

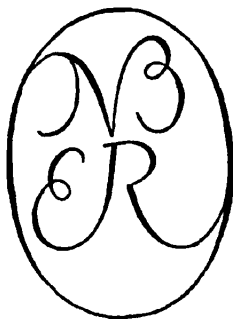
# Wages in Germany

## 1871-1945

BY GERHARD BRY

*Rutgers University*

ASSISTED BY CHARLOTTE BOSCHAN



A STUDY BY THE  
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*TO THEA*



## PREFACE

THE title of this book might suggest that the study is concerned with matters past and far away. In some sense this is, of course, true. But the limitation to a specific time and country is less stringent and less significant than it might appear. The major characteristics of wage behavior, as observed during the three-quarters of a century under review, reappear during the more recent past. And wage behavior in industrial Germany is shown to have had much in common with that observed in the United States and Great Britain during corresponding phases of their development.

So far as topical interest is concerned, the study deals with money and real wage trends in the course of economic growth and development; with the late and slight response of wage rates to downturns in economic activity; with wages during creeping, marching, and galloping inflation. These topics are, of course, the focus of much current economic thinking.

The value of the book, however, lies not only in the description of wage phenomena common to industrial countries. The bulk of the study is devoted to German experience, and what are perhaps its most interesting portions deal with German wages during two World Wars and the Great Inflation, against the background of the German institutional setting and economic thinking of these periods.

The study reflects the continuing interest of the National Bureau in the economics of wage behavior. It complements Daniel Creamer's *Behavior of Wage Rates during Business Cycles* (1950), Clarence D. Long's *Wages and Earnings in the United States, 1860-1890* (1960), and Albert Rees' *Real Wages in Manufacturing, 1890-1914* (in press). All of these investigations, in addition to making available more reliable series of money and real wages, are designed to clarify the important short-term and long-term relationships between wages, output, and general economic conditions.

Economists seeking to ascertain basic characteristics of economic behavior are deeply concerned with the degree of generality that can be claimed for their findings and hypotheses. Are the observed phenomena limited to a particular set of institutions, or do they reflect ubiquitous and generally valid relationships? Evidence from more than one country and more than one historical period is helpful in deciding such an issue. The present study will, it is hoped, in this fashion contribute to our understanding of wage behavior.

LEO WOLMAN



## AUTHOR'S ACKNOWLEDGMENTS

HAD I known, long years ago, how much effort the writing of this book would entail, I might never have begun it; and had I not had the generous help of many friends and colleagues, I might never have finished it. It gives me pleasure to recount my debts.

Of all my obligations, the largest is that to Leo Wolman. It was he who suggested this project, and who watched over its development every step of the way—advising, encouraging, prodding. I find it difficult adequately to express my thanks to him.

Geoffrey H. Moore read the manuscript with meticulous attention, making acute observations which helped to improve both content and organization. His practical assistance was invaluable. Daniel Creamer read several drafts of the manuscript and made many helpful comments. Harold Barger, at a critical juncture, gave me reassurance and constructive advice. Also, at one time or another, Solomon Fabricant, George and Vera Eliasberg, and Albert Rees offered good counsel.

Before being submitted to the publisher, the book was circulated, in mimeographed form, to a number of scholars in this country and abroad. I received many helpful responses which permitted me to correct mistakes and to add new material. The remaining weaknesses of this volume certainly cannot be blamed on lack of professional cooperation. I am particularly grateful for the detailed comments by Frieda Wunderlich of the New School for Social Research, by Hedwig Wachenheim of New York City, by John T. Dunlop and Melvin Rothbaum of Harvard University, by J. Heinz Müller of Freiburg University, by W. G. Hoffmann of Münster University, by Jürgen Kuczynski of Humboldt University in Berlin, and by E. H. Phelps Brown of the London School of Economics. I also wish to record my thanks to George Soule and Harry W. Laidler, who served as members of the reading committee of the Board of Directors of the National Bureau of Economic Research.

I have been particularly fortunate in my assistants. During the early stages of data collection and processing, several friends extended helping hands. Among them Ann Merjos came to my aid at a point when—in utter self-delusion—I thought I could complete this work in my spare time. During recent years I have enjoyed the unremitting cooperation of Charlotte Boschan, who has served not only as an indispensable co-worker but also, rather often, as my conscience. I am grateful for her industry, her perseverance, and above all for her rare qualities of mind.

If now and then the reader should come upon a deft turn of phrase in the depths of this book, I can assure him that these are raisins embedded

in the dough by my main editor, Bettina Hartenbach. Margaret T. Edgar edited my later additions and took care in the innumerable details of preparing the manuscript for press. I consider the editors responsible for whatever readability this study may possess.

H. Irving Forman designed and drew the charts with the impeccable craftsmanship that all of us at the National Bureau accept as one of our blessings.

I should like also to acknowledge the unstinting cooperation I received from the National Bureau's clerical staff in processing the manuscript against an ominous deadline.

Finally, there is my family. All research workers admit, with varying degrees of guilt, the heavy costs they inevitably pass on to the innocent—the women and children. My own case is no exception. Early in their lives my son Peter and my daughter Ava learned to shudder at the words "German Wages." I want to thank them for their prolonged forbearance. As for my wife, I have recorded my gratitude on an earlier page.

GERHARD BRY

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**WAGES IN GERMANY**  
**1871-1945**



# INTRODUCTION

## *Scope and Limitations*

THIS book records the behavior of wages in Germany from 1871 to 1945—the period during which the Reich existed as a political unit. These were fateful years, beginning with the foundation of the Reich and ending with its collapse and partition. They embrace periods of peace and war; of growth and stagnation; of inflation and deflation; of monarchical, democratic, and totalitarian regimes; of free and controlled labor markets. The aim of this study has been to analyze wage behavior, under these unusually varied conditions, in all its major aspects—trends and cycles in wage rates and earnings, in money wages and real wages, in wage levels and in wage differentials.

The broad scope of this investigation required the study of an unusual amount of source material. The chief statistical sources were published official and private compilations of time series. On occasion, particularly for the early years, it was necessary to go back to crumbling periodicals. And sometimes wage series or composite indexes could only be put together from bits and pieces. Most of the basic data and all of the derived series are presented here. In addition to quantitative data, the investigation drew upon a wealth of qualitative material—descriptions of wage setting, trade union activity, the role of employers' organizations, apprenticeship agreements, and the like.

Some limits must necessarily be set to a study of this sort. Hence, there are several aspects of wage behavior that might appear pertinent to our inquiry but could not be dealt with. What, for instance, were the effects—on wage levels and on wage structure—of differences in size of establishment, degree of fixed capital investment, variations in productivity, extent of cartelization, relative strength of union organization, length of training period, social status of occupations? How would wage trends change if adjustments were made for emoluments in kind, paid vacations, and other fringe benefits to which monetary values might be assigned? Analysis of problems such as these would require more detailed information than could be secured and more complex designs of research than the investigation permitted.

The reader will note that this study is organized not by historical periods but by topics such as wage trends, wage structure, and cyclical fluctuations. An arrangement of this sort seemed preferable for a systematic analysis of economic relationships. However, during extraordinary periods, such as the two world wars or the Great Inflation, rapid institutional changes loom so large in the wage picture that analytic description of wage behavior must of necessity become historical. A separate chapter, therefore, is reserved for a description of these unusual events. Finally, wage behavior in Germany was compared with that in two other countries,

Great Britain and the United States, in order to determine to what extent the findings reflect specifically German circumstances and to what extent more general experience.

### *Summary of Findings*

#### TRENDS IN WAGE LEVELS

Over the three-quarters of a century under review, hourly earnings in Germany increased about fourfold, weekly earnings about threefold. The difference is attributable mainly to the decline in working hours—one of the great economic and cultural consequences of modern technology. Between the foundation of the Reich and the establishment of the Weimar Republic the workweek was reduced from around 70 to about 48 hours. Despite interruptions by war and inflation, the long-term upward trend of money wages was remarkably steady.

Although wage trends are affected by price changes, they are not fully explained by them. In contrast to the persistent rise of money wages, wholesale prices underwent two huge cycles during the history of the Reich, reaching similar levels in 1871, 1913, and 1944. Living costs also rose, but for the period as a whole their increase was milder than that of wages. The relation between the two measures is reflected in the movements of real wages.

Hourly real earnings roughly doubled during the history of the Reich, whereas weekly real earnings increased about 50 percent. If allowance be made for taxes and social insurance contributions, the rise of weekly real disposable or real net earnings may amount to only about one-third between 1871 and 1944. This is, of course, quite different from the trebling of weekly money earnings. An interesting and important aspect of real wage behavior is the break in trend around the turn of the century. The weekly real earnings of 1900 were not significantly exceeded until about 30 years later, and then only by a few percent during the three years centering around the 1929 peak in general business activity. The leveling out of weekly real earnings after 1900 and up to 1913 is to be explained by a particularly rapid rise in the prices of consumers' goods, coupled with a continuing decline in the length of the workweek. The low levels of real wages during the interwar period are to be understood in terms of a further decline in hours of work and the general deterioration of economic conditions during the years following World War I and the Great Inflation.

A close relation of real wages to general economic conditions can be observed throughout German wage history. Taking per capita industrial production as a rough measure of economic activity, we find closely parallel developments of output and real wages. The steady growth of the economy before World War I, the dismal circumstances that obtained during the war and the inflation, the ups and downs during the remaining



years of the Weimar Republic, the recovery and later collapse under the National Socialist regime—all these developments are consistently reflected in the behavior of both production and real earnings. The parallel is not always perfect—the differences in the patterns are as illuminating as the similarities—but on the whole trends of real wages are closely bound to those of output.

### THE STRUCTURE OF WAGES

Wages for different categories of workers varied within relatively narrow bounds—certainly in comparison to the almost limitless range of prices for commodities and services. Furthermore, the long-term trends of individual wage series are more similar, one to another, than are the trends of product prices. The wage structure, therefore, is considerably more stable over time than the price structure. Both the high degree of homogeneity and the greater stability of wages, as compared to product prices, stem from basic differences between labor and commodities. In broadest terms, the services provided by human beings are more similar, industrially more interchangeable, more equally affected by changes in technology, productivity, reproduction costs, and market demand, than are inanimate goods.

Despite the marked similarity of the trends of wages, there were distinct long-term changes in the structure of wages—changes which, on the whole, tended to diminish inequalities among workers of varying characteristics. This can be observed clearly enough in the decline of skill, age, sex, and regional differentials. A similar, though not so striking, tendency can be discerned with regard to city-size and industrial differentials.

Many factors, such as education, mechanization, and the regional spread of industrialization, could be cited to explain the lessening of one or another differential. But these special factors would hardly account for the pervasiveness of the trend. The process of equalizing wages must be understood in more general terms—as a concomitant of industrialism itself. Perhaps, in mass-producing goods and distributing them over wide areas, in fostering industrial organization, in spreading information, and in providing education—in doing all this, modern industrialism serves as a leveler. In spite of increasing occupational specialization, differences become less important between individual working capacities, between living standards, and between living costs of workers in different industries, cities, or regions. It is this increasing homogeneity of socio-economic and cultural conditions that may go far to explain the narrowing of wage differentials.

### CYCLICAL BEHAVIOR

In the analysis of the cyclical behavior of wages a clear distinction must be drawn between (1) wage rates—the prices paid per unit of working time or output; and (2) earnings—which include premium payments

for overtime, night and holiday work, and, in the case of weekly earnings, reflect also variations in straight-time hours.

German money wage rates showed only two substantial declines. One occurred in the 1870's, during the severe business contraction that followed the *Gründerjahre* boom, the other during the Great Depression. To be sure, wage rate responses to business contractions took other forms—retardation in rate of growth, stagnation, or slight decline. If all these responses are counted, we find that wage rates conformed fairly well to major cyclical changes in general business conditions. Nevertheless, the rarity and the minor extent of the actual declines suggest a pronounced downward rigidity of German wage rates.

Whenever wage rates responded to cyclical changes in business conditions, they did so with considerable delay. This lag in timing, both at peaks and at troughs, stands out as one of the most characteristic features of the behavior of German wage rates. Moreover, the tendency to lag is found even when wage rates respond strongly. The business cycle peak preceding the Great Depression, for instance, occurred in April 1929, but union wage rates did not actually decline until December 1930—fully 20 months later. It is true that these rates had stopped increasing somewhat earlier, but even if the first month of the resultant wage plateau is regarded as a “turning point,” the lag still amounts to 13 months.

The cyclical behavior of earnings was quite different from that of rates. Earnings—and particularly weekly earnings—showed closer conformity to business cycles, larger fluctuations, and less pronounced lags after turning points. With the exception of wage rates, most of the factors governing the behavior of earnings responded promptly and consistently to changes in general business conditions.

As for real wages, several aspects of their cyclical behavior are of interest. The downward rigidity and delayed response of money wage rates, in conjunction with the cyclically more responsive living costs, frequently led to increases of real wage rates during declines in general business activity. This happened, for instance, during the Great Depression. And the actual specific declines of real wages—whether rates or earnings—were characteristically mild. Thus, in weekly real earnings (the most responsive real wage measure) during 1929-32 (the most severe of the business contractions), we find that the decline, measured on an annual basis, amounted to only 15 percent.

With regard to the timing of cyclical turns, real wage rates show even more protracted delays than money wage rates. They lagged after the 1929 peak by at least 21 months and perhaps as long as 32—depending on the choice of turning points. An extreme delay occurred also at the terminal trough of the Great Depression. This instance, however, reflects the unusual labor market conditions that prevailed in Germany from 1933 on.

## WAR AND INFLATION

*World War I.* The labor-market pressures that developed in the course of that war brought about radical changes in wages. Money earnings, on the average, roughly doubled during the brief span of four years; real earnings decreased by about a third. More important, perhaps, than the changes in wage levels was the upheaval in the wage structure. In general, wages of women increased more than those of men. Workers in war industries gained much more than those employed in civilian jobs. People who worked on piece rates fared far better than those on time rates. And workers in major industrial centers commanded larger wage increases than those in rural communities. These circumstances led in some cases to a narrowing, in others to a widening, of wage differentials. Whatever the net effect of the widely divergent trends on the wage structure as a whole, a most important consequence was the emergence of enormous inequities in the pay of German workers. The government took some steps to mitigate extreme hardship by adjusting wage rates to marital status and number of dependents. But the basic disparities remained, contributing to the social unrest which led to the overthrow of the Kaiserreich and the establishment of the Weimar Republic.

*The Great Inflation.* The development of democratic institutions was not followed at once by economic prosperity. The currency depreciation, which continued wartime trends and culminated in the hyper-inflation of 1922-23, created well-nigh incredible conditions in the economy as a whole and in the labor market in particular. Money wages, between 1913 and the end of 1923, increased a trillion times, but even this astronomical rise was appreciably less than that of living costs. Thus, during 1922 and 1923 weekly real wages sank so low that they amounted to only one-half or two-thirds of the levels attained in 1913.

Real wages, moreover, were subject to extreme and erratic fluctuations. Wage determination became a highly complex matter, as attempts were made to gear wages to the rapid pace of currency depreciation. A special "express" index of living costs soon failed to provide information fast enough to implement current payroll calculations, and employers had to pay their workers on the basis of the dollar exchange rate or the quotation of a specific commodity price. They were compelled, furthermore, to make wage payments several times a week, and frequently with emergency money when the government printing presses fell behind the clamor for currency. Sometimes part of the wages were paid in kind. The upshot of this confusing jumble of price changes, payroll calculations, and methods of disbursement was an unprecedented instability of real wages. For skilled workers in the wood products industry, for instance, real wages in October of 1923 were 25 percent of 1913 levels, in November of the same year 58 percent, and in December 72 percent.

The inflation had drastic effects not only on money and real wage

levels, but also on the wage structure. Perhaps the most dramatic change it brought about was the virtual disappearance of skill differentials. For eight industries these differentials—measured as differences between wage rates of skilled and unskilled workers expressed in percent of the former—averaged about 30 percent before World War I; during a few months in 1922-23 they shrank to about 9 percent. Skill differentials in building, about 22 percent before the war, amounted to only 4 percent in April 1922. This phenomenon was brought about by the granting of equal cost-of-living adjustments, in terms of marks and pfennigs, to both skilled and unskilled workers. Such adjustments were intended to protect the lower-paid worker against the hazards of hunger and cold.

*National Socialism and World War II.* Wages under the totalitarian regime were strictly controlled, and their behavior deviated sharply from that observable during comparable periods of expanding economic activity. The government stabilized money-wage rates at their very lowest depression level, and permitted an increase of only 3 percent between 1933 and 1944. In view of a 60 percent rise in employment during the same period, this stability of wage rates is without parallel in German history.

Wage stabilization was possible only as an integral part of price control. However, Nazi price management permitted living costs to inch up gradually, so that hourly real wage rates in 1939 were 6 percent below the depression levels of 1932, and in 1944 about 15 percent below.

Workers managed to exceed their depression incomes by working longer and harder. Weekly money earnings between 1932 and 1939 went up by about 30 percent, between 1932 and 1944 by close to 45 percent. After changes in living costs, taxes, and social insurance contributions are taken into account, the increases in weekly real earnings between 1932 and 1939 amounted to less than 20 percent, and between 1932 and 1944 to less than 15 percent. Although computations of real wages for periods of war are far from reliable, it is certain that the National Socialist regime was able to prevent both an extreme rise of money earnings and an extreme deterioration of real earnings.

The impact of wage controls on age, skill, sex, regional, city-size, and industrial differentials was moderate. However, confronted as they were by enormous manpower requirements, the Nazis employed a large number of irregular workers, at rates sharply distinguished from those paid to the regular work force. Agricultural and domestic service for boys and girls, as well as compulsory harvest work for school children and furloughed soldiers—furloughed to do farm work—helped to enlarge the domestic labor force. Quantitatively more important was the impressment of foreign workers, a total of about 9 million persons at the beginning of 1944. At that time every fourth worker in Germany was a foreigner. The remuneration of these workers was lower than that of German nationals, and ranged widely, in accordance with ethnic origin and depending upon the status of the worker as “civilian” or “war prisoner.”

For example, a Russian civilian worker earned about one-third of the wages of a German worker. As a prisoner of war, a Russian received 40 pfennigs per day; this was less than half the allowance paid to prisoners from the most favored enemy countries.

### INTERNATIONAL COMPARISONS

The findings on German wages have been compared with similar findings for Great Britain and the United States in order to distinguish "specifically German" from "typical" wage behavior.

Trends in wage levels for the three countries are indicated in Charts 33 to 38. For Germany and the United States, the lines are based on earnings, whereas for Great Britain only wage rates are available. The marked long-term increase of money wages in Germany had obvious counterparts in the other two countries. German hourly wages during the seventy-three years rose about fourfold; the rise in Great Britain was as steep; and the increase in the United States sevenfold (Chart 33). The steadiness of the upward trend also is common to all three countries: after interruptions by wars or by major cyclical swings, the old trends tended to become re-established. Finally, the milder rise of weekly wages is shared by all three countries (Chart 34), since a material reduction of working hours was characteristic of industrialized nations.

The first major differences among national long-term trends appear in real wages, hourly and weekly (Charts 37 and 38). In the period as a whole, hourly real wages in Germany and Great Britain approximately doubled, those in the United States well-nigh quintupled. The comparative picture for the years before 1913 varies from that for subsequent years. Before World War I, the net increase in German and British real wages came fairly close to that of wages in the United States. After World War I, real wages in the United States outpaced by far those of Germany and Great Britain.

A trend toward equalization of the wage structure has been noted as a major characteristic of German wage history. The findings of British and American students indicate similar trends in the two English-speaking countries. In the case of skill differentials, for instance, we find, over the period as a whole, a distinct narrowing of the gap between the wages of skilled and unskilled workers in the three countries.

As to cyclical behavior, the outstanding features of German wage rates were the rarity of marked declines and a tendency of wage rates to lag substantially behind turns in general business conditions. Both these traits apply also to wage rates in Great Britain and the United States. Moreover, the occurrence of countercyclical increases of real rates during business contractions and the still more retarded response of real, as compared to money, wage rates are observable for all three countries.

In general, both conformity and amplitude are more pronounced in

earnings than in wage rates. In Germany hourly rates tended to decline least, hourly earnings somewhat more, weekly earnings most. Also, in the United States and Great Britain, the fluctuations of weekly earnings were larger than those of hourly earnings. Furthermore, the amplitudes of both rates and earnings are roughly similar in magnitude. On the whole, it can be said that the cyclical characteristics of wages—rates and earnings, money wages and real wages—are strikingly similar in the three industrial countries.

Of the unusual events through which the German economy passed, the two most obviously “shared” by the other nations are the world wars. During World War I money wages and real wages reflected the economic and military fortunes of each country. Money wage rises and real wage declines were extreme in Germany, which entered the war first, was closest to the battlefields, suffered the greatest damage to its industrial apparatus, and lost the war. By contrast, the United States experienced the smallest rise in money wages, but a considerable gain in real wages.

Comparison of wage behavior between the two world wars again points up the general finding that wage levels reflect broad social and economic conditions. We observe the same real wage pattern in the second as in the first war—with Germany in the worst position, and the United States in the most advantageous. Furthermore, real wage trends in all three countries were more favorable during World War II than during the earlier struggle. Apparently the intensive utilization of resources, spurred by the war effort, permits modern industrial nations to wage war without seriously lowering the living standards of their civilian workers.

### *Implications of the Study*

Findings on the behavior of wages lend themselves to varied applications. They may be used to test past and current generalizations. They may contribute to an understanding of doctrine and to the resolution of controversy. And they may influence wage policies of government and decisions of management or labor.

According to certain wage doctrines, earnings are determined by a fixed wage fund and the size of the labor force; real wages are bound to stay close to subsistence levels; capitalism tends to bring about a deterioration of real wages; differentials will increase as between wages received by the mass of workers and those paid to a “labor aristocracy”; total wage income tends to form a decreasing share of national income; money wages and real wages move cyclically in opposite directions; real wage declines are a prerequisite to cyclical revivals; and so forth. The findings of this study should be helpful for an appraisal of generalizations of this sort.

A record of actual wage behavior may apply to wage theory in other

ways. The propositions of wage theory usually reflect experiences of the period in which they were formulated. Mercantilists and physiocrats, writing during the preindustrial era of low productivity and low wage levels, adhered to rigid subsistence theories. The development of steam-engine industrialism at first brought, on the whole, little improvement and, at times, severe deterioration in wages and working conditions; hence the retention of but slightly modified subsistence ideas by the classical economists, and the exploitation doctrines of Marx and other critics. Later, with the startling technological advances, the increasing use of laborsaving machinery, and the substantial gains in real wages, wage theorists began to concentrate on problems of marginal productivity. As labor organizations grew in importance and government came to play an ever larger role in wage determination, wage doctrine increasingly emphasized the role of bargaining power. Any extended exploration of such relationships would have no place in a predominantly empirical study. However, students of wage theory may find the present account of some value for their work.

Finally, there are practical implications. Although the historical record cannot possibly indicate that a particular wage policy is in general superior to another, findings on wage behavior have wide applications in the field of action. Consider, for instance, the long lags and the limited downward flexibility of wage rates during business cycles; the consistency in the long-term upward trend of money wages and real wages; the typical relation of wages and living costs during pronounced inflations; the wild disparities in "free" wage developments during catastrophes like wars; the tendency toward decreasing skill or regional differentials. These observed characteristics should bear on cost predictions, plant design, long-term investment decisions, labor-management negotiations, and government wage policies—if there is any relation between the progress of economics and economic progress.

### *A Postscript on Recent Years*

Most of this book deals with the years during which the German Reich existed as a political unit. That period ended in 1945. Now, more than a dozen years after the end of World War II, one can gain some impression of wage developments under the new economic and political conditions. Let us see to what extent the general characteristics of wage behavior found for the earlier period are also apparent in recent years—and conversely, to what extent recent developments may require qualification of the broad generalizations on wage behavior culled from German wage history. This brief inquiry is confined to the German Federal Republic (West Germany). Some basic data on wage movements, prices, production, employment and average weekly hours are provided for reference in Appendix Table A-54.

### LONG-TERM TRENDS

Money wages and real wages, be they hourly or weekly earnings, rose steadily after 1947. If we accept the official measure of consumers' goods prices, then real wages through 1949 remained under prewar levels; in 1950—two years after the currency reform and the first year with a normal workweek and reasonably high production—they reached their 1938 standing; and after 1950 they advanced with the general recovery of the economy. Rough comparisons show real earnings in 1958 to be about forty-five to fifty-five percent above 1938. If we compare wage levels reached in the past few years with the trends prevailing throughout the history of the Reich we find them well in line. The broad secular trends of rising money wages and real wages, hourly and weekly, continued in recent years.

### SKILL AND SEX DIFFERENTIALS

Some broad historical tendencies toward equalization of the wage structure appear to be still operative during the postwar years. Skill differentials continued to decline. The gap between average hourly earnings of unskilled men and earnings of all male workers was 19 percent of the latter in 1938, 16 percent in 1947, and 14 percent in 1958. For women workers, no pronounced trend in skill differentials was found during the postwar period. Sex differentials between hourly earnings of all workers also decreased, in continuation of long-term historical experience. In 1938 the earnings gap was 42 percent; in 1958 it had shrunk to 36 percent. However the decline in sex differentials was concentrated in the group of skilled workers. For unskilled workers, the sex differential widened in fact between 1938 and the present.

### REGIONAL AND INDUSTRIAL DIFFERENTIALS

The evidence shows a long-term trend toward decline of regional differentials in the German Reich. Whether regional inequality of wages has diminished, during recent years, in the territory now covered by West Germany cannot be readily ascertained. But since the area covered by East Germany consists of former low-wage territory, regional inequality of wages within the Federal German Republic is presumably smaller than in the prewar Reich. Finally, a word on industrial differentials. Between 1938 and 1958, wages in low-earnings industries tended to experience considerably steeper percentage gains than wages in high-earnings industries, indicating a diminished inequality between the extremes of the industrial wage structure.

### CYCLICAL BEHAVIOR

During the postwar recovery years 1946-58, there were no marked cyclical downturns in Germany's economic activity. As Appendix Table A-54



shows, neither production nor employment declined, at least not on an annual basis. Between 1949 and 1950 we witness an increase in unemployment (somewhat boosted by an influx of East German refugees and a general recovery of labor-force participation) and mild declines in wholesale and retail prices. These declines are not reflected in any downturn of money or real earnings—an experience well in keeping with wage behavior in the past.

Altogether, we find that the general characteristics of wage behavior under the German Reich have persisted during recent years—a rising trend of money and real wages, a diminishing inequality in the wage structure, and an imperviousness of wage behavior to mild declines in prices or rises in unemployment. Indeed, the major characteristics of recent wage behavior in Germany could have been approximated quite effectively, on the basis of historical evidence.

# CHAPTER 1

## The Economic Background

### *General Development*

THE years 1871 to 1945 encompass a dramatic history—the rise and fall of the German Empire. At the beginning of this period Germany was a newly industrialized, enterprising young nation, embarking on a career of economic and political expansion. Toward the end, a mature German economy was rallying its resources for the conquest of Europe. And by 1945, a defeated Germany emerged from this venture with a reduced and crippled population, with destroyed, outworn, or dismantled industry, with its political and economic unity lost. Between the birth and the death of the Reich were seventy-five turbulent years.

Although the primary concern in this study is with wages, we must begin with a background sketch of the major changes in the national economy and in the labor market. Let us first take note of the important shifts in the area and the population of Germany, particularly during the latter part of the period under observation.

#### AREA AND POPULATION

In the early years, between 1871 and 1913, there was one insignificant change in area: the little North Sea island of Heligoland was incorporated into the Reich. But after the defeat of Germany in World War I its geographic scope was reduced several times, resulting in a territorial loss of 13 percent and a population loss of 10 percent, or about 6.5 million people.<sup>1</sup> Among the areas ceded in accordance with the Treaty of Versailles were Alsace-Lorraine and parts of Upper Silesia, the province of Posen, and large parts of western and eastern Prussia. The Saar, with its important coal mines, was to be administered by France until 1935, when a plebiscite was to be held. After 1922 there was an interlude of twelve years during which there were no further shifts of German territory. But following Hitler's rise to power, the Saar was reincorporated into the Reich in 1935. Then came a series of annexations by the National Socialist regime: in 1938 Austria and the Sudetenland; in 1939 the Memel area, Danzig, and the Wartegau. These acquisitions expanded the Reich's territory by 45 percent and increased its population by 30 percent, or more than 20 million.<sup>2</sup> With the launching of World War II, a new wave of annexations resulted in the addition of Alsace-Lorraine, Luxemburg, parts of Yugoslavia, and a few other areas. Toward the end of the war even distant areas such as the North Italian provinces of Trento and Bolzano

<sup>1</sup> *Statistisches Jahrbuch für das Deutsche Reich* (hereafter cited as *Jahrbuch*) 1928, p. 28.

<sup>2</sup> Computed from data in *Jahrbuch* 1939-40, page a.

also were taken into the Reich.<sup>3</sup> Other territories, parts of Poland and Czechoslovakia, were administered by Germany but were never officially incorporated. There are few industrial nations with a similar record of territorial contraction and expansion during a brief quarter century.<sup>4</sup>

Such, in brief, is the recent record of the shifts in land area and in the population of Germany.<sup>5</sup> It is a record that bears heavily upon German economic development, since the losses and gains quite naturally affected the relative position of that country as an industrial power. Moreover, they influenced the structure of the German economy.

The present study is concerned only with the German territory and population encompassed by the Kaiserreich from 1871 to 1918, and later with the Weimar Republic and the unexpanded Third Reich (with the exclusion or inclusion of the Saar). No attempt will be made to present data for the areas incorporated into the Reich under National Socialism, except in the few cases where data for "Germany proper" are not available.

Major population changes in the German Reich are shown in Table 1. Population within the shifting Reich boundaries (column 1) more than doubled between 1871 and 1945, increasing between 1871 and 1913 by 26 million, and between 1913 and 1945 by 22 million. However, while population growth before World War I was largely independent of area changes, after 1913 it was deeply affected by such changes. The table indicates also that the reduction in the "current Reich area" population between 1913 and 1929 occurred despite natural population growth. Obviously too, the greater portion of the increase in "current area" population between 1929 and 1945 was due to territorial expansion under the National Socialist regime. Population growth within constant territory tended to slow down.

#### NATIONAL INCOME AND PRODUCTION

A comprehensive picture of Germany's economic development is provided by the course of national income expressed in marks of constant

<sup>3</sup> The problem of a changing Reich area did not exist during World War I. At that time occupied territories were put under German administration but were not incorporated into the Reich.

<sup>4</sup> After World War II, frontier adjustments and partitioning brought still more extensive changes. The conquered areas were freed, Austria was declared independent, Germany east of the rivers Oder and Neisse was brought mainly under Polish administration (a small part was annexed by Russia). In 1946, the remaining territory was about one quarter smaller than the Reich before the war, excluding Austria. The population loss was less serious since most Germans in the area under Polish administration migrated west. In 1949, the reduced rump area of Germany, once divided into four zones of occupation, was transformed into the western *Bundesrepublik*, and the eastern *Deutsche Demokratische Republik*, under Communist administration. In 1950 West Germany accounted for about three-fourths of the area and population of the two republics. (See *Statistisches Jahrbuch für die Bundesrepublik Deutschland*, 1953, pp. 13, 21, 31, and 561).

<sup>5</sup> German statistics are far from uniform in the treatment of these changes. They refer sometimes to a constant Reich area of given (but not always the same) dimension, sometimes to a changing Reich area. The reader must therefore take note of the territorial coverage of any economic measures dealing with the period 1913-45.

TABLE 1  
Population Changes in Germany, Selected Years, 1871-1945  
(millions)

Year	Currently Changing Reich Area (1)	Constant Reich Area of 1925 <sup>a</sup> (2)	Reich Area of Dec. 1937 <sup>b</sup> (3)
1871	41.0	—	—
1890	49.2	—	—
1913	67.0	59.6	60.4
1929	64.7 <sup>b</sup>	64.0	64.7
1939	79.5	—	69.3
1945	88.6 <sup>c</sup>	—	67.0

<sup>a</sup> Excludes Saar.

<sup>b</sup> Includes Saar.

<sup>c</sup> Estimated for 1945. Population of Alsace, Lorraine, and Luxemburg (during their census years of 1935 or 1936) was added to the 1940 Reich total as given in *Jahrbuch 1939-40*, p. 9. The rate of population change 1940-45, as experienced in the Reich area of December 31, 1937, is applied to the result.

SOURCE, by column:

(1) *Jahrbuch 1939-40*, p. 9.

(2) "Das deutsche Volkseinkommen vor und nach dem Kriege," *Einzelschriften zur Statistik des Deutschen Reichs*, No. 24 (Berlin 1932), p. 66.

purchasing power. According to Table 2, real national income more than tripled from 1871 to 1913 in the Kaiserreich area; thereafter, from 1913 to 1939, it increased by 50 percent.<sup>6</sup> On a constant area basis this would mean a more than fivefold gain over the whole period 1871 to 1939. The figure for 1939 is by far the highest during the post-1913 era; undoubtedly it reflects the incorporation of the Saar (1935) as well as preparations for war. By contrast, in 1929 one of the best years of the interwar period prior to the rearmament boom, real national income stood at only 8 percent above 1913 levels. For the "normal" years 1925-32 (post-inflation, pre-Nazi) it averaged 99 percent of 1913, and for all the interwar years 1925 through 1939 for which figures are available, it averaged 7 percent above 1913. These averages certainly do not indicate a continuation of the economic growth of the Kaiserreich period. They raise the question whether after World War I the German economy ceased to be a progressive economy and just maintained itself as a going, but not a growing, concern. Before we look for answers to this question, it will be useful to consider as additional evidence the index numbers of industrial production presented in Table 2 and Appendix Table A-1.

The production indexes of the Institut für Konjunkturforschung<sup>7</sup> are given in Table 2 for selected single years and are averaged for certain periods. They cover manufacturing, mining, and building construction.

<sup>6</sup> The average annual rate of increase was 3.1 percent from 1871 to 1913 and 1.6 percent from 1913 to 1939.

<sup>7</sup> Hereafter referred to as IKF.

TABLE 2  
Real National Income and Industrial Production in Germany,  
Selected Years, 1871-1939  
(1913 = 100)

	Real National Income (1)	INDUSTRIAL PRODUCTION		
		Producers' goods (2)	Consumers' goods (3)	Total (4)
		REICH AREA OF 1913		
1871	28	16	35	21
1890	63	35	56	40
1913	100	100	100	100
		REICH AREA OF 1925 <sup>a</sup>		
1913	100	100	100	100
1925	94	89	101	92
1929	108	118	109	114
1932	82	53	86	66
1939	150	164 <sup>bc</sup>	128 <sup>bd</sup>	148 <sup>bc</sup>
Average for period:				
1925-29	103	103	104	103
1925-32	99	92	101	95
1925-39	107	106	105	105
1919-39 <sup>e</sup>	103	n.a.	n.a.	93

n.a. = not available.

<sup>a</sup> Includes Saar from 1935 on.

<sup>b</sup> Includes Austria and Sudetenland.

<sup>c</sup> Six-month average.

<sup>d</sup> Three-month average.

<sup>e</sup> Data for 1919-22 do not apply strictly to 1925 area, since production of ceded areas was included before their cession.

SOURCE, by column:

(1) Paul Jostock, "The Long-Term Growth of National Income in Germany," *Income and Wealth* (International Association for Research in Income and Wealth, Series v, 1953), p. 118. Year 1871, linear interpolation between 1870 and 1877.

(2 and 3) 1871-1928, *Konjunkturstatistisches Handbuch* 1936 (Berlin), Institut für Konjunkturforschung), p. 47. Hereafter referred to as *IKF Handbuch*. For 1928-39, League of Nations, *Statistical Yearbook* 1939-40, p. 169 (postwar series spliced in 1928). Shifted to base 1913=100. The 1913 data for Reich area of 1925, *Sonderheft des Instituts für Konjunkturforschung* (Berlin, Institut für Konjunkturforschung, 1935), No. 31, p. 37. Hereafter referred to as *IKF Sonderheft*.

(4) 1871-1929, *IKF Sonderheft* No. 31, pp. 28, 56, and 58. For 1928-38, *Jahrbuch* 1939-40, p. 57 (spliced to earlier series in 1928). For 1939, League of Nations, *Statistical Yearbook* 1939-40, p. 169. Shifted to base 1913=100. The 1913 data for Reich area of 1925 obtained by averaging cols. 2 and 3. For weights see *IKF Sonderheft* No. 31, p. 37.

On a constant area basis, that is, after adjustment for the area changes from 1919 to 1922, total industrial production grew about sevenfold between 1871 and 1939. Such measures of growth are of course very

sensitive to small differences in the estimates for the base period. Moreover, the 1939 production figure happens to be somewhat more affected by the territorial acquisitions of the National Socialists than the real income figure.<sup>8</sup> Germany's rapid industrialization around the turn of the century is reflected vividly in the rise of this index. During this period, substitution of manufactured for home-produced goods accounts, among other things, for the greater increase in industrial production—where these changes are more concentrated—as compared with real national income. The rapid industrialization process is illustrated further by the growth of producers' as compared with consumers' goods. According to the index, producers' goods output increased tenfold from 1871 to 1939; consumers' goods output less than fourfold.

With regard to comparative trends before and after World War I, the production figures bear out the major conclusions derived from the data on real income. Whereas from 1871 to 1913 increases in production levels were extremely rapid (fivefold for total production and more than sixfold for producers' goods), the increases were much more moderate from 1913 to 1939 (48 percent in total production and 64 percent in producers' goods). Average industrial production during 1925-29 was 3 percent above 1913 levels, during 1925-32 about 5 percent below 1913, and during 1925-39 about 5 percent above 1913—findings which are all in close agreement with the national income data. For total production the average level can be computed for all the years 1919 through 1939.<sup>9</sup> The figures indicate that for the interwar period as a whole, industrial production was 7 percent below 1913 levels. We may fairly conclude, then, that Germany's economic growth during the Kaiserreich prior to 1913 did not continue at a comparable rate thereafter. The prewar period was clearly marked by growth. The interwar period, compared to 1913 levels, was not.

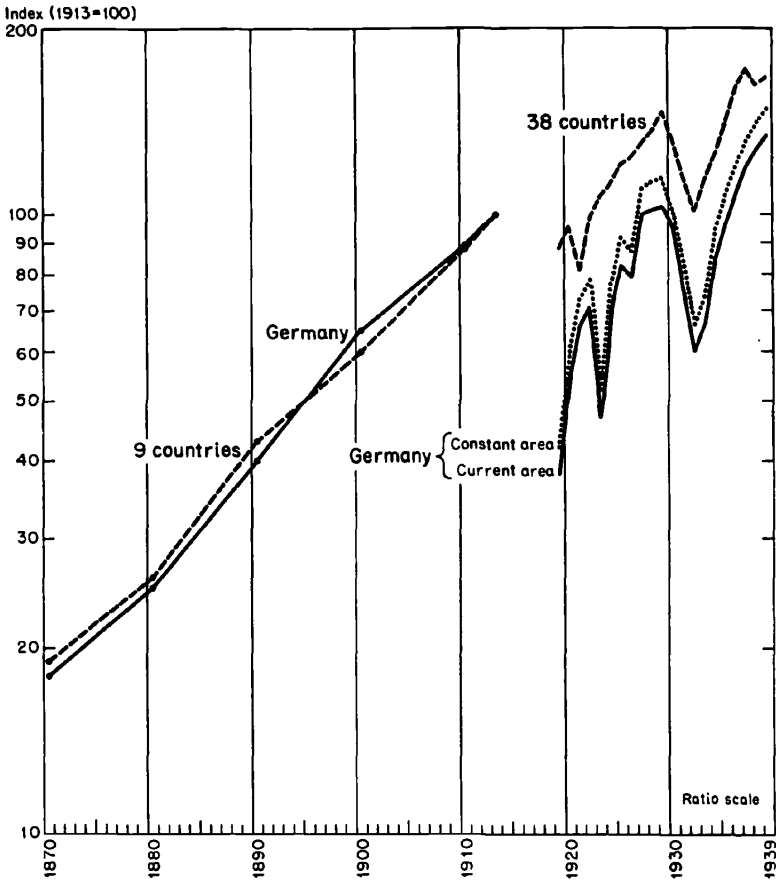
The conclusion that economic growth in the interwar period was of minor significance may seem to contradict data on German production trends during the period 1919-39. Table 3 and Chart 1 do indeed show that a growth trend through these data may rival pre-1913 growth rates. But closer examination reveals that the rapid increase is attributable mainly to two unusual circumstances: the extremely low production levels after World War I,<sup>10</sup> and the rearmament boom from 1936 to 1939. In fact, production did not reach the 1913 level until 1927. Despite the many

<sup>8</sup> See Table 2, footnotes a and b.

<sup>9</sup> This average has a known upward bias because it includes, for 1919-22, the production of subsequently ceded areas. Similarly, Saar production and at least part of Austrian and Sudeten production are included in some of the years at the end of the period.

<sup>10</sup> The movements from 1919 to 1923 are affected by many abnormal events, including the demobilization crisis of 1919. They are said to refer to "current Reich area," that is, they reflect cessions of territory between 1919 and 1922. The effect of these cessions is counteracted in part by industry migration from the ceded areas to the Reich (from Lorraine to the Ruhr area, for instance). The early data are affected further by the inflation and the Ruhr occupation of 1923.

CHART 1  
Industrial Production, Germany and Other Countries, 1870-1939



Source: Table 3

abnormal elements in the German development, production trends in the German economy parallel closely the figures selected by the IKF to represent “world” production.<sup>11</sup> Thus, as concerns the *rate* of production growth, Germany’s production trends resemble quite closely those of the large sample of nations chosen by the IKF to represent the “world.” It is in the *level* relative to 1913 that the striking differences are to be observed. While world production averaged 25 percent above 1913 during 1919-39, German production was 7 percent below 1913 on a constant area basis, and 15 percent below the 1913 production of the Kaiserreich area.

Let us now look at the changes in income and production, as measured

<sup>11</sup> For countries included in “world” figures and for separate data on United States and Great Britain, see Table 3.

TABLE 3

Industrial Production, Germany and Other Countries, Selected Years,  
1870-1913; and All Years, 1919-1939  
(1913 = 100)

Year	Germany	United States	Great Britain	"World"
<i>1913 AREA</i>				<i>9 countries</i>
1870	18	13	43	19
1880	25	21	54	26
1890	40	36	66	43
1900	65	52	77	60
1910	89	85	87	88
1913	100	100	100	100
<i>1925 AREA<sup>a</sup></i>				
	<i>1913 production of:</i>			
	<i>prewar</i>	<i>postwar</i>		
	<i>area = 100</i>	<i>area = 100</i>		<i>38 countries</i>
1919	38	42	112	89
1920	55	61	122	91
1921	66	73	98	57
1922	71	78	126	78
1923	47	52	141	85
1924	70	77	134	91
1925	83	92	151	89
1926	79	87	160	76
1927	100	110	160	100
1928	102	113	168	98
1929	103	114	184	106
1930	90	99	157	99
1931	74	82	132	91
1932	60	66	99	91
1933	67	74	115	97
1934	85	94	127	110
1935	97	107	152	114
1936	108	119	178	123
1937	119	131	199	131
1938	127	140	149	117
1939	134 <sup>b</sup>	148 <sup>c</sup>	189	—

For Germany, manufacturing, mining, and construction; for Great Britain, manufacturing and mining; for the United States, manufacturing only.

<sup>a</sup> Includes Saar from March 1935 on.

<sup>b</sup> Six-month average.

<sup>c</sup> Five-month average.

SOURCE:

Germany: See source for Table 2, col. 4. The 1919-22 data include production of ceded areas before their cession.

United States: 1870-99, Edwin Frickey, *Production in the United States, 1860-1914* (Harvard Economic Studies, Volume LXXXII, 1947,) p. 54. (Spliced to later series in 1899.) For 1899-1939, Solomon Fabricant, *Employment in Manufacturing, 1899-1939* (National Bureau of Economic Research, 1942), p. 331.



Great Britain: Walther Hoffmann, "Ein Index der industriellen Produktion für Grossbritannien seit dem 18. Jahrhundert," *Weltwirtschaftliches Archiv*, Sept. 1934; and *Probleme der Weltwirtschaft*, Vol. 63.

World: 1870-1928, *IKF Sonderheft* No. 31, pp. 28 and 56. For 1928-39, *Statistik des In- und Auslands* (Berlin, Institut für Konjunkturforschung), *passim*. Hereafter referred to as *IKF Statistik des In- und Auslands*. Years 1930 and 1931 interpolated on the basis of unrevised 1929-32 data from *IKF Handbuch* 1936, p. 46. (Spliced to earlier series in 1928.) All data shifted to base 1913 = 100.

For 1870-1913 the countries included are Belgium, France, Great Britain, Russia, United States, Italy, Sweden, Finland, and Canada.

For 1919-39, the series covers 38 countries which, according to the IKF, account for 92 percent of world production.

on a per capita basis. Since population increased throughout the period, albeit at a diminishing rate, the per capita income and production figures must be expected to exhibit more moderate long-term growth than the totals. Table 4 shows that between 1871 and 1939 per capita real income increased about three times, and per capita industrial production three and a half times, whereas per capita consumers' goods production merely doubled. Comparison of the growth before and after World War I demonstrates again the greater contribution of the earlier period to the over-all development. Averages for the period 1925-32 are 6 to 11 percent below 1913 levels and averages for the period 1925-39 are 3 to 5 percent below. These trends are significant with respect to wages. Slow growth in consumers' goods obviously sets limits to real wages. Similarly, a halt in the rise of per capita production and income must affect wage levels. During the early sharp rise in over-all per capita real income, real earnings of wage earners could readily double alongside similar income increases of other social groups. Between 1913 and the interwar period, the situation was radically different; over-all per capita real income dropped. Under these circumstances, even maintenance of 1913 levels of average earnings for wage earners could have been accomplished only at the cost of a substantial reduction in the average real income of other population groups.

We may compare these trends with those prevailing in other industrial countries. Table 5 contains a summary of trends in real per capita national income for Germany, Great Britain, and the United States. The data show that the over-all increase in per capita real income between 1871 and 1939 was almost the same for Germany and Great Britain—roughly two and one-half times. During this period real per capita income in the United States almost quadrupled. Similar relationships are found for the movements prior to 1913. Between 1871 and 1913, German and British real per capita income just about doubled while that in the United States tripled. Between 1913 and 1939, income in all three countries showed increases of the same order—in Germany, 28 percent, in Great Britain, 31 percent, and in the United States 33 percent—and in all three the increases are less rapid than for the period 1871-1913 as a whole.<sup>12</sup>

<sup>12</sup> The German figure for 1939 includes the Saar.

TABLE 4  
 Real Income per Capita and Production per Capita in Germany,  
 Selected Years, 1871-1939  
 (1913 = 100)

Year	Production per Capita		
	Real Income per Capita <sup>a</sup> (1)	Total (2)	Consumers' goods (3)
	REICH AREA OF 1913		
1871	46	34	57
1890	86	54	76
1913	100	100	100
	REICH AREA OF 1925 <sup>b</sup>		
1913	100	100	100
1924	-	74	92
1925	90	88	96
1926	92	82	82
1927	99	104	104
1928	102	106	104
1929	101	106	101
1930	97	92	97
1931	85	76	92
1932	75	61	79
1933	79	68	84
1934	87	85	94
1935	93	95	90
1936	101	105	96
1937	109	115	100
1938	120	122	103
1939	128	127 <sup>cd</sup>	110 <sup>cd</sup>
Averages			
1925-32	93	89	94
1925-39	97	95 <sup>cd</sup>	95 <sup>cd</sup>

<sup>a</sup> National real income divided by population.

<sup>b</sup> 1935 on, including Saar.

<sup>c</sup> Includes Austria and Sudetenland for 1939.

<sup>d</sup> First six months of 1939.

SOURCE: Income and production data, see source to Table 2. Population data, see source to Table 1.

1938 and 1939 are not directly comparable. Production data include "as a rule Austria since the middle of 1938 and Sudetenland since January 1939" (League of Nations, *Statistical Yearbook*, 1939-40, p. 169). Population data, however, are without Austria or Sudetenland.

However, great differences do emerge if averages for the interwar period are compared with 1913 levels. During the period 1925-32, German real per capita income was 7 percent below that of 1913, British income was 7 percent higher, and United States income 26 percent higher than before

TABLE 5

Real National Income per Capita in Germany, Great Britain, and the United States, Selected Years, 1871-1939  
(1913 = 100)

	Germany (1)	Great Britain (2)	United States (3)
	<i>Reich area of 1913 Including Southern Ireland</i>		
Year			
1871	46	54	35
1890	86	83	69
1913	100	100	100
	<i>Reich area of 1925 Excluding Southern Ireland<sup>a</sup></i>		
1913	100	...	100
1929	101	112	144
1932	75	107	90
1939	128 <sup>b</sup>	131 <sup>c</sup>	133
Average for Period			
1925-32	93	107	126
1925-39	97 <sup>d</sup>	113	121

<sup>a</sup> Note that the basic real per capita income figures for the years after World War I refer to the current area of Great Britain (excluding Southern Ireland) but that the index base consists of the prewar per capita income of Great Britain as it existed in 1913 (including Southern Ireland). Prewar per capita income of the new area is not available.

<sup>b</sup> Includes Saar territory.

<sup>c</sup> Estimated, based on Prest and price deflator; our estimate.

<sup>d</sup> Includes Saar territory from 1935 on.

SOURCE, by column:

(1) Table 4.

(2) A. R. Prest, "National Income of the United Kingdom, 1870-1946," *Economic Journal*, 1948, pp. 55 and 58. Shifted to "factor payment" concept based on Jeffries' adjustment of money income; see James B. Jeffries and Dorothy Walters, "National Income of the United Kingdom, 1870-1952," Report to the International Association for Research in Income and Wealth (preliminary).

(3) From Simon Kuznets' worksheets, prepared for Capital Requirements Study, February 18, 1952 (unpublished).

World War I. For the longer period 1925-39, German real per capita income was 3 percent below 1913, while British income and United States income respectively were 13 and 21 percent above. Although certain allowances must be made for differences in concepts, character of basic data, and estimating techniques used in the income computations for the three countries, it seems clear that German real per capita income levels during the interwar period not only were low in comparison with Germany's own 1913 status, but also showed a less favorable development than those

of Great Britain and, more strikingly, those of the United States. Comparison of the three countries in this respect serves further to emphasize the significance of the break in pre-1913 growth trends for the later development of the German economy.

### *Labor Force: Structure and Organization*

#### CHANGES IN THE LABOR FORCE

For the purposes of the present study, description of general economic trends requires an account of the major changes in the labor market. We shall begin with the German labor force, restricting attention at this point to the broadest trends. Data for the entire period 1871-1945 are not available but information does exist for the census years 1882, 1895, 1907, 1925, 1933, and 1939. Between 1882 and 1939, population in the Reich area (as of 1937) increased from about 40 million to about 69 million—a gain of 70 percent. Members of the labor force during the same period increased from 17 million to 35 million—a rise of more than 100 percent.<sup>13</sup> The more rapid growth of the labor force in relation to the population as a whole (Table 6) is attributable in the main to two factors: the changing age structure of the population<sup>14</sup> and the increase in the number of female workers. Age groups capable of active work outstripped total population in rate of growth, approximating the growth of the entire labor force. Women in the labor force accounted for only a quarter of the female population in 1882 and 1895 but for more than a third after World War I.

The changing industrial composition of the German labor force may be traced in Table 7. Germany in 1882 was still largely agricultural; farming accounted for 7 out of 17 million gainfully occupied in that year. Industry (manufacturing, mining, building, and crafts) took up only 6 million members of the labor force. The remaining 4 million were in trade and services. Between 1882 and 1939, Germany's agricultural workers increased by one-fourth, but all other major groups of the labor force except domestic servants swelled more rapidly. It is not surprising that the number of industrial workers should have increased almost two and one-half times, since the country was undergoing rapid industrialization during that period. In percentage terms, however, the rise in industrial employment was far surpassed by employment rises in public and private services (up 263 percent) and in trade, transportation, and communications (up 325 percent). These developments led to major changes in the industrial composition of the labor force.

The most striking change was the drastic decline in the relative importance of agriculture. In 1882 about 42 percent of the labor force depended

<sup>13</sup> Labor force data in this section refer to the Reich area of 1937, which includes the Saar.

<sup>14</sup> Statistisches Reichsamt, *Deutsche Wirtschaftskunde*, 1933, pp. 40-44.

TABLE 6  
Labor Force and Population, by Sex, Census Years, 1881-1939

<i>Year</i>	<i>Labor Force</i> (millions)	<i>Population</i> (millions)	<i>Percentage</i> <i>in</i> <i>Labor Force</i>
TOTAL			
1882	17.0	40.2	42.3
1895	19.9	46.4	42.9
1907	25.4	55.6	45.7
1925	32.3	63.2	51.1
1933	32.6	66.0	49.4
1939	34.6	69.3	49.9
MALE			
1882	12.0	19.7	60.9
1895	14.0	22.8	61.4
1907	16.9	27.4	61.7
1925	20.7	30.6	67.6
1933	21.0	32.1	65.4
1939	21.8	33.9	64.3
FEMALE			
1882	5.0	20.5	24.4
1895	5.9	23.6	25.0
1907	8.5	28.2	30.1
1925	11.6	32.6	35.6
1933	11.6	33.9	34.2
1939	12.8	35.4	36.2

For Reich area of December 31, 1937 (includes Saar); census classification of 1933, except for 1939.

SOURCE: 1882-1933, *Jahrbuch 1939-40*, p. 29. For 1939, *Wirtschaft und Statistik*, 1941, Sonderbeilage zu Heft 19.

on agricultural pursuits, but by 1939 the comparable figure was only 26 percent. The relative position of the industrial labor force increased but moderately—from 36 percent in 1882 to 42 percent in 1939, despite the fervid industrialization of Germany during that period. The apparent discrepancy is explained by productivity. A great change occurred in relative importance of employment in the trade, transportation, and communications group, which rose from 8 percent in 1882 to 18 percent in 1939, largely because of the development of a national market and the increasing dependence on manufactured goods. Public and private services also claimed a larger proportion of the working force. The marked increase that occurred in this category during the latter census years represents the growing importance of the Nazi government's control functions, and its expansion of military and quasi-military forces. The decline in relative importance of domestic services was undoubtedly a

TABLE 7

Labor Force, by Major Industrial Groups, Census Years, 1882-1939

Year	Agriculture	Manufacturing, Mining, Building Crafts	Trade, Transportation, and Communications	Public and Private Services Except Domestic	Domestic Service	Total Labor Force
NUMBER (thousands)						
1882	7,173	6,050	1,427	991	1,364	17,005
1895	7,218	7,744	2,122	1,385	1,440	19,909
1907	8,597	10,118	3,464	1,726	1,473	25,378
1925	9,807	13,667	5,240	2,208	1,407	32,329
1933	9,388	13,235	5,994	2,725	1,280	32,622
1939	8,985	14,603	6,071	3,599	1,358	34,617
INDEXES (1882 = 100)						
1882	100.0	100.0	100.0	100.0	100.0	100.0
1895	100.6	128.0	148.7	139.8	105.6	117.1
1907	119.9	167.2	242.7	174.2	108.0	149.2
1925	136.7	225.9	367.2	222.8	103.2	190.1
1933	130.9	218.8	420.0	275.0	93.8	191.8
1939	125.3	241.4	425.4	363.2	99.6	203.6
PERCENT OF TOTAL						
1882	42.2	35.6	8.4	5.8	8.0	100
1895	36.3	38.9	10.7	6.9	7.2	100
1907	33.9	39.9	13.6	6.8	5.8	100
1925	30.3	42.3	16.2	6.8	4.4	100
1933	28.8	40.6	18.4	8.3	3.9	100
1939	26.0	42.2	17.5	10.4	3.9	100

For Reich area of December 31, 1937 (includes Saar); census classification of 1933, except for 1939.

SOURCE: 1882-1933, *Jahrbuch* 1939-40, p. 29. For 1939, *Wirtschaft und Statistik*, 1941 Sonderbeilage zu Heft 19.

result of several tendencies: the development of wider opportunities for women in other types of employment; the lessening importance of the German middle classes; the disinclination of women to conform to the traditional subservience of German domestic workers; and for the years after 1939, the efforts of the National Socialist regime to channel the female labor supply into what were regarded as essential occupations.

Also, within manufacturing drastic changes occurred in the industrial composition of employment. Table 8 contains information on major structural changes, for selected years between 1882 and 1939. Note the drastic declines in the relative importance of textiles, clothing, and food, and the growing role of the metal and chemical industries. During the period under review, the share of consumers' goods declined from almost half to little more than a third, and the share of producers' goods increased

TABLE 8

Employment in Major Manufacturing Industries, Mining, and Transportation, Selected Years, 1882-1939

Year	Stone and Metal- Clay working		Chemicals Building		Textiles Clothing		Leather		Foods and Tobacco		Wood		Printing		Railroads		Shipping		Total												
	Year	Mining	Clay working	Chemicals	Building	Textiles	Clothing	Leather	Foods and Tobacco	Wood	Printing	Railroads	Shipping	Total	Year	Mining	Clay working	Chemicals		Building	Textiles	Clothing	Leather	Foods and Tobacco	Wood	Printing	Railroads	Shipping	Total		
		NUMBER (thousands)																													
1882	427	307	573	106	372	572	386	70	522	239	85	61	305	58	4,081	1882	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	
1893	528	504	902	161	854	758	499	96	717	368	124	105	415	68	6,097	1893	123.7	164.2	157.4	151.9	229.6	132.5	129.3	137.1	137.4	154.0	145.9	172.1	136.1	117.2	149.4
1903	740	642	1,412	237	1,127	874	684	119	865	522	177	167	560	94	8,220	1903	173.3	209.1	246.4	223.6	303.0	152.8	177.2	170.0	165.7	218.4	208.2	273.8	183.6	162.1	201.4
1913	1,047	650	2,209	327	1,458	995	862	148	1,222	601	243	231	787	125	10,905	1913	245.2	211.7	385.5	308.5	391.9	174.0	223.3	211.4	234.1	251.5	285.9	378.7	258.0	215.5	267.2
1929	1,064	648	2,482	540	1,482	1,113	878	113	1,203	722	262	313	713	117	11,650	1929	249.2	211.1	433.2	509.4	398.4	194.6	227.5	161.4	230.5	302.1	308.2	513.1	233.8	201.7	285.5
1939	963	744	4,326	794	2,184	1,355	972	144	1,359	762	312	336	966	133	15,350	1939	225.5	242.3	755.0	749.1	587.1	236.9	251.8	205.7	260.3	318.8	367.1	551.0	316.7	229.3	376.1
		INDEXES (1882 = 100)																													
1882	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	1882	10.5	7.5	14.0	2.6	9.1	14.0	9.5	1.7	12.8	5.9	2.1	1.5	7.5	1.4	100.0
1893	123.7	164.2	157.4	151.9	229.6	132.5	129.3	137.1	137.4	154.0	145.9	172.1	136.1	117.2	149.4	1893	8.7	8.3	14.8	2.6	14.0	12.4	8.2	1.6	11.8	6.0	2.0	1.7	6.8	1.1	100.0
1903	173.3	209.1	246.4	223.6	303.0	152.8	177.2	170.0	165.7	218.4	208.2	273.8	183.6	162.1	201.4	1903	9.0	7.8	17.2	2.9	13.7	10.6	8.3	1.4	10.5	6.4	2.2	2.0	6.8	1.1	100.0
1913	245.2	211.7	385.5	308.5	391.9	174.0	223.3	211.4	234.1	251.5	285.9	378.7	258.0	215.5	267.2	1913	9.6	6.0	20.3	3.0	13.4	9.1	7.9	1.4	11.2	5.5	2.2	2.1	7.2	1.1	100.0
1929	249.2	211.1	433.2	509.4	398.4	194.6	227.5	161.4	230.5	302.1	308.2	513.1	233.8	201.7	285.5	1929	9.1	5.6	21.3	4.6	12.7	9.6	7.5	1.0	10.3	6.2	2.2	2.7	6.1	1.0	100.0
1939	225.5	242.3	755.0	749.1	587.1	236.9	251.8	205.7	260.3	318.8	367.1	551.0	316.7	229.3	376.1	1939	6.3	4.8	28.2	5.2	14.2	8.8	6.3	0.9	8.9	5.0	2.0	2.2	6.3	0.9	100.0
		PERCENT OF TOTAL EMPLOYMENT																													
1882	10.5	7.5	14.0	2.6	9.1	14.0	9.5	1.7	12.8	5.9	2.1	1.5	7.5	1.4	100.0	1882	10.5	7.5	14.0	2.6	9.1	14.0	9.5	1.7	12.8	5.9	2.1	1.5	7.5	1.4	100.0
1893	8.7	8.3	14.8	2.6	14.0	12.4	8.2	1.6	11.8	6.0	2.0	1.7	6.8	1.1	100.0	1893	8.7	8.3	14.8	2.6	14.0	12.4	8.2	1.6	11.8	6.0	2.0	1.7	6.8	1.1	100.0
1903	9.0	7.8	17.2	2.9	13.7	10.6	8.3	1.4	10.5	6.4	2.2	2.0	6.8	1.1	100.0	1903	9.0	7.8	17.2	2.9	13.7	10.6	8.3	1.4	10.5	6.4	2.2	2.0	6.8	1.1	100.0
1913	9.6	6.0	20.3	3.0	13.4	9.1	7.9	1.4	11.2	5.5	2.2	2.1	7.2	1.1	100.0	1913	9.6	6.0	20.3	3.0	13.4	9.1	7.9	1.4	11.2	5.5	2.2	2.1	7.2	1.1	100.0
1929	9.1	5.6	21.3	4.6	12.7	9.6	7.5	1.0	10.3	6.2	2.2	2.7	6.1	1.0	100.0	1929	9.1	5.6	21.3	4.6	12.7	9.6	7.5	1.0	10.3	6.2	2.2	2.7	6.1	1.0	100.0
1939	6.3	4.8	28.2	5.2	14.2	8.8	6.3	0.9	8.9	5.0	2.0	2.2	6.3	0.9	100.0	1939	6.3	4.8	28.2	5.2	14.2	8.8	6.3	0.9	8.9	5.0	2.0	2.2	6.3	0.9	100.0

SOURCE: F. Grumbach and H. König, "Beschäftigung und Löhne der deutschen Industrielwirtschaft, 1888-1954," *Weltwirtschaftliches Archiv*, 1957, Heft 1, pp. 128, 129, 134, 135 (Tables 2 and 4). The employment estimates are based on the number of workers covered by accident insurance, adjusted for variation in statutory coverage.

correspondingly.<sup>15</sup> This reflects, of course, the process of Germany's internal industrialization and her growing participation in the world export of machinery and chemicals.

Let us examine the numerical role of the wage earner in Germany's growing economy. Table 9 shows that in 1882 wage earners formed about

TABLE 9  
Labor Force, by Socio-economic Status, Census Years, 1882-1939

Year	<i>Independent Proprietors and Higher Officers</i>	<i>Unpaid Family Members</i>	<i>Salary Earners</i>	<i>Wage Earners</i>	<i>Domestic Servants</i>	<i>Total Labor Force</i>
NUMBER (thousands)						
1882	4,359	1,692	1,192	8,406	1,356	17,005
1895	4,649	1,804	2,129	9,892	1,434	19,909
1907	4,779	3,799	3,333	12,012	1,457	25,378
1925	5,129	5,477	5,499	14,886	1,339	32,329
1933	5,338	5,354	5,570	15,131	1,229	32,622
1939	4,816	5,676	6,548	16,237	1,340	34,617
INDEXES (1882 = 100)						
1882	100.0	100.0	100.0	100.0	100.0	100.0
1895	106.7	106.6	178.6	117.7	105.8	117.1
1907	109.6	224.5	279.6	142.9	107.4	149.2
1925	117.7	323.7	461.3	177.1	98.7	190.1
1933	122.5	316.4	467.3	180.0	90.6	191.8
1939	110.5	335.5	549.3	193.2	98.8	203.6
PERCENT OF TOTAL						
1882	25.6	10.0	7.0	49.4	8.0	100
1895	23.3	9.1	10.7	49.7	7.2	100
1907	18.8	15.0	13.1	47.3	5.8	100
1925	15.9	16.9	17.0	46.1	4.1	100
1933	16.4	16.4	17.1	46.4	3.7	100
1939	13.9	16.4	18.9	46.9	3.9	100

For Reich area of December 31, 1937 (includes Saar); census classification of 1933, except for 1939.

SOURCE: 1882-1933, *Jahrbuch* 1939-40, p. 29. For 1939, *Wirtschaft und Statistik*, 1941, Sonderbeilage zu Heft 19.

half, and by 1939 a little less than half, of Germany's labor force. This remarkable stability contrasts both with the rapidly increasing proportion of salary earners and the decline of self-employed persons and domestic servants. Wage earners are, of course, found in all major segments of the economy—agriculture, industry, trade, services, and the like. Industrial wage earners, with whom this study is primarily concerned, form only a

<sup>15</sup> Since Table 8 contains also employment in mining, transportation, etc., the share of producers' goods is not simply the difference between that of consumers' goods and 100 percent.



portion of the larger group. In 1925, for instance, there were about 10 million of them, compared with almost 15 million wage earners in general. The rate of their increase was quite different from that of wage earners as a whole. While the number of all wage earners about doubled between 1882 and 1939, those attached to industry more nearly tripled. And while wage earners at large declined in relative importance during this period, industrial workers increased their proportion of the labor force from about a quarter to about a third. The absolute and the relative changes in the number of industrial workers are set forth in Table 10. It is this group,

TABLE 10

Total Labor Force and Wage Earners in Industry, Census Years, 1882-1939

	<i>Total Labor Force</i> (millions) (1)	WAGE EARNERS IN INDUSTRY	
		<i>Number</i> (millions) (2)	<i>Percent of</i> <i>Total Labor Force</i> (3)
1882	17.0	4.1	24.1
1895	19.9	5.6	28.1
1907	25.4	7.8	30.7
1925	32.3	10.5	32.5
1933	32.6	10.1	31.0
1939	34.6	11.2	32.4

For Reich area of December 31, 1937 (includes Saar); census classification of 1933 except for 1939.

SOURCE, by column:

(1): See Table 9.

(2): 1939, *Wirtschaft und Statistik*, 1941, Sonderbeilage zu Heft 19. For 1933 and 1925, *Jahrbuch* 1939-40 p. 31. Area and census classification of 1933. For 1907, our estimate, based on percentage increase between 1907 and 1925, using 1925 area and 1925 census classification (*Statistik des Deutschen Reichs*, N.F. 402, p. 226). For 1895 and 1882, our estimate, based on percentage increases between 1895-1907 and 1882-95, using 1907 area and 1907 census classification (*Statistik des Deutschen Reichs*, N. F. 211, p. 76\*).

plus a small number of industrial entrepreneurs and managers included in the "independent" group, that make up the industrial labor market with which this study is concerned and which will be described further.

#### ORGANIZATION OF WORKERS

As German industry developed during 1871-1945 the structure of the labor market underwent profound changes with respect to the organization of both sellers and buyers of labor. At the beginning of the period this market was virtually unorganized, with a few workers' or employers' associations operating only on a local basis. There were no labor contracts, and the government played an altogether insignificant role. Toward the end of the period, regulation of the labor market was compulsory and

a function of the government. Both workers and employers were members of the same organization, and wages and working conditions were determined centrally by an all-powerful totalitarian regime. We shall now trace the course of this development.

Two years before the formation of the Reich, the *Gewerbeordnung* (industry code) of the North German Federation had revoked the anti-coalition law. Workers in the young Reich of 1871 could not only congregate in *Vereinen* (clubs) with educational and cultural objectives, as they had previously done; they could also form organizations for the explicit purpose of increasing their strength in the labor market—that is, band together in trade unions. The early 1870's witnessed the creation of many such organizations—on a local level and within a single occupation. Characteristically the organizations were founded largely along ideological lines, by groups as much interested in political or religious aims as in unionism for its own sake. The German trade unions began at their very inception as “liberal” or “socialist” or “Christian,” distinctions which continued right up to their destruction by the Hitler regime. One reason for the development of several unions, each moving along its own ideological path, was the political backwardness of Germany itself. Social reforms were urgent issues for all workers, but the schemes for such reforms varied in their appeal to religious and political groupings. This differentiation prevented the growth of a unified trade union movement like that of Great Britain. However, sponsorship of political reforms by the German unions undoubtedly helped to speed their growth.

Union activities in Germany did not begin with the freedoms proclaimed by the *Gewerbeordnung*. The various educational, cultural, social, and insurance associations of workers played a role in wage demands, strikes, and strike support. In several industries, for example printing and tobacco products, workers' organizations existed on a national scale. But only during the late sixties came the first attempts to unite the local or national organizations of different industries into broad federations. A Congress held during September 1868 in Berlin, under Lassalle's auspices, engaged in the organization and coordination of union activities. In the same year Karl Hirsch, under the auspices of the *Fortschrittspartei* (Progressive Party) organized the Hirsch-Dunker Unions. And the Socialists Liebknecht and Bebel called for and supported the organization of unions at their party's Congress at Eisenach, in 1869. In the course of these various attempts, many national unions were founded—some before and some after the Franco-Prussian War.

The Hirsch-Dunker group, or *Deutsche Gewerkvereine*, was a central organization of unions founded in 1869. The membership of the Hirsch-Dunker Unions was small in the first decade, between 10,000 and 20,000 workers, but it grew to about 100,000 around the turn of the century and remained near that level until the outbreak of World War I. This organization was liberal and patriotic—in contrast to the socialist and

internationalist persuasion of the groups that were later to form the Free Trade Unions. The Hirsch-Dunker Unions sought to cooperate with employers and to attain betterment of wages and working conditions by predominantly peaceful means, although in principle strikes were not ruled out. Their program was modeled largely upon that of the early British trade unions, with emphasis on economic rather than political aims.

The most important German union organization was strongly political, the *Sozialistische Gewerkschaften*, or *Freie Gewerkschaften* (Socialist Trade Unions, or Free Trade Unions). Many of these unions were founded largely as a result of the activities of the *Sozialdemokratische Partei* (Social Democratic Party), which had adopted the development of trade unions in all industries as a major interest since its founding. Although the Free Trade Unions were formally independent organizations, they were always closely linked to the program and leadership of the Social Democratic Party. Many union leaders were party members; they embraced the ideologies of the party, including its tenets on the class struggle and its anticlerical orientation.

Our first estimate of the strength of the Free Trade Unions dates from 1877. In that year total membership was given as 49,000.<sup>16</sup> In spite of the numerical insignificance of the Free Unions and of the Social Democratic Party in those early years, the rulers of the new Reich regarded them as sufficiently dangerous to existing institutions and to the central authority to warrant suppression. Bismarck's *Sozialistengesetz* (anti-Socialist law) of 1878 declared the Social Democratic Party illegal and suppressed, in rapid succession, one after the other of the Socialist Trade Unions. The law remained in force until 1890. In the years following its enactment vigorous prosecution threatened to destroy whatever organizational strength the free unions had built up. Severe and persistent persecution led to dissolution or isolation of local organizations, imprisonment or inactivity of union leaders, and demoralization of members.<sup>17</sup> However, during the later years of the law, the development of so-called *Fachvereine* (occupational organizations with ostensibly educational aims) served to maintain the organizational continuity of the Free Unions and to preserve their aims. Six weeks after revocation of the law in 1890 a union congress was convoked and the so-called *Generalkommission* was established as a national federation and organizational center for the recently legalized

<sup>16</sup> Original estimate by Geib, in *Pionier*, January 26, 1878. Quoted from Karl Zwing, *Geschichte der Deutschen Freien Gewerkschaften*, Gewerkschafts-Archiv Bücherei, Bd. 5 (Jena, 1926), pp. 52-53.

<sup>17</sup> About the effects of the Anti-Socialist Law on the carpenters union see Josef Schmöle, *Die Sozialdemokratischen Gewerkschaften in Deutschland seit dem Erlasse des Sozialistengesetzes*, Zweiter Teil, Erste Abteilung (Jena), 1898. The author describes, among other things, the effect of the law on wages, working time, and morale. According to Schmöle, "the hair-raising wage cuts and the increasing working time in 1879 and 1880 were usually accepted without any resistance." (p. 16.)

TABLE 11  
 Membership of German Workers in Three Largest Unions, 1891-1931  
 (thousands)

<i>Year</i>	<i>Free Unions</i> (1)	<i>Christian Unions</i> (2)	<i>Hirsch-Dunker Unions</i> (3)	<i>Sum of Big Three</i> (4)
1891	278	...	66	344
1892	237	...	45	282
1893	224	...		285
1894	246	...	67	313
1895	259	6 <sup>a</sup>	67	332
1896	329	8 <sup>a</sup>	72	409
1897	412	21 <sup>a</sup>	80	513
1898	494	34 <sup>a</sup>	83	611
1899	580	56 <sup>a</sup>	87	723
1900	680	77 <sup>a</sup>	92	849
1901	678	84	65	827
1902	733	85	103	921
1903	888	91	110	1,089
1904	1,052	108	112	1,272
1905	1,345	188	117	1,650
1906	1,690	247	119	2,056
1907	1,866	274	109	2,249
1908	1,832	265	106	2,203
1909	1,833	271	108	2,212
1910	2,017	295	123	2,435
1911	2,340	341	108	2,789
1912	2,553	345	109	3,007
1913	2,574	343	107	3,024
1914	2,076	283	78	2,437
1915	1,159	176	61	1,396
1916	967	174	58	1,199
1917	1,107	244	79	1,430
1918	1,665	405	114	2,184
1919	5,479	858	190	6,527
1920	7,890	1,077	226	9,193
1921	7,568	986	225	8,779
1922	7,895	1,049	231	9,175
1923	7,138	938	216	8,292
1924	4,618	613 <sup>a</sup>	147	5,378
1925	4,156	588 <sup>a</sup>	158	4,902
1926	3,977	532 <sup>a</sup>	163	4,672
1927	4,150	606 <sup>a</sup>	168	4,924
1928	4,654	647 <sup>a</sup>	169	5,469
1929	4,906	673 <sup>a</sup>	169	5,470
1930	4,822	659 <sup>a</sup>	198	5,679
1931	4,418	578 <sup>a</sup>	181	5,177

<sup>a</sup> End-of-year figures.

SOURCE: M. Bergmann and others, *Handbuch der Arbeit*, pp. 46-50, 199, 254-57.

unions. The number of workers involved in this effort was about 350,000,<sup>18</sup> representing a sevenfold increase over the 49,000 estimated Free Trade Union members as of 1877, the year before the anti-Socialist law was put into effect.

An attempt to organize workers outside the domain of the socialist unions was started later by the so-called *Christliche Gewerkschaften* (Christian Trade Unions). The foundation of these organizations must be largely attributed to the animosity of the Free Unions toward the Church. The Christian Unions were formed around 1900 from several separate occupational organizations (miners, textile workers, etc.), located mainly in the Catholic regions of western Germany. They held their first congress in 1899 and established a General Secretariat in Cologne in 1903 under the leadership of Adam Stegerwald. At that time, the Christian unions had close to 100,000 members. Between 1903 and the beginning of World War I they more than tripled their membership, which numbered 343,000 in 1913. The aims of the Christian unions were rather similar to those of the Hirsch-Dunker organization, except for their religious slant.

The large-scale expansion of the trade unions and the growth of their power in the labor market began about two decades before World War I. Table 11 shows that membership of the three large unions reached a combined total of more than 1 million in 1903, 2 million in 1906, and 3 million in 1912. The phenomenal growth of the unions during these years enabled them to become decisive participants in the determination of wages and working conditions. During the early years of World War I, union membership dropped sharply—a loss of almost two-thirds. Induction of workers into the army, loss of a number of the prewar gains of labor, and disappointment of many members with the position the unions had taken toward the war must have contributed to the decline.<sup>19</sup> In the latter years of the war, the unions regained some of their importance. The gradual recovery after 1916 is explained in part by the influx of female labor into factories and unions. By 1918 union membership had climbed again, surpassing the 2 million mark.

The immediate postwar period saw the peak of union strength in Germany. In 1919 the *Allgemeine Deutsche Gewerkschaftsbund* (ADGB) was formed as the central organization of the Free Trade Unions, succeeding the *Generalkommission*. Membership of the Big Three in that year was more than double the prewar total. Between 1919 and 1923 the German unions constituted the largest national labor movement in the world,<sup>20</sup>

<sup>18</sup> Maurycy Bergmann and others, *Handbuch der Arbeit*, Vol. III (Jena, 1931), p. 37.

<sup>19</sup> The criticism came from two directions. The radical Left resented the *Burgfrieden* (national unity) policy of the unions. The extreme Right criticized the union leaders for their former international orientation and for insufficient enthusiasm toward the government's war aims.

<sup>20</sup> See Leo Wolman, *Ebb and Flow in Trade Unionism* (National Bureau of Economic Research, 1936), Appendix Table XII.

TABLE 12  
 Union Membership of German Workers and White-Collar Employees, by Affiliation, 1922, 1929, and 1932  
 (thousands)

	1922			1929			1932		
	Wage Earners	White- Collar Employees	Total	Wage Earners	White- Collar Employees	Total	Wage Earners	White- Collar Employees	Total
(1) Free trade unions	7,817	997	8,814	4,867	421	5,288	4,104	466	4,570
(2) Christian unions	1,031	850	1,881	764	502	1,266	689	594	1,283
(3) Hirsch-Dunker unions	231	447	678	204	361	565	181	393	574
(4) Cooperationists	222	62	284	...	67	67	123	...	123
(5) Communist and syndicalist unions	247	...	247	72	...	72	36	...	36
(6) Confessional unions	40	11	51	...	...	...	...	...	...
(7) Other independent unions	92	1,262	1,354	43	261	304	62	287	349
(1) + (2) + (3)	9,079	2,294	11,373	5,835	1,284	7,119	4,974	1,453	6,427
Total	9,680	3,629	13,309	5,950	1,612	7,562	5,195	1,740	6,935
Free unions (1) as percent of total	80.8	27.5	66.2	81.8	26.1	69.9	79.0	26.8	65.9
Big Three as percent of total	93.8	63.2	85.5	98.1	79.7	94.1	95.7	83.5	92.7

SOURCE: 1922, *Reichsarbeitsblatt* 1924, Nr 1-2 p. 21\*. For 1929, *Wirtschaftsstatistik*, 1933, p. 301. All figures refer to beginning of year.  
 1930, p. 575. For 1932, Statistisches Reichsamt, *Deutsche*

with a membership of about 9 million. From 1922 to 1926, however, union membership declined steadily. The largest losses, of close to 3 million, occurred during 1923-24, reflecting partly the ineffectiveness of the unions in their attempts to protect real wage standards during the inflation, their inability to prevent infringement of the eight-hour day, and their failure to assure acceptable wage levels during the period of currency stabilization. The splitting of the Free Trade Unions into a social-democratic majority and a communist-dominated minority contributed effectively to the weakening of the movement. The low point was reached in 1926, when the Big Three counted only 4.7 million members. From 1926 to 1929 there was another rise in union membership, which increased to 5.7 million but then began to decrease—in rough conformity with the ups and downs of general business conditions.<sup>21</sup> Total union strength is not to be measured solely by membership in the three large centralized organizations. Table 12 presents a complete enumeration of union membership for 1922, 1929, and 1932 as given by the Statistische Reichsammt. In the three selected years organized manual workers accounted for about three-fourths of all organized employees, and white-collar workers for the remaining fourth. Within the organization of wage earners proper, the Free Trade Unions represented about 80 percent and the Big Three well over 90 percent of all organized workers. The situation was different, however, in the case of white-collar workers. In this category, the free unions took in only some 30 percent, whereas the Big Three had between 60 and 85 percent. The relative strength of the non-Socialist unions thus should not be judged on the basis of their wage earner membership alone.

During the Great Depression union strength was reduced. In view of the limited ability of the unions to protect the interests of their members effectively in this period, it is surprising that union affiliation held up as well as it did. Workers' membership in the Big Three declined from 5.8

<sup>21</sup> An indication should be given of the degree of organization reached in the course of union development. A comparison of workers organized by the three big unions and total number of wage earners counted in the nearest census year is presented below:

	<u>Union Members</u>	<u>Workers</u>	<u>Percentage</u>
	<i>Big Three</i>	<i>Census Years</i>	<i>Organized in</i>
	(000's)	(000's)	<i>Unions</i>
	(1)	(2)	(3)
1907	2,249	13,311	17
1922	9,175	...	57 <sup>a</sup>
1925	4,902	16,024	31
1929	5,748	...	36 <sup>a</sup>

<sup>a</sup> Related to 1925 census count. According to the census count of 1933, there were 16,158,000 workers in the comparable Reich area. Substitution of this figure would not affect the percentage of workers organized.

SOURCE: Col. 1 is from Table 11; Col. 2 from *Handbuch* 1928-40, p. 31 (Reich area of 1934).

million in 1929 to 5.0 million by the end of 1931, and probably somewhat further in 1932. Membership of white-collar workers in the Big Three even showed an increase—from 1.3 million in 1929 to 1.5 million in 1932. A partial explanation of the mildness of the decline of total union membership is that unemployed members could stay in a union, paying no fees or only token fees; unemployed persons were even accepted as new members. However, apart from this technical aspect of membership rules, the sustained loyalty of the workers to their organizations remains an important fact of the chronicle. Incidentally, even during this severest of all depressions, the Communists were not successful, to any important extent, either in splitting the old-time unions or in organizing unions of their own. And during the period of the Weimar Republic the factory organization of the National Socialists, NSBO, made scarcely any attempt to assume union functions or to compete with the organizations then existing.

When the National Socialist regime came to power in January 1933, one of its early acts was the destruction of the trade unions. A new organization, the German Labor Front, was formed and declared to represent all gainfully occupied persons, whether they were employers, employees, independent craftsmen, businessmen, or professionals. Practically everyone, except farmers and government employees, was to be included in the Labor Front. Numerically, the Labor Front grew rapidly into a tremendous organization. In 1939 it included about 20 million individual members in Germany proper and an additional 3 million members in Austria, Sudetenland, Danzig and the western territories of Poland. To these figures should be added 10 million so-called collective members—persons in agricultural, professional, and cultural organizations.

The German Labor Front differed from the old unions in composition, organization, and functions. In the first place, it was not exclusively an employees' organization. Second, it was not a voluntary, democratically run association, but a compulsory organization ruled by the representatives of the National Socialist dictatorship. Third, and most important, the function of the Labor Front was not to represent employee interests in the determination of wages and working conditions, but to maintain tranquillity in the labor market within the framework of National Socialist institutions. A part of this job was political and economic pacification of the workers with deviating ideological and organizational traditions. That this pacification could be successfully attained in a relatively short time remains one of the sociologically most interesting—albeit disquieting—proofs of the instability of political attitudes in a modern industrial society. Finally, the Labor Front amassed a huge fund from contributions of its members, a fund providing important resources for the Government. The role of the Labor Front in influencing conditions of work was an indirect one: it prevented the existence of any kind of labor organization independent of Nazi control and thus permitted effective realization of Nazi directives affecting wages and other working conditions.



ORGANIZATION OF EMPLOYERS<sup>22</sup>

During the long period 1871-1945, great changes took place in the development of large enterprises; these changes profoundly affected the labor market. In 1875 there were only 115 industrial establishments employing more than 1,000 workers; in 1939 there were 1,344. In the latter year these enterprises constituted less than 1 percent of all business establishments but employed 23 percent of the labor force. In the same year there were 9,064 establishments that employed more than 200 workers (compared with 1,549 in 1875). These accounted for about 5 percent of all industrial units, but employed 44 percent of all workers.<sup>23</sup> Aside from the labor market organization brought about by the growing number of larger firms, we must consider also the effect of organizations formed to control product markets (cartels, syndicates, etc.), or to influence tariffs, export policy, taxes, and other measures of interest to business. Although these groups claimed no direct concern with the labor market, their organizational ties were not without influence in this sphere.

Certain combinations were formed for the express purpose of furthering employer interests in the labor market. These associations of employers were usually created to neutralize or defeat the forces of organized labor. As early as 1871-73 there sprang up numerous local associations of employers, usually within the same industry, to deal with workers' demands for higher wages and shorter hours. After the crash of 1873, employment declined, prices fell, labor organizations became quiescent, and most of the associations of employers disappeared. For the next few decades the few remaining employers' organizations were relatively inactive and limited to a few trades.

It was a strike of textile workers in Saxony, in the year 1903, that revived employers' interest in banding together. To combat the solidarity of the Free Trade Unions, employers in several industries cooperated to provide support for the textile industrialists. This activity resulted in two permanent associations of employers, which in 1913 were fused into one, the *Vereinigung Deutscher Arbeitgeberverbände* (Federation of German Employers Associations) or VDA, jointly employing about 1.8 million persons in that year.<sup>24</sup>

Under the Weimar Republic the VDA was a highly centralized, efficient

<sup>22</sup> For a general description of the development and policies of employer organizations see Adolf Weber, *Der Kampf zwischen Kapital und Arbeit* (Tübingen, 1954). A radically critical treatment of the topic is found in Jürgen Kuczynski's *Studien zur Geschichte des Deutschen Imperialismus* (Berlin, 1948), Vol. 1, Chapter 2.

<sup>23</sup> For the 1939 data see *Handbuch 1928-44*, p. 245. For the 1875 data see *Statistik des deutschen Reichs*, No. 35 (Berlin, 1879), p. 853.

<sup>24</sup> Employer organizations grew more or less in proportion to union membership. In 1904, when the three big unions had 1.3 million members, the employers' organizations covered 1.1 million workers. By 1913, the three unions counted 3.0 million members, and the employers' association covered 1.8 million workers. In 1920, when the three unions reported 9.2 million members, the employers' associations covered about 8 million.

association, consisting of two organizations, one functioning on an industrial and the other on a regional basis. Depending upon the problem of the hour, either one of these organizations, or both together, could take action. A separate corporation, the *Deutsche Streik Schutz*, provided strike insurance. Apart from labor market activities proper, VDA also entered into arrangements with nonindustrial employer associations for exchange of information and cooperation in legislative efforts and other matters of common interest. It maintained ties with industrial organizations like the *Reichsverband der Deutschen Industrie* in order to coordinate actions affecting general economic policy. During the years 1920-32, VDA and its affiliated associations wielded great power in the labor market.

The reorganization of German business under the Nazis affected employer representation in a radical manner. The VDA dissolved shortly after the destruction of the old trade unions. A law of February 27, 1934, designed to promote an "organic structure of the German Economy," gave the Ministry of Economics broad authority to reshuffle trade associations, extend their membership, and recognize them as exclusive representatives of their industry. The leadership principle was to permeate the functioning of these organizations. In the course of executing this law, many of the business organizations that had flourished during the Weimar Republic were incorporated into a new structure of "groups" and "chambers," without drastic changes in personnel. On the other hand, their policies were, of course, fitted into the patterns decreed by the Nazi administration.<sup>25</sup> Since, after the abolition of collective bargaining, wages and working conditions were no longer to be determined by independent labor market factors, collective representation of employer interests was declared obsolete. Ideologically, the separate representation of employer interests ran counter to the National Socialist tenet that there were no "class" interests, but only a national interest.

#### DETERMINATION OF WAGES AND WORKING CONDITIONS

During the early decades of the Reich, wages and working conditions were determined largely by the employers, whose prerogatives in this respect were regarded as property rights flowing from ownership of their establishments. These were the years when the labor market most nearly approached the state of "perfect competition," so that short-term changes in wages resulted only from abundance or scarcity of workers at the posted rate. The *Gewerbeordnung* (industry code) of the *Norddeutsche Bund* (North German Federation) of 1869 permitted coalition in unions, but restricted this right to industrial workers. It also limited the unions' freedom to recruit and to strike, by invoking penalties where such activities might be coercive. After the foundation of the Kaiserreich, the *Gewerbeordnung*

<sup>25</sup> On the organization of business under National Socialism see Franz Neumann, *Behemoth* (Oxford University Press, 1942), pp. 240-47; and L. Hamburger, *How Nazi Germany Has Controlled Business* (Brookings Institution, 1943).

was applied to the whole of Germany. The government tolerated unions in principle, but in actual cases of labor strife the local police authorities frequently prevented the workers' organizations from exercising their new rights. Agitating, organizing, demonstrating, and striking were often regarded as violations of the law-and-order provisions of the *Allgemeine Landrecht*. Also, unions were frequently closed down when public prosecutors started procedures against union leaders for violations of the old Prussian *Vereinsgesetz* of 1850—a law plainly superseded by the *Gewerbeordnung*.<sup>26</sup> In spite of these vexations, organizational activity continued and strikes did occur; they must have affected wages and working conditions to some degree. On the whole, collective action on the part of workers was usually local and spontaneous, except in the printing trades.

Bismarck's anti-Socialist laws (1878-90) established the right of the police to suppress subversive institutions and publications, and to exile persons responsible for subversive activities. Originally directed primarily against Socialists, it led to intense persecution of union leaders and to the dissolution of unions. Only local, strictly vocational associations were tolerated. At the same time, however, the state supported legislation favorable to labor. Thus during the period of the anti-Socialist laws, a workers' insurance system was built which became a model for other industrial nations. In 1883 nation-wide sickness insurance was established, in 1884 accident insurance, in 1889 disability and old age insurance. However, the government took little positive action on working conditions and wages. The industry code contained some elementary provisions for the protection of women and children, and for the inspection of industrial enterprises to insure minimum standards of hygiene. But there was no regulation of maximum hours or minimum wages.

The great era of social legislation for the protection of labor and the improvement of working conditions started after 1890, under the leadership of the Prussian Secretary of Commerce, von Berlepsch. In 1891 a far-reaching revision of the *Gewerbeordnung* was instituted, which provided for Sunday rest in industry and not more than five hours' Sunday work in trade; effectively prohibited the truck system;<sup>27</sup> set minimum standards for the protection of health and maximum hours for work in certain industries dealing with noxious materials; and established legal limits to working hours for women and youths. The revised *Gewerbeordnung* did not, however, set minimum wages, establish general maximum hours, or affect the prevailing methods of wage determination.

Toward the turn of the century, union leaders worked toward general

<sup>26</sup> The *Vereinsgesetz* required registration and supervision of workers organizations; it forbade extension of organization beyond the local level. In Prussia, all social and insurance groups were supervised and on occasion prosecuted under this law. Only in 1900 did federal law specifically permit broader than local organization and legitimate union activities—notwithstanding existing state law.

<sup>27</sup> Under this system part of the workers' remuneration was given in kind.

acceptance of collective bargaining as a basis for the determination of wages. Collective agreements were not, at that time, altogether a novelty. The book printing trades had concluded local wage agreements as early as the middle of the nineteenth century, and after 1873 had negotiated nation-wide agreements on wages, hours, and other conditions of work. Aside from the book printing trades, however, even local collective agreements were rare; none are reported until the late 1880's.<sup>28</sup> Collective bargaining and conclusion of union contracts became increasingly important after 1900; by the beginning of 1914 there were in effect about 10,900 contracts covering 1,399,000 workers.<sup>29</sup> But even with the multiplication of agreements, the German trade unions did not succeed in obtaining legal recognition of their role as representatives of labor in collective bargaining up to the outbreak of World War I.

The war led to increased state activities in the field of labor relations. These were not always to the advantage of labor. For example, protection of women and children in industrial plants tended to be ignored, and general compulsory labor for men was introduced in 1916 by the *Allgemeine Dienstpflicht Gesetz* (Auxiliary Service Law). At the same time the importance of labor's cooperation in the prosecution of the war was clearly recognized, resulting in increased recognition of the trade unions as the workers' representatives. Unions were assured that they would cease to be treated as political organizations, subject to the restrictions imposed on the latter. In the spring of 1918, a provision affording legal protection to strike breakers was revoked. During the last months of the war the attempt to assure labor's cooperation led to the organization of a central board of employer and employee representatives.

The decisive change in the official status of labor came with the Revolution of 1918. Though not "radical" with regard to basic changes in economic institutions, the revolution brought far-reaching political changes and, at least for a while, did not lack in dynamic impetus. During several months, radical Workers' and Soldiers' Councils, patterned after Soviet models, attempted to gain power and threatened both industrialists and unions. A provisional Socialist government was established to hold office until the election of a parliament. A few days after the outbreak of the Revolution, the Provisional Government proclaimed complete freedom of association, extending this right to farm workers, domestics, and civil servants. On November 15, 1918—that is, within a week after the founding of the Republic—the famous Stinnes-Legien Agreement was concluded and the so-called *Zentralarbeitsgemeinschaft* (Central Board for Industrial Cooperation) was set up. The agreement, drafted and signed by representatives of the three major unions and by representatives of the Federation of Employers' Associations, was of far-reaching importance,

<sup>28</sup> For details see Robert Kuczynski, *Arbeitslohn und Arbeitszeit in Europa und Amerika, 1870-1909* (Berlin, 1913), pp. 403, 498, 527, 534, etc.

<sup>29</sup> See Table 14.

for it not only formulated the principles along which labor relations were to develop during the following decade and a half, but also embodied the basic compromise upon which the Weimar Republic was founded—the parity of capital and labor. By the agreement unions were recognized as the official representatives of labor; wages and working conditions were to be determined by collective bargaining between employers and union representatives; arbitration was to be invoked in case of conflict; and work councils, formed to enforce the provisions of the collective agreements, were to function in all but the smallest factories.

The Stinnes-Legien Agreement was soon implemented by legislation. Within two weeks government decrees provided that written collective agreements were to have the force of legal contracts, in some instances applying to entire industries. Another decree established techniques of arbitration, with awards that could be made binding even if they ran counter to the desires of the conflicting parties. A further decree established the 8-hour day.

It was the aim of the Weimar Republic to foster permanent compromises between capital and labor, mainly through collective bargaining. To this end labor had to be represented on all levels. Labor representatives were to participate in a supreme economic advisory board, the *Reichswirtschaftsrat* (Reich Economic Council). Special labor legislation was to provide the conditions under which the system of collective democracy could function. Trade unions were to bargain with employers for satisfactory wages and working conditions in various industries or industry sections. Only where agreement could not be achieved through direct negotiation between workers and employers, could government officials issue binding awards which had the effect of imposed contracts. On the plant level, the interests of labor were to be represented by *Betriebsräte* (works councils) which were to have a large share not only in the establishment and administration of factory rules and in the execution of the collective agreements, but also in the supervision of the general management of production, finances, and the like.<sup>30</sup> Representatives of unions as well as of employers' organizations served as judges in labor courts.<sup>31</sup>

<sup>30</sup> The original concept of the works councils' functions was rather sweeping. Although some antecedents of works councils had existed in former shop committees, the establishment of the councils in the early years of the Republic was due largely to radical demands for the establishment of a German *Rätesystem* patterned after the Russian soviets. Alternative schemes for combining the *Rätesystem* with democratic institutions were advanced by the non-Communist wing of the German labor movement. As a compromise between the various factions, a clause was incorporated in the Weimar Constitution providing for works councils as the lowest level of a structure of joint economic administration. Near the top of the structure stood the *Reichsarbeitsrat* (Reich Labor Council), which in turn would form part of the top Reich Economic Council. See S. W. Halperin, *Germany Tried Democracy* (Crowell, 1946), pp. 161-65. See also Boris Stern, *Works Council Movement in Germany*, Bureau of Labor Statistics, *Bul.* 383, 1925.

<sup>31</sup> For a description of the role of union representatives in German labor courts see Frieda Wunderlich, *German Labor Courts* (University of North Carolina Press, 1946).

Such was the pattern of collective industrial democracy in which capital and labor were to rule jointly, the function of the state being merely to act as arbiter.<sup>32</sup>

In actual fact, however, many of the provisions for such joint rule remained on paper only. Some of the articles of the Weimar Constitution concerned with the *Rätesystem* were not followed by specific laws and thus never became effective. The Social Democratic support of a national constituent assembly put an end to any political prospects for the work councils; the *Betriebsrätegesetz* limited the functions of the work councils largely to those of ordinary shop committees. The intermediate councils, designed to be the link between factory organizations and central administration, never materialized. The Reich Economic Council did not determine economic policy, nor did labor participate in the supervision of management in industrial undertakings. What did work was the collective bargaining aspects of the plan, at least in times of prosperity, so that for many years wages were actually determined by free negotiations between representatives of industry and labor. Table 13 shows that the number of

TABLE 13  
Collective Agreements in Force during Selected Years, 1913-1928

Jan. 1 of Year	Number (in thousands) of:			Establishments per Agreement	Workers Covered per Agreement
	Agreements	Establishments Covered	Workers Covered		
1914	10.9	143	1,399	13	128
1920	11.0	272	5,986	25	544
1924	8.8	813	13,135	92	1,493
1929	8.9	998	12,276	112	1,379
1931	9.1	1,068	11,950	117	1,313

SOURCE: 1914-20, W. Woytinsky, *Die Welt in Zahlen* (Berlin, 1925) Vol. II, p. 153. For 1924-29, *Reichsarbeitsblatt*, Sonderheft 55, p. 5\*. For 1931, Statistisches Reichsamt, *Deutsche Wirtschaftskunde*, 1933, p. 299; data for 1931 not strictly comparable with earlier data.

workers covered by collective agreements jumped from about 1.4 million at the beginning of 1914, to nearly 6.0 million in 1920, and to 13.1 million in 1924. They stood at about 12.3 million at the beginning of 1929. The table shows also that a declining number of agreements tended to cover an increasing number of establishments and workers. This is a reflection of the ever-widening scope of collective agreements. While in 1913 almost half of all agreements covered a local trade or a single establishment, this

<sup>32</sup> For a detailed discussion of the subject see Nathan Reich, *Labor Relations in Republican Germany; an Experiment in Industrial Democracy, 1918-1933* (New York, Oxford University Press, 1938).

type amounted to only 10 percent of all agreements in 1929. In that year, 90 percent were regional or national in scope—covering a still higher percentage of workers.<sup>33</sup>

The mechanism for collective agreements worked tolerably well as long as the economy ran relatively smoothly, but headed into difficulties with the Great Depression. In the course of the depression, the conflict between the basic aim of trade unions (to keep up and improve the workers' standards of living) and the desire on the part of employers to reduce labor costs (in order to maintain or restore profitability) became increasingly sharp. Under such tensions no amount of bargaining could lead to agreements, especially since union leaders understandably preferred not to agree voluntarily to wage cuts. The state had then to carry out its function as arbiter. Now this function had worked out to the advantage of the trade unions as long as business conditions were good and as long as the Social Democratic Party participated in the government. In fact, the unions had become rather dependent on "their" government in the settlement of disputes.<sup>34</sup> When, in March 1930, the Social Democratic Party left the coalition government, it escaped direct responsibility for the unpopular deflationary measures, but at the same time deprived the unions of their most important instrument for influencing economic policies. As the depression continued, compulsory arbitration became more and more important, and the decisions, under the changed economic and political circumstances, tended more and more to reduce labor costs and to defend profit. Voluntary collective agreements gradually disappeared, and resort was had increasingly to arbitration. Of the 7,541 wage agreements in effect by the end of 1931, about one third had been achieved through arbitration. These arbitrated agreements covered as many as 6.6 million of the 8.3 million workers under collective contracts.<sup>35</sup> On December 8, 1931, Reich Chancellor Brüning, in his Fourth Emergency Decree,<sup>36</sup> ordered an across-the-board reduction in wage rates to the level of January 10, 1927, regardless of existing collective agreements. This was the beginning of wage determination by fiat. Thus wage determination by agreement was the first victim of the emergency rule which ultimately was unable to preserve either the economic or the political institutions of the Republic.

<sup>33</sup> For 1913, see Wladimir Woytinsky, *Die Welt in Zahlen* (Berlin, 1925), p. 156. For 1929 see *Reichsarbeitsblatt*, Sonderheft 55, p. 6\*.

<sup>34</sup> Frieda Wunderlich describes how workers started to lose interest in their unions when wages were "fixed by the state." See "Labor under German Democracy," *Social Research*, 1940, Supplement II, p. 86.

<sup>35</sup> *Jahrbuch* 1933, p. 317.

<sup>36</sup> Article 48 of the Weimar Constitution provided for emergency legislation by the President, in extraordinary circumstances. Theoretically, the Reichstag had the constitutional power to repeal such legislation but made scant use of this right, because of difficulties in agreeing on substitute measures. The repeated use of the emergency decree by Brüning led to the serious abridgement of democratic processes. It was widely regarded as signifying a transition to government by dictatorship.

It was but a small step from wage setting by compulsory arbitration and emergency decree to outright administrative determination of wage levels. When, in 1933, the National Socialists took power they abolished collective bargaining and fixed minimum wage rates at existing rock-bottom levels. The National Labor Law of January 20, 1934<sup>37</sup> created the office of a supreme Reich Labor Trustee. He and his deputies had the power to determine *Tarifordnungen* (collective rules) covering entire industries, and setting minimum wage rates. The rules permitted individuals to be paid at higher rates than the established minimum wages—as under the Weimar Republic. This arrangement worked well enough, from the government's point of view, as long as unemployment kept wage rates close to minimum levels. But by the end of 1934 the revived metal-working industry was beginning to offer rates well above the minimum and, when the rearmament program got into full swing, industries connected with war production had to raise wages. Thus, in June 1938, the labor trustees were empowered, at their discretion, to fix wage maxima in addition to the minima. At the same time, permission had to be obtained for any adjustment of existing rate schedules. Circumventions of these provisions were frequent,<sup>38</sup> but no new wage measures were introduced before the outbreak of World War II.

The War Economy Order of September 1939 brought a host of wage regulations. It required the labor trustees to fix wage maximums for all sectors of the economy. Premium rates were abolished for overtime, night, Sunday, and holiday work, and provisions for holidays with pay were suspended. Special permission had to be obtained for any changes in rates, and infringement of the new rules was to be punishable by fines, imprisonment, or forced labor.

Modification of these rules was soon necessary. Before the year 1939 was out, holidays with pay, and higher rates for night, Sunday, holiday, and overtime work were partially restored.<sup>39</sup> In order to control average hourly and weekly earnings and at the same time to stimulate increased output, the government also introduced a new system of "efficiency wages." Workers were classified into eight skill grades for which base rates were set. According to his output, each worker received an efficiency number

<sup>37</sup> On the destruction of the trade unions and the formation of the Labor Front, see Hans-Gerd Schumann, *Nationalsozialismus und Gewerkschaftsbewegung: Die Vernichtung der deutschen Gerwerkschaften und der Aufbau der Deutschen Arbeitsfront*, (Hanover and Frankfurt a/M, 1958). On the early phase of wage policy under National Socialism see P. Waelbroeck and I. Bessling, "Some Aspects of German Social Policy under the National Socialist Regime," *International Labour Review*, February 1941.

<sup>38</sup> They consisted of upgrading jobs; increasing family allowances; granting special allowances for housing and traveling; increasing contributions toward insurance, pension funds, and income taxes. See René Livchen, "War-time Development in German Wage Policy," *International Labour Review*, August 1942, p. 139.

<sup>39</sup> Under the restoration decree overtime payments by the employer began after the eighth hour, overtime wages for the employee after the tenth hour. The overtime payments for the ninth and tenth hour went to the government. Full restoration of prewar conditions took place in September 1940. See *ibid.*, pp. 143 and 146.



which determined his pay below or above the base rate, but as average productivity increased, the base rates could be lowered at will by the government. Thus only earnings differentials, but not necessarily earnings levels, were affected by increased effort of workers. This system operated in most of the larger enterprises in the building and metal industries, and to some extent in the coal mining and textile industries.<sup>40</sup> Coupled with the official determinations of wage rates and the cost of living, the system of controls set up by the National Socialists represented the most pervasive power over wages, whether monetary or real, ever effected in modern German industry.

### *Trends in Hours of Work*

One of the momentous changes in labor conditions during the period under discussion was the reduction of working hours. Such reductions occurred, of course, in all major industrial nations, though the German situation differed in some important respects from that of other countries. Since Germany was a latecomer to the industrial field, German workers at the time of the Reich's foundation were still subject to the long hours customary in agricultural work and common in early industrialization. Further, when the eight-hour day was finally established, it came literally "overnight," as one of the first administrative decrees of the young Weimar Republic.

Hours are, next to wages, the most important aspect of working conditions. Furthermore, changes in hours have a direct effect upon daily and weekly earnings; and, through their influence on premium payments for overtime, night work, and the like, they also affect hourly earnings. Any discussion of wages, therefore, must take into account the concurrent changes in daily and weekly working hours. What were the major trends in hours of work during the period 1871-1945?

In Germany during the early 1870's, the 12-hour day was probably most frequent, though workdays varied considerably in length. Building workers in Berlin and printers and cabinetmakers in large cities were already working under 10-hour maximum arrangements, whereas textile workers in Silesia worked 14 and 15 hours a day. In many industries, especially in the smaller communities, the workers had still to win recognition of the 12-hour day as a maximum.<sup>41</sup> The demand for shorter

<sup>40</sup> John P. Umbach, "Labor Conditions in Germany," *Monthly Labor Review*, March 1945, p. 511.

<sup>41</sup> For the development of hours, see "Arbeitszeit" in *Handwörterbuch der Staatswissenschaften*, 1923 edition, pp. 896-97; "Arbeitszeit" in *Handwörterbuch der Arbeitswissenschaft*, p. 426; "Geschichtliche Entwicklung des Achtstundentages im In- und Ausland," in *Reichsarbeitsblatt* 1919, pp. 386 ff. and 456 ff.; and Robert Kuczynski, *op. cit.*, *passim*. Estimates of the trend of average hours in large cities, before 1913, are given by Paul Jostock, "The Long-term Growth of National Income in Germany," *Income and Wealth* (International Association for Research in Income and Wealth, Series v, 1955), p. 99.

working hours was widespread and an active concern of all workers' organizations.

During the 1870's and 1880's the movement for reduction of the working day continued. In 1877 the newly formed Social Democratic Party submitted legislation in the Reichstag for a 10-hour maximum day for men from Monday through Friday and a 9-hour maximum on Saturday. These proposals fell on deaf ears at the time, but they served to make the shortening of the working day one of the most popular demands of the Social Democratic Party and of the labor organizations allied with it. In subsequent years shorter hours were introduced in a number of industries, often as a result of strikes. A working day exceeding 11 hours still prevailed in most factories in 1890 but was regarded by the workers and their organizations as an important object of reform.

About 1890, efforts to reduce the length of the working day attained more organized expression. After the First International Socialist Congress in Paris in 1889, the Social Democratic Party of Germany formally included in its program the demand for an 8-hour day. The limitations on hours worked by women, contained in the 1891 revision of the *Gewerbeordnung*, gave further impetus to the move to reduce hours. In 1892 a commission for labor statistics was formed—largely for the purpose of making inquiries into prevailing working hours. The decades between 1890 and the outbreak of World War I witnessed an appreciable shortening of the working day. An official inquiry of 1897 found the working day to be between 9 and 11 hours. Although no average was stated, it was probably above 10, possible above 10½ hours. From 1908 on, available statistics report the working hours agreed upon in labor contracts; the average length of the working day stipulated for 1913, for example, was somewhat above 9½ hours.<sup>42</sup> During World War I many of the gains of the preceding decades had to be sacrificed to meet the emergency needs of the Reich. Particularly in munitions plants, and especially during the latter part of the war, workdays of 11 hours and more became the rule rather than the exception.

After the German defeat in 1918, one of the first acts of the Weimar Republic was to legalize the 8-hour day in the decrees of November 2 and December 17, 1918. If working hours were unevenly distributed over the week the total could not be more than 48 hours; if half-day work were arranged for Saturdays, the time could be made up on the other workdays of the week. The decrees, originally designed to govern working hours during the period of demobilization, were intended as temporary

<sup>42</sup> However, it must be assumed that organized workers covered by labor contracts commanded better than average working conditions. In 1913 the average day for German workers was in all likelihood about 10 hours, perhaps a bit longer. A day of 10 to 11 hours is given by the *Handwörterbuch der Arbeitswissenschaft*, p. 466. Jürgen Kuczynski assumes "over 10 hours" in *Germany, 1800 to the Present Day* (Vol. III, Part 1, of *A Short History of Labour Conditions under Industrial Capitalism*, London, 1945), p. 146.

measures to be replaced eventually by a permanent law. However, since several government bills introduced in the Reichstag during 1921-23 failed to obtain majority votes, the validity of the demobilization decrees had to be extended again and again. Although the 8-hour law was quite specific, the economic stresses of the inflation led to frequent infractions. Complaints were heard that an economy impoverished by defeat in war and disorganized by the rapidly declining value of its currency could not afford to limit its output by a rigid 48-hour maximum.<sup>43</sup> Thus the decrees were allowed to lapse. On December 21, 1923 a new decree, permitting longer hours in several circumstances, was passed. There is no doubt that, shortly after its enactment and during the expansion up to the middle of 1925, the 8-hour day or 48-hour week was significantly exceeded, especially in smaller communities. For the main industrial centers of the Reich as a whole, the average working time in manufacturing and related industries during the mid-1920's was nearly 50 hours per week, or 8.3 hours for each of six working days of equal length.

In the course of the next few years the trend was toward shorter hours. Table 14 shows a decline in collectively agreed "normal" hours per week from 49.8 in 1924 to 48.8 in 1929. A similar decrease appears also in the results of inquiries by unions which tried to measure hours actually worked. During the subsequent depression, average hours of full-time workers dropped still further with the decline in overtime work. In view of the large number of unemployed, the unions sought in vain to spread the available work by obtaining a legal limitation of the week to 40 hours.<sup>44</sup> According to government inquiries beginning with 1929, the average workweek of employed wage earners amounted in that year to 46 hours.<sup>45</sup> Between 1929 and 1932 the average number of weekly hours per wage earner declined further to 41.5, reflecting the increasing incidence of part-time work during the Great Depression.<sup>46</sup>

During the economic expansion under National Socialism, the length of the working day increased. The official figures on average hours per week in manufacturing show an increase of about 8 hours between 1932 and 1939. The average for the latter year is 47 hours per week. This would imply an average workday of less than 8 hours. It must be remembered,

<sup>43</sup> The arguments are given in detail by Robert Kuczynski, *Postwar Labor Conditions in Germany*, Bureau of Labor Statistics, Bul. 380, 1925, pp. 104-7. See also his analysis of further developments, pp. 107-15.

<sup>44</sup> *Jahrbuch des Allgemeinen Deutschen Gewerkschaftsbundes 1931*, Berlin, 1932, p. 158.

<sup>45</sup> Table 14 shows this to be almost three hours below the normal work week stipulated in labor contracts and the actual hours worked as reported in union statistics. The explanation lies in the character of the official data. While the total number of workers carried on the payroll is used as the denominator, the hours counted are only those actually worked—excluding those lost by sickness, leaves of absence, and at times even by vacations. Part-time workers and their shorter work week are included in these statistics, without any adjustments.

<sup>46</sup> In 1929 part-time workers formed 7 percent of union members; in 1932 more than 24 percent. See *IKF Handbuch 1933*, p. 29.

TABLE 14  
Average Working Hours per Week, 1924-1942

Year	Normal Hours Implicit in Wage Rate Schedules <sup>a</sup>			Union Inquiry into Actual Hours Worked (4)	Average Hours Worked per Worker on Payroll of Manufacturing Industry (5)
	Skilled (1)	Unskilled (2)	Combined (3)		
1924	48.9	51.9	49.8	50.4 <sup>b</sup>	
1925	48.8	51.3	49.5	...	
1926	48.9	51.4	49.6	...	
1927	48.4	50.8	49.1	49.9 <sup>c</sup>	
1928	48.5	49.8	48.9	48.9 <sup>d</sup>	46.0 <sup>e</sup>
1929	48.4	49.8	48.8	...	46.0
1930				48.6 <sup>f</sup>	...
1931					...
1932					41.5
1933					42.9
1934					44.6
1935					44.4
1936					45.6
1937					46.1
1938					46.5
1939					47.0 <sup>g</sup>
1940					...
1941					...
1942					49.2 <sup>h</sup>

<sup>a</sup> Averages of April and October.

<sup>b</sup> Average of one week in May and November.

<sup>c</sup> Average of one week in April and October.

<sup>d</sup> One week in October.

<sup>e</sup> Last six months.

<sup>f</sup> One week in February.

<sup>g</sup> First six months.

<sup>h</sup> Month of March.

SOURCE, by column:

(1, 2) For 1924, computed from data in *Jahrbuch* 1928, p. 371. For 1925-29, computed from data in *Jahrbuch* 1930, p. 299. (Slight change in coverage.) Twelve industries.

(3) Weighted average of cols. 1 and 2. Weights: 2.5 (skilled) + 1 (unskilled), according to number of workers as given in *Vierteljahrshefte zur Statistik des Deutschen Reichs*, 1931, p. 97.

(4) Computed from frequency distributions given in *Jahrbuch des Allgemeinen Deutschen Gewerkschaftsbunds* (Berlin, 1930), p. 221. Open-end classes include at times as many as 20 percent of workers. Mid-points of open-end classes were assumed to be 1.5 hours distant from specified inner class limits. In upper-end classes this is reasonable in view of customary limitations on working hours during peacetime. In lower-end classes, the selection of the probable mid-points is more uncertain, but the frequencies are small and relatively stable (close to 6 percent throughout except for 1924, where they are about 5 percent). Alternative reasonable assumptions about probable mid-points have only minor effects on results. Sample size of investigation varies between 2.4 and 3.1 million workers. Data are for one week in year (seasonally non-extreme). (notes continue)

(5) For 1928, estimated from change in average daily working hours 1928-29, *IKF Handbuch* 1936, p. 32. Data for 1929-39, *Jahrbuch* 1939-40, p. 384. Entry for 1942, *Monthly Labor Review*, March 1945, p. 513. Series covers the manufacturing, mining, and building activities of the *Industrieberichterstattung*.

however, that the surprisingly low average is brought about by the large-scale use of part-time workers, especially women, in this period of acute labor shortage.

The outbreak of World War II brought some extension of working hours. The increase was not, however, as spectacular as it would have been if the German economy had not already reached full employment under the rearmament program. The official statistics report an average workweek of only 49 hours in 1942—just 2 hours above 1939 levels. Again the effect of part-time work on these averages must be considered. There is good evidence that the hours of full-time workers were appreciably higher, except in certain civilian industries suffering from materials shortages. In war industries, employees often worked 60 or more hours a week during 1942. Toward the end of the war working hours increased still further. In 1944 the working time was 60 hours per week or 10 hours per day in most industries, and reached 72 hours per week or 12 hours per day in many armament and other factories engaged in war production.<sup>47</sup> The wheel had gone a full circle for the second time. By the end of the war German workers were putting in about the same length of time as they had some three decades earlier, during World War I, or seven decades earlier, at the time of the foundation of the Reich. After the military and political collapse of 1945, the 8-hour day and the 48-hour week again became the rule for German workers.<sup>48</sup>

In the foregoing pages we have scanned those developments in the German economy that seem essential for an understanding of wage behavior. We have followed the transition from the Kaiserreich to the Weimar Republic, with its political crises, and finally to the advent of a totalitarian regime. In the economic sphere we have traced the growth of production and national income during the first four decades of Reich history, the break in growth trends following World War I, the feverish economic expansion, and the subsequent collapse during the Third Reich. Reviewing the changes in the labor market, we have noted the increasing

<sup>47</sup> *Monthly Labor Review*, March 1945, p. 513. The decree on the sixty-hour week of 1944 abolished the former legal limits of weekly hours for men, pointing to the superhuman exertion of German soldiers on all fronts. For women and youths, a maximum workweek of 56 hours was maintained. See *Reichsarbeitsblatt 1944*, Part I, p. 318, and Part V, p. 327.

<sup>48</sup> In Western Germany, the Hours of Work Order of 1938 was still in force at the time of writing. It prescribes the forty-eight-hour week, with overtime payments for additional work. Actual working time was reported to be about 40 hours during the first few postwar years, but closer to 49 or 50 hours in more recent years. See the following articles in *International Labour Review*, "Conditions in Germany, Normal Hours of Work in the U.S. Zone," July 1948, pp. 101-2; H. C. Nipperday, "The Development of Labour Law in the Federal Republic of Germany since 1945," August 1954, pp. 160-61.

importance of industrial wage earners and the trend toward ever tighter organization of the labor market. Finally, we have observed the trend toward shorter working hours, and the fluctuations in hours under varying business conditions and during the several crises through which Germany passed. Against this general background let us now proceed to the primary subject of this book, the analysis of wage behavior.

## CHAPTER 2

### Trends in Wage Levels

#### *Money Wages*

##### AVERAGE WAGE LEVELS

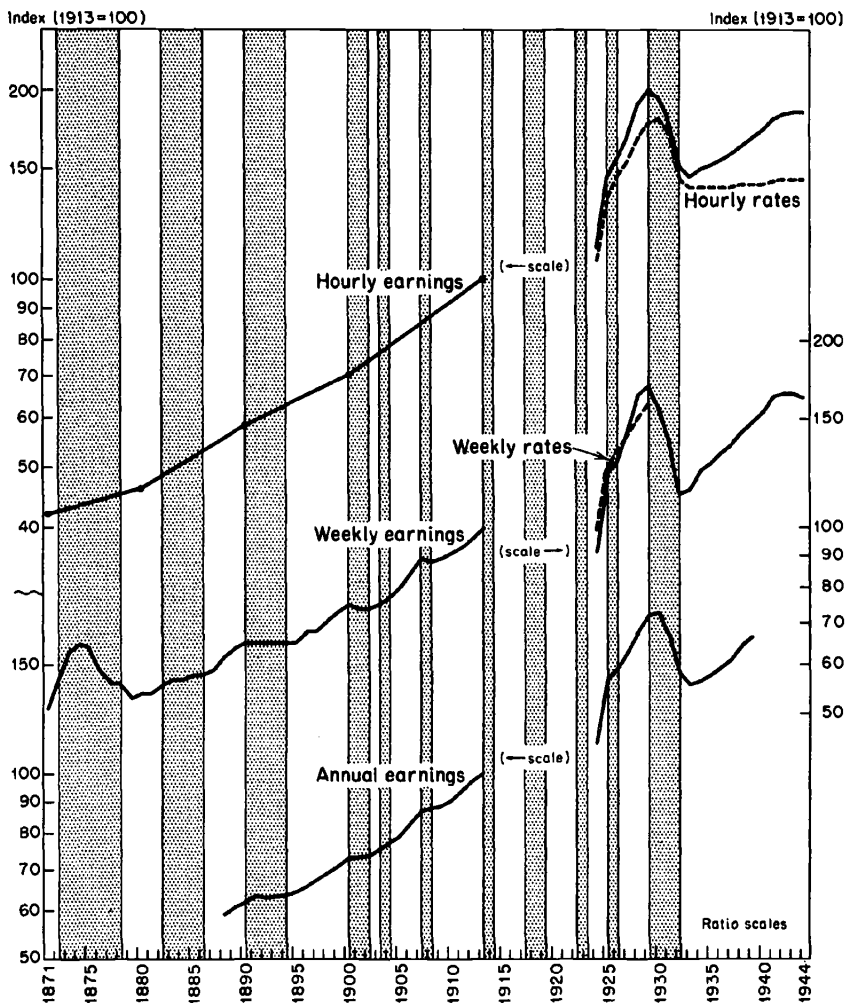
In this chapter we are concerned only with broad changes in wage levels. The changes may be measured in terms of wage rates, that is, in terms of prices established for an hour of labor, or sometimes for a normal work-week. Alternatively, they may be measured in terms of hourly or weekly earnings which reflect factors other than rates, such as number of hours worked, premium pay for overtime or night work, and changes in the composition of the working force. In the evaluation of wage changes it should be kept in mind that wages are not necessarily the whole income of wage earners. Particularly during the first half of the period under review, rental income from sub-tenants, and produce from garden plots significantly supplemented wage income received. Furthermore, in some industries such as mining, wages were generally supplemented by so-called *Deputate*, that is, by emoluments in kind. But lack of statistical information on these and other elements of income restricts the present analysis to wage payments proper—in marks of varying or fixed purchasing power.

During the seventy-five years of the Reich's existence there was a pronounced rise in wage levels. In 1871 the average German industrial worker earned 10 to 15 marks a week, in 1913 about 25, and in 1944 more than 40. That is, weekly earnings increased more than threefold over the long period, roughly doubled between 1871 and 1913, and rose by about 60 percent between 1913 and 1944. These observations are based on Table 15, Appendix Table A-2, and the data underlying their computation.<sup>1</sup> The average rate of growth from 1871 to 1944 was 1.6 percent per year, and there was little difference in this rate between the years before 1913 and the years after. There is in fact a surprising consistency in the general direction of wage trends throughout the Reich's history, as can be seen from Chart 2.

Comprehensive information on hourly earnings exists only for 1913 and the postinflation years. However, inferences as to the trend of hourly wages during the years prior to 1913 can be drawn from the behavior of weekly earnings and from available data on normal working hours. Estimates of changes in hourly earnings levels between 1871, 1880, 1890,

<sup>1</sup> For weekly earnings there exists fairly comprehensive information over the whole period under investigation. For 1871 to 1913, Jürgen Kuczynski constructed a wage index designed to approximate weekly earnings. For 1913 and the postinflation years there are data published by the Statistische Reichsamt. The Kuczynski index and the Reichsamt data are presented in Appendix Table A-2, with notes discussing the character of these measures.

CHART 2  
Hourly and Weekly Money Wages, All Industry, 1871-1944



Shaded areas represent business contractions.

Source: Table I, Appendix Tables A-2 and A-55.

1900, and 1913 are included in Table 15.<sup>2</sup> We find, for the long period, that hourly earnings rose more than fourfold. They were around 20 pfennigs in 1871, close to 50 pfennigs in 1913, and a little below 90 pfennigs in 1944. The average rate of increase was 2.1 percent a year between 1871 and 1944. This is, of course, a sharper rise than that of weekly earnings, which were affected by the shortening of the workweek.

<sup>2</sup> This table gives also the assumptions on the length of the workweek, which underlie these estimates.



TABLE 15  
Hourly and Weekly Wages, Selected Years, 1871-1944  
(1913 = 100)

Year	HOURLY WAGES		WEEKLY WAGES	
	Rates	Earnings <sup>a</sup>	Rates	Earnings
1871	...	42	...	51
1880	...	46	...	54
1890	...	58	...	65
1900	...	70	...	75
1913	100	100	100	100
1918	...	...	...	200
December 1923	...	...	...	86,200 billion
January 1924	92	...	84	...
1924	107	112	99	91
1925	135	146	124	123
1929	177	200	158	169
1932	144	151	...	113
1939	141	168	...	148
1944	144	184 <sup>b</sup>	...	162 <sup>b</sup>
Averages				
1924-32	154	166	...	136
1924-39	148	162	...	134
1924-44	147	166 <sup>b</sup>	...	141 <sup>b</sup>

<sup>a</sup> Estimates of hourly earnings for 1871, 1880, 1890, and 1900 were based on weekly earnings and the following assumptions concerning the number of hours worked per week: 72 hours in 1871; 70 hours in 1880; 67.8 hours in 1890; 64.2 hours in 1900; and 60 hours in 1913. Note that the adjustment does not depend on the accuracy with which the average level is gauged, but merely requires a realistic estimate of the rate of decrease in the length of the workweek.

<sup>b</sup> The "Ostmark" is included from 1940 on.

SOURCE: Appendix Table A-2. Rates for January 1924, estimated here, are weighted averages of rates for skilled and unskilled. Basic data directly from *Wirtschaft und Statistik*.

As with weekly earnings, the average rate of growth of hourly earnings is rather similar before and after World War I.

In view of the limitations of the data for the period before World War II,<sup>3</sup> it is fortunate that we can make a broad check on the representative-ness of the depicted earning trend by comparing it with an independently derived series of annual earnings. These earnings are presented, for the years 1888 to 1913 and 1924 to 1939, in Appendix Table A-55 and Chart 2. They are based on payroll and employment data, compiled by the German

<sup>3</sup> J. Kuczynski's index is based on a combination of daily, weekly, and annual rates or earnings in selected cities and establishments. This implies a relatively small sample, of restricted industrial coverage, with at least the possibility of statistical bias through selection of larger and more highly unionized enterprises.

workmen's compensation insurance over the period of its existence.<sup>4</sup> For the years 1888 to 1913 the over-all earnings index confirms the weekly earnings trends previously described. For the period 1913 and after, the annual earnings index exhibits a somewhat steeper upward trend than the weekly earnings estimates of the Statistische Reichsamt.

In the three-quarters of a century under consideration, the broad upward trend of wages was modified by strong cyclical and episodic fluctuations, discussed at length in later chapters. Here our concern is with the broad trends in wages through all major phases of the Reich's history, and with only those short-term events that contribute to an understanding of the major long-term trends.

*1871 to World War I.* During the first four years of the Reich's history, average weekly earnings increased between 25 and 30 percent in response to the feverish business activity of the *Gründerjahre*. With the collapse of this huge investment spree, wages suffered a decline of about 20 percent, which brought them down almost to their low levels of 1871. From the low point, reached in 1879, wages began to move upward, continuing without major interruptions<sup>5</sup> up to the outbreak of World War I.

The rise of earnings from the mid-1890's to 1913 was somewhat more rapid than the increase had been from 1871 to 1894—a fact apparently related to the steeper price movements and perhaps the accelerated growth of labor organizations during the later period. However, the steady advance of money wages was scarcely modified either by the persecution of labor organizations during Bismarck's anti-Socialist laws (1878-90) or by the subsequent extremely favorable climate of what was called the springtime of social reform (*Sozialpolitischer Frühling*).

*War and Inflation.* With the outbreak of World War I wages began to climb at a faster rate. During the four years 1914-18 weekly earnings of Ruhr miners,<sup>6</sup> for instance, doubled—an increase that matched the gain achieved during the four preceding decades. The wartime rise in average weekly wages of course reflects an increase in hours. However, since the average number of hours worked per week probably did not increase much more than 10 percent during the course of the war,<sup>7</sup> hourly wages must have gone up approximately 80 percent.

<sup>4</sup> The earnings data were only recently derived and published. See W. Grumbach and F. König, "Beschäftigung und Löhne der deutschen Industriewirtschaft, 1888-1954," *Weltwirtschaftliches Archiv*, 1957, Heft 1, pp. 125-55. For a brief description of the data, see note to Appendix Table A-55.

<sup>5</sup> The index (presented in Chart 2) shows mainly retardations of growth and only two small actual declines (from 1900 to 1901 and from 1907 to 1908).

<sup>6</sup> Data on average weekly wages of coal miners in the Ruhr district were chosen to represent the broad tendencies during this decade. They are available throughout the period 1913-23 and correspond rather well to some broader indexes available for portions of the period. For details see notes to Appendix Table A-2.

<sup>7</sup> The increase to an average of about 11 hours a day may appear small, in view of the long working time in armament factories. However, the average is affected by short hours in certain civilian industries and by increasing part-time work in practically all industries.

Germany's defeat in 1918 and the resultant demobilization, cession of territories, occupation of the Ruhr, and hyperinflation brought about unusual phenomena in wage behavior. At first wages went up moderately; then they climbed at an increasingly rapid pace until, at the end of 1923, they reached fantastic heights—about a trillion times<sup>8</sup> prewar levels. Wage developments during war and inflation mark a dramatic interruption of long-term trends in German wage levels.

The stabilization of the currency in January 1924 brought prices and money wages down again to a mark-and-pfennig basis. The currency was stabilized by the government; one trillion old reichsmarks were to equal one new rentenmark. This placed the value of the stabilized mark roughly in line with the prewar currency. New wage levels were arrived at not by government decree but by collective bargaining processes. Both the employers and the trade unions formulated their proposals with reference to "normal" conditions such as had existed before the war. The employers' representatives held that, inasmuch as the national product had declined since 1913, wage rates should also be set below prewar levels.<sup>9</sup> The workers' spokesmen, on the other hand, pointed out that even with "gold" wages at prewar levels the laboring classes would suffer hardship, since the purchasing power of gold had decreased in comparison with 1913.<sup>10</sup>

The outcome of these negotiations showed that the bargaining power of the employers' organizations was stronger than that of the unions. Unemployment at that time was extremely high; at the end of 1923, 28 percent of union members were unemployed, and an additional 42 percent worked short time.<sup>11</sup> With the stabilization of January 1924 average hourly wage rates<sup>12</sup> were about 8 percent below 1913 levels. Weekly rates compared still less favorably with those of 1913 because of the reduction in working hours.

<sup>8</sup> There may be some danger of misunderstanding due to the different terms for large numbers used in Germany and in this country. The wage increase was 1,000,000,000,000 times—here called a trillion. For increases by 1,000,000,000 (the German *Milliarde*) the term billion will be used below.

<sup>9</sup> The *Vereinigung Deutscher Arbeitgeberverbände* (VDA) gave the following directions to its members: "The wage rate, expressed in rentenmarks, should not exceed two-thirds of prewar levels. The resultant decrease in income should be compensated by additional hours. Prevailing higher rates should be reduced. Arbitration decisions leading to higher rates should be prevented by nonparticipation of employers in the proceedings." Translated from Franz Nast, *Arbeitszeit und Arbeitslohn im Deutschen Baugewerbe, 1869-1925* (Frankfurt a/M, 1928), p. 92.

<sup>10</sup> For a recital of the arguments on both sides, see International Labour Office, "The Workers' Standard of Life in Countries with Depreciated Currencies," *Studies and Reports*, Series D, No. 15 (Geneva, 1925), p. 78.

<sup>11</sup> *Jahrbuch* 1928, p. 386.

<sup>12</sup> For 1913 and the period starting with January 1924 comprehensive wage rate statistics, compiled by the Statistische Reichsamt, are available. They cover the most important centers for each of twelve industries, and from 1928 on for each of eighteen. In each industry the wage rates are a combination of minimum time rates and standard piece rates for adult workers in selected representative occupations. For further description of these data, see notes to Appendix Table A-2.

*Weimar Prosperity and Depression.* In January 1924 living costs turned out to be about 30 percent above their 1913 level, a development that could scarcely have been foreseen by the parties to the wage negotiations. The high cost of living, coupled with the setting of wage rates below prewar levels, created enormous pressure toward wage increases. The steep upward trend of wages during 1924 and part of 1925 is to be regarded, therefore, as a poststabilization adjustment of the low initial wage levels. Hourly rates increased by 32 percent between January 1924 and January 1925, and went up another 20 percent between January 1925 and January 1926. The comparable increases in weekly rates were 33 percent and 18 percent respectively. The difference reflects minor changes in the length of the normal workweek.

From 1924 onward, wage levels can be followed on an annual basis in the form of hourly and weekly earnings, hourly rates, and—for the years 1924-29—weekly rates. These series are presented in Appendix Table A-2, Chart 2, and, for selected years, in Table 15. For 1924 to 1932, trend movements are difficult to determine because of the large cyclical amplitudes of wage movements during the 1926-29 expansion and the Great Depression that followed. On the average, over those nine years, hourly rates were about 54 percent above their 1913 levels (Table 15). The increase in hourly earnings was somewhat larger—66 percent. The greater increase in hourly earnings is due to the fact that they include voluntary payments in excess of minimum rates as well as premium pay for overtime and night work—elements which tended to play a larger role in the interwar period. The smaller increase in weekly earnings—36 percent—is due, of course, to the drop in working hours.<sup>13</sup>

*The National Socialist Expansion.* After March 1933 wage rates were set and controlled by the National Socialist regime. During the years of totalitarian rule continuing to 1945, wage rates were kept close to the depression levels of 1933,<sup>14</sup> despite the huge expansion of industrial production. In contrast to the rigid level of wage rates, hourly earnings between 1933 and 1944 rose 26 percent, weekly earnings 41 percent. The greater rise of weekly as compared with hourly earnings reflects the important influence of the increase in working hours. Compared with 1913 levels, on the other hand, the level of hourly earnings reached by the end of World War II was about 84 percent above 1913, that of weekly earnings only about 62 percent. The reason for the lower comparative showing of weekly earnings over this period lies, among other things, in the effect of part-time work, especially of women, on average weekly earnings during World War II.

*Gross Earnings and Net Earnings.* Thus far our observations on trends

<sup>13</sup> For weekly earnings and perhaps hourly rates as well, these averages may be considered to be roughly in line with secular trends as depicted in Chart 2. Averages of hourly earnings, however, are decidedly above long-term trends.

<sup>14</sup> It is true that these were minimum rates, but at the depth of the depression they were close to rates actually paid.

in wages have been based on "gross wages," that is, wages before deductions for taxes, social insurance contributions, and involuntary fees. It is desirable to present also a computation of "net earnings," that is, earnings after such deductions.

Average legal deductions from weekly earnings can be ascertained for some benchmark years of the period before World War I and for the years 1924-44. As a share of earnings, deductions increased from about 3 percent in 1890 to 6 percent in 1913, to 12 percent in 1929, and to about 15 percent during World War II. These amounts withheld went to pay taxes and social insurance contributions—the latter accounting for the greater part of such deductions throughout all the years.<sup>15</sup> Other contributions, such as union dues (and, in the Nazi period, Labor Front dues, quasi-compulsory contributions to the *Winterhilfe*, and so on) are not calculable for the whole period. They are estimated to have absorbed an additional 1 or 2 percent of weekly earnings in 1929, and 2 or 3 percent in 1941.<sup>16</sup> Data on gross and net weekly earnings are presented in Table 16. Although the trend of net earnings is not drastically different from that of gross earnings, the levels of average net earnings for, say, 1924-32 or 1933-39 would compare less favorably with prewar levels than average gross earnings would.

#### SELECTED RATES AND EARNINGS

Wage behavior cannot be studied on the basis of comprehensive indexes alone. Such series share the shortcomings of all aggregates in that they hide as much as they reveal. They do not show, for instance, the variety of divergent activities underlying the average levels; they understate the extent of fluctuation in the components; and they fail to record systematic changes in the structure of the aggregates. In the present wage analysis, the broad indexes conceal the differences in wage behavior as between industries, skill groups, men and women, regions of the country, and the like. Specifically, the only index of German wages available for the years 1871-1913 (Kuczynski), does not provide separate indexes for rates and earnings, or for daily, weekly, and annual wages, but instead combines all these wage types. Such a combination may have been inescapable if one sought to obtain the greatest possible comprehensiveness. But the result does not lend itself to the sort of analysis that deals with differential behavior of various wage types or with cyclical measures. For such analysis we must seek less comprehensive but more homogeneous data.

Several fairly homogeneous long-term series have been assembled in Appendix Tables A-3 through A-9 and are graphically presented in Charts 3, 4, and 5. From these series, important differences in wage behavior emerge. Hourly wage rates of unskilled building workers, for example,

<sup>15</sup> For details see *Wirtschaft und Statistik*, 1938, pp. 158-61.

<sup>16</sup> See René Livchen, "Net Wages and Real Wages in Germany," *International Labour Review*, July 1944, pp. 66-69.

TABLE 16  
Weekly Gross and Net Earnings, 1913 and 1925-1944

Year	WEEKLY GROSS EARNINGS		AVERAGE LEGAL DEDUCTIONS <sup>a</sup>		WEEKLY NET EARNINGS	
	1913= 100 (1)	Marks (2)	Percent (3)	Marks (4)	Marks (5)	1913= 100 (6)
1913	100.0	26.14	6.0	1.57	24.57	100.0
1924	91.2	23.84	7.5	1.79	22.05	89.7
1925	122.9	32.12	7.0	2.25	29.87	121.6
1926	127.6	33.35	9.0	3.00	30.35	123.5
1927	143.2	37.37	10.0	3.74	33.63	136.9
1928	163.8	42.81	11.5	4.92	37.89	154.2
1929	168.7	44.09	12.0	5.29	38.80	157.9
1930	155.4	40.61	12.0	4.87	35.74	145.5
1931	136.7	35.73	12.5	4.47	31.26	127.2
1932	112.9	29.51	12.5	3.69	25.82	105.1
1933	115.4	30.16	12.5	3.77	26.39	107.4
1934	123.8	32.36	13.0	4.21	28.15	114.6
1935	126.8	33.15	13.0	4.31	28.84	117.4
1936	131.6	34.39	13.5	4.64	29.75	121.1
1937	136.2	35.59	13.5	4.80	30.79	125.3
1938	142.8	37.31	14.0	5.22	32.09	130.6
1939	148.2	38.72	14.0	5.42	33.30	135.5
1940 <sup>b</sup>	152.6	39.89	15.0	5.98	33.91	138.0
1941	162.6	42.51	15.0	6.38	36.13	147.0
1942	163.6	42.76	15.0	6.41	36.35	147.9
1943	164.3	42.94	15.0	6.44	36.50	148.6
1944	162.4	42.45	15.0	6.38	36.14	147.1
Averages						
1924-32	135.8	35.49			31.71	129.1
1924-39	134.2	35.07			30.92	125.8
1924-44 <sup>b</sup>	140.6	36.75			32.08	130.6

<sup>a</sup> Deductions include taxes and social insurance contributions.

<sup>b</sup> The "Ostmark" is included from 1940 on.

SOURCE, by column:

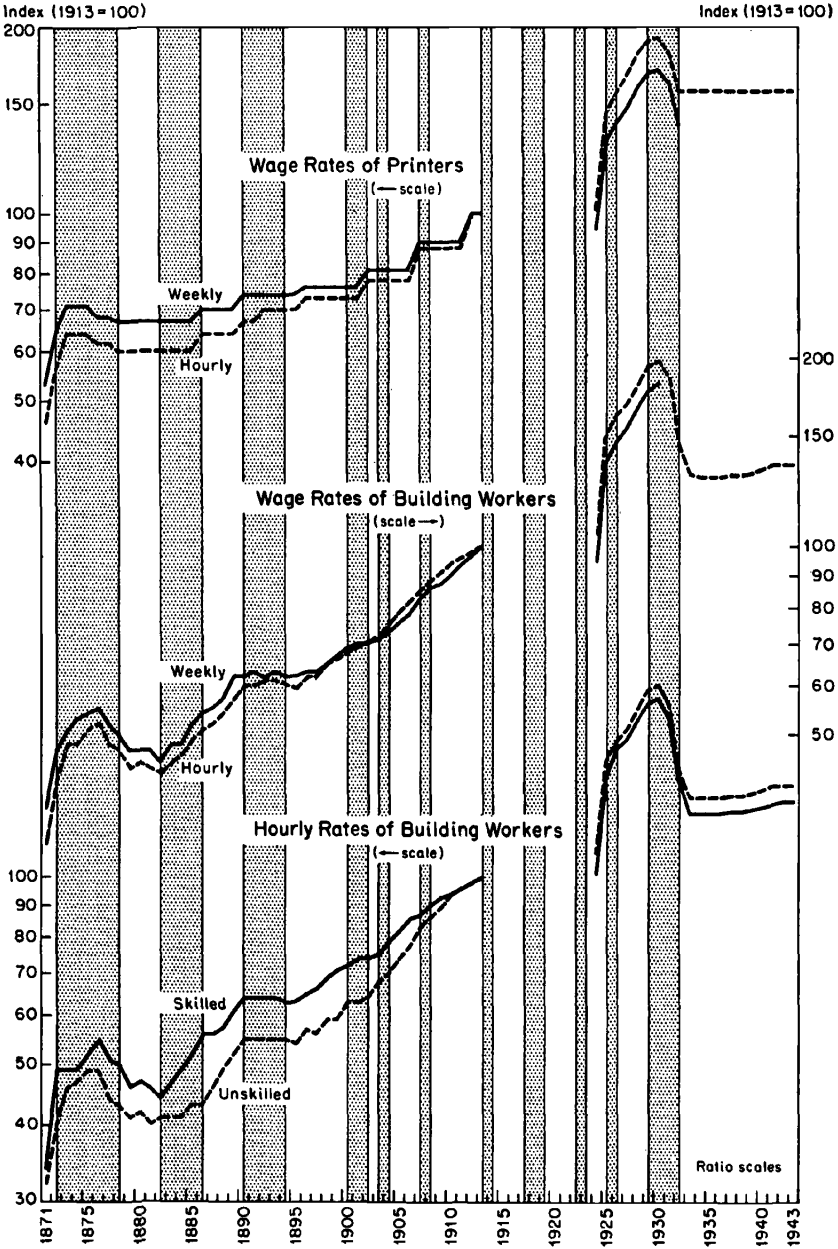
(1) Appendix Table A-2 and its sources.

(2) 1913-36, *Jahrbuch* 1941-42, p. 384. For 1937-44, based on 1936 levels and movement of index (col. 1).

(3) 1913 and 1928-37, *Wirtschaft und Statistik*, 1938, pp. 160-61. For 1924-27, Jürgen Kuczynski, *Germany 1800 to the Present Day*, p. 239. For 1938-41 René Livchen, "Net Wages and Real Wages in Germany," *International Labour Review*, July 1944, p. 67.

increased more than those of skilled building workers—particularly between 1890 and 1913, when rates of unskilled workers went up 82 percent and those of skilled workers only 56 percent (see Chart 3).

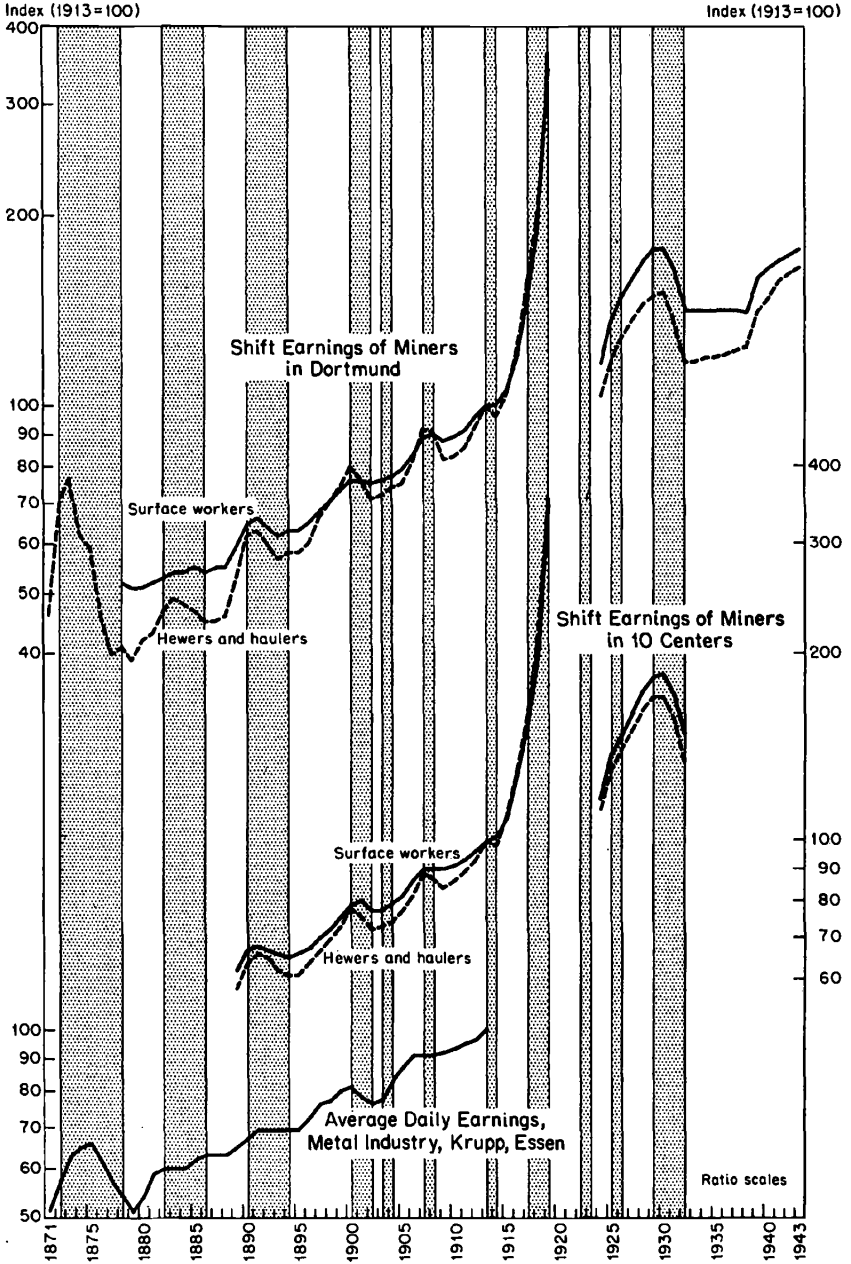
CHART 3  
 Wage Rates and Earnings, Printers and Building Workers,  
 1871-1913 and 1924-1943



Shaded areas represent business contractions.

Source: Appendix Tables A-3, A-4, and A-5.

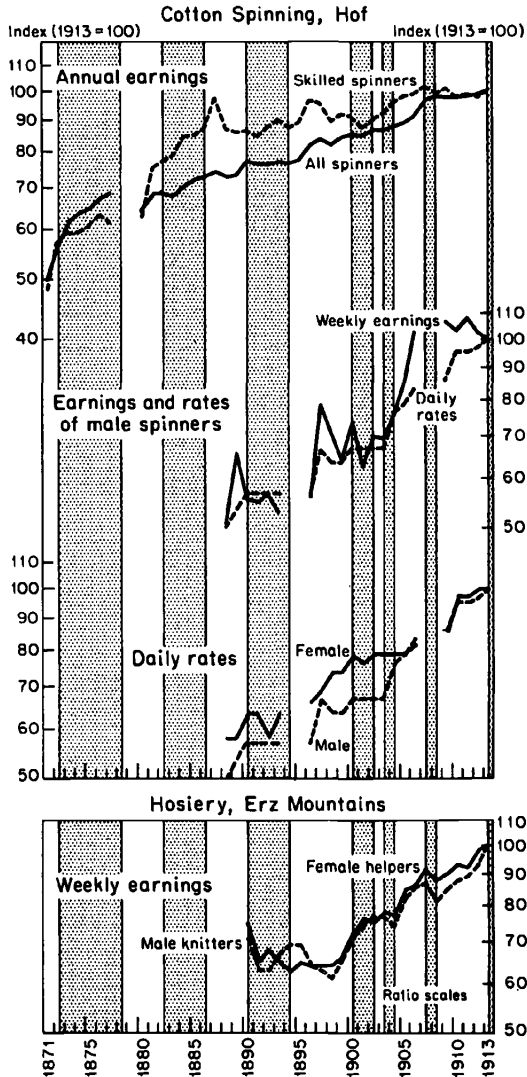
CHART 4  
Earnings of Miners and Metalworkers, 1871-1913 and 1924-1943



Shaded areas represent business contractions.  
Source: Appendix Table A-8.



CHART 5  
Wage Rates and Earnings, Textile Workers, 1871-1913



Shaded Areas represent business contractions.

Source: Appendix Tables A-9 and A-10.

Earnings of hewers and haulers, in Dortmund as well as in the combined ten mining centers, show considerably wider short-term fluctuations than earnings of mine workers above ground (see Chart 4). The earnings of a group of skilled cotton spinners in Hof fluctuate sharply, whereas wages of all workers in the entire spinning department show a fairly

smooth upward trend. Daily rates of male and female workers in the same cotton mill in Hof exhibit very divergent movements between 1888 and 1907 (see Chart 5).

Despite the divergences just noted, there remains a decided resemblance among all these series, and between them and the comprehensive indexes previously discussed. Thus we find that from 1871 to 1913 all wages go up, the smallest increase being 88 percent (weekly rates of printers), the largest 212 percent (hourly rates of unskilled building workers). The doubling of weekly wages assumed for the country as a whole is not incompatible with the movements of these sample series. The similarities are apparent also after World War I. From 1913 to the average of 1924-32 the comprehensive indexes of weekly earnings rose roughly 36 percent, and those of hourly earnings 66 percent. The comparable increases in the less comprehensive wage series ranged from 31 percent for shift earnings of underground coal miners in Dortmund to 70 percent for hourly rates of unskilled building workers. Obviously, as far as long-term trends are concerned, there is a marked uniformity in wage movements<sup>17</sup>—not difficult to explain. Labor is a relatively homogeneous economic category, at least to the extent that major long-term changes affecting the demand, supply, or costs of some labor are likely to affect all labor. Although, over the short term, labor markets are predominantly local, over the long term, substitution of skills and relatively high mobility within the country as a whole create the semblance of a national market.

Hourly wages increase more than weekly wages. This, of course, is a corollary of the trend toward the shorter workday and workweek. In examining the comprehensive indexes, it was necessary to infer the movement of hourly wages from 1871 to 1913 from our general knowledge of the decrease in working hours. However, for some industries, the derivation of hourly wages can be based on more adequate information. The decline in working time between 1871 and 1913 amounts to about 13 percent for both building and printing (see Appendix Tables A-3, A-4, and A-5). These percentages are somewhat lower than the 17 percent assumed for all industries in Germany, probably because both building and printing enjoyed a favorable initial situation during the early years of the Reich.<sup>18</sup> Between 1913 and, say, 1929, hourly rates of building workers went up

<sup>17</sup> Compared, for instance, with price trends. See the following section on Wages and Prices for further discussion.

<sup>18</sup> In printing, the point of decreasing returns from additional hours is reached relatively early, for in such work constant attention to detail is of paramount importance. Printers therefore have scarcely known the almost never-ending working day, characteristic, for example, of early textile operations. Furthermore, printers were the first to conclude nationwide labor contracts. Building workers had analogous advantages, notably the local character of their work—which excluded competition from outside areas and permitted local organizations to influence wage levels. Finally, the printing and building wage data presented here refer to fairly large cities, which led the way in reducing hours of work.

by 95 percent, while weekly rates reflected the general reduction in working hours. In this they resemble closely the conditions in manufacturing at large, as can be seen in the hourly and weekly wage rate indexes in Charts 2 and 3.

Rates and earnings for the same type of work, especially when given on an hourly basis, must be expected to move in fairly close unison over the long run. This resemblance is apparent in the data on wages of cotton spinners in Hof (Chart 5), despite the erratic fluctuations in earnings which reflect premium pay for overtime. It is also evident in the almost identical trends of hourly rates and hourly earnings for "all industry," as depicted in Chart 2.

### *Wages and Prices*

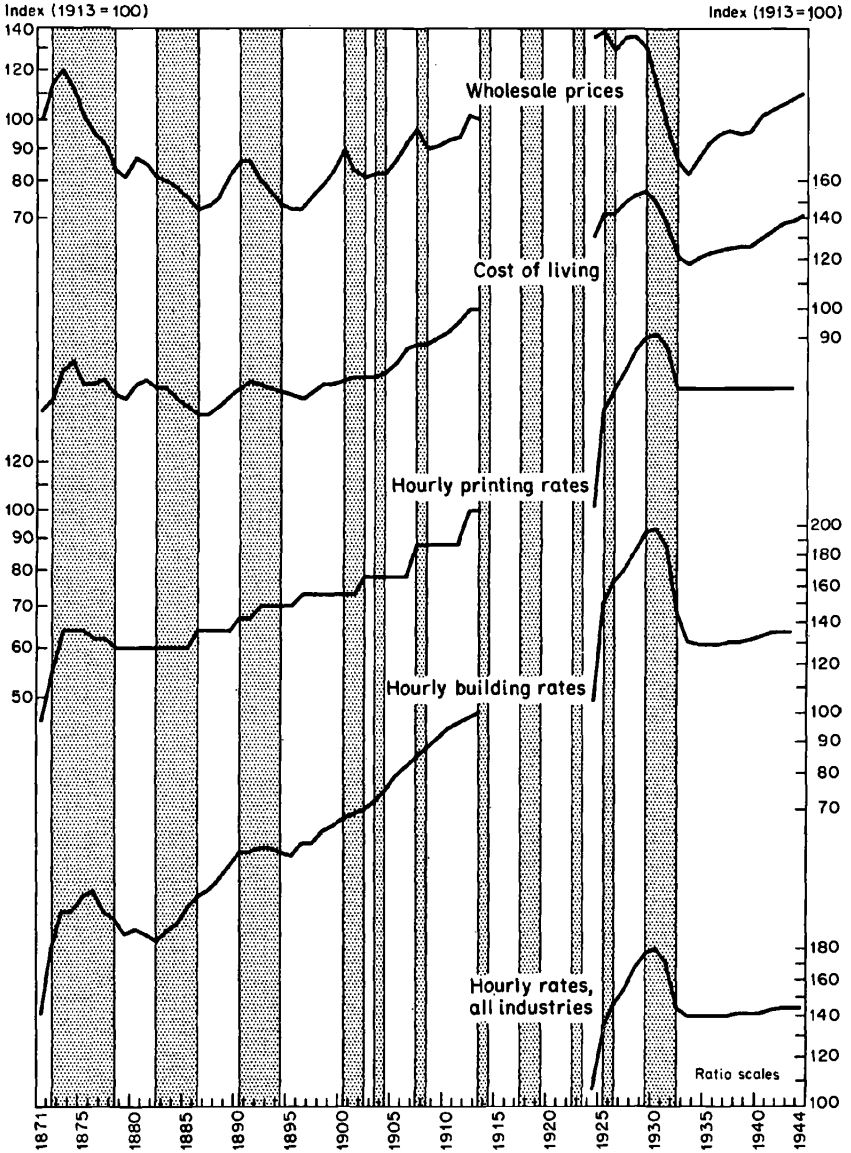
#### GENERAL

Since wage rates are in fact prices paid in one of the most important markets of an industrial economy, it is of theoretical interest to establish how prices for units of labor behave in comparison with other prices. Moreover, wage rates form a basic cost element in all business enterprises. It is important, therefore, to know how they move in comparison with other costs and with prices of finished products. Finally, from the point of view of income, a comparison of wages and prices is essential to an appraisal of the variable purchasing power of money wages. For such purposes, wages should be compared with retail prices of consumers' goods in proportions typically bought by wage earners—that is, with "living costs."

In any analysis of wages and prices over long periods of time, there are difficult problems of comparability. The product to which a historical price series refers—even if it is only a single commodity—will seldom remain unchanged. This is obviously true of manufactured goods, and sometimes may even apply to staples. Historical prices, too, are often ill defined and may vary over time with regard to details of quotation and terms of sale. Furthermore, index numbers must be used to make comparisons of sufficiently broad coverage, and since the movements of different prices vary widely, the selection of the series conditions the behavior of the index. Finally, there is the problem created by the changing relative importance of the goods included.

Similar difficulties arise on the side of wages. Jobs change in character in the course of technological progress; occupational designations are frequently inexact; index-number problems arise here too. And if we seek to compare wages and prices, we must remember also that the compared series typically refer to different markets. Labor markets and product markets can rarely be matched either industrially or regionally. For all these reasons, the reader is asked to keep in mind the unavoidable limitations in the following comparisons of wage rates and prices.

CHART 6  
Wage Rates and Prices, 1871-1913 and 1924-1944



Shaded areas represent business contractions.

Source: Appendix Tables A-1, A-2, A-3, and A-4.

## WAGE RATES AND WHOLESALE PRICES

From 1871 to 1944 wage rates rose while wholesale prices, on the average, did not. This is the most striking difference to be observed between the two trends. The historical index of wholesale prices computed by the Institut für Konjunkturforschung shows almost the same level in 1871, in 1913, and in 1944.<sup>19</sup> By contrast, wage rates trebled or quadrupled over the long period. This appears from examination of Appendix Tables A-3 and A-4, and from Chart 6.

During the period 1871-1913, wholesale prices followed part of a long cycle, from the *Gründerjahre* peak in 1873 to a double trough in 1886 and 1896, and up again to World War I. The long Kondratieff wave was modified by relatively sharp shorter cycles which corresponded by and large to changes in general business activity. Wage rates differed substantially from wholesale price movements in all the described respects. Instead of the Kondratieff movements they showed a general growth trend. Instead of returning to initial levels, they doubled or trebled. Except for the *Gründerjahre* cycle, the short-term fluctuations in wage rates were mild, as is frequent in series with steep upward slopes.<sup>20</sup> For 1913 and 1924-44, price-wage comparisons may be based on comprehensive measures in both fields. The Jacobs-Richter index is still used,<sup>21</sup> but the wage rates are now measured by average union rates in a large number of industries. From 1913 to 1933, prices increased only about 10 percent, wage rates as much as 44 percent. The intervening movements also are sharply differentiated, as can be seen on Chart 6.

The question arises why wage trends deviate so markedly from those of prices—why rates for labor can quadruple over seven decades while raw material prices fluctuate about the same level. The basic reason is, of course, the increasing productivity of labor, whereby the price of a unit of labor can rise without involving an increase in labor costs per unit of product. On the product side, rising productivity means a tendency toward reduction of labor input per unit and thus of prices. On the wage side, the dominant mechanisms produce pressures toward increased rates. Although wage rates can be and have been reduced in major contractions, they are rarely cut promptly and, if the contractions are short

<sup>19</sup> A. Jacobs and H. Richter, "Die Grosshandelspreise in Deutschland von 1792 bis 1934," *IKF Sonderheft* No. 37 (Berlin, 1935.) The index (hereafter referred to as Jacobs-Richter index) covers 13 major and 45 minor commodity groups of agricultural and industrial raw materials. For further description see Appendix Table A-1. The wholesale price index prepared by Otto Schmitz reports 1871 at 123 and 1913 at 127 percent of the 1879-88 level. See *Index Numbers of Wholesale Prices in the United States and Foreign Countries*, Bureau of Labor Statistics, Bul. 284, 1921.

<sup>20</sup> The foregoing statements are based on a comparison of wholesale prices and wage rates of printers and building workers, the only wage-rate series available for all years prior to 1913.

<sup>21</sup> The movements of the broader 400-commodity index of the Statistische Reichsamts deviate only in detail from those of the Jacobs-Richter index. But use of the latter is continued here since it is available for the entire period 1871-1945.

and mild, are usually left alone. This resistance to wage decreases, which will be discussed later in connection with the cyclical rigidity of rates, affects the course of wage trends, for if rates frequently go up and rarely go down their levels must gradually rise. Product prices are of course affected both by the tendency toward reduced labor input and that toward increased labor costs per hour. These forces balanced over the years under review, so that the available price indexes<sup>22</sup> stand, at the end of the Third Reich, approximately where they were at the beginning of the Second.

We may learn a little more about the comparative trends of wages and prices if we follow their course period by period (see Appendix Tables A-1 and A-2, and Chart 6). The decline of wholesale prices from the foundation of the Reich to the latter years of the century was largely an international phenomenon.<sup>23</sup> The wage rate increase during these years was made possible by the low initial level of wages relative to prices, and by the great advances of productivity during the early years of German industrialization. And the latter factor, perhaps abetted by the growth of unions, was presumably responsible for the fact that between 1890 and 1913 wage rates increased more rapidly than wholesale prices.

The relatively small increase of wage rates, compared with wholesale prices, between 1913 and 1924 must be understood in terms of the immediate postinflation situation. The dearth of supply, in the presence of a huge postponed demand for consumers' and producers' goods, made money "dear" and prices relatively high. However, the stabilization of 1924 came at a time when unemployment was already widespread and productivity relatively low. This situation encouraged efforts to restore profits by reducing labor costs and led to extremely low poststabilization wages. The subsequent years witnessed a reversal of trends: from 1924 to 1930 prices dropped slightly, but wages increased by about three-quarters. The price decline became possible through decisive improvements in production techniques brought about by the "rationalization movement," and through the rising volume of production during the late 1920's. The wage rise is attributable in part to these very increases in productivity, furthered by the poststabilization adjustments and favored by the prevailing social climate.

The economic realities of the Great Depression forced wage rates down sharply, although not to the same degree as wholesale prices. Finally, the behavior of prices and wages between 1933 and 1944 must be understood against the background of National Socialist economic policy. Stabilizing wage rates and permitting price rises helped to attain the "guns-before-butter" production goals of the new regime—in marked

<sup>22</sup> It would be desirable to compare wage rates with a broader price index, covering manufactured goods as well. Such an index is unfortunately not available for the period prior to 1913.

<sup>23</sup> It is sometimes explained as a consequence of decreasing gold production, increasing demand for gold for monetary purposes, and increasing production of commodities. Cf. *IKF Sonderheft* No. 37, p. 44.

contrast to the preceding expansion with its stable prices and increasing wage rates. All in all, the experience of 1871-1944 suggests that wage rates were rather independent of price changes.

Important among the findings that emerge from our data is the pronounced resemblance among wage trends, in contrast to the wide diversification among wholesale price trends. The latter is illustrated in the following tabulation:

Wholesale Prices, Jacobs-Richter Index,  
Selected Years, 1871-1933  
(1913 = 100)

	1871	1890	1913	1929	1933
Total index	100	86	100	131	82
Cattle	65	74	100	127	64
Vegetables	99	98	100	122	93
Building materials	128	100	100	163	101
Chemicals	183	89	100	120	59
Textiles	123	83	100	150	67

SOURCE: *IKF Sonderheft* No. 37, p. 83.

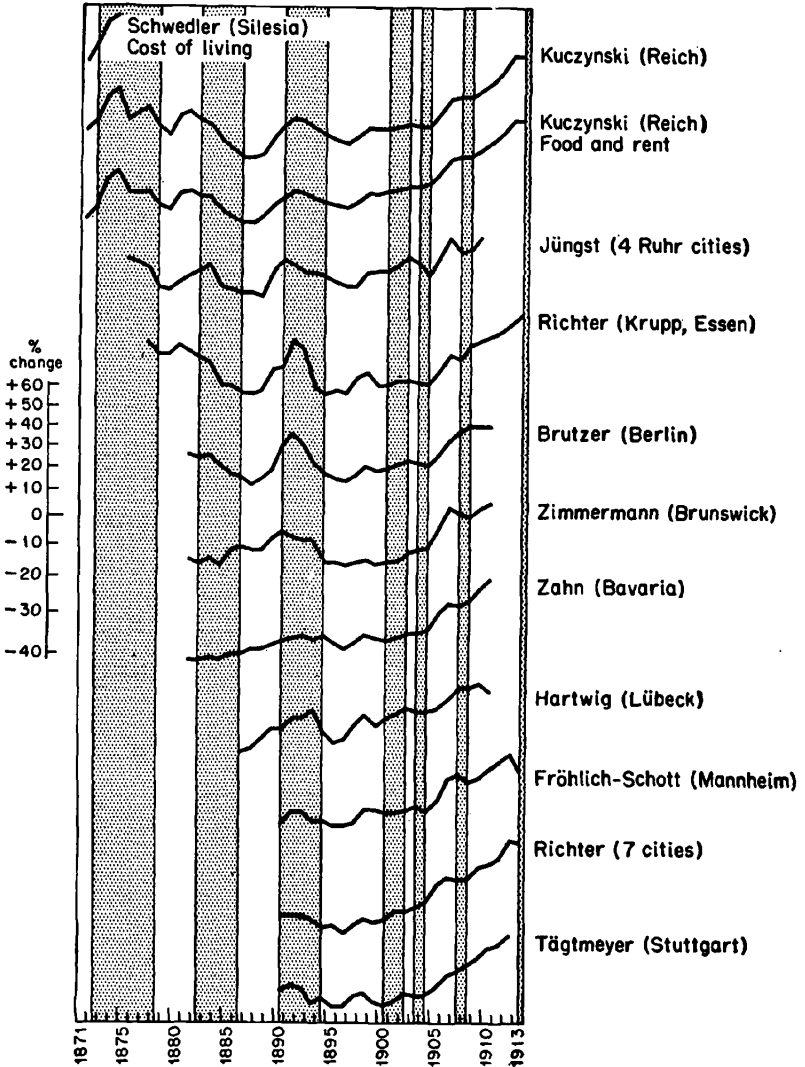
The homogeneity among wage trends can be explained by the substitutability of labor within skill groups, and by the fact that increased productivity affects the living costs of all workers in a similar way. The diversification of prices, on the other hand, reflects the limited substitution among commodities and the fact that productivity increases in one group of goods do not necessarily affect others. The data in the above tabulation bear on this point. Price trends are more diverse before than after 1913, as should be expected in a period of initial industrialization. It was in those early years that growth rates and productivity gains differed most sharply from one industry to another.

#### WAGE RATES AND RETAIL PRICES

The most striking aspect of the retail price index depicted in Chart 6 is the manner in which it follows a middle course between wholesale prices and wage rates. This can be observed both with regard to long-term trends and short-term movements.<sup>24</sup> While wage rates between 1871 and 1944 more than treble, and wholesale prices at the end of this period revert to their initial level, retail prices just about double. From 1871 moving toward the end of the century, wholesale prices decline and wage rates increase, whereas cost of living tends to maintain its level. From the turn of the century to the outbreak of World War I, the rise of living costs

<sup>24</sup> All observations on retail price behavior in this section will be based on cost of living data, that is, on prices of consumers' goods in proportions typically bought by working class families. For information about the nature and representativeness of the cost-of-living index numbers used up to 1913, see Chart 7, Appendix Table A-11 and its note. For postwar years, see Appendix Table A-33 and the discussion in Chapters 4 and 5.

CHART 7  
Cost of Living, 1871-1913



Except where otherwise indicated, the series cover food alone.  
Shaded areas represent business contractions.

Source: Appendix Table A-11.



again is intermediate between that of wholesale prices and wage rates. A deviation from this pattern occurs between 1913 and 1924, when cost of living increases more sharply than either wage rates or wholesale prices. This situation, brought about by the unrealistic setting of wage rates at the time of the stabilization, is soon corrected: after the poststabilization adjustment the "normal" situation is reestablished and cost of living, in relation to 1913, resumes its intermediate level. From 1925 to 1929, wholesale prices are stable, cost of living rises moderately, and wage rates sharply. During the Great Depression cost of living again plays its intermediate role: it declines more than wage rates, while wholesale prices slump more than the other two measures. Finally, between 1933 and 1944 wholesale prices rise markedly, wage rates little, and retail prices intermediately.<sup>25</sup>

An explanation of the intermediate position of retail prices between wholesale prices and wage rates may be that the proportion of labor costs is larger in retail prices than in wholesale prices. This would be true even for identical finished commodities, since distribution costs are to a large extent labor costs. It is certainly true of the wholesale and retail price indexes used in this study, inasmuch as the wholesale index represents largely raw materials and semifinished goods. Whenever there is a discrepancy between the movements of wholesale prices and wage rates, retail prices are likely to be affected by both trends. Modification in this relation may of course be brought about by different demand-supply conditions in wholesale markets, as compared with retail markets.

The closer resemblance of retail prices to wage rates, as compared with wholesale prices to wage rates, must have been furthered also by the frequent direct bearing of cost of living on wage determination. The steep increase in money wage levels between 1900 and 1913 was definitely influenced by the sharp rise in retail prices.<sup>26</sup> The relation of wage rates and cost of living emerges still more clearly during World War I and the Great Inflation. During the years of hyperinflation wage rates were in fact frequently geared by sliding scale agreements to the movements of cost of living. Also, the large poststabilization rise of wage rates in 1924-25

<sup>25</sup> The above description of the behavior of retail prices is presented in nonquantitative terms. Although the intermediate position of living costs is surprisingly well maintained, it cannot be described by a simple or a weighted average between wholesale prices and wage rates. The quantitative relation between the three measures changes over time, and it depends largely on the character and coverage of the particular wage and price indexes chosen. This suggests the limited reliability of estimates of cost-of-living behavior derived from wholesale prices and wages, for periods during which no reliable retail price statistics are available. Estimates of this sort have been presented by Rufus S. Tucker, in "Gold and the General Price Level," *Review of Economic Statistics*, January 1934, p. 9.

<sup>26</sup> This price development was commonly attributed to the high tariff and sales tax policies brought about by the coalition of "Steel and Rye" — a pact between heavy industry and Junkerdom. For a description of the pact and its social consequences see Alexander Gerschenkron, *Bread and Democracy in Germany* (University of California Press, 1943), particularly pp. 44, 62-64, 85.

could be traced to the gross maladjustment between wage rates and cost of living at the time of the currency reorganization.<sup>27</sup> While wage rates and wholesale prices are usually juxtaposed in tabular or graphic comparison, wages are frequently related to retail prices of consumers' goods in the form of quotients, called real wages. Rates or earnings are divided by cost-of-living indexes, and the results purport to show the changing purchasing power of the given wage payments. While this device has distinct merits as long as consumption habits remain fairly stable, it loses some of its significance whenever such conditions do not prevail. Indeed, the result of the deflation of wages by cost of living becomes more difficult to interpret the greater the change in consumption patterns. Such changes are greatest over long periods of time and during wars or other national emergencies. And it is precisely for such periods of broad changes in consumption patterns and price levels that statistical adjustment of money wages by living costs is most needed and least successful. Yet despite its shortcomings, the division of wages by living costs is an indispensable tool of wage analysis. Trends in the resultant "real wages" will now be discussed.

### *Real Wages*

#### GENERAL

Average weekly real earnings increased by about 55 percent from 1871 to 1944, a record quite different from the trebling of money earnings already noted. The difference is produced, of course, by the doubling of retail prices for consumers' goods, which markedly reduced the purchasing power of the increased money earnings. From the beginning of our period up to 1913, weekly real earnings increased 35 percent, or 0.7 percent per annum on the average. From 1913 to 1944 the total increase was 15 percent and the annual average increase 0.45 percent. Thus—in contrast to the continuity of money wage trends—the average rate of growth in weekly real earnings was significantly lower for the period after World War I than for the earlier period. The corresponding increases for hourly earnings are 64 percent (or 1.2 percent per year) before World War I and 30 percent (or 0.9 percent per year) between 1913 and 1944. These observations on real wages are based on Table 17, Chart 8, and the data presented in Appendix Tables A-12 and A-13. Chart 8 points, moreover, to a major change in the direction of the trend of real earnings, which occurred about 1913. The break is more pronounced for weekly real earnings than for hourly real earnings, because of the sharp reduction of working hours between the era of the Kaiserreich and that of the Weimar Republic.

The general growth in real wage levels before World War I, the break in trends after 1913, and the emergence of a second trend segment starting

<sup>27</sup> Cost-of-living advances influence changes not only in wage levels but also in the wage structure, a relationship to be discussed in detail in Chapter 3.

TABLE 17  
Real Wages and per Capita Production, Selected Years, 1871-1944  
(1913 = 100)

Year	Real Hourly Wages		Real Weekly Earnings		Per Capita Production	
	Rates	Earnings	Gross	Net	Consumers' Goods	Total
	(1)	(2)	(3)	(4)	(5)	(6)
1871	...	61	74	78	57	34
1880	...	61	70	71	52	37
1890	...	77	87	88	76	55
1900	...	91	98	99	86	77
1913	100	100	100	100	100	100
1924	82	86	70	69	92	74
1929	115	130	110	102	101	106
1932	120	125	94	87	79	61
1939	112	133	117	108	110	127
1944	102	130	115	104	...	...
Averages						
1924-32	108	117	96	91	94	88
1924-39	111	121	101	94	95	94
1924-44	109	124	105	97	...	...

SOURCE, by column:

1871-1913

(2) Money wages, Table 1; deflated by cost-of-living index, Appendix Table A-1. (3, 5, 6) Appendix Table A-13.

(4) Real weekly gross earnings less social insurance contributions (0%, 3%, 3%, 4%, 5% for 1871, 1880, 1890, 1900, and 1913 respectively). See Jürgen Kuczynski, *Germany, 1800 to the Present Day*, p. 134.

1913-1944

(1 to 3, 5, 6) Appendix Table A-13.

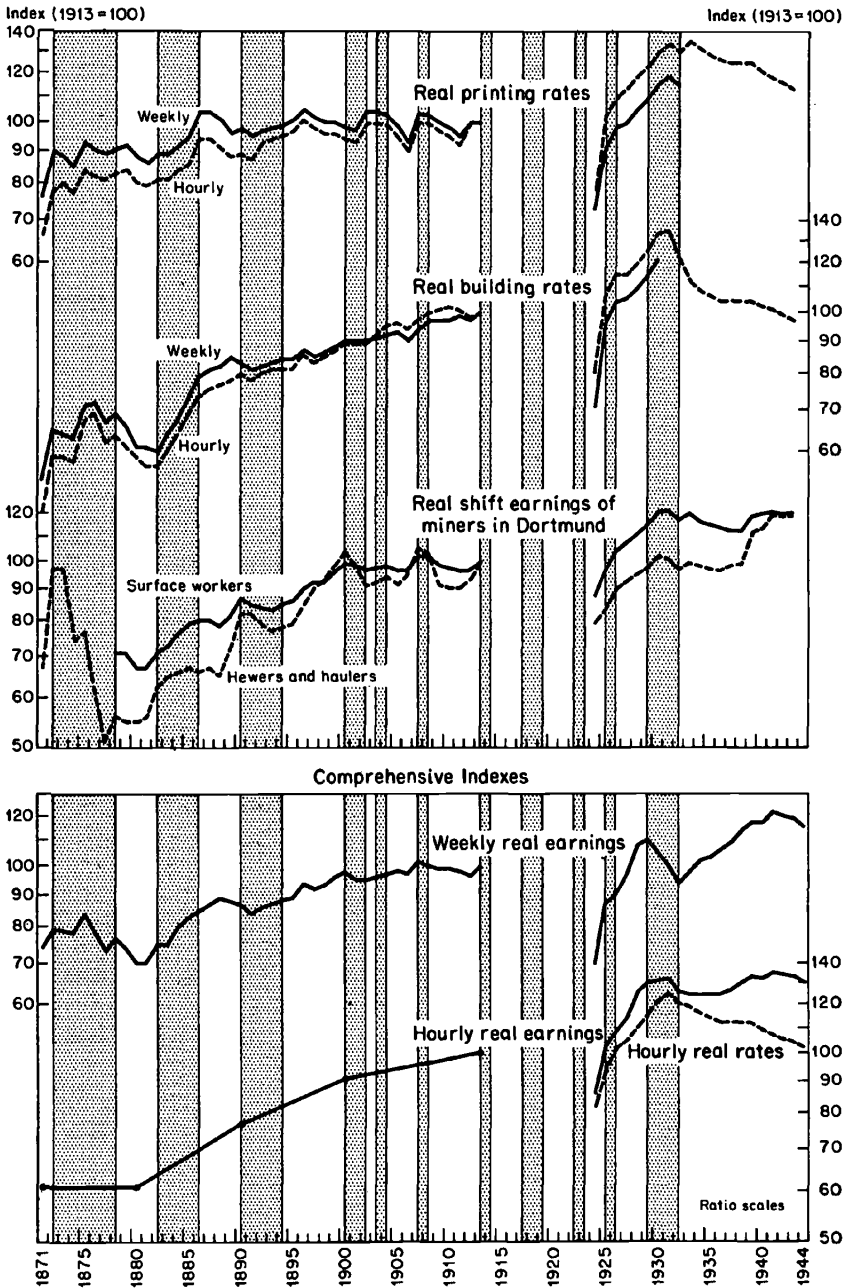
(4) Net money earnings, Table 2; deflated by cost-of-living index, Appendix Table A-1.

at low levels but exhibiting sharp growth rates—all these developments must be understood against the background of German economic history. The relation between real-wage behavior and general economic trends will be set forth in the period-by-period description of real wages with which the rest of this chapter is concerned.

## 1871 TO WORLD WAR I

Average weekly real earnings roughly followed the economic fortunes of the *Gründerjahre* by first rising and then falling, until the beginning of the 1890's. In 1880 and 1881 real earnings were lower than they had been in 1871; from then on they went up. After a rather steep rise during the 1890's and part of the subsequent decade, the growth lost momentum and

CHART 8  
Real Wages, 1871-1913 and 1924-1944



Shaded areas represent business contractions.  
Source: Appendix Tables A-12 and A-13, and Table 17.

weekly real earnings began to level out. In fact, between 1900 and 1913, the increase in weekly real earnings amounted to only 2 percent.

According to the data presented in the tables and charts just mentioned, the level of weekly real earnings reached in 1900 was not significantly exceeded until 28 years later—and then only during the four years 1928-31, by an average of about 6 percent.<sup>28</sup> Thus, for practical purposes, weekly real earnings appear to have reached their upper peacetime limits as early as 1900. This finding seems so startling that it calls for corroboration from outside sources. Some evidence can be obtained from other computations of real earnings, from the notes of contemporary observers, and from reports on the behavior of related economic measures, such as per capita real income.

The findings from such corroborative evidence may be summarized as follows. Some students, working with smaller segments of the German wage and price picture, have found that real earnings increased by 16 to 36 percent between 1890 and 1913;<sup>29</sup> others have found that they remained virtually the same,<sup>30</sup> while still others have reported a decline in real earnings of as much as 17 percent between 1900 and 1910, possibly less between 1900 and 1913.<sup>31</sup>

For the five to eight years preceding World War I the yearbooks of many unions contain discussions of price developments and their effects on the earnings of workers. It may be significant that the yearbooks of textile workers' and food workers' unions contain reports implying actual decreases of real wages for at least some of their members and comment bitterly on the duties and indirect taxes held responsible for the rises in living costs.<sup>32</sup> The yearbooks of metalworkers' unions merely state that increasing prices forced them to intensify their fight for higher wages.<sup>33</sup> Obviously real-wage experience during that period varied greatly from industry to industry. Victor Böhmert, one of the pioneers in the field of German labor statistics, reported at the end of 1909 and 1910 that the lower income groups in particular were suffering from recent steep price increases. He pointed out that some industries favored by patents and

<sup>28</sup> It was again exceeded in the course of the armament prosperity under National Socialism, but the significance of that excess is doubtful, a point to be discussed later on.

<sup>29</sup> See, for instance, Adam Müller, *Reallöhne vor und nach dem Kriege in Südwestdeutschland* (Frankfurt a/M, 1930), pp. 63-65.

<sup>30</sup> For example, Kurt Richter, *Die Reallohnbewegung in Deutschland, England und den Vereinigten Staaten von Amerika, 1890-1913, insbesondere in ihrer Beziehung zur Golderzeugung* (Würzburg, 1937), Table 9, facing p. 68.

<sup>31</sup> Carl von Tyszka, "Löhne und Lebenskosten in Westeuropa, 1914," Verein für Sozialpolitik, *Schriften*, Vol. 145 III, p. 289. This estimate was made contemporaneously—von Tyszka, a trained observer, obviously considered a decline of the given extent as compatible with his personal observations.

<sup>32</sup> See, for example, Verband der Bäcker, Konditoren und verwandten Berufsgenossen Deutschlands, *Jahrbuch* 1909 (Hamburg), pp. 14-16; *Jahrbuch* 1912, p. 17; *Jahrbuch* 1913, *passim*.

<sup>33</sup> Deutscher Metallarbeiterverband, *Jahr- und Handbuch* 1908, p. 91; also 1910, p. 62, and 1912, p. 77.

protective tariffs were paying sufficiently high wages to compensate for the high price levels. This was true, for instance, in the machinery industry, in building, furniture making, book and art printing, and embroidering. On the other hand, millions of unskilled workers and day laborers as well as broad sections of the lower middle classes were hard hit by the price advances.<sup>34</sup> A final, indirect check on the course of real wages is provided by per capita real national income. The increase of per capita money income (by about 35 percent) between 1900 and 1913 is almost matched by that of retail prices (about 30 percent)—for an increase of per capita real income of about 4 percent between these years. All in all, the corroborative evidence confirms the finding of this study that weekly real earnings leveled off after 1900. Hence it must be accepted as fact that, though money earnings increased by about a third between 1900 and 1913, the gain was largely offset by price increases in consumers' goods. A minority of German workers suffered an actual decrease in real earnings; a majority experienced stability or a moderate rise, with the average real earnings level advancing by only a small percentage.

It should not be assumed, however, that the two decades prior to World War I brought no benefits to German wage earners. While average weekly real earnings remained almost static, working time per week declined. In other words, real earnings per hour increased during these years. A rough adjustment of weekly earnings for reductions in hours shows that from 1871 to 1913 average hourly real earnings increased by about 64 percent. From 1890 to 1900 the rise amounted to 18 percent and from 1900 to 1913 to about 10 percent.

#### WAR AND INFLATION

World War I brought one of the sharpest drops in average real earnings during the entire wage history of the Reich. Despite the doubling of money wages during 1914-18, average real weekly earnings decreased every year, reaching a level about 35 percent below prewar standards by the end of the war. These observations are based on the wage and cost-of-living information published by the Statistische Reichsamt.<sup>35</sup> From 1918 on, real earnings began to increase considerably. In 1919 they were within 20 percent of prewar levels, in 1921 within 10 percent. However, the frenzied race between prices and wages during the last two years of the Great Inflation was definitely lost by wages. Average weekly earnings during 1922 and 1923 were 30 percent below 1913 levels. In comparing inflation levels with 1913 real earnings levels, a clear distinction must be made between weekly and hourly earnings. While the workweek may have

<sup>34</sup> See periodical *Der Arbeiterfreund*, 1909, pp. 454-55; and 1910, p. 440.

<sup>35</sup> For the war years it is not possible to make separate statements on weekly and hourly earnings. The length of the working day increased in the war industries, but decreased in several consumers' goods industries. On the average, the working day just prior to the final defeat was probably somewhat longer than ten hours. See Chapter 1, section on Trends in Hours of Work.

averaged 60 hours in 1913, it was reduced by law to 48 hours during the 1919-23 period. This means that at their peak, in 1921, average hourly real earnings must have been about 11 percent above those of 1913, and in 1922 and 1923 about 12 percent below the 1913 levels.<sup>38</sup>

#### WEIMAR PROSPERITY AND DEPRESSION

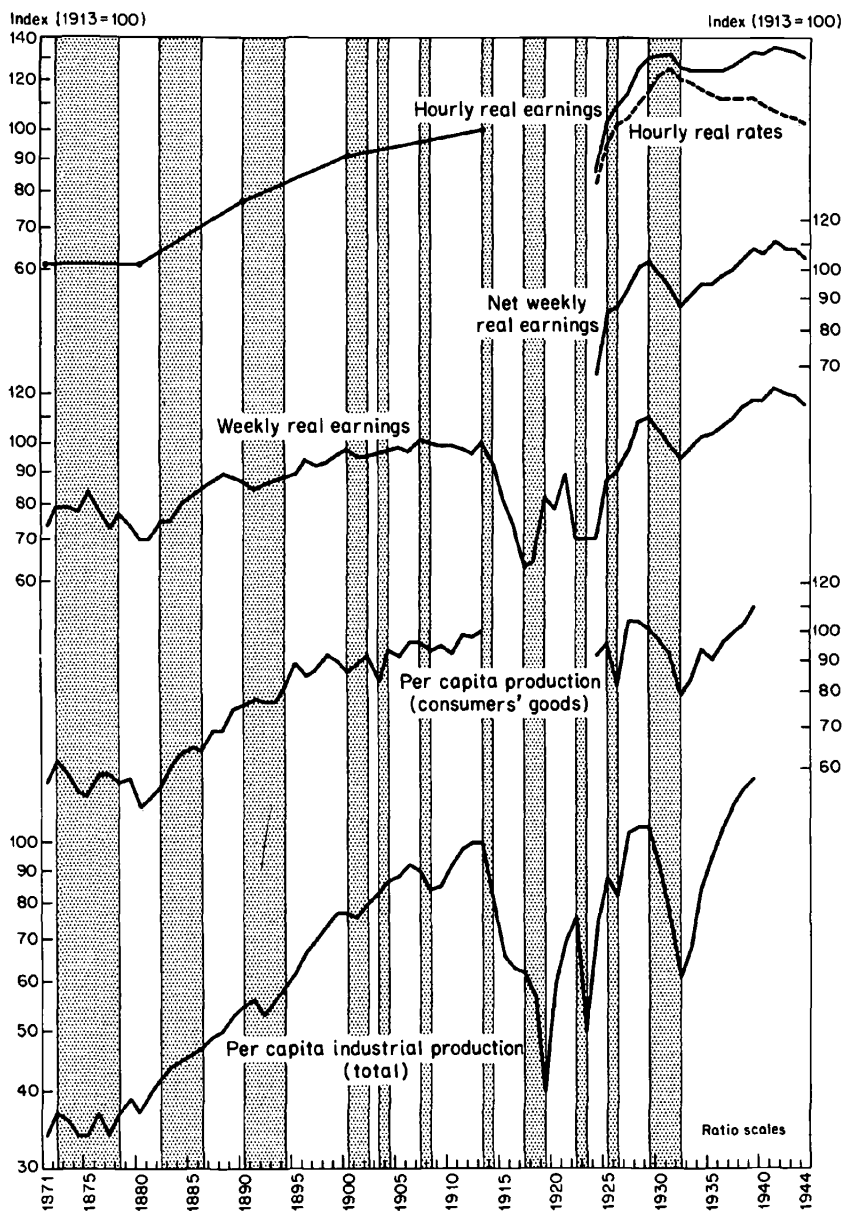
In January 1924 hourly money wage rates were 8 percent below 1913, and weekly rates 16 percent below. Since the cost of living had advanced by about 30 percent during this period, the poststabilization rate of real wages was close to 30 percent below 1913 for hourly, and 35 percent below 1913 for weekly rates. This situation led to the strong pressures toward increases in money wages, previously described. Here it must be added that the rapid rise in money wages, following the low stabilization levels, was accompanied by further advances in prices of consumers' goods which no doubt affected the extent and duration of the poststabilization adjustment of money wages. However, the net effect of this race between wages and prices was a substantial increase in real wages from their low stabilization levels. Between January 1924 and January 1925, hourly real wage rates increased by 24 percent, in the following twelve months by 16 percent—resulting in an increase of 45 percent during these two years, though even in 1925 hourly real wage rates stood at 5 percent below those of 1913. The increases in weekly real rates between the two 12-month periods were 26 percent and 15 percent respectively, again amounting to 45 percent for the two years, yet the level reached in 1925 was 12 percent below that of 1913.

Chart 8 and Appendix Table A-13 (Part III) show the movement of rates and earnings during the years following the stabilization of the currency. Hourly real rates went up 40 percent from 1924 to 1929, reaching a point about 15 percent above 1913. The comparable increase in weekly rates was 37 percent, but their relative standing in the prosperous year of 1929 was only 3 percent above 1913. It should be remembered that these rates are minima set for designated occupations and that, particularly in prosperous years, they were exceeded by rates actually paid and still more by average earnings.

In hourly earnings, the excesses over minimum rates are attributable to voluntary payments above the minima as well as to premium rates for overtime, night, and Sunday work. For weekly earnings, the increase in hours worked per week adds to the discrepancy. In both cases changes in the composition of the working force and in the nature of the work itself tend to modify earnings. For these reasons the increase in earnings between 1924 and 1929 exceeds that of rates. Hourly real earnings increased 51 percent during that period, weekly real earnings 57 percent. It may be

<sup>38</sup> For *all* German workers the average working day was about 10 hours in 1913 and 8 hours in 1919-23. For workers covered by collective agreements it was about 9½ hours in 1913 and 8 hours in 1919-23.

CHART 9  
Real Wages and Production, 1871–1944



Shaded areas represent business contractions.

Source: Table 17 and Appendix Tables A-13 and A-49. Net weekly real earnings computed from Table 16 and Appendix Table A-49.



noted that hourly real rates and hourly real earnings continued their advance beyond 1929, reaching a peak as late as 1931. At their highest point before the Great Depression, hourly real earnings reached a level 32 percent above that prevailing before World War I, whereas weekly real earnings never exceeded 1913 levels by more than 10 percent.

During the Great Depression the sharp reductions in money wages were accompanied by declines in living costs. These declines were greater than those of hourly rates; consequently they led to an increase in real wage rates and dampened the decline in real earnings, both hourly and weekly. The postinflation years of the Weimar Republic, 1924-32, show average hourly real earnings 17 percent above the levels reached before World War I, but average weekly real earnings 4 percent below.

### THE NATIONAL SOCIALIST EXPANSION

The advent of the National Socialist dictatorship brought about basic changes in real wage trends. The virtual stabilization of money wage rates at depression levels, in the face of rising living costs, led to a gradual decline of hourly real rates. By the end of the World War II these rates had about returned to 1913 levels. This decline in real rates could, however, be counterbalanced by efficiency premiums, by overtime payments, by shifts into more highly paid jobs. Thus average hourly real earnings stayed at about 1933 levels until 1936, then increased by about 9 percent to their peak in 1941, and finally slid down by a few percent toward the end of the war. The 1941 standing was an all-time high—it was 4 percent above 1929, 35 percent above 1913, and 121 percent above 1871 levels.

In comparison to hourly real earnings, weekly real earnings showed a considerably steeper rise during the period of National Socialism. Between their low point in 1932 and their peak in 1941 they increased 30 percent. Like hourly earnings, they show a small decline from 1941 to the end of the war. Their standing in 1944, the last year for which information is available, was 5 percent above 1929, 15 percent above 1913, and 56 percent above 1871 levels.<sup>37</sup>

### *Real Wages and Production*

#### COMPARISON OF TRENDS

The relation of real wage movements to changes in economic conditions is now to be investigated by comparison of real earnings with trends in production per capita of population. The relevant data are to be found in Table 17, Chart 9 and Appendix Table A-13.

In Chart 9 we may observe a marked resemblance between per capita production and trends in real earnings. In fact, it seems that the behavior of real wages can be explained largely in terms of changes in economic

<sup>37</sup> For a critical discussion of these measures, see Chapter 5, pp. 260ff.

conditions as reflected in per capita industrial production. The steeply increasing trend of industrial production during the initial industrialization of the German economy, 1871-1900, corresponds to the general rise in real earnings. The decline in the rate of production growth and the more pronounced cyclical fluctuations between 1900 and 1913 coincide with the gradual leveling off in the upward trend of weekly real earnings. The break in trend at 1913, and the decline during World War I are shared by *real earnings and per capita production*. And so are the main features of the subsequent development—the steep general interwar movement as well as many of the short-term fluctuations, such as the postwar recovery, the hyperinflation decline, the poststabilization recovery, the ups and downs of Weimar prosperity and depression, and the expansion under National Socialism.

Trend slopes shown by total per capita production are steeper than those of real earnings, largely because of the sharp rise in producers' goods production. Comparison of per capita production of consumers' goods and real earnings shows a stronger resemblance in trend slopes, a not unexpected development in view of the somewhat closer economic relation of real earnings to consumers' than to producers' goods.<sup>38</sup>

#### LEVELS BEFORE AND AFTER WORLD WAR I

Among the major findings of the preceding portions of this study are the breaks in real-wage and production trends brought about by World War I, and the unfavorable position of their postwar levels as compared with those of 1913. Here we shall examine these levels in quantitative terms. According to Table 17, hourly real rates during the interwar period (1924-39) lie around 10 percent above 1913 levels, hourly real earnings about 20 percent above. But this advance is almost exactly compensated by the decline in hours, so that average weekly real gross earnings during these years are at practically the same level as they were shortly before the outbreak of World War I. This finding corresponds roughly to the fact that average per capita production levels during the interwar period were slightly below those of 1913. If allowance is made for legal deductions from wages, the correspondence becomes closer. Weekly real net earnings during the interwar period average 6 percent below 1913 levels—exactly the same as per capita production. The averages for the 1924-32 period also are close: net weekly real earnings during this period average 9 percent below 1913 levels, compared with 12 percent in the case of per capita production. Perhaps a more instructive comparison would be that between real wages and production of consumers' goods. For the interwar period and for the 1924-32 period, the levels relative to 1913 are again rather similar.

<sup>38</sup> There are, of course, important factors, such as unemployment, savings, inventories, making for differences between the behavior of real earnings and of consumers' goods production.

## CONCLUSION

The resemblance between real earnings and per capita production, with regard both to trends and to interwar levels, calls for cautious interpretation. The coverage of the two series is basically different. The production indexes relate to all manufactured goods, whereas the real earnings series relate to the purchasing power (applicable to manufactured and non-manufactured consumers' goods, services, and savings) of employed industrial wage earners only. Thus the precise matching of average interwar levels, at 94 percent of 1913, is coincidental and has no economic significance. The significant result of the comparison lies in the finding that real wage trends tended to follow the economic fortunes of the country and are to be explained largely in those trends.

There is no doubt that the behavior of wages is affected also, particularly over shorter periods, by conditions other than broad economic trends. Such influences will be examined in Chapters 4 and 5, which deal with wage behavior during business cycles and during abnormal economic conditions. For the present, however, we are still concerned with long-term trends, specifically with long-term changes in the wage structure. This is the subject of the following chapter.

## CHAPTER 3

### The Structure of Wages

BEFORE analyzing the data relating to long-term changes in the structure of German wages for the period 1871-1945, a warning is in order about certain limitations in the basic materials available to us. Ideally, we should have at our disposal a body of information that would enable us to classify rates and earnings by skill, age, sex, region, industry, size of city, size of establishment, degree of cartel control, extent of union organization, and perhaps other relevant characteristics. Unfortunately, the materials at hand are inadequate for such thorough cross-classification. Thus, especially for the first four decades, the analysis can provide only a meager indication of major trends. The data are somewhat richer from 1913 on; for that year, and for the period 1924-43, there are union rate statistics which offer some guidance for the evaluation of wage differentials and of changes in them. These union rates are broken down by skill, sex, and industry. Moreover, for part of the twenty-year period, such data exist for representative regional centers in each industry. There are also occasional breakdowns of wage rates by age groups.<sup>1</sup>

In the present chapter—and always within the limitations just noted—the task is to trace long-term changes in the wage structure with respect to two major groups of differentials.<sup>2</sup> The first comprises wage differentials relating to characteristics of the workers themselves, that is, skill, age, and sex. The second brings together differentials relating to the character and location of employment, that is, industry, region, and size of city. Some of these characteristics are, of course, closely interrelated. Thus, advanced skills are more frequent among male than among female workers; heavy industries are concentrated predominantly in large cities and in the western and northern parts of Germany. But even where there is no apparent interrelationship, one can compute only in rare cases the “pure” or “net” differentials by which to measure the effects upon wages of variations in a single characteristic. In general, differentials must frequently remain in an “impure” or “gross” form, expressing, for example,

<sup>1</sup> Investigation of wage structure might, of course, include other aspects, such as analysis of wage payments by size (wage income distribution). Information on this subject is extremely scanty. For an analysis of wage income along these lines, based on social insurance contributions, see “Die Schichtung der Lohneinkommen: Statistik der Beiträge zur Invalidenversicherung 1929 bis 32,” *Vierteljahrshäfte zur Statistik des Deutschen Reichs*, 1932, iv, p. 82. A recent study dealing with the explanation and function of wage differentials is Friedrich Fürstenberg, *Probleme der Lohnstruktur* (Tübingen, 1958.)

<sup>2</sup> In this study the term “wage differential” denotes the difference between the lower and the higher wage level, expressed in percent of the higher. The skill “differential” (skilled less unskilled, in percent of skilled) and the skill “ratio” (unskilled in percent of skilled) add up to 100 percent.

differences between men's and women's wages without taking into account variations in skill or other factors.

### *Differentials Relating to Type of Worker*

#### SKILL DIFFERENTIALS

The evidence indicates a decrease of skill differentials between the beginning and the end of our period (see Appendix Table A-14 and Chart 10). Building is the only industry for which skill differentials can be computed in an unbroken record extending from 1871 through 1943. In 1871 hourly wage rates for unskilled building workers in Berlin, Nuremberg, and Rostock represented about 70 percent of those for skilled workers. In 1943 unskilled building workers earned about 80 percent of the wages of skilled workers.<sup>3</sup> There are other series on skill differentials at our disposal but they cover only segments of the long period.

Even a casual inspection of the charted material shows that the tendency toward decreasing skill differentials did not assert itself in all subperiods, and that when it was present it varied greatly in strength. Let us now follow the course of skill differentials period by period.

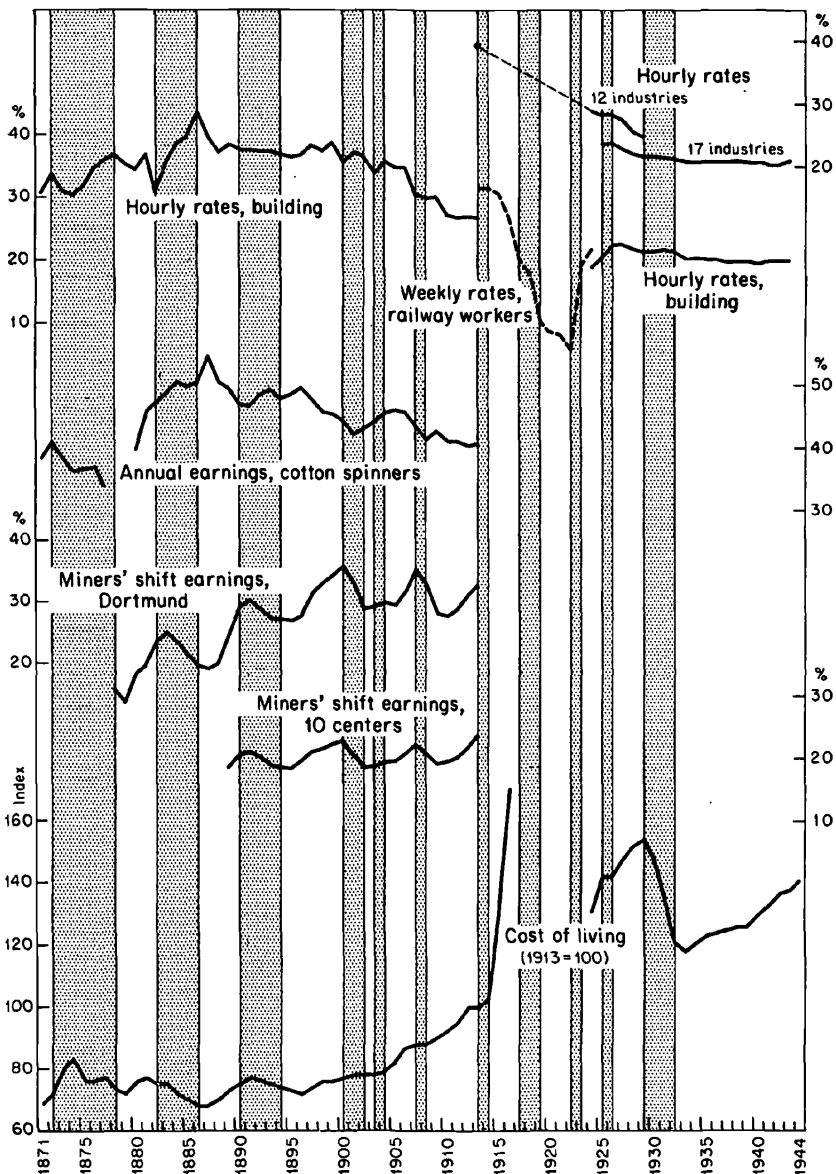
*1871-1913.* During the first two decades, the gap between wages of skilled and unskilled workers widened; during the last two or three decades before the outbreak of World War I, it tended to narrow. This appears clearly in the differentials for building workers and cotton spinners, depicted in Chart 10. With some differences in timing and amplitude, this "long cycle" in skill differentials is also suggested in the mining series given in Appendix Table A-14.<sup>4</sup> The net effect of the widening and narrowing of skill differentials during the period 1871-1913 cannot be definitely ascertained on the basis of the available evidence. If there was a net change it cannot have been marked. However, the narrowing of skill differentials

<sup>3</sup> The latter ratio is based on all cities, so that the two ratios are not comparable in coverage. However, in 1913 (the only year available for both samples) the differentials are similar enough to justify the long-term comparison. Masons or carpenters are used as representative of "skilled" occupations, their helpers as representative of "unskilled."

<sup>4</sup> Only the differentials for building workers are reasonably "pure." For cotton spinning, earnings of skilled spinners are compared with those of the whole spinning department—including largely unskilled women, but also some skilled and unskilled men. Skill differentials for mining workers are "gross," since the division between underground and surface workers corresponds only roughly with that between skilled and unskilled.

Further pairs of wage series, permitting computation of skill differentials for this period, may be found in the following sources: Robert Kuczynski, *Arbeitslohn und Arbeitszeit in Europa und Amerika, 1870-1909* (Berlin, 1913), pp. 30, 62, 67, 71, 120, 138, 258, 308, 294, 302; and by the same author, *Die Entwicklung der gewerblichen Löhne seit der Begründung des Deutschen Reiches* (Berlin, 1909), pp. 87, 94; Franz Thieme, "Die Entwicklung der Preise und ihre Bedeutung für die wirtschaftliche Lage der Bevölkerung in der Stadt Halle," Verein für Sozialpolitik, *Schriften*, Vol. 145 I, (Munich and Leipzig, 1914), p. 70; Erich Sperling, *Arbeitslohn-Entwicklung in Handwerk und Industrie* (Rostock, 1907), p. 76; Ernst Behrendt, *Die Arbeits- und Lohnverhältnisse in einer mittleren Maschinenfabrik Ostpreussens* (Giessen, 1930), *passim*.

CHART 10  
Skill Differentials and Cost of Living, 1871-1944



Shaded areas represent business contractions.

Skill differentials are differences between wages of skilled and unskilled workers, expressed in percent of the former.

Source: Appendix Tables A-1 and A-14.

during the second half of the pre-1913 period initiated a trend which continued for many more decades, as will be recounted shortly.

In tracing the course of skill differentials during the period before World War I, no comment has been offered upon the extent of the differentials or their variations from industry to industry. In fact, the significance of such measures is hard to interpret. A measure of the extent of skill differentials in any industry depends heavily upon the particular occupations selected to represent the broad skill groups. Particularly among skilled workers, we find a wide variety of occupations, and of wage rates even within the same occupation.<sup>5</sup> Also in the group of so-called unskilled workers there are considerable differences in the training required for helpers—as, for example, in printing establishments compared with textile factories. Even “common labor” is no truly homogeneous class. Thus, evaluation of the actual size of skill differentials and comparison of their variation between industries is, at best, complex. And, in view of the meager factual information available for the period before 1913, meaningful interpretation is impossible.

1913-1945. From 1913 on, skill differentials underwent a series of drastic changes. We are fortunate in having, for this last prewar year, a fairly representative estimate. In twelve industries (nine manufacturing, with building, mining, and railroads), hourly wages of unskilled workers amounted to about 60 percent of those for skilled workers, with a resultant differential of about 40 percent.<sup>6</sup>

The movement of skill differentials for the period 1913-24 is illustrated by data on wage rates for building and railway workers. After the outbreak of World War I, the gap between wages of unskilled and skilled workers

<sup>5</sup> The following tabulation illustrates the variation of rate levels even for skilled workers of the same occupation within a single factory. It gives daily wage rates (in marks) in a rolling mill in western Germany, 1892:

	<i>Maximum</i>	<i>Minimum</i>
1st roller	5.40	4.30
2nd roller	4.95	4.06
1st heater	6.00	4.80
2nd heater	5.60	4.30
Planer and sawer	4.60	3.80
Feeder and changer	4.20	3.40
Loader	3.80	3.20
Casting dresser, adult	3.10	2.70
Casting dresser, 18-20 years old	2.50	2.00
Casting dresser, 16-18 years old	2.00	1.60
Errand boys, less than 16 years old	1.60	0.60

Source: T. Bödiker, “Arbeitslohnstatistik,” *Preussische Jahrbücher*, Vol. 71, No. 2 (Berlin, 1893), p. 244.

<sup>6</sup> These differentials are based on the union rates compiled by the Statistische Reichsamt (see Appendix Table A-14, Part III, col. 4). For 1913 the published wages represent in part hourly rates and in part hourly earnings. However, within each industry the same type of wage measure is used in the computation of differentials.

diminished rapidly. Whereas the differential between the wages of unskilled and skilled railway workers was 31 percent before the war, it had dropped to 18 percent by 1918. A similar development occurred among building workers. For Berlin, Hamburg, and Stettin, the average skill differential in building narrowed from 25 percent before World War I to 10 percent in October 1918. The decline in these differentials continued

TABLE 18  
Skill Differentials, Based on Average Weekly Wage Rates in Eight Industries, 1913, and April 1922 to June 1924

Year and Month	Units of Columns 2 and 3 (1)	Wage Rates		Differentials <sup>a</sup> (4)
		Skilled (2)	Unskilled (3)	
1913	marks	35.02	24.31	30.6
1922	Apr. marks	889	802	9.8
	July marks	1,477	1,345	8.9
	Oct. marks	4,981	4,459	10.5
	Nov. marks	8,939	7,974	10.8
	Dec. marks	15,680	14,187	9.5
1923	Jan. marks	24,855	22,529	9.4
	Feb. marks	62,221	55,915	10.1
	Mar. marks	77,672	69,836	10.1
	Apr. marks	78,948	70,970	10.1
	May marks	100,345	90,025	10.3
	June thousand marks	246	220	10.6
	July thousand marks	974	874	10.3
	Aug. thousand marks	25,303	22,586	10.7
	Sept. thousand marks	632,000	561,000	11.2
	Oct. billion marks	244	211	13.5
	Nov. billion marks	16,540	14,231	14.0
	Dec. rentenmarks	28.81	24.27	15.8
1924	Jan. rentenmarks	27.31	22.87	16.3
	Feb. rentenmarks	28.12	23.08	17.9
	Mar. rentenmarks	29.13	23.21	20.3
	Apr. rentenmarks	31.54	24.43	22.5
	May rentenmarks	33.75	26.16	22.5
	June rentenmarks	35.52	27.16	23.5

<sup>a</sup> These differentials are differences between wage rates of skilled and unskilled workers, expressed in percent of the former.

SOURCE: International Labour Office, *Studies and Reports*, Series D, No. 15, pp. 148-49. For November and December 1922 see "Zahlen zur Geldentwertung in Deutschland, 1913 bis 1923," *Wirtschaft und Statistik*, 1925, p. 42. See also Appendix Table A-44.

through most of the following period, the Great Inflation. Thus by 1922 the skill differential seems to have almost disappeared. For 1913, part of 1922, 1923, and part of 1924, the trend of skill differentials can be judged on the basis of broader inquiries (see Table 18). If we average the data for



eight industries (five manufacturing, with building, mining, and railroads), we find that unskilled workers received 70 percent of the wages of their skilled colleagues in 1913, about 90 percent in 1922, and a little less in 1923.<sup>7</sup>

With the stabilization of the currency, skill differentials widened again, without reaching prewar proportions. Wages for unskilled railway workers (which in 1922 had been within 6 percent of those for skilled) were 22 percent below skilled workers' wages in 1924. Over the average of twelve industries for which union rates are available in 1913 and in 1924-25 (see Appendix Table A-14, Part III, col. 4), skill differentials changed from a little under 40 percent before the war to just below 25 percent after stabilization. From 1925 on, skill differentials can be judged on the basis of the broad union rate statistics, covering twelve and, after 1928, seventeen industries.<sup>8</sup> No drastic changes in skill differentials occurred during the last two decades of the history we are following. The skill differentials for male workers in all industry changed from 23.4 percent in 1925 to 21.5 percent in 1929, and 20.6 percent in 1933, remaining at that level throughout most of the National Socialist period. Only insignificant changes, within the range of 1 percent, took place in the course of World War II.

The reduction of skill differentials in the immediate poststabilization period was well-nigh universal. The tabulation on page 86 shows that in all ten industries for which skill differentials can be computed, the difference between rates of skilled and unskilled workers declined from 1913 to 1924. The situation is less simple during the subsequent years. While the over-all measure of wage rates, as indicated above, shows a slight decrease of differentials between 1924 and 1929, and again between 1929 and 1933, conditions varied somewhat from industry to industry. In the industries listed we find a decrease in only three of the ten between 1924 and 1929, and in three of the eleven between 1929 and 1933.

*Some Determinants of Skill Differentials.* The fact that there are skill differentials is not difficult to explain. Employers are willing to pay higher rates for skilled workers because they are more "productive." Skilled workers, in their turn, demand more payment per unit of work time—compared with that paid to unskilled—to compensate for their investment in training and experience. Thus both the demand and the supply curves for skilled labor lie above those for unskilled workers.

More complex than the explanation of the existence of skill differentials is the interpretation of their size. As pointed out above, the numerical

<sup>7</sup> This tendency toward a slight widening of the gap in wages as related to skills during the last year of the Great Inflation can be observed also among the railway workers. It is confined to wage behavior during the last two or three months of 1923, when wages were negotiated in terms of stable "gold marks."

<sup>8</sup> For the period 1925-28 wage rates for skilled and unskilled workers are estimated on the basis of the twelve-industry sample. However, the estimates were derived by "back-casting" wage rates from the average levels of the larger seventeen-industry samples in 1928. Thus, the differentials reflect estimated conditions in all seventeen industries even for the early years.

quotient depends largely on the selection of representative occupations. But this is a technical matter, the question here being to what extent the differential between the chosen occupations actually reflect differences in skill. It is clear that, in the short run, the relative scarcity of skilled and unskilled workers should affect the relation between the supply schedules.

Skill Differentials  
(differences between wage rates of skilled and unskilled, expressed in percent of the former)

	1913-14 <sup>a</sup>	1924 <sup>b</sup>	1929	1933
Hard coal mining	56	43	37	37
Metalworking	26	18	20	21
Building	25	22	21	20
Papermaking	22	21	21	24
Printing	19	17	13	17
Woodworking	31	15	18	...
Textiles	22	16	17	16
Brewing	19	11	12	12
Baking	20	15	15	15
Chemicals	19	12	17 <sup>c</sup>	...
Soft-coal mining	...	...	14	12
Paper products	...	...	26	26
Pottery	...	...	17	17

<sup>a</sup> For 1913-14, based on hourly earnings except for building, woodworking, brewing, and printing.

<sup>b</sup> Differentials of averages for January, April, July, and October.

<sup>c</sup> Differential of averages for October and April.

SOURCE:

1913-14 and 1924: Computed from data published in *Jahrbuch* 1924-25, pp. 277 ff., and *Jahrbuch* 1928, p. 371. However, wage rates of skilled and unskilled workers given in that source were linked to the revised series, with the January 1928 ratio used as adjustment factor. For 1929 and 1933: Computed from data in *Vierteljahrshefte zur Statistik des Deutschen Reichs*, 1931, n, pp. 105 ff., and *Wirtschaft und Statistik, passim*.

However, the wage differentials may have become so rigid that they cease to reflect such short-term changes in relative availability. Moreover, even over longer periods, custom or control over supply (limited apprenticeships) may keep differentials below or above the amounts warranted by differences in productivity, training costs, or other elements closely related to skills.

It is possible to identify some of the causes for changes in skill differentials. In Chart 10, which presents also a cost-of-living series, one may observe a rather close relationship between variations in skill differentials and changes in price levels. In general, rising price levels tend to be associated with narrowing differentials, and vice versa. Specifically, the period of falling price levels, 1874 to about 1886, was accompanied by widening skill differentials. During the period from the latter date to 1913, and still

more during the era of World War I and the Great Inflation, retail prices rose rapidly while the gap in wage rates as between skilled and unskilled workers narrowed. The stabilization of 1924 brought prices back from their fantastic heights but left them above 1913 levels. Correspondingly, skill differentials reappeared to a significant extent, remaining smaller, however, than they had been before World War I. Also from 1924 to 1929 the observed relationship holds; a retail price rise was accompanied by a moderate decline in differentials. But after 1929 the comparison breaks down, for skill differentials became practically rigid, maintaining their levels despite the fluctuations in retail prices—or, for that matter, in wage rates. On the whole, prior to the Great Depression and the advent of National Socialism, the correspondence between prices and skill differentials is striking, and may well suggest an economic relationship between the two measures.

In what manner can price trends affect skill differentials? For certain short-term periods the connection is fairly obvious. Take, for example, times of national emergency characterized by strong inflationary trends, by a decline of real wages toward socially tolerable minima, and by scarcity of essential commodities. In such periods wages for unskilled workers need more and prompter protection against increasing living costs. In periods of general prosperity, accompanied by rising price levels, the need for protection is less acute, though labor-market pressures apparently bring about mild decreases in differentials. On the other hand, in periods of falling prices, usually times of sluggish business activity, skilled workers may be better able to defend their wage levels. The form of wage adjustments also may contribute to the correlation of price change and skill differentials. If, during periods of rising prices, wage adjustments are made "across the board" in terms of equal sums of marks and pfennings, the low-paid workers benefit by a greater percentage change, and there is consequently a decrease in skill differentials.<sup>9</sup> Changes in price levels, though of primary importance, do not provide the entire explanation for changes in skill differentials. For example, during the first decade and a half of our period, wages of skilled workers increased more rapidly than those of unskilled, thus widening the differential. While prices declined during that period, the change in skill differentials can hardly be attributed to this factor. In this case the increase in the skill gap should rather be explained by the fact that the initial industrialization of Germany created more acute shortages for skilled than for unskilled labor.

One might assume also that unionization would affect skill differentials. For example, during the period 1890 to 1913, when union organization increased but was restricted largely to skilled labor, one might expect to

<sup>9</sup> See two publications of the International Labour Office in *Studies and Reports*, Series D, "The Workers' Standard of Life in Countries with Depreciated Currencies," No. 15 (Geneva, 1925), pp. 48-51; and "Wage Changes in Various Countries, 1914 to 1925," No. 16 (Geneva, 1926), p. 13.

find that the spread between skill differentials had widened. However, during that period, skill differentials actually narrowed, so that any possible influence of growing unionization of the skilled must have been obscured by other elements. We have noted that the rising costs of living and the decreasing hours of work during the fifteen years preceding World War I created strong pressures toward relatively larger wage increases for low-paid workers.

During World War I and the Great Inflation, prices affected wage developments to such an extent that they must be recognized as a dominant factor also in the trend of differentials. At the same time, we cannot disregard the influence of the government on wartime wages or the tendency of the Weimar Republic to give special protection to low-paid wage earners in the race between wages and rising retail prices. In the post-stabilization era, further factors must be considered. Before World War I, there had been a steady influx of unskilled labor from the countryside to the cities. This movement was dwindling after the war, leaving unskilled workers at least temporarily in an improved bargaining position.<sup>10</sup> Furthermore, unionization, which before the war was restricted largely to skilled workers, now also embraced the unskilled. At that time even the unions of skilled workers favored the lessening of skill differentials. This was not so much an expression of egalitarian attitudes, but rather reflected the belief that higher wages for the unskilled might act as a deterrent to the introduction of laborsaving machinery and the revision of operations. Again, the slight narrowing of the differentials from 1924 to 1929 might be understood in terms of increasing retail prices and changing labor market conditions. But it is true also that technological improvements during the rationalization period (which followed the stabilization of the currency) freed some skilled labor or made it more easily dispensable, with a resultant deterioration in the comparative bargaining position of skilled workers.<sup>11</sup> The relatively high degree of stability in skill differentials after 1929, despite major wage changes, is due to the technical routine of wage setting. During the later 1920's only base rates for specific skill and age groups, so-called *Ecklöhne* (see note to Appendix Table A-2), were determined in negotiations, arbitration, or collective orders. Wages for other skill groups maintained their prior percentage relation to the *Ecklöhne*, the proportions changing only in case of hardship adjustments. This explains the mildness of the fluctuations in skill differentials during the subsequent years, including the era of National Socialism and World War II.

<sup>10</sup> *Ibid.*, No. 15, pp. 48-51. The reduced influx of unskilled workers was cited as contributing to lesser skill differentials during the inflation, but affected also later years. Note, however, that during the late 1920's, higher unemployment rates tended to nullify the stated advantages.

<sup>11</sup> See Fritz Prerauer, "Untersuchungen der Spanne zwischen den Löhnen von gelernten und ungelernten Arbeitern, unter besonderer Berücksichtigung der Vorkriegszeit," *Weltwirtschaftliches Archiv*, 1929, pp. 390\*-91\* (Jena).

## AGE DIFFERENTIALS

Age differentials may relate to rates or to earnings. In rates, age differentials occur usually between adult and young workers, not among adults. In earnings, however, such differentials can be traced throughout the whole age distribution of wage earners, for earnings levels are related to length of experience in a specific field, to seniority, and to physical age. These differences are frequently interwoven with differences in occupation and job function; within strictly comparable occupations and functions age differentials in earnings seem relatively small.

Usable information on age differentials within the group of adult workers is scarce. More accessible to statistical analysis are wage differentials between youths and adult workers. The group of young workers represented a very important, though gradually declining, portion of the German labor force.<sup>12</sup> As late as 1907 male youths under 20, including both apprentices and regular workers, constituted almost a quarter of all male wage earners, but by 1933 only about one-tenth.<sup>13</sup> As will be seen presently, important wage differentials existed between youths and adults. Frequently such differentials obtained also between youths, young workers in the next higher age groups, and older workers.

*Wages for Youths, Excluding Apprentices.* Historically, substantially lower wage payments for youthful workers were the rule whenever young boys or young girls were employed in industrial occupations. Gröber<sup>14</sup> reports that before World War I girls under 16 years of age, working in the hosiery industry of the Erz Mountains, received two-thirds to five-sixths of the wages for female workers over 16. For the period after World War I, Soecknick<sup>15</sup> finds that young textile weavers in Thuringia earned 41 percent of adults' wages when they were 14 to 16 years old, 63 percent when they were 16 to 18 years old, 84 percent when they were 18 to 20 years old. The age differentials reported for textile workers in Silesia during 1920 were basically similar.<sup>16</sup>

<sup>12</sup> Factory work for children was progressively curtailed in the course of German industrial development. In 1832 it was prohibited in Prussia for children under 6 years of age, a limit later raised to 9 years. In 1854 the limit was 10 years, later raised to 12. In 1891 a federal law amending the *Gewerbeordnung* prohibited, outright, factory work of children under 13 years of age and, conditionally, under 14 years. That is, children between 13 and 14 could do light factory work under 6 hours per day in states that did not have compulsory schooling up to that age (Bavaria, Württemberg). The census of 1895 reports 215,000 children under 14 years old as regularly employed, but only 38,000 in factories. See Max Schön, "Die Erwerbstätigkeit der Kinder unter 14 Jahren," *Verein für Sozialpolitik, Schriften*, Vol. 36, 1898, pp. 174 ff.

<sup>13</sup> *Statistik des Deutschen Reichs*, N.F. 211, p. 12\*, and N.F. 453, III, p. 16.

<sup>14</sup> Rudolf Gröber, *Nominallohn und Reallohn; Untersuchung über die Löhne in der erzgebirgischen Strumpfindustrie von 1889 bis 1913 und von 1924 bis 1928*. (Greifswald, 1932), p. 74.

<sup>15</sup> Margarete Soecknick, "Die Entwicklung der Reallöhne in der Nachkriegszeit, dargestellt an typischen Thüringer Industrien," Jena Universität, Wirtschaftliches Seminar, *Abhandlungen*, Vol. 18, No. 1, p. 50.

<sup>16</sup> Herbert Böhm-Münsterberger, *Die Entwicklung der Löhne gewerblicher Arbeitnehmer im Breslauer Wirtschaftsgebiet* (Gelnhausen, 1933), p. 14.

Provisions for age differentials in wage rates were not confined to youths proper. Up to 23 or 24 years of age such differentials frequently appeared in union contracts. In the printers' agreement of 1902, for instance, the weekly rate for book printers of 24 years or over was 25 marks; for those of 21 to 24 years it was one mark less; and for those under 21, two marks less. Also, in the agreements of the Weimar Republic and the collective wage decrees of the National Socialist period, union rates were established for adults (over 22, over 23, over 24, or whatever the age limit chosen),<sup>17</sup> and younger workers received less by a percentage which, from about 1925 on, was seldom changed. For textile workers in Baden, age differentials for men and women covering all age groups between 14 and 25 years and the whole period from November 1923 to June 1933 can be computed. Table 19 gives a selection of these groups and

TABLE 19  
Age Differentials Based on Hourly Rates of Unskilled Textile Workers in  
Baden, 1923-1933  
(Differences between the wage rates of the highest age group, adults over  
23, and those of the other groups, expressed as percent of the former)

Contract Period	AGE GROUPS				
	14 years	16 years	18 years	20 years	23 years
	MALE WORKERS				
Nov. 5, 1923–Nov. 26, 1923	74	67	48	22	11
Jan. 7, 1924–Mar. 31, 1924	66	59	47	22	12
June 2, 1925–Jan. 1, 1927	60	54	40	20	8
Nov. 14, 1927–Mar. 30, 1931	58	53	40	20	7
May 3, 1932–June 26, 1933	60	54	40	21	8
	FEMALE WORKERS				
Nov. 5, 1923–Nov. 26, 1923	68	58	47	32	16
Jan. 7, 1924–Mar. 31, 1924	57	48	39	26	17
June 2, 1924–Jan. 1, 1927	49	43	35	19	11
Nov. 14, 1927–Mar. 30, 1931	47	42	36	20	11
May 3, 1932–June 26, 1933	49	44	36	21	10

SOURCE: Computed from data given by Walter Jehle, *Die Arbeiterlöhne in der badischen Textil-Industrie seit der Stabilisierung der Mark 1923-1933*, (Lörrach-Stetten, 1935), p. 113.

periods. The most obvious feature is the spread of wage rates according to age during any period, and for both males and females. In an extreme case, rates for boys of 14 were only about a quarter of those for unskilled male adults of 25 years or over. We find, moreover, that in all age groups and for both sexes, the prevailing tendency over time is toward a diminution of age differentials, expressed as a percent of wage rates for adults. The major declines in age differentials took place in the period 1923 to 1925, with later variations less marked and not always in the same direction. The declines were, as might be expected, more drastic for the younger age groups, whose wages were lowest. For the groups up to 18 years,

<sup>17</sup> See, for instance, *Jahrbuch* 1928, pp. 365-69, footnotes.

age differentials were more pronounced in the case of males. This distinction becomes blurred for the 20-year-old workers and is reversed for the 23-year-olds.<sup>18</sup>

The narrowing of age differentials through wage increases for younger workers was a standing demand of organized labor; the reasons were not entirely humanitarian, since low wage rates for young workers constituted a check on the wages of adults. The union goals were met in two ways. First, the progressive age restrictions on work of children and youths reduced the percentage of young workers employed. Second, the increasing coverage of union agreements regularized the payments to youthful workers and cut down the abuses frequently connected with their employment. Although systematic comparative information on wages of young workers before and after World War I is lacking, there can be little doubt that their relative situation improved markedly between the time of the Reich's foundation and the period of the Weimar Republic. After the seizure of power by the National Socialists the established protection of children and youths against unfavorable working conditions seems to have been relaxed. The annual reports of German factory and mine inspectors during the Nazi period contain cases reminiscent of the conditions of early industrial capitalism.<sup>19</sup>

*Compensation for Apprentices.* Presumably the payment apprentices receive is not intended simply as compensation for work, but takes into account the training supplied by the employer. During the preindustrial era of Germany the latter aspect dominated the relationship, for the apprentice paid a "premium" or fee to the master. The old custom of apprenticeship, which usually meant rooming, boarding, and working with the master, deteriorated with the rise of industry. The *Gewerbeordnung* of 1869, together with the establishment of *Gewerbefreiheit* (freedom of trade), also introduced the right of craftsmen or industrial organizations to train workers—without limitation as to number, without specification of training standards, and without any rules pertaining to compensation. The result was a complete disorganization of training procedures, with grave effects upon industry and labor. The problem of providing skilled workers for growing industrial requirements, aggravated by the tendency of employers to use apprentices as a source of cheap labor (in household

<sup>18</sup> A partial explanation of this curious reversal lies in the fact that age differentials for women are based largely on varying experience and skill. In the case of unskilled male workers, variations in physical strength form an important additional factor in the relative worth of laborers. While the great difference in physical strength between 14-year-olds and adults explains the larger age differentials among males, the negligible difference in strength between 23- and 25-year-old men accounts for the relatively small differential between these two age groups.

<sup>19</sup> See Jürgen Kuczynski, *Germany under Fascism, 1933 to the Present Day*, (Vol. III, Part 2, of *A Short History of Labour Conditions under Industrial Capitalism*, London, 1944), pp. 136-145. From the case histories in these reports it is difficult to judge how widespread the reported abuses were, and particularly how their frequency compared with that of earlier periods.

or shop), prompted early investigations, both public and private. An inquiry into the apprenticeship system was directed by the *Bundesrath* during the early 1870's. The ensuing report, in addition to a detailed description of the shortcomings of the prevailing system, provided the following summary on remuneration:

"Apprenticeship fees seem to be used much less frequently. Sometimes they have no other purpose than to buy a reduction of apprenticeship years. Whenever such fees are paid, the apprentice lodges with the master. When the apprentice lives elsewhere, he pays fees only in exceptional cases. He even receives *Kostgeld* (board expenses) from the employer which, under certain circumstances, comes close to a wage payment. Apart from this, actual wage payments are rare."<sup>20</sup>

A series of amendments to the *Gewerbeordnung*, the most important of which is the *Novelle* (amendment) of 1897, brought about decisive improvements in apprentice training and curbed many of the grosser abuses of *Lehrlingszucht* (apprentice breeding). But it left the question of remuneration entirely untouched. Thus a wide variety of arrangements continued to exist. Shortly before World War I, some apprentices in highly desirable trades still paid fees. In rural communities room and board were often provided, but rarely in cities. Cash wages became increasingly common. In 1905-06, of 1095 apprentices in Freiburg, about half received cash wages. No statistical summation of apprentice wages is available, but scattered information indicates that the pay ranged from small amounts of pocket money to sums comparable with those earned by young workers who were not apprenticed.<sup>21</sup> In certain large establishments, apprentice wages had been firmly established for decades, progressing from nominal payments in the first year to wages approximating those of apprenticed adults in the last year.<sup>22</sup>

<sup>20</sup> *Ergebnisse der über die Verhältnisse der Lehrlinge, Gesellen und Fabrikarbeiter auf Beschluss des Bundesraths angestellten Erhebungen*, zusammengestellt im Reichskanzleramt (Berlin, 1876), page v (translation mine). An increasingly close relation between the *Kostgeld* paid to the apprentice and an ordinary wage payment is stressed by other contemporary observers. Frequently apprentices completed their training only if paid, since they could earn ordinary wages as young factory workers. Parents were said to have their share of responsibility for the decay of training standards, because many of them apprenticed their sons only where they could earn money immediately. Masters, on the other hand, had to get their money's worth if they were to pay instead of being paid. Therefore they regarded the apprentice arrangement as a labor contract rather than a training system. Some employers had scores of apprentices and offered relatively high remuneration, which indicates that apprentices were in fact a desirable low-cost labor supply. See J. Brinckmann, "Lehrlingswesen," *Verein für Sozialpolitik, Schriften*, 1875, pp. 96-99. The problem of *Lehrlingszucht* (apprentice breeding) for profit is historically described by J. Altenrath in "Das Lehrlingswesen und die Berufserziehung des gewerblichen Nachwuchses," *Zentralstelle für Volkswohlfahrt, Flugschriften*, No. 7, 1912, pp. 48-50.

<sup>21</sup> See Bernhard Jauch, *Das gewerbliche Lehrlingswesen in Deutschland seit dem Inkrafttreten des Handwerkergesetzes vom 26. Juli 1897, unter besonderer Berücksichtigung Badens* (Freiburg im Breisgau, 1911), pp. 39-44.

<sup>22</sup> For some early arrangements of this sort see Robert Garbe, *Der zeitgemässe Ausbau des gesammten Lehrlingswesens für Industrie und Gewerbe* (Berlin, 1888), p. 119.



The decisive changes in apprentice remuneration came with the coverage of these payments by collective bargaining contracts. The trend had already started before World War I, particularly in the printing industry and occasionally also in building. It became more widespread after the war. There arose considerable legal controversy as to whether the apprenticeship relation could be subject to collective bargaining. Actually, however, about three-fourths of all collective agreements in 1923 did cover some aspects of apprenticeship, including remuneration. For the first few postwar years, unapprenticed youths were in general better paid than apprentices—though rates for apprentices increased with age and years of experience. Piece rates were paid only in the last year or half-year of apprenticeship, or to unapprenticed youths shortly before they could command adult wages. Finally, within each group—that of apprentices and that of young unapprenticed workers—there was a wide spread of wage rates.<sup>23</sup>

On the whole, the long-term trend during the early postwar period was toward better training of apprentices, less exploitation, and more adequate remuneration. One of the achievements of the Weimar Republic was improvement of standards in training apprentices, adjustment of their number to the needs of each industry, and introduction of higher and more uniform rates of pay.<sup>24</sup> To sum up, over the entire period under review apprentices as well as youthful workers were able to improve their wage levels in relation to those of skilled adults.

### SEX DIFFERENTIALS

*Nature and Extent.* Women's wages in Germany were always markedly lower than men's. An inquiry into working conditions of women and children in the years, 1874-75, found that earnings of most women workers were 5 to 8 marks per week (with extremes as low as 2 and as high as 19 marks).<sup>25</sup> Wages for men were considerably higher during those years.

<sup>23</sup> "Lehrlinge und Jugendliche im Tarifvertrag," *Reichsarbeitsblatt* 1923, pp. 223-30. The basic relation of apprentice payments to other rates may be shown by an example. In contracts for the building industry, apprentice wages were expressed in percent of the rate for skilled workers. In 1930, the following schedule was in effect for building apprentices in Berlin:

<i>During:</i>	<i>Percent of Pay of Skilled Adults</i>
First half year	10
Second half year	15
Third half year	20
Fourth half year	30
Fifth half year	40
Sixth half year	50

Source: Deutscher Baugewerksbund, *Jahrbuch* 1930 (Berlin, 1931), pp. 460-61.

<sup>24</sup> E. Schindler, "Lehrlingswesen," in *Handwörterbuch der Staatswissenschaften*, 4th edition, pp. 315 and 321.

<sup>25</sup> *Ergebnisse der über die Frauen- und Kinderarbeit in den Fabriken auf Beschluss des Bundesraths angestellten Erhebungen*, zusammengestellt vom Reichskanzleramt (Berlin, 1876), p. 11.

In medium-sized cities unskilled building workers earned about 13 marks per week, skilled builders and printers close to 20 marks (see Appendix Tables A-3 and A-5). About forty years later, shortly before the outbreak of World War I, a study of average daily earnings for men and women in twelve industries showed the weighted average of women's daily earnings to be 2.28 marks, that of men's earnings to be 5.17 marks. According to these figures, women's earnings in March 1914 were about 44 percent of the average for men.<sup>26</sup> Another twenty-five years later, in 1939, a weighted average of men's weekly earnings in sixteen industries was 45.14 marks, that of women 22.93 marks.<sup>27</sup> All these computations show that women as a group, throughout the existence of the Reich, earned at best about half of men's wages. To the extent that the data are comparable at all, they suggest further that during the period as a whole, there occurred no drastic changes in the relation between men's and women's earnings, but only a moderate improvement in the earnings of women relative to those of men.

We must recognize at the outset that the foregoing comparisons have little to do with the relation of rates or earnings received by men and those received by women in the same occupation for the same type and amount of work. First of all, the comparisons are based on extremely broad wage classes. Second, the earnings averages for men and for women were computed without taking into account the concentration of women workers in low-wage industries such as textiles, clothing, paper products, and foods. Third, no allowance was made for the fact that, in more industries than not, women's work was predominantly unskilled or semi-skilled. It is still true, however, that such comparisons provide valuable over-all information on women's wages which would be lost if the data were standardized with regard to industry, occupation, skill, and other relevant factors. Moreover, while analysis of women's and men's wages could be confined to specific industries, it would be extremely difficult to restrict it also to comparable occupations and skills. Typically, men and women within each industry perform different operations. Only in a few cases, as in segments of the textile, clothing, tobacco, and some other industries, are men and women assigned to the same sort of work. Thus, in most comparisons, the reported gross sex differential will derive also from differences in occupation and skill which cannot be measured separately. In fact, even within the broad groups of skilled and unskilled

<sup>26</sup> *Reichsarbeitsblatt* 1917, p. 643. Since the weighting (by employment) is not the same for men and women, the wage differential reflects also the different industrial composition of the male and the female work force.

<sup>27</sup> Estimated. For published data on average weekly earnings of skilled and unskilled men, and of women, in September 1937, see *Wirtschaft und Statistik*, 1938, p. 160. Approximate weights for skilled and unskilled workers were derived from information published in *Vierteljahrshefte zur Statistik des Deutschen Reichs*, 1931, Vol. II, pp. 97 and 101. For changes in earnings between September 1937 and the year 1939, according to the indexes published by the Statistische Reichsamt, see *Wirtschaft und Statistik*, 1938-40, *passim*.

workers, the comparisons will typically reflect occupational as well as residual skill differences for which no special gauge can be constructed.<sup>28</sup> With the nature of the differentials in mind, let us now review the findings.

1871-1913. Prior to World War I, there was a wide range in sex differentials, varying with industry and occupation. There is little evidence of a systematic change in differentials from 1880 to 1913—the period for which information is available in continuous series. (See Appendix Tables A-15 and A-16.)<sup>29</sup>

In some occupations, mainly in the textile industry, men and women were performing the same operations. Typically these were piece-rate jobs and the rate was the same for both sexes, although in most cases the earnings of the men were higher than those of the women.<sup>30</sup> It happened, of course, on occasion that women working at the same jobs and at the same rates made more money than men.<sup>31</sup> In these instances, particularly if the character of the operation made it likely that women's earnings would exceed those of men, a special premium was sometimes paid to men, so that their earnings would match or surpass those of their women co-workers.<sup>32</sup>

Women played a minor role in mining operations. However, the excellent records available on shift earnings of men and women workers in coal and ore mining provide one of the few opportunities of comparing women's and men's earnings over an extended period before 1913. The data presented in Appendix Table A-17 show that between 1886 and 1913 women averaged about 40 to 60 percent of the shift earnings of men working above ground.<sup>33</sup> The table shows also that, in four of the five mining centers, the gap between shift earnings of male and female surface workers tended to increase—the only exception being ore mining west of the Rhine. This tendency appears also, albeit to a smaller degree, from a comparison of women's earnings with those of skilled underground miners. The upward trend in women's shift earnings during the thirty years preceding World War I obviously did not match that of male workers.

1913-1945. World War I ushered in a wide diversity of wage movements.

<sup>28</sup> Such comparisons, moreover, will be greatly influenced by the occupations chosen and possibly by the classification of borderline occupations as skilled, semiskilled, or unskilled.

<sup>29</sup> It will be observed that in the cotton spinning industry in Hof the comparison is within the same skill group. For the printing industry and for hosiery production in the Erz Mountains, however, the comparison is between unskilled females and skilled males. This factor, of course, affects the size of the respective wage gaps.

<sup>30</sup> Agnes Karbe, "Die Frauenlohnfrage," *Hamburger Wirtschafts- und Sozialwissenschaftliche Schriften*, No. 6 (Rostock, 1928), p. 23. In the cited case the difference for weaving was slightly above 10 percent.

<sup>31</sup> See, for instance, *Der Arbeiterfreund*, 1877, p. 442.

<sup>32</sup> Max Weber, "Psychophysik der industriellen Arbeit," *Archiv für Sozialwissenschaft und Sozialpolitik*, Vol. 28, (Tübingen, 1909), p. 268.

<sup>33</sup> Although shift earnings of men above ground include the earnings of some skilled mechanics, these were predominantly earnings of workers possessing less skill than the average underground miner.

Despite this diversity, broad averages in major industries show a rather consistent though moderate narrowing of the gap between earnings of men and women. In March 1914 the weighted average of women's earnings in twelve industries was 44 percent of that for men. This proportion rose to 48 percent by September 1918, but declined somewhat in March 1919.<sup>34</sup> The decrease in the sex differentials was rather uniform, occurring in nine out of twelve industries. In two of the other three (leather and rubber) the differentials remained constant, and in only one industry (electrical goods) they increased.

After World War I sex differentials broadened temporarily, but did not again become as large as they had been before the war. In the course of the inflation years, the differentials again tended to narrow. Table 20, which presents data on sex differentials in the textile industry, indicates that before the war, women's rates were about two-thirds of those for men, for both skilled and unskilled workers. At the peak of the hyperinflation, skilled women received about three-quarters of men's rates, unskilled women only slightly less. By the end of 1923, the gap had widened again, remaining a little below prewar size in the case of skilled workers, but somewhat larger in the case of unskilled. The last column of the table expresses wage rates of skilled men minus rates of unskilled women as a percentage of those of skilled men. Since these quotients do not show a wider gap at the end of the inflation than before the war, they suggest that it was only the particularly rapid increase of rates for unskilled men which prevented women from improving their position vis-à-vis that group.

The poststabilization adjustment brought about a slight narrowing of sex differentials between the beginning and the end of the year 1924. This reduction was a little more pronounced among unskilled than among skilled workers and was closely linked to the gradual adjustment of skill differentials to their postinflation levels. Sex differentials for skilled textile workers narrowed by less than 2 percentage points, those of unskilled workers by 3 percentage points between January and September 1924. Changes in sex differentials of workers in the paper products industry were in the same direction and of similar magnitude. Differentials for unskilled stone cutters changed from 54 percent in January 1924 to 42 percent in July 1925.<sup>35</sup>

After 1925, sex differentials remained fairly stable up to the end of the period under review. This finding is based on the union rate statistics,

<sup>34</sup> *Statistik des Deutschen Reichs*, Vol. 293, p. 18; and *Reichsarbeitsblatt*, *passim*. See also footnote 26 above.

<sup>35</sup> Differentials for textile and paper product workers are computed from unrevised data published in *Wirtschaft und Statistik*, *passim*. Since the original data are not adjusted to the revised series, the levels of the differentials are not comparable to those shown in Table 21. Differentials for stone cutters are from data given in *Deutscher Bauwerksbund, Löhne und Arbeitszeit im Baugewerbe in den Jahren 1914 und von 1924 bis 1930* (Berlin, 1912), p. 10.

TABLE 20

Sex Differentials, Based on Wage Rates in the Textile Industry, 1913, and  
April 1922 to September 1924  
(Differences between men's and women's wages, expressed as percent of the former)

<i>Year and Month</i>	<i>Skilled Workers</i>	<i>Unskilled Workers</i>	<i>Unskilled Women Compared with Skilled Men</i>
1913	33.7	32.7	45.1
1922 Apr.	26.5	27.8	38.7
July	24.8	28.5	35.9
Oct.	23.1	26.5	35.0
Nov.	23.3	26.9	36.0
Dec.	23.1	24.3	32.9
1923 Jan.	23.6	26.5	33.8
Feb.	25.4	28.7	36.1
Mar.	24.7	28.4	36.2
Apr.	24.9	28.8	36.6
May	25.0	29.1	36.5
June	25.0	30.1	37.5
July	23.8	27.7	35.2
Aug.	24.6	30.8	37.5
Sept.	22.7	26.2	34.3
Oct.	26.9	33.3	40.3
Nov.	30.9	38.1	45.1
Dec.	30.7	36.8	44.9
1924 Jan.	29.5	32.8	42.8
Feb.	28.5	31.0	42.8
Mar.	29.5	31.4	44.5
Apr.	28.8	30.9	44.2
May	27.4	28.0	41.9
June	27.9	34.4	42.4
July	28.0	28.8	42.5
Aug.	28.0	28.8	42.5
Sept.	28.2	29.1	42.8

SOURCE: Computed from data published in International Labour Office, *Studies and Reports*, Series D, No. 15, pp. 148-149. For November and December 1922, see "Zahlen zur Geldentwertung in Deutschland, 1913 bis 1923," *Wirtschaft und Statistik*, 1925, p. 42. See also Appendix Table A-44.

which permit the computation of sex differentials for a few industries from 1924 on, and for a great variety of industries from 1928 on.<sup>86</sup> In 1929 the differential was least among cotton weavers (18 percent), greatest among skilled stationery makers (42 percent). Such industrial differences must, of course, be interpreted in the light of earlier remarks on occupational

<sup>86</sup> Detailed information for the years 1928, 1930, and 1935 is contained in Elisabeth Oehlandt, "Deutsche Industriearbeiterinnen-Löhne, 1928-1935," *Hamburger Wirtschafts- und Sozialwissenschaftliche Schriften*, Vol. 36 (Rostock, 1937), p. 22.

classification. From 1928 to 1933 sex differentials declined slightly and then stayed approximately constant to the very end of the National Socialist period. The stability of sex differentials during the last two decades of Reich history is mainly attributable to the mechanics of collective bargaining. Usually only a representative base rate was negotiated and the percentage change in the wage level was applied "across the board" to other rates, including those of women. The established relation between men's and women's wages was maintained by the wage-rate stabilization under National Socialism.

TABLE 21

Sex Differentials, in Three Industries, Selected Years, 1913-1943  
(Differences between men's and women's wages, expressed as percent of the former)

Year	TEXTILES			PAPER PRODUCTS			STONE CUTTING	
	Skilled Workers (1)	Unskilled Workers (2)	Unskilled Women	Skilled Workers (4)	Unskilled Workers (5)	Unskilled Women	Unskilled Workers (7)	Unskilled Women
			Compared with Skilled Men (3)			Compared with Skilled Men (6)		Compared with Skilled Men (8)
1913	22	16	41	48	30	53	54	59
1924	17	19	38	41	38	54	45 <sup>a</sup>	52 <sup>a</sup>
1926	18	18	37	40	36	51	41 <sup>a</sup>	46 <sup>a</sup>
1929	17	19	38	40	37	53	40 <sup>a</sup>	46 <sup>a</sup>
1932	16	21	38	41	38	54	..	..
1943	16	22	38	43	38	53	..	..

<sup>a</sup> July.

SOURCE:

Cols. 1 to 6 computed from data in *Wirtschaft und Statistik, passim*. Original data from 1913-27 linked to new series in 1928. This linking affects the level but not the movement of the differentials.

Cols. 7 and 8 computed from data in *Deutscher Bauarbeiterbund, Löhne und Arbeitszeit im Baugewerbe in den Jahren 1914 und von 1924 bis 1930* (Berlin, 1912), p. 10.

In some industries—textiles, paper products, and stone cutting—post-inflation differentials can be compared with those obtaining before World War I. The results are found in Table 21. In 1913 sex differentials within skill groups varied widely—from 16 to 54 percent. The gap narrowed between that year and the poststabilization period for skilled workers, but it widened in two of the three presented series for unskilled. However, wage rates of both skilled and unskilled women increased in relation to those of skilled male workers between 1913 and 1924. This generalization finds additional support in the differentials computed by Margarete Soecknick for the textile, pottery, and metal industries in Thuringia. Table 22 presents the differentials of skilled and unskilled women's wage rates and those for skilled men (in percent of the latter). Comparison of the differentials in 1914 and 1926 shows a more pronounced decline in sex differentials than that observed on the basis of the more comprehensive series, given in Table 21.

TABLE 22

Sex Differentials, in Three Industries in Thuringia, 1914, 1920, and 1926  
(Differences between wages of skilled men and of women in indicated skill groups, expressed as percent of the former)

Year	TEXTILES		POTTERY		METALWORKING
	Skilled Women	Unskilled Women	Skilled Women	Unskilled Women	Skilled and Unskilled Women
1914	30	43	60	65	56
1920	10	34	34	45	48
1926	20	30	40	47	43

SOURCE: Margarete Soecknick, *Die Entwicklung der Reallöhne in der Nachkriegszeit* (Jena, 1927), p. 75.

Throughout German wage history sex differentials were marked. Before World War I, women's wages on the average were probably about half of those for men, an average covering a wide dispersion, with most differentials falling between 30 and 60 percent. No definite trend in actual net sex differentials can be observed for that period, although gross differentials probably narrowed somewhat. However, there were noticeable changes after 1913 and up to about 1925: between those years the gap between wage rates of men and of women narrowed, albeit to a moderate extent. A decrease of about 15 percentage points would probably be a generous estimate of the change.<sup>37</sup> During the last two decades of the Reich's existence sex differentials remained virtually stable.

*An Interpretation of Sex Differentials.* Differences in physical strength and in physiological aptitudes can help to explain some of the observed differentials in wages as between men and women in Germany. But there are many other causes, among them lack of educational facilities for girls and a tendency to disparage mechanical abilities of women, which contributed to a differential in aptitudes that was essentially more cultural than physiological in origin. The extent of sex differentials in Germany was closely related also to prevailing social institutions and to specifically German attitudes. Woman "belonged" at home, where her status was subordinate to that of her husband or father, the "*Herr im Haus*." She was held to be inferior in industrial work and suited only for occupations requiring little skill and responsibility. The only exceptions observed occurred in the textile factories, in which women frequently held skilled positions. Since a woman's opportunities for work were so severely limited, she could not develop any serious interest in a career. Girls who worked in factories usually left their jobs upon marriage. Thus, up to

<sup>37</sup> Karbe (*op. cit.*) assumes a decrease of roughly 20 percentage points. Oehlandt (*op. cit.*) is not convinced that any narrowing of the gap can be definitely discerned. However, the material presented here leaves no doubt that wages of women improved in relation to those of men.

World War I, there were relatively few women workers. The unions made little headway in attempting to organize them. Nor did women have any say in politics until the revolution of 1918 gave them suffrage.<sup>38</sup> While discrimination against women in industrial work was not restricted to Germany, it was probably more pronounced there than in the other large industrial countries.

The war experience and the establishment of the Weimar Republic brought about decisive changes in the economic position of German women. War needs sharply increased the employment of women, who proved their aptitudes in occupations traditionally closed to them and even found supervisory positions. Also, wage rates had to be set high enough to attract women workers to the labor force and to specific industries and jobs. The results were significantly higher rate and earnings levels for women, accompanied by declining differentials. The Weimar Republic improved educational facilities for women and encouraged liberal ideas concerning their place in home and society. Along with increased organization of female labor, job openings became more plentiful for women, partly as a result of technological changes.<sup>39</sup> The wage demands of women were affected by growing experience and improved quality of work as well as by their more pressing need to support themselves and their families. War deaths and disabilities had robbed many families of male providers and lessened the marriage opportunities of women. Although such circumstances tended to increase the female labor supply, the improved status and augmented requirements of working women seem to have been countervailing factors. All these changes found expression in narrowing differentials.

The question arises then, why, in view of these radical changes in social and economic conditions, was the reduction of sex differentials so slight? Perhaps the most important reason is that the interwar years were marked by large-scale unemployment, even in the relatively prosperous late 1920's. By the time the employment of women in well-paid jobs had become possible, their chances of obtaining such positions were impaired by widespread unemployment and by growing resentment against *Doppelverdiener* (two earners in one family). Indeed, during the early years of National Socialism, the reconversion of female workers into *Hausfrauen* became a widely publicized part of the government's campaign to create employment for men. And in later years, when rearmament and mobilization necessitated the recall of women into the labor market,

<sup>38</sup> For a detailed discussion of the determination of sex differentials in Germany, see Karbe, *op. cit.*, Chapters III and VI. See also A. Salomon, "Die Ursachen der ungleichen Entlohnung von Männer- und Frauenarbeit," *Staats- und Sozialwissenschaftliche Forschungen*, Vol. 122 (Leipzig, 1906).

<sup>39</sup> Anna Schwarz, *Das Verhältnis zwischen Frauen- und Männerlöhnen in Deutschland vor und nach der Revolution 1918* (Basel, 1925), an analysis mainly based on wages in the textile industry and hospital services. See also Isa Strasser, *Frauenarbeit und Rationalisierung* (Berlin, 1927); and Karbe, *op. cit.*, Chapter XII.



the wage-stabilization policy prevented the increased demand for women workers from affecting their wages.

### *Differentials Relating to Place of Employment*

#### CITY-SIZE DIFFERENTIALS

*Nature and Extent.* Large cities like Berlin and Hamburg ranked consistently high in terms of wage levels, while in small cities like Rostock workers received lower wages in the same industries and occupations.<sup>40</sup> To what extent did variations in size of city affect wage levels, and what were the trends of city-size differentials in Germany up to 1945?

In printers' contracts, throughout the history of the Reich, city-size variations were a major basis of wage differentiation. During the early decades collective agreements in the printing industry provided that in cities with a population over 25,000 the basic rate should be augmented. A special wage commission established increases: of 20 percent for Berlin; 15 percent for Hamburg, Leipzig, Stettin, and Stuttgart; 8.5 percent for Munich; 5 percent for Halle and Karlsruhe. In cities below 10,000, on the other hand, the workers could be asked to concede about 8 percent.<sup>41</sup> In later wage agreements before and after World War I the principle of city-size differentials was maintained.

Although such differentials were not as fundamental a part of wage arrangements in other industries as they were in printing, their prevalence in a large variety of industries can be established from Table 23 for December 1929. Without a single exception, hourly wage rates were highest in Berlin (population 4,024,000), intermediate in Krefeld (131,000), and lowest in Siegen (31,000). The average of forty-two occupations represented in the three cities shows wage rates in Krefeld to have been 12 percent lower, and those in the small city of Siegen to have been 20 percent lower than rates in Berlin.<sup>42</sup>

The only existing large-scale inquiry into city-size differentials was conducted for one point in time—September 1, 1941.<sup>43</sup> The investigation related to average hourly earnings actually paid. The summary results, presented in Table 24, show a clear tendency of hourly earnings to

<sup>40</sup> See, for instance, Appendix Tables A-4 and A-5.

<sup>41</sup> Third collective agreement in the printing industry, dated from January 1878 on. See Robert Kuczynski, *op. cit.*, pp. 567-68.

<sup>42</sup> The averages for Krefeld and Siegen do not encompass all of the forty-two occupations covered by the inquiry. On the basis of the fourteen occupations cited in Table 23 which are reported for all three cities, average wage rates in Siegen were 77 percent, and in Krefeld 87 percent of those in Berlin. However, Siegen, although a small city, lies in a highly industrial northwestern section of Germany, the so-called Siegerland. The differential for most small cities, including those in rural areas, would presumably be wider.

<sup>43</sup> *Wirtschaft und Statistik*, 1942, pp. 425-28. This inquiry covers the Greater Reich, including Austria and other annexed areas, but the increased coverage does not impair the validity of the basic results.

TABLE 23

Average Hourly Wage Rates, Typical Occupations in Selected Industries and Cities, December 1929  
(pfennigs)

	48 Cities	Berlin <sup>a</sup>	Krefeld <sup>a</sup>	Siegen <sup>a</sup>
<i>Skilled Occupations</i>				
Building	129	154	135	111
Painting	125	149	125	111
Brewing	118	129	118	95
Printing	118	122	120	115
Furniture	115	130	118	107
Baking	110	125	111	110
Leather	99	110	96	...
Paper	96	114	97	90
Metalworking	94	112	83	73
Shoe	90	92	...	...
Railway	85	107	84	78
Textiles	81	99	80	...
Chemicals	81	88	79	...
<i>Unskilled Occupations</i>				
Building	107	127	112	92
Brewing	107	115	106	86
Printing	98	107	99	95
Paper producing	84	94	85	...
Public utilities	82	98	87	82
Railway	68	85	67	62
42 occupations covered by inquiry <sup>b</sup>	107	125	110	100
14 identical occupations <sup>c</sup>	104	120	104	93

<sup>a</sup> In 1925 the population of Berlin was 4,024,000; that of Krefeld was 131,000; and that of Siegen, 31,000.

<sup>b</sup> Not all of the 42 occupations covered by the inquiry are represented in the average for each city.

<sup>c</sup> The averages refer to the 14 occupations reported in this table, which are available for all 3 cities.

SOURCE: Allgemeiner Deutscher Gewerkschaftsbund, *Jahrbuch* 1930, pp. 342-57.

increase with size of city. With one exception (skilled males and skilled and semiskilled females in the third and fourth largest city-size group) this tendency holds between any two classes. Wages in the smallest city-size group (population under 10,000) are about 25 percent below those in the metropolitan group.<sup>44</sup>

*Trends in City-Size Differentials.* Table 25 presents hourly wage rates of masons in cities for which information could be obtained, for the years 1887, 1913-14, and 1929. The cities are arrayed according to their size in

<sup>44</sup> Investigation of the twenty separate industries shows a similar general tendency toward association of high earnings with large cities, but exceptions to this rule are much more frequent than they appear in the over-all averages.

TABLE 24  
Average Hourly Earnings in Cities of Varying Size, 1941

City Population (thousands)	AVERAGE HOURLY EARNINGS, SEPTEMBER 1941				DIFFERENTIALS: <sup>a</sup>				DIFFERENCES:					
	Male		Female		Male		Female		Male		Female		Male	
	Skilled (1)	Semi- skilled (2)	Unskilled (3)	Skilled and Unskilled (4)	Skilled (5)	Semi- skilled (6)	Unskilled (7)	Skilled and Unskilled (8)	Skilled (9)	Semi- skilled (10)	Unskilled (11)	Skilled and Unskilled (12)	Skilled (13)	Unskilled (14)
Over 1,000	130.2	115.3	92.0	65.7	10.5	12.7	12.7	11.0	13.7	14.6	11.7	7.2	11.6	10.5
500-1,000	116.5	100.7	80.3	58.5	16.9	14.1	12.9	17.7	22.0	16.3	11.9	11.6	11.6	10.5
200-500	108.2	99.0	80.1	54.1	16.7	17.7	17.1	16.0	21.8	20.4	15.7	10.5	10.5	10.5
100-200	108.4	94.9	76.3	55.2	20.6	21.0	19.1	17.8	26.8	24.2	17.6	11.7	11.7	11.7
50-100	103.4	91.1	74.4	54.0	21.3	23.1	19.5	19.5	27.7	26.6	17.9	12.8	12.8	12.8
25-50	102.5	88.7	74.1	52.9	24.3	24.3	22.1	22.4	31.7	28.0	20.3	14.7	14.7	14.7
10-25	98.5	87.3	71.7	51.0	26.0	26.8	23.6	24.0	33.8	30.9	21.7	15.8	15.8	15.8
Under 10	96.4	84.4	70.3	49.9	26.0	26.8	23.6	24.0	33.8	30.9	21.7	15.8	15.8	15.8

<sup>a</sup> The differentials are differences between earnings in the highest size-class and those in the other classes, expressed in percent of the former.

SOURCE: Cols. 1 to 4, *Wirtschaft und Statistik*, 1942, p. 426. Survey includes areas incorporated into the Reich after 1937.

TABLE 25  
Hourly Wage Rates of Masons in Cities of Different Size, 1887,  
1913-1914, and 1929

City	POPULATION (thousands)		HOURLY WAGE RATES (pfennigs)		
	1885 (1)	1925 (2)	1887 (3)	1913/14 (4)	Apr. 1929 (5)
Berlin	1,315	4,024	50	82	148
Hamburg	306	1,079	50	88	150
Leipzig	170	679	40	74	134
Dresden	246	619	35 <sup>a</sup>	70	132
Frankfurt a/M	155	468	34	65	131
Hanover	140	423	38	71	129
Nürnberg	115	392	32	65	131
Chemnitz	111	332	28 <sup>b</sup>	60	132
Bremen	118	295	40	73	132
Magdeburg	114	294	37	62	125
Stettin	100	254	40	62	128
Elberfeld	106	168	32	66	132
Lübeck	55	121	35	70	132
Rostock	39	78	35	65	115
Quedlinburg	19	27	24	53	110
Average of 3 highest	597	1,927	47	81	144
Average of 3 lowest	38	75	31	63	119
Differentials <sup>c</sup>	93.6	96.1	34	22	17

<sup>a</sup> 1886.

<sup>b</sup> 1890.

<sup>c</sup> The differentials are differences between data in the three highest and the three lowest cities, expressed as percent of the former.

SOURCE, by column:

(1) *Jahrbuch* 1891, p. 5.

(2) *Jahrbuch* 1929, pp. 10-12.

(3) Berlin, Hamburg, Leipzig, Frankfurt a/M, Hanover, Bremen, Magdeburg, Stettin, Lübeck: Franz Nast, *Arbeitszeit und Arbeitslohn im Baugewerbe*, p. 69.

Chemnitz: Verein für Sozialpolitik, *Schriften*, Vol. 145 iv, "Entwicklung der Preise in der Stadt Chemnitz," p. 211.

All other: Robert Kuczynski, *Die Entwicklung der gewerblichen Löhne seit der Begründung des Deutschen Reiches* (Berlin 1909), pp. 43, 47, 50, 52.

(4 and 5) Elberfeld, Lübeck, Rostock, and Quedlinburg: Deutscher Baugewerksbund, *Löhne und Arbeitszeit im Baugewerbe*, pp. 163, 175, 180, 148. All other cities: *Jahrbuch* 1926, p. 277; and *Jahrbuch* 1929, p. 259.

1925 (which corresponds fairly closely to an array based on city size in 1885). Analysis of the rates shows the high correlation between city size and wage rates in the three benchmark years.

As for trends, the table shows that the differentials, computed as percentages of Berlin and Hamburg rates, declined markedly over the forty-two-year period. This tendency is discernible between 1887 and 1913, and it becomes more pronounced during the period 1913 to 1929. The differentials between the three largest and the three smallest cities

(according to 1925 population) are 34 percent, 22 percent, and 17 percent of the three largest for the selected years. The trend toward a narrowing of city-size differentials is borne out by other evidence. The Statistische Reichsamts, in the evaluation of a different set of data, observes decreasing city-size differentials in masons' wages between 1900 and 1913, and between 1913 and later years—in fact up to World War II. *Wirtschaft und Statistik* states in 1942: “. . . Since the First World War, 1914-1918, wage rates have become more similar between size classes of cities. This tendency is particularly clear in case of building, but it is in no way confined to that industry.”<sup>45</sup> It is true, of course, that in comparing city-size differentials in wages for 1887 and 1929 we are dealing with cities that changed greatly both in size and in character. This does not, however, invalidate the importance of the change in differentials. The point is that relative differences in wages as between small and large cities became less in the course of time. The reasons for this decline in city-size differentials are discussed below.

*Some Determinants of City-Size Differentials.* The Statistische Reichsamts, in its interpretation of the data, considers the extent to which the greater earnings in large cities were absorbed by higher living costs.<sup>46</sup> The Reichsamts estimates that one-half or even more of the differential had to be spent for higher rents. Also, transportation costs tended to be greater in large cities. Higher food costs, on the other hand, were about counterbalanced by somewhat lower clothing costs. It is concluded that, even after adjustments for differences in cost of living, substantial differentials remain in real wages.

City-size differentials in wages can thus be traced only in part to differences in living costs. The greater productivity in the highly industrialized big cities and, by comparison, the perpetual economic difficulties of the agricultural areas may provide further explanation. Moreover, the existence of a surplus agricultural population, the concentration of labor-union activity in large cities, and finally, the greater availability of highly efficient workers in large industrial centers, are cited as contributing to city-size differentials. The available evidence does not, however, permit measurement of the relative importance of these factors.

City-size differentials have been shown to have decreased over time. Around 1887, wage rates for masons in small cities (population 19,000 to 55,000) were one-third below those in the largest cities, and wage rates in cities with populations under 10,000 were presumably still lower. By 1929 the comparable gap was 20 percent or less. Table 25, which presents this information, suggests also that the explanation for this tendency cannot be sought in a decreasing difference in the size of cities themselves. The large cities included in the array, in fact, grew faster than the small

<sup>45</sup> *Wirtschaft und Statistik*, 1942, p. 427 (translation ours). For additional evidence on the development of city-size differentials in building, see *ibid.*, 1931, p. 153.

<sup>46</sup> *Ibid.*, 1942, pp. 427-28.

cities, yet city-size differentials in wage rates shrank. It appears then, that the trend toward declining city-size differentials must be explained in terms of other factors. Among these is the trend toward greater equalization of living costs. Increasing reliance on manufactured consumers' goods and rising cultural standards in rural areas tended to narrow the gap between city and country with regard to both consumption patterns and prices. Pricewise, the substitution of manufactured for hand-made goods meant—for many commodities—lower prices for city dwellers (as compared with prices paid to craftsmen) and greater expense for the inhabitants of small towns (who may formerly have produced the goods themselves). Furthermore, the originally great differences between large and small cities in availability of efficient workers tended to diminish with the spread of education and with the establishment of industrial centers outside of large cities. Finally, after World War I, the growth of labor unions throughout the whole Reich area reduced another factor responsible for differences in wage rates paid as between large and small cities.

### REGIONAL DIFFERENTIALS

*Nature and Extent.* Striking differences in wages paid in the several geographic regions of Germany are observable throughout the entire period under investigation. Data on average hourly rates for masons are available in about twenty areas for 1885, 1905, and 1929, and of unskilled workers in all industries for 1941 (see Appendix Table A-18). Table 26 summarizes the area information into (unweighted) wage averages for five large geographic regions.<sup>47</sup> The summary shows that in 1885, 1905, and 1929 the wage differentials between major German regions were considerable. The gap amounted to as much as 20 to 25 percent between the agricultural East and the highly industrialized Northwest. But also, as between other major regions, substantial differentials were maintained throughout the period up to 1929.

Ample corroborative evidence attests to regional differentials in other occupations and industries. An inquiry into international wage conditions conducted in 1905 by the London Board of Trade<sup>48</sup> revealed that skilled and unskilled building workers, printers, and municipal workers tended to receive higher wages in the North Sea ports and the industrial cities of the Northwest than in other regions. The lowest wages for these occupations were paid in the East, Silesia, and the Baltic ports.<sup>49</sup> Regional

<sup>47</sup> The coverage of these regions is indicated in Appendix Table A-18, where proximate areas of roughly similar economic character are combined.

<sup>48</sup> *Cost of Living in German Towns*, report of an inquiry of the London Board of Trade into working-class rent, housing, and retail prices, together with the rates of wages in certain occupations in the principal industrial towns of the German Empire (London, 1908), p. xxxii.

<sup>49</sup> In this inquiry the regional wage averages were based on quotations in a small number of large cities. Thus the differentials might reflect city type as well as regional characteristics. Since, however, wage rates even of large cities are affected by wage levels of the surrounding area, regional wage differences do emerge from these comparisons.

TABLE 26  
Regional Differentials, Based on Average Hourly Earnings,  
1885, 1905, 1929, and 1941

Region <sup>a</sup>	MASONS			UNSKILLED WORKERS
	1885 <sup>a</sup> (1)	1905 <sup>a</sup> (2)	1929 (3)	1941 (4)
EARNINGS (pfennigs)				
East	24	37	114	63
Central	27	43	124	79
South	28	40	136	76
Southwest	29	44	132	80
Northwest	32	51	139	82
DIFFERENTIALS (percent) <sup>b</sup>				
East	25	27	18	23
Central	16	16	11	4
South	12	22	2	7
Southwest	9	14	5	2
Northwest	0	0	0	0

<sup>a</sup> 1885, 1905, Old Reich area; later years, Reich area of 1937.

<sup>b</sup> The differentials are differences between wages in the Northwest and those in the other regions, expressed in percent of the former.

SOURCE: Appendix Table A-18.

differences are indicated further in a comparison of wages between the Breslau industrial district in Silesia and the Mannheim and Frankfurt districts in the Rhine area. Analysis of wage rates for comparable occupations in Breslau and the two other cities shows that the East-West differential obtained in several, though not in all, the industries covered in Table 27.<sup>50</sup>

The only large-scale inquiry into the question of regional differentials was conducted by the Statistische Reichsamts for September 1941.<sup>51</sup> The broad results of this investigation, arranged according to five large regions, are presented in column 4 of Table 26. Again, as in earlier years and for

<sup>50</sup> See Herbert Böhm-Münsterberger, *op. cit.*, *passim*. The existence of the East-West differentials is demonstrated in the textile, metal products, and woodworking industries, for which data are included in Table 27. The author finds similar differentials also in the clothing industry, for the interwar period; and in the brewing industry he finds a differential for the interwar period but not for 1913. These differentials are measured for comparable occupations in cities of roughly similar size. (The population of Frankfurt was 460,000, that of Breslau 550,000 in 1925.) Thus the measures refer to regional differentials in a strict sense.

<sup>51</sup> Reported in *Wirtschaft und Statistik*, 1942, pp. 282-85. The Reich, for the purpose of this investigation, was divided into thirty regions. Included in these regions were the annexed portions of Poland and Czechoslovakia, and the whole of Austria. The large cities of Berlin, Hamburg, and Vienna were treated as separate units. The regional averages contained in the last column of Table 26 and computed in Appendix Table A-18 refer to the Reich area of 1937.

TABLE 27

Regional Differentials, Based on Wage Rates for Selected Occupations,  
Breslau and Rhineland Cities, 1913 and 1929

	BRESLAU <sup>a</sup>		MANNHEIM-FRANKFURT a/M <sup>a</sup>		DIFFERENTIALS <sup>b</sup>	
	1913 (pfennigs)	1929	1913 (pfennigs)	1929	1913 (percent)	1929
Textile workers, male						
Skilled	28	59	40	70	30	16
Metalworkers, male						
Skilled	45	84	54	89	17	6
Unskilled	28	67	46	74	39	9
Woodworkers, male						
Skilled	40	105	60	125	33	16

<sup>a</sup> The industrial district of Breslau lies in the Southeast, the cities of Mannheim and Frankfurt a/M in the western industrial parts of Germany. These three cities are of medium size, and have industrial suburbs. In 1925 their populations were: 550,000 (Breslau); 460,000 (Frankfurt); 246,000 (Mannheim).

<sup>b</sup> The differentials are differences between wage rates in Breslau and the western cities, expressed in percent of the latter.

SOURCE: Herbert Böhm-Münsterberger, *Die Entwicklung der Löhne gewerblicher Arbeitnehmer im Breslauer Wirtschaftsgebiet*, 1933, pp. 15, 19, 20, and 24.

specified occupations, wages were highest in the Northwest and lowest in the East, the differential for the two regions being about 30 percent. The breakdown given in the original source permits us to conclude, moreover, that there was a tendency toward gradually decreasing earnings levels proceeding from West to East and, to a lesser extent, from North to South.

*Trends in Regional Differentials.* The data on wage rates for masons (Table 26) suggest that regional differences were significantly reduced in the course of the forty-four years covered.<sup>52</sup> The greatest change occurred between 1905 and 1929, and presumably, as with other differentials, between the immediate prewar years and the poststabilization period. Also from Table 27 we can observe a decrease of regional differentials. Thus in the textile, metal, and woodworking industries, the narrowing gap between wages paid in Silesia (in or about Breslau) and in Southwest Germany (Mannheim or Frankfurt a/M) is clearly apparent. Whereas in the reported occupations the differentials in 1913 were about 15 to 40 percent, they had narrowed to 5 to 15 percent during the years of the Weimar Republic.<sup>53</sup>

*Some Determinants of Regional Differentials.* The regional wage differentiation, which has been described, corresponds closely to the advanced

<sup>52</sup> Since the differentials are highly sensitive to the particular grouping, only large and consistent changes can be accepted with confidence.

<sup>53</sup> The shrinking of the differentials cannot be explained on cyclical grounds for two reasons: first, 1913 and 1929 were both fairly prosperous years; second, in all cases except textiles, comparisons of 1913 and, say, 1932 also show a lessening of differentials.



industrialization of the West and North of Germany as compared to the South and East. The greater productivity of the West and the North permitted labor to attain higher average earnings. The predominantly agricultural East of Germany was not only backward in industrialization but also hampered by difficulties of transportation; the Polish Corridor was a severe obstacle to trading with the rest of the country; long hauls added to the prices of both incoming industrial wares and outgoing agricultural products. Furthermore, the tendency toward greater population increase, and therefore labor supply, in agricultural areas helped to perpetuate the low wage levels in East Germany.<sup>54</sup>

Differences in freight costs, over and above differences in cost of living, have been held to explain the continuation of the East-West differentials. Perhaps this is too easy an explanation. For we find that wage differentials between the Breslau and Mannheim-Frankfurt areas narrowed despite persistent deterioration of the freight situation in Silesia.<sup>55</sup>

The tendency toward decreasing regional differentials appears to have followed the gradual industrialization of the East and the South. Mechanization of agriculture, growth of cities, and establishment of new industries tended to reduce the differences in the character of the regions. Apart from these basic trends, policies of the government and of workers' and employers' organizations affected regional wage trends. Employers—and sometimes unions—in the low wage areas tried to hold on to their cost advantages. Employers and unions in high-wage areas sought to decrease wage differentials in order to avoid low-cost competition. The government supported the latter position as a matter of general policy.<sup>56</sup> The difference of interests between the regions was reflected in the diverging views on coverage of wage contracts. To return to the example: Employers in Silesia tried to avoid schematization, that is, inclusion of Silesian wage areas in nationwide agreements. Employers and unions outside Silesia, on the other hand, attempted to break the "ceilings" on prices and wages which stemmed from availability of cheap eastern merchandise. By refusing to "agree" in private bargaining processes, they could cause wage determination to be shifted to government arbitrators. The latter tended, in the name of social equalization, to set wage levels which reduced the gap between the East and other Reich areas.

## INDUSTRIAL DIFFERENTIALS

*Nature and Extent.* German workers in similar skill, sex, and age groups differed from one industry to another in the wage rates they received.

<sup>54</sup> *Wirtschaft und Statistik*, 1942, p. 284-85. To a certain extent, the lower earnings were balanced by lower costs of food and housing in these areas. Also wage taxes, characterized by progressive rates, tended to be lower in the eastern part of Germany.

<sup>55</sup> The economic position of the Breslau area worsened after World War I. The cession of Upper Silesia meant loss of its nearby eastern markets. Competition in more distant western markets burdened outbound products with increased freight costs.

<sup>56</sup> See Böhm-Münsterberger, *op. cit.*, pp. 58-62 and 65-67.

TABLE 28  
Hourly Wage Rates of Skilled and Unskilled Male Workers, by Industry, 1913, 1925, 1930, and 1939

Industry	1913			1925 <sup>a</sup>			1930 <sup>a</sup>			1939 <sup>a</sup>		
	Pfennigs (1)	Rank (2)	Increase over 1913 (percent) (5)	Pfennigs (3)	Rank (4)	Increase over 1913 (percent) (8)	Pfennigs (6)	Rank (7)	Increase over 1913 (percent) (11)	Pfennigs (9)	Rank (10)	Increase over 1913 (percent) (11)
<i>Skilled Workers</i>												
Coal mining	81.1	1	14	92.1	2	14	123.9	3	53	98.0	2	21
Building	70.5	2	36	95.9	1	100	141.0	1	100	92.7	4	31
Brewing	67.6	3	35	91.0	3	91	129.4	2	91	110.2	1	63
Metals	66.2	4	22	80.7	6	56	103.3	8	56	85.6	7	29
Woodworking	62.7	5	36	85.5	4	36	123.6	4	97	86.3	6	38
Printing	61.0	6	38	83.9	5	38	116.9	5	92	95.8	3	57
Chemicals	57.0	7	34	76.4	8	34	107.9	6	89	87.4	5	53
Baking	50.4	8	55	78.0	7	55	105.6	7	110	84.4	8	67
Paper products	48.2	9	44	69.4	9	44	97.2	9	102	78.2	9	62
Textiles	44.7	10	30	58.1	11	30	79.3	11	77	66.3	11	48
Papermaking	32.6	11	87	61.1	10	87	87.3	10	168	70.9	10	117
<i>Unskilled Workers</i>												
Building	55.7	1	43	79.7	1	43	116.2	1	109	77.9	3	40
Brewing	54.7	2	46	79.7	2	46	114.9	2	110	97.9	1	79
Printing	48.5	3	51	73.2	4	51	101.8	4	110	78.5	2	62
Chemicals	46.0	4	43	65.8	6	43	89.4	6	94	72.6	4	58
Woodworking	45.3	5	64	74.2	3	64	106.5	3	135	69.6	6	54
Metals	42.5	6	27	53.9	10	27	77.4	10	82	63.1	8	48
Baking	41.0	7	65	67.6	5	65	90.8	5	121	72.6	5	77
Coal mining	35.9	8	51	54.2	9	51	78.0	9	117	62.1	9	73
Paper products	35.6	9	66	59.0	7	66	82.7	7	132	65.8	7	85
Textiles	34.6	10	40	48.6	11	40	66.6	11	92	55.7	11	61
Papermaking	29.4	11	88	55.3	8	88	78.4	8	167	61.4	10	109

<sup>a</sup> April.

source: 1913 and 1925, *Jahrbuch* 1929, pp. 266-67. Data for 1913 are earnings, except for building, brewing, woodworking, and printing; For 1930, *Jahrbuch* 1930, pp. 299-306. Minor impairment in comparability of wages for skilled paper makers between

1925 and 1930; For 1939, *Jahrbuch* 1939-40, pp. 353-60; spliced to old series in April 1930. Data for April 1930 from *Jahrbuch* 1931, pp. 284-93. For woodworking, coverage changes again in 1931; spliced on basis of overlap (see *Jahrbuch* 1934).

The information on industrial differentials for the years prior to 1913 is too scanty for reliable comparisons, but from 1913 on we can compare industry wage levels on the basis of union rates collected and published by the Statistische Reichsamt. Table 28 presents such rates for skilled and unskilled workers in eleven industries for 1913, 1925, 1930, and 1939. For skilled workers, coal mining, building, and brewing paid the highest rates; and paper products, textiles, and papermaking the lowest rates at each of the selected dates (except for 1939, when printing rates eclipsed those of building workers). The situation of unskilled workers cannot be described so simply. But here also a few industries (building, brewing, printing) consistently paid top rates while others (textiles, paper) always paid lowest rates. Although the rank, according to industry wage levels, is not the same in an array of rates for skilled and for unskilled workers, the general order is somewhat similar: building and brewing rank high, and paper and textiles rank low in both cases.

The Statistische Reichsamt published averages of wage rates paid in important centers of each industry. The selected centers may be mainly large cities, as with the building and the metal industry, or relatively small cities, as with textiles. Differences in the regional distribution of industries also affect the comparability of the Reichsamt data. The averages for the printing industry cover virtually the whole Reich; for the metal industry they are heavily weighted by western industrial centers; and for textiles they overrepresent southern and southeastern centers. In connection with the analysis of another type of differential, Table 23 presented union rates for a number of industries in a group of forty-eight cities (average) and in Berlin, Krefeld, and Siegen.<sup>57</sup> The table shows also that in the average for all forty-eight cities, as well as in the three cities selected for their extreme variation in size, there are characteristic differences in wage rates from industry to industry. Building, brewing, and printing rank high; paper, shoes, and textiles rank low. (Metal workers and railway workers show remarkably unfavorable averages, in view of the special skills required for many operations in these industries.)<sup>58</sup>

The ranking cited above shows the industrial structure of minimum wage rates rather than that of rates actually paid or of average earnings. There

<sup>57</sup> The data are collected and published by the *Allgemeiner Deutscher Gewerkschaftsbund* (Free Trade Unions). Not all occupations are represented in all of the forty-eight cities. The more serious shortcoming in this respect is in textiles, for which eight cities are without representation. But the averages given at least attempt to equalize city coverage.

<sup>58</sup> Although this study is concerned primarily with nonagricultural industries, it is worth noting that wages in agriculture were typically lower than those paid in manufacturing, mining, or transportation. At the end of 1929, cash and noncash wage rates per hour in agriculture averaged about 42 pfennigs for men and 27 pfennigs for women (unweighted averages for sixteen major regions; see *Allgemeiner Deutscher Gewerkschaftsbund, Jahrbuch* 1929, p. 365; and 1930, p. 359). This compares with averages of 67 and 47 pfennigs for unskilled men and women in the low-paying textile industry. (Weighted averages for eighteen centers, Statistisches Reichsamt, *Jahrbuch* 1930, p. 304.)

are some suitable materials available for investigation of the earnings structure and its comparison with the minimum rate structure. One such body of data is provided by the inquiries carried through for separate industries during the years 1928 through 1932. Appendix Table A-19 summarizes the industrial rate and earnings averages derived from some of these inquiries and confronts them with the wage rates of comparable industries.<sup>59</sup> The comparison is carried through for time and piece rates in three major skill groups. The evidence shows, first of all, that the ranks occupied by industry averages do not vary greatly from skill group to skill group. The similarity of the industrial structure of each skill group allays any suspicion that the industrial differentials might be fortuitous. Second, and more important for present purposes, the ranks in the rates and earnings reported in the various inquiries are highly correlated, and in close correspondence with the relation of industry averages shown by the current union rate statistics.

Industrial differentials in both rates and earnings can be observed also from the regular quarterly publication of earnings for about a score of industries (available from 1936 on). In an effort to summarize the degree of correspondence in the industrial structure of rates and earnings, wage rates and hourly earnings for eleven industries, which could be matched approximately, are assembled in Table 29 for the year 1939. Despite some differences in the rank of individual industries, there was a fairly close similarity in the basic grouping. Brewing, hard coal mining, chemicals, and building tended to stay in the upper part of the array in rates and earnings for skilled and unskilled workers. On the other hand, textiles, pottery, and clothing tended to rank low in all arrays. The rank correlation between rates and earnings in the eleven matched industries is +0.79 for skilled workers, and +0.93 for unskilled.<sup>60</sup> This indicates a fairly close correspondence between the industrial structure of rates and earnings.

The finding of a fairly similar industrial structure of rates and earnings is particularly important in view of the fact that large deviations of rates from earnings in minor industrial subgroups<sup>61</sup> have occasionally led to the conclusion that union rates give an entirely unrealistic picture of the effective wage structure. The rather high coefficients of rank correlation

<sup>59</sup> The selection of industries was restricted to those investigated between March 1928 and March 1929 in order to compare industry averages only within a roughly uniform economic climate. Of course, the mere passage of time may give an upward slant to wages investigated during the latter part of the period, since revisions of wage rates may have occurred. However, the advance of union rates during this period was moderate in comparison to the size of the industrial differentials. Another limitation of the comparison is the different coverage of the industry inquiries and the current monthly union rate statistics. Such differences refer both to industry definition and sample coverage.

<sup>60</sup> The rank correlation coefficients were computed as  $1 - \frac{6\sum d^2}{n^3 - n}$ , where  $d$  = difference between ranks, and  $n$  = number of industry groups.

<sup>61</sup> A 70 percent excess of piece-work earnings over rates in the case of blast-furnace workers, for instance.

TABLE 29

Hourly Wage Rates and Earnings, Skilled and Unskilled Male Workers,  
by Industry, 1939<sup>a</sup>

Industry	SKILLED WORKERS				UNSKILLED WORKERS			
	Wage Rates		Earnings		Wage Rates		Earnings	
	Pfennigs	Rank	Pfennigs	Rank	Pfennigs	Rank	Pfennigs	Rank
Brewing	105.2	1	103.9 <sup>b</sup>	2	93.2	1	91.0	1
Hard-coal mining	95.5	2	101.1	3	60.3	5	72.9	4
Chemicals	87.1	3	104.0	1	70.1	2	80.1	2
Building	82.7	4	91.5 <sup>b</sup>	4	66.0	4	73.1	3
Baking	80.7	5	89.4	6	68.9	3	70.7	5
Shoes	79.2	6	83.5 <sup>c</sup>	8	...	...	...	...
Papermaking	75.9	7	73.8 <sup>b</sup>	10	57.3	7	68.2	7
Soft-coal mining	75.8	8	81.7	9	67.4	...	...	...
Clothing	74.1	9	91.0	5	47.9	...	...	...
Pottery	70.8	10	88.3	7	58.9	6	69.0	6
Textiles	63.6	11	73.6	11	52.1	8	58.9	8

<sup>a</sup> Rates as of April, 1939, earnings for year 1939.<sup>b</sup> Skilled and semiskilled workers.<sup>c</sup> All production workers.SOURCE: Rates, *Jahrbuch* 1939-40, pp. 353-62. Earnings, *Handbuch* 1928-44, pp. 470-71.

in the 1939 comparisons are especially noteworthy, since wage rates in 1939 differed but little from their depression standing, while earnings reflected the effects of six years of rising business activity and employment levels under the special conditions of an armament boom.

*Trends in Industrial Differentials.* Apart from differences in wage levels, there are notable variations in the wage trends of different industries. For the period before World War I, the following tabulation shows percentage increases in a number of comprehensive wage series. The first column gives wage changes from 1871 to 1913, based on J. Kuczynski's indexes, which combine daily, weekly, and annual quotations. The percentage changes show a considerable spread. Reasons for the moderate increase in printers' wages may be found in two sets of facts. Workers in

## PERCENTAGE CHANGES IN WAGE LEVELS

	1871 to 1913		1888 to 1913	
	(J. Kuczynski Indexes) (1)	(J. Kuczynski Indexes) (2)	(Grumbach-König Annual Earnings) (3)	
Building	+124	+67	+67	
Woodworking	+103	+70	+54	
Textiles	+97	+41	+59	
Metalworking	+86	+50	+68	
Printing	+63	+39	+18	
Mining	+51	+74	+92	

SOURCE: (1 and 2), Jürgen Kuczynski, *Germany 1800 to the Present Day*, pp. 131-32; (3) Appendix Table A-55.

this industry had been able to obtain comparatively favorable wage conditions at the beginning of the Reich's history. Furthermore, the introduction of the mechanical composing machine reduced the demand and the skill requirements for printers. We are less secure in interpreting the other trend differences. In mining, earnings in 1871 were relatively high—perhaps particularly so in the sample used—and the reduction in working hours was probably greater than average. In building, the effectiveness of even local organization of workers must have been an important factor in the early wage increases in this industry. All in all, for the period 1871-1913, the available information is not sufficiently representative to permit reliable generalizations as to the trend of industrial wage differentials.

For the period 1888 to 1913 we have both J. Kuczynski and Grumbach-König estimates of wage increases in the industries listed. Again we have a considerable spread between wage changes in various industries, particularly in column 3. In both estimates, wages of building workers and miners went up strongly, those of printers relatively little. But the correspondence between the industry measures in columns 2 and 3 is not close. Grumbach and König computed measures of variation among average annual earnings levels in the fourteen industries covered. They found the standard deviation of industry averages to be 23.4 in 1890, but only 18.3 in 1913.<sup>62</sup> This shows a substantial contraction of industrial differentials during the prewar period.

From 1913 on, trends in industrial wage differentiation can be traced on the basis of hourly union rates.<sup>63</sup> The percentage increases from 1913 to 1939 are shown in column 11 of Table 28. In the table the industries are ranked according to wage levels in 1913. For both skilled and unskilled workers the industry with the lowest pay in 1913 (papermaking) received the highest percentage increase, and the industry with the highest pay (coal mining for skilled workers, and building for unskilled), the lowest percentage increase. A simple measure of variation for all eleven industries—for both skilled and unskilled workers—shows a decided decline of industrial differentiation from 1913 to 1925, and from 1925 to 1939.<sup>64</sup> Between April 1925 and April 1930 the industrial differentiation

<sup>62</sup> F. Grumbach and H. König, "Beschäftigung und Löhne der deutschen Industrie-wirtschaft 1888-1954," *Weltwirtschaftliches Archiv*, 1957, Heft 1, p. 140. The standard deviation measures are based on industry averages, expressed as relatives of their own mean. Thus they describe relative rather than absolute dispersion.

<sup>63</sup> For 1913, hourly earnings were used except for building, woodworking, brewing, and printing. See *Jahrbuch* 1928, p. 371, footnote 15.

<sup>64</sup> The measure consists of the average deviations (sign ignored) of the rates for each industry from their mean, divided by that mean and multiplied by 100.

	1913	April 1925	April 1930	April 1939
Skilled	18.3	12.2	13.6	10.4
Unskilled	15.7	14.7	14.9	11.9

The decline of industrial differentials after 1913 is also borne out by the study of Grumbach and König, *loc. cit.*

increased somewhat, presumably for cyclical reasons. The long-term trend from 1913 to 1939 is doubtless toward greater equality among wage rates paid in various industries.

The Statistische Reichsamt summarized its statistics of industrial wage rates for producers' and consumers' goods up to 1931.<sup>65</sup> Trend differences between hourly wage rates in producers' and consumers' goods emerge from the following tabulation:

WAGE RATES (1913 = 100)				
	Producers' Goods		Consumers' Goods	
	Skilled	Unskilled	Skilled	Unskilled
1913	100	100	100	100
1925, April	125	147	145	153
1929, April	166	205	196	206

Producers' goods industries paid higher wages than industries making consumers' goods—a difference that was more marked for skilled than for unskilled workers.<sup>66</sup> Thus the percentage increases are highest where prewar levels are lowest, and vice versa. Again, the increasing equalization of wage levels is the most conspicuous long-term tendency.

*Some Determinants of Industrial Differentials.* In the investigation of industry differentials it is particularly important to realize that these measures are not "pure", that is, they do not isolate the effects of different industrial conditions from those of other factors. The effect of location in large or small cities, and in agricultural or industrial areas, has already been mentioned. Other differentials also, such as those deriving from skill and sex, affect the industrial wage structure. This is true even if inter-industry comparisons are made within the same major skill-sex groups, since these groups are too broad to exclude the skill factor effectively. Hence the industrial differentials actually compare wage rates for somewhat subjective categories of "typical" skilled and unskilled workers in the various industries. Furthermore, the selection of so-called representative occupations influences the industrial comparison. For example, it makes a substantial difference for interindustrial comparisons whether the tool- and diemaker or the turret-lathe operator is chosen to represent skilled workers in the metal industry. Finally, the attempt to choose a typical occupation provides no assurance that the resultant rate is close to the

<sup>65</sup> Producers' goods include mining, metals, chemicals, building, woodworking, papermaking, and printing. Consumers' goods include textiles, brewing, baking and paper products.

<sup>66</sup> Before the outbreak of World War I, producers' goods industries paid 69 pfennigs for skilled workers, and 42 pfennigs for unskilled. Consumers' goods industries paid 40 pfennigs for skilled, and 32 pfennigs for unskilled (see *Jahrbuch* 1928, pp. 371-72). Between 1913 and 1929 wage rates in consumers' goods industries advanced more than those in producers' goods industries. The difference is particularly striking among skilled workers, but also observable among unskilled workers.

mean or mode of the total distribution of skilled or unskilled workers in a given industry. The skill factor might be thought to be negligible if industrial comparisons are based on wage rates for unskilled workers. This is not necessarily true, however. The printer's helper may be required to do a more complex job than, say, the helper in the baking industry. Furthermore, the term skill must be understood here in a broad sense. Typically, more physical stamina is needed in mining and building than in textile production or printing. An industrial differential might well appear as a consequence of differences in aptitudes of this type.

Even if industrial differentials could, to a considerable extent, be resolved into regional, city-size, skill, sex, and age differentials, it would still be valuable to measure their combined effect. Moreover, different industries have economic characteristics that affect wage levels independently of the other differentials mentioned. Some industries, for instance, may enjoy a relatively high degree of protection from sharp competition, because they are essentially local (like building and brewing), or because imports of competitive products from foreign countries carry high tariffs (like some chemicals and metals), or because they are largely cartel controlled (like coal and coke, iron and steel, chemicals, some electrical goods, building materials, etc.). These sheltered industries are less subject to price pressures and may therefore be better able to afford a liberal wage policy than highly competitive, unsheltered industries such as textiles, clothing, or foods. Then too, other factors specific for particular industries, such as dominance of large establishments, heavy capital investment, steep growth trends, high productivity, strong seasonal variations, large cyclical amplitudes, dangerous or disagreeable working conditions—all these may find reflection in industrial wage differentials.

The generally high wages in building, brewing, and (for skilled workers) mining must be related at least in part to the combination of aptitude, experience, and stamina required by the major occupations in these industries. The need for intelligence and long experience probably also goes far to explain the relatively high levels of printers' rates. By comparison, textiles, foods, and papermaking require less of these qualifications. It must be noted, however, that some of the high-wage industries also happen to be those more heavily concentrated in industrial centers with high living costs. They tend to be characterized by heavy capitalization and high productivity and, on the whole, to be more largely cartel dominated and more thoroughly unionized. Some of these high-wage industries also are industries with large fluctuations in employment. In the case of brewing and building, strong seasonality is obvious. In building, hard coal mining, and most subgroups of the metal industry, the cyclical instability of employment may require some compensation in the form of higher wage levels.

We find, then, a marked correlation among the cited determinants of wage levels. This correlation is not fortuitous. Heavy industries with large



capital investment tend to require a highly skilled and responsible labor supply. Such a labor supply is more likely to congregate in industrial areas and close to large cities. The heavy fixed costs and the durability of their products make these heavily capitalized industries cyclically sensitive and increase their need for protective market control. The above elements—high skills, large establishments, concentration in industrial centers, and strong organization of employers—make for powerful unions and high wage demands; and employers' control of product markets enables them to pursue relatively liberal wage policies. The correlation of the several wage determinants leads to the grouping of wages into broad categories, with producers' goods industries predominating in the upper part of the wage scale, and consumers' goods industries in the lower part. However, the correlation is far from perfect and the factors are combined in varying proportions. Thus consumers' goods industries like brewing and printing appear in the upper segment of the wage array, and sawmill products in the lower segment.

The reasons for the narrowing of industrial differentials in the course of time must be sought in the changes that took place in the conditions accounting for these differentials. It has been pointed out that to some extent industrial differentials reflect differences due to other factors, such as skill, sex, age, location. The narrowing of wage differentials based on these factors as previously described must thus find expression in the trend of industrial differentials. Also, differences in some purely industrial characteristics, that were formerly pronounced, tended to become milder. For instance, during the early decades of the Reich's history and probably up to World War I, consumers' goods industries operated with very low capital investment. This situation changed with the increasing use of machinery and the growing size of establishments in consumers' goods industries. The change affected both productivity and cyclical sensitivity in these industries. Moreover, unionization, which before World War I was concentrated in a few industries, permeated the whole industrial field after the war. It would be difficult to describe the trends in less tangible conditions, such as differences between industries in the degree of protection and market control. Indeed, some of the factors making for industrial wage differentiation may well have grown in importance. After all, industrial differentials did not disappear; they continued to be an important aspect of the German wage structure. It may well be asked how it is possible that industrial wage differentials in a local labor market can be maintained over an extended period. Theoretical considerations might lead one to expect that even if there is no short-term substitutability of industrial skills, competition of workers for jobs in the high-wage industries should in the long run tend to equalize wages for comparable skills in different industries. There are, however, important obstacles to a proper functioning of such competitive mechanism. Entry into the skilled trades of the high-wage industries may be limited by control of apprentice

training. The employment capacity of the high-wage industries may be too small to constitute a sufficient incentive for a large influx. Greater job security in the cyclically less sensitive consumers' goods industries may play a role. Finally, the availability of women workers and young workers characterizes the labor supply picture of the light industries and tends to perpetuate their lower wage levels.

The investigation of wage differences deriving from such factors as skill, age, sex, city-size, region, and industry has shown that such differentials generally tended to shrink over the long period under review. All long-term changes point to a leveling-out of sharp differences, and to a greater measure of equality in the wage structure. We find that most of these differentials narrowed in rough conformity to the social and economic inequalities from which they stemmed.

The period of greatest progress in this wage equalization extended from 1913 through the late 1920's—during the transition from the Kaiserreich to the Weimar Republic. It would seem plausible that the changes in economic, social, and political climate brought about by the Revolution of 1918 were mainly responsible for the trends toward equalization. It must be realized, however, that there were in operation long-term forces which helped to bring about this equalization process—forces which also created the conditions for the Revolution and the emergence of democratic institutions. Among these forces were the progressive industrialization of Germany, the urbanization of the countryside, the spread of general education and industrial training, the introduction of mass-production technology with its reduced requirements for select handicraft skills, and the gradual spread of unionism throughout all industries, areas, and skill groups. Industrialism tends to equalize living conditions, productive capacities, and economic requirements. In this process it also fosters equality in the wage structure.

## CHAPTER 4

### Cyclical Behavior of Wages

#### *Cycles in Money Wages*

##### GENERAL

UP TO now we have paid little systematic attention to the short-term movements which modified secular changes in wage levels at all times. Drastic fluctuations of that sort frequently occurred in connection with extraordinary episodes, such as the two world wars or the Great Inflation. Discussion of wage behavior under these abnormal circumstances will be reserved for Chapter 5. Here we shall be concerned with short-term changes in wage levels during the comparatively "normal" phases of German history.

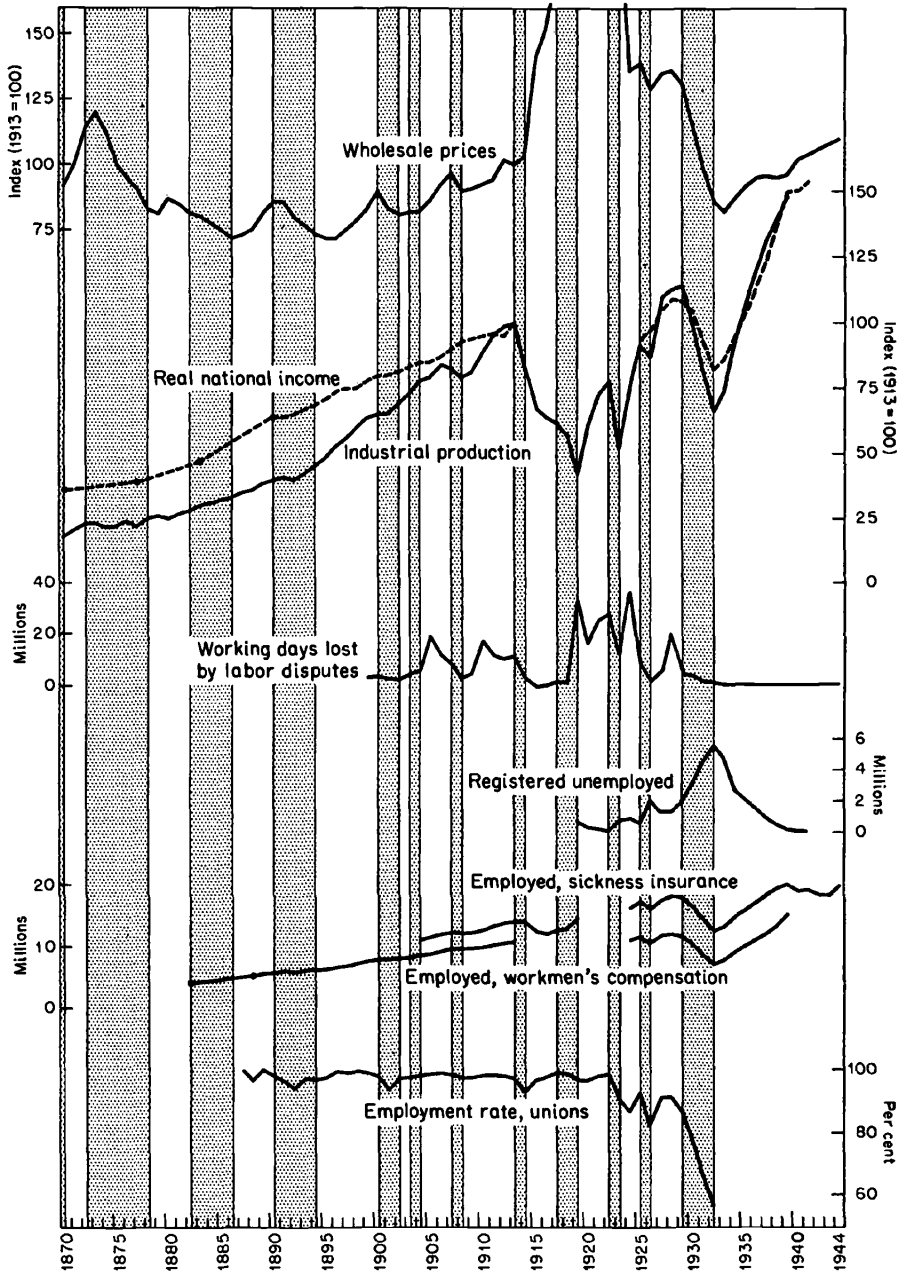
During the period 1870-1945 the German economy passed through twelve business cycles<sup>1</sup>—including those during periods of inflation, war, and the years of National Socialism. If these unusual periods are omitted, we have eight and one-half business cycles occurring under comparatively ordinary circumstances. During these "normal" periods there were only two really dramatic cycles—the *Gründerjahre* boom and bust, and the cycle ending with the Great Depression. The *Gründerjahre* boom<sup>2</sup> was stimulated by the results of the victory in the Franco-Prussian War: annexation of Alsace and Lorraine, reparations payments from France, retirement of war bonds by the government, and—most important—general expectations of a great political and economic future for the Reich. The foundation of the Reich had also brought practically unrestricted freedom to found enterprises (only the incorporation of banks and railroads required a license), a federal commercial law, a uniform national currency, and an improved banking system. These conditions were conducive to the emergence of a large number of business ventures, industrial and financial. Railroad companies, mining and industrial enterprises, real estate and building concerns sprang up—frequently set up for wildly speculative and even fraudulent aims. Production, commodity prices, and stock quotations rose rapidly until 1873, when one of the sharpest and longest contractions in Germany's business history

<sup>1</sup> The reference chronology of the National Bureau includes turning points for eleven of these cycles, up to 1932. But the rise and fall of the German economy under National Socialism no doubt constitutes an additional cycle. The number of cycles remains the same, whether they are based on monthly or on annual data.

The National Bureau chronology is presented and compared with chronologies by Spiethoff, Clausing, and Wagemann in Appendix B. In this and later chapters, German business cycles (and their expansion and contraction phases) are identified in accordance with the reference chronology of the National Bureau.

<sup>2</sup> For a brief vivid description of the *Gründerjahre* cycle see Heinrich Bechtel, *Wirtschaftsgeschichte Deutschlands im 19. und 20. Jahrhundert* (München, 1956), pp. 183-88.

CHART II  
Business and Labor Market Conditions, 1870-1944



Shaded areas represent business contractions.  
Source: Appendix Table A-1.

occurred. There was an extraordinary wave of bankruptcies. The price decline was very steep—about a third for raw material and intermediate product prices. The production index of the IKF registered only a mild decline, although iron consumption is reported to have been cut by more than half, and contemporary and later historical studies describe “very considerable” and “widespread” unemployment.<sup>3</sup> The other huge business cycle, lasting from 1926 to 1932, developed in a radically different climate, following as it did in the wake of a lost war. The expansion was characterized by relatively high levels of unemployment—which might, at least partly, reflect the short-term effects of a large-scale program of modernization and “rationalization,” furthered by long-term loans from abroad. The Great Depression was international in scope and complicated by mass unemployment and severe political repercussions. Compared with these upheavals, the other “normal” cycles were relatively mild and did not affect the economy to a similar extent (see Appendix Table A-1 and Chart 11).

For the purposes of a wage study the cyclical behavior of labor-market activities is of particular interest. A number of pertinent series—covering employment, unemployment, and labor strife—are included in the table and chart mentioned. To summarize their behavior in broadest terms: The selected indicators show that short-term changes in the labor market are closely associated with volume of production and business cycles at large. In the series bearing on physical output—labor input and degree of employment or unemployment—we find substantial differences in cyclical behavior before and after World War I. The interwar period brought higher unemployment levels and more violent cyclical swings. The difference in labor-market behavior before and after World War I corresponds to the break in industrial growth trends which is so decisive an aspect of German economic development.

This chapter will be concerned in detail with the effect of varying business conditions on the course of wages, but only incidentally with the effect of wage changes on the fortunes of the economy at large. However, since the broad economic implications of wage behavior will be touched upon occasionally, it is desirable to indicate the quantitative importance of wage payments in personal income fluctuations. Table 30 shows changes

<sup>3</sup> *Der Arbeiterfreund* (Berlin, 1879), pp. 18 ff.; Willard L. Thorp, *Business Annals* (National Bureau of Economic Research, 1926), and Arthur A. Spiethoff, *Die Wirtschaftlichen Wechsellagen* (Tübingen, 1955), Vol. I, p. 124.

A mild decline in industrial production, in spite of a generally severe contraction, occurred also in the United States during these years. This might be related to the marked fall in prices and its effect on purchases. Rendigs Fels, explaining the mildness of volume reductions in the United States, argues that the high price flexibility at that time mitigated the decline of output (though prolonging the contraction phase of the cycle) and that the price depression stimulated exports and created a favorable balance of payment. See his “American Business Cycles, 1865-1879,” *American Economic Review*, June 1951, especially pp. 346 and 347. The circumstances cited—mild decline in production, sharp price breaks, and prolonged depression—are also characteristic of the German contraction.

TABLE 30  
Total Personal Income, by Source, 1913 and 1925-1940  
(billions of marks)

Year	Total Personal Income	Dividends and Interest	Rents	Proprietors' Income, Forestry and Agriculture	Proprietors' Income, Trade and Industry	Unemployment Insurance and Pensions	Wages and Salaries
1913	43.6	5.7	0.9	5.7	9.2	1.4	20.7
1925	57.6	1.2	0.5	5.7	10.9	5.6	33.7
1926	60.8	1.6	0.6	5.8	10.8	7.1	34.8
1927	67.1	2.1	0.8	5.9	12.0	7.4	38.9
1928	72.7	2.8	0.8	5.8	12.2	8.4	42.6
1929	73.6	3.3	0.9	5.5	11.8	9.2	43.0
1930	69.0	3.3	0.9	5.0	10.0	10.0	39.9
1931	59.4	3.2	0.9	4.4	7.5	10.1	33.4
1932	47.8	2.3	0.8	3.7	6.0	9.4	25.7
1933	47.9	2.4	0.7	3.9	6.4	8.5	26.0
1934	52.6	2.6	0.8	5.0	7.2	7.9	29.2
1935	57.9	2.6	0.8	5.8	8.5	7.9	32.3
1936	63.2	2.7	1.0	5.8	10.6	7.8	35.3
1937	69.7	2.8	1.1	6.1	13.3	7.6	38.9
1938	77.4	3.0	1.2	6.4	15.9	7.9	43.0
1939	85.8	3.0	1.3	6.9	17.9	10.2	46.4
1940	91.2	3.2	1.4	6.9	18.5	14.1	47.1

SOURCE: "Das deutsche Volkseinkommen vor und nach dem Kriege," *Einzelschriften zur Statistik des Deutschen Reichs*, No. 24 (1932), p. 83; *Jahrbuch 1939-40*, p. 579, and 1941-42, p. 605.

in total personal income and its major components for 1913 and for 1925-40. Wage-salary income during the interwar period is here seen to have accounted for more than half of total personal income in each of these years. The cyclical swings of labor income were roughly similar to those of total national income—wider than those in pension income and agricultural income, but shallower than those of profits in trade and industry. Table 31 contains a further breakdown of wage-salary income. It shows that wage income proper is only about half of total wage-salary income. This relation varies strongly with the business cycle, since salary income shows appreciably greater cyclical stability. While in 1929, for instance, 54 percent of the wage and salary total consisted of wages, this portion fell to 46 percent in 1932. Between 1929 and 1932 wage income was almost cut in half, while salary income decreased by only 30 percent. Fluctuations in the industrial payroll (manufacturing and mining) tended to be wider than those in the payroll covering all wage earners. During the reference contraction of 1929-32, for instance, the industrial payroll decreased by 59 percent—about ten percentage points more than the total wage bill.

These fluctuations in aggregate wage payments are caused to a large

TABLE 31  
Total Wages and Salaries, 1929-1940  
(billions of marks)

Year	Wages and Salaries (1)	Salaries (2)	Wages (3)	Payroll in Manufacturing and Mining (4)
1929	43.0	19.7	23.3	13.3
1930	39.9	18.7	21.2	n.a.
1931	33.4	16.7	16.7	n.a.
1932	25.7	13.8	11.9	5.4
1933	26.0	13.6	12.4	5.9
1934	29.2	14.3	14.9	8.0
1935	32.3	15.4	16.9	9.3
1936	35.3	16.5	18.8	10.6
1937	38.9	17.7	21.2	12.1
1938	43.0	19.3	23.7	13.6
1939	46.4	20.9	25.5	16.2
1940	47.1	22.1	25.0	15.7

SOURCE, by column:

(1 to 3) *Wirtschaft und Statistik*, 1939, p. 301; *Jahrbuch 1939-40*, p. 579, and 1941-42, pp. 605 ff.

(4) For 1929 and 1932, *Wirtschaft und Statistik*, 1939, p. 301; for 1933 to 1940, *Handbuch 1928-44*, p. 473.

extent by variations in total man-hours worked, which in turn reflect changes in employment and in average hours worked per week. During the 1929-32 contraction the decline in total man-hours was as large as 46 percent. Only a minor part of the variation in the wage bill is explained by fluctuations in earnings and in rates, which is one of the earnings components. It is with the cyclical behavior of rates and earnings of employed workers, particularly those attached to manufacturing and mining, that the following analysis is concerned.

Before we embark on the analysis itself, let us review the conceptual differences between rates and earnings.<sup>4</sup> Wage rates, quoted on an hourly or weekly basis, are, in principle, the prices for work of defined character and skill during the given time period. Rates are typically quoted for "straight-time" work and are thus not affected by premium arrangements for overtime, night, and holiday work, or for high productivity. Nominal and effective wage rates must always be clearly distinguished. The former may be minimum rates, "prevailing" rates, union rates, or other wage quotations which serve as a limit or norm. Effective rates are always actually paid rates—as reflected in payroll or similar records. Piece rates are paid for defined operations or for entire parts and products. They

<sup>4</sup> See also Daniel Creamer, *Behavior of Wage Rates During Business Cycles*, (Occasional Paper 34, National Bureau of Economic Research, 1950), pp. 2-4; and Paul H. Douglas, *Real Wages in the United States 1890-1926*, (Houghton Mifflin, 1930), pp. 6 ff.

are quoted per unit of operation or accepted product. Minimum standard piece rates assure the piece-rate worker of a floor under his efficiency wage.<sup>5</sup>

The collectively agreed-upon rates had different significance during different time periods. At the beginning of our period they were usually the highest paid in each trade—covering only a relatively small number of organized, and generally highly paid, workers. During the Weimar Republic they covered practically all workers, and being regarded as minimum rates, they were generally exceeded by actually paid rates. Direct comparison of nominal rates in the nineteenth and twentieth centuries might thus somewhat understate the changes in effective rates. The quoted rates, in any case, can be regarded as “list prices” only, not as “effective prices.” Furthermore, to derive effective labor costs per hour to the employer, modifying factors such as incidence and rate of premium payments must be considered.

Both time and piece rates are, of course, basic elements in the determination of earnings. Among the additional elements affecting earnings are the rates for, and the relative importance of, premium work, the actual output of piece workers, production and other bonuses, and the number of hours worked. The latter affects daily earnings, shift earnings<sup>6</sup> and weekly earnings directly and indirectly (via premium payments), hourly earnings only indirectly.

Earnings, as commonly ascertained, are often affected by additional variables. Typically, average earnings are derived as quotients of aggregate payroll and total hours, shifts, or weeks worked during the payroll period. In these cases, changes in the composition of the work force and of the hours worked will affect the resultant earnings whenever no statistical standardization of the composition is provided. Without standardization average hourly and weekly earnings may be affected by changes in skill, age, and sex composition of the work force, changes in the quantitative importance of inexperienced labor as compared with experienced, and by changes in the proportion of single and married workers and of workers in different types of industries, cities, and regions. Weekly earnings, furthermore, may be influenced by a changing importance of part-time work, particularly if no clear distinction is made between fully and partially employed

<sup>5</sup> Piece rates will not be analyzed *per se* in subsequent discussions, but they enter into the derivation of some union rates and of average hourly and weekly earnings. For the union rates available during the period of the Weimar Republic and later, so-called *Akkordrichtsätze* (standard rates for piece work) are included in the rate averages. These were minimum standards for expected average earnings resulting from piece rates and were usually set at 15 percent above comparable time rates. On the nature of the minimum time and standard piece rates agreed to in the collective contracts of the Weimar Republic, see notes to Appendix Table A-2, Part III.

<sup>6</sup> Shift earnings play a large part in German wage analysis, since one of the most important collections of German earnings statistics, miners' earnings, is published in this form. In German coal mines, shift earnings for surface workers were mostly based on time rates. In underground operations the so-called *Gedingelohn* prevailed, a system in which remuneration of the miner was, to a large extent, based on group performance.



persons. Some of the effects of changing composition of the work force and of changes in number of hours worked may, of course, be excluded if average earnings are computed separately for men and women, skilled and unskilled, and similar categories. Such standardized earnings data for broad groups (skill, sex, and industry) are available for the last few years of the Reich. For earlier periods the best way to exclude the effects of changing composition is to select sufficiently small, occupationally well-defined groups.

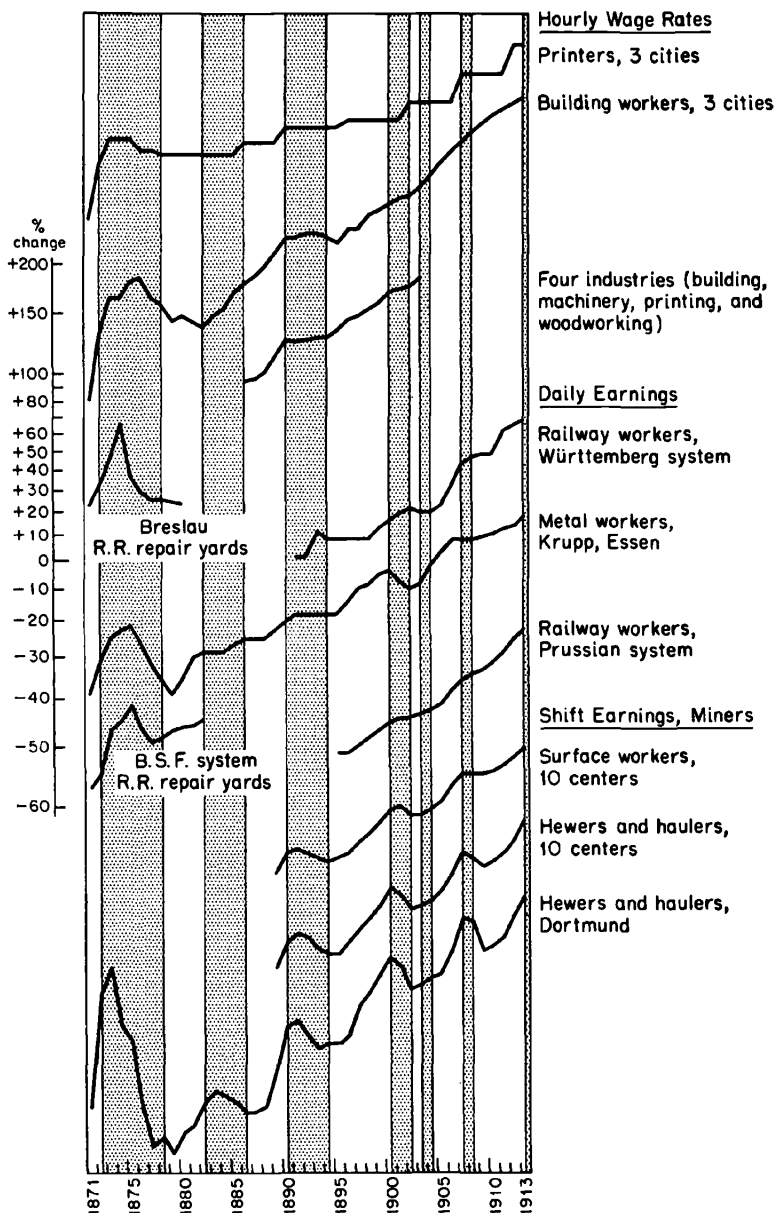
Many of the wage series depicted in Charts 2 to 5 and Chart 12 show recurrent ups and downs which correspond roughly to business cycle expansion and contraction periods—an indication that wages respond to cyclical changes in general business activity. However, even casual inspection of these charts reveals that the actual relation of short-term wage fluctuations and business cycles was far from regular or simple. Frequently annual changes in wages appeared to be rather independent of cycles in general business conditions. This was true not only for contractions in periods of rapid monetary depreciation, such as 1917-19 or 1922-23, but also for some of the briefer "normal" contractions, for example 1903-4, to which our wage series showed little or no perceptible response. In particular, wage rates failed to show—over extended periods of time—genuine cycles (with rises and actual declines) despite fluctuations in general business conditions. Thus it is necessary first to establish whether wage rates and earnings did in fact respond to changes in general business conditions, and if so, with what degree of regularity and under what circumstances. Only then may we ask how promptly they responded, how strongly, and in what cyclical patterns.

## WAGES AND TURNING POINTS IN BUSINESS CONDITIONS

### *Conformity of Wage Cycles*

WAGE RATES AND BUSINESS CYCLES. There is no doubt that German wage rates showed true cyclical behavior during the *Gründerjahre* cycle of 1870-78, and during the major business cycle of 1926-32. This appears from the hourly and weekly printing and building rates depicted in Charts 3 and 6 as well as from the average rates for all industry (1924-32) in the latter chart. In the cycles cited, even these rough annual data show substantial increases and declines which can easily be related to cyclical changes in business conditions. We can go no further, however, in finding examples of full cycles, with actual ups and downs, of wage rates in the annual record of the long-term series mentioned. It is true that in some instances wage rates undergo changes in their rate of growth, or a leveling-out into plateaus, which may be related to cycles in general business conditions. In building rates prior to World War I, for example, a combination of leveling-off and brief decline matches the 1890-94 contraction in general business conditions; and the retardation of growth during 1900-2 corresponds to the business contraction of the same years. Again, the

CHART 12  
Wage Rates and Earnings in Selected Industries, 1871-1913



Shaded areas represent business contractions.

Source: Tables 33 and 36, and Appendix Tables A-3 to A-8.

comprehensive interwar series of union rates shows during the mid-1920's a slight retardation in its rise which might be regarded as a response to the business contraction of 1925-26. But in other instances wage rates do not indicate any observable responses to changing business conditions. Thus, in following the course of rates in building, we can find no reflection of the contractions of 1882-86, 1903-4,<sup>7</sup> and 1907-8. Instead, we note that throughout these contractions building rates increased at an undiminished pace, and that between 1878 and 1882 they declined during a business expansion. Nor can we observe a correspondence in the case of printing rates before World War I: here it is virtually impossible to match the leveling-out stages of the rates to contractions in business cycles.<sup>8</sup>

The sporadic nature of the conformity of wage rates to business cycles is observable in the summary measures presented in Appendix Table A-20, based on hourly and weekly wage rates in selected industries as well as on comprehensive hourly rates from 1924 to 1932. Average annual changes of cycle relatives are shown for each reference expansion and contraction during the years 1871-1913 and 1924-32.<sup>9</sup> In all rate series the only substantial declines occurred during the Great Depression. The actual declines following the *Gründerjahre* expansion do not show up in these reference measures because of the difference in timing between wage cycles and reference cycles. The conformity of wage rates is summarized by the measures<sup>10</sup> given in Table 32. These indexes show high average conformity during expansions and negative conformity during contractions. Over the cycle as a whole, a low positive conformity appears in all except hourly union rates for printers.<sup>11</sup>

<sup>7</sup> The 1903-4 contraction, although included in the chronology of the National Bureau, is somewhat dubious (see Arthur F. Burns and Wesley C. Mitchell, *Measuring Business Cycles*, National Bureau of Economic Research, 1946, p. 133). The contraction is not recognized by Spiethoff (see Appendix Table B-1).

<sup>8</sup> The response of wage rates to business cycles is here examined largely in terms of behavior during reference contractions, since in periods of long-term growth, trend and cycle elements can hardly be distinguished in expansion phases. In such growth periods, wage decreases during business contractions, on the other hand, constitute *prima facie* evidence of cyclical response.

<sup>9</sup> Cycle relatives describe the standing of a series expressed in percent of the average of that series during each cycle. Average annual changes during contractions and expansions are computed as differences between cycle relatives at turning points, divided by number of years between turning points.

<sup>10</sup> Conformity indexes range between +100 (perfect positive conformity) and -100 (perfect inverse conformity). For a short description of the meaning of these indexes see note to Appendix Table A-20. A detailed explanation will be found in Burns and Mitchell, *op. cit.*, pp. 176 ff. The indexes used here do not take account of systematic differences between the timing of the series and business cycles; that is, they are all computed from changes between peak and trough years of business cycles. Because of the tendency of wage rates to lag, this may result in an understatement of the degree of relationship between wage rates and business cycles.

<sup>11</sup> Nationwide rate agreements for printers were valid over long periods, sometimes as long as eight years. Although the substance of the agreements may have been affected by the state of business at the time they were concluded, the printing rates before World War I were not sufficiently flexible to reflect short-term fluctuations in general business activity with any regularity.

TABLE 32  
Indexes of Conformity, Wage Rates, Annual Series, 1871-1932

Series	CYCLES COVERED		INDEXES OF CONFORMITY		
	Number	Years	Expansions	Contractions	Full Cycles
<i>Union Rates</i>					
Hourly rates					
Comprehensive series					
	2	1923-32	+100	0	+33
Printing	8½	1871-1913, 1923-32	+78	-50	-13
Building	8½	1871-1913, 1923-32	+78	-50	+33
Weekly rates					
Printing	8½	1871-1913, 1923-32	+78	-38	+27
Building	8	1871-1913, 1923-32	+78	-86	+14
<i>Effective Hourly Rates</i>					
Printing	2	1890-1903	+100	-100	+33
Building	2½	1886-1903	+100	-100	+100
Machinery	2½	1886-1903	+100	+100	+100
Woodworking	2	1890-1903	+100	-100	+67

SOURCE: Appendix Table A-20.

The evidence introduced for the years up to World War I shows the existence of full wage-rate cycles only during a single, rather exceptional, period—the *Gründerjahre*. The cyclical response of wage rates is doubtful during less pronounced cycles. Thus it cannot be ascertained, from the long-term series of building and printing rates, whether changes in German wage rates before World War I typically bore distinct relations to business cycles. In order to resolve the question on the basis of more adequate information, composite indexes of actually paid hourly wage rates covering the years 1886-1903 were constructed from six printing industry series, seven machinery industry series, ten building series, and seven wood industry series, which were available in a sufficiently comparable form for the greater part of the period.<sup>12</sup> Table 33 and Chart 13 show the resultant index numbers for the four industries, with 1890-99 as the base period. Average annual changes of cycle relatives and conformity measures are included in Appendix Table A-20 and Table 32. They indicate clearly that in the two contractions covered, 1890-94 and 1900-1902, there occurred either a small actual decline (machinery industry, averaging about 2 percent per year) or an increase smaller than that during the adjoining expansions.<sup>13</sup> Over the average of all expansions covered by the four series,

<sup>12</sup> The basic series for this sample were taken from Robert R. Kuczynski, *Arbeitslohn und Arbeitszeit in Europa und Amerika, 1870-1909* (Berlin, 1913). The rates are "effective" or actually paid rates, not "nominal" rates, or union rates.

<sup>13</sup> The single exception is the behavior of printing rates during the 1900-2 contraction; here the average percentage increase is larger than in the preceding expansion, although smaller than in the subsequent expansion.

TABLE 33  
 Effective Hourly Wage Rates, Four Industries, 1886-1903  
 (1890-99 = 100)

Year	Building	Machinery	Printing	Woodworking	Average of Four Industries
1886	84.8	78.0	...	...	82.1 <sup>a</sup>
1887	84.5	79.9	...	...	82.6 <sup>a</sup>
1888	85.5	82.3	84.8	...	84.6 <sup>a</sup>
1889	91.3	88.7	86.0	91.4	89.4
1890	95.7	100.3	90.5	94.3	95.2
1891	96.6	99.4	91.5	91.9	94.8
1892	97.0	96.9	95.7	93.6	95.8
1893	97.3	95.4	97.5	94.3	96.1
1894	96.2	94.1	97.2	97.9	96.4
1895	97.6	98.7	100.8	97.0	98.5
1896	101.3	103.9	102.8	104.3	103.1
1897	103.1	100.1	107.5	105.9	104.2
1898	106.7	104.0	107.0	109.1	106.7
1899	108.9	106.9	109.5	111.6	109.2
1900	112.8	112.1	111.0	120.7	114.2
1901	115.1	110.0	112.2	123.7	115.2
1902	114.8	108.6	117.2	123.9	116.1
1903	118.9	113.3	122.7	125.6	120.1

<sup>a</sup> For 1886-88, computed by linking percentage changes in available industries.

Based on data from Robert R. Kuczynski, *Arbeitslohn und Arbeitszeit in Europa und Amerika, 1870-1909* (Berlin, 1913).

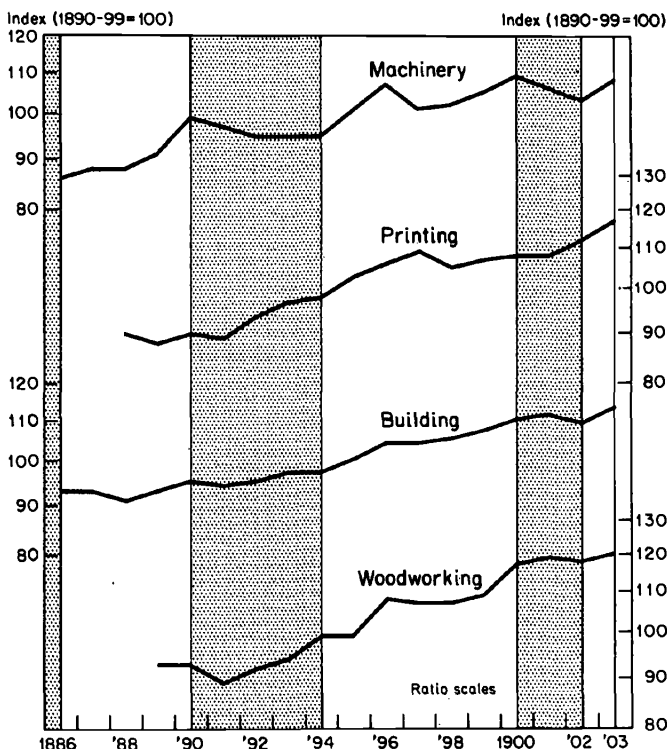
the annual increase of cycle relatives was 3.5 percentage points; the corresponding increase for contractions was 0.5 points. The conformity shown by these effective rates is somewhat more pronounced than that of the union rates for printers and building workers. We find, moreover, high positive conformity of actually paid rates in the machinery and woodworking industries, for which no comparable union rates are available.

To sum up what can be said about conformity of wage rates prior to World War I: Only during the *Gründerjahre* does cyclical conformity appear in the form of clear changes of direction, corresponding to the ups and downs of business. In some pre-1913 contractions, wage rates responded to changes in general business by retardations in the rate of increase. Even such retardations cannot be regularly observed during some shorter contractions. Actually paid or effective rates tended to show clearer conformity than nominal rates.

For cycles following World War I, the degree of conformity of wage rates can be established on the basis of monthly evidence (see Table 34

and Chart 14). The response of union wage rates to the 1926-32 cycle is, of course, the most striking feature of the chart. However, the monthly data reveal also a general leveling-out of wage rates toward the end of 1925, and even small actual declines in rates during the summer of 1926. There are good reasons for relating this leveling-out or decline to the general business contraction of March 1925 to March 1926. First, actual

CHART 13  
Effective Hourly Wage Rates, Four Industries, 1886-1903



Shaded areas represent business contractions.

Source: Table 33.

declines, in excess of those shown in the average, occur in several industries (building, woodworking, and others; see Chart 15 and Appendix Table A-21). Second, during this period wage contracts in some industries expired without being renewed, and it is known that collectors of wage statistics tended to assume that wage rates continued to be paid at the level of the expired contracts, although lower rates may actually have been paid. Finally, the fact that the leveling-out of wage rates started only eight months after the peak in business conditions is compatible with the characteristic lag in these rates, which will be discussed later in detail.

Appendix Table A-22 shows the behavior of ten wage series on a

reference cycle basis. The specific rate declines in response to the March 1925–March 1926 recession occurred only after that reference cycle phase. As a consequence, wage rates during the reference contraction increased more than during the subsequent expansion. This situation, in spite of perfect conformity in all other reference cycle phases, limited the over-all conformity for the interwar period to +33. The conformity would be perfect if allowance were made for differences in timing.<sup>14</sup>

TABLE 34  
Hourly Union Rates, by Months, 1924-1933  
(1928 = 100)

Month	1924	1925	1926	1927	1928	1929	1930	1931	1932	1933
Jan.	56.7	72.5	86.7	87.4	95.7	103.1	107.1	106.7	88.8	84.2
Feb.	56.0	73.3	86.8	87.5	95.8	103.2	107.1	105.3	88.8	84.1
Mar.	55.4	75.2	86.8	88.2	96.3	103.4	107.1	104.2	88.6	83.6
Apr.	59.2	77.0	86.7	89.9	98.5	104.0	107.3	102.1	88.6	83.6
May	63.4	78.8	86.7	92.9	100.5	105.7	107.4	101.3	86.5	83.6
June	66.2	80.7	86.4	93.5	100.6	106.1	107.4	101.1	85.3	83.5
July	66.4	81.8	86.5	93.5	100.9	106.3	107.4	101.0	85.2	83.5
Aug.	66.7	83.5	86.5	93.6	101.6	106.6	107.4	100.9	85.1	83.5
Sept.	66.8	84.4	87.3	93.7	101.6	106.6	107.4	100.8	84.6	83.5
Oct.	67.9	85.1	87.2	94.6	102.6	106.7	107.4	100.1	84.3	83.5
Nov.	69.7	86.3	87.3	95.1	102.7	106.8	107.4	99.5	84.3	83.5
Dec.	71.6	86.4	87.4	95.2	103.0	107.1	107.3	98.8	84.2	83.5

This index combines the revised union rate statistics (available from 1928 on) with earlier, unrevised, figures. The linking of the segment 1925-27 to the later segment was carried through by the Statistische Reichsamtsamt (see *Reichsarbeitsblatt* 1931, Part II, p. 109). In the present study the index was pushed back one more year (1924), on the basis of the average of skilled and unskilled male workers, with the weights 1.0 and 2.2, respectively. These weights, based on employment (*Vierteljahrshefte zur Statistik des Deutschen Reichs*, 1931, p. 97), are those used by the Statistische Reichsamtsamt in the revised index. For a description of the nature of these rates see notes to Appendix Table A-2, Part III. SOURCE: *Reichsarbeitsblatt*, 1931, Part II, p. 109; 1933, Part II, p. 44; 1934, Part II, p. 91. Monthly data for 1924 estimated, in the present study, on the basis of wage rates for male workers (skilled and unskilled) as published in *Jahrbuch* 1926, p. 291.

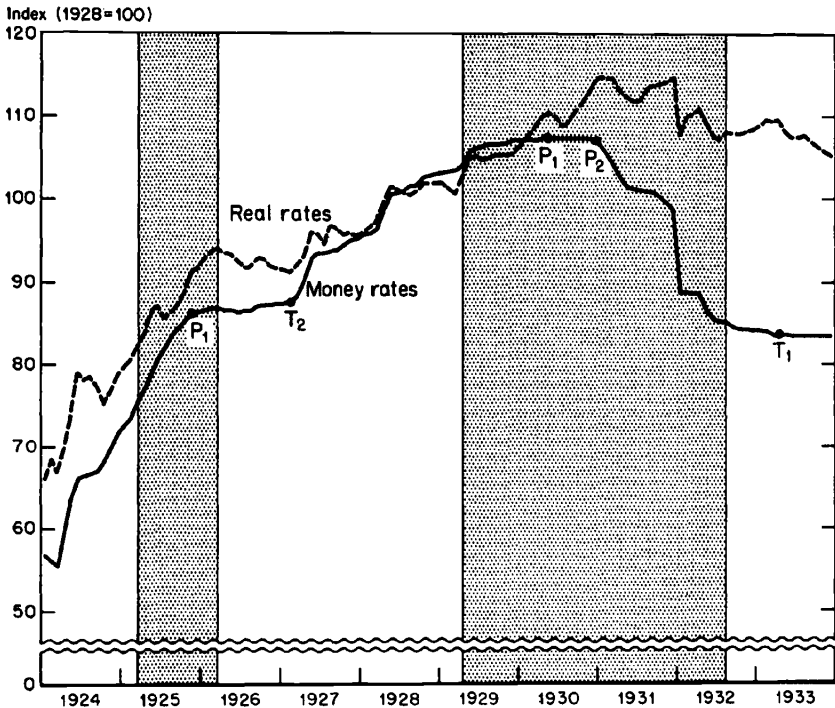
EARNINGS AND BUSINESS CYCLES. A closer relation is observable for earnings and business cycles than for rates. The comprehensive hourly and weekly earnings series depicted in Chart 2 show that during the years 1924-44 all major business cycles are clearly reflected. The short 1925-26 contraction leads only to a deceleration in the rate of growth, but in the other phases earnings actually rise and fall with general expansions and

<sup>14</sup> The above observations refer to the aggregate rate measure. Appendix Table A-22 gives also industrial detail. The individual series show strikingly similar behavior. Conformity indexes during the interwar period are the same for each of the included series: +100 for expansions, 0 for contractions, and +33 for full cycles. If differences in timing were taken into account, each of the ten presented series would show perfect conformity.

contractions in business.<sup>15</sup> Thus, conformity for the postwar period is perfect (+100).

Tolerably good positive correspondence between earnings cycles and business cycles can be found also during the period before World War I (See Chart 12, Appendix Table A-23, and Table 35). Average daily earnings of workers in Krupp's iron works,<sup>16</sup> for instance, show distinct

CHART 14  
Average Hourly Money and Real Wage Rates, 17 Industries, 1924-1933



Shaded areas represent business contractions.

Source: Tables 34 and 44.

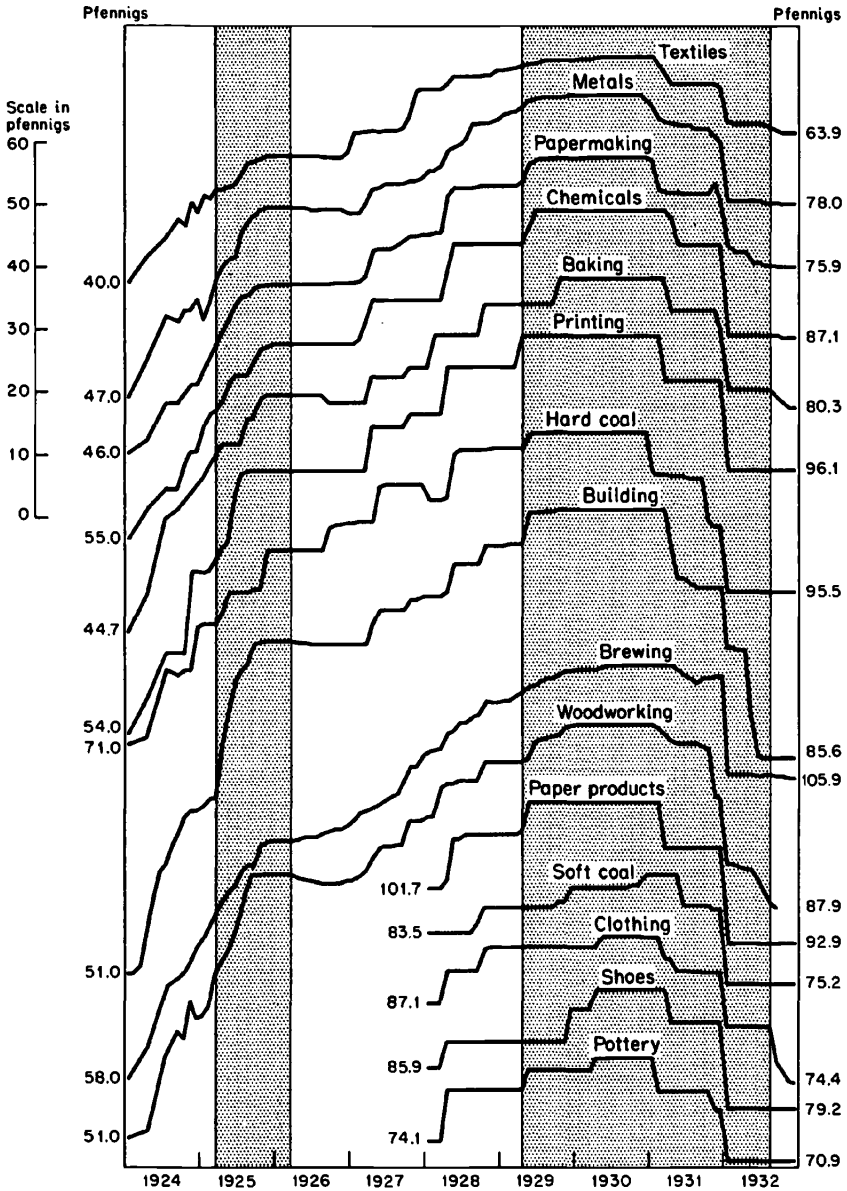
cyclical movements, which in most instances can be quite clearly related to corresponding phases in business activity. In all contractions except the somewhat dubious one of 1903-4, earnings of Krupp workers declined or rose less than in the adjacent expansions. Conformity for the prewar period is measured as +67. In the case of daily earnings in railway repair yards, a fair degree of conformity can also be demonstrated.

<sup>15</sup> The position of 1926 had to be read from a graph, and 1927 was then interpolated on the basis of the movement of hourly rates.

<sup>16</sup> The Krupp data are annual, based on payroll divided by number of workers. The firm grew rapidly, and the average earnings data reflect major changes in composition.



CHART 15  
 Union Wage Rates of Skilled Men, 15 Industries, 1924-1932



Shaded areas represent business contractions.  
 Source: Appendix Table A-21.

TABLE 35  
Indexes of Conformity, Earnings, Annual Series, 1871-1932

<i>Series</i>	CYCLES COVERED		INDEXES OF CONFORMITY		
	<i>Number</i>	<i>Years</i>	<i>Expansions</i>	<i>Contractions</i>	<i>Full Cycles</i>
<i>Hourly Earnings</i>					
Comprehensive series	2	1923-32	+100	0	+100
<i>Daily Earnings</i>					
Krupp, Essen	6½	1871-1913	+100	-17	+67
<i>Weekly Earnings</i>					
Comprehensive series	8½	1871-1913, 1923-32	+89	+12	+73
<i>Miners' Shift Earnings</i>					
Below ground:					
Hard coal, Upper Silesia	6	1890-1913, 1923-32	+100	-33	+90
Hard coal, Lower Silesia	6	1890-1913, 1923-32	+100	0	+60
Hard coal, Dortmund	8½	1871-1913, 1923-32	+100	+50	+73
Hard coal, Saar District	4	1890-1913	+100	0	+71
Hard coal, Aachen	6	1890-1913, 1923-32	+100	+33	+60
Lignite, Halle	6	1890-1913, 1923-32	+100	+33	+80
Salt, Halle	6	1890-1913, 1923-32	+100	0	+80
Ore, Halle	6	1890-1913, 1923-32	+100	+33	+60
Ore, Upper Harz	5½	1890-1913, 1923-32	+100	-67	-33
Ore, Siegen-Nassau	6	1890-1913, 1923-32	+100	+33	+100
Ten centers	6	1890-1913, 1923-32	+100	+33	+80
Above ground:					
Hard coal, Dortmund	7½	1878-1913, 1923-32	+100	-14	+62
Ten centers	6	1890-1913, 1923-32	+100	+17	+80

SOURCE: Appendix Table A-23.

Still closer is the correspondence of miners' earnings to changes in general business conditions. In fact, specific cycles in miners' earnings can generally be matched with reference cycles. There are, however, three major exceptions. One is the mild reference contraction of 1903-4 which is skipped by underground miners' earnings in every district. The second is the contraction of 1925-26 in which miners' earnings showed no actual declines, but rather experienced in every district a marked deceleration of growth as compared to the preceding expansion year.<sup>17</sup> The third exception refers to the state-controlled ore mines in the Upper Harz. The generally high degree of association between cycles in miners' earnings and those in general business conditions does not imply that miners'

<sup>17</sup> The cyclical significance of this deceleration is not certain. Earnings increases between 1924 and 1925 still showed some effects of the poststabilization adjustment. Furthermore, the rates of increase during the 1925-26 depression are not set off from those in the subsequent expansion years.

earnings always declined during reference contractions. Because of lags in timing, the earnings sometimes underwent cyclical responses only after the reference contraction had run its course. Such a situation prevailed in the hard coal mines of Silesia and the Saar during and after the reference contraction of 1907-08. In other cases the actual declines occurred only in certain years during the reference contractions without resulting in a net decline between turning points or in an average annual decline during the reference contractions as a whole (i.e., hard coal mining in Upper Silesia and salt mining in Halle during the reference contraction of 1890-94). The conformity indexes for these earnings series typically range between +60 and +100, with only government-owned ore mines in the Upper Harz showing negative conformity.<sup>18</sup>

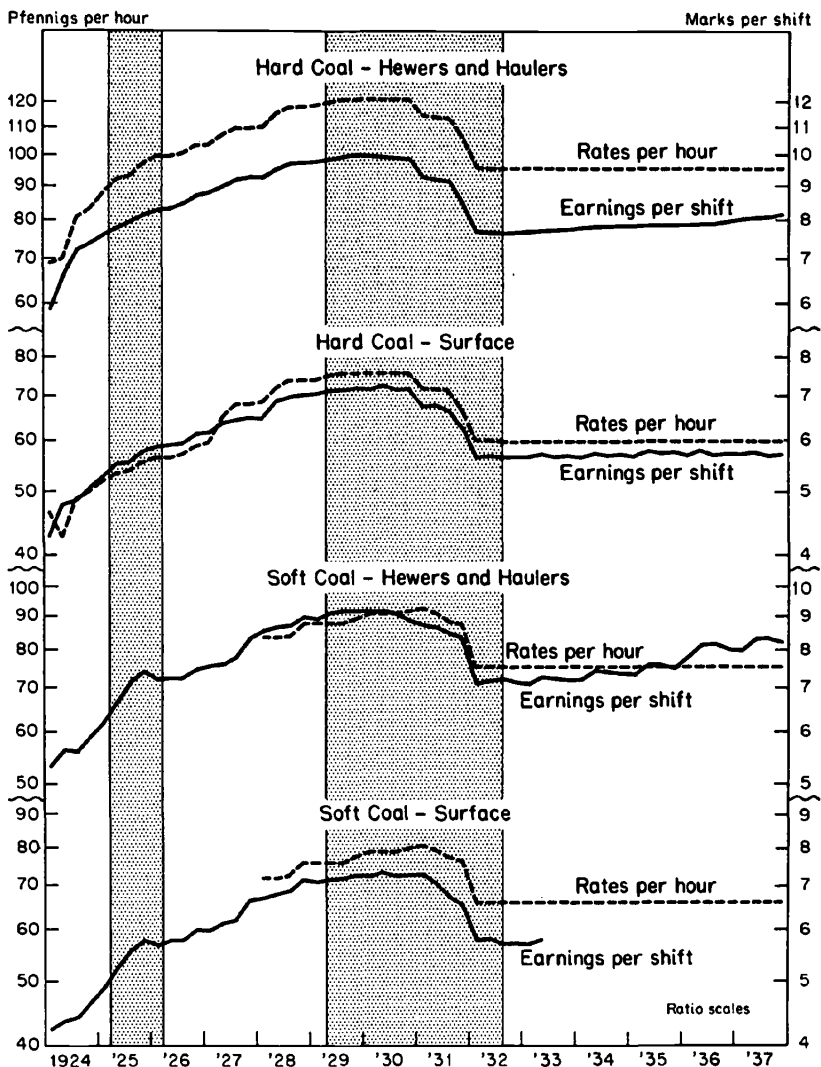
All in all, earnings conform more closely than wage rates to business cycles, both by showing less tendency to skip cycles and by clearer and more frequent actual declines during business contractions. The basic reason is that the factors which differentiate earnings from rates, particularly those having to do directly or indirectly with hours worked, are positively related to business activity. If business conditions improve, employment rises, the workweek lengthens, and overtime, night, and holiday premium pay is more frequent. Conversely, in times of declining business activity, these elements tend to shrink. It is true that some factors in the earnings picture may be countercyclical in character. The attempt to preserve a skeleton staff of experienced workers in times of unemployment might, for instance, affect the skill composition of the remaining work force in the direction of a greater percentage of higher skills. But these cyclically dampening influences are doubtless the less effective ones. In the German experience they are not only obscured by the effects of hours and premium payments, but also, during prosperous times, by the excess of rates actually paid over the established minimum rates.

### *The Lag of Wages behind Cyclical Turns*

WAGE RATES. To establish the relation of cyclical turns in wage rates to those in general business, monthly and quarterly data would of course be desirable. Unfortunately, for the period prior to 1913 the best available data are annual. Even they, rough as they are, suggest one of the most outstanding features of the behavior of wage rates: their distinct lag

<sup>18</sup> The above measures are based on annual series. From 1889 and throughout the later years, miners' earnings for ten districts are available, or can be derived, in quarterly form. Effects of the 1903-4 reference contraction, which were not reflected in the annual averages, can be detected in the more detailed quarterly earnings record which was compiled for five districts (see Appendix Table A-24). Similarly a flattening out in response to the 1925-26 contraction can be observed in quarterly earnings of coal miners for the Reich as a whole (see Appendix Table A-25 and Chart 16), while no such response is apparent in the annual records. Conformity indexes were constructed for six quarterly series during the years 1890-1913 and 1924-32 (see Appendix Table A-26). These measures indicate a degree of conformity similar to that observed on the basis of the annual information.

CHART 16  
Wage Rates and Earnings of Coal Miners, Reich Area, 1924-1937



Shaded areas represent business contractions, in terms of monthly chronology.

Source: Appendix Table A-25

behind turning points in general business conditions. As indicated in Charts 3 and 12, during the *Gründerjahre* printing rates began to decline only after 1875, and the peak of building wages was reached in 1876.<sup>19</sup> Measured against the turning point established by the National Bureau, 1872, the lag amounts to at least three years. Although this dating of the turn in business conditions seems early to the present writer,<sup>20</sup> even a shift of the reference turn to 1873 would still leave the wage rates lagging materially. Examination of the wage rates for building during the first decade of the Reich's history also creates the impression of lags. While it is difficult to match cycle phases of wage rates and general business activity during the 1880's, in subsequent decades further evidence of lags in rates is found. The upper turn of rates in building, for instance, occurs two years after the reference peak of 1890, and the slight subsequent trough one year after the reference turn of 1894.<sup>21</sup> Even the mild trend modification around 1900-1902 shows a one-year lag at the 1900 peak and coincidence at the trough.<sup>22</sup> Proper matching of cycle phases becomes possible again only for the interwar period, particularly in relation to the 1929 and 1932 reference turns. On an annual basis, hourly wage rates in printing and building, as well as every other series included in the comprehensive wage-rates index, reach their peaks one year after the 1929 turn in general business conditions. And, after the Great Depression had run its course, wage rates for all industry continued to decline materially for a year after the lower turn in general business conditions was passed.

The general impression of a substantial lag of wage rates behind reference turns can be verified and the extent of the lag more adequately determined on the basis of the monthly union rates published for the period 1924-44. Before proceeding to such measurement, however, we must note a peculiarity in the behavior of union wage rates. Inspection of Chart 15 shows that the cyclical responses of wage rates deviate from the known behavior of the majority of economic activities. The deviation consists in the step-function character of the rate series, with their long maintenance of horizontal movements—whether in the form of high

<sup>19</sup> Contemporary observers mention the latter year as marking the decline of "wages." Victor Böhmert describes wage developments during the *Gründerjahre* in relation to general business activity. He recounts how, after the Frankfurt peace, a rush into capital investments started. The extraordinary demand for labor boosted wages in some enterprises by 50 to 100 percent. Only from 1876 on—according to Böhmert—could one note decreases in wages, leading to a wage trough in 1879. From that point a slow improvement set in. See "Statistik des Arbeitslohns," *Handwörterbuch der Staatswissenschaften*, 1890 ed. Vol. 1, p. 707.

<sup>20</sup> Also Spiethoff, Thorp, and Jerome regard 1873 as the peak year. See Appendix Table B-1 for Spiethoff's chronology. See also Thorp, *op. cit.*, p. 207, and Harry Jerome, *Migration and Business Cycles*, pp. 174-75 (National Bureau of Economic Research, 1926).

<sup>21</sup> No adequate data are available for the prewar period to compare the timing of building wage rates with that of building activity.

<sup>22</sup> The composite indexes of actually paid wage rates for four industries presented in Table 33 and Chart 13 are inconclusive with regard to timing. The machinery series, however, is coincident at all four turns.

plateaus close to business cycle peaks, of flat bottoms close to business cycle troughs, or of intermediate planes representing interruption of growth in response to declines in business activity. Such behavior leads to difficulties in the identification of cyclical responses, and requires special descriptive measures which will permit us to relate both edges of the plateaus to turning points in general business or in employment.<sup>23</sup> For this purpose a distinction is made henceforth between the initial ( $P_1$ ) and terminal ( $P_2$ ) edges of the high ridges, the corresponding points ( $T_1$  and  $T_2$ ) of the flat valleys, and the edges ( $P_1$  and  $T_2$ ) of intermediate plateaus in a rising trend. The above terms and symbols will be helpful in subsequent description of the cyclical behavior of rates.<sup>24</sup>

Average hourly union rates of all industry are found in Table 34 and Chart 14. The reaction of average wage rate levels to the 1925-26 contraction occurred in the form of a leveling-out, starting close to the end of 1925 and ending at the beginning of 1927. If the edges of the plateau are taken to represent the beginning ( $P_1$ ) and end ( $T_2$ ) of the reaction to the reference contraction, the delay in such reaction should be stated as eight months behind the peak of general business activity, and eleven months behind the trough. After the latter upturn, wage rates proceeded to rise during the prosperous years of the late 1920's. Business conditions began to worsen in April 1929. Wage rates, however, continued to advance moderately for one more year, reaching a plateau in May 1930<sup>25</sup> ( $P_1$ ), and maintaining peak levels to the end of that year. They did not start to decline until December 1930 ( $P_2$ ), that is, twenty months after the downturn in general business conditions.<sup>26</sup> A rather pronounced lag in the reaction of wage rates to changes in general business conditions can be observed after the business cycle trough of August 1932. Average union rates continued to decline after that date for about seven more months. No single lower turning point can be established because wage rates

<sup>23</sup> The National Bureau's standard rules on timing are not especially suited to describe the cyclical behavior of step functions in general or that of German wage rates in particular. The Bureau's rules designate the highest monthly values or the center of the highest three-month average as the turning point. In the case of a high ridge or flat trough, the last observation on the plateau level is regarded as the turning point. This procedure fails to delineate the initial edges of the plateau, which indicate the cyclically important cessation of growth or decline. Moreover, if the essential character of a series is that of a step function, the cyclical description should be based on the location of steps and plateaus rather than on small temporary elevations or turning points created by minor changes in the level of the plateau.

<sup>24</sup> For minor cycles in business activity, Creamer also determined turning points of wage rates at the beginning or at the end of plateaus (Creamer, *op. cit.* pp. 6 ff.). However, Creamer chose a technique differing from that employed in this study.

<sup>25</sup> Although the average of all wage rates showed only a mild rise after December 1929, rates in four of the seventeen industries included in the average increased substantially after that date, and no series declined. In May 1930, however, rates for skilled workers had reached their high in all industries except soft coal (see Chart 15). In view of these considerations, May 1930 rather than December 1929 is here regarded as the initial edge of the wage plateau.

<sup>26</sup> The peak of wage rates occurred also with a pronounced lag behind the peaks of employment, of man-hours, and of industrial production.

after the spring of 1933 ( $T_1$ ) were kept virtually stable until about the beginning of World War II ( $T_2$ ).

The response of wage rates came with appreciable delay after each reference turn. The extent of the lags depends on the type of measure used. If the first signs of cyclical response, even in the form of reaching or leaving plateaus, are used as benchmarks, the observed lags were between seven and thirteen months. If only actual reversals in direction and ends of plateaus are regarded as specific turning points, the evidence would show only one clear lag, of nineteen or twenty months after the April 1929 peak, and a long lag of unspecified duration after the August 1932 trough. However defined, the wage-rate lags during the Weimar Republic ranged between seven and twenty months; these are not incompatible with the lag of about one year suggested by the annual information for the years prior to 1913, as discussed above.

The lag of the monthly wage-rate index for all industry can be observed in every single component industry, see Appendix Table A-21 and Chart 15. Furthermore, the concentration of turning points in industry rates is fairly strong. After the 1929 peak, for instance, ten out of eighteen industries maintained their peak levels through the first three months of 1931. Wage rates of metal workers and clothing workers had their turning points ( $P_2$ ) as early as November 1930, and soft coal miners as late as May 1931. Thus, after the 1929 reference peak, the quoted lag in the decline of average rates ( $P_2$ ) was a minimum lag, reflecting the early wage-rate decline in two industries, metals and clothing. In other industries the lag was longer—sometimes as much as two years.

**EARNINGS.** Average earnings exhibit less tendency to lag than wage rates, as has already been suggested by information for the *Gründerjahre* cycle. The peak in wage rates occurred about 1875—three years after the reference turning point of 1872 as determined by the National Bureau. The available earnings information is sporadic and not directly comparable to the rate data. However, of the ten earnings series assembled in Table 36, only three show peaks in 1875, three in 1874, and the rest in 1873 or even earlier.

For miners' shift earnings, it is possible to measure the timing of turning points against those in general business conditions on a quarterly basis over the periods 1890-1914 and 1924-33. Five series are included (see Table 37 and Appendix Table A-24). We find clear lags at each peak, averaging nine months for the five series and over the five reported upper turning points. At reference troughs the evidence is less uniform. Lags prevail, but seven leads and five coincidences occur in the twenty-eight measured instances. Over the average of five troughs, shift earnings show smaller lags (0.7 to 3.7 months) than at peaks, or even a lead (1.3 months in the case of Dortmund). No significant differences were found in the timing of underground miners' and surface workers' shift earnings (see columns 1 and 2 of Appendix Table A-24).

TABLE 36  
Average Earnings per Day or Shift, 1871-1882  
(marks)

Year	AVERAGE DAILY EARNINGS					AVERAGE SHIFT EARNINGS OF MINE WORKERS				
	Railroad Repair Yards		Metal Works Machinery			Hard-Coal Miners				
	Breslau (1)	Stargard (2)	BSF Systems (3)	Krupp, Essen (4)	Vulkan, Sieltin (5)	Hewers and Haulers:		All Workers		
					Dortmund (6)	Dortmund (7)	Aachen (7)	Right of Rhine (9)	Left of Rhine (10)	
1871	2.60	2.11	2.21	3.03	2.36	3.00	2.70	3.24	3.65	...
1872	2.80	2.10	2.34	3.39	2.67	4.50	3.18	3.18	3.72	3.18
1873	3.07	2.11	2.77	3.74	3.00	5.00	3.25	3.52	3.77	3.10
1874	3.52	2.36	2.85	3.86	3.12	4.00	3.32	3.48	3.43	3.00
1875	2.88	2.59	3.03	3.89	2.94	3.80	3.05	3.16	3.07	2.96
1876	2.73	2.54	2.75	3.64	2.56	3.00	2.83	2.86	2.54	2.90
1877	2.65	2.50	2.62	3.36	2.69	2.56	2.83	2.50	2.10	2.44
1878	2.65	2.48	2.68	3.21	2.61	2.66	2.93	2.35	2.15	2.25
1879	2.63	2.27	2.75	3.02	2.53	2.55	2.96	2.30	2.31	1.90
1880	2.61	2.16	2.79	3.19	2.53	2.70	3.03	2.55	2.29	2.25
1881	...	...	2.80	3.50	2.53	2.79	3.07	2.52	2.28	2.26
1882	...	...	2.87	3.57	2.57 <sup>b</sup>	3.01	3.16	2.48	2.30	2.29

<sup>a</sup> Breslau-Schweidnitz-Freiburg System.

<sup>b</sup> Estimated on basis of annual earnings.

SOURCE, by column:

(1 to 3) Victor Böhmer, "Arbeitslohn," *Handwörterbuch der Staatswissenschaften* (1890 ed.), p. 715.

(4, 5, 7 to 10) Jürgen Kuczynski, *Germany 1800 to the Present Day*, pp. 183, 197.

(6) Robert R. Kuczynski, *Entwicklung der gewerblichen Löhne seit der Begründung des Deutschen Reiches*, p. 9.



TABLE 37

Leads and Lags of Miners' Shift Earnings, Selected Centers, Quarterly, 1890-1914 and 1924-1933  
(leads, -, and lags, +, in months)

Reference Turning Points	AT PEAKS						AT TROUGHS												
	Hard Coal			Lignite			Ore			Hard Coal			Lignite			Ore			
	Dortmund	Upper Silesia	Saar- brücken	Halle	Halle	Halle	Dortmund	Upper Silesia	Saar- brücken	Halle	Halle	Halle	Dortmund	Upper Silesia	Saar- brücken	Halle	Halle	Halle	
Jan. 1890	+22	+19	+16	+19	+25	+25	-18	-15	-3	-6	-6	-18	-15	-3	-6	-6	-18	-15	-3
Mar. 1900	+8	+8	+8	+8	+8	+8	+2	+8	+2	+5	+5	+2	+8	+2	+2	+5	+2	+8	+2
Aug. 1903	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
July 1907	+4	+4	+7	+4	-5	-5	+5	+17	+8	+11	+11	+5	+17	+8	+11	+11	+5	+17	+8
Apr. 1913	+4	+4	+10	+4	+7	+7	0	+3	0	0	0	0	+3	0	0	0	0	+3	0
Prewar average	+9.5	+8.8	+10.2	+8.8	+8.8	+8.8	-2.8	+3.2	+1.8	+2.5	+2.5	-2.8	+3.2	+1.8	+2.5	+2.5	-2.8	+3.2	+1.8
Mar. 1925	...	...	...	...	...	...	+3	+3	...	+3	+3	...	+3	...	...	...	...	+3	...
Apr. 1929	+7	+7	...	+10	+10	+10	0	+6 <sup>b</sup>	...	-3	-3	0	+6 <sup>b</sup>	...	...	...	0	+6 <sup>b</sup>	...
Average, all peaks	+9.0	+8.4	...	+9.0	+9.0	+9.0	-1.3	+3.7	...	+1.7	+1.7	-1.3	+3.7	...	...	...	-1.3	+3.7	...

<sup>a</sup> Data start in first quarter of 1924.

<sup>b</sup> Based on incomplete evidence.

SOURCE: For basic data, see Appendix Table A-24. For reference turning points, Burns and Mitchell, *Measuring Business Cycles*,

p. 79. In accordance with standard procedure of the National Bureau, the mid-points of the quarterly specific turns were measured against the monthly reference chronology.

The earlier turn of earnings, as compared to rates, can be demonstrated on the basis of more comparable and more comprehensive data for the interwar period. The annual evidence presented in Appendix Table A-2 and Chart 2 shows that turning points of average weekly earnings coincide with those of general business activity both in 1929 and 1932. Hourly earnings also turned with general business in 1929, but they were one year behind the reference recovery in 1932. Thus, compared with wage rates, which lagged one year at the peak and at least one year at the trough, earnings clearly tended to respond more promptly to changes in business activity. Furthermore, in the one case of delay, hourly earnings in 1933 showed a well-defined trough, while wage rates did not. There is no way of ascertaining when and how rapidly the latter might have recovered in the absence of stabilization by government order.<sup>27</sup> The conclusion from all the evidence on turning points of wage rates and earnings is that both tended to lag behind turns in general business conditions. The lag in almost all instances was longer in rates than in earnings, often a year or more in rates, but only months in earnings. The data suggest that weekly earnings lagged less than hourly. In some instances wage rates not only maintained their levels but actually continued their cyclical movements for many months after earnings had experienced their cyclical turns. The evidence is too scanty to permit any broad generalization about the differences in the timing of turning points in hourly earnings and hourly rates.

*Why do Wages Lag?* We have found that wages are tardy in their reactions to cyclical changes in general business conditions. Sometimes they skip cycles altogether. This behavior requires some interpretation.

One obvious reason for the delay in rate adjustments to cyclical turns is the difficulty of identifying such turns at the time of their occurrence. Even if statistical information were immediately available—and of course it is not—it is always difficult to decide whether a current reversal in business conditions is cyclical in character or merely one of the minor ripples which develop at all times. And even if turning points could be

<sup>27</sup> On a quarterly basis, shift earnings of soft-coal miners, both above and below ground, for the Reich as a whole, show pronounced lags at the peaks in 1925 and 1929. Hard-coal miners' earnings did not respond to the 1925-26 contraction. At the 1929 peak they reached a high plateau ( $P_1$ ) about four months after the reference peak and maintained it for more than a year. At the end of the Great Depression, however, rock bottom levels were closely approximated by all miners' earnings during the first quarter of 1932, that is, about a half-year before general business activity reached its low. After the first quarter, earnings moved differently in the reported categories, but it is clear that at the bottom of the Great Depression, miners' earnings did not show the marked lag which could be observed at earlier turning points (see Appendix Table A-25 and Chart 16).

The availability of quarterly data on both wage rates and earnings of coal miners during the interwar period offers an opportunity for study of the differences in their behavior. During the 1929-32 contraction, the rates and earnings records in hard-coal mining show little difference. In soft-coal mining, wage rates rose for more than a year after earnings had reached their top levels.

properly identified at once, there would still remain important forces making for a delay of rate adjustments. Typically, rate increases occur on the insistence of labor, and rate cuts on the insistence of management. What has to be explained, therefore, is the delay in these two parties' initiative and effectiveness.<sup>28</sup> The need to maintain friendly labor relations may deter management from insisting on wage adjustments during the first stages of contractions—as long as conditions are not demonstrably bad. After cyclical peaks come decreases in orders, mounting inventories, slowing receipts, and tighter credits, all bringing enterprises into actual or prospective financial straits. Adjustments of costs become imperative—among them adjustments of labor costs. The latter can be partially reduced by layoffs and by avoidance of premium payments, a policy that contributes to the relatively early cyclical response of earnings as compared to rates. In the long run, cuts in basic rates become increasingly important for the individual firms in their struggle to maintain profits. But such cuts become possible only when rising unemployment and retail price declines make employees willing and able to accept them. Conversely, labor's demands become pressing only when new prosperity is clearly secure. After cycle troughs, rising retail prices reduce the purchasing power of the wage rate. For a while, compensation for this loss will occur in terms of longer hours, premium payments, and possibly increased family income through reemployment of family members formerly laid off. Continued price rises will create strong desires for rate increases. These desires, however, will be translated into successful demands only when increasing orders and rising sales make employers able to yield, and when tightening labor market conditions make them willing. The time required for such developments explains much of the delay in the reaction of wage rates to turns in business and employment.

Thus cyclical shifts in relative bargaining power of employers and wage earners lead—at two periods in the cycle—to a situation in which upward and downward adjustments can be fought for successfully. These periods occur only after changes in employment, sales volume, and profits have affected relative bargaining strength. They do not occur close to reference cycle turns but lie well within the expansion or contraction phases. The timing of labor conflicts bears out these observations: the number of working days lost through strikes and lockouts reaches peak heights well within periods of business upswing (Chart 11 and Appendix Table A-1). This is true for the strike peaks of 1905, 1910, 1924, and 1928. In fact the only reference expansions in this series which do not show distinct strike peaks are the short expansion of 1902-3, the *Burgfrieden* period during World War I, and the postwar inflation period. Strikes seem to have been far less important during contractions. Chart 11 indicates that over the years 1899-1932 contraction periods show relatively

<sup>28</sup> For a discussion of such delays see Wesley C. Mitchell, *Business Cycles* (University of California Press, 1913), Part III, pp. 464-66; and Creamer, *op. cit.*, pp. 20-22.

low levels of working days lost. Even 1931 and 1932, when the major depression adjustment in wage rates took place, were years when labor strife was at a comparatively low level. The reasons are not far to seek. In periods of business contraction the reduced demand for goods, the swollen inventories, and the availability of unemployed labor render most strikes ineffective.

There are other factors that prevent prompt response of wage rates to changing business conditions. The high degree of organization of both employers and workers tends to enhance the defensive strength of the particular group, which in a given phase of the cycle seeks to maintain the status quo. But probably a more potent factor in the timing of wage rates is the prevalence of collective agreements. Such agreements often cover long periods and may serve to stabilize wage levels for a considerable time after a recognized turn in business conditions. On occasion they may even provide for increases that go into effect after the cycle reaches a peak, or for decreases that become effective after the reference trough has passed. For example, the long delay in rate adjustments after the 1929 peak reflects the fact that many wage contracts expired only in the course of the year 1930.<sup>29</sup> Also, published rate adjustments deal with minimum rates. Reduction of voluntary payments in excess of minimum rates could lead to a decrease of actually paid rates before recorded minimum rates declined. There is a reasonable presumption<sup>30</sup> that the peak of piece rates at the beginning of the Great Depression may have been reached as early as May 1930. Even this, however, would be a full year after the reference turn.

Earnings shared the tendency of wage rates to lag behind turns in general business conditions. Hourly earnings tended to show a longer delay than weekly earnings, but both lagged less than rates. Any lag in earnings can be traced mainly to the fact that wage rates form an important constituent of earnings. That earnings lag less than wage rates, on the other hand, is due to the prompter response of hours and of premium payments to changes in business activity.<sup>31</sup> Finally, the lesser lag of weekly as compared with hourly earnings is explained by the fact that changes in hours affect weekly earnings both directly and indirectly (by varying the relative importance of hours at premium rates), whereas they influence hourly earnings only indirectly.

<sup>29</sup> This is true for building, metals, textiles, and hard coal. See Horst Wagenführ, "Kartelpreise und Tariflöhne im Konjunkturverlauf," *Jahrbücher für Nationalökonomie und Statistik*, 1933, Vol. 1, pp. 508-9 (Jena, 1933).

<sup>30</sup> The arbitration award of Oynhausen, made in May 1930, permitted decreases of voluntary overpayments of piece rates and precipitated a wave of downward adjustments. See *Reichsarbeitsblatt* 1930, Part II, p. 111.

<sup>31</sup> On an annual basis, cyclical turns of average hours coincided with the turns in general business conditions in 1929 and 1932. Even on a monthly basis, average hours seem to turn within one or two months of the reference turning points (see Chart 27, below). There is not enough information to generalize about the timing of hours during business cycles in Germany.

## AMPLITUDE AND PATTERNS OF WAGE CYCLES

*Cycle Amplitudes*

RATE MEASURES. Only for the first decade of the Reich's prewar history can true cycles in wage rates be identified and some measures of the amplitudes of their fluctuations be computed.<sup>32</sup> Appendix Tables A-3 and A-4 offer some of the evidence. Hourly building rates increased by about 45 percent from 1871 to 1876, and declined by about 19 percent<sup>33</sup> between the latter year and 1882. Printing rates show milder fluctuations—a 33 percent increase and a 7 percent decrease during their *Gründerjahre* cycle. Hourly rates of railway repair yard workers in Upper Silesia declined 12 to 22 percent between 1873 and 1876.<sup>34</sup> In general, there must have been great variety in the cyclical behavior of rates during this period. We learn that daily wage rates of building workers in Dresden were about 25 percent lower during 1877 and 1878 than during the *Gründerjahre*, and certain examples indicate declines as large as 30 percent.<sup>35</sup> On the other hand, some wage rates seem to have survived the depression of the late 1870's without declines. The daily rate for common labor at the chinaware factories at Meissen, for instance, is reported to have increased from 1.20 marks in 1871 to 2.20 marks in 1876, and to have maintained this level through 1883. Victor Böhmert, one of the foremost labor statisticians of that period, contends that the very low wage rates of common laborers did not go down after 1876 because their plane of living could not be further reduced.<sup>36</sup> This does not appear to be a satisfactory explanation. The wage rates of the chinaware workers were not of a lower order than, say, those of railroad repair yard workers, whose rates were in fact reduced. The reasons for the extraordinary resistance of wage rates in the Meissen china works against downward adjustment must be sought elsewhere. The *Meissner Porzellan Manufaktur* was a state-owned enterprise, and it is probable that the maintenance of wage levels was supported by the state, for political reasons, against the downward drag by

<sup>32</sup> In principle, amplitudes during these years can be derived for both specific and reference cycles. In periods during which cyclical responses consist mainly in varying rates of growth, or in leveling off during contractions, only reference cycle measures can be used.

<sup>33</sup> In order to derive comparable measures of relative change during expansions and contractions one must attempt to reduce the bias created by the fact that percentage increases are computed from a relatively low, and percentage decreases from a relatively high, level. To minimize this bias, wage (and other) changes during reference cycles are expressed in terms of differences between cycle relatives, the common base being cycle averages. In the case of specific cycles, percentage changes are computed with the averages of the values at specific turning points used as bases. To minimize the effect of random fluctuations on amplitude measures, the peak and trough standings are represented by three-month averages centered at the turn.

<sup>34</sup> The periodical *Der Arbeiterfreund* (1878, p. 25) reports a decrease from 18-20 pfennigs to 16 pfennigs.

<sup>35</sup> *Der Arbeiterfreund*, 1879, p. 19, and 1880, p. 23.

<sup>36</sup> "Statistik des Arbeitslohns," *Handwörterbuch der Staatswissenschaften*, 1890 ed., Vol. 1, pp. 707-8.

competitive forces in the labor market. All in all, the early changes in wage rates, covering the *Gründerjahre* boom and the subsequent contraction, showed increases of about 30 to 70 percent<sup>87</sup> and decreases of about 10 to 30 percent. These measures approximate specific amplitudes, except for the fact that the year of the Reich's foundation, 1871, is used as a substitute for an initial trough. It is known that wage rates tended to rise for many years prior to 1871.<sup>88</sup> Since these rises have trend character, it would not seem wise to include them in any specific expansion measure—quite apart from the fact that the present inquiry is limited to wage history beginning with the foundation of the Reich.

Another opportunity of measuring the amplitudes of a major specific cycle in wage rates arises for the interwar period. Annual averages of hourly wage rates rose from 1924 to 1930 and declined from the latter year to 1933. The increase amounts to 50 percent, the decrease to about 25 percent of the average of peak and trough. The approximate amplitudes of wage rate changes during the interwar cycle were thus similar—during both rise and fall—to those experienced during the *Gründerjahre* cycle (see Appendix Table A-2 for basic data). If based on monthly averages, the amplitude measures for the interwar cycle are somewhat modified. On that basis hourly union rates, from their low in March 1924 to their peak plateau in May-December 1930, increased by 64 percent. From this plateau down to the trough, reached in April 1933 and stabilized by the National Socialists for many years, wage rates decreased by 25 percent. Thus, monthly data showed a considerably larger increase than annual data during the rise of wage rates, but there was little difference in the extent of the decline. The explanation is simple enough. During the rapid poststabilization adjustment of 1924, the monthly trough in March is considerably below the average for the whole year; by contrast, the subsequent peak and trough positions lie on prosperity and depression plateaus respectively, so that there is little or no difference between the monthly and average annual extremes.

The increase in wage rates between 1924 and 1930 should not, of course, be regarded entirely as a response to the reference expansion of 1926-29. As pointed out before and evident in Chart 14, the 1925-26 reference contraction led to a leveling-out of wage rates between November 1925 and February 1927. Consequently, the specific response of wage rates to the 1926-29 expansion in general business activity might be measured between the terminal edge of this intermediate plateau ( $T_2$ , in February 1927) and the May-December 1930 level. The rise of hourly rates during this shorter span of time was only 20 percent, compared with the 64 percent increase between the poststabilization low and the high prosperity levels.

<sup>87</sup> Böhmer, *loc. cit.*, reports for some enterprises increases of 50 to 100 percent, but it is not entirely clear that he refers to wage rates proper.

<sup>88</sup> Jürgen Kuczynski, *Germany, 1800 to the Present Day*, pp. 102-7 and 178-99.

The behavior of wage rates during reference cycles can be followed in Appendix Table A-20. Because of the systematic lag of wage rates, their reference cycle amplitudes tend to be considerably smaller than the amplitudes of their specific cycles. For instance, only a minor portion of the *Gründerjahre* rise in wage rates took place during the expansion of 1870-72; the decisive rises occurred between 1872 and 1876, a period of contraction in general business. It has already been pointed out that for almost half a century no major cyclical declines occurred. However, both flattening-out and minor cyclical declines are clearly apparent, in the long-term building series and in the samples of effectively paid rates, during the reference contractions of 1890-94 and 1900-1902. For the 1926-32 cycle, the measurement of wage rate amplitudes during reference cycle phases leads to results differing only little from the measures of their amplitudes during the specific cycle of 1927-33. The reason lies again in the step function character of rate changes. Despite the substantial lags in the turning points, or plateau edges, of rates, only small changes in wage levels took place during these lags (see Chart 15).

EARNINGS MEASURES, ALL INDUSTRY. Up to the mid-1920's our information on the amplitudes of earnings is severely restricted by the limitations of the available wage data. Table 36 presents some evidence relating to the *Gründerjahre*. Again, as in the case of wage rates, specific earnings rises are determined from the year 1871 on. Measured in this fashion, specific cycle increases vary between 3 and 50 percent of the average between peak and trough, decreases between 15 and 57 percent. These amplitudes are roughly similar to those found in wage rates. However, the variation of amplitudes within the group of earnings is so wide, and the rates data and earnings data are so different in coverage, that no definite conclusions can be drawn as to the comparative behavior of the two during these early years. Somewhat more enlightening is the comparison of rates and earnings series for the period 1871-1913 in Chart 12 and Appendix Tables A-20 and A-23. In comparison to the three long-term wage-rate series, the earnings series show a more frequent occurrence of genuine cycles. It appears that wage rates fluctuate least, hourly earnings somewhat more, and daily and shift earnings most.

Comparisons between amplitudes of rates and earnings become feasible at last for the interwar period. Amplitudes of hourly rates, hourly earnings, and weekly earnings, all in annual form, are given in the following tabulation: We note that in all cases, hourly rates showed the smallest amplitudes, hourly earnings intermediate, and weekly earnings the largest. The reasons for this order are similar to those determining the timing relationship between these series. The behavior of earnings is affected not only by wage rates, but also by other elements, particularly the number of hours worked.

Inspection of Charts 12 and 2 shows that, also during reference cycles, earnings amplitudes were larger than those of wage rates (see also the

CHANGES IN PERCENT OF THE AVERAGE OF  
TERMINAL POINTS

	<i>Average hourly rates</i>	<i>Average hourly earnings</i>	<i>Average weekly earnings</i>
From 1925 to specific peak	+28	+31	+32
From 1924 to specific peak <sup>a</sup>	+51	+56	+60
From specific peak to specific trough	-25	-31	-40

<sup>a</sup> According to our estimates of 1924 levels.

amplitude measures in Appendix Tables A-20 and A-23). For the period 1886-1902, for which information on effective wage rates is available, the following tabulation shows reference cycle amplitudes of six rate and three earnings series: In the two prewar cycles the amplitudes of wages

## AVERAGE ANNUAL CHANGE OF CYCLE RELATIVES

	<i>Expansion</i> 1886-90	<i>Contraction</i> 1890-94	<i>Expansion</i> 1894- 1900	<i>Contraction</i> 1900- 1902	<i>Average of 2 Cycles</i>	
					<i>Expansion</i>	<i>Contraction</i>
<b>Union Rates</b>						
Hourly printing rates	+1	+1	+0	+4	+0.5	+2.5
Hourly building rates	+4	-0	+2	+1	+3.0	+0.5
Weekly printing rates	+1	0	+1	+4	+1.0	+2.0
Weekly building rates	+3	0	+2	0	+2.5	0
<b>Effective Rates</b>						
Hourly building rates	+3	+0	+3	+1	+3.0	+0.5
Hourly machinery rates	+6	-2	+3	-2	+4.5	-2.0
<b>Earnings</b>						
Daily earnings, Krupp	+2	+1	+3	-3	+2.5	-1.0
Shift earnings, Dortmund, miners	+9	-2	+5	-7	+7.0	-4.5
Weekly earnings (Comprehensive series)	+3	0	+2	-1	+2.5	-0.5

SOURCE: Appendix Tables A-20 and A-23.

were small and so were the differences between them. The evidence suggests a somewhat stronger cyclical response of effective rates as compared to union rates, and a somewhat stronger response of earnings as compared to rates. For corroborative evidence we must turn to the interwar measures. These show clearly larger amplitudes of earnings as compared with rates, and larger amplitudes of weekly as compared with hourly earnings. This observation is valid both for the expansion and the contraction phases.

AVERAGE ANNUAL CHANGE OF CYCLE RELATIVES,  
ALL INDUSTRY

	<i>Expansion</i> 1923 <sup>a</sup> -25	<i>Contraction</i> 1925-26	<i>Expansion</i> 1926-29	<i>Contraction</i> 1929-32	<i>Average of 2 cycles</i>	
					<i>Expansion</i>	<i>Contraction</i>
Average hourly rates	+22	+9	+6	-7	+14	+1
Average hourly earnings	+25	+7	+8	-9	+16	-1
Average weekly earnings	+29	+4	+9	-13	+19	-4

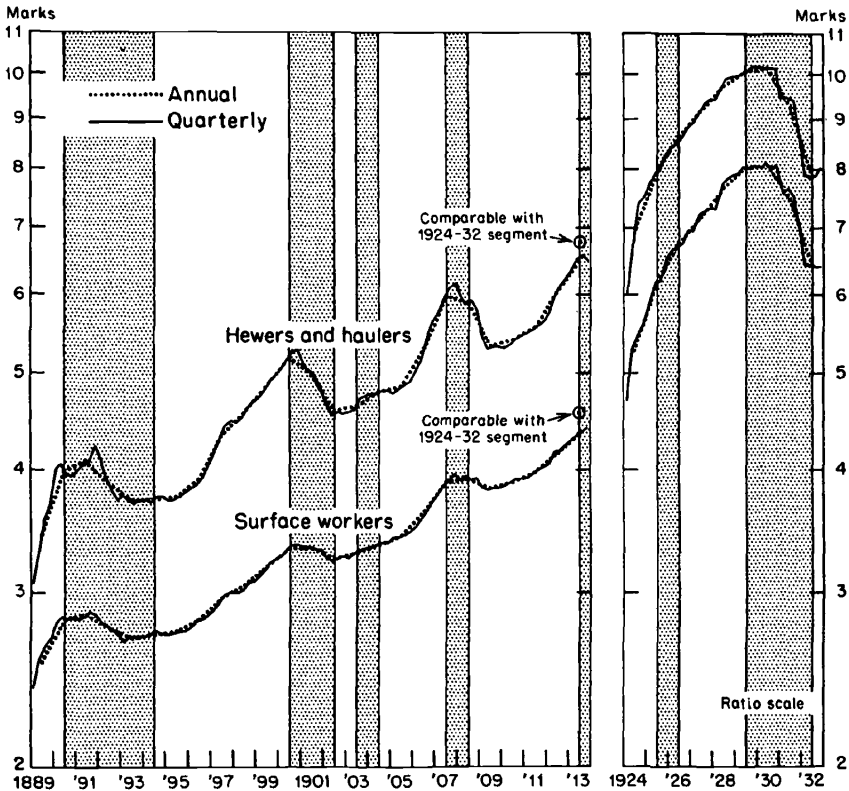
<sup>a</sup> Based on incomplete reference expansion. Expansion is measured from 1924 on.



MINING. The information on shift earnings of miners is markedly superior, both in time coverage and quality, to available earnings records for other industries. From 1886, the mining data are reported separately for underground miners and workers above ground for a variety of coal, ore, and salt mines on an annual basis, and from 1889, on a quarterly basis.

CHART 17

Average Shift Earnings of Coal Miners, Dortmund, Annual and Quarterly Data, 1889-1913 and 1924-1932



Shaded areas represent business contractions, in terms of annual chronology.

Source: Appendix Tables A-6, A-7, and A-24.

Comparison of quarterly and annual data shows only moderate differences in cyclical amplitudes<sup>39</sup> (see Chart 17). For the Dortmund underground coal miners, for instance, the average rise in the specific expansions during the cycles 1891-1913 and 1924-32, was 34 percent on the basis of quarterly, and 29 percent on the basis of annual, data. The corresponding specific

<sup>39</sup> Here amplitudes—both for reference and for specific cycles—are expressed in terms of differences between cycle relatives. For an explanation of these measures see footnote 33 above.

declines amounted to 18 percent and 15 percent respectively.<sup>40</sup> Chart 4 permits a comparison of amplitudes in the earnings of underground miners and surface workers. During the period prior to 1913 the earnings of underground workers fluctuated considerably more than those of surface workers. In the poststabilization period this difference was less pronounced. The reason for the differing behavior of the two series is that earnings of underground miners were based largely on output, while surface workers were generally paid on a time basis. For the period 1924-32 the importance of this difference is reduced, however, by rapid changes in wage rates which affected underground miners and surface workers to almost the same extent.

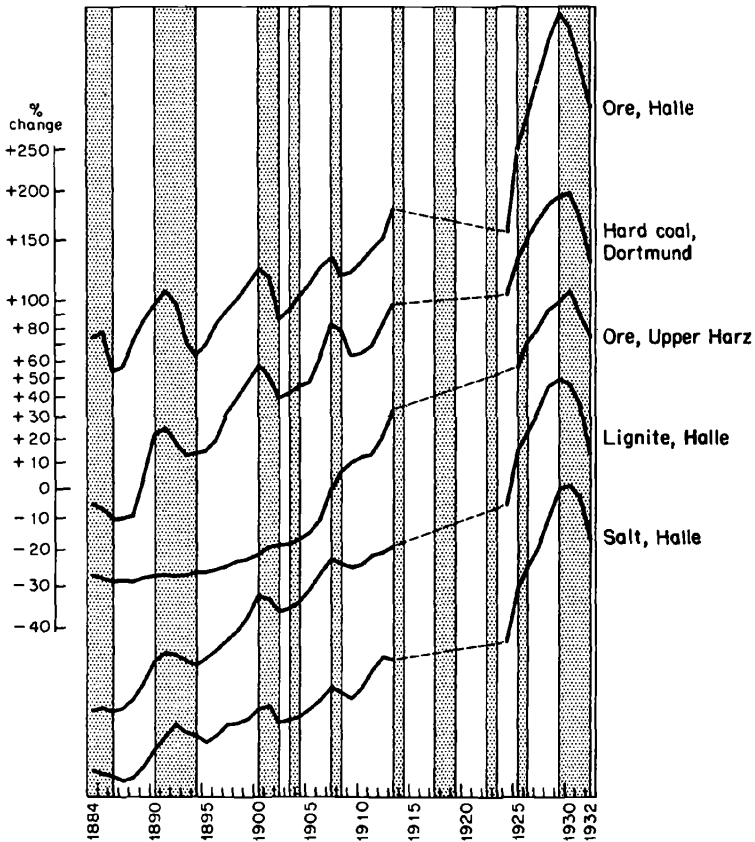
There were marked variations in the cyclical fluctuations of earnings in different districts and different types of mines (see Chart 18 and Appendix Tables A-26 and A-27). The type of product mined seems to have had important effects on the amplitudes of shift earnings. Thus the largest amplitudes occur in the copper ore mines of Halle. Apparently the marked fluctuations in the effective demand for this basic industrial material led to wide swings in the number of shifts worked, in the average length of shifts, and in the incidence and extent of premium payments.<sup>41</sup> By contrast, note the smaller earnings fluctuations of those mines in Halle which produce potash for fertilizers and salt for human consumption. The steady growth and the low income-elasticity of the demand for these products seem to have protected not only production and prices, but also workers' earnings, from violent cyclical swings. Even among different coal-mining centers, some variation in earnings amplitudes can be traced to differences in the product. Lignite from Halle, for instance, was used largely for home fuel, while the hard coal output of Dortmund went mainly into industrial consumption. Corresponding to the larger cyclical amplitude in industrial as compared with domestic use, shift earnings in Halle's lignite mines show smaller swings, at least during specific cycles.

For every one of the ten series, increases during expansions were clearly larger than decreases during contractions. The aggregate measure of earnings in all ten mining districts shows that the average increase during reference expansions was +15 points, the average decline during contractions -5; the corresponding figures for specific cycles were +26

<sup>40</sup> See Table 38 and Appendix Table A-26. The brief cycle 1890-91, which appeared in the quarterly but not in the annual data, is excluded from the average to insure comparison of cyclical movements between corresponding peaks and troughs. The difference between the quarterly and annual amplitude measures stems from the fact that the annual data neglect the contribution to the total amplitude of intra-annual fluctuations during peak and trough years. The average difference during expansions is enhanced by the large poststabilization adjustment during the calendar year 1924, which is reflected only in part in the annual record.

<sup>41</sup> Iron ore miners in the Upper Harz experienced remarkably small earnings cycles despite the fact that the product is an industrial raw material. The mines were state owned, and subject to a policy striving for cyclically stable production, employment, and shift earnings.

CHART 18  
Shift Earnings of Hewers and Haulers, Selected Centers,  
1884-1913 and 1924-1932



Shaded areas represent business contractions.

Source: Appendix Table A-6 and its sources.

and -12 (see Table 38). This situation reflects the strong long-term upward trends. Expansions tended to last longer than contractions, and the rate of change during expansions tended to be greater than that during contractions. The measures of total amplitudes during expansions and contractions do not permit conclusions as to the comparative rates of change per year. These rates, averaged by cycle, are shown in Table 38. During reference cycles the average annual rate of increase in expansions is larger than the average annual rate of decrease during contractions for each of the ten series. During specific cycles, however, coal miners' earnings in Dortmund and ore miners' earnings in Halle and Siegen-Nassau show larger average annual changes in contractions than

TABLE 38  
Amplitudes in Shift Earnings of Hewers and Haulers,  
1889-1913 and 1924-1932

	AVERAGE AMPLITUDES OF CYCLE RELATIVES <sup>a</sup>			
	<i>Reference Cycles</i>		<i>Specific Cycles</i>	
	<i>Expansions</i>	<i>Contractions</i>	<i>Expansions</i>	<i>Contractions</i>
Hard coal, Upper Silesia	+15	-4	+25	-10
Hard coal, Lower Silesia	+14	-4	+25	-11
Hard coal, Dortmund <sup>b</sup>	+16	-6	+29	-15
Hard coal, Saar District <sup>c</sup>	+8	-2	+13	-6
Hard coal, Aachen	+16	-5	+27	-12
Soft coal, Halle	+14	-4	+24	-10
Salt, Halle	+14	-2	+23	-8
Ore, Halle	+23	-10	+37	-22
Ore, Upper Harz	+13	+2	+48	-9
Ore, Siegen-Nassau	+22	-12	+34	-20
Ten Centers	+15	-5	+26	-12
	AVERAGE ANNUAL CHANGE OF CYCLE RELATIVES <sup>a</sup>			
	<i>Reference Cycles</i>		<i>Specific Cycles</i>	
	<i>Expansions</i>	<i>Contractions</i>	<i>Expansions</i>	<i>Contractions</i>
Hard coal, Upper Silesia	+6	-1	+5	-4
Hard coal, Lower Silesia	+6	0	+5	-5
Hard coal, Dortmund <sup>b</sup>	+6	-1	+5	-8
Hard coal, Saar District <sup>c</sup>	+2	0	+3	-3
Hard coal, Aachen	+6	-1	+6	-4
Soft coal, Halle	+6	-1	+4	-4
Salt, Halle	+6	0	+4	-4
Ore, Halle	+10	-2	+7	-9
Ore, Upper Harz	+3	+3	+4	-4
Ore, Siegen-Nassau	+8	-6	+7	-9
Ten Centers	+6	-1	+5	-4

<sup>a</sup> The changes of cycle relatives are based on annual series. The averages presented are derived from measures for individual cycle phases, that is each cycle phase carries the same weight irrespective of years covered.

<sup>b</sup> For Dortmund the given measures were compared with others derived from quarterly data; the two sets were very similar, as could be surmised from Chart 17.

<sup>c</sup> Data end 1913.

SOURCE: Appendix Tables A-6, A-7, A-23, A-24, A-26, and A-27.

in expansions. For the ten districts as a whole, the average annual change in expansions is +5, that in contractions -4 percentage points.

Information pertaining to coal mines in the years 1924-38 provides us with an opportunity of comparing the behavior of rates and earnings, on a quarterly basis, for a well-defined segment of industry. Wage rates and earnings are presented separately for soft and hard coal, and for underground and surface workers, in Appendix Table A-25 and Chart 16. Graphic comparison shows that the amplitudes of rates and of shift

earnings are surprisingly close, differing in this respect from the broad annual wage indexes, wherein earnings amplitudes exceeded those of wage rates by a considerable margin.

EXCESS OF EARNINGS OVER RATES. The quantitative differences in cyclical behavior as between rates and earnings depend largely on the extent to which various earnings components are permitted to influence the wage measures used. The differences in amplitudes can be traced to the group of factors which "modify" wage rates into earnings. For the years 1924 to 1933 the excess of hourly earnings over rates changed as follows:<sup>42</sup>

Year	Hourly Rates	Hourly Earnings	Excess of Earnings over Rates
	(pfennigs)		(percent of rates)
1924	51.5	53.3	+3.5
1925	65.0	69.3	+6.6
1926	70.3	73.3	+4.3
1927	74.4	80.2	+7.8
1928	80.8	90.1	+11.5
1929	85.3	94.9	+11.3
1930	86.8	92.2	+6.2
1931	82.3	85.2	+3.5
1932	69.7	71.5	+2.6
1933	67.6	69.3	+2.5

SOURCE: Hourly rates for 1929-33: *Wirtschaft und Statistik*, *passim*; for 1924-28: our estimates, based on index of hourly rates (Appendix Table A-2).

Hourly earnings: our estimates, based on absolute level for 1936 (*Handbuch* 1928-44, p. 469), and index of hourly earnings (Appendix Table A-2).

The cyclical character and the positive conformity of the modifying factors are brought out by these computations. The excesses reach three turning points in advance of, or at the same time as, reference cycle turns; they continue to show a small decline even after the 1932 reference trough.

From September 1927 on, special wage investigations in single industries provide some additional information. They were made every three years but unfortunately not simultaneously for all industries, so that the results do not refer to comparable stages of the cycle.<sup>43</sup> Despite this shortcoming,

<sup>42</sup> The comparison is based on the comprehensive rates and earnings series as given in Appendix Table A-2. For rates the series is based on sixteen industries from 1928 to 1933, the earlier period (1924-27) being extrapolated on the basis of fewer industries. For earnings the whole series is estimated by the Statistische Reichsam. Although the industry coverages are not comparable, the series are so comprehensive that the movements of both may be regarded as representative. The relation of the absolute levels must be considered with more caution. Yet the relation between the levels must be approximately right, for in 1932, when the excess of earnings over rates is known to have been small, the computed difference amounts to only 2.6 percent. It must be understood further that the comparison is between actual hourly earnings and nominal rates; there is practically no information on the excess of actually paid rates over nominal rates.

<sup>43</sup> The results are published in *Wirtschaft und Statistik*, and summary tables are reproduced in various issues of the *Jahrbuch*.

the investigations provide some detailed illustrations of the excess of earnings over rates at known stages of the business cycle. The excesses are sometimes surprisingly large—occasionally larger than the rate itself.<sup>44</sup> The average excess of earnings over rates for whole industries is, of course, more moderate. There are at least two major reasons for the relatively wide industrial variation among the excesses: industries with a large proportion of piece work tended to show higher excesses; and some industries followed a rate policy whereby excesses were built up and then reduced without changes in the agreed rate.

W. Woytinsky observes that the industrial differentials among union rates are larger than those among effective hourly earnings, so that the excesses of earnings over rates tend to reduce extreme differentials in basic rates. In support of this thesis he offers the tabulation below.<sup>45</sup> The tabulation refers to piece work only and gives no information on the relation of hourly earnings to the corresponding time rates. Other students have found that the relation of earnings to rates is not the same for both time

	Year	Average Hourly Union Rates	Average Excess	Average Hourly Earnings
			(p f e n n i g s)	
Rolling mills	1928	79.8	56.5	136.3
Smelting	1928	81.9	39.3	121.2
Shoes	1929	97.9	26.5	124.4
Metal products	1928	99.0	21.1	120.1
Chemicals	1928	109.8	22.4	132.2
Woodworking	1928	117.5	10.3	127.8

work and piece work. In general, according to Straube,<sup>46</sup> within an industry the excess of earnings over time rates is greatest for the higher-paid skilled workers. By contrast, the excess over piece rates is greatest when these rates are relatively low. Among different industries, excess of earnings over rates is largest for the industries with low time rates. However, these rules are subject to exceptions, since the excess of earnings over rates is affected by the timing of the investigations and the renewal dates of union contracts.

### *Cycle Patterns*

**RATE CYCLES.** Wage rate cycles have distinct over-all patterns. We have seen that the movements of printing rates before 1913 approximated a step function because such rate agreements were drawn on a nationwide basis

<sup>44</sup> For first rollers in Siegerland rolling mills the excess amounted to 125 percent of the rate in October 1928 (*Jahrbuch* 1930, p. 291).

<sup>45</sup> *Handwörterbuch des Gewerkschaftswesens*, pp. 1575 ff. The author compares wage rates with earnings, excluding premium payments for overtime, etc. However, the use of earnings including premium payments would not materially affect the picture.

<sup>46</sup> Dora Straube, *Die Veränderungen von Lohn und Preis nach der Stabilisierung in Deutschland* (Kallmünz, 1935).

and for relatively long periods. The long terms of the agreements explain both the progress of the rates by sudden steps, and their poor correspondence with changes in general business conditions. Building rates followed a different course before World War I; they moved more gradually (see Chart 3). Rates in the three selected cities were based on local arrangements which were subject to frequent revision; hence they conformed somewhat more closely to cyclical changes in the economy at large.

The step-by-step movements as well as the smooth progression of average wage levels can be observed in the behavior of monthly union rates during the interwar period. Comparison of Charts 14 and 15 shows that the movements of average union rates for all industry are considerably smoother than those of the component industries. The step-by-step progress, with its many intermediate plateaus and instantaneous rate changes, appears for both individual industries and for their average: (1) during 1925-26 when, under the weight of the business recession, current rate arrangements were commonly continued or changed only slightly; (2) at the prosperity plateau of 1929-30, when long-term agreements in effect in most industries insured stability of wage rate levels; (3) at the end of 1931, when the government's emergency decree brought about compulsory rate adjustments in all industries; and (4) from 1933 on, when the stabilization policy of the National Socialist regime prevented a cyclical recovery of wage rates.

In periods when changes in wage rates were neither controlled nor suppressed by external forces, appreciable differences may be observed in their behavior patterns from industry to industry. Investigation of rates for skilled male workers in various industries shows that relatively smooth changes of industry averages prevailed in brewing, textiles, and metals—all of which had wage agreements of relatively short duration and predominantly local or regional character. In other industries, changes of average rates occurred by steps whenever the agreements were Reich-wide, as in printing, or when wage agreements were concluded at a particular season. Pottery, chemicals, and book printing tended to experience wage-rate changes in the spring, soft coal in the winter.<sup>47</sup>

In monthly union rates the expansion phase is markedly longer than the contraction (see Chart 14). If the whole period of March 1924 to April 1933 is regarded as one huge cycle, the asymmetrical character of the wave is most pronounced—an expansion of 80 months compared to a contraction of 31 months. If, on the other hand, the plateau from November 1925 to February 1927 is regarded as a contraction, then two specific cycles are to be recognized, with troughs at January 1924, February 1927 ( $T_2$ ), and April 1933 ( $T_1$ ). Even here the asymmetry is apparent: the first cycle embraces an expansion of twenty-two months and a contraction of fifteen, and the second an expansion of forty-six months and a contraction

<sup>47</sup> *Ibid.*, p. 27.

of twenty-eight.<sup>48</sup> In the same chart the duration of these cycle phases can be compared graphically with that of the corresponding reference cycle phases, in which, also, the length of expansions exceeds that of contractions. But this excess is far less pronounced than for wage rates.

**EARNINGS CYCLES.** The contours of the cyclical movements of earnings tend on the whole to be smoother than those of rates (see Chart 12). That we find smoother lines for earnings is not surprising, since the elements which modify rates into earnings change, by and large, gradually.

The asymmetry of wage cycles is apparent also in earnings; shift earnings of miners, for instance, form cycles with considerably longer expansion than contraction phases. For the quarterly earnings series of Dortmund coal miners, the standard analysis of the National Bureau established an average duration of specific expansions of 57.0 months, while specific contractions lasted only 20.4 months.<sup>49</sup> Reference cycles show a less extreme difference between the duration of expansions and contractions.

The cyclical patterns of shift earnings in Dortmund were not exceptional. Although, as pointed out above, the behavior of miners' earnings is diversified (see Chart 18), annual averages of shift earnings of hewers and haulers in ten mining districts show the same general pattern as the earnings of Dortmund miners (see Chart 4). The asymmetry and the smoothness of earnings cycles are notable also in the comprehensive earnings index available for the interwar period (see Chart 2).

#### WAGE CYCLES AND EMPLOYMENT

*Timing Relations.* We shall now proceed to relate wage cycles to changes in employment conditions, to fluctuations in the occurrence and intensity of labor strife, and various types of governmental activity—in short, to changing conditions in the labor market. First to be investigated is the relation of fluctuations in wages to changes in employment.

On the whole, changes in employment are rather closely correlated with movements in general business activity. Even the scant statistical data available for the years prior to World War I indicate clearly that employment fluctuations conform closely to the ups and downs of business conditions. For the interwar period the relation of reference turns, employment cycles, and wage behavior can be discussed on the basis of considerably better data. Monthly indicators of employment conditions, in deseasonalized form, are compared in the accompanying tabulation with the peaks and troughs in general business activity. It shows, that

<sup>48</sup> Here the end of the prosperity plateau in December 1930 is regarded as the upper turning point ( $P_2$ ) of the second cycle. Even if the prosperity plateau itself is not included in either specific expansion or contraction, the duration of the actual rise exceeds considerably that of the actual decline. Only if the beginning of the plateau ( $P_1$ ) in May 1930 is regarded as dividing expansion and contraction, does the duration of the two phases become almost the same.

<sup>49</sup> In five cycles during 1890-1914 and 1924-32.



CYCLICAL TURNING POINTS IN EMPLOYMENT INDICATORS  
AND IN GENERAL BUSINESS CONDITIONS

Turning Points	Reference Cycles	Unemployment <sup>a</sup>		Employed Members of Sickness Insurance		Employment in Percent of Capacity
		At Employment Exchanges	In Percent of Union Membership	Series I	Series II	IKF
Dates of Turning Points						
Peak	Mar. '25	May '25	May '25	...	...	...
Trough	Mar. '26	Aug. '26	July '26	June '26	...	...
Peak	Apr. '29	Oct. '27	Apr. '28	Feb. '28	Aug. '29	Aug. '28
Trough	Aug. '32	July '32	July '32	...	July '32	Aug. '32
Leads, -, and Lags, +, of Employment Indicators (in months)						
Peak	Mar. '25	+2	+2	...	...	...
Trough	Mar. '26	+5	+4	+3	...	...
Peak	Apr. '29	-18	-12	-14	+4	-8
Trough	Aug. '32	-1	-1	...	-1	0

<sup>a</sup> The peaks and troughs of the unemployment series were inverted to make them comparable with the other measures in this tabulation.

SOURCE: Appendix Table A-28. For graphic presentation of registered unemployed and employed members of sickness insurance funds, see also Chart 27.

during the relatively mild contraction of 1925-26, the available employment indicators reacted with a tardiness of about 2 to 5 months at peak and trough. During the Great Depression of 1929-32, turns in the employment indicators tended to precede those in general business activity—at the 1929 peak by eight to eighteen months,<sup>50</sup> but by only one month at the subsequent trough.

Wage lags behind employment turns would obviously differ from those behind reference turns. Their timing in relation to reference turns and to

	Reference Cycles	TURNING POINTS		LAG OF WAGE RATES, IN MONTHS:	
		Unemployment	Wage Rates	Behind Reference Turns	Behind Unemployment
Peak	Mar. '25	May '25	Nov. '25 (P <sub>1</sub> )	8	6
Trough	Mar. '26	Aug. '26	Feb. '27 (T <sub>2</sub> )	11	6
Peak	Apr. '29	Oct. '27	May '30 (P <sub>1</sub> )	13	31
			Dec. '30 (P <sub>2</sub> )	20	38
Trough	Aug. '32	July '32	Mar. '33 (T <sub>1</sub> )	7	8

SOURCE: Table 34 and Appendix Table A-28.

<sup>50</sup> Also employed members of sickness insurance associations show a marked lead, according to the unrevised series (i). The revised series (ii) shows a lag of 4 months, or, if May is regarded as an alternative peak, a lag of 1 month. The latter segment ii differs from the earlier segment i mainly in that it is based on a constant number of reporting insurance societies. *Reichsarbeitsblatt* 1932, Supplement 10, pp. 6 ff.

unemployment may be observed in the last tabulation. In each case the lag of wage rates remains even if the length of the lag changes. Obviously the delayed response of wage rates cannot be explained by lags in employment.

Pertinent also is the degree of unemployment at the time wage rates reacted to the deterioration of labor market conditions. Taking the 1929 peak as an example, we find that when the top plateau in wage rates was reached ( $P_1$ , in May 1930), unemployment amounted to almost 3 million, and the unemployment rate of union members to 20 percent—both before seasonal adjustment. At the terminal point of the plateau ( $P_2$ , in December 1930), that is, at the last month before union wage rates showed an actual decline, unemployment had hit the 3.5 million mark and the unemployment rate among trade union members was 34 percent. Also to be noted is the extent of part-time employment among trade union members—another 21 percent of their membership. That is to say, full time employment had been reduced to 45 percent of organized workers before wage rates gave way to the labor market pressures.

Large-scale unemployment, coupled with maintenance of wage-rate levels, was historically a new experience. This became the basis of claims that wage-rate behavior had acquired characteristics which seriously interfered with the mechanisms normally relied upon to bring about recovery. The strength of the unions was cited as the major reason for this rigidity. Whether or not such assumptions were sound, there can be no doubt that both union rates and effective rates did in fact resist downward adjustment in the face of widespread unemployment.

### *Amplitudes*

ALL INDUSTRIES. The magnitude of changes in wage levels is, to a certain extent, correlated with amplitudes of employment cycles, as shown by the data presented in Appendix Tables A-1, A-2, and A-28, and Charts 26 and 27 later in this chapter. Associated with the moderate decline of employment (among employed subscribers to sickness insurance) from 104.7 in 1925 to 97.1 in 1926 (December 1924 = 100) is a scarcely noticeable reaction of wage rates, and a slight deceleration in the increase of earnings.<sup>51</sup> The more substantial employment changes from 1926 to 1929 and from 1929 to 1932 (+10 percent and -34 percent respectively), on the other hand, were accompanied by hourly rate changes of +19 percent and -20 percent, hourly earnings changes of +25 percent and -28 percent, and weekly earnings changes of +8 percent and -40 percent respectively.<sup>52</sup> The positive relation between the amplitudes of employment and wages appears particularly clearly in the comparison between the two contraction phases, 1925-26 and 1929-32.

<sup>51</sup> Wage and employment changes during the preceding expansion are neglected because of the atypical poststabilization adjustment of wage rates.

<sup>52</sup> Changes for each cycle phase are expressed in percent of the average of the standing at both turning points. Computations are based on annual data.

Over long periods of time, however, one cannot find such close relationships for the fluctuations in wages and employment. For instance, the amplitudes of wage fluctuations during the *Gründerjahre* cycle of 1870-79 and during the Weimar Republic cycle of 1926-32 were of similar magnitude, though the two business cycles differed greatly in severity. The Institut für Konjunkturforschung calculates the decrease in volume of production during the first cycle as 10 to 20 percent.<sup>53</sup> During the Great Depression the decrease in production was 42 percent (of peak level).<sup>54</sup> Relative to the severity of the cycle, wage rates were less flexible in the Great Depression than in the 1870's.

We can compare cyclical amplitudes of wage rates in various industries with those of measures of employment in the same industries.<sup>55</sup> Table 39 contains such measures, on an annual basis, for fifteen industries which are arrayed according to the severity of their wage-rate declines. For a number of industries, the table shows also the percentage decline in finished product prices. There appears to be little correlation between the severity of wage-rate declines and declines in finished product prices. The evidence shows a tendency of wage rates to fall more sharply in industries with greater employment and production declines. We find also that wage-rate, employment, and production declines tend to be milder in consumers' goods industries than in producers' goods—a fact that may help to explain the differences in absolute wage levels between these industry groups.

**MINING.** The data on this industry permit us to relate amplitudes in the fluctuations of shift earnings to those in employment and other relevant variables. Total employment in ten mining districts, and shift earnings for underground miners and for surface workers in the same establishments are compared in Chart 19. The most striking features of the employment series are the bold rise during the pre-1913 period and the precipitous fall during the interwar years. The rise is due, of course, to the rapid industrial expansion of the country up to World War I; the fall is due to the introduction of laborsaving devices during the mid-1920's and, after 1929, to the effects of the Great Depression. Chart 19 shows only a limited correlation between mining wages and mining employment. Up to 1913 miners' earnings evidenced relatively strong fluctuations in periods where mining employment showed cyclical influences only in the form of retardation of growth.<sup>56</sup> Similarly, during the expansion of 1926-29,

<sup>53</sup> *IKF Sonderheft* 31, p. 43. Note, however, that the published index of industrial production shows a decline of only 6 percent, with a decline of 4 percent in producers' goods and 10 percent in consumers'; *op. cit.*, p. 58 (measures in percent of peak levels).

<sup>54</sup> See Appendix Table A-1.

<sup>55</sup> Reference-cycle amplitudes during the Great Depression are the only measures that can be derived for a sufficient number of wage-rate, employment, or production series to permit systematic comparisons.

<sup>56</sup> The strong secular trends in mining employment make it difficult to relate the observed variations in cyclical amplitudes of earnings among different mining districts to corresponding variations in employment.

TABLE 39

Cyclical Declines in Wage Rates, Prices, and Employment, from 1929 to 1932  
(percent)<sup>a</sup>

Industry	Decline in Union Rates (1)	Decline in Employment <sup>b</sup> (2)	Decline in Percentage of Employed Union Members (3)	Decline in Production Indexes (4)	Decline in Finished Product Prices (5)
Building	25.3	75.1	74.9	66.5	26.5
Hard coal	20.4	...	...	35.9	15.4
Woodworking	19.8	44.3	57.6	54.1	...
Paper products	18.4	35.0	35.7	...	37.6
Chemicals	17.3	...	27.1	44.6	17.0
Printing	17.2	...	29.5	18.9	...
Metals	16.9	...	39.1	40.5	10.8
Papermaking	16.1	22.3	21.4	20.8	37.6
Pottery	16.0	...	34.8	43.2	...
Clothing	15.9	33.2	29.6	16.8	31.3
Food	15.8 <sup>c</sup>	14.2 <sup>d</sup>	18.6 <sup>e</sup>	12.0 <sup>f</sup>	...
Soft coal	14.4	...	...	29.8	...
Textiles	13.6	22.8	24.1	16.5	55.7
Shoes	12.5	...	21.3	17.8	32.6
Brewing	12.1	...	...	41.2	...

<sup>a</sup> Percentage changes are stated in conventional form, i.e., they are based on levels for the year 1929.

<sup>b</sup> Data give employment as percent of "employment capacity." However, this technologically determined capacity does not change greatly in the short run, particularly during contractions.

<sup>c</sup> Baking and confectionery.

<sup>d</sup> Average decline in foods (10.7%) and in coffee, tea, beer, tobacco, etc. (17.6%).

<sup>e</sup> Foods and beverages, but excluding tobacco.

<sup>f</sup> Foods, beverages, and tobacco.

SOURCE, by column:

(1) Computed from Appendix Table A-21.

(2) From *IKF Handbuch* 1936, pp. 19-24.

(3) From *IKF Handbuch* 1933, p. 25 ff.

(4) From *IKF Handbuch* 1936, pp. 49-50.

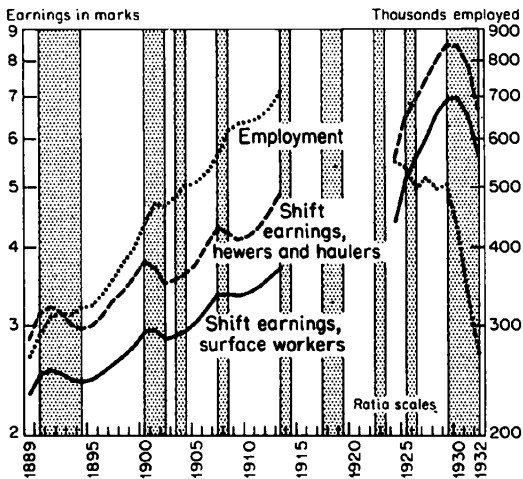
(5) From Appendix Table A-32.

earnings increased substantially, although employment barely maintained its level. Finally, during the contraction of 1929-32, earnings decreased only moderately despite a precipitous decline in employment. Apparently miners' earnings fluctuated more with general business conditions and with wages in other industries than with employment in the mining industry itself.

For the hard coal mining district of Dortmund, an attempt was made to assemble more detailed evidence on employment, shifts worked, production, productivity, and other factors that might help to explain the cyclical behavior of miners' earnings (see Appendix Tables A-6, A-7, and A-29, and Chart 20). The data suggest that extra shifts and overtime

shifts played an important role in this respect. Frequently such shifts were not counted separately, so that the overtime pay appears as increased "shift" earnings. Market conditions and the coal price also influenced earnings. In periods of high prices and brisk demand, employers were liberal in their standards of what constituted a full cart and what kind of coal warranted premium pay because it was extra hard, came from thin seams, or was not easily accessible. All these elements entered into the

CHART 19  
Shift Earnings and Total Employment in Ten Mining Centers,  
1889-1913 and 1924-1932



Shaded areas represent business contractions.

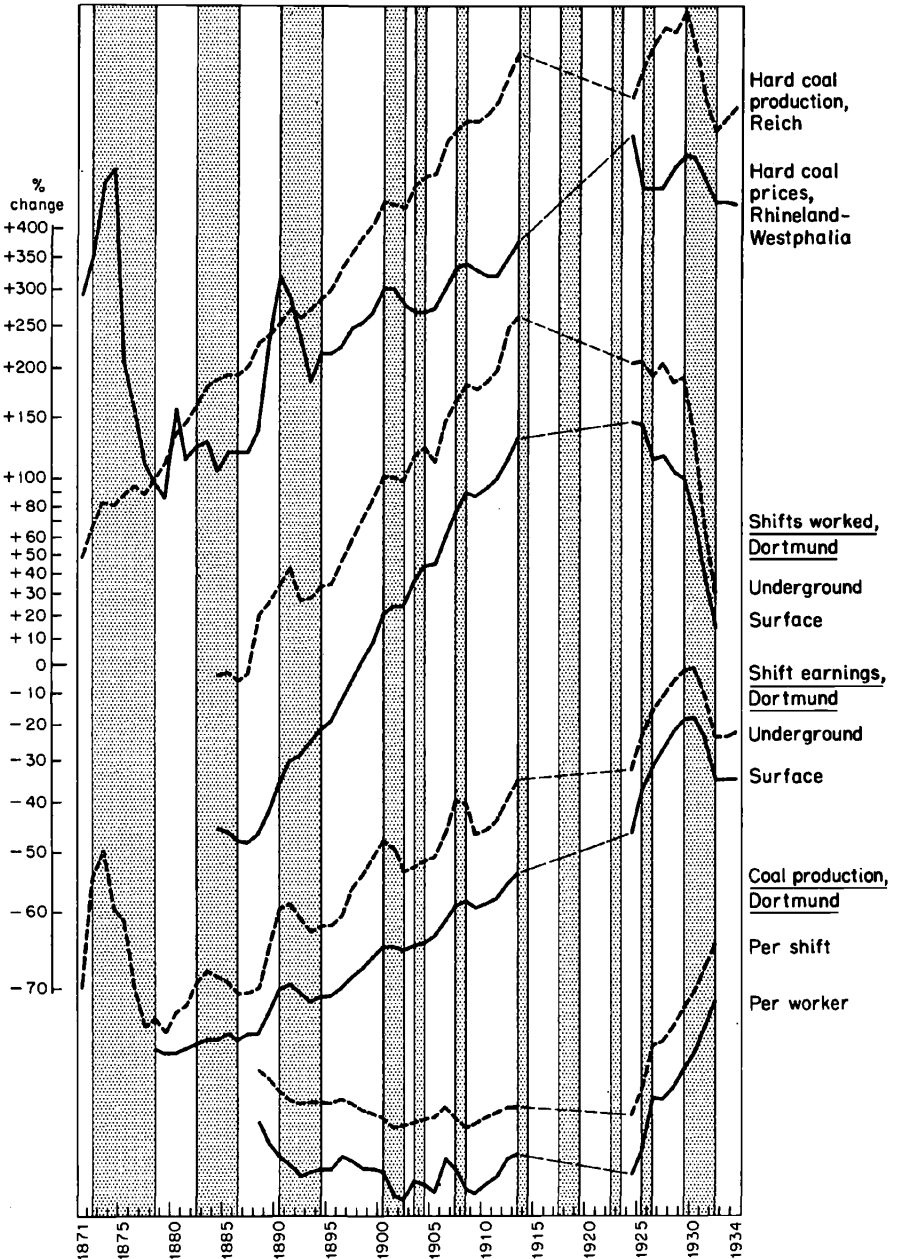
Source: Appendix Tables A-6 and A-7. For employment, see *Zeitschrift für das Berg-, Hütten-, und Salinenwesen, passim*.

wage arrangement and could be shaded in what was essentially an adjustment of piece rates for underground miners. Surface workers served on a time arrangement. But changes in their basic rates and the incidence of overtime imparted cyclicity—though of smaller amplitudes—also to the shift earnings of these workers.

*Wages, Employment, and Payroll.* The roles played by rates, earnings, and employment in labor-market cycles can be analyzed through their contributions to payroll changes. The available data do not permit a breakdown of payroll fluctuations into their determinants, for a full cycle; but such an analysis can be carried through for the business contraction of 1929-32. The basic data are to be found in Table 40, where we note that during this reference contraction the total payroll in manufacturing and mining industries decreased by 60 percent,<sup>57</sup> while employment went down about 40 percent. Average annual (or weekly) earnings, for wage earners who kept their jobs, were reduced by about one-third; part of this loss

<sup>57</sup> The percentage changes are measured from the peak.

CHART 20  
Average Earnings of Dortmund Miners, and Other Variables,  
1871-1913 and 1924-1934



Shaded areas represent business contractions.  
Source: Appendix Tables A-8 and A-29 and their sources.

TABLE 40  
Cyclical Changes in the Industrial Payroll and Its Major Components,  
1929-1932

	Unit	1929	1930	1931	1932
(1) Hourly union rates	pfennigs	85.3	86.8	82.3	69.7
(2) Ratio of earnings to rates	ratio	1.113	1.062	1.035	1.026
(3) Average hourly earnings (line 1 × line 2)	pfennigs	94.9	92.2	85.2	71.5
(4) Number of hours worked per week	hours	46.02	44.22	42.48	41.46
(5) Number of weeks per year	weeks	48.7	49.0	49.0	49.0
(6) Number of hours worked per year (line 4 × line 5)	hours	2240	2167	2082	2032
(7) Average annual earnings (line 5 × line 6)	marks	2126	1998	1774	1453
(8) Employed workers	million workers	6.241	5.428	4.492	3.711
(9) Total wage payroll (line 6 × line 7)	billion marks	13.27	10.85	7.97	5.39

SOURCE, by line:

(1) *Wirtschaft und Statistik, passim*.

(2) Computed: (3) ÷ (1).

(3) Our estimate based on absolute levels (*Handbuch* 1924-44, p. 469) and index (Appendix Table A-2).

(4) Our estimate. Hours worked per day (*IKF Handbuch* 1936, p. 32), multiplied by 6.

(5) 1929 and 1932 computed: (6) ÷ (4); 1930 and 1931 assumed to be equal to 1932.

(6) Computed: for 1929 and 1932 (7) ÷ (3) × 100; for 1930 and 1931 (4) × (5).

(7) Computed: for 1929 and 1932 (9) ÷ (8); for 1930 and 1931 (3) × (6).

(8) *Handbuch* 1928-44, p. 480.

(9) 1929 and 1932, *Wirtschaft und Statistik*, 1939, p. 301. For 1930 and 1931, computed: (7) × (8).

Hourly rates and earnings are averages based on constant weights. Any resultant inaccuracies are of minor importance, for the limited purposes of this table.

must have been due to the shortening of the average workweek by about 10 percent. Average hourly earnings dropped by only 25 percent, and the decline of minimum rates set by collective agreement was still milder, amounting to about 18 percent. That the drop was larger in average hourly earnings than in rates may be explained on several counts. Among them are the decline of work at premium rates; reduction of output paid for by piece rates; changes in the industrial, sex, and age composition of the work force and of hours worked; and the decrease of voluntary rate payments in excess of agreed minima. No data are available for an evaluation of the changes in these factors. It can be estimated, however, that the average excess of hourly earnings over minimum union rates amounted to about 11 percent in 1929, but to only 3 percent in 1932.<sup>58</sup>

Having presented the percentage changes of various payroll components, let us measure the contribution made by each of these components to the

<sup>58</sup> This statement is based on the possibly incautious assumption that the rates and earnings samples are roughly comparable.

total decline in industrial payroll.<sup>59</sup> According to this tabulation the

Contribution of Major Factors to Payroll Decline, 1929 to 1932

<i>Decline in—</i>	<i>Billions of Marks</i>	<i>Percentage Contribution</i>
Employment	4.70	59.7
Hours	.94	11.9
Excess of hourly earnings over rates	.85	10.8
Wage rates	1.39	17.6
Total industrial payroll	7.88	100.0

decrease in employment accounts for more than half of the total payroll reduction, and the decrease in employment and hours together for more than 70 percent. The drop in hourly earnings accounts for close to 30 percent of the total decline, and that in wage rates proper for less than 20 percent. It must be stressed that these figures describe the numerical contribution of the various factors, but do not reflect the causal importance among the variables.<sup>60</sup>

<sup>59</sup> The approach to the measurement of these contributions was originally suggested by Paul Boschan. It is described in a joint paper to be separately published. Roughly, the total contribution of each factor is built up from its contributions to changes in the product of the several factors during small subperiods—in this case the year-to-year changes. Within the subintervals, the contribution of each factor can be regarded as a compromise between its maximum and minimum possible contribution. Computationally, the contribution of each factor is derived from the weighted change of the particular factor during the subinterval, the weights being determined by the average levels of the other factors. The weighted changes of the various factors add up, in each subinterval and interval, to the change in their product.

<sup>60</sup> The German government's wage-rate decree of 1931 was accompanied by an extended controversy on the cyclical consequences of alternative wage policies. The problem was whether a deflationary wage policy should be pursued in order to increase profitability, or whether maintenance or perhaps even an increase of wage rates would augment purchasing power, and thus serve to restore prosperity. The following findings of the present study may bear upon this controversy: (1) wage rates showed material cyclical declines only twice in the seventy-five-year period; (2) these decreases lagged behind turns in general business; (3) the numerical contribution of the decline of union rates to the total payroll contraction was limited to about one-fifth.

We can now perceive that the argument for high wage policies was subject to certain limitations: The decline in wage rates contributed little to the decline in the payroll, and still less to the contraction of total purchasing power. The depression continued to deepen despite the fact that high wage levels were maintained for a long time—about one and one-half years—after the turn in general business conditions. Under the enormous pressures of unemployment, actual upward adjustments of wage rates would have been extremely unlikely. The statistical evidence also throws some light on the alternative proposition, that is, the policy of stimulating employment and supporting profitability by decreasing wages. Relevant in this connection is the rare occurrence of actual rate declines, their relatively mild character, and the long delays involved. Also, both parties to the wage controversy would have done well to give adequate weight to the international aspect of the economic catastrophe, of which German events formed only a part. In focusing their attention on wage rates, both sides tended perhaps to overestimate the strategic importance of an economic variable which is relatively inflexible and constitutes only one of many factors in the complex cyclical process.



## *Cycles in Wage Rates and Prices*

### GENERAL

Comparisons of the cyclical behavior of wage rates and prices can be carried through only in rather rough form, for several reasons. Neither the prices nor the wage rates reported were necessarily those paid (effective prices or rates). The wholesale prices at our disposal are for the most part list prices and do not show concessions that might have been frequent in slack periods. And the wage rates we quote are generally minimum rates which cannot reflect the higher payments made in lively periods of business. During the years of the Weimar Republic, prices tended to have a maximum and wages a minimum character.<sup>61</sup> While list prices tended to be closer to effective prices during prosperity, and union rates closer to effective rates during depression, the published quotations in both instances failed to describe the full amplitudes of actual fluctuations. Moreover, the industrial coverage is reasonably similar for only a few price-wage comparisons; in general, our indexes do not cover the same segment of the economy. These shortcomings do not vitiate all comparisons of prices and wages, but they do indicate the limits within which such comparisons can be taken as valid.

### CYCLES IN WAGE RATES AND WHOLESALE PRICES

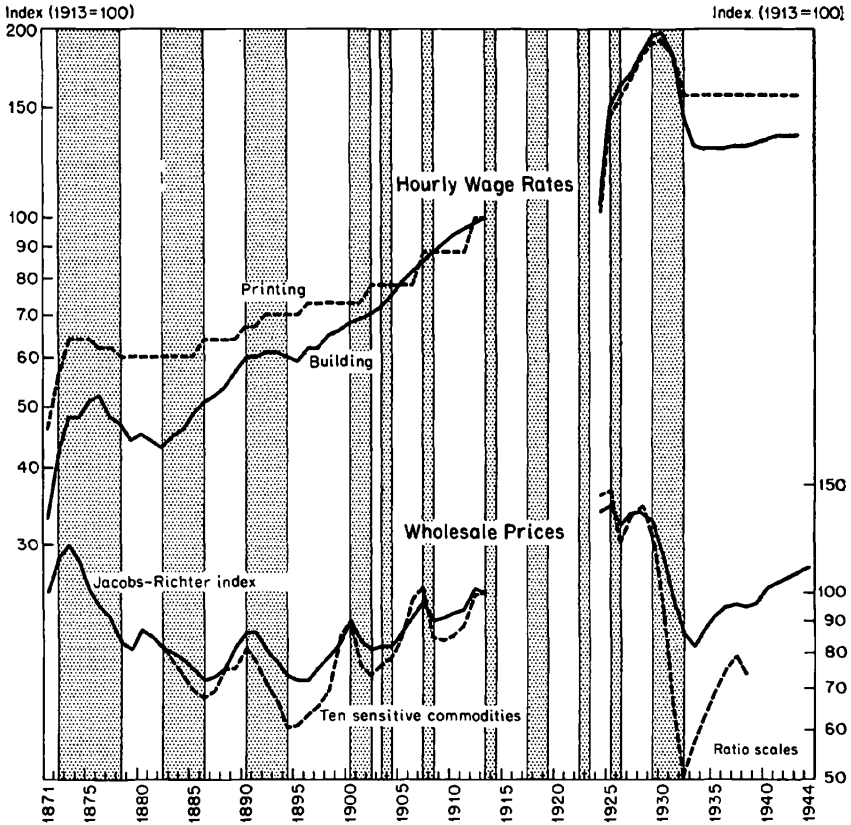
*Cyclical Behavior, Annual Series, 1871-1944.* Wholesale prices and wage rates for 1871 through 1944 are depicted, on an annual basis, in Charts 6 and 21. Most of the components of the wholesale price index are raw materials prices. A number of differences in cyclical behavior as between these prices and wage rates are to be noted in the rough annual data. First of all, wholesale prices show distinct cycles which in almost all cases can be clearly associated with changes in general business conditions. In wholesale prices there is little skipping of cycles.<sup>62</sup> Compared with the wage rates traced in the same charts, the conformity of wholesale price cycles to those of general business is definitely superior, and their turning points are closer to business peaks and troughs. Nor do wholesale prices show the strong lags, which are so consistent a feature of wage-rate cycles. It is true that wholesale prices lagged behind the 1872 peak<sup>63</sup> and behind the 1878, 1904, and 1932 troughs. On the other hand, wholesale prices showed an early peak before the 1882 break in business prosperity,

<sup>61</sup> Even during this period there may have occurred premium payments above quoted prices and occasional wage payments below union rates. But these must have been exceptional.

<sup>62</sup> The one exception, for the years charted, is the short and particularly mild 1902-4 reference cycle (see footnote 7 of this chapter). Even in this case, however, traces of cyclicity can be found.

<sup>63</sup> This is a rather uncertain peak (see note 20, this chapter). An alternative determination of the upper turning point, in 1873, would make the wholesale price turn coincide, but would not disturb the substantial lag in wage rates.

CHART 21  
Wage Rates and Wholesale Prices, 1871–1913 and 1924–1944



Shaded areas represent business contractions.

Source: Appendix Tables A-1, A-3, A-4, and A-30. For source of sensitive commodity prices see also footnote 64, this chapter.

and also before the 1929 reference turn. On most other occasions the turning points roughly coincided.

As for amplitudes, they tended on the whole to be larger in wholesale prices<sup>64</sup> than in wage rates. This tendency is sometimes obscured by the strong secular, long cycle, and episodic fluctuations apparent in both types of series. For instance, the upward trend in wage rates and the downward trend in prices during the first decade of the Reich's existence made for

<sup>64</sup> Chart 21 also presents a price index for ten sensitive commodities. The amplitudes for this index are considerably larger than those for the Jacobs-Richter index. Source for sensitive index: 1882-99, direct communication from IKF; 1900-1913, E. F. Wagemann, *Economic Rhythm, A Theory of Business Cycles* (McGraw-Hill, 1930), pp. 266-68; 1924-38, *IKF Handbuch* 1933, p. 116 and 1936, p. 99; later data, IKF, *Statistik des In- und Auslands*, *passim*. Commodities included are scrap castings, scrap iron, scrap brass, lead, lumber, wool, hemp, flax, oxbides, calfskins.

equally large total fluctuations in both cases. Similarly, after 1923, the poststabilization adjustment in wage rates and their failure to decline during the 1925-26 contraction led to a huge wage-rate rise from 1924 to 1929, compared to mild changes in prices. After 1929 the cyclical downward adjustment of prices must have been accentuated by the depressing trends of largely noncyclical character that prevailed throughout the poststabilization years. Perhaps the most convincing evidence of the larger amplitude of wholesale prices is found during the years 1880 to 1913, when prices showed clear cyclical behavior and wage rates did not. In this as in other periods, the lesser amplitude of wage rates is not so apparent in expansions; it is most conspicuous in the failure of rates to respond, or respond promptly and significantly, to deteriorations in business conditions. The explanation for the weaker cyclical response of wage rates cannot be found in the long-term upward trend of these rates alone. At least during the last two or three decades before World War I there was a similar upward trend in the general price level. The cause must be sought rather in the determination of the price of labor and in the social forces which precluded purely "economic" adjustments in the labor market.<sup>65</sup>

*Turning Points, 1924-1939.* Comparison of wage rates and prices can be carried through in greater detail on the basis of the monthly data presented in Appendix Table A-30 and Chart 22. Not only are the wholesale prices in these exhibits available at more frequent time intervals (monthly), but also their total coverage is substantially increased (four hundred commodities). The index is broken down into economically significant groups, such as prices for raw materials and semimanufactured goods versus prices of finished goods; controlled prices versus free prices or versus sensitive commodity prices; prices for producers' goods versus prices for consumers' goods. The cyclical behavior of wage rates will forthwith be compared with that of these price categories.

Chart 22 confirms the preliminary findings on conformity which were set forth in the previous section. All represented price series show clear cycles with a one-to-one correspondence to changes in general business conditions. They all experience actual declines during or close to business contractions. Wage rates are the only broad price group in which the reaction to the 1925-26 contraction consists of an interruption of growth only.

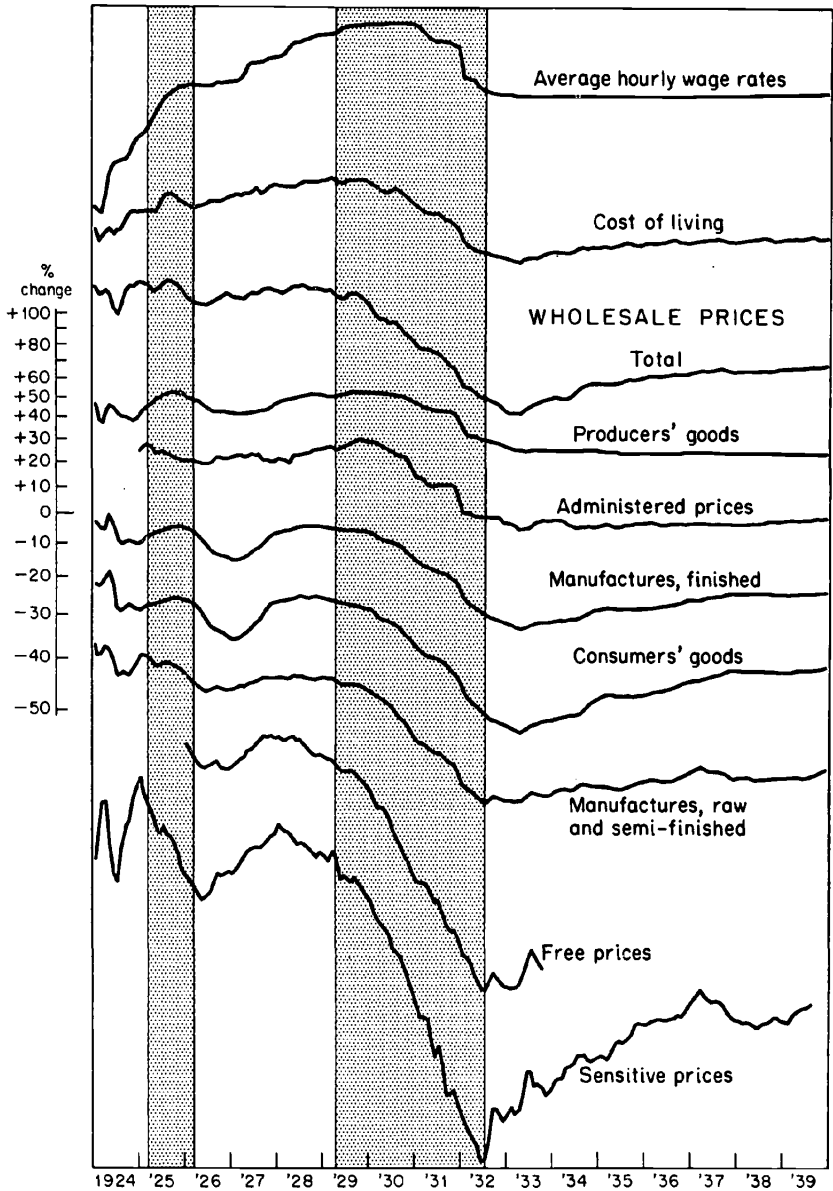
Table 41 relates the turning points of wage rates and prices to those in general business conditions.<sup>66</sup> The most impressive features of the table

<sup>65</sup> See Mitchell, *Business Cycles*, 1913, pp. 465-66.

<sup>66</sup> The comparisons are restricted to the four reference turning points in 1925, 1926, 1929, and 1932. The 1923-26 reference cycle is covered only in part, since wage series start in 1924 and some price series in 1925. Furthermore, the vehement short-term fluctuations of prices, in response to the stabilization problems of the year 1924, make it difficult to determine cyclical turning points during that year.

Neither wage rates nor the included prices showed enough seasonality to warrant adjustment.

CHART 22  
Wages and Prices, 1924-1939



Shaded areas represent business contractions.

Source: Appendix Table A-30

TABLE 41

Timing of Cyclical Turning Points in Wage Rates and Prices, 1924-1932  
(leads, -, and lags, +, in months)

	Peak March 1925	Trough March 1926	Peak April 1929	Trough August 1932
<i>Hourly Wage Rates</i> <sup>a</sup>	+8	+11	+13 +20	+8 +67
<i>Cost of Living</i>	+6	0	-1 <sup>b</sup>	+8
<i>Wholesale Prices</i>				
All commodities including farm products	+6	+3	-9	+8
Manufactures, raw and semi-finished	-1	+3	-11	-1
Manufactures, finished	+6	+11	-6	+8
Producers' goods	+6	+12	+5	+9 <sup>c</sup>
Consumers' goods	+7	+10	-5	+8
Sensitive prices	-2	+2	-15	-2
Free prices		+9	-15	-1
Administered prices	0	+3	+7	+8

<sup>a</sup> The timing relations in this line are based on a number of special decisions. In 1925 and 1926, formation of a plateau was regarded as equivalent to a cyclical decline, and its initial and terminal edges as "turning points." The two entries for 1929 and again for 1932 represent the beginning and end of a peak ridge and a flat-bottomed trough. The extremely late upturn after the Great Depression is due to the wage stabilization under National Socialism. The 67-month lag stated above implies the end of the depression plateau to have been reached in March 1938. However, even this late turn marks but a slight change in the direction of wage trends. During the subsequent two years the rise in rates amounts to about 1 percent only.

<sup>b</sup> This lead implies a peak of living costs in March 1929. This peak is brought about by a minor ripple. Alternatively, living costs might be held to form a peak plateau. At the initial and the terminal edge of this plateau the timing of living costs would be measured as -8 for P<sub>1</sub>, and +8 for P<sub>2</sub>.

<sup>c</sup> Measured to beginning of trough plateau (T<sub>1</sub>). End of plateau (T<sub>2</sub>) occurs years later.

SOURCE: Appendix Table A-30.

are the consistent substantial lags of turning points in wage rates behind those of prices. In relation to reference turning points, this consistency reflects the long lag of wage rates behind changes in general business conditions, as compared to a much shorter lag of prices. The lags in wage rates vary from eight to twenty months, occur at each of the four major turns in business conditions, and are generally larger than those of any of the price series.<sup>67</sup> Although averages for observations derived from two cycles can hardly be taken to represent a "central tendency," they

<sup>67</sup> For the determination of turning points at the plateaus of 1925-26 and from 1929-30, see footnote to Table 41. Note that at the prosperity plateau around 1930 the lag of wage rates behind price turns exists whether the beginning (P<sub>1</sub>) or the end (P<sub>2</sub>) of the peak plateau is used as a basis of measurement. An extreme lag of 67 months is observed after the Great Depression and is due to wage stabilization under the Nazis. If this lag is omitted the range of lags is eight to twenty months.

serve to show that sensitive commodity prices lead, while administered prices (largely cartel prices) lag behind changes in business conditions. Similarly, wholesale prices of raw materials and semifinished goods tend to lead, while those of finished goods tend to lag. Somewhat unexpected is the situation in producers' and consumers' goods, particularly during the Great Depression. Both at their peak and at their trough consumers' goods prices show a considerably earlier reversal of direction than prices of producers' goods. At the peak this difference amounts to 10 months; at the trough it must be measured in years. The lead of consumers' goods prices requires explanation in view of the central role usually occupied by the markets for producers' goods in the turn of business fortunes. At the 1929 peak this lead was frequently regarded as a consequence of the limited capacity of the German consumers' goods market, which was easily glutted in periods of sustained prosperity. It reflected also the greater role of cartel agreements in the sphere of producers' goods, which might have led both to a better defense of effective prices and to a perpetuation of list prices long after price shading became the rule. The lag at the subsequent trough must be understood in terms of National Socialist price policies, to be discussed in the next chapter.

The difference in timing between wage rates and the price indexes presented here merits some comment. The signs of slackening or quickening pace of business conditions may be expected to appear in the demand-supply conditions of the product markets before production schedules and employment policies are actually adjusted.<sup>68</sup> That is, broadly speaking, labor market changes tend to lag behind product market changes. Furthermore, the frictions discussed in earlier sections of this chapter prevent prompt response of wage rates to changes in labor market conditions, while less effective frictions exist in price responses to changes in product market conditions. A case may be made out for the existence of an analogous set of frictions bearing on cartel-controlled prices. In this instance, agreements within the cartel and the establishment of industry-wide price lists correspond roughly to the collective agreements between unions and employers. The need to reach internal and external agreement on price revisions has delaying effects, corresponding in some ways to delays caused by the need for new collective agreements in the case of wage revisions.<sup>69</sup> The similarity between wages and cartel prices did not find expression in the timing of the specific turns in cartel prices at the 1925 and 1926 changes in business conditions. It did, however, lead to a delay in the downward revision of cartel prices at the 1929 peak, second

<sup>68</sup> In fact, such adjustments would characteristically be postponed until changes in the product markets are clear enough to warrant changes in managerial policy.

<sup>69</sup> It should perhaps be emphasized that cartel-controlled prices are here used as *pars pro toto*. Administered prices and tendencies toward nonprice competition existed also outside the sphere of formal cartel arrangements. For a systematic comparison of union wage rates and cartel prices see Wagenführ, "Kartellpreise und Tariflöhne im Konjunkturverlauf," pp. 501-17.

only to that of wage rates. This delay of seven months' duration behind the turn of general business conditions is all the more remarkable in view of the fact that the controlled prices were for raw materials and that the index of all raw materials and semifinished goods prices turned down eleven months before the reference-cycle peak. At the 1932 trough, the low in controlled prices lagged eight months behind the reference trough, compared with a one-month lead for all raw materials and semifinished articles. However, in this case, the eight-month lag of controlled prices was equaled and exceeded by other price categories.

*Amplitudes, 1924-1933.* We shall now compare the behavior of wage rates and prices in terms of their cyclical changes between reference turning points. Net annual changes of cycle relatives are presented in Appendix Table A-31. The table shows that wage rates were also sharply differentiated from other prices with regard to amplitudes, during both reference expansions and contractions. Between January 1924 and March 1925 wage rates rose appreciably more than the most volatile price series, that of ten sensitive commodity prices. The rise of wage rates amounted to about 25 percentage points, compared with a change of less than 1 percentage point in the wholesale price index for all commodities, and with a decline of about 3 percentage points in raw material prices. During the reference contraction from March 1925 to March 1926, wage rates rose countercyclically by 16 percentage points in the face of a moderately declining general wholesale price level. It is true that prices of finished manufactures (producers' as well as consumers' goods) also rose, but not by more than 2 percentage points. In the subsequent business expansion from March 1926 to April 1929, wage rates rose 18 percentage points, or 6 percentage points per year, about twice as fast as the most rapidly rising price series—sensitive commodity prices and living costs—and six times as fast as wholesale prices at large. Finally, during the Great Depression (measured from April 1929 to August 1932) wage rates declined less than all price series save one.<sup>70</sup> While the general wholesale price level dropped more than 33 percentage points, or 10 per year, the decline of wage rates kept within two thirds of this change.

In general the cyclical behavior of wage rates shows greater homogeneity than that of prices. This observation parallels the conclusions reached from the previous analysis of long-term trends in wage rates and prices. The greater homogeneity in the cyclical behavior of wages is reflected in the amplitudes of wage rates and prices during the reference cycle 1926-29-32. Table 42 presents the amplitudes of those four wage-rate series which—of

<sup>70</sup> The only major price group that declined less than wage rates was that of producers' goods—where prices are actually exposed to particularly strong downward pressures. However, the strong cartel organizations prevailing in the machinery field were able to limit the downward movement of this category. Note also the possibility of a greater diversion of list prices and effective prices in this group. The "normal" relation between amplitudes of producers' goods and consumers' goods prices has been described and explained by Mitchell, *Business Cycles*, 1913, pp. 462-64.

the seventeen reported industries—show the largest and the smallest increases and decreases during the two reference phases. The table also gives the amplitudes of several price series, selected to indicate the variation in price behavior. It is readily apparent that variations in amplitudes as large as those observed in the selected price series did not occur in wage rates.<sup>71</sup> This is not to say that in all segments of the price system and among broad commodity groups price behavior is necessarily less homogeneous than wage behavior. It can be shown, however, that, as in the case of trends, the variations between different wage-rate series are of limited range. The extreme variations in cyclical behavior, which are frequently to be found in prices, are never present in wage rates.<sup>72</sup>

TABLE 42  
Amplitudes of Selected Wage Rates and Prices, 1926-1932

	CHANGE OF CYCLE RELATIVES DURING:	
	<i>Expansion</i> 1926-29	<i>Contraction</i> 1929-32
<i>Wage Rates</i>		
Papermaking	+20	-17
Building	+15	-31
Baking	+16	-15
Brewing	+21	-12
<i>Wholesale Prices</i>		
Raw materials		
Sugar	-11	+21
Hides and skins	+12	-77
Agricultural products		
Vegetables	-3	-11
Cattle	+5	-58
Industrial materials and semi-manufactures		
Lubricants	-9	-4
Rubber	-124	-81
Building materials	+10	-35
Industrial finished products		
Machinery	+6	-10
Furniture	+11	-40

SOURCE: Wage rates, amplitudes computed from Appendix Table A-22.

Prices, amplitudes computed from *IKF Sonderheft 37, passim*. For each commodity group, those goods whose prices showed extreme variation during the indicated cycle phase were selected.

<sup>71</sup> The above comparisons are based on wages for skilled workers only, but the situation is not basically different for unskilled workers.

<sup>72</sup> The differences between cyclical amplitudes in prices are due partly to trend factors, so that the great variability in cyclical behavior merely reflects that already found in trend behavior. But trend behavior cannot explain completely the differences in amplitudes, as we learn from a comparison of, say, sugar prices and hide prices, or of furniture prices and prices for industrial machinery. Here, amplitudes vary widely despite similarity in trends. No attempt has been made to distinguish between trend elements and other elements in the apparent cyclical behavior of prices and wages.



*Wage Rates and Cost-Price Relationships.* The deviation in the cyclical behavior of wage rates from that of other prices must have had important consequences for the relationship of cost and finished-product prices, and ultimately for the profitability of manufacturing enterprises. Chart 22 indicates the direction and extent of the resulting pressures. Prices for finished manufactures started to decline in October 1928, while wage rates continued to rise or to maintain their level until December 1930. True, industrial raw material prices declined during the same interval. On the other hand, prices paid by manufacturers for producers' goods remained virtually stable, and volume of production declined considerably. Between the peak of finished product prices (October 1928) and the last month of peak wage rates ( $P_2$ , in December 1930) the percentage changes in the price, cost, and volume elements are shown below.<sup>73</sup>

	<i>Percentage Change between October 1928 and December 1930</i>
Hourly wage rates	+5
Producers' goods prices	-3
Finished manufactured product prices	-11
Volume of industrial production	-15
Raw material and semifinished product prices	-18

The reported percentage changes can indicate the direction of certain cost-price pressures, but they cannot gauge their intensity or their effects on profitability. It should be remembered that the wage data themselves are minimum rates, and that the prices and wages here discussed form only a small portion of the elements that affect profitability. The maintenance of fixed and quasi-fixed costs may have had more impact on business fortunes than the disparity between sales prices and such variable cost elements as wage rates had.<sup>74</sup> Furthermore, the volume of producers' goods purchased by manufacturers decreased sharply during the contraction, so that the relatively high price level of these goods played a minor role in the total picture. Finally, the juxtaposition of finished goods prices as "sales prices," and raw materials plus semifinished product prices as "costs," is a gross simplification. For manufacturing and mining, as a whole, semifinished goods and raw materials are the end products of many enterprises, and conversely, finished products enter many establishments in the form of equipment or components, that is, as a cost element.

This last reservation can be overcome, however. In a number of

<sup>73</sup> The total specific decline of prices for finished manufactures was 30 percent; for raw materials 36 percent; for producers' goods only 19 percent; and the decline of wage rates was 22 percent.

Note that the percentage changes are here stated in the conventional way, i.e., they are measured from the initial date. This suffices for the present discussion, since the measures concern behavior during one contraction only. No direct comparisons are intended between amplitudes in expansion and contraction phases.

<sup>74</sup> Profits, because of their residual character and small size relative to revenues, are, of course, highly sensitive to even slight changes in major cost items.

CHART 23  
Wages, Prices, and Production, Seven Industries, 1924-1934

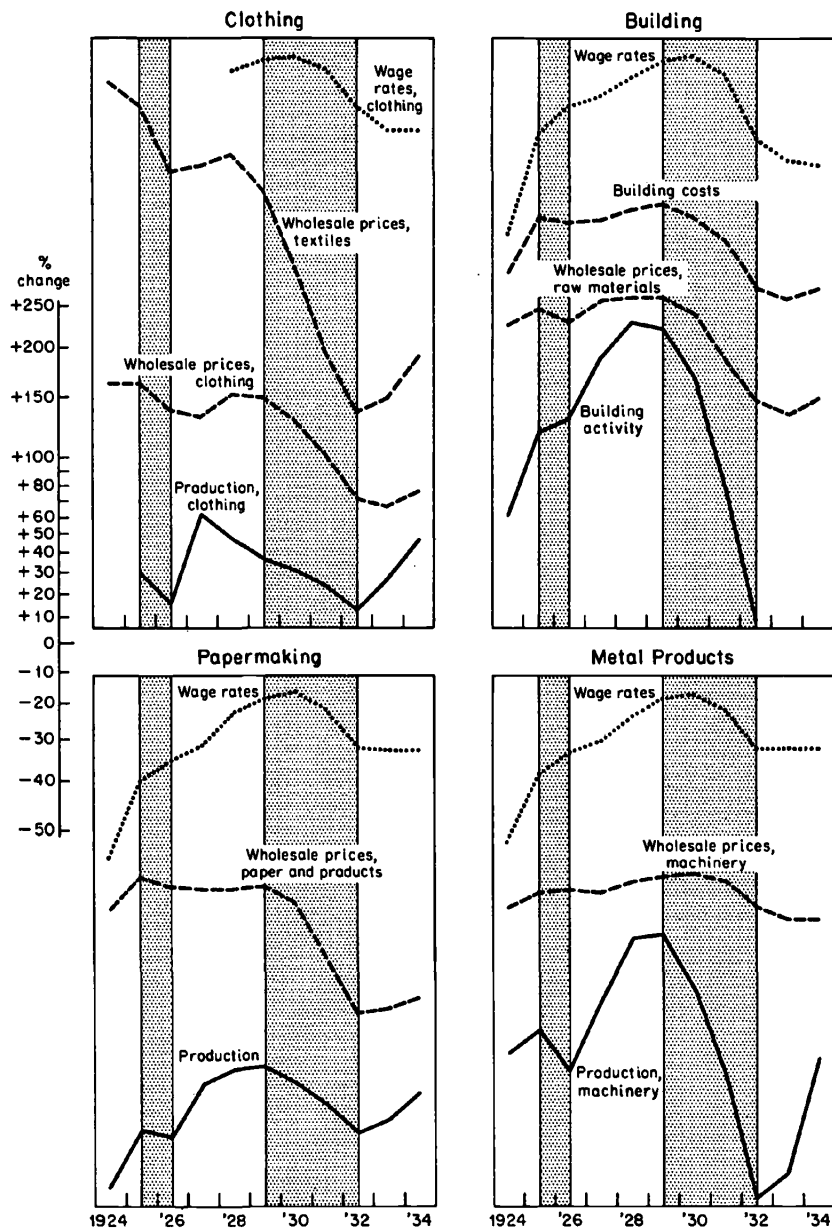
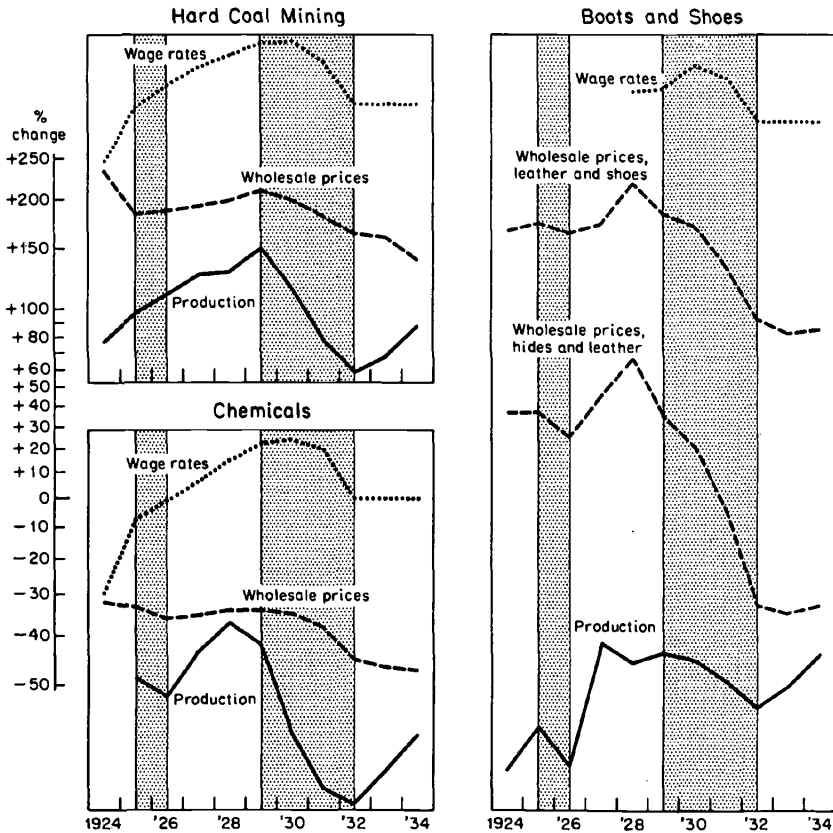


Chart 23 (Concl.)



Shaded areas represent business contractions.  
Source: Appendix Table A-32.

industries, it is possible to distinguish prices for materials from those for end products. Also it can be shown that the price-cost differentials and their importance for profits must have varied considerably from industry to industry, depending on the cyclical behavior of prices, wages, sales volume, productivity, importance of fixed costs, and other factors. Appendix Table A-32 and Chart 23 contain price-cost comparisons and, wherever possible, production or employment information on an annual basis for the following industries: clothing, papermaking, boots and shoes, chemicals, hard-coal mining, building, and metal products. Common to all these industries, during the years 1924-29, was a steep rise in wage rates in the face of only slightly increasing, virtually stable, or actually falling finished product prices. The rise in wage rates coincided with a period when production trends were generally going up and relations between raw-material and finished-product prices were not unfavorable. In the course

of the Great Depression, prices of most finished products declined promptly, whereas in each industry wage rates reached their annual peaks only in 1930.

From industry to industry we find considerable variation in price-cost-production patterns. In clothing, for instance, the production peak was reached as early as 1927, in the hard-coal mining industry as late as 1929. Furthermore, while the basically competitive textile industry suffered price declines from 1928 on, the largely cartel-controlled metal products industry was able to maintain its controlled price levels until 1930. As compared with the great variety in the timing, amplitude, and pattern of prices and production in each of the industries covered, the patterns of wage rates were fairly similar. In the period 1924-29, wage rates went up—whether finished-product prices were rising (metal products), falling (chemicals), or stable (paper). And wage rates continued their rise through the year 1930, even where product prices had started to decline one, two, or three years earlier. All in all, during the postinflation period of the Weimar Republic, wage rates exhibited rather autonomous patterns with a considerable degree of family resemblance among themselves but at best mild modifications (see Chart 23) in response to the varied production and price movements in different industries. The greater homogeneity in behavior of wages as compared to prices may be traced to the exchangeability of skills, the thorough organization of the labor market, and last but not least, the effects of changes in living costs, which influence wage rates uniformly in all industries. By contrast, manufactured goods are exchangeable only to a limited extent, are highly differentiated with regard to cyclical fluctuations, and their prices are commonly not affected by considerations of the seller's welfare.

#### WAGE RATES AND LIVING COSTS

*Prior to World War I.* As pointed out in Chapter 2, trends of consumers-goods retail prices or cost-of-living indexes occupied an intermediate position between wage rates and wholesale prices.<sup>75</sup> This relation between the three measures characterizes also their cyclical behavior, as can be seen from Chart 6. The chart shows, however, that cost-of-living, wage-rate, and wholesale-price cycles are not always in correspondence. The period from 1871 to 1913, for instance, includes four specific cycles (increases and decreases) in living costs compared with one specific cycle in wage rates. There is closer correspondence between cycles in living costs and wholesale prices and, in fact, between these two measures and general

<sup>75</sup> The retail prices covered only food and rent, weighted approximately according to their importance for a typical worker's family. They are sometimes referred to as cost of living, although they do not cover all such expenditures. Comparison of the Kuczynski index with other food-cost or living-cost indexes (Chart 7) shows that the similarity of the various measures is greater in their trend than in their cyclical behavior. Thus the cyclical movements of the Kuczynski index are less "confirmed" and may be regarded as only a rough approximation of living-cost behavior.

business conditions. Even here, however, living costs may be viewed as showing two cycles during the *Gründerjahre*, whereas wholesale prices experienced only one cycle. The cyclicity of living costs expresses itself only in a leveling out of growth during the 1904-8 cycle, and it disappears entirely during the brief reference cycle of 1902-4. At the six turning points of living costs which can be matched with those in general business conditions, cost of living lagged behind reference turns in four cases, led in one, and coincided in the remaining instance.

To say that living costs followed an "intermediate" course between wage rates and wholesale prices is to generalize too broadly for purposes of the present chapter. During the *Gründerjahre* cycle, for instance, wage rate amplitudes exceeded those of living costs. From about 1880, the rate picture was dominated by the strong upward trend of wages, with the result that during business expansions the rise of wage rates tended to exceed that of living costs. And during matchable contractions, cost of living declined while wage rates increased or leveled off.

1924-1933. Substantially better information on the cyclical behavior of wage rates and living costs can be obtained for the poststabilization years. The comprehensive index of union wage rates and an official cost-of-living index covering all major expenditure groups are available by monthly intervals. The basic data are contained in Appendix Tables A-30 and A-33, and the timing relations and amplitudes during reference cycles are shown in Table 41 and Appendix Table A-31. From these exhibits we observe that at two of four reference turning points (March 1925 and August 1932) living costs lagged, at one (March 1926) they coincided, and at one (April 1929) they led. The lead in the last case, however, amounts to one month only and is brought about by a random departure from a level which extends for another eight months after the reference turn. If the end of this plateau ( $P_2$ ) were regarded as a turning point, we should establish lags in three cases and coincidence in one. Cost-of-living indexes at each turning point reversed their direction earlier than wage rates, with an average lead of about a half-year.

During the two interwar cycles, living costs increased less in expansions and decreased more in contractions than wage rates did. This finding applies whether their amplitudes are measured in terms of reference or of specific cycles, except for the brief 1925-26 reference contraction, when wage rates and living costs continued their specific rises. The monthly observations for the interwar period thus confirm the impressions derived from annual data for the pre-1913 era. However, during the Kaiserreich the cyclical behavior of wage rates and living costs could be explained largely in terms of the strong secular upward trends in wages. Such trends are not apparent for the interwar period, because it was so brief and was characterized by strong cyclical fluctuations. The amplitude measures describe net changes between reference or specific turning points only. They offer no information on the behavior of wages or living costs during

intermediate cyclical stages. As Chart 22 shows, during the phase of drastic wage rate reduction, from the end of 1930 to the beginning of 1932, wage rates actually declined more than cost of living.

Up to this point the investigation of cycles in wages and in living costs has been carried through in terms of comparative price behavior. Hence the presentation has been restricted to living costs and wage rates proper. Still to be examined are the effects of the disparate cyclical movements of wage rates and prices upon the purchasing power of wages—in other words, the cyclical behavior of “real wages.”

### *Cycles in Real Wages*

#### REAL WAGES AND TURNING POINTS IN BUSINESS CYCLES

##### *Real Wage Cycles*

BEFORE WORLD WAR I. The wage-price quotient, which gives us real wages, cannot be expected to record changes in the total economic well-being of workers, since neither all working conditions nor all living-cost elements find reflection in this measure. However, even the purchasing power of the income at the worker's disposal is not adequately described by real earnings. Income from other sources, changes in size of family, the employment and earning status of other family members all codetermine the volume of goods and services available to the individual wage earner. Although the changing purchasing power of average family income is probably the most adequate gauge of economic well-being, it is difficult, from the data at hand, to make a close measurement.<sup>76</sup> The present aim, therefore, is to follow the course of money and real wages of employed workers, and only incidentally to consider other determinants of their economic welfare. Thus, the following real-wage analysis will deal primarily with cyclical fluctuations in the purchasing power of rates and earnings of employed workers.

Hourly real rates of building and printing workers are presented in Appendix Tables A-12 and Chart 8. The outstanding feature here is the relatively high inverse conformity to business cycles. Particularly during the long cycles in the nineteenth century, specific cycles in real rates for building and printing can be matched fairly easily with business cycles at large. But the real-rate declines (or pauses in growth) occur for the most part during expansions in general business activity, and the real-rate increases during business cycle contractions. For printing rates, the cyclical character of real wages is more pronounced than that of money wages. The apparent inverse conformity as well as the more pronounced cyclical swings of these real-wage series must be explained by the combination of two sets of facts. First, money wage rates during the years

<sup>76</sup> Jürgen Kuczynski's "real net wages" represent an attempt to estimate per capita working-class income of both employed and unemployed. This estimate is, of course, only indirectly related to the concept of average family income. See, for instance, his *Germany, 1800 to the Present Day*, pp. 133-38.

1872-82 showed long lags and thus moved counter to general business fluctuations. In subsequent years they increased in expansions but showed little or no decline in contractions. Second, during business contractions, living costs tended actually to decline in the face of slightly rising or stable rates. The result is the inverse conformity we have observed.

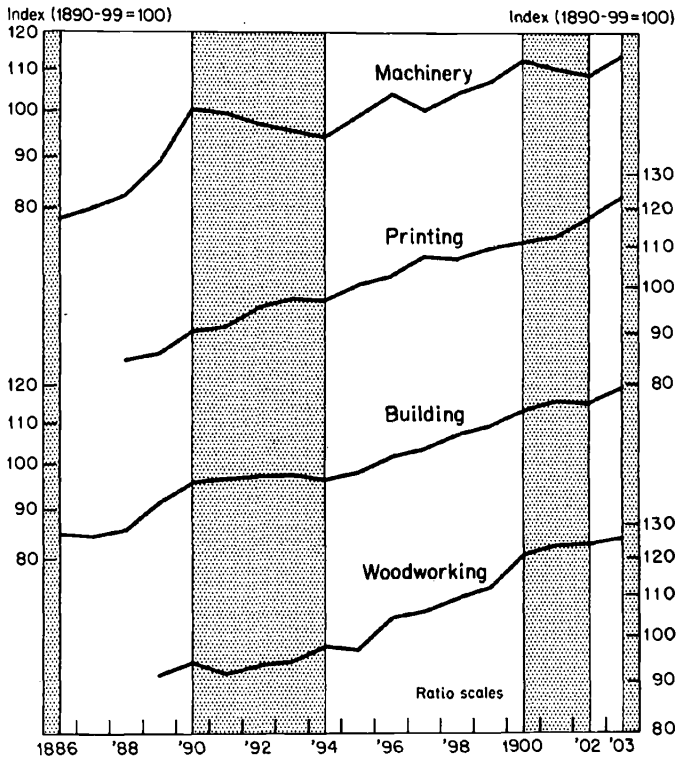
TABLE 43  
Effective Hourly Real Wage Rates, Four Industries, 1886-1903  
(1890-1899 = 100)

<i>Year</i>	<i>Building</i>	<i>Machinery</i>	<i>Printing</i>	<i>Wood</i>	<i>Average, Four Industries</i>
1886	93	86	...	...	90
1887	93	88	...	...	91
1888	91	88	90	...	90
1889	93	91	88	93	91
1890	95	99	90	93	94
1891	94	97	89	89	92
1892	95	95	94	92	94
1893	97	95	97	94	96
1894	97	95	98	99	97
1895	100	101	103	99	101
1896	104	107	106	108	106
1897	104	101	109	107	105
1898	105	102	105	107	105
1899	107	105	107	109	107
1900	110	109	108	117	111
1901	111	106	108	119	111
1902	109	103	112	118	111
1903	113	108	117	120	114

SOURCE: Based on wage rates (actually paid rates, taken from payroll records) from Table 33, and on cost of living from Appendix Table A-11.

In view of the striking character of the finding that contractions in business activity tended to bring about improved real rates (and that prosperity brought declines in these rates), further evidence should be adduced. Accordingly, real wage rates for building, machinery, printing, and woodworking were computed (see Table 43 and Chart 24). The basic money rates, unlike the long-term series at our disposal, were ascertained directly from factory payrolls. From them we learn that the real rates in the machinery industry rose during business expansions and declined during contractions. In the other industries real wage rates tended to rise during both expansions and contractions of business. The rise during expansions, however, was considerably larger than during contractions. Thus, the evidence examined for this particular period does not confirm the inverse relation shown by the longer series on nominal rates in building

CHART 24  
Effective Hourly Real Wage Rates, Four Industries, 1886-1903



Shaded areas represent business contractions.

Source: Table 43.

and printing. Nevertheless, insofar as our evidence goes, a decline in real wage rates during business contractions does not appear to be typical of the cycles before World War I.

Positive conformity of wages to business cycles before World War I is more clearly apparent in the case of earnings. Appendix Table A-12 and Chart 8 record real shift earnings of underground and surface miners in Dortmund's hard coal mines, and earning averages for ten coal, ore, and salt mining districts. A high degree of positive conformity emerges from these data. The only elements preventing technically "perfect" conformity consist in the occasional skipping of brief mild cycles, such as that from 1902 to 1904. Conformity of this high order is not, however, to be found in other real earnings series. Appendix Table A-12 shows that the specific cycles in average daily real earnings of Krupp metals' workers and of railroad workers did not correspond in any regular fashion to the fluctuations in general business conditions. In some cases where the money-wage decline was sharp, it appears also in real wages (see, for instance,



the 1875-80 and 1900-1902 declines in Krupp earnings). But in most cases the pre-1913 fluctuations in money earnings were mild, and often compensated or even overcompensated by changes in living costs.

**INTERWAR CYCLES.** Broad annual indexes of hourly real rates, and hourly and weekly real earnings, are computed in Appendix Table A-13 and presented graphically in Chart 9. On these indexes we may make the following observations: The 1925-26 contraction is skipped by all the annual real wage measures. The subsequent cycle, embracing the Weimar period of prosperity and depression, is clearly reflected in all series. During the Great Depression, hourly and weekly real earnings showed actual declines. There was a net increase between 1929 and 1932 in hourly real rates, but the gain was considerably smaller than that experienced in the preceding reference expansion, and it occurred despite a specific decline after 1931. To the extent that cycle phases can be matched, we find positive conformity of real wage cycles and business cycles, and no evidence at all of an inverse relationship.

Hourly real union rates, by months, are derived in Table 44 and depicted in Chart 14. During the reference contraction of March 1925 to

TABLE 44  
Hourly Real Union Rates, by Months, 1924-1933  
(1928 = 100)

	1924	1925	1926	1927	1928	1929	1930	1931	1932	1933
Month										
Jan.	65.9	79.8	92.9	91.3	96.1	101.9	106.6	114.7	107.6	108.9
Feb.	68.5	80.5	93.7	91.0	96.5	101.3	107.4	114.6	109.9	109.5
Mar.	66.8	82.4	94.1	92.1	97.2	100.4	108.7	114.5	110.0	109.3
Apr.	69.6	84.1	93.4	93.1	99.6	102.9	109.8	112.7	110.9	109.4
May	73.7	86.8	93.3	96.1	101.6	104.8	110.4	112.2	108.8	107.9
June	79.1	87.1	92.6	95.9	101.1	105.2	110.0	111.6	107.4	107.3
July	78.0	85.4	91.7	94.5	100.6	104.6	108.8	111.7	107.0	107.3
Aug.	78.3	86.3	91.7	96.7	100.5	104.9	109.0	113.4	108.0	107.5
Sept.	76.9	87.2	92.9	96.4	101.0	105.0	110.3	113.8	107.9	106.9
Oct.	75.0	88.8	92.7	95.6	101.9	105.0	111.4	113.8	107.8	106.1
Nov.	76.8	91.3	91.8	95.8	101.9	105.1	112.7	114.0	107.9	105.4
Dec.	78.8	91.6	91.5	95.4	101.9	105.7	114.1	114.6	108.1	105.0
Average	73.9	85.9	92.7	94.5	100.0	103.9	109.9	113.5	108.4	107.5

SOURCE: Based on wage rates from Table 34 and cost of living as given in Appendix Table A-33, (shifted to 1928 = 100).

March 1926, and during most of the Great Depression, real wage rates did not decline. Nevertheless real wage rates may be regarded as conforming positively to the general business cycle. This statement assumes matching of the wage declines beginning March 1926 and April 1931 (or January 1932) with the proximate business contraction, despite the

fact that the long delay in real wage responses places the first decline wholly within the succeeding reference expansion, and the second decline partly within it.

In view of the predominant evidence on positive conformity of real wage rates in years for which satisfactory information is available, the question arises whether the earlier indication of inverse conformity does not reflect shortcomings of the data. The issue cannot be resolved with certainty, since reliable evidence is scarce. Yet it appears plausible that, during periods of rising wages and relatively low unemployment, workers (especially those in the better organized industries) may have been able to maintain their rates during contractions even in the face of falling retail price levels. That such a situation, leading to increased real rates during contractions, existed in the printing trades seems quite certain. During the later interwar period, in any case, the wide amplitudes of cyclical fluctuations in all money wages forced real wages into positive conformity.

*The Lagging of Real Wage Turns.* The annual character, the small coverage, and the unreliability of cost-of-living information for the years prior to World War I render the task of establishing timing relations for this period one of doubtful worth. The following observations on timing, therefore, will be based exclusively on wage information for the interwar period.

The comprehensive annual data are found in Appendix Table A-13 and Chart 9. Even for this period, only one turning point can be investigated for all available comprehensive series.<sup>77</sup> The decisive difference between the timing of real wages and money wages is the tendency of real wages to lag further in cyclical response. The same cannot be observed for weekly earnings, in which turning points of money and real wages coincide. But hourly real rates and average hourly real earnings have their specific peaks in 1931—two years after the turn of general business activity and one or two years after the turn of the corresponding money wage series. The tendency toward a longer lag in real wages as compared with money wages appears also, to some extent, in the timing of the subsequent recovery. Hourly money rates, for instance, reached their low ( $T_1$ ) in 1933, stabilized at this level, and resumed a slow increase only with the outbreak of World War II; by contrast, hourly real rates continued their decline from 1931 to the very end of the Reich's existence. Average hourly money earnings had their trough in 1933, whereas average hourly real earnings maintained their depression levels until 1935.

For hourly wage rates the timing relations can be studied also on the basis of monthly information. The tendency toward an increased lag can be observed in the reaction to the 1925-26 contraction. The leveling out of money wages ( $P_1$ ) started in November 1925—that is, eight months

<sup>77</sup> All series start with 1924, the first poststabilization year, and move up to their specific peak at or after 1929. They all reflect the Great Depression, but some do not show clear upturns thereafter.

after the reference peak. The upper turning point of real rates, on the other hand, occurred in March 1926—that is, twelve months after the reference peak and in fact coincided with the reference trough. The subsequent specific recovery came in February 1927, both for money<sup>78</sup> and for real rates. The coincidence is brought about by the sharp steplike upswing in money rates. The long lag in real rates appears most clearly in the response of wage rates to the onset of the Great Depression. While at that point the lag in money rates extended to thirteen or twenty months, the lag in real rates lasted twenty-one, twenty-three, or even thirty-two months—depending upon the determination of the peak.<sup>79</sup> Chart 14 shows how, during the year 1931, money rates experienced significant declines while real rates continued, with minor fluctuations, to hover close to their peak position until the very end of the year.

Shift earnings of coal miners provide us with material for a quarterly comparison of money and real wages, as presented in Appendix Tables A-25 and A-34, and Charts 16 and 25. In the Great Depression, real earnings of hard-coal miners turned upward three to six quarters later than the corresponding money wages. At various dates in 1931, strong cuts in miners' money wages caused temporary declines of real wages. However, the stabilization or slow recovery of money wages by the first quarter of 1932—in the face of further declines in cost of living—brought about renewed increases in real earnings in all four series up to the first quarter of 1933. At that time cost of living began to rise and—in connection with the government's policy of wage stabilization—led to a leveling-out or slow decline in miners' real earnings.<sup>80</sup>

#### AMPLITUDES OF REAL WAGES

Generally amplitudes of real wages are smaller than those of money wages. This is true of rates as well as earnings, and of reference as well as specific cycles. The extent of the difference is described in this section, which again will be based mainly on data covering the interwar years 1924-33, and only occasionally on some earlier or later evidence.

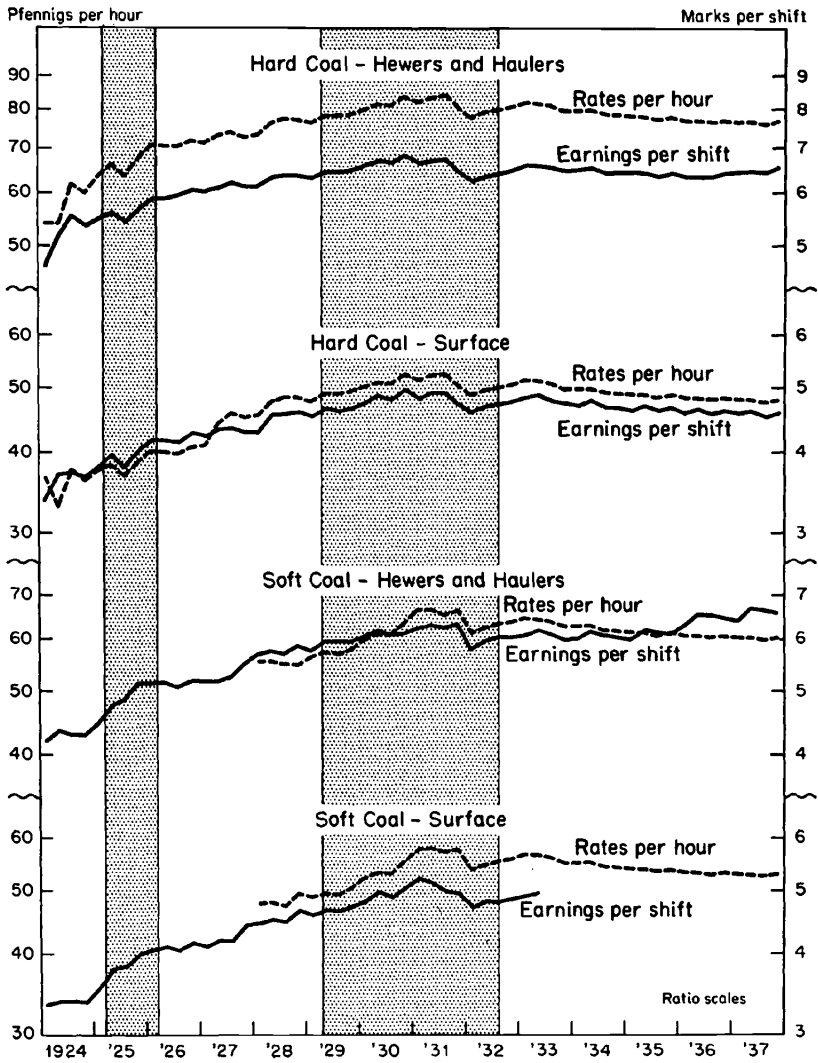
For the broad annual indexes of hourly wage rates and of hourly and weekly earnings, amplitudes of money wages and real wages during reference expansions and contractions are shown in Table 45. During all reference cycle phases and for each wage type, real wages fluctuated less than money wages. This is owing, of course, to the positive conformity and good timing correspondence of cost-of-living changes with fluctuations

<sup>78</sup> The end of the plateau in money wages was considered as a lower turn ( $T_2$ ).

<sup>79</sup> The peak could be chosen at the beginning of the plateau ( $P_1$ , January 1930) or at the end ( $P_2$ , March 1931), or even at the alternate peak in December 1931.

<sup>80</sup> There are basically similar relationships between quarterly money-wage rates and real-wage rates in German coal mines. The resemblance of rates and earnings cycles in coal mining was demonstrated in Chart 16. Hard coal miners' money-wage rates form a plateau rather than a clear peak. The lags of real wages behind the initial edges ( $P_1$ ) of the money-wage plateaus were eight quarters, those behind the terminal edges ( $P_2$ ) three quarters.

CHART 25  
Real Wage Rates and Earnings of Coal Miners, Reich Area, 1924-1937



Shaded areas represent business contractions, in terms of monthly chronology.  
Source: Appendix Table A-34 and its sources.

TABLE 45  
Amplitudes of Money and Real Wages,  
1924-1932

	CHANGES OF CYCLE RELATIVES			
	1924-25	1925-26	1926-29	1929-32
<i>Money Wages</i>				
Hourly rates, monthly	+25 <sup>a</sup>	+16	+18	-20
Hourly rates, annual	+22	+9	+19	-20
Hourly earnings, annual	+25	+7	+25	-27
Weekly earnings, annual	+29	+5	+28	-38
<i>Real Wages</i>				
Hourly rates, monthly	+19 <sup>a</sup>	+14	+9	+4
Hourly rates, annual	+14	+8	+11	+4
Hourly earnings, annual	+18	+6	+17	-4
Weekly earnings, annual	+21	+4	+20	+16

<sup>a</sup> Based on incomplete cycle; data start January 1924, reference cycle trough dated November 1923.

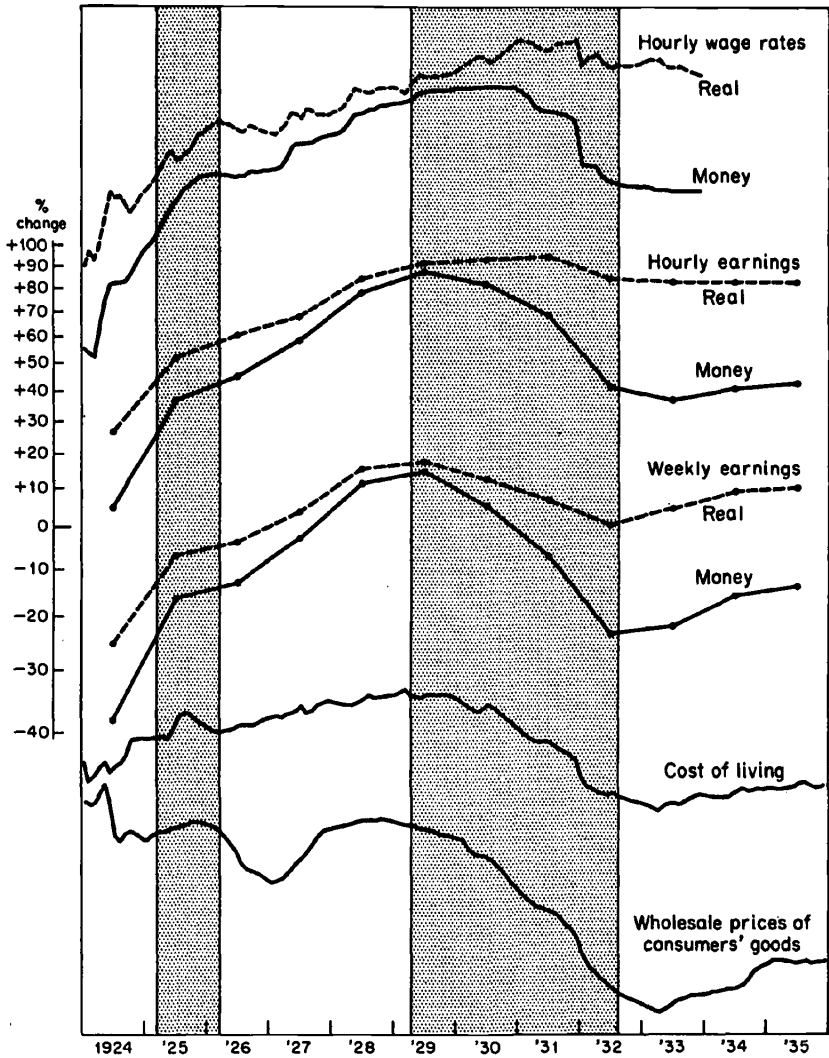
SOURCE: Money wages, Appendix Tables A-20, A-22, and A-23; Real wages, computed from Appendix Table A-13 and Table 44.

in general business activity. In one case, that of hourly rates during the Great Depression, the movements of money and real wages diverged<sup>81</sup>, hourly real rates showing a small increase with money rates declining about one-fifth. Between 1924 and 1929, money wages as well as real wages showed net increases between all reference turning points. In the case of real wage rates this is true even for the period 1924-32. Since the deflator used in the derivation of real wages is the same in all wage forms, it follows that the order in the amplitudes of the three money-wage measures and the three real-wage measures is similar. That is, hourly rates exhibit the narrowest, and weekly earnings the widest swings. This generalization is not invalidated by the fact that, during the 1925-26 reference contraction, increases in hourly rates were largest, and those in weekly earnings smallest; in terms of deceleration of growth, hourly rates still exhibit the least, and weekly earnings the strongest, cyclical response.

The availability of hourly real wage rates by months makes it possible to describe the differences between the monthly and the annual measures. Table 45 shows that both annual and monthly real wage rates rose during all reference cycle phases. Little regularity is to be noted in the relation of the amplitudes of annual and monthly data. Nor do the monthly data show consistently larger percentage changes during reference expansions, or greater deceleration during contractions. The wide variation between

<sup>81</sup> This is the one important case compatible with Keynes' expectation that money and real wage levels would follow different cyclical directions. In all other cases the net changes of monthly wage rates between reference turning points move in the same direction. See John Maynard Keynes, *The General Theory of Employment, Interest, and Money* (Harcourt, Brace, 1936), p. 10.

CHART 26  
Wages, and Prices of Consumers' Goods, 1924-1935



Shaded areas represent business contractions.

Source: Tables 34 and 44; Appendix Tables A-2, A-13, and A-30.

monthly and annual reference turns and the substantial lags of real rates are responsible for this irregularity. The table serves to emphasize the possibility of large and unpredictable differences among cyclical amplitudes derived from annual and monthly data.

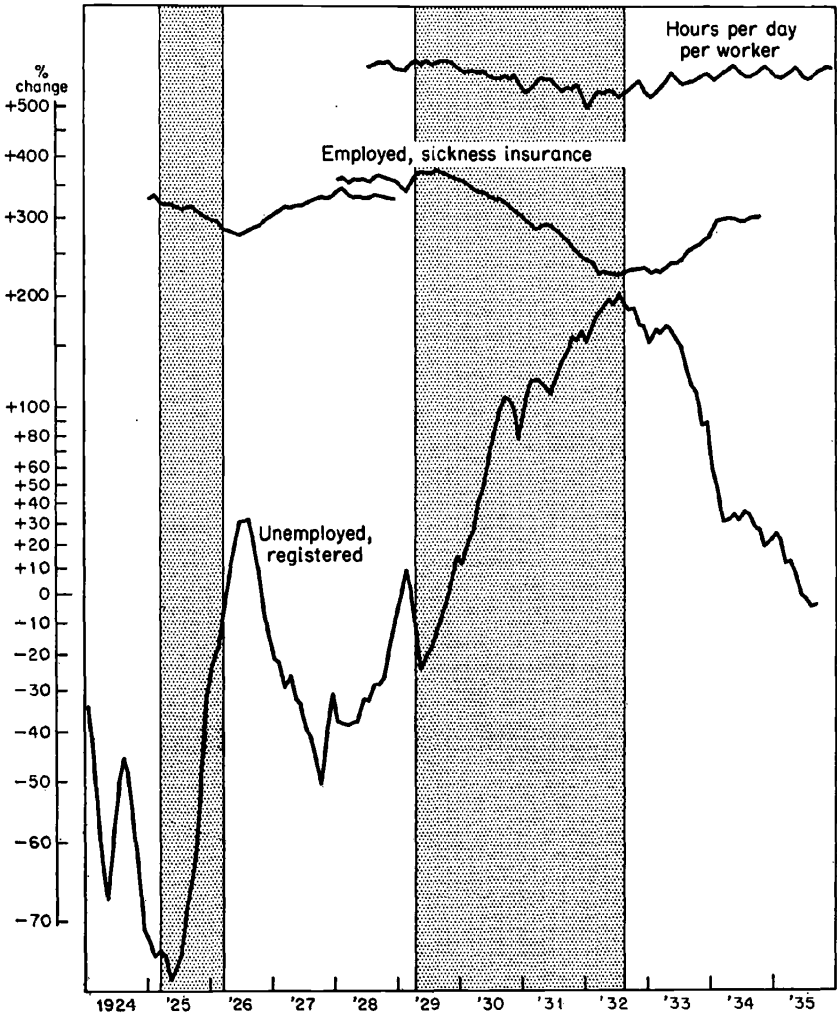
### *Money Wages and Real Wages during the Great Depression*

The cyclical behavior of money wages, the fluctuations of prices and living costs, and the resultant changes in real wages have been treated in some detail. It is desirable now to review the interplay of these trends as it unfolds in the course of the business cycle. To this end we shall analyze labor market conditions and wage behavior during the Great Depression, a period for which the salient cyclical changes can be examined on the basis of fairly abundant data. Charts 26 and 27 provide a synopsis of the major labor-market and wage developments throughout the years 1924-35. It will be observed that average earnings must be appraised on the basis of annual information.

According to the chronology established by the National Bureau, the turning point marking the onset of the Great Depression for the German economy occurred in April, 1929. But long before that date, changes in labor market conditions and price levels occurred that had a decisive bearing on wage developments. The number of unemployed workers registered at employment exchanges, for instance, started to increase from the autumn of 1927. This early increase cannot be regarded as entirely "cyclical"; it is to be traced at least in part to the widespread introduction of laborsaving devices in the course of the "rationalization" of German industry.<sup>82</sup> On the other hand, the unemployment resulting from the rationalization had consequences for the labor market as well as for consumers' goods markets, and constitutes an important aspect of the depression. In October 1928, consumers' goods prices at wholesale began to fall. This drop was related to the widespread—indeed international—decline in agricultural and other raw-material prices, but it also reflected the limited capacity of the German consumers' goods market, which shrank still more with the spread of unemployment. Whatever the causes of the cyclical turn in these prices, the effects of their decline on living costs appeared soon: consumers' prices at retail, as measured by the cost-of-living index, stopped their rise in March 1929, and up to the end of that year moved on a plateau slightly lower than their peak levels. A peak ridge of brief duration was reached also by employment during that year. Aggregate employment, seasonally adjusted, attained peak levels about April or May 1929, and almost maintained them until August—that is,

<sup>82</sup> National Industrial Conference Board, *Rationalization of German Industry* (New York, 1931). See particularly the tables on pp. 172-75, for data on increasing output per worker.

CHART 27  
Employment Indicators, 1924-1935



Shaded areas represent business contractions.

Source: Appendix Table A-28 and its sources; for hours see *IKF Handbuch*, 1936, p. 32.



for about four months after the date selected as the reference turning point. Average hours worked per worker per day reached their peak level at the month of the reference turn (April) and maintained it for a considerable time, in fact, until November of that year. Thus it was possible that, up to the fall of 1929, total labor input, in hours, held up relatively well, although registered unemployment (excluding its seasonal component) came close to two million workers.

The cyclical reaction of wages to deteriorating labor market conditions occurred first in earnings. The date of this reaction cannot be determined precisely. We know that, on an annual basis, average weekly and hourly money earnings as well as weekly real earnings reached their peak in 1929, but we have to guess at their intra-annual movements. Quarterly shift earnings in coal mines reached their peak in the fourth quarter of the year, together with a peak in coal output and employment. This makes it appear plausible that earnings for industry as a whole also reached their peak together with employment and average hours—that is, decidedly after the reference turn and probably during the latter part of the year. Throughout 1929 wage rates kept rising, with the most conspicuous though small upward step occurring after the reference contraction had set in.

After 1929, average weekly earnings decreased drastically and continuously. Between the years 1929 and 1932, the decline was 33 percent of the peak level, or 11 percentage points sharper than that of living costs. Consequently, average weekly real earnings declined also throughout the reference contraction, although, of course, at a lesser rate than money earnings. The situation was somewhat different in the case of average hourly earnings. The decline of the latter was milder between 1929 and 1931 than the drop in living costs, so that hourly real earnings continued to rise throughout these years. The mild decline in wage rates contributed, of course, to the situation. Between 1931 and 1932 the revisions in rates and the reductions in average hours worked per employed worker also forced average weekly real earnings into a cyclical decline.

Wage rates, as set down in collective agreements, were the last to give way to labor-market pressures. On an annual basis, money wage rates continued to climb up to 1930; on a monthly basis, they maintained peak plateau levels to the end of that year. It is known that during 1930 there was a systematic reduction of voluntary payments in excess of union rates, and that this reduction is not reflected in the published minima. But the labor-cost savings derived in that manner were rather limited, and by the end of the year there were already strong pressures toward the reduction of the wage minima themselves. The force of these pressures may be deduced from the following facts: by December of 1930 unemployment had mounted to 34 percent of all union members, and part-time unemployment to 21 percent. Employment had dropped 10 percent from peak levels, average hours worked per day 8 percent, and industrial production 11 percent. On the other hand, the reduction of living costs, coupled with the mild

rises or stability of money wage rates, had brought about an increase in real wage rates of 11 percent since the reference turn of April 1929. Thus, by the end of 1930, the need for cost cutting had become acute; there was little possibility of cutting labor costs further by reducing payments above minimum rates; growing unemployment had seriously weakened the competitive position of the workers; and the decline in living costs had mitigated the effect of rate cuts upon real income.

Only as a joint effect of these circumstances, aided by the pressure of compulsory arbitration awards, were minimum wage rates finally forced down. In this connection, let it be restated that their total decline during the year 1931 amounted to 8 percent. The fourth emergency decree of December 1931 brought a sizable downward adjustment in rates (10 percent). The decline of money wage rates continued throughout 1932, and in fact into the spring of 1933. During that phase, living costs were reduced also. The respective net declines of wage rates and living costs in the course of 1931 were about equal, with the consequence that hourly real wage rates in December 1931 returned (after a temporary drop) to the peak level they had reached during the first quarter of that year. The cut by emergency decree in the money wage rate and the subsequent adjustments finally forced real rates down too, but their total decline, until the advent of National Socialism, amounted only to 10 percent.

In the course of the year 1932 there were some signs of revival in the economy at large, and in the labor market in particular. Average hours worked picked up first, near the beginning of the year. About the middle of the year, employment (after allowance for seasonal factors) began to rise, registered unemployment passed its peak, and industrial output started to recover. Within the labor market the turn in cyclical fortunes was clearly observable. Reference revival is dated by the National Bureau at August 1932. On an annual basis, the recovery immediately pulled up weekly money and real earnings, and because of the continuing decline in living costs, the recovery of real earnings was even greater than that of money earnings. Hourly money earnings reached their low in 1933, and rose slowly thereafter. Hourly real earnings, which also declined to a low in 1933, maintained their trough levels through 1936. The reason for the late turn of hourly wages is found in the continued decline of rates, while the flat-bottomed trough of hourly real earnings is to be explained by the rise of consumers' goods prices and living costs from April 1933 on. As at the onset of the Great Depression, wage rates were the last to respond to changing business conditions. Trough levels were reached in March 1933, and maintained for many years. The concomitant increase in living costs led to twelve years of real rate decline. After March 1933, however, wage changes were controlled by National Socialist economic policies. Since they do not illustrate normal cyclical conditions, they will be considered separately in the following chapter, which is devoted to wage behavior during unusual episodes in the Reich's history.

## CHAPTER 5

### Wages during War, Inflation, and Dictatorship

THE present chapter is concerned with wage behavior in World War I, the Great Inflation, and the period of National Socialism including World War II. During these extraordinary episodes of German history, the course of wages was so much affected by drastic changes in political and economic circumstances and in governmental control measures that it can be understood only in terms of these unique determinants.

The Great Inflation may be regarded as an aftermath of World War I. And World War II follows the political, economic, and military preparations carried out in the preceding phase of National Socialism. Thus the contiguous episodes are related. It appears advisable to treat the periods 1913-18 and 1919-23 separately, and to consider 1933-45 as a unit. The periods 1913-18 and 1919-23 present sharp contrasts; the war years of the Kaiserreich differed widely from the postwar years of the Weimar Republic, when the prevalent sentiments were pacifist and anti-imperialist. The war period and the post-war years, moreover, form two distinct business cycles, reflecting the initial success and final collapse of the war adventure (1914-17-19) and the inflationary boom and bust of the reconstruction period (1919-22-23). Also in the labor market there were decisive changes, in employment conditions, composition of work force, degree of organization, and the like. Finally, there are marked differences in the quality and quantity of statistics available for the war years and for the postwar period.

For the entire period of the National Socialist regime, on the other hand, the unifying elements outweigh the differences. Both prewar and war years are characterized by the increasing importance of armament efforts, and by political and ideological continuity. The high level of military expenditures supported high levels of business activity and welded the two periods into one huge cycle, for which we have fairly continuous and consistent data on labor market conditions and on wages.

#### *Wages in World War I*

##### GENERAL<sup>1</sup>

*The Labor Market.* The War of 1914-18 confronted the economy of an industrially matured Germany with the first of a series of extraordinary experiences. For the labor market, the initial effect of the declaration of

<sup>1</sup> For this section on wages during World War I, extensive use is made of the following sources: Waldemar Zimmermann, "Die Veränderungen der Einkommens- und Lebensverhältnisse der deutschen Arbeiter durch den Krieg," in *Die Einwirkung des Krieges auf Bevölkerungsbewegung, Einkommen und Lebenshaltung in Deutschland*, Wirtschafts- und Sozialgeschichte des Weltkrieges (Carnegie Foundation for International Peace,

war and of mobilization was a drastic increase in unemployment. Appendix Table A-35 shows that the unemployment ratio for trade union members jumped from about 3 percent in the immediate prewar months to 22 percent in August 1914. This sharp rise is based on union statistics, refers largely to skilled workers, and may not be altogether representative of industry at large. But even with an admitted bias of the data, there can be no question of the disorganizing effects of mass mobilization on industrial enterprises, of the dismissal of workers in nonessential sectors of the economy, and of temporary materials shortages—all of which contributed to the increase in unemployment at the beginning of the war. By the summer of 1915, employment was back to prewar levels. At this time the principal war industries were already feeling the pinch of labor scarcity. In the course of the following year shortages of workers became fairly general, and unemployment ratios declined somewhat further.<sup>2</sup> The great expansion of industrial efforts began after the battle of the Somme in 1916. By the end of August of that year Generals Hindenburg and Ludendorff had taken over the high command, established a special ministry of war production, and launched the all-out effort known as the Hindenburg program. The unemployment ratio of union members went down still further, remaining below 1 percent from June 1917 to the end of the war.

There are thus to be distinguished four major phases in labor-market developments during World War I: first, the mobilization crisis; second, the formation of a civilian labor force under wartime conditions; third, the Hindenburg program; and fourth, the defeat. The timing of these periods corresponds fairly well with the cyclical fluctuations of general business activity during the war, as measured by the National Bureau. In its reference chronology the initial mobilization period up to the last quarter of 1914 appears as a continuation of the contraction that began in May 1913; the period of a gradually developing war economy and the subsequent all-out effort under the Hindenburg program appear as expansion; the final period of labor and raw material shortages appears again as a contraction.<sup>3</sup>

In the course of the war, the total industrial work force was reduced.

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Stuttgart, Deutsche Verlags-Anstalt, 1932). Peter Quante, "Lohnpolitik und Lohnentwicklung im Kriege," *Zeitschrift des preussischen statistischen Landesamts*, 1919, Vol. 59, pp. 323 ff. Friedrich Hesse, "Die deutsche Wirtschaftslage von 1914 bis 1923. Krieg, Geldblähe und Wechsellagen," *Beiträge zur Erforschung der wirtschaftlichen Wechsellagen: Aufschwung, Krise, Stockung*, No. 16 (Jena, 1938).

<sup>2</sup> Union membership dropped rapidly during the early years of the war; hence the representativeness of the sample of unionized workers has been seriously questioned. See W. Woytinsky, *Der Deutsche Arbeitsmarkt* (Berlin, Verlagsgesellschaft des Allgemeinen deutschen Gewerkschaftsbundes, 1930), pp. 11 and 32. The figures from 1915 on are held to overstate the degree of unemployment; nevertheless, they reflect the gradual tightening of the labor market, even if they fail to picture adequately the extent of the developing labor shortages.

<sup>3</sup> Arthur F. Burns and Wesley C. Mitchell, *Measuring Business Cycles* (National Bureau of Economic Research, 1946), p. 79.

In establishments subject to factory and mining inspection (those with ten or more workers), 7.4 million were employed in 1913, and about 6.7 million<sup>4</sup> in 1918. As important as the change in over-all levels were changes in the composition of the work force. It can be seen from the following tabulation that the ratio of female workers in the inspected establishments rose from about one-fifth to about one-third. Women made up for about half of the net loss suffered through mobilization of men. The increasing employment of women, at least in the industrial plants covered by inspection, resulted mainly from absorption of female unemployed, transfer of women from nonindustrial to industrial jobs (particularly in war plants), and shifts from smaller to larger enterprises.<sup>5</sup> Our tabulation shows also a rise in the proportion of young workers. However, since that classification covers only workers under 16 years of age, the reported figures can merely indicate the existence, but not the extent, of the substitution of youths for workers of draft age. Postponed retirement, re-employment of superannuated workers, and employment of civilian foreigners and prisoners of war also affected the composition of the labor force.

Employment in Establishments Subject to Factory  
Inspection, by Sex and Age, 1913 and 1918  
(thousands)

	1913	1918
Men		
adult	5,410	3,876
under 16	384	421
Total	5,794	4,297
Women		
adult	1,406	2,139
under 16	187	181
Total	1,593	2,320
Men and Women		
adult	6,816	6,015
under 16	571	602
Total	7,387	6,617

SOURCE: Zimmermann, *op. cit.*, pp. 350-51.

The industrial composition of the work force also underwent major changes during the war years. If the major industries are classified roughly into war industries proper (metals, machinery, chemicals, petroleum, and oil), predominantly civilian industries (food, clothing, textiles, printing),

<sup>4</sup> W. Zimmermann, *op. cit.*, pp. 350-51. For 1918, the industry detail given in this source adds up to 6.8 million, and the printed total is 6.6.

<sup>5</sup> See Clarence D. Long, *The Labor Force in Wartime America*, Occasional Paper 14, (National Bureau of Economic Research, 1944), pp. 48-49.

and an intermediate group (wood, paper, leather,<sup>6</sup> stone and clay, building, mining, miscellaneous), the expansion of the war industries, the moderate decline of the intermediate group, and the strong contraction of the civilian industries appear clearly from the following tabulation:

	<i>Thousands of employees</i>		<i>Change, 1913 to 1918</i>	
	1913	1918	<i>Thousands</i>	<i>Percent</i>
War industries	2,116	3,050	+934	+44.1
Intermediate group	2,970	2,359	-611	-20.6
Civilian industries	2,301	1,380	-921	-40.0

SOURCE: Zimmermann, *loc. cit.*

The wartime shifts in the composition of the work force can be followed on the basis of semiannual inquiries by the Statistische Reichsamt on man-days worked. Thus we learn from Table 46 that, in the 370 establish-

TABLE 46  
Total Days Worked, 370 Establishments, by Sex, March and September  
1914-1918

<i>Year and Month</i>	<i>DAYS WORKED (thousands)</i>			<i>INDEX (March 1914 = 100)</i>		
	<i>Men</i>	<i>Women</i>	<i>Total</i>	<i>Men</i>	<i>Women</i>	<i>Total</i>
1914 Mar.	1,997	316	2,313	100	100	100
Sept.	1,452	250	1,702	73	79	74
1915 Mar.	1,693	313	2,006	85	99	87
Sept.	1,650	383	2,033	83	121	88
1916 Mar.	1,664	468	2,132	83	148	92
Sept.	1,699	566	2,265	85	179	98
1917 Mar.	1,897	704	2,601	95	223	112
Sept.	2,024	739	2,763	101	234	119
1918 Mar.	2,070	771	2,841	104	244	123
Sept.	2,116	754	2,870	106	239	124

SOURCE: Investigation by the Statistische Reichsamt, *Reichsarbeitsblatt*, 1919, p. 619.

ments covered, total days worked dropped about a quarter in the months following the mobilization order, then slowly returned toward prewar levels, and began to exceed those levels after the launching of the Hindenburg program. By the end of the war, these establishments employed

<sup>6</sup> Leather is included in the intermediate group because it was not available for civilian products except at the very beginning of the war.

about as many men as before the war, but more than twice as many women.

These drastic changes in the supply and demand for labor of various sorts created an enormous turnover, placed the traditional wage structure under extreme pressure, led to serious wage inequalities, and gave rise to inflationary dangers. For the first time in modern German history the government was challenged to tamper with the hitherto autonomous labor market.

*Wage Policies.* The government did intervene, at first hesitantly, then moving more firmly in response to acute pressures, but without the guidance of a preconceived general policy. The haphazard character of wage regulation and other measures affecting the labor market was accentuated by the great number of governmental agencies authorized to intervene, or in fact able to do so. Let us follow the major steps taken by the authorities during various stages of the conflict.

In the earliest phase of the war the principle of contractual freedom was fully maintained. Prices as well as wages were left to "find their own levels" in response to market conditions. The general expectation was that the war would be brief and victorious, so the only acute need seemed to be maintenance of peace in the domestic labor market. Since all major unions had entered *Burgfrieden* (labor truce) arrangements and voluntarily relinquished the strike weapon, the war ministry decided to assist in wage negotiations and in the mediation of disputes. Its assistance was supposed to be technical in nature; the government was not to be concerned with the adequacy of particular wage levels. It was not long, however, before conditions developed which led the government to commit itself somewhat further. When employment fell, during the initial mobilization, some employers reduced wage rates. The unions protested but were powerless. The war ministry, fearing a general lowering of labor morale, tried to discourage such wage cutting. It announced that no military contracts would be awarded to firms paying less than union wages and, at a later phase (December 1915), it introduced into its contracts penalty clauses for wage payments below levels collectively agreed upon. The impact of the government's contract rules was, however, limited to a few industries, such as clothing, wood, building, and tobacco, since in the typical war industries collective agreements were extremely rare. The solution of the problem of maintaining union standards was brought about by circumstances quite apart from governmental efforts—the developing scarcity of workers.

As early as 1915 the ministry of war began to receive complaints from war plants on pirating of workers. The ministry recommended that employed workers should not be approached directly with offers of new jobs, that advertisements of openings should not contain promises of wage increases, and—at a later date—that *Abkehrscheine* (permissions to change jobs) should not be granted if the current employer paid rates at

collectively agreed-upon levels. Such recommendations could do little to stem the wage trends produced by the developing labor shortages. During the first two years of the war the pressures toward wage increases had been dampened by the early unemployment and by the availability of labor reserves—women, youths, and retired workers. But when casualties and military recruitment began to exhaust the labor reserve<sup>7</sup> and the Hindenburg program decreed all-out production efforts, the scarcity, especially in the armament industries, became acute. The result was extreme pressure in the direction of rising wage levels.

The government supplemented the Hindenburg production program by the *Vaterländische Hilfsdienstgesetz* (national labor service law), which was designed to recruit additional manpower and to bring about a more equal sharing of the burdens of war. All able-bodied men were now obliged to participate in the economic war effort if called upon.<sup>8</sup> The law furthermore restricted labor mobility to some extent and provided for strict screening of applications for *Abkehrscheine*—but very few of its provisions had to do with wages. In theory the *Hilfsdienstgesetz* was supposed to accomplish total economic mobilization. In practice, however, the number of persons called up under the law was relatively small, so that mobilization of manpower fell considerably short of the original goal. This must be largely attributed to the fact that in 1917 most able-bodied men were either in the armed forces or were gainfully employed. Nor did the new law effectively cut down labor turnover; eventually a formulation was adopted which permitted the granting of *Abkehrscheine* in cases where the job change promised “sufficient improvement of working conditions.” Since war industries, with their cost-plus contracts, were easily in a position to offer “sufficient improvement,” labor pirating went on unabated, contributing to the rise of wage levels.<sup>9</sup> The war ministry continued, in principle at least, to keep aloof from determining actual wage levels. As late as July 5, 1917 it ruled: “A definite position regarding actual wage levels must be avoided under all circumstances, and suggestions regarding wage increases are not in order.”<sup>10</sup> In practice, there were many instances of intervention. The armament industrialists, “through channels,” affected the decisions of mediation commissions which consisted of labor, management, and government representatives. And in a number of cases upward adjustments of wages were ordered to forestall unrest

<sup>7</sup> The government tried to augment the native labor supply by compulsory recruiting of foreigners (starting as early as 1915 with Belgian workers), employing prisoners of war, and granting temporary leaves to soldiers. These measures mitigated somewhat the shortages of labor, but could not abate the pressures.

<sup>8</sup> Women were not affected. The trade unions had agreed to the law only under the condition that it was restricted to men between 17 and 60 years of age.

<sup>9</sup> The inability of the war ministry to take strong measures in combating labor turnover is well illustrated in a decree of September 14, 1917, which says in part: “Industry must be relied upon, in its own interest, to resist labor turnover as much as possible.” Quante, *op. cit.*, p. 332 (translation ours).

<sup>10</sup> *Ibid.*, p. 324 (translation ours).



in mines, shipyards, or other enterprises essential to the war program.

Clearly, the needs of the hour and the economic strength of the interests involved conditioned the actions of the government. In general the armament industries had their way, whether by appeal to the national welfare or by exerting their influence in the war ministry itself. Civilian industries had less recourse to governmental intervention either in their own interests or in the interests of their workers. What movements in wages actually developed under those conditions will be discussed in the following sections.

### MONEY WAGE LEVELS

During World War I money wages roughly doubled. It was a period of increasing working hours, rising incidence of overtime payments, rapid shifts of workers toward war industries, and basic changes in the sex, age, and skill composition of the work force within each industry. To what extent are these changes reflected in wage measures? There are no comprehensive surveys of wage changes over time; in an attempt to answer this question we shall have to content ourselves with the best available sample studies. In general, wage rates increased less, of course, than earnings, and hourly earnings less than weekly, for comparable groups of workers. Furthermore, measures reflecting the shifts toward war industries tend to indicate larger increases than those that exclude the effects of these shifts by using fixed industry weights.

An unweighted average of weekly straight-time earnings of male workers in seventeen occupations in Hanover increased by about 75 percent between June 1914 and June 1918.<sup>11</sup> The data are an approximation to weekly rates; changes in hours and premium payments are not included. The wage increase registered by this sample is particularly low, for several reasons. First, the data refer to straight-time earnings. Second, the terminal date of the comparison is June, whereas the war continued until November. Third, the sampled factories were located in relatively small cities, which were less affected by the armament boom. Finally, and most important, only one of the five industries covered is a typical war industry. How different the situation was in the war industries is apparent from the data, presented on Table 47, which cover hourly wage rates in metals and machinery as well as in chemical plants in the district of Magdeburg. Here the unweighted average rates of skilled adult men increased to almost two and one-half times their prewar levels, although this rise is measured only to July 1918 and not to the end of the war.

For gross hourly earnings we can utilize the results of some fairly

<sup>11</sup> Ida Meyer, "Die Löhne in Hannover, während des Krieges und nach dem Kriege," *Vierteljahrshefte Deutscher Städte* (Berlin, 1921), Vol. 1, No. 3-4. See also *Wirtschaftsstatistisches Taschenbuch*, (Jena, 1922), p. 199. Data cover building, woodworking, printing, metals and machinery, and municipal services. For each of the five industries, two factories with more than 10 workers, in each of several cities in the district of Hanover, were sampled.

TABLE 47  
Hourly Wage Rates in Magdeburg, Two Industries, January and July 1914-1918

Year and Month	MONEY RATES (pfennigs)				INDEX (July 1914 = 100)			
	Skilled Men	Unskilled Men	Juveniles and Apprentices	Women	Skilled Men	Unskilled Men	Juveniles and Apprentices	Women
METALWORKING AND MACHINERY								
1914 July	52.9	42.5	12.2	23.5	100	100	100	100
1915 Jan.	55.4	45.0	13.0	25.0	105	106	107	106
July	58.5	48.0	13.6	26.5	111	113	111	113
1916 Jan.	61.5	49.5	14.6	28.5	116	116	120	121
July	65.6	52.5	15.8	31.0	124	124	130	132
1917 Jan.	77.9	61.5	18.8	36.5	147	145	154	155
July	97.3	72.0	20.8	43.5	184	169	170	185
1918 Jan.	114.6	85.5	22.4	49.0	217	201	184	209
July	130.4	94.0	25.8	54.5	247	221	211	232
CHEMICALS								
1914 July	45.3	41.0	16.5	22.0	100	100	100	100
1915 Jan.	47.1	42.5	16.5	23.5	104	104	100	107
July	53.6	45.5	16.5	25.0	118	111	100	114
1916 Jan.	56.6	47.5	17.0	27.0	125	116	103	123
July	63.5	52.0	19.0	30.5	140	127	115	139
1917 Jan.	78.2	58.5	20.0	36.0	173	143	121	164
July	93.0	67.0	22.5	41.5	205	163	136	189
1918 Jan.	103.3	79.0	23.5	63.5	228	193	142	289
July	104.7	91.0	32.5	67.5	231	222	197	307

Computed from the *Monthly Labor Review*, July 1920, p. 126. The above averages cover 19 occupations in 26 establishments of the metalworking and machinery industry, and 16 occupations in 18 establishments of the chemical industry. They are simple aver-

ages of the rates quoted for selected occupations and thus do not reflect the effect of shifts in the numerical importance of the various occupations. The rates include cost-of-living bonuses.

TABLE 48

Average Hourly Earnings, 479 Establishments in Bavaria, by Industry, Skill, Age, and Sex; Change from June 1914 to October 1918

Industry	OCTOBER 1918 IN PERCENT OF JUNE 1914			
	Skilled Men	Unskilled Men	Women	Youths
Metals	227	219	150	233
Machinery	233	228	213	276
Instruments	263	218	233	229
Chemicals	214	215	238	222
4 War industries	234	220	208	240
Mining	205	218	147	218
Stone and clay	207	214	233	241
Wood	210	226	220	239
Leather	227	207	222	236
Paper	179	189	218	193
Building	191	210	254	250
6 Intermediate industries	203	211	216	230
Food	189	197	200	211
Brewing	173	192	250	218
Textiles	176	190	185	188
Clothing	196	184	229	218
Shoes	208	219	227	225
Printing	174	185	200	176
Glass	207	234	240	204
Pottery	174	169	173	175
Gas and electric	171	186	188	191
Transportation	185	177	200	268
Trade	178	208	179	191
11 Civilian industries	185	195	206	206
Unweighted averages of 21 industry relatives	199	204	209	219
Relatives of average <sup>a</sup>	204	220	205	235

<sup>a</sup> Earnings averages equal total payroll divided by total manhours.

SOURCE: Karl Kreiner, "Die Arbeits-, Lohn-, und Produktionsverhältnisse der bayrischen Industrie im Juni 1914, Oktober 1918 und Mai 1919, auf Grund der Wirtschaftserhebung des Staatskommissars für Demobilmachung," *Zeitschrift des bayrischen Statistischen Landesamts*, 1921, p. 33. For earnings in pfennigs see Appendix Table A-36.

extensive investigations. Skilled male workers in 479 companies distributed over twenty-one industries in Bavaria approximately doubled their average hourly earnings between June 1914 and October 1918, although more than half of the industries covered were essentially civilian in character (see Table 48 and Appendix Table A-36). The greater incidence of premium payments is reflected in this record of hourly earnings. Similar results emerge from a government investigation into average

TABLE 49  
Average Daily Earnings, 370 Establishments, by Sex and Industry,  
March and September 1914-1918

Industry	1914		1915		1916		1917		1918	
	March	Sept.	March	Sept.	March	Sept.	March	Sept.	March	Sept.
(March 1914 = 100)										
MALE WORKERS										
Metals	100	102	114	125	135	145	178	213	217	234
Machinery	100	98	120	132	139	149	173	202	243	245
Chemicals	100	96	104	118	125	134	157	194	203	232
Electrical	100	89	110	117	127	165	205	242	267	298
4 War Industries	100.0	96.2	112.0	123.0	131.5	148.2	178.2	212.8	232.5	252.2
Stone and clay	100	85	88	100	106	116	132	151	166	188
Wood	100	102	108	109	123	133	147	185	184	236
Leather and rubber	100	98	97	114	115	126	144	154	162	173
Paper	100	106	114	124	129	141	160	188	210	240
4 Materials	100.0	97.8	101.8	111.8	118.2	129.0	145.8	169.5	180.5	209.2
Food	100	102	104	105	103	108	114	132	137	150
Textiles	100	88	101	111	110	115	122	142	159	178
Clothing	100	72	94	98	106	97	130	155	180	216
Printing	100	92	104	111	116	118	142	140	148	179
4 Civilian industries	100.0	88.5	100.8	106.2	108.8	109.5	127.0	142.2	156.0	180.8
Unweighted averages of industry rela- tives	100.0	94.2	104.8	113.7	119.5	128.9	150.3	174.8	189.7	214.1
Relatives of averages <sup>a</sup>	100.0	99	114	127	135	146	176	209	226	241
FEMALE WORKERS										
Metal	100	81	108	147	169	200	228	277	287	324
Machinery	100	86	126	140	159	170	189	214	264	275
Chemicals	100	81	100	111	131	150	174	221	239	280
Electrical	100	76	109	124	142	175	191	225	239	267
4 War industries	100.0	81.0	110.8	130.5	150.2	173.8	195.5	234.2	257.2	286.5
Stone and clay	100	89	97	112	117	131	154	172	186	232
Wood	100	89	116	98	111	130	159	191	219	274
Leather and rubber	100	84	88	98	108	113	134	147	148	171
Paper	100	104	107	118	123	133	170	190	213	250
4 Materials	100.0	91.5	102.0	106.5	114.8	126.8	154.2	175.0	191.5	231.8
Food	100	90	100	110	114	138	135	177	192	202
Textiles	100	89	97	101	105	101	112	144	170	187
Clothing	100	67	95	80	100	95	125	156	175	219
Printing	100	90	89	103	110	114	126	147	167	199
4 Civilian industries	100.0	84.0	95.2	98.5	107.2	112.0	124.5	156.0	176.0	201.8
Unweighted averages of industry relatives	100.0	85.5	102.7	111.8	124.1	137.5	158.1	188.4	208.2	240.0
Relatives of averages <sup>a</sup>	100	85	99	112	132	154	178	214	239	264

<sup>a</sup> Earnings averages equal total payroll divided by total man-days.

SOURCE: Investigation by the Statistische Reichsamt, *Reichsarbeitsblatt*, 1917-1919, *passim*. For earnings in marks see Appendix Table A-37.

daily earnings in 370 establishments covering several hundred thousand workers in twelve industries.<sup>12</sup> The information is classified by industry and sex. The unweighted average increase in daily earnings of male workers in each of the twelve industries amounts to 114 percent between March 1914 and September 1918 (see Appendix Table A-37 and Table 49). Reflected in this measure are longer hours per day, premium payments, and shifts in the composition and occupational distribution of male workers, but not interindustry shifts.<sup>13</sup> Appendix Tables A-38, A-39, and A-40, which will be referred to later in another context, present further examples of wage development in the printing, metals, transportation, mining, and building industries.

It is difficult to arrive at an orderly summary of the many, often widely varying, pieces of evidence. Hourly wage rates over the nation as a whole seem to have increased by less than 100 percent in the course of the war. For weekly earnings, both Quante and Zimmermann evaluated the over-all situation about as follows: only a relatively small group of workers failed to double their earnings during the war. For a majority of workers earnings increased by 120 to 150 percent. Finally, a small group of privileged workers enjoyed greater increases, sometimes amounting to more than a tripling of their prewar earnings.

The increases in hourly earnings were, of course, more moderate than in weekly earnings. Of the twenty-one industries in Bavaria for which average data on hourly earnings are available, increases of less than 100 percent were reported as follows: for skilled men by eleven industries, for unskilled men by nine, for women by five, and for youths by six. These industry averages imply that the number of workers experiencing less than a doubling of their hourly earnings must have been sizeable.

Whatever the increases of wages from 1913 to 1918, the patterns of all wage trends were similar in some respects. During the initial mobilization, wages declined, maintained their level, or increased but slightly.<sup>14</sup> In the subsequent years, up to about mid-1916, increases were general. From then to the end of the war wage rises accelerated, tending to exceed the net increase of the first half of the war. (See Table 47 and Appendix Tables A-37, A-38, A-39, and A-40.)

Basically, the pattern in the change of wage levels must be explained

<sup>12</sup> Data compiled and published by the Statistische Reichsamts.

<sup>13</sup> A simple division of total man-hours into total payroll, at the beginning and at the end of the war, results in an increase of average daily earnings of 141 percent. The difference between the two increases furnishes an indication of the importance of shifts between industries.

<sup>14</sup> Up to 1916 union wage rates in civilian industries tended to be ceiling rates. Management held the line tenaciously, even by denouncing malcontent workers as troublemakers to the recruiting officers. The normal consequence was induction of the accused workers into the military services, which the unions called *Drohung mit dem Schützengraben* (threatening with the trenches). This practice ceased when procurement rather than labor costs became the major problem. See Zimmermann, *op. cit.*, pp. 360-61.

in terms of the major phases of labor market and general economic conditions. The early maintenance or reduction of wages is related to the mobilization crisis. The subsequent wage increase to 1916 is to be understood in terms of gradual acceleration of war production, depletion of labor force reserves, and rising price levels. The marked increases toward the end of the war must be viewed against the background of the desperate efforts in both the military and economic spheres, the acute shortages of manpower and goods, and the spiraling inflationary trends.

Up to this point wage behavior during World War I has been described in fairly broad averages, covering many occupations, establishments, and sometimes industries. We have found that even these data showed considerable variety of response to wartime conditions—but of course they do not fully express the extreme diversity of wage trends. Examples of the diversity are numerous. In private and government-owned war plants in large industrial centers, three- to fourfold increases of earnings were reported for a number of occupations or departments; these contrast with earnings increases amounting to only 70 or 80 percent, as in southeastern textile plants.<sup>15</sup> Other differential trends developed as between workers paid on a time basis and those working on piece rates. Piece rates were rarely lowered during the war, with the result that unskilled or semi-skilled men and women doing piece-rate work often obtained appreciably higher earnings than their skilled co-workers who remained on time rates.

In terms of marks and pfennigs rather than wage trends, we find that by the end of the war some highly specialized metal workers in the Berlin industrial region earned 50 or even 60 marks per day—that is, about 10 times as much as the daily rates for common labor in Dresden nonwar plants (6 marks), 17 times as much as the corresponding rate in Elbing (3.50 marks), and 20 to 30 times as much as the daily rate for young girls working in nonwar plants outside the big industrial centers. In prewar times such differences were unheard of.

#### WAGE DIFFERENTIALS<sup>16</sup>

*Skill Differentials.* Skill differentials tended to narrow during World War I. The Statistische Reichsamt, in tracing the development of wages and prices through the war period and the Great Inflation, presented comparable series of wage rates for skilled and unskilled employees of the German railways. These series show a narrowing of skill differentials from 31 percent in 1913 to 6 percent in 1917 (see Appendix Table A-14). Similar findings emerge for rates of building workers in Berlin, Hamburg, and Stettin (Appendix Table A-39) and for the average hourly earnings of male workers in twenty-one Bavarian industries (first two columns of

<sup>15</sup> *Ibid.*, pp. 400 ff. The above observations all refer to earnings, not to wage rates. Rate increases in the textile plants mentioned were sometimes as low as 50 percent.

<sup>16</sup> As in previous chapters, the term differential describes the difference between wages of higher paid and wages of lower paid workers in percent of the former.

Table 50).<sup>17</sup> The latter data constitute good evidence for the claim that the prevailing tendency was toward a narrowing of wage differentials between skilled and other workers. Differentials, computed on the basis of weighted averages for the whole sample, changed from 27 to 21 percent. Of the twenty-one industries covered, fourteen showed a narrowing, one showed no change, and six showed a widening in skill differentials.

Reasons for a narrowing of skill differentials in wartime come readily to mind. Negotiations during the war reflected the greater need for protection of low-paid workers in the face of monetary depreciation. In this spirit, cost-of-living adjustments were given in absolute rather than percentage terms. As for earnings, it appears that the entry into the work force of quickly trained or elderly people diluted the quality of the skilled groups in particular. Furthermore, mass-production methods used in filling war orders, together with the incentive system as administered during the war, served to boost the pay of the unskilled. As noted above, earnings of unskilled men on piece work sometimes exceeded those of their skilled neighbors.

There are, on the other hand, numerous examples of widening skill differentials. Table 47 shows that wage rates of unskilled metal and chemical workers in Magdeburg increased less than those of their skilled fellow-workers. The same holds true for average shift earnings of workers in the Krupp steel works at Essen (see Appendix Table A-38) and for certain industries in Bavaria. In that state, average earnings for war industries as a group indicate an increase in skill differentials due, no doubt, to the extreme scarcity of such specialized personnel as tool- and diemakers or workers able to handle the large tools used in making heavy arms. We find then that, though unskilled workers on the whole tended to improve their wage position in relation to the broad group of skilled workers, they did not do so in relation to such skilled persons as precision workers in metals and machinery.

*Age Differentials.* One would surmise that the scarcity of adult workers led to decreasing age differentials. This can indeed be observed in many instances. From the report of the inquiry into average hourly earnings in Bavaria, we find that age differentials narrow from 68 percent to 64 if comparison is made with earnings of skilled adults, and from 57 percent to 54 if comparison is made with the earnings of unskilled and semiskilled (see Table 50). These relatively modest changes gain in significance when we note that in comparison with skilled adults, young workers maintained or improved their relative position in all but one of the twenty-one

<sup>17</sup> These data were not available to Quante and seem to have been neglected by Zimmermann. The average hourly earnings statistics for Bavaria are based on a special inquiry of the State Commissioner for Demobilization. The data cover 479 firms with about 170,000 employees, and report hourly earnings of skilled and unskilled men, women, and youths separately for 21 industries and for the months of June 1914, October 1918, and April 1919. The results of the inquiry, published in 1921, constitute the most important body of information for an evaluation of changes in skill, sex, and age differentials during World War I.

TABLE 50  
Skill, Age, and Sex Differentials, Based on Average Hourly Earnings, 479 Establishments in Bavaria, June 1914 and October 1918  
(differences between earnings, expressed in percent of earnings of the higher-paid workers)

Industry	SKILL DIFFERENTIALS			AGE DIFFERENTIALS			SEX DIFFERENTIALS		
	Men			between Youths and			between Women and		
	June 1914	Oct. 1918	June 1914 Oct. 1918	Skilled Men	Unskilled Men	June 1914 Oct. 1918	Skilled Men	Unskilled Men	June 1914 Oct. 1918
Metals	25	28	68	67	54	54	69	38	58
Machinery	28	30	72	66	60	50	54	30	35
Instruments	29	41	73	77	62	57	60	40	36
Chemicals	22	21	64	63	54	52	47	38	32
4 War industries	26	30	69	68	58	54	58	36	40
Mining	23	18	61	59	50	27	48	6	36
Stone and Clay	18	15	56	53	48	53	47	43	38
Wood	25	19	65	61	54	52	50	36	38
Leather	33	39	65	64	48	40	57	36	31
Paper	31	27	73	71	61	60	48	39	29
Building	21	13	58	44	46	36	44	46	35
6 Intermediate industries	25	22	64	59	52	48	49	34	34
Food	23	20	60	55	47	44	46	33	32
Brewing	24	16	46	32	29	20	36	42	24
Textiles	26	20	60	57	45	46	35	16	19
Clothing	21	26	64	60	54	46	40	35	19
Shoes	26	22	68	65	57	56	40	19	16
Printing	34	30	76	75	63	65	56	41	36
Glass	42	34	62	62	34	43	61	43	41
Pottery	33	35	70	70	56	54	52	28	26
Gas and electric	23	17	59	54	47	45	33	21	20
Transportation	19	22	58	40	49	22	40	26	16
Trade	20	7	83	82	79	81	47	35	44
11 Civilian industries	26	23	64	59	51	47	49	31	27
Differentials between averages <sup>a</sup>	27	21	68	64	57	54	53	36	40
Unweighted average of differentials	26	24	65	61	53	49	48	33	31

<sup>a</sup> Earnings averages equal total payroll divided by total man-hours.

SOURCE: Appendix Table A-36.



reporting industries. Other examples of narrowing margins between wages of young and adult workers are to be found in records of shift earnings in the Krupp steel works. Average shift earnings are available separately for youths of 16 to 21 and youths under 16 years of age. Both categories—whether measured against shift earnings of skilled or unskilled adults—show a decided improvement in the relative position of young workers (see Appendix Table A-38).

As with skill differentials, numerous exceptions to the general findings must be noted. In metals and machinery, and in the chemical industry in Magdeburg, for instance, age differentials widened in the course of the war.<sup>18</sup> Such situations were apt to occur in industries or establishments where adults commanded premium wages and where young workers were employed mainly as helpers.

*Sex Differentials.* Wages of women tended to advance more than those of men during the war period. For Bavaria, (see Table 50) in fifteen out of twenty-one industries hourly earnings of women increased more than those of skilled men, and in sixteen industries more than those of unskilled and semiskilled men. And of the twelve industries surveyed by the Statistische Reichsamt, only two showed widening sex differentials (370 enterprises, gross differentials without standardization for skill; see Table 51). According to Reichsamt data, the differential between women's and men's earnings declined from 53 to 47 percent. From the Bavarian data, the change appears to have been still smaller.

The Reichsamt data, which are semiannual, permit us to follow the change in sex differentials during the main periods of the war. During the first few months of the mobilization crisis, earnings for women in almost all industries covered declined more than those of men. After the autumn of 1914 the sex differential narrowed, reaching prewar proportions in some industries as early as March 1915, in others as late as September 1917. From these levels, sex differentials were typically further reduced although not without intermittent reversals; during the last year of the war reductions in sex differentials are observable in most industries. The net result of wage changes, from the beginning to the end of the war, led to a narrowing of sex differentials.

The stages in the development of wage differentials between men and women can be followed in terms of the major changes in labor-market conditions, particularly in employment for women. During the early war years female workers could be recruited relatively easily, while men became increasingly scarce. This explains the initial widening of sex differentials. With the intensification of military and industrial efforts, the female labor reserve shrank and additional incentives were necessary to recruit women and to attract them to war industries. In the later stages of the war, industrial processes were adapted to female workers, and with

<sup>18</sup> Zimmermann assumes in fact that the earnings of youths more often than not lagged behind those of adult workers, *ibid.*, p. 363.

TABLE 51

Sex Differentials, Based on Average Daily Earnings in 370 Establishments,  
March and September 1914-1918  
(differences between average earnings of men and those of women, expressed in  
percent of the former)

Industry	1914		1915		1916		1917		1918	
	Mar.	Sept.	Mar.	Sept.	Mar.	Sept.	Mar.	Sept.	Mar.	Sept.
Metal	63	71	65	56	54	49	53	52	51	49
Machinery	57	63	55	54	51	51	53	55	54	52
Chemicals	54	61	56	57	52	49	49	48	46	45
Electrical	39	48	40	36	32	35	43	43	45	45
4 War industries	54	62	55	52	48	46	50	50	49	48
Stone and clay	64	63	61	60	61	60	58	59	60	56
Wood	53	59	49	58	58	54	49	51	44	45
Leather	44	52	50	52	48	50	48	47	49	45
Paper	45	47	49	48	48	49	42	45	45	43
4 Materials	52	55	52	54	53	53	49	50	49	47
Food	63	67	65	61	59	53	56	50	48	50
Textiles	37	36	40	43	40	44	42	36	32	34
Clothing	41	45	40	52	44	42	43	40	42	40
Printing	61	61	66	64	62	62	65	59	55	56
4 Civilian industries	53	56	56	57	54	53	54	48	46	47
Differentials between industry averages <sup>a</sup>	53	58	54	54	51	50	51	50	48	47

Earnings averages equal total payroll divided by total man-days.

<sup>a</sup> Based on unweighted combination of twelve industry averages.

SOURCE: Appendix Table A-37.

growing experience women were given more responsible and more highly paid jobs. This process brought about the narrowing of sex differentials to and beyond prewar levels.

There were, however, situations in which production proper was carried out by men, while women did only subsidiary work, as in the metals industry. There were also cases where, though the earnings of women increased substantially beyond the average for women as a group, men's earnings rose still faster, as in machinery and instrument making. Perhaps more important than the extent of the change in sex differentials—which depended on the specific employment conditions of men as well as of women—was the fact that in the course of the war women learned to fill jobs and command wages which up to that period had been reserved for males.

*Industrial Differentials.* The most conspicuous changes in wage differentials during World War I occurred along industrial lines. A growing

inequality among industries appears in the following measures of variation computed from averages of daily earnings in 370 establishments in twelve industries:<sup>19</sup> Industrial inequality rose immediately in men's

	<i>Mar. 1914</i>	<i>Sept. 1914</i>	<i>Sept. 1915</i>	<i>Sept. 1916</i>	<i>Sept. 1917</i>	<i>Sept. 1918</i>
Men	14.7	18.5	17.8	18.4	20.6	19.0
Women	10.5	11.9	16.0	21.0	19.1	16.2

earnings and more gradually in women's earnings. It reached its peak for men in 1917, for women in 1916. At the end of the war industrial inequality of average earnings was decidedly greater than it had been before the war.

Table 49 shows that the decisive differentiation occurred between war and civilian industries. The following tabulation gives the percentage increase of daily earnings between March 1914 and September 1918, in each of three classes of industry:

	<i>Men</i>	<i>Women</i>
War industries	+152%	+186%
Intermediate group	+109%	+132%
Civilian industries	+81%	+102%

Differentials between average daily earnings in the civilian and in the war industry group, in percent of war industries, show the following movements:

	<i>Mar. 1914</i>	<i>Sept. 1914</i>	<i>Sept. 1915</i>	<i>Sept. 1916</i>	<i>Sept. 1917</i>	<i>Sept. 1918</i>
Men	4	11	17	28	36	32
Women	3	-1	26	37	35	31

Clearly, earnings differentials between war and civilian industries increased during the war, reaching their peak in 1916 or 1917.

Up to this point, the discussion of industrial differentials has been based on the Reichsamt data for 370 establishments (Table 49). Basically similar conclusions follow also from examination of the Bavarian data on hourly earnings in twenty-one industries. The requisite classification has been provided in Table 48; it shows an average increase in earnings of skilled men in war industries of 134 percent, in civilian industries of 85 percent.

Obviously the differences in earnings paid by war and civilian industries resulted from varying demand for the products of these two industry groups. In addition, there were factors that tended to augment the differentiation. First, immediately before the outbreak of the war Germany had undergone a recession, particularly in producers' goods industries; unemployment in these industries had been considerable and earnings

<sup>19</sup> A simplified coefficient of variation is used, consisting of the average deviation (signs ignored) of the industry averages from their own mean, divided by that mean, multiplied by 100.

levels had fallen. Thus during the war the rise was especially marked for this group. The second factor was produced by conditions prevailing around the end of the war; during 1917 and 1918 raw material shortages created unemployment, short work, and relatively low earnings levels in a number of civilian industries. The effect was to dampen the percentage increases of earnings shown by the civilian industry group.

Toward the close of the war the industrial differentials narrowed somewhat. Low-wage earners required more protection against the effects of inflation. Cost-of-living bonuses, granted in absolute terms, served to diminish the gap between high-wage and low-wage industries. Furthermore, the decline in labor force reserves and the reduction of civilian output to a bare minimum brought conditions in the two industry groups closer together. Both became equally essential and both experienced similar difficulties in recruiting labor.

### WAGES AND PRICES

How do wage-rate changes during the war compare with changes in wholesale and retail prices? Only one wholesale price index is available for the period of World War I. Presented in monthly form in Appendix Table A-41 the index shows a 50 percent increase over prewar levels by July 1915, a doubling by August 1917, and an increase of about 135 percent by the end of the war. These increases, at the stated points in time, are greater than those of hourly wage rates. However, the slight coverage and doubtful representativeness of the wholesale price index<sup>20</sup> make it impossible to draw significant conclusions.

Although there is no "official" cost-of-living index for Germany before February 1920, there are three sets of data on which an evaluation of changes in living costs during the war can be based. The first is a series of private estimates of food-cost or living-cost changes in certain cities. Food costs are available for a few selected dates, living costs for 1914 and for October 1918 only.<sup>21</sup> The second set of data consists of monthly estimates of the costs of sixteen foods which made up the basic ration of a German Marine. The food prices were ascertained regularly in about two hundred cities and were weighted according to the composition of the Marine ration.<sup>22</sup> Third, there are annual estimates of wartime living costs

<sup>20</sup> The index is unsatisfactory with regard to commodity groups included, number of commodities priced per group, and regional coverage of the price sample. The index covers thirty-eight commodities, eighteen foods and twenty raw materials.

<sup>21</sup> Estimates for Berlin, Saxony, Danzig, and the Rhine province may be found in Quante, *op. cit.*, for food, p. 366, and for living costs, p. 368. Estimates for rationed food prices in Prussia were made by Günther up to February 1918 and continued by Zimmermann; see Zimmermann, *op. cit.*, p. 430.

<sup>22</sup> This index was published monthly in *Monatliche Übersichten über Lebensmittelpreise* by the private organization (Wirtschaftstatistisches Bureau, Berlin) of Richard Calwer and during the war served as the major guide for estimates of retail food costs. Frequently the index was misleadingly referred to as a cost-of-living index. The monthly data of Calwer's index are reproduced in Appendix Table A-41.

prepared by the Statistische Reichsamt during the mid-1920's.<sup>23</sup> The increases in living costs during the course of the war shown by the three sets of data vary considerably: 229 percent (Calwer), 257 percent (Quante), and 313 percent (Statistisches Reichsamt).<sup>24</sup>

The annual Reichsamt estimates constitute the best available measure of the rise in living costs during World War I. For comparison of living-cost estimates with monthly wage data, it was necessary to reduce the former series to a monthly basis. Accordingly, Calwer's monthly index of food costs, 1913 to January 1920, was adjusted to correspond with the annual level of the Reichsamt estimates of total living costs and to connect with the official cost-of-living index, which is available from February 1920 on. The estimate aimed at reflecting, as far as possible, the intra-annual movements of the Calwer data while preserving the annual living-cost levels. The basic data and the resulting monthly estimates of total living costs are set forth in Appendix Table A-41. The most conspicuous deviations between the Calwer index of food costs and the monthly index of total living costs derived in the present study are to be noted for 1917 and 1918. At the beginning of 1917 both Calwer's index and the new estimates are approximately twice as high as before the war, but for October 1918 the former index stands at 213, the latter at 273. Both the increase registered by the Calwer index and the greater rise shown by the new monthly index are larger than the increase in wage levels for the majority of all workers.

### REAL WAGES

The observed relation between changes in wages and in living costs meant a sharp decline of real wages. Changes in average real weekly wages in four occupations as reported by the Statistische Reichsamt are shown in Table 52. For the three series describing wages of skilled male workers, the real wage decline between 1913 and 1918 ranges from 17 to 46 percent. The net decline in the real wage rates of unskilled railway workers during the same period is reported as only 0.2 percent, although the real wage level in 1917 is given as about 26 percent below prewar levels. Increases between 1917 and 1918 appear in all four series, but they are probably fictitious. The economic circumstances of the last war year could scarcely have permitted significant improvements in real wages.

The gradual deterioration of real earnings can be studied on the basis of the Reichsamt's investigation of 370 enterprises. Using our monthly

<sup>23</sup> These estimates entered the real wage computations which the Reichsamt published in connection with its attempt to describe the behavior of major economic activities during the period of monetary depreciation, 1913-23. See "Zahlen zur Geldentwertung in Deutschland, 1914 bis 23," *Wirtschaft und Statistik*, 1925, p. 40. The annual cost-of-living index presented here (see Appendix Table A-41) was derived by dividing real wages into money wages.

<sup>24</sup> The Calwer and Reichsamt rises refer to the full years 1913 and 1918. The Quante estimate refers to the rise between 1914 and the month of October 1918.

TABLE 52  
Average Weekly Real Wage Rates, Selected Occupations, 1913-1923  
(1913 = 100)

Year	Railway Workers		Printers, Compositors	Miners <sup>a</sup> , Hewers and Haulers
	Skilled	Unskilled		
1913	100.0	100.0	100.0	100.0
1914	97.2	97.2	97.2	93.3
1915	79.7	80.8	77.3	81.3
1916	69.2	73.8	60.6	74.4
1917	63.9	74.2	49.4	62.7
1918	83.3	99.8	54.1	63.7
1919	92.2	119.8	72.3	82.4
1920	66.7	89.1	60.8	77.6
1921	74.5	100.0	68.9	89.1
1922	64.2	87.6	60.9	69.9
1923	50.9	69.1	54.2	70.1

<sup>a</sup> Miners' wages are earnings until November 1922, and rates from December 1922 on. Data refer to Dortmund.

SOURCE: *Wirtschaft und Statistik*, 1925, "Zahlen zur Geldwertung in Deutschland, 1914 bis 1923," pp. 40-41.

estimates of living costs as deflators, we obtain the averages of the relatives of real earnings, in Table 53. Broadly, these changes are: a 10 to 20 percent decrease in 1914; a tendency toward stabilization up to the spring of 1916; a decline to spring 1917, lowering real earnings to levels 25 to 35 percent below prewar; and stabilization at these low levels thereafter.<sup>25</sup> This behavior conforms roughly to the changing economic situation. The decline from March to September 1914 coincides with the mobilization crisis, the drop after March 1916 and the subsequent stabilization at low levels with the introduction and implementation of the Hindenburg program.

In view of the differentiated wage trends as between men and women, war and civilian industries, and other groupings, it is necessary to follow the varying courses of real earnings (see Table 53). The most outstanding deviation from the all-industry trend is found for real earnings of women in war industries. These increased between September 1914 and March 1916, at a time when real wages in all other groups decreased. Moreover, by the end of the war this group showed the highest real earnings in relation to prewar levels (88 percent). At the other extreme are real earnings of men in civilian industries, which were as low as 55 percent of prewar levels. For a more complete picture of the course of real wages during the war, one should consider their development industry by industry. The relative standing of daily real earnings in each of twelve industries

<sup>25</sup> Other quarterly and semiannual data, such as shift earnings of workers employed by Krupp (Essen), for instance, show very similar patterns.

TABLE 53  
Average Daily Real Earnings, 370 Establishments, March and September  
1914-1918  
(March 1914 = 100)

	1914		1915		1916		1917		1918	
	Mar.	Sept.	Mar.	Sept.	Mar.	Sept.	Mar.	Sept.	Mar.	Sept.
MALE WORKERS										
War industries	100	90.8	91.8	89.8	88.9	78.4	76.2	78.8	77.8	77.4
Intermediate industries	100	92.3	83.4	81.6	79.9	68.3	62.3	62.8	60.4	64.2
Civilian industries	100	83.5	82.6	77.5	73.5	57.9	54.3	52.7	52.2	55.5
Unweighted averages of industry relatives	100	88.9	85.9	83.0	80.8	68.2	64.3	64.8	63.4	65.7
Relatives of averages <sup>a</sup>	100	93.4	93.4	92.7	91.2	77.2	75.2	77.4	75.6	73.9
FEMALE WORKERS										
War industries	100	76.4	90.8	95.3	101.5	92.0	83.5	86.7	86.0	87.9
Intermediate industries	100	86.3	83.6	77.7	77.6	67.1	65.9	64.8	64.0	71.1
Civilian industries	100	79.2	78.0	71.9	72.4	59.3	53.2	57.8	58.9	61.9
Unweighted average of industry relatives	100	80.6	84.1	81.6	83.8	72.8	67.5	69.8	69.6	73.6
Relatives of averages <sup>a</sup>	100	80.2	81.1	81.8	89.2	81.5	76.1	79.3	79.9	81.0

<sup>a</sup> Earnings averages equal total payroll divided by total man-days.

SOURCE: Table 49 and Appendix Table A-41.

at the close of the war, as compared with prewar levels, is given in Table 54. The highest relative standing of real earnings was registered by women in the metal industries; in September 1918 their earnings were approximately equal to prewar levels. The lowest relative standing is found for male workers in the food industry, whose real earnings in September 1918 came to only 46 percent of those prevailing in March 1914. The majority of the reported industry groups show materially reduced real earnings levels in 1918 as compared with 1914.

Quante, and later Zimmermann, summarize real wage developments during the war. They state that for all workers real earnings declined to

TABLE 54

Daily Real Earnings in 370 Establishments; Change from March 1914 to September 1918

<i>Industry</i>	<i>September 1918 in Percent of March 1914</i>	
	<i>Men</i>	<i>Women</i>
Metal	71.8	99.4
Machinery	75.2	84.4
Chemicals	71.2	85.9
Electrical	91.4	81.9
4 War industries	77.4	87.9
Stones and allied	57.7	71.2
Wood	72.4	84.0
Leather and rubber	53.1	52.5
Paper	73.6	76.7
4 Materials	64.2	71.1
Food	46.0	62.0
Textiles	54.6	57.4
Clothing	66.3	67.2
Printing	54.9	61.0
4 Civilian industries	55.5	61.9
Unweighted averages of industry relatives	65.7	73.6
Relatives of average <sup>a</sup>	73.9	81.0

<sup>a</sup> Earnings averages equal total payroll divided by total man days.  
SOURCE: Appendix Tables A-37 and A-41.

mid-1917; for most workers the decline continued throughout the remaining war years; for a small proportion the war boom brought a recovery to prewar levels; for a very few it brought advantages over the prewar situation. The summary evaluation in this nonquantitative form remains substantially valid even if alternative living cost estimates are used.

Reduced food, clothing, and other rations, and decreasing per capita consumption of consumers' goods confirm the basic finding that planes of living deteriorated radically. During the last year of World War I consumers' durables were extremely scarce and of low quality. Homes were ransacked for pieces of copper or brass, stove doors, kitchen utensils, or other hardware that could be used for armaments. Coal was rationed rigidly, in quantities insufficient for human comfort. Clothing was scarce, rationed, and of very inferior quality. Meat, toward the end of the war, was rationed at 250 grams per week per person in large cities, and 100 to 150 grams in small towns. Butter and eggs, if available at all, could be had only in very small quantities. The lack of fats and proteins began to



undermine the population's health. Even potatoes and flour were scarce. Turnips became a mainstay of the diet. The inadequacy of the war diet is illustrated in the following tabulation, in which food rations valid during two selected periods are shown as percentages of prewar consumption:

	<i>July 1916 through June 1917</i>	<i>July 1918 through December 1918</i>
Meats	31	12
Fish	51	5
Eggs	18	13
Lard	14	7
Butter	22	28
Cheese	2	15
Vegetables	14	7
Sugar	48	82
Potatoes	71	94
Vegetable fats	39	17
Cereals	52	48

SOURCE: Zimmermann, *op. cit.*, p. 457.

Goods in excess of rations could sometimes be acquired by barter, by payment of exorbitant prices, or through personal relations. Many families received food packages sent by soldier husbands or sons from Belgium. Others got food from friends or relatives in the country. The well to do could buy in the "black market." To live on the official rations meant serious malnutrition and physical deterioration.

The war, moreover, created enormous disparities among the wage incomes of differently situated families. At one extreme were large-city families of highly skilled deferred workers with grown-up children. Such families could consist entirely of wage earners in well-paying industries. At the other extreme were families of soldiers and sailors with young children, whose mothers were at best available for part-time work. The government attempted to dampen the flagrant inequalities in family earnings by adjusting basic wage rates in accordance with marital status and number of dependent children.<sup>26</sup> But the supplementary payments had slight effect upon the strong basic disparities.

While some privileged groups could avoid impoverishment and actual malnutrition, a large part of the working population could not. Their situation is vividly described in a petition submitted in August 1918 to the Ministry of the Interior by the roofers' union. The petition, said to "echo over 100 letters," states in part: "It cannot go on this way. Our colleagues are being physically ruined . . . They don't get enough money to pay black-market prices, and rationed goods don't fill their stomachs. They have nothing to wear. Each week it gets worse. Several articles have risen in price twentyfold while wage rates have gone up by only one-half. We can't keep up with it, we are finished . . . Our closets and cupboards

<sup>26</sup> The family bonuses and bonuses for children constituted elements of the *Soziallohn* (social wage) principle which remained part of the German wage system after the war.

are bare, our savings are in the safes of the usurers. Our children starve . . . It is simply beyond our strength."<sup>27</sup>

### *Wages in the Great Inflation*

This section deals with the behavior of wages during the postwar period from the Armistice of November 1918 to the stabilization of the currency at the end of 1923. Previous chapters have dealt with wage behavior during the inflation as part of the description of long-term tendencies. Here we shall relate it in detail to the economic conditions of the time and observe the strange problems that arose in the race between wages and prices.<sup>28</sup>

#### MONEY WAGE LEVELS

Changes in wage levels during the inflation can be depicted by comprehensive indexes of hourly and weekly wage rates for skilled and unskilled workers in eight industries, as shown in Appendix Table A-42.<sup>29</sup> Taking prewar levels as the basis of comparison,<sup>30</sup> one might say that wage rates in marks were roughly 3 times their 1913 levels by the end of 1918; 5 times by the end of 1919; 10 times by the end of 1920; 20 times by the end of 1921. From that point on one must proceed at shorter intervals to convey the course of wage increases as measured in currency. By the middle of 1922 wage rates in marks were 50 times as high as before the war, and by the end of that year, 500 times. By the middle of 1923, they stood at ten thousand times their prewar levels and by the end of that year at a trillion times the levels of 1913.

Wage developments during the Great Inflation showed a relatively high degree of homogeneity, as can be seen in Appendix Tables A-43 and A-44, which present some of the major series of weekly money wages, available by months. That all wage rates rose phenomenally is not surprising, since the decisive determinant was the currency depreciation. If we compare

<sup>27</sup> Quoted in *Schriften der Gesellschaft für Soziale Reform*, Vol. 65 (Jena, 1919), p. 6 (translation ours).

<sup>28</sup> Wage behavior during the inflation is described by Constantino Bresciani-Turroni in "The Movement of Wages in Germany during the Depreciation of the Mark and after Stabilization," *Journal of the Royal Statistical Society*, 1929, pp. 374-427. The same author discussed wages during 1919-23 in *The Economics of Inflation* (London, 1937), pp. 300-313 and 224-427. See also Robert Kuczynski's "Postwar Labor Conditions in Germany," U.S. Bureau of Labor Statistics, *Bulletin* No. 380, 1925.

<sup>29</sup> The weekly data were compiled by the Statistische Reichsamt for selected months of 1922 and for all months of 1923. The International Labour Office estimated the movement of hourly wage levels by making the necessary adjustments for changes in working hours. In order to obtain, in the present study, a tolerably comprehensive index for the whole period 1919-23, the eight-industry index was interpolated and extrapolated on the basis of other available information. The procedures used are described in the note to Appendix Table A-42.

<sup>30</sup> Here as well as in other parts of this section, wage levels during the inflation are compared with prewar levels. This is preferable since a later base, located, for instance, at the time of the Armistice, would be statistically less certain and economically less significant.

trends in the dollar exchange rate, in domestic prices, and in wages (Appendix Tables A-41 and A-42, and Chart 28), we find that, although these measures do not exhibit identical inflationary increases, their major movements are in close correspondence—the strong rise of the series up to the spring or summer of 1920, the tendency toward flattening out or even decline until mid-1921, the accelerated increases during the subsequent year, and the hyperinflationary upsurge starting with the summer of 1922.

The inflationary advance of wages after World War I continued certain developments which had their origin in the war itself, and in its economic consequences. The extreme scarcity of goods and labor in the face of high money incomes and extensive government spending had, by the end of the war, driven prices and wages up to about two and one-half times their prewar levels. Germany's defeat, and the demobilization which swelled the ranks of the unemployed, relieved pressures on the labor market but did not alleviate the scarcity of coal, iron, machinery, and consumers' goods. Prices and wages continued to advance. From the Armistice to the end of 1919 wages about doubled and prices rose by 240 percent. The relation between currency depreciation, money wage levels, and employment from the beginning of 1920 to about mid-1922 can be observed in Chart 28. Note the inverse short-term correspondence between the price and unemployment series.<sup>31</sup> The explanation must be found in the stimulus which price rises and currency depreciation gave to production and trade. Buying equipment and materials at low prices and selling finished products at high prices created substantial paper profits. Rising prices served also to encourage speculative buying and padding of inventories. Unfavorable exchange rates<sup>32</sup> were a boon to all export industries, although they acted as a brake on imports. With all these forces in action the sudden jump of the dollar exchange rate from 15 to 24 marks at the beginning of 1920 led to a noticeable decrease of unemployment, and the subsequent fall of the dollar to 9 marks in June 1920 led to an immediate increase in unemployment—particularly in the export industries. With the further depreciation of the currency, up to about mid-1922,<sup>33</sup> unemployment went down again.

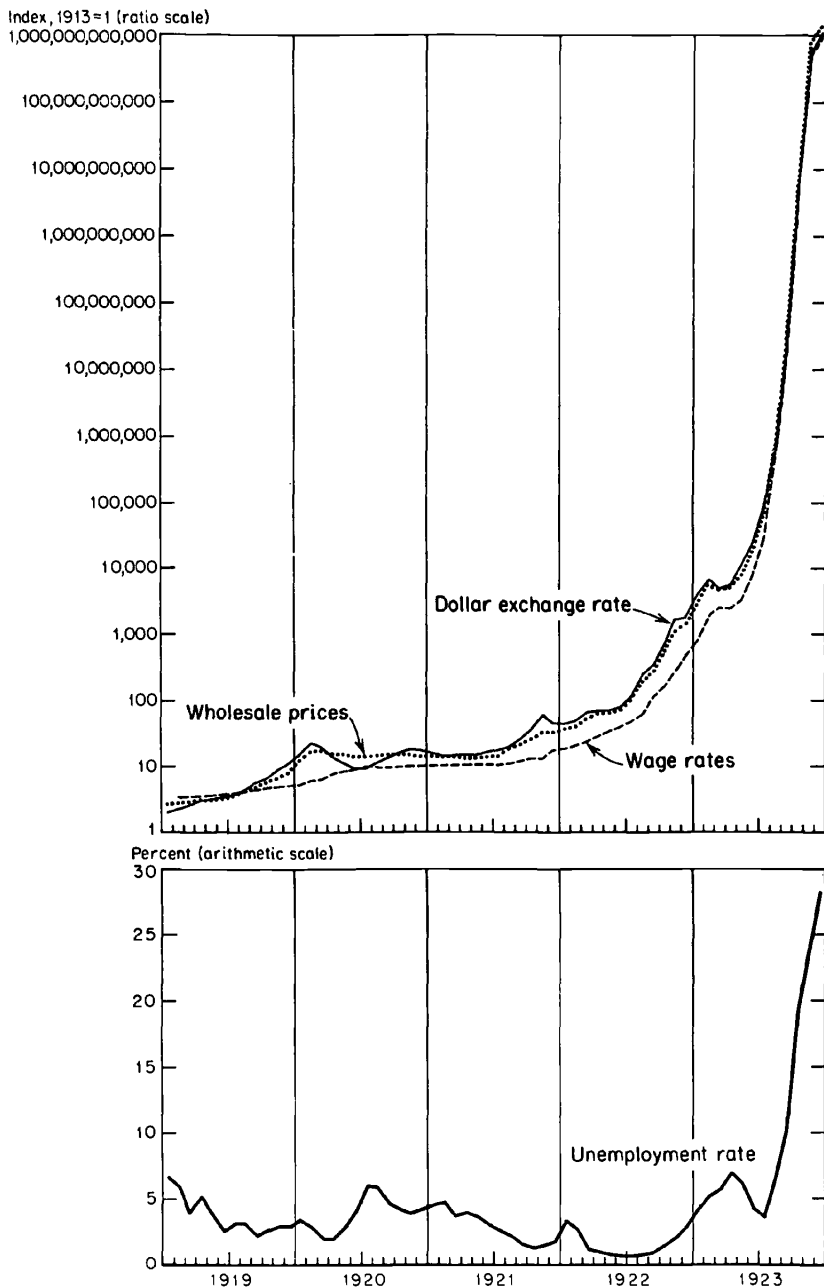
Until about that date the currency depreciation was accompanied by increases in production and employment. How did wages fare during this period? Money wage rates moved upward under the joint pressure of a depreciating currency and a tightening labor market, but they did not reflect the minor fluctuations in either. They went up by relatively small steps during 1919 and 1920, despite the hectic changes in the external and internal value of the currency. The leveling-off during the latter part of

<sup>31</sup> Here measured by the unemployment rate of union members.

<sup>32</sup> By "unfavorable" exchange rate is meant the relatively low external value of the German currency.

<sup>33</sup> The reference peak was in May 1922.

CHART 28  
Wages, Prices, and Unemployment, 1919-1923



Source: Appendix Tables A-35, A-41, and A-42.

1920 and the first half of 1921 reflected the temporary success of the German government's stabilization efforts and took place in the face of increasing employment. During the last months of 1921 and the first half of 1922, the changes in the value of the currency and the tightening of the labor market exerted pressure in the same direction and led to a quadrupling of wages in less than ten months.

In mid-1922 the dams burst. The currency began to depreciate at an ever faster rate, inaugurating the hyperinflation. After an abortive attempt at stabilization in the spring of 1923, the period of astronomic rises set in. Hyperinflation, in the second half of 1922 and the year 1923, was accompanied by very different changes in production and employment than had occurred in the preceding milder phase of currency depreciation. Reference to Appendix Table A-35 shows that unemployment climbed fast, reaching 6 percent of union members in mid-1923 and 19 percent by October of that year. The rapid and unpredictable changes in the value of money led to a *Flucht in die Sachwerte*, a grasping for any article that was not affected by the depreciation. To keep one's assets protected was more important than paper profits and losses. Rational business calculations became increasingly difficult. Wages moved in the wake of the general currency depreciation. As previously noted, by December 1923 wages expressed in nonstabilized currency were close to one trillion times their pre-1913 levels.

Changes in wage levels during the inflation have been described without distinction between hourly and weekly wages or between wage rates and earnings. For the period 1919-23 proper, there is some justification for such neglect. During the inflation, the eight-hour day and the forty-eight-hour week prevailed as "normal" work periods, and they were rarely exceeded in practice. Hence hourly and weekly wage rates ordinarily moved together, and earnings in general reflected very little overtime or other premium payments. It is true that, particularly during the last eighteen months of hyperinflation, part-time work and shared jobs became increasingly frequent and affected average weekly earnings of many groups of workers. The available information does not, however, permit us to evaluate the course of average weekly earnings with any degree of certainty. The distinction between hourly and weekly wage rates becomes of great importance, however, if wage levels during the inflation are compared with those prevailing before the outbreak of World War I, because of the significant decreases in the length of the normal workweek. The consequent difference in the relative level of hourly and weekly rates is apparent in all the data contained in Appendix Table A-42. While weekly wage rates tended on the average to increase somewhat less than a trillion times between 1913 and the end of 1923, the increase of hourly wages exceeded the trillion mark. The actual increase varied among different skill and sex groups. These differences are the subject matter of the following section.

TABLE 55

Skill Differentials, Based on Weekly Wage Rates, 1913, and April 1922 to December 1923  
(differences between rates of skilled and rates of unskilled workers, expressed in percent of the former)

Year and Month	Coal Mining	Building	Wood	Metals	Textiles		Chemicals	Printing	Railways	Average
					Men	Women				
1913	34.0	21.8	27.5	36.1	18.3	17.2	18.9	27.3	31.4	30.6
1922 Apr.	15.7	4.2	6.1	5.4	15.0	16.5	5.5	16.9	6.1	9.8
July	13.3	4.8	10.2	6.0	10.4	14.7	6.5	14.9	6.6	8.9
Oct.	17.6	4.6	10.5	7.0	11.6	15.4	7.3	15.0	5.5	10.5
Nov.	...	4.7	...	6.9	12.4	16.5	6.6	...	5.5	10.8
Dec.	...	5.1	...	7.2	11.3	12.7	6.8	...	5.0	9.5
1923 Jan.	13.7	4.9	10.8	7.4	9.8	13.3	6.9	13.4	5.2	9.4
Feb.	14.8	4.9	9.4	7.2	10.4	14.4	6.9	11.6	5.2	10.1
Mar.	15.0	5.0	10.7	7.2	11.0	15.4	6.9	11.0	5.2	10.1
Apr.	15.0	5.1	10.7	7.4	11.0	15.6	6.9	11.0	5.2	10.1
May	15.3	5.2	10.3	7.8	10.5	15.3	7.0	10.8	5.3	10.3
June	15.4	5.8	11.0	8.3	10.6	16.7	7.9	10.6	4.8	10.6
July	15.5	5.8	10.7	8.2	10.5	15.0	8.9	10.1	5.0	10.3
Aug.	15.4	5.9	10.4	8.2	9.7	17.2	7.8	10.0	5.1	10.7
Sept.	16.1	5.9	10.0	8.4	11.0	15.1	8.5	10.2	5.5	11.2
Oct.	17.2	7.3	12.6	13.7	10.4	18.4	10.2	9.9	5.6	13.5
Nov.	16.6	10.0	11.4	13.4	11.3	20.6	9.9	14.7	12.4	14.0
Dec.	12.7	10.2	13.2	15.0	12.8	20.5	8.4	15.0	22.0	15.8

SOURCE: Computed from data given in *Wirtschaft und Statistik*, Reports, Series D, No. 15, pp. 148-49; see also Appendix Table 1925, "Zahlen zur Geldentwertung in Deutschland, 1914 bis 1923," pp. 40-42; and International Labour Office, *Studies and*

## WAGE DIFFERENTIALS

The narrowing of skill and sex differentials during the inflation has been described briefly in Chapter 3. It remains now to demonstrate in some detail the extent of these and other changes in the wage structure.

From the data given in Tables 18, 55, and Appendix Table A-39, it is apparent that a narrowing of skill differentials occurred in all industries and under all types of local conditions. What we must note is the virtual disappearance of the differentials during certain months. At times the skill gap was close to 5 percent in whole industries such as building, chemicals, and railroad transportation; and under special circumstances the gap was virtually closed. Thus, for the cities of Berlin, Hamburg, and Stettin, the hourly rates of unskilled building workers are reported to have differed by 3 percent or even less from those of their skilled colleagues by the end of 1920. Toward the close of 1923 skill differentials widened somewhat. After the stabilization of the currency the differentials between wages of skilled and unskilled grew in all industries, though they never again reached the magnitudes typical of the prewar period.

For any systematic comparison of sex differentials with prewar levels we must rely on textile data. Table 20 permits us to observe the change of sex differentials from 1913 to April 1922; and from there on to December 1923. For both skilled and unskilled workers the differentials narrowed over the period as a whole; the smallest differential of rates occurred before the apogee of the inflation. Whereas before the war women employed in textiles were paid about two-thirds of men's rates, during some periods of the inflation they received as much as three-quarters of men's pay for the same work, and occasionally a little more. After the stabilization this group of women obtained roughly 70 percent of men's rates.<sup>34</sup>

As for industrial differentials, there is, unfortunately, little systematic information for the period of inflation. What data there are apply only to eight industries in 1913 and to selected dates from April 1922 on. Despite the basic uniformity in the behavior of wages during the inflation, dispersion measures show a greater variation of the industry averages around their grand mean during the height of the inflation than either before the war or after stabilization. For male workers, at selected dates, we have the following figures:

	Average Percentage Deviation from Unweighted Mean <sup>a</sup> , Eight Industries			
	1913	July 1922	July 1923	January 1924
Skilled	8.2	7.0	11.2	8.7
Unskilled	7.6	8.1	10.9	9.5

<sup>a</sup> A simplified coefficient of variation is used, consisting of the average deviation (signs ignored) of the industry averages from their own mean, divided by the mean, multiplied by 100.

<sup>34</sup> Obviously one cannot draw broad conclusions from figures for the textile industry alone. The investigation of war wages in 370 establishments showed that daily earnings of female textile workers, relative to those of male workers, were higher, throughout the war, than in most of the other industries (See Table 51).

## WAGES AND PRICES

*Wages and Wholesale Prices.* In this section the behavior of wage rates will be compared with that of prices. Wages, as an hourly measure—unaffected by changes in the length of the workweek—are used. As for prices, the dollar exchange rate was used earlier in this chapter, as an indicator of the external depreciation of the German currency. However, the loss of the currency's internal purchasing power can be measured more satisfactorily by German indexes of wholesale and retail prices.

TABLE 56  
Changes in Wages and Prices, Selected Periods, 1913-1923  
(percent)

Period <sup>a</sup>		HOURLY RATES		WEEKLY RATES		PRICES	
		Skilled	Unskilled	Skilled	Unskilled	Wholesale	Living Costs
from	to						
1913	1918 IV	+180	...	+150	...	+138	+238
1918 IV	1919 I	+18	...	+16	...	+13	+5
1919 I	1920 July	+185	...	+183	...	+409	+198
1920 July	1921 July	+12	...	+12	...	+4	+18
1921 July	1922 July	+367	...	+359	...	+604	+331
1922 July	1923 July	+59,480	+64,007	+65,808	+64,913	+74,248	+69,753
1923 July	1923 Dec. <sup>b</sup>	+3,231	2,822	2,958	+2,777	+1,687	3,312
1919 I	1922 July	+1,385	...	+1,355	...	+3,639	+1,414
1922 July	1923 Dec. <sup>b</sup>	+19,251	+18,088	+19,495	+18,054	+12,542	+23,135
1913	1919 I	+230	...	+190	...	+169	+256
1913	1920 July	+840	...	+720	...	+1,267	+960
1913	1921 July	+950	...	+820	...	+1,328	+1,150
1913	1922 July	+4,800	+6,600	+4,120	+5,340	+9,959	+5,290
1913	1923 July <sup>c</sup>	+2,919	+4,295	+2,781	+3,595	+7,479	+3,765
1913	1923 Dec. <sup>d</sup>	+94.3	+121.2	+82.3	+99.8	+126.2	+124.7

<sup>a</sup> Roman numerals denote quarter of year.

<sup>b</sup> In millions.

<sup>c</sup> In thousands.

<sup>d</sup> In trillions.

SOURCE: Appendix Tables A-41 and A-42.

The reader is reminded that the only wholesale price index available for the inflation period is the inadequate 48-product index that had to be used for World War I. It consists entirely of prices of raw materials and foods and can scarcely be regarded as more than the roughest indicator of general wholesale price trends. Wage rates and wholesale prices are listed in Appendix Tables A-41 and A-42, and comparisons of their changes during specified periods are shown in Table 56. The data suggest that between 1913 and 1919, the percentage increases of wholesale prices did not differ greatly from increases in hourly wage rates of skilled workers.



Between 1919 and mid-1922 the index of wholesale prices rose considerably faster than that of wage rates, but from mid-1922 to the close of 1923 the situation was reversed again, with wholesale prices rising 12 billion and wage rates 19 billion times.

It is possible to conclude from the above comparisons that during the earlier period of the inflation wage costs increased less than material costs and possibly less than product prices, while the reverse obtained during the hyperinflation. Bresciani-Turroni investigated the relation of wage changes, price changes, and business conditions by comparing movements in wage-price ratios with those in unemployment rates of union members, and found a high degree of correlation. While stressing that he did not attribute rising unemployment during the latter part of the inflation to disproportionately high wage levels, he did hold that changes in the wage-price ratios were closely related to fluctuations in unemployment and in general business activity. The main exhibit of Bresciani-Turroni's presentation is reproduced in Chart 29. It seems to the present writer that speculation about the functional relationship between the selected measures must not neglect the concrete circumstances of the particular inflationary phase. During the period from 1920 to mid-1922 the fall of the wage-price ratio may have helped business,<sup>35</sup> while during the subsequent period of hyperinflation the rise of that ratio may have added only in a small way to unemployment. For that period unemployment should probably be related to more general conditions, such as the disorganization of economic and political life in the wake of currency depreciation, the occupation of the Ruhr, and the effects of fluctuations of prices and foreign exchange rates on German industry.

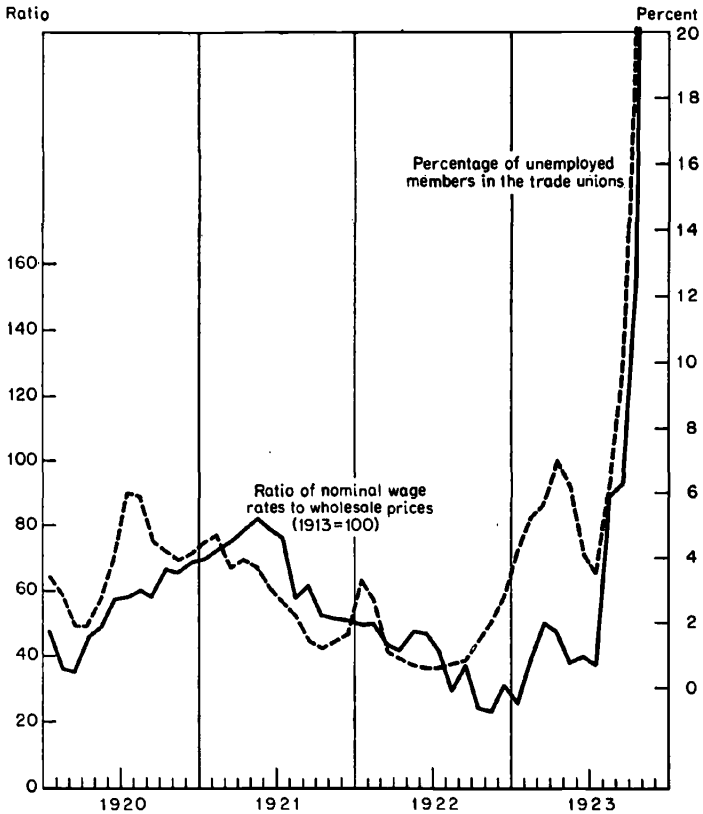
*Wages and Living Costs.* For no period in German wage history have comparisons of wages and retail prices been more urgently needed than for the time of the Great Inflation, when changes in retail prices during one short day could wipe out a large part of a worker's earnings. For this reason defects in the cost-of-living index are of crucial importance, for they can cause an altogether biased impression of the relation between wages and retail prices. Let us consider, then, the quality of the index available for the years 1919 to 1923.

From the Armistice to the beginning of 1920 we have only the implicit annual deflation figures of the Statistische Reichsamt and the monthly food-cost index of Calwer. As can be seen from Appendix Table A-41, attempts to derive from these data a monthly measure approximating living costs during the war years were continued for the immediate postwar period. From February 1920 on, the Statistische Reichsamt compiled

<sup>35</sup> It should be considered, however, that additional factors—advancing prices, anticipation of the continuation of inflationary trends, the favorable relation of total production costs and finished product prices at the time of sale, the “unfavorable” rate of exchange of the German currency, and others—must have contributed to the relatively high employment levels during the early inflationary period. (See the part of this section dealing with Money Wage Levels.)

and published an official cost-of-living index based on the consumption pattern of a family of five persons and computed on a monthly basis. The Reichsamts index is reproduced in the same appendix table.

CHART 29  
Wage-Price Ratios and Unemployment During the Inflation



Source: Appendix Table A-35 and Bresciani-Turroni, *The Economics of Inflation*, pp. 442 and 450.

For the inflation period, the coverage and quality of the available information on living costs is superior to that for earlier periods, for which no "authoritative" cost-of-living statistics were computed. During the first years of publication, only the food, rent, and fuel and light groups were included in the index, in 1922 a clothing group was added. (No "miscellaneous" group was included before the end of the inflation.) The composition of the standard budget was changed several times, once to allow for seasonal variations in consumption, and then to adapt the index to modifications in consumption patterns after the abolition of wartime controls.<sup>36</sup> The effect of these changes on the movement of the

<sup>36</sup> Rationing was continued in Germany until 1922.

index was, however, relatively mild.<sup>37</sup> In the earlier years of the period, the index was based on quotations in six hundred communities, with prices ascertained once a month during the first two years and twice a month from 1922 on. In the spring of 1923 a weekly index, called "express index," was computed, based on quotations in about seventy communities. The increased frequency of price collections was prompted, of course, by the spiraling of the inflation.

Despite attempts at systematic collection of data and the broad coverage, cost-of-living statistics are far from satisfactory for the inflation period. The original restriction of the index to three consumption groups was noted above. Furthermore, scarcities of foods and other goods, widespread black-market operations, and barter trading reduced the area of consumption to which the official index could be applied. Another reason for its inadequacy is to be found in the extent, rapidity, and diversity of the price rises themselves, which affected the purchasing habits of the people and rendered the index invalid beyond the day of the actual collection of data.

The movements of the cost-of-living index naturally reflected the consequences of the currency depreciation and thus ran roughly parallel to changes in other variables, such as wholesale prices, wage rates, dollar exchange rates, and real estate values. Closer comparison, however, brings out important distinctions of detail. As can be seen from Table 56, living costs between 1913 and the beginning of 1919 increased more than hourly and weekly wage rates of skilled workers.<sup>38</sup> In the early postwar phase of the inflation, wage rates and living costs tended to show similar net increases, with wages sometimes outrunning the rises in living costs. During the period of hyperinflation, however, wage rates were unable to keep pace with retail price increases. The distinction between hourly and weekly wages is important in the comparisons involving 1913, since between that date and the postwar years working time declined considerably. Living costs rose farther above prewar levels than weekly wages at all times during the years 1919-23. They also rose more than hourly wages of skilled workers and, for most of the period, more than hourly wages of unskilled. The resultant real wages will now be discussed.

## REAL WAGES

*Wage Determination during the Inflation.* Money wages, at least in the latter part of the inflation period, were determined in close relation to the depreciation of the currency and to changes in the cost of living—that is, in terms of expected real wage levels. The increasingly rapid price changes

<sup>37</sup> For comparison of the various forms in which the index was published, see International Labour Office, *Studies and Reports*, Series D, No. 5, "The Workers' Standard of Life in Countries with Depreciated Currencies" (Geneva, 1925), p. 42.

<sup>38</sup> For unskilled workers we have no comparable information. The available evidence suggests that the rise in hourly rates of unskilled workers may at times have exceeded that in living costs.

made it necessary to renegotiate wages more and more frequently. Within a so-called *Manteltarif* (collective agreement covering working conditions other than wages), wage conventions were renegotiated on the average about every two months in 1921, every month during most of 1922, biweekly at the beginning of 1923, and weekly as the hyperinflation spiraled.

It seems that for a while negotiation of new agreements at short intervals was preferred to sliding scale arrangements. Management assumed it would derive some benefits from short-term stability of a cost element during times of rising prices for finished products. Such stability facilitated cost calculations and protected profit margins. The unions, for their part, were reluctant to perpetuate low real wages by concluding long-term sliding scale agreements, with a base line that reflected prevailing wage levels. Thus, they went along with management in negotiating short-term agreements. But the frequent bargaining over wage contracts involved unions and management in a perpetual struggle, and thus contributed heavily to the intensity of the labor strife which characterized this period of the inflation.

By mid-1923, weekly renegotiation of wage covenants failed to keep pace with the currency depreciation, and sliding scale arrangements had to be invoked. The weekly "express" index of living costs, compiled by the Statistische Reichsam, came into general use as an adjustment factor for negotiated base wages. Even this procedure proved too slow. On the day of publication, prices usually had already exceeded those prevailing on the day of sampling, and had further opportunity to advance during the time required for payroll accounting, wage disbursement, and ultimate expenditure by wage earners. To obviate some of these delays, many firms used the dollar exchange rate as the adjustment factor, because this rate could be established in up-to-date form on the day of wage payment. This, too, had its shortcomings: the price rises between payment and expenditure could not be compensated properly, and to forestall the rapid dwindling of the purchasing power of earnings new devices were required. One practice current by the summer of 1923 was to pay wages in installments; that is, part of the earnings for a current week's work were paid on Tuesday and the remainder on Friday of that week. Later the frequency of payments was increased to three or even more times per week. By the end of August, agreements between workers' and employers' associations specified that wages should be fixed on the basis of expected prices in the expenditure period, rather than of prices prevailing on the date of wage payment. This required forecasting prices, and compensatory adjustments at the time of subsequent payments, in amounts determined by the inaccuracies of the forecasts. The administrative problems involved in such procedures were formidable. Forecasting and later adjustments added to clerical work, and the process gave rise to controversies about possible benefits accruing to employers from conservative forecasting.<sup>39</sup>

<sup>39</sup> For details see Bresciani-Turroni, *The Economics of Inflation*, pp. 202, 203, and 310.

During the last months of hyperinflation, it made a difference whether purchases were made in the morning, or in the afternoon—after the day's dollar exchange rate was out, and stores had adjusted their prices. On paydays workers had to be released early so they could spend at least part of their earnings on the same day, before the further depreciation of the morrow.

It is difficult to appreciate fully the effects of the almost continuous price revisions on purchasing power, consumer motivation, and buying patterns. An eye-witness report gives us some revealing details:

"I do not think that any statistics can give an adequate picture of reality during the period of hyperinflation. How can you measure prices which change practically every hour—as they did during the last months of the inflation? At the end of 1923, business paid wages and salaries not only twice a week, but every day. Collective bargaining negotiations were continuous.

"May I give you some recollections of my own situation at that time? As soon as I received my salary I rushed out to buy the daily necessities. My daily salary, as editor of the periodical *Soziale Praxis*, was just enough to buy one loaf of bread and either a small piece of cheese or some oatmeal. On one occasion I had to refuse to give a lecture at a Berlin city college because I could not be assured that my fee would cover the subway fare to the classroom, and it was too far to walk. On another occasion, a private lesson I gave to the wife of a farmer was paid somewhat better—by one loaf of bread for the hour.

"An acquaintance of mine, a clergyman, came to Berlin from a suburb with his monthly salary to buy a pair of shoes for his baby; he could buy only a cup of coffee. The Zeiss works in Jena, a nonprofit enterprise, calculated the gold mark equivalent of its average wage paid during a week in November 1923 and found weekly earnings to be worth four gold marks, less than a sixth of prewar levels."<sup>40</sup>

While the monetary depreciation progressed, certain devices introduced elements of stability into wage payments. Some companies established kitchens to feed their workers at least one square meal a day. Some firms bought coal, potatoes, meat, or other necessities and distributed them to workers as part of their remuneration. During hyperinflation, payments in kind and personal privileges such as access to food, coal, and clothing became tremendously important<sup>41</sup>—often exceeding the significance of cash payments. After stabilization was decided upon in principle, wages were increasingly negotiated in terms of gold marks, as in many wage agreements concluded in November, 1923, and most of those concluded in December. However, the new stabilized rentenmark currency was not yet available at that time, and actual wage payments during the last weeks

<sup>40</sup> Direct communication from Dr. Frieda Wunderlich, New School for Social Research, New York City.

<sup>41</sup> Such devices were used also to introduce stability into other business transactions, e.g. coal bonds, rye bonds, even kilowatt-hour bonds.

of 1923 were still made in depreciated marks or in one of the numerous substitute currencies.

*Statistical Computation of Real Wages.* Usually, real wages are computed by means of dividing money wages by cost-of-living index numbers. In this process, the choice of corresponding time periods does not, ordinarily, present a problem; money wages are related to retail prices for the same month. But for the period of the Great Inflation, the rapid changes in price levels make it desirable to juxtapose the earnings of the workweek and the prices of the related expenditure period. But what is the proper expenditure period for a given earnings series? The Statistische Reichsamt, from 1920 on, divided average earnings for the calendar month by prices for an expenditure period lagging seven days behind the work month. And in October–November 1923, to take account of intra-weekly wage installments and accelerated disbursements, the Reichsamt used a lag of five days. But it is rather doubtful whether these lags provided a realistic matching of earnings and expenditure periods. In the period of hyperinflation, workers could scarcely have spread their purchases over as many as five days after they received their wages.<sup>42</sup> The waiting lines at food stores on payday were mute evidence of the workers' need to beat the price spiral even by hours. On the other hand, highly perishable goods could not be bought far in advance and larger purchases (like furniture) could not be made without some accumulation of funds. While sometimes there were complex installment arrangements, which adjusted separate payments to the then existing price levels, some loss of the purchasing power of wages through delay in shopping was unavoidable.

It is important that the reader remember, in the following discussion, that the actual expenditure period is unknown, and that even if it were known, proper adjustment would be difficult because we lack daily living-cost indexes for most of the period. Moreover, the wage installments are not separately recorded; thus, we do not know how much in a given week was paid on Tuesday and how much on Friday. If, finally, the importance of payments in kind is recalled, it will be readily apparent that the computation of real wages during the Great Inflation is a hazardous undertaking. Below, real wages are discussed as computed by the Statistische Reichsamt and other sources. The manner of deflation will be made explicit wherever possible.

*The Behavior of Real Wages during the Inflation.* In the earlier discussion of wage trends (Chapter 2) some important elements of real-wage behavior during the inflation were enumerated: throughout that period, real wages tended to be below prewar levels; real wages fluctuated significantly during the inflation period, showing relatively high levels in 1921 and considerably less favorable levels in 1922 and 1923. The previous discussion, however, was based on extremely limited evidence. One single wage series (weekly

<sup>42</sup> See Bresciani-Turroni, *The Economics of Inflation*, p. 302, and his references to Meerwarth and Mommer.

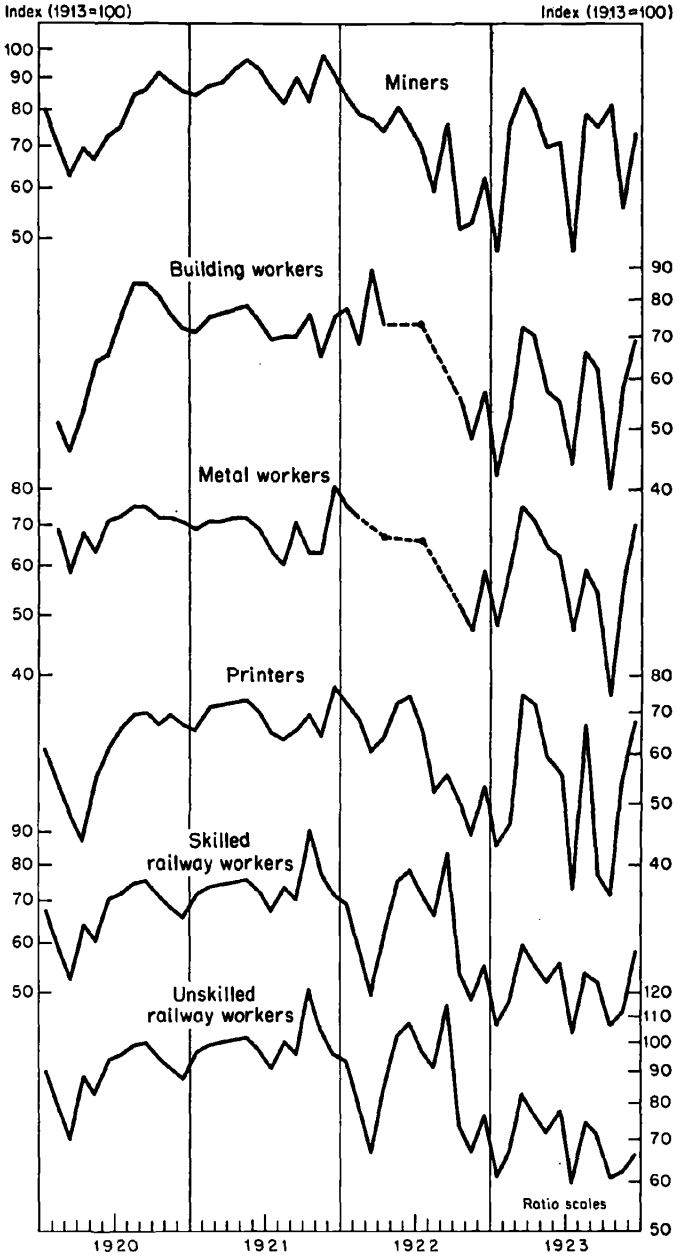
earnings of underground coal miners in the Ruhr district) given in annual form was used to describe real-wage behavior. This information will now be supplemented by series covering other occupations and industries and computed for shorter units of time.

Appendix Table A-45 presents average hourly and weekly real wage rates based on eight industries (1913 = 1). In comparison with 1913, real hourly rates show more favorable levels than weekly real rates because of the decline in working hours. Similarly, real rates of unskilled workers show more favorable relative levels than those of skilled workers because of the decline in skill differentials. Real rates of skilled workers, both hourly and weekly, were below 1913 levels throughout the period of inflation. For unskilled workers, weekly real rates were also below 1913 levels, whereas hourly real rates tended to exceed prewar levels throughout the greater part of the period 1922-23. Only in the last stages of hyperinflation did hourly real rates for unskilled workers drop below 1913 levels. In view of the 8-hour day and the sharing of jobs, it may be presumed that levels of earnings, relative to 1913, did not significantly exceed those of rates. Therefore the following comments on the relative levels of real rates may be applied also to the approximate purchasing power of employed workers' earnings.

With the exception of the dip in the spring of 1920, real wages tended to rise during 1920. For skilled workers the autumn levels of 1920 were retained through 1921. From the beginning to the end of 1922 real wages dropped precipitously; and during 1923, after a brief upsurge in the first months of the year, they returned to the low levels characteristic of the greater part of the hyperinflation. Chart 30 illustrates the increasing instability of real wage levels. While the fluctuations during the earlier years of the inflation period are not inconsiderable, they appear mild when measured against those occurring in 1922 and 1923.

For the inflation period as a whole, the highest and lowest levels of real weekly wages of skilled workers, in relation to 1913, were 102 and 51 percent respectively. The comparable values for unskilled workers, for the period covered in Appendix Table A-45, were 94 and 48. The range of fluctuation as well as the real wage levels at the lower extreme are certainly impressive. Yet they are based on averages of eight industries and are therefore apt to understate the fluctuations and the extent of the decline of real wages in less comprehensive groups. Examination of the component industry averages provides an inkling of the remarkable instability of the purchasing power of inflation wages. In the eight industry groups presented in Appendix Table A-46, the index numbers range from 116 (unskilled female textile workers, March 1923) to 25 percent (skilled woodworkers, October 1923). Even in these monthly data there is considerable averaging-out. Almost incredible variations occur in the real values of the weekly wage payments to small groups or individuals. The *Allgemeine Deutsche Gewerkschaftsbund* published weekly real earnings of a fully employed

CHART 30  
Real Wages during the Inflation



Source: Appendix Tables A-43, A-46, and their sources.



married printer, week by week, during the second half of 1923. In the fifteenth pay period (October 6-12) his real earnings were given as 18.9 percent of the 1913 average.<sup>43</sup> Robert Kuczynski computed the real values of wage payments to Berlin chemical workers at specific dates, relating money wages to estimated index numbers of living costs for the same date. He found that on some occasions real wages thus derived were less than 10 percent of prewar levels.<sup>44</sup> The strong fluctuations and low levels of real wages had effects extending beyond the decline in the economic well-being of German workers; they also contributed to important changes in the composition of the national product and in labor productivity. Monetary incentives lost force with the uncertain purchasing power of earnings and with the increasing scarcity of goods. Furthermore, after the deprivations suffered during the war, the low real wages of the inflation period impaired the health of the workers and their general efficiency.

Although this study is not concerned with salary payments, it seems pertinent at this point to mention that, on the whole, salaried workers may have fared even worse during the inflation than wage earners. From the salaries of government employees reproduced in Table 57, we note that the real income of the higher-paid group declined more than that of the lower-paid. Also, in 1923 real monthly salaries of the two higher-paid employee groups constituted a smaller fraction of their prewar income than the comparable payments to wage earners constituted of theirs (see Appendix Table A-45). Prewar salaries for the higher classes of government employees were above average wage levels for industrial wage earners. Thus, both in the relation of real salaries to real wages and in the relation of high salaries to low salaries, we find a reflection of the general trend from "efficiency" toward "sufficiency" wages—the latter designed to provide socially tolerable minima rather than rewards for productive contributions.

*Real Wages and Economic Activity during the Inflation.* Real wages during the Great Inflation follow, in broadest outlines, the trends of general business activity, as may be observed from the following tabulation in which production and employment indicators are compared with

<sup>43</sup> *ADGB Jahrbuch* (Berlin, 1923), p. 80. The realism of this particular quotation seems doubtful, however. Payments on Friday were related to the cost-of-living index on the following Monday. It is not stated whether advances were made during the week, nor is there a discussion of the possibility that major purchases may have been made Friday night, Saturday, or even Monday morning before the price changes occurred which determined that day's index.

<sup>44</sup> Robert Kuczynski, "Postwar Labor Conditions in Germany," pp. 132-33. The estimates are derived by linear interpolation between the official index numbers of living costs, for Mondays. The computations are free from the influence of both advanced and postponed wage payments—the latter being a far from rare occurrence during the time when the printing presses could scarcely keep pace with the demand for the steadily depreciating currency. However, linear interpolation in the case of, say, a geometric progression, might lead to overestimated living costs and underestimated real wages.

TABLE 57  
 Monthly Real Salaries of Government Employees, in Three Classifications,  
 Large Cities, 1913-1923  
 (1913 = 100)

Year	High Level	Intermediate Level	Low Level
1913	100.0	100.0	100.0
1914	97.2	97.2	97.2
1915	77.3	77.3	77.3
1916	58.9	58.9	58.9
1917	42.9	48.6	53.6
1918	46.8	55.0	69.6
1919	40.2	54.8	89.3
1920	31.7	44.0	71.3
1921	39.3	52.2	82.3
1922	35.6	46.4	72.9
1923	38.0	49.5	69.9

SOURCE: *Wirtschaft und Statistik*, 1925, "Zahlen zur Geldentwertung in Deutschland, 1914 bis 1923," p. 43.

weekly real wages of skilled workers. The tendency of real wages to rise during the early inflation years, 1920-21, is in general correspondence with the economic improvements reflected in production and employment.

	<i>Index of Industrial Production</i>			<i>Unemployment Ratio of Union Members (percent)</i>	<i>Weekly Real Wages (1913 = 100)</i>
	<i>Producers' Goods</i> 1913 = 100	<i>Consumers' Goods</i> 1913 = 100	<i>Total<sup>a</sup></i>		
1919	37	—	42	3.7	85
1920	64	56	61	3.8	72
1921	74	76	73	2.0	78
1922	80	81	78	1.5	68
1923	49	63	52	9.6	80

<sup>a</sup> The total index in 1921 and 1922 lies below the indexes of the producers' goods and consumers' goods components. This cannot be entirely due to our adjustments to postwar territory, since the data as published by the *Institut für Konjunkturforschung* reveal a similar disparity.

SOURCE: Production *IKF Sonderheft* 31, p. 64, on base 1913 = 100 (postwar territory) and using 1913 to 1927-29 relationship, *ibid.*, p. 37. See also Table 2 above. Unemployment, computed from Appendix Table A-1. Weekly real wages, skilled workers, Appendix Table A-45.

Similarly, the low real wage levels experienced in the second half of 1922 and in 1923 correspond to the reduced increases in the annual production data for 1922 and to the sharp decline of production and employment in the following year. However, the short-term fluctuations apparent in monthly unemployment data (and presumably also in production) are not reflected in real wage changes. Conversely, the considerable short-term fluctuations of real wages do not have their counterpart in employment (or production) fluctuations. Reasons for this lack of short-term

correspondence are not hard to find. On one hand, employment fluctuations during the earlier inflation years appear to have been relatively mild, with the unemployment ratio of union members during 1919-22 rarely exceeding 5 percent. Money wage rates, on the other hand, exhibited their usual tendency to withstand short-term pressures toward downward adjustment, but were affected by the strong monetary forces making for increases during that time. The insufficiently coordinated movements of wages and living costs led to fluctuations in real wages much sharper than those shown by the comparatively smooth unemployment record.

Several of the annual real wage series record levels lower in 1920 than in 1919. This showing might be explained in part by the unreliability of living-cost computations in 1919, the strong decrease in real wages during the first few months of 1920, and the fact that after 1920 the computation of real wages was based on a cost-of-living index which lagged seven days behind the earnings month. But even after allowance for these statistical problems, real wage levels can have increased only moderately between those two years despite an apparent increase of about 45 percent in the industrial production index.

The peculiar conditions of economic reconstruction during the immediate postwar years may shed some light on this seeming inconsistency. The year 1919, as compared with the preceding war year, witnessed a strong reduction of producers' goods output and a relatively fast recovery of consumers' goods. This was a consequence of economic demobilization and of the pressing need to feed, clothe, and warm the war-weary defeated population. In the following year there was a sharp change in emphasis; reconstruction of productive resources was now the immediate goal. The index of producers' goods output rose from 37 to 64 in 1920. Although the output recovery of the goods included in the index might have been faster than of producers' goods at large, there can be no doubt that during its prosperous phase the inflation was a producers' goods rather than a consumers' goods boom. Emphasis on producers' goods output was stimulated in part by the need to replace the destroyed, outworn, or ceded capital equipment. It was enhanced also by the government's activity in road and canal building, electrification, and other projects designed to reduce demobilization unemployment and to help in reconstruction.

Most important, perhaps, were the effects of the inflation itself. The huge profits accruing from sales at ever-increasing price levels, a tax system not adapted to claim any substantial share of these profits, and the urge to protect cash assets against depreciation led businessmen to augment their properties. Companies built factories, replaced their war-worn equipment, even bought more than they could expect to use. In a curious mixture of aggressive and defensive speculation, producers acquired raw materials, piled up semifinished goods, and held on to finished inventories. They were motivated not only by the wish to assure "profits" from the rising price level; they saw also in the accumulation of producers'

goods one of the few available means of protecting their assets.<sup>45</sup> The emphasis on producers' goods dovetailed effectively with the lag of money wages behind wholesale and retail prices, which tended to reduce labor costs and to decrease the share of the national product available to consumers. Note also that agricultural output destined primarily for domestic consumption was especially low during the first postwar years, that some part of the national product went into reparations, and that unfavorable exchange rates stimulated exports. These factors kept business activity in high gear during the early postwar years, while consumers' goods production and real wages hovered about relatively low levels. Indeed, in those years the beneficial aspects of inflation seemed so obvious to some of Germany's outstanding businessmen that they regarded efforts aimed at stabilizing or raising the value of the currency as an invitation to catastrophe.<sup>46</sup> This attitude was perhaps encouraged by a Reichsbank credit policy which permitted expansion of corporations, acquisition of competing enterprises, and retirement of industrial bonds at practically no cost—since loans could be repaid in depreciated currency.

From the autumn of 1922 to the end of 1923 real wages changed in conformity with deteriorating general economic conditions. The high replacement costs of merchandise sold led to a gradual decrease, and in some cases a virtual disappearance, of inventories. Declining productivity impaired the favorable export position of German manufacturers. As wage rates caught up with wholesale prices the much-touted cost-price advantages of the early inflation vanished. Producers now frequently found themselves in possession of capital equipment which increased their obligations without contributing either to production or to increased productivity. In the face of declining production, growing unemployment, and vacant shelves in the food stores, wages lost more and more ground in their race with living costs. Both consumers' goods and producers' goods output declined materially from 1922 to 1923, and with them real wages and the standard of living. According to some sources, conditions were as bad or worse than during the preceding war. The cities were in an extremely precarious situation regarding food supply, since farmers refused to deliver produce except in exchange for goods. And again, as during the last years of the war, access to friends or relatives in the country was more important for survival than money or real wages.

Because of the unsatisfactory nature of the data on money wages and living costs for the period of hyperinflation, it is desirable to check the major results of the computation of real wages against other evidence. Information on per capita consumption provides some such measures (see Table 58). The sharply reduced consumption of important commodities is noteworthy, whether consumption during the entire inflation is compared

<sup>45</sup> See *IKF Sonderheft* 31, pp. 25 ff.; and Bresciani-Turroni, *The Economics of Inflation*, pp. 196-97.

<sup>46</sup> Bresciani-Turroni, *ibid.*, p. 191.

TABLE 58

Per Capita Consumption of Selected Goods, 1913 and 1920-1923  
(1913=100)

	1913	1920	1921	1922	1923
Potatoes	100 <sup>a</sup>	...	47 <sup>a</sup>	80 <sup>a</sup>	62 <sup>a</sup>
Rice	100	81	132 <sup>b</sup>	66	69
Meat	100	...	...	61	54
Herring	100	223	75 <sup>b</sup>	60	91
Imported fruit	100	29	21 <sup>b</sup>	19	16
Sugar	100 <sup>c</sup>	72 <sup>c</sup>	88 <sup>c</sup>	109 <sup>c</sup>	103 <sup>c</sup>
Salt	100	121	117	163	122
Cocoa	100	96	161 <sup>b</sup>	177	104
Coffee	100	27	50 <sup>b</sup>	24	25
Beer	100	37	53	50	44
Distilled spirits	100	25	36	71	43
Cotton	100	37	53 <sup>b</sup>	59	41

<sup>a</sup> Fiscal year, starting July 1.

<sup>b</sup> May-December 1921.

<sup>c</sup> Fiscal year, ending August 31.

SOURCE: *IKF Sonderheft* 31, p. 27; and *Jahrbuch* 1924-25, pp. 306 ff., and 1930, pp.400 ff.

with that of 1913, or consumption of 1923 is compared with that of earlier inflation years. It is likely, of course, that some of the figures, particularly those for domestic goods, may understate true consumption. Barter arrangements and distribution by private channels may have caused many a head of cattle or sack of potatoes to escape the statistical enumerator. But the information on consumption of beer and cotton goods is less likely to be distorted, and these data show similarly low levels. All in all, it can be said that both the index numbers of industrial production and the scattered data on per capita consumption tend to corroborate the broad findings on real wage levels during the inflation. These levels were substantially below, and during the last phases of the crisis pitifully below, the real wages that prevailed before the outbreak of World War I.

### *Wages under National Socialism*<sup>47</sup>

#### GENERAL

*Labor Market Changes.* This section treats the last of the unusual episodes in the Reich's history—the period of National Socialism, lasting

<sup>47</sup> For the material in this section the author is indebted to prior studies of German wage conditions. Especially instructive are three articles by René Livchen in *International Labour Review*, August 1942, December 1943, and July 1944; John P. Umbach's article on "Labor Conditions in Germany," *Monthly Labor Review*, U.S. Bureau of Labor Statistics, March 1945; Jürgen Kuczynski's *Germany under Fascism, 1933 to the Present Day*, Vol. III, Part 2 of *A Short History of Labour Conditions under Industrial Capitalism* (London, 1944); and Otto Nathan's *The Nazi Economic System; Germany's Mobilization*

from 1933 to 1945. The advent of National Socialism wrought dramatic changes in the political and economic structure of Germany. During most of the period there was an expansion of business activity. But since the social product, particularly in the war phases of the expansion, consisted increasingly of arms, supplies for the armed forces, and the means of producing and transporting such material, the customary benefits of accelerated business activity and high employment accrued to the German people only to a very limited degree.

The labor policy of the National Socialist regime and the principal measures of wage control have been outlined previously,<sup>48</sup> though scant attention has been paid to the enormous changes in the composition of the work force. During the early years of National Socialism, when the creation of jobs for heads of families was a primary concern of the regime, the most important changes in the composition of the work force were probably an increase in the proportion of unskilled workers and a decrease in the proportion of employed women. Later, the armament drive augmented the relative importance of producers' goods industries. The aim of economic self-sufficiency also affected the industrial distribution of the work force. And finally, when war increasingly drew Germany's manpower into the armed services, the ranks of the employed were replenished by more extensive use of female workers, by recruitment of youths, the aged, the handicapped, and by employment of voluntary or impressed foreign workers and prisoners of war. The labor supply was stretched further by compulsory service of civilians at military constructions, the "Farm Year" for German girls, furloughs to military men for industrial or agricultural employment, increased part-time work by mothers, and by similar arrangements.

The net effect of the wartime labor recruitment measures was merely to maintain the level of the civilian labor force in the face of the heavy military draft. At the same time, the skill, age, sex, regional, industrial, and ethnic composition of the employed population changed drastically. Despite the extreme needs for manpower during the war, the number of native Germans in the total labor force (civilian and armed services) barely increased after 1939. The native civilian labor force shrank, of course, but this was at least partly compensated by a large influx of foreigners. The result was an over-all decline of the total civilian labor

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*for War* (Duke University Press, 1944), Chapters 7, 8, and 10. These authors studied labor market and wage control (Livchen, Nathan), actual wage behavior (Livchen, Umbach, Kuczynski) and labor conditions other than wages (Kuczynski, Nathan). Within the limited scope of the present section their findings will be reported to the extent necessary for an understanding of the atypical behavior of wages under National Socialism. Readers interested in the problems of totalitarian labor market administration or in the working and living conditions of industrial labor during the Third Reich should consult these studies directly.

<sup>48</sup> See Chapter 1, last pages of the section on Determination of Wages and Working Conditions.

force (natives and foreigners) from 39.4 million in 1939 to 36.1 million in 1945.<sup>49</sup>

*Wage and Labor Allocation Policies.* The policies of National Socialism on wages and the labor market<sup>50</sup> were subordinate to its major economic program, designed to bring the national product to a maximum, and within that product the portion devoted to military needs. A corollary of the emphasis on military needs was the reduction of civilian consumption to a minimum compatible with social acceptance—a policy described by the slogan, “guns before butter.” Labor recruitment plus a combination of low basic rates and an efficiency wage system were to swell the national product. The shift toward “essential” output was furthered by material allocation, increasingly stringent employment controls, and greater earnings opportunities in war industries. Limitation of civilian consumption was brought about by wage-rate stabilization, taxes, quasi-compulsory contributions, and forced savings. Most of the labor market and wage-control measures, developed during the prewar years, were tightened during the war period. The differences between the labor and wage policies of the two world wars are striking: the earlier improvised, barely coordinated, and poorly implemented regulations were replaced by a preparedness policy and an administrative control apparatus developed for about six years before actual military operations began.

Wage rates were virtually stabilized by the regime at the lowest levels struck in the course of the Great Depression. While these were minimum rates and theoretically could be exceeded, during the first years of National Socialism unemployment was still substantial, acting as a brake on excess payments. Furthermore, the expressed policy was not to increase rates until all unemployment had been absorbed. Later, when improving employment conditions tended to exert upward pressure on wage rates, the restraining actions of the labor trustees prevented more than nominal advances. Even under war conditions the rigid control of wage rates was relaxed only to permit adjustments of the most glaring inequities. From 1938 on, when payments above the minima became more frequent, the labor trustees were empowered to fix maximum wages in certain industries.<sup>51</sup> And after the launching of the war the trustees were actually required to set compulsory wage maxima.<sup>52</sup>

The National Socialist regime could not rest satisfied with controlling wage rates. There was the economic necessity for wages to maintain or increase their incentive function, for more hours to be worked, and at

<sup>49</sup> For statistical details and interpretation of these changes see Clarence D. Long, *The Labor Force in War and Transition, Four Countries*, Occasional Paper 36, (National Bureau of Economic Research, 1952), pp. 17 ff. and 37 ff.

<sup>50</sup> See also Chapter 1, last pages of the section on Determination of Wages and Working Conditions.

<sup>51</sup> Decree of June 25, 1938.

<sup>52</sup> War Economy Order of September 4, 1939.

the same time, for wage earners' income to be prevented from rising unduly. The very rigidity of rates, in the face of rising prices, naturally strengthened the incentive to earn more. Increasing use was made of piece work in order to relate wage payments more closely to output and thus to induce greater exertion. Redetermination of piece rates in cases of "excessive" earnings, and a tough policy of establishing low basic efficiency rates, where there were new products or changed specifications, served to maintain earnings incentives. The workers found that they had to work longer hours and produce more goods if they were to maintain or to raise their plane of living.

At the same time the regime had to limit civilian claims on consumers' goods—the increase of earnings had to be kept under control. Since the drive for large total output implied high levels of employment and hours, the control had to be applied to the manageable factors making for the excess of hourly earnings over rates.<sup>53</sup> Such factors included voluntary overpayments, circumvention of wage stabilization orders by spurious promotions, gratuitous premium payments, special bonuses, paid vacations, payments into savings funds, payments of insurance or tax contributions by the employer, and so forth. In addition, there were, of course, bona fide promotions to higher paying jobs, increased incidence of work at premium rates, and establishment of favorable base rates in work remunerated on an output basis. In practically all these areas the government intervened to limit increases in earnings.

As previously noted, voluntary payments above minimum rates were prohibited. Circumvention of rate regulations was countered by an order requiring specific permission before revision of wage schedules, reclassification of occupations, or changes in the terms of employment.<sup>54</sup> Unwarranted payment of special premiums was made a punishable offense. Bona fide promotions were not discouraged, but improvement of a worker's earnings position simply by transferring him into a better-paying establishment or industry was curtailed; such changes were made subject to the approval of the employment exchanges.<sup>55</sup> The authorities tried first to abolish, and later to modify, premium payments for overtime, night and holiday work, but in order to maintain morale they finally had to reinstitute these payments on their old scale.<sup>56</sup> Also for newly created occupations, or employment of a new type of worker in an

<sup>53</sup> The shift from low-paying consumers' goods industries to higher-paying producers' goods industries, for instance, was not suitable for intervention within the framework of basic policies. However, even in that case, the wage rate stabilization prevented the development of extreme wage disparities and thus helped to curb the effects of inter-industry shifts.

<sup>54</sup> Decree of June 25, 1938. The decree was not very successful, according to Livchen, *op. cit.*, Aug. 1942, p. 139. An order of April 25, 1941 required consent of the labor trustees before a worker could be promoted.

<sup>55</sup> Orders of December 29, 1934; February 11, 1937; September 1, 1939.

<sup>56</sup> Orders of September 4, 1939; November 16, 1939; November 17, 1939; December 12, 1939; September 3, 1940.



established occupation, the government saw to it that wages were kept at what it considered "economic" levels. Women replacing men received 80 percent of men's rates on time, but the same rates on piece work.<sup>57</sup> And in the employment of "substandard" labor, undercutting of normal rates was permitted.<sup>58</sup> Foreigners, prisoners of war, and other irregulars were remunerated at special reduced rates. In order to limit earnings derived from piece work, the government introduced in some industries an interesting system of efficiency wages, whereby average earnings levels could be held fairly constant.<sup>59</sup> Throughout the war period the government insisted on frequent redetermination of basic piece rates. This was done, not only to curtail purchasing power, but also to maintain the incentive function of the piece rates in cases of rising output per man. Physical scarcities of consumers' goods deprived "extra" money earnings of much of their practical value. Prompt adjustment of piece rates forced workers to exert themselves in order to make ends meet.

The requirement that workers must obtain permission for job changes has been mentioned. There was indeed a close interrelation between wage and mobility controls. If wages were to be stabilized or nearly stabilized it was necessary (1) to remove the pressures on wage levels set up by any spontaneous movement of workers to higher-paying industries, occupations, localities, and so on, and (2) to set up alternative allocating mechanisms to shift labor to places where workers were needed. Thus wage stabilization required both a restrictive and an affirmative control of mobility. Conversely, to support a system of labor allocation, it was necessary to limit wage inducements leading to undesired mobility. The National Socialist government developed wage and mobility controls in close correspondence. A decree of August 1934 and an Act of November 1935 gave to the Reich Institute of Employment Services exclusive power over work placement, vocational guidance, and assignment of apprentices. Under a law of February 1935, all important categories of workers<sup>60</sup> received workbooks for recording their training, work history, and other pertinent facts. These workbooks became a most important tool of labor allocation. Even before the outbreak of the war, hiring and firing in certain industries were subject to the consent of the employment office. After September 1939 the administration of labor allocation was tightened. A change of job before permission was granted became a criminal act. The right to control job changes and conscript labor gave the authorities complete power to freeze or shift labor at will. They used these powers extensively.<sup>61</sup>

<sup>57</sup> *Reichsarbeitsblatt* 1940, p. 301; circular to labor trustees.

<sup>58</sup> Decree of October 15, 1935. See also Nathan, *op. cit.*, p. 186.

<sup>59</sup> The efficiency ratings controlled the distribution of earnings rather than their average levels. See Umbach, *op. cit.*, p. 511.

<sup>60</sup> By 1939 about 36 million workers were covered.

<sup>61</sup> Umbach, *op. cit.*, pp. 123-27.

## CHANGES IN MONEY WAGE LEVELS

*Wage Rates.* Wage rates had decreased by 21 percent from their high prosperity plateau to the trough in general business conditions reached in August 1932. Although business activity and labor market conditions started to improve from that time on, wage rates continued to decline through October 1932, and experienced another small downward adjustment from February to March 1933. It was at this level that the National Socialist regime introduced its stabilization program.<sup>62</sup> The virtual

<sup>62</sup> During 1933 wage rates were kept stable by administrative measures. The labor act of January 20, 1934 gave to the labor trustees formal sanction to regulate wages in their districts.

stability of money wage rates during the subsequent six years is without parallel in German wage history. Up to 1933 wage rates had increased in all expansions and in most of the milder contractions. During 1933-39 they rose less than 1 percent despite a spectacular spurt in production and employment, and in the face of a tightening labor market. The following tabulation compares employment and wage-rate changes between selected years from 1929 to 1944.

<i>Year</i>	<i>Employment</i>	<i>Wage Rates</i> (1932 = 100)
1929	143	123
1932	100	100
1933	104	97
1939	162	98
1944	160	100

SOURCE: Appendix Tables A-1 and A-2.

Up to 1937, the wage administration merely perpetuated the level and structure of wages as they had developed in the course of the collective bargaining efforts, arbitration awards, and emergency decrees of the Weimar Republic. Later the labor trustees began to make minor adjustments where special inducements were needed or where major inequities existed. Before the outbreak of World War II wage rates of building, mining, textile, and farm workers were increased slightly, and some regional differentials, which had created difficulties in connection with the allocation of workers to plants in eastern Germany, were reduced. Altogether, the adjustments made before World War II led to a rise of less than 1 percent in the wage-rate index. Even under the pressures of the war in progress the stability of wage rates was largely preserved; between 1939 and 1944 a further rise in wage rates amounted to only 2 percent.

Between 1933 and 1944 the total rate increase came to less than 3 percent. In evaluating this finding we must, however, keep some qualifications in mind. First, the reported rates were minimum rates and were on occasion exceeded before the outbreak of the war. Second, the index is standardized

with regard to the relation between time rates and piece rates; in fact, however, piece rates—usually about 15 percent higher than time rates—gained in importance. Third, the index is standardized with regard to sex, age, skill, and industrial composition and does not reflect any shifts among these categories. Fourth, despite the regime's attempts to prevent circumvention of the wage stabilization measures, there was a good deal of wage adjustment by subterfuge.

*Earnings.* The stabilization of wage rates dampened, but by no means prevented, fluctuations in earnings. Table 59 compares the movements of

TABLE 59  
Average Hourly Wage Rates, and Average Hourly and Weekly Earnings,  
1932-1944

<i>Year</i>	<i>Hourly Rates</i>	<i>Hourly Earnings</i>	<i>Weekly Earnings</i>
1932 = 100			
1929	122.4	132.7	149.4
1932	100.0	100.0	100.0
1933	97.0	96.9	102.2
1934	96.8	99.3	109.7
1935	96.8	100.8	122.3
1936	96.8	102.5	116.6
1937	97.0	104.6	120.6
1938	97.4	108.2	126.5
1939	97.9	111.3	131.3
1940	97.9	113.9	135.2
1941	98.8	119.2	144.0
1942	99.4	121.1	144.9
1943	99.6	122.0	145.5
1944	99.6	121.8	143.8
1939 = 100			
1929	125.0	119.2	113.8
1939	100.0	100.0	100.0
1940	100.0	102.4	103.0
1941	101.0	107.1	109.7
1942	101.6	108.8	110.4
1943	101.8	109.6	110.9
1944	101.8	109.5	109.6

SOURCE: Based on data in *Wirtschaft und Statistik, passim; Jahrbuch, passim; Handbuch 1928-44, passim*. For details see source to Appendix Table A-2.

hourly rates, hourly earnings, and weekly earnings. By 1944 hourly wage rates had just about regained 1932 levels, hourly earnings were 22 percent above 1932, and weekly earnings 44 percent. In both hourly and weekly earnings the rate of increase slowed down appreciably after 1941. Between 1943 and 1944 there were actual declines. This behavior reflects the major

military and economic experiences of the war—the two initial years of economic and military successes; the subsequent period of all-out war, beginning with the Russian campaign and ending with the major reverses in North Africa and Russia; and the final years of retreat and defeat. During the early war years hourly and weekly earnings rose. Their subsequent leveling-out is to be explained largely by the fact that by 1941 working hours had been expanded close to socially tolerable limits. Furthermore, raw materials shortages, air raid warnings, and bomb damage began to cut into operations, and the more extensive use of substandard labor (such as juveniles, invalids, elderly people) also affected the averages. Thus from 1943 onward, these factors led to actual declines in hourly as well as in weekly earnings.

The behavior of earnings under National Socialism can be traced in greater detail on the basis of quarterly measures. Index numbers of average hourly and average weekly earnings for all industry are available from the third quarter of 1933, and presented in Table 60. From December 1935 on, the quarterly data on earnings distinguish hourly and weekly earnings, earnings for men and women, earnings for skilled and unskilled, and earnings for producers' and consumers' goods industries (Table 61). The quarterly data in general show a relatively smooth progression, particularly in the hourly-wages series. Weekly earnings reveal more conspicuous short-term fluctuations, both seasonal and nonseasonal.

Occasionally we are able to gauge the effect of statistical standardization on the earnings measures. The official earnings index is standardized for skill, age, sex, and industrial composition.<sup>63</sup> While in its standardized form the hourly index increased by about 23 percent between 1933 and 1941, the same measure with currently changing industry weights would show a rise of about 33 percent. The difference provides some indication of the effect of shifts of wage earners toward higher-paying industries. Average earnings for all wage earners in a sample of large enterprises exhibit trends basically similar to those traced by the highly standardized earnings indexes previously described. And the same is true for averages computed from income distributions in certain insurance statistics.<sup>64</sup> Obviously, the standardizations employed in the official index affect that index in different directions. While standardization of industrial composition, for instance, dampens the rise of the measure, standardization of sex composition tends to boost it. Our comparison of the various measures suggests that the official index, apart from fulfilling its specific function, also provides a fair indication of approximate changes in the unweighted average of earnings for all German wage earners.

*Wage Changes and Wage Control.* The unusual degree of wage stability in the face of rapidly rising employment has been mentioned previously.

<sup>63</sup> For details on the construction of the index see *Wirtschaft und Statistik*, 1936, pp. 283-286.

<sup>64</sup> See Livchen, *op. cit.*, December 1943, p. 725, for data and more detailed discussion.

TABLE 60  
Average Hourly and Average Weekly Earnings, All Industry, 1933-1943  
(1936 = 100)

<i>Year and Month</i>	EARNINGS	
	<i>Hourly</i>	<i>Weekly</i>
1933 Sept.	94.7	87.8
Dec.	95.8	91.5
1934 Mar.	96.4	93.0
June	96.4	93.4
Sept.	97.1	93.4
Dec.	98.0	96.5
1935 Mar.	98.2	95.1
June	98.2	96.2
Sept.	98.2	96.9
Dec.	98.9	97.5
1936 Mar.	99.3	97.5
June	99.7	99.5
Sept.	100.2	100.6
Dec.	100.6	102.4
1937 Mar.	101.3	102.1
June	101.4	102.8
Sept.	102.4	103.7
Dec.	103.2	105.5
1938 Mar.	103.6	105.2
June	104.4	105.6
Sept.	106.5	110.7
Dec.	107.8	112.4
1939 Mar.	108.1	111.1
June	109.7	114.5
Sept.	107.3	110.6
Dec.	109.2	114.0
1940 Mar.	110.0	112.8
June	...	...
Sept.	112.4	119.1
Dec.	114.5	120.8
1941 Mar.	115.5	122.2
June	...	...
Sept.	117.3	125.0
Dec.	117.8	124.3
1942 Mar.	117.5	123.6
June	...	...
Sept.	118.9	125.0
Dec.	119.5	126.4
1943 Mar.	119.3	126.5

SOURCE: *Wirtschaft und Statistik*, 1938, p. 159; 1939, p. 520; and 1943, p. 279.

**TABLE**  
Average Hourly and Weekly Earnings, Major Classifications,  
(December

Year and Month	HOURLY EARNINGS						
	All Industries	Producers' Goods	Consumers' Goods	Men		Women	
				Skilled, Semiskilled	Unskilled	Skilled, Semiskilled	Unskilled
1935 Dec.	100	100	100	100	100	100	100
1936 Mar.	100.4	100.4	100.5	100.4	100.3	100.7	100.3
June	100.8	100.9	100.4	101.0	100.4	100.5	100.2
Sept.	101.3	101.4	100.9	101.5	100.6	101.1	100.9
Dec.	101.7	101.9	100.8	102.0	101.1	101.2	101.7
1937 Mar.	102.4	102.6	101.6	102.6	101.5	102.3	102.3
June	102.5	102.7	101.3	102.9	101.5	101.8	101.5
Sept.	103.5	103.8	101.8	104.0	102.6	102.1	102.8
Dec.	104.3	104.8	101.7	104.9	103.3	101.7	103.9
1938 Mar.	104.7	105.1	102.7	105.5	103.6	102.5	104.3
June	105.3	105.9	103.3	106.1	104.9	103.1	104.3
Sept.	107.7	108.2	105.1	108.4	107.2	105.1	106.9
Dec. <sup>a</sup>	109.0	109.5	106.2	109.8	107.8	106.0	108.8
1939 Mar.	109.3	109.7	106.9	110.0	108.1	107.0	109.1
June	110.9	111.3	108.3	111.7	109.9	108.2	110.2
Sept.	108.5	108.6	107.2	109.4	106.6	107.3	109.8
Dec.	110.5	110.7	108.5	111.0	109.6	108.5	110.0
1940 Mar.	111.2	111.3	109.8	111.8	109.4	110.1	111.9
June	...	...	...	...	...	...	...
Sept.	113.6	113.7	112.8	114.6	111.6	114.0	113.7
Dec.	115.8	115.9	114.5	116.7	113.8	115.1	115.4
1941 Mar.	116.8	116.8	116.7	117.8	114.1	117.9	117.0
June	...	...	...	...	...	...	...
Sept.	118.7	118.6	119.0	119.6	116.2	120.6	119.3
Dec. <sup>b</sup>	119.3	119.3	119.5	120.2	116.8	120.8	120.0
1942 Mar.	118.9	118.9	119.7	120.1	115.4	121.4	119.9
June	...	...	...	...	...	...	...
Sept.	120.3	120.3	121.3	121.9	116.2	122.9	119.9
Dec.	120.9	120.9	121.7	122.4	116.9	123.0	120.7
1943 Mar.	120.7	120.7	122.5	122.1	117.1	123.6	119.4

<sup>a</sup> Beginning December 1938, including Austria.

<sup>b</sup> Beginning December 1941, including Sudetenland and eastern territories incorporated into the Reich.

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Quarterly, December 1935 to March 1943  
1935 = 100)

Year and Month	WEEKLY EARNINGS						
	All Industries	Producers' Goods	Consumers' Goods	Men		Women	
				Skilled, Semiskilled	Unskilled	Skilled, Semiskilled	Unskilled <sup>d</sup>
1935 Dec.	100	100	100	100	100	100	100
1936 Mar.	99.9	99.4	102.1	99.9	99.7	102.6	98.6
June	102.0	101.7	103.4	102.1	101.9	102.1	99.6
Sept.	103.1	102.7	105.2	103.2	102.6	104.6	99.9
Dec.	105.0	104.5	106.5	105.6	102.9	107.0	103.9
1937 Mar.	104.7	104.3	106.1	105.2	102.6	106.4	103.1
June	105.4	105.1	106.3	105.8	104.5	105.0	101.7
Sept.	106.3	105.9	108.2	106.5	105.9	106.6	102.7
Dec.	108.1	107.6	110.6	108.9	105.2	109.4	105.9
1938 Mar.	107.8	107.3	110.2	108.9	105.5	108.7	103.8
June	108.2	107.7	110.6	109.1	106.7	107.7	103.5
Sept.	113.5	112.9	116.4	114.3	113.3	114.2	107.4
Dec. <sup>a</sup>	115.2	114.4	119.8	116.5	111.9	118.2	111.5
1939 Mar.	113.9	113.1	118.6	115.3	110.6	116.7	109.2
June	117.4	116.8	120.7	118.8	116.4	116.9	109.6
Sept.	113.4	113.4	112.7	115.1	112.0	107.1	106.5
Dec.	116.9	117.1	114.2	118.7	116.5	108.6	107.2
1940 Mar.	115.7	115.4	116.3	117.7	112.3	111.2	106.4
June	...	...	...	...	...	...	...
Sept.	122.2	121.5	125.1	124.8	119.0	121.0	108.8
Dec.	123.9	123.1	128.6	126.4	119.8	123.8	111.7
1941 Mar.	125.4	124.7	129.1	128.3	121.1	123.7	112.0
June	...	...	...	...	...	...	...
Sept.	128.3	127.6	131.8	131.3	125.1	126.2	113.6
Dec. <sup>b</sup>	127.5	126.7	131.5	130.5	122.3	125.6	113.9
1942 Mar.	126.7	126.1	130.2	130.4	120.0	124.3	111.7
June	...	...	...	...	...	...	...
Sept.	128.1	127.5	131.4	132.0	122.8	123.3	109.7
Dec.	129.5	129.0	132.2	133.6	124.2	124.4	110.0
1943 Mar.	129.6	128.9	134.0	134.1	123.9	125.8	107.3

SOURCE: *Wirtschaft und Statistik*, 1937, p. 515; 1938, pp. 691, 1011; 1939, p. 235; 1941, p. 121; and 1943, p. 280.

TABLE 62  
Skill Differentials, Average Hourly and Weekly Earnings, by Industry,  
Selected Years, 1936-1944  
(differences between earnings of skilled and earnings of unskilled  
workers, expressed in percent of the former)

	HOURLY				WEEKLY			
	1936	1938	1939	March 1944	1936	1938	1939	March 1944
<i>Male Workers</i>								
Mining	19.7	20.4	20.9	...	17.3	20.1	19.6	...
Hard coal	24.1	26.2	27.9	...	19.4	23.3	25.8	...
Iron ore	20.9	21.4	22.3	...	17.8	18.4	17.6	...
Iron and steel <sup>a</sup>	17.9	19.4	19.6	22.0	20.7	25.9	24.4	26.6
Nonferrous metals	...	14.1	14.9	23.2	...	19.1	19.7	28.9
Foundries	...	23.6	24.3	31.1	...	23.2	24.4	33.9
Metalworking	31.9	32.0	31.2	34.3	33.1	34.4	33.5	37.4
Machinery	31.7	33.4	32.7	37.0	33.0	35.4	33.5	39.5
Electrical goods	29.8	32.1	31.9	34.9	31.6	34.5	34.0	38.4
Instruments	31.8	34.4	33.1	33.5	32.7	35.5	34.7	34.7
Chemicals <sup>b</sup>	...	23.2	23.0	...	...	26.2	27.7	...
Rubber and products	...	17.3	18.3	...	...	24.1	25.1	...
Stone and clay	15.1 <sup>c</sup>	22.4	21.7	24.1	16.2 <sup>c</sup>	24.9	24.9	28.4
Pottery <sup>c</sup>	...	22.1	21.9	26.6	...	21.0	19.8	29.1
Glass	17.2 <sup>c</sup>	28.6	26.7	31.6	23.8 <sup>c</sup>	29.4	27.0	33.7
Building <sup>d</sup>	18.1	19.2	20.1	13.7	19.7	22.7	23.2	11.5
Woodworking	12.6	15.3	14.9	9.9	14.7	17.9	18.4	24.0
Papermaking <sup>c</sup>	8.7	8.0	7.6	10.8	11.2	11.2	12.0	17.9
Book printing <sup>e</sup>	17.6	16.2	16.6	16.3	16.0	14.3	13.4	15.3
Textiles	22.6	20.7	20.0	22.8	21.3	19.2	18.2	23.7
Baking	22.0	16.6	20.9	21.0	21.4	23.0	22.8	23.1
Brewing <sup>c</sup>	12.7	12.4	12.4	12.6	13.0	12.9	12.3	17.6
<i>Female Workers</i>								
Pottery	8.5	13.7	13.7	15.1	7.3	13.7	13.5	17.5
Glass <sup>f</sup>	...	11.6	10.0	9.9	...	10.9	9.9	17.1
Textiles	22.9	21.7	20.2	17.4	22.6	21.6	19.3	19.7
Baking	11.7	11.8	10.9	14.3	10.7	12.5	13.4	25.3

<sup>a</sup> Helpers vs. first man.

<sup>b</sup> Unskilled vs. foremen.

<sup>c</sup> Helpers vs. skilled and semiskilled combined.

<sup>d</sup> Helpers vs. carpenters.

<sup>e</sup> Semiskilled vs. skilled.

<sup>f</sup> Helpers vs. semiskilled.

SOURCE: Appendix Table A-47.



We can best observe the results of wage-rate stabilization by a comparison of conditions in the two world wars. During World War I wage rates about doubled; during World War II they rose by only 2 percent, a sharp contrast, indeed. The success of the National Socialist regime in keeping money wage rates close to their depression levels cannot be gainsaid, though it appears to have surprised some of the wage administrators themselves!<sup>65</sup>

The effects of controls on the course of earnings are brought out in a comparison of earnings and employment between 1929 and 1939. Though employment in 1939 was considerably above its previous prosperity levels, hourly as well as weekly earnings were materially lower. These comparisons do not indicate the separate effect of wage controls, since price levels in 1939 also were below those of 1929 (see Appendix Tables A-1 and A-2). The effectiveness of controls upon earnings during the war is illustrated by comparison of the records of the two world wars; during World War I earnings increased 120 to 150 percent, during World War II about 10 percent.

Some of the control measures are reflected directly in the short-term movements of the quarterly wage record. For example, the fluctuations observed shortly after the outbreak of World War II must be interpreted in terms of the war emergency decree and its later modifications. Both hourly and weekly earnings were temporarily reduced upon the abolition of premium payments.<sup>66</sup> However, the principal result of the Nazi control measures lies in their gradual, cumulative effects on earnings levels—in keeping with the over-all objectives of the regime's economic policy.

#### WAGE DIFFERENTIALS<sup>67</sup>

*Skill Differentials.* As a result of the wage-rate stabilization program, changes in the rate structure were few and of minor importance. Thus, any analysis of skill differentials under National Socialism must be based on earnings.

Table 61 shows that both hourly and weekly earnings of skilled workers rose faster than those of unskilled workers. The deviations became more pronounced after the beginning of World War II. The data imply a widening of skill differentials during both the prewar and the war period, thus reversing the long-term tendencies which prevailed in prior decades.

Skill differentials in percentage form can be derived on an industry-by-industry basis from the breakdown of hourly and weekly earnings statistics by industry, skill, and sex. The basic data are found in Appendix Table A-47 and the differentials in Table 62. The skill differentials range from as

<sup>65</sup> Nathan, *op. cit.*, p. 185.

<sup>66</sup> See Chapter 1, last pages of the section on Determination of Wages and Working Conditions. Part of the drop might also have been due to indirect effects of restrictions on use of raw materials in consumers' industries.

<sup>67</sup> As elsewhere in this study, differentials represent differences between wages of higher-paid and lower-paid workers, expressed in percent of the former.

much as 40 percent in the case of weekly earnings in the machinery industry in March 1944, to a mere 7 percent in the case of weekly earnings of women in the pottery industry in 1936. In the great majority of industries, skill differentials conformed to the trend of the aggregate measure—that is, they widened between 1936 and 1939 as well as during the war itself. This behavior presumably reflects the greater relative scarcity of skilled labor, particularly in armament industries.

The scarcity of information on skill differentials for the period of World War I makes it impossible to carry out any quantitative comparison of their behavior in the two conflicts. We have noted that, in general, skill differentials in war industries tended to widen during the first war, while those in civilian industries more frequently narrowed. The situation was similar during the second war. However, the changes in differentials observable for World War I were more drastic than those for World War II (see Tables 50 and 62), as would be expected in view of the controls, which dampened all changes in wage levels and in the wage structure during the twelve years of National Socialism.

*Sex Differentials.* When the National Socialists took power they regarded most industrial employment of women with disapproval. This was in keeping with their *Herrenmenschen* ideology, which emphasized the domestic functions of the German woman; more important, it was a correlative of their employment policy, which aimed above all to create industrial jobs for family supporters. Although in the course of the subsequent expansion the employment of women increased, the regime concentrated its initial employment program on male workers. Between 1932 and 1937, employed male membership in sickness insurance funds (in the Reich territory of 1937) rose from 8.2 million to 13.0 million, but female membership only from 4.8 to 5.9 million—with a reduction of women's share in total employment from 37 percent to 31 percent. With the approach of high employment levels and the drafting of men into the armed forces, the regime began to take a more kindly view of the industrial employment of women. From 1937 on, the number and share of women in total employment grew rapidly, from 5.9 million in 1937, to 6.9 million in 1939, and to more than 9.0 million in 1944—a rise from 31 to 33, and finally to 44 percent in the three respective years.<sup>68</sup> The final desperate attempts of the Nazi rulers to ward off defeat in the war relied heavily on the last remaining human resource—female labor. The total mobilization measures following the attempt on Hitler's life in July 1944 included compulsory registration of women up to the age of 50 for war-work. A decree of February 1945 ordered conscription of all women between 16 and 60 years old for auxiliary work with the *Volkssturm*,

<sup>68</sup> See *Handbuch* 1928-44, p. 478. The basic data exclude armed services and war prisoners, but include foreign workers. For a discussion of the relatively small additions of native German women to the labor force see Long, *The Labor Force in War and Transition, Four Countries* (Occasional Paper 36, National Bureau of Economic Research, 1952), p. 37 ff.

but empowered local leaders to assign the women to other types of work where needed.<sup>69</sup> In view of these extreme measures to recruit women workers it is remarkable that the statistics do not seem to indicate any substantial rise in the percentage of women in the native labor force.<sup>70</sup>

The mounting necessity of putting women to work in manufacturing gave rise to many changes. It required technical adjustment of machinery and jobs to female aptitudes and physical strength. It also furthered shifts on the ideological "front"—the emphasis on woman's role in the home gave way to a demand that she fulfill her responsibility to the nation.<sup>71</sup> Finally it caused adaptation of wage policies to the new employment needs. What, then, was the effect of these revised policies upon wage behavior as reflected in sex differentials?

The relative stability of wage rates during World War II precluded any significant changes in sex differentials. More interesting is the behavior of sex differentials in earnings. For hourly earnings, changes in sex differentials from December 1935 to the end of the war were rather small. In weekly earnings, men experienced substantially larger wage increases than women. As the labor market tightened men worked longer hours than women; and part-time work, which reduces the statistical average of weekly earnings, became more prevalent for women than for men. (See Table 61.) Sex differentials did not necessarily change in the same direction for skilled and unskilled workers. Note for instance, that during the war, hourly and even weekly earnings of skilled and semiskilled women increased faster than those of men, but the earnings of unskilled women rose more slowly. The difference is not difficult to explain. With the relentless recruitment of men into the armed services, women began to invade occupations and to shoulder responsibilities previously denied to them. Such opening of new earnings opportunities was more conspicuous in the skilled than in the unskilled trades.<sup>72</sup>

Sex differentials can be computed in percentage form, by industry, for 1936 and subsequent years. They are presented in Table 63. For average weekly earnings, the trend is almost without exception toward a slight widening of the differentials, which must be traced to the fact that the increase in hours was more pronounced for male than for female workers.

<sup>69</sup> Umbach, *op. cit.* p. 502.

<sup>70</sup> For statistical support and discussion of this thesis, see Long, *The Labor Force in War and Transition, Four Countries*, pp. 37 and 40-45.

<sup>71</sup> In their attempts to reconcile the new policies with their basic ideology the leaders of National Socialist women's organizations may well have established a record in free interpretation of terms. They had previously declared that woman's place was in the home, but now women were needed in industry. Hence "home" was redefined as whatever can be "encompassed by the spirit of motherhood," and thus they could state that "our home is Germany, wherever she may need us." See Ruth Köhler-Irrgang, *Die Sendung der Frau in der Deutschen Geschichte* (Leipzig, 1940), p. 235.

<sup>72</sup> As a corollary to this situation, the growth in earnings of skilled women exceeded that of unskilled women substantially more than the growth in earnings of skilled men exceeded that of unskilled men.

TABLE 63  
Sex Differentials, Average Hourly and Weekly Earnings, by Industry,  
Selected Years, 1936-1944  
(differences between earnings of male and earnings of female workers,  
expressed in percent of the former, for skill groups indicated)

	HOURLY				WEEKLY			
	1936	1938	1939	March 1944	1936	1938	1939	March 1944
<i>Nonferrous metals</i>								
Female vs. male unskilled	...	35.6	35.0	32.3	...	38.7	41.1	47.0
<i>Foundries</i>								
Female vs. male unskilled	...	27.0	27.3	30.5	...	33.6	35.4	46.4
<i>Metalworking</i>								
Female vs. male unskilled	23.1	23.1	24.1	26.8	26.0	27.1	29.7	43.6
<i>Machinery</i>								
Female vs. male unskilled	24.8	21.6	22.7	25.5	27.9	27.8	29.7	44.5
<i>Electrical goods</i>								
Female vs. male unskilled	24.7	21.5	21.5	23.9	27.0	25.1	27.0	40.3
<i>Instruments</i>								
Female vs. male unskilled	26.7	24.7	25.7	28.8	29.7	28.7	29.8	47.6
<i>Chemicals</i>								
Female vs. male unskilled	...	34.4	34.0	...	...	38.5	40.3	...
<i>Rubber and products</i>								
Female vs. male unskilled	...	38.4	36.8	...	...	41.1	41.4	...
<i>Stone and clay</i>								
Female vs. male unskilled	35.3	34.1	32.3	34.5	36.7	37.7	36.4	44.2
<i>Pottery</i>								
Female skilled vs. male skilled	...	45.8	44.7	42.5	...	48.6	48.1	53.8
Female unskilled vs. male unskilled	...	39.9	39.0	33.6	...	43.9	44.0	46.3
<i>Glass</i>								
Female semiskilled vs. male semiskilled	...	53.6	52.5	48.6	...	54.3	54.2	57.8
Female unskilled vs. male unskilled	...	43.2	41.5	35.9	...	45.0	44.5	50.7
<i>Papermaking</i>								
Female vs. male unskilled	34.9	35.7	33.9	30.0	39.2	40.8	40.5	46.2
<i>Book printing</i>								
Female vs. male semiskilled	48.9	49.7	48.9	48.8	50.0	51.1	51.8	55.3
<i>Textiles</i>								
Female vs. male skilled	29.1	29.9	29.5	28.5	30.0	32.6	33.7	39.5
Female vs. male unskilled	29.4	30.8	29.7	23.5	31.2	34.7	34.7	36.4
<i>Clothing</i>								
Female vs. male semiskilled	43.0	42.9	42.5	38.1	44.3	45.0	45.4	51.0
<i>Boots and shoes</i>								
Female vs. male production worker	34.5	33.8	33.3	34.9	33.8	33.7	35.0	44.7
<i>Baking</i>								
Female skilled vs. male skilled	42.9	42.6	42.6	38.7	45.8	45.8	46.3	49.4
Female unskilled vs. male unskilled	35.4	39.3	35.4	33.5	38.4	38.4	39.8	50.9

SOURCE: Appendix Table A-47.

For hourly earnings a widening of sex differentials predominates in heavy armament and some other war materials industries, while a narrowing is observable in several consumers' goods industries.

*Industrial Differentials.* In the course of a normal cyclical expansion the output of durable goods tends to rise more rapidly than that of nondurables. Similarly, producers' goods output tends to gain more than consumers' goods. This relation is accentuated during rearmament and war cycles, when producers' goods industries have to satisfy the demand for weapons, for ammunition, war vehicles, and the like in addition to supplying essential replacement and investment demands. So, under the National Socialist regime, the more rapidly expanding industries experienced the most acute labor shortages after they had depleted the pool of unemployed workers attached to them. Such pressures were conducive to offers of higher wages, to longer hours, and to a greater relative importance of premium payments. What we must now seek to determine is whether and to what extent the differential expansion of industries, or groups of industries, was in fact reflected in the changing wage structure. As in the case of other differentials, any conclusions must be based on earnings data.

Table 61 shows hourly and weekly earnings in producers' as well as consumers' goods industries with December 1935 as the base. A rather unexpected feature of this exhibit is that, except for a brief period in 1939, weekly earnings rose more, relative to December 1935, in consumers' than in producers' goods industries. A similar situation obtained during the war in the case of hourly earnings.<sup>73</sup>

Since information on earnings is available by industry from 1936 on, we are able to investigate the differences among earnings for various industries. Actual average hourly and weekly earnings as well as percentage changes between the years 1936 and 1939, and March 1944, are presented in Table 64 for nineteen industries. For hourly earnings, one would seek in vain for a clear-cut differential development of earnings in typical war and typical civilian industries. For instance, the metalworking industries registered a relatively small earnings increase, whereas there was a large increase in boot and shoe manufacture. We can, however, observe a rather forceful tendency on the part of hourly earnings in low-wage industries to increase faster than those in high-wage industries. Weekly earnings present a different picture: there is little evidence of a systematic

<sup>73</sup> German statisticians have been puzzled by this behavior and have advanced several explanations: consumption goods experienced a seasonal low in the base quarter; the textile industry in the base quarter suffered from raw material shortages and therefore worked short time in 1935-36; in the producers' goods industries there occurred a relatively greater dilution of skills; the employment of women changed the composition of the work force more in producers' than in consumers' goods; after combing consumers' goods industries for dispensable manpower, the remaining workers had to perform more overtime work at premium rates. The factors cited are probably contributory rather than alternative.

relation between earnings levels and earnings increases; and, in war industries, weekly earnings tended to advance faster than in civilian industries.

These tendencies are reflected in the following dispersion measures based on nineteen industry averages:

	<i>Hourly Earnings<sup>a</sup></i>	<i>Weekly Earnings<sup>a</sup></i>
1936	20.0	22.1
1939	19.0	22.0
1944 (March)	16.3	22.6

<sup>a</sup> A simplified coefficient of variation is used, consisting of the average deviation (signs ignored) of the industry averages from their own mean, divided by the mean, multiplied by 100.

For hourly earnings we find that industry averages tended to move together. The dispersion measures for weekly earnings do not show significant changes. This means that the tendency toward more equal hourly

TABLE 64  
Average Hourly and Weekly Earnings, Nineteen Industries,  
1936, 1939, and March 1944

<i>Industry<sup>a</sup></i>	HOURLY EARNINGS					
	AMOUNT (pfennigs)			PERCENTAGE CHANGE		
	<i>1936</i>	<i>1939</i>	<i>1944</i>	<i>1936-39</i>	<i>1939-44</i>	<i>1936-44</i>
1 Book printing	106.4	107.0	114.2	+ .6	+ 6.7	+ 7.3
2 Brewing	100.9	101.9	101.5	+ 1.0	- .4	+ .6
3 Electrical goods <sup>b</sup>	92.3	99.8	107.0	+ 8.1	+ 7.2	+ 15.9
4 Iron and steel	88.2	96.5	103.6	+ 9.4	+ 7.4	+ 17.5
5 Instruments <sup>b</sup>	87.4	95.2	102.5	+ 8.9	+ 7.7	+ 17.3
6 Machinery <sup>b</sup>	87.3	94.7	101.1	+ 8.5	+ 6.8	+ 15.8
7 Metalworking	85.7	92.2	96.5	+ 7.6	+ 4.7	+ 12.6
8 Foundries	81.4	92.9	100.0	+ 14.1	+ 7.6	+ 22.9
9 Mining	76.1	83.2	92.4	+ 9.3	+ 11.1	+ 21.4
10 Building	71.6	76.8	82.3	+ 7.3	+ 7.2	+ 14.9
11 Stone and clay	65.0	75.2	80.3	+ 15.7	+ 6.8	+ 23.5
12 Papermaking	63.6	66.8	73.6	+ 5.0	+ 10.2	+ 15.7
13 Books and shoes	63.2	68.5	80.8	+ 8.4	+ 18.0	+ 27.8
14 Glass	61.7	68.2	85.2	+ 10.5	+ 24.9	+ 38.1
15 Pottery	58.0	63.9	71.9	+ 10.2	+ 12.5	+ 24.0
16 Textiles	54.9	58.0	62.8	+ 5.6	+ 8.3	+ 14.4
17 Clothing	54.6	60.4	66.4	+ 10.6	+ 9.9	+ 21.6
18 Sawmills	54.6	63.6	71.8	+ 16.5	+ 12.9	+ 31.5
19 Baking	50.6	53.3	61.8	+ 5.3	+ 15.9	+ 22.1
Average	73.9	79.9	87.1	+ 8.1	+ 9.0	+ 17.9

(continued on next page)

TABLE 64, *continued*

	WEEKLY EARNINGS					
	AMOUNT (marks)			PERCENTAGE CHANGE		
	1936	1939	1944	1936-39	1939-44	1936-44
<i>Industry<sup>a</sup></i>						
1 Book printing	50.49	52.73	56.06	+4.4	+6.3	+11.0
2 Electrical goods <sup>b</sup>	45.34	50.55	52.72	+11.5	+4.3	+16.3
3 Iron and steel	45.53	50.71	65.00	+11.4	+28.2	+42.8
4 Machinery <sup>b</sup>	44.17	48.97	53.29	+10.9	+8.8	+20.6
5 Brewing	43.69	51.97	52.37	+19.0	+ .8	+19.9
6 Instruments <sup>b</sup>	42.89	49.18	52.27	+14.7	+6.3	+21.9
7 Metalworking	42.27	46.24	46.48	+9.4	+ .5	+10.0
8 Foundries	40.29	47.00	52.05	+16.7	+10.7	+29.2
9 Mining	33.73	39.77	47.46	+17.9	+19.3	+40.7
10 Building	32.97	37.31	38.27	+13.2	+2.6	+16.1
11 Papermaking	31.29	34.13	36.91	+9.1	+8.1	+18.0
12 Stone and clay	30.52	36.49	38.59	+19.6	+5.8	+26.4
13 Glass	30.13	33.16	40.47	+10.1	+22.0	+34.3
14 Pottery	27.83	30.51	32.58	+9.6	+6.8	+17.1
15 Boots and shoes	27.64	30.55	35.51	+10.5	+16.2	+28.5
16 Sawmills	26.28	31.06	35.32	+18.2	+13.7	+34.4
17 Clothing	25.36	28.03	26.54	+10.5	-5.3	+4.7
18 Baking	23.76	24.66	25.01	+3.8	+1.4	+5.3
19 Textiles	23.20	26.04	27.17	+12.2	+4.3	+17.1
Average	35.13	39.42	42.85	+12.2	+8.7	+22.0

<sup>a</sup> Ranked by earnings levels, 1936.

<sup>b</sup> Semiskilled male workers only.

SOURCE: *Handbuch* 1928-44, pp. 470-71. Data for 1944 available only for March.

earnings must have been counterbalanced by the greater expansion of hours in the high-wage war industries.

Comparison with World War I can be carried through only in general terms, since industry averages for the earlier period are available for only a limited number of industries and are based on relatively small samples of companies. Earnings averages for the first war period are available only in daily form; since they reflect changes in hours, they are more comparable to the weekly than to the hourly earnings of the second war. The averages for World War I indicated a marked trend toward industrial inequality. The National Socialists, with their effective wage controls, obviously were able to avoid an extreme industrial differentiation of wage incomes.

*Irregular and Regular Work Force.* Under the National Socialist regime, and particularly during the war years, the services of supplementary labor became so important that a brief description of the wages of such workers seems pertinent to the present discussion. The government mobilized some of the auxiliary workers at wages sharply differentiated from those paid to regular workers. This introduced an element of wage differentiation which remained largely unreflected in the official statistics of rates and earnings.

In its efforts to mobilize all available labor resources, the government introduced compulsory service for young men and women, who were summoned to serve a year at agricultural work. There were also a number of so-called "voluntary" services, such as the agricultural year for younger boys and girls, and the domestic year for girl members of the Nazi youth organization. During the war, school children were mobilized to help at harvest time and to perform other essential services—all at nominal remuneration.

Quantitatively more important than auxiliary labor service in its various forms was the regular employment of foreign workers. The following tabulation indicates the increase in their numbers:

	October 1940	January 1944
	(millions)	
Civilian Workers	1.1	6.4
War Prisoners	1.1	2.2
Total	2.2	8.6

SOURCE: E. M. Kulischer, "The Displacement of Population in Europe," International Labour Office, *Studies and Reports*, Series O, No. 8 (Montreal, 1943); and "The Mobilisation of Foreign Labour by Germany," *International Labour Review*, Oct. 1944.

In 1944, about every fourth worker in Germany was a foreigner. Among the foreign civilian workers a sharp distinction must be drawn between eastern and western workers. The latter, at least theoretically, received the same basic wages as German workers, while the eastern workers were paid considerably lower rates.<sup>74</sup> Within the group of eastern workers a further distinction was made between three subgroups. The most favored subgroup consisted of workers from the Baltic countries. They usually were given inferior jobs, received no premium pay for night and holiday work, and paid a special tax of 15 percent on earnings above 9 marks "in order that their previous standard of living not be exceeded." Considerably worse treatment was accorded to Polish workers; a special regulation provided that they were to be employed at the lowest existing rate for each occupation<sup>75</sup> and age, and stipulated that the rules on minimum piece rates would not apply to them. The maximum rates for the Poles were to be 70 percent of the rates received by Germans, and they were to get no family allowances, birth and marriage subsidies, bonuses at Christmas or other times. The third group, the Russians, were in the worst position. Their basic rates were the same as those for German workers, but in accordance with a special decree concerning the remuneration of labor from the newly acquired eastern territories,<sup>76</sup> all employers of Russian workers had to deduct a steeply progressive tax which left such

<sup>74</sup> The sole exceptions are the so-called *Volksdeutsche* (members of the German ethnic group) who were paid German wages.

<sup>75</sup> It appears that the remuneration of Polish skilled workers was at the rates of unskilled Germans.

<sup>76</sup> *Reichsgesetzblatt*, Part I, p. 41, January 20, 1942.



workers a maximum weekly wage of 17 marks, out of which they had to pay 1.50 marks a day for board and lodging. The charge for living expenses could be reduced only if the deductions left a hapless Russian with less than 40 pfennigs a day.<sup>77</sup>

In the drive to stimulate output, special premiums were introduced in August 1943 for efficient Russian workers with satisfactory records of conduct. They were promised a premium of 20 percent after one year of loyal service, 30 percent after two years, and 50 percent after three years. They were not, however, to receive premium pay for overtime, night, or Sunday work. Here is an approximate comparison of wages for German and eastern workers, as of April 1943:

	<i>Unskilled</i>	<i>Skilled</i>
	(marks)	
German workers' weekly wages	24.50	42.35
Minus eastern workers' tax	-5.25	-16.80
	<hr/>	<hr/>
Equals gross wage, eastern workers	19.25	25.55
Minus deductions for board and lodging	-10.50	-10.50
	<hr/>	<hr/>
Amount paid out to eastern workers	8.75	15.05

In addition, some part of the final cash payment was made in scrip which theoretically could be cashed, but only in occupied Russian territory.

As for western foreign workers, although their basic rates were the same as those of German workers, their wages were in fact reduced in several ways. There were, for instance, compulsory deductions for support of the workers' dependents in their home country. Furthermore, the resultant payments to the dependents were made in the currencies of the workers' countries. Having introduced artificial exchange rates which favored the German currency, the Third Reich obtained the services of these foreign workers at still lower cost than appeared on the books.<sup>78</sup>

Yet to be described are the rates paid to prisoners of war. These were nominal. In 1944, Russian prisoners received 40 pfennigs per day, Polish prisoners 70 pfennigs, and prisoners of all other nationalities 90 pfennigs. If the work consisted of emergency repairs after air raids, the rates paid the unfavored nationals were still lower, for Russians 30 pfennigs and for Poles 60 pfennigs, while other nationalities obtained the normal rate of 90 pfennigs. These rates were of course supplementary to the lodging and food provided in the prisoner-of-war camps. If private employers used gangs of prisoners they had to pay the fixed wages, provide the prisoners with board and lodging, and make compensation to their camps. Since war prisoners must be fed, clothed, and housed whether

<sup>77</sup> Yet this was an improvement over original arrangements. Before September 1943, reductions in the charge for board and lodging for Russian workers were permitted only if they retained less than 20 pfennigs a day.

<sup>78</sup> See Umbach, *op. cit.*, p. 513.

they worked or not, their impressment at nominal wages constituted an important net advantage to the German economy.

Finally, let us look at the employment situation of Jewish workers. From 1933 onward, Jews had been gradually deprived of all opportunities for work. With the emergency requirements of 1939, there was a slight reversal of policy, and a small number of physically fit Jews were put to work. A special decree covering their employment<sup>79</sup> specified that they had to accept any work, were debarred from benefit of protective regulations, were to be paid subsistence wages only, and were preferably to be assigned to menial tasks in strict separation from other workers. Severe punishment was threatened if anyone, including employers, violated these rules.<sup>80</sup> The period of legalized employment of Jewish workers was relatively brief. When the turn of military events drove the regime to ever more desperate measures, the gain to be derived from the employment of some Jewish workers was subordinated to a more effective prosecution of the regime's extermination policies.

#### WAGES AND PRICES

*Wage Rates and Wholesale Prices.* Prices were strictly controlled during the period of National Socialism.<sup>81</sup> The effectiveness of such controls can be gauged by the fact that price levels in all major categories remained materially below their previous prosperity levels, although from 1939 on the level of general business activity was higher and the scarcity of goods more pronounced than in 1928-29 (see Table 65 and Appendix Table A-1). Even in the course of World War II, wholesale and retail prices did not increase by much more than 10 percent, compared with the doubling or trebling of price levels in the course of World War I.

Controls were most effective in two "price" areas—labor and producers' goods. As noted previously, wage rates under National Socialism did not increase more than 3 percent, and prices of producers' goods were, by the end of World War II, on a par with or slightly below their 1933 position. The stability in these two areas is the more noteworthy since general wholesale price levels from 1933 to 1944 increased by about a quarter and prices in some commodity groups went up more than a third. Thus, the high degree of stability of wage rates was a cyclical abnormality in relation not only to general business activity but also to the substantial changes in wholesale price levels.

The special position of producers' goods in these comparisons is not fortuitous. In the past, cartels had been more effective in the producers' goods than in the consumers' goods area. The prevention of major downward adjustments during the Great Depression left producers' goods

<sup>79</sup> October 3, 1941, with executive orders of October 31, 1941.

<sup>80</sup> Livchen, "Wartime Developments in German Wage Policy," *International Labour Review*, August 1942, p. 163.

<sup>81</sup> The first control measures were issued as early as the fall of 1933. See L. Hamburger, *How Nazi Germany Controlled Business* (Brookings Institution, 1943), p. 47.

TABLE 65  
Wage Rate and Prices, 1929-1944

Year	Average Hourly Wage Rates (1)	Cost of Living (2)	WHOLESALE PRICES					
			All Commodities (3)	Manufactures, Raw and Semi-finished (4)	Finished Manu- factures (5)	Producers' Goods (6)	Consumers' Goods (7)	Sensitive Prices (8)
(1932 = 100)								
1928	116	126	145	151	135	116	149	277
1929	122	128	142	149	134	117	146	247
1930	124	123	129	135	127	116	136	194
1931	118	113	115	116	116	111	119	132
1932	100	100	100	100	100	100	100	100
1933	97	98	97	100	96	96	95	114
1934	97	100	102	103	98	96	100	126
1935	97	102	105	103	101	96	106	138
1936	97	103	108	106	103	95	108	149
1937	97	104	110	108	106	96	113	157
1938	97	104	110	106	107	95	115	147
1939	98	105	111	107	107	95	116	149 <sup>a</sup>
1940	98	108	114	111	110	95	121	...
1941	99	110	116	113	112	96	125	...
1942	99	113	119	115	113	96	126	...
1943	100	115	120	115	115	96	129	...
1944	100 <sup>b</sup>	117	122	116	116	96	130	...
(1939 = 100)								
1939	100	100	100	100	100	100	100	...
1940	100	103	103	104	103	100	104	...
1941	101	106	105	106	105	101	108	...
1942	101	108	107	108	106	101	109	...
1943	102	110	109	108	107	101	111	...
1944	102 <sup>b</sup>	112	110	108	108	101	113	...

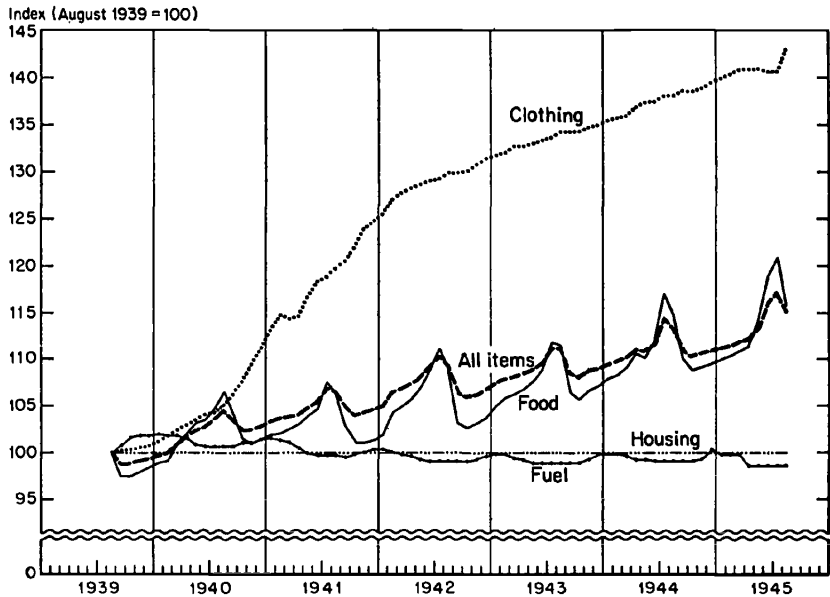
<sup>a</sup> First four months only. <sup>b</sup> Assumed to equal 1943.

SOURCE: Wage rates, see sources for col. 1, Part III, Appendix Table A-2. Cost of living, Appendix Table A-33. Wholesale prices, *Handbuch* 1928-44, p. 460; *IKF Handbuch* 1936, pp. 99 ff; *Statistik des In- und Auslands*, 1939-1940, *passim*.

in a relatively strong price position. This fact, together with the rapid expansion of production and sales, assured increased profits to manufacturers of producers' goods despite the fairly strict control of their sales prices and the price increases in raw materials and semimanufactured items. The price control by cartels during the Great Depression and the price control by government during National Socialism led to a situation in which producers' goods prices throughout 1924-45 fluctuated less than consumers' goods prices or any other major price category.

The less rigid control of consumers' goods prices was deliberate, and played a most important role in the economic policies of National Socialism. It was an intrinsic part of the price and wage control system designed to allocate national income in keeping with the over-all objectives of the regime. Controlled increases in prices of consumers' goods at wholesale formed the basis of similarly controlled increases in consumers' goods prices at retail.

CHART 31  
Cost of Living, by Major Components, 1939-1945



Source: Appendix Table A-33 (base shifted).

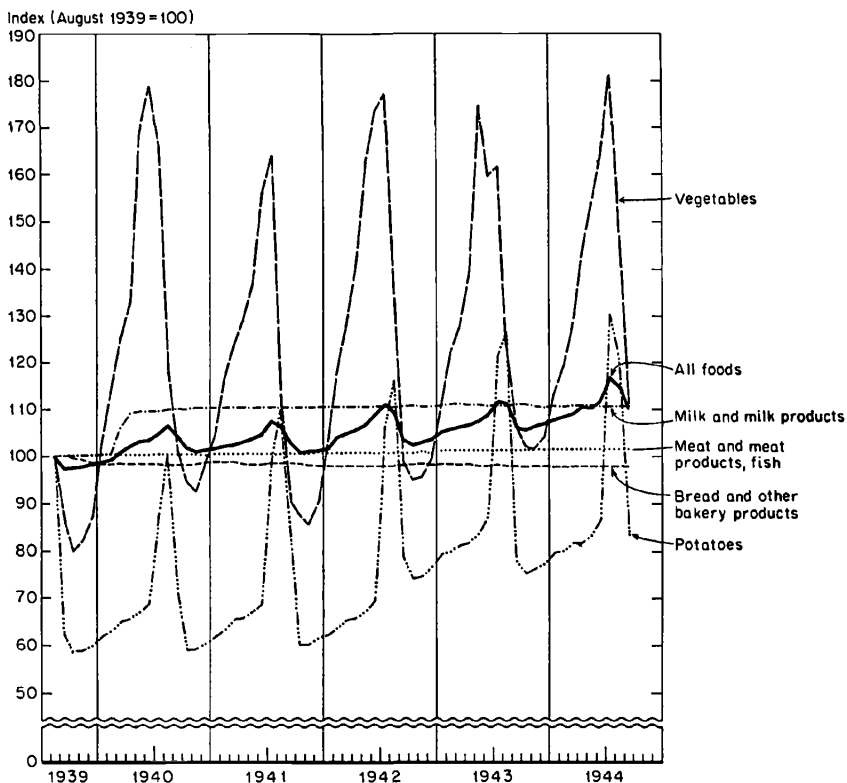
*Cost of Living.* The official cost-of-living index for the years of National Socialism shows an increase of about 20 percent compared with a wage-rate rise of 3 percent, a fact worth emphasis, since in the preceding expansion the increase in wage rates had tended to outpace the rise in cost-of-living. It is probable, however, that also in some pre-1913 reference expansions as well as during World War I there was a rise of living costs in excess of that in wage rates.<sup>82</sup> Characteristically, the greater increase of living costs as compared with wage rates can be found throughout the period of National Socialism.

Examination of the index reveals that the increases are concentrated in a few of its segments (see Appendix A-33 and Chart 31). Through the years 1933-45, the rent index remained entirely stable, the miscellaneous index rose by less than 10 percent, and the fuel and light index actually

<sup>82</sup> See Chart 6 and the section of this chapter on Wages in World War I.

dropped by a few percent. Substantial increases were registered only in the food segment (up about 30 percent) and in the clothing segment (up about 80 percent). These two segments, however, account for two-thirds of the total index, and could thus impart considerable fluctuation to the index as a whole.<sup>83</sup>

CHART 32  
Cost of Foods, 1939-1943



Source: Table 66.

Food prices are responsible for most of the seasonality of the total index. Table 66 and Chart 32 present some selected food prices. We note that meat and bakery products were kept at a virtually stable level from the beginning of the war. Prices of milk products were raised in April of 1940 but were rigidly controlled thereafter. Prices for vegetables and potatoes fluctuated seasonally within their historical range; the trend level of these prices was permitted to move upward gradually. With this

<sup>83</sup> The composition of the index is based on an inquiry into consumption habits undertaken in 1927-28. The segments of the index and their relative weights are as follows: food, 55.4 percent; rent, 13.1 percent; fuel and light, 4.7 percent; clothing, 12.9 percent; miscellaneous (including furniture), 13.9 percent.

TABLE 66  
 Food Costs, by Months, 1939-1943  
 (August 1939 = 100)

<i>Year and Month</i>	<i>Bakery Products</i>	<i>Potatoes</i>	<i>Vegetables</i>	<i>Meats and Fish</i>	<i>Milk and Products</i>	<i>All Foods<sup>a</sup></i>
<i>1939</i>						
Aug.	100.0	100.0	100.0	100.0	100.0	100.0
Sept.	100.0	62.4	85.9	100.1	100.0	97.6
Oct.	99.4	58.7	79.9	100.1	100.1	97.6
Nov.	99.3	58.7	82.1	100.1	100.1	97.9
Dec.	98.8	59.7	87.2	100.1	100.1	98.3
<i>1940</i>						
Jan.	98.4	61.9	102.5	100.3	100.2	98.9
Feb.	98.4	62.9	114.4	100.3	100.4	99.0
Mar.	98.5	65.1	125.6	100.4	106.0	101.0
Apr.	98.5	65.6	133.6	100.3	109.3	102.1
May	98.5	66.9	168.6	100.3	109.4	103.3
June	98.5	68.9	178.7	100.3	109.6	103.4
July	98.5	87.2	165.9	100.4	109.6	104.7
Aug.	98.4	100.2	118.2	100.4	110.0	106.6
Sept.	98.4	71.0	101.4	100.4	110.1	104.0
Oct.	98.4	59.5	94.8	100.4	110.1	101.5
Nov.	98.5	59.5	92.8	100.4	110.3	101.0
Dec.	98.6	60.8	98.7	100.3	110.3	101.5
<i>1941</i>						
Jan.	98.8	61.9	104.3	100.5	110.3	101.8
Feb.	98.9	63.4	116.8	100.5	110.3	102.1
Mar.	98.9	65.6	123.5	100.5	110.4	102.5
Apr.	98.5	65.9	129.1	100.5	110.5	103.0
May	98.3	67.3	137.2	100.5	110.5	103.9
June	98.4	68.9	156.0	100.7	110.5	104.6
July	98.5	99.0	164.1	100.5	110.5	107.5
Aug.	98.5	110.3	110.8	100.5	110.5	106.6
Sept.	98.5	82.5	90.6	100.5	110.5	102.8
Oct.	98.5	60.2	87.5	100.7	110.5	101.0
Nov.	98.1	60.2	85.7	100.7	110.5	101.1
Dec.	98.0	61.9	90.8	100.8	110.7	101.1

(continued on next page)

TABLE 66, *continued*Food Costs, by Months, 1939-1943  
(August 1939 = 100)

<i>Year and Month</i>	<i>Bakery Products</i>	<i>Potatoes</i>	<i>Vegetables</i>	<i>Meats and Fish</i>	<i>Milk and Products</i>	<i>All Foods*</i>
<i>1942</i>						
Jan.	98.0	62.4	103.8	100.9	110.7	101.7
Feb.	98.0	63.8	118.6	100.9	110.8	104.1
Mar.	98.0	65.6	128.7	100.9	110.8	105.0
Apr.	98.0	66.0	142.1	100.9	110.8	105.6
May	98.0	67.3	163.0	100.9	110.8	106.9
June	98.0	69.7	173.8	100.9	110.8	109.0
July	98.0	106.1	177.4	100.9	110.8	111.2
Aug.	98.0	116.1	131.2	100.9	110.7	109.3
Sept.	98.1	78.8	98.7	100.9	110.8	103.2
Oct.	98.2	74.3	95.1	100.9	110.9	102.7
Nov.	98.4	74.5	95.5	101.1	110.8	103.0
Dec.	98.3	76.7	99.6	100.9	110.8	103.6
<i>1943</i>						
Jan.	98.4	79.4	111.2	101.1	110.9	105.1
Feb.	98.4	79.9	122.4	101.3	111.2	105.9
Mar.	98.3	81.3	128.0	101.3	111.2	106.2
Apr.	98.4	81.8	139.9	101.3	111.0	106.8
May	98.0	83.8	174.9	101.3	111.0	107.5
June	98.0	87.2	159.6	101.3	110.9	108.9
July	98.1	121.4	161.5	101.3	111.0	111.9
Aug.	98.0	126.8	125.3	101.3	110.9	111.7
Sept.	98.0	78.0	106.3	101.3	111.1	106.3
Oct.	98.0	75.1	102.2	101.7	111.1	105.7
Nov.	98.0	76.1	101.8	101.7	110.9	106.5
Dec.	98.0	77.4	104.0	101.6	110.8	107.0
<i>1944</i>						
Jan.	98.0	79.9	113.4	101.7	110.9	108.0
Feb.	98.0	80.0	119.0	101.7	110.8	108.4
Mar.	98.0	81.9	127.6	101.7	110.9	109.0
Apr.	98.0	81.9	142.8	101.7	110.9	110.7
May	98.0	83.3	153.6	101.7	110.9	110.2
June	98.0	87.0	164.1	101.7	110.8	111.7
July	98.0	130.4	181.2	101.7	110.8	117.0
Aug.	98.0	121.0	145.1	101.7	110.8	114.9
Sept.	98.0	83.5	111.2	101.7	110.8	110.1

\* Total food group of cost-of-living index for 72 cities.

SOURCE: *Wirtschaft und Statistik, passim*. Base shifted to August 1939 = 100.

highly individualized system of controlling small groups or even separate items, food prices and living costs in general could be forced into conformity with the basic economic policies of the regime.

The above observations concern the actual behavior of the cost-of-living index, as published. For the purposes of the present inquiry it is necessary to comment on the quality of the index. In 1933 the published cost-of-living index was based on an obsolete consumption scheme which had originated in 1907 and had been modified only slightly to allow for obvious changes in consumption up to the mid-1920's. The inadequacies of the index were generally recognized and led to an official budget inquiry in 1927-28. Preparation of a new cost-of-living index, based on the results of the more recent inquiry, was started during the time of the Weimar Republic, but actual revision and publication of the new index were undertaken only in 1934. Despite the major increases in the number of commodities included and the changes in the weights of the commodity groups, the unrevised and revised measure agreed surprisingly well—at least in the behavior of the aggregate index.<sup>84</sup> The revision did not entirely silence criticism of the cost-of-living index. The average income of the sample used in the budget inquiry was said to deviate substantially from that of the working class as a whole; the preponderance of large families in the sample was said to lead to a disproportionately low share of rental expenses; and the expenditures for tobacco and alcoholic beverages were held to be seriously underestimated.<sup>85</sup> However it was conceded by some critics that, up to about 1936, the new index might have been a tolerably faithful indicator of changes in the living costs of German workers.

The Nazi trend toward autarchy, the reservation of major consumption items for military purposes, and the widespread use of substitutes changed consumption patterns and impaired the value of the fixed-weight index. It was hinted, even by National Socialist officials, that the index might not mirror satisfactorily the actual increases in expenditures necessary to maintain a given level of economic well-being. In fact some rough estimates of the bias were made. Between 1933 and 1937 actual living costs were said to have risen by 7 to 15 percent instead of the 6 percent indicated by the official index.<sup>86</sup>

<sup>84</sup> The new index is presented and discussed in "Neuberechnung der Reichsindexziffer für die Lebenshaltungskosten," *Wirtschaft und Statistik*, 1934, pp. 626-31. A discussion of the principles underlying the revision can be found in "Die Messung der Lebenshaltungskosten," *Vierteljahrshefte zur Statistik des Deutschen Reichs*, 1937, 1, pp. 149-165. The results of the budget inquiry of 1927-28, basic to the revision, are contained in "Die Lebenshaltung von 2,000 Arbeiter-, Angestellten- und Beamtenhaushaltungen," *Einzelchriften zur Statistik des Deutschen Reichs* (No. 22, Berlin, 1932).

<sup>85</sup> W. Woytinsky, "Statistik der Arbeit," in *Internationales Handwörterbuch des Gewerkschaftswesens* (Berlin, 1932), pp. 1585-1586.

<sup>86</sup> See *Die Wirtschaftskurve*, August 1938, pp. 301 ff. Jürgen Kuczynski makes some adjustments of the official index which imply a rise of at least 9 percent between 1933 and 1937 (his explicit adjustments are for the increase from 1932 to 1937). See his "Germany under Fascism, 1933 to the Present Day," pp. 105-6.



The real difficulties started in 1939, when the war accentuated the changes in consumption patterns caused by more acute shortages and by the introduction of rationing. The Statistische Reichsamts revised the character of the index to make allowance for its changing composition.<sup>87</sup> The new one is a chain index based on monthly link relatives which describe, as well as possible, price changes of identical goods. This was not always feasible, however. Where there were substitutions of rations, the price of the substitute could be inserted without the use of links. We find that "fat consumption was cheapened because more margarine was allotted instead of other edible fats,"<sup>88</sup> or in the case of vegetables, the prices for the three vegetables in most ample supply at any time were used for the computation of the index.<sup>89</sup> By such treatment the value of the index as an indicator of price changes is certainly impaired. Furthermore, the more permanent substitutions of goods in the index were made without proper regard to quality. Fats, for instance, could be replaced by jams and jellies. It is clear that, with such substitutions, the quality of the priced consumers' goods could deteriorate without any fixed lower limit. Eventually a diet of turnips and ersatz-coffee might be priced instead of a high protein diet. And while the prices of the original consumption might have skyrocketed, the index may show moderate increases only. The authorities recognized that, as the war proceeded, the cost-of-living index was regarded with extreme skepticism by those members of the public who cared to follow it. But the authorities insisted staunchly that basic foods did not cost much more in 1942 than they had in 1938, and added: "If this result seems to be contradicted by the experience of daily life, this is due to attempts on the part of consumers to supplement their nutrition (beyond the basic needs covered by rationed foods) by buying unrationed food and luxuries (e.g., restaurant fare) or buying more expensive qualities than in peacetime."<sup>90</sup>

In view of the actual shortages, the widespread network of black markets, the deteriorations in quality, the changes in consumption patterns, and the leeway granted to the compilers, the cost-of-living index for the period of World War II must be regarded as an unreliable measure. One is safe, however, in assuming that the official measure did not overstate the rise of living costs.

## REAL WAGES

*Wage Rates.* The policy of stabilizing wage rates but permitting rises in living costs led to a gradual decline in real hourly wage rates of roughly

<sup>87</sup> For a description of the major changes see *Wirtschaft und Statistik*, November 1939, p. 717; and October 1942, p. 343.

<sup>88</sup> *Ibid.*, October 1942, p. 347.

<sup>89</sup> *Ibid.*, May 1942, p. 141; June 1943, p. 166.

<sup>90</sup> *Wirtschaft und Statistik*, quoted by H. W. Singer, *London and Cambridge Economic Service*, January 1943, p. 22.

13 percent between 1932 and 1943 (see Table 67).<sup>91</sup> The significance of this decline has been commented upon previously. Briefly, the drop in real hourly rates was expected to serve as a spur to production and at the same time to limit consumers' demand on the national product. The close control over wages and prices permitted a gradual decline of real wage rates, timed to correspond with increases in hours. The decrease in real wage rates was concentrated during World War II. Whereas the decline from 1932 to 1939 amounted to only 6 percent, it was about 9 percent from 1939 to 1944.

TABLE 67  
Average Real Wage Rates and Earnings, All Industry, 1932-1944  
(1932 = 100)

<i>Year</i>	<i>Hourly Rates</i>	<i>Hourly Earnings</i>	<i>Weekly Earnings</i>
1932	100.0	100.0	100.0
1933	99.4	99.4	104.8
1934	96.8	99.4	109.6
1935	95.2	99.2	110.5
1936	94.5	100.0	113.7
1937	93.9	101.2	116.8
1938	93.6	103.8	121.4
1939	94.0	106.9	126.0
1940	91.1	106.0	125.8
1941	89.9	108.5	131.1
1942	87.9	107.0	128.0
1943	87.4	107.0	127.7
1944	85.5 <sup>a</sup>	104.6	123.5

<sup>a</sup> Assumes stability of money rates, 1943 to 1944.

SOURCE: Money wages, see sources to Appendix Table A-2. Cost of living, Appendix Table A-33, base shifted to 1932 = 100.

Decreases of real wage rates occurred during both world wars, though the situations differed in several respects. First, the real rate decline during World War I started from cyclical peak levels (1913), that during World War II from trough levels (1932). Second, wage rates, cost of living, and therefore real wage changes were uncontrolled during the first war but controlled during the second. Finally, in contrast to wage behavior during World War I, the deterioration of real wage rates during the more recent conflict was uniform, and avoided extreme differences between favored and unfavored groups of workers. The differences in wage behavior as

<sup>91</sup> In view of the minimum character of money wage rates during the Weimar Republic, it should be noted that under the National Socialist regime minimum rates and effectively paid rates were rather close. This was brought about by fixing wages at depression levels. Real wage rates, as described above, are based on the official cost-of-living index. If the adjusted cost-of-living index given in column 5 of Table 68 is used as a deflator, the total decline between the years mentioned would amount to 17 percent.

between the two wars can be observed from Table 52 and 67.<sup>92</sup> Real wage rates during World War II, as derived from official wage and living-cost data, declined uniformly by about 7 to 9 percent. The few rate series available for World War I illustrate the larger decline as well as the wider differences in the development of real rates. Between 1913 and 1918 the decline ranged from 0.2 percent (unskilled railway workers) to 46 percent (printers and compositors). The relative position of the reported series in 1917 is even worse than in 1918, bearing witness to the extreme fluctuations of real wages during the first war.<sup>93</sup>

*Earnings.* Real rates and real earnings under National Socialism can be compared in Table 67. While real rates decreased throughout the Nazi period, average hourly real earnings at first maintained their level (1932-36), then rose gradually by a little more than 8 percent (1936-41), decreased by about 1 percent (to 1943), and then by another 2 percent (to 1944).<sup>94</sup> This behavior is closely related to the economic and political fortunes of the regime. During the early period when the creation of jobs was the major objective (1932-36), rises in earnings just about compensated for increased living costs. During the period of active war preparation and the initial war expansion (1936-41), there were material increases of hourly real earnings. The period of all-out war and military reversals brought about the reduction of hourly real earnings.

If official real wage measures are used as a guide, hourly real earnings were significantly (more than 5 percent) above depression levels only in five out of the almost thirteen years of National Socialism. And if some account is taken of the admitted defects of the official cost-of-living index, the number of "favorable" years would be further reduced.

Weekly real earnings increased<sup>d</sup> considerably more than hourly real earnings, corresponding to the relation of weekly and hourly money earnings. According to official data, weekly real earnings increased by 31 percent from 1932 to 1941. They dropped in subsequent years, but in 1944 were still 24 percent above depression levels and even 6 percent above 1929 levels. The record appears less impressive if adjustments are made for increased deductions and for the inadequacies of the cost-of-living index—at least to the extent admitted by contemporary German publications. Comparisons of unadjusted and adjusted weekly real earnings levels in 1929 and from 1932 to 1944 are presented in Table 68. The table shows that after these adjustments weekly real earnings at their peak in 1941 were only 21 percent above depression levels and in 1944 only 14 percent above, compared with the 1929 position of 18 percent above 1932. But even after

<sup>92</sup> See also Table 79 and Chart 33.

<sup>93</sup> These comparisons are rough. Adjustment for price changes during World War I was carried out on the basis of rather crude estimates of living costs, but during World War II on the basis of the official index described in the previous section.

<sup>94</sup> The downward bias of living costs, as previously discussed, probably led to an overstatement of the rise in real earnings after 1936 and to an understatement of their eventual decline.

TABLE 68  
 Weekly Real Earnings, Adjusted, 1929 and 1932-1944  
 (1932 = 100)

Year	WEEKLY REAL EARNINGS			COST-OF-LIVING INDEXES	
	Official Index (1)	After Deductions (2)	After Deductions and Living Cost Adjustment (3)	Official Index (4)	Adjusted Index (5)
1929	117	118	118	127.7	127.7
1932	100	100	100	100.0	100.0
1933	105	104	104	97.8	97.8
1934	110	109	109	100.4	100.4
1935	111	110	110	102.0	102.0
1936	114	112	112	103.2	103.2
1937	117	115	110	103.7	108.6
1938	121	119	114	104.1	109.0
1939	126	123	118	104.6	109.5
1940	126	122	116	107.9	113.0
1941	131	127	121	110.4	115.6
1942	128	124	119	113.3	118.6
1943	128	123	118	114.8	120.2
1944	124	119	114	117.2	122.7

SOURCE, by column:

(1) Appendix Table A-2, adjusted by col. 4 of this table.

(2) Table 16, col. 6, adjusted by col. 4 of this table.

(3) Table 16, col. 6, adjusted by col. 5 of this table.

(4) Appendix Table A-33.

(5) Official cost-of-living index used for 1929 and 1932-36. For 1937, assumed to be 11 percent over 1933 on the basis of estimate in *Die Wirtschaftskurve* which states the rise in living costs between 1933 and 1937 to be 7 to 15 percent (Vol. 17, pp. 301 ff.). For 1938-44, revised by ratio of adjusted to official index in 1937. This adjustment assumes no increase in the bias ratio—a conservative assumption. See Hilde Oppenheimer-Bluhm, *The Standard of Living of German Labor under Nazi Rule*, Supplement v, *Social Research*, 1943, p. 39.

these adjustments the real earnings data are of limited significance. Whether qualities were kept up or deteriorated, whether workers had relatives on farms, whether they were friends with the butcher, whether they had access to the black market, whether they obtained gifts from soldiers, whether their places of employment provided one square meal—these factors more than others determined the workers' economic well-being and the amount of goods they could purchase with their wages. It is such considerations that led some authors to believe that for the war years real wages should not be computed at all.<sup>95</sup> Without prejudice to the limited use made of

<sup>95</sup> For an eloquent defense of this view see Jürgen Kuczynski, *Germany under Fascism, 1933 to the Present Day*, pp. 175-76. Kuczynski, though continuing to report money wages and cost-of-living data, stops computing real wages with 1938.

the real wage measure in the preceding pages, it can be readily agreed that, in the course of the war, real wages—however measured—became a less and less important indicator of economic well-being. The reduced rations, the scarcities, the deterioration of goods in general, the increase in hours and intensity of work, the tightening restrictions on mobility, the cutting of holidays and vacations, and the exhaustion induced by air raids and air-raid alarms—none of these factors is reflected in real wage measures.

During World War II real wages deteriorated more tardily and probably less than during World War I. This was because of exploitation of occupied territories, more systematic use of domestic and foreign labor reserves, productivity increases since the previous war, and the system of control measures. These factors permitted the provision of a substantial amount of consumers' goods despite the devotion of all major resources to actual war purposes. Thus weekly real earnings as measured by the official index began to sink only in 1941. The food situation did not become really serious until 1944, when bombing raids disorganized normal household routine to such an extent that more than twenty-six million people could be fed only in communal centers. Things went from bad to worse, until the final defeat. In fact, it was only years after the termination of hostilities that real wages and consumption began to recover.

## CHAPTER 6

### Wages in Germany, Great Britain, and the United States

#### *General*

It is the purpose of this chapter to summarize the major findings in German wage behavior and to confront them, wherever possible, with the results of corresponding inquiries for Great Britain and the United States. Such a comparison should help to determine which features of German wage behavior can be regarded as characteristic of wages in general, and which must be explained by historical circumstances peculiar to Germany. Ideally, a number of other industrial countries should be included in the international comparisons, but only two are dealt with in order to keep the discussion within manageable limits. Great Britain and the United States were selected, first, because the industrial histories of the three countries are roughly comparable; second, because they formed the core of world industrialism during the three-quarters of a century ending in 1945; and third, because wage series for each of them are relatively plentiful.

It stands to reason that, within the confines of a brief chapter, the comparisons must often rest on the results of investigations made by students of wages in Great Britain and the United States. At times, readily available summary measures in the form of wage and price indexes were used. Since these measures for Great Britain and the United States are used "as available," that is, without adjustments to assure comparability with the German data, most comparisons must be regarded as rough and ready, indicating only broad similarities and differences.

Before we turn to comparison of wage behavior, a brief review of the economic development of the three countries is indicated. By the time Germany had attained political unity and launched its career as an industrial nation, Great Britain had already achieved a high level of industrialization and a commanding role in the markets for manufactured goods. Britain's advanced industrial development, the limitations of its domestic market for industrial products, and its need to import both raw materials and foodstuffs made that country highly dependent upon industrial exports. To a considerable extent, Germany's industrialization progressed in an atmosphere of economic competition with Great Britain. During the first decades of Germany's economic development, when the industrialization process itself created a rapidly mounting demand, German industrial products began to replace imports from Britain in the domestic market—especially if the market was protected from British competition. The conflict became sharper when Germany was well established as an industrial nation, with the needs for raw materials and foreign markets

characteristic of an industrially mature country. In foreign markets Germany soon challenged Britain's virtual monopoly. As for the United States, it was blessed with a unique combination of advantages. A relative late-comer to the industrial field, at least compared to Britain, it enjoyed the benefits of rapid industrial growth. But unlike the other two countries, the United States encompassed a huge territory rich in resources and with a large and growing domestic market—an "empire" within its own borders. This made possible extensive industrial expansion without an immediate need to invade the markets of competing nations or to defend American markets politically.

The differences in the economic and political development of the three nations affected the pace of their industrial progress as well as their economic and military fortunes during and after their first overt conflict—World War I. Great Britain's victory after heavy losses, America's late entry into the struggle and her important contribution to the Allied cause to some extent re-established the array of power as it had existed before the war. Britain maintained an essentially defensive economic position based on the resources of her empire, and the United States continued a relatively unimpeded economic growth. Germany, after its defeat, was thrown back to the position of the tardy aspirant who must start anew. But by 1929 it had largely recovered from the worst effects of defeat and had modernized its productive apparatus. The ravages of the Great Depression provided the political opportunities for preparing a new all-out challenge to the international status quo. The National Socialists devoted Germany's industrial potential to rearmament, and tried to adjust the European political scene for a second time to what must have appeared to them as a new balance of economic power. World War II was the result of this challenge. And in that war Germany's defeat was decided—to a far greater extent than in World War I—by the ever-growing might of two nations, the United States and the Soviet Union. Germany had not been able to attain industrial predominance by being first in the field like Great Britain, or by being large and protected like the United States. German ambitions, if they were to be realized, must overcome strong economic and political resistance. The first attempt to break this resistance ended in a major setback, the second in Germany's destruction as a political unit.

The patterns of the relationship among the three industrial powers have been important determinants of trends in economic growth and in wage behavior. At an earlier point in this study we have followed real per capita income changes in Germany, Great Britain, and the United States, for most of the period with which we are concerned (see Table 5). Let us recapitulate the broad findings insofar as they bear upon wage developments. Between 1871 and 1913, real per capita income doubled in Germany and Great Britain, trebled in the United States. Between 1913 and 1939 the increase was about one-third in the United States and a little

less in the other countries. The climate of the interwar period as a whole, however, differed sharply among the three countries. In Germany, real per capita income for 1925-32 was 7 percent below the 1913 level, in Great Britain 7 percent above, and in the United States 26 percent above.

There were notable differences also in trade union organization. The following tabulation shows total union membership in percent of the gainfully occupied population of each country. Before World War I, the degree of organization was relatively low in all three countries, with

Trade Union Membership, in Percent of Labor Force

	<i>Germany</i>	<i>Great Britain<sup>a</sup></i>	<i>United States</i>
1910	8	14	6
1920	42	43	12
1930	24	22	7

<sup>a</sup> Great Britain's union membership in 1910, 1920, and 1930 is compared with the working population for 1911, 1921, and 1931. If union membership data in the latter three years are used for comparison, the percentages are 17, 34, and 21, respectively. SOURCE: For Germany, our estimates: union membership, three big unions (Table 11) plus estimated other unions (see Table 12 for interwar period); labor force, interpolated from data for census years (see Table 6). For Great Britain and the United States, see Leo Wolman, *Union Membership in Great Britain and the United States*, Bulletin 68, National Bureau of Economic Research, 1937, p. 10.

Great Britain ranking first, Germany in an intermediate position, and the United States last. After World War I, Germany attained a degree of organization roughly comparable to that of Great Britain. In all three countries unionization grew rapidly between 1910 and 1920, and declined sharply between 1920 and 1930. By 1920 unions in Germany and Great Britain accounted for more than 40 percent of the working populations, but in the United States for only 12 percent. In 1930, however, in both Germany and Great Britain, only 20 to 25 percent of the gainfully occupied population belonged to trade unions, and in the United States less than 7 percent. Unions in the United States did not attain their major growth until the later years of the Great Depression. By the end of the 1930's the degree of unionization in the United States was probably about 15 percent and in Great Britain 28 percent.<sup>1</sup> In the meantime, however, German trade unions had been engulfed by the Nazi Labor Front.

### *Long-Term Trends*

#### MONEY WAGES

During the three-quarters of a century under review, money wage levels in all three countries showed clearly defined and substantial growth trends. The rises were not uninterrupted, but the factors making for growth in each of the countries were persistent enough to bring about,

<sup>1</sup> Estimates by Leo Wolman, personal communication.



for the period 1871-1944, a quadrupling of hourly wages in Germany and Great Britain, and a sevenfold increase in the United States.

Appendix Table A-48, and Charts 33 and 34 present indexes depicting the approximate course of wage levels in Germany, Great Britain, and the United States.<sup>2</sup> We observe from these exhibits that up to World War I, hourly money wages increased most rapidly in Germany, next in the United States, and most slowly in Great Britain. After 1913 the picture changed radically, with Germany now showing the least rapid advance in hourly wages. British rates rose on the whole more steeply after 1913 than did German rates, and United States earnings made by far the strongest gains (see Chart 33). During the three decades following the outbreak of World War I, hourly wages in Germany rose by about one-half, tripled in Britain, and increased four-to-five times in the United States.<sup>3</sup>

Average hourly wage levels, relative to 1913, are shown in summary measures for selected periods in the following tabulation. For all three

<i>Period</i>	<i>Germany</i>		<i>Great Britain</i>	<i>United States</i>
	<i>Rates</i>	<i>Earnings</i>	<i>Rates</i>	<i>Earnings</i>
1924-32	153	166	194	243
1924-39	148	162	194	249
1924-44	147	166	211	281

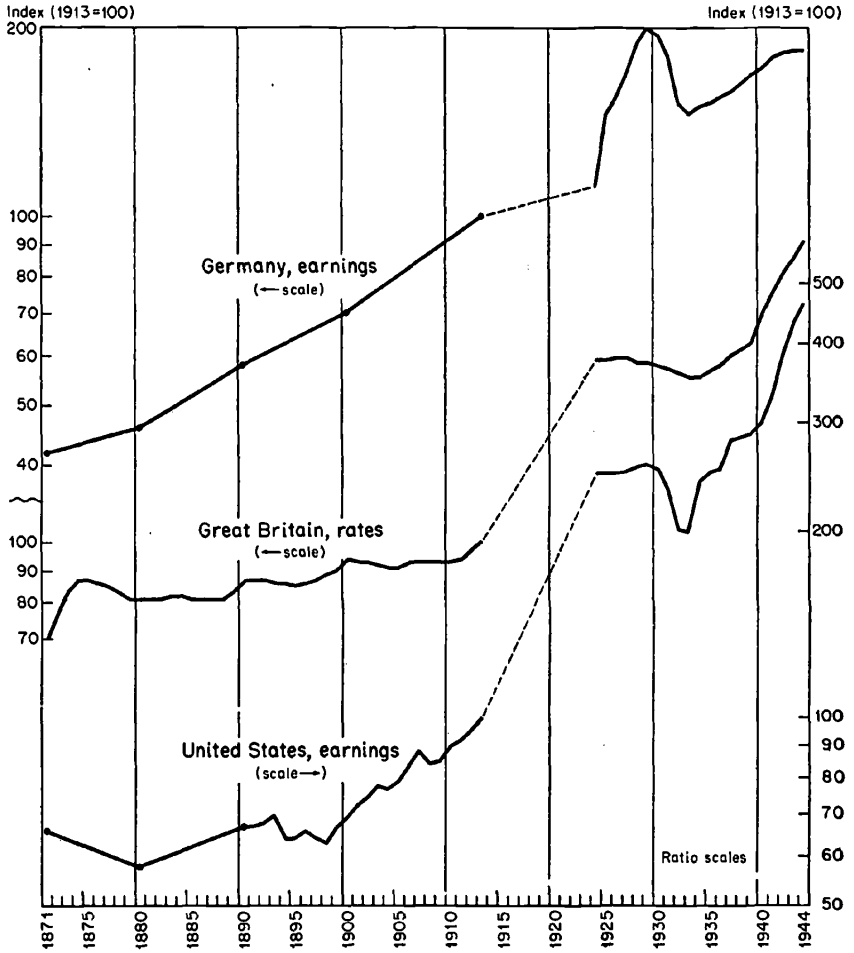
periods, German money wage levels are seen to be closer to the 1913 base than those in Great Britain and the United States. This is true whether German wage rates are compared to British rates, or German earnings to United States earnings. The relative positions of money wages in the three countries are plotted also in the upper portions of Charts 35 and 36. Of particular interest is a comparison of wage changes during the last decade and a half of the Reich's existence. Between 1929 and 1944, German hourly wage rates and earnings show a net decrease while British wages show an increase of 50 percent and United States wages an even larger growth (80 percent in hourly earnings).

Because the measures presented above must have been influenced by differences in wage concepts and coverage in the several national indexes,

<sup>2</sup> For Germany, the data developed in Chapter 2 were used. For Great Britain and the United States, sources and adjustments are described in Appendix Table A-48 and notes thereto. The intention was to base comparisons on comprehensive wage measures over long periods of time. Resort to disparate wage measures was unavoidable, since comparable long-term series of rates and earnings were not always available. To permit comparisons between roughly equivalent wage measures, both rate and earnings series were reported for post-1913 Germany. Comparison between the two series shows a steeper long-term increase in earnings than in rates. In order to exclude the effects of the differences in wage concepts and of differences which might arise from the varying industrial and occupational coverage of the national indexes, direct comparisons of wages for building workers will also be carried through. For 1913 and 1924-44, some measures of wage rates proper can be obtained for all three countries.

<sup>3</sup> For the United States, these observations are largely based on earnings, but there is no doubt that similar rises would be shown also by rates.

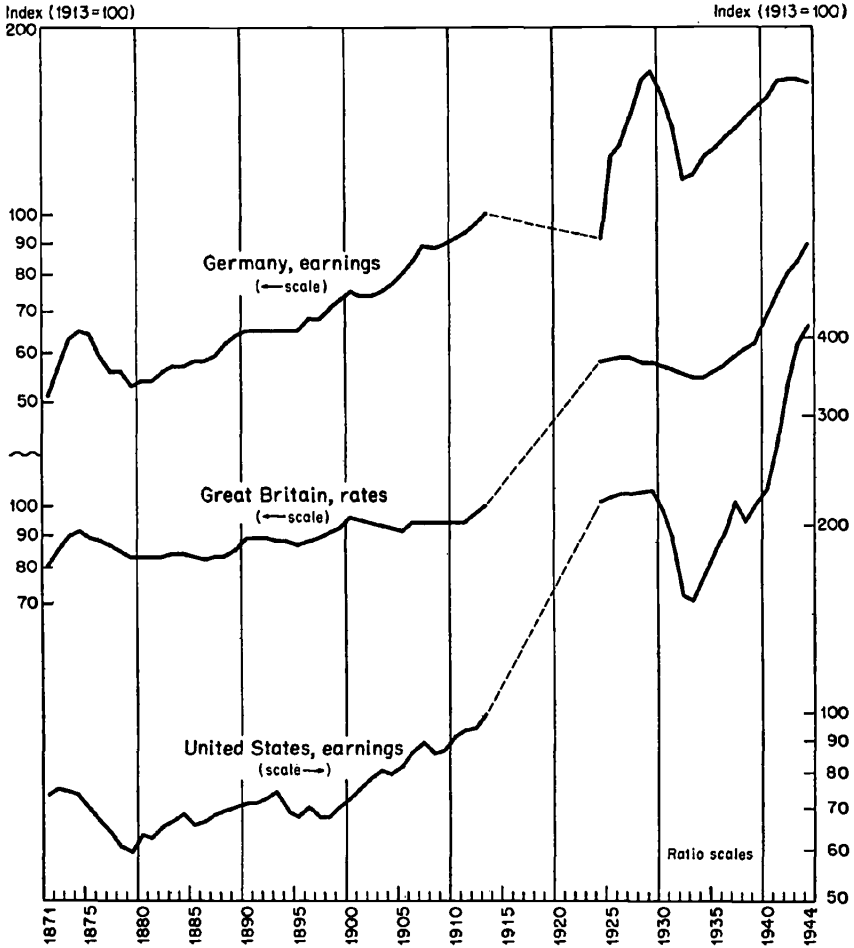
CHART 33  
 Hourly Money Wages in Germany, Great Britain, and the United States,  
 1871-1913 and 1924-1944



Source: Appendix Table A-48.

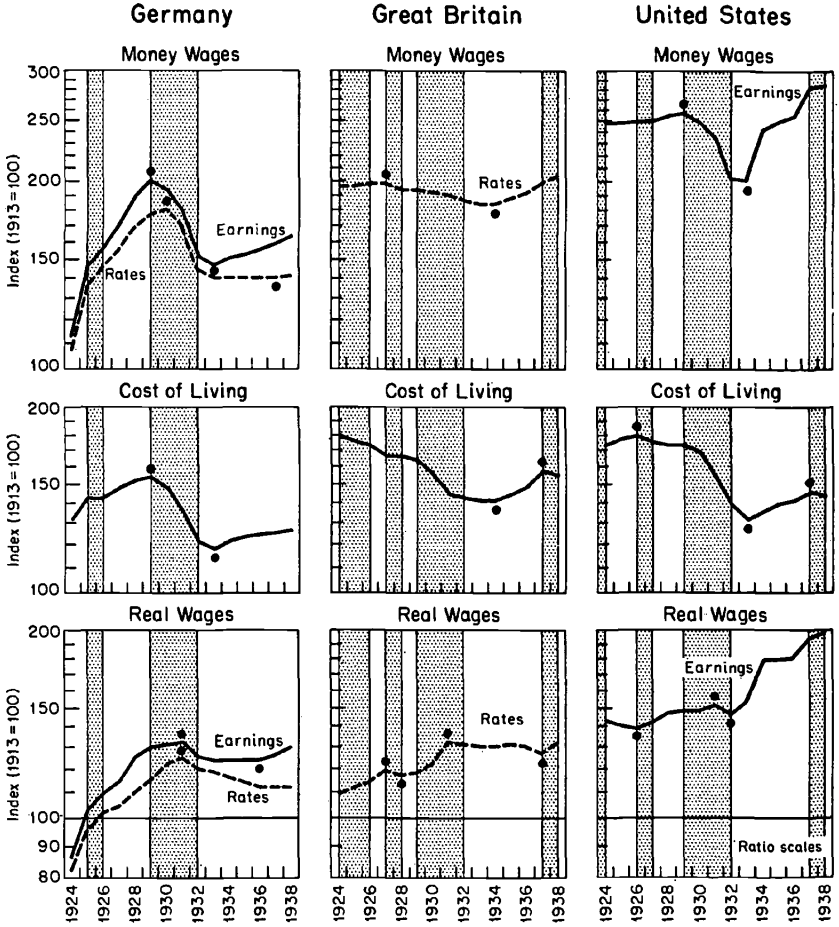
CHART 34

Daily or Weekly Money Wages in Germany, Great Britain, and the United States, 1871-1913 and 1924-1944



Source: Appendix Table A-48.

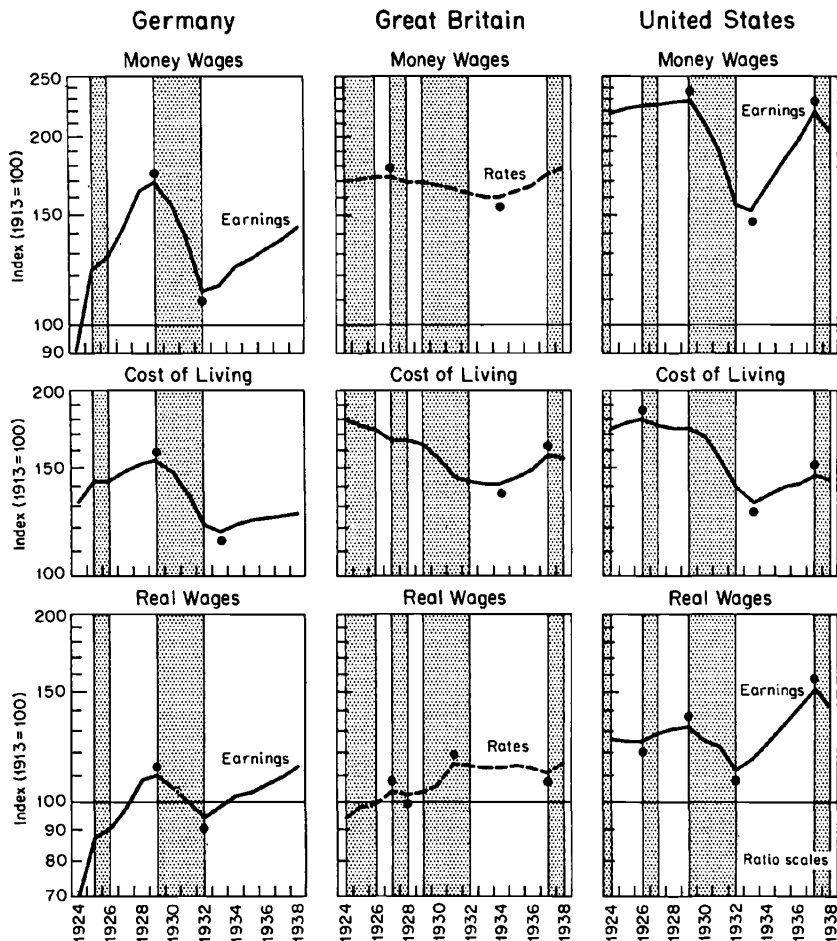
CHART 35  
 Hourly Money Wages, Cost of Living, and Real Wages in Germany,  
 Great Britain, and the United States, 1924-1938



Shaded areas represent business contractions; dots indicate cyclical turning points of the series.  
 Source: Appendix Tables A-48, A-49, and A-50.

CHART 36

Weekly Money Wages, Cost of Living, and Real Wages in Germany, Great Britain, and the United States, 1924-1938



Shaded areas represent business contractions; dots indicate cyclical turning points of the series.  
 Source: Appendix Tables A-48, A-49, and A-50.

an attempt was made to exclude the effect of such differences by comparing hourly wage rates for skilled and for unskilled building workers in the three countries. These measures will be referred to later, in connection with the analysis of real wages and wage differentials. The result, simply stated, is that the relative movements of the three series for building workers generally confirm the major findings derived from the comprehensive indexes (see Appendix Table A-51).<sup>4</sup>

The seventy-five years covered by our survey witnessed a drastic reduction in the length of the workweek, amounting to roughly one-third, in each of the three countries. Though direction and total reduction are similar for all three, the levels and the timing differ from one country to another. Germany's workers, in 1871, still labored six days a week and about twelve hours a day, or approximately seventy-two hours a week. In the United States in that year the workweek was shorter, probably not much above sixty hours.<sup>5</sup> About the same workweek prevailed in Great Britain.<sup>6</sup> Table 69 traces the approximate course of the reduction of hours in the three countries. Note that from 1871 to 1932 hours seem to have gone down faster in Germany than in the other two countries. The faster reduction of hours in Germany prior to World War I is intimately related to that country's position as an industrial late-comer, starting out with a long workweek in 1871. After 1933, the extraordinary conditions that prevailed in Germany make it difficult to ascertain "trends."

In view of the general movement toward shorter working hours in all three countries, the upward trend of weekly wages is, of course, milder than that of hourly wages. The differences in the development of hours in the three countries affect the relation among the national wage trends (see Appendix Table A-48 and Chart 34). From 1871 to 1944 weekly wages increased about threefold in Germany and Great Britain, but almost sixfold in the United States. Again, the pre-1913 trend in German weekly wages is steeper and the post-1913 trend flatter than the comparable trends in the two other countries. The lower average level, relative to 1913, of German wages during the selected interwar periods shows up also in weekly wages. Thus, the major findings derived from hourly wage information seem confirmed by the movement of weekly wages.

<sup>4</sup> During the interwar period 1924-39, skilled building workers in Germany commanded hourly rates about 50 percent above those prevailing in 1913. Comparable British rates were about 90 percent and United States rates almost 150 percent above pre-World War I levels. Increases in the rates for unskilled building workers were steeper in all three countries but the order in the relative rise remains the same.

<sup>5</sup> See Clarence D. Long, *Wages and Earnings in the United States, 1860-1890* (Princeton University Press for National Bureau of Economic Research, 1960), Table 13. See also Colin Clark, *The Conditions of Economic Progress* (London, Macmillan, 1951), p. 47; and Joseph S. Zeisel, "The Workweek in American Industry," 1850-1956, *Monthly Labor Review*, January 1958.

<sup>6</sup> A. L. Bowley, "Wages, Earnings and Hours of Work, 1914-1947, United Kingdom," London and Cambridge Economic Service, *Special Memorandum No. 50*, May 1947, p. 11.

TABLE 69

Hours Worked per Week, Germany, Great Britain, and the United States,  
Selected Years, 1871-1944  
(1913 = 100)

Year	Germany	Great Britain	United States
1871	120	114	113
1880	117	102	112
1890	113	102	107
1900	107	102	106
1913	100	100	100
1924	81	87	88
1929	84	86	89
1932	75	86	77
1939	88	89	76
1944	88	90	91

## SOURCE:

## Germany:

1871-1913, estimated, see Chapter 1, section on Trends in Hours of Work. For 1913-44, based on ratio of weekly earnings to hourly earnings, as given in Appendix Table A-48.

## Great Britain:

1871-1913, based on ratio of weekly rates to hourly rates, as given in Appendix Table A-48. For 1913-42, Colin Clark's estimate of average hours worked, including agriculture, *The Conditions of Economic Progress* (London, Macmillan, 1951), p. 63. For 1944, United Nations, *Statistical Yearbook, 1949-1950*, p. 89.

## United States:

1871-90, Clarence D. Long, *Wages and Earnings in the United States, 1860-1890*, Table 13. Spliced to later segment in 1890. For 1890-1913, Albert Rees, in *38th Annual Report* (National Bureau of Economic Research, 1958), p. 59. For 1913-44, Bureau of Labor Statistics, as given in *Historical Statistics of the United States, 1789-1945*, p. 67, Series D 118.

## WAGES AND PRICES

We may ask to what extent the marked wage increases and the differences between the wage trends in the three countries are due merely to variations in general price levels—for it is obvious that price levels must have had some influence on wage trends. Table 70 shows long waves of raw material prices in all three countries. At the foundation of the Reich in 1871, these prices were as high or higher than they were on the eve of World War I; in 1890 they were 15 to 20 percent lower; and in 1929 they were 30 to 40 percent higher. In 1929, price levels, as measured by the indexes, were 50 to 70 percent higher than in 1890, a fact that helps to explain the wage rises during the same period. But between 1871 and 1913 wages rose, although price levels were as low or lower in the later than in the earlier year. And between 1924 and 1939 hourly wages showed a net rise and prices a net drop. It is true that the price indexes cover only a small part of the multitude of goods sold, and also that they are not comparable

TABLE 70

Wholesale Prices in Germany, Great Britain, and the United States,  
Selected Years, 1871-1944  
(1913 = 100)

Year	Germany	Great Britain	United States
1871	100	118	119
1890	86	85	81
1900	90	88	80
1913	100	100	100
1924	136	165	141
1929	131	134	137
1932	86	95	93
1939	96	113	110
1944	110	186	149
<i>Averages</i>			
1924-32	123	133	130
1924-39	109	121	122
1924-44	108	133	125

## SOURCE:

Germany: Appendix Table A-1.

Great Britain: For 1871-1913, Sauerbeck-Statist Index, as published by U. S. Bureau of Labor Statistics, *Bul.* No. 284, p. 280. For 1913-44, League of Nations, *Statistical Year-book*, 1932-33, p. 268, and 1942-44, p. 195.

United States: *Historical Statistics of the United States, 1789-1945*, pp. 233-234, Series L 15.

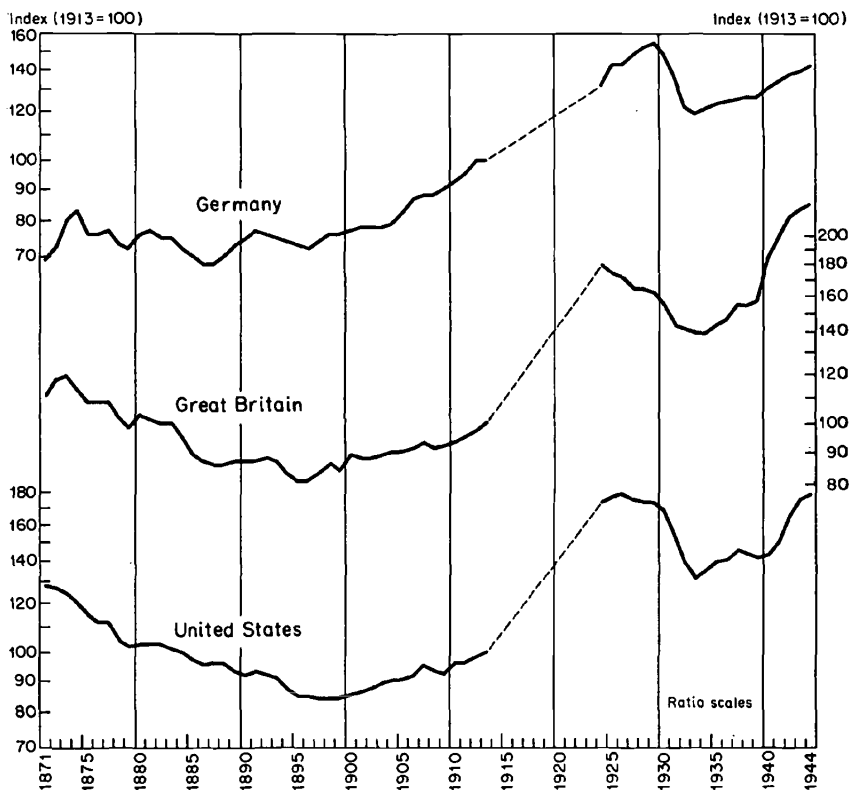
between countries. However, there is satisfactory evidence that neither the growth nor the differential behavior of wage trends can be explained primarily by variations in wholesale price levels.

Appendix Table A-49 and Chart 37 present data on retail price changes, in the form of indexes of living costs. These prices show a closer correspondence to wages than do wholesale prices. Marked long-term growth trends are to be noted both in hourly wages and in living costs through the last fifty years of the period under investigation. The faster net rise of German wages before World War I—relative to that in the other two countries—is paralleled by a steeper increase in living costs. Similarly, the slower rise of German wages between 1913 and 1939, for instance, finds a parallel in a milder increase in consumers' retail prices. However, the long-term increases in wages are greater than in living costs, and the differences in wage trends are not simply related to differences in retail prices. For instance, the rise of money wages in the United States, from 1913 to 1939, exceeds substantially that in Great Britain, whereas the net advance of living costs appears to have been greater in Great Britain than in the United States during those years.



CHART 37

Cost of Living in Germany, Great Britain, and the United States, 1871–1913  
and 1924–1944



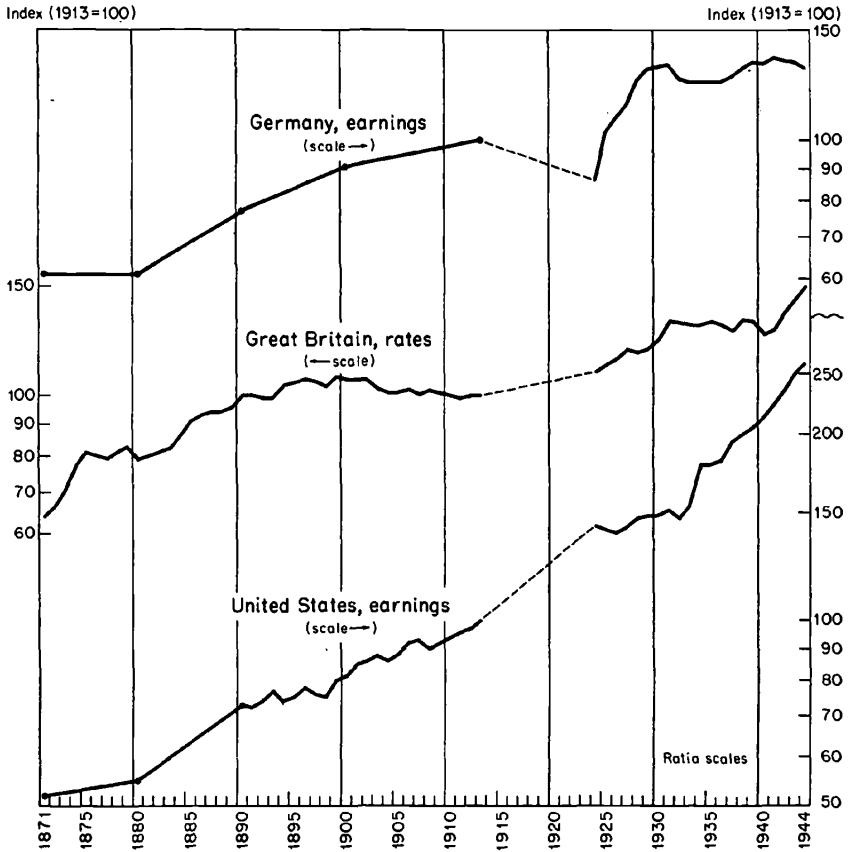
Source: Appendix Table A-49.

### REAL WAGES

It was found that hourly real earnings just about doubled in Germany between 1871 and 1944. This increase is of course considerably less than that of the comparable money wages, which quadrupled. As indicated by the indexes presented in Appendix Table A-50 and Chart 38, the increase in German hourly real wages is a little below that in hourly real rates in Great Britain; it is substantially less than the rise of hourly real earnings in the United States, which was fivefold. Before the outbreak of World War I, German hourly real wages rose faster than British but more slowly than those in the United States. After 1913, German hourly real wages lagged. The low standing—in relation to 1913—of German hourly real wage levels during the interwar period is brought out again in the lower panel of Chart 35 and the three sets of averages found in the following

CHART 38

Hourly Real Wages in Germany, Great Britain, and the United States, 1871-1913 and 1924-1944



Source: Appendix Table A-50.

tabulation. In order to permit comparisons unaffected by differences in

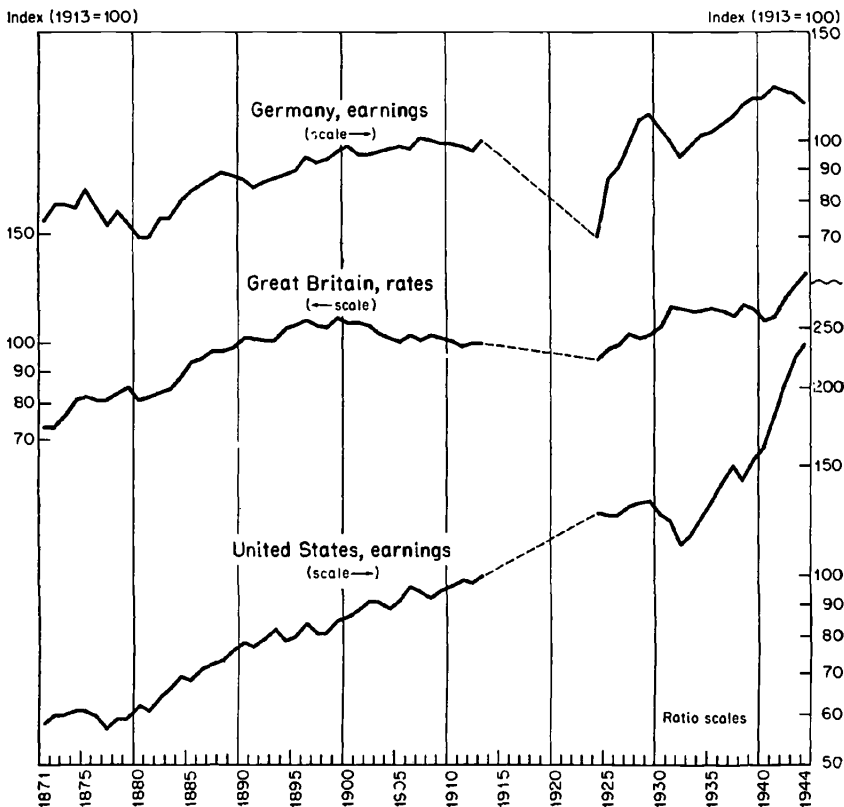
Period	Germany		Great Britain	United States
	Rates	Earnings	Rates	Earnings
1924-32	108	117	119	145
1924-39	111	121	124	162
1924-44	109	124	127	179

SOURCE: Appendix Table A-50.

wage concept and coverage, hourly real wage rates of building workers in the three countries have been analyzed, too. They show basically similar

CHART 39

## Daily or Weekly Real Wages in Germany, Great Britain, and the United States, 1871-1913 and 1924-1944



Source: Appendix Table A-50.

behavior.<sup>7</sup> The data and measures underlying these results can be found in Appendix Table A-52.

Appendix Table A-50 and Chart 39 contain measures of weekly real rates and earnings. The rise of weekly real wages is of course affected by the reduction of working hours which occurred at somewhat different rates in the three countries. The net rise of weekly real wages between 1871 and 1944 amounted to about 55 percent in Germany, in Great Britain to about 80 percent, and in the United States to about 300 percent. Between 1871 and 1913 the weekly real wage rises in Germany and Great Britain are very similar. However, they were concentrated in different subperiods. While

<sup>7</sup> Similarity is to be noted in the low interwar position of German hourly real wage rates, the intermediate position of British, and the high levels of United States wages, all measured relative to 1913. This order—though not the extent of differentiation—is the same as that observed in money wage trends.

enormous gains seem to have occurred in Great Britain during the decades of the 1870's and 1880's German real wages rose considerably faster than British toward the end of the century. As pointed out in Chapter 2, around 1900 weekly real earnings in Germany had virtually reached their 1913 level. Comparison with real wage behavior in England suggests that this was not necessarily a specifically German phenomenon. Indeed the indexes seem to indicate that 1913 levels in Great Britain were reached as early as 1890 and that they were actually exceeded around 1900. It is necessary, however, to make liberal allowances for margins of error.<sup>8</sup> The evidence available at the time of this writing suggests, in any case, that the decade or decades immediately preceding World War I did not witness substantial increases of weekly real wages in the two large European industrial countries. Economic progress for wage earners during these years seems to have been concentrated in other directions. In Germany it was expressed in a decline of average hours worked and an increase of industrial employment opportunities at relatively high wages. In Great Britain the available data on the length of the workweek show only a 2 percent decrease between 1890 and 1913. However, industrialization in Britain made rapid progress during these years, and the additional industrial employment opportunities, at wages in excess of those paid in agriculture or handicrafts, for example, may have contributed to the well-being of British wage earners.

For the years following 1913, both Appendix Table A-50 and Chart 39 point up the generally high levels—relative to that base year—of weekly real earnings in the United States and the low levels in Germany. Note that in 1929 and 1939 the relatives for Germany are higher than those for Great Britain. However, the British index numbers are based on wage rates for a normal workweek, and therefore do not reflect the wage increases accruing from overtime, other work at premium pay, and perhaps changes in the composition of the work force. These elements may have been important factors in the wage increases between 1913 and the two prosperous years under consideration. Thus, for these two years, the increase of weekly earnings probably exceeded the reported increase of weekly rates. The real wage position of the three countries during the interwar years can be judged on the basis of the period averages relative

<sup>8</sup> Phelps Brown and Handfield-Jones, in their article, "The Climacteric of the 1890's: A Study in the Expanding Economy," *Oxford Economic Papers*, October 1952, called attention to the stagnation of real wages in several industrial countries during the pre-1913 decades. They advanced the idea that the "climacteric" was an international phenomenon, brought about by basically similar circumstances. But note that, pending further studies, the similarity of the "leveling-out" should not necessarily be regarded as a proof of the phenomenon. The limited coverage of the cost-of-living data in particular may have brought about a similar bias in several countries. For the United States, furthermore, recent recomputations of real wages show little of the leveling-out that characterized earlier estimates. The more recent studies, by Albert Rees and by Clarence D. Long, were used throughout to describe wage behavior in the United States up to 1913.

to 1913, given below. During 1924-32 the average level of German weekly

	<i>Germany</i>	<i>Great Britain</i>	<i>United States</i>
	<i>Earnings</i>	<i>Rates</i>	<i>Earnings</i>
1924-32	96	104	125
1924-39	101	108	130
1924-44	105	110	147

SOURCE: Appendix Table A-50.

real earnings was 4 percent below 1913 levels and substantially lower than the comparable position of British and United States wages. The ranking of the three countries is, with respect to wage increases, the same if the period is extended forward to 1939 or to 1944.

An important finding of the study of German wages was the close resemblance of trends in weekly real earnings to corresponding trends in per capita income. That such resemblance exists for all three countries is suggested by the following tabulation of interwar levels relative to 1913.

Weekly Real Wages and Per Capita Real Income, 1925-32<sup>a</sup>  
(1913 = 100)

	<i>Germany</i>	<i>Great Britain</i>	<i>United States</i>
Weekly real wages <sup>b</sup>	99	105	125
Per capita real national income	93	107	126

<sup>a</sup> The period 1925 through 1932 was selected so that comparison between wages and income could be made for the same years. German real income data are not available for the year 1924.

<sup>b</sup> Earnings for Germany and the United States, rates for Great Britain.

SOURCE: See Appendix Table A-50 (weekly real wages), and Table 5 (per capita real income).

Note that the relative position of weekly real wages is extremely close to that of per capita real national income, particularly in Britain and the United States. However, a good deal of this surprisingly high correspondence must be attributed to coincidence. There is, for example, considerable difference in the coverage of wage and income indexes. Moreover, index levels in individual years vary far more than do the averages. Nevertheless, comparison of real wage indexes and per capita real income data shows the following points of correspondence:

1. Weekly real wages reflect the strong net rise in per capita real income in the years 1871 to 1939.
2. Between these end years the approximately equal rise of per capita income in Germany and Great Britain, as well as the substantially greater rise in the United States, is reflected in real wage behavior.
3. A similar correspondence is notable also for the interwar periods 1925-32 or 1925-33, relative to 1913.

4. The rank of the countries and the basic correspondence of real wages and real income are maintained also if the period of comparison is expanded to 1939. That is, during the decade and one-half between the stabilization of the German currency and the onset of World War II, German weekly real earnings and per capita real income averaged approximately their 1913 levels; British real rates and per capita income were roughly 10 percent above 1913; United States earnings were about 20 percent and per capita income 30 percent above their levels on the eve of World War I.

It is not necessary to analyze such correspondence in every detail. Note, however, a striking lack of agreement with reference to the United States, where per capita real income is reported to have almost trebled during the years 1871-1913, while weekly real earnings advanced by only 70 percent. Part of this difference can be readily explained as a consequence of the industrialization process, during which the employment composition shifted from agriculture to manufacturing. But there may be other causes such as the use of different deflators, and perhaps inadequacies in the basic information. Apart from this major exception, a basically close relation between per capita national income and average weekly real earnings in the three countries prevails.

### *Wage Differentials*

#### GENERAL

Trends of German wages—according to the analysis in Chapter 2—tended to show considerably less dispersion than, for instance, trends of different groups of wholesale prices. Similar conclusions follow from a cursory examination of data for Britain and the United States. Again, it is not so much the absence of consonant changes in the price structure that distinguishes wage changes from price changes, but rather the grossly incongruous behavior of a few classes—which can be found usually in wholesale prices but rarely in wages. To take an example from the United States: while the index of building material prices computed by the United States Bureau of Labor Statistics increased two and one-half times between 1890 and 1944, the index of metal and metal product prices decreased slightly.<sup>9</sup> Such divergences in trends cannot be found in wage movements. The reason is that technological progress and consequent decreases in production costs may affect industrial products in widely different ways, though they tend to have a uniform influence upon the price of labor.

The relative uniformity of wage changes does not, of course, preclude gradual changes in the wage structure. For Germany these changes have been measured by wage differentials and described in Chapter 3. We have observed a long-term tendency toward decreasing differentials, that is,

<sup>9</sup> See *Historical Statistics of the United States, 1789-1945*, pp. 233-34.

toward a greater equality in the wage structure. However, the equalizing trends showed differing strengths in the several segments of the wage structure and during different periods of German wage history.

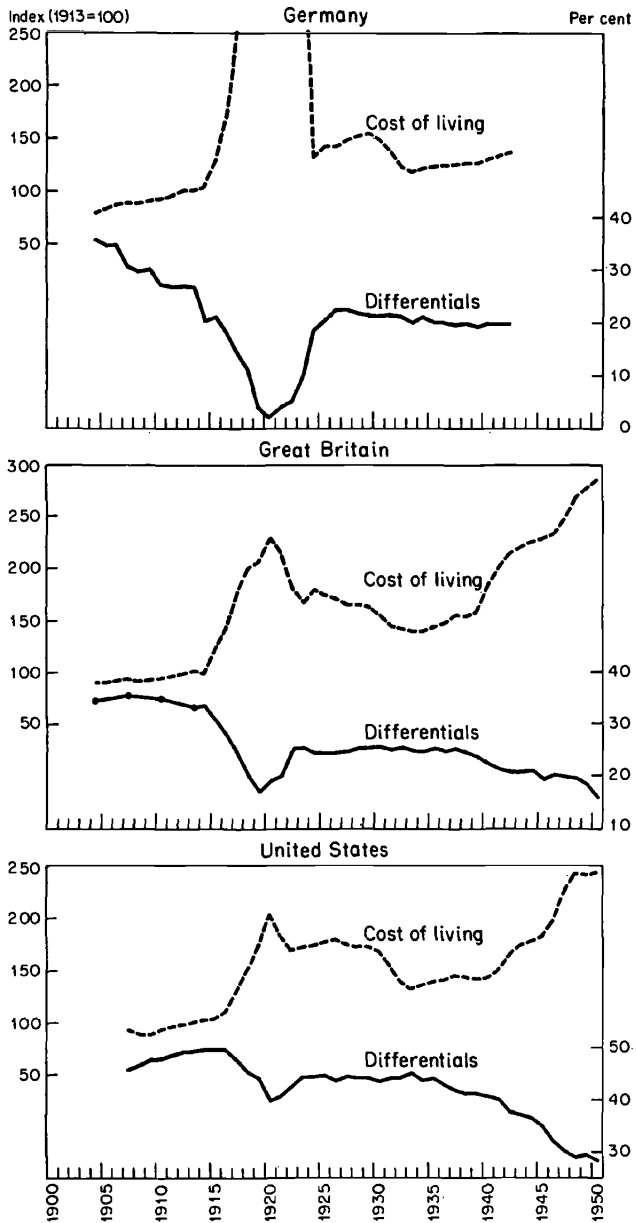
### SKILL DIFFERENTIALS

The analysis of German skill differentials showed a long-term tendency toward narrowing, and a fairly close empirical relationship between changes in skill differentials and changes in living costs. In keeping with the latter relationship we found a tendency toward first a widening, and then a narrowing, of skill differentials before 1913. During World War I and continuing through the inflation, the skill gap declined sharply, and by 1923 had virtually disappeared. Stabilization brought a re-establishment of substantial differences between the wages of skilled and unskilled, but never to the extent obtaining before the war. In the early post-stabilization years there was a moderate tendency toward a further narrowing of the skill gap. However, from the end of the 1920's the relation between wage rates of unskilled and skilled workers remained fairly stable. This was the case not only during the last years of collective bargaining, but also during the wage administration of the National Socialists. For all of this period wage rates of unskilled male workers, in an average of seventeen industries, amounted to about 80 percent of those for skilled.

Neither the long-term tendency toward a narrowing of skill differentials nor the close relation between these differentials and living costs was a peculiarly German phenomenon, as we may observe when we compare skill differentials in the building industries of Germany, Great Britain, and the United States. Chart 40 and Appendix Table A-53 show important elements of correspondence among the major changes in skill differentials. Noteworthy in this connection is the decline of these differentials between 1913 and the early 1920's, the subsequent moderate increase to less than prewar scope, and the more recent tendency toward a further reduction of the skill gap. Illustrations are taken from the building industry because long-term data on that industry are available for all three countries. There is much evidence that basically similar trends characterized wage behavior in the manufacturing, mining, and transportation industries.<sup>10</sup> It

<sup>10</sup> For the United States, see Leo Wolman, in *32nd Annual Report*, National Bureau of Economic Research, 1952, p. 43; Harry Ober, "Occupational Wage Differentials 1907-1947," *Monthly Labor Review*, August 1948, pp. 127-34; Philip W. Bell, "Cyclical Variations and Trend in Occupational Wage Differentials in American Industry since 1914," *Review of Economics and Statistics*, 1951, pp. 328 ff.; Edwin Mansfield, "Wage Differentials in the Cotton Textile Industry, 1933-1952," in *Review of Economics and Statistics*, February 1955, p. 80. For Great Britain, see the data for industries other than building presented by K. G. J. C. Knowles and D. J. Robertson, "Differences between the Wages of Skilled and Unskilled Workers, 1880-1950," *Bulletin of the Oxford University Institute of Statistics*, April 1951, p. 111; also Bowley, "Wages, Earnings and Hours of Work, 1914-1947, United Kingdom," p. 6. For evidence on further contraction of British skill differentials during recent years, see Edwin Mansfield, "A Note on Skill Wage Differentials in Britain, 1948-54," *Review of Economics and Statistics*,

CHART 40  
Skill Differentials in the Building Industry and Cost of Living, Germany, Great Britain, and the United States, 1904-1950



The differentials are the difference between wage rates of skilled and unskilled workers, expressed as percent of the former.

Source: Table 74, Appendix Tables A-49, A-53, and their sources.



is worth noting that the magnitudes of the skill differentials, despite their dependence upon the classification used and upon the occupations selected, tended to resemble each other roughly in the three countries. To take an illustration from the close of our period: around 1943 wage rates of unskilled workers for the average of all manufacturing industries in Germany were about 80 percent of those for skilled; practically the same relation existed in Great Britain for the skill differentials of wage rates in the building, shipbuilding, and engineering industries; in the United States average hourly earnings for unskilled workers were about 73 or 74 percent of those for skilled and semiskilled. The comparable ratios for the period before World War I were around 60 percent for Germany and Great Britain, and a little below 70 percent for the United States.<sup>11</sup>

Skill differentials were narrowest in all three countries at the close of each war and during the years immediately following, largely owing to the inflationary price rises. A relationship between skill differentials and cost-of-living movements for all three countries appears clearly from Chart 40. The differentials declined with the price rises from 1914 to the early 1920's; they increased to more than prewar size with the subsequent deflation; and in the late 1930's and the 1940's they declined in the non-regimented countries while living costs rose.

The effect of retail price rises on skill differentials under extreme circumstances is illustrated by the fact that the differentials were virtually obliterated in Germany where, during the Great Inflation, skyrocketing of prices was practically unchecked. The reasons for the narrowing of skill differentials in times of rapidly rising prices do not apply uniformly from country to country or from circumstance to circumstance. In Germany during World War I and the Great Inflation the need to protect the low-paid unskilled worker was probably the most important cause. However, the development may be very different in a country where inflation is not accompanied by a rapid deterioration of living conditions. In the United States during World War II, for example, increased living costs and the narrowing of skill differentials appears to have resulted from the increasing relative scarcity of goods and manpower, rather than from the social need to protect low-paid workers. Here the scarcity of goods led to a rise in the general price level, including living costs; and the scarcity of labor gave rise to a need to procure labor for "less desirable," mostly unskilled, jobs.<sup>12</sup>

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August 1957, pp. 348-51. The tendency toward closing of skill gaps between 1913 and 1920, and the moderate widening thereafter have been observed also for other countries. See, for instance, J. H. Richardson, "Some Aspects of Recent Wage Movements and Tendencies in Various Countries," *International Labour Review*, 1928, pp. 179-203.

<sup>11</sup> Caution is required in the interpretation of the similarity of these figures. While it seems significant that the skill ratios are higher than about 50 or 60 percent, the reported average ratios are affected by the selection of industries and occupations. Around 1943, for instance, these ratios in Germany ranged from 58 percent (hard-coal mining) to 89 percent (soft-coal mining).

<sup>12</sup> Albert Rees made valuable suggestions on this point.

The evidence presented in Chart 40 suggests that living costs are not the only major determinant of skill differentials. In the United States we may note the diverse directions of the changes in these two variables before World War I, and the stability of the differentials during much of the interwar period—while living costs showed distinct short-term variations. But even broad long-term tendencies show far from perfect correspondence. Apart from the rise in living costs, a wide variety of long-term factors tend to operate toward a narrowing of skill differentials. Among these are: (1) the increasing use of mass-production techniques with an accompanying breakdown of skilled operations into simpler jobs; (2) the mechanization of some typical tasks of unskilled labor, such as handling, storing, and transporting materials, entailing large expenditures for capital equipment; (3) the spread of general education, democratic ideologies, and political franchise; (4) the efforts of trade unions to reduce skill differentials, and the increasing unionization of unskilled workers; (5) the growing role of government in wage determination, tending to promote greater wage equality especially in times of social stress; and possibly (6) the equalization of efficiency fostered by generally higher levels of health and economic well-being. There are, on the other hand, factors that set limits to the narrowing of skill differentials: (1) differences in aptitudes and training; (2) the growing supply of unskilled labor; (3) greater ease of substitution and sharper competition among unskilled workers; (4) a tendency to “freeze” the wage structure in order to simplify negotiation of wage contracts. Skill differentials, despite the observed historical trends toward narrowing, must be regarded as a permanent feature of any industrial wage structure.<sup>13</sup>

#### AGE DIFFERENTIALS

Information on differentials in German wage rates is largely qualitative. There are no series by which trends in these differentials can be measured over long periods of time. But information available for a number of briefer periods shows that:

1. Wage rates for younger workers during World War I tended to increase more than those for adults, and especially more than those for skilled adults.
2. During the 1920's and early 1930's, age differentials tended to decline, largely as a consequence of the inclusion of wages for youths in collective bargaining contracts.
3. Over the whole period 1871-1945, the status of apprentices changed from that of paying workers to that of paid workers.
4. The coverage of apprentice remuneration by collective bargaining

<sup>13</sup> There might, of course, also be factors leading toward wider skill differentials. An example may be technological developments requiring high skills and affecting the relative scarcity of skilled workers as compared with unskilled. For a discussion of a related subject see Richard Perlman, “Forces Widening Occupational Wage Differentials,” *Review of Economics and Statistics*, May 1958.

contracts tended to standardize and raise the level of such wages in relation to adult workers' pay.

Age differentials, apart from their decrease, diminished in importance in the wage structure, largely as a result of the increasingly stringent provisions of child labor legislation.

Indications of a narrowing of age differentials and of a decline in their importance in the wage structure can be found also in the wage histories of Great Britain and of the United States. In Great Britain, child labor legislation as well as union campaigns tended to improve the wage levels of children and youths relative to those of adults. A special problem, that of "dead-end employment," was created by the fact that age differentials, for instance in British coal mines, were large for youths up to 17 years of age but contracted sharply at age 18 and over. This resulted in a common practice of "sacking" most youths at the age of 18, when higher wage levels made their employment less profitable. A gradual raising of wages for youths and a consequent narrowing of age differentials brought the solution to this problem.<sup>14</sup> And reduced employment of youths generally brought about a decreasing importance of age differentials in the British wage structure.

There is little doubt that in the United States, as well, the general trend in age differentials between wages of youths and adults was downward. During the last decades of the period under review the general tendency in both governmental wage regulations and collective bargaining contracts in this country was to establish "entry rates" without special provisions for the remuneration of youths.<sup>15</sup> As in the other two countries, a decreasing importance of the age differential in the wage structure can be observed as child labor legislation gained ground. In keeping with the experience of other industrial countries, child labor, as reported by the Census, increased up to the beginning of this century, when about one-fifth of all children between 10 and 16 years of age were listed as gainfully occupied. It is possible that the reported increase may reflect to some degree improved reporting, and shifts from agricultural to industrial jobs, since earlier reporting of gainfully employed youths in agricultural occupations might have been unreliable. Less subject to doubt, however, is the subsequent drastic reduction of the percentage of youths in the American labor force. By 1930 less than one-twentieth of the 10 to 16 age group was gainfully occupied; by 1940 this ratio must have dropped further.<sup>16</sup> Thus the major

<sup>14</sup> See Paul T. David, *Barriers to Youth Employment* (American Council on Education, 1942), pp. 85-86.

<sup>15</sup> It is sometimes pointed out that this does not always mean an improvement in the relative remuneration of youths. See *Ibid.*, p. 87.

<sup>16</sup> *Ibid.*, p. 50. See also Clarence D. Long, *The Labor Force in Wartime America*, (National Bureau of Economic Research, Occasional Paper 14, 1944), Table 2; and, by same author, *The Labor Force under Changing Income and Employment* (Princeton University Press, for the National Bureau of Economic Research, 1958), Appendix Table A-2.

trends observed in wage levels, related to age of German workers, appear to have been experienced also in Great Britain and the United States.<sup>17</sup>

### SEX DIFFERENTIALS

Sex differentials in Germany tended to show a moderate decline during the period under investigation. The decline was concentrated largely between 1914 and 1924, and was more clearly apparent when wages of women (skilled or unskilled) were compared with those of skilled men. The rise of wage rates for unskilled men, during the period noted, was steeper than that for women. During the 1920's the gap between rates for women and those for men closed somewhat more, but from 1933 on, the rate structure was practically frozen, and little change can be observed in the relation of women's wage rates to those of skilled male workers.

The above observations are based on rates for comparable occupations.<sup>18</sup> More important for the average wage level of employed women—but not measurable by available statistics—is the fact that more and more women were admitted to remunerative occupations and to industries paying higher wages, a factor contributing heavily to the general trend toward greater equality between women's and men's wages. Investigations of fairly wide coverage but somewhat doubtful comparability show average sex differentials to have been about 60 percent during the 1870's, about 55 percent before the outbreak of World War I, and somewhat below 50 percent on the eve of World War II.

The long-term decline in sex differentials has been observed also in other industrial countries. In Great Britain the differential between men's and women's earnings was reported as 56 percent of men's earnings in 1906 and 52 percent in 1924 and 1935. A further narrowing of the differential is reported on the basis of a different sample for the period 1938-45 (from 53 percent to 47 or 48 percent).<sup>19</sup> Both the dimensions and the trends of the British differentials are rather close to their German counterparts. For the United States a long-term trend toward declining sex differentials can be inferred from the statistics of average hourly earnings published by the National Industrial Conference Board. For the group of industries reported on, average hourly earnings by women workers were below 60 percent of those received by male workers in 1914. This ratio fluctuated between 60 and 70 percent during the period 1920-44, and tended to stay above 70 percent in 1947 and 1948.<sup>20</sup> A recent study of

<sup>17</sup> For a description of recent world-wide trends toward a decline of age differentials and toward equal pay for equal work, see "Wage Differentials Affecting Young Workers," *International Labour Review*, December 1955, especially pp. 531-34.

<sup>18</sup> Sex differentials in average hourly earnings for a combination of industries (constant weights) can be computed from the mid-1930's on. Between 1935 and 1943, sex differentials declined minutely (see Table 61).

<sup>19</sup> Bowley, "Wages, Earnings and Hours of Work, 1914-1947, United Kingdom," p. 6.

<sup>20</sup> National Industrial Conference Board, *The Economic Almanac*, 1950, p. 343. Publication of the data ceased after July 1948.

sex differentials in the American cotton textile industry revealed a clear tendency toward reduced differentials, between 1933 and 1952. The narrowing of the gap was largely concentrated in the periods of the early New Deal and World War II.<sup>21</sup>

It appears that labor shortages during times of war have played an important role, historically, in equalizing wages of men and women. The relative gains in women's wages were sometimes reduced after the war—but never to prewar levels. It might be mentioned in this context that the trend toward narrowing sex differentials during and after a war has been observed also in France and other countries.<sup>22</sup>

#### CITY-SIZE, REGIONAL, AND INDUSTRIAL DIFFERENTIALS

Tendencies toward a tightening of the German wage structure, measured by narrowing differentials, have been observed as between cities of different size, between different regions, and between different industries. The narrowing of these differentials appears to have been less marked and less unambiguous than, for example, the narrowing of skill differentials.

Some information on the narrowing of regional differentials is available also for Great Britain and the United States. Although no published report of long-term changes of these differentials in Great Britain was found, it appears that regional differentials narrowed in the course of time and—because of the development of national minimum rates—possibly more for unskilled than for skilled workers.<sup>23</sup> For the United States the narrowing of North-South differentials—due to broadening industrialization, unionization, and so on—is well established. "In most industries, southern wage rates have been rising relative to comparable northern rates during the past fifty years. The narrowing of the South-North differential has generally been more marked during the past two decades."<sup>24</sup> For the cotton textile industry, the decline of the North-South differential during the past twenty years has recently been analyzed.<sup>25</sup> A narrowing of regional differentials for the United States as a whole has also been found by several observers.<sup>26</sup>

Also industrial differentials in the United States have narrowed. This is

<sup>21</sup> Mansfield, *op. cit.*, p. 82.

<sup>22</sup> See, for example, Richardson, *op. cit.*, p. 191.

<sup>23</sup> This evaluation was contributed by K. G. J. C. Knowles of the Institute of Statistics, Oxford University. A suggestion of decreasing regional differentiation appears also in the discussion of district and local wage variations in Great Britain, in Margot Heinemann's *Wages Front* (London, Lawrence and Wishart, 1947), pp. 145-53. This author, incidentally, describes also long-term trends toward narrowing of differences between wages for time workers and for piece workers (p. 210).

<sup>24</sup> R. A. Lester, "Southern Wage Differentials: Developments, Analysis, and Implications," *Southern Economic Journal*, April 1947, p. 386.

<sup>25</sup> Mansfield, *op. cit.*, p. 81.

<sup>26</sup> For the period 1907-19, see J. W. Bloch, "Regional Wage Differentials 1907-46," *Monthly Labor Review*, April 1948, p. 371. For 1939-46, see W. Woytinsky and associates, *Employment and Wages in the United States* (Twentieth Century Fund, 1953), p. 481.

evident from 1933 on,<sup>27</sup> but was particularly pronounced during and after World War II.<sup>28</sup> Woytinsky analyzed the industrial earnings structure during the first four decades of this century, but his findings did not lead to clear-cut conclusions.<sup>29</sup> The decline of industrial differentials since the Great Depression was largely brought about by the establishment of minimum wages, and by wage increases in similar absolute amounts for different industries.<sup>30</sup>

## CONCLUSIONS

A general trend toward a tightening of the wage structure is observable for all three countries, pronounced in skill, age, and sex differentials but perceptible also in regional, city-size, and industrial differentials. It can hardly have come about by chance that in all these aspects of the wage structure the long-term trend was in the same direction—toward greater equality. The mass production of goods, their distribution throughout wide areas, the tendencies toward tight industrial organization, the growth of communication, and the spread of education—all these tend to reduce differences among groups of the labor force and thus the differences in their wages.

## *Cyclical Behavior*

### MONEY WAGES

The discussion of German money wages in Chapter 4 dealt with the conformity of wage cycles to general business cycles, their timing in relation to reference turning points, their cyclical amplitudes, their numerical contribution to total payroll changes, and their relation to labor market conditions. The results of the investigation are summarized below and, whenever possible, compared with related findings on wage behavior in Great Britain and the United States.

*Conformity.* Perhaps the most important finding on the cyclical behavior of German wage rates as distinguished from earnings is the rarity of substantial cyclical declines. Between 1871 and 1944 wage rates showed

<sup>27</sup> A. M. Ross and W. Goldner, "Forces Affecting the Interindustry Wage Structure," *Quarterly Journal of Economics*, 1950, pp. 255 and 263.

<sup>28</sup> See, for instance, David R. Roberts, "The Meaning of Recent Wage Changes," in *Insights into Labor Issues*, R. A. Lester and J. Shister, eds. (Macmillan, 1948), pp. 228-29. See also Herman P. Miller, "Changes in the Industrial Distribution of Wages in the United States, 1939-1949," in *An Appraisal of the 1950 Census Income Data* (Studies in Income and Wealth, Vol. 23, Princeton University Press for National Bureau of Economic Research, 1958).

<sup>29</sup> W. Woytinsky, *Earnings and Social Security in the United States* (Social Science Research Council, 1943), p. 202.

<sup>30</sup> Ross and Goldner regard the closing of the wage structure as a kind of statistical illusion produced by the unsatisfactory method of measuring fairly uniform absolute increases in percentage terms (*op. cit.*, pp. 263-65). It seems to this writer that increasing equality in the wage structure remains a tangible effect of the fairly uniform absolute increases—whatever form be used to describe the underlying wage changes.

material losses only twice: during the long and severe contraction following the *Gründerjahre* boom of the early 1870's, and during the Great Depression of 1929-32.<sup>31</sup> At times, as during the 1925-26 contraction, monthly wage rates leveled out or decreased minutely; declines in some industries amounted to one and one-half percent of the peak level. In other industries contracts were permitted to lapse but the levels of the expired agreements continued to appear in the statistics (see Chart 15 and Chapter 4, p. 130). At other times, as during the major contractions prior to 1913, a deceleration in the increase of wage rates has frequently been observable, even on the basis of the crude annual data. Finally, there were instances where no cyclical responses of wage rates to changes in business conditions could be discovered. However, if all responses—including deceleration of growth—are counted, money wage rates on the whole appear to have conformed fairly closely to major cyclical changes in general business conditions.

Both the resistance of wage rates to sizable downward adjustments, and cyclical response in the form of deceleration or leveling out can be observed also in British and United States wage experience. For the period before World War I, cyclical observations are based on annual data only. In Great Britain, wage rates reacted to all major contractions in the form of actual, albeit mild, declines. Their reaction to the briefer contractions, such as those occurring between 1900 and 1914, are not clear.<sup>32</sup> For the United States there is no doubt that during the major price and earnings declines wage rates also receded.<sup>33</sup> However, the available annual series on rates, show no reaction to the three brief contractions that occurred in the period 1907-14.<sup>34</sup>

For the period following World War I the cyclical behavior of wage rates can be judged on the basis of monthly information. In the course of the five contractions between 1919 and 1945 in both Great Britain and the United States, wage rates showed substantial declines only in connection with the deflationary postwar contraction of 1920-21 and during the Great Depression. Wage rates either did not react cyclically to the other contractions or responded so imperceptibly that only special techniques revealed the responses.<sup>35</sup> However, the mild rate cycles thus established

<sup>31</sup> The change of money wage levels brought about by the stabilization of the currency at the close of the year 1923 are disregarded here.

<sup>32</sup> For basic data see Wood, *op. cit.*, pp. 102 ff., and Bowley, *Wages and Income in the United Kingdom since 1860* (London, Cambridge University Press, 1937).

<sup>33</sup> For basic data see Appendix Table A-48, col. 7 (1871-90), and *Historical Statistics of the United States, 1789-1945*, p. 69. The latter figures refer to union rates and may not be representative for the period.

<sup>34</sup> See Wesley C. Mitchell, *Gold, Prices, and Wages under the Greenback Standard* (University of California Publications in Economics, 1908), Table 37. Furthermore, wage material published by labor departments of various states contains instances of cyclical sensitivity of wage rates during later contractions.

<sup>35</sup> See Daniel Creamer, assisted by Martin Bernstein, "Behavior of Wage Rates during Business Cycles" (National Bureau of Economic Research, Occasional Paper 34, 1950), Charts 1 through 5.

could be related to reference cycles. All in all, it can be said that in Britain and the United States, as well as in Germany, wage rates conformed fairly well to major changes in business conditions.

The response of earnings to cyclical changes in business activity is clearer than that of rates. In Germany quarterly shift earnings of coal miners showed, on the whole, good conformity over the period 1889-1932 and a skipping of only a few brief, mild cycles. Comprehensive earnings series became available in 1924, but for a decade were published in annual form only. From these series it appears that earnings responded clearly to the later of the two business cycles occurring between 1924 and 1932. During the brief and mild contraction of 1925-26, the rise in hourly earnings showed only a minute deceleration, and that in weekly earnings a somewhat stronger one. A more regular cyclical response of hourly earnings, compared to wage rates, emerges also from an examination of United States data.

In general, weekly earnings show more reliable cyclical responses than hourly earnings. There is, however, a strong difference between series on an annual and on a monthly basis. On an annual basis, weekly earnings series tend to be cyclically rather insensitive to mild business cycles. This is valid for both Germany and the United States. As pointed out previously, weekly earnings in Germany showed only a mild response to the 1925-26 contraction. In the United States weekly earnings, on an annual basis, declined during only three out of the five business contractions occurring between 1920 and 1939. Monthly series of weekly earnings on the other hand, declined in all five contractions.

*Timing.* The outstanding feature in the timing of turning points in German wage rates is their substantial lag behind turns in general business conditions. At the two times when distinct specific turns in wage rates occurred (the *Gründerjahre* and the Great Depression), wage rates in annual form show lags of one year or more. For the interwar period, the timing of wage rates can be established on the basis of monthly data. Only two business cycles fall into the poststabilization phase of this period. However, at each of the four turning points involved, a substantial lag of wage rates behind monthly reference dates appears. The lags vary between seven and twenty months, their precise extent being dependent partly on the rules adopted for determining specific turning points.<sup>36</sup>

The tendency of turning points in wage rates to lag behind those in general business conditions appears clearly also in British and United States experience (compare the annual dates for reference and specific turning points given in Table 71; see also Chart 35). For Great Britain, the average length of the lag during the 1920-40 period has been computed at eleven months, for the United States over the period 1923-31, at nine months.<sup>37</sup> With reference to the turning point preceding the Great

<sup>36</sup> See Chapter 4, pp. 138 ff.

<sup>37</sup> See Cleamer, *op. cit.*, pp. 17 and 30. NBER reference cycle turns are used throughout.



TABLE 71

Percentage Change of Money Wages during the Great Depression,  
Germany, Great Britain, and the United States  
(change expressed in percent of peak levels)

	GERMANY			GREAT BRITAIN			UNITED STATES		
	<i>Peak</i>	<i>Trough</i>	<i>Change</i>	<i>Peak</i>	<i>Trough</i>	<i>Change</i>	<i>Peak</i>	<i>Trough</i>	<i>Change</i>
RATES AND EARNINGS, ALL INDUSTRY									
<i>Reference Contraction</i>									
Hourly rates	1929	1932	-19	1929	1932	-4	1929	1932	-18
Hourly earnings	1929	1932	-24	...	...	..	1929	1932	-21
Weekly earnings	1929	1932	-33	...	...	..	1929	1932	-32
<i>Specific Contraction</i>									
Hourly rates	1930	1937	-22	1927	1934	-7	1929	1933	-23
Hourly earnings	1929	1933	-27	...	...	..	1929	1933	-22
Weekly earnings	1929	1932	-33	...	...	..	1929	1933	-33
HOURLY WAGE RATES, BUILDING									
<i>Reference Contraction</i>									
Skilled workers	1929	1932	-25	1929	1932	-7	1929	1932	-11
Unskilled workers	1929	1932	-25	1929	1932	-8	1929	1932	-11
<i>Specific Contraction</i>									
Skilled workers	1930	1936	-35	1929	1934	-9	1931	1933	-17
Unskilled workers	1930	1936	-34	1929	1934	-10	1930	1933	-19

SOURCE: Appendix Tables A-48 and A-51. For United States rates, see *Statistical Abstract of the United States, 1940*, p. 339 (entrance rates for 13 industries).

Depression, German wage rates lagged as much as nineteen months, those in Great Britain and the United States about one year. In this instance the German rates obviously exhibited a particularly effective resistance to downward revision.

The fact that there were pronounced lags in the turning points of wage-rates in all three countries supports the thesis that such lags are inherent in the economic nature of wage rates. Some major reasons for the occurrence of the lags were discussed in connection with the German experience (see Chapter 4, p. 142 ff.). Among them were the difficulty of identifying turning points at the time of their occurrence; the unpopularity of wage-rate cuts, and the need for a sufficiently strong change in employment and profit conditions to make moves for wage adjustments feasible; the existence of contractual obligations extending over many months. No doubt these factors help to explain the wage-rate lags in Great Britain and the United States as well.

At this point we should note the relation between the strong lags in the turning points of wage rates and the skipping of brief mild cycle phases, which we have observed earlier. Briefer contractions might run their

course before wage rates begin to respond, and significant declines be prevented by the ensuing recovery. This tendency is re-enforced in periods of long-term upward trends in wage rates, which tend to delay the occurrence of upper turning points and thus contribute further to the skipping.

Besides the timing of turns in wage rates, Tab'e 71 also gives some indication of the timing of turns in earnings during the Great Depression. The German evidence shows greater frequency of coincidences and reduced lags of earnings compared with lags in wage rates. There is no comparable evidence for Great Britain for the same years. In the United States, annual series of both average hourly and weekly earnings show coincidence at the 1929 peak and a one-year lag at the 1932 trough. The generally closer timing of turns in weekly earnings, and to a certain extent also hourly earnings, was brought about by the lead (or, on an annual basis, the approximate coincidence) of turns in average hours worked compared with turns in general business conditions. It should be noted, however, that the observed coincidences are based on annual data. On the basis of monthly data, earnings in the United States definitely show lags,<sup>38</sup> and a similar situation might be surmised in the case of Germany.

*Amplitudes.* One of the characteristics of German wage rates, mentioned above in connection with their conformity to business cycles, is their strong resistance to downward adjustments. Thus, cyclical responses to contractions consisted often merely of growth deceleration or leveling-out into plateaus. Close scrutiny of plateau periods for which monthly data are available reveals, however, that behind the macroscopic picture of these plateaus there may lie mild cycles with minute amplitudes. Appendix Table A-21 and Chart 37, for instance, show that in connection with the 1925-26 business contraction average wage rates not only leveled out, but actually declined by about 0.5 percent of the peak—with somewhat larger declines in certain industries. This finding checks neatly with Creamer's measurement of similar mild wage-rate cycles in Great Britain and the United States.<sup>39</sup> During the two periods when German wage rates underwent major full cycles, their fluctuations happened to be roughly similar. During the *Gründerjahre* cycle their specific advance was about 50 percent, their decline 20 percent. During the interwar period the specific advance between 1924 and 1930 was 68 percent, and the decline during the Great Depression was 22 percent—all measured on an annual basis in percent of levels at initial turns.<sup>40</sup>

The annual reference turning points marking the boundaries of the Great Depression are set by the National Bureau at 1929 and 1932 for

<sup>38</sup> *Ibid.*, p. 32.

<sup>39</sup> *Ibid.*, Charts 1, 2, 3, and 5.

<sup>40</sup> Measured in percent of peak-trough averages, the increase during the *Gründerjahre* cycle is 45 percent for building rates and 33 percent for printing rates, the decline 20 percent and 7 percent respectively. During the interwar period average hourly rates increased by 50 percent of the peak-trough average, and decreased 25 percent.

each of the three countries covered by the present study. The coincidence of these reference years enables us to compare wage changes in the three countries. The comparative data are set forth in Table 71 which also presents information on amplitudes during the corresponding specific cycles. As to the amplitudes of wage rates, the most conspicuous feature of the comparison is the mild decline in British as compared with German and United States rates, an observation which applies both to the comprehensive wage measures and to the building industry wage rates. The relatively mild decline in British rates, furthermore, is apparent in both reference and specific cycle behavior. The question arises why British rates declined relatively little and why, for instance, wage rates in Germany—the country that experienced the longest lag before any rate reaction appeared at all—finally showed significantly stronger declines. In principle, there are many factors which could be held responsible for the comparatively severe decline of rates in Germany, and the mild decline in Britain. Prominent among them might be the severity of the contraction of business activity as measured by the cutbacks in real national income or employment. Also, the fall in price levels would be expected to exert an important influence. The following tabulation describes the decline in these factors in the three countries between 1929 and 1932. Great Britain shows the mildest declines in all the selected indicators of contraction severity.<sup>41</sup>

Percentage Changes in Per Capita Real Income, Employment, Wholesale Prices, and Retail Prices: Germany, Great Britain, United States, 1929-1932 (percent of peak levels)

	<i>Germany</i>	<i>Great Britain</i>	<i>United States</i>
Per capita real income	-26	-4	-37
Employment, excluding agriculture	-29	-9	-25
Wholesale prices	-34	-29	-32
Retail prices	-21	-13	-20

SOURCE:

Per capita real income, Table 5. Employment, United Nations, *Statistical Yearbook* 1948, p. 80. Wholesale prices, Table 70. Retail prices, Appendix Table A-49.

For Germany and the United States, behavior of wage rates as well as that of earnings can be compared on the basis of the data in Table 71. Both comprehensive measures show broadly similar declines during the Great Depression. During the reference contraction the declines in the composite series of rates amounted to 18 to 19 percent, in hourly earnings to a little more than 20 percent, and in weekly earnings to somewhat more than 30 percent. For specific contractions a similar relation generally prevailed.<sup>42</sup> The close resemblance between wage declines in the two countries is not found in building wage rates. As shown by the lower

<sup>41</sup> Note also, however, that between 1924 and 1929 British wage rates declined, in contrast to the increases observable in Germany and the United States.

<sup>42</sup> The exception is the relation between hourly rates and earnings in the United States. However, the coverage of the hourly rates and earnings series for this country is so different that little systematic importance can be attached to their relative amplitudes in either reference or specific contractions.

panel of Table 71, German building rates decreased about twice as much as United States rates.

Per capita national real income experienced a greater decline in the United States than in Germany (see the tabulation above), and the employment and price measures give evidence of roughly similar behavior. Why, then, did German wages react as strongly or even more strongly to the Great Depression than their counterparts in the United States? It is possible, of course, that the difference is due to variations in the concepts and the industrial coverage of the measures used. The steep German wage-rate decline, on the other hand, occurred under circumstances which could well provide an explanation for it. One of the unique features of German wage history during the Great Depression was the "deflationary" intervention by the government. In particular, it was Chancellor Brüning's Fourth Emergency Decree which finally forced German wage rates down almost to their ultimate trough levels. It may be surmised that such government intervention brought rates to levels lower than they would have touched if market factors alone had been the prevailing force. Brüning's intervention may also explain the curious fact that the decline could be as strong as it was in the very country where the delay of the wage-rate decline was so prolonged.

Occasionally one encounters statements to the effect that wage rates have a long-term tendency toward increasing rigidity. Since German wage rates underwent only two substantial declines during the period 1871-1945, broad generalizations would scarcely be acceptable on the basis of the available evidence. Nevertheless, it is interesting to compare the two instances of marked decline. The wage-rate declines during the post-*Gründerjahre* contraction and during the Great Depression were roughly similar in magnitude. But wholesale-price declines were somewhat milder and production declines very much milder during the first contraction than during the second. That is, although the limited German evidence does not of itself indicate any "tendency" toward more pronounced downward rigidity, it would not be incompatible with such a thesis, if the wage decline is measured against employment and price changes. The British experience has been examined by Dunlop,<sup>43</sup> who finds no evidence of long-term trends in wage-rate variability, measured either by itself or in relation to employment and price changes. Creamer notes some tendency toward increasing rigidity for the United States during the period 1920-49, especially if wage reactions are compared with fluctuations in production and employment. However, Creamer hesitates to generalize from so brief a period.<sup>44</sup> Our knowledge of the wage behavior in the three countries obviously does not support any sweeping statements on long-term trends toward increasing rigidity.

<sup>43</sup> John T. Dunlop, "Trends in the Rigidity of English Wage Rates," *Review of Economic Studies*, June 1939, pp. 190 and 198.

<sup>44</sup> Creamer, *op. cit.*, pp. 39-40.

*Wage Cycles and Labor Market Conditions*

EMPLOYMENT. Since wage rates are prices prevailing in the labor market, some major processes in this market were studied in order to determine their effect on wage behavior. Wage-rate behavior in Germany has been related to employment on an aggregative, as well as on an industry-by-industry basis. As far as timing relationships are concerned, the substitution of cyclical turns in employment for those in general business conditions does not modify the basic findings on the sluggishness in the response of wage rates. In particular, the lag in German wage rates behind changes in general business conditions cannot be explained by a systematic lag of turns in employment or unemployment. Creamer has set forth similar findings for Great Britain and the United States.<sup>45</sup> Moreover, the differences between turning points in various industries do not appear to be related to corresponding differences in employment conditions in these industries, but rather to the length and expiration dates of wage agreements.

More fruitful has been the attempt to relate the amplitude of wage rate responses to those in employment. For Germany it has been shown that cycles which brought only mild wage responses were those characterized by milder declines in employment. The same situation prevailed also in Great Britain and the United States.<sup>46</sup> However, for none of the three countries would the evidence support a statement to the effect that cyclical responses of wage rates are directly proportional to declines in employment. The declines of United States wage rates during the 1920-21 and 1929-32 contractions certainly bear little resemblance to employment changes during the same periods. Nor is this finding surprising; the amplitude of wage-rate declines is obviously codetermined by other factors, such as changes in price levels.

If comparisons between employment changes and wage-rate changes were carried out industry-by-industry during the same cycle, the effect of changes in the price level would be minimized. Such changes would in fact be ruled out if the comparisons were made between the same dates. In order to see whether, under such circumstances, wage-rate changes bear any relation to business activity in various industries, German employment and production data were compared with wage rates, for the reference contraction 1929-32. A fair degree of correlation was established (see Chapter 4, p. 159 and Table 39). In Great Britain, juxtaposition of the available wage-rate and employment information by industry, for the Great Depression, showed no significant relationship between changes in wages and those in employment.<sup>47</sup> Exploratory study of hourly wage

<sup>45</sup> *Ibid.*, Table 1 and Chart 5.

<sup>46</sup> *Ibid.*, pp. 12 and 26.

<sup>47</sup> This observation is based on changes in wage rates, as given by E. C. Ramsbottom in "The Course of Wage Rates in the United Kingdom, 1921-1934," *Journal of the Royal Statistical Society*, 1935, pp. 665-66; and as given by Bowley, *London and*

and employment behavior in the United States suggests a low positive correlation between the mentioned variables.<sup>48</sup> The relationship observed for Germany should not, of course, be interpreted as denoting a simple causal relationship between employment and wage fluctuations. Many of the cyclically sensitive industries, such as building and hard-coal mining, happen also to be high-wage industries. The positive relation between employment and wage-rate decline could thus be due, at least in part, to the tendency of high rates to decline more than low rates.<sup>49</sup> Similarly, the fact that some industries with smaller wage-rate declines also experienced relatively small employment setbacks does not necessarily support contentions that employment changes determine wage changes, or that wage rigidity has but slight effect upon employment. Again, it must be understood that the low-wage consumers' goods industries may tend to suffer less decline in wages and employment for reasons other than those reflected in either of the two variables.

LABOR STRIFE AND GOVERNMENT ACTIVITY. In studying the German experience, no way was found to isolate the effect of union or employer activity on wage cycles. It was possible, however, to relate the occurrence of labor strife—strikes and lockouts—to the lag of wage rates after lower turning points. Strikes tended to reach their heights (in terms of man-days lost) close to mid-expansion, that is, after the rise of living costs began to depress the purchasing power of the hourly rate, after increased employment began to ease competitive pressures in the labor market, and after increased sales provided some leeway for businesses to grant wage rises. Evidence in the United States confirms the occurrence of peaks in labor strife well within the expansion phase. Albert Rees<sup>50</sup> finds, on examination of the period 1915 to 1940, that strike peaks characteristically precede peaks in general business activity by about five months. He reports also a lag of strike troughs behind reference troughs. Rees's findings are in keeping with the observation in Germany of low-strike activity during contractions, though the German evidence does not show sufficient regularity to permit a generalization on the timing of troughs in labor strife. For Great Britain, it is possible to establish a basically positive general conformity of strike activity to business cycles. However,

*Cambridge Economic Service*, May 1947, p. 12. For employment, see Agatha L. Chapman, *Wages and Salaries in the United Kingdom, 1920-1938* (London, Cambridge University Press, 1953), pp. 98-100. The wage-employment comparisons were hampered by the fact that information for these two measures is rarely available for comparable industrial classifications. Furthermore, wage rates showed relatively small declines during the Great Depression.

<sup>48</sup> This study was based on (1) average hourly earnings and employment in twenty-one manufacturing industries, as reported by the National Industrial Conference Board, and (2) entrance rates for common labor and employment as reported by the Bureau of Labor Statistics.

<sup>49</sup> This is not always true, however. Brewing, a high-wage industry, showed a small decline in wage rates.

<sup>50</sup> "Industrial Conflict and Business Fluctuations," *Journal of Political Economy*, October 1952.

the annual information examined does not show any evidence of peaks in labor strife at or close to the mid-expansion phase of the cycle, as was observable for Germany.<sup>51</sup>

German wage history offers many examples of effective government intervention in wage setting. Throughout the Weimar Republic, the settling of wage disputes by compulsory arbitration provided a tool for government influence. Up to the onset of the Great Depression, this tool was used largely to promote "social progress"—to iron out wage inequities and to support, in a moderate fashion, wage earners' demands that they participate in the fruits of economic recovery. After the depression was under way, however, the arbitration boards changed their goals, attempting instead to bring about a moderate decline of wage rates. More drastic acts of intervention by the government were embodied in the deflationary emergency decrees of 1930 and 1931. The second effected a reduction of wage rates to 1927 levels—leading to a total wage-rate cut of about 10 percent. After the National Socialists took power, wages became wholly subject to government administration, and wage rates were stabilized at or close to depression levels. In Great Britain there was no comparable government initiative aimed at wage setting, but the United States government did intervene in the process. Its intervention was initiated only after the trough of the Great Depression was reached, and had as its objective the raising and not the lowering or stabilization of wage levels. These differences in wage policy are reflected clearly in the differentiated short-term trends of German and United States wage levels (see Charts 35 and 36).

WAGES AND OTHER PAYROLL COMPONENTS. Chapter 4 sets forth the attempt to establish for Germany the separate contributions to changes in the total industrial payroll, of wage rates, excess of hourly earnings over rates, average hours worked, and employment. Tabulated below are the percentage changes in each of the above variables and the percentage contribution made by each factor to the decline of the total payroll for the years 1929-32 in Germany and in the United States. Unfortunately, comparable information is not available for Great Britain.

A striking feature of this evidence is the close resemblance of German and United States experience in both the extent and structure of payroll declines. During a contraction of roughly similar magnitude—as measured by employment—the changes in the payroll and its components, and the contribution of the various components to the total decline were very similar in the two countries. For both countries about 60 percent of the total payroll decline is attributable to the drop in employment and only 18-20 percent to the change in wage rates.<sup>52</sup>

<sup>51</sup> See data on industrial disputes, International Labour Office, *Yearbook of Labour Statistics*, 1937, and 1951-52.

<sup>52</sup> This statement refers, of course, to the numerical contribution of these factors only, not to their causal importance.

	<u>Germany</u>	<u>United States</u>
	<i>Percentage Changes, 1929-32</i>	
1. Employment	-41	-38
2. Average hours worked	-9	-13
3. Hourly earnings	-25	-21
4. Excess of earnings over rates	-8	-4
5. Wage rates per hour	-18	-18
Payroll	-59	-57

*Contribution<sup>a</sup> to Payroll Decline, 1929-32*  
(percent)

1. Employment	59.7	57.2
2. Average hours worked	11.9	17.4
3. (Hourly earnings) <sup>b</sup>	(28.4)	(25.4)
4. Excess of earnings over rates	10.8	5.3
5. Wage rates per hour	17.6	20.1
	100.0	100.0

<sup>a</sup> The method used in the derivation of these measures is briefly explained in Chapter 4, footnote 59.

<sup>b</sup> Hourly earnings (line 3) are subtotals of lines 4 + 5.

### WAGES AND PRICES

German wage rates were found to be a rather insensitive type of price, with regard both to timing and amplitudes. They turned later and declined less than most major categories of wholesale prices—in fact later and less than living costs.

The later and lesser cyclical reactions of wage rates as compared with wholesale prices can be said to have occurred in all three countries. On an annual basis, the specific peaks of wage rates, closest to the 1929 turn in general business conditions, were reached in the following years:

	<i>Hourly Wage Rates</i>	<i>Wholesale Prices</i>
Germany	1930	1928
Great Britain	1927	1924
United States	1929	1928

As for amplitudes, a comparison of percentage declines, measured from peak levels, between the reference turning points of 1929 and 1932 stands as follows:

	<i>Hourly Wage Rates</i>	<i>Wholesale Prices</i>
Germany	-19	-34
Great Britain	-4	-29
United States	-18	-32

The lesser variability of wage rates can be demonstrated also by a comparison of wage and price behavior during periods when wage rates underwent the minute declines observable in monthly records, described previously. While German wage rates declined by about 0.5 percent in connection with the 1925-26 contraction in general business conditions,



wholesale prices dropped by 10 percent or more. Similarly, in the two mild contractions of the 1920's (1924-26 and 1927-28 in Great Britain; 1923-24 and 1926-27 in the United States) both countries experienced only minute indications of cyclicity in wage rates but clear reactions in wholesale prices.<sup>53</sup> Thus, although the differing compositions of the national indexes preclude a quantitative comparison of, for instance, the change in wage-price ratios in the three countries, the finding that there is relatively slight variability in wage rates, as compared with wholesale prices, is firmly established.

The cyclical insensitivity of wage rates to downward pressures appears less pronounced in comparison with retail prices for goods and services. The German experience during the years 1924-32 shows that in specific and reference expansions wages went up more, and in contractions declined less, than living costs. Somewhat analogous relations prevail also, for the same period, in Great Britain and the United States. The relation of money wages and living costs, and the consequent changes in real wages, can be observed in Charts 35 and 36.<sup>54</sup> In all three countries the prevailing tendency during the period 1924-32 for wage levels was to increase or hold their own in the face of mild decreases in living costs and, when living costs declined radically, to show smaller declines than the latter. The relations of living costs and wage rates in the three countries for the period 1924-38 can be followed in Chart 35. They are, of course, reflected in the movements of real wages, to which we shall now turn.

## REAL WAGES

*Conformity.* Real wage rates in Germany before World War I showed occasional evidence of inverse conformity to business cycles, particularly when wage rates were fixed for a number of years—as in the printing industry—and when real wage fluctuations were thus due entirely to cost-of-living changes. On the whole, however, and particularly if the later and more sensitive monthly information of the interwar period is used as a guide, positive conformity of real wage rates with changes in business conditions must be regarded as the norm. Appraisal of conformity is

<sup>53</sup> The price indexes used in these comparisons are the Sauerbeck Index for Great Britain, and the Bureau of Labor Statistics Index of Wholesale Prices for the United States. Note that the declines of British wholesale prices in the contractions of 1924-26 and 1927-28 are not separated by any significant specific expansion.

<sup>54</sup> In Great Britain wage rates changed but little between 1924 and 1932. But the slight increase, and the leveling-out through 1927, were accompanied by a living-cost decline of about 8 percent. And during the remainder of the period both wage rates and living costs declined, the latter exhibiting significantly larger movements. In 1932 wage rates were about 5 percent below their 1925 levels, living costs about 19 percent below. Also in the United States, wage rates, hourly earnings, and living costs showed relatively shallow movements up to 1930. In 1924 and 1925 living costs rose, and during 1926 through 1930 they decreased, in the face of practically stable wage rates. From 1930 to 1932 or 1933, the decrease in living costs exceeded the declines in wage rates. (Based on wage rate and earnings data as reported by Creamer, *op. cit.*, Table A. The cost-of-living data are those compiled and published by the Bureau of Labor Statistics.)

complicated by long lags in real wage rates, but if allowance is made for timing relations, the preponderance of positive conformity is clear enough. In the case of real earnings, even the pre-1913 evidence tends to show positive conformity, an impression that is confirmed by the behavior of earnings during the interwar period.

The positive conformity of German money and real wage rates to business cycles lends support to the critics of J. M. Keynes' thesis that money and real rates tend to move, cyclically, in opposite directions. As Chart 14 shows, the behavior of money and real wage rates was characterized by positive co-variance rather than by inverse variation, especially during cyclical rather than intracyclical movements.

A tendency toward positive conformity in the cyclical fluctuations of money and real wage rates has been found also by Dunlop<sup>55</sup> and by Tarshis<sup>56</sup> for Great Britain and the United States. Their findings have been doubted by Ruggles.<sup>57</sup> Dunlop makes the following summary statement: "Statistically, real wage rates generally rise with an increase in wage rates, rise during the first period after the peak, and then fall under the pressure of severe wage reductions."<sup>58</sup> This would describe quite well the behavior of German wage rates during the 1926-32 cycle. It would describe only approximately, however, the German wage behavior of the 1924-26 cycle, since the eventual decline of real wage rates was brought about by rising living costs rather than by severe money wage-rate reductions, and since the decline occurred only after the next expansion in business had begun. Ruggles has expressed, on a priori grounds, some expectations about the behavior of money and real wage rates, as follows:<sup>59</sup> "In a mild recession or in the early phases of a major depression it would be quite possible for the real wage rate to decline, largely because of the lag in the response of rent to changes in income. In a deeper, more prolonged depression, however, it seems likely that the real wage rate would rise. Rent becomes more variable than money wage rates in the longer run, so that the only components of expenditures whose prices remain less flexible than money wage rates are a few public utilities." It is clearly outside the scope of this study to evaluate the theoretical merits of Ruggles' expectations. It appears, however, that the behavior of German wage rates does not support his view. Typically, German real wage rates rose during mild contractions and during the early phases of severe contractions, but declined as the depression deepened.

<sup>55</sup> John T. Dunlop, "The Movement of Real and Money Wages," *Economic Journal*, June 1938, pp. 413-434.

<sup>56</sup> Lorie Tarshis, "Changes in Real and Money Wages," *Economic Journal*, March 1939, pp. 150-154.

<sup>57</sup> Richard Ruggles, "The Relative Movements of Real and Money Wage Rates," *Quarterly Journal of Economics*, November 1940, pp. 130-144.

<sup>58</sup> *Op. cit.*, p. 434.

<sup>59</sup> Richard Ruggles, "The Nature of Price Flexibility and the Determinants of Relative Price Changes in the Economy," *Business Concentration and Price Policy* (Princeton University Press for National Bureau of Economic Research, 1955), p. 495.

*Timing.* The lag of turning points in German real wage rates behind those in general business conditions is still more pronounced than the lag in money wage rates. At the 1925 peak the lag in money wage rates was eight months, that in real wage rates twelve months. At the 1929 peak, a money wage lag of thirteen or twenty months occurred, as compared with a real wage lag of about two or even two and one-half years.<sup>60</sup> It is not clear whether a similar extension of lags occurred also at troughs. Following the 1925-26 contraction, money and real wage rates showed about the same lag. After the Great Depression, on the other hand, there occurred a slight upturn of real rates between July 1932 and February 1933, while money rates were still declining. It is difficult, however, to distinguish cyclical and shorter-term movements at that point; and from 1933 on, the stabilization of money wage rates under the Nazis led to an abnormally extended decline in real wage rates—with no revival up to the end of World War II.

The lag of real wages behind money wages can be observed also in German hourly earnings. Annual series of hourly real earnings, for instance, show a lag of two years, while the peak of hourly money earnings coincides with the business cycle peak. When we look at weekly earnings, however, we find that both the money and real wage series turn together with general business conditions—a result of the important role played by hours in the determination of weekly earnings.

The more pronounced lag of real as compared with money wages can be shown to prevail in all three countries at the 1929 peak. The peak in real wage rates was reached in Germany, Great Britain, and the United States in 1931, that is, two years after the reference turning point and one or more years after the turn of money rates in each country. (See Table 72 and Charts 36 and 37.) Real wage rates also lagged considerably behind the 1932 reference trough. However, while real wages lagged behind money rates in Germany and Great Britain, they turned in the same year in the United States. Comparison of the lower panels of Tables 71 and 72 indicates the extended lags of real wage rates as compared with money rates for skilled and unskilled building workers in the three countries. The findings are similar to those based on the comprehensive measures.<sup>61</sup>

<sup>60</sup> At the 1925 peak, the break of the sharp wage rise and the leveling-out into the intermediate plateau in November was regarded as the upper turning point of money wage rates. Real wage rates show a clear peak in March 1926. For the onset of the Great Depression, the alternative figures mentioned refer to the beginning ( $P_1$ ) and end ( $P_2$ ) of their peak plateau in the case of money rates, and to the first and second double peak in the case of real rates (see Chart 14).

<sup>61</sup> All series show longer lags of real rates at both the peak and the trough. With the exception of one instance (the turn of skilled workers' rates in the United States after the 1929 peak), all real rates had their peak in 1931, that is, two years after the reference peak and one or two years later than money rates. At the subsequent trough the lag of real rates was two years longer than that of money rates in the United States, three years longer in Great Britain, and at least eight years longer under the extraordinary conditions prevailing in Germany.

TABLE 72

Percentage Change of Real Wages during the Great Depression,  
Germany, Great Britain, and the United States

	GERMANY			GREAT BRITAIN			UNITED STATES		
	Peak	Trough	Percent	Peak	Trough	Percent	Peak	Trough	Percent
			Change			Change			Change
RATES AND EARNINGS, ALL INDUSTRY									
<i>Reference Contraction</i>									
Hourly rates	1929	1932	+4	1929	1932	+10	1929	1932	+3
Hourly earnings	1929	1932	-4	...	...	...	1929	1932	-1
Weekly earnings	1929	1932	-15	...	...	...	1929	1932	-15
<i>Specific Contraction</i>									
Hourly rates	1931	1944	-18	1931	1937	-4	1931	1933	-3
Hourly earnings	1931	1936	-6	...	...	...	1931	1932	-3
Weekly earnings	1929	1932	-15	...	...	...	1929	1932	-15
HOURLY WAGE RATES, BUILDING									
<i>Reference Contraction</i>									
Skilled workers	1929	1932	-4	1929	1932	+7	1929	1932	+10
Unskilled workers	1929	1932	-5	...	1932	+5	1929	1932	+11
<i>Specific Contraction</i>									
Skilled workers	1931	1944	-30	1931	1937	-6	1933	1935	-7
Unskilled workers	1931	1944	-29	1931	1937	-5	1931	1935	-6

SOURCE: Appendix Tables A-50 and A-52.

Also in hourly earnings, the stronger lag of real wages as compared with money wages is in evidence. The peak of hourly money earnings in 1929 coincided with that of general business conditions, both for German and for United States wage earners; but hourly real earnings did not turn until 1931. The longer delay in the turn of hourly real earnings appeared in Germany also at the end of the Great Depression. However, in the United States hourly real earnings hit their trough in 1932—one year before money earnings. For Great Britain, there are no earnings data for the period under review.

The cyclical timing of weekly real earnings, finally, reflects the responsive behavior of average hours worked, of the output of piece work, and of the incidence of premium payments, rather than changes in basic rates. In Germany and the United States weekly earnings, both money and real, turned at the reference peak year of 1929. Weekly real earnings also turned in the reference trough year of 1932. However, in the United States the real earnings trough occurred one year earlier than that of money earnings, reflecting the anomaly previously reported for average hourly earnings.

*Amplitudes.* Even a casual comparison of the record of money wages

(Charts 33 and 34) with that of real wages (Charts 38 and 39) reveals clearly the smaller cyclical amplitudes of the latter. Let us look more closely at real-wage behavior during the Great Depression. In all three countries we find the smaller amplitudes of real wages (see Tables 71 and 72 and Charts 35 and 36). There are, however, a number of special situations which modify the generalization, to be considered below.

Between the terminal years of the 1929-32 slump, money wage rates in all three countries show uniquely steep declines. Yet living costs declined still faster, so that the indexes of hourly real rates show actual increases in the three countries (and building rates, increases in Great Britain and the United States). These increases indicate, of course, a low degree of responsiveness of real wage rates to the decline in business conditions. The described increases of real wage rates, between the reference turns, do not imply that real rates were depression-proof. Declines in real rates did occur, albeit with delay. However, the comprehensive rate indexes, as well as the series describing changes in building rates, all show specific real rate decreases, which are smaller than the comparable decreases in money rates.

The general observation that real wages have smaller amplitudes than money wages holds also for average hourly and weekly earnings. Comparative information is available for Germany and the United States only. In these two countries real wages as well as money wages experienced declines of very similar magnitudes; the weekly real earnings declines in both countries amounted to 15 percent.

### *Wages during War and Inflation*

#### GENERAL

Chapter 5 of this study dealt with the behavior of German wages under extraordinary circumstances, such as the two world wars and the Great Inflation. The purpose of that chapter was to describe the unique determinants of wage behavior in Germany during those episodes. Here, the task is to compare the major findings with corresponding findings for Great Britain and the United States. Apart from the difficulty of summarizing the detailed description presented for Germany, it might seem altogether futile to undertake a comparison of individual national situations. Nevertheless, despite the unique character of special events in each of the countries, their national histories have some features in common. The two world wars involved all three countries. The Great Inflation and subsequent stabilization were but the specific ways in which Germany underwent its postwar adjustment; and the development of National Socialism up to World War II was, to be sure, the peculiar course Germany followed in moving out of the Great Depression and into rearmament. Thus the course of events in Germany had historic and economic counterparts in British and American experience, although, of course, with

marked differences from country to country. Germany lost the two world wars; Great Britain and the United States were victors. Germany was unable to control her currency depreciation after World War I; the other two countries managed to do so. Germany's economic expansion after 1932 was dominated by a rearmament drive, while the expansions in Great Britain and the United States, at least for the greater part of the period before 1939, were predominantly in the civilian sector of the economy.

The broad similarities as well as the broad differences in the three countries' experiences during these unusual periods must be reflected in their wage histories. This, at least, is a surmise worth testing. For this purpose, the major similarities and differences in the economic fortunes and in the wage behavior of the three countries will be analyzed below.

### WORLD WAR I

Money wages during World War I increased each year in Germany, Great Britain, and the United States. In all three countries wage levels went up more sharply in the second half of the war than in the first. And in all three countries earnings tended to rise more than wage rates. However, there were marked differences in the extent of wage increases, the rise being sharpest in Germany and mildest in the United States. The differences, already discernible between 1914 and 1916 levels, became more pronounced during the latter part of the war.

The information underlying the above generalizations is assembled in Table 73. Data on wage rates of skilled building workers and earnings of coal miners, available for all three countries, permit comparisons of tolerably similar categories. The comprehensive wage indexes presented in the last three columns of the table show so many differences in concepts, coverage, and composition that they cannot be directly compared. They do, however, shed some light on the representativeness of the more narrowly defined measures and, at least for Germany and the United States, provide some rough indication of comparative wage trends. Over the years 1914 to 1918 wage rates of building workers rose by about a quarter in the United States, by 60 percent in Britain, and by about 100 percent in Germany. Average weekly earnings rose more sharply in all instances, and again the most marked increase occurred in Germany, the least marked in the United States. Indications are that between the first and the last year of the war, average earnings increases in each country may have exceeded those in its building rates by roughly 30 percentage points.

The order of wage rises corresponds with the extent to which the countries were affected by the war. Germany, closest to actual battle-grounds and ultimately defeated, experienced the strongest rises. The United States, far removed from the scenes of the conflict, entering it later than the other participants, and being on the victorious side, showed

TABLE 73

Money Wages in Germany, Great Britain, and the United States, 1914-1923

Year	WAGE RATES OF SKILLED BUILDING WORKERS, PER HOUR			EARNINGS OF COAL MINERS PER WEEK OR SHIFT			COMPREHENSIVE INDEXES WAGES PER WEEK OR DAY		
	Germany	Great Britain	United States	Germany, weekly	Great Britain, shift	United States, weekly	Germany, earnings or rates	Great Britain, weekly rates (July)	United States, weekly earnings
1914	100 <sup>a</sup>	100	100	100	100 <sup>b</sup>	100	100 <sup>c</sup>	100	100
1915	102 <sup>a</sup>	103	101	110	115 <sup>b</sup>	106	121 <sup>c</sup>	108	100
1916	116	108	104	130	129 <sup>b</sup>	116	141 <sup>c</sup>	118	111
1917	152	123	110	160	136 <sup>b</sup>	144	194 <sup>c</sup>	135	125
1918	201 <sup>a</sup>	160	122	200	195 <sup>b</sup>	178	235 <sup>c</sup>	175	152
1919	...	188	139	340	224 <sup>b</sup>	207	360 <sup>d</sup>	210	175
1920	703	259	186	794	260	233	820 <sup>b</sup>	252	213
1921	859	252	189	1,206	246	250	920 <sup>b</sup>	250	194
1922	3,171	191	179	4,100 <sup>b</sup>	154	250	4,220 <sup>b</sup>	188	186
1923	237,627	183	197	2,762,100 <sup>b</sup>	160	257	2,781,300 <sup>b</sup>	168	200

<sup>a</sup> April.<sup>b</sup> July.<sup>c</sup> Average of March and September.<sup>d</sup> Third quarter.

SOURCE:

## Building Rates

Germany (data refer to Berlin): 1914-18: Waldemar Zimmermann, "Die Veränderung der Einkommens- und Lebensverhältnisse der deutschen Arbeiter durch den Krieg," in *Die Einwirkung des Krieges auf Bevölkerungsbewegung, Einkommen und Lebenshaltung in Deutschland*, *Wirtschafts- und Sozialgeschichte des Weltkrieges* (Carnegie Foundation for International Peace, Stuttgart, Deutsche Verlags-Anstalt, 1932), p. 398. For 1920-23: Robert Kuczynski, "Postwar Labor Conditions in Germany," U. S. Bureau of Labor Statistics, *Bul.* 380, pp. 125-27. Weekly rates given are adjusted for change of hours. (Adjustment factor: 51 to 46, prewar to postwar hours as reported in source.)

Great Britain: Bowley index, as given in C. E. Lyon, *British Wages*, U.S. Department of Commerce, Trade Promotion Series, No. 42, 1926. Weekly rates given are adjusted for change of hours in London. (Adjustment factor: 50 to 44, prewar to postwar hours as reported by A. L. Bowley, "Wages, Earnings and Hours of Work, 1914-1947, United Kingdom," *London and Cambridge Economic Service*, Special Memorandum No. 50, p. 11.) The change of hours in London is fairly representative for that in the cities included in the wage-rate index. See A. L. Bowley, *Prices and Wages in the United Kingdom, 1914-1920* (Oxford, Clarendon Press, 1921), pp. 116-20.

United States: *Historical Statistics of the United States, 1889-1945*, p. 69, Series D 154 and D 156.

## Miners' Earnings

Germany (data refer to Ruhr): *Wirtschaft und Statistik*, 1925, "Zahlen zur Geldentwertung in Deutschland, 1914 bis 1924," p. 41.

Great Britain: 1914-19, A. L. Bowley, *Wages and Prices in the United Kingdom, 1914-1920*, p. 150. (Figures refer to July.) For 1920-23, A. L. Bowley, *Wages and Income in the United Kingdom since 1860* (Cambridge University Press, 1937), p. 22.

United States: Paul H. Douglas, *Real Wages in the United States, 1890-1926* (Houghton Mifflin, 1930), p. 162.

## Comprehensive Indexes

Germany: 1914-18, daily earnings of male workers in twelve industries, average for March and September; see Appendix Table A-37. For 1919-23, weekly wage rates of skilled workers in eight industries, see Appendix Table A-42, col. 3.

Great Britain: Wages in eleven occupations, predominantly weekly rates. Bowley data as reported in C. E. Lyon, *op. cit.*, p. 52. Where range was given, mid-point was selected.

United States: Full-time earnings in all manufacturing industries, see Douglas, *op. cit.*, p. 130.

smaller increases. The connection between the two sets of facts lies probably in the extent to which direct participation and all-out effort increased inflationary tendencies—in the absence of direct price and wage controls.

TABLE 74  
Cost of Living in Germany, Great Britain, and the United States, 1914-1923

Year	Germany	Great Britain <sup>a</sup>		United States
		Ministry of Labour	Bowley	
		I	II	
1914	100	100	100	100
1915	125	125	120	101
1916	165	145	135	108
1917	245	180	160	128
1918	304	205	180	150
1919	403	210	...	172
1920	988	232	...	200
1921	1,301	219	...	178
1922	14,602	184	...	167
1923	15,437 bill	169	...	170

<sup>a</sup> The adjusted (Bowley) index takes into account the increasing proportion of income spent on food and clothing during the years 1914 to 1918. It assigns progressively larger estimated weights to these items. The unadjusted (Ministry of Labour) index keeps weights constant throughout. See A. L. Bowley, *Prices and Wages in the United Kingdom, 1914-20* (Cambridge University Press, 1937), pp. 74-75.

SOURCE:

Germany: Appendix Table A-41, col. 2, put on base 1914 = 100.

Great Britain: For 1914-18, from Bowley, *op. cit.*, p. 106. For 1919-23, see Charles E. Lyon, *British Wages*, p. 52 (base shifted to 1914).

United States: *Historical Statistics of the United States, 1789-1945*, p. 236. Series L 41 (B.L.S. Index, all items), base shifted to 1914 = 100.

The available wholesale price indexes are too different in composition and coverage to permit comparisons in the wartime changes of price levels.<sup>62</sup> The movements of retail prices, as represented by cost-of-living indexes, exhibit indeed the same order, with regard to price increases, as that observed for wages. Table 74 shows that living costs in the United States increased by one-half, in Great Britain they doubled, and in Germany trebled.

<sup>62</sup> The German index comprises thirty-eight commodities—eighteen foods and twenty industrial raw materials (see *Wirtschaft und Statistik*, 1925, "Zahlen zur Geldentwertung in Deutschland 1914 bis 1923"). For Great Britain there is the Board of Trade Index covering forty-seven articles—twenty-five foods, six coal and metals, six textile raw materials, and ten miscellaneous; the Economist Index covering forty-four raw materials; and the Statist Index covering forty-five raw materials. (See U.S. Bureau of Labor Statistics, *Bul.* 284, pp. 261-62, 270, and 276-78.) For the United States there are various indexes, the most comprehensive being that of the Bureau of Labor Statistics, which during the war years covered between three hundred and four hundred commodities. See *Bul.* p. 284, p. 109 and *Bul.* 200, p. 8).



Whatever the merits of the foregoing speculation on the connection between money wage levels and degree of war effort, the relation between retail price changes and wage changes is close and significant. The extent to which retail price changes modified the comparative movement in money wages will be examined next. The reader is asked to bear in mind that the quotients describing the relation of money wage changes and cost-of-living changes in comparison with prewar levels are particularly difficult to interpret in times of rapid shifts such as wars. Real wages under such circumstances, are indeed far from "real." It is, therefore, the broad changes rather than the specific numerical values of the real wage quotient with which we are here concerned.

In contrast to the direction of money wage changes, the general trend of real wages was downward. Specifically, the data assembled in Table 75 show lower real wage levels in 1918 than in 1914 for all series except miners' shift earnings in the United States and possibly in Great Britain—depending upon the cost-of-living index used as deflator.<sup>63</sup> In each country, real-rate declines are more pronounced than earnings declines, a fact which follows from the smaller rise of money rates as compared with earnings. The changes in real wage rates range from -35 percent to -3 percent, in earnings from -32 percent to +13 percent. While in money wages Germany experienced the most pronounced and the United States the smallest rises, in real wages the decline was largest in Germany and smallest in the United States.<sup>64</sup>

The comparison of real wage movements in the three countries illustrates—in different ways than comparison of money wage movements—the close relation between wage behavior and the political and economic developments of each country. The extraordinary decline of real wages in Germany during World War I was traced, in Chapter 5, to the long-drawn-out war experience, to the proximity of military operations and, most important, to the military disasters that befell that nation. The somewhat smaller decline in British real wages would appear plausible in the light of the greater protection from war damage and the victorious outcome of the conflict. The remarkably favorable showing of the United States, with earnings levels approximately maintained or even increased, must be explained by the same factors.

#### POSTWAR ADJUSTMENTS

The behavior of money wages, in the five years following World War I, is dominated by the fate of the respective price levels in the three countries. The major differences are to be noted between countries with rapidly depreciating currencies and those that underwent deflation or

<sup>63</sup> Note, however, that the weekly earnings decline in the United States was negligible.

<sup>64</sup> This is true for each of the selected wage types if the cost-of-living indexes published by the respective governments are used as deflators. Real rates in building appear to be an exception, if A. L. Bowley's adjusted living-cost index is used to deflate the British wage data.

TABLE 75  
Real Wages in Germany, Great Britain, and the United States, 1914-1923

Year	WAGE RATES OF SKILLED BUILDING WORKERS, PER HOUR				EARNINGS OF COAL MINERS PER WEEK OR SHIFT				COMPREHENSIVE INDEXES WAGES PER WEEK OR DAY					
	Germany		United States		Germany		Great Britain		Germany		Great Britain		United States	
	(May)		(May)		Weekly Earnings (Year)		Shift Earnings (Year)		Weekly Earnings (Year)		Earnings or Rates (Year)		Weekly Earnings (Year)	
	I (July)	II (July)	I (May)	II (May)	I (Year)	II (Year)	I (Year)	II (Year)	I (Year)	II (Year)	I (July)	II (July)	I (Year)	II (Year)
1914	100 <sup>a</sup>	100	100	100	100 <sup>b</sup>	100 <sup>b</sup>	100 <sup>b</sup>	100	100 <sup>c</sup>	100	100	100	100	100
1915	79 <sup>a</sup>	86	99	87	92 <sup>b</sup>	96 <sup>b</sup>	96 <sup>b</sup>	108	96 <sup>c</sup>	86	90	86	90	102
1916	71	80	96	80	88 <sup>b</sup>	96 <sup>b</sup>	96 <sup>b</sup>	108	87 <sup>c</sup>	80	87	80	87	104
1917	60	77	85	67	76 <sup>b</sup>	85 <sup>b</sup>	85 <sup>b</sup>	112	79 <sup>c</sup>	75	84	75	84	98
1918	65 <sup>a</sup>	89	83	68	95 <sup>b</sup>	108 <sup>b</sup>	108 <sup>b</sup>	113	77 <sup>c</sup>	85	97	85	97	99
1919	...	...	81	88	107 <sup>b</sup>	...	...	116	90 <sup>d</sup>	100	...	100	...	101
1920	55	112	89	83	112	...	...	113	74 <sup>e</sup>	109	...	109	...	103
1921	87	115	105	95	112	...	...	141	73 <sup>e</sup>	114	...	114	...	110
1922	92	104	106	74 <sup>b</sup>	84	...	...	151	72 <sup>e</sup>	108	...	108	...	113
1923	56	108	115	51 <sup>b</sup>	95	...	...	153	62 <sup>e</sup>	99	...	99	...	119

<sup>a</sup> April.

<sup>b</sup> July.

<sup>c</sup> Daily earnings averages for March and September.

<sup>d</sup> Weekly rates, third quarter.

<sup>e</sup> Weekly rates, July.

SOURCE: The series for real wages are derived from money wages

(Table 73) and cost-of-living indexes (Table 74 and sources thereto), with this exception: Real earnings in the United States for coal miners and all manufacturing workers were taken directly from Paul H. Douglas, *Real Wages in the United States, 1890-1926*, pp. 130 and 162. For Great Britain columns (i) are deflated by the Ministry of Labour index, columns (ii) by the Bowley index.

managed to maintain their price levels. Germany suffered one of the most conspicuous sieges of hyperinflation, as a comparison of its money wage levels with those of Great Britain and the United States amply demonstrates. Some differences between price behavior in Great Britain and in the United States are worth mentioning. Although in comparison with prewar conditions both British and United States retail price levels in 1923 (measured by living costs) are about equally high (roughly 70 percent above 1913), in Great Britain the level was attained after rapid price rises up to 1920 and subsequent declines, while the amplitudes of price fluctuations in the United States were appreciably milder (see Table 74). These conditions are reflected in the differential movement of money wages in the two countries. Between 1920 and 1923, for instance, a sharp decline in British wage rates and earnings compares with an actual increase in the corresponding measures in the United States. The decline in British wages is obviously related to the deflationary price behavior during this period. However, the increase in United States wage levels occurs despite a reduction in living costs. Thus, factors other than the fate of the currency must have affected money wage movements. These factors will be reflected more clearly in the behavior of real wages.

Table 75 contains real wage information for the series introduced in this section, up to the year 1923. The prewar base is maintained, since it offers a more meaningful standard for comparison than, say, the immediate postwar years 1919 or 1920.<sup>65</sup> Comparisons of real wage movements relative to prewar levels are startling. In 1923, for instance, real wages in Germany were 44 to 49 percent below prewar levels, in Britain from 5 percent below to 8 percent above, and in the United States 15 percent to 53 percent above 1913—the position within the range depending upon the particular wage category in each instance. Thus, in the adjustment period after World War I the tendencies that developed during the war itself were continued. The political and economic conditions after the war obviously were consequences of the differentiated war experiences. They affected real wage levels of the three countries in much the same directions as war conditions had affected them previously. This perpetuation of fortunes and calamities was to lead, also in subsequent years, to differentiated courses in general economic trends and in wage behavior.

### THE WAY OUT OF THE GREAT DEPRESSION

Wage behavior from the trough of the Great Depression to the outbreak of World War II differed substantially among the three countries (see Table 76). Money wage rates of building workers declined in all three countries from 1932 to 1933, but the decrease in German building rates

<sup>65</sup> The year 1914 is here used as indicating prewar levels, in order to maintain comparability with the measures describing wage behavior during World War I. The use of the year 1913 as basis of comparison would not affect any conclusions, since neither wages nor prices changed substantially between these two years.

TABLE 76  
Money Wages in Germany, Great Britain, and the United States, 1932-1945

Year	HOURLY WAGE RATES OF SKILLED BUILDING WORKERS			EARNINGS OF COAL MINERS PER WEEK OR SHIFT			WEEKLY RATES OR EARNINGS, COMPREHENSIVE WAGE INDEXES		
	Germany	Great Britain	United States	Germany	Great Britain	United States	Germany	Great Britain	United States
	Hard Coal Per Shift	All Coal Per Shift	Bituminous Coal Per Week	Average Earnings	Rates	Average Earnings	Average Earnings	Rates	Average Earnings
1932	100	100	100	100	100	100	100	100	100
1933	79	98	99	101	99	104	102	99	98
1934	79	98	100	102	100	130	110	99	108
1935	79	100	100	103	101	141	112	101	118
1936	79	103	102	104	110	163	117	103	128
1937	79	105	109	105	116	169	121	107	141
1938	79	108	119	106	125	150	126	110	131
1939	80	108	120	118	131	178	131	112	140
1940	81	116	121	123	147	178	135	125	148
1941	82	125	126	121	168	222	144	135	173
1942	82	127	133	123	196	252	145	145	215
1943	82	134	133	124	215	299	146	152	253
1944	82	133	134	...	246	369	144	163	270
1945	...	143	137	...	262	376	...	173	260
1939	100	100	100	100	100	100	100	100	100
1940	101	108	101	104	112	104	103	112	106
1941	103	115	105	103	128	129	110	121	124
1942	103	118	111	104	150	147	110	130	154
1943	103	124	112	106	164	174	111	136	181
1944	103	123	112	...	187	215	110	146	193
1945	...	132	114	...	200	219	...	155	186

<sup>a</sup> October 1938.

SOURCE

Building Rates: Appendix Table A-51. Data for Germany refer to April, those for Great Britain to September, and those for the United States to May.

Miners' Earnings:

Germany: *Handbuch* 1928-44, p. 468.

Great Britain: For 1932-37, A. L. Bowley, *Wages and Income in the*

*United Kingdom from 1860* (Cambridge University Press, 1937), p. 22. For 1937-45, A. L. Bowley, "Wages, Earnings and Hours of Work, 1914-1947, p. 10.

United States: Bureau of Labor Statistics, *Handbook of Labor Statistics, 1947*, p. 80.

Comprehensive Indexes: See source to Appendix Table A-48. Data for Great Britain refer to September.

was particularly steep, owing to especially unfavorable conditions in the building industry.<sup>66</sup> Fundamental differences in wage-rate behavior emerge from 1933 onward. Between that year and the outbreak of World War II, building wage rates in Germany were stabilized close to their depression levels, while in Great Britain they increased by 10 percent, and in the United States by more than 20 percent—all measured from their specific troughs. Comparison with levels at the reference turn of 1932 further increases the differences between the experience of the three countries. The reasons for these extreme differences may be traced to government interference in wage determination. In Germany the policies of the National Socialists aimed at wage stabilization, while in the United States the policies of the New Deal tended to encourage wage-rate increases both directly and indirectly by furthering collective bargaining and the growth of unionism.

The differential behavior of wage rates is reflected in differences among earning trends. Coal miners' earnings in 1939 were 18 percent above 1932 levels in Germany, 31 percent above in Great Britain, and 72 percent above in the United States. The data used would, however, appear to favor the United States experience, where earnings are measured per week, while in Germany and Great Britain they are measured per shift. Number of shifts worked per man and week are cyclically sensitive and thus, in expansions of general business activity, tend to boost the rise of average weekly earnings above that of average shift earnings. For the comprehensive weekly earnings measures, direct comparison is possible only between Germany and the United States. The comparison shows stronger gains for the United States than for Germany, whether 1932 or 1933 is used as a point of departure. However, the difference between the composite indexes (weekly earnings for both countries) is far less pronounced than that between the reports on miners' earnings (shift earnings for Germany, weekly earnings for United States). Part of the explanation must lie in the fact that German wage policy under National Socialism brought about a significant extension of working hours per week, while hours in the United States actually declined.<sup>67</sup> Moreover, in Germany the increasing resort to payment according to results helped to raise average weekly earnings.

The comparative behavior of money wages should be evaluated in the light of concomitant changes in price levels, and especially in living costs. Reference to Table 77 shows that for the period 1932-39 changes in living costs can provide only part of the explanation of wage behavior. Living costs declined in all three countries between 1932 and 1933, and rose thereafter—just as wage rates did. But the rises of living costs in the three

<sup>66</sup> The comprehensive index of German wage rates shows a decline of only 4 percent between these dates.

<sup>67</sup> In Germany average weekly hours in manufacturing establishments increased by 17 percent between 1932 and 1939, while in the United States they declined fractionally between the two dates (see Table 69).

TABLE 77

Cost of Living in Germany, Great Britain, and the United States,  
1932-1945

Year	Germany		Great Britain		United States	
	I	II	I	II	I	II
	(1932 = 100)					
1932	100	100	100	100	100	...
1933	98	...	96	...	95	...
1934	100	...	98	...	98	...
1935	102	...	99	...	101	...
1936	103	...	102	...	102	...
1937	104	109	107	...	105	...
1938	104	109	108	...	103	...
1939	105	110	110	111	102	...
1940	108	113	122	129	103	...
1941	110	116	138	141	108	109
1942	113	119	138	151	119	121
1943	115	120	138	155	127	130
1944	117	123	139	159	129	133
1945	122 <sup>a</sup>	...	141	161	132	136
	(1939 = 100)					
1939	100	100	100	100	100	...
1940	103	103	110	117	101	...
1941	106	106	125	127	106	107
1942	108	108	125	136	117	118
1943	110	110	125	140	124	127
1944	112	112	126	143	126	130
1945	116 <sup>a</sup>	...	128	145	129	133

<sup>a</sup> August.

SOURCE:

Germany: See Table 68, both for the official index (i) and for the index adjusted for admitted bias (ii).

Great Britain: Official index (i) as published contemporaneously by Ministry of Labour, and reprinted in *London and Cambridge Economic Service* Bul. iv, Nov. 10, 1947, p. 129. Adjusted index (ii), as computed by R. G. D. Allen, *ibid.*, Bul. i, February 1949, p. 16.

United States: Official index (i) as published by the U. S. Bureau of Labor Statistics, see *Monthly Labor Review*, May 1952, p. 615. Index (ii) adjusted for underestimate reported by the Mitchell Committee in *Prices and the Cost of Living in Wartime—An Appraisal of the Bureau of Labor Statistics Index of Cost of Living 1941-44* (Report of the technical committee of the President's Committee on the Cost of Living, Wesley C. Mitchell, chairman, Simon Kuznets, and Margaret G. Reid, June 15, 1944).

countries during the subsequent period bore scant relation to wage-rate behavior. Whereas in the United States, between 1933 and 1939 building wage rates, for instance, rose more strongly than in the other two countries, living-cost increases in this country were comparatively low. The largest increase of living costs occurred in Great Britain, the country that held an intermediate rank with regard to wage-rate rises. This situation

emphasizes the favorable wage trends in the United States, shown in the following comparison of real wages.

Real wage rates in Germany declined between 1932 and 1939, approximately maintained their levels in Great Britain, and increased in the United States. For building wage rates, the movements may be followed in detail in Table 78.<sup>68</sup> The same order is maintained in the movement of real earnings of coal miners and—for Germany and the United States—of comprehensive weekly earnings series. The larger increase of real earnings in the United States and the smaller increase in Germany cannot be traced to the developments of real per capita income in these countries. Reference to Table 5 shows indeed that income increased considerably faster in Germany than in the United States between 1932 and 1939. The distribution of the increase of income rather than the extent of the increase accounts for the differential development of workers' real earnings in the two countries. It is the contrast between the guns-before-butter policy of the German National Socialists and the social policies of the New Deal, which is reflected in the real earnings behavior of the two countries in the years following the Great Depression.

## WORLD WAR II

*Money Wages.* During World War II wage levels in all three countries rose, continuing a post-1932 trend. As can be seen in Table 76 and Chart 41, Germany, during the war, experienced very mild wage increases only, reflecting the thoroughgoing system of controls and perhaps the high utilization of manpower that were in effect as early as 1939. Between 1939 and the years 1943 or 1944 (the last years for which information is available) wage rates of German building workers increased by 3 percent, shift earnings of coal miners by 6 percent, and weekly earnings in all German industry by about 10 percent. Much greater increases occurred in wage levels in Great Britain and the United States than in Germany—just as they had before the war. This is true both for wage rates and for earnings. Weekly earnings levels in the latter countries rose by about 80 to 90 percent, compared with the 10 percent increase in German weekly earnings reported above.

For the period of World War II wage comparisons of the three countries may be based on several sets of fairly similar data. Specifically, hourly wage rates of skilled building workers, average shift or weekly earnings of coal miners, and average weekly earnings for all industry (or an approximation to such coverage) will be used for the following observations. The most striking characteristic of wage rates for building workers is their relatively mild rise in all three countries, amounting to only 3 percent in

<sup>68</sup> The reader is reminded of the nonrepresentative character of the decline in German building wage rates, particularly during the first two years of the comparison period. Between 1932 and 1934, real building wage rates in that country declined by 20 percent whereas the comprehensive index of real wage rates declined by only 3 percent. (See also Table A-13.)

TABLE 78

Real Wages in Germany, Great Britain, and the United States, 1932-1945

Year	A. BUILDING WORKERS, COAL MINERS HOURLY WAGE RATES OF SKILLED BUILDING WORKERS						EARNINGS OF COAL MINERS PER WEEK OR SHIFT					
	Germany		Great Britain		United States		Germany, Hard Coal Per Shift		Great Britain, All Coal Per Shift		United States, Bituminous Coal Per Week	
	I	II	I	II	I	II	I	II	I	II	I	II
	1932 = 100											
1932	100	100	100	100	100	100	100	100	100	100	100	100
1933	83	...	99	...	106	...	103	...	103	...	110	...
1934	80	...	99	...	101	...	101	...	102	...	133	...
1935	78	...	99	...	99	...	101	...	102	...	140	...
1936	77	...	100	...	103	...	100	...	108	...	161	...
1937	77	69	96	...	104	...	101	91	109	...	160	...
1938	77	69	99	...	116	...	102	92	116	...	147	...
1939	78	70	97	97	119	...	112	101	119	119	169	...
1940	75	68	89	82	119	...	114	103	121	114	173	...
1941	75	68	90	86	118	117	110	99	122	120	206	204
1942	74	67	91	82	111	109	108	97	142	131	211	210
1943	72	65	96	84	106	104	108	97	156	139	236	232
1944	71	64	94	82	105	102	...	...	176	156	287	279
1945	...	...	100	87	104	101	...	...	186	164	285	275
	1939 = 100											
1939	100	100	100	100	100	100	100	100	100	100	100	100
1940	97	97	91	85	100	...	101	101	102	96	103	...
1941	96	96	92	89	99	98	98	98	103	101	122	121
1942	95	95	93	85	93	92	96	96	120	110	125	124
1943	93	93	99	87	89	87	96	96	132	117	140	137
1944	91	91	97	85	88	86	...	...	148	131	170	165
1945	...	...	103	90	87	85	...	...	157	138	169	163

Germany, to 32 percent in Great Britain and to 14 percent in the United States. All these rises are appreciably below the corresponding increases in earnings. The stronger increase of hourly rates in Great Britain than in the United States is attributable to a virtual absence of wage controls in Britain.<sup>69</sup> Shift earnings of coal miners show the insignificant rise characteristic of all wages in Germany in that period. Earnings of British coal miners doubled, those of United States miners somewhat more than doubled.<sup>70</sup> A basically similar relationship is to be observed among the

<sup>69</sup> See Jean Flexner, "Great Britain: Wage Trends and Policies, 1938-47," *Monthly Labor Review*, 1947, pp. 290, ff.

<sup>70</sup> The difference in coverage might affect these comparisons. The British data refer to shift earnings and include all branches of coal mining. The United States data are average weekly earnings and cover bituminous coal mines only (see p. 313).



Table 78, *continued*

## B. COMPREHENSIVE INDEXES, WEEKLY RATES OR EARNINGS

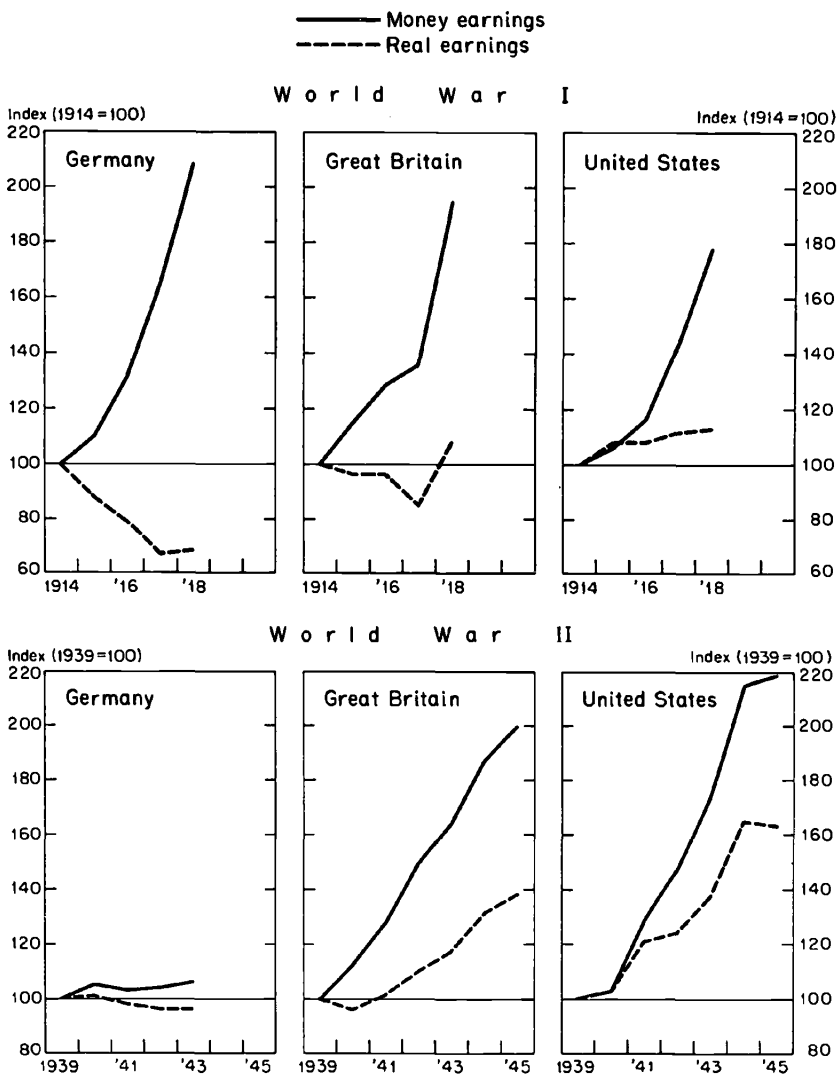
Year	WEEKLY RATES OR EARNINGS, COMPREHENSIVE WAGE INDEXES							
	Germany, Average Earnings		Great Britain				United States, Average Earnings	
			Rates		Average Earnings			
	I	II	I	II	I	II	I	II
1932 = 100								
1932	100	100	100	100			100	100
1933	105	...	100	...			104	...
1934	110	...	100	...			110	...
1935	111	...	100	...			117	...
1936	114	...	99	...			126	...
1937	117	105	98	...			134	...
1938	121	110	101	...			127	...
1939	126	113	100	100			137	...
1940	126	113	95	89			144	...
1941	131	117	97	94			161	159
1942	128	115	103	94			180	178
1943	128	114	109	96			200	199
1944	124	111	115	101			210	203
1945	...	...	121	105			198	190
1939 = 100								
1939	100	100	100	100	100 <sup>a</sup>	100 <sup>a</sup>	100	100
1940	100	100	95	89	110	104	105	...
1941	104	104	97	94	111	109	117	116
1942	102	102	103	94	124	114	131	130
1943	101	101	109	96	138	123	145	142
1944	98	98	115	101	140	124	153	148
1945	...	...	121	105	137	121	144	139

<sup>a</sup> October 1938.

SOURCE: Money wages, see Table 76. Cost of living, see source to Table 77. The cost-of-living index numbers used for deflation were not always those given in Table 77. In cases where the wage quotation referred to a specific month, the cost-of-living index for the same month was used. For the adjusted cost-of-living indexes the monthly levels were approximated by raising the official index for the month by an adjustment factor derived from annual data. Real wages in columns (i) are derived by use of the official cost-of-living indexes as published contemporaneously. Real wages in columns (ii) take account of adjustments as presented in Table 77. Building rates for Germany refer to April, for Great Britain to September, for the United States to May. Also the comprehensive wage rates for Great Britain refer to September.

more comprehensive weekly earnings measures (available for all three countries from 1938 on, the year Great Britain started to report average weekly earnings in time series form). The increases during the war amounted

CHART 41  
Coal Miners' Earnings in Two Wars, Germany, Great Britain, and the United States



Source: Table 79.

to 10 percent in Germany, 80 percent in Great Britain, and 86 percent in the United States.<sup>71</sup>

<sup>71</sup> The German data cover the period up to 1944 only. The British and United States earnings indexes differ with regard to industrial composition and other elements of construction. For instance, the British treat two persons at half-time work as one fully employed worker, while in the United States half-time workers are fully counted in the employment indexes. It is believed, however, that for the broad comparisons here

*Living Costs.* It is particularly necessary, when one seeks to appraise wage behavior during wartime, to juxtapose wage developments with the concomitant changes in the retail price levels of goods typically consumed by working-class families (see Table 77). The problems created by rapidly changing consumption patterns have already been pointed out. The need to maintain the character of one's price measure over time conflicts increasingly with the need to keep the measure representative of current patterns of expenditure. How did the statistical agencies of the three nations react to these difficulties? The Germans approached the problem by gradual substitution of available goods of similar function and foods of similar caloric value—a procedure which, in view of the grave shortages, led to basic changes in the quality and composition of the goods priced. In the United States also, the composition of the index underwent changes; scarce goods were dropped, and available goods or grades of goods were linked to the established index. But these substitutions were not nearly so radical as those in the German index, and the retail price measure could thus maintain a higher degree of comparability over time without becoming obsolete. In Great Britain, at the outbreak of World War II, the government decided to postpone a long-overdue revision of its retail price measure. Thus Great Britain continued during that period to employ an index established in 1904 (and revised only slightly thereafter), geared to time-honored consumption patterns. Furthermore, subsidies to stabilize food prices were granted predominantly for the goods represented, or even overrepresented, in the British measure. The resulting "stabilization of the index" was presumably intended to limit the inflationary consequences of wage-rate changes arising out of contracts with escalator clauses. While some downward bias in the measure of living costs and some upward bias in real wages must be expected in the contemporaneous measures of all three countries, the bias is apt to be least serious in the United States index, and considerably more serious in those of Germany and Great Britain. In Germany, the bias is created mainly by lack of goods and deterioration of quality—elements whose quantitative impact on the index is difficult to measure. In Great Britain, the bias is caused mainly by the limitation of the index to a number of simple price-supported staples. In all three countries the defects of the indexes were recognized, and attempts were made to gauge the extent of bias and possibly to revise the cost-of-living measure. In Germany the inadequacy of the index had

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pursued the indexes offer an adequate guide. The U.S. Bureau of Labor Statistics in 1944 computed weekly earnings changes in Great Britain and in the United States between October 1938 and July 1943, using comparable industrial groups and the same (United States) employment composition as weights. The results were in line with those shown by the unadjusted data, in that they indicated similar weekly earnings trends in both countries. The similarity was produced by a smaller increase of hours but a larger increase of hourly earnings in Great Britain as compared with the United States. See "Wartime Hours and Earnings in the United States and Great Britain," *Monthly Labor Review*, July 1944, especially pp. 153-54 and 156.

already become evident during the preparedness economy preceding the actual launching of the war.<sup>72</sup> In the United States the debate raged during the war years and led to re-evaluations of living-cost changes.<sup>73</sup> In Great Britain a major revision of the index was undertaken in 1947, when attempts were made to recompute all changes in living costs on the basis of the new index structure.<sup>74</sup> In the present analysis of living costs and in the comparison of real wages, allowance, in the form of alternative indexes, has been made for revisions.

*Real Wages.* We now turn to the quotients which result when we divide consumers' goods price indexes into money wage measures—"real wages." For the years under discussion these measures can at best indicate broad tendencies. They are presented in Table 78.<sup>75</sup>

Real wage rates per hour, as represented by time rates for skilled building workers, decreased during World War II in all three countries. The lowest relative level, 15 percent below 1939, occurred in 1942 in Great Britain (deflation by Allen index). These rates, because of their minimum character, can scarcely be regarded as describing properly the effectively paid real hourly rates in any of the three countries—not to speak of the many other important elements that shape the total wage picture in time of war. It is more instructive, therefore, to turn to measures of real earnings.

Looking at the real earnings of coal miners, we find the following order in the extent of war changes: in Germany real earnings fell, in Britain they rose, and in the United States they rose still more. Specifically, real shift earnings of German coal miners were 4 percent below 1939 levels in 1943. Real shift earnings of British coal miners rose by 57 percent between the beginning and the last year of the war, according to official figures. If deflation is carried through by the adjusted living-cost measure, as computed by Allen, the increase amounts to only 38 percent. The United States figures show a weekly earnings increase for bituminous coal miners of close to 70 percent (or 63 percent after adjustment) between the years 1939 and 1945. Coal mining was of course an important industry during the war, and earnings in that industry are not necessarily indicative of earnings behavior in general. Weekly real earnings changes for all industry are in fact somewhat more moderate, Germany registering a small decline, Great Britain an increase of 20 percent (deflated by the revised retail price measure), and the United States a rise of about 40 percent. In all three countries there was a decline of weekly real earnings in the last year reported. In Germany the decline appears in the figures

<sup>72</sup> See Chapter 5, section on Wages under National Socialism.

<sup>73</sup> See Report of the President's Committee on the Cost of Living, Office of Economic Stabilization, 1945, as quoted in Table 77.

<sup>74</sup> See R. G. D. Allen, "Prices," *London and Cambridge Economic Service*, February 1949.

<sup>75</sup> The revised living-cost measures, discussed above, have also been included in the tabulations. For Germany the revisions related to increases during the period 1933-37. Thus only the level but not the movement of living costs and real wages during World War II are affected by these adjustments.

for 1944 (and must be assumed to have continued through the remainder of the war), in Great Britain and the United States it appears only in the data for 1945. Both the decline during the late war years and the differential for Germany and the other two countries reflect again the major economic, political, and military circumstances of the three powers at the end of the war.

*Comparison of the Two War Periods.* The availability of information on miners' earnings, in both world wars and for all three countries, permits some comparisons of wage behavior during the two wars. The course of money earnings and real earnings of miners is illustrated in Table 79 and Chart 41. In these comparisons it is important to consider that the first war lasted about four years and the second about six. For money wages, we find the greatest contrast in wage behavior in Germany for the two war periods. In that country coal miners' earnings doubled during the first war, but increased by only a very few percent during the second. The increases in miners' money earnings in England and America were

TABLE 79  
Coal Miners' Earnings in Two World Wars: Germany, Great Britain, and the United States

Year	MONEY EARNINGS			REAL EARNINGS		
	Germany Hard Coal, per Shift	Great Britain, All Coal, per Shift	United States, Bit. Coal, per Week	Germany, Hard Coal, per Shift	Great Britain, All Coal, per Shift	United States, Bit. Coal, per Week
WORLD WAR I (1914 = 100)						
1914	100	100	100	100	100	100
1915	110	115	106	88	96	108
1916	131	129	116	79	96	108
1917	165	136	144	67	85	112
1918	208	195	178	68	108	113
WORLD WAR II (1939 = 100)						
1939	100	100	100	100	100	100
1940	105	112	103	101	96	103
1941	103	128	129	98	101	121
1942	104	150	147	96	110	124
1943	106	164	174	96	117	137
1944	...	187	215	...	131	165
1945	...	200	219	...	138	163

SOURCE:

For 1914-18: Germany, *Zeitschrift für das Berg-, Hütten- und Salinenwesen, passim*. Deflation by cost-of-living index as derived from data published by the Statistische Reichsamts.

Great Britain, A. L. Bowley, *Prices and Wages in the United Kingdom, 1914-20*, pp. 106 and 150. Deflation by "modified index."

United States: Douglas, *Real Wages in the United States*, p. 162.

For 1939-45: Money wages, Table 76; real wages, Table 78.

somewhat milder during the first four years of World War II than during World War I. However, in the course of the last two years of the more recent conflict, the cumulative increase in war wages clearly surpassed that experienced from 1914 to 1918. The totalitarian approach to the control of money wages obviously was more effective than the less incisive measures adopted in Great Britain and the United States.

For real wages, we observe a marked similarity in the comparative behavior of the three countries between the two wars. In both, Germany occupied the least favorable and the United States the most favorable position. The most conspicuous contrast between the two wars is the apparently more favorable real earnings record in all three countries during World War II. During World War I real earnings of German coal miners were cut drastically, and earnings of their British counterparts were moderately reduced, whereas earnings of United States miners increased by about 10 percent. These movements are to be compared with the insignificant decline of miners' real earnings in Germany (at least during the first four war years), with the substantial increase of miners' earnings in Britain, and the still more pronounced gains of miners' earnings in the United States during World War II. The findings may appear surprising, in view of the greater scope, longer duration, and greater destructiveness of the more recent conflict. Yet there are plausible explanations for the reported developments. For Germany, our information reaches only to 1943. Up to that year that country was able to avoid the worst consequences of war conditions. It was militarily successful, could base its war production not only on the efforts of Germans but also on the exploitation of foreign workers, and consistently ransacked the economies of conquered areas by sequestering their production, wearing out their equipment, and so on.<sup>76</sup> For the British experience the greater effectiveness of the German blockade during the first war and the more substantial aid from abroad during the second war may provide some explanation. For both Germany and Great Britain the higher productivity of labor in the second as compared with the first war forms an important condition for the more favorable showing of real earnings in World War II. As for the United States, World War II brought about such an unparalleled expansion of industrial activity that new records were set in output of war and war-related goods, and at the same time weekly real earnings could rise more than they did during the earlier war.

The experiences of the three countries during World War I had profound effects upon their respective economic conditions and upon their wage histories during the decades following the Armistice of 1918. Similarly sweeping effects were also to follow from the varying experiences of these countries during World War II. But this is a new story that will require the perspective of future students for its presentation and appraisal.

<sup>76</sup> See Jürgen Kuczynski and M. Witt, *The Economics of Barbarism* (London, 1942).

## **APPENDIXES**

### **APPENDIX A**

#### **Basic Tables**





TABLE A-1

## Indicators of Business and Labor Market Conditions in Germany, 1870-1944

Year	INDICATORS OF BUSINESS CONDITIONS					INDICATORS OF LABOR MARKET CONDITIONS					
	Industrial Production (1913=100) (1)	Wholesale Prices (1913=100) (2)	Cost of living (1913=100) (3)	Real National Income (1913=100) (4)	Reference Dates, NBER (5)	Employment Rate, Unions (percent) (6)	Employed, Sickness Insurance (millions) (7)	Employed, Workmen's Compensation (millions) (8)	Unemployed, Registered (millions) (9)	Man-days Lost	
										Strikes (millions) (10)	Lockouts (millions) (11)
1870	18	92	64	36	T						
1871	21	100	69	..							
1872	23	114	72	..	P						
1873	23	120	80	..							
1874	22	112	83	..							
1875	22	100	76	..							
1876	24	95	76	..							
1877	22	91	77	39							
1878	25	83	73	..	T						
1879	26	81	72	..							
1880	25	87	76	..							
1881	27	85	77	..							
1882	28	81	75	..	P					4.081	
1883	30	80	75	47						..	
1884	31	78	72	..						..	
1885	32	75	70	..						..	
1886	33	72	68	..						..	
1887	35	73	68	..						..	
1888	36	75	70	..		99.8				5.191	
1889	39	82	73	..		96.2				5.613	
1890	40	86	75	64		99.8				5.933	
1891	41	86	77	64	P	97.7				6.013	
1892	40	80	76	65		96.1				6.004	
1893	42	77	75	67		93.7				6.097	
1894	45	73	74	69	T	97.2				6.208	
						96.9					

TABLE A-1, continued

Year	INDICATORS OF BUSINESS CONDITIONS				INDICATORS OF LABOR MARKET CONDITIONS						
	Industrial Production (1913=100) (1)	Wholesale Prices (1913=100) (2)	Cost of Living (1913=100) (3)	Real National Income (1913=100) (4)	Reference Dates, NBER (5)	Employment Rate, Unions (percent) (6)	Employed, Sickness Insurance (millions) (7)	Employed, Workmen's Compensation Registered (millions) (8)	Unemployed, Registered (millions) (9)	Strikes (millions) (10)	Man-days Lost (millions) (11)
1895	48	72	73	71		97.2		6.434			
1896	53	72	72	74		99.4		6.745			
1897	56	76	74	75		98.8		7.093			
1898	60	79	76	75		99.6		7.379			
1899	64	83	76	78		98.8		7.700		3.3	0.1
1900	65	90	77	80	P	98.0		8.005		3.2	0.5
1901	65	83	78	80		93.3		7.908		2.3	0.1
1902	69	81	78	81	T	97.1		7.955		1.3	0.7
1903	73	82	78	83	P	97.3		8.220		2.8	1.4
1904	78	82	79	85	T	97.9	11.0	8.552		3.6	1.7
1905	79	86	82	85		98.4	11.3	8.868		14.5	4.5
1906	84	92	87	87		98.8	12.0	9.272		8.2	3.4
1907	83	97	88	90	P	98.4	12.2	9.652		6.2	2.8
1908	79	90	88	93	T	97.1	12.0	9.541		2.3	1.4
1909	81	91	90	94		97.2	12.2	9.619		2.8	1.4
1910	89	93	92	95		98.1	12.7	9.979		4.6	13.2
1911	96	94	95	96		98.1	13.3	10.397		7.7	3.8
1912	99	102	100	95		98.0	13.9	10.616		7.7	3.0
1913	100	100	100	100	P	97.1	14.0 <sup>a</sup>	10.905		8.8	3.0
1914	83	105	103		T	92.8	14.0	...		1.7	1.1
1915	67	142	129			96.8	12.3			0.04	0
1916	64	152	170			97.8	12.2			0.2	0
1917	62	179	253		P	99.0	12.7			1.9	0
1918	57	217	313			98.8	12.7			1.5	0
1919	42	416	415		T	96.3	14.7		0.693	32.5	0.6

TABLE A-1, continued

Year	INDICATORS OF BUSINESS CONDITIONS				INDICATORS OF LABOR MARKET CONDITIONS						
	Industrial Production (1913=100) (1)	Wholesale Prices (1913=100) (2)	Cost of Living (1913=100) (3)	Real National Income (1913=100) (4)	Reference Dates, NBER (5)	Employment Rate, Unions (percent) (6)	Employed, Sickness Insurance (millions) (7)	Employed, Workmen's Compensation (millions) (8)	Unemployed, Registered (millions) (9)	Strikes (millions) (10)	Man-days Lost Lockouts (millions) (11)
1920	61	1,486	1,018			96.2		...	0.366	15.4	1.4
1921	73	1,911	1,340			98.0		...	0.310	22.6	3.3
1922	78	34,208	15,040		P	98.5		...	0.077	23.4	4.3
1923	52	16,620 bill.	15,900 bill.		T	90.4		...	0.829	11.0	1.3
1924	77	136	131			86.5	16.1	11.186	0.937 <sup>b</sup>	13.4	22.8
1925	92	139	142	94	P	93.3	17.3	11.882	0.664	4.0	5.9
1926	87	129	142	97	T	82.0	16.0	10.447	2.068	0.8	0.4
1927	110	135	148	105		91.3	17.5	11.949	1.391	3.1	3.0
1928	113	136	152	109		91.4	18.0	12.104	1.391	8.6	11.7
1929	114	131	154	108	P	86.7	17.9	11.650	1.899	1.6	2.7
1930	99	114	148	104		77.3	16.4	10.424	3.076	3.7	0.3
1931	82	98	136	92		65.8	14.3	8.541	4.520	1.5	0.4
1932	66	86	121	82	T	56.2	12.5	7.125	5.575	1.1	0
1933	74	82	118	86			13.0	7.697	4.804	0.1	0
1934	94	87	121	95			15.0	9.296	2.718	0	0
1935	107 <sup>c</sup>	92	123	104			15.9	10.258	2.151 <sup>e</sup>	0	0
1936	119	95	124	114			17.1	11.251	1.593	0	0
1937	131	96	125	124			18.4	12.335	0.912	0	0
1938	140 <sup>d</sup>	95	126	137			19.5	13.318	0.430	0	0
1939	148 <sup>e</sup>	96	126	150			20.2	15.350	0.119	0	0
1940		102	130	150			19.0		0.052	0	0
1941		104	133	154			19.2		0.010	0	0
1942		106	137				18.4 <sup>f</sup>			0	0
1943		108	138				18.3 <sup>f</sup>			0	0
1944		110	141				20.0 <sup>f</sup>			0	0

(notes on next page)

## Footnotes to Table A-1

<sup>a</sup> First 11 months.

<sup>b</sup> Change in coverage. From 1924 includes all registered unemployed, up to 1923 only "main recipients" of unemployment insurance. The 1924 and 1925 data, comparable to earlier segment, are 841,000 and 384,000 respectively.

<sup>c</sup> Includes Saar from March 1935 on.

<sup>d</sup> According to source, the data "as a rule" include Austria from March 1938 and Sudetenland from January 1939 (*Statistical Year-Book of the League of Nations*, 1939-40, p. 169).

<sup>e</sup> Average of first 6 months.

<sup>f</sup> End of March.

SOURCE, by column:

(1) Production Index of the Institut für Konjunkturforschung (IKF). The data for 1870-1918 are based on the Kaiserreich territory. The interwar data are related to 1913 production in the post-Versailles area. However, at the beginning of the interwar period the territorial changes between 1919 and 1922 are reflected in the index, i.e., these years have an upward bias. Similarly, at the end of the interwar period the addition of the Saar and in part of Austria and the Sudetenland affect the level of the index. The following sources were used:

1870-1928: *IKF Sonderheft* 31, pp. 23, 28, 56, and 58.

1928-38: *Jahrbuch* 1939-40, p. 57\* (spliced to earlier series in 1928). Shifted to base 1913 = 100 by averaging producers' goods and consumers' goods, see Table 2, cols. 2 and 3. For Weights see *IKF Sonderheft* 31, p. 37.

1939: League of Nations, *Statistical Year-Book*, 1939-40, p. 169.

(2) 1870-1913 and 1924-34: *Jahrbuch* 1938, p. 321. Covers forty-five raw materials and semimanufactured goods (Jacobs-Richter Index).

1914-23: *Wirtschaft und Statistik*, 1925, "Zahlen zur Geldentwertung in Deutschland, 1913 bis 1923" p. 5. Covers 38 commodities (18 foods, 20 raw materials).

1935-45: *Handbuch* 1928-44, p. 459. Covers 45 raw materials and semimanufactured goods (Jacobs-Richter Index).

(3) Appendix Tables A-11, col. 1 and its sources; A-33, col. 1; and A-41, col. 2.

(4) 1870, -77, -83 and -90: National income, see Paul Jostock, "The Long-term Growth of National Income in Germany," International Association for Research in Income and Wealth, *Income and Wealth*, Series V, p. 118. Deflated by cost-of-living index, (see col. 3).

1891-1913: For national income, see "Das deutsche Volkseinkommen, vor und nach dem Kriege," *Einzelchriften zur Statistik des deutschen Reichs*, No. 24, pp. 31 and 32. Deflated by cost-of-living index, (see col. 3).

1925-41: Paul Jostock, "The Growth of National Income and National Wealth in Germany," Report to the *International Association for Research in Income and Wealth* (unpublished).

(5) Arthur F. Burns and Wesley C. Mitchell, *Measuring Business Cycles* (National Bureau of Economic Research, 1946), p. 70. P = peak; T = trough.

(6) 1887-1903: Jürgen Kuczynski, "Germany, 1800 to the Present Day" (for full title, see note to Appendix Table A-2, Part I). Figures are Kuczynski's estimates of unemployment among industrial workers (based on labor market and membership reports of health and accident insurance associations).

1904-13 and 1919-23: W. Woytinsky, *Der Deutsche Arbeitsmarkt; Ergebnisse der gewerkschaftlichen Arbeitslosenstatistik 1919 bis 1929* (Berlin, Verlagsgesellschaft des Allgemeinen Deutschen Gewerkschaftsbundes, 1930), pp. 102 and 121.

1913-18: *Jahrbuch* 1920, p. 261.

1924-32: *Reichsarbeitsblatt*, *passim*.

(7) 1904 and 1924-27: Computed from data in *Reichsarbeitsblatt*, *passim*. Spliced to IKF series, using Kuczynski's estimate for 1913-14. See Jürgen and Marguerite Kuczynski, *Die Lage des deutschen Industriearbeiters, 1913-14 und 1924 bis 1930* (Berlin, 1931), p. 8.

1928-29: *IKF Handbuch* 1936, p. 12.

1929-38: *IKF Statistik des In- und Auslands*, *passim*.

1930 and 1931: Our estimates. Interpolated on basis of unrevised series, *IKF Handbuch* 1936, p. 12.

Footnotes to Table A-1, *concluded*

1938-45: *Handbuch* 1928-44, p. 478, spliced to IKF series in 1938.

(8) F. Grumbach and H. König, "Beschäftigung und Löhne der deutschen Industrie-  
wirtschaft, 1888-1954," *Weltwirtschaftliches Archiv*, 1957-I, pp. 128-29, Table 2.

(9) 1919-23: Robert R. Kuczynski, "Postwar Labor Conditions in Germany,"  
Bureau of Labor Statistics, *Bul.* 380, 1925, pp. 157, ff.

1924-28: *IKF Handbuch* 1933, p. 15 (linked to later series in 1928).

1928-42: *Handbuch* 1928-44, p. 484.

(10 and 11) *Jahrbuch* 1934, p. 321. Data for 1925 taken from *Jahrbuch* 1933, p. 311.

TABLE A-2  
Money Wages, All Industry, 1871-1944  
(1913 = 100)  
Part I: 1871-1913

Year	Average Weekly Earnings	Year	Average Weekly Earnings	Year	Average Weekly Earnings
1871	51	1885	58	1900	75
1872	57	1886	58	1901	74
1873	63	1887	59	1902	74
1874	65	1888	62	1903	75
		1889	64	1904	77
1875	64	1890	65	1905	80
1876	59	1891	65	1906	84
1877	56	1892	65	1907	89
1878	56	1893	65	1908	88
1879	53	1894	65	1909	89
1880	54	1895	65	1910	91
1881	54	1896	68	1911	93
1882	56	1897	68	1912	96
1883	57	1898	71	1913	100
1884	57	1899	73		

The only wage measure for the 1871-1913 period that aims at comprehensive coverage is the wage index constructed by Jürgen Kuczynski, given here with base shifted to 1913. The original series is in *Germany, 1800 to the Present Day* (Vol. III, Part I of *A Short History of Labour Conditions under Industrial Capitalism*, London, 1945), p. 128. It is based on a great number of weekly, daily, and in some cases, annual series of rates or earnings; it does not include any hourly wage data. Because of the type of wage data included, the index is affected by the long-term changes in normal or actual working hours. The following industries are included: metals, textiles, wood, printing, chemicals, transportation, mining, building.

(continued on next page)

Table A-2, *continued*  
Part II: 1913-1923

<i>Year</i>	<i>Weekly Earnings of Ruhr Miners</i>	<i>Year</i>	<i>Weekly Earnings of Ruhr Miners</i>
1913	100	1919	340
1914	100	1920 Dec.	990
1915	110	1921 Dec.	1,780
1916	130	1922 Dec.	45,230
1917	160	1923 Dec.	86,200 billions
1918	200		

No comprehensive index numbers are available for the war and inflation period. Average weekly wages of coal miners in the Ruhr district were chosen to represent the tendencies during that decade because they corresponded well to the indexes which are available for segments of the period 1913-23, as follows:

- (a) From the first 6 months of 1913 to the last 6 months of 1918 the weekly wages of coal miners in the Ruhr district increased by 123 percent, while average daily earnings of male workers in 12 industries increased by 141 percent from March 1914 to September 1918.
- (b) From 1913 to April 1922 (first month in which comprehensive data are available) miners' wages rose 26.1 times, while average weekly wages of skilled and unskilled workers in 8 industries rose 27.6 times.
- (c) From 1913 to the end of the hyperinflation, miners' wages rose 862 billion times, while average weekly wages of skilled and unskilled workers in 8 industries rose 871 billion times.

SOURCE: *Wirtschaft und Statistik*, 1925; "Zahlen zur Geldentwertung in Deutschland, 1914 bis 1924," p. 41.

(continued on next page)

TABLE A-2, *continued*  
Part III: 1913-14 and 1924-1944

Year	Hourly Wages		Weekly Wages	
	Rates (1)	Earnings (2)	Rates (3)	Earnings (4)
1913-14	100	100	100	100
1924	107	112	99	91
1925	135	146	124	123
1926	146	155	134	128
1927	154	169	141	143
1928	168	190	151	164
1929	177	200	158	169
1930	180	194	...	155
1931	171	180	...	137
1932	144	151	...	113
1933	140	146	...	115
1934	140	150	...	124
1935	140	152	...	127
1936	140	155	...	132
1937	140	158	...	136
1938	141	163	...	143
1939	141	168	...	148
1940	141	172 <sup>a</sup>	...	153 <sup>a</sup>
1941	143	180	...	163
1942	144	183	...	164
1943	144	184	...	164
1944	144	184	...	162

<sup>a</sup> From 1940 on including the "Ostmark."

The wage rate statistics compiled by the Statistische Reichsamts cover the most important centers for each of 12 industries, 1913 and 1924-27, and for each of 17 industries, 1928 on. In each industry the wage rates are a combination of minimum time rates and minimum standard piece rate for adults in selected representative occupations. The rates for the selected occupations are not, of course, necessarily the average rates paid for the skill groups which they represent. The standard piece rates are usually about 15 percent above comparable time rates and are designed to provide a minimum of hourly earnings to be realized by the *average* piece worker in the selected occupation. Thus, neither time nor piece rates are minimum rates for all workers in the broad skill groups which the selected occupations represent. Sources and other details for the several series are:

(notes continue on next page)

Table A-2, *concluded*

## SOURCE:

## Hourly Rates

1913, 1924, and 1925: Rates for skilled and unskilled workers in 12 industries, *Wirtschaft und Statistik*, 1926, p. 51, and *Jahrbuch 1927*, pp. 318-21. Average of skilled and unskilled workers (weighted 2.5 and 1.0) our estimate. (Adjusted to level of later segment in 1925.)

1925-42: *Wirtschaft und Statistik* and *Reichsarbeitsblatt*, *passim*. Based on 12 industries up to 1927, and on 17 industries thereafter; level of entire series based on average for 17 industries.

1943: Our estimate. Based on 1942-43 change of hourly rates in five skill and sex groups (unweighted average).

1944: Assumed to equal 1943.

## Weekly Rates

Average of skilled and unskilled workers (weighted 2.5 and 1.0) our estimate.

1913: *Jahrbuch 1927*, p. 320.

1924-25: *Wirtschaft und Statistik*, 1926, p. 51.

1926: *Jahrbuch 1927*, p. 320.

1927: *Wirtschaft und Statistik*, 1927, *passim*.

1927-28: *Wirtschaft und Statistik*, 1929, p. 53.

1928-29: *Wirtschaft und Statistik*, 1930, p. 148.

Level of series based on latest segment.

## Earnings, Weekly and Hourly

1913 and 1925: *Wirtschaft und Statistik*, 1938, p. 157 and 1939, p. 520.

1924: Our estimate; based on change of rates 1924-25 and average relationship of change in earnings to change in rates during 1925-29.

1926: Interpolated between 1925 and 1927 on basis of hourly rates.

1927: Read from graph in *Vierteljahrshefte zur Statistik des deutschen Reichs*, hereafter referred to as *Vierteljahrshefte*, 1943, v, p. 20.

1928-44: *Handbuch 1928-44*, p. 472.



TABLE A-3  
Wages of Printers, 1871-1943  
Part I: Three Cities,<sup>a</sup> 1871-1913

Year	AVERAGE WEEKLY RATES				AVERAGE HOURLY RATES		
	<i>Berlin</i>	<i>Hanover</i>	<i>Munich</i>	<i>Average, 3 Cities</i>		<i>Average, 3 Cities</i>	
	(marks) (1)	(marks) (2)	(marks) (3)	(marks) (1913=100) (4)	(5)	(pfgs.) (1913=100) (6)	(7)
1871	16.70 <sup>b</sup>	16.70 <sup>b</sup>	18.86 <sup>b</sup>	17.42	53	29.0	46
1872	22.50	22.50	18.86	21.29	65	35.5	56
1873 <sup>e</sup>	26.00	22.43	21.45	23.29	71	40.7	64
1874	26.00	22.43	21.45	23.29	71	40.7	64
1875	26.00	22.43	21.45	23.29	71	40.7	64
1876 <sup>d</sup>	24.38	21.94	21.45	22.59	68	39.5	62
1877	24.38	21.94	21.45	22.59	68	39.5	62
1878 <sup>e</sup>	23.40	21.45	21.13	21.99	67	38.4	60
1879	23.40	21.45	21.13	21.99	67	38.4	60
1880	23.40	21.45	21.13	21.99	67	38.4	60
1881	23.40	21.45	21.13	21.99	67	38.4	60
1882	23.40	21.45	21.13	21.99	67	38.4	60
1883	23.40	21.45	21.13	21.99	67	38.4	60
1884	23.40	21.45	21.13	21.99	67	38.4	60
1885	23.40	21.45	21.13	21.99	67	38.4	60
1886 <sup>e</sup>	24.60	22.55	22.55	23.23	70	40.6	64
1887	24.60	22.55	22.55	23.23	70	40.6	64
1888	24.60	22.55	22.55	23.23	70	40.6	64
1889	24.60	22.55	22.55	23.23	70	40.6	64
1890 <sup>f</sup>	25.63	23.58	23.58	24.26	74	42.4	67
1891	25.63	23.58	23.58	24.26	74	42.4	67
1892	25.63	23.58	23.58	24.26	74	44.7	70
1893	25.63	23.58	23.58	24.26	74	44.7	70
1894	25.63	23.58	23.58	24.26	74	44.7	70
1895	25.63	23.58	23.58	24.26	74	44.7	70
1896 <sup>d</sup>	26.25	24.15	24.68	25.03	76	46.1	73
1897	26.25	24.15	24.68	25.03	76	46.1	73
1898	26.25	24.15	24.68	25.03	76	46.1	73
1899	26.25	24.15	24.68	25.03	76	46.1	73
1900	26.25	24.15	24.68	25.03	76	46.1	73
1901	26.25	24.15	24.68	25.03	76	46.1	73
1902 <sup>f</sup>	28.13	25.88	26.44	26.82	81	49.4	78
1903	28.13	25.88	26.44	26.82	81	49.4	78
1904	28.13	25.88	26.44	26.82	81	49.4	78
1905	28.13	25.88	26.44	26.82	81	49.4	78
1906	28.13	25.88	26.44	26.82	81	49.4	78
1907 <sup>f</sup>	31.25	28.75	29.37	29.79	90	55.7	88
1908	31.25	28.75	29.37	29.79	90	55.7	88
1909	31.25	28.75	29.37	29.79	90	55.7	88
1910	31.25	28.75	29.37	29.79	90	55.7	88
1911	31.25	28.75	29.37	29.79	90	55.7	88
1912 <sup>f</sup>	34.38	31.62	33.00	33.00	100	63.5	100
1913	34.38	31.62	33.00	33.00	100	63.5	100

TABLE A-3, *continued*  
Part II: All Cities, 1913 and 1924-1943

Year	Weekly Rates <sup>a</sup>		Hourly Rates <sup>b</sup>	
	(marks) (1)	(1913 = 100) (2)	(pfennigs) (3)	(1913 = 100) (4)
1913	34.38	100	61.0	100
1924	32.56	95	62.0	102
1925	45.00	131	88.8	146
1926	48.00	140	95.9	157
1927	50.86	148	101.7	167
1928	55.12	160	110.2	181
1929	57.88	168	115.7	190
1930	58.50	170	116.9	192
1931	55.60	162	111.1	182
1932	47.87	139	95.7	157
1933	...	...	95.7	157
1934	...	...	95.7	157
1935	...	...	95.7	157
1936	...	...	95.7	157
1937	...	...	95.7	157
1938	...	...	95.7	157
1939	...	...	95.7	157
1940	...	...	95.7	157
1941	...	...	95.7	157
1942	...	...	95.8	157
1943	...	...	95.8	157

<sup>a</sup> Berlin, Hanover, and Munich.

<sup>b</sup> Our estimate, based on piece rates for compositors.

<sup>c</sup> From May 9th.

<sup>d</sup> From July 1st.

<sup>e</sup> From October 1st.

<sup>f</sup> From January 1st.

<sup>g</sup> Highest city-size class.

<sup>h</sup> All city-size classes.

SOURCE, Part I:

Weekly rates

Jürgen Kuczynski, "Germany 1800 to the Present Day," p. 192.

Hourly rates

Our estimates based on weekly rates and data on hours worked per week, as published by Jürgen Kuczynski, *op. cit.*, p. 144; Robert Kuczynski, *Arbeitslohn und Arbeitszeit in Europa und Amerika, 1870-1909* (Berlin, 1913), pp. 567-69; and *Jahrbuch 1926*, p. 288.

Part II:

Weekly and hourly rates

1913-April 1930: *Jahrbuch 1924-25*, p. 284; *Jahrbuch 1926*, p. 288; *Jahrbuch 1927*, pp. 319, 321; *Jahrbuch 1929*, p. 261.

Weekly rates

May 1930-1932: Our estimate based on average hourly union rates (*Vierteljahrshefte*, 1931, Part II, p. 105), assuming a 48-hour workweek. Adjusted to level of preceding segment.

Hourly rates

May 1930-1944: *Vierteljahrshefte*, 1931, Part II, p. 105; *Wirtschaft und Statistik, passim*; *Reichsarbeitsblatt, passim*. Adjusted to level of preceding segment.

TABLE A-4

Hourly Wage Rates of Building Workers, 1871-1943  
Part I: Berlin, Nuremberg, and Rostock, 1871-1913

Year	SKILLED					UNSKILLED					ALL WORKERS										
	Berlin		Nuremberg		Rostock		Berlin		Nuremberg		Rostock		Average, 3 Cities								
	<i>Pfennigs</i> (1)	<i>Pfennigs</i> (2)	<i>Pfennigs</i> (2)	<i>Pfennigs</i> (2)	<i>Pfennigs</i> (3)	<i>Pfennigs</i> (3)	<i>Pfennigs</i> (4)	<i>Pfennigs</i> (4)	<i>Pfennigs</i> (5)	<i>Pfennigs</i> (5)	<i>Pfennigs</i> (6)	<i>Pfennigs</i> (6)	<i>Pfennigs</i> (7)	<i>Pfennigs</i> (7)	<i>Pfennigs</i> (8)	<i>Pfennigs</i> (8)	<i>Pfennigs</i> (9)	<i>Pfennigs</i> (9)	<i>Pfennigs</i> (10)	<i>Pfennigs</i> (10)	<i>Pfennigs</i> (11)
1871	27.5	20.5	22.5	23.5	34	14	16	16.3	32	19.9	33										
1872	42.5	24	26	30.8	44	17	16	20.2	40	25.5	42										
1873	45	28.5	27.5	33.7	49	18.5	20 <sup>a</sup>	23.3	46	28.5	48										
1874	45	29.5	27.5	34.0	49	19.5	20.5	23.7	47	28.8	48										
1875	45	31	32.5	36.2	52	20.5	23 <sup>a</sup>	24.7	49	30.4	51										
1876	45	31.5	37.5	38.0	55	20.5	25	24.8	49	31.4	52										
1877	39 <sup>a</sup>	31.5	35	35.2	51	20	23	22.5	44	28.8	48										
1878	36	32	35	34.3	50	20	22.5	21.7	43	28.0	47										
1879	33 <sup>a</sup>	31	32	32.0	46	21	21	20.7	41	26.3	44										
1880	33 <sup>a</sup>	32	32	32.2	47	23 <sup>a</sup>	20.5	21.2	42	26.8	45										
1881	32.5	32	32	32.2	46	22.5 <sup>a</sup>	20.5	20.3	40	26.3	44										
1882	30	29	32	30.3	44	25	20	21.0	41	25.7	43										
1883	37.5	29	32	32.8	47	25 <sup>a</sup>	20	21.0	41	26.9	45										
1884	40.5 <sup>a</sup>	30	32	34.2	49	25	20	21.0	41	27.6	46										
1885	45	32	32	36.3	52	27	21	22.0	43	29.2	49										
1886	50	32	35	39.0	56	27.5	20	22.0	43	30.5	51										
1887	50	32	35	39.0	56	28	22.5	23.5	46	31.3	52										
1888	50	32	37	39.7	57	30	25	25.0	49	32.3	54										
1889	55	32.5	40	42.5	61	32.5	25	26.2	52	34.3	57										

TABLE A-4, continued

Year	SKILLED					UNSKILLED					ALL WORKERS			
	Berlin		Nuremberg		Rostock	Average, 3 Cities		Berlin		Nuremberg		Rostock	Average, 3 Cities	
	<i>pfennigs</i>	<i>pfennigs</i>	<i>pfennigs</i>	<i>pfennigs</i>	<i>pfennigs</i>	<i>pfennigs</i>	<i>pfennigs</i>	<i>pfennigs</i>	<i>pfennigs</i>	<i>pfennigs</i>	<i>pfennigs</i>	<i>pfennigs</i>	<i>pfennigs</i>	<i>pfennigs</i>
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	
1890	55	36	42	44.3	64	35	22	26	27.7	55	36.0	60		
1891	55	37	42	44.3	64	35	22	26	27.7	55	36.0	60		
1892	55	37	42	44.7	64	35	23	26	28.0	55	36.3	61		
1893	55	37	42	44.7	64	35	23	26	28.0	55	36.3	61		
1894	52.5	37	42	43.8	63	34	23	26	27.7	55	35.8	60		
1895	50	38	42	43.3	63	32.5	24	26	27.5	54	35.4	59		
1896	55	39	42	45.3	65	35	25	26	28.7	57	37.0	62		
1897	55	40	42	45.7	66	32.5	26	26	28.2	56	36.9	62		
1898	60	42	42	48.0	69	35	27	28	30.0	59	39.0	65		
1899	60	43	44	49.0	71	35	27	28	30.0	59	39.5	66		
1900	62.5	43	44	49.8	72	40	27	29	32.0	63	40.9	68		
1901	65	43	45	51.0	74	40	27	29	32.0	63	41.5	69		
1902	65	43	45	51.0	74	40	28	29	32.3	64	41.7	70		
1903	67.5	43	45	51.8	75	45	28	30	34.3	68	43.1	72		
1904	70	47	47	54.7	79	45	30	31	35.3	70	45.0	75		
1905	73	51	47	57.0	82	48	33	31	37.3	74	47.2	79		
1906	75	54 <sup>a</sup>	50	59.7	86	50	35	32	39.0	77	49.3	82		
1907	75	56	50	60.3	87	50	40	36	42.0	83	51.2	85		
1908	75	59	53	62.3	90	50	43	38	43.7	86	53.0	88		
1909	78 <sup>a</sup>	60	55 <sup>a</sup>	64.3	93	50 <sup>a</sup>	45	40	45.0	89	54.7	91		
1910	80	60	56	65.3	94	55	47	41	47.7	94	56.5	94		
1911	80	62	58 <sup>a</sup>	66.7	96	54 <sup>a</sup>	49.5 <sup>a</sup>	43 <sup>a</sup>	48.8	96	57.8	96		
1912	80	63	60	67.7	98	54 <sup>a</sup>	50.5 <sup>a</sup>	44 <sup>a</sup>	49.5	98	58.6	98		
1913	82	64 <sup>a</sup>	62 <sup>a</sup>	69.3	100	55 <sup>a</sup>	51 <sup>a</sup>	46	50.7	100	60.0	100		

TABLE A-4, continued  
Part II: All Cities, 1913 and 1924-1943

Year	SKILLED		UNSKILLED		ALL WORKERS	
	(pfennigs)	(1913 = 100)	(pfennigs)	(1913 = 100)	(pfennigs)	(1913 = 100)
1913	64.5	100	48.5	100	56.5	100
1924	65.4	101	53.1	109	59.2	105
1925	94.0	146	75.0	155	84.5	150
1926	103.8	161	80.7	166	92.2	163
1927	108.0	167	83.8	173	95.9	170
1928	115.5	179	90.5	187	103.0	182
1929	123.1	191	96.9	200	110.0	195
1930	125.2	194	98.5	203	111.8	198
1931	116.7	181	91.5	189	104.1	184
1932	92.0	143	72.4	149	82.2	145
1933 <sup>b</sup>	81.5	126	65.2	134	73.4	130
1934	81.1	126	64.8	134	73.0	129
1935	81.1	126	64.9	134	73.0	129
1936	81.2	126	65.0	134	73.1	129
1937	81.6	127	65.6	135	73.6	130
1938	81.7	127	65.6	135	73.6	130
1939	82.3	128	66.0	136	74.2	131
1940	82.9	129	67.0	138	75.0	133
1941 <sup>c</sup>	84.4	131	67.7	140	76.0	135
1942	84.9	132	68.1	140	76.5	135
1943	84.9	132	68.1	140	76.5	135

Part I and Part II are not comparable. However, judged by their behavior during the interwar period, the data for the three cities are fairly representative. Between January 1924 and December 1929 the rates for skilled workers in the three cities increased by 245 percent; those in all cities by 246 percent; the corresponding

increases in the rates of unskilled workers were 232 percent and 228 percent respectively.

<sup>a</sup> Our estimates.

<sup>b</sup> From 1933 to 1940 for April of each year.

<sup>c</sup> From 1941 on, for December of each year.

## Notes to Table A-4

## SOURCE:

1871-1908: Robert Kuczynski, *Die Entwicklung der Gewerblichen Löhne seit der Begründung des deutschen Reiches* (Berlin, 1909). pp. 38 ff. For the period 1871-79, averages for unskilled and for the total were computed by using estimates of rates for unskilled workers in Berlin. These estimates were based on the rates of skilled workers in Berlin, and on skill differentials as observed in Nuremberg and Rostock.

1909: Our estimate. Interpolated on the basis of hourly rates of masons and carpenters and unskilled building workers in Chemnitz and Halle (see Franz Thieme, "Die Entwicklung der Preise und ihre Bedeutung für die wirtschaftliche Lage der Bevölkerung in der Stadt Halle"; and Hermann Hennig, "Die Entwicklung der Preise in der Stadt Chemnitz," both published in Verein für Sozialpolitik, *Schriften*, Vol. 145 (Munich and Leipzig), 1914.

1910-13: Waldemar Zimmermann, "Die Veränderung der Einkommens- und Lebensverhältnisse der deutschen Arbeiter durch den Krieg," in *Die Einwirkung des Krieges auf Bevölkerungsbewegung, Einkommen und Lebenshaltung in Deutschland, Wirtschafts- und Sozialgeschichte des Weltkrieges* (Carnegie Foundation for International Peace, Stuttgart, Deutsche Verlags-Anstalt, 1932), pp. 398-99.

1913 and 1924-27: *Wirtschaft und Statistik, passim*. Spliced to later series in January 1928.

1928-30: *Vierteljahrshefte*, 1931, Vol. II, pp. 104-5.

1931-43: *Wirtschaft und Statistik*, and *Reichsarbeitsblatt, passim*.

TABLE A-5

Weekly Wage Rates of Building Workers, 1871-1930  
 Part I: Berlin, Nuremberg, and Rostock, 1871-1913

Year	SKILLED						UNSKILLED				ALL WORKERS			
	Berlin		Nuremberg		Rostock		Berlin		Nuremberg		Rostock		Average 3 Cities	
	marks (1)	marks (2)	marks (3)	marks (4)	marks (5)	marks (6)	marks (7)	marks (8)	marks (9)	marks (10)	marks (11)	marks (12)	Average 3 Cities 1913=100	Average 3 Cities 1913=100
1871	18.00	13.44	15.00	15.48	39	12.24	9.18	10.50	10.64	36	13.1	38		
1872	25.50	16.08	17.22	19.60	50	17.34	11.04	10.50	12.96	43	16.3	47		
1873	27.00	18.72	18.00	21.24	54	18.36	12.06	12.25	14.22	48	17.7	51		
1874	27.00	20.04	18.00	21.68	55	18.36	12.66	13.50	14.84	50	18.3	53		
1875	27.00	20.46	19.50	22.32	56	18.36	12.78	13.80	14.98	50	18.7	54		
1876	25.32	20.58	22.50	22.80	58	17.22	13.20	15.00	15.14	51	19.0	55		
1877	23.55	20.16	21.00	21.57	55	16.02	12.78	13.80	14.20	47	17.9	52		
1878	21.75	20.52	21.00	21.09	53	14.70	13.32	13.50	13.84	46	17.5	50		
1879	19.50	20.04	19.20	19.58	50	13.32	13.26	12.60	13.06	44	16.3	47		
1880	19.50	20.34	19.20	19.68	50	13.32	12.72	12.30	12.78	43	16.2	47		
1881	19.50	20.46	19.20	19.72	50	13.32	12.36	12.30	12.66	42	16.2	47		
1882	18.00	19.50	19.20	18.90	48	12.24	12.18	12.00	12.14	41	15.5	45		
1883	22.50	19.08	19.20	20.26	51	15.30	12.18	12.00	13.16	44	16.7	48		
1884	22.50	19.62	19.20	20.44	52	15.30	12.00	12.00	13.10	44	16.8	48		
1885	26.82	20.82	19.20	22.28	56	16.44	12.42	12.60	13.82	46	18.1	52		
1886	29.76	20.58	21.00	23.78	60	16.98	12.54	12.00	13.84	46	18.8	54		
1887	29.76	20.70	21.00	23.82	60	17.58	12.72	13.50	14.60	49	19.2	55		
1888	30.00	20.76	22.20	24.32	62	18.60	13.02	15.00	15.54	52	19.9	57		
1889	33.78	21.90	24.00	26.56	67	20.58	13.92	15.00	16.50	55	21.5	62		
1890	33.18	21.66	25.20	26.68	68	20.40	13.44	15.60	16.48	55	21.6	62		
1891	33.12	21.84	25.20	26.72	68	20.94	13.62	15.60	16.72	56	21.7	63		
1892	32.88	21.90	25.20	26.66	67	20.34	13.80	15.60	16.58	55	21.6	62		
1893	33.00	21.84	25.20	26.68	68	20.76	13.74	15.60	16.70	56	21.7	63		
1894	33.00	22.02	25.20	26.74	68	20.34	13.68	15.60	16.54	55	21.6	62		

TABLE A-5, continued

Year	SKILLED					UNSKILLED					ALL WORKERS	
	Berlin		Nuremberg		Rosstock	Berlin		Nuremberg		Rosstock	Average 3 Cities	
	marks (1)	marks (2)	marks (3)	marks (4)	marks (5)	marks (6)	marks (7)	marks (8)	marks (9)	marks (10)	marks (11)	marks (12)
1895	30.54	22.74	25.20	26.16	66	20.04	14.22	15.60	16.62	56	21.4	62
1896	30.90	23.40	25.20	26.50	67	20.46	15.18	15.60	17.08	57	21.8	63
1897	30.42	24.60	25.20	26.74	68	19.56	16.02	15.60	17.06	57	21.9	63
1898	32.64	25.44	25.20	27.76	70	20.88	16.26	15.60	17.58	59	22.7	65
1899	32.58	25.92	26.40	28.30	72	21.66	16.26	16.80	18.24	61	23.3	67
1900	33.90	25.98	26.40	28.76	73	24.90	16.44	16.80	19.38	65	24.1	69
1901	35.40	25.80	27.00	29.40	74	23.64	16.44	17.40	19.16	64	24.3	70
1902	35.28	25.68	27.00	29.32	74	23.88	16.68	17.40	19.32	65	24.3	70
1903	36.45	25.80	27.00	29.75	75	24.30	16.80	18.00	19.70	66	24.7	71
1904	37.80	26.22	28.20	30.74	78	24.30	17.10	18.60	20.00	67	25.4	73
1905	39.42	28.50	28.20	32.04	81	25.92	18.24	18.60	20.92	70	26.5	76
1906	40.50	28.50	30.00	33.00	84	27.00	18.24	19.20	21.48	72	27.2	78
1907	40.50	31.35	30.00	33.95	86	27.00	21.66	21.60	23.42	78	28.7	83
1908	40.50	33.06	31.80	35.12	89	27.00	22.80	22.80	24.20	81	29.7	86
1909	40.50	33.63	33.00	35.71	90	27.00	22.80	24.00	24.60	82	30.2	87
1910	40.50	34.20	33.60	36.10	91	27.00	26.79	24.60	26.13	87	31.1	90
1911	42.12	35.34	34.80	37.42	95	28.62	27.93	26.40	27.65	92	32.5	94
1912	43.20	35.91	36.00	38.37	97	29.70	29.07	27.60	28.79	96	33.6	97
1913	44.28	37.05	37.20	39.51	100	30.78	30.21	28.80	29.93	100	34.7	100



TABLE A-5, continued  
Part II: Selected Cities, 1913 and 1924-1930

Year	SKILLED		UNSKILLED		ALL WORKERS	
	(marks)	(1913 = 100)	(marks)	(1913 = 100)	(marks)	(1913 = 100)
1913	37.88	100	29.76	100	33.82	100
1924 <sup>a</sup>	34.80	92	29.59	99	32.19	95
1925	50.82	134	42.06	141	46.44	137
1926	55.16	146	44.68	150	49.92	148
1927	57.78	153	47.18	159	52.48	155
1928	62.20	164	50.89	171	56.55	167
1929	65.78	174	54.26	182	60.02	177
1930	67.25	178	55.43	186	61.34	181

<sup>a</sup> From 1924 on, all figures are averages for April and October. The figures for 1930 refer to April only.

SOURCE: 1871-1913: Jürgen Kuczynski, *Germany 1800 to the Present Day*, pp. 178-81. For the years indicated below, estimates were derived by us as follows:

Weekly wage rates of masons in Berlin in 1878 and 1879, interpolated on basis of changes in daily rates for carpenters; in 1877 and 1880, derived by linear interpolation. Weekly wage rates of unskilled building workers in Nuremberg and Rostock from 1871 to 1902, and in Berlin from 1885 to 1902, estimated from daily

wage rates of unskilled building workers in these cities, based on a normal 6 day workweek. Wage rates of unskilled building workers in Rostock 1873 and 1875, interpolated on basis of masons' wage rates in Rostock; for Berlin 1871, rate for Hamburg substituted. For Berlin 1872-84, rates of unskilled building workers based on change in rates of skilled.

For 1913 to April 1928, *Jahrbuch* 1928, p. 371. (Refers to 23 cities.) For April 1928 to April 1930, *Jahrbuch* 1929, p. 259, and *Jahrbuch* 1930, p. 301. (Refers to 34 cities.)

TABLE A-6  
Average Earnings per Shift, Hewers and Haulers, Ten Centers, 1889-1932  
(marks)  
Part I: 1889-1913

Year	Hard Coal					Lignite		Salt		Ore		All Mines Average, 10 centers (marks) (1913=100)
	Upper Silesia	Lower Silesia	Dortmund	Saar District	Aachen and Left Rhine	Halle	Halle	Halle	Halle	Upper Harz	Siegen- Nassau	
1889	2.31	2.40	3.42	3.44	3.05	2.60	3.26	2.98	2.30	2.60	2.84	58.2
1890	2.71	2.67	3.98	4.09	3.42	2.84	3.48	3.15	2.31	2.71	3.14	64.3
1891	2.83	2.74	4.08	4.21	3.56	2.90	3.63	3.31	2.32	2.55	3.21	65.8
1892	2.79	2.67	3.87	4.23	3.28	2.89	3.81	3.16	2.33	2.48	3.15	64.5
1893	2.74	2.60	3.71	3.83	3.18	2.83	3.69	2.74	2.33	2.41	3.01	61.7
1894	2.79	2.59	3.73	3.68	3.15	2.79	3.65	2.61	2.35	2.38	2.97	60.9
1895	2.78	2.64	3.75	3.70	3.20	2.86	3.56	2.72	2.35	2.37	2.99	61.3
1896	2.82	2.68	3.90	3.73	3.30	2.94	3.65	2.95	2.38	2.77	3.11	63.7
1897	2.91	2.80	4.32	3.80	3.57	3.05	3.81	3.09	2.40	3.04	3.28	67.2
1898	3.09	2.89	4.55	3.90	3.74	3.15	3.81	3.22	2.45	3.15	3.40	69.7
1899	3.27	3.04	4.84	3.99	3.93	3.32	3.85	3.41	2.47	3.59	3.57	73.2
1900	3.57	3.27	5.16	4.11	4.45	3.58	4.01	3.60	2.51	3.79	3.80	77.9
1901	3.52	3.15	4.98	4.09	4.34	3.56	4.07	3.50	2.58	3.44	3.72	76.2
1902	3.35	2.91	4.57	4.07	4.22	3.37	3.83	2.98	2.59	3.04	3.49	71.5
1903	3.37	2.93	4.64	4.12	4.26	3.42	3.85	3.09	2.60	3.17	3.54	72.5
1904	3.39	3.00	4.78	4.22	4.39	3.50	3.90	3.26	2.65	3.18	3.63	74.4
1905	3.50	3.15	4.84	4.29	4.60	3.66	4.03	3.41	2.72	3.44	3.76	77.0
1906	3.69	3.29	5.29	4.40	4.96	3.88	4.14	3.64	2.84	4.06	4.02	82.4
1907	4.00	3.57	5.98	4.57	5.28	4.10	4.35	3.74	3.20	4.43	4.32	88.5
1908	4.04	3.59	5.86	4.63	5.17	4.04	4.26	3.51	3.41	3.88	4.24	86.9
1909	3.97	3.47	5.33	4.51	5.01	3.97	4.18	3.55	3.52	3.66	4.12	84.4
1910	3.91	3.46	5.37	4.50	5.05	4.01	4.34	3.70	3.59	3.86	4.18	85.7
1911	3.98	3.54	5.55	4.60	5.19	4.16	4.67	3.87	3.62	4.03	4.32	88.5
1912	4.22	3.71	6.02	4.83	5.56	4.20	4.89	4.02	3.82	4.34	4.56	93.4
1913	4.71	3.99	6.47	5.18	5.99	4.31	4.83	4.50	4.27	4.56	4.88	100.0

TABLE A-6, continued

Part II: 1912-1932

Year	Hard Coal				Lignite		Salt		Ore		All Mines	
	Upper Silesia		Lower Silesia		Aachen and Left Lower Rhine		Saar District		Dortmund		Dortmund	Saar District
	Upper Silesia	Lower Silesia	Dortmund	Lower Silesia	Halle	Halle	Halle	Halle	Halle	Upper Harz	Siegen-Nassau	Average, 10 centers (marks) (1913=100)
1912	4.60	3.78	6.30	4.83	5.56	4.11	5.10	4.07	4.18	4.34	4.69	94.4
1913	5.13	4.08	6.75	5.18	5.99	4.22	5.04	4.16	4.59	4.56	4.97	100.0
1914	5.09	4.13	6.48	5.03	5.79	4.19	4.98	4.13	4.57	4.44	4.88	98.2
1915	5.74	4.40	7.10	5.16	6.37	4.59	5.14	4.95	5.53	4.97	5.40	108.7
1916	6.94	5.10	8.52	6.20	7.67	5.23	5.96	6.28	7.29	6.51	6.51	131.0
1917	8.60	6.49	10.70	8.66	9.68	6.34	7.08	7.97	8.40	7.27	8.12	163.4
1918	11.67	8.73	13.47	11.24	12.79	8.14	9.40	9.45	10.76	9.25	10.49	211.1
1919	20.56	16.02	23.06	17.86	21.78	14.82	15.99	14.38	16.94	16.13	17.75	357.1
1920	48.18	43.53	58.26	...	54.56	37.13	38.47	37.94	39.10	40.96	44.24 <sup>a</sup>	890.0 <sup>a</sup>
1921	73.86	61.91	80.68	...	77.83	58.72	60.44	55.16	58.91	59.78	65.25 <sup>a</sup>	1312.9 <sup>a</sup>
1922	658.07	551.63	704.68	...	678.12	570.53	673.53	546.07	530.36	580.56	610.39 <sup>a</sup>	12281.7 <sup>a</sup>
1923	...	...	...	...	...	...	...	...	...	...	...	...
1924	5.62	4.57	6.97	6.99 <sup>b</sup>	6.50	4.90	5.37	3.82	...	5.41	5.57 <sup>b,c</sup>	112.1 <sup>b,c</sup>
1925	6.41	5.26	7.98	8.00	7.61	6.00	6.61	5.19	5.37	6.33	6.48	130.4
1926	6.58	5.77	8.62	8.64	8.14	6.40	7.07	5.87	5.91	6.37	6.94	139.6
1927	7.06	6.45	9.19	9.21	8.62	6.89	7.62	6.67	6.16	6.86	7.47	150.3
1928	7.60	6.79	9.73	9.76	9.06	7.60	8.47	7.67	6.46	7.34	8.05	162.0
1929	8.15	7.06	10.08	10.11	9.36	7.78	9.47	8.54	6.83	7.57	8.50	171.0
1930	8.12	7.08	10.17	10.20	9.30	7.65	9.48	8.09	7.13	7.58	8.48	170.6
1931	7.33	6.68	9.28	9.32	8.76	7.16	9.16	7.03	6.54	6.79	7.80	156.9
1932	6.22	5.69	7.88	7.92	7.40	5.90	7.84	6.03	6.02	5.94	6.68	134.4

<sup>a</sup> Excluding Saar District.<sup>c</sup> Excluding Upper Harz.<sup>b</sup> From 1924 on, Lower Rhine-Westphalia is substituted for Saar District.SOURCE: *Zeitschrift für das Berg-, Hütten- und Salinenwesen, passim.*

**TABLE A-7**  
Average Earnings per Shift, Mine Workers above Ground, Ten Centers, 1889-1932  
(marks)

Part I: 1889-1913

Year	Hard Coal					Lignite		Salt		Ore		All Mines
	Upper Silesia	Lower Silesia	Dortmund	Aachen and Left Rhine		Halle	Halle	Halle	Halle	Upper Harz	Siegen-Nassau	Average, 10 centers (marks) (1913=100)
				Saar District	Rhine							
1889	1.83	2.03	2.57	2.70	2.34	2.19	3.06	2.78	1.65	2.09	2.32	62.4
1890	2.10	2.18	2.82	2.98	2.53	2.33	3.24	2.91	1.75	2.20	2.50	67.2
1891	2.17	2.23	2.85	3.01	2.49	2.39	3.35	3.03	1.73	2.15	2.54	68.3
1892	2.16	2.23	2.76	2.98	2.46	2.39	3.35	2.93	1.73	2.15	2.51	67.5
1893	2.15	2.21	2.70	2.84	2.44	2.34	3.33	2.66	1.76	2.09	2.45	65.9
1894	2.15	2.18	2.72	2.79	2.44	2.29	3.38	2.59	1.75	2.05	2.43	65.3
1895	2.14	2.19	2.74	2.80	2.49	2.33	3.38	2.60	1.72	2.08	2.45	65.9
1896	2.16	2.24	2.81	2.76	2.54	2.38	3.43	2.73	1.77	2.26	2.51	67.5
1897	2.22	2.31	2.96	2.77	2.61	2.45	3.49	2.86	1.79	2.47	2.59	69.6
1898	2.34	2.39	3.04	2.82	2.74	2.56	3.50	2.93	1.84	2.59	2.68	72.0
1899	2.44	2.49	3.18	2.86	2.82	2.69	3.50	3.02	1.87	2.88	2.78	74.7
1900	2.66	2.66	3.32	3.00	3.03	2.88	3.64	3.17	1.93	3.09	2.94	79.0
1901	2.69	2.68	3.32	3.01	3.10	2.90	3.70	3.21	1.99	2.96	2.96	79.6
1902	2.63	2.58	3.25	3.01	3.16	2.81	3.48	2.84	2.03	2.69	2.85	76.6
1903	2.65	2.59	3.29	3.04	3.25	2.85	3.41	2.92	2.04	2.79	2.88	77.4
1904	2.64	2.62	3.35	3.16	3.30	2.93	3.40	3.00	2.08	2.78	2.93	78.8
1905	2.70	2.75	3.42	3.26	3.44	3.02	3.47	3.16	2.15	2.94	3.03	81.5
1906	2.81	2.83	3.61	3.36	3.67	3.23	3.54	3.29	2.28	3.27	3.19	85.8
1907	3.00	2.99	3.88	3.53	3.76	3.30	3.67	3.44	2.51	3.48	3.36	90.3
1908	3.07	3.03	3.91	3.59	3.74	3.31	3.71	3.31	2.58	3.33	3.36	90.3
1909	3.10	3.02	3.83	3.59	3.71	3.30	3.72	3.30	2.65	3.18	3.34	89.8
1910	3.10	3.03	3.88	3.60	3.72	3.32	3.72	3.40	2.69	3.28	3.37	90.6
1911	3.13	3.08	3.97	3.61	3.82	3.43	3.86	3.50	2.78	3.43	3.46	93.0
1912	3.26	3.19	4.15	3.64	4.00	3.50	3.95	3.64	2.88	3.60	3.58	96.2
1913	3.38	3.31	4.34	3.83	4.06	3.58	4.06	3.72	3.15	3.75	3.72	100.0

TABLE A-7, continued

Part II: 1912-1932

Year	Hard Coal						Lignite		Salt			Ore		All Mines Average, 10 centers (marks) (1913=100)					
	Upper Silesia		Lower Silesia		Aachen and Left Lower Rhine		Saar District		Dortmund		Halle		Halle		Upper Harz		Siegen-Nassau		
1912	3.27	3.14	4.38	4.38	3.65	4.01	3.39	3.97	3.73	3.17	3.60	3.63	96.0						
1913	3.38	3.26	4.56	4.56	3.84	4.21	3.47	4.08	3.81	3.43	3.75	3.78	100.0						
1914	3.42	3.33	4.58	4.58	3.84	4.23	3.48	4.08	3.82	3.47	3.72	3.80	100.5						
1915	3.77	3.54	4.85	4.85	3.98	4.52	3.75	4.17	4.20	4.10	4.07	4.10	108.5						
1916	4.39	3.93	5.49	5.49	4.65	5.08	4.31	4.83	5.31	5.35	4.78	4.81	127.2						
1917	5.54	4.72	6.80	6.80	6.47	6.08	5.32	5.70	6.45	6.04	5.61	5.87	155.3						
1918	7.58	6.48	8.80	8.80	8.42	7.84	7.03	7.88	7.86	7.79	7.06	7.67	202.9						
1919	13.96	13.37	16.54	16.54	13.51	13.34	13.84	12.82	12.51	12.49	12.45	13.48	356.6						
1920	37.19	38.36	39.89	39.89	...	35.81	34.35	30.67	32.91	29.74	32.69	34.62 <sup>a</sup>	915.9 <sup>a</sup>						
1921	56.48	54.80	63.15	63.15	...	58.26	54.65	48.45	48.23	44.66	46.59	52.81 <sup>a</sup>	1397.1 <sup>a</sup>						
1922	555.94	514.14	565.02	565.02	...	545.07	523.85	549.70	514.20	451.10	502.83	524.64 <sup>a</sup>	13879.4 <sup>a</sup>						
1923	...	...	...	...	...	...	...	...	...	...	...	...	...						
1924	4.27	3.75	5.27	5.27	5.28 <sup>b</sup>	4.95	4.42	4.20	3.25	...	4.09	4.39 <sup>b,c</sup>	116.1 <sup>b,c</sup>						
1925	4.78	4.34	6.19	6.19	6.20	5.92	5.43	5.27	4.18	4.39	4.95	5.17	136.8						
1926	5.13	4.68	6.76	6.76	6.77	6.32	5.84	5.61	4.62	4.85	5.16	5.57	147.4						
1927	5.53	5.13	7.19	7.19	7.20	6.70	6.35	6.18	5.02	5.16	5.61	6.01	159.0						
1928	5.90	5.71	7.70	7.70	7.71	7.10	7.09	6.93	5.69	5.76	6.00	6.56	173.5						
1929	6.25	6.07	8.02	8.02	8.03	7.43	7.32	7.68	6.33	6.07	6.26	6.95	183.9						
1930	6.38	6.13	8.07	8.07	8.09	7.49	7.21	7.73	6.21	6.17	6.34	6.98	184.7						
1931	5.94	5.80	7.48	7.48	7.49	7.00	6.69	7.66	5.63	5.83	5.79	6.53	172.8						
1932	5.09	4.91	6.42	6.42	6.43	5.90	5.52	6.56	4.78	5.41	5.14	5.62	148.7						

<sup>a</sup> Excluding Saar District.<sup>c</sup> Excluding Upper Harz.<sup>b</sup> From 1924 on, Lower Rhine-Westphalia is substituted for Saar District.SOURCE: *Zeitschrift für das Berg-, Hütten- und Salinenwesen, passim.*

TABLE A-8  
Earnings of Miners and Metalworkers, 1871-1943  
(1913 = 100)

Year	Shift Earnings, Dortmund Miners		Shift Earnings, Miners, 10 Districts		Daily Earnings, Metal Workers		Daily Earnings, Railroad Workers	
	Hewers and Haulers (1)	Workers above Ground (2)	Hewers and Haulers (3)	Workers above Ground (4)	Krupp (Essen) (5)	Württemberg R.R. (6)	Prussian-Hessian R.R. (7)	
1871	46 <sup>a</sup>	...	...	...	51	...	...	
1872	70	...	...	...	57	...	...	
1873	77	...	...	...	63	...	...	
1874	62	...	...	...	65	...	...	
1875	59	...	...	...	66	...	...	
1876	46	...	...	...	62	...	...	
1877	40	...	...	...	57	...	...	
1878	41	52	...	...	54	...	...	
1879	39	51	...	...	51	...	...	
1880	42	51	...	...	54	...	...	
1881	43	52	...	...	59	...	...	
1882	47	53	...	...	60	...	...	
1883	49	54	...	...	60	...	...	
1884	48	54	...	...	60	...	...	
1885	47	55	...	...	62	...	...	
1886	45	54	...	...	63	...	...	
1887	45	55	...	...	63	...	...	
1888	46	55	...	...	63	...	...	
1889	53	59	58	62	65	...	...	
1890	62	65	64	67	67	...	...	
1891	63	66	66	68	69	60	...	
1892	60	64	65	67	69	60	...	
1893	57	62	62	66	69	66	...	
1894	58	63	61	65	69	64	...	

TABLE A-8, continued

Year	Shift Earnings, Dortmund Miners		Shift Earnings, Miners, 10 Districts		Daily Earnings, Metal Workers		Daily Earnings, Railroad Workers	
	Hewers and Haulers (1)	Workers above Ground (2)	Hewers and Haulers (3)	Workers above Ground (4)	Krupp (Essen) (5)	Württemberg R.R. (6)	Prussian-Hessian R.R. (7)	
1895	58	63	61	66	69	64	63	
1896	60	65	64	67	72	64	63	
1897	67	68	67	70	76	64	65	
1898	70	70	70	72	77	64	67	
1899	75	73	73	75	80	67	69	
1900	80	76	78	79	81	69	71	
1901	77	76	76	80	78	71	72	
1902	71	75	72	77	76	72	72	
1903	72	76	73	77	77	71	73	
1904	74	77	74	79	83	71	74	
1905	75	79	77	81	87	73	76	
1906	82	83	82	86	91	78	80	
1907	92	89	89	90	91	85	83	
1908	91	90	87	90	91	87	85	
1909	82	88	84	90	92	88	86	
1910	83	89	86	91	93	88	89	
1911	86	91	89	93	95	96	92	
1912	93	96	93	96	96	98	97	
1913	100	100	100	100	100	100	100	
1914	96	100	98	101	...	...	105	
1915	105	106	109	108	...	...	112	
1916	126	120	131	127	...	...	131	
1917	159	149	163	155	...	...	185	
1918	200	193	211	203	...	...	304	
1919	342	363	357	357	...	...	476	

TABLE A-8, continued

Year	Shift Earnings, Dortmund Miners		Shift Earnings, Miners, 10 Districts		Daily Earnings, Metal Workers		Daily Earnings, Railroad Workers	
	Hewers and Haulers (1)	Workers above Ground (2)	Hewers and Haulers (3)	Workers above Ground (4)	Krupp (Essen) (5)	Württemberg R. R. (6)	Prussian-Hessian R. R. (7)	
1920	863	875	890	916	...	...	...	
1921	1195	1385	1313	1397	...	...	...	
1922	10440	12391	12282	13879	...	...	...	
1923	...	...	...	...	...	...	...	
1924	103	116	112	116	...	...	...	
1925	118	136	130	137	...	...	...	
1926	128	148	140	147	...	...	...	
1927	136	158	150	159	...	...	...	
1928	144	169	162	174	...	...	...	
1929	149	176	171	184	...	...	...	
1930	151	177	171	185	...	...	...	
1931	137	164	157	173	...	...	...	
1932	117	141	134	149	...	...	...	
1933	117	141	...	...	...	...	...	
1934	119	141	...	...	...	...	...	
1935	119	141	...	...	...	...	...	
1936	120	141	...	...	...	...	...	
1937	122	141	...	...	...	...	...	
1938	124	140	...	...	...	...	...	
1939	141	150	...	...	...	...	...	
1940	147	155	...	...	...	...	...	
1941	158	160	...	...	...	...	...	
1942	162	163	...	...	...	...	...	
1943	165	167	...	...	...	...	...	



## Notes to Table A-8,

<sup>a</sup> For the years 1871 to 1877, hewers only.

## SOURCE, by column:

(1 and 2) 1871-77: Original source, Verein für die bergbaulichen Interessen im Oberbergamtsbezirk Dortmund, *Mitteilungen über den Niederrheinisch Westfälischen Steinkohlenbergbau, 1901*, p. 191. Direct source, Robert Kuczynski, *Die Entwicklung der gewerblichen Löhne seit der Begründung des Deutschen Reiches* (Berlin, 1909), p. 9.

1878-83: M. Reuss, "Mitteilungen aus der Geschichte des Königlichen Oberbergamtes zu Dortmund und des Niederrheinisch Westfälischen Bergbaues," *Zeitschrift für das Berg-, Hütten- und Salinenwesen*, 1892, p. 391.

1884-1932: Appendix Tables A-6, and A-7 with their source.

1933-43: Our estimates, based on shift earnings in Lower Rhine-Westphalia (hewers only for col. 1) as published in *Zeitschrift für das Berg-, Hütten und Salinenwesen* for 1933-37; and in *Handbuch* 1946, pp. L3a<sup>1</sup>, L3a<sup>2</sup> for 1938-43.

(3 and 4) Appendix Tables A-6 and A-7.

(5) Jürgen Kuczynski, *Germany, 1800 to the Present Day*, pp. 183-84.

(6) Original source, *Verwaltungsberichte der Königlich-Württembergischen Verkehrsanstalten*. Direct source, *Statistisches Handbuch für Württemberg, passim*.

(7) *Statistisches Jahrbuch für den Preussischen Staat*, 1911, p. 197; 1920-21, p. 131.

TABLE A-9  
Wage Rates and Earnings in the Cotton Spinning Industry in Hof, 1871-1913

Year	ANNUAL EARNINGS				WEEKLY EARNINGS				DAILY RATE	
	Skilled		Total		Male		Female		Male	Female
	Male Spinners (marks) (1913=100)	Spinning Department (marks) (1913=100)	Spinning Department (marks) (1913=100)	Department (marks) (1913=100)	Male (marks) (1913=100)	Female (marks) (1913=100)	Male (marks) (1913=100)	Female (marks) (1913=100)	Male (marks) (1913=100)	Female (marks) (1913=100)
1871	627	48.1	383	49.7	...	...	...	...	...	...
1872	747	57.3	438	56.8	...	...	...	...	...	...
1873	774	59.4	477	61.9	...	...	...	...	...	...
1874	774	59.4	490	63.6	...	...	...	...	...	...
1875	793	60.8	499	64.7	...	...	...	...	...	...
1876	829	63.6	520	67.4	...	...	...	...	...	...
1877	802	61.5	529	68.6	...	...	...	...	...	...
1878	...	...	...	...	...	...	...	...	...	...
1879	...	...	...	...	...	...	...	...	...	...
1880	820	62.9	493	63.9	...	...	...	...	...	...
1881	982	75.3	529	68.6	...	...	...	...	...	...
1882	1004	77.0	529	68.6	...	...	...	...	...	...
1883	1022	78.4	523	67.8	...	...	...	...	...	...
1884	1102	84.5	542	70.3	...	...	...	...	...	...
1885	1108	85.0	554	71.9	...	...	...	...	...	...
1886	1132	86.8	560	72.6	...	...	...	...	...	...
1887	1269	97.3	573	74.3	...	...	...	...	...	...
1888	1132	86.8	560	72.6	17.46	50.5	11.78	60.7	1.50	50.0
1889	1117	85.7	563	73.0	22.68	65.6	11.86	61.1	1.60	53.3
1890	1123	86.1	594	77.0	19.08	55.2	12.72	65.5	1.70	56.7
1891	1102	84.5	588	76.3	19.02	55.0	14.27	73.5	1.70	56.7
1892	1138	87.3	585	75.9	19.64	56.8	12.89	66.4	1.70	56.7
1893	1169	89.6	591	76.7	18.19	52.6	12.74	65.6	1.70	56.7
1894	1132	86.8	588	76.3	...	...	...	...	...	...
1895	1157	88.7	594	77.0	...	...	...	...	...	...
1896	1252	96.0	630	81.7	19.34	55.9	13.00	66.9	1.70	56.7
										65.8

TABLE A-9, continued

Year	ANNUAL EARNINGS				WEEKLY EARNINGS				DAILY RATE			
	Skilled		Total		Male		Female		Male		Female	
	Male Spinners (marks) (1913=100)	Spinning Department (marks) (1913=100)	Spinning Department (marks) (1913=100)	Total (marks) (1913=100)	(marks) (1913=100)	(marks) (1913=100)	(marks) (1913=100)	(marks) (1913=100)	(marks) (1913=100)	(marks) (1913=100)	(marks) (1913=100)	(marks) (1913=100)
1897	1242	95.2	646	83.8	27.20	78.6	14.85	76.5	2.00	66.7	1.30	68.4
1898	1163	89.2	630	81.7	24.25	70.1	14.60	75.2	1.90	63.3	1.40	73.7
1899	1190	91.3	649	84.2	22.05	63.7	14.60	75.2	1.90	63.3	1.40	73.7
1900	1181	90.6	655	85.0	25.56	73.9	17.39	89.5	2.00	66.7	1.50	78.9
1901	1132	86.8	652	84.6	21.67	62.6	15.12	77.9	2.00	66.7	1.45	76.3
1902	1172	89.9	667	86.5	24.10	69.7	15.65	80.6	2.00	66.7	1.50	78.9
1903	1193	91.5	667	86.5	23.92	69.2	17.27	88.9	2.00	66.7	1.50	78.9
1904	1245	95.5	676	87.7	26.33	76.1	15.65	80.6	2.30	76.7	1.50	78.9
1905	1273	97.6	685	88.8	29.37	84.9	17.24	88.8	2.35	78.3	1.50	78.9
1906	1285	98.5	695	90.1	35.56	102.8	17.88	92.1	2.50	83.3	1.55	81.6
1907	1322	101.4	744	96.5	...	...	...	...	...	...	...	...
1908	1288	98.8	753	97.7	...	...	...	...	...	...	...	...
1909	1313	100.7	750	97.3	36.96	106.9	20.79	107.1	2.57	85.7	1.62	85.3
1910	1276	97.9	750	97.3	35.55	102.8	19.02	97.9	2.86	95.3	1.85	97.4
1911	1288	98.8	756	98.1	37.51	108.4	20.47	105.4	2.86	95.3	1.85	97.4
1912	1270	97.4	756	98.1	35.35	102.2	19.04	98.0	2.90	96.7	1.90	100.0
1913	1304	100.0	771	100.0	34.59	100.0	19.42	100.0	3.00	100.0	1.90	100.0

Weekly earnings and daily rates are for operators known as "batteurs," industrie, 1432-1913," *Wirtschafts- und Verwaltungsstudien, mit besonderer Berücksichtigung Bayerns* (Leipzig, 1923).

SOURCE: Karl Schmid, "Die Entwicklung der Hofer Baumwoll-

TABLE A-10

Weekly Earnings in Eleven Hosiery Factories, Erz Mountains, 1890-1913, and 1924-1928

Year	Male Knitters		Female Helpers	
	(marks)	(1913=100)	(marks)	(1913=100)
1890	17.08	71	10.11	75
1891	15.27	63	8.85	65
1892	15.19	63	9.16	68
1893	16.28	67	8.81	65
1894	16.72	69	8.55	63
1895	16.62	69	8.76	65
1896	15.50	64	8.59	64
1897	15.18	63	8.71	64
1898	14.87	61	8.65	64
1899	15.68	65	8.91	66
1900	17.28	71	9.68	72
1901	17.81	74	10.23	76
1902	18.64	77	10.20	75
1903	18.58	77	10.53	78
1904	18.03	74	10.40	77
1905	19.76	82	11.46	85
1906	20.71	86	11.65	86
1907	21.14	87	12.49	92
1908	19.57	81	11.93	88
1909	20.63	85	12.12	90
1910	21.38	88	12.58	93
1911	21.62	89	12.38	92
1912	22.52	93	13.20	98
1913	24.22	100	13.52	100
1924	30.47	126	17.27	128
1925	39.42	163	22.33	165
1926	42.31	175	24.13	178
1927	48.09	199	26.38	195
1928	53.83	222	30.25	224

SOURCE: Rudolf Gröber, *Nominallohn und Reallohn: Untersuchung über die Löhne in der erzgebirgischen Strumpfindustrie von 1889 bis 1913, und von 1924 bis 1928*, (Greifswald, 1932).

TABLE A-11  
Notes  
(table is on pp. 354-55)

\* For Silesia, 1865=100.

SOURCE, by column:

(1 and 2) Jürgen Kuczynski, *Germany, 1800 to the Present Day*.

(3) Carl Schwedler, "Arbeitslöhne in der schlesischen Textil-Industrie und Unterhaltsbedarf in den letzten 10 Jahren." *Der Arbeiterfreund*, 1874 (Berlin, 1874) pp. 149 ff. Weighted index of potatoes, bread, wheat flour, peas, barley, semolina, rice, butter, milk, coffee, chicory, sugar, American bacon and American fat, beef, pork, salt, soap, starch, soda, petroleum, candles, rapeseed oil, coal, wood, rent, clothing, taxes, and school expenses (1865=100).

(4) *Reichsarbeitsblatt* 1911, p. 671. Based on a series of articles by Jüngst.

(5) 1877-1900: "Consumption of Food and Cost of Living of Working Classes in the United Kingdom and Certain Foreign Countries." *British and Foreign Trade and Industry Memoranda* (London, 1903), p. 224. Index based on retail prices charged Krupp's workmen at Essen for black bread, wheat flour, potatoes, beef, veal, bacon, butter, coffee, and sugar.

1900-13: Kurt Richter, *Die Reallohnbewegung in Deutschland, England und den Vereinigten Staaten von Amerika 1890-1913, insbesondere in ihrer Beziehung zur Golderzeugung* (Würzburg, 1937), Table 9. Index based on prices charged Krupp's workmen at Essen for beef, pork, mutton, rice, beans, peas, wheat flour, prunes, potatoes, bread, butter, sugar, salt, and coffee.

(6) Gustav Brutzer, "Die Verteuerung der Lebensmittel in Berlin im Laufe der letzten 30 Jahre," Verein für Sozialpolitik, *Schriften*, Vol. 139, II, 1912, p. 44. Weighted index of 3 kinds of meat, lard, 2 kinds of bread, butter and fat, potatoes, milk, eggs, coffee, sugar, flour, and rice. (Base shifted to 1900 = 100)

(7) Waldemar Zimmermann, "Die Preisbewegung in der Stadt Braunschweig in den Jahren 1881-1910," *Bulletin de l'Institut International de Statistique*, Vol. 19 III, 1911-13, pp. 132-33. Index based on four kinds of flour, peas, beans, lentils, potatoes, straw, hay, five kinds of meat, butter. (Unweighted, base shifted to 1900 = 100)

(8) F. Zahn "Die Entwicklung der Preise in Bayern, 1881-1910," *Bulletin de l'Institut International de Statistique*, Vol. 19 III, 1911-13, p. 130-31. Index based on bread, two kinds of flour, three kinds of meat, potatoes, milk, butter, lard, eggs, and beer. (Weighted, base shifted to 1900 = 100)

(9) J. Hartwig, "Die Preisbewegung in Lübeck seit 1886," *Bulletin de l'Institut International de Statistique*, Vol. 19 III, 1911-13, p. 134-35. Index based on wholesale prices of four kinds of grain, peas, beans, lentils, two kinds of straw, hay; and retail prices of two kinds of bread, four kinds of meat, butter, eggs, five kinds of cereals, two kinds of coffee, salt, lard. (Unweighted, base shifted to 1900 = 100)

(10) Fröhlich and Schott, "Verwaltungs und Rechenschaftsbericht der Stadt Mannheim für 1912," quoted from Adam Müller, *Reallohne vor und nach dem Kriege in Südwestdeutschland* (Frankfurt a/M; 1930), p. 47. Index based on two kinds of bread, meat and sausage, fish, flour and cereals, peas, beans, lentils, butter, fat, milk, and eggs. (Weighted, base shifted to 1900 = 100)

(11) Kurt Richter, *op. cit.*, Table 12. Index based on potatoes, butter, wheat flour, beef, pork, mutton; in Gleiwitz, Breslau, Görlitz, Berlin, Halle, Osnabrück, Aachen. (Weighted, base shifted to 1900 = 100)

*Continued on page 356.*

TABLE  
Estimates of Living

Year	<i>Entire Reich</i>		<i>Silesia*</i>	<i>4 Ruhr Cities</i>	<i>Krupp, Essen</i> <i>(Bd. of Trade</i> <i>and Richter)</i>	<i>Berlin</i> <i>(Brutzer)</i>	<i>Brunswick</i> <i>(Zimmer-</i> <i>mann)</i>
	<i>(Jürgen Kuczynski)</i> <i>Food and Rent</i> (1)	<i>Food</i> (2)	<i>(Schwedler)</i> <i>Cost of Living</i> (3)	<i>(Jüngst)</i> <i>Food</i> (4)	<i>Food</i> (5)	<i>Food</i> (6)	<i>Food</i> (7)
1871	90	99	114	...	...	...	...
1872	94	103	121	...	...	...	...
1873	104	112	132	...	...	...	...
1874	108	116	135	...	...	...	...
1875	99	103	...	104	...	...	...
1876	99	106	...	103	...	...	...
1877	100	108	...	101	117	...	...
1878	95	101	...	94	112	...	...
1879	93	98	...	93	112	...	...
1880	99	105	...	96	116	...	...
1881	100	106	...	98	113	105	101
1882	98	103	...	100	111	104	100
1883	98	102	...	102	109	105	102
1884	93	96	...	94	100	101	99
1885	91	93	...	93	100	98	105
1886	89	90	...	92	97	97	106
1887	89	90	...	92	97	94	105
1888	91	91	...	91	98	96	105
1889	95	97	...	100	106	99	109
1890	98	101	...	104	107	109	112
1891	100	104	...	102	118	114	110
1892	99	103	...	99	114	110	109
1893	97	100	...	99	99	102	109
1894	96	98	...	98	97	98	100
1895	95	96	...	96	98	96	100
1896	94	95	...	94	97	95	99
1897	96	97	...	94	103	97	100
1898	99	100	...	99	105	101	101
1899	99	100	...	100	100	99	99
1900	100	100	...	100	100	100	100
1901	101	101	...	102	102	102	101
1902	102	102	...	105	102	103	104
1903	102	101	...	103	101	102	105
1904	103	101	...	98	100	101	105
1905	107	106	...	105	106	105	113
1906	113	112	...	113	112	111	123
1907	114	113	...	107	110	115	120
1908	114	113	...	108	116	117	119
1909	117	116	...	113	118	117	123
1910	120	119	...	...	120	117	125
1911	124	123	...	...	122	...	...
1912	130	131	...	...	126	...	...
1913	130	131	...	...	130	...	...

<i>Bavaria</i>	<i>Lübeck</i>	<i>Mannheim</i>	<i>7 Cities</i>	<i>Stuttgart</i>	<i>Reich</i>	<i>Prussia</i>	
<i>(Zahn)</i>	<i>(Hartwig)</i>	<i>(Fröhlich-Schott)</i>	<i>(Richter)</i>	<i>(Tägtmeyer)</i>	<i>(Zimmermann)</i>	<i>(Tyszka)</i>	
<i>Food</i>	<i>Food</i>	<i>Food</i>	<i>Food</i>	<i>Food</i>	<i>Food</i>	<i>Food</i>	<i>Food</i>
(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	111 (1873-80)
...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...
93	...	...	...	...	...	...	...
93	...	...	...	...	...	...	...
94	...	...	...	...	...	...	105 (1881-83)
93	...	...	...	...	...	...	...
95	...	...	...	...	...	...	...
95	88	...	...	...	...	...	...
97	89	...	...	...	...	...	...
97	93	...	...	...	...	...	99 (1886-90)
98	96	...	...	...	...	...	...
100	96	96	101	106	...	...	...
101	100	100	101	108	...	...	...
102	100	100	101	107	...	...	...
100	103	97	100	101	103	...	105 (1891-95)
102	95	97	97	103	...	...	...
99	91	95	98	100	...	...	...
97	92	95	95	100	...	...	...
99	97	96	98	104	...	...	...
102	101	101	100	105	102	...	100 (1896-1900)
101	97	101	99	102	...	...	...
100	100	100	100	100	100	100	...
101	102	100	103	102	...	102	...
103	104	101	103	105	...	104	...
103	102	102	104	104	102	102	106 (1901-05)
104	102	100	106	104	...	104	...
111	104	105	114	107	...	112	...
115	107	113	117	112	...	115	...
114	112	115	116	114	112	120	...
116	112	112	116	116	116	120	121 (1905-10)
121	114	113	121	119	...	126	...
126	110	117	122	124	...	123	127 (1906-12)
...	...	120	125	125	...	128	...
...	...	124	134	130	...	138	...
...	...	116	133	...	126	...	...

## Notes to Table A-11—continued

(12) F. Tägtmeyer, "Kosten der Lebenshaltung in Stuttgart 1890-1912." Verein für Sozialpolitik, *Schriften*, Vol. 145 II, 1914, p. 420. Index based on 3 kinds of meat, lard, bread, flour, butter, eggs, milk, potatoes, sugar, coffee. (Weighted)

(13) Waldemar Zimmermann, "Die Veränderungen der Einkommens- und Lebensverhältnisse der deutschen Arbeiter durch den Krieg," in *Die Einwirkung des Krieges auf Bevölkerungsbewegung, Einkommen und Lebenshaltung in Deutschland, Wirtschafts- und Sozialgeschichte des Weltkrieges* (Carnegie Foundation for International Peace, Stuttgart, Deutsche Verlags-Anstalt, 1932), p. 325. Index based on pork, beef, mutton, bacon, bread, peas, butter, lard, milk, eggs, potatoes, coffee, and sugar. Expenditure pattern based on 1907 budget inquiry by *Reichsamt*. (Base shifted to 1900 = 100)

(14 and 15) Carl von Tyszka, "Löhne und Lebenskosten in Westeuropa im 19. Jahrhundert," Verein für Sozialpolitik, *Schriften*, Vol. 145 III, 1914, p. 266. Index based on wheat, rye, potatoes, beef, pork, butter. Col. 14 contains averages centered for each period.

The only "cost-of-living index" available for the entire period 1871-1913 is that constructed by Jürgen Kuczynski (column 1). The index, which is mainly a composite of a number of indexes constructed by others, covers only food and rent. However, even the rent component gives an advantage rarely found in other measures for this period, which typically cover food only. Kuczynski's index was compared with the major available independent food cost measures—whether included in his index or not. This comparison is carried through in the above table and in Chart 7. In spite of differences in detail there is a rather striking similarity in the behavior of all these series, particularly with respect to trends. Though the similarity does not validate Kuczynski's index as a representative cost-of-living measure, it does suggest that it is realistic as an indicator at least of changes in food costs.



TABLE A-12  
Real Wages in Printing, Building, and Mining, 1871-1913, and 1924-1943  
(1913=100)

Year	Printing Rates		Building Rates		Shift Earnings, Dortmund Miners		Shift Earnings, Miners, 10 Centers		Daily Earnings, Metal Workers	
	Hourly (1)	Weekly (2)	Hourly (3)	Weekly (4)	Hewers and Haulers (5)	Workers above Ground (6)	Hewers and Haulers (7)	Workers above Ground (8)	Krupp (Essen) (9)	Württemberg R. R. Hessian R. R. (10) (11)
1871	66	76	48	54	67	...	...	...	74	...
1872	78	90	59	65	97	...	...	...	79	...
1873	80	88	59	64	97	...	...	...	79	...
1874	77	85	58	63	74	...	...	...	78	...
1875	84	93	67	71	77	...	...	...	87	...
1876	82	90	69	72	61	...	...	...	82	...
1877	81	89	62	67	51	...	...	...	74	...
1878	83	91	64	69	56	71	...	...	74	...
1879	84	92	61	66	55	71	...	...	71	...
1880	80	88	59	61	55	67	...	...	71	...
1881	79	86	57	61	56	67	...	...	77	...
1882	81	89	57	60	62	71	...	...	80	...
1883	81	89	60	64	65	73	...	...	80	...
1884	84	92	64	67	66	76	...	...	83	...
1885	86	95	69	74	67	79	...	...	89	...
1886	94	104	74	79	66	80	...	...	93	...
1887	94	104	76	81	67	80	...	...	93	...
1888	91	101	77	82	65	78	...	...	90	...
1889	88	96	78	85	72	81	80	85	89	...

TABLE A-12, continued

Year	Printing Rates		Building Rates		Shift Earnings, Dortmund Miners		Shift Earnings, Miners, 10 Centers		Daily Earnings, Metal Workers		Daily Earnings, Railroad Workers	
	Hourly (1)	Weekly (2)	Hourly (3)	Weekly (4)	Hewers and Haulers (5)	Workers above Ground (6)	Hewers and Haulers (7)	Workers above Ground (8)	Krupp (Essen) (9)	Württemberg R. R. (10)	Prussian R. R. (11)	
1890	89	98	80	83	82	87	86	90	89	...	...	
1891	87	95	78	81	82	85	85	89	88	78	...	
1892	93	97	80	82	79	84	85	89	91	79	...	
1893	94	98	81	83	77	83	82	88	92	87	...	
1894	95	99	81	84	78	85	82	88	93	86	...	
1895	97	101	81	84	79	86	84	90	95	88	86	
1896	101	105	86	87	84	90	88	94	100	89	87	
1897	98	102	83	85	90	92	91	94	103	86	88	
1898	96	100	85	86	93	92	92	95	101	84	88	
1899	96	100	87	88	98	96	96	98	105	88	91	
1900	94	98	89	90	104	99	101	103	105	90	92	
1901	93	97	89	90	99	98	98	102	100	91	92	
1902	100	104	89	90	91	96	92	98	97	92	92	
1903	100	104	92	91	92	97	93	99	99	91	94	
1904	99	103	95	92	94	98	94	100	105	90	94	
1905	95	99	96	93	91	96	94	99	106	89	93	
1906	90	93	94	90	94	96	95	99	105	90	92	
1907	100	103	97	94	105	102	101	103	103	97	94	
1908	100	103	100	97	103	102	99	103	103	99	97	
1909	97	100	101	97	91	98	94	100	102	98	96	

TABLE A-12, continued

Year	Printing Rates <sup>a</sup>		Building Rates		Shift Earnings, Dortmund Miners		Shift Earnings, Miners, 10 Centers		Daily Earnings, Metal Workers		Daily Earnings, Railroad Workers	
	Hourly (1)	Weekly (2)	Hourly (3)	Weekly <sup>b</sup> (4)	Hewers and Haulers (5)	Workers above Ground (6)	Hewers and Haulers (7)	Workers above Ground (8)	Krupp (Essen) (9)	Württemberg R. R. (10)	Prussian R. R. (11)	
1910	95	98	102	97	90	97	93	98	101	96	97	
1911	92	95	101	99	90	96	93	98	100	101	97	
1912	100	100	98	97	93	96	93	96	96	98	97	
1913	100	100	100	100	100	100	100	100	100	100	100	
1924	78	73	80	71	79	88	86	89	...	...	...	
1925	103	92	106	96	83	96	92	97	...	...	...	
1926	110	99	115	104	90	104	98	104	...	...	...	
1927	113	100	115	105	92	107	102	108	...	...	...	
1928	119	105	120	109	95	111	107	114	...	...	...	
1929	123	109	126	114	97	114	111	119	...	...	...	
1930	130	115	134	121	102	120	115	125	...	...	...	
1931	134	119	135	...	101	121	115	127	...	...	...	
1932	130	115	121	...	97	117	111	123	...	...	...	
1933	135	...	112	...	99	120	...	...	...	...	...	
1934	131	...	108	...	98	116	...	...	...	...	...	
1935	128	...	106	...	97	115	...	...	...	...	...	
1936	126	...	104	...	96	113	...	...	...	...	...	
1937	125	...	104	...	98	112	...	...	...	...	...	
1938	125	...	104	...	99	112	...	...	...	...	...	
1939	125	...	104	...	112	118	...	...	...	...	...	

TABLE A-12, continued

Year	Printing Rates		Building Rates		Shift Earnings, Dortmund Miners		Shift Earnings, Miners, 10 Centers		Daily Earnings, Metal Workers		Daily Earnings, Railroad Workers	
	Hourly (1)	Weekly (2)	Hourly (3)	Weekly (4)	Hewers and Haulers (5)	Workers above Ground (6)	Hewers and Haulers (7)	Workers above Ground (8)	Krupp (Essen) (9)	Wuerttemberg R. R. Hessian R. R. (10)	Prussian- (11)	
1940	121	...	102	...	113	119	...	...	...	...	...	
1941	118	...	101	...	119	120	...	...	...	...	...	
1942	116	...	99	...	118	119	...	...	...	...	...	
1943	113	...	97	...	119	120	...	...	...	...	...	

<sup>a</sup> From 1933 to 1940 real weekly printing rates and real hourly building rates are for April of each year; from 1941 on they are for December.

<sup>b</sup> From 1924 through 1929 real weekly building rates are averages of real rates for April and October. For 1930, figure refers to April only.

SOURCE, by column:

All series deflated by cost-of-living index, Appendix Tables A-1 and A-33, applied to money wages as found in the following sources:

- (1 and 2) Appendix Table A-3.
- (3) Appendix Table A-4.
- (4) Appendix Table A-5, and its sources.
- (5 and 6) Appendix Table A-8.
- (7) Appendix Table A-6.
- (8) Appendix Table A-7.
- (9, 10, and 11) Appendix Table A-8.

TABLE A-13

Real Wages and per Capita Production, All Industry, 1871-1944  
 Part I: 1871-1913  
 (1913 = 100)

Year	Weekly Earnings (1)	Per Capita Production	
		Total (2)	Consumers' Goods (3)
1871	74	34	57
1872	79	37	62
1873	79	36	59
1874	78	34	55
1875	84	34	54
1876	78	37	59
1877	73	34	59
1878	77	37	57
1879	74	39	58
1880	70	37	52
1881	70	40	54
1882	75	42	56
1883	75	44	61
1884	80	45	64
1885	83	46	65
1886	85	47	64
1887	87	49	69
1888	89	50	69
1889	88	53	75
1890	87	55	76
1891	84	56	78
1892	86	53	77
1893	87	56	77
1894	88	59	81
1895	89	62	89
1896	94	67	85
1897	92	70	87
1898	93	74	92
1899	96	77	90
1900	98	77	86
1901	95	76	89
1902	95	80	92
1903	96	83	83
1904	97	87	93
1905	98	88	91
1906	97	92	96
1907	101	90	96
1908	100	84	93
1909	99	85	95
1910	99	92	92
1911	98	98	99
1912	96	100	98
1913	100	100	100

TABLE A-13, continued

Part II: 1913-1923

(1913=100)

Year	Weekly Earnings of Ruhr Miners (1)	Per Capita Production
		Total (2)
1913	100	100
1914	93	82
1915	81	66
1916	74	63
1917	63	62
1918	64	57
1919	82	40
1920	78	60
1921	89	70
1922	70	76
1923	70	50

Part III: 1913-14, and 1924-1944

Year	Hourly Wages		Weekly Wages		Per Capita Production	
	Rates (1)	Earnings (2)	Rates (3)	Earnings (4)	Total (5)	Consumers' Goods (6)
1913-14	100	100	100	100	100	100
1924	82	86	75	70	74	92
1925	95	103	88	87	88	96
1926	102	109	94	90	82	82
1927	104	114	95	97	104	104
1928	110	125	100	108	106	104
1929	115	130	103	110	106	101
1930	122	131	...	105	92	97
1931	125	132	...	100	76	92
1932	120	125	...	94	61	79
1933	119	124	...	98	68	84
1934	116	124	...	102	85	94
1935	114	124	...	103	95	90
1936	112	124	...	106	105	96
1937	112	126	...	109	115	100
1938	112	130	...	114	122	103
1939	112	133	...	117	127	110
1940 <sup>a</sup>	109	132	...	117	...	...
1941	107	135	...	122	...	...
1942	105	134	...	120	...	...
1943	104	133	...	119	...	...
1944	102	130	...	115	...	...

<sup>a</sup> From 1940 on, including Ostmark; see, however, Table A-20.

## SOURCE:

Part I, 1871-1913—Money wages: Appendix Table A-2. Cost of living: Appendix Table A-11. Production data: *IKF Sonderheft* 31, p. 58. (Shifted to base 1913=100.) Population: *Jahrbuch* 1939-40, p. 9.

Part II, 1913-1923—Real Wages: *Wirtschaft und Statistik*, 1925, "Zahlen zur Geldentwertung in Deutschland, 1913 bis 1923," p. 41. Production data: *IKF Sonderheft* 31, pp. 23 and 56. (Shifted to base 1913=100. For adjustment to postwar area in base year, see also source to Table 2.) Population: *Jahrbuch* 1939-40, p. 9.

Part III, 1924-1944—Money wages: Appendix Table A-2. Cost of living: Appendix Table A-33. Production data: Table 4.

**TABLE A-14**  
**Skill Differentials, 1871-1943**  
(differences between wages of skilled and wages of unskilled, expressed in percent of the former)  
**Part I: Building, Textiles, and Mining, 1871-1913**

<i>Year</i>	<i>Building, Based on Hourly Rates (1)</i>	<i>Cotton Spinning, Based on Annual Earnings (2)</i>	<i>Mining, Based on Shift Earnings Dortmund (3)</i>	<i>10 Centers (4)</i>
1871	30.6	38.9	...	...
1872	34.4	41.4	...	...
1873	30.9	38.4	...	...
1874	30.3	36.7	...	...
1875	31.8	37.1	...	...
1876	34.7	37.3	...	...
1877	36.1	34.0	...	...
1878	36.7	...	15.8	...
1879	35.3	...	13.7	...
1880	34.4	39.9	18.5	...
1881	37.0	46.1	19.7	...
1882	30.7	47.3	23.6	...
1883	36.0	48.8	25.1	...
1884	38.6	50.8	23.4	...
1885	39.4	50.0	21.4	...
1886	43.6	50.5	19.5	...
1887	39.7	54.8	19.1	...
1888	37.0	50.5	19.9	...
1889	38.4	49.6	24.9	18.3
1890	37.5	47.1	29.1	20.4
1891	37.5	46.6	30.1	20.9
1892	37.4	48.6	28.7	20.3
1893	37.4	49.4	27.2	18.6
1894	36.8	48.1	27.1	18.2
1895	36.5	48.7	26.9	18.1
1896	36.6	49.7	27.9	19.3
1897	38.3	48.0	31.5	21.0
1898	37.5	45.8	33.2	21.2
1899	38.8	45.5	34.3	22.1
1900	35.7	44.5	35.7	22.6
1901	37.3	42.4	33.3	20.4
1902	36.7	43.1	28.9	18.3
1903	33.8	44.1	29.1	18.6
1904	35.5	45.7	29.9	19.3
1905	34.6	46.2	29.3	19.4
1906	34.7	45.9	31.8	20.6
1907	30.3	43.7	35.1	22.2
1908	29.9	41.5	33.3	20.8
1909	30.0	42.9	28.1	18.9
1910	27.0	41.2	27.7	19.4
1911	26.8	41.3	28.5	19.9
1912	26.9	40.5	31.1	21.5
1913	26.8	40.9	32.9	23.8

SOURCE, by column, Part I, 1871-1913:

(1) Computed from data in Appendix Table A-4.

(2) Computed from data in Appendix Table A-9. Note that skill differentials were derived by comparing average earnings of skilled male spinners with those of the total spinning department—which consisted mainly of unskilled women, but also included unskilled and skilled men. Thus the differential is particularly “impure.”

(3) Computed from data in Appendix Tables A-6 and A-7. For early years, based on data from same source.

(4) Computed from data in Appendix Table A-6 and A-7.

TABLE A-14, *continued*  
 Part II: Railway and Building Workers, 1913-1924

WEEKLY RATES OF RAILWAY WORKERS			
<i>Year</i>	<i>Skilled Workers</i> (marks) (1)	<i>Unskilled Workers</i> (marks) (2)	<i>Differentials</i> (3)
1913	34.56	23.70	31.4
1914	34.56	23.70	31.4
1915	35.64	24.78	30.5
1916	40.56	29.70	26.8
1917	55.85	44.45	20.4
1918	90.20	74.06	17.9
1919	139.23	124.83	10.3
1920	235.60	215.60	8.5
1921	349.00	321.25	8.0
1922	3,257.00	3,075.00	5.6
1923	2,923.00 <sup>ab</sup>	2,370.00 <sup>ab</sup>	18.9 <sup>c</sup>
1924	30.08	23.54	21.7

HOURLY RATES OF BUILDING WORKERS, BERLIN, HAMBURG AND STETTIN			
<i>Year</i>	<i>Masons</i> (marks) (1)	<i>Unskilled Workers</i> (marks) (2)	<i>Differentials</i> (3)
1913-14	.80	.60	25
1914 Apr.	.79	.63	20
1915 Apr.	.80	.63	21
1916 May	.87	.71	18
1917 May	1.10	.95	14
1918 Apr.	1.34	1.20	11
1919 Dec.	3.05	2.92	4
1920 Dec.	6.62	6.48	2
1921 Dec.	12.23	11.73	4
1922 Dec.	360	342	5
1923 Dec.	632 <sup>a</sup>	570 <sup>a</sup>	10

<sup>a</sup> Billions of marks.

<sup>b</sup> December 1923 is computed by using the conversion rate of one trillion marks = one Rentenmark. The figure given is the average for the year.

<sup>c</sup> Differential of annual averages. During the year 1923 those averages are dominated by the high December levels. Averaging of the monthly differentials would result in a figure of 7.3.

SOURCE, Part II, 1913-1924:

1913-23: Railway workers, *Wirtschaft und Statistik*, 1925, "Zahlen zur Geldentwertung in Deutschland 1914 bis 1923," p. 40. Building workers, Allgemeiner Deutscher Gewerkschaftsbund, *Jahrbuch, passim*; and Waldemar Zimmermann, "Die Veränderung der Einkommens- und Lebensverhältnisse der deutschen Arbeiter durch den Krieg," in *Die Einwirkung des Krieges auf Bevölkerungsbewegung, Einkommen und Lebenshaltung in Deutschland, Wirtschafts- und Sozialgeschichte des Weltkrieges* (Carnegie Foundation for International Peace, Stuttgart, Deutsche Verlags-Anstalt, 1932), p. 398.

1924: Average of first nine months, International Labour Office, *Studies and Reports*, Series D, No. 15, p. 148-149.



TABLE A-14, *continued*  
 Part III: Building, Mining, and All Industry, 1913, and 1924-1943

Year	<i>Building Based on Hourly Rates</i>	<i>Mining Based on Shift Earnings</i>		<i>12 Industries Based on Hourly Rates</i>	<i>17 Industries Based on Hourly Rates</i>	
	(1)	<i>Dortmund</i> (2)	<i>Centers</i> (3)	(4)	<i>Male</i> (5)	<i>Female</i> (6)
1913	24.8	32.4	23.9	39.3	...	...
1924	18.8	24.4	21.2	28.7 <sup>d</sup>	...	...
1925	20.2	22.4	20.2	27.9 <sup>d</sup>	23.4	...
1926	22.3	21.6	19.7	28.2 <sup>d</sup>	23.6	...
1927	22.4	21.8	19.5	27.4 <sup>d</sup>	22.6	...
1928	21.6	20.9	18.5	25.2 <sup>d</sup>	21.6	17.4
1929	21.3	20.4	18.2	24.7 <sup>e</sup>	21.5	16.9
1930	21.3	20.6	17.7	...	21.5	17.0
1931	21.6	19.4	16.3	...	21.4	17.1
1932	21.3	18.5	15.9	...	21.1	17.3
1933	20.0	18.8	...	...	20.6	16.1
1934	20.1	19.6	...	...	20.6	16.1
1935	20.0	20.0	...	...	20.6	15.9
1936	20.0	20.6	...	...	20.6	15.9
1937	19.6	22.4	...	...	20.6	15.7
1938	19.7	23.5	...	...	20.7	15.1
1939	19.8	28.3	...	...	20.6	14.6
1940	19.2	28.8	...	...	20.6	14.4
1941	19.8	31.5	...	...	20.2	14.1
1942	19.8	32.1	...	...	20.2	14.7
1943	19.8	31.7	...	...	20.8	14.7

<sup>d</sup> Average of differentials for April and October.

<sup>e</sup> April only.

SOURCE, by column, Part III, 1913 and 1924-43:

(1) Computed from data in Appendix Table A-4.

(2) Computed from data in Appendix Tables A-6 and A-7, and from data underlying cols. 1 and 2 of Appendix Table A-8.

(3) Computed from data in Appendix Table A-6 and A-7.

(4) Computed from data in *Jahrbuch* 1928, p. 371, and *Jahrbuch* 1929, pp. 266-67.

(5 and 6) Computed from data in *Wirtschaft und Statistik, passim*, and in *Handbuch* 1928-1944, p. 472. Differentials are based on comprehensive wage averages which, from 1928 on, cover 17 industries. Because systematic wage information is not available for five of these industries before 1928, wage rates 1925-28 for column 5 were estimated by us on the basis of a 12-industry sample and linked to the later segment in 1928. Thus, even for the early period the level of the differentials given in column 5 reflects the conditions in all 17 industries.

TABLE  
Earnings of Men and Women in

Year	WEEKLY EARNINGS, PRINTING					
	Nuremberg				Berlin	
	Job Printing		Newspaper Printing		Book Printing	
	Male Compositors (1)	Female Helpers (2)	Male Compositors (3)	Female Helpers (4)	Male Compositors (5)	Female Helpers (6)
1880	...	...	...	...	...	...
1881	...	...	...	...	...	...
1882	...	...	...	...	...	...
1883	...	...	...	...	...	...
1884	...	...	...	...	...	...
1885	...	...	...	...	...	...
1886	...	...	...	...	...	...
1887	...	...	...	...	...	...
1888	...	...	...	...	...	...
1889	...	...	...	...	...	...
1890	40.3	14.4	50.5	16.7	...	...
1891	39.0	14.4	52.6	16.7	...	...
1892	40.1	14.8	54.6	18.1	...	...
1893	40.6	15.1	55.7	18.1	46.4	25.2
1894	40.4	15.2	53.6	17.8	46.4	27.8
1895	40.5	15.2	58.8	20.2	49.4	25.1
1896	41.0	14.8	57.5	20.8	51.3	25.7
1897	45.7	17.0	59.5	19.6	52.8	24.3
1898	45.7	17.3	58.5	21.5	53.4	24.1
1899	45.6	18.7	61.2	22.2	53.4	25.9
1900	45.7	18.0	62.3	22.7	51.0	24.3
1901	45.2	18.7	65.8	24.6	52.3	26.1
1902	48.5	18.4	67.9	24.7	54.6	27.0
1903	48.9	18.6	70.2	26.0	56.0	28.9

SOURCE, by column:

(1 to 6): Robert Kuczynski, *Arbeitslohn und Arbeitszeit in Europe und Amerika, 1870-1909* (Berlin, 1913), pp. 328 and 363.

## A-15

## Selected Industries, 1880-1903 (marks)

Year	DAILY EARNINGS, VELVET WEAVING <i>Krefeld</i>		WEEKLY EARNINGS, AWNING MANUFACTURE <i>Berlin</i>		
	Male Weavers (7)	Female Reelers (8)	Male Awning Makers (9)	Male Awning Painters (10)	Seamstresses (11)
1880	...	...	26.94	16.66	11.81
1881	...	...	...	...	...
1882	...	...	26.14	20.44	11.11
1883	...	...	...	...	...
1884	...	...	27.82	21.55	12.57
1885	...	...	...	...	...
1886	...	...	31.97	22.66	11.70
1887	...	...	...	...	...
1888	...	...	26.42	22.31	10.98
1889	3.02	1.78	...	...	...
1890	3.03	2.05	28.63	21.75	14.54
1891	3.21	2.04	...	...	...
1892	2.77	1.57	28.60	21.58	13.03
1893	3.35	1.94	...	...	...
1894	2.47	1.37	27.16	20.51	11.05
1895	2.99	2.06	...	...	...
1896	2.89	1.78	29.43	23.87	12.68
1897	2.89	1.78	...	...	...
1898	3.15	2.14	31.25	19.82	11.50
1899	3.56	2.15	...	...	...
1900	3.62	2.13	31.23	21.97	12.42
1901	3.60	2.16	...	...	...
1902	3.73	2.32	31.79	20.08	12.87
1903	3.37	2.10	34.93	20.31	13.12

(7 and 8): Jürgen Kuczynski, *Löhne und Ernährungskosten in Deutschland, 1820-1937* (Libau, 1937), p. 21.

(9, 10 and 11): Robert Kuczynski, *Die Entwicklung der gewerblichen Löhne seit der Begründung des deutschen Reiches* (Berlin, 1909), p. 85.

TABLE A-16

Sex Differentials, Based on Wages in Selected Industries, 1880-1913  
(differences between wages of men and wages of women, expressed in percent of the former)

Year	Cotton Spinning, Hof		Hosiery, Erz Mountains		Job Printing, Nuremberg		Newspaper Printing, Nuremberg		Book Printing, Berlin		Awning Manufacture, Berlin		Velvet Weaving, Krefeld	
	Daily Rates, Male & Female Weavers	Weekly Earnings, Male Knitters & Female Helpers	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
1880	...	...	...	...	...	...	...	56.2	29.1	...	...	...	...	...
1881	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1882	...	...	...	...	...	...	...	57.5	45.6	...	...	...	...	...
1883	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1884	...	...	...	...	...	...	...	54.8	41.7	...	...	...	...	...
1885	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1886	...	...	...	...	...	...	...	63.4	48.4	...	...	...	...	...
1887	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1888	26.7	...	...	...	...	...	...	58.4	50.8	...	...	...	...	...
1889	31.2	...	...	...	...	...	...	...	...	...	...	...	...	41.1
1890	29.4	40.8	64.3	66.9	64.3	66.9	...	49.2	33.1	...	...	32.3	36.4	43.3
1891	29.4	42.0	63.1	68.3	63.1	68.3	...	...	...	...	...	...	...	...
1892	35.3	39.7	63.1	66.8	63.1	66.8	...	54.4	39.6	...	...	...	...	...
1893	29.4	45.9	62.8	67.5	62.8	67.5	45.7	...	...	...	...	...	...	...
1894	...	48.9	62.4	66.8	62.4	66.8	40.1	59.3	46.1	...	...	...	...	...
1895	...	47.3	62.5	65.6	62.5	65.6	49.2	...	...	...	...	...	...	...
1896	26.5	44.6	63.9	63.8	63.9	63.8	49.9	56.9	46.9	...	...	...	...	...
1897	35.0	42.6	62.8	67.1	62.8	67.1	54.0	...	...	...	...	...	...	...
1898	26.3	41.8	62.1	63.2	62.1	63.2	54.9	63.2	42.0	...	...	...	...	...
1899	26.3	43.2	59.0	63.7	59.0	63.7	51.5	...	...	...	...	...	...	...

TABLE A-16, continued

Year	Cotton Spinning, Hof	Hosiery, Erz Mountains	Job Printing, Nuremberg	Newspaper Printing, Nuremberg	Book Printing, Berlin	Awning Manufacture, Berlin	Velvet Weaving, Krefeld
	Daily Rates, Male & Female Weavers	Weekly Earnings, Male Knitters & Female Helpers	Male Compositors & Female Helpers	Weekly Earnings, Compositors & Female Helpers	Awning Makers & Seamstresses	Weekly Earnings, Makers Painters & Seamstresses	Daily Earnings, Male Weavers & Female Reelers
	(1)	(2)	(3)	(4)	(5)	(6)	(8)
1900	25.0	44.0	60.6	63.6	52.4	60.2	41.2
1901	27.5	42.6	58.6	62.6	50.1	...	40.0
1902	25.0	45.3	62.1	63.6	50.5	59.5	37.8
1903	25.0	43.3	62.0	63.0	48.4	62.4	37.7
1904	34.8	42.3	...	...	...	...	...
1905	36.2	42.0	...	...	...	...	...
1906	38.0	43.7	...	...	...	...	...
1907	...	40.9	...	...	...	...	...
1908	...	39.0	...	...	...	...	...
1909	37.0	41.3	...	...	...	...	...
1910	35.3	41.2	...	...	...	...	...
1911	35.3	42.7	...	...	...	...	...
1912	34.5	41.4	...	...	...	...	...
1913	36.7	44.2	...	...	...	...	...

SOURCE: Columns 1 and 2 computed from data given in Appendix Table A-9 and A-10; columns 3 to 8 computed from data given in Appendix Table A-15.

TABLE A-17

Sex Differentials in the Mining Industry, Workers above Ground, 1886-1913  
(differences between wages of men and wages of women, expressed in percent of the former)

Year	COAL MINING		ORE MINING		
	Upper Silesia	Lower Silesia	Siegen-Nassau	Right Bank of Rhine	Left Bank of Rhine
1886	51.9	41.1	...	...	...
1887	51.9	41.8	...	...	...
1888	54.2	41.3	...	...	...
1889	55.2	41.4	48.8	46.4	56.7
1890	57.1	40.8	48.6	50.5	57.3
1891	58.1	40.8	49.3	52.1	56.7
1892	58.8	41.7	48.4	53.3	54.1
1893	58.6	43.4	45.9	52.1	51.0
1894	58.6	43.6	46.3	50.2	47.5
1895	57.9	44.3	46.6	50.7	47.3
1896	58.3	44.2	49.6	50.2	47.6
1897	58.6	45.5	51.0	51.1	49.1
1898	58.5	43.5	50.6	51.0	50.2
1899	58.2	42.6	52.1	49.6	48.3
1900	58.3	42.9	52.1	50.2	47.3
1901	57.6	41.8	52.4	50.2	45.8
1902	57.8	43.0	51.3	47.6	42.5
1903	58.5	44.0	50.2	48.2	42.8
1904	58.0	44.7	50.0	49.2	41.3
1905	58.1	44.0	51.7	46.8	43.1
1906	58.4	44.9	52.9	53.6	41.4
1907	58.7	46.5	53.2	53.7	40.1
1908	59.3	46.2	...	54.8	43.5
1909	59.4	46.7	...	53.2	45.5
1910	59.7	47.2	...	52.6	45.0
1911	60.1	48.1	...	54.0	44.2
1912	60.7	49.5	...	52.9	44.8
1913	61.5	48.9	...	54.3	47.1

SOURCE: 1886-1907, Robert Kuczynski, *Die Entwicklung der gewerblichen Löhne seit der Begründung des Deutschen Reiches* (Berlin, 1909), pp. 5, 7, 23, 25, and 27.

1908-1910, *Reichsarbeitsblatt* 1910, p. 187-88.

1909-1912, *Jahrbuch* 1911, p. 89; 1912, p. 71; 1913, p. 79.

1913, *Jahrbuch* 1914, p. 89. Spliced to earlier series in 1912.

TABLE A-18  
Average Hourly Earnings by Regions, Masons, 1885, 1905, and 1925, and  
Unskilled Workers, All Industry, 1941  
(pfennigs)

	<i>Masons</i>			<i>Unskilled Workers</i>		
	1885	1905	1929		1941	
<i>East</i>						
Pomerania	23.9	37.5	Pomerania	125	Pomerania	69
Mecklenburg	24.1	36.8	Mecklenburg	109		
Silesia	21.0	34.8	Upper Silesia	103	Upper Silesia	61
			Lower Silesia	111	Lower Silesia	65
Posen, East and West Prussia	26.5	40.5	Posen and West Prussia	109	West Prussia	53
			East Prussia	125	East Prussia	66
Average	23.9	37.4		114		63
<i>Central</i>						
Brandenburg	35.1	58.0	Brandenburg	113	Brandenburg	79
Saxony (kingdom)	27.5	41.5	Saxony E. and W.	145	Saxony	78
Saxony and Anhalt	25.6	38.0	Saxony and Anhalt	127	Lower Saxony	82
Hesse-Nassau and Hesse-Darmstadt	26.6	43.0	Hesse and Hesse-Nassau	134	Hesse	78
			Siegerland	113		
Thuringia	22.0	36.0	Thuringia	116	Thuringia	79
			East Thuringia	117		
Average	27.4	43.3		124		79
<i>South</i>						
Bavaria excl. Palatinate	27.3	39.5	Bavaria, E. of Rhine	141	Bavaria	74
Württemberg	28.2	39.8	Württemberg and Hohenzollern	130	Upper Danube	78
Average	27.8	39.6		136		76
<i>Southwest</i>						
Baden, Alsace- Lorraine and Palatinate	28.0	42.8	Baden and Bavaria W. of Rhine	134	Southwest Germany	79
			Palatinate	125		
			Nahe	130		
Rhineland	30.6	45.0	Rhineland	138	Rhineland	82
Average	29.3	43.9		132		80
<i>Northwest</i>						
Westphalia and Lippe	28.6	46.5	Westphalia (East) and Lippe	120	Westphalia and lower Rhine	81
			Northwest Germany	129		
			West Germany	132	Nordmark	82
Schleswig-Holstein, Hamburg, Lübeck	39.8	62.2	North Germany	192	Mittelbe	82
Hanover, Oldenburg, Braunschweig,			North-Weser-Ems	138		
Bremen	27.6	45.2	Braunschweig	124		
Average	32.0	51.3		139		82

Regional averages are unweighted. They may be affected by the differences in the available area breakdown within the major regions.

SOURCE: 1885 and 1905, Robert Kuczynski, *Die Entwicklung der Gewerblichen Löhne seit der Begründung des Deutschen Reiches* (Berlin, 1909), p. 53. For 1929, *Wirtschaft und Statistik*, 1931, Vol. 4, p. 149. For 1941, *Wirtschaft und Statistik*, 1942, pp. 282-85.

TABLE A-19  
 Union Rates and Average Hourly Earnings for Time and Piece Workers,  
 Selected Industries, 1928-1929

	TIME WORKERS				PIECE WORKERS				Monthly Sample, Rates (pfennings) (9)
	Union Rates (pfennings) (1)	Union Rates (rank) (2)	Average Earnings (pfennings) (3)	Average Earnings (rank) (4)	Union Rates (pfennings) (5)	Union Rates (rank) (6)	Average Earnings (pfennings) (7)	Average Earnings (rank) (8)	
<i>Skilled Workers</i>									
Iron and steel, foundries	74.5	1	92.0	2	85.7	2	109.4	2	...
Iron and steel, mechanical and electrical repair shops	75.6	2	90.3	1	82.8	1	98.3	1	...
Metals, hardware	79.3	3	98.0	4	89.8	3	117.8	5	86.5
Metals, engineering	83.5	4	105.6	5	93.3	4	116.8	4	90.0
Boots and shoes	83.6	5	97.7	3	94.5	5	114.4	3	86.5
Metals, electrical products	96.2	6	113.2	6	109.8	6	124.0	6	97.9
Chemicals	98.5	7	122.3	9	109.8	7	132.0	7	107.8
Woodworking, musical instruments	107.8	8	120.2	8	128.5	9	141.1	9	...
Woodworking, furniture making	107.9	9	117.2	7	121.9	8	137.2	8	...
<i>Semiskilled Workers</i>									
Iron and steel, mechanical and electrical repair shops	66.7	1	78.3	2	74.7	1	89.5	2	...
Boots and shoes	66.8	2	70.9	1	75.4	2	85.0	1	...
Iron and steel, foundries	70.1	3	84.1	3	76.1	3	100.9	3	...
Metals, hardware	71.7	4	87.7	5	83.8	4	108.1	5	...
Metals, engineering	74.7	5	85.5	4	85.0	5	106.3	4	77.4
Metals, electrical products	79.9	6	89.3	6	92.9	6	108.3	6	78.7
Chemicals	81.0	7	96.9	8	95.6	7	113.0	7	...
Woodworking, musical instruments	91.9	8	90.6	7	...	...	...	...	...
Woodworking, furniture making	95.4	9	98.1	9	...	...	...	...	98.3



TABLE A-19, continued

	TIME WORKERS				PIECE WORKERS				Monthly Sample Rates (pfennings) (9)
	Union Rates (1)	Union Rates (2)	Average Earnings (pfennings) (3)	Average Earnings (rank) (4)	Union Rates (5)	Union Rates (rank) (6)	Average Earnings (pfennings) (7)	Average Earnings (rank) (8)	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	
<i>Unskilled Workers.</i>									
Iron and steel, mechanical, and electrical repair shops	61.6	1	69.0	1	67.8	2	90.0	1	...
Iron and steel, foundries	63.7	2	74.5	2	67.1	1	95.7	4	...
Metals, engineering	67.6	3	76.6	3	79.1	3	92.7	2	...
Metals, hardware	68.6	4	82.0	5	79.9	4	104.3	5	70.2
Metals, electrical products	77.8	5	81.5	4	89.6	5	95.3	3	
Woodworking, musical instruments	94.1	6	97.1	7	...	...	...	...	
Woodworking, furniture making	94.5	7	94.7	6	...	...	...	...	88.3

Industries were investigated at the following dates: woodworking, March 1928; chemicals, June 1928; iron and steel, and metals, October 1928; boots and shoes, March 1929.  
SOURCE, by columns:

Cols. 1 to 8. Dora Straube, *Die Veränderung von Lohn und Preis*

*nach der Stabilisierung in Deutschland*, (Kallmünz, 1935), Appendix.  
That author consolidated the results of the special triannual earnings inquiries of the Statistische Reichsamt.

Col. 9. *Jahrbuch* 1931, pp. 284-92. Monthly union rate statistics, all manufacturing, April 1928, based on smaller sample than special inquiries.

TABLE  
Amplitudes and Conformity Indexes of Wage Rates

	AVERAGE ANNUAL CHANGE									
	(1) <i>Expansion<sup>a</sup></i> 1870- 1872	(2) <i>Con- traction</i> 1872- 1878	(3) <i>Expansion</i> 1878- 1882	(4) <i>Con- traction</i> 1882- 1886	(5) <i>Expansion</i> 1886- 1890	(6) <i>Con- traction</i> 1890- 1894	(7) <i>Expansion</i> 1894- 1900	(8) <i>Con- traction</i> 1900- 1902	(9) <i>Expansion</i> 1902- 1903	(10) <i>Con- traction</i> 1903- 1904
Number of Years	1 <sup>a</sup>	6	4	4	4	4	6	2	1	1
<i>Union Rates</i>										
<i>Hourly Rates</i>										
<i>Comprehensive series</i>										
Printing	+17	+1	0	+1	+1	+1	+0 <sup>c</sup>	+4	0	0
Building	+20	+2	-2	+4	+4	-0 <sup>c</sup>	+2	+1	+3	+4
<i>Weekly Rates</i>										
Printing	+18	+0 <sup>c</sup>	0	+1	+1	0	+1	+4	0	0
Building	+18	+1	-3	+5	+3	0	+2	+0 <sup>c</sup>	+2	+3
<i>Effective Rates</i>										
Printing	...	...	...	...	...	+2 <sup>d</sup>	+2	+3	+5 <sup>d</sup>	...
Building	...	...	...	...	+3	+0 <sup>c</sup>	+3	+1	+4 <sup>e</sup>	...
Machinery	...	...	...	...	+6	-2	+3	-2	+4 <sup>e</sup>	...
Wood	...	...	...	...	...	+1 <sup>d</sup>	+3	+1	+1 <sup>d</sup>	...

<sup>a</sup> Measures based on incomplete expansion; data start in 1871.

<sup>b</sup> Based on inverted cycle, 1907-08-13. Not included in average.

<sup>c</sup> Less than 0.5 of 1 percent.

<sup>d</sup> Based on inverted cycle 1925-26-29.

<sup>e</sup> Based on inverted cycle. Not included in average.

<sup>f</sup> Based on incomplete reference expansion. Data start in 1924.

SOURCE: Table 33 and Appendix Tables A-2, A-3, A-4, and A-5.

Conformity indexes are computed according to National Bureau methods. They vary between +100 (perfect positive conformity) and -100 (perfect inverse conformity).

Col. 20 indicates the conformity during reference expansions. It is computed as: (a) number of times the series goes up during expansions, less (b) number of times the series goes down during expansions—the difference being expressed in percent of the total number of expansions included in the series.

Col. 21 indicates the conformity during reference contractions, similarly computed.

A-20

during Reference Cycles, Annual Series, 1871-1913 and 1924-1932

OF CYCLE RELATIVES									INDEXES OF CONFORMITY		
(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
<i>Expan- sion</i>	<i>Con- traction</i>	<i>Expan- sion<sup>b</sup></i>	<i>Expan- sion<sup>c</sup></i>	<i>Con- traction</i>	<i>Expan- sion</i>	<i>Con- traction</i>	<i>Expan- sions</i>	<i>Con- tractions</i>	<i>Expan- sions</i>	<i>Con- tractions</i>	<i>Full Cycles</i>
1904- 1907	1907- 1908	1908- 1913	1923- 1925	1925- 1926	1926- 1929	1929- 1932	<i>(average)</i>				
3	1	5	1 <sup>e</sup>	1	3	3					
...	...	...	+22	+9	+6	-7	+14	+1	+100	0	+33
+4	0	+3	+34	+9	+6	-6	+7	+1	+78	-50	-13
+4	+4	+2	+33	+10	+7	-11	+8	+2	+78	-50	+33
+4	0	+2	+31	+7	+6	-6	+7	+1	+78	-38	+27
+4	+4	+3	+34	+8	+6 <sup>d</sup>	...	+8	+3	+78	-86	+14
...	...	...	...	...	...	...	+4	+2	+100	-100	+33
...	...	...	...	...	...	...	+3	+1	+100	-100	+100
...	...	...	...	...	...	...	+4	-2	+100	+100	+100
...	...	...	...	...	...	...	+2	+1	+100	-100	+67

Col. 22 indicates the conformity of a series to entire business cycles (measured from trough to trough and from peak to peak). It is computed as: (a) the number of times the series falls faster (or rises more slowly) in contraction than in the preceding expansion, plus (b) the number of times the series falls faster (or rises more slowly) in contraction than in the following expansion, less (c) the number of times the series falls more slowly (or rises faster) in contraction than (i) in the preceding expansion and (ii) in the following expansion—the algebraic sum being expressed in percent of the total number of observations.

A value of +100 for this index means that the annual rate of change during reference contractions is without exception algebraically lower than the rate of change during the nearest preceding and following reference expansions.

All conformity indexes used in these tables are indexes "ignoring timing differences," i.e., they do not take account of typical lags or leads.

For a detailed explanation of the computation of these indexes see Arthur F. Burns and Wesley C. Mitchell, *Measuring Business Cycles*, (National Bureau of Economic Research, 1946), pp. 176-85.

TABLE  
Union Wage Rates of Skilled Male  
(pfennigs)

<i>Year and Month</i>	<i>Building (1)</i>	<i>Woodworking (2)</i>	<i>Metal Products (3)</i>	<i>Textiles (4)</i>
1924				
Jan.	51	51	47	40
Feb.	51	...	...	...
Mar.	52	...	...	...
Apr.	57	52	53	44
May	65	...	...	...
June	67	...	...	...
July	68	64	60	47
Aug.	71	...	...	...
Sept.	73	68	59	50
Oct.	76	67	61	49
Nov.	77	73	61	53
Dec.	77	70	63	51
Average	65	58 <sup>b</sup>	55 <sup>b</sup>	45 <sup>b</sup>
1925				
Jan.	77.5	70.4	59.7	53.9
Feb.	78.9	72.0	61.9	53.3
Mar.	78.9	77.2	65.6	55.0
Apr.	87.2	79.5	68.2	55.0
May	93.0	80.6	68.9	55.2
June	97.5	83.1	69.3	55.7
July	99.3	86.8	73.5	57.3
Aug.	100.1	91.1	75.1	59.0
Sept.	103.7	93.0	76.2	59.4
Oct.	104.0	93.0	77.2	59.7
Nov.	104.1	93.1	77.4	60.2
Dec.	104.1	93.1	77.4	60.2
Average	94.0	84.4	70.9	57.0
1926				
Jan.	104.1	93.1	77.4	60.2
Feb.	104.1	93.1	77.4	60.2
Mar.	104.1	93.1	77.4	60.2
Apr.	104.0	92.5	77.4	60.2
May	104.0	92.4	77.4	60.2
June	103.6	92.2	77.0	60.2
July	103.6	92.1	77.0	60.2
Aug.	103.6	91.7	77.1	60.0
Sept.	103.6	91.7	77.1	60.0
Oct.	103.6	91.7	77.1	59.9
Nov.	103.6	91.7	77.1	59.9
Dec.	103.6	92.1	76.5	60.5
Average	103.8	92.3	77.2	60.1

A-21

Workers by Industry, Monthly, 1924-1932  
per hour)

<i>Chemicals</i> (5)	<i>Papermaking</i> (6)	<i>Printing</i> (7)	<i>Baking</i> (8)	<i>Brewing</i> (9)	<i>Hard-Coal Mining</i> (10)
55	46	54	44.7	58.0	71
...	...	...	...	...	...
...	...	...	...	...	...
60	48	60	50.7	63.0	72
...	...	...	...	...	...
...	...	...	...	...	...
63	54	67	62.7	72.6	83
...	...	...	...	...	...
63	54	67	64.0 <sup>a</sup>	73.7 <sup>a</sup>	82
67	55	67	65.4	74.9	83
69	57	80	66.7 <sup>a</sup>	76.8 <sup>a</sup>	83
69	57	80	68.0 <sup>a</sup>	78.7 <sup>a</sup>	90
61 <sup>b</sup>	51 <sup>b</sup>	62 <sup>b</sup>	55.9 <sup>b</sup>	67.1 <sup>b</sup>	77 <sup>b</sup>
72.3	59.4	79.9	69.2	80.5	90.4
75.0	61.3	80.1	71.0 <sup>a</sup>	82.5 <sup>a</sup>	90.4
75.3	63.3 <sup>a</sup>	82.0 <sup>a</sup>	72.8 <sup>a</sup>	84.5 <sup>a</sup>	90.4
77.2	65.3	83.9	74.6	86.5	92.1
79.9	66.7	84.3	74.6	88.0	95.5
81.1	69.5	91.9	74.6	88.6	95.5
81.1	71.0	95.5	74.6	91.0	95.5
81.1	71.1	95.9	78.5	91.9	95.5
83.3	72.4	95.9	78.5	91.5	95.9
85.3	72.9	95.9	81.7	95.2	95.9
85.6	73.0	95.9	82.4	95.7	102.0
86.1	73.1	95.9	82.4	95.8	102.1
80.3	68.2	89.8	76.2	89.3	95.1
86.1	73.1	95.9	82.4	95.8	102.1
86.1	73.1	95.9	82.4	95.8	102.1
86.1	73.1	95.9	82.4	95.9	102.1
86.1	73.1	95.9	82.4	96.4	102.1
86.1	73.1	95.9	82.4	96.4	102.1
86.1	73.1	95.9	82.4	96.4	102.1
86.1	73.1	95.9	82.4	96.9	102.1
86.1	73.1	95.9	81.2	97.2	105.6
86.1	73.2	95.9	81.2	97.6	106.1
86.1	73.2	95.9	81.2	97.6	106.1
86.1	73.2	95.9	81.2	98.2	106.3
86.1	73.1	95.9	82.0	96.7	103.4

TABLE

<i>Year and Month</i>	<i>Building (1)</i>	<i>Woodworking (2)</i>	<i>Metal Products (3)</i>	<i>Textiles (4)</i>
1927				
Jan.	103.6	92.1	76.5	63.8
Feb.	103.6	92.7	76.3	63.9
Mar.	103.6	93.5	78.1	64.1
Apr.	106.8	95.6	80.3	64.3
May	109.0	97.4	80.4	64.2
June	109.0	97.8	81.3	64.4
July	109.0	97.8	81.3	64.4
Aug.	109.0	97.9	81.3	64.4
Sept.	109.1	97.9	81.3	64.7
Oct.	110.8	101.8	81.7	66.4
Nov.	110.8	101.8	81.7	70.6
Dec.	111.3	101.8	82.0	70.9
Average	108.0	97.3	80.2	65.5

A-21, continued

<i>Chemicals</i> (5)	<i>Papermaking</i> (6)	<i>Printing</i> (7)	<i>Baking</i> (8)	<i>Brewing</i> (9)	<i>Hard-Coal Mining</i> (10)
86.1	73.2	95.9	81.2	99.0	106.3
86.6	73.4	95.9	81.2	100.3	106.6
89.5	74.1	95.9	81.2	100.5	106.6
93.3	78.7	102.9	85.3	101.0	106.6
93.3	78.8	102.9	85.3	101.8	112.3
93.3	78.8	102.9	85.3	102.5	112.5
93.3	78.8	102.9	85.3	103.1	112.5
93.3	79.2	102.9	85.3	103.2	112.5
93.3	80.2	102.9	85.3	105.5	112.5
93.3	80.8	104.9	86.9	108.0	112.5
93.3	80.8	104.9	86.9	108.0	112.5
93.3	81.0	104.9	86.9	109.7	112.5
91.8	78.2	101.6	84.7	103.6	110.5

TABLE

<i>Year and Month</i>	<i>Building</i> (1)	<i>Wood-working</i> (2)	<i>Metal Products</i> (3)	<i>Textiles</i> (4)	<i>Chemicals</i> (5)	<i>Paper-making</i> (6)	<i>Printing</i> (7)	<i>Baking</i> (8)
1928								
Jan.	111.3	102.5	83.3	70.9	93.3	81.0	104.9	86.9
Feb.	111.3	102.5	83.3	70.9	93.3	81.4	104.9	92.1
Mar.	111.3	107.1	83.9	70.9	93.3	81.4	104.9	92.1
Apr.	111.9	107.8	86.5	71.5	97.9	87.0	112.5	92.1
May	116.5	107.8	87.2	72.9	102.3	88.6	112.5	92.1
June	116.5	108.3	87.5	72.9	102.3	88.6	112.5	92.1
July	116.5	108.3	88.3	72.9	102.3	88.6	112.5	92.1
Aug.	116.5	108.3	90.8	72.9	102.3	88.6	112.5	92.1
Sept.	116.5	108.3	90.8	72.9	102.3	88.9	112.5	92.1
Oct.	119.4	111.4	91.0	73.1	102.3	88.9	112.5	96.9
Nov.	119.4	111.4	91.0	73.1	102.3	88.9	112.5	96.9
Dec.	119.4	111.4	91.3	73.9	102.3	88.9	112.5	96.9
Average	115.5	107.9	87.9	72.4	99.7	86.7	110.6	92.9
1929								
Jan.	119.4	111.4	92.2	73.9	102.3	88.9	112.5	96.9
Feb.	119.5	111.4	92.5	74.1	102.3	88.9	112.5	96.9
Mar.	119.5	111.4	92.6	74.2	102.3	88.9	112.5	96.9
Apr.	119.5	111.4	93.4	74.6	102.3	89.4	117.3	96.9
May	124.8	111.5	94.5	74.8	104.8	92.4	117.3	96.9
June	124.8	114.6	94.6	74.9	107.5	92.7	117.3	96.9
July	124.8	114.8	95.0	75.3	107.5	93.2	117.3	96.9
Aug.	124.9	115.3	95.1	75.6	107.5	93.2	117.3	96.9
Sept.	124.9	115.4	95.1	75.6	107.5	93.3	117.3	96.9
Oct.	125.2	115.5	95.1	75.6	107.5	93.4	117.3	101.0
Nov.	125.2	117.1	95.1	75.6	107.5	93.4	117.3	101.0
Dec.	125.2	117.2	95.4	75.6	107.5	93.4	117.3	101.0
Average	123.1	113.9	94.2	75.0	105.5	91.8	116.1	97.9
1930								
Jan.	125.2	117.3	95.4	75.7	107.5	93.4	117.3	101.0
Feb.	125.2	117.3	95.4	75.7	107.5	93.4	117.3	101.0
Mar.	125.2	117.3	95.4	75.7	107.5	93.5	117.3	101.0
Apr.	125.2	117.3	95.4	76.0	107.5	93.5	117.3	101.0
May	125.2	117.3	95.4	76.1	107.5	93.5	117.3	101.0
June	125.2	117.3	95.4	76.1	107.5	93.5	117.3	101.0
July	125.2	117.3	95.4	76.1	107.5	93.5	117.3	101.0
Aug.	125.2	117.3	95.4	76.1	107.5	93.5	117.3	101.0
Sept.	125.2	117.3	95.4	76.1	107.5	93.5	117.3	101.0
Oct.	125.2	117.3	95.4	76.1	107.5	93.5	117.3	101.0
Nov.	125.2	117.3	95.4	76.1	107.5	93.5	117.3	101.0
Dec.	125.2	117.3	94.8	76.1	107.5	93.5	117.3	101.0
Average	125.2	117.3	95.4	76.0	107.5	93.5	117.3	101.0



A-21, continued

Brewing (9)	Paper Products (10)	Pottery (11)	Clothing (12)	Shoes (13)	Railroads (14)	Postal Service (15)	Mining	
							Hard Coal (16)	Soft Coal (17)
110.4	101.7	74.1	87.1	85.91	87.1	78.7	110.1	83.5
110.5	101.7	74.1	87.1	85.91	87.1	78.7	110.1	83.5
110.6	101.7	74.1	87.1	85.91	87.1	78.7	110.1	83.5
113.1	102.9	82.3	92.4	90.05	92.2	86.2	110.2	83.5
113.5	109.5	82.3	92.4	90.05	92.2	86.2	117.4	83.5
115.0	109.5	82.3	92.4	90.05	92.2	86.2	118.0	83.5
115.0	110.3	82.3	92.4	90.05	92.2	86.2	118.0	83.5
116.0	110.3	82.3	92.4	90.05	92.2	86.2	118.0	83.5
116.1	110.3	82.3	92.4	90.05	92.2	86.2	118.0	84.8
118.5	110.3	82.3	96.0	90.05	92.2	86.2	118.0	87.5
118.3	110.3	82.3	96.1	90.05	92.2	86.2	118.2	87.5
118.3	110.3	82.3	96.1	90.05	92.2	86.2	118.2	87.5
114.6	107.4	80.2	92.0	89.02	90.9	84.3	115.4	84.6
118.5	110.3	82.3	96.1	90.05	92.2	86.2	118.2	87.5
118.5	110.3	82.3	96.1	90.05	92.2	86.2	118.2	87.5
119.3	110.3	82.3	96.1	90.05	92.2	86.2	118.2	87.5
119.9	110.5	82.3	96.1	90.05	96.3	89.9	118.3	87.5
120.8	115.5	85.5	96.2	90.05	96.3	89.9	120.3	87.5
120.9	115.5	85.5	96.2	90.05	96.3	89.9	120.7	87.5
121.8	115.5	85.5	96.2	90.05	96.3	89.9	120.7	87.5
122.1	115.5	85.5	96.2	90.05	96.3	89.9	120.7	87.5
122.1	115.5	85.5	96.2	90.05	96.3	89.9	120.8	87.5
122.6	115.5	85.5	96.2	90.05	96.3	89.9	120.8	88.4
123.3	115.5	85.5	96.2	90.05	96.3	89.9	120.8	88.4
123.4	115.5	85.5	96.2	95.23	96.3	89.9	120.8	90.7
121.1	113.8	84.4	96.2	90.48	95.3	89.0	119.9	87.9
123.5	115.5	85.5	96.2	95.23	96.3	89.9	120.8	90.7
123.5	115.5	85.5	96.2	95.23	96.3	89.9	120.8	90.7
123.5	115.5	85.5	96.2	95.23	96.3	89.9	120.8	90.7
123.5	115.5	87.4	96.2	98.33	96.3	89.9	120.8	90.7
124.0	115.5	87.4	97.8	98.33	96.3	89.9	120.8	90.7
124.1	115.5	87.4	97.8	98.33	96.3	89.9	120.8	90.7
124.1	115.5	87.4	97.8	98.33	96.3	89.9	120.8	90.7
124.1	115.5	87.4	97.8	98.33	96.3	89.9	120.8	90.7
124.1	115.5	87.4	97.8	98.33	96.3	89.9	120.8	90.7
124.1	115.5	87.4	97.8	98.33	96.3	89.9	120.8	90.7
124.1	115.5	87.4	97.7	98.33	96.3	89.9	120.8	92.7
123.9	115.5	86.9	97.3	97.56	96.3	89.9	120.8	90.9

TABLE

<i>Year and Month</i>	<i>Building</i> (1)	<i>Wood-working</i> (2)	<i>Metal Products</i> (3)	<i>Textiles</i> (4)	<i>Chemicals</i> (5)	<i>Paper-making</i> (6)	<i>Printing</i> (7)	<i>Baking</i> (8)
1931								
Jan.	125.2	117.3	93.5	76.1	107.5	93.0	117.3	101.0
Feb.	125.2	116.8	91.5	74.6	107.5	87.9	117.3	101.0
Mar.	125.2	115.7	91.2	73.2	107.5	87.8	110.3	101.0
Apr.	118.8	114.6	90.9	71.8	106.5	87.8	110.3	96.0
May	114.4	114.4	90.8	71.8	102.2	87.8	110.3	96.0
June	114.4	114.4	90.6	71.8	102.1	87.7	110.3	96.0
July	113.2	114.4	90.6	71.8	102.1	87.7	110.3	96.0
Aug.	112.9	114.4	90.1	71.8	102.1	87.7	110.3	96.0
Sept.	112.9	113.9	90.1	71.8	102.1	87.7	110.3	96.0
Oct.	112.9	113.5	90.1	71.8	102.1	87.7	110.3	96.0
Nov.	112.9	105.5	88.8	71.8	102.1	89.3	110.3	96.0
Dec.	112.9	105.4	87.4	70.9	102.1	86.0	110.3	92.5
Average	116.7	113.4	90.5	72.4	103.8	88.2	111.5	97.0
1932								
Jan.	103.2	94.9	78.5	65.6	87.4	79.3	96.1	83.2
Feb.	103.2	94.9	78.5	65.4	87.4	78.4	96.1	83.2
Mar.	102.9	94.7	78.5	65.4	87.4	78.4	96.1	83.2
Apr.	102.9	94.1	78.5	65.4	87.4	78.4	96.1	83.2
May	92.1	94.0	78.5	65.4	87.4	76.5	96.1	83.2
June	85.7	92.5	78.5	65.4	87.4	76.5	96.1	83.2
July	85.6	90.4	78.1	65.2	87.4	76.1	96.1	83.2
Aug.	85.6	88.6	78.1	64.6	87.4	76.1	96.1	83.2
Sept.	85.6	87.9	78.1	64.1	87.4	76.0	96.1	82.0
Oct.	85.6	...	78.0	63.9	87.1	76.0	96.1	81.1
Nov.	85.6	...	78.0	63.9	87.1	75.9	96.1	80.3
Dec.	85.6	...	78.0	63.9	87.1	75.9	96.1	80.3
Average	92.0	91.3 <sup>c</sup>	78.3	64.8	87.3	77.0	96.1	82.4

<sup>a</sup> Estimated by linear interpolation.

<sup>b</sup> Average of January, April, June, and October.

<sup>c</sup> In computation of average, stability of rates between September and December 1932 was assumed.

A-21, continued

Brewing (9)	Paper Products (10)	Pottery (11)	Clothing (12)	Shoes (13)	Railroads (14)	Postal Service (15)	Mining	
							Hard Coal (16)	Soft Coal (17)
124.1	115.5	87.4	97.7	98.33	96.3	89.9	114.3	92.7
124.1	115.5	82.1	97.7	98.33	96.3	89.9	114.1	92.7
124.1	108.2	82.1	94.3	98.33	96.3	89.9	114.1	92.7
124.1	108.2	82.1	94.3	93.16	90.4	89.9	113.9	92.7
123.3	108.2	82.1	92.3	93.16	90.4	85.1	113.9	92.7
122.4	108.2	82.1	92.3	93.16	90.4	85.1	113.9	87.9
122.0	108.2	82.1	92.2	93.2	90.4	85.1	113.4	87.9
121.2	108.2	82.1	92.2	93.2	90.4	85.1	113.4	87.9
122.0	108.2	82.1	92.1	93.2	90.4	85.1	113.4	87.9
122.0	108.2	82.1	92.1	93.2	90.4	85.1	106.6	87.9
122.4	108.2	79.0	92.1	93.2	90.4	85.1	105.8	87.1
122.3	108.2	79.0	92.1	93.2	87.0	81.1	105.8	87.1
122.8	109.4	82.0	93.4	94.5	91.6	86.4	111.9	89.8
106.5	92.9	70.9	83.5	79.2	78.3	73.0	95.5	75.2
106.5	92.9	70.9	83.5	79.2	78.3	73.0	95.5	75.2
106.5	92.9	70.9	83.5	79.2	78.3	73.0	95.5	75.2
106.5	92.9	70.9	83.5	79.2	78.3	73.0	95.5	75.2
106.5	92.9	70.9	83.5	79.2	78.3	73.0	95.5	75.2
106.4	92.9	70.9	83.5	79.2	78.3	73.0	95.5	75.2
106.5	92.9	70.9	83.5	79.2	78.3	73.0	95.5	75.2
106.5	92.9	70.9	83.5	79.2	78.3	73.0	95.5	75.2
106.3	92.9	70.9	77.7	79.2	78.3	73.0	95.5	75.2
106.3	92.9	70.9	76.2	79.2	78.3	73.0	95.5	75.2
105.9	92.9	70.9	74.6	79.2	78.3	73.0	95.5	75.2
105.9	92.9	70.9	74.4	79.2	78.3	73.0	95.5	75.2
106.4	92.9	70.9	80.9	79.2	78.3	73.0	95.5	75.2

SOURCE: *Wirtschaft und Statistik, passim*. Data for 1924-27 were linked to later segment, using January 1928 ratios as adjustment factors.

TABLE A-22  
Amplitudes and Conformity Indexes of Hourly Wage Rates, Reference Cycles, Monthly Series,  
January 1924 to August 1932

	AVERAGE ANNUAL CHANGE OF CYCLE RELATIVES						INDEXES OF CONFORMITY		
	Expansion <sup>a</sup>		Contraction		Average		Average		Average
	Nov. 23- Mar. 25	Mar. 25- Mar. 26	Mar. 26- Apr. 29	Apr. 29- Apr. 32	Apr. 29- Apr. 32	Apr. 29- Apr. 32	Expansions	Contractions	Full Cycles
Number of Years	1.08	1.0	3.08	3.3					
All industries	+23	+16	+6	-6	+14	+5	+100	0	+33
Building	+34	+27	+5	-9	+20	+9	+100	0	+33
Woodworking	+32	+23	+6	-6	+19	+8	+100	0	+33
Metal	+26	+19	+6	-5	+16	+7	+100	0	+33
Textiles	+26	+11	+7	-4	+16	+4	+100	0	+33
Chemicals	+27	+14	+6	-5	+16	+4	+100	0	+33
Papermaking	+26	+16	+7	-5	+16	+6	+100	0	+33
Printing	+33	+18	+6	-5	+20	+6	+100	0	+33
Baking	+38	+14	+5	-5	+22	+4	+100	0	+33
Mining, hard-coal	+21	+13	+5	-6	+13	+4	+100	0	+33
Brewing	+31	+14	+7	-4	+19	+5	+100	0	+33

<sup>a</sup> Amplitude measures based on incomplete reference expansion, starting January 1924.

SOURCE: Appendix Table A-21.

For definition of conformity indexes see notes to Table A-20.

TABLE A-23

Amplitudes and Conformity Indexes of Earnings, Reference Cycles, Annual Series,  
1871-1913 and 1924-1932

	AVERAGE ANNUAL CHANGE OF CYCLE RELATIVES					
	(1)	(2)	(3)	(4)	(5)	(6)
	<i>Expansion<sup>a</sup></i> 1870-1872	<i>Contraction</i> 1872-1878	<i>Expansion</i> 1878-1882	<i>Contraction</i> 1882-1886	<i>Expansion</i> 1886-1890	<i>Contraction</i> 1890-1894
Number of years	1 <sup>a</sup>	6	4	4	4	4
Hourly earnings Comprehensive series	...	...	...	...	...	...
Daily earnings Krupp, Essen	+10	-1	+3	+1	+2	+1
Weekly earnings Comprehensive series	+10	-0 <sup>t</sup>	0	+1	+3	0
Miners' shift earnings Hewers and haulers						
Hard coal						
Upper Silesia	...	...	...	...	...	+1 <sup>d</sup>
Lower Silesia	...	...	...	...	...	-1 <sup>d</sup>
Dortmund	+43 <sup>e</sup>	-9 <sup>e</sup>	+3 <sup>e</sup>	-1 <sup>e</sup>	+9 <sup>e</sup>	-2
Saar District <sup>e</sup>	...	...	...	...	...	-3 <sup>d</sup>
Aachen District	...	...	...	...	...	-2 <sup>d</sup>
Lignite, Halle	...	...	...	...	...	-0 <sup>dt</sup>
Salt, Halle	...	...	...	...	...	+1 <sup>d</sup>
Ore						
Halle	...	...	...	...	...	-4 <sup>d</sup>
Upper Harz	...	...	...	...	...	+0 <sup>dt</sup>
Siegen-Nassau	...	...	...	...	...	-3 <sup>d</sup>
Ten centers	...	...	...	...	...	-1 <sup>d</sup>
Surface workers						
Hard coal						
Dortmund	...	...	+0 <sup>et</sup>	+0 <sup>et</sup>	+5 <sup>e</sup>	-1
Ten centers	...	...	...	...	...	-1 <sup>d</sup>

(continued on next page)

TABLE A-23, *continued*

	AVERAGE ANNUAL CHANGE OF CYCLE RELATIVES					
	(7)	(8)	(9)	(10)	(11)	(12)
	<i>Expansion</i> 1894-1900	<i>Contraction</i> 1900-1902	<i>Expansion</i> 1902-1903	<i>Contraction</i> 1903-1904	<i>Expansion</i> 1904-1907	<i>Contraction</i> 1907-1908
Number of years	6	2	1	1	3	1
Hourly earnings						
Comprehensive series	...	...	...	...	...	...
Daily earnings						
Krupp, Essen	+3	-3	+1	+8	+3	0
Weekly earnings						
Comprehensive series	+2	-1	+1	+3	+5	-1
Miners' shift earnings						
Hewers and haulers						
Hard coal						
Upper Silesia	+4	-4	+1	+1	+5	+1
Lower Silesia	+4	-6	+1	+2	+6	+1
Dortmund	+5	-7	+2	+3	+7	-2
Saar District <sup>o</sup>	+2	-1	+1	+2	+3	+1
Aachen District	+6	-3	+1	+3	+6	-2
Lignite, Halle	+4	-3	+1	+2	+5	-2
Salt, Halle	+2	-2	+1	+1	+4	-2
Ore						
Halle	+5	-10	+4	+6	+4	-6
Upper Harz	+1	+2	+0 <sup>t</sup>	+2	+6	+7
Siegen-Nassau	+8	-12	+4	+0 <sup>t</sup>	+11	-14
Ten centers	+4	-5	+1	+3	+6	-2
Surface workers						
Hard coal						
Dortmund	+3	-1	+1	+2	+5	+1
Ten centers	+3	-2	+1	+2	+4	0

(continued on next page)

TABLE A-23, *continued*

	AVERAGE ANNUAL CHANGE OF CYCLE RELATIVES				
	(13) <i>Expansion<sup>b</sup></i> <i>1908-1913</i>	(14) <i>Expansion<sup>g</sup></i> <i>1923-1925</i>	(15) <i>Contraction<sup>g</sup></i> <i>1925-1926</i>	(16) <i>Expansion</i> <i>1926-1929</i>	(17) <i>Contraction</i> <i>1929-1932</i>
Number of years	5	1 <sup>d</sup>	1	3	3
Hourly earnings					
Comprehensive series	...	+25	+7	+8	-9
Daily earnings					
Krupp, Essen	+2 <sup>e</sup>	...	...	...	...
Weekly earnings					
Comprehensive series	+3 <sup>e</sup>	+29	+4	+9	-13
Miners' shift earnings					
Hewers and haulers					
Hard coal					
Upper Silesia	+3	+13	+3	+7	-9
Lower Silesia	+2	+14	+10	+6	-7
Dortmund	+2	+13	+8	+5	-8
Saar District <sup>g</sup>	+2	...	...	...	...
Aachen District	+3	+15	+7	+5	-7
Lignite, Halle	+1	+20	+7	+6	-9
Salt, Halle	+3	+20	+7	+9	-6
Ore					
Halle	+5	+29	+14	+12	-11
Upper Harz	+5	...	+9	+5	-4
Siegen-Nassau	+3	+15	+1	+6	-8
Ten centers	+3	+15	+7	+7	-8
Surface workers					
Hard coal					
Dortmund	+2 <sup>e</sup>	+16	+10	+6	-7
Ten centers	+2	+16	+8	+7	-7

(continued on next page)

TABLE A-23, *continued*

	AVERAGE ANNUAL CHANGE OF CYCLE RELATIVES		INDEXES OF CONFORMITY		
	(18)	(19)	(20)	(21)	(22)
	<i>Expansions</i>	<i>Contractions</i>	<i>Expansions</i>	<i>Contractions</i>	<i>Full Cycles</i>
	<i>(average)</i>				
Number of years	...	...	...	...	...
Hourly earnings					
Comprehensive series	+16	-1	+100	0	+100
Daily earnings					
Krupp, Essen	+4	+1	+100	-17	+67
Weekly earnings					
Comprehensive series	+7	-1	+89	+12	+73
Miners' shift earnings					
Hewers and haulers					
Hard coal					
Upper Silesia	+6	-1	+100	-33	+90
Lower Silesia	+6	0	+100	0	+60
Dortmund	+6	-1	+100	+50	+73
Saar District <sup>e</sup>	+2	0	+100	0	+71
Aachen District	+6	-1	+100	+33	+60
Lignite, Halle	+6	-1	+100	+33	+80
Salt, Halle	+6	0	+100	0	+80
Ore					
Halle	+10	-2	+100	+33	+60
Upper Harz	+3	+3	+100	-67	-33
Siegen-Nassau	+8	-6	+100	+33	+100
Ten centers	+6	-1	+100	+33	+80
Surface workers					
Hard coal					
Dortmund	+6	+1	+100	-14	+62
Ten centers	+6	0	+100	+17	+80

<sup>a</sup> Measures based on incomplete expansion; data start in 1871.

<sup>b</sup> Based on inverted cycle, 1907-08-13.

<sup>c</sup> Not included in average.

<sup>d</sup> Based on inverted cycle, 1890-94-1900.

<sup>e</sup> Excluded from average (cols. 18 and 19). Amplitude averages based on all available cycles are:

	<i>Expansions</i>	<i>Contractions</i>
Dortmund; Hewers, haulers (excl. 1908-13 expansion)	+11	-2
Dortmund; Surface workers (excl. 1908-13 expansion)	+5	+1

<sup>f</sup> Less than 0.5 of 1 percent.

<sup>g</sup> Based on incomplete cycle; data not available before 1924.

SOURCE: Appendix Tables A-2, and A-6 to A-8.

For definition of conformity indexes see notes to Table A-20.



TABLE A-24  
Shift Earnings of Miners, Selected Centers, by Quarters  
1889-1914 and 1924-1932  
(marks)

<i>Year and Quarter</i>	<i>Hard Coal, Dortmund</i>		<i>Hard Coal, Upper Silesia</i>	<i>Hard Coal, Saarbrücken</i>	<i>Lignite, Halle</i>	<i>Copper Ore, Halle</i>
	<i>Hewers, Haulers</i>	<i>Surface Workers</i>	<i>Hewers, Haulers</i>	<i>Hewers, Haulers</i>	<i>Hewers, Haulers</i>	<i>Hewers, Haulers</i>
1889						
I	3.06	2.40	2.06	3.06	2.50	2.89
II	3.31	2.54	2.24	3.30	2.50	2.89
III	3.57	2.63	2.43	3.64	2.70	2.92
IV	3.69	2.69	2.46	3.69	2.70	3.22
1890						
I	4.00	2.79	2.62	3.89	2.65	3.27
II	4.06	2.83	2.71	4.06	2.91	3.08
III	3.94	2.82	2.75	4.14	2.91	3.08
IV	3.93	2.82	2.77	4.24	2.89	3.17
1891						
I	4.00	2.82	2.76	4.26	2.82	3.12
II	4.05	2.84	2.84	4.28	2.89	3.35
III	4.06	2.87	2.87	4.16	2.94	3.39
IV	4.23	2.85	2.86	4.16	2.92	3.38
1892						
I	4.08	2.80	2.80	4.22	2.85	3.47
II	3.92	2.78	2.78	4.32	2.89	3.17
III	3.80	2.76	2.81	4.15	2.91	3.05
IV	3.71	2.71	2.77	4.02	2.89	2.90
1893						
I	3.76	2.67	2.78	3.88	2.80	2.72
II	3.71	2.71	2.77	3.86	2.84	2.85
III	3.69	2.71	2.79	3.82	2.86	2.72
IV	3.72	2.71	2.64	3.79	2.84	2.67
1894						
I	3.72	2.71	2.74	3.70	2.74	2.65
II	3.70	2.72	2.79	3.69	2.79	2.57
III	3.75	2.74	2.82	3.66	2.80	2.59
IV	3.75	2.72	2.80	3.65	2.84	2.62
1895						
I	3.72	2.72	2.78	3.69	2.81	2.61
II	3.72	2.73	2.78	3.67	2.84	2.53
III	3.75	2.74	2.80	3.69	2.91	2.79
IV	3.79	2.75	2.79	3.74	2.87	2.93
1896						
I	3.82	2.77	2.78	3.76	2.81	2.86
II	3.85	2.81	2.81	3.70	2.92	2.78
III	3.91	2.81	2.85	3.72	2.98	3.00
IV	4.01	2.84	2.82	3.73	3.02	3.16

(continued on next page)

TABLE A-24, *continued*

<i>Year and Quarter</i>	<i>Hard Coal, Dortmund</i>		<i>Hard Coal, Upper Silesia</i>	<i>Hard Coal, Saarbrücken</i>	<i>Lignite, Halle</i>	<i>Copper Ore, Halle</i>
	<i>Hewers, Haulers</i>	<i>Surface Workers</i>	<i>Hewers, Haulers</i>	<i>Hewers, Haulers</i>	<i>Hewers, Haulers</i>	<i>Hewers, Haulers</i>
1897						
I	4.14	2.88	2.82	3.77	2.93	3.16
II	4.26	2.91	2.85	3.75	3.05	2.93
III	4.41	2.99	2.95	3.81	3.10	2.99
IV	4.46	3.00	3.01	3.87	3.13	3.27
1898						
I	4.44	2.99	3.03	3.91	3.03	3.10
II	4.49	3.01	3.03	3.85	3.11	3.07
III	4.60	3.06	3.12	3.88	3.21	3.32
IV	4.67	3.07	3.18	3.95	3.23	3.38
1899						
I	4.72	3.12	3.17	3.95	3.18	3.30
II	4.78	3.15	3.21	3.97	3.28	3.36
III	4.90	3.21	3.30	4.00	3.38	3.45
IV	4.95	3.24	3.39	4.04	3.46	3.51
1900						
I	5.04	3.26	3.50	4.09	3.41	3.48
II	5.14	3.32	3.54	4.08	3.56	3.53
III	5.25	3.35	3.62	4.11	3.67	3.59
IV	5.27	3.35	3.62	4.16	3.67	3.81
1901						
I	5.08	3.34	3.57	4.13	3.55	3.50
II	5.02	3.33	3.52	4.05	3.58	3.44
III	4.97	3.32	3.54	4.08	3.61	3.54
IV	4.84	3.31	3.46	4.08	3.52	3.52
1902						
I	4.66	3.26	3.36	4.07	3.24	3.05
II	4.52	3.22	3.34	4.06	3.40	3.07
III	4.55	3.24	3.36	4.07	3.42	2.91
IV	4.54	3.26	3.34	4.08	3.43	2.90
1903						
I	4.55	3.25	3.35	4.09	3.30	2.87
II	4.58	3.29	3.32	4.08	3.40	3.67
III	4.70	3.31	3.41	4.12	3.47	3.11
IV	4.74	3.32	3.40	4.16	3.49	3.29
1904						
I	4.76	3.33	3.37	4.19	3.39	3.21
II	4.76	3.35	3.38	4.18	3.49	3.25
III	4.79	3.37	3.42	4.24	3.56	3.31
IV	4.79	3.37	3.39	4.25	3.57	3.27
1905						
I	4.77	3.41	3.48	4.31	3.52	3.46
II	4.81	3.41	3.47	4.25	3.60	3.38
III	4.86	3.43	3.53	4.29	3.66	3.39
IV	4.88	3.45	3.53	4.32	3.84	3.41

(continued on next page)

TABLE A-24, *continued*

<i>Year and Quarter</i>	<i>Hard Coal, Dortmund</i>		<i>Hard Coal, Upper Silesia</i>	<i>Hard Coal, Saarbrücken</i>	<i>Lignite, Halle</i>	<i>Copper Ore, Halle</i>
	<i>Hewers, Haulers</i>	<i>Surface Workers</i>	<i>Hewers, Haulers</i>	<i>Hewers, Haulers</i>	<i>Hewers, Haulers</i>	<i>Hewers, Haulers</i>
1906						
I	5.02	3.50	3.59	4.37	3.72	3.55
II	5.14	3.57	3.59	4.35	3.78	3.56
III	5.38	3.63	3.74	4.39	3.96	3.68
IV	5.60	3.72	3.81	4.49	4.07	3.76
1907						
I	5.74	3.77	3.87	4.54	3.88	3.78
II	5.90	3.86	3.95	4.49	4.10	3.72
III	6.09	3.90	4.09	4.60	4.18	3.74
IV	6.14	3.96	4.10	4.65	4.24	3.73
1908						
I	5.94	3.89	4.04	4.65	4.02	3.53
II	5.85	3.93	4.04	4.61	4.03	3.39
III	5.89	3.90	4.09	4.62	4.09	3.56
IV	5.77	3.92	4.02	4.64	4.01	3.56
1909						
I	5.42	3.83	3.96	4.59	3.87	3.57
II	5.28	3.81	3.94	4.48	3.98	3.54
III	5.31	3.83	4.01	4.45	4.03	3.49
IV	5.30	3.83	3.97	4.50	4.00	3.64
1910						
I	5.29	3.84	3.90	4.46	3.87	3.70
II	5.33	3.87	3.90	4.47	3.96	3.66
III	5.40	3.91	3.95	4.49	4.07	3.67
IV	5.45	3.91	3.91	4.57	4.16	3.77
1911						
I	5.49	3.92	3.91	4.60	4.05	3.73
II	5.51	3.96	3.96	4.52	4.17	3.75
III	5.58	3.99	4.04	4.59	4.21	3.91
IV	5.63	4.02	4.01	4.69	4.21	4.05
1912						
I	5.74	4.04	4.03	4.73	4.09	3.99
II	5.97	4.16	4.22	4.79	4.16	3.95
III	6.12	4.17	4.29	4.82	4.21	4.04
IV	6.21	4.23	4.32	4.95	4.34	4.08
1913						
I	6.35	4.28	4.61 <sup>a</sup>	5.20 <sup>a</sup>	4.29 <sup>a</sup>	4.08 <sup>a</sup>
II	6.50	4.33	4.63	5.18	4.29	4.06
III	6.56	4.36	4.79	5.16	4.33	4.08
IV	6.47	4.40	4.78	5.20	4.32	4.16
1914						
I	6.25	...	4.72	5.57	4.25	4.13
II	6.19	...	4.72	5.08	4.26	4.02
III	6.08	...	4.57	4.84	4.26	3.97
IV	6.13	...	4.51	4.94	4.31	4.12

(continued on next page)

TABLE A-24, continued

Year and Quarter	Hard Coal, Dortmund		Hard Coal, Upper Silesia	Hard Coal, Saarbrücken	Lignite, Halle	Copper Ore, Halle
	Hewers, Haulers	Surface Workers	Hewers, Haulers	Hewers, Haulers	Hewers, Haulers	Hewers, Haulers
1924						
I	6.02	4.67	5.41	...	5.06	3.48
II	6.77	5.29	5.51	...	5.45	3.66
III	7.39	5.44	5.63	...	5.54	3.97
IV	7.51	5.64	5.89	...	5.68	4.31
1925						
I	7.75	5.89	6.09	...	5.96	4.61
II	7.91	6.18	6.42	...	6.45	5.00
III	8.03	6.19	6.53	...	6.80	5.51
IV	8.27	6.51	6.54	...	7.18	5.67
1926						
I	8.45	6.64	6.53	...	6.70	5.59
II	8.48	6.69	6.50	...	6.68	5.75
III	8.62	6.74	6.56	...	6.60	5.98
IV	8.87	6.96	6.73	...	6.81	6.17
1927						
I	8.90	6.94	6.86	...	6.84	6.40
II	9.10	7.23	6.96	...	6.90	6.44
III	9.34	7.27	7.18	...	6.96	6.80
IV	9.42	7.34	7.26	...	7.37	7.07
1928						
I	9.41	7.31	7.26	...	7.54	7.29
II	9.70	7.76	7.45	...	7.71	7.42
III	9.92	7.87	7.77	...	7.76	7.86
IV	9.94	7.91	7.88	...	8.04	8.12
1929						
I	9.95	7.92	7.97	...	8.00	8.18
II	10.04	8.04	8.09	...	8.13	8.67
III	10.12	8.03	8.24	...	8.26	8.59
IV	10.20	8.09	8.27	...	8.37	8.68
1930						
I	10.19	8.04	8.19	...	8.38	8.76
II	10.18	8.13	8.12	...	8.24	8.51
III	10.16	8.04	8.12	...	8.20	7.37
IV	10.14	8.09	8.03	...	8.13	7.63
1931						
I	9.46	7.59	7.49	...	7.86	7.24
II	9.45	7.67	7.47	...	7.55	7.15
III	9.39	7.55	7.41	...	7.66	7.18
IV	8.76	7.08	6.96	...	7.63	6.55
1932						
I	7.90	6.43	6.22	...	6.20	5.99
II	7.88	6.44	6.25	...	6.14	6.04
III	7.87	6.41	6.22	...	6.31	6.08
IV	8.04	6.40	6.17	...	6.30	6.01

\* 1913 and 1914 spliced to old series in 1912.

SOURCE: *Zeitschrift für das Berg-, Hütten- und Salinenwesen, passim*. Quarterly data may not average exactly to annual figures shown on Appendix Tables A-6 and A-7.

TABLE A-25

Average Wage Rates and Earnings of German Coal Miners, by Quarters,  
1924-1938

Year and Quarter	HEWERS AND HAULERS				SURFACE WORKERS			
	Hard Coal		Soft Coal		Hard Coal		Soft Coal	
	Rates per Hour (pfennigs) (1)	Earnings per Shift (marks) (2)	Rates per Hour (pfennigs) (3)	Earnings per Shift (marks) (4)	Rates per Hour (pfennigs) (5)	Earnings per Shift (marks) (6)	Rates per Hour (pfennigs) (7)	Earnings per Shift (marks) (8)
1924								
I	69	5.89	...	5.31	46.5	4.26	...	4.22
II	70	6.63	...	5.62	42.6	4.78	...	4.34
III	81	7.20	...	5.57	48.9	4.86	...	4.39
IV	83	7.35	...	5.88	49.9	5.04	...	4.63
1925								
I	88.0	7.59	...	6.18	51.9	5.25	...	4.89
II	91.9	7.78	...	6.62	53.3	5.53	...	5.23
III	93.0	7.91	...	7.11	53.7	5.54	...	5.57
IV	97.3	8.11	...	7.40	55.5	5.78	...	5.75
1926								
I	99.4	8.25	...	7.20	56.4	5.86	...	5.67
II	99.4	8.28	...	7.22	56.4	5.89	...	5.77
III	100.5	8.44	...	7.22	57.0	5.91	...	5.77
IV	103.4	8.69	...	7.46	58.8	6.13	...	5.98
1927								
I	103.6	8.75	...	7.52	59.5	6.15	...	5.97
II	107.5	8.95	...	7.59	65.1	6.37	...	6.15
III	109.5	9.18	...	7.76	68.0	6.43	...	6.18
IV	109.5	9.25	...	8.31	68.0	6.49	...	6.66
1928								
I	110.1	9.24	83.5	8.55	68.4	6.47	71.7	6.68
II	115.2	9.52	83.5	8.63	71.9	6.86	71.7	6.77
III	118.0	9.71	83.9	8.67	73.8	6.96	72.3	6.82
IV	118.1	9.73	87.5	8.96	73.9	7.00	75.6	7.13
1929								
I	118.2	9.75	87.5	8.89	73.9	7.01	75.6	7.08
II	119.8	9.84	87.5	9.08	75.1	7.10	75.6	7.13
III	120.7	9.93	87.5	9.14	75.7	7.11	75.6	7.17
IV	120.8	10.00	89.2	9.14	75.7	7.18	77.7	7.26
1930								
I	120.8	9.97	90.7	9.14	75.7	7.14	78.9	7.22
II	120.8	9.94	90.7	9.14	75.7	7.23	78.9	7.32
III	120.8	9.90	90.7	9.06	75.7	7.14	78.9	7.23
IV	120.8	9.86	91.6	8.83	75.7	7.16	79.7	7.27
1931								
I	114.2	9.26	92.7	8.71	71.8	6.73	80.6	7.28
II	113.9	9.19	91.1	8.63	71.5	6.76	79.4	7.07
III	113.4	9.14	87.9	8.45	71.2	6.66	77.0	6.73
IV	106.1	8.52	87.4	8.35	66.7	6.25	76.3	6.56
1932								
I	95.5	7.68	75.2	7.10	60.0	5.66	66.0	5.77
II	95.5	7.66	75.2	7.18	60.0	5.67	66.0	5.80
III	95.5	7.65	75.2	7.21	59.9	5.65	66.0	5.71
IV	95.5	7.66	75.2	7.12	59.9	5.65	66.0	5.71

(continued on next page)

TABLE A-25, continued

Year and Quarter	HEWERS AND HAULERS				SURFACE WORKERS			
	Hard Coal		Soft Coal		Hard Coal		Soft Coal	
	Rates per Hour (pfennigs) (1)	Earnings per Shift (marks) (2)	Rates per Hour (pfennigs) (3)	Earnings per Shift (marks) (4)	Rates per Hour (pfennigs) (5)	Earnings per Shift (marks) (6)	Rates per Hour (pfennigs) (7)	Earnings per Shift (marks) (8)
1933								
I	95.5	7.68	75.2	7.07	59.9	5.65	66.0	5.70
II	95.5	7.71	75.2	7.25	59.9	5.72	66.0	5.79
III	95.5	7.72	75.2	7.21	59.9	5.65	66.0	...
IV	95.5	7.76	75.2	7.19	59.9	5.69	66.0	...
1934								
I	95.5	7.79	75.2	7.21	59.9	5.65	66.0	...
II	95.5	7.81	75.2	7.42	59.9	5.74	66.0	...
III	95.5	7.83	75.2	7.40	59.9	5.69	66.0	...
IV	95.5	7.87	75.2	7.35	59.9	5.71	66.0	...
1935								
I	95.5	7.86	75.2	7.33	59.9	5.67	66.0	...
II	95.5	7.87	75.2	7.59	59.9	5.77	66.0	...
III	95.5	7.87	75.2	7.59	59.9	5.72	66.0	...
IV	95.5	7.87	75.2	7.49	59.9	5.75	66.0	...
1936								
I	95.5	7.88	75.2	7.80	59.9	5.69	66.0	...
II	95.5	7.89	75.2	8.12	59.9	5.79	66.0	...
III	95.5	7.89	75.2	8.15	59.9	5.69	66.0	...
IV	95.5	7.95	75.2	7.99	59.9	5.74	66.0	...
1937								
I	95.5	8.01	75.2	7.98	59.9	5.72	66.0	...
II	95.5	8.05	75.2	8.32	59.9	5.76	66.0	...
III	95.5	8.06	75.2	8.34	59.9	5.69	66.0	...
IV	95.5	8.16	75.2	8.23	59.9	5.71	66.0	...
1938								
I	95.5	8.19	75.2	8.09	59.9	5.65	66.0	...
II	95.5	8.23	75.2	8.61	59.9	5.78	66.0	...
III	95.5	8.23	75.2	8.66	59.9	5.69	66.0	...
IV	95.5	8.34	75.2	8.48	59.9	5.73	66.0	...

SOURCE: Rates, *Wirtschaft und Statistik, passim*. Earnings, 1924-28, *Jahrbuch 1934*, p. 272; 1929-38, *Wirtschaft und Statistik, passim*, and *Reichsarbeitsblatt, passim*.

TABLE A-26

Amplitudes and Conformity Indexes of Miners' Shift Earnings, Reference Cycles, Quarterly Series, 1890-1913 and 1924-1932

		AVERAGE ANNUAL CHANGE OF CYCLE RELATIVES								
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
		Contraction <sup>a</sup> 1890 <sup>I</sup> -95 <sup>I</sup>	Expansion 1895 <sup>I</sup> -1900 <sup>II</sup>	Contraction 1900 <sup>II</sup> -02 <sup>I</sup>	Expansion 1902 <sup>I</sup> -03 <sup>III</sup>	Contraction 1903 <sup>III</sup> -05 <sup>I</sup>	Expansion 1905 <sup>I</sup> -07 <sup>II</sup>	Contraction 1907 <sup>II</sup> -08 <sup>V</sup>	Expansion 1908 <sup>V</sup> -13 <sup>I</sup>	Contraction 1913 <sup>I</sup> -14 <sup>III</sup>
Number of years	5		5.25	1.75	1.5	1.5	2.25	1.5	4.25	1.5
<i>Underground Miners</i>										
Hard coal, Upper Silesia	+1	+5	-3	+1	+1	+1	+5	+1	+3	-1
Hard coal, Dortmund	-1	+6	-6	+1	+1	+1	+9	-2	+2	-3
Hard coal, Saarbrücken	-1	+2	-0.2	+1	+3	+2	+2	+2	+3	-5
Lignite, Halle	+1	+4	-6	+4	+1	+1	+7	-2	+2	-0.5
Copper ore, Halle	-4	+5	-9	+1	+7	+3	+3	-3	+3	-2
<i>Surface Workers</i>										
Hard coal, Dortmund	-0.5	+4	-1	+1	+2	+5	+5	+1	+2 <sup>e</sup>	...

TABLE A-26, continued

	AVERAGE ANNUAL CHANGE OF CYCLE RELATIVES							INDEXES OF CONFORMITY		
	(10) Expansion <sup>b</sup> 1923 <sup>v</sup> -25 <sup>ii</sup>	(11) Contraction <sup>b</sup> 1925 <sup>ii</sup> -26 <sup>ii</sup>	(12) Expansion 1926 <sup>ii</sup> -29 <sup>ii</sup>	(13) Contraction 1929 <sup>ii</sup> -32 <sup>iii</sup>	(14) Expansions (average)	(15) Contractions (average)	(16) Expansions	(17) Contractions	(18) Full Cycles	
Number of years	1.38	1	3	3.25						
<i>Underground Miners</i>										
Hard coal, Upper Silesia	+12	+1	+7	-8	+6	-1	+100	-14	+82	
Hard coal, Dortmund	+18	+8	+6	-7	+7	-1	+100	+43	+64	
Hard coal, Saarbrücken	...	...	...	...	+2	0	+100	+20	+25	
Lignite, Halle	+17	+4	+6	-7	+7	-1	+100	+14	+100	
Copper ore, Halle	+23	+16	+13	-11	+8	-1	+100	+43	+64	
<i>Surface Workers</i>										
Hard coal, Dortmund	+19	+9	+6	-7	+6	+1	+100	0	+60	

Roman numerals after dates denote quarters.

For definition of conformity indexes see notes to Table A-20.

<sup>a</sup> Based on inverted cycle.

<sup>b</sup> Based on incomplete cycle; data start in first quarter of 1924.

<sup>c</sup> Based on inverted cycle 1907-1913; data not available after fourth quarter of 1913.

SOURCE: Appendix Table A-24.





TABLE A-28

Employment Indicators, Adjusted for Seasonal Variation, by Months,  
1925-1934

Year and Month	Employed Members of Sickness Insurance Associations		Employment, Ratio to Capacity <sup>a</sup>	Unemployment	
	Series I (Dec.1924=100) (1)	Series II (millions) (2)	(percent) (3)	At Employment Exchanges (thousands) (4)	Trade Union Membership (percent) (5)
1925 Jan.	107.8	...	...	552	6.0
Feb.	109.2	...	...	522	5.5
Mar.	105.9	...	...	531	5.0
Apr.	105.3	...	...	523	4.4
May	105.5	...	...	479	4.1
June	104.5	...	...	501	4.2
July	103.6	...	...	527	4.6
Aug.	104.3	...	...	629	5.3
Sept.	104.5	...	...	689	5.6
Oct.	103.3	...	...	795	7.1
Nov.	101.7	...	...	1,049	11.1
Dec.	100.5	...	...	1,370	14.9
Average	104.7	...	...	681	6.5
1926 Jan.	99.6	...	...	1,532	16.7
Feb.	99.6	...	...	1,621	16.7
Mar.	96.4	...	...	1,839	18.4
Apr.	95.9	...	...	2,113	19.2
May	95.1	...	...	2,322	20.8
June	94.3	...	...	2,601	21.8
July	94.5	...	...	2,603	22.1
Aug.	96.0	...	...	2,618	20.6
Sept.	96.6	...	...	2,440	19.0
Oct.	97.4	...	...	2,136	17.3
Nov.	99.3	...	...	1,880	14.8
Dec.	100.5	...	...	1,702	12.8
Average	97.1	...	...	2,117	18.4
1927 Jan.	101.4	...	...	1,557	9.4
Feb.	102.9	...	...	1,548	9.2
Mar.	104.4	...	...	1,400	8.5
Apr.	104.3	...	...	1,462	9.5
May	105.2	...	...	1,348	9.7
June	105.2	...	...	1,326	10.0

(continued on next page)

TABLE A-28, continued

Year and Month	Employed Members of Sickness Insurance Associations		Employment, Ratio to Capacity <sup>a</sup>	Unemployment	
	Series I (Dec.1924=100) (1)	Series II (millions) (2)	(percent) (3)	At Employment Exchanges (thousands) (4)	Trade Union Membership (percent) (5)
1927 July	105.8	...	...	1,204	9.6
Aug.	107.3	...	...	1,152	8.5
Sept.	107.7	...	...	1,058	8.1
Oct.	108.1	...	...	984	7.4
Nov.	107.6	...	...	1,176	8.1
Dec.	108.3	...	...	1,371	7.8
Average	105.7	...	...	1,299	8.8
1928 Jan.	111.2	17.47	...	1,235	7.6
Feb.	112.0	17.56	...	1,227	7.3
Mar.	109.1	17.21	...	1,220	7.5
Apr.	108.4	17.47	...	1,234	7.2
May	108.5	17.45	...	1,236	7.6
June	108.0	17.46	...	1,344	8.1
July	108.1	17.28	72.3	1,335	8.6
Aug.	109.1	17.58	72.4	1,416	8.8
Sept.	108.8	17.67	72.1	1,411	9.1
Oct.	108.1	17.57	70.7	1,455	9.6
Nov.	107.5	17.40	68.6	1,652	10.0
Dec.	107.4	17.36	69.9	1,812	11.9
Average	108.8	17.46	...	1,381	8.6
1929 Jan.	106.1	17.04	71.4	1,966	12.2
Feb.	103.4	16.63	69.5	2,179	14.5
Mar.	105.4	17.19	71.0	2,036	13.3
Apr.	108.5	17.88	71.6	1,712	11.7
May	108.9	17.95	72.3	1,500	11.7
June	108.4	17.92	71.0	1,575	12.0
July	108.2	17.83	71.1	1,626	13.0
Aug.	109.0	18.00	71.0	1,742	13.1
Sept.	108.4	17.89	70.3	1,814	14.5
Oct.	107.6	17.70	68.6	1,946	15.6
Nov.	107.0	17.53	68.8	2,143	14.7
Dec.	107.2	17.41	68.2	2,281	13.3
Average	107.3	17.58	70.4	1,877	13.3

(continued on next page)

TABLE A-28, *continued*

<i>Year and Month</i>	<i>Employed Members of Sickness Insurance Associations</i>		<i>Employment, Ratio to Capacity<sup>a</sup></i>	<i>Unemployment</i>	
	<i>Series I (Dec. 1924 = 100)</i> (1)	<i>Series II (millions)</i> (2)	(percent) (3)	<i>At Employment Exchanges (thousands)</i> (4)	<i>Trade Union Membership (percent)</i> (5)
1930 Jan.	107.5	17.38	69.1	2,219	19.1
Feb.	106.3	17.13	67.8	2,404	20.4
Mar.	103.9	16.79	65.9	2,493	20.1
Apr.	102.7	16.62	64.0	2,787	20.5
May	102.5	16.62	62.6	2,928	21.4
June	101.2	16.38	61.7	3,301	22.3
July	100.3	16.19	60.1	3,591	23.0
Aug.	100.4	16.20	58.9	3,949	23.3
Sept.	99.8	16.06	58.1	4,115	24.2
Oct.	98.2	15.76	56.6	4,065	24.8
Nov.	97.4	15.53	55.8	3,894	26.0
Dec.	97.7	15.39	55.3	3,507	28.1
Average	101.5	16.34	61.3	3,271	22.8
1931 Jan.	96.2	15.02	53.6	4,072	29.7
Feb.	95.3	14.80	53.5	4,361	30.0
Mar.	93.3	14.53	52.7	4,393	31.1
Apr.	93.7	14.66	52.7	4,358	32.1
May	94.0	14.76	52.9	4,266	32.9
June	93.4	14.66	52.7	4,162	33.7
July	92.3	14.44	51.6	4,433	34.8
Aug.	91.4	14.19	49.9	4,683	36.1
Sept.	90.2	13.95	48.6	4,839	37.6
Oct.	88.3	13.57	47.5	5,137	38.5
Nov.	87.4	13.30	47.0	5,060	38.9
Dec.	87.4	13.09	45.6	5,248	37.3
Average	91.9	14.25	50.7	4,584	34.4
1932 Jan.	...	12.99	44.3	5,035	37.9
Feb.	...	12.83	43.8	5,375	38.3
Mar.	...	12.34	42.5	5,587	41.3
Apr.	...	12.42	41.7	5,739	44.3
May	...	12.37	41.1	5,877	47.6
June	...	12.29	41.0	5,764	49.0

(continued on next page)

## Notes to Table A-28

\* This is a measure presented by the IKF. Employment capacity is estimated on the basis of theoretical employment opportunities offered by existing equipment, and of actual peak employment figures.

SOURCE, by column:

- (1) *Reichsarbeitsblatt* 1928 II, pp. 135 ff., and *passim*.
- (2) *Reichsarbeitsblatt* 1932, Supplement No. 10, p. 6 ff., and *passim*.
- (3) *IKF Handbuch* 1936, p. 17.
- (4) *IKF Handbuch* 1936, p. 16.
- (5) *Reichsarbeitsblatt*, *passim*.

Data on unemployed registered at employment exchanges (col. 4) are available for 1924 in *IKF Handbuch* 1933, p. 15. The seasonally adjusted data are (in thousands):

Jan.	1,314	July	982
Feb.	1,152	Aug.	1,079
Mar.	905	Sept.	1,025
Apr.	745	Oct.	838
May	643	Nov.	701
June	803	Dec.	574

All series adjusted for seasonal variation. Averages of adjusted figures are not necessarily equal to annual data given elsewhere.

TABLE A-28, *continued*

<i>Year and Month</i>	<i>Employed Members of Sickness Insurance Associations</i>		<i>Employment, Ratio to Capacity<sup>a</sup></i>	<i>Unemployment</i>	
	<i>Series I (Dec.1924=100)</i> (1)	<i>Series II (millions)</i> (2)	(percent) (3)	<i>At Employment Exchanges (thousands)</i> (4)	<i>Trade Union Membership (percent)</i> (5)
1932 July	...	12.27	40.2	5,991	49.3
Aug.	...	12.39	40.1	5,804	47.3
Sept.	...	12.46	40.6	5,670	46.9
Oct.	...	12.54	41.7	5,677	45.2
Nov.	...	12.57	42.9	5,355	43.2
Dec.	...	12.61	43.0	5,345	39.9
Average	...	12.51	41.9	5,602	44.2
1933 Jan.	...	12.35	42.9	5,012	40.2
Feb.	...	12.40	42.9	5,264	...
Mar.	...	12.37	43.4	5,184	...
Apr.	...	12.57	43.8	5,331	...
May	...	12.80	44.6	5,304	...
June	...	12.80	45.6	5,113	...
July	...	12.92	45.9	4,960	...
Aug.	...	13.32	46.9	4,582	28.3
Sept.	...	13.51	48.3	4,277	24.0
Oct.	...	13.65	49.2	4,161	22.0
Nov.	...	13.88	50.7	3,715	20.3
Dec.	...	13.99	50.7	3,758	21.9
Average	...	13.05	46.2	4,722	...
1934 Jan.	...	14.54	53.0	3,144	22.1
Feb.	...	15.02	54.9	2,959	17.5
Mar.	...	15.14	56.1	2,591	15.1
Apr.	...	15.17	57.1	2,609	15.6
May	...	15.11	57.5	2,662	16.4
June	...	14.93	58.4	2,612	17.7
July	...	14.93	58.5	2,696	17.2
Aug.	...	15.11	59.2	2,664	16.3
Sept.	...	15.17	60.3	2,536	16.3
Oct.	...	15.18	60.8	2,520	...
Nov.	...	...	62.2	2,353	...
Dec.	...	...	63.0	2,412	...
Average	...	...	58.4	2,646	...

(notes on next page)

TABLE A-29.

Production, Prices, and Other Variables Related to Earnings of Dortmund Hard Coal Miners, 1871-1913 and 1924-1932

Year	PRODUCTION				PRICES				SHIFTS WORKED PER YEAR				EMPLOYMENT	
	Total		Per Man-shift		Per Worker		Total		Per Worker		Total		Per Worker	
	Reich (1913=100) (1)	Dortmund (1913=100) (2)	Dortmund (tons) (3)	Dortmund (tons) (4)	Rhineland (1913=100) (5)	Total (6)	Above Ground (1913=100) (7)	Below Ground (number) (8)	Above Ground (number) (9)	Below Ground (1913=100) (10)	Above Ground (1913=100) (11)			
1871	15.5	...	...	...	82	...	...	...	...	...	...	...	...	
1872	17.5	...	...	...	94	...	...	...	...	...	...	...	...	
1873	19.1	...	...	...	123	...	...	...	...	...	...	...	...	
1874	18.9	...	...	...	130	...	...	...	...	...	...	...	...	
1875	19.7	...	...	...	64	...	...	...	...	...	...	...	...	
1876	20.3	...	...	...	54	...	...	...	...	...	...	...	...	
1877	19.7	...	...	...	44	...	...	...	...	...	...	...	...	
1878	20.8	...	...	...	41	...	...	...	...	...	...	...	...	
1879	22.1	...	...	...	39	...	...	...	...	...	...	...	...	
1880	24.7	...	...	...	54	...	...	...	...	...	...	...	...	
1881	25.6	...	...	...	45	...	...	...	...	...	...	...	...	
1882	27.4	...	...	...	47	...	...	...	...	...	...	...	...	
1883	29.4	...	...	...	48	...	...	...	...	...	...	...	...	
1884	30.1	...	...	...	43	26.3	23.3	...	...	...	...	...	...	
1885	30.7	...	...	...	46	26.6	23.2	...	...	...	...	...	...	
1886	30.6	...	...	...	46	25.8	22.4	290	324	27.8	23.9	23.9	23.9	
1887	31.7	...	...	...	46	26.3	22.3	302	326	27.3	23.8	23.8	23.8	
1888	34.4	30.0	1.015	325	50	33.1	23.0	316	337	32.9	23.5	23.5	23.5	
1889	35.4	30.6	.981	302	70	34.6	24.9	301	333	36.0	25.8	25.8	25.8	

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TABLE A-29, continued

Year	PRODUCTION				PRICES				SHIFTS WORKED PER YEAR				EMPLOYMENT	
	Total	Per Man-shift		Per Worker	Total	Rhineland (1913=100)		Total	Per Worker		Total	Below Ground (1913=100)	Above Ground (1913=100)	
		Reich (1913=100)	Dortmund			Dortmund	Dortmund		Below Ground	Above Ground				Below Ground
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)				
1890	36.9	32.0	.935	286	88	36.9	297	333	39.0	28.8				
1891	38.8	33.8	.906	278	81	39.3	298	334	41.2	31.2				
1892	37.6	33.3	.895	267	70	34.9	289	325	37.7	32.5				
1893	38.9	34.8	.900	271	60	35.0	292	325	37.5	34.4				
1894	40.3	36.6	.900	274	66	36.6	295	327	38.8	35.8				
1895	41.7	37.2	.898	274	66	36.9	297	326	38.9	37.0				
1896	45.1	40.5	.908	286	68	40.1	308	333	40.8	38.8				
1897	47.9	43.7	.897	283	73	43.5	307	335	44.3	41.9				
1898	50.7	46.0	.873	274	74	47.0	304	337	48.2	44.9				
1899	53.4	49.3	.865	274	77	50.8	308	338	51.7	47.7				
1900	57.5	53.8	.851	271	84	55.4	309	339	56.3	53.2				
1901	57.1	52.7	.821	247	84	55.1	291	325	59.4	56.9				
1902	56.5	52.3	.828	245	79	54.6	288	322	59.3	57.3				
1903	61.3	58.4	.839	261	77	59.9	304	332	61.6	61.3				
1904	63.5	60.9	.848	258	77	61.8	296	333	65.2	64.5				
1905	63.8	59.0	.855	252	78	58.4	283	334	64.6	64.5				
1906	72.1	69.3	.885	284	84	67.8	315	348	67.3	68.3				
1907	75.3	72.4	.849	273	91	73.4	313	350	73.3	75.3				
1908	77.7	74.6	.820	254	92	77.5	301	341	80.6	82.9				
1909	77.3	74.7	.834	251	90	76.3	292	332	81.7	84.0				

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TABLE A-29, continued

Year	PRODUCTION			PRICES		SHIFTS WORKED PER YEAR				EMPLOYMENT		
	Total	Per Man-shift		Dortmund (1913=100) (2)	Dortmund (tons) (3)	Dortmund (tons) (4)	Rhineland (1913=100) (5)	Total		Per Worker		Above Ground (1913=100) (11)
		Dortmund (1913=100) (1)	Dortmund (tons) (3)					Dortmund (tons) (4)	Below Ground (1913=100) (6)	Above Ground (1913=100) (7)	Below Ground (number) (8)	
1910	79.5	78.4	.854	260	88	82.7	78.5	82.7	296	335	83.0	85.4
1911	83.4	82.4	.868	267	88	85.9	82.2	85.9	300	337	85.8	88.0
1912	92.0	90.5	.883	286	94	92.8	95.5	92.8	309	344	90.7	93.1
1913	100.0	100.0	.884	289	100	100.0	100.0	100.0	313	346	100.0	100.0
1924	84.4	82.4	.860	268	147	105.4	83.8	105.4	261	283	87.9	111.8
1925	94.2	91.2	.946	296	121	105.1	84.7	105.1	276	306	88.5	111.0
1926	103.2	98.2	1.114	356	121	92.2	79.9	92.2	285	311	80.9	96.5
1927	109.1	103.3	1.132	354	121	93.4	84.1	93.4	279	311	87.6	98.8
1928	107.2	100.3	1.191	369	131	87.9	78.2	87.9	273	309	82.5	93.4
1929	116.1	108.2	1.271	395	137	86.0	79.8	86.0	282	315	83.9	90.9
1930	101.3	93.9	1.353	419	136	75.1	64.5	75.1	259	298	68.0	80.2
1931	84.2	75.0	1.487	461	125	59.5	45.9	59.5	251	291	48.1	64.0
1932	74.4	64.2	1.625	507	115	49.0	35.7	49.0	243	282	37.2	52.5

SOURCE, by column:

(1) 1871-1913, *IKF Sonderheft* 31, p. 58. For 1924-1932, *Jahrbuch* 1925, p. 10; 1930, p. 104; 1933, p. 103; 1939-40, p. 165; *Handbuch* 1928-44, p. 279. Put on basis 1913=100 (post-Versailles territory).

(2) *Zeitschrift für das Berg-, Hütten- und Salinenwesen*, 1914, p. 43; 1928, p. ST 19; 1932, p. ST 6; 1935, p. ST 32. Index numbers 1924-32 based on production in Lower Rhine-Westphalia.

(3 and 4) *Zeitschrift für das Berg-, Hütten- und Salinenwesen*, 1914, p. 43; 1928, p. ST 71; 1932, p. ST 17; 1933, p. ST 17. Figures for 1924-32 our estimates, based on data in Lower Rhine-Westphalia.

(5) *IKF Sonderheft* 37, p. 63. Quotations are wholesale prices for "Essen Fettkohle" and "Rheinisch-Westfälische Fet-Förderkohle."

(6 to 11) *Zeitschrift für das Berg-, Hütten- und Salinenwesen, passim*. Employment figures refer to "full-time" workers. That is, part-shifts and extra shifts are reported in form of full-time equivalents. Put on basis 1913=100. Figures for 1931 and 1932 our estimates, based on data in Lower Rhine-Westphalia.

The mining district of Lower Rhine-Westphalia, on which the 1924-32 data in cols. 2 to 4 and 6 to 11 were based, covers almost the same territory as the district of Dortmund. In case of cols. 3 and 4, which show tonnages, the 1913 figures comparable to the later segment are 0.945 tons and 309 tons, respectively.

TABLE A-30

Average Hourly Wage Rates, Cost of Living, and Wholesale Prices, by Months, 1924-1939  
(1925=100)<sup>a</sup>

Year and Month	AVERAGE HOURLY WAGE RATES (1)	COST OF LIVING (2)	WHOLESALE PRICES									
			All Commodities (3)	Manufactures, Raw and Semifinished (4)	Manufactures, Finished (5)	Consumers' Goods (6)	Producers' Goods (7)	Sensitive Prices (8)	Free Prices (1926=100) (9)	Administered Prices (10)		
1924												
Jan.	70.5	91.9	99.2	106.7	103.5	106.6	98.4	89.5	...	...	...	...
Feb.	69.7	87.5	96.4	103.0	100.9	105.8	92.6	97.5	...	...	...	...
Mar.	68.9	88.7	97.0	103.6	100.8	106.0	92.1	108.9	...	...	...	...
Apr.	73.6	90.9	98.4	106.2	103.9	108.9	95.6	109.1	...	...	...	...
May	78.9	92.0	97.3	104.9	106.4	111.5	97.9	94.1	...	...	...	...
June	82.3	89.5	92.0	100.9	102.6	105.6	97.5	84.6	...	...	...	...
July	82.6	91.0	90.2	95.6	96.8	97.8	95.1	82.2	...	...	...	...
Aug.	83.0	91.2	93.7	95.9	95.6	96.7	93.8	92.0	...	...	...	...
Sept.	83.1	93.0	98.0	97.1	96.7	98.4	94.0	99.7	...	...	...	...
Oct.	84.5	96.8	99.9	95.9	96.9	99.4	92.7	101.4	...	...	...	...
Nov.	86.7	97.1	99.1	98.1	96.3	98.5	92.6	110.3	...	...	...	...
Dec.	89.1	97.2	100.5	100.6	95.7	97.4	92.9	114.4	...	...	...	...
Average	79.4	92.2	96.8	100.7	99.7	102.7	94.6	98.6	...	...	...	...
1925												
Jan.	90.2	97.2	101.2	102.9	96.2	97.1	94.6	118.4	...	...	...	100.5
Feb.	91.2	97.3	100.6	102.8	97.4	98.0	96.4	111.5	...	...	...	102.6
Mar.	93.5	97.6	99.6	102.3	98.5	99.1	97.4	106.5	...	...	...	103.1
Apr.	95.8	97.9	97.7	100.7	98.9	99.1	98.3	104.7	...	...	...	102.4
May	98.0	97.0	98.0	99.0	99.9	99.7	100.1	99.7	...	...	...	99.4
June	100.4	98.9	99.4	99.1	100.3	100.0	100.8	97.5	...	...	...	99.9

July	101.7	102.4	100.7	100.1	100.6	100.2	101.4	99.4	...	100.4
Aug.	103.9	103.5	101.8	99.9	101.3	100.9	102.1	97.1	...	99.2
Sept.	105.0	103.5	101.8	99.6	102.0	101.6	102.5	96.6	...	99.2
Oct.	105.8	102.5	100.9	99.1	101.9	101.7	102.2	93.6	...	97.8
Nov.	107.3	101.0	99.9	98.2	101.8	101.5	102.3	90.4	...	97.6
Dec.	107.5	100.8	98.6	96.8	101.6	101.2	102.3	85.0	...	97.4
Average	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	...	100.0
<i>1926</i>										
Jan.	107.8	99.7	95.8	95.3	100.8	100.9	100.7	83.6	107.1	97.4
Feb.	108.0	99.0	94.7	94.1	100.3	100.2	100.2	82.6	103.8	97.3
Mar.	108.0	98.5	93.9	93.0	99.6	99.5	99.7	81.0	101.2	97.1
Apr.	107.8	99.2	93.6	91.9	98.5	97.9	99.5	78.5	99.6	96.9
May	107.8	99.4	93.3	91.2	97.3	96.6	98.4	77.3	98.6	96.5
June	107.5	99.7	93.0	90.5	95.7	94.6	97.4	77.8	98.1	96.2
July	107.6	100.8	93.9	91.1	93.5	91.8	96.2	78.8	98.5	96.3
Aug.	107.6	100.8	94.5	91.4	92.6	90.8	95.7	82.2	99.6	96.8
Sept.	108.6	100.5	95.1	92.1	92.2	90.0	95.7	84.5	100.5	98.6
Oct.	108.5	100.6	96.1	91.1	91.8	89.7	95.5	84.1	98.0	98.5
Nov.	108.6	101.6	96.7	91.0	91.6	89.2	95.7	84.6	97.8	97.9
Dec.	108.7	102.1	96.7	91.1	90.8	88.0	95.4	85.6	97.6	98.0
Average	108.0	100.2	94.8	92.0	95.4	94.1	97.5	81.7	100.0	97.3

(continued on next page)

TABLE A-30, continued

Year and Month	AVERAGE HOURLY WAGE RATES (1)	COST OF LIVING (2)	WHOLESALE PRICES							
			All Commodities (3)	Manufactures, Raw and Semifinished (4)	Manufactures, Finished (5)	Consumers' Goods (6)	Producers' Goods (7)	Sensitive Prices (1926=100) (8)	Free Prices (1926=100) (9)	Administered Prices (10)
<i>1927</i>										
Jan.	108.7	102.3	95.8	91.3	90.4	87.5	95.1	85.0	98.5	98.6
Feb.	108.8	102.8	95.6	91.7	90.4	87.6	95.0	86.0	99.3	99.2
Mar.	109.7	102.5	95.2	92.4	90.6	88.2	94.8	87.6	100.9	99.7
Apr.	111.8	103.3	95.1	92.1	91.3	89.1	94.9	90.5	101.8	98.7
May	115.5	103.4	96.7	93.0	92.1	90.2	95.2	91.8	104.4	99.1
June	116.3	104.2	97.2	93.3	93.2	91.8	95.6	92.6	104.8	99.5
July	116.3	105.8	97.0	93.8	93.9	92.8	95.7	92.9	106.3	99.6
Aug.	116.4	103.5	97.2	94.3	94.6	94.0	95.9	92.4	107.5	99.8
Sept.	116.5	103.9	98.5	95.1	96.2	96.2	96.1	93.3	109.6	97.3
Oct.	117.7	105.8	98.6	95.0	97.6	98.3	96.3	95.1	109.3	97.6
Nov.	118.3	106.2	98.8	95.0	98.7	99.6	97.1	96.3	109.8	97.1
Dec.	118.4	106.7	98.4	95.0	99.3	99.9	98.3	96.9	109.1	97.1
Average	114.5	104.2	97.0	93.5	94.0	92.9	95.8	91.7	105.1	98.6
<i>1928</i>										
Jan.	119.0	106.5	97.8	95.3	99.6	100.1	98.9	100.7	110.0	98.2
Feb.	119.2	106.2	97.2	94.8	100.1	100.3	99.6	99.2	108.3	98.0
Mar.	119.8	105.9	97.7	94.7	100.4	100.6	100.0	98.1	108.4	97.6
Apr.	122.5	105.8	98.4	94.9	100.6	100.9	100.1	97.9	109.4	96.3
May	125.0	105.8	99.6	96.0	101.1	101.5	100.4	95.4	109.8	99.4
June	125.1	106.4	99.6	95.7	101.5	102.0	100.8	93.6	108.2	99.6

July	125.5	107.3	99.9	95.8	101.9	102.1	101.3	94.5	108.4	99.6
Aug.	126.4	108.0	99.8	95.2	101.8	102.0	101.5	93.7	105.9	100.1
Sept.	126.4	107.5	98.7	94.7	101.8	101.9	101.7	92.4	104.2	100.1
Oct.	127.6	107.6	98.8	94.6	102.1	102.1	102.0	90.5	103.0	101.2
Nov.	127.7	107.8	98.9	94.7	102.0	102.1	101.9	89.3	102.5	101.3
Dec.	128.1	108.1	98.7	95.1	101.8	101.9	101.7	91.2	102.9	101.5
Average	124.4	106.9	98.8	95.1	101.2	101.5	100.8	94.7	106.8	99.4
<i>1929</i>										
Jan.	128.2	108.2	98.0	95.0	101.3	101.3	101.3	90.3	101.9	101.8
Feb.	128.4	108.9	98.2	94.8	101.0	100.9	101.2	88.2	100.9	102.0
Mar.	128.6	110.1	98.4	95.2	100.8	100.7	101.1	91.2	100.9	102.2
Apr.	129.4	108.0	96.7	94.4	100.7	100.3	101.3	89.3	99.4	101.1
May	131.5	107.9	95.6	93.1	100.5	99.9	101.5	82.6	97.2	101.4
June	132.0	107.8	95.3	93.3	100.5	99.7	101.8	84.5	96.9	102.1
July	132.2	108.7	97.2	93.1	100.4	99.4	102.1	82.8	96.9	103.0
Aug.	132.6	108.7	97.4	93.3	100.5	99.2	102.7	82.2	97.1	103.6
Sept.	132.6	108.5	97.4	93.3	100.3	98.8	102.8	84.0	96.6	104.3
Oct.	132.7	108.7	96.8	92.8	99.9	98.3	102.7	81.6	95.1	104.9
Nov.	132.8	108.6	95.6	92.1	99.9	98.1	102.7	79.4	93.2	104.9
Dec.	133.2	108.2	94.7	91.7	99.7	97.9	102.7	78.4	92.2	104.6
Average	131.2	108.5	96.8	93.5	100.5	99.5	102.0	84.5	97.4	103.0

(continued on next page)

TABLE A-30, continued

Year and Month	AVERAGE GOURLY WAGE RATES	COST OF LIVING	WHOLESALE PRICES																	
			(1)	(2)	(3)	Manufactures, Raw and Manufactures, Consumers' Goods			(7)	(8)	(9)	(10)								
<i>1930</i>																				
Jan.	133.2	107.4	93.3	91.0	99.6	97.7	102.6	77.3	90.4	104.3										
Feb.	133.2	106.6	91.2	89.9	98.7	96.3	102.6	73.8	87.2	104.0										
Mar.	133.2	105.4	89.1	89.0	97.6	94.7	102.4	72.0	84.9	103.8										
Apr.	133.5	104.4	89.4	88.5	96.9	93.9	102.1	71.1	85.2	102.6										
May	133.6	104.0	88.6	87.8	96.7	93.6	102.0	69.7	84.7	101.8										
June	133.6	104.4	87.8	86.5	96.5	93.3	101.8	68.3	82.6	101.1										
July	133.6	105.6	88.2	84.7	96.0	92.7	101.5	64.9	78.9	100.3										
Aug.	133.6	105.3	87.9	83.5	95.3	91.8	101.3	63.9	76.8	99.4										
Sept.	133.6	104.1	86.6	82.5	94.7	90.9	101.2	63.2	74.8	99.0										
Oct.	133.6	103.0	84.8	81.0	93.7	89.6	100.8	60.7	72.2	98.9										
Nov.	133.6	101.9	84.7	80.1	92.5	87.9	100.1	58.3	70.6	97.9										
Dec.	133.5	100.5	83.1	77.9	91.2	86.3	99.4	55.7	68.3	94.0										
Average	133.5	104.4	87.9	85.2	95.8	92.4	101.5	66.6	79.7	100.6										
<i>1931</i>																				
Jan.	132.7	99.4	81.2	76.2	90.3	85.3	98.7	53.1	66.2	91.7										
Feb.	131.0	98.2	80.4	75.5	89.2	84.1	97.8	51.1	65.6	91.6										
Mar.	129.6	97.3	80.3	75.3	88.5	83.3	97.3	51.2	65.6	91.4										
Apr.	127.0	96.8	80.2	74.4	87.9	82.6	96.8	50.6	65.0	89.6										
May	126.0	96.5	79.9	73.3	87.6	82.2	96.5	47.2	62.8	89.0										
June	125.7	96.8	79.2	73.0	87.2	81.8	96.3	44.4	61.4	89.4										

July	125.6	96.7	78.8	73.1	87.0	81.6	96.2	46.4	62.0	89.7
Aug.	125.5	95.1	77.7	72.0	86.7	81.0	96.2	43.2	59.1	89.5
Sept.	125.4	94.7	76.6	71.0	85.9	79.9	96.0	38.7	56.6	89.4
Oct.	124.5	94.1	75.5	70.5	85.1	78.8	95.8	38.9	55.6	89.7
Nov.	123.8	93.3	75.2	70.3	84.3	77.8	95.1	39.4	55.7	89.3
Dec.	122.9	92.2	73.1	68.4	83.2	76.8	94.0	38.0	54.0	86.1
Average	126.6	95.9	78.2	72.8	86.9	81.3	96.4	45.2	60.8	89.7
<i>1932</i>										
Jan.	110.4	88.2	70.5	65.4	79.9	73.6	90.4	36.1	51.2	81.4
Feb.	110.4	86.4	70.4	64.6	78.0	71.7	88.5	35.2	50.5	80.9
Mar.	110.2	86.1	70.4	64.1	77.0	70.5	88.1	34.0	49.7	80.9
Apr.	110.2	85.4	69.4	63.3	76.4	69.5	87.9	33.2	47.9	80.2
May	107.6	85.0	68.5	62.3	75.8	68.9	87.4	32.5	46.7	80.1
June	106.1	84.9	67.8	61.8	75.1	68.0	87.0	30.7	45.2	79.9
July	106.0	85.1	67.6	61.4	74.6	67.3	86.9	30.8	45.1	79.9
Aug.	105.8	84.2	67.3	62.1	73.9	66.3	86.6	33.1	46.6	79.8
Sept.	105.2	83.9	67.1	63.0	73.5	66.0	86.2	36.8	48.2	79.6
Oct.	104.9	83.7	66.5	62.6	73.2	65.5	86.0	36.8	47.2	80.0
Nov.	104.9	83.5	66.2	62.3	72.9	65.3	85.7	36.2	46.5	78.0
Dec.	104.7	83.3	65.2	61.9	72.5	65.0	85.1	35.3	45.7	78.1
Average	107.2	85.0	68.1	62.9	75.2	68.1	87.2	34.2	47.5	79.9

(continued on next page)

TABLE A-30, continued

Year and Month	AVERAGE HOURLY WAGE RATES	COST OF LIVING	WHOLESALE PRICES									
			(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
			All Commodities	Manufactures, Raw and Semifinished	Manufactures, Finished	Consumers' Goods	Producers' Goods	Sensitive Prices	Free Prices (1926=100)	Administered Prices		
<i>1933</i>												
Jan.	104.7	82.6	64.2	61.9	72.1	64.6	84.7	36.1	45.7	78.0		
Feb.	104.6	82.1	64.3	61.7	71.7	64.1	84.3	37.2	45.4	77.8		
Mar.	104.0	81.8	64.2	61.8	71.2	63.5	84.2	36.3	45.6	77.6		
Apr.	104.0	81.7	64.0	61.7	71.0	63.3	84.0	36.6	46.1	76.3		
May	104.0	82.9	64.8	62.3	71.2	63.7	83.8	38.4	48.1	76.4		
June	103.9	83.2	65.5	63.3	71.5	64.3	83.8	42.3	50.7	76.5		
July	103.9	83.2	66.2	63.8	72.1	65.1	83.9	42.4	52.1	77.6		
Aug.	103.9	83.0	66.4	63.5	72.4	65.4	84.0	40.2	50.8	78.7		
Sept.	103.9	83.5	66.9	63.3	72.5	65.7	84.0	40.6	49.8	78.7		
Oct.	103.9	84.1	67.5	63.0	72.6	66.0	83.9	39.8	48.7	79.2		
Nov.	103.9	84.7	67.7	62.9	72.6	66.0	83.8	38.7	...	79.1		
Dec.	103.9	85.0	67.8	63.2	72.7	66.1	83.8	39.4	...	79.1		
Average	104.0	83.2	65.8	62.7	72.0	64.8	84.0	39.0	...	77.9		
<i>1934</i>												
Jan.	103.9	84.8	67.9	63.8	72.8	66.2	83.8	40.6	...	79.2		
Feb.	103.9	84.7	67.8	64.2	73.1	66.7	83.7	41.1	...	79.2		
Mar.	103.9	84.5	67.6	64.4	73.1	66.8	83.7	41.0	...	79.0		
Apr.	103.9	84.4	67.6	64.3	73.2	66.9	83.7	42.7	...	77.9		
May	103.9	84.3	67.8	64.1	73.3	67.1	83.8	42.8	...	77.6		
June	103.9	84.9	68.5	64.4	73.3	67.1	83.8	43.4	...	76.9		



July	103.9	85.8	69.7	65.2	73.4	67.2	83.8	44.7	...	77.1
Aug.	103.9	86.2	70.6	65.5	73.7	67.7	83.8	44.7	...	77.3
Sept.	104.0	85.7	70.8	65.5	74.3	68.7	83.9	44.8	...	77.2
Oct.	104.0	86.0	71.2	65.3	75.2	70.1	83.9	43.8	...	77.5
Nov.	103.9	86.2	71.4	65.2	75.7	70.8	83.9	43.7	...	77.2
Dec.	103.9	86.1	71.2	65.2	75.8	71.1	83.9	44.4	...	77.5
Average	103.9	85.3	69.3	64.8	73.9	68.0	83.8	43.1	...	77.8
1935										
Jan.	103.9	86.3	71.3	65.1	76.1	71.6	83.7	44.7	...	77.7
Feb.	103.9	86.3	71.2	65.0	76.5	72.2	83.5	44.5	...	78.0
Mar.	103.9	86.1	71.0	64.8	76.4	72.2	83.5	44.0	...	78.1
Apr.	103.9	86.2	71.1	64.5	76.3	72.0	83.5	45.5	...	77.3
May	103.9	86.5	71.1	64.3	76.2	71.9	83.5	46.8	...	77.0
June	103.9	86.7	71.4	64.3	76.1	71.8	83.2	47.1	...	77.1
July	103.9	87.6	71.8	64.5	76.1	71.9	83.1	46.7	...	77.6
Aug.	103.9	87.7	72.2	64.8	76.1	72.0	83.1	47.2	...	77.6
Sept.	103.9	87.0	72.1	65.1	76.1	71.8	83.1	47.9	...	77.6
Oct.	103.9	86.5	72.5	65.6	76.1	71.9	83.1	50.0	...	78.2
Nov.	103.9	86.6	72.7	65.8	76.1	71.9	83.2	50.2	...	78.1
Dec.	103.9	87.0	72.9	66.1	76.2	72.0	83.2	49.9	...	78.2
Average	103.9	86.7	71.8	65.0	76.2	71.9	83.3	47.0	...	77.7

(continued on next page)

TABLE A-30, continued

Year and Month	AVERAGE HOURLY WAGE RATES	COST OF LIVING	WHOLESALE PRICES											
			(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)		
			All Commodities			Manufactures, Raw and		Manufactures, Consumers'		Producers' Goods		Sensitive Prices	Free Prices (1926=100)	Administered Prices
<i>1936</i>														
Jan.	103.9	87.6	73.1	66.2	76.4	72.3	83.2	50.0	...	...	...	...	...	78.3
Feb.	103.9	87.6	73.1	66.5	76.5	72.6	83.1	50.4	...	...	...	...	...	78.4
Mar.	103.9	87.5	73.1	66.5	76.6	72.9	83.1	50.6	...	...	...	...	...	78.5
Apr.	103.9	87.6	73.1	66.3	76.8	73.0	83.1	50.9	...	...	...	...	...	77.7
May	103.9	87.6	73.2	66.1	76.9	73.2	83.1	50.7	...	...	...	...	...	77.6
June	103.9	87.7	73.3	66.2	77.1	73.5	83.1	50.6	...	...	...	...	...	77.8
July	103.9	88.3	73.5	66.1	77.3	73.9	83.1	50.8	...	...	...	...	...	78.0
Aug.	103.9	88.4	73.8	66.5	77.5	74.1	83.1	50.9	...	...	...	...	...	78.0
Sept.	103.9	87.7	73.6	66.8	77.7	74.5	83.2	51.6	...	...	...	...	...	78.1
Oct.	103.9	87.7	73.6	67.2	78.1	75.1	83.3	51.3	...	...	...	...	...	78.3
Nov.	103.9	87.6	73.6	67.5	78.4	75.4	83.3	52.0	...	...	...	...	...	78.1
Dec.	103.9	87.6	74.0	68.2	78.6	75.7	83.3	53.3	...	...	...	...	...	78.2
Average	103.9	87.7	73.4	66.7	77.3	73.8	83.2	51.1	...	...	...	...	...	78.1
<i>1937</i>														
Jan.	104.0	87.7	74.3	68.7	78.6	75.8	83.3	54.5	...	...	...	...	...	78.3
Feb.	104.0	87.9	74.4	69.0	78.6	75.8	83.3	55.1	...	...	...	...	...	78.5
Mar.	104.0	88.1	74.8	69.6	78.9	76.2	83.3	56.6	...	...	...	...	...	78.5
Apr.	104.0	88.2	74.6	68.8	79.0	76.5	83.3	54.9	...	...	...	...	...	78.4
May	104.0	88.2	74.7	68.5	79.3	76.9	83.3	54.5	...	...	...	...	...	78.1
June	104.0	88.3	74.8	68.5	79.4	77.1	83.3	54.0	...	...	...	...	...	78.0

July	104.0	88.9	75.0	68.4	79.5	77.3	83.3	54.3	78.0
Aug.	104.0	88.8	75.2	68.2	79.6	77.5	83.2	54.2	78.1
Sept.	104.0	88.2	74.9	67.8	80.1	78.2	83.2	53.6	78.1
Oct.	104.0	87.9	74.7	67.2	80.3	78.7	83.2	52.1	78.0
Nov.	104.0	88.0	74.4	66.7	80.4	78.8	83.2	51.1	77.9
Dec.	104.0	87.9	74.4	66.9	80.4	78.8	83.2	50.7	78.0
Average	104.0	88.2	74.7	68.2	79.5	77.3	83.3	53.8	78.2
<i>1938</i>									
Jan.	104.0	88.0	74.5	67.0	80.3	78.6	83.2	50.8	78.1
Feb.	104.0	88.2	74.5	67.0	80.4	78.7	83.2	50.3	78.1
Mar.	104.0	88.4	74.6	67.0	80.4	78.7	83.1	50.5	78.1
Apr.	104.5	88.5	74.5	66.6	80.4	78.7	83.1	50.3	78.2
May	104.5	88.7	74.3	66.2	80.3	78.7	83.1	49.7	78.0
June	104.6	88.8	74.5	66.5	80.3	78.7	83.1	49.3	78.1
July	104.6	89.4	74.5	66.5	80.3	78.7	83.1	50.0	78.2
Aug.	104.6	89.1	74.7	66.7	80.3	78.6	83.1	50.0	78.7
Sept.	104.6	88.2	74.5	66.7	80.2	78.4	83.1	50.4	78.9
Oct.	104.6	88.0	74.5	66.8	80.2	78.4	83.1	51.1	78.9
Nov.	104.6	88.1	74.8	66.8	80.1	78.3	83.1	51.1	78.7
Dec.	104.6	88.3	75.0	66.9	80.2	78.4	83.1	50.4	78.9
Average	104.4	88.5	74.6	66.7	80.3	78.6	83.1	50.3	78.4

(continued on next page)

TABLE A-30, continued

Year and Month	AVERAGE HOURLY WAGE RATES (1)	COST OF LIVING (2)	WHOLESALE PRICES									
			All Commodities (3)	Manufactures, Raw and Semifinished (4)	Manufactures, Finished (5)	Consumers' Goods (6)	Producers' Goods (7)	Sensitive Prices (1926=100) (8)	Free Prices (1926=100) (9)	Administered Prices (10)		
1939												
Jan.	104.6	88.7	75.1	66.9	80.1	78.3	83.0	83.0	50.3	...	...	79.4
Feb.	104.6	88.6	75.1	67.0	80.1	78.3	83.0	83.0	50.1	...	...	79.5
Mar.	104.6	88.8	75.2	67.0	80.2	78.5	83.1	83.1	51.5	...	...	79.5
Apr.	104.7	88.7	75.0	67.0	80.3	78.7	83.1	83.1	52.2	...	...	79.5
May	104.7	88.9	75.1	66.8	80.3	78.6	83.1	83.1	52.6	...	...	79.3
June	104.7	89.1	75.3	66.8	80.3	78.7	83.0	83.0	52.8	...	...	79.4
July	104.7	89.7	75.5	67.1	80.3	78.8	83.0	83.0	53.0	...	...	79.5
Aug.	104.7	89.7	75.5	67.3	80.4	78.9	83.0	83.0	53.5	...	...	79.8
Sept.	104.7	88.6	75.4	67.6	80.5	79.0	83.0	83.0	n.a.	...	...	79.8
Oct.	104.9	88.7	75.5	68.1	80.5	79.1	83.1	83.1	n.a.	...	...	79.7
Nov.	104.9	88.9	75.7	68.6	80.7	79.3	83.0	83.0	n.a.	...	...	79.8
Dec.	104.9	89.1	75.9	68.7	80.7	79.5	83.0	83.0	n.a.	...	...	79.9
Average	104.7	89.0	75.4	67.4	80.4	78.8	83.0	83.0	...	...	...	79.6

<sup>a</sup> Base shifted to 1925; for col. 9, shifted to 1926=100.

SOURCE: *Wirtschaft und Statistik; Jahrbuch; IKF Handbuch 1933*

and 1936; *IKF Statistik des In- und Auslands; IKF Beilage zum Wochenbericht; Reichsarbeitsblatt; all passim.*

TABLE A-31

Amplitudes and Conformity Indexes of Wage Rates, Cost of Living, and Wholesale Prices  
Reference Cycles, Monthly Series, January 1924 to August 1932

	AVERAGE ANNUAL CHANGE OF CYCLE RELATIVES						INDEXES OF CONFORMITY					
	Expansion <sup>a</sup>		Contraction		Average		Expansion		Contraction		Average	
	Nov. 1923- Mar. 1925	Mar. 1925- Mar. 1926	Apr. 1926- Apr. 1929	Apr. 1929- Apr. 1932	Apr. 1929- Apr. 1932	Apr. 1929- Apr. 1932	Expansion	Contraction	Expansion	Contraction	Average	Full Cycles
Number of years	1.08	1.00	3.08	3.33								
Hourly wage rates	+23	+16	+6	-6	+14	+5	+100	0	+100	0	+33	+33
Cost of living	+6	+1	+3	-7	+4	-3	+100	0	+100	0	+100	+100
Wholesale prices												
All commodities	+0 <sup>b</sup>	-5	+1	-10	+1	-8	+100	+100	+100	+100	+100	+100
Manufactures, raw and semifinished	-4	-9	+0 <sup>b</sup>	-11	-2	-10	0	+100	0	+100	+100	+100
Manufactures, finished	-5	+1	+0 <sup>b</sup>	-9	-2	-4	0	0	0	0	0	-33
Producers' goods	-1	+2	+0 <sup>b</sup>	-5	-1	-1	0	0	0	0	0	-33
Consumers' goods	-7	+0 <sup>b</sup>	+0 <sup>b</sup>	-11	-3	-5	0	0	0	0	0	-33
Sensitive prices	+17	-28	+3	-22	+10	-25	+100	+100	+100	+100	+100	+100
Free prices	...	...	-1	-18	...	...	...	...	...	...	...	...
Administered prices	...	...	+2	-7	...	...	...	...	...	...	...	...

<sup>a</sup> Amplitude measures based on incomplete reference expansion,  
starting January 1924.

<sup>b</sup> Less than 0.5 of 1 percent.

<sup>c</sup> Measures based on inverted cycle, 1925-29.

SOURCE: Appendix Table A-30.

For definition of conformity indexes see notes to Table A-20

TABLE A-32  
Wage Rates, Prices, and Production in Selected Industries, 1924-1934

TEXTILES AND CLOTHING						
Year	Hourly Wage Rates		Wholesale Prices		Production	
	Textiles (pfennigs)	Clothing	Textiles (1928=100)	Clothing (1928=100)	Textiles and Clothing (1928=100)	Clothing (1928=100)
1924	45*	...	131	104	81	...
1925	57	...	120	104	90	88
1926	60	...	94	94	83	79
1927	66	...	96	92	108	110
1928	72	92	100	100	100	100
1929	75	96	88	99	92	93
1930	76	97	66	91	90	89
1931	72	93	48	80	87	84
1932	65	81	39	68	79	77
1933	64	74	41	66	91	86
1934	64	74	48	70	99	100

BUILDING					
Year	Hourly	Wholesale	Building	Production	Building
	Wage Rates (pfennigs)	Prices, Raw Materials (1928=100)	Costs (1928=100)	of Building Materials (1928=100)	Activity (1928=100)
1924	65	90	79	...	49
1925	94	96	97	94	67
1926	104	91	95	84	70
1927	108	99	96	100	88
1928	116	100	100	100	100
1929	123	100	102	100	98
1930	125	94	97	88	82
1931	117	79	89	56	54
1932	92	68	75	38	33
1933	85	65	72	46	...
1934	84	69	75	76	...

(continued on next page)

TABLE A-32, *continued*

PAPERMAKING			
<i>Year</i>	<i>Hourly Wage Rates (pfennigs)</i>	<i>Wholesale Prices, Paper and Products (1928=100)</i>	<i>Production (1928=100)</i>
1924	51 <sup>a</sup>	93	65
1925	68	105	80
1926	73	101	78
1927	78	100	95
1928	87	100	100
1929	92	101	101
1930	94	95	95
1931	88	78	88
1932	77	63	79
1933	76	64	83
1934	76	67	92
HARD COAL MINING			
<i>Year</i>	<i>Hourly Wage Rates (pfennigs)</i>	<i>Wholesale Prices, Hard Coal (1928=100)</i>	<i>Production (1928=100)</i>
1924	77 <sup>a</sup>	112	77
1925	95	95	86
1926	103	96	92
1927	110	98	99
1928	115	100	100
1929	120	104	109
1930	121	100	94
1931	112	94	78
1932	96	88	69
1933	96	87	73
1934	96	80	82

(continued on next page)

TABLE A-32, *continued*

CHEMICALS				
<i>Year</i>	<i>Hourly Wage Rates (pfennigs)</i>	<i>Wholesale Prices (1928=100)</i>	<i>Production (1928=100)</i>	
1924	61 <sup>a</sup>	103	...	
1925	80	101	81	
1926	86	97	76	
1927	92	98	90	
1928	100	100	100	
1929	106	100	92	
1930	108	99	66	
1931	104	94	54	
1932	87	83	51	
1933	87	81	58	
1934	87	80	66	

BOOTS AND SHOES				
<i>Year</i>	<i>Hourly Wage Rates (pfennigs)</i>	<i>Wholesale Prices</i>		<i>Production (1928=100)</i>
		<i>Leather and Shoes (1929=100)</i>	<i>Hides and Leather</i>	
1924	...	84	82	67
1925	...	86	82	79
1926	...	83	75	68
1927	...	86	87	108
1928	89	100	100	100
1929	90	89	81	104
1930	98	85	72	101
1931	94	73	57	94
1932	79	60	40	85
1933	79	57	39	92
1934	79	58	40	104

(continued on next page)



TABLE A-32, *continued*

METAL PRODUCTS			
<i>Year</i>	<i>Hourly Wage Rates (pfennigs)</i>	<i>Wholesale Prices, Machinery (1928=100)</i>	<i>Production of Machinery (1928=100)</i>
1924	55 <sup>a</sup>	91	65
1925	71	96	71
1926	77	97	61
1927	80	96	80
1928	88	100	100
1929	94	102	101
1930	95	103	83
1931	90	100	60
1932	78	91	38
1933	78	87	42
1934	78	87	64

<sup>a</sup> Average of January, April, June, and October.

SOURCE: Wage rates, *Wirtschaft und Statistik*, *passim*. All data apply to skilled men.

Price and production indexes, *IKF Handbuch* 1933, *passim*; *IKF Handbuch* 1936, *passim*; and *IKF Sonderheft* 37, *passim*. (Indexes shifted to 1928=100.)

TABLE A-33  
 Cost of Living by Months, 1924-1945,  
 (1913-14 = 100)

<i>Year and Month</i>	<i>Total</i>	<i>Food</i>	<i>Housing</i>	<i>Fuel and Light</i>	<i>Clothing</i>	<i>Miscellaneous</i>
<i>1923</i>						
Dec.	147.6	167.2	21.6	164.8	194.1	180.4
<i>1924</i>						
Jan.	130.4	142.2	26.1	153.0	175.8	166.3
Feb.	124.1	131.2	31.3	146.5	171.8	162.8
Mar.	125.8	132.6	35.4	143.0	174.3	164.0
Apr.	128.9	132.9	49.5	140.2	179.7	164.7
May	130.5	134.6	50.6	138.6	184.7	164.9
June	127.0	128.7	52.8	138.4	181.1	162.6
July	129.1	132.6	63.1	135.8	168.9	162.1
Aug.	129.3	133.5	64.2	133.6	166.3	161.2
Sept.	131.9	138.0	64.5	132.7	168.2	161.3
Oct.	137.3	146.9	68.0	129.2	170.2	161.0
Nov.	137.8	147.3	68.8	127.9	172.8	160.8
Dec.	137.9	147.2	68.8	127.9	173.4	160.7
Average	130.8	137.3	53.6	137.2	173.9	162.7
<i>1925</i>						
Jan.	137.9	146.5	71.0	128.5	173.1	161.5
Feb.	138.0	146.4	71.5	128.5	172.6	162.2
Mar.	138.5	147.0	72.2	128.4	172.6	162.8
Apr.	138.9	145.3	78.5	128.5	173.7	163.4
May	137.7	142.5	79.4	128.4	173.7	164.8
June	140.4	147.2	79.6	128.8	173.6	166.2
July	145.3	155.0	81.8	129.4	173.9	168.6
Aug.	146.9	155.6	87.7	130.4	173.6	170.7
Sept.	146.8	154.4	89.0	132.4	174.1	171.8
Oct.	145.4	151.7	89.0	132.1	174.1	172.3
Nov.	143.3	147.9	89.2	132.1	173.4	172.3
Dec.	143.1	147.5	89.3	132.4	172.7	172.7
Average	141.8	148.9	81.5	130.0	173.4	167.4
<i>1926</i>						
Jan.	141.5	144.5	91.1	132.5	171.3	172.3
Feb.	140.5	143.0	91.4	132.6	169.5	171.6
Mar.	139.8	142.1	91.4	132.6	168.3	170.8
Apr.	140.8	142.7	97.4	131.7	167.2	170.0
May	141.0	143.4	98.6	130.6	165.4	169.1
June	141.5	144.4	99.9	130.4	164.4	168.5
July	143.1	146.4	104.4	131.2	162.9	167.4
Aug.	143.1	146.8	104.9	131.3	161.0	166.9
Sept.	142.6	146.0	104.9	132.8	159.7	166.6
Oct.	142.8	146.6	104.9	133.4	159.7	165.8
Nov.	144.2	149.3	104.9	133.9	158.6	165.5
Dec.	144.9	150.7	104.9	134.2	157.7	165.6
Average	142.2	145.5	99.9	132.3	163.8	168.3

(continued on next page)

TABLE A-33, *continued*

<i>Year and Month</i>	<i>Total</i>	<i>Food</i>	<i>Housing</i>	<i>Fuel and Light</i>	<i>Clothing</i>	<i>Miscellaneous</i>
<i>1927</i>						
Jan.	145.2	151.8	104.9	134.6	156.9	163.9
Feb.	145.9	153.5	104.9	134.3	156.6	163.5
Mar.	145.4	152.4	104.9	134.5	156.6	163.7
Apr.	146.6	151.5	115.1	133.0	156.1	164.3
May	146.7	152.0	115.1	130.7	155.9	164.5
June	147.9	154.0	115.1	130.6	156.6	164.6
July	150.1	158.0	115.1	131.6	156.6	164.8
Aug.	146.8	151.5	115.1	132.8	157.8	165.1
Sept.	147.4	151.7	115.1	134.3	159.8	165.7
Oct.	150.2	152.8	125.4	135.9	162.5	167.0
Nov.	150.7	153.2	125.4	135.9	164.4	168.0
Dec.	151.4	154.0	125.4	136.1	165.9	168.0
Average	147.9	153.0	115.1	133.7	158.8	165.3
<i>1928</i>						
Jan.	151.1	153.1	125.5	135.8	166.7	168.4
Feb.	150.7	152.0	125.6	136.0	168.1	168.6
Mar.	150.3	151.2	125.6	135.8	168.8	168.7
Apr.	150.1	150.7	125.5	134.3	170.1	169.0
May	150.1	150.4	125.5	133.7	170.4	169.4
June	151.0	152.0	125.6	134.2	170.6	169.8
July	152.2	154.1	125.7	134.8	170.6	170.3
Aug.	153.3	155.9	125.9	135.4	170.6	170.3
Sept.	152.6	154.4	125.9	137.0	170.9	170.6
Oct.	152.7	153.7	125.9	139.6	171.6	171.8
Nov.	152.9	154.0	125.9	140.3	172.1	172.0
Dec.	153.4	154.6	125.9	140.7	172.7	172.2
Average	151.7	153.0	125.7	136.5	170.3	170.1
<i>1929</i>						
Jan.	153.5	154.8	125.9	140.9	172.7	172.2
Feb.	154.6	156.7	125.9	141.8	172.7	172.2
Mar.	156.3	159.7	125.9	142.7	172.8	172.3
Apr.	153.3	154.3	126.0	141.2	172.8	172.3
May	153.1	154.1	126.0	139.4	172.7	172.5
June	153.0	154.1	126.0	139.1	172.6	172.5
July	154.2	156.3	126.0	139.5	172.4	172.6
Aug.	154.2	156.1	126.2	139.8	172.1	172.7
Sept.	154.0	155.8	126.3	141.1	171.3	172.7
Oct.	154.2	156.0	126.5	142.5	171.0	172.7
Nov.	154.1	155.8	126.5	142.6	170.7	172.8
Dec.	153.6	154.9	126.7	143.0	170.5	172.8
Average	154.0	155.7	126.2	141.1	172.0	172.5

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TABLE A-33, *continued*

<i>Year and Month</i>	<i>Total</i>	<i>Food</i>	<i>Housing</i>	<i>Fuel and Light</i>	<i>Clothing</i>	<i>Miscellaneous</i>
<i>1930</i>						
Jan.	152.4	152.8	126.7	143.0	170.1	172.9
Feb.	151.2	150.5	126.7	143.4	169.7	173.0
Mar.	149.5	147.6	126.8	143.3	168.7	173.0
Apr.	148.2	145.3	127.4	142.0	167.8	173.1
May	147.6	144.4	127.7	139.8	167.4	173.0
June	148.2	144.9	129.8	140.0	167.1	173.3
July	149.8	148.0	130.0	140.5	165.6	173.2
Aug.	149.4	147.8	130.2	140.7	163.4	172.8
Sept.	147.7	144.7	130.5	142.2	160.9	173.6
Oct.	146.2	142.8	130.6	143.1	158.7	171.1
Nov.	144.6	141.3	130.6	142.5	154.6	168.8
Dec.	142.6	138.9	131.3	141.2	149.9	167.9
Average	148.1	145.7	129.0	141.8	163.7	172.1
<i>1931</i>						
Jan.	141.1	136.9	131.8	140.5	147.3	166.4
Feb.	139.4	134.3	131.8	140.7	145.3	165.8
Mar.	138.1	132.5	131.8	140.8	143.4	165.0
Apr.	137.4	131.7	131.6	139.4	142.2	164.5
May	137.0	132.1	131.6	136.4	139.2	164.1
June	137.4	133.2	131.6	136.3	137.6	163.7
July	137.2	133.1	131.6	136.9	136.2	163.5
Aug.	135.0	129.7	131.6	137.0	133.5	163.0
Sept.	134.4	129.2	131.6	138.2	131.9	162.1
Oct.	133.5	128.0	131.6	139.4	129.6	161.4
Nov.	132.4	126.5	131.6	139.6	127.5	160.7
Dec.	130.8	124.5	131.6	139.4	125.0	159.4
Average	136.1	131.0	131.6	138.7	136.6	163.3
<i>1932</i>						
Jan.	125.1	120.4	121.5	131.7	120.0	152.7
Feb.	122.6	117.4	121.5	128.6	117.2	149.2
Mar.	122.2	117.3	121.5	128.0	115.9	148.4
Apr.	121.2	115.9	121.4	127.3	114.2	148.0
May	120.6	115.2	121.4	125.5	113.4	147.6
June	120.5	115.6	121.4	125.4	112.0	146.9
July	120.7	116.2	121.3	125.8	111.1	146.5
Aug.	119.5	114.5	121.2	125.6	109.6	145.8
Sept.	119.0	113.6	121.2	126.6	109.3	145.3
Oct.	118.7	113.3	121.6	127.3	108.7	144.5
Nov.	118.5	113.3	121.4	127.6	107.9	143.9
Dec.	118.2	112.9	121.4	128.0	107.3	143.2
Average	120.6	115.5	121.4	127.3	112.2	146.8

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TABLE A-33, *continued*

<i>Year and Month</i>	<i>Total</i>	<i>Food</i>	<i>Housing</i>	<i>Fuel and Light</i>	<i>Clothing</i>	<i>Miscellaneous</i>
<i>1933</i>						
Jan.	117.2	111.3	121.4	128.0	106.9	142.5
Feb.	116.5	110.3	121.4	128.0	106.4	142.0
Mar.	116.1	109.7	121.3	128.0	106.0	141.6
Apr.	115.9	109.5	121.3	127.2	105.6	141.5
May	117.6	112.8	121.3	125.4	105.7	141.5
June	118.0	113.7	121.3	125.1	105.8	141.2
July	118.0	113.5	121.3	125.1	106.1	141.5
Aug.	117.8	113.4	121.3	125.5	106.6	139.7
Sept.	118.5	114.4	121.3	126.3	107.2	140.0
Oct.	119.4	115.9	121.3	127.6	107.9	140.0
Nov.	120.2	117.1	121.3	127.8	108.2	140.2
Dec.	120.6	117.8	121.3	128.0	108.2	140.0
Average	118.0	113.3	121.3	126.8	106.7	141.0
<i>1934</i>						
Jan.	120.4	117.6	121.3	127.8	108.5	139.9
Feb.	120.2	117.2	121.3	127.8	108.9	139.9
Mar.	119.9	116.5	121.3	127.8	109.3	140.0
Apr.	119.8	116.4	121.3	127.1	109.5	139.9
May	119.6	116.1	121.3	125.0	109.6	139.9
June	120.5	117.8	121.3	124.6	109.8	140.0
July	121.8	120.0	121.3	125.1	110.2	140.0
Aug.	122.3	120.7	121.3	125.4	110.7	139.9
Sept.	121.6	119.2	121.3	126.3	111.9	140.0
Oct.	122.0	119.3	121.3	127.2	114.0	140.2
Nov.	122.3	119.5	121.2	127.5	115.5	140.3
Dec.	122.2	119.1	121.2	127.5	116.1	140.4
Average	121.1	118.3	121.3	126.6	111.2	140.0
<i>1935</i>						
Jan.	122.4	119.4	121.2	127.6	116.8	140.4
Feb.	122.5	119.5	121.2	127.5	117.1	140.4
Mar.	122.2	118.8	121.2	127.6	117.2	140.3
Apr.	122.3	119.0	121.2	126.8	117.5	140.4
May	122.8	120.2	121.2	124.7	117.7	140.5
June	123.0	120.6	121.2	124.2	117.8	140.5
July	124.3	122.9	121.2	124.6	117.8	140.6
Aug.	124.5	123.2	121.2	125.0	118.0	140.8
Sept.	123.4	120.9	121.2	125.9	118.1	140.9
Oct.	122.8	119.6	121.3	126.8	118.4	140.9
Nov.	122.9	119.9	121.3	127.1	118.3	141.0
Dec.	123.4	120.9	121.3	126.9	118.4	141.0
Average	123.0	124.4	121.2	126.2	117.8	140.6

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TABLE A-33, *continued*

<i>Year and Month</i>	<i>Total</i>	<i>Food</i>	<i>Housing</i>	<i>Fuel and Light</i>	<i>Clothing</i>	<i>Miscellaneous</i>
<i>1936</i>						
Jan.	124.3	122.3	121.3	127.1	118.5	141.1
Feb.	124.3	122.3	121.3	127.1	118.6	141.3
Mar.	124.2	122.2	121.3	127.1	118.7	141.3
Apr.	124.3	122.4	121.3	126.3	118.7	141.3
May	124.3	122.4	121.3	125.1	119.0	141.3
June	124.5	122.8	121.3	124.1	119.5	141.3
July	125.3	124.0	121.3	124.5	119.9	141.4
Aug.	125.4	124.2	121.3	124.9	120.3	141.4
Sept.	124.4	122.0	121.3	125.5	121.3	141.6
Oct.	124.4	121.7	121.3	126.6	122.2	141.6
Nov.	124.3	121.3	121.3	126.8	123.3	141.6
Dec.	124.3	121.0	121.3	126.8	124.2	141.7
Average	124.5	122.4	121.3	126.0	120.3	141.4
<i>1937</i>						
Jan.	124.5	121.4	121.3	126.6	124.2	141.8
Feb.	124.8	121.9	121.3	126.6	124.4	141.8
Mar.	125.0	122.3	121.3	126.6	124.5	141.9
Apr.	125.1	122.3	121.3	125.8	124.8	142.0
May	125.1	122.4	121.3	124.6	125.1	142.0
June	125.3	122.9	121.3	123.7	124.2	142.4
July	126.2	124.5	121.3	123.7	125.5	142.5
Aug.	126.0	124.0	121.3	124.0	125.8	142.6
Sept.	125.1	122.0	121.3	125.0	126.6	142.7
Oct.	124.8	121.3	121.3	125.6	127.2	142.8
Nov.	124.9	121.2	121.3	125.8	127.6	142.8
Dec.	124.8	121.1	121.3	125.9	127.9	142.4
Average	125.1	122.3	121.3	125.3	125.7	142.3
<i>1938</i>						
Jan.	124.9	121.2	121.3	125.9	128.3	142.6
Feb.	125.2	121.5	121.3	125.9	128.6	142.7
Mar.	125.5	122.2	121.3	125.8	128.9	142.7
Apr.	125.6	122.3	121.2	125.5	129.4	142.5
May	125.9	122.8	121.2	124.1	129.9	142.5
June	126.0	123.0	121.2	123.1	130.9	142.6
July	126.8	124.3	121.2	123.2	131.4	142.0
Aug.	126.5	123.9	121.2	123.6	131.4	142.0
Sept.	125.2	121.3	121.2	124.5	131.4	142.0
Oct.	124.9	120.7	121.2	125.1	131.6	142.0
Nov.	125.0	120.8	121.2	125.5	131.7	142.2
Dec.	125.3	121.3	121.2	125.6	131.9	142.1
Average	125.6	122.2	121.2	124.8	130.5	142.3

(continued on next page)

TABLE A-33, *continued*

<i>Year and Month</i>	<i>Total</i>	<i>Food</i>	<i>Housing</i>	<i>Fuel and Light</i>	<i>Clothing</i>	<i>Miscellaneous</i>
<i>1939</i>						
Jan.	125.8	122.0	121.2	125.6	132.1	142.1
Feb.	125.7	121.9	121.2	125.6	137.3	142.1
Mar.	126.0	122.5	121.2	125.6	132.7	141.9
Apr.	125.9	122.2	121.2	125.3	132.9	142.0
May	126.1	122.6	121.2	124.1	133.0	141.9
June	126.5	123.6	121.2	122.9	133.1	141.9
July	127.3	124.9	121.2	123.1	133.4	142.0
Aug.	127.3	124.9	121.2	123.3	133.6	142.0
Sept.	125.7	121.7	121.2	124.2	133.7	142.0
Oct.	125.8	121.7	121.2	125.3	133.7	142.0
Nov.	126.1	122.2	121.2	125.4	134.1	142.1
Dec.	126.4	122.8	121.2	125.4	134.4	142.2
Average	126.2	122.8	121.2	124.7	133.3	142.0
<i>1940</i>						
Jan.	127.0	123.5	121.2	125.5	135.1	142.7
Feb.	127.2	123.7	121.2	125.4	135.8	143.1
Mar.	128.6	126.1	121.2	125.4	136.5	143.4
Apr.	129.4	127.3	121.2	125.0	137.2	143.8
May	130.4	128.9	121.2	124.2	138.0	144.6
June	130.8	129.1	121.2	124.0	138.9	146.4
July	131.7	130.7	121.2	124.0	139.1	146.7
Aug.	133.1	133.0	121.2	124.0	140.1	146.7
Sept.	131.6	129.9	121.2	124.1	141.6	147.0
Oct.	130.2	126.6	121.2	124.5	143.6	147.2
Nov.	130.2	126.0	121.2	124.4	146.2	147.5
Dec.	130.8	126.6	121.2	125.0	148.3	147.6
Average	130.1	127.6	121.2	124.6	140.0	145.6
<i>1941</i>						
Jan.	131.5	127.1	121.2	125.1	151.3	148.2
Feb.	131.9	127.4	121.2	124.9	153.3	148.4
Mar.	132.1	128.0	121.2	124.5	152.8	148.4
Apr.	132.4	128.6	121.2	123.8	153.1	148.5
May	133.4	129.7	121.2	123.1	155.9	148.7
June	134.1	130.6	121.2	122.9	158.1	149.0
July	136.1	134.2	121.2	122.9	158.7	149.0
Aug.	135.7	133.0	121.2	122.9	160.1	149.1
Sept.	133.3	128.3	121.2	122.7	160.8	149.2
Oct.	132.3	126.1	121.2	123.1	162.2	149.7
Nov.	132.8	126.2	121.2	123.3	165.6	150.0
Dec.	133.0	126.3	121.2	123.7	166.4	150.1
Average	133.2	128.8	121.2	123.6	158.2	149.0

(continued on next page)

TABLE A-33, *continued*

<i>Year and Month</i>	<i>Total</i>	<i>Food</i>	<i>Housing</i>	<i>Fuel and Light</i>	<i>Clothing</i>	<i>Miscellaneous</i>
<i>1942</i>						
Jan.	133.5	127.0	121.2	123.7	167.5	150.5
Feb.	135.5	130.0	121.2	123.4	169.8	150.9
Mar.	136.0	131.0	121.2	123.1	170.8	150.8
Apr.	136.6	131.8	121.2	122.8	171.4	150.8
May	137.5	133.5	121.2	122.4	171.9	150.9
June	138.9	136.0	121.2	122.2	172.3	150.8
July	140.4	138.7	121.2	122.2	172.6	150.8
Aug.	139.2	136.4	121.2	122.2	173.4	150.8
Sept.	135.2	128.8	121.2	122.2	173.4	150.9
Oct.	134.8	128.2	121.2	122.2	173.7	150.7
Nov.	135.2	128.6	121.2	122.3	174.8	151.0
Dec.	135.8	129.4	121.2	122.8	175.4	151.2
Average	136.6	131.6	121.2	122.6	172.3	150.9
<i>1943</i>						
Jan.	136.7	131.2	121.2	123.1	176.0	150.0
Feb.	137.3	132.3	121.2	123.1	176.3	150.2
Mar.	137.6	132.6	121.2	122.5	177.2	150.1
Apr.	138.0	133.3	121.2	122.3	177.2	150.3
May	138.5	134.3	121.2	122.0	177.6	150.2
June	139.4	135.9	121.2	122.0	178.0	150.2
July	141.5	139.7	121.2	122.0	178.4	150.3
Aug.	141.4	139.3	121.2	122.0	179.1	150.3
Sept.	137.9	132.8	121.2	122.0	179.1	150.4
Oct.	137.5	131.9	121.2	122.0	179.1	150.6
Nov.	138.2	133.1	121.2	122.3	180.0	150.6
Dec.	138.5	133.6	121.2	123.3	180.2	150.6
Average	138.5	134.2	121.2	122.4	178.2	150.3
<i>1944</i>						
Jan.	139.3	134.8	121.2	123.3	180.9	150.7
Feb.	139.6	135.2	121.2	123.3	181.3	150.8
Mar.	140.1	136.1	121.2	122.8	181.7	151.0
Apr.	141.3	138.1	121.2	122.3	182.8	151.0
May	141.1	137.5	121.2	122.3	183.4	151.2
June	142.0	139.3	121.2	122.2	183.4	151.2
July	145.8	146.1	121.2	122.2	184.4	151.3
Aug.	144.4	143.4	121.2	122.2	184.4	151.3
Sept.	141.2	137.4	121.2	122.2	185.1	151.5
Oct.	140.4	135.9	121.2	122.2	185.1	151.5
Nov.	140.7	136.3	121.2	122.4	185.3	151.5
Dec.	141.1	136.6	121.2	123.7	186.3	152.3
Average	141.4	138.1	121.2	122.5	183.7	151.3

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TABLE A-33, *continued*

<i>Year and Month</i>	<i>Total</i>	<i>Food</i>	<i>Housing</i>	<i>Fuel and Light</i>	<i>Clothing</i>	<i>Miscellaneous</i>
<i>1945</i>						
Jan.	141.6	137.4	121.2	123.1	186.9	152.3
Feb.	141.9	137.8	121.2	123.1	187.4	152.4
Mar.	142.4	138.6	121.2	123.1	188.3	152.4
Apr.	142.8	139.2	121.2	121.6	188.3	153.3
May	144.4	142.1	121.2	121.6	188.3	153.3
June	148.0	148.6	121.2	121.6	187.7	154.8
July	149.2	151.1	121.2	121.6	187.7	153.7
Aug.	146.7	144.6	121.2	121.6	190.9	153.7

SOURCE: *Jahrbuch* 1936, p. 294; *Jahrbuch* 1941-42, p. 376; *Wirtschaft und Statistik, passim*; *Handbuch* 1946, Part v, p. 5; and *Statistisches Jahrbuch für die Bundesrepublik Deutschland*, 1952, p. 407.

TABLE A-34

Real Earnings of German Coal Miners by Quarters, 1924-1938  
(marks per shift)

<i>Year and Quarter</i>	<i>Hard Coal</i>		<i>Soft Coal</i>	
	<i>Hewers and Haulers</i>	<i>Surface Workers</i>	<i>Hewers and Haulers</i>	<i>Surface Workers</i>
1924 I	4.65	3.36	4.19	3.33
II	5.15	3.71	4.36	3.37
III	5.53	3.74	4.28	3.37
IV	5.34	3.66	4.27	3.36
1925 I	5.50	3.80	4.48	3.54
II	5.60	3.98	4.76	3.76
III	5.41	3.79	4.86	3.81
IV	5.64	4.02	5.14	4.00
1926 I	5.87	4.17	5.12	4.03
II	5.87	4.17	5.12	4.09
III	5.91	4.14	5.05	4.04
IV	6.03	4.26	5.18	4.15
1927 I	6.01	4.23	5.17	4.10
II	6.08	4.33	5.16	4.18
III	6.20	4.34	5.24	4.17
IV	6.13	4.30	5.51	4.42
1928 I	6.13	4.29	5.67	4.43
II	6.33	4.56	5.74	4.50
III	6.36	4.56	5.68	4.47
IV	6.36	4.58	5.86	4.66
1929 I	6.30	4.53	5.74	4.57
II	6.43	4.64	5.93	4.66
III	6.44	4.61	5.93	4.65
IV	6.49	4.66	5.94	4.71
1930 I	6.60	4.73	6.05	4.78
II	6.72	4.89	6.18	4.95
III	6.64	4.79	6.08	4.85
IV	6.82	4.96	6.11	5.03
1931 I	6.64	4.82	6.24	5.22
II	6.69	4.92	6.29	5.15
III	6.75	4.92	6.24	4.97
IV	6.44	4.73	6.32	4.96
1932 I	6.23	4.59	5.76	4.68
II	6.34	4.69	5.94	4.80
III	6.39	4.72	6.02	4.77
IV	6.46	4.77	6.01	4.82

(continued on next page)

TABLE A-34, *continued*

<i>Year and Quarter</i>	<i>Hard Coal</i>		<i>Soft Coal</i>	
	<i>Hewers and Haulers</i>	<i>Surface Workers</i>	<i>Hewers and Haulers</i>	<i>Surface Workers</i>
1933 I	6.59	4.85	6.06	4.89
II	6.58	4.88	6.19	4.94
III	6.54	4.78	6.10	...
IV	6.46	4.74	5.99	...
1934 I	6.48	4.70	6.00	...
II	6.51	4.78	6.18	...
III	6.42	4.67	6.07	...
IV	6.44	4.67	6.01	...
1935 I	6.42	4.63	5.99	...
II	6.41	4.70	6.19	...
III	6.34	4.61	6.12	...
IV	6.40	4.67	6.09	...
1936 I	6.34	4.58	6.28	...
II	6.34	4.65	6.53	...
III	6.31	4.55	6.52	...
IV	6.40	4.62	6.43	...
1937 I	6.42	4.58	6.39	...
II	6.43	4.60	6.65	...
III	6.41	4.52	6.63	...
IV	6.54	4.58	6.59	...
1938 I	6.54	4.51	6.46	...
II	6.54	4.59	6.84	...
III	6.52	4.51	6.86	...
IV	6.67	4.58	6.78	...

SOURCE: For money earnings, Appendix Table A-25; for cost of living, Appendix Table A-33. Earnings were deflated by the official cost-of-living index with base 1913-14 = 100, as published. The resultant real wages are expressed in 1913-14 prices, although they cover only the period from 1924 on.

TABLE A-35  
 Unemployment, Trade Union Members, by Months, 1913-1924  
 (percent)

	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924
Jan.	3.2	4.7	6.5	2.6	1.7	0.9	6.6	3.4	4.5	3.3	4.2	26.5
Feb.	2.9	3.7	5.1	2.8	1.6	0.8	6.0	2.9	4.7	2.7	5.2	25.1
Mar.	2.3	2.8	3.3	2.2	1.3	0.9	3.9	1.9	3.7	1.1	5.6	16.6
Apr.	2.3	2.8	2.9	2.3	1.0	0.8	5.2	1.9	3.9	0.9	7.0	10.4
May	2.5	2.8	2.9	2.5	1.0	0.8	3.8	2.7	3.7	0.7	6.2	8.6
June	2.7	2.5	2.5	2.5	0.9	0.8	2.5	4.0	3.0	0.6	4.1	10.5
July	2.9	2.9	2.7	2.4	0.8	0.7	3.1	6.0	2.6	0.6	3.5	12.5
Aug.	2.8	22.4	2.6	2.2	0.8	0.7	3.1	5.9	2.2	0.7	6.3	12.4
Sept.	2.7	15.7	2.6	2.1	0.8	0.8	2.2	4.5	1.4	0.8	9.9	10.5
Oct.	2.8	10.9	2.5	2.0	0.7	0.7	2.6	4.2	1.2	1.4	19.1	8.4
Nov.	3.1	8.2	2.5	1.7	0.7	1.8	2.9	3.9	1.4	2.0	23.4	7.3
Dec.	4.8	7.2	2.6	1.6	0.9	5.1	2.9	4.1	1.6	2.8	28.2	8.1

SOURCE: *Reichsarbeitsblatt, passim.*

TABLE A-36

Average Hourly Earnings, 479 Establishments in Bavaria, by Industry, Sex, and Skill,  
June 1914 and October 1918  
(pfennigs)

	<i>Skilled Men</i>		<i>Unskilled Men</i>		<i>Women</i>		<i>Youths</i>	
	<i>June 1914</i>	<i>Oct. 1918</i>	<i>June 1914</i>	<i>Oct. 1918</i>	<i>June 1914</i>	<i>Oct. 1918</i>	<i>June 1914</i>	<i>Oct. 1918</i>
Metals	56	127	42	92	26	39	18	42
Machinery	60	140	43	98	30	64	17	47
Instruments	63	166	45	98	27	63	17	39
Chemicals	50	107	39	84	24	57	18	40
Mining	44	90	34	74	32	47	17	37
Stone and clay	45	93	37	79	21	49	17	41
Wood	52	109	39	88	25	55	18	43
Leather	63	143	42	87	27	60	22	52
Paper	52	93	36	68	22	48	14	27
Building	66	126	52	109	28	71	28	70
Food	47	89	36	71	24	48	19	40
Brewing	63	109	48	92	28	70	34	74
Textiles	42	74	31	59	26	48	17	32
Clothing	47	92	37	68	24	55	17	37
Shoes	50	104	37	81	30	68	16	36
Printing	70	122	46	85	27	54	17	30
Glass	60	124	35	82	20	48	23	47
Pottery	54	94	36	61	26	45	16	28
Gas and electric	56	96	43	80	34	64	23	44
Transport	53	98	43	76	32	64	22	59
Trade	65	116	52	108	34	61	11	21
Averages, <sup>a</sup>								
21 industries	54.9	111.8	40.3	88.8	25.8	53.0	17.3	40.6
Unweighted averages of industry levels	55.1	110.1	40.6	82.9	27.0	56.1	19.1	42.2

<sup>a</sup>Earnings averages equal total payroll divided by total manhours.

SOURCE: Karl Kreiner, "Die Arbeits-, Lohn-, und Produktionsverhältnisse der bayrischen Industrie im Juni 1914, Oktober 1918 und Mai 1919; auf Grund der Wirtschaftserhebung des Staatskommissars für Demobilmachung," *Zeitschrift des Bayrischen Statistischen Landesamts*, 1921, p. 33.

TABLE A-37

Average Daily Earnings, 370 Establishments, by Sex and Industry, March and September, 1914-1918  
(marks)

	MALE WORKERS											
	1914		1915		1916		1917		1918			
	March	Sept.	March	Sept.	March	Sept.	March	Sept.	March	Sept.	March	Sept.
Metals	5.64	5.67	6.29	6.93	7.47	8.02	9.88	11.81	12.01	12.94		
Machinery	5.32	5.23	6.41	7.01	7.39	7.91	9.19	10.75	12.93	13.04		
Chemicals	5.16	4.97	5.37	6.07	6.43	6.93	8.09	10.01	10.50	11.95		
Electrical goods	4.52	4.02	4.99	5.31	5.76	7.44	9.25	10.93	12.06	13.46		
4 War industries	5.14	4.97	5.76	6.33	6.76	7.58	9.10	10.88	11.88	12.85		
Stone and clay	4.68	4.00	4.13	4.66	4.98	5.41	6.18	7.07	7.78	8.79		
Wood	4.22	4.30	4.56	4.60	5.20	5.61	6.22	7.80	7.77	9.96		
Leather and rubber	5.07	4.95	4.94	5.78	5.85	6.37	7.30	7.81	8.21	8.78		
Paper	3.93	4.17	4.49	4.88	5.08	5.56	6.29	7.37	8.27	9.43		
4 Materials	4.48	4.36	4.53	4.98	5.28	5.74	6.50	7.51	8.01	9.24		
Food	5.69	5.78	5.94	5.96	5.88	6.14	6.47	7.51	7.81	8.52		
Textiles	3.64	3.19	3.67	4.05	4.00	4.17	4.45	5.18	5.79	6.47		
Clothing	3.79	2.72	3.58	3.70	4.00	3.68	4.94	5.88	6.82	8.17		
Printing	6.50	5.95	6.74	7.24	7.51	7.69	9.23	9.10	9.59	11.63		
4 Civilian industries	4.90	4.41	4.98	5.24	5.35	5.42	6.27	6.92	7.50	8.70		
Averages, 12 industries*	5.17	5.12	5.88	6.56	7.00	7.56	9.10	10.82	11.68	12.46		
Unweighted averages of industry levels	4.84	4.58	5.09	5.52	5.80	6.24	7.29	8.44	9.13	10.26		

(continued on next page)

TABLE A-37, continued

	FEMALE WORKERS											
	1914		1915		1916		1917		1918			
	March	Sept.	March	Sept.	March	Sept.	March	Sept.	March	Sept.		
Metals	2.05	1.66	2.22	3.02	3.46	4.11	4.68	5.67	5.88	6.65		
Machinery	2.28	1.96	2.87	3.20	3.63	3.88	4.31	4.88	6.01	6.26		
Chemicals	2.36	1.92	2.35	2.62	3.08	3.55	4.11	4.21	5.63	6.60		
Electrical goods	2.75	2.09	3.01	3.40	3.91	4.80	5.24	6.18	6.58	7.35		
4 War industries	2.36	1.91	2.61	3.06	3.52	4.08	4.58	5.48	6.02	6.72		
Stone and clay	1.67	1.49	1.62	1.87	1.96	2.19	2.57	2.87	3.10	3.87		
Wood	1.99	1.78	2.31	1.95	2.20	2.59	3.17	3.81	4.36	5.45		
Leather and rubber	2.82	2.37	2.49	2.77	3.05	3.18	3.79	4.15	4.18	4.82		
Paper	2.15	2.23	2.29	2.53	2.64	2.85	3.65	4.09	4.57	5.37		
4 Materials	2.16	1.97	2.18	2.28	2.46	2.70	3.30	3.73	4.05	4.88		
Food	2.10	1.89	2.09	2.31	2.40	2.89	2.84	3.72	4.04	4.24		
Textiles	2.30	2.05	2.22	2.32	2.41	2.33	2.57	3.31	3.92	4.29		
Clothing	2.25	1.50	2.14	1.79	2.24	2.13	2.81	3.50	3.94	4.92		
Printing	2.56	2.30	2.29	2.64	2.82	2.93	3.22	3.77	4.27	5.10		
4 Civilian industries	2.30	1.94	2.18	2.26	2.47	2.57	2.86	3.58	4.04	4.64		
Averages, 12 industries <sup>a</sup>	2.28	1.94	2.25	2.55	3.02	3.52	4.06	4.87	5.45	6.02		
Unweighted averages of industry levels	2.27	1.94	2.32	2.54	2.82	3.12	3.58	4.26	4.71	5.41		

<sup>a</sup> Earnings averages equal total payroll divided by total man-days.

SOURCE: Investigation by the Statistische Reichsamt; *Reichsarbeitsblatt* 1917-1919, *passim*.

TABLE A-38

Average Earnings per Shift, Krupp-Essen, by Sex, Age, and Skill, Quarterly, 1914-1918

Year and Quarter	Male Workers			Female Workers		Male Workers		
	Over 21 Years		Under 16 Years	Over 21 Years		Over 21 Years		Under 16 Years
	Skilled	Unskilled (marks)		Skilled	Unskilled (1914, 1st quarter=100)	Skilled	Unskilled (1914, 1st quarter=100)	
1914	I	6.67	5.42	1.08	100	100	100	100
	II	6.68	5.46	1.05	100	101	96	97
	III	6.86	5.53	1.10	103	102	103	102
	IV	7.08	5.67	1.18	106	105	116	109
1915	I	7.29	5.86	1.39	109	108	124	129
	II	7.70	6.13	1.50	115	113	133	139
	III	7.91	6.19	1.71	119	114	133	158
	IV	8.30	6.41	1.77	124	118	135	164
1916	I	8.46	6.41	1.86	127	118	134	172
	II	8.88	6.68	1.81	133	123	142	168
	III	9.08	6.82	1.81	136	126	146	168
	IV	9.68	7.26	1.97	145	134	151	182
1917	I	10.55	7.98	2.27	158	147	167	210
	II	11.54	8.57	2.38	173	158	178	220
	III	12.08	8.85	2.68	181	163	190	248
	IV	12.99	9.55	2.86	195	176	216	265
1918	I	13.98	10.18	2.97	210	188	230	275
	II	...	...	...	...	...	...	...
	III	...	...	...	...	...	...	...
	IV	16.00	10.25	...	240	189	...	...

SOURCE: Waldemar Zimmermann, "Die Veränderung der Einkommens- und Lebensverhältnisse der deutschen Arbeiter durch den Krieg," in Die Einwirkung des Krieges auf Bevölkerungsbewegung,

Einkommen und Lebenshaltung in Deutschland, *Wirtschafts- und Sozialgeschichte des Weltkrieges* (Carnegie Foundation for International Peace, Stuttgart, Deutsche Verlags-Anstalt, 1932), p. 382.



TABLE A-39

## Wages Rate of Skilled and Unskilled Building Workers, Three Large Cities, 1913-1923

Year	SKILLED (marks)			UNSKILLED (marks)			SKILL DIFFERENTIALS <sup>a</sup>		
	Berlin	Hamburg	Stettin	Berlin	Hamburg	Stettin	Berlin	Hamburg	Stettin
1913-14	0.84	0.90	0.65	0.57	0.75	0.49	32.1	16.7	24.6
1914 (Apr.)	0.82	0.90	0.65	0.64	0.75	0.49	22.0	16.7	24.6
1915 (Apr.)	0.84	0.90	0.65	0.64	0.75	0.50	23.8	16.7	23.1
1916 (Sept.)	0.98	1.01	0.75	0.81	0.86	0.60	17.3	14.9	20.0
1917 (Dec.)	1.60	1.26	1.00	1.48	1.11	0.85	7.5	11.9	15.0
1918 (Oct.)	1.80	1.51	1.20	1.68	1.36	1.05	6.7	9.9	12.5
1919 (Dec.)	3.20	3.30	2.65	3.00	3.20	2.55	6.2	3.0	3.8
1920 (Dec.)	6.80	6.80	6.25	6.60	6.70	6.15	2.9	1.5	1.6
1921 (Dec.)	12.25	13.85	10.60	11.60	13.30	10.30	5.3	4.0	2.8
1922 (Dec.)	370	401	310	352	381	293	4.9	5.0	5.5
1923 (Dec.)	700 <sup>b</sup>	640 <sup>b</sup>	555 <sup>b</sup>	630 <sup>b</sup>	560 <sup>b</sup>	520 <sup>b</sup>	10.0	12.5	6.3

<sup>a</sup> The differentials are differences between wages of skilled and those of unskilled workers expressed in percent of the former.

<sup>b</sup> In billions.

SOURCE: For 1913-14 and 1919-23: *ADGB Jahrbuch* 1922, pp.139, 150, and 161; 1923, pp. 89, 101, and 111. For April 1914 to October 1918: Waldemar Zimmermann, "Die Veränderungen der Einkom-

mens- und Lebensverhältnisse der deutschen Arbeiter durch den Krieg," in *Die Einwirkung des Krieges auf Bevölkerungsbewegung, Einkommen und Lebenshaltung in Deutschland, Wirtschaftlich- und Sozialgeschichte des Weltkrieges* (Carnegie Foundation for International Peace, Stuttgart, Deutsche Verlags-Anstalt, 1932), p. 398.

TABLE A-40

Average Weekly Wage Rates, Selected Occupations, Annually 1913-1919, and Monthly 1920-1923

Year and month	Railroad Workers		Printers, Compositors	Miners, <sup>a</sup> Underground	Railroad Workers		Printers, Compositors	Miners, <sup>a</sup> Underground
	Skilled	Unskilled			Skilled	Unskilled		
								(1913 = 1.00) <sup>b</sup>
1913	34.56	23.70	31.65	40.50	1.000	1.000	1.000	1.000
1914	34.56	23.70	31.65	38.88	1.000	1.000	1.000	0.960
1915	35.64	24.78	31.65	42.60	1.031	1.046	1.000	1.052
1916	40.56	29.70	32.55	51.12	1.174	1.253	1.028	1.262
1917	55.85	44.45	39.50	64.20	1.616	1.876	1.248	1.585
1918	90.20	74.06	53.59	80.88	2.610	3.125	1.693	1.997
1919	139.23	124.83	94.96	138.36	4.029	5.267	3.000	3.416
1920 Jan.	173	158	144	241	5.00	6.68	4.54	5.95
Feb.	173	158	144	241	5.00	6.68	4.54	5.95
Mar.	173	158	144	241	5.00	6.68	4.54	5.95
Apr.	230	216	144	292	6.67	9.11	4.54	7.22
May	230	216	192	296	6.67	9.11	6.07	7.31
June	264	240	209	318	7.64	10.13	6.62	7.86
July	264	240	223	321	7.64	10.13	7.04	7.93
Aug.	264	240	225	351	7.64	10.13	7.10	8.66
Sept.	264	240	225	353	7.64	10.13	7.10	8.72
Oct.	264	240	225	397	7.64	10.13	7.10	9.80
Nov.	264	240	245	400	7.64	10.13	7.73	9.89
Dec.	264	240	245	400	7.64	10.13	7.73	9.87
1921 Jan.	293	269	245	403	8.48	11.35	7.73	9.95
Feb.	293	269	258	405	8.48	11.35	8.16	10.00
Mar.	293	269	258	406	8.48	11.35	8.16	10.02
Apr.	293	269	258	421	8.48	11.35	8.16	10.39
May	293	269	258	434	8.48	11.35	8.16	10.73
June	293	269	258	439	8.48	11.35	8.16	10.84

July	293	269	258	442	8.48	11.35	8.16	10.90
Aug.	341	317	268	445	9.87	13.38	8.46	10.98
Sept.	341	317	291	512	9.87	13.38	9.20	12.65
Oct.	485	446	340	517	14.03	18.82	10.74	12.78
Nov.	485	446	365	711	14.03	18.82	11.53	17.56
Dec.	485	446	476	720	14.03	18.82	15.04	17.78
1922 Jan.	521	482	496	732	15.08	20.34	15.67	18.07
Feb.	521	482	553	822	15.08	20.34	17.47	20.30
Mar.	521	482	582	942	15.08	20.34	18.39	23.26
Apr.	754	708	707	1,056	21.82	29.87	22.34	26.07
May	979	910	860	1,230	28.33	38.40	27.17	30.37
June	1,171	1,094	1,013	1,326	33.88	46.16	32.01	32.74
July	1,445	1,349	1,224	1,662	41.81	56.92	38.67	41.04
Aug.	2,146	2,021	1,537	2,244	62.09	85.27	48.56	55.41
Sept.	4,066	3,826	2,480	4,314	117.65	161.44	78.36	106.52
Oct.	4,781	4,518	4,129	5,418	138.34	190.63	130.46	133.78
Nov.	8,352	7,896	6,996	10,602	241.67	333.16	221.04	261.78
Dec.	13,824	13,128	12,207	18,318	400.00	553.92	385.69	452.30
1923 Jan.	22,248	21,096	19,763	28,176	644	890	624	696
Feb.	46,416	44,016	40,981	85,674	1,343	1,857	1,295	2,115
Mar.	58,020	55,020	66,516	98,430	1,679	2,322	2,102	2,430
Apr.	58,020	55,020	68,981	98,430	1,679	2,322	2,180	2,430
May	78,924	74,724	82,494	124,206	2,284	3,153	2,606	3,067
June	207,444	196,548	190,784	309,438	6,002	8,293	6,028	7,640
July	859,510	817,451	671,671	1,118,664	24,870	34,492	21,222	27,621
Aug. <sup>c</sup>	20.0	18.9	22.7	34.2	0.5787	0.7975	0.7172	0.8444
Sept. <sup>c</sup>	416.0	393.0	359.0	893.0	12.037	16.582	11.343	22.049
Oct. <sup>d</sup>	196	185	162	441	5.671	7.806	5.118	10.889
Nov. <sup>d</sup>	10,886	9,533	14,958	19,998	315	402	473	494
Dec. <sup>d,e</sup>	24,000	18,720	25,800	34,890	694	790	815	861

<sup>a</sup> Miners' wages are earnings until November 1922 and rates from December 1922.

<sup>b</sup> Relatives computed from figures with a greater number of digits than given in first 4 columns of this table.

<sup>c</sup> In millions.

<sup>d</sup> In billions.

<sup>e</sup> Computed from Rentenmarks, using conversion rate of 1 Rentenmark = 1 trillion paper marks.

SOURCE: *Wirtschaft und Statistik 1925*, "Zahlen zur Geldentwertung in Deutschland, 1914 bis 1923," p. 40.

TABLE A-41  
Cost of Living, Wholesale Prices, and Dollar Exchange Rates, by Months, 1913-1923  
(1913 = 1.00)

Year and Month	Food Index, Calwer		Cost-of-Living Index		Wholesale Price Index (4)	Dollar Exchange Rate (Aug. 1914 = 1.00) (5)
	(1)	Reichsmark (2)	Interpolated (3)			
1913 Jan.	1.01	...	1.01	...	...	...
Feb.	1.01	...	1.01	...	...	...
Mar.	1.01	...	1.01	...	...	...
Apr.	1.00	...	1.00	...	...	...
May	0.99	...	0.99	...	...	...
June	0.99	...	0.99	...	...	...
July	1.01	...	1.01	...	...	...
Aug.	1.01	...	1.01	...	...	...
Sept.	1.00	...	1.00	...	...	...
Oct.	1.00	...	1.00	...	...	...
Nov.	1.00	...	1.00	...	...	...
Dec.	0.99	...	0.99	...	...	...
Average	1.00	1.00	1.00	1.00	1.00	...
1914 Jan.	0.99	...	1.00	0.96	0.96	...
Feb.	0.98	...	0.99	0.96	0.96	...
Mar.	0.98	...	0.99	0.96	0.96	...
Apr.	0.96	...	0.97	0.95	0.95	...
May	0.96	...	0.97	0.97	0.97	...
June	0.96	...	0.98	0.99	0.99	...
July	0.98	...	0.99	0.99	0.99	...
Aug.	1.03	...	1.05	1.09	1.09	1.00
Sept.	1.02	...	1.05	1.11	1.11	1.00
Oct.	1.05	...	1.07	1.18	1.18	1.04
Nov.	1.08	...	1.11	1.23	1.23	1.10
Dec.	1.12	...	1.15	1.25	1.25	1.07
Average	1.01	1.03	1.03	1.05	1.05	1.02

1915 Jan.	1.15	...	1.16	1.26	1.10
Feb.	1.23	...	1.19	1.33	1.12
Mar.	1.28	...	1.21	1.39	1.15
Apr.	1.34	...	1.25	1.42	1.16
May	1.42	...	1.27	1.39	1.15
June	1.45	...	1.30	1.39	1.16
July	1.48	...	1.32	1.50	1.17
Aug.	1.52	...	1.35	1.46	1.17
Sept.	1.55	...	1.36	1.45	1.15
Oct.	1.63	...	1.38	1.47	1.16
Nov.	1.51	...	1.35	1.47	1.18
Dec.	1.53	...	1.35	1.48	1.23
Average	1.43	1.29	1.29	1.42	1.16
1916 Jan.	1.61	...	1.36	1.50	1.27
Feb.	1.69	...	1.41	1.51	1.28
Mar.	1.88	...	1.47	1.48	1.32
Apr.	2.02	...	1.52	1.49	1.30
May	2.03	...	1.58	1.51	1.24
June	2.05	...	1.68	1.52	1.26
July	2.08	...	1.75	1.61	1.31
Aug.	2.08	...	1.82	1.59	1.33
Sept.	2.08	...	1.87	1.54	1.37
Oct.	2.08	...	1.92	1.53	1.36
Nov.	2.06	...	1.98	1.51	1.38
Dec.	2.07	...	2.05	1.51	1.36
Average	1.98	1.70	1.70	1.52	1.31

(continued on next page)

TABLE A-41, continued

Year and Month	Food Index, Calwer		Cost-of-Living Index		Wholesale Price Index	Dollar Exchange Rate (Aug. 1914=1.00)
	(1)	Reichsmark	Interpolated			
		(2)	(3)	(5)		
1917 Jan.	2.09	...	2.15	1.56	1.38	
Feb.	2.11	...	2.25	1.58	1.40	
March	2.13	...	2.32	1.59	1.39	
Apr.	2.13	...	2.40	1.63	1.54	
May	2.12	...	2.45	1.63	1.56	
June	2.14 <sup>a</sup>	...	2.52	1.65	1.69	
July	2.15	...	2.57	1.72	1.70	
Aug.	2.13	...	2.62	2.03	1.70	
Sept.	2.12	...	2.67	1.99	1.72	
Oct.	2.13	...	2.73	2.01	1.74	
Nov.	2.16	...	2.78	2.03	1.65	
Dec.	2.18	...	2.85	2.03	1.35	
Average	2.13 <sup>a</sup>	2.53	2.53	1.79	1.57	
1918 Jan.	2.20	...	2.89	2.04	1.24	
Feb.	2.20	...	2.93	1.98	1.26	
Mar.	2.22	...	2.96	1.98	1.24	
Apr.	2.22	...	3.00	2.04	1.22	
May	2.23	...	3.03	2.03	1.22	
June	2.24	...	3.08	2.09	1.28	
July	2.26	...	3.12	2.08	1.38	
Aug.	2.31	...	3.17	2.35	1.45	
Sept.	2.37	...	3.23	2.30	1.57	
Oct.	2.40	...	3.29	2.34	1.57	
Nov.	2.43	...	3.37	2.34	1.77	
Dec.	2.45	...	3.47	2.45	1.97	
Average	2.29	3.13	3.13	2.17	1.43	

1919 Jan.	2.48	...	3.52	2.62	1.95
Feb.	2.53	...	3.55	2.70	2.17
Mar.	2.62	...	3.60	2.74	2.47
Apr.	2.71	...	3.67	2.86	3.00
May	2.87	...	3.75	2.97	3.06
June	3.06	...	3.85	3.08	3.34
July	3.20	...	3.97	3.39	3.59
Aug.	3.32	...	4.15	4.22	4.48
Sept.	3.72	...	4.25	4.93	5.73
Oct.	3.92	...	4.65	5.62	6.39
Nov.	4.23	...	5.15	6.78	9.12
Dec.	4.46	...	5.66	8.03	11.14
Average	3.26	4.15	4.15	4.16	4.70
1920 Jan.	5.08	...	7.49	12.56	15.4
Feb.	5.75	8.5	8.5	16.85	23.6
Mar.	6.52	9.6	...	17.09	20.0
Apr.	7.38	10.4	...	15.67	14.2
May	8.74	11.0	...	15.08	11.1
June	9.03	10.8	...	13.82	9.3
July	9.82	10.6	...	13.67	9.4
Aug.	10.17	10.2	...	14.50	11.4
Sept.	10.66	10.1	...	14.98	13.8
Oct.	12.93	10.7	...	14.66	16.2
Nov.	13.89	11.2	...	15.09	18.4
Dec.	14.39	11.6	...	14.40	17.4
Average	9.53	10.2 <sup>b</sup>	...	14.86	15.0

(continued on next page)

TABLE A-41, continued

Year and Month	Food Index, Calwer		Cost-of-Living Index		Wholesale Price Index	Dollar Exchange Rate (Aug. 1914=1.00)
	(1)	Reichsamt	Interpolated			
		(2)	(3)	(4)		
1921 Jan.	14.85	11.8	...	14.39	15.5	
Feb.	13.99	11.5	...	13.76	14.6	
Mar.	13.86	11.4	...	13.38	14.9	
Apr.	13.67	11.3	...	13.26	15.1	
May	13.74	11.2	...	13.08	14.8	
June	13.68	11.7	...	13.66	16.5	
July	13.97	12.5	...	14.28	18.3	
Aug.	15.41	13.3	...	19.17	20.1	
Sept.	15.55	13.7	...	20.67	25.0	
Oct.	16.28	15.0	...	24.60	35.8	
Nov.	18.44	17.7	...	34.16	62.6	
Dec.	20.02	19.3	...	34.87	45.7	
Average	15.29	13.4	...	19.11	24.9	
1922 Jan.	21.36	20.4	...	36.65	45.7	
Feb.	26.24	24.5	...	41.03	49.5	
Mar.	39.95	29.0	...	54.33	67.7	
Apr.	49.59	34.4	...	63.88	69.3	
May	42.53	38.0	...	64.58	69.1	
June	49.87	41.5	...	70.30	75.6	
July	64.32	53.9	...	100.59	117.5	
Aug.	94.18	77.6	...	192.00	270.3	
Sept.	151.92	133.2	...	287.00	349.2	
Oct.	250.31	220.7	...	566.00	757.7	
Nov.	509.00	446.1	...	1,154.00	1,711.1	
Dec.	747.42	685.1	...	1,475.00	1,807.8	
Average	...	150.4	...	342.08	...	



1923 Jan.	...	1,120	...	2,785	4,281
Feb.	...	2,643	...	5,585	6,650
Mar.	...	2,854	...	4,888	5,047
Apr.	...	2,954	...	5,212	5,825
May	...	3,816	...	8,170	11,355
June	...	7,650	...	19,385	26,202
July	...	37,651	...	74,787	84,186
Aug.	...	586,045	...	944,041	1,100,632
Sept.	...	15.0 <sup>c</sup>	...	23.5 <sup>c</sup>	23.5 <sup>c</sup>
Oct.	...	3.66 <sup>d</sup>	...	7,094.8 <sup>c</sup>	6.02 <sup>d</sup>
Nov.	...	657 <sup>d</sup>	...	725.7 <sup>d</sup>	522.3 <sup>d</sup>
Dec.	...	1,247 <sup>d</sup>	...	1,261.6 <sup>d</sup>	1,000.0 <sup>d</sup>
Average <sup>e</sup>	...	159.0 <sup>d</sup>	...	166.2 <sup>d</sup>	...

<sup>a</sup> June 1917 estimated by straight-line interpolation.

<sup>b</sup> January 1920 estimated at 7.49.

<sup>c</sup> In millions.

<sup>d</sup> In billions.

<sup>e</sup> The annual averages during the last years of hyperinflation are, of course, disproportionately affected by the late months in each year. Similarly, though to a lesser extent, monthly averages are affected by price quotations near the end of the month. This is particularly important during the last phase of the hyperinflation when prices increased drastically from week to week.

SOURCE, by column:

(1) Richard Calwer, *Monatliche Übersichten über Lebensmittelpreise*, monthly by Wirtschaftstatistisches Bureau of Richard Calwer, Berlin.

(2 and 4) *Wirtschaft und Statistik*, 1925, "Zahlen zur Geldwertung in Deutschland, 1914 bis 1923," p. 5.

(3) Our estimates of monthly living costs, derived by adjusting Calwer's monthly food cost data (col. 1) to the annual Reichsamt estimates of living costs and to the February 1920 level of the official Reichsamt index (col. 3). The adjustment was done graphically and leads only to a rough approximation of monthly living costs.

(5) *Wirtschaft und Statistik*, 1923, p. 413 and p. 740. Average for 1914 based on assumption of stable rates from January through August.

TABLE A-42  
 Hourly and Weekly Wage Rates of Skilled and Unskilled Workers,  
 Weighted Averages of Eight Industries, 1913 and 1918-1923  
 (1913 = 1.0)

	HOURLY RATES		WEEKLY RATES	
	<i>Skilled</i>	<i>Unskilled</i>	<i>Skilled</i>	<i>Unskilled</i>
1913	1.0	1.0	1.0	1.0
1918 IV	2.8	...	2.5	...
1919 I	3.3	...	2.9	...
II	3.5	...	3.1	...
III	4.1	...	3.6	...
IV	5.0	...	4.4	...
1920 January	5.3	...	4.7	...
February	6.0	...	5.3	...
March	6.1	...	5.4	...
April	7.9	...	6.9	...
May	8.5	...	7.5	...
June	8.9	...	7.9	...
July	9.4	...	8.2	...
August	9.5	...	8.4	...
September	9.6	...	8.4	...
October	9.7	...	8.5	...
November	9.9	...	8.7	...
December	10.2	...	8.9	...
1921 January	10.2	...	9.0	...
February	10.3	...	9.1	...
March	10.4	...	9.1	...
April	10.4	...	9.1	...
May	10.4	...	9.1	...
June	10.4	...	9.1	...
July	10.5	...	9.2	...
August	10.9	...	9.5	...
September	12.4	...	10.9	...
October	13.4	...	11.8	...
November	15.3	...	13.4	...
December	18.4	...	16.2	...

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TABLE A-42, continued

	HOURLY RATES		WEEKLY RATES	
	Skilled	Unskilled	Skilled	Unskilled
1922 January	19.0	...	16.7	...
February	20.9	...	18.3	...
March	23.6	...	20.7	...
April	29.0	40.0	25.4	33.0
May	34.0	...	29.8	...
June	40.0	...	35.2	...
July	49.0	67.0	42.2	55.3
August	63.0	...	56.6	...
September	115.0	...	103.2	...
October	163.0	223.0	142.2	183.4
November	293.0	...	255.3	323.7
December	514.0	...	447.7	589.4
1923 January	816	1,126	709.7	926.7
February	2,058	2,794	1,776.7	2,300.1
March	2,559	3,492	2,217.9	2,872.7
April	2,510	3,550	2,254.4	2,919.4
May	3,301	4,500	2,865.4	3,703.2
June	8,098	11,015	7,024.6	9,049.8
July	29,194	42,952	27,812.7	35,952.3
August <sup>a</sup>	835.4	1,128.5	722.4	929.1
September <sup>a</sup>	20,909	28,040	18,047	23,077
October <sup>b</sup>	8.146	10.507	6.967	8.680
November <sup>b</sup>	542.46	711.1	472.3	585.4
December <sup>b</sup>	943.3	1,211.9	822.7	998.4

<sup>a</sup> In thousands.

<sup>b</sup> In billions.

## SOURCE

Weekly Rates, 1913, April 1922, July 1922, and October 1922 to December 1923: *Wirtschaft und Statistik*, 1925, "Zahlen zur Geldwertung in Deutschland, 1914 bis 1923," p. 42 (shifted to base 1913 = 1.0). January 1920 to March 1922, and the months of May, June, and September 1922: our estimates, on basis of weighted average of selected wage series for skilled workers in 8 industries. See Appendix Table A-43 for basic data, and note to present table for procedures. 1919: our estimate based on miners' earnings (see below).

Hourly Rates, 1913, April 1922, July 1922, and October 1922, January to December 1923: International Labour Office, *Studies and Reports*, Series D, Number 15, p. 6. All other months estimated as described for weekly wages.

The data in this table represent the results of an attempt to derive a fairly comprehensive over-all index of hourly and weekly wage rates covering the whole of the period 1919 through 1923. For April, July, and October 1922, and for the year 1923, officially compiled weighted averages for eight industries could be used (see Appendix Table A-44 for industry detail). These averages were originally derived from weekly wage rates and published in this form by the Statistische Reichsamt. They were later converted into index numbers of hourly wage rates (see International Labour Office, *Studies and Reports*, Series D, No. 15, p. 6).

The data for 1920 and 1921, and for the nine months of 1922, not covered by the agencies mentioned, were supplied by interpolating and extrapolating the above data on the basis of the series contained in Appendix Table A-43. Series relating to each of the eight industries included in the official index could be found in case of skilled workers. Weighted averages (based on employment data for 1928-30, as given in

Notes for Table A-42, *continued*

*Vierteljahrshefte zur Statistik*, 1931, No. II, p. 101) were used to combine the wage rates for individual industries. Information for unskilled workers was insufficient to permit us to carry through a similar computation for this group of workers.

Monthly or quarterly information describing wage changes during 1919 are extremely scarce. While there is no doubt about the steep rise of wage rates in that year and about the general magnitude of the rise (approximately a doubling between the Armistice and the end of 1919), the information is too scanty to permit a closer measurement. In order to indicate the approximate movement of wage levels during this period, the index was pushed back through 1919 in quarterly form, based on the three annual series of mining, printing, and railway workers' wages published in "Zahlen zur Geldentwertung" and on the quarterly shift earnings of underground miners in four mining districts. (Hard coal mines in Dortmund and Upper Silesia, salt mines in Halle, and ore mines in Halle, *Zeitschrift für das Berg-, Hütten-, und Salinenwesen*, 1919-1921, *passim*.) The average annual level in 1919 was established on the basis of the described annual data, the intra-annual movements on the basis of the quarterly mining data. The resultant figures related sensibly to what is known about the total increase of wages between 1913 and the beginning of 1919. Also, the step from the fourth quarter of 1919 to January 1920 proved reasonable—although this would not necessarily have been expected from the procedure used. The alternative procedure of simply back-casting the series from the first quarter of 1920 resulted in an unreasonably large step between that point and the fourth quarter of 1919, and in unreasonably low levels for the beginning of 1919. The same data were used for the extension of both hourly and weekly index numbers.

As to the reliability of the index, one may treat the period after April 1922 with confidence, including the interpolated numbers. In the case of the data for 1920 and up to April 1922 one must remember that the component series often have a very limited coverage. For the year 1919, finally, the index numbers can be understood to give only a rough indication of general trends.

TABLE A-43

Weekly Wages of Skilled Male Workers, Selected Series in Eight Industries, by Months,  
1920-1922  
(1913 = 1.00)

<i>Year and Month</i>	<i>Coal Mining</i>	<i>Building</i>	<i>Wood</i>	<i>Metals</i>	<i>Textiles</i>	<i>Chemicals</i>	<i>Printing</i>	<i>Railroads</i>
1919	3.42	...	...	...	...	...	3.00	4.03
1920 Jan.	5.95	4.06	4.01	4.82	4.69	4.01	4.54	5.00
Feb.	5.95	4.38	4.27	5.84	5.95	4.12	4.54	5.00
Mar.	5.95	4.62	4.53	5.84	5.91	4.23	4.54	5.00
Apr.	7.22	5.78	4.78	7.02	10.22	4.33	4.54	6.67
May	7.31	6.68	6.29	7.35	10.21	6.98	6.07	6.67
June	7.86	7.09	6.60	7.67	10.22	7.32	6.62	7.64
July	7.93	7.75	8.08	7.67	10.19	10.04	7.04	7.64
Aug.	8.66	7.94	8.50	7.67	10.23	10.48	7.10	7.64
Sept.	8.72	7.94	8.80	7.67	10.23	10.77	7.10	7.64
Oct.	9.80	7.94	8.80	7.67	10.23	10.77	7.10	7.64
Nov.	9.89	7.94	8.80	8.05	10.23	10.77	7.73	7.64
Dec.	9.87	7.94	9.30	8.05	11.62	11.19	7.73	7.64
1921 Jan.	9.95	7.94	10.20	8.05	11.66	10.33	7.73	8.48
Feb.	10.00	8.21	10.20	8.05	11.69	10.33	8.16	8.48
Mar.	10.02	8.22	10.20	8.05	11.98	10.33	8.16	8.48
Apr.	10.39	8.22	10.20	8.05	11.69	10.33	8.16	8.48
May	10.73	8.22	10.20	8.05	11.69	10.33	8.16	8.48
June	10.84	8.22	10.20	8.05	11.70	10.33	8.16	8.48
July	10.91	8.33	10.20	8.05	11.70	11.00	8.16	8.48
Aug.	10.98	9.02	11.64	8.05	11.71	11.00	8.46	9.87
Sept.	12.65	9.32	11.64	9.76	14.67	11.80	9.20	9.87
Oct.	12.77	10.85	13.28	9.76	14.67	14.33	10.74	14.03
Nov.	17.65	11.22	16.10	11.24	17.66	14.58	11.53	14.03
Dec.	17.78	13.94	18.00	15.54	19.26	19.80	15.04	14.03
1922 Jan.	18.07	14.87	20.67	15.54	19.26	21.67	15.67	15.08
Feb.	20.30	15.76	20.67	17.53	22.31	21.67	17.47	15.08
Mar.	23.26	21.48	24.18	17.53	27.97	21.67	18.39	15.08
Apr.	26.07	24.47	28.28	23.56	30.25	31.67	22.34	21.82
May	30.4	29.88	33.10	...	35.7	39.02	27.2	28.3
June	32.7	36.78	42.86	...	40.8	45.7	32.0	33.9
July	41.0	41.68	50.00	38.87	55.0	57.9	38.7	41.8
Aug.	55.4	51.08	61.11	...	79.7	78.7	48.6	62.1
Sept.	106.5	90.34	118.25	...	146.6	136.7	78.4	117.7
Oct.	133.8	132.53	177.78	134.84	200.3	204.4	130.5	138.3
Nov.	261.8	264.26	266.67	233.62	355.0	305.6	221.0	241.7
Dec.	452.3	385.42	523.81	426.66	623.3	582.4	385.7	400.0

(notes on next page)

## Notes for Table A-43

## SOURCE

Coal Mining: Based on weekly wages of hewers and haulers in the Ruhr district as published in *Wirtschaft und Statistik*, 1925, "Zahlen zur Geldentwertung in Deutschland, 1914 bis 1923," p. 40.

Building: Based on weekly wage rates of building workers in Berlin, reported by Friedrich Hesse in "Die Deutsche Wirtschaftslage von 1914-1923," *Beiträge zur Erforschung der wirtschaftlichen Wechsellagen*, No. 16 (Jena, 1938), p. 484; and weekly wages of bricklayers in Berlin, reported by Robert Kuczynski in *Postwar Labor Conditions in Germany*, United States Bureau of Labor Statistics, Bul. 380, 1925, p. 125.

Wood: Based on weekly wages, as published in "Die Wirtschaftskurve," *Frankfurter Zeitung*, 1922, No. 1, p. 24, and No. 2, p. 31; and hourly rates of carpenters in Hamburg and workers in Hamburg sawmills and crate factories, as published in "Der Wert der Gehälter und Löhne," *Statistische Mitteilungen über den Hamburgischen Staat*, No. 13, p. 27 (Hamburg, 1922). February 1920 to June 1920 interpolated on basis of six other series.

Metals: Based on weekly wage rates of metal workers in Berlin, Friedrich Hesse, *op. cit.*, p. 484.

Textiles: Based on real time rates of weavers in Thuringia as reported by Margarete Soecknick, "Die Entwicklung der Reallöhne in der Nachkriegszeit, dargestellt an typischen Thüringer Industrien," Jena Universität, Wirtschaftliches Seminar, *Abhandlungen*, Vol. 18 (Jena 1927), pp. 57 und 58, inflated by cost-of-living index for Thuringia as found in same source, pp. 9-11.

Chemicals: Based on hourly rates of workers in chemical factories in Hamburg, as published in "Der Wert der Gehälter und Löhne," *Statistische Mitteilungen über den Hamburgischen Staat*, No. 13, p. 27 (Hamburg, 1922). February 1920 to June 1920 interpolated on basis of six other series.

Printing: Based on weekly wage rates of compositors as published in *Wirtschaft und Statistik*, 1925, "Zahlen zur Geldentwertung in Deutschland, 1914 bis 1923," p. 40.

Railroads: Based on weekly wage rates of skilled railroad workers as published in *Wirtschaft und Statistik*, 1925, "Zahlen zur Geldentwertung in Deutschland, 1914 bis 1923," p. 40.

TABLE A-44

Weekly Wage Rates of Skilled and Unskilled Workers in Eight Industries, by Months, 1913, and April 1922 to January 1924

Year and Month	Textiles								Weighted Average	
	Coal Mining	Building	Wood	Metals	Men	Women	Chemicals	Printing		Railroads
1913	37.62	37.69	31.43	36.20	26.18	17.37	32.99	33.21	34.56	35.02
1922 Apr.	1,032	974	883	853	791	581	968	746	754	889
July	1,626	1,617	1,431	1,407	1,312	986	1,536	1,280	1,445	1,477
Oct.	5,280	5,436	4,982	4,881	4,776	3,673	5,335	4,281	4,781	4,981
Nov.	...	8,954	...	8,457	8,011	6,143	9,695	...	8,352	8,939
Dec.	...	15,580	...	15,445	14,193	10,918	17,410	...	13,824	15,680
1923 Jan.	27,918	23,000	22,193	25,379	22,674	17,315	27,646	20,586	22,248	24,855
Feb.	82,470	54,734	50,175	59,308	51,673	38,560	67,090	42,689	46,416	62,221
Mar.	94,536	76,591	71,225	76,148	73,695	55,518	85,142	69,288	58,020	77,672
Apr.	94,536	80,303	73,250	78,420	75,585	56,774	86,355	71,855	58,020	78,948
May	118,974	94,407	84,228	102,815	90,578	67,951	106,983	85,931	78,924	100,345
June	299	225	218	242	208	156	266	199	207	246
July	1,086	966	915	992	860	655	1,135	700	860	974
Aug.	32,490	26,660	17,400	22,986	22,680	17,108	26,520	23,623	19,970	25,303
Sept.	838,000	695,000	448,000	580,000	591,000	457,000	717,000	374,000	416,000	632,000
Oct.	402	205	103	182	134	98	266	162	196	244
Nov.	18,582	19,483	16,133	17,907	14,030	9,701	18,864	14,958	10,886	16,540
Dec.	33.20	30.63	26.69	29.70	21.78	15.10	29.33	25.80	24.00	28.81
1924 Jan.	33.84	26.66	25.62	27.35	20.69	14.59	25.92	25.80	24.00	27.31

(continued on next page)

TABLE A-44, continued

Year and Month	Coal Mining	Building	Wood	Metals	Textiles		Chemicals	Printing	Railroads	Weighted Average
					Men	Women				
1913	24.84	29.48	22.78	23.13	21.38	14.38	26.76	24.16	23.70	24.31
1922 Apr.	870	933	782	807	672	485	915	620	708	802
July	1,410	1,539	1,285	1,322	1,176	841	1,436	1,089	1,349	1,345
Oct.	4,350	5,184	4,460	4,538	4,223	3,106	4,945	3,639	4,518	4,459
Nov.	...	8,536	...	7,870	7,014	5,130	9,054	...	7,896	7,974
Dec.	...	14,788	...	14,328	12,586	9,530	16,222	...	13,128	14,187
1923 Jan.	24,096	21,863	19,793	23,500	20,442	15,019	25,738	17,824	21,096	22,529
Feb.	70,278	52,027	45,439	55,063	46,282	33,009	62,479	37,717	44,016	55,915
Mar.	80,370	72,737	63,570	70,694	65,618	46,994	79,241	61,647	55,020	69,836
Apr.	80,370	76,242	65,421	72,605	67,298	47,932	80,384	63,955	55,020	70,970
May	100,740	89,517	75,543	94,805	81,112	57,546	99,529	76,626	74,724	90,025
June	253	212	194	222	186	130	245	178	197	220
July	918	910	817	911	770	557	1,034	629	817	874
Aug.	27,474	25,093	15,598	21,098	20,469	14,164	24,443	21,261	18,942	22,586
Sept.	703,000	654,000	403,000	531,000	526,000	388,000	656,000	336,000	393,000	561,000
Oct.	333	190	899	157	120	80	239	146	185	211
Nov.	15,492	17,534	14,296	15,510	12,448	7,701	16,992	12,757	9,533	14,231
Dec.	29.00	27.52	23.18	25.25	19.00	12.00	26.88	21.93	18.72	24.27
1924 Jan.	28.50	23.58	22.20	22.21	17.62	11.84	23.04	21.93	18.72	22.87

UNSKILLED WORKERS

marks

thousand marks

billion marks

renten marks

SOURCE: *Wirtschaft und Statistik, 1925*, "Zahlen zur Geldentwertung in Deutschland, 1914 bis 1923," p. 42; and International Labour Office, *Studies and Reports, Series D, No. 15*, pp. 148-149.



TABLE A-45

Hourly and Weekly Real Wage Rates of Skilled and Unskilled Workers,  
Weighted Averages of Eight Industries, by Months, 1919-1923

Year and Month	Hourly		Weekly	
	Skilled	Unskilled (1913 = 1.00)	Skilled	Unskilled
1913	1.00	1.00	1.00	1.00
1919 I	0.93	...	0.81	...
II	0.96	...	0.85	...
III	1.02	...	0.90	...
IV	0.97	...	0.85	...
Average	0.97	...	0.85	...
1920 January	0.71	...	0.63	...
February	0.71	...	0.63	...
March	0.64	...	0.56	...
April	0.76	...	0.66	...
May	0.77	...	0.68	...
June	0.82	...	0.73	...
July	0.88	...	0.74	...
August	0.93	...	0.82	...
September	0.95	...	0.83	...
October	0.91	...	0.79	...
November	0.89	...	0.78	...
December	0.88	...	0.77	...
Average	0.82	...	0.72	...
1921 January	0.87	...	0.76	...
February	0.90	...	0.79	...
March	0.91	...	0.80	...
April	0.92	...	0.81	...
May	0.93	...	0.81	...
June	0.89	...	0.78	...
July	0.83	...	0.73	...
August	0.81	...	0.71	...
September	0.88	...	0.78	...
October	0.86	...	0.76	...
November	0.85	...	0.74	...
December	0.94	...	0.83	...
Average	0.88	...	0.78	...

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TABLE A-45, *continued*

Year and Month	Hourly		Weekly	
	Skilled	Unskilled	Skilled	Unskilled
			(1913 = 1.00)	
1922 January	0.88	...	0.77	...
February	0.81	...	0.71	...
March	0.77	...	0.68	...
April	0.82	1.13	0.72	0.93
May	0.90	...	0.79	...
June	0.93	...	0.81	...
July	0.83	1.14	0.72	0.94
August	0.67	...	0.60	...
September	0.82	...	0.73	...
October	0.63	0.86	0.55	0.71
November	0.59	0.80	0.51	0.65
December	0.71	0.98	0.62	0.81
Average	0.78	...	0.68	...
1923 January	0.56	0.77	0.49	0.64
February	0.74	1.00	0.63	0.82
March	0.91	1.24	0.79	1.02
April	0.83	1.17	0.74	0.96
May	0.75	1.02	0.65	0.84
June	0.74	1.02	0.65	0.84
July	0.50	0.74	0.48	0.62
August	0.78	1.05	0.67	0.86
September	0.71	0.95	0.61	0.78
October	0.61	0.78	0.52	0.65
November	0.61	0.80	0.53	0.66
December	0.80	1.03	0.70	0.85
Average	0.71	0.96	0.62	0.80

SOURCE: Appendix Tables A-41 and A-42. Data for April, July, and October 1922, and all months of 1923 are those published by the Statistische Reichsamt (weekly) or by the International Labour Office (hourly). All other data our estimates.

During the period of inflation, real wages cannot always be derived from monthly indexes of money wages and living costs, as published, because of the importance of the discrepancy between earnings periods and expenditure periods. Also, the cost-of-living index implicit in the money wages and hourly real wages, published by the International Labour Office, is not the same as that implicit in the weekly wages published by the Statistische Reichsamt.

TABLE A-46

Average Weekly Real Wage Rates of Skilled and Unskilled Workers in Eight Industries, by Months, April 1922 to December 1923

Year and Month	Coal Mining	Building	Wood	Metals	Textiles			Chemicals	Printing	Railroads	Weighted Average
					Men	Women					
(1913 = 100)											
SKILLED WORKERS											
1922 Apr.	78	73	80	67	86	95	83	64	62	72	
July	73	73	77	66	85	96	79	65	71	72	
Oct.	54	56	61	52	70	82	62	50	53	55	
Nov.	...	48	...	47	62	71	59	...	...	51	
Dec.	...	57	...	59	75	86	73	...	...	62	
1923 Jan.	51	42	48	48	59	68	58	43	44	49	
Feb.	78	52	57	59	70	79	73	46	48	64	
Mar.	89	72	80	75	100	114	92	73	60	79	
Apr.	83	70	77	71	95	108	86	71	55	74	
May	72	57	61	64	79	89	74	59	52	65	
June	74	55	64	62	74	83	75	56	56	65	
July	50	44	50	47	57	65	59	36	43	48	
Aug.	80	66	51	59	81	92	75	66	54	67	
Sept.	75	62	48	54	76	89	74	38	52	61	
Oct.	80	40	25	37	38	42	60	34	44	52	
Nov.	56	58	58	56	60	63	64	52	46	53	
Dec.	75	69	72	70	71	74	76	65	58	70	

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TABLE A-46, continued

Year and Month	Coal Mining	Building	Wood	Metals	Textiles		Chemicals	Printing	Railroads	Weighted Average
					Men	Women				
(1913 = 100)										
UNSKILLED WORKERS										
1922 Apr.	99	90	97	99	89	96	97	73	85	93
July	96	89	96	97	93	99	91	76	97	94
Oct.	67	68	75	76	76	83	71	58	74	71
Nov.	...	58	...	68	66	72	68	...	...	66
Dec.	...	69	...	85	81	91	83	...	...	80
1923 Jan.	66	51	60	70	66	72	66	51	61	64
Feb.	101	63	71	85	77	82	83	57	66	82
Mar.	115	88	99	109	109	116	105	83	82	102
Apr.	106	85	94	103	104	110	99	87	76	96
May	92	69	75	93	86	91	85	72	72	84
June	94	67	79	89	81	84	85	68	77	84
July	64	53	62	68	62	67	67	45	59	62
Aug.	103	79	64	85	90	92	85	82	74	86
Sept.	96	75	60	78	83	91	83	47	72	78
Oct.	100	48	30	51	42	42	67	43	61	65
Nov.	70	67	71	76	66	60	72	62	62	66
Dec.	95	80	87	93	75	72	86	77	66	85

SOURCE: International Labour Office, *Studies and Reports*, Series D, No. 15, pp. 16, ff.; and *Wirtschaft und Statistik*, 1925, "Zahlen zur Geldentwertung in Deutschland, 1914 bis 1923," p. 42.

TABLE A-47  
Average Hourly and Weekly Earnings in Twenty-two Industries, by Sex and Skill, Selected Years, 1936-1944

	Hourly (pennings)				Weekly (marks)			
	1936	1938	1939	March 1944	1936	1938	1939	March 1944
	Mining	76.1	80.4	83.2	92.4	33.73	36.80	39.77
Male skilled	87.0	92.8	96.6	...	37.61	41.37	44.91	...
Male unskilled	69.9	73.9	76.4	...	31.11	33.07	36.12	...
Hard-coal mining	84.3	85.9	88.7	...	36.92	38.66	43.30	...
Male skilled	94.5	97.8	101.1	...	40.18	43.30	48.93	...
Male unskilled	71.7	72.2	72.9	...	32.40	33.21	36.30	...
Soft-coal mining	78.1	82.3	81.7	87.7	34.82	39.02	42.18	45.87
Iron ore mining	66.2	76.4	82.1	88.6	30.24	34.95	38.60	41.68
Male skilled	75.7	87.7	94.2	...	33.80	39.44	43.06	...
Male unskilled	59.9	68.9	73.2	...	27.78	32.17	35.50	...
Iron and Steel	88.2	95.3	96.5	103.6	45.53	49.68	50.71	65.00
First man	93.9	102.4	103.3	113.3	50.08	57.67	56.80	74.40
Third man	92.5	100.2	100.8	107.2	47.75	51.74	52.65	67.68
Helpers	77.1	82.5	83.1	88.4	39.70	42.76	42.95	54.58
Nonferrous Metals	...	90.2	90.3	98.0	...	44.58	45.38	48.92
Male skilled	...	98.1	99.4	112.8	...	50.93	52.76	60.70
Male semiskilled	...	96.9	97.1	106.5	...	47.94	49.04	55.41
Male helper	...	84.3	84.6	86.6	...	41.20	42.38	43.13
Female	...	54.3	55.0	58.6	...	25.24	24.98	22.85
Foundries	81.4	89.4	92.9	100.0	40.29	45.02	47.00	52.05
Male skilled	...	98.3	102.7	117.8	...	49.64	52.21	63.75
Male semiskilled	...	93.3	97.5	105.0	...	46.92	49.67	56.26
Male helper	70.8	75.1	77.7	81.2	35.83	38.10	39.45	42.16
Female	...	54.8	56.5	56.4	...	25.30	25.47	22.61
Metalworking	85.7	91.0	92.2	96.5	42.27	45.90	46.24	46.48
Male skilled	98.4	106.4	108.6	121.0	49.18	54.99	56.02	63.43
Male semiskilled	86.8	93.2	95.7	101.1	42.88	47.23	48.74	51.92
Male helper	67.0	72.4	74.7	79.5	32.90	36.06	37.25	39.69
Female	51.5	55.7	56.7	58.2	24.34	26.30	26.19	22.39

(continued on next page)

TABLE A-47, continued

	Hourly (pennings)				Weekly (marks)			
	1936	1938	1939	March 1944	1936	1938	1939	March 1944
Machinery	89.3	94.1	95.8	...	45.32	48.31	48.93	...
Male skilled	96.3	104.4	107.2	121.6	49.20	54.27	55.25	64.38
Male semiskilled	87.3	92.0	94.7	101.1	44.17	47.29	48.97	53.29
Male helper	65.8	69.5	72.1	76.6	32.96	35.08	36.74	38.95
Female	49.5	54.5	55.7	57.1	23.77	25.34	25.81	21.62
Electrical goods	83.9	87.4	88.6	...	41.12	43.52	43.46	...
Male skilled	107.9	115.2	117.3	127.1	54.41	59.82	60.42	63.31
Male semiskilled	92.3	97.9	99.8	107.0	45.34	49.40	50.55	52.72
Male helper	75.7	78.2	79.9	82.7	37.19	39.17	39.87	38.97
Female	57.0	61.4	62.7	62.9	27.14	29.33	29.10	23.25
Instruments	86.2	87.4	88.9	...	43.13	43.69	44.22	...
Male skilled	103.7	110.0	111.6	123.8	52.82	56.37	57.71	64.64
Male semiskilled	87.4	93.5	95.2	102.5	42.89	47.46	49.18	52.27
Male helper	70.7	72.2	74.7	82.3	35.56	36.35	37.68	42.18
Female	51.8	54.4	55.5	58.6	25.01	25.93	26.44	22.10
Chemicals	82.0	83.5	83.5	...	37.92	40.24	41.08	...
Male, special mechanics	104.1	106.3	107.0	...	49.67	53.79	56.20	...
Male, production workers	87.8	88.5	89.3	...	40.88	42.97	44.98	...
Foremen, etc.	...	103.3	104.0	...	...	51.95	54.88	...
Semiskilled	...	90.4	91.5	...	...	43.78	46.11	...
Unskilled	...	79.3	80.1	...	...	38.34	39.68	...
Female	51.7	52.0	52.9	...	22.99	23.59	23.70	...
Rubber and Products	81.4	83.1	83.5	...	36.84	38.89	38.75	...
Male, special mechanics	102.5	104.7	105.1	...	49.86	54.54	53.75	...
Male, production workers	92.5	96.5	97.4	...	42.21	45.87	46.49	...
Foremen, etc.	...	111.6	112.3	...	...	56.55	57.50	...
Semiskilled	...	99.4	101.3	...	...	47.92	48.81	...
Unskilled	...	92.3	91.7	...	...	42.94	43.09	...
Female	54.5	56.9	58.0	...	23.75	25.28	25.24	...

(continued on next page)

TABLE A-47, continued

	Hourly (pfennigs)				Weekly (marks)			
	1936	1938	1939	March 1944	1936	1938	1939	March 1944
Stone and Clay	65.0	71.7	75.2	80.3	30.52	34.91	36.49	38.59
Male skilled	{ 70.3	83.3	87.4	93.9	{ 33.26	41.60	43.79	47.30
Male semiskilled	59.7	77.8	81.7	87.2	27.88	38.01	39.87	42.65
Male helpers	38.6	64.6	68.4	71.3	17.65	31.23	32.90	33.86
Female	58.0	42.6	46.3	46.7	27.83	19.46	20.94	18.88
Pottery	{ 71.5	60.9	63.9	71.9	{ 35.05	28.97	30.51	32.58
Male skilled	74.8	84.8	88.3	102.3	40.99	40.99	42.90	52.46
Male semiskilled	42.6	74.8	78.4	90.4	36.65	36.65	38.94	46.54
Male helpers	39.0	66.1	69.0	75.1	32.40	32.40	34.40	37.18
Female skilled	61.7	46.0	48.8	58.8	19.60	21.06	22.25	24.22
Female unskilled	75.0	39.7	42.1	49.9	18.17	18.18	19.25	19.98
Glass	{ 75.0	65.6	68.2	85.2	30.13	31.58	33.16	40.47
Male skilled	54.6	82.3	84.4	107.6	35.05	40.62	41.86	54.93
Male semiskilled	33.0	81.4	84.7	102.0	26.72	38.82	41.15	51.34
Male helpers	71.6	58.8	61.9	73.6	16.11	28.69	30.57	36.41
Female semiskilled	82.6	37.8	40.2	52.4	32.97	17.73	18.83	21.66
Female helpers	85.4	33.4	36.2	47.2	37.99	15.79	16.96	17.96
Building	69.9	74.5	76.8	82.3	45.01	35.83	37.31	38.27
Masons	62.2	83.7	88.2	92.9	46.24	41.03	42.79	43.35
Carpenters and cement workers, etc.	54.6	89.0	91.5	96.9	32.41	45.01	46.24	45.71
Helpers	51.2	71.9	73.1	83.6	28.06	34.78	35.51	40.45
Road construction workers	63.6	66.4	67.8	68.4	26.28	31.52	32.55	30.97
Sawmills	63.6	60.1	63.6	71.8	28.58	29.22	31.06	35.32
Male skilled	64.8	65.4	68.9	70.7	24.37	32.37	34.38	39.85
Male unskilled	42.2	55.4	58.6	63.7	26.58	26.58	28.07	30.28
Papermaking	71.0	65.6	66.8	73.6	31.29	32.39	34.13	36.91
Male skilled and semiskilled	64.8	72.7	73.8	82.3	35.94	37.13	39.48	45.64
Male unskilled	42.2	66.9	68.2	73.4	31.92	32.99	34.76	37.47
Female	42.2	43.0	45.1	51.4	19.40	19.54	20.68	20.17

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TABLE A-47, continued

	Hourly (pennings)			Weekly (marks)				
	1936	1938	1939	March 1944	1936	1938	1939	March 1944
Book printing	106.4	107.3	107.0	114.2	50.49	52.66	52.73	56.06
Male skilled	120.2	120.7	120.5	130.3	56.86	59.08	59.23	65.31
Male semiskilled	99.0	101.2	100.5	109.0	47.79	50.64	51.32	55.29
Female semiskilled	50.6	50.9	51.4	55.8	23.90	24.75	24.73	24.70
Textiles	54.9	56.7	58.0	62.8	23.20	26.16	26.04	27.17
Male skilled	69.0	71.6	73.6	80.3	29.33	33.79	34.29	39.10
Male unskilled	53.4	56.8	58.9	62.0	23.08	27.30	28.06	29.83
Female skilled	48.9	50.2	51.9	57.4	20.52	22.76	22.72	23.65
Female unskilled	37.7	39.3	41.4	47.4	15.89	17.84	18.33	18.98
Clothing	54.6	58.5	60.4	66.4	25.36	27.27	28.03	26.54
Male skilled and semiskilled	81.0	87.5	91.0	97.3	38.34	42.06	43.97	47.38
Female skilled and semiskilled	46.2	50.0	52.3	60.2	21.35	23.13	24.01	23.21
Boots and Shoes	63.2	65.9	68.5	80.8	27.64	30.57	30.55	35.51
Male production worker	77.2	80.4	83.5	99.5	33.64	37.28	37.74	47.98
Female production worker	50.6	52.3	55.7	64.8	22.26	24.70	24.54	26.51
Baking and Confectionery	50.6	51.8	53.2	61.8	23.76	24.83	24.66	25.01
Male skilled	85.5	87.3	89.4	96.7	41.50	44.09	44.72	49.65
Male unskilled	66.7	72.8	70.7	76.4	32.60	33.95	34.52	38.17
Female skilled	48.8	50.1	51.3	59.3	22.48	23.91	24.02	25.13
Female unskilled	43.1	44.2	45.7	50.8	20.07	20.92	20.79	18.76
Brewing	100.9	102.0	101.9	101.5	43.69	48.38	51.97	52.37
Male skilled and semiskilled	104.5	104.7	103.9	101.5	44.88	49.24	52.07	52.30
Male unskilled	91.2	91.7	91.0	88.7	39.03	42.90	45.66	43.09
Male delivery men	104.5	107.0	108.4	109.2	45.92	51.54	57.14	58.76

SOURCE: *Handbuch* 1928-44, pp. 470-71.



TABLE A-48

Money Wages in Germany, Great Britain, and the United States, 1871-1913 and 1924-1944  
(1913 = 100)

Year	HOURLY				WEEKLY OR DAILY		
	Germany		Great Britain	United States	Germany	Great Britain	United States
	Rates (1)	Earnings (2)	Rates (3)	Earnings <sup>a</sup> (4)	Earnings (5)	Rates (6)	Earnings <sup>a</sup> (7)
1871	...	42	70	66	51	80	74
1872	...	...	77	...	57	85	76
1873	...	...	83	...	63	90	75
1874	...	...	87	...	65	91	74
1875	...	...	87	...	64	89	70
1876	...	...	86	...	59	88	67
1877	...	...	85	...	56	87	64
1878	...	...	83	...	56	85	61
1879	...	...	81	...	53	83	60
1880	...	46	81	58	54	83	64
1881	...	...	81	...	54	83	63
1882	...	...	81	...	56	83	66
1883	...	...	82	...	57	84	67
1884	...	...	82	...	57	84	69
1885	...	...	81	...	58	83	66
1886	...	...	81	...	58	82	67
1887	...	...	81	...	59	83	69
1888	...	...	81	...	62	83	70
1889	...	...	83	...	64	85	71
1890	...	58	87	67	65	89	72
1891	...	...	87	67	65	89	72
1892	...	...	87	68	65	89	73
1893	...	...	86	70	65	88	75
1894	...	...	86	64	65	88	69
1895	...	...	85	64	65	87	68
1896	...	...	86	66	68	88	71
1897	...	...	87	64	68	89	68
1898	...	...	89	63	71	91	68
1899	...	...	90	67	73	92	71
1900	...	70	94	69	75	96	73
1901	...	...	93	73	74	95	76
1902	...	...	93	75	74	94	79
1903	...	...	92	78	75	93	81
1904	...	...	91	77	77	92	80

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TABLE A-48, *continued*

Year	HOURLY				WEEKLY OR DAILY		
	Germany		Great Britain	United States	Germany	Great Britain	United States
	Rates (1)	Earnings (2)	Rates (3)	Earnings (4)	Earnings (5)	Rates (6)	Earnings (7)
1905	...	...	91	79	80	91	82
1906	...	...	93	84	84	94	87
1907	...	...	93	88	89	94	90
1908	...	...	93	84	88	94	86
1909	...	...	93	85	89	94	87
1910	...	...	93	90	91	94	92
1911	...	...	94	92	93	94	94
1912	...	...	97	95	96	97	95
1913	100	100	100	100	100	100	100
1924	107	112	196	248	91	170	218
1925	135	146	196	248	123	171	222
1926	146	155	198	248	128	172	224
1927	154	169	198	249	143	172	225
1928	168	190	194	254	164	169	227
1929	177	200	194	256	169	169	228
1930	180	194	192	250	155	167	211
1931	171	180	190	233	137	165	190
1932	144	151	186	202	113	162	155
1933	140	146	184	200	115	160	152
1934	140	150	184	241	124	160	167
1935	140	152	188	249	127	164	183
1936	140	155	192	252	132	167	198
1937	140	158	200	282	136	174	219
1938	141	163	204	284	143	178	203
1939	141	168	208	286	148	181	217
1940	141	172	234	299	153	203	229
1941	143	180	251	330	163	218	269
1942	144	183	271	386	164	235	333
1943	144	184	283	435	164	245	392
1944	144	184	303	461	162	263	419

\* Wage rates from 1871-1890.

## Notes to Table A-11

## SOURCE

Germany, 1871-1944: Appendix Table A-2.

Great Britain, weekly rates:

1871-1902: George H. Wood, "Real Wages and the Standard of Comfort since 1850," *Journal of the Royal Statistical Society*, 1909, pp. 102-3, shifted to base 1913 = 100.

1902-10: Continuation of Wood's series, in Arthur L. Bowley, *Wages and Income in the United Kingdom since 1860* (Cambridge, 1937), Table I, spliced to earlier series in 1902.

1906-14: Labour Department Index, given by A. L. Bowley, *loc. cit.*, spliced to earlier series in 1906-10.

1914-44: Arthur L. Bowley, "Wages, Earnings and Hours of Work 1914-1947, United Kingdom," *London and Cambridge Economic Service*, Special Memorandum 50, May 1947, p. 7.

Great Britain, hourly rates:

1871-1939: E. H. Phelps Brown with Sheila V. Hopkins, "The Course of Wage Rates in Five Countries, 1860-1939," *Oxford Economic Papers*, June 1950, pp. 276 and 281. Shifted to base 1913 = 100.

1939-44: Based on weekly rates, assuming stability of hours, see Bowley, *London and Cambridge Economic Service*, Special Memorandum No. 50, May 1947, pp. 7 and 10.

Data for 1924 refer to December, all later data to September.

United States:

1871-90: Wage rates, from Clarence D. Long, *Wages and Earnings in the United States, 1860-1890* (National Bureau of Economic Research, 1960), Appendix Table A-1 and Table 13. Spliced to later segment in 1890.

1890-1913: Earnings, from Albert Rees, *38th Annual Report* (National Bureau of Economic Research, 1958), p. 59.

1913-14: U.S. Bureau of Labor Statistics, as given in *Historical Statistics of the United States, 1789-1945*, p. 67, Series D-123 and 124.

1914-44: *Ibid.*, Series D-119.

TABLE A-49  
 Living Costs in Germany, Great Britain, and the United States,  
 1871-1913 and 1924-1944  
 (1913 = 100)

<i>Year</i>	<i>Germany</i>	<i>Great Britain</i>	<i>United States</i>
1871	69	110	128
1872	72	117	127
1873	80	119	125
1874	83	113	121
1875	76	108	115
1876	76	108	112
1877	77	108	112
1878	73	102	104
1879	72	98	102
1880	76	103	103
1881	77	101	103
1882	75	100	103
1883	75	100	101
1884	72	95	100
1885	70	89	97
1886	68	87	95
1887	68	86	96
1888	70	86	96
1889	73	87	93
1890	75	87	92
1891	77	87	93
1892	76	88	92
1893	75	87	91
1894	74	83	87
1895	73	81	85
1896	72	81	85
1897	74	83	84
1898	76	86	84
1899	76	84	84
1900	77	89	85
1901	78	88	86
1902	78	88	87
1903	78	89	89
1904	79	90	90
1905	82	90	90
1906	87	91	91
1907	88	93	95
1908	88	91	93
1909	90	92	92

(continued on next page)

TABLE A-49, *continued*

<i>Year</i>	<i>Germany</i>	<i>Great Britain</i>	<i>United States</i>
1910	92	93	96
1911	95	95	96
1912	100	97	98
1913	100	100	100
1924	131	180	173
1925	142	175	177
1926	142	173	179
1927	148	166	175
1928	152	166	173
1929	154	164	173
1930	148	157	169
1931	136	144	154
1932	121	142	138
1933	118	141	131
1934	121	141	135
1935	123	144	139
1936	124	148	140
1937	125	157	145
1938	126	155	143
1939	126	159	141
1940	130	187	142
1941	133	198	149
1942	137	200	165
1943	138	198	175
1944	141	202	178

## SOURCE:

Germany: Appendix Table A-1.

Great Britain:

1871-1913: A. L. Bowley, *Wages and Income in the United Kingdom since 1860* (Cambridge University Press, 1937), pp. 121-22.

1913-44: Ministry of Labour Index as given in A. L. Bowley, "Wages, Earnings and Hours of Work, 1914-1947, United Kingdom," *London and Cambridge Economic Service*, Special Memorandum No. 50, May 1947, p. 7. (Base shifted to 1913 = 100). Data for 1924 refer to December, all later data to September.

United States:

1871-80: Ethel D. Hoover, "Prices in the 19th Century," *Trends in the American Economy in the Nineteenth Century*, Studies in Income and Wealth, Volume Twenty-four (Princeton University Press for National Bureau of Economic Research).

1880-90: Clarence D. Long, *Wages and Earnings in the United States, 1860-1890* (National Bureau of Economic Research, 1960), Table B-2.

1890-1913: Albert Rees, *38th Annual Report* (National Bureau of Economic Research 1958), p. 59.

1913-44: U. S. Bureau of Labor Statistics, *Monthly Labor Review*; particularly issue of May 1952, p. 615.

TABLE A-50

Real Wages in Germany, Great Britain, and the United States, 1871-1913 and 1924-1944  
(1913 = 100)

July of Year	HOURLY				WEEKLY OR DAILY		
	Germany		Great Britain	United States	Germany	Great Britain	United States
	Rates (1)	Earnings (2)	Rates (3)	Earnings <sup>a</sup> (4)	Earnings (5)	Rates (6)	Earnings <sup>a</sup> (7)
1871	...	61	64	52	74	73	58
1872	...	...	66	...	79	73	60
1873	...	...	70	...	79	76	60
1874	...	...	77	...	78	81	61
1875	...	...	81	...	84	82	61
1876	...	...	80	...	78	81	60
1877	...	...	79	...	73	81	57
1878	...	...	81	...	77	83	59
1879	...	...	83	...	74	85	59
1880	...	61	79	55	70	81	62
1881	...	...	80	...	70	82	61
1882	...	...	81	...	75	83	64
1883	...	...	82	...	75	84	66
1884	...	...	86	...	80	88	69
1885	...	...	91	...	83	93	68
1886	...	...	93	...	85	94	71
1887	...	...	94	...	87	97	72
1888	...	...	94	...	89	97	73
1889	...	...	95	...	88	98	76
1890	...	77	100	73	87	102	78
1891	...	...	100	72	84	102	77
1892	...	...	99	74	86	101	79
1893	...	...	99	77	87	101	82
1894	...	...	104	74	88	106	79
1895	...	...	105	75	89	107	80
1896	...	...	106	78	94	109	84
1897	...	...	105	76	92	107	81
1898	...	...	103	75	93	106	81
1899	...	...	107	80	96	110	85
1900	...	91	106	81	98	108	86
1901	...	...	106	85	95	108	88
1902	...	...	106	86	95	107	91
1903	...	...	103	88	96	104	91
1904	...	...	101	86	97	102	89

(continued on next page)

TABLE A-50, *continued*

<i>July of Year</i>	HOURLY				WEEKLY OR DAILY		
	<i>Germany</i>		<i>Great Britain</i>	<i>United States</i>	<i>Germany</i>	<i>Great Britain</i>	<i>United States</i>
	<i>Rates (1)</i>	<i>Earnings (2)</i>	<i>Rates (3)</i>	<i>Earnings (4)</i>	<i>Earnings (5)</i>	<i>Rates (6)</i>	<i>Earnings (7)</i>
1905	...	...	101	88	98	101	91
1906	...	...	102	92	97	103	96
1907	...	...	100	93	101	101	95
1908	...	...	102	90	100	103	92
1909	...	...	101	92	99	102	95
1910	...	...	100	94	99	101	96
1911	...	...	99	96	98	99	98
1912	...	...	100	97	96	100	97
1913	...	...	100	100	100	100	100
1924	82	86	109	143	70	94	126
1925	95	103	112	140	87	98	125
1926	102	109	114	139	90	99	125
1927	104	114	119	142	97	104	129
1928	110	125	117	147	108	102	131
1929	115	130	118	148	110	103	132
1930	122	131	122	148	105	106	125
1931	125	132	132	151	100	115	123
1932	120	125	131	146	94	114	112
1933	119	124	130	153	98	113	116
1934	116	124	130	179	102	113	124
1935	114	124	131	179	103	114	132
1936	112	124	130	180	106	113	141
1937	112	126	127	194	109	111	151
1938	112	130	132	199	114	115	142
1939	112	133	131	203	117	114	154
1940	109	132	125	211	117	109	161
1941	107	135	127	221	122	110	181
1942	105	134	136	234	120	118	202
1943	104	133	143	249	119	124	224
1944	102	130	150	259	115	130	235

<sup>a</sup> Wage rates from 1871-1890.

SOURCE: Appendix Tables A-48 and A-49.

TABLE A-51

Hourly Money Wage Rates of Skilled and Unskilled Building Workers in Germany, Great Britain, and the United States, 1913-1914, and 1924-1944 (1913-14 = 100)

Year	SKILLED			UNSKILLED		
	Germany	Great Britain	United States	Germany	Great Britain	United States
1913-14	100	100	100	100	100	100
1924	101	195	217	109	218	237
1925	146	195	225	155	218	245
1926	161	195	240	166	218	267
1927	167	195	249	173	219	272
1928	179	192	250	187	214	275
1929	191	192	254	200	214	279
1930	194	189	264	203	208	293
1931	181	184	265	189	201	292
1932	143	178	227	149	197	249
1933	126	174	221	134	192	238
1934	126	174	222	134	192	245
1935	126	178	224	134	197	246
1936	126	184	232	134	203	261
1937	127	189	248	135	208	283
1938	127	193	269	135	214	312
1939	128	193	271	136	214	314
1940	129	208	275	138	236	321
1941	131	223	285	140	256	336
1942	132	227	301	140	265	369
1943	132	239	302	140	273	374
1944	132	238	305	140	273	378

## SOURCE:

Germany: Appendix Table A-4. Data from 1933 on are for April. Rates for 1944 assumed to equal those for 1943. Base, 1913 = 100.

Great Britain: Our estimates, based on weekly rates as given in Arthur L. Bowley, "Wages, Earnings and Hours of Work, 1914-1947, United Kingdom," pp. 12-13. The assumption is that the number of hours worked per week changed from about 50 to about 44 between December 1914 and December 1924 and remained constant from 1924 to 1944 (*loc. cit.*, p. 11). Data for 1924 refer to December, later data to September. Base, December 1914 = 100.

United States: *Historical Statistics of the United States, 1889-1945*, p. 69, Series D 154 and D 156. Until 1938, data refer to May 15; from 1939 to 1941 they refer to June 1; thereafter to July 1. Base, May 1913 = 100.



TABLE A-52

Hourly Real Wage Rates of Skilled and Unskilled Building Workers in Germany, Great Britain, and the United States, 1913-1914, and 1924-1944 (1913-14 = 100)

Year	SKILLED			UNSKILLED		
	Germany	Great Britain	United States	Germany	Great Britain	United States
1913-14	100	100	100	100	100	100
1924	78	107	125	84	120	136
1925	103	111	127	109	124	138
1926	113	111	131	117	125	146
1927	113	117	139	117	131	152
1928	118	115	142	123	128	156
1929	124	116	146	130	130	160
1930	131	120	153	137	132	169
1931	133	127	169	139	139	186
1932	118	124	161	124	137	177
1933	109	123	171	116	135	184
1934	105	123	163	112	135	180
1935	103	123	159	109	136	174
1936	101	123	166	108	136	186
1937	101	120	169	108	132	193
1938	101	124	187	108	137	217
1939	101	121	192	108	134	223
1940	99	110	191	107	125	223
1941	99	112	190	105	128	224
1942	96	112	179	103	131	220
1943	95	120	170	102	136	210
1944	93	117	169	99	134	209

SOURCE: For money wages see Appendix Table A-51. For source of cost-of-living indexes used see Appendix Table A-49. Cost of living indexes are all shifted to base of money wage indexes. Data in this table refer to the months indicated in Appendix Table A-51. Computations based on unrounded data.

TABLE A-53

Skill Differentials of Building Workers, in Germany, Great Britain, and the United States, 1904-1950

Year	Germany	Great Britain	United States	Year	Germany	Great Britain	United States
1904	35.5	34.4	...	1930	21.3	25.5	43.5
1905	34.6	...	...	1931	21.6	25.0	44.1
1906	34.7	...	...	1932	21.3	25.4	44.1
1907	30.3	35.1	45.9	1933	20.0	24.8	45.1
1908	29.9	...	46.8	1934	21.1	24.7	43.8
1909	30.0	...	47.6				
				1935	20.0	25.1	44.1
1910	27.0	34.8	47.9	1936	20.0	24.8	42.9
1911	26.8	...	48.7	1937	19.6	25.0	41.9
1912	26.9	...	49.2	1938	19.7	24.4	41.2
1913	26.8	33.1	49.2	1939	19.8	23.7	41.2
1914	20	33.5	49.7				
				1940	19.2	22.1	40.8
1915	21	30.7	49.7	1941	19.8	21.1	40.1
1916	18	27.8	49.7	1942	19.8	20.7	37.5
1917	14	24.6	47.6	1943	19.8	20.8	37.1
1918	11	19.9	45.4	1944	...	21.0	36.7
1919	4	16.9	44.4				
				1945	...	19.2	35.1
1920	2	19.0	39.8	1946	...	20.0	32.0
1921	4	19.9	40.5	1947	...	19.7	30.1
1922	5	25.2	42.5	1948	...	19.6	28.9
1923	10	25.3	44.4	1949	...	18.4	29.3
1924	18.8	24.4	44.4	1950	...	15.9	28.4
1925	20.2	24.4	44.8				
1926	22.3	24.4	43.5				
1927	22.4	24.6	44.4				
1928	21.6	25.2	44.1				
1929	21.3	25.3	44.1				

## SOURCE:

Germany: Appendix Table A-14.

Great Britain: K. G. J. C. Knowles and D. J. Robertson, "Differences between the Wages of Skilled and Unskilled Workers, 1880-1950," Oxford University, *Bulletin of the Institute of Statistics*, April 1951, p. 111.United States: 1907-47: Harry Ober, "Occupational Wage Differentials, 1907-47," *Monthly Labor Review*, August 1948, p. 127. For 1948-50: Based on *Statistical Abstract of the United States*, 1951, p. 202.

TABLE A-54  
Earnings and Selected Economic Indicators, Federal German Republic,  
1938 and 1947-1958

Year	Average Money Earnings		Average Real Earnings		Consumers Goods Prices	Wholesale Prices	Production	Employment in Industry <sup>a</sup>	Registered Unemployed	Average Workweek
	(1)	(2)	(3)	(4)						
	Hourly Weekly (manufacturing, transportation)	Hourly Weekly (manufacturing, mining, transportation)	(medium incomes)	(industrial products)	(manufacturing and mining)	(000's)	(000's)	(hours)		
1938	100	100	100	100	100	100	100	(000's)	(000's)	49.5
1947	116	91	87	68	134	n.a.	34		600 <sup>b</sup>	38.9
1948	130	110	84	71	155	n.a.	51		1,230	42.2
1949	151	141	91	85	166	191	75		1,580	46.3
1950	162	157	104	101	156	186	93	4,797	1,432	48.0
1951	186	177	111	105	168	221	111	5,332		47.4
1952	200	191	117	112	171	226	118	5,518		47.5
1953	209	201	124	120	168	220	130	5,751		47.9
1954	215	210	127	124	169	217	145	6,062		48.6
1955	230	226	134	131	172	222	167	6,576		48.8
1956	250	242	142	138	176	226	180	6,991		48.0
1957	272	254	151	141	180	232	189	7,221		46.5
1958	292	266	157	143	186	233	195	7,273		45.7

<sup>a</sup> Excludes employment in building and in electric power, gas and water works. Only establishments with 10 and more employees are covered.

<sup>b</sup> Rough estimate.

Source: *Statistisches Jahrbuch für die Bundesrepublik Deutschland; Wirtschaft und Statistik; Wirtschaftskunde der Bundesrepublik*

*Deutschland* (Stuttgart and Cologne, 1955), *passim*. Whenever 1938 data appear, they refer to the present area of the Federal German Republic, not to the prewar Reich. Earnings for 1957 and 1958 were derived by splicing the new earnings indexes (base 1950) to the prior index numbers (base 1938).

TABLE A-55  
Annual Earnings in Major Industries, 1888 to 1913 and 1924 to 1939  
(1913 = 100)

Year (1)	Chemicals, Gas, Water										Paper and Products (12)	Wood (11)	Food and Tobacco (10)	Leather (9)	Clothing (8)	Textiles (7)	Building (6)	Mining (2)	Stone and Clay (3)	Metal- working (4)	Printing (13)	Railroad (14)	Shipping (15)	Total (16)
	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)														
1888	52.2	60.4	59.7	64.4	59.9	62.8	58.9	57.4	63.2	65.0	62.4	84.8	63.7	52.5	58.9									
1889	55.4	62.1	61.2	65.3	62.2	63.6	61.2	57.4	64.3	64.7	63.6	88.8	65.7	59.7	60.7									
1890	60.4	60.4	62.1	67.5	62.2	64.7	61.7	59.0	65.6	65.8	65.7	93.9	68.1	60.3	61.5									
1891	61.9	62.6	63.1	68.5	62.5	65.4	64.4	60.0	67.4	67.8	66.9	85.3	69.0	61.8	63.5									
1892	59.9	62.1	62.2	68.9	62.6	65.6	64.6	60.2	67.7	66.9	65.6	84.9	70.5	61.8	63.2									
1893	58.9	61.8	62.7	68.2	61.9	68.2	66.4	59.8	68.4	66.8	64.4	82.7	71.5	62.4	63.4									
1894	59.4	62.2	63.0	68.8	62.1	68.3	65.9	60.7	68.2	67.2	64.4	79.5	71.8	61.7	63.6									
1895	59.9	61.8	63.5	69.9	62.9	68.9	69.3	62.9	67.9	66.1	66.9	80.9	72.1	59.1	64.0									
1896	62.6	61.5	65.2	70.7	65.0	70.2	70.0	62.3	70.7	68.5	69.2	77.6	73.2	60.1	65.7									
1897	65.5	65.0	65.8	71.9	66.1	71.4	71.4	63.7	72.3	70.7	71.8	83.3	74.6	60.9	67.4									
1898	66.3	68.1	69.1	73.3	69.1	72.6	71.3	67.2	73.5	72.5	73.7	87.6	71.3	62.1	69.1									
1899	69.7	69.5	70.1	73.6	71.0	74.1	71.3	67.7	75.8	74.9	73.7	85.8	74.0	64.0	70.9									
1900	74.2	71.0	71.3	75.4	74.1	75.6	72.0	69.6	77.4	75.7	75.4	88.2	75.1	67.0	72.9									
1901	71.3	72.9	69.9	75.4	73.3	76.9	73.6	71.5	78.4	77.8	75.4	83.3	75.9	68.8	73.1									
1902	69.8	74.4	72.7	75.4	74.1	78.1	74.9	73.0	75.8	78.8	76.2	85.4	76.6	75.3	73.6									
1903	72.5	75.6	74.2	78.0	74.9	78.9	79.5	75.3	77.6	80.2	78.4	83.3	77.3	77.9	75.2									
1904	73.5	79.5	76.2	78.9	76.5	80.3	82.4	76.3	77.6	80.2	80.0	84.1	78.5	83.2	77.0									
1905	74.6	81.8	78.6	80.5	79.0	81.0	83.9	78.6	79.0	82.7	81.8	85.3	79.6	84.2	78.9									
1906	81.5	85.1	81.5	84.1	84.0	85.0	87.3	83.6	81.6	86.5	84.9	87.5	82.1	85.4	83.2									
1907	88.7	88.9	87.3	85.5	87.1	85.8	91.8	87.2	86.1	88.8	88.3	93.1	85.5	87.1	87.2									
1908	88.2	89.2	87.6	87.3	86.5	87.0	92.1	88.9	87.3	89.3	89.5	93.4	90.0	88.3	88.0									
1909	83.4	89.4	88.3	87.9	88.9	89.2	93.2	90.0	88.4	89.9	90.3	94.0	92.6	90.6	88.4									
1910	84.7	91.7	91.5	90.0	91.4	91.3	95.4	92.7	90.1	93.0	92.3	95.3	94.1	90.6	90.8									
1911	87.9	94.7	95.1	93.9	95.6	92.9	95.1	94.8	93.8	95.7	94.7	96.3	95.9	91.8	93.8									
1912	94.8	97.3	98.4	96.9	97.7	96.6	97.1	98.1	95.3	99.4	97.7	99.8	99.8	92.9	97.0									
1913	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0									

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TABLE A-55, continued

Year (1)	Mining (2)	Stone and Clay (3)	Metal- working (4)	Chemicals, Gas, Water (5)	Building (6)	Textiles (7)	Clothing (8)	Leather (9)	Food and Tobacco (10)	Wood (11)	Paper and Products (12)	Printing (13)	Railroad (14)	Shipping (15)	Total (16)
1924	98.0	108.4	104.3	115.0	110.0	129.7	115.9	132.7	116.9	98.0	123.5	123.5	122.2	134.8	111.9
1925	120.9	147.6	135.2	146.6	145.8	157.8	140.2	168.0	146.4	130.7	161.0	170.4	155.9	180.0	142.4
1926	131.9	142.4	132.2	163.6	152.2	168.9	144.8	177.8	152.8	130.1	177.6	167.9	160.7	187.9	147.7
1927	138.9	162.0	150.1	169.1	159.6	180.6	155.3	184.3	158.2	141.8	186.5	175.1	167.8	196.6	157.1
1928	148.1	176.3	161.6	184.7	174.0	189.8	165.0	200.2	171.0	152.4	190.7	188.8	186.6	222.2	169.3
1929	157.3	185.4	173.1	196.6	184.1	199.8	173.4	206.3	191.6	161.5	216.4	194.7	188.8	231.2	180.0
1930	155.3	187.8	177.8	197.8	179.7	203.0	182.2	215.2	195.1	160.0	223.5	199.3	190.0	227.6	182.1
1931	137.4	170.9	168.1	189.7	157.9	190.0	165.5	201.6	184.5	143.5	212.0	188.3	174.5	221.1	168.1
1932	114.9	141.2	145.8	165.0	124.1	168.1	142.1	174.3	162.9	117.2	186.6	167.0	153.6	172.8	144.6
1933	115.1	132.5	141.9	161.1	115.5	162.0	136.4	167.3	155.3	110.7	181.5	160.0	151.9	154.8	138.8
1934	121.4	135.5	144.3	161.0	119.8	158.0	136.9	165.7	158.2	116.9	178.6	168.7	151.5	153.4	140.7
1935	124.0	143.2	149.6	164.5	124.6	158.9	136.6	166.6	158.2	120.8	181.0	169.8	149.2	153.9	144.2
1936	130.4	144.5	154.7	167.7	128.5	161.0	140.5	168.8	162.3	126.8	182.2	170.1	149.2	155.9	148.2
1937	141.0	151.1	158.5	168.4	131.7	162.6	142.8	171.1	164.1	132.7	184.9	172.6	149.2	159.2	152.5
1938	142.3	159.9	165.1	174.6	140.5	169.8	148.5	176.7	169.8	140.7	193.7	177.6	168.6	170.0	160.7
1939	150.0	169.6	170.2	181.5	148.1	172.6	155.3	181.0	174.3	150.4	196.6	174.8	163.9	177.3	166.0

The earnings presented in the body of this table are derived from payroll and employment data compiled by the German workmen's compensation insurance system; earnings of railroad workers are based on the specialized statistics existing for this industry. Gross annual earnings of full-time employees (excluding executives) are computed. The industry levels reflect changes in the composition of the work force, with respect to skill, sex, and age as well as the proportion between wage earners and white-collar workers. The reliability of the data is somewhat impaired by the fact that, during

the years 1888 and 1902, some establishments reported "assessed" rather than actual wages. However, and in spite of the cautioning by the original compilers, contemporary statisticians as well as the cited authors believe that the computed indexes portray major industry earnings trends in a realistic manner.  
SOURCE: Franz Grumbach and Heinz König, "Beschäftigung und Löhne der deutschen Industrierwirtschaft, 1888-1954," *Weltwirtschaftliches Archiv*, 1957, Heft 1, pp. 138-139 (Table 6).

## APPENDIX B

### Chronology of German Business Cycles

Several scholars have established chronologies of German business cycles for the period under review. This Appendix contains a comparison of the reference cycle chronology of the National Bureau with those developed by Arthur A. Spiethoff for the years up to World War I, by Gustav Clausing for the interwar period, and by Ernst Wagemann for the prewar and part of the interwar period. These chronologies are shown in Table B-1, which permits the identification of cycles, cycle phases, and durations.

The National Bureau identifies business cycle turning points on a monthly and on an annual basis. From the dates of lower turns (troughs)

TABLE B-1  
Chronologies of German Business Cycles, 1870-1932

Year	NATIONAL BUREAU OF ECONOMIC RESEARCH			SPIETHOFF-CLAUSING			
	Turning Points		Duration, In Years	Characterization	Duration, In Years		
	Monthly	Annual	Phase		Cycle	Phase	Cycles
1870		T	Exp. 2	8	Boom Boom	Upswing 5	11
1871							
1872		P	Contr. 6	Recession	Recession		
1873						Exp. 4	
1874			8	Cap. Shortage	8		
1875						Contr. 4	
1876			Exp. 4	Primary Rise	Upswing 3		
1877		T				8	
1878			Contr. 4	Recession	Slump 4		
1879	T, Feb.					8	
1880			8	Cap. Shortage	8		
1881		P				Contr. 4	Recession
1882	P, Jan.		8	Primary Rise	Upswing 3		
1883						8	Secondary Rise
1884			Contr. 4	Primary Rise	Slump 4		
1885		T				8	Recession
1886	T, Aug.		8	Primary Rise	Upswing 3		
1887						8	Secondary Rise
1888			Contr. 4	Recession	Slump 4		
1889						8	Boom
1890	P, Jan.		8	Cap. Shortage	8		
1891						8	Recession
1892			Contr. 4	Recession	Slump 4		
1893						8	Primary Rise
1894		T	8	Recession	Slump 4		

(continued on next page)

TABLE B-1 *continued*

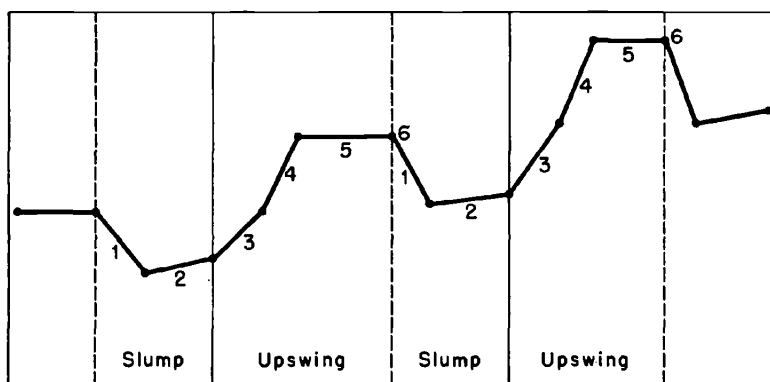
Year	NATIONAL BUREAU OF ECONOMIC RESEARCH			SPIETHOFF-CLAUSING		
	Turning Points		Duration, In Years	Characterization	Duration, In Years	
	Monthly	Annual	Phase		Phase	Cycles
1895	T, Feb.			Secondary Rise	Upswing 6	8
1896			Boom			
1897		Exp. 6	Boom			
1898			Boom			
1899			8	Boom	Slump 2	
1900	P, Mar.	P	Contr. 2			
1901				Cap. Shortage	Upswing 5	7
1902	T, Mar.	T	Exp. 1	Recession		
1903	P, Aug.	P	Contr. 1	Primary Rise	Slump 2	
1904		T		Boom		
1905	T, Feb.		Exp. 3	Boom	Upswing 2	
1906				Boom		
1907	P, July	P	Contr. 1	Cap. Shortage	Slump 2	
1908	T, Dec.	T		Recession		
1909				Primary Rise	Upswing 4	
1910			Exp. 5	Boom		
1911				Boom	Upswing 6	8
1912			6	Boom		
1913	P, Apr.	P	Contr. 1	Cap. Shortage	Slump 2	
1914	T, Aug.	T		World War I		
1915			Exp. 3	World War I	Upswing 5	7
1916				World War I		
1917		P		World War I	Slump 2	
1918	P, June		Contr. 2	World War I		
1919	T, June	T		Inflation	Upswing 4	
1920			Exp. 3	Inflation		
1921				Inflation	Upswing 2	3
1922	P, May	P	Contr. 1	Inflation		
1923	T, Nov.	T	Exp. 2	Inflation	Slump 4	6
1924			Contr. 1	Adaptation		
1925	P, Mar.	P		Adaptation	Upswing 2	
1926	T, Mar.	T	Exp. 3	Adaptation		
1927				Boom	Slump 4	
1928				Cap. Shortage		
1929	P, Apr.	P	6	Recession	Upswing 6	6
1930				Recession		
1931			Contr. 3	Recession	Slump 4	
1932	T, Aug.	T		Recession		

and upper turns (peaks) the duration of expansion and contraction phases as well as the duration of full cycles can be computed. In Table B-1, these durations are given for the annual chronology only, and the full cycle measures gauge the duration of trough-to-trough cycles. However, the durations based on monthly turning points and the duration of peak-to-peak cycles can be readily computed from the data presented. Note that the annual reference dates are not independently derived from annual data, but are established in the neighborhood of monthly turning

points. This insures compatibility of the annual and monthly reference systems and of the cyclical measures derived from them.

The determination of a turning point is not based on any one major aggregate, such as production or employment, but on the cyclical behavior of a considerable number of time series in the area of production, transportation, trade, prices, finance, and so forth.<sup>1</sup>

Spiethoff's chronology of German business cycles is based on the economic characterization of each year rather than on the identification of turning points. This characterization is done in terms of the following schematic model of the business cycle:



The stages are (1) recession, (2) primary rise, (3) secondary rise, (4) boom, (5) capital shortage, and (6) crisis. While the first five stages characterize extended time periods, stage 6 denotes the end of the prosperity plateau and refers thus to a brief period—pictured as a point rather than a line on the schematic diagram. Recession and primary rise form the “slump,” the other stages form the “upswing” of the cycle. Full cycles are measured from stage 1 through stage 6. It will be noted that the slump includes the period of mild primary rises. Upper turning points are identified, lower ones are not. Each calendar year is characterized as belonging to one of the six stages, as indicated in the synoptic table, B-1.<sup>2</sup>

The characterization is carried by Spiethoff to the year 1913 only. For the interwar period Spiethoff's work was continued by Clausing, who

<sup>1</sup> A detailed description of the methods used can be found in Arthur F. Burns and Wesley C. Mitchell, *Measuring Business Cycles* (National Bureau of Economic Research, 1947). This work contains also the chronology (p. 79), in which the last turning point given is the trough of 1932. But presumably the period of National Socialism constitutes an additional cycle with the peak in the neighborhood of 1943 and the trough about 1945. The subsequent economic recovery constituted a long expansion with no evidence of any general contraction in business activity up to the time of this writing.

<sup>2</sup> For details of the chronology see Arthur A. Spiethoff, *Die Wirtschaftlichen Wechsellagen* (Tübingen, 1955). The translation of Spiethoff's nomenclature used here is that given in Wilhelm Röpke, *Crises and Cycles* (London 1936), p. 19.



developed the following monthly chronology for business cycles during the postinflation years:<sup>3</sup>

Nov. 1923–July 1924	recession	} period of adaptation
Aug. 1924–Sept. 1924	primary rise	
Oct. 1924–Jan. 1925	boom	
Feb. 1925–June 1925	capital shortage	
July 1925–Jan. 1926	recession	
Feb. 1926–Oct. 1926	primary rise	} upswing
Nov. 1926–Feb. 1927	secondary rise	
Mar. 1927–Dec. 1927	boom	
Jan. 1928–June 1929	capital shortage	} slump
July 1929–end 1932	recession	

The time from November 1923 to October 1926 is characterized as a period of adaptation. For the following years the upswing-slump scheme is used again. In Spiethoff's recent use of this work for his annual chronology, the year 1929 appears as a recession year.

Let us next consider the chronology presented by Ernst F. Wagemann,<sup>4</sup> who developed a four-phase scheme of the business cycle, consisting of (1) depression, (2) upswing, (3) boom, and (4) downswing. In principle, all these phases are time periods, that is, phases (1) and (3) should not be mistaken as pinpointing peaks or troughs. In determining the duration of cycles, however, Wagemann measures from "low" (*Tiefstand*) to "crises"—terms which could be taken to stand for "trough" and "peak," were it not that the low is always the year following the crisis. Thus we actually have here a duration measure considering the period covered from "one year after the peak" to and including the following peak. The peak years from 1873 to World War I are the same as those given by Spiethoff except that Wagemann places the "crisis" in 1913-14 rather than in 1913. Since peak-to-peak durations (similarly measured) are the same for the two authors, and Wagemann does not specify trough years, Wagemann's chronology was omitted from our annual table. However, Wagemann has also a monthly chronology, for the period November 1923 to December 1927, which differs from Clausing's chronology, and is therefore presented.

Nov. 1923–June 1924	depression
July 1924–Jan. 1925	upswing
Feb. 1925–Sept. 1925	boom
Oct. 1925–Jan. 1926	downswing
Feb. 1926–Oct. 1926	depression
Nov. 1926–Aug. 1927	upswing
Sept. 1927–Nov. 1927	boom
Dec. 1927–	downswing

<sup>3</sup> Gustav Clausing, *Die Wirtschaftlichen Wechsellagen von 1919-32* (Jena, 1933), particularly p. 13. The characterization given here has been somewhat simplified. Readers with specialized interests should thus consult the original source.

<sup>4</sup> Ernst F. Wagemann, *Konjunkturlehre* (Berlin, 1928), particularly pp. 82, 85, and 87.

Comparison between the various chronologies and characterizations is not simple. Table B-1 reveals a fair correspondence in the identification of full cycles and their approximate duration, on an annual basis, except for the fact that Spiethoff regards the years 1903 through 1907 as a single upswing, skipping the 1903-4 contraction shown in the National Bureau chronology. However, the intracyclical phases are not comparable because (1) Spiethoff includes part of the expansion (as measured by the National Bureau) in his "slump"; and (2) he measures durations of phases by the number of calendar years included, while the National Bureau counts the years between turning points. (This is reflected in the different position of the phase brackets in Table B-1.) The general effect of both of these distinctions is to shift Spiethoff's phases forward in time, relative to the expansions and contractions identified by the National Bureau.

In order to compare the chronologies directly in terms of turning points, the last year of Spiethoff's recession was experimentally regarded as a trough, and the last year of his upswing as a peak. The results appear in the Table B-2.

TABLE B-2  
Reference Cycle Turning Points, NBER and Spiethoff-Clausing, Annual,  
1870-1932

PEAKS			TROUGHES		
NBER Date	Spiethoff-Clausing		NBER Date	Spiethoff-Clausing	
	Date	Timing rela- tive to NBER (years)		Date	Timing rela- tive to NBER (years)
			1870	...	
1872	1873	+1	1878	1878	0
1882	1882	0	1886	1883	-3
1890	1890	0	1894	1893	-1
1900	1900	0	1902	1902	-1
1903	...	...	1904	...	...
1907	1907	0	1908	1908	0
1913	1913	0	1914	...	...
1917	...	...	1919	...	...
1922	...	...	1923	...	...
1925	...	...	1926	1926	0
1929	1928	-1	1932	1932	0

Based on sources given in footnotes 1, 2, and 3 of this Appendix. For derivation of Spiethoff-Clausing dates, see the accompanying text.

The annual turning points compare tolerably well. In nine of fourteen cases they are identical, in four more they do not differ by more than a year. Only for the trough in the eighteen-eighties is there a serious discrepancy.<sup>5</sup>

<sup>5</sup> Note that Spiethoff and Wagemann agree on 1873 rather than 1872 as the peak year of the *Gründerjahre*. In view of these opinions and other quantitative evidence, the National Bureau may decide to review the determination of that turning point. Some review of the evidence may also be called for in order to explain the large discrepancy in the timing of the trough in the eighteen-eighties.

A similar comparison can also be carried through for the monthly chronologies of the National Bureau, Clausing, and Wagemann, during part of the interwar period. The last month of recession and of upswing in Clausing's, and the last month of depression and of boom in Wagemann's scheme, will be regarded as turning points (Table B-3).

TABLE B-3  
Reference Cycle Turning Points, NBER, Clausing, and Wagemann,  
Monthly, 1923-1932

<i>NBER Date</i>	<i>Clausing</i>		<i>Wagemann</i>	
	<i>Date</i>	<i>Timing relative to NBER</i>	<i>Date</i>	<i>Timing relative to NBER</i>
PEAKS				
1925, Mar.	1925, June	+3 months	1925, Sept.	+6 months
1929, Apr.	1929, June	+2 months	<sup>a</sup>	
TROUGHES				
1923, Nov.	1924, July	+8 months	1924, June	+7 months
1926, Mar.	1926, Jan.	-2 months	1926, Oct.	+7 months
1932, Aug.	1932, (end)	+4 months	—	—

<sup>a</sup> Wagemann gives Nov. 1927 as end of the boom. This, however, was obviously not a turning point corresponding to the business cycle peak preceding the Great Depression. Wagemann's book was published in 1928.

On the whole, there is agreement on the identification of cycles. The National Bureau, Clausing, and Wagemann agree on the existence of an expansion up to 1925 and a brief contraction from then to 1926. The National Bureau and Clausing concur on the subsequent expansion to 1929 and the following Great Depression. However, there exists considerable difference of opinion on the dates of turning points. Except for one turn, those inferred from the Clausing and the Wagemann chronology are markedly later than those accepted by the National Bureau. This consistent sequence suggests the existence of systematic reasons for the differences in turning points. Wagemann's concept of depression and boom may explain the lag of the last month of these phases behind the National Bureau's reference turns. However, Spiethoff's definition of his phases (as illustrated in the schematic diagram) seems to exclude such explanation.

This is not the place to attempt an evaluation of the substantive merits of the chronologies. As a research tool, the National Bureau reference chronology has the advantage of presenting monthly as well as annual benchmarks, covering the whole period without gaps, and offering explicit reference dates that lend themselves to the computation of comparative

timing and amplitude measures.<sup>6</sup> These advantages are not fortuitous. Unlike the other chronologies, the chronology of the National Bureau was devised as a reference grid for the very purpose of describing and comparing cyclical behavior in various segments of the economy. The National Bureau chronology was used throughout this study, without further reference to alternative ways of periodization.

<sup>6</sup> Regarding the qualitative characterization of each year, the National Bureau of Economic Research has published material on Germany in Willard L. Thorp's *Business Annals* (1926) and Carl T. Schmidt's *German Business Cycles, 1924-1933* (1934), particularly Chapter 2.