CHAPTER THREE

STATISTICAL ANALYSIS OF CYCLICAL FLUCTUATIONS IN SELECTED TIME SERIES, 1924–1933

Economic life is thoroughly dynamic. Population grows and shrinks, wealth is accumulated and dissipated, markets are conquered and lost, fashions and technique change. The volume and prices of business transactions vary from hour to hour, from day to day; they vary every week and every month. Economic life is subject to continuous modifications that occur in most diverse manners.

It might appear that the confusing complexity of economic changes could give no general impression except that of unordered aberrations. However, after careful consideration, the details fade and certain broad categories define themselves. The consequent classification justifies itself in that it provides a working basis for further study.

A chart illustrating the changes in some aspect of economic life over a considerable period of time, for

example, pig-iron production during twenty years, would probably reveal several sorts of fluctuation. Steady growth of population and wealth might induce continual increase in the annual production of iron. The iron industry would be obliged to expand productive capacity. It would be subject to continuous structural change, and the chart of pig-iron production would show a *secular movement.* Again, it is conceivable that a physical calamity, such as an earthquake, might lead to the destruction of a plant and to a sudden decrease in production. An abrupt structural change would be imposed upon the industry, and the chart would show a *random perturbation.* Also, it is possible that there might be a pronounced tendency, year after year, for production to rise during the winter and to decline during the summer. That is, pig-iron production would be subject to *seasonal fluctuations.* Further, the chart might reveal a wave-like movement not characterized by the periodic regularity of the seasonal changes —an alternation of 'boom' and 'dull' periods, each lasting from several months to several years. Pig-iron output would be characterized by *cyclical fluctuations.*[1]

The variety of changes here illustrated is apparent in many aspects of economic activity. These types of

[1] It is possible, of course, that examination of a period longer than twenty years might lead to the discovery of longer rhythmic fluctuations, *'long cycles'.*

economic mutation, then, may be classified as follows:

Secular movements: relatively continuous changes involving no sudden alteration in development but rather a gradual structural modification—growth, decline, extension, regression.

Random perturbations: changes involving a relatively abrupt modification of structure, or of the course of development—conventionally called 'irregular', 'random', or 'accidental'.

Seasonal variations: changes recurring fairly regularly every year and having their origin in the distribution of economic activities according to particular hours, days, weeks, months or seasons, because of climatic conditions, customs, institutions, regulations.

Cyclical fluctuations: "recurrences of rise and decline in activity, affecting most of the economic processes of communities with well-developed business organization, not divisible into waves of amplitudes nearly equal to their own, and averaging in communities at different stages of economic development from about three to about six or seven years in duration." *Business cycles* are "congeries of cyclical fluctuations in a large number of economic activities, fluctuations which differ widely in amplitude and considerably in timing." [2]

It must be recognized that all economic changes

[2] W. C. Mitchell, *Business Cycles: The Problem and Its Setting* (National Bureau of Economic Research, 1927) pp. 468, 309.

are interacting and that a study of business cycles must have frequent reference to various preceding or concurrent non-cyclical fluctuations. Indeed, it is probable that intimate functional relationships exist between the various modifications and fluctuations of an economy.

A type of recurrent rise and decline in many economic activities is the most obvious aspect of cyclical fluctuations. That is, business cycles are aggregations of rhythms of expansion and contraction in individual elements of an economy. Accurate characterization of business cycles, then, must be based upon description of the cyclical fluctuations apparent in representative economic time series. The vague terms of qualitative description must be made precise by measuring the duration of cyclical phases in particular series, the extent and intensity of their swings through expansion and contraction, and the specific pattern of their movements in the various phases. Further, the cycles in each series (which may be called 'specific cycles') must be compared with concurrent cycles in other series and with cycles in other periods of time.

The present aim is to arrive at concise statistical characterization of cyclical movements in series representative of such significant aspects of the German economy as industrial and agricultural production, commodity and security prices, the capital and credit system, domestic and foreign trade, business enterprise and employment. Finally, summari-

zation of the cyclical behavior of major groups in the economic process should make possible further generalization in respect of the course and peculiarities of the business cycle here studied. Obviously, limitations of time, space and data prevent the measurement of cycles in all, or even very many, economic activities. Selection of what are considered to be adequately representative series must be made. Such limitations must give caution to final generalizations.

1. THE TECHNIQUE OF MEASURING CYCLICAL BEHAVIOR

Before the present study was undertaken, the National Bureau of Economic Research had developed a method for determining the cyclical behavior of economic processes and had applied it to several hundreds of time series from the United States, Great Britain, France and Germany.[8] This method has been used for purposes of the present analysis. The procedure is briefly as follows:

When a given time series is taken up for analysis, it is first examined to see whether it reveals cyclical alternations of expansion and contraction. Practically all of the German series available show such

[8] See *Recent Economic Changes* (National Bureau of Economic Research, 1929), II, 890–909; and *Encyclopedia of the Social Sciences* (New York, 1930), Vol. 3, article on Business Cycles, pp. 92–106.

alternations. A series that shows these cyclical characteristics is corrected for seasonal variations, if any appear, and is then broken into segments on the basis of its successive cyclical low points. These segments, which cover a cyclical movement in one series from a low to a high and back to a low, are called the 'specific cycles' of the series, to differentiate them from cycles in general business activity.

Next, the average value of the series during each specific cycle is computed. The values of the original data (corrected for seasonal variations) at the specific low and high points are turned into relatives on the basis of the above average as 100. Further, in order to gain a clear view of the cyclical behavior of different series not merely at their high and low points but also during their phases of expansion and contraction, the patterns are elaborated by taking observations at six other points of each cycle. In order to see what happens during expansion the interval between the initial low point of each cycle and the high point is broken into thirds, the average values of the original data in each of these thirds are computed, and these averages are also turned into relatives of the average value of the specific cycle. The results indicate whether the series rises rapidly from its trough and then continues to advance more slowly; whether it is slow in getting started and then mounts rapidly; whether it rises at a fairly uniform rate or whether the advance is checked and then resumed. Similarly, the period from the high

point of the cycle to the terminal low is broken into thirds, for each of which an average value is determined and then converted into a relative of the cycle average. Thus each specific cycle apparent in a series is turned into a nine-point 'cyclical pattern', which can be compared with other 'cyclical patterns' in any manner that the investigation may suggest.

This procedure eliminates that part of the secular trend which is represented by the change in average value from one cycle to the next. But the 'intra-cycle' trend, as that portion which falls within the limits of one cycle may be called, is retained in the relatives.

The cyclical pattern then shows the average standing of the series during the three months centered on the date of its upturn; its average standings during successive thirds of its period of expansion; its average standing during the three months centered on the date of its downturn; its average standing during the three successive stages of its period of contraction; and finally, its average standing during the three months centered on the date of the upturn that begins the next cycle. All the average standings are in terms of relatives to the average value of the series during a specific cycle, after seasonal variations have been eliminated. The relatives make possible measurement of amplitudes of expansion and contraction in comparable terms for various series.

As indicated above, a business cycle is an aggre-

gation of specific cycles running concurrently in a preponderant number of economic activities of a country. But the agreement in time between the cyclical fluctuations of different series is not close. Indeed, one of the most significant features of business cycles is the chronological sequence in which different activities reach the peaks of their specific cycles and decline, or reach the troughs of their specific cycles and rise. To investigate this order it is necessary to supplement the patterns of specific cycles by a second set of patterns based upon a uniform chronology. The chronology most appropriate is that indicated by the cyclical turning points in the cycles of business activity at large.

Accordingly, a set of 'reference dates' is selected to mark as nearly as possible the months and years in which general business activity in Germany experienced successive revivals and recessions.[4] The reference dates are fixed by a critical study both of business annals, drawn from commercial journals and similar sources, and of the specific cycles of whatever statistical series are available. No great precision can be claimed for the reference dates, both because the materials available for fixing them in successive decades vary in character and because business revivals and recessions are not single events occurring at a point in time, but processes that

[4] 'Revival' is the period when most economic activities have ceased to contract and begin to turn up; 'recession' is the period when they have ceased to expand and begin to turn down.

begin in some part of the business system and take months, usually more than a year, to run their full course. To date one of these turns by a single month is therefore arbitrary. The aim is to fix upon the months in which changes in the direction of business developments from expansion to contraction, or from contraction to expansion, had become general. A time-scale to record the sequence in which the specific cycles of different business factors make their cyclical turns is necessary. The reference dates serve that purpose, however they may be fixed.

The statistical series to be analyzed is now broken up into a new set of cyclical segments. The first set —the specific-cycle segments—was fixed by the successive cyclical lows and highs found in the series itself. The new set—the reference-cycle segments—is fixed by the successive cyclical lows and highs as established for general business activity. In most series a one-to-one correspondence between specific cycles and reference cycles is found, together with a fairly regular lead or lag of the specific revivals and recessions in comparison with the reference revivals and recessions. Other series show similar correspondence during much of the time, but now and then have an extra specific cycle or skip a reference cycle. A few series show no systematic relationship in time between their specific and reference cycles.

With the reference-cycle segments as a basis, a new set of nine-point relatives freed from seasonal variations is computed, with the average value of the

original data (corrected for seasonal variations) during each reference cycle as 100. Thus a nine-point 'reference-cycle' pattern is obtained.[5] This makes possible computation of a set of three indexes of conformity of series to the 'reference-cycle' pattern. (1) If a series shows a net rise during the reference-cycle expansion, it is said to have positive conformity in expansion: +. If the reverse is true, it is said to have negative conformity: —. (2) Similarly, agreement or disagreement of the series with the reference-cycle contraction is indicated as + or —. (3) In some series there may be a rise or a fall throughout both reference-cycle periods. If in such a case a rise in expansion exceeds a rise in contraction, or a fall in expansion is less than a fall in contraction, the index is +. If, on the other hand, there is a rise in expansion less than a rise in contraction, or a fall in expansion greater than a fall in contraction, the index is —.

The cyclical behavior of each series can now be statistically described in respect of its (1) specific amplitude, duration and turning points; and (2) conformity to, or difference from, the fluctuations in general business, with respect to turning points and movement during expansion and contraction periods.[6]

[5] It should be emphasized that this reference-cycle pattern, except for the timing of the cyclical segments, is obtained with the data of the original series in the same way as the specific-cycle pattern.

[6] The method described above has reference to analysis of monthly data, in which form most of the series are expressed. Analysis of

2. COMPARISON OF CYCLICAL FLUCTUATIONS IN GERMAN ECONOMY DURING PRE-WAR AND POST-INFLATION PERIODS

A statistical study of the post-inflation cycles in German economy may well begin with a comparison of various manifestations of such cycles with pre-War cyclical experience. There is reason to believe that such a study will indicate in broad outlines the respects in which the recent cycles are peculiar. That is, a comparison of the pre-War and post-inflation cyclical behavior of comparable series representative of many aspects of the economy should offer general answers to such questions as the following: Do the cyclical fluctuations, 1924–33, depart from average experience in their total duration and in the duration of their phases of expansion and contraction? Are there significant differences in the conformity of particular series to cyclical movements in general business, as between the pre-War and post-inflation periods? How closely grouped temporally are the cyclical turning points of the series (so-called 'high' and 'low' points) in the two periods? How does the extent of the cyclical upswings and downswings in

annual data is similar. There is, of course, no correction for seasonal variation. In the elaboration of specific-cycle and reference-cycle patterns there is only one observation each between low and high points, and between high and low points, instead of three observations each, as in the case of monthly data. This observation is a simple average of the annual values occurring between the turning points. Slight modifications in the technique of analysis are also necessary in the case of quarterly data.

the various post-inflation series compare with pre-War experience?

For this comparison, twenty monthly and quarterly series, eleven of which cover four or more pre-War cycles, have been selected. Most of these series are identical in both periods.[7] They are as follows:

Pig-iron production
Coal production
Coke production
Vessels under construction (quarterly)

Wholesale price index
Index of textile prices
Stock price index

[7] In a few instances, however, it was not possible to secure identical series; cycles in similar series were then compared. Thus, the post-inflation series, 'volume of bills drawn', is compared with the pre-War series, 'bills of exchange tax'. The other instances of this sort are: a new index of wholesale prices of raw materials, agricultural and colonial products (1924–33) is compared with the Schmitz index of wholesale prices of raw materials, agricultural and colonial products (1879–1914); a stock price index based on prices of 329 representative stocks on the Berlin Exchange (1924–33) is compared with 'prices of listed securities', which is an average of the sum of prices of all securities listed on the Berlin Exchange (1904–14); Reichsbahn freight cars placed at the disposal of shippers (1924–33) is compared with Prussian-Hessian Railway cars loaded (1904–08) and cars loaded on all German railways (1908–14); Reichsbahn railway freight receipts (1924–33) is compared with freight earnings of the Prussian-Hessian Railway (1897–1907) and freight earnings on all German railways (1907–13); Reichsbahn passenger and baggage receipts (1924–33) is compared with earnings of the Prussian-Hessian Railway from passengers and baggage (1897–1913).

Reichsbank discount of bills
Private bank discount rate
Reichsbank discount rate
Volume of bills drawn
Freight car loadings
Railway freight earnings
Railway passenger earnings
Reichsbank clearances

Value of imports (quarterly)
Value of exports (quarterly)

Unemployment in trade unions
Applicants for positions

Business failures

Although the above series seem to have considerable significance as reflections of the entire economy, more satisfactory conclusions might be possible if the sample of monthly data were more extensive. In the absence of further monthly data, it was decided that consideration of a sample of twenty-three representative annual series—however limited such series may be for purposes of studying cyclical fluctuations—could at least support the conclusions that might be drawn. These annual series, seventeen of which cover four or more pre-War cycles, are as follows:

Potassium-salts production
Pig-steel production
Sugar beets processed
Zinc production
Wheat crop
Rye Crop
Potato crop
Hay crop

Wholesale price of rye
Wholesale price of potatoes
Wholesale price of wool
Wholesale price of coal
Wholesale price of pig iron
Wholesale price of pork
Wholesale price of lead

Money circulation
Gold cover of money circulation
Savings deposits surplus
Loans and discounts, banks of issue

Railway freight traffic

Coal miners' wages

Organization of joint-stock companies
Business failures

It should be pointed out that the following observations in respect of differences between average pre-War cyclical experience and the post-inflation cycles must be limited by the rather meager data available. However, only broader generalizations concerning such differences are made and it is believed that the representativeness of the series should make such generalizations relevant to the entire German economy.

a. The Duration of Pre-War and Post-Inflation Cycles

The qualitative description given in Chapter II indicates the approximate duration of phases in the two post-inflation business cycles to have been as follows:

I. First cycle, 1924–26
   Expansion: winter 1923–24 to spring 1925
   Contraction: spring 1925 to spring 1926
II. Second cycle, 1926–32
   Expansion: spring 1926 to spring 1928
   Contraction: spring 1928 to autumn 1932

As noted above, for purposes of cyclical analysis particular months have been selected as marking the turning points of these phases of expansion and contraction. These months are as follows:

Revival: December 1923
Recession: April 1925
Low: March 1926
Revival: April 1926
Recession: April 1928
Low: August 1932

Most of the monthly series available show two specific cycles in the post-inflation period whose turning points agree fairly well with the first four dates and the last date selected. The high point and the final low point of the reference cycle, 1926–32, however, present some difficulty. The individual series show considerable difference in the precise dates of these turning points. But it appears that by the middle of spring, 1928, forces making for continuing general expansion had spent themselves. It would thus seem to be quite safe to select April to mark the beginning of general contraction. Furthermore, in late summer 1932 a transition from continuous cyclical decline to revival occurred (hesitant, to be sure) in significant aspects of the economy, particularly in industrial production, employment and security prices. August 1932, then, has been chosen as the final month of the general contraction.

Table 6 presents the National Bureau's selection of turning points of the German business cycles since 1879.

TABLE 6

REFERENCE DATES FOR BUSINESS CYCLES IN GERMANY
1879–1932

Expansion		*Contraction*		*Duration in months*		
REVIVAL	HIGH	RECESSION	LOW	EXPANSION	CONTRACTION	FULL CYCLE
March 1879	Dec. 1879	Jan. 1880	Feb. 1881	10	14	24
March 1881	Jan. 1882	Feb. 1882	Aug. 1886	11	55	66
Sept. 1886	March 1890	April 1890	Feb. 1895	43	59	102
March 1895	March 1900	April 1900	March 1902	61	24	85
April 1902	July 1903	Aug. 1903	Feb. 1905	16	19	35
March 1905	July 1907	Aug. 1907	Oct. 1908	29	15	44
Nov. 1908	April 1913	May 1913	July 1914	54	15	69
Aug. 1914	June 1918	July 1918	June 1919	47	12	59
July 1919	May 1922	June 1922	Nov. 1923	35	18	53
Dec. 1923	March 1925	April 1925	March 1926	16	12	28
April 1926	March 1928	April 1928	Aug. 1932	24	53	77
AVERAGE DURATION:						
11 cycles, 1879 to 1932				31.4	26.9	58.3
3 cycles, 1902 to 1914				33.0	16.3	49.3

This temporal scheme, then, may be accepted, giving the first post-inflation business cycle a duration of 28 months, and the second, one of 77 months. During the 53 years, 1879–1932, there were eleven business cycles, with an average duration of approximately 58.3 months. Thus, the first post-inflation cycle had a duration considerably shorter than the average. Indeed, there was only one pre-War cycle of shorter duration, that of 1879–81. The second post-inflation cycle, on the other hand, was much longer than the average. Only two pre-War cycles, 1886–95, 1895–1902, were longer. These generali-

zations hold also if comparison be made with the three cycles immediately preceding the War, 1902–05, 1905–08, 1908–14.

The eleven cycles show an average expansion of approximately 31.4 months and an average contraction of 26.9 months. That is, during the entire period considered, the average duration of expansion was 54 per cent of the total duration of the cycles, and the average contraction, 46 per cent. Corresponding averages for the three cycles, 1902–05, 1905–08, 1908–14, are: expansion, 67 per cent, contraction, 33 per cent. The first post-inflation cycle shows the following relationship: expansion, 57 per cent, contraction, 43 per cent. Thus, this cycle does not depart essentially from pre-War experience, which indicated that, on the average, somewhat more than half the total duration of the cycle consisted of expansion. However, in the second post-inflation cycle the proportion is: expansion, 31 per cent, contraction, 69 per cent. In four pre-War cycles—1879–81, 1881–86, 1886–95, 1902–05—contraction lasted for more than half the total duration of the cycle; but in only one of these, 1881–86, was its duration more than 60 per cent of the total.

Thus, the duration of the two post-inflation business cycles departs most conspicuously from average experience in the shortness of the first cycle, 1924–26, in the length of the second cycle, 1926–32, and in its relatively long contraction phase.

b. Conformity of Various Series to the Cyclical Reference-Pattern in Pre-War and Post-Inflation Periods

It has been noted above that business cycles may be conceived of as aggregates of rhythms of expansion and contraction, of recurrences of rise and fall, in many individual economic activities, which vary in duration from two to seven years. They are given conceptual validity by the conformity of most activities in an economy to their temporal pattern. The larger the relative number of series exhibiting specific cycles that conform to the timing of a particular cycle in 'general business', the more precise, the more significant for the economy must such a cycle be.

The twenty monthly and quarterly series, and the twenty-three annual series, enumerated above, have been examined in order to measure the conformity of their behavior to the reference-cycle pattern as indicated in Table 6. Only if a series rises during a reference-cycle expansion and falls during the following reference-cycle contraction is it said to show complete conformity.[8] The method of deriving 'conformity' indexes is described more fully in the preceding section. The extent to which the forty-three monthly, quarterly and annual series conformed to

[8] If the series declines during a reference-cycle expansion and rises during the subsequent reference-cycle contraction, it is said to have inverse conformity. This is generally true of such series as unemployment and business failures.

TABLE 7

CONFORMITY OF VARIOUS SERIES TO REFERENCE CYCLES IN PRE-WAR AND POST-INFLATION PERIODS[1]

	CYCLE 1902–05	CYCLE 1905–08	CYCLE 1908–14	CYCLE 1923–26	CYCLE 1926–32
Monthly and Quarterly Series					
Number of series covering period of the cycle ..	16	19	20	19	20
Number of series showing					
Direct conformity ..	7	13	14	10	15
Inverse conformity ..	2	3	3	2	3
Annual Series					
Number of series covering period of the cycle ..	23	23	23	23	23
Number of series showing					
Direct conformity ..	3	12	15	8	13
Inverse conformity ..	6	4	1	2	2

[1] As is indicated in the table, not all of the forty-three series cover the period of each of the reference-cycles. Moreover, the number of series showing positive and negative conformity to the reference-cycle is not the same as the number of series covering the period of the cycle, because in each case there are some series that show no conformity.

the reference-cycles, April 1902—February 1905; March 1905—October 1908; November 1908—July 1914; December 1923—March 1926; April 1926—January 1932, is presented in Table 7.

A large proportion of the series in Table 7 conform to the three reference-cycles: March 1905—October 1908, November 1908—July 1914, and April 1926—August 1932. Smaller proportions conform to the two cycles: April 1902—February 1905, and December 1923—March 1926. Both monthly and annual series indicate differences in the conformity of the series from one cycle to another to be much the same. However, cyclical swings of short duration or of minor amplitude are often not reflected in series of annual data. In such series, whose individual yearly items are summations or averages of monthly or of quarterly data, short-run amplitudes are obscured. Thus only the wider cyclical swings are likely to be reflected in annual data. Moreover, even long-run cyclical swings tend to be obscured by annual series with a vigorous rising or falling secular trend. This may explain the fact that there are numerous annual series that do not conform to the relatively short cycles, 1902–05 and 1923–26.

Although all of the series conform to some of the three pre-War cycles and two post-inflation cycles of the reference-pattern, only two series (pig-iron production and freight car loadings) conform to all five cycles. One series, private bank discount rates, was not quoted in 1924 and part of 1925, but conforms to the three pre-War cycles and to the cycle 1926–32. Another series (unemployment in trade

unions) shows inverse conformity in both pre-War and post-inflation periods.

Three series (the index of prices of five textiles, Reichsbank discount of bills and the Reichsbank discount rate) conform to all three pre-War reference-cycles but not to both of the post-inflation cycles. Ten series (production of coal, coke, potassium salts and rye, index of wholesale prices, wholesale price of rye, volume of bills drawn, railway freight earnings, railway passenger earnings and value of imports) conform to the two post-inflation reference-cycles but not to all of the three pre-War reference-cycles. One series, applicants for positions, shows two inverted cycles in the pre-War period, 1902–14, and conforms negatively to the reference-cycles in the period 1924–32. The remaining twenty-five series fail to conform entirely to either all of the pre-War or all of the post-inflation reference-cycles.

Series of industrial production and domestic and foreign trade show, on the whole, close conformity to the reference pattern in both periods. Cycles in agricultural production series only occasionally run parallel to the cyclical course of general business. (Wheat crops showed but two cycles during the years 1902–14 and two cycles of erratic turning points in the period 1924–32; potato crops showed three erratic cycles during 1902–14, and three cycles during 1924–32; rye crops conformed to the reference cycles in the post-inflation period but showed three erratic cycles during 1902–14; hay crops

showed four cycles in the years 1902–14 and two erratic cycles in 1924–32.) Money and banking series tended to conform to the reference-pattern somewhat less in the post-inflation period than in the pre-War period. Prices of agricultural commodities and prices subject to regulation did not conform with regularity during either period.

Of course, the measure of conformity as described above is exacting. Many series characterized by a rising secular trend do not decline during every reference contraction period. Rather, their expansion is retarded. That is, in numerous series that show a rise throughout the period of the reference-cycle, their rate of rise in the expansion period may exceed their rate of rise in the contraction period.[9] If an alternation of acceleration and retardation of a rate of rise be recognized as a kind of conformity to the pattern of general business cycles, then the degree in which the forty-three series reflect all the cyclical movements of the reference-pattern is enlarged. Adding the series in which there is such variation in the rate of change to those in which there are alternating phases of actual rise and decline, it is found that the accepted reference-cycle pattern was evident in the following number of series:

[9] Conversely, in the case of many series that *fall* throughout a reference-cycle period the rate of fall in expansion may be less than the rate of fall in contraction.

REFERENCE-CYCLES	NUMBER OF SERIES COVERING PERIOD OF THE REFERENCE-CYCLE	NUMBER OF SERIES CONFORMING [1]
1902–1905	39	24
1905–1908	42	33
1908–1914	43	36
1923–1926	42	34
1926–1932	43	39

[1] The 'non-conforming' series are: reference-cycle 1902–05: vessels under construction, production of potassium salts, sugar beets processed, zinc production, wholesale price index, wholesale prices of rye, pork, lead and pig iron, volume of bills drawn, money circulation, gold cover of money circulation, savings deposits surplus, coal miners' wages, organization of joint-stock companies; reference-cycle 1905–08: zinc production, wheat, rye and hay crops, stock price index, wholesale prices of pork and coal, gold cover of money circulation, savings deposits surplus; reference-cycle 1908–14: stock price index, wholesale prices of rye, potatoes, wool and coal, gold cover of money circulation, loans and discounts of banks of issue; reference-cycle 1923–26: hay crop, wholesale prices of potatoes, wool, pig iron and coal, coal miners' wages, organization of joint-stock companies, business failures (annual series); reference-cycle 1926–32: hay crop, wholesale prices of potatoes and lead, Reichsbank discount rate. All but a few of these series are of an annual nature (see lists of series, Sec. 2, a).

Summing up the evidence, then, it may be said that conformity of the series to the first post-inflation reference-cycle, December 1923—March 1926, was more apparent than in the pre-War cycle, April 1902—February 1905, but it was relatively less pronounced than in the pre-War cycles, March 1905—October 1908 and November 1908—July 1914. This is probably accounted for by the rise followed by a short but sharp decline during the period of so-called 'halting revival' in the first half of 1924 in eleven of the series considered; and further by the short duration of the contraction phase of the cycle

and the consequent lack of evidence of contraction in many annual series. However, a relatively large proportion of the series conform to the second post-inflation cycle, April 1926—August 1932. This cycle was reflected more generally in the economic activities of Germany than was any pre-War cycle.

c. Cyclical Turning Points in Pre-War and Post-Inflation Cycles

The relative degree of 'scatter' of the specific cyclical turning points of a group of series about reference-cycle turning points is of interest inasmuch as it may give some indication of the representativeness of the reference-dates. That is, if, for instance, the 'high' points of a group of representative series are grouped closely about a reference-cycle 'high', there would seem to be reason to believe that the reference turning point has been well selected.

More than that, however, a measure of the dispersion of turning points of specific series in various cycles may further illuminate the characteristics of such cycles. Small dispersion might indicate that factors making for a change from expansion to contraction in the economy—or from contraction to expansion, as the case may be—impinged within narrow temporal limits upon many aspects of the economy, and that the resistances to the change were slight. On the other hand, a large degree of scatter might indicate that such factors operated slowly and that they were opposed by impulses acting towards a con-

tinuance of the prevailing direction of cyclical movement.

Questions to be answered here, then, are: How closely do the actual turning points of a representative group of time series conform to establish reference turning points in pre-War and post-inflation periods in German economy? How are these actual turning points distributed temporally?

For these purposes cyclical 'highs' and 'lows' of the same groups of 20 monthly and quarterly and 23 annual series considered above have been examined. Turning points of two monthly series, business failures and unemployment in trade unions, are not included in the measurements because they do not extend back beyond one pre-War cycle. The reference turning points selected for comparison are: the highs of March 1900, July 1903, July 1907, April 1913, March 1925 and March 1928; the lows of March 1902, February 1905, October 1908, March 1926 and August 1932. The low points of July 1914 and November 1923 are not included because of the lack of sufficient data to make measurements about these points reliable. Inasmuch as the annual series do not extend beyond 1932, the dispersion of their cyclical turning points about the reference low of 1932 has not been calculated.

Two measures of dispersion of the turning points have been derived: First, the mean deviation of the actual turning points (which are apparent) from each reference turning point, and second, the mean

deviation of the actual turning points from their own median turning point in each cyclical 'high' and 'low'.

TABLE 8a

RELATIVE DISPERSIONS OF SPECIFIC TURNING POINTS OF 18 MONTHLY AND QUARTERLY SERIES[1] REPRESENTATIVE OF PRE-WAR AND POST-INFLATION GERMAN ECONOMY

REFERENCE TURNING POINT	NUMBER OF SERIES SHOWING SPECIFIC TURNING POINT	MEAN DEVIATION FROM REFERENCE TURNING POINT (*months*)	MEAN DEVIATION FROM MEDIAN TURNING POINT (*months*)
High—March 1900	13	5·9	5·4
High—July 1903	10	11.8	8.8
High—July 1907	18	4.2	3.8
High—April 1913	13	9.2	8.8
Average of mean deviations, four pre-War highs		7.8	6·7
High—March 1925	14	3·9	3·5
High—March 1928	18	9.0	8.9
Low—March 1902	15	4·5	4·5
Low—February 1905	13	7.8	7.8
Low—October 1908	18	4·4	3·5
Average of mean deviations, three pre-War lows		5.6	5·3
Low—March 1926	17	4.6	4·4
Low—August 1932	14[2]	4·3	4·3

[1] Three of the 18 series are not available for the years 1900–05, and one series for the years 1924–25. Such series, of course, do not appear in the calculations relating to the high and low points during those periods. Other series not included in the calculations show no change in cyclical direction during the period of the appropriate business

TABLE 8b

RELATIVE DISPERSIONS OF SPECIFIC TURNING POINTS OF 23 ANNUAL SERIES REPRESENTATIVE OF PRE-WAR AND POST-INFLATION GERMAN ECONOMY[1]

REFERENCE TURNING POINT	NUMBER OF SERIES SHOWING SPECIFIC TURNING POINT	MEAN DEVIATION FROM REFERENCE TURNING POINT (years)	MEAN DEVIATION FROM MEDIAN TURNING POINT (years)
High—1900	20	1.2	1.2
High—1903	11	.8	.8
High—1907	20	.8	.8
High—1913	20	·5	·5
Average of mean deviations, four pre-War highs		.8	.8
High—1925	11	·5	·5
High—1928	19	·9	.8
Low—1902	19	·9	·9
Low—1905	13	·9	·9
Low—1908	20	1.2	1.2
Average of mean deviations, three pre-War lows		1.0	1.0
Low—1926	16	·7	·7

[1] Series not included in the calculations show no cyclical turning points during the period of the appropriate business cycle.

cycle. (Thus, in the case of the high points dispersed about March 1900, three series are excluded because they do not extend back so far, and two because they skip the high turning point of the reference-cycle.) This must be remembered in the comparison of the behavior of the series about reference and median turning points.

[2] The four remaining series in the group of 18 had not shown definite cyclical upturns at the time of writing (July 1933).

Tables 8a and 8b show little or no difference between deviations of turning points measured from reference points and from median points. On the basis of this relatively small sample of economic series, then, it may be said that the 'reference dates' for the periods 1900–13 and 1924–32 are adequately representative.

Moreover, the tables indicate that, in comparison with pre-War experience, the high points marking the end of expansion and the beginning of contraction in early 1925 were compactly grouped in time, that the low points marking the subsequent upturn in 1926 were fairly compact, that the high points in the cycle 1926–32 were conspicuously scattered. The meager evidence available indicates that the low points terminating the contraction of 1928–32 were also compact. These observations agree with conclusions arrived at above (Ch. II, Part A): namely, the recession of 1925 came suddenly and found slight resistance in the economy; the subsequent recovery was also swift and was almost immediately evident in many aspects of German economy; the downturn into the second post-inflation contraction became apparent in many series at widely separated times and thus was not clearly defined; and finally, a measure of recovery set in fairly quickly during the summer and autumn of 1932.

d. The Amplitudes of Pre-War and Post-Inflation Cycles

A further characterization, and a vivid one, can be drawn for the post-inflation cycles by comparing them with pre-War cyclical fluctuations in the extent of the upswings and downswings during expansion and contraction. For this purpose of comparing cyclical amplitudes Table 9 has been prepared, giving for each of the series admitting comparison:

1. The average amplitude of cyclical rise and fall, and of the total rise and fall, together with the average rise and fall per month (in the case of monthly series) or per year (in the case of annual series), of the specific cycles shown by each series during the entire pre-War period on record;
2. The amplitudes of cyclical rise and fall, and of the total rise and fall, together with the rise and fall per month or per year, of the specific cycles shown by each series during the period approximately delimited by the years 1900 and 1914;
3. The amplitudes of cyclical rise and fall, and of the total rise and fall, together with the rise and fall per month or per year, of the specific cycles shown by each series during the post-inflation period, 1924–32.

Table 9 relates to cyclical amplitudes of the forty-three series enumerated above. Twenty-eight of these series show four or more pre-War cycles. The table is arranged in four parts: Part A presents amplitudes of fifteen series that conform passably to the reference-cycles established for the period 1924–32. Part B presents the amplitudes of thirteen series, most of them annual, which show but one cycle in the period 1924–32. Parts C and D include respectively five series that underwent three or more cycles and ten series showing two non-conforming cycles in the period 1924–32. Inverted series—namely, business failures and unemployment—are indicated by the use of minus signs in the columns headed 'Rise' and 'Rise per month or year', and by plus signs in the columns headed 'Fall' and 'Fall per month or year'. The cyclical amplitudes are measured in percentages of the averages of the series during each specific cycle.

TABLE 9

AMPLITUDE OF SPECIFIC CYCLE FLUCTUATIONS IN GERMAN TIME SERIES DURING PRE-WAR AND POST-INFLATION CYCLES

PART A

CYCLES CONFORMING CLOSELY IN TIMING WITH THE STANDARD REFERENCE-CYCLES IN THE POST-INFLATION PERIOD

	AMPLITUDE OF CYCLICAL FLUCTUATIONS				
	RISE	FALL	RISE AND FALL	RISE PER MONTH OR YEAR	FALL PER MONTH OR YEAR
A. INDUSTRIAL AND AGRICULTURAL PRODUCTION					
1. *Monthly and Quarterly Series*					
PRODUCTION OF PIG IRON					
Average of 6 pre-War cycles					
Aug. '81—June '14	+43.3	−14.5	57.8	+0.9	−1.2
Three pre-War cycles					
Nov. '01—Aug. '03—May '04	+31	−6	37	+1.4	−0.7
June '04—Apr. '07—Oct. '08	+27	−17	44	+0.8	−0.9
Nov. '08—July '13—June '14	+53	−8	61	+0.9	−0.7
Post-inflation cycles					
Oct. '23—June '25—Feb. '26	+108	−45	153	+5.4	−5.6
Mar. '26—Nov. '27—Aug. '32	+72	−115	187	+3.4	−2.0
PRODUCTION OF COAL					
Average of 4 pre-War cycles					
Apr. '02—Nov. '14	+25.2	−18.0	43.2	+0.9	−2.2
Four pre-War cycles					
Apr. '02—Mar. '04—July '04	+29	−11	40	+1.2	−2.8
Aug. '04—July '08—Jan. '09	+28	−10	38	+0.6	−1.7
Feb. '09—May '11—Oct. '11	+17	−8	25	+0.6	−1.6
Nov. '11—June '13—Nov. '14	+27	−43	70	+1.4	−2.5
Post-inflation cycles					
Aug. '23—Sept. '24—Jan. '26	+87	−10	97	+6.7	−0.6
Feb. '26—July '29—Mar. '32	+32	−52	84	+0.8	−1.6

TABLE 9 *(cont.)*

AMPLITUDE OF SPECIFIC CYCLE FLUCTUATIONS IN GERMAN TIME SERIES DURING PRE-WAR AND POST-INFLATION CYCLES

PART A

CYCLES CONFORMING CLOSELY IN TIMING WITH THE STANDARD REFERENCE-CYCLES IN THE POST-INFLATION PERIOD

	AMPLITUDE OF CYCLICAL FLUCTUATIONS				
	RISE	FALL	RISE AND FALL	RISE PER MONTH OR YEAR	FALL PER MONTH OR YEAR
PRODUCTION OF COKE					
Average of 2 pre-War cycles					
Apr. '02–Aug. '14	+72	−38	110	+1.1	−4.7
Two pre-War cycles					
Apr. '02–Feb. '08–May '09	+90	−18	108	+1.3	−1.2
June '09–Jan. '14–Aug. '14	+54	−58	112	+1.0	−8.3
Post-inflation cycles					
Oct. '23–Nov. '24–Jan. '26	+93	−21	114	+7.2	−1.5
Feb. '26–Nov. '29–Apr. '32	+58	−78	136	+1.3	−2.7
VESSELS UNDER CONSTRUCTION					
Average of 5 pre-War cycles					
IVQ '95–IIQ '09	+58.8	−54.4	113.2	+3.9	−3.6
Three pre-War cycles					
IIQ '00–IQ '01–IVQ '03	+36	−70	106	+3.0	−2.1
IQ '04–IQ '06–IQ '07	+88	−41	129	+3.3	−3.4
IIQ '07–IVQ '07–IIQ '09	+38	−86	124	+4.2	−4.8
Post-inflation cycles					
IIIQ '23–IQ '25–IIIQ '26	+42	−96	138	+2.0	−5.3
IVQ '26–IIIQ '27–IIQ '33[1]	+125	−191	316	+10.4	−2.8
2. *Annual Series*					
PRODUCTION OF POTASSIUM SALTS					
Average of 6 pre-War cycles					
1879–1915	+54.7	−21	75.8	+11.8	−11.8

[1] Tentative final low.

TABLE 9 *(cont.)*

AMPLITUDE OF SPECIFIC CYCLE FLUCTUATIONS IN GERMAN TIME SERIES DURING PRE-WAR AND POST-INFLATION CYCLES

PART A

CYCLES CONFORMING CLOSELY IN TIMING WITH THE STANDARD REFERENCE-CYCLES IN THE POST-INFLATION PERIOD

	AMPLITUDE OF CYCLICAL FLUCTUATIONS				
	RISE	FALL	RISE AND FALL	RISE PER MONTH OR YEAR	FALL PER MONTH OR YEAR
Two pre-War cycles					
1895–1901–1902	+82	−10	92	+13.7	−10
1902–1913–1915	+125	−72	197	+11.4	−36
Post-inflation cycles					
1924–1925–1926	+36	−21	57	+36	−21
1926–1929–1932[1]	+35	−58	93	+11.7	−19.3
RYE CROP					
Average of 9 pre-War cycles					
1880–1910	+17.5	−11	28.5	+9.7	−8.5
Two pre-War cycles					
1901–1904–1905	+21	−5	26	+7	−5
1905–1909–1910	+17	−9	26	+4.2	−9
Post-inflation cycles					
1924–1925-1926	+35	−25	60	+35	−25
1926–1927–1931	+28	−24	52	+14	−8
B. COMMODITY PRICES					
Monthly Series					
WHOLESALE PRICE INDEX					
Average of 6 pre-War cycles					
(Schmitz) Apr. '79—June '14	+22.2	−18.3	40.5	+0.9	−0.6
Three pre-War cycles					
Mar. '95—Aug. '00—July '04	+29	−16	45	+0.4	−0.3
Aug. '04—Sept. '07—Dec. '08	+26	−13	39	+0.7	−0.9
Jan. '09—May '12—June '14	+21	−8	29	+0.5	−0.3

[1] Tentative final low.

TABLE 9 *(cont.)*

AMPLITUDE OF SPECIFIC CYCLE FLUCTUATIONS IN GERMAN TIME SERIES DURING PRE-WAR AND POST-INFLATION CYCLES

PART A

CYCLES CONFORMING CLOSELY IN TIMING WITH THE STANDARD REFERENCE-CYCLES IN THE POST-INFLATION PERIOD

	AMPLITUDE OF CYCLICAL FLUCTUATIONS				
	RISE	FALL	RISE AND FALL	RISE PER MONTH OR YEAR	FALL PER MONTH OR YEAR
Two post-inflation cycles					
July '24—Jan. '25—Apr. '26	+16	−12	28	+2.7	−0.8
May '26—June '28—Apr. '33	+10	−47	57	+0.4	−0.8
C. SECURITY PRICES					
Monthly Series					
STOCK PRICE INDEX					
Pre-War cycle					
Oct. '05—Aug. '07—Sept. '09	−9	+7	16	−0.4	+0.3
Post-inflation cycles					
June '24—Jan. '25—Dec. '25	+69	−61	130	+9.9	−5.5
Jan. '26—Apr. '27—June '32	+88	−103	191	+5.5	−1.7
D. DOMESTIC TRADE					
Monthly Series					
FREIGHT CAR LOADINGS					
Average of 2 pre-War cycles					
Feb. '05—Aug. '14	+44	−50.5	94.5	+0.9	−23.8
Pre-War cycles					
Feb. '05—Dec. '07—Dec. '08	+30	−7	37	+0.9	−0.6
Jan. '09—June '14—Aug. '14	+58	−94	152	+0.9	−47.0
Post-inflation cycles					
Jan. '24—Feb. '25—Jan. '26	+61	−12	73	+4.7	−1.1
Feb. '26—Feb. '28—Aug. '32	+30	−47	77	+1.2	−0.9
RAILWAY FREIGHT EARNINGS					
Average of 4 pre-War cycles					
July '97—Aug. '14	+37.5	−32.7	70.2	+1.1	−2.7

TABLE 9 *(cont.)*

AMPLITUDE OF SPECIFIC CYCLE FLUCTUATIONS IN GERMAN TIME SERIES DURING PRE-WAR AND POST-INFLATION CYCLES

PART A

CYCLES CONFORMING CLOSELY IN TIMING WITH THE STANDARD REFERENCE-CYCLES IN THE POST-INFLATION PERIOD

	AMPLITUDE OF CYCLICAL FLUCTUATIONS				
	RISE	FALL	RISE AND FALL	RISE PER MONTH OR YEAR	FALL PER MONTH OR YEAR
Three pre-War cycles					
Jan. '02–Feb. '04–Jan. '05	+45	−30	75	+1.7	−2.7
Feb. '05–June '07–Dec. '08	+28	−12	40	+1.0	−0.7
Jan. '09–Sept. '13–Aug. '14	+48	−73	121	+0.8	−6.6
Post-inflation cycles					
July '23–Feb. '25–Jan. '26	+115	−28	143	+6.1	−2.5
Feb. '26–July '29–Jan. '32	+46	−71	117	+1.1	−2.4
RAILWAY PASSENGER EARNINGS					
Average of 3 pre-War cycles					
Mar. '97–Mar. '09	+34	−15.7	49.7	+1.1	−1.1
Two pre-War cycles					
May '02–June '06–June '07	+41	−13	54	+0.8	−1.1
July '07–June '08–Mar. '09	+16	−12	28	+1.3	−1.3
Post-inflation cycles					
Aug. '23–June '25–June '26	+123	−26	149	+5.6	−2.2
July '26–May '29–Mar. '33[1]	+27	−60	87	+0.8	−1.3
E. EMPLOYMENT AND WAGES					
Monthly Series					
UNEMPLOYMENT IN TRADE UNIONS					
One pre-War cycle					
Apr. '09–July '11–Aug. '14	−83	+787	870	−3.0	+21.3
Post-inflation cycles					
Nov. '23–May '25–June '26	−146	+166	312	−8.1	+12.8
July '26–Oct. '27–July '32	−94	+260	354	−5.9	+4.6
APPLICANTS FOR POSITIONS (MALE)					
Average of 2 pre-War cycles	−84.5	+60	144.5	−1.8	+2.7

[1] Tentative final low.

TABLE 9 *(cont.)*

AMPLITUDE OF SPECIFIC CYCLE FLUCTUATIONS IN GERMAN TIME SERIES DURING PRE-WAR AND POST-INFLATION CYCLES

PART A

CYCLES CONFORMING CLOSELY IN TIMING WITH THE STANDARD REFERENCE-CYCLES IN THE POST-INFLATION PERIOD

	AMPLITUDE OF CYCLICAL FLUCTUATIONS				
	RISE	FALL	RISE AND FALL	RISE PER MONTH OR YEAR	FALL PER MONTH OR YEAR
Two pre-War cycles					
Feb. '02—Dec. '06—Dec. '08	−105	+90	195	−1.8	+3.8
Jan. '09—Dec. '11—Aug. '13	−64	+30	94	−1.8	+1.5
Post-inflation cycles					
Jan. '24—Feb. '25—May '26	−93	+160	253	−7.2	+10.7
June '26—Oct. '27—June '32	−52	+327	379	−3.1	+5.8
F. BUSINESS ENTERPRISES					
Monthly Series					
BUSINESS FAILURES					
Pre-War cycle					
Nov. '08—May '10—Apr. '13	−32	+49	81	−1.7	+1.4
Post-inflation cycles					
July '24—Mar. '25—Dec. '25	−51	+126	177	−6.4	+14.0
Jan. '26—Apr. '27—Sept. '31	−170	+173	343	−10.6	+3.3
G. FOREIGN TRADE					
Quarterly Series					
VALUE OF IMPORTS					
Average of 2 pre-War cycles					
1894–1908	+47	−19.5	66.5	+0.65	−1.95
Two pre-War cycles					
IIQ '94—IQ '00—IQ '01	+39	−15	54	+0.6	−1.2
IIQ '01—IVQ '07—IIIQ '08	+55	−24	79	+0.7	−2.7
Post-inflation cycles					
IIIQ '24—IIIQ '25—IQ '26	+11	−47	58	+0.9	−7.8
IIQ '26—IQ '28—IQ '33[1]	+59	−106	165	+2.5	−1.8

[1] Tentative final low.

TABLE 9 *(cont.)*

AMPLITUDE OF SPECIFIC CYCLE FLUCTUATIONS IN GERMAN TIME SERIES DURING PRE-WAR AND POST-INFLATION CYCLES

PART B

SERIES SHOWING ONE CYCLE IN THE POST-INFLATION PERIOD

	AMPLITUDE OF CYCLICAL FLUCTUATIONS				
	RISE	FALL	RISE AND FALL	RISE PER MONTH OR YEAR	FALL PER MONTH OR YEAR
A. INDUSTRIAL AND AGRICULTURAL PRODUCTION					
Annual Series					
PRODUCTION OF PIG STEEL					
Average of 3 pre-War cycles 1883–1915	+110.3	−19.0	129.3	+11.1	−12.5
Three pre-War cycles					
1883–1900–1901	+219	−9	228	+12.9	−9.0
1901–1907–1908	+59	−9	68	+9.8	−9.0
1908–1913–1915	+53	−39	92	+10.6	−19.5
One post-inflation cycle					
1923–1927–1932[1]	+88	−93	181	+22.0	−18.6
SUGAR BEETS PROCESSED					
Average of 9 pre-War cycles 1876–1911	+38.1	−29.3	67.4	+17.5	−26.4
Four pre-War cycles					
1898–1901–1902	+30	−36	66	+10	−36
1902–1903–1904	+13	−23	36	+13	−23
1904–1905–1908	+44	−31	75	+44	−10.3
1908–1910–1911	+32	−54	86	+16	−54
Post-inflation cycle					
1923–1930–1931	+80	−60	140	+11.4	−60.0
ZINC PRODUCTION					
Average of 3 pre-War cycles 1889–1914	+24.7	−7.7	32.4	+2.7	−7.7

[1] Tentative final low.

TABLE 9 *(cont.)*

AMPLITUDE OF SPECIFIC CYCLE FLUCTUATIONS IN GERMAN TIME SERIES DURING PRE-WAR AND POST-INFLATION CYCLES

PART B

SERIES SHOWING ONE CYCLE IN THE POST-INFLATION PERIOD

	AMPLITUDE OF CYCLICAL FLUCTUATIONS				
	RISE	FALL	RISE AND FALL	RISE PER MONTH OR YEAR	FALL PER MONTH OR YEAR
Two pre-War cycles					
1897–1898–1899	+2	−1	3	+2	−1
1899–1913–1914	+61	−21	82	+4.4	−21
Post-inflation cycle					
1924–1929–1932	+89	−81	170	+17.8	−27.0
B. VOLUME AND COST OF CREDIT AND CAPITAL					
Annual Series					
MONEY CIRCULATION					
Average of 3 pre-War cycles					
1888–1913–1914	+28.3	−1.3	39.6	+3.6	−1.3
One pre-War cycle					
1908–1913–1914	+15	−1	16	+3.0	−1.0
Post-inflation cycle					
1924–1929–1931	+47	−3	50	+9.4	−1.5
SAVINGS DEPOSITS SURPLUS					
Average of 7 pre-War cycles					
1881–1914	+68.3	−69.4	137.7	+36.7	−30.6
Four pre-War cycles					
1900–1901–1903	+86	−5	91	+86	−2.5
1903–1904–1907	+6	−101	107	+6	−33.7
1907–1909–1912	+135	−84	219	+67.5	−28.0
1912–1913–1914	+30	−96	126	+30	−96
Post-inflation cycle					
1924–1928–1931	+151	−375	526	+37.8	−125.0

TABLE 9 *(cont.)*

AMPLITUDE OF SPECIFIC CYCLE FLUCTUATIONS IN GERMAN TIME SERIES DURING PRE-WAR AND POST-INFLATION CYCLES

PART B

SERIES SHOWING ONE CYCLE IN THE POST-INFLATION PERIOD

	AMPLITUDE OF CYCLICAL FLUCTUATIONS				
	RISE	FALL	RISE AND FALL	RISE PER MONTH OR YEAR	FALL PER MONTH OR YEAR
C. COMMODITY PRICES					
1. *Monthly Series*					
INDEX OF PRICES OF FIVE TEXTILE COMMODITIES					
Average of 4 pre-War cycles					
Jan. '98–Nov. '11	+29.5	−23.5	53	+1.3	−1.4
Three pre-War cycles					
Dec. '01–Jan. '04–Apr. '05	+31	−16	47	+1.2	−1.1
May '05–Sept. '07–Oct. '08	+35	−33	68	+1.2	−2.5
Nov. '09–Jan. '10–Nov. '11	+18	−13	31	+1.2	−0.6
Post-inflation cycle					
Jan. '27–Sept. '27–Mar. '33[1]	+17	−96	113	+2.1	−1.5
2. *Annual Series*					
WHOLESALE PRICE OF WOOL					
Average of 4 pre-War cycles					
1894–1911	+22.2	−12.7	34.9	+9.2	−8.5
Two pre-War cycles					
1901–1907–1908	+39	−11	50	+6.5	−11.0
1908–1909–1911	+10	−6	16	+10.0	−3.0
Post-inflation cycle					
1926–1928–1932[1]	+23	−91	114	+11.5	−22.8
WHOLESALE PRICE OF PIG IRON					
Average of 5 pre-War cycles					
1881–1914	+32.4	−32	64.7	+6.9	−13.5
Two pre-War cycles					
1902–1907–1909	+28	−37	65	+5.6	−18.5

[1] Tentative final low.

TABLE 9 *(cont.)*

AMPLITUDE OF SPECIFIC CYCLE FLUCTUATIONS IN GERMAN TIME SERIES DURING PRE-WAR AND POST-INFLATION CYCLES

PART B

SERIES SHOWING ONE CYCLE IN THE POST-INFLATION PERIOD

	AMPLITUDE OF CYCLICAL FLUCTUATIONS				
	RISE	FALL	RISE AND FALL	RISE PER MONTH OR YEAR	FALL PER MONTH OR YEAR
1909–1913–1914	+28	−4	32	+7.0	−4.0
Post-inflation cycle					
1928–1930–1932[1]	+2	−20	22	+1.0	−10.0
WHOLESALE PRICE OF COAL					
Average of 2 pre-War cycles					
1897–1910	+27	−5.5	32.5	+9.8	−1.8
Two pre-War cycles					
1897–1901–1906	+29	−6	35	+7.2	−1.2
1906–1908–1910	+25	−5	30	+12.5	−2.5
Post-inflation cycle					
1927–1929–1932[1]	+8	−16	24	+4.0	−5.3
D. DOMESTIC TRADE					
Monthly Series					
REICHSBANK CLEARANCES					
Average of 5 pre-War cycles					
Oct. '86–Aug. '14	+51.2	−31.4	82.6	+1.4	−4.0
Two pre-War cycles					
Jan. '02–Nov. '07–Mar. '08	+61	−15	76	+0.9	−3.8
Apr. '08–Feb. '14–Aug. '14	+63	−75	138	+0.9	−12.5
Post-inflation cycle					
Oct. '23–Apr. '29–Feb. '33[1]	+161	−117	278	+2.4	−2.5
E. EMPLOYMENT AND WAGES					
Annual Series					
COAL MINERS' WAGES					
Average of 2 pre-War cycles					
1902–1914	+22	−6	28	+4.7	−3.7

[1] Tentative final low.

TABLE 9 *(cont.)*

AMPLITUDE OF SPECIFIC CYCLE FLUCTUATIONS IN GERMAN TIME SERIES DURING PRE-WAR AND POST-INFLATION CYCLES

PART B

SERIES SHOWING ONE CYCLE IN THE POST-INFLATION PERIOD

	AMPLITUDE OF CYCLICAL FLUCTUATIONS				
	RISE	FALL	RISE AND FALL	RISE PER MONTH OR YEAR	FALL PER MONTH OR YEAR
Two pre-War cycles					
1902–1907–1909	+25	−9	34	+5.0	−4.5
1909–1913–1914	+18	−3	21	+4.5	−3.0
Post-inflation cycle					
1924–1930–1932[1]	+39	−25	64	+6.5	−12.5
F. BUSINESS ENTERPRISES					
Annual Series					
BUSINESS FAILURES					
Average of 4 pre-War cycles					
1892–1913	−10	+24.2	34.2	−5.9	+9.0
Two pre-War cycles					
1901–1905–1908	−12	+22	34	−3.0	+7.3
1908–1910–1913	−7	+18	25	−3.5	+6.0
Post-inflation cycle					
1926–1927–1931	−65	+78	143	−65	+19.5
ORGANIZATION OF JOINT-STOCK COMPANIES					
Average of 4 pre-War cycles					
1894–1914	+61.2	−57	118.2	+16	−25.6
Three pre-War cycles					
1903–1907–1908	+80	−38	118	+20	−38
1908–1910–1911	+21	−10	31	+10.5	−10
1911–1912–1914	+6	−38	44	+6.0	−19
Post-inflation cycle					
1926–1927–1932[1]	+49	−106	155	+49.0	−21.2

[1] Tentative final low.

TABLE 9 *(cont.)*

AMPLITUDE OF SPECIFIC CYCLE FLUCTUATIONS IN GERMAN TIME SERIES DURING PRE-WAR AND POST-INFLATION CYCLES

PART C

SERIES SHOWING THREE OR MORE CYCLES IN THE POST-INFLATION PERIOD

	AMPLITUDE OF CYCLICAL FLUCTUATIONS				
	RISE	FALL	RISE AND FALL	RISE PER MONTH OR YEAR	FALL PER MONTH OR YEAR
A. AGRICULTURAL PRODUCTION					
Annual Series					
POTATO CROP					
Average of 8 pre-War cycles					
1879–1914	+28.5	−25.3	53.8	+15.5	−16.6
Three pre-War cycles					
1904–1905–1906	+29	−13	42	+29	−13
1906–1909–1911	+9	−28	37	+3	−14
1911–1913–1914	+42	−18	60	+21	−18
Post-inflation cycles					
1923–1925–1926	+26	−34	60	+13	−34
1926–1928–1929	+30	−3	33	+15	−3
1929–1930–1931	+16	−8	24	+16	−8
B. VOLUME AND COST OF CREDIT AND CAPITAL					
1. *Annual Series*					
LOANS AND DISCOUNTS, BANKS OF ISSUE					
Average of 4 pre-War cycles					
1895–1913	+19.7	−9.2	28.9	+7.2	−5.6
Three pre-War cycles					
1902–1903–1904	+7	−3	10	+7.0	−3.0
1904–1907–1909	+25	−15	40	+8.3	−7.5
1909–1912–1913	+23	−8	31	+7.7	−8.0
Three post-inflation cycles					
1924–1925–1926	+37	−35	72	+37	−35
1926–1927–1928	+23	−3	26	+23	−3
1928–1929–1930	+5	−19	24	+5	−19

TABLE 9 *(cont.)*

AMPLITUDE OF SPECIFIC CYCLE FLUCTUATIONS IN GERMAN TIME SERIES DURING PRE-WAR AND POST-INFLATION CYCLES

PART C

SERIES SHOWING THREE OR MORE CYCLES IN THE POST-INFLATION PERIOD

	AMPLITUDE OF CYCLICAL FLUCTUATIONS				
	RISE	FALL	RISE AND FALL	RISE PER MONTH OR YEAR	FALL PER MONTH OR YEAR
2. *Monthly Series*					
REICHSBANK DISCOUNT OF BILLS					
Average of 9 pre-War cycles					
Apr. '79—Nov. '13	+43.0	−33.4	76.4	+1.7	−3.1
Three pre-War cycles					
May '02—Mar. '04—Nov. '04	+28	−26	54	+1.2	−3.2
Dec. '04—Nov. '07—Nov. '08	+49	−43	92	+1.4	−3.6
Dec. '08—Dec. '12—Nov. '13	+64	−60	124	+1.3	−5.5
Post-inflation cycles					
Nov. '23—Nov. '24—July '26	+124	−74	198	+10.3	−3.7
Aug. '26—Oct. '27—Jan. '29	+68	−33	101	+4.5	−2.2
Feb. '29—July '29—Aug. '30	+41	−53	94	+8.2	−3.8
Sept. '30—Nov. '31—Dec. '32	+85	−60	145	+5.7	−4.6
C. COMMODITY PRICES					
Annual Series					
WHOLESALE PRICE OF RYE					
Average of 5 pre-War cycles					
1890–1913	+22.4	−23.2	45.6	+11.2	−11.3
Three pre-War cycles					
1901–1902–1903	+3	−9	12	+3.0	−9.0
1903–1907–1910	+38	−25	63	−25	−8.3
1910–1912–1913	+20	−13	33	−13	−13.0
Post-inflation cycles					
1924–1925–1926	+21	−6	27	+21.0	−6.0
1926–1927–1930	+29	−43	72	+29.0	−14.3
1930–1931–1932[1]	+12	−3	15	+12.0	−3.0

[1] Tentative final low.

TABLE 9 *(cont.)*

AMPLITUDE OF SPECIFIC CYCLE FLUCTUATIONS IN GERMAN TIME SERIES DURING PRE-WAR AND POST-INFLATION CYCLES

PART C

SERIES SHOWING THREE OR MORE CYCLES IN THE POST-INFLATION PERIOD

	AMPLITUDE OF CYCLICAL FLUCTUATIONS				
	RISE	FALL	RISE AND FALL	RISE PER MONTH OR YEAR	FALL PER MONTH OR YEAR
D. DOMESTIC TRADE					
Monthly Series					
VOLUME OF BILLS DRAWN					
(Bills of Exchange Tax)					
Average of 4 pre-War cycles					
Mar. '79—May '09	+39.2	−16.5	55.7	+0.5	−1.2
One pre-War cycle					
Apr. '02—Feb. '08—May '09	+47	−18	65	+0.7	−1.2
Post-inflation cycles					
Feb. '24—Sept. '25—July '26	+81	−51	132	+4.3	−5.1
Aug. '26—Nov. '28—May '31	+50	−51	108	+1.8	−1.7
June '31—Oct. '31—Feb. '33	+53	−55	108	+13.2	−3.2

PART D

SERIES SHOWING TWO CYCLES WITH ERRATIC TURNING POINTS IN THE POST-INFLATION PERIOD

	AMPLITUDE OF CYCLICAL FLUCTUATIONS				
	RISE	FALL	RISE AND FALL	RISE PER MONTH OR YEAR	FALL PER MONTH OR YEAR
A. AGRICULTURAL PRODUCTION					
Annual Series					
WHEAT CROP					
Average of 9 pre-War cycles					
1881–1907	+18.2	−14.4	32.6	+15.7	−10.3
Three pre-War cycles					
1901–1902–1903	+43	−11	54	+43	−11
1903–1904–1905	+7	−3	10	+7	−3

TABLE 9 *(cont.)*

AMPLITUDE OF SPECIFIC CYCLE FLUCTUATIONS IN GERMAN TIME SERIES DURING PRE-WAR AND POST-INFLATION CYCLES

PART D

SERIES SHOWING TWO CYCLES WITH ERRATIC TURNING POINTS IN THE POST-INFLATION PERIOD

	AMPLITUDE OF CYCLICAL FLUCTUATIONS				
	RISE	FALL	RISE AND FALL	RISE PER MONTH OR YEAR	FALL PER MONTH OR YEAR
1905–1906–1907	+7	−12	19	+7	−12
Two post-inflation cycles					
1924–1925–1926	+29	−22	51	+29	−22
1926–1928–1929	+39	−16	55	+19.5	−16
HAY CROP					
Average of 6 pre-War cycles					
1893–1911	+24.3	−18.3	42.6	+18.7	−16.7
Four pre-War cycles					
1901–1903–1904	+17	−21	38	+8.5	−21.0
1904–1906–1907	+28	−15	43	+14.0	−15.0
1907–1908–1909	+9	−20	29	+9.0	−20.0
1909–1910–1911	+26	−35	61	+26	−35
Post-inflation cycles					
1925–1927–1928	+6	−14	20	+3.0	−14.0
1928–1931–1932[1]	+21	−1	22	+7.0	−1.0
B. VOLUME AND COST OF CREDIT AND CAPITAL					
1. *Monthly Series*					
REICHSBANK DISCOUNT RATE					
Average of 8 pre-War cycles					
Nov. '76–July '14	+59.0	−58.4	117.4	+3.9	−2.7
Three pre-War cycles					
Oct. '02–Oct. '04–Aug. '05	+31	−31	62	+1.2	−3.1
Sept. '05–Mar. '07–May '09	+65	−57	122	+3.4	−2.2
June '09–Sept. '13–July '14	+50	−42	92	+1.0	−4.2
Post-inflation cycles					
May '27–Oct. '29–Sept. '30	+39	−54	93	+1.3	−4.9
Oct. '30–Aug. '31–Apr. '33[1]	+137	−137	274	+12.5	−6.8

[1] Tentative final low.

TABLE 9 *(cont.)*

AMPLITUDE OF SPECIFIC CYCLE FLUCTUATIONS IN GERMAN TIME SERIES DURING PRE-WAR AND POST-INFLATION CYCLES

PART D

SERIES SHOWING TWO CYCLES WITH ERRATIC TURNING POINTS IN THE POST-INFLATION PERIOD

	AMPLITUDE OF CYCLICAL FLUCTUATIONS				
	RISE	FALL	RISE AND FALL	RISE PER MONTH OR YEAR	FALL PER MONTH OR YEAR
PRIVATE BANK DISCOUNT RATE					
Average of 10 pre-War cycles					
Oct. '76–Apr. '14	+84.8	−83.6	168.4	+4.2	−4.7
Four pre-War cycles					
Aug. '02–Aug. '03–Mar. '05	+65	−57	122	+5.0	−3.0
Apr. '05–July '07–Nov. '08	+89	−89	178	+3.2	−5.6
Dec. '08–July '10–May '11	+55	−21	76	+2.8	−2.1
June '11–June '13–Apr. '14	+65	−79	144	+2.6	−7.9
Post-inflation cycles					
Jan. '27–Apr. '28–Aug. '30	+48	−65	113	+3.2	−2.3
Sept. '30–Sept. '31–Dec. '32	+86	−76	162	+6.6	−5.1
2. *Annual Series*					
GOLD COVER OF MONEY CIRCULATION					
Average of 8 pre-War cycles					
1882–1912	+5.5	−2.5	8.0	+2.9	−1.5
Four pre-War cycles					
1899–1902–1903	+8	−2	10	+2.7	−2.0
1903–1905–1907	+5	−1	6	+2.5	−0.5
1907–1908–1910	+3	−1	4	+3.0	−0.5
1910–1911–1912	+1	−2	3	+1.0	−2.0
Post-inflation cycles					
1925–1926–1927	+21	−6	27	+21	−6.0
1927–1930–1932[1]	+28	−84	112	+9.3	−42.0

[1] Tentative final low.

TABLE 9 *(cont.)*

AMPLITUDE OF SPECIFIC CYCLE FLUCTUATIONS IN GERMAN TIME SERIES DURING PRE-WAR AND POST-INFLATION CYCLES

PART D

SERIES SHOWING TWO CYCLES WITH ERRATIC TURNING POINTS IN THE POST-INFLATION PERIOD

	AMPLITUDE OF CYCLICAL FLUCTUATIONS				
	RISE	FALL	RISE AND FALL	RISE PER MONTH OR YEAR	FALL PER MONTH OR YEAR
C. COMMODITY PRICES					
Annual Series					
WHOLESALE PRICE OF POTATOES					
Average of 7 pre-War cycles					
1890–1913	+35.7	−31	66.7	+25.8	−17.6
Three pre-War cycles					
1902–1904–1906	+44	−47	91	+22.0	−23.5
1906–1908–1910	+42	−28	70	+21.0	−14.0
1910–1912–1913	+52	−29	81	+26.0	−29.0
Post-inflation cycles					
1925–1927–1930	+75	−90	165	+37.5	−30.0
1930–1931–1932[1]	+5	−6	11	+5.0	−6.0
WHOLESALE PRICE OF PORK					
Average of 6 pre-War cycles					
1891–1914	+22.3	−19.5	41.8	+13.1	−11.6
Four pre-War cycles					
1899–1902–1904	+27	−20	47	+9	−10
1904–1906–1907	+29	−19	48	+14.5	−19
1907–1909–1911	+20	−20	40	+10	−10
1911–1912–1914	+25	−18	43	+25	−9
Post-inflation cycles					
1924–1926–1927	+16	−17	33	+8	−17
1927–1929–1932[1]	+25	−56	81	+12.5	−18.7
WHOLESALE PRICE OF LEAD					
Average of 2 pre-War cycles					
1894–1910	+59	−48.5	107.5	+10.8	−20.3

[1] Tentative final low.

TABLE 9 *(cont.)*

AMPLITUDE OF SPECIFIC CYCLE FLUCTUATIONS IN GERMAN TIME SERIES DURING PRE-WAR AND POST-INFLATION CYCLES

PART D

SERIES SHOWING TWO CYCLES WITH ERRATIC TURNING POINTS IN THE POST-INFLATION PERIOD

	AMPLITUDE OF CYCLICAL FLUCTUATIONS				
	RISE	FALL	RISE AND FALL	RISE PER MONTH OR YEAR	FALL PER MONTH OR YEAR
Pre-War cycle					
1902–1907–1910	+58	−47	105	+11.6	−15.7
Post-inflation cycles					
1924–1925–1928	+16	−53	69	+16.0	−17.7
1928–1929–1932[1]	+13	−88	101	+13.0	−29.3
D. DOMESTIC TRADE					
Annual Series					
RAILWAY FREIGHT TRAFFIC					
Average of 4 pre-War cycles					
1889–1914	+31.2	−6.5	37.7	+5.7	−6.5
Two pre-War cycles					
1901–1907–1908	+32	−1	33	+5.3	−1.0
1908–1913–1914	+33	−21	54	+6.6	−21.0
Post-inflation cycles					
1923–1927–1928	+59	−2	61	+14.8	−2.0
1928–1929–1932[1]	+2	−53	55	+2.0	−17.7
E. FOREIGN TRADE					
Quarterly Series					
VALUE OF EXPORTS					
Average of 2 pre-War cycles					
1894–1909	+48	−14	62	+0.7	−0.6
Two pre-War cycles					
IQ '94–IQ '00–IIQ '01	+46	−8	54	+0.6	−0.5
IIIQ '01–IVQ '06–IIQ '09	+50	−20	70	+0.8	−0.7
Two post-inflation cycles					
IQ '24–IVQ '26–IQ '27	+44	−7	51	+1.3	−2.3
IIQ '27–IIQ '29–IQ '33[1]	+38	−91	129	+1.4	−2.0

[1] Tentative final low.

The first post-inflation cycle, 1924–26, started from a relatively low point, inasmuch as the depression marking the end of the currency inflation had reached extreme depths in many aspects of the economy. The subsequent expansion, beginning in the early months of 1924, and lasting approximately a year, was characterized by rises of relatively large cyclical amplitudes in most of the fifteen series presented in Part A of Table 9. Because of the short duration of this period of expansion, the intensity of rise was high in many series. In only four series was the amplitude of the cyclical rise *less* than the average of expansion amplitudes in corresponding pre-War series.[10] Ten series show *no* pre-War cycle with greater amplitude of expansion.[11] In only one series of the fifteen, vessels under construction, was the intensity of rise (cyclical expansion per month or year) less than the pre-War average.

The contraction in this cycle, occurring in the period 1925–26, was in most series milder than the expansion. Nevertheless, for eight series the amplitude of contraction was greater than pre-War average amplitude.[12] Intensity of the cyclical decline was

[10] Vessels under construction, production of potassium salts, wholesale price index and value of imports.

[11] Production of pig iron, coal, coke and wheat, index of stock prices, freight car loadings, railway freight earnings, railway passenger earnings, unemployment in trade unions, business failures.

[12] Pig-iron production, vessels under construction, rye production,

greater than pre-War average contraction intensity in eleven series.

Ten of the fifteen series show a greater *total* amplitude during the cycle 1924–26 than their pre-War average total amplitude. This would seem to be a reflection of relatively greater amplitude of cyclical expansion rather than of contraction. In ten series the amplitude of rise accounts for 50 per cent or more of the total amplitude and in six of these for more than 70 per cent of the total.[13]

The relatively large amplitude of the first post-inflation cycle, 1924–26, was especially marked in series of industrial production and domestic trade. The cyclical amplitude in agricultural production and commodity price series was not so conspicuously large.

Expansion in the second post-inflation cycle, 1926–32, began at a relatively high level. Only four of the fifteen series show greater amplitude of cyclical rise than in the first post-inflation cycle.[14] But in nine series the amplitude of cyclical expan-

index of stock prices, railway passenger earnings, applicants for positions, business failures, value of imports.

[13] Since only four of the twenty-three annual series considered record a decline in 1925–26, the decline was not strongly pronounced relatively. As noted before, in *annual* series amplitudes of cyclical fluctuations tend to be dampened and only the wider swings are likely to appear.

[14] Vessels under construction, stock prices, business failures, value of imports.

sion was greater than the pre-War average, indicating that the post-inflation period was generally characterized by wide cyclical swings. The intensity of this expansion was less pronounced than in the cycle 1924–26, not only because the amplitude of the rise was in most series less than in that cycle, but also because the length of the period of expansion was generally greater. Only three series show larger intensity of rise in the second post-inflation cycle than in the first. But the rate of expansion of ten series was greater than the corresponding pre-War average.

The cycle 1926–32, however, is characterized especially by great amplitude of contraction. For thirteen series the amplitude of the decline was greater than the average for pre-War cycles. Indeed, eleven series show greater severity of contraction than in any recorded pre-War cycle.[15] Differences in the intensity of the fall were not so pronounced, for many of the series show a relatively long period of contraction. Intensity of fall was greater in the second post-inflation cycle than the corresponding average for pre-War cycles in seven series, and greater than the intensity of fall in the first post-inflation cycle in only three series.

[15] Pig-iron, coal and coke production, vessels under construction, rye production, wholesale price index, index of stock prices, railway passenger earnings, applicants for positions, business failures, value of imports.

Thirteen series show a greater *total* amplitude in the cycle 1926–32 than in their pre-War averages, and of these, nine were marked by greater cyclical amplitude than in the preceding cycle. These instances of relatively large cyclical amplitude are predominantly manifestations of large declines rather than of large rises. For eleven series the amplitude of the cyclical decline accounted for more than 50 per cent of the total amplitude; for three series, which move inversely to the general business cycle, the amplitude of the rise was more than half of the total. As in the first post-inflation cycle, great amplitude was shown in series of industrial production and domestic trade. However, the large amplitude of decline, which characterized this cycle, was conspicuous in practically all the series examined.

That post-inflation cyclical fluctuations have been exceptionally wide is borne out also by those series that show only one cycle or more than two cycles during the years 1924–32. Of thirteen series that passed through one cycle (most of them are annual series) eleven show greater total amplitude than in the average of corresponding pre-War series. Ten of these series are marked by cyclical amplitude of unprecedented severity.[16] Eight series show larger

[16] Sugar beets processed, zinc production, money circulation, savings deposits surplus, index of prices of five textiles, wholesale price of wool, Reichsbank clearings, coal miners' wages, business failures, organization of joint-stock companies.

amplitude of cyclical rise, and twelve exhibit larger amplitude of cyclical fall, than in the pre-War average. Extraordinarily high intensity of rise and fall also was apparent in most of the thirteen series.[17]

Five series, presented in Part C of Table 9, underwent three or more post-inflation cycles. Of these, two show greater amplitude in each of the cycles than in the pre-War average. Two show greater amplitude in only the first post-inflation cycle and one in only the second post-inflation cycle. Part D includes ten series that passed through two cycles with erratic turning points in the years 1924–32. In six series—wheat crop, Reichsbank discount rate, gold cover of money circulation, wholesale price of pork, railway freight traffic, and value of exports—the amplitude of fluctuation of the second cycle was greater than the pre-War average cyclical amplitude.

Thus it may be said that the cyclical amplitude of the swings in the post-inflation period was in most series greater, often considerably greater, than in comparable pre-War series. In ten series out of the group of fifteen that conform to the post-inflation reference-cycles, the total cyclical amplitude of each

[17] Four commodity price series are included in this group. It is interesting to observe that the so-called 'free' prices, as represented by the index of textile raw material prices and the wholesale price of wool, show very wide cyclical fluctuations in the post-inflation period, particularly in the phase of contraction. The prices of coal and iron, which are subject to regulation, are characterized by relatively mild cyclical fluctuations.

of the two post-inflation cycles is greater than the amplitude of the pre-War averages. Series showing but one cycle during 1924–32 also underwent extraordinarily large fluctuations. Relatively wide amplitude is especially evident in industrial production and domestic trade series. The violence of the swings seems to be characterized especially by a wide rise of high intensity with the beginning of post-inflation recovery and a sweeping contraction in the recession after 1928 and 1929.

e. Summary

It appears, then, from the statistical evidence thus far presented, that most aspects of German industrial production and employment, commodity and security prices, money and banking, domestic and foreign trade, passed through two cycles during the years 1924–32.

The first of these cycles, approximately delimited by the dates, December 1923 and March 1926, was of short duration in comparison with pre-War German cyclical experience. High points of the series conforming to the cycle are grouped with relatively small dispersion about March 1925. The expansion phase, which was of exceptional amplitude and intensity, was terminated abruptly. The subsequent contraction was short and of less amplitude than the expansion. Numerous series do not actually fall during the contraction phase of this cycle but most series

show at least retardation in their rates of rise during that phase.

The second post-inflation cycle began during the spring of 1926—approximately in April 1926—and continued until the late summer of 1932. It is thus one of the longest of German cycles on record. It has been closely enmeshed with the totality of German economy, inasmuch as almost all series examined give evidence of actual rise and fall during its course. The high points of series conforming to this cycle appear at widely separated dates. Therefore its crest is difficult to establish. However, a variety of economic activities reached their highest levels during the spring of 1928. The amplitude of rise and fall during the cycle has also been unusually large. Especially marked is the severity and long duration of the phase of contraction.

3. CYCLICAL BEHAVIOR OF SIGNIFICANT GROUPS IN GERMAN ECONOMY, 1924–1933

The comparison of cyclical fluctuations in selected time series during pre-War and post-inflation periods has brought forth certain general characteristics of the cycles from 1924 to 1933. It is believed that more intensive study of groups of series reflecting various important aspects of German economy will further illuminate the nature of the post-inflation cycles.

Eighty-four series relating to a variety of eco-

nomic categories are considered for purposes of this study. They have been classified in the following seven groups: industrial and agricultural production, currency, credit and capital, commodity and security prices, employment and wages, business organization, domestic trade, foreign trade. The character of each of the eighty-four series (all but a few of which cover the full period 1924–33) is described under its appropriate division.[18] The series are examined, according to the procedure outlined above, with a view to determining the duration, timing and amplitude of their cyclical fluctuations, and their conformity to the general pattern.[19]

[18] Most of these series have been published, from time to time, in the quarterly of the Institut für Konjunkturforschung, *Vierteljahrshefte zur Konjunkturforschung*, Vols. 1–8, in the monthly of the Statistisches Reichsamt, *Wirtschaft und Statistik*, Vols. 4–13, and in the annual statistical abstract of the Statistisches Reichsamt, *Statistisches Jahrbuch für das Deutsche Reich*, 1924–1933. A few series have not been published for all the years 1924–33; these were obtained from the Statistisches Reichsamt.

[19] Charts of the specific cyclical pattern in each series are also presented in appropriate sections. The method of obtaining these patterns is described in the first section of this chapter. To repeat briefly, each series is corrected for seasonal variations, if any appear, and then is broken into segments on the basis of its successive cyclical low points. Next, the average value of the series during each specific cycle is computed, and the values at specific low and high points are turned into relatives on the basis of the above average as 100. Further, the periods of specific expansion and contraction are broken into thirds, for each of which an average value is determined and then converted into a relative of the cycle average. Thus, for each specific cycle nine observations are plotted. Inasmuch as these nine points are calculated on the basis of the average of the items in the cycle to which they relate, the terminal low of the first cycle and the initial low of the second cycle have in most instances differ-

a. Industrial and Agricultural Production

Twenty-four series have been selected as representative of various aspects of industrial and agricultural production. This group includes nine monthly and three annual series of industrial production; two monthly series of building construction and one quarterly series of construction of vessels; two monthly and four annual series reflecting agricultural production; one monthly index of orders for manufacturing and construction industry; and two monthly series of commodity stocks. In somewhat more detail, these series are as follows:

A. INDUSTRIAL PRODUCTION

1. General index of industrial production: a monthly weighted average of commodity output in the coal, iron, non-ferrous metal, lime, cement, tile, potash, machine, automobile, textile, shoe, porcelain, paper, piano and clock industries, on the base, 1928 = 100. This index is estimated to reflect about 30 per cent, in value, of total German industrial production.

2. Index of industrial production of

a. production goods: a weighted monthly average of production of coal, iron, non-ferrous metals, building materials, potash, wood and cellulose, on the base, 1928 = 100. This index is a component of the general index, wherein it has a weight of 50 per cent.

b. consumption goods: a weighted monthly average of production of machines, automobiles, textiles, shoes, por-

ent values. Reference low and high points are marked by heavy vertical lines on the charts.

celain, paper, pianos and clocks, on the base, 1928 = 100. This, too, is a component of the general index, with a weight of 50 per cent.

3. Production of

a. pig iron: total monthly production of pig iron in Germany, exclusive of the Saar, in tons.

b. pig steel: total monthly production of pig steel in Germany, exclusive of the Saar, in tons.

c. coal: total monthly production of coal (bituminous and anthracite) in Germany, exclusive of the Saar, in tons.

d. coke: total monthly production of coke in Germany, exclusive of the Saar, in tons.

e. lignite: total monthly production of lignite ('brown coal') in Germany, exclusive of the Saar, in tons.

4. Index of textile production: a weighted monthly average of output of various textiles, such as cotton yarn, linen yarn and hemp yarn, on the base, 1928 = 100.

5. Production of

a. zinc: total annual production of zinc (ore and refined), in tons.

b. potassium salts: total annual output of potassium salts, in tons.

6. Sugar beets processed: total annual tonnage of sugar beets converted into raw sugar.

B. CONSTRUCTION

7. Residential buildings completed: the number of residential buildings completed each month in 96 large and middle-sized cities. This series extends only from January 1925 onward. Unfortunately, it was impossible to secure monthly data on the beginning of building construction prior to 1928.

8. Industrial buildings completed: the number of industrial buildings completed each month in 96 large and middle-sized cities from January 1925 on.

9. Vessels under construction: the gross tonnage of vessels under construction in German shipyards, during each quarter. This series takes into account only vessels of 100 tons and upwards, the construction of which has actually been commenced.

C. AGRICULTURAL PRODUCTION

10. Crops
    a. rye: total annual crop of rye, in bushels.
    b. wheat: total annual crop of wheat, in bushels.
    c. potato: total annual crop of potatoes, in bushels.
    d. hay: total annual harvest of hay, in tons.

11. Animals marketed for slaughter
    a. hogs: the total weight (in kilograms) of the hogs marketed for slaughter each month.
    b. cattle: the total weight (in kilograms) of cattle marketed for slaughter each month.

D. ORDERS

12. Inflow of orders: an index of the new orders in the iron, machinery, textile and building industries.

"Weighting is based on the money volume of production in the respective industrial groups. So far as it has been possible to distinguish between home and foreign orders, only domestic orders have been taken into account. . . . Statistics based on selling prices are converted into quantity statistics by a process of reduction with the aid of appropriate

price index figures. . . . The index has been calculated on the basis of July, 1924, to June, 1926 = 100." [20]

E. COMMODITY STOCKS

13. Textile raw materials stocks: total weight of stocks of raw cotton, washed wool, wool slivers and flax, in the hands of producers, in terms of relatives on the base, 1928 = 100.

14. Coal stocks: total tonnage of stocks of coal, coke and briquettes at the mines at the end of each month. Coke tonnage has been converted into terms of comparability with coal tonnage on the basis, 1 ton of coke = 1 1/3 tons of coal. One ton of briquettes is assumed to be equivalent to one ton of coal.

Number of specific cycles. The nine monthly series of industrial production, covering the years 1924–33, show two clearly-defined cycles that agree closely in timing with the reference-cycles of that period: the first begins early or in the middle of 1924 and lasts until about the beginning of 1926; the second extends from the latter time to the autumn of 1932. Of the three *annual* series of industrial production, only one—output of potassium salts—shows two cycles, 1924–26 and 1926–33. The others, sugar beets processed and output of zinc, are marked by one cycle in the post-inflation period. (It is possible that the annual data tend to dampen what may have been a relatively mild contraction in 1925 so that it is not at all apparent.) The build-

[20] Ernst Wagemann, *Economic Rhythm* (McGraw-Hill, 1930), pp. 147, 149.

TABLE 10

CYCLICAL BEHAVIOR OF SERIES RELATING TO INDUSTRIAL AND AGRICULTURAL PRODUCTION, 1924–1933

(1)	(2)	(3)			(4)			(5)		(6)		
SERIES	NUMBER AND DELIMITING DATES OF SPECIFIC CYCLES	DURATION IN MONTHS			LEAD (–) OR LAG (+) OF SPECIFIC TURNING POINTS WITH RESPECT TO REFERENCE TURNING POINTS IN MONTHS			CONFORMITY TO BEHAVIOR OF THE TWO REFERENCE CYCLES		AMPLITUDE OF SPECIFIC CYCLE		
		EXPANSION	CONTRACTION	FULL CYCLE	FIRST LOW	SECOND HIGH	SECOND LOW	REFERENCE CYCLE EXPANSION	REFERENCE CYCLE CONTRACTION	EXPANSION	CONTRACTION	FULL CYCLE
A. INDUSTRIAL PRODUCTION												
1. General index	2 Jan'24–Apr'26	20	7	27	+2	+6	+1	+	+	+46	–11	57
	May'26–Aug'32	23	53	76	+1	0	0	+	+	+38	–55	93
2. Indexes of production												
a. production goods	2 Jan'24–Jan'26	13	11	24	+2	–1	–2	+	+	+51	–21	72
	Feb'26–Aug'32	41	38	79	–2	+15	0	+	+	+56	–87	143
b. consumption goods	2 Jan'24–May'26	11	17	28	+2	–3	+2	+	+	+27	–30	57
	Jun'26–Aug'32	16	59	75	+2	–6	0	+	+	+58	–43	101
3. Production of												
a. pig iron	2 Oct'23–Feb'26	20	8	28	–1	+3	–1	+	+	+108	–45	153
	Mar'26–Aug'32	21	57	78	–1	–4	0	+	+	+72	–115	187
b. pig steel	2 Oct'23–Jan'26	16	11	27	–1	–1	–2	+	+	+102	–47	149
	Feb'26–Jan'32	22	50	72	–2	–4	–7	+	+	+76	–108	184
c. coal	2 Aug'23–Jan'26	13	16	29	–3	–6	–2	+	+	+87	–10	97
	Feb'26–Mar'32	42	32	74	–2	+16	–5	+	+	+32	–52	84
d. coke	2 Oct'23–Jan'26	13	14	27	–1	–4	–2	+	+	+93	–21	114
	Feb'26–Apr'32	46	29	75	–2	+20	–4	+	+	+58	–78	136
e. lignite	2 Oct'23–May'26	26	5	31	–1	+9	+2	+	+	+45	–16	61
	Jun'26–Apr'33[1]	35	48	83	+2	+13	+8	+	+	+43	–50	93

4. Index of textile production	2	Jan'24–Apr'26	19	8	27	+2	+5	+1	+	+	+29	−29	58
		May'26–Jun'32	16	58	74	+1	−7	−2	+	+	+48	−42	90
5. Production of													
a. zinc[3]	1	1924–32[1]	5	3	8	+1			+	−	+89	−81	170
							+1	0	+	+			
b. potassium salts[3]	2	1924–26	1	1	2	+1	0	0	+	+	+36	−21	57
		1926–32[1]	3	3	6	0	+1	0	+	+	+35	−58	93
6. Sugar beets processed[3]	1	1923–31	7	1	8	0			+	−	+80	−60	140
							+2	−1	+	+			
B. Construction													
7. Residential buildings completed	1	Sept'25–Mar'32	50	28	78	−6	+20	−5	+	+	+119	−137	256
8. Industrial buildings completed	1	May'27–Mar'32	33	25	58	+14	+23	−5	+	+	+73	−104	177
9. Vessels under construction	2	IIIQ'23–IIIQ'26	21	18	39	−1	−6	+5	−	+	+42	−96	138
		IVQ'26–IIQ'33[1]	12	69	81	+5	−7	+9	+	+	+125	−191	316
C. Agricultural Production													
10. Crops													
a. rye[3]	2	1924–26	1	1	2	+1	0	0	+	+	+35	−25	60
		1926–31	2	3	5	0	0	−1	+	+	+28	−24	52
b. wheat[3]	2	1924–26	1	1	2	+1	0	0	+	+	+29	−22	51
		1926–29	2	1	3	0	0	−3	+	−	+39	−16	55
c. potato[3]	3	1923–26	2	1	3	0	0	0	+	+	+26	−34	60
		1926–29	2	1	3	0	0	*	+	−	+30	−3	33
		1929–31	1	1	2			−1			+16	−8	24
d. hay[3]	2	1925–28	2	1	3	+2	+2	+2	−	−	+6	−14	20
		1928–32[1]	3	1	4	+2	+3	0	−	−	+21	−1	22

TABLE 10 *(cont.)*

CYCLICAL BEHAVIOR OF SERIES RELATING TO INDUSTRIAL AND AGRICULTURAL PRODUCTION, 1924–1933

(1)	(2)	(3)			(4)			(5)		(6)		
SERIES	NUMBER AND DELIMITING DATES OF SPECIFIC CYCLES	DURATION IN MONTHS			LEAD (−) OR LAG (+) OF SPECIFIC TURNING POINTS WITH RESPECT TO REFERENCE TURNING POINTS IN MONTHS			CONFORMITY TO BEHAVIOR OF THE TWO REFERENCE CYCLES		AMPLITUDE OF SPECIFIC CYCLE		
		EXPANSION	CONTRACTION	FULL CYCLE	FIRST LOW	HIGH	SECOND LOW	REFERENCE CYCLE EXPANSION	REFERENCE CYCLE CONTRACTION	EXPANSION	CONTRACTION	FULL CYCLE
C. AGRICULTURAL PRODUCTION												
11. Animals marketed for slaughter												
a. hogs	3 Mar'24–Jul'26	13	15	28	+4	+1	+4	+	+	+55	−39	94
	Aug'26–Oct'29	19	20	39	+4	−1		+	+	+32	−42	74
	Nov'29–Mar'33[1]	25	16	41			+7			+36	−15	51
b. cattle	3 Mar'24–Mar'27	24	12	36	+4	+12	+12	+	−	+32	−20	52
	Apr'27–Nov'30	31	13	44	+12	+19		+	−	+21	−22	43
	Dec'30–Apr'33[1]	13	16	29			+8					
D. ORDERS										+49	−8	57
12. Index of new orders	2 Jan'24–Jan'26	13	11	24	+2	−1	−2	+	+	+86	−57	143
	Feb'26–Feb'32	15	58	73	−2	−11	−6	+	+	+76	−103	179
E. COMMODITY STOCKS												
13. Textile raw materials	1 Aug'26–Oct'31	11	51	62	+5	−8	−10	+	+[2]	+68	−61	129
14. Coal	2 Jun'25–Nov'28	18	23	41	−9	−15		−	−[2]	−148	+55	203
	Dec'28–Apr'33[1]	7	46	53			+8			−22	+124	146

[1] Tentative final low.

[2] Comparison is possible with only the second of the two reference cycles because of the brevity of the series.

[3] Duration in years.

ing construction series, which begin in January 1925, are marked by one cycle in the period 1926–33. One, residential buildings completed, indicates a cyclical contraction during 1925. The quarterly series, vessels under construction, shows two cycles, 1924–26 and 1926–33.

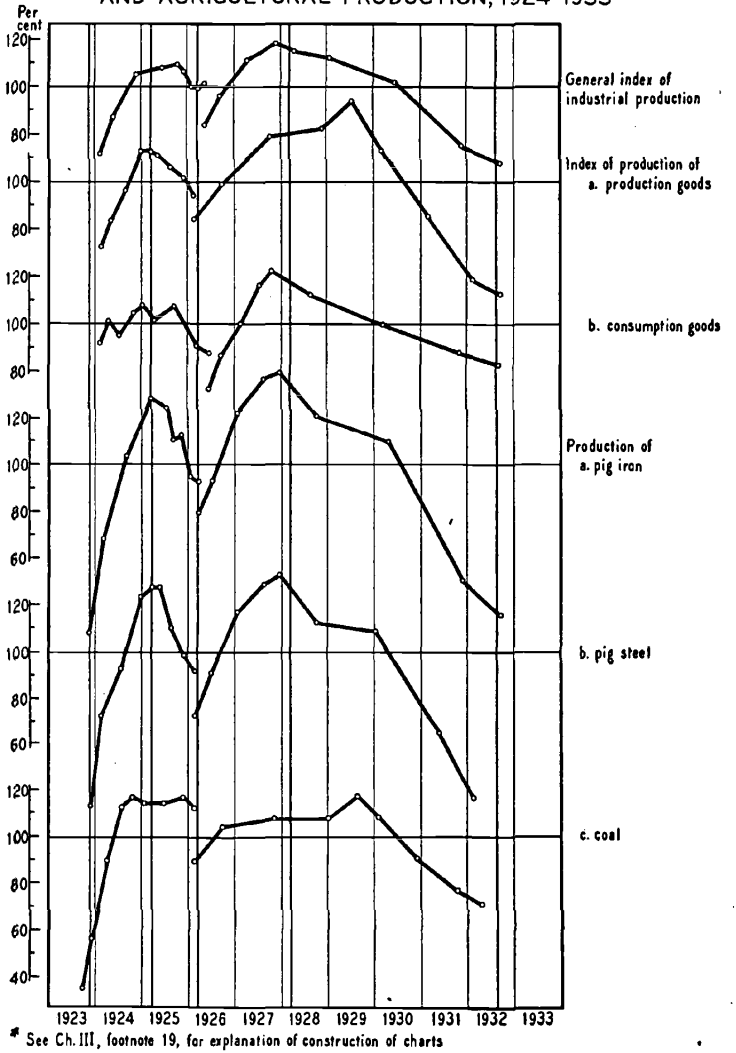
The series of agricultural production fail to agree closely in respect of their specific cycles. The two monthly series, hogs and cattle marketed for slaughter, give evidence of three cycles, but they have little correspondence of timing. The annual series of hay production shows two cycles, 1925–28 and 1928–32; rye production, two cycles, 1924–26 and 1926–31; potato production, three cycles, 1923–26, 1926–29 and 1929–31; wheat production, two cycles, 1924–26 and 1926–29.

'Inflow of orders' passed through two cycles whose terminal points are near those of the two reference-cycles. The coal stocks series, which goes back to the beginning of 1925, shows two inverted cycles, 1925–28 and 1928–33. The series of textile raw materials stocks shows one cycle, 1926–31.

Duration. The durations of the two cycles in the monthly production series show fair correspondence with those of the appropriate reference-cycles. In the first specific cycle, the durations range between 24 and 31 months; in the second, between 72 and 83 months. Durations of the two post-inflation reference-cycles are, respectively, 28 and 77 months. However, in these nine series there is considerable

CHART 2

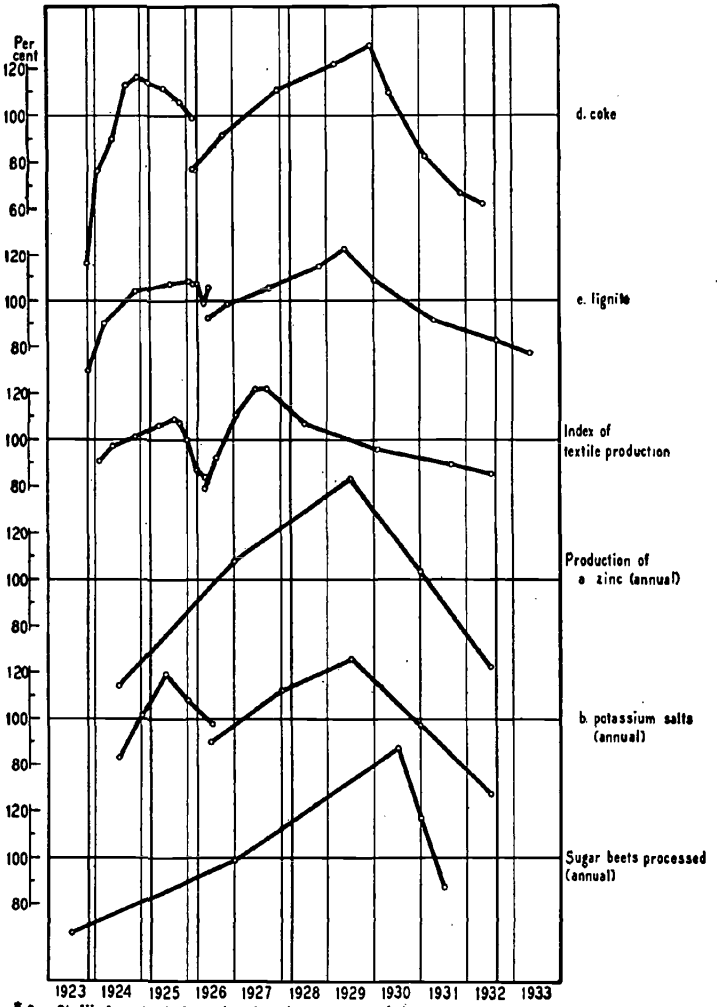
CYCLICAL BEHAVIOR OF SERIES RELATING TO INDUSTRIAL AND AGRICULTURAL PRODUCTION, 1924-1933*



* See Ch. III, footnote 19, for explanation of construction of charts

CHART 2 (CONT.)

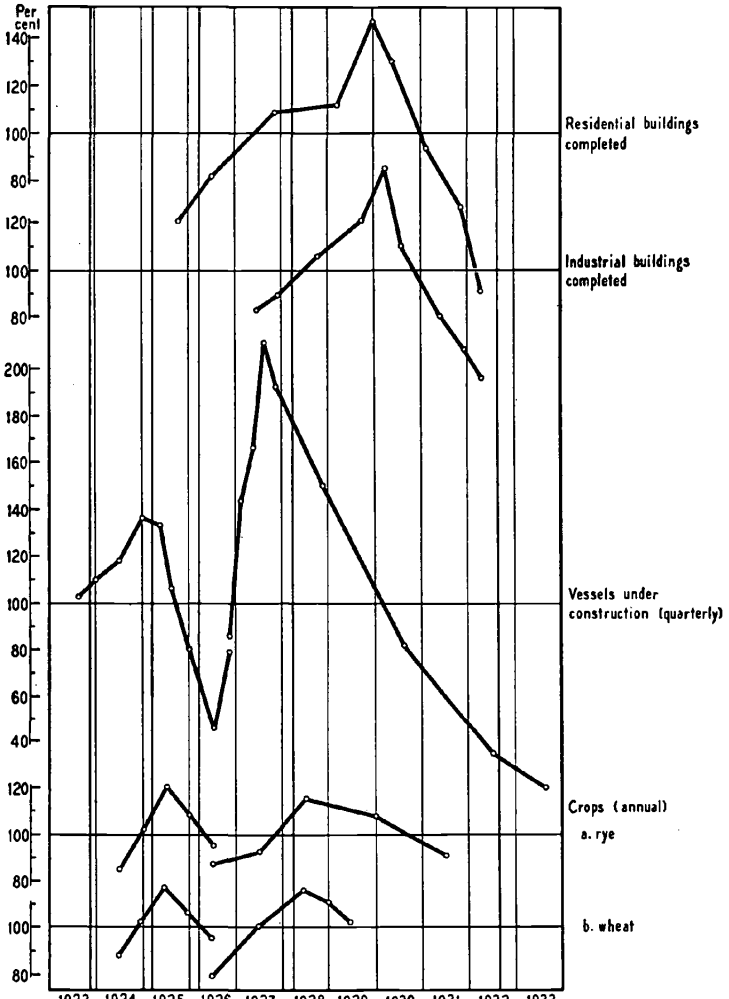
CYCLICAL BEHAVIOR OF SERIES RELATING TO INDUSTRIAL AND AGRICULTURAL PRODUCTION, 1924-1933*



* See Ch. III, footnote 19, for explanation of construction of charts

CHART 2 (CONT.)

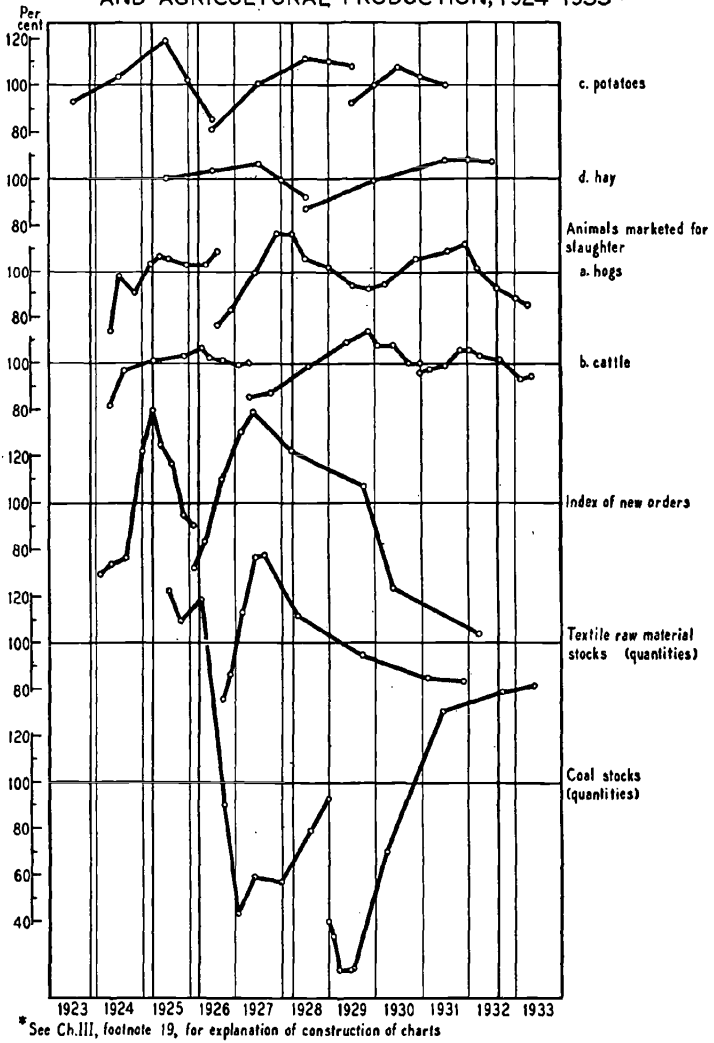
CYCLICAL BEHAVIOR OF SERIES RELATING TO INDUSTRIAL AND AGRICULTURAL PRODUCTION, 1924-1933*



*See Ch. III, footnote 19, for explanation of construction of charts

CHART 2 (CONT.)

CYCLICAL BEHAVIOR OF SERIES RELATING TO INDUSTRIAL AND AGRICULTURAL PRODUCTION, 1924-1933*



*See Ch.III, footnote 19, for explanation of construction of charts

variation in the relative lengths of the phases of expansion and contraction in both specific cycles. The series, general industrial production, output of production goods, pig iron, pig steel, lignite and textiles have, in the first cycle, periods of contraction shorter (by from 16 to 81 per cent) than their periods of expansion. On the other hand, output of consumption goods, coal and coke, show *longer* periods of contraction (by from 7 to 55 per cent). There is as much lack of agreement in the relative lengths of the phases in the second cycle: three series, output of production goods, coal and coke, are characterized by relatively shorter periods of contraction (by from 7 to 37 per cent); and six series, general industrial production, output of consumption goods, pig iron, pig steel, lignite and textiles, have longer periods of contraction (by from 37 to 269 per cent). Both series of building construction show, in their one cycle, a longer period of expansion than of contraction. Contraction in the series of vessels under construction is relatively short in the first cycle and especially long in the second. Agricultural series with two cycles in the post-inflation period show the first cycle to have been of relatively short duration. Of the remaining series, only 'inflow of orders' agrees closely with the reference-pattern in the relative duration of its specific cycles and cyclical phases.

Timing. The cyclical turning points of the series, production of pig iron, are more closely timed with the low and high points in the reference-pattern than

those of any other industrial production series. But all of these series accord fairly well with the reference turning points, except only the 'high' in the second cycle, where some of the specific high points lag considerably. The average deviation of specific turning points (in the nine monthly industrial production series) from corresponding reference points are: initial low point of the first cycle, 1.7 months; high point of the first cycle, 4.2 months; terminal low of the first cycle and initial low of the second cycle, 1.7 months; high point of the second cycle, 9.4 months; terminal low of the second cycle, 2.9 months. Of these nine series, coal, coke and lignite production show the greatest divergences of turning points in both cycles. The building construction series, as is to be expected, show rather long lags in their one apparent cycle. Certain of the cyclical lows and highs in the annual series of agricultural output are surprisingly close in time to the reference points. Three series, rye, wheat and potato crops, agree with the reference-pattern in showing high points in 1925 and 1928, and a low point in 1926. The cyclical turning points in hay crops deviate in every instance but one from the reference points. Like the industrial production series, the index of orders agrees well in timing with the reference lows of 1923, 1926 and 1932, and the high of 1925, but not with the high point of 1928. This series leads the reference-pattern at every turning point except the low of 1923.

Conformity. All of the monthly series of industrial production, building construction and new orders are characterized by specific cycles that conform to the first of the two post-inflation reference-cycles. Vessels under construction show a net decline during the period of the reference-cycle, but at a more rapid rate during the reference period of contraction than during the expansion; the annual series, sugar beets processed and zinc output, rise throughout the period 1924–26, but show a retardation in that advance during the reference contraction phase. Of the agricultural series, hogs slaughtered, rye, wheat and potato crops run a course parallel to the first reference-cycle. Conformity to the reference-cycle 1926–33 is even more pronounced throughout the entire production group. Only four series out of the entire group of twenty-four fail to show cycles that conform to the reference-pattern, namely, cattle marketed for slaughter, wheat, potato and hay crops. The series of coal stocks shows inverse conformity.

Amplitude. In magnitude of average total swing in the two cycles, the series of industrial production rank as follows: production of pig iron, pig steel, coke, production goods, coal, consumption goods, general industrial production, lignite, textiles. Every series but one—coal production—shows greater amplitude in the second post-inflation cycle than in the first. Especially marked were the cyclical amplitudes of rise in the first cycle, and of fall in the second

cycle. These generalizations also hold with respect to the cyclical amplitudes of the series, vessels under construction and new orders. Of the two building construction series, residential building shows the greater amplitude. Both commodity stocks series show wide cyclical swings. Compared with industrial production, the series of agricultural output show small cyclical amplitudes, nor is there consistency in the variation of magnitude of swing from one cycle to another.

General observations. Thus, the series of industrial production, construction, orders and commodity stocks show close correspondence in their cyclical fluctuations. The monthly series of industrial production conform throughout the post-inflation period with the reference-pattern; and the annual series of production, the series of construction, orders and stocks conform fairly closely. Variation from one series to another, however, is great in respect of the relative duration of periods of contraction and expansion. Iron and steel production agrees most closely of all the aspects of industrial production with the reference-pattern, and construction of vessels least. Specific turning points of the first post-inflation cycle apparent in the non-agricultural production series are closely grouped in respect of the reference-cycle low and high points; but the high point in the second cycle is not so well defined. Production of raw materials and of production goods show greater cyclical amplitudes than does production of con-

sumption goods. The amplitude of expansion was outstanding in the first cycle; the amplitude of contraction was outstanding in the second.

The agricultural series give evidence of relatively less agreement with the reference-pattern. Only one of the six series of agricultural output shows cycles that correspond fairly well with the post-inflation reference-cycles; two others pass through two cycles in the period 1924–33 but they differ considerably from the reference-pattern in timing; and three series show three cycles during that period. Cyclical amplitudes of these agricultural series are relatively small.

Two pronounced irregularities in the cyclical movements of the various production series are to be noted. Most of the monthly series are characterized by a sharp and short fall and rise in the late spring and early summer of 1924. This is an aspect of the interruption of expansion that was general throughout the German economy at that time. A sharp credit contraction on the part of the Reichsbank, together with the impingement of a strike in the Ruhr coal mines, seem to have been important factors making for this break in recovery (see Ch. II, Part A, Sec. 1, b). Furthermore, most of the monthly series of output of production goods and raw materials show a decided rise and fall during the period roughly delimited by the autumn of 1928 and the summer of 1929. Unusual seasonal factors, together with a lockout in the Rhenish-Westphalian

iron industry, apparently were active in making for the sudden contraction and subsequent short, compensating, expansion (see Ch. II, Part A, Sec. 4, a). Series of production of consumption goods, lignite and textiles do not give evidence of such an irregular movement.

b. Currency, Credit and Capital

Fourteen monthly series, representative of various aspects of money, banking and capital, have been subjected to cyclical analysis. As few cover the entire post-inflation period, conclusions must be somewhat limited. The series are as follows:

1. The volume of money in circulation: the total volume of money, metal and paper, in circulation at the end of each month during the entire post-inflation period.
2. Reichsbank discount of bills and checks: the total value, at the end of each month, of the bills of exchange and checks discounted by the Reichsbank during the entire post-inflation period.
3. Loans and discounts, banks of issue: the end-of-month totals of the loans and discounts of all the German banks of issue, January 1924–April 1933.
4. Deposits, banks of issue: the end-of-month totals of the deposits with all the German banks of issue, January 1924–April 1933.
5. Loans and advances of private, public and note-issuing banks in Germany. From 80 to 85 per cent of the total banking business in Germany is done by the institutions here represented. The series gives month-end totals, December 1924 to May 1933.
6. Bills discounted by private, public and note-issuing

banks in Germany: the total value at the end of each month from December 1924 to May 1933.

7. Deposits, other than savings, with all the private, public and note-issuing banks in Germany. The series gives monthly totals from December 1924 to May 1933.

8. Monthly net increase in savings deposits with all German savings banks. This series, extending from September 1925 to January 1932, is obtained by subtracting the amount of withdrawals from savings accounts from the amount of deposits.

9. Domestic capital issues

a. bonds. This series gives the total nominal value of all bonds issued in Germany during each month from January 1925 to April 1933.

b. stocks. This series gives the total paid-in value of all shares of stock (excluding new shares issued in connection with the consolidation of enterprises) issued during each month from January 1926 to April 1933.

10. Reichsbank discount rate: the average monthly official discount rate of the Reichsbank for the entire post-inflation period.

11. Interest rates: private bank discount rate. This series gives the average monthly rate of discount for prime bankers' bills, quoted in Berlin, from December 1924 to April 1933.

12. Interest rates: monthly money. This series gives the average monthly rate for 30-day loans, quoted in Berlin, for the entire post-inflation period.

13. Annual rate of return on 5 per cent mortgage bonds: the average annual return on 5 per cent bonds issued by mortgage banks during each month from January 1924 to January 1932.

Number of specific cycles. Of the seven series covering the entire post-inflation period, 1924–33,

only one (annual rate of return on 5 per cent bonds) shows two cycles with temporal limits comparable with the two post-inflation reference cycles. Three (money circulation, Reichsbank discount rates and monthly money rates) of the remaining six series show two cycles with erratic turning points, one (deposits of the bank of issue) shows three cycles, and two (Reichsbank discounts and loans and discounts of issuing banks) show four cycles. Seven other series do not cover the entire period 1924–33, for five begin at the end of 1924, and two begin at the end of 1925. During the period 1925–33, two series show one cycle, one series, two cycles, and two show three cycles; during the period 1926–33, one series shows two cycles, and one, three cycles. There is thus relatively little accord between the series in this group and the reference-pattern in respect of the number of cycles in the post-inflation years, nor is there even much agreement within the group itself. However, in many of the banking series a marked upswing is apparent during 1924–25 to 1929–30, after which there is a tendency towards decline. The series of interest rates show decline throughout the period of the first reference-cycle.

Duration. The specific cycles in these fourteen series vary in duration from 14 to 101 months. Only the one series with two cycles in the years 1924–32 shows similarity to the reference-pattern in respect of duration: the first cycle is short; the second is long and has a relatively long phase of contraction. Series

TABLE 11

CYCLICAL BEHAVIOR OF SERIES RELATING TO CURRENCY, CREDIT AND CAPITAL, 1924–1933

(1)	(2)	(3)			(4)			(5)		(6)		
SERIES	NUMBER AND DELIMITING DATES OF SPECIFIC CYCLES	DURATION IN MONTHS			LEAD (–) OR LAG (+) OF SPECIFIC TURNING POINTS WITH RESPECT TO REFERENCE TURNING POINTS IN MONTHS			CONFORMITY TO BEHAVIOR OF THE TWO REFERENCE CYCLES		AMPLITUDE OF SPECIFIC CYCLE		
		EXPANSION	CONTRACTION	FULL CYCLE	FIRST LOW	HIGH	SECOND LOW	REFERENCE CYCLE EXPANSION	REFERENCE CYCLE CONTRACTION	EXPANSION	CONTRACTION	FULL CYCLE
1. Money circulation	2 Jul'23–May'31	76	18	94	–4			+	–	+122	–12	134
	Jun'31–Dec'32	8	11	19		+20	+4	+	+	+9	–18	27
2. Reichsbank discount of bills and checks	4 Nov'23–Jul'26	12	20	32	0	–4	+4	+	+	+124	–74	198
	Aug'26–Jan'29	15	15	30	+4	–5		+	–	+68	–33	101
	Feb'29–Aug'30	5	14	19						+41	–53	94
	Sept'30–Dec'32	15	13	28			+4			+85	–60	145
3. Loans and discounts, banks of issue	4 Jan'24–Oct'26	18	15	33	+2	+4	+7	+	+	+82	–54	136
	Nov'26–Jan'29	10	17	27	+7	–7		+	–	+41	–30	71
	Feb'29–Aug'30	3	16	19						+43	–51	94
	Sept'30–Dec'32	17	11	28			+4			+73	–54	127

4. Deposits, banks of issue	3	Aug'24–Jun'26	6	16	22	+9	−1	+3	−	+	+61	−56	117
		Jul'26–Jan'31	14	41	55	+3	−7		+	+	+34	−70	104
		Feb'31–Apr'33[1]	8	19	27			+8			+56	−36	92
5. Loans and advances, private, public, and note-issuing banks	1	Dec'24–May'33[1]	73	28	101	+13			+[2]	+[2]	+103	−33	136
							+34	+9					
6. Bills discounted, private, public, and note-issuing banks	3	Dec'24–Aug'26	7	13	20	+13	+4	+5			+25	−12	37
		Sept'26–May'31	41	16	57	+5	+22		+[2]	+[2]	+44	−17	61
		Jun'31–Mar'33[1]	8	14	22			+7			+19	−13	32
7. Deposits (other than savings) in private, public and note-issuing banks	1	Dec'24–May'33[1]	66	35	101	+13			+[2]	+[2]	+84	−48	132
							+27	+9					
8. Monthly net increases in savings deposits, savings banks	2	Dec'25–Sept'27	11	10	21	−3					+79	−38	117
		Oct'27–Aug'31	14	33	47		+8	−12	+[2]	+[2]	+89	−392	481
9. Domestic capital issues													
a. bonds	3	Aug'25–Oct'27	15	11	26	−7					+210	−177	387
		Nov'27–May'29	7	12	19		+2		+[2]	+[2]	+92	−121	213
		Jun'29–Apr'33[1]	15	32	47			+8			+275	−314	589
b. stocks	3	Mar'26–Jan'28	12	10	22	0	−12				+163	−138	301
		Feb'28–Nov'30	12	22	34				+[2]	+[2]	+218	−261	479

TABLE 11 *(cont.)*

CYCLICAL BEHAVIOR OF SERIES RELATING TO CURRENCY, CREDIT AND CAPITAL, 1924–1933

(1)	(2)	(3)			(4)			(5)		(6)		
SERIES	NUMBER AND DELIMITING DATES OF SPECIFIC CYCLES	DURATION IN MONTHS			LEAD (−) OR LAG (+) OF SPECIFIC TURNING POINTS WITH RESPECT TO REFERENCE TURNING POINTS IN MONTHS			CONFORMITY TO BEHAVIOR OF THE TWO REFERENCE CYCLES		AMPLITUDE OF SPECIFIC CYCLE		
		EXPANSION	CONTRACTION	FULL CYCLE	FIRST LOW	HIGH	SECOND LOW	REFERENCE CYCLE EXPANSION	REFERENCE CYCLE CONTRACTION	EXPANSION	CONTRACTION	FULL CYCLE
	Dec'30–Jun'32	9	10	19			−2			+415	−440	855
10. Reichsbank discount rate	2 May'27–Sept'30	29	11	40	+14			−	+	+39	−54	93
	Oct'30–Apr'33[1]	11	20	31		+19	+8	−	+	+137	−137	274
11. Interest rates, private bank discount rate	2 Jan'27–Aug'30	15	28	43	+10	+1		+[2]	+[2]	+48	−65	113
	Sept'30–Dec'32	13	15	28			+4			+86	−76	162
12. Interest rates, monthly money	2 Jun'26–Jul'30	36	13	49	+3	+15		−	+	+55	−69	124
	Aug'30–Dec'32	16	13	29			+4	+	+	+69	−63	132
13. Annual rate of return on 5% mortgage bonds	2 Jun'24–Aug'25	9	5	14	+7	0	−7	−	+	−75	+13	88
	Sept'25–Jun'32	18	55	82	−7	−13	−2	−	−	−47	+39	86

[1] Tentative final low.

[2] Comparison is possible with only the second of the two reference cycles because of the brevity of the series.

with but one cycle during the entire period are characterized by a long phase of expansion and a short contraction. Cyclical durations in the other series show great variations, both in total length and in relative length of phases.

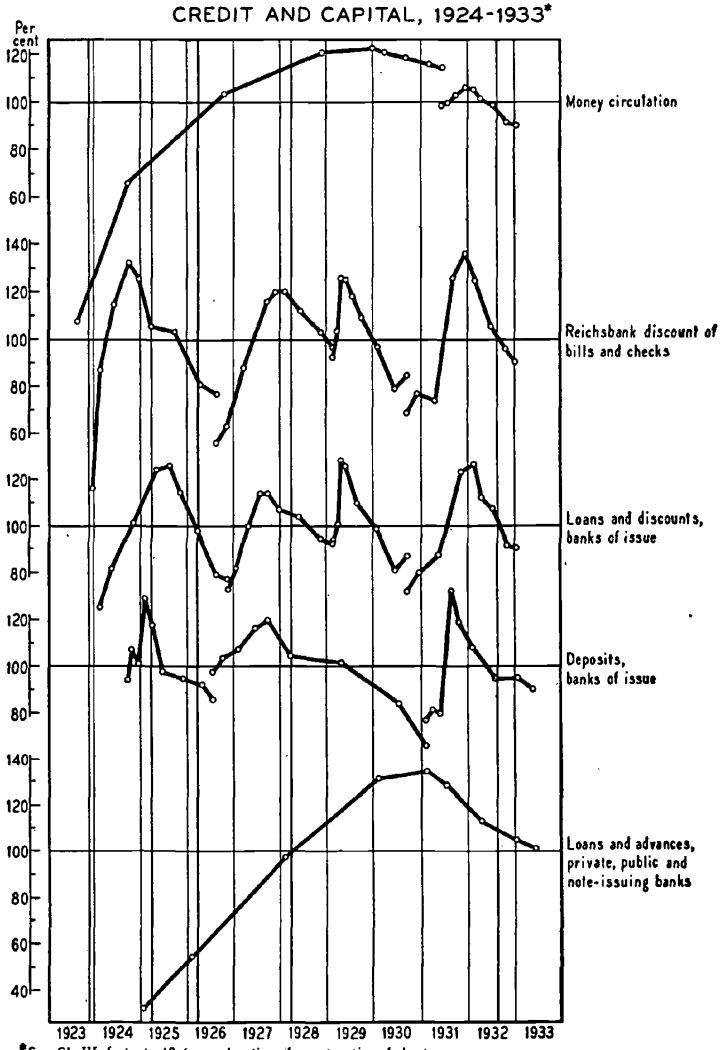
Timing. Because of the differences in the number and character of cycles apparent in the money and banking series, there is little possibility for generalization concerning the relative timing of cyclical turning points. In the one series with two cycles during 1924–32, all turning points except the high in the first cycle and the terminal low of the second cycle show large divergence from the corresponding reference points.

Conformity. Of the seven series that cover the period of the first reference-cycle, 1924–26, only two, discounts of the Reichsbank and of all the banks of issue, show cyclical movements that conform with that reference-cycle. But most give evidence of a retardation in expansion during the first reference contraction period. Ten out of the entire group of fourteen series conform to the second reference-cycle, and one (the annual rate of return on 5 per cent bonds) shows inverse conformity.

Amplitude. The greatest cyclical amplitudes are apparent in the two series of domestic capital issues, although nearly all the series show relatively wide swings. However, great variation in relationship between cyclical phases and amplitude makes any positive generalization difficult. Only a few series agree

CHART 3

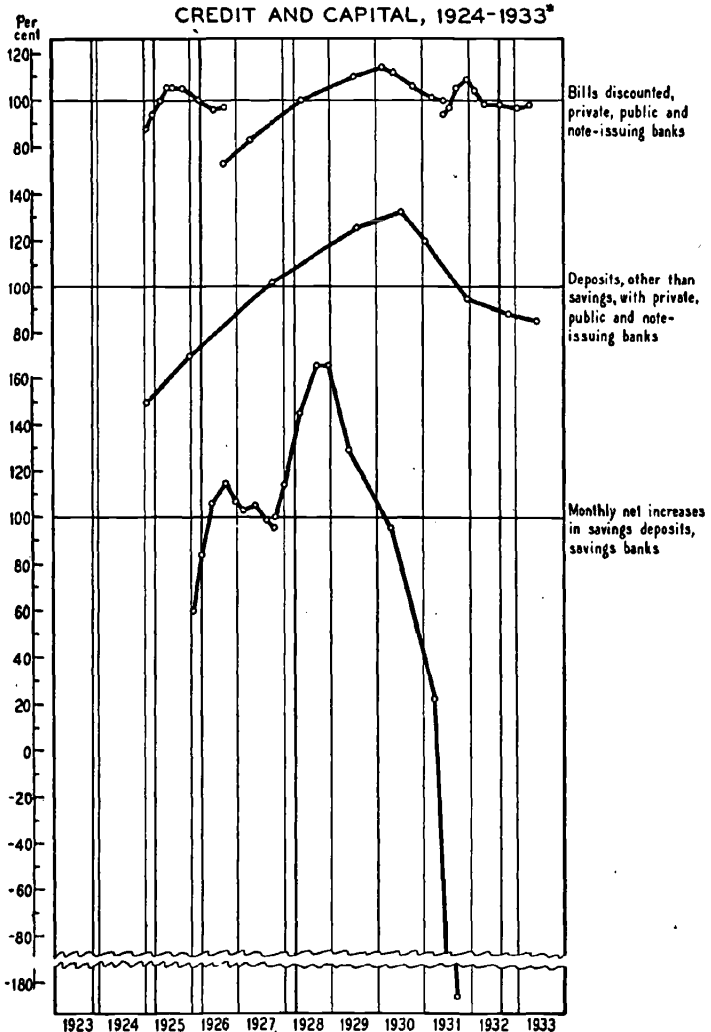
CYCLICAL BEHAVIOR OF SERIES RELATING TO CURRENCY, CREDIT AND CAPITAL, 1924-1933*



*See Ch. III, footnote 19, for explanation of construction of charts

CHART 3 (CONT.)

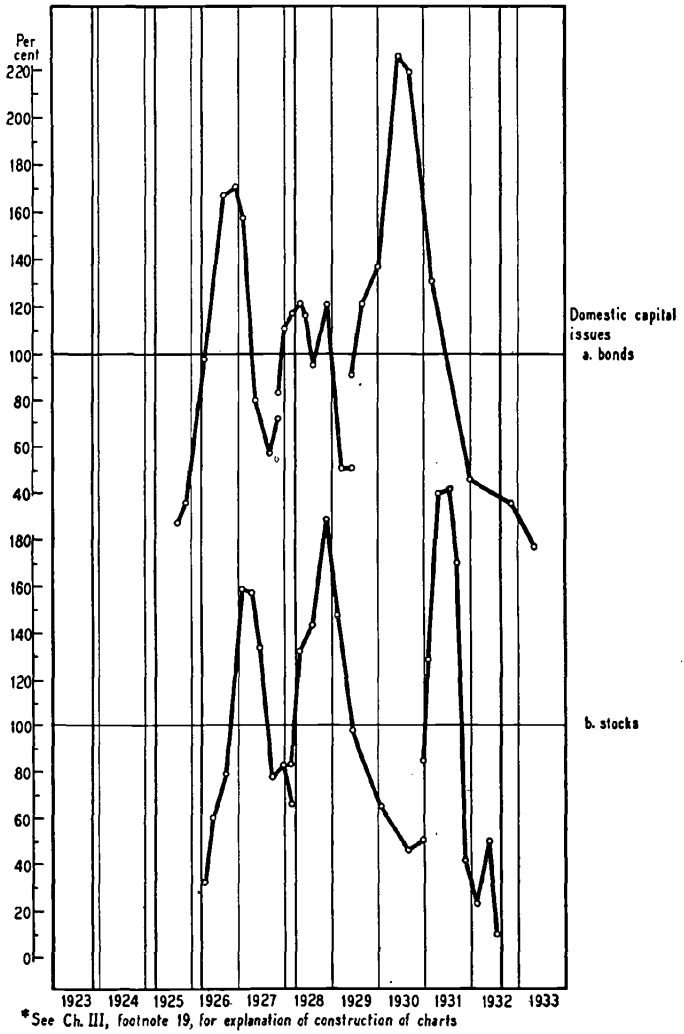
CYCLICAL BEHAVIOR OF SERIES RELATING TO CURRENCY, CREDIT AND CAPITAL, 1924-1933*



*See Ch. III, footnote 19, for explanation of construction of charts

CHART 3 (CONT.)

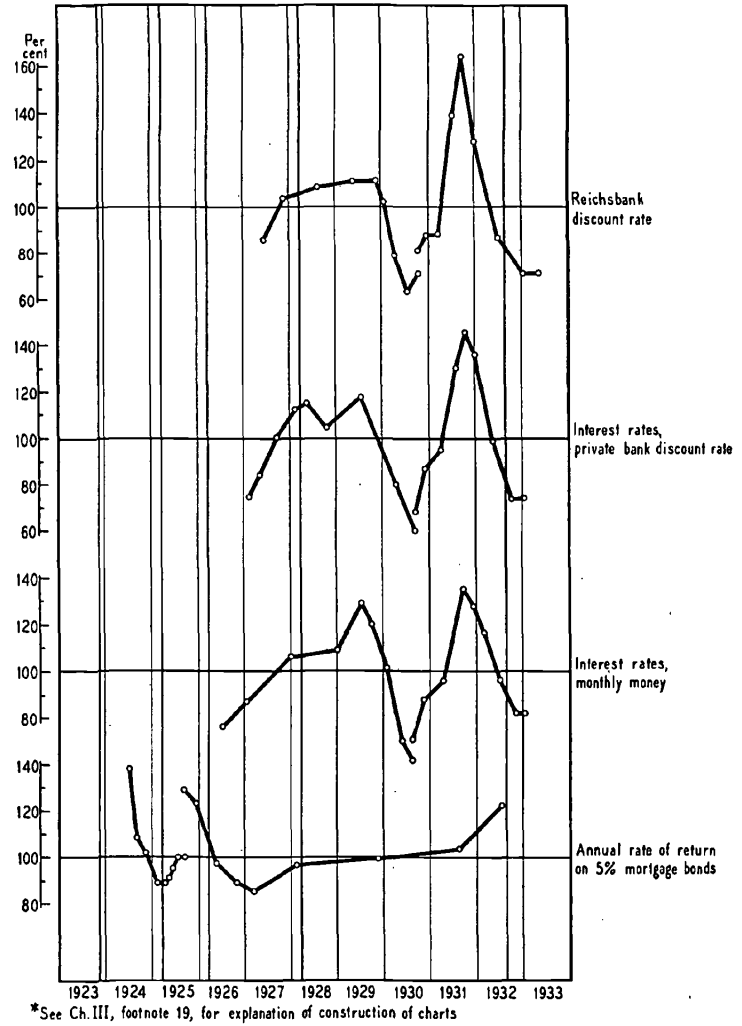
CYCLICAL BEHAVIOR OF SERIES RELATING TO CURRENCY, CREDIT AND CAPITAL, 1924-1933*



*See Ch. III, footnote 19, for explanation of construction of charts

CHART 3 (CONT.)

CYCLICAL BEHAVIOR OF SERIES RELATING TO CURRENCY, CREDIT AND CAPITAL, 1924-1933*



*See Ch. III, footnote 19, for explanation of construction of charts

with the reference-pattern in that they are characterized by an especially wide amplitude in the first post-inflation expansion and in the most recent contraction.

General observations. There is, then, little consistency within this group with respect to cyclical behavior during the post-inflation period. Of all the groups of series here considered, it shows least agreement with the reference-pattern. Series of currency circulation and activities of private, public and note-issuing banks give indication of a tendency to rise to a peak in 1929–30, and to decline thereafter. Series related to the activities of only the banks of issue show cyclical movement parallel to the first reference-cycle and a sharply-pronounced irregular movement during the credit crisis of 1931. The interest rate series show, in general, decline until the end of 1926, rise from then until 1930, decline in 1930, a sharp rise in 1931, and further decline in 1932.

c. Commodity and Security Prices

Fifteen commodity price series and one index of stock prices are considered in this group. Thirteen of the commodity price series and the stock price index cover the period January 1924 to January 1932. Data for two series, the indexes of 'free' and of regulated prices, are available only since January 1926. The various price series are as follows:

1. A general index of commodity prices at wholesale. This

is a weighted arithmetic mean of relative prices on the base, 1913 = 100. It includes some 800 price quotations relating to about 400 commodities. The general index is divisible into several sub-groups:

2. Indexes of wholesale prices of

a. agricultural products. This group has a weight of 35 per cent in the general index. It includes prices of vegetable foods, meats, animal products and fodder.

b. raw materials and semi-finished goods. This has a weight of 38 per cent in the general index. It includes prices of coal, iron and iron raw materials, other metals, textiles, skins and leather, chemicals, fertilizers, technical fats and oils, rubber, paper, building materials.

c. industrial finished goods. Its weight in the general index is 26 per cent. It includes prices of such commodities as machines, tools, household goods, automobiles, furniture, textiles, shoes. This group is in turn divided into two further sub-groups:

(1) production goods

(2) consumption goods

3. An index of ten sensitive commodity prices. This index, a simple arithmetic mean of relatives, includes the wholesale prices of lead, tin plate, wool, flax, hemp, oxhides, calfskins and various metal scraps.

4. An index of prices of five textiles and of textile raw materials, including cotton yarn, cotton cloth, raw silk and German and Australian wool. This also is a simple arithmetic average of relative prices, on the base, 1924-30 = 100.

5. Indexes of wholesale prices of

a. iron and iron raw materials. This index is a weighted arithmetic average of relative prices, on the base, 1913 = 100.

b. coal. This index is a weighted arithmetic average of relative prices, on the base, 1913 = 100.

6. An index of

a. 'free' prices, that is, of commodity prices not subject to regulation. This index is a weighted arithmetic average of relative prices, on the base, 1926 = 100.

b. commodity prices subject to regulation. The index includes prices of bituminous coal, lignite, domestic iron ore, pig iron, iron mill products, aluminum, fertilizers, industrial oils, cellulose and paper, and building materials. This index is a weighted arithmetic average of relative prices, on the base, 1926 = 100.

7. An index of prices of

a. *imported* raw materials and semi-finished goods. This series includes the prices of English coal, Swedish and Spanish iron ores, non-ferrous metals, textile raw materials, and semi-finished goods, hides and leather, technical oils and fats, rubber. This index is a weighted arithmetic average of relative prices, on the base, 1913 = 100.

b. *domestic* raw materials and semi-finished goods. This includes prices of domestic coal, iron ores, pig iron and other iron products, chemicals, artificial fertilizers, paper, building materials. This index is a weighted arithmetic average of relative prices, on the base, 1926 = 100.

8. A general index of cost of living in Germany. This is a weighted arithmetic average of relative prices on the base, 1913–14 = 100. The index pertains to a fixed budget covering expenditures for food, rent, heat and light, clothing and miscellaneous items of a worker's family of five.

9. A general index of stock prices. It is calculated as a simple arithmetic mean of the monthly average prices of 329 representative stocks on the Berlin Bourse, converted into relatives on the base, 1924–26 = 100. Stock quotations were suspended from July 1, 1931 to March 1932.

Number of specific cycles. Twelve of the fourteen price series that cover the years 1924–33 passed through two cycles. The indexes of textile and of coal prices skip the first post-inflation reference-cycle in that they show decline throughout the period 1924–26. The indexes of 'free' and regulated prices, which go back only to the beginning of 1926, show one cycle, 1926–33. In most of the series the cycles are clearly defined; some of the indexes of prices subject to regulation, such as iron and coal, show less definite cycles.

Duration. The duration of the cycle covering the years 1924–26, apparent in twelve series, varies between 18 and 29 months, with an average duration of 23 months for the twelve series. Duration of the second cycle, 1926–32, apparent in all the series, ranges between 65 and 85 months, with an average of 76 months. The cycles in most of the series are somewhat shorter than their corresponding reference-cycles. Most of the series, too, indicate that in both cycles the period of contraction was longer than the period of expansion. This is especially pronounced in the second cycle, in which ten series show a phase of contraction more than twice as long as the phase of expansion.[21] The greater length of contraction is evidence of the tendency towards price decline throughout the post-inflation period. It is not nearly so apparent in series of prices subject to

[21] Prices of agricultural products, textiles and industrial stocks are characterized by declines of extremely long relative duration.

TABLE 12

CYCLICAL BEHAVIOR OF SERIES RELATING TO COMMODITY AND SECURITY PRICES, 1924–1933

(1)	(2)	(3)			(4)			(5)		(6)		
SERIES	NUMBER AND DELIMITING DATES OF SPECIFIC CYCLES	DURATION IN MONTHS			LEAD (–) OR LAG (+) OF SPECIFIC TURNING POINTS WITH RESPECT TO REFERENCE TURNING POINTS IN MONTHS			CONFORMITY TO BEHAVIOR OF THE TWO REFERENCE CYCLES		AMPLITUDE OF SPECIFIC CYCLE		
		EXPANSION	CONTRACTION	FULL CYCLE	FIRST LOW	HIGH	SECOND LOW	REFERENCE CYCLE EXPANSION	REFERENCE CYCLE CONTRACTION	EXPANSION	CONTRACTION	FULL CYCLE
1. General index of wholesale prices	2 Jul'24–Apr'26	13	8	21	+8	+5	+1	+	+	+11	–8	19
	May'26–Apr'33[1]	27	57	84	+1	+4	+8	+	+	+8	–42	50
2. Indexes of wholesale prices												
a. agricultural products	2 Jun'24–Feb'26	7	13	20	+7	–2	–1	+	+	+28	–11	39
	Mar'26–Jan'33	10	73	83	–1	–15	+5	+	+	+15	–50	65
b. raw materials and semi-finished goods	2 Jul'24–Jun'26	6	17	23	+8	–2	+3	+	+	+7	–12	19
	Jul'26–Jul'32	23	50	73	+3	+2	–1	+	+	+7	–40	47
c. industrial finished goods	2 Dec'24–Feb'27	9	17	26	+13	+6	+11	+	+	+6	–12	18
	Mar'27–Apr'33[1]	20	54	74	+11	+7	+8	+	+	+13	–34	47
(1) *Production goods*	2 Nov'24–Mar'27	10	18	28	+12	+6	+12	+	+	+10	–7	17
	Apr'27–Apr'33[1]	30	43	73	+12	+18	+8	+	+	+8	–19	27

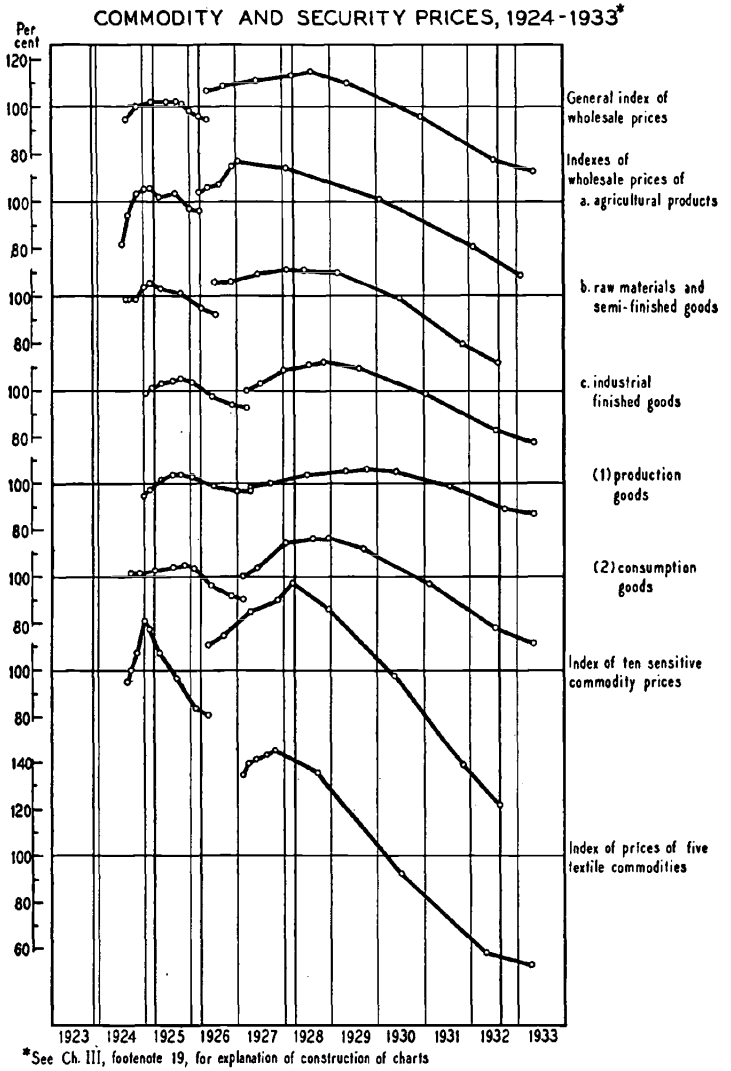
(2) *Consumption goods*	2 Aug'24–Jan'27	14	15	29	+9	+7	+10	+	+	+5	−15	20
	Feb'27–Apr'33[1]	22	53	75	+10	+8	+8	+	+	+16	−44	60
3. Index of ten sensitive commodity prices	2 Jul'24–Apr'26	6	15	21	+8	−2	+1	+	+	+35	−44	79
	May'26–Jul'32	22	53	75	+1	−1	−1	+	+	+27	−93	120
4. Index of prices of five textile commodities	1 Jan'27–Mar'33[1]	8	66	74	+10	−6	+7	−	+	+17	−96	113
								+	+			
5. Indexes of wholesale prices												
a. iron	2 Oct'24–Jun'26	6	14	20	+11	+1	+3	−	+	+16	−8	24
	Jul'26–Apr'33[1]	39	43	82	+3	+18	+8	+	+	+7	−25	32
b. coal	1 Mar'26–May'32	44	30	74	0	+20	−3	−	+	+10	−20	30
								+	+			
6. Indexes of												
a. 'free' prices	1 Dec'26–Feb'33[1]	13	61	74	+9	−2	+6	+[2]	+[2]	+15	−79	94
b. regulated prices	1 Dec'27–May'33[1]	24	41	65	+21	+21	+9	+[2]	+[2]	+6	−22	28
7. Indexes of prices												
a. imported goods	2 Jul'24–Dec'26	6	23	29	+8	−2	+9	+	+	+12	−28	40
	Jan'27–Jul'32	17	50	67	+9	+2	−1	+	+	+13	−72	85
b. domestic goods	2 Oct'24–Jun'26	7	13	20	+11	+2	+3	−	+	+7	−6	13
	Jul'26–Apr'33	40	42	82	+3	+19	+8	+	+	+9	−28	37
8. Cost of living index	2 Feb'24–Mar'26	18	7	25	+3	+5	0	+	+	+18	−5	23
	Apr'26–Apr'33[1]	36	49	85	0	+12	+8	+	+	+13	−29	42
9. Stock price index	2 Jun'24–Dec'25	7	11	18	+7	−2	−3	−	+	+69	−61	130
	Jan'26–Jun'32	16	62	78	−3	−11	−2	+	+	+88	−103	191

[1] Tentative final low.

[2] Comparison is possible with only the second of the two reference cycles because of the brevity of the series.

CHART 4

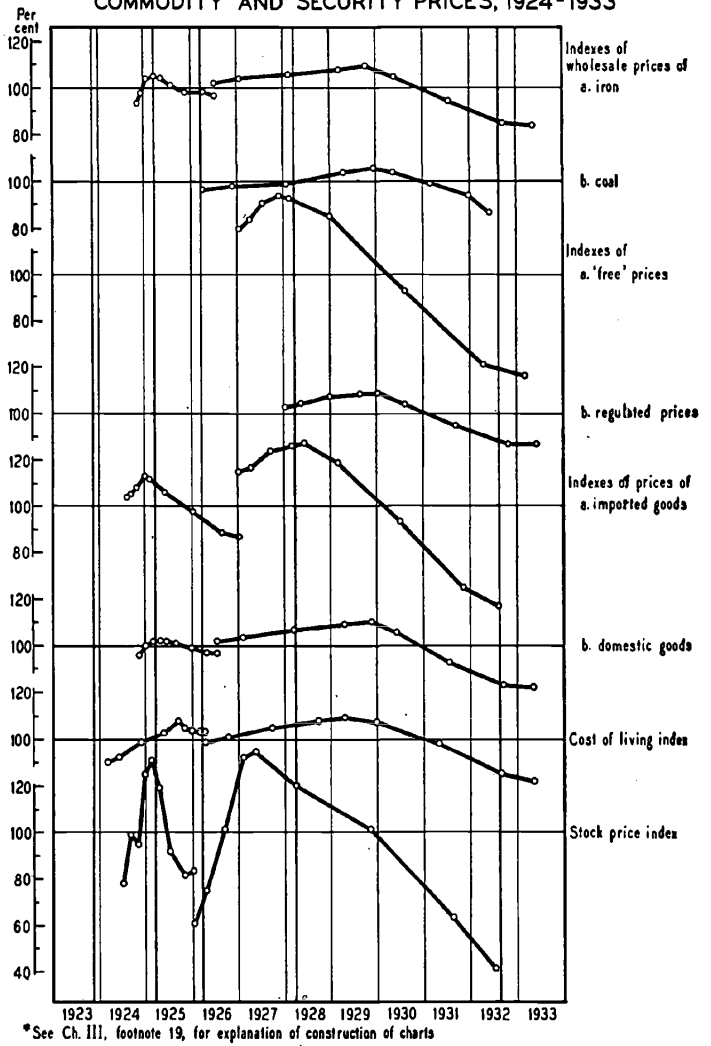
CYCLICAL BEHAVIOR OF SERIES RELATING TO COMMODITY AND SECURITY PRICES, 1924-1933*



*See Ch. III, footenote 19, for explanation of construction of charts

CHART 4 (CONT.)

CYCLICAL BEHAVIOR OF SERIES RELATING TO COMMODITY AND SECURITY PRICES, 1924-1933*



*See Ch. III, footnote 19, for explanation of construction of charts

being fixed arbitrarily, which offered more resistance to factors making for decline.

Timing. The cyclical turning points of the index of sensitive prices appear to be more closely timed with the low and high points of the reference-cycles than do any of the other price series. Considerable divergence is apparent in the turning points of the indexes of finished goods prices, which show lags of from 6 to 18 months behind the reference points. The series relating to commodities whose prices are regulated—the index of regulated prices, iron and coal price indexes, raw material price index—also manifest a pronounced tendency to lag behind reference points. In fact, the cyclical movement in all the price series appears to have lagged somewhat with respect to the reference-cycles, there being more than three times as many instances of lag as of lead at the reference points. A tendency to lead is apparent in the stock price index. The average deviation of the turning points of the series from the reference turning points is least in the case of the high point in the 1924–26 cycle, amounting to but 3.5 months. The next best defined turning point is the low between the two cycles; in this instance the mean deviation is 6.1 months. The greatest scatter of turning points occurs in the high of the second cycle, where the mean deviation is 10.4 months.

Conformity. Nine out of fourteen series show cycles conforming to the reference-cycle, 1924–26. The exceptions are the indexes of prices of textiles,

iron, coal, domestic goods and stocks. Each of these shows a net decline during the reference period of expansion, 1924–25.[22] All sixteen series conform to the second reference-cycle.

Amplitude. A comparison of the cycles apparent in the various price series indicates that the swing in the second post-inflation cycle was considerably wider than in the first cycle. Averages of the total amplitudes of rise and fall in the twelve series showing two cycles are: 36.8 per cent for the first cycle, and 66.9 per cent for the second cycle. Differences between the amplitudes of expansion and of contraction are especially marked in the second cycle, during which all sixteen series show a relatively severe decline. The average amplitude of expansion in this cycle is 17.0 per cent; of contraction, 49.7 per cent. The price indexes of agricultural products, sensitive commodities, textiles, imported goods and stocks, and free prices, show especially wide swings in both cycles. Small cyclical amplitudes are evident in the indexes of regulated prices, iron and coal and production goods prices.

General observations. Most of the price series, then, have passed through two cycles in the post-inflation years—cycles that correspond fairly closely to the reference-pattern. Cyclical fluctuations in prices

[22] The phase of expansion in the first post-inflation cycle in prices was relatively slow in getting under way. Many prices, after a short rise in the early months of 1924, fell sharply during the middle of that year, possibly in continuation of adjustment to the gold mark basis.

subject to the relatively free interplay of competing market factors show closer conformity than do cycles in prices subject to restraint by government authority or business organizations. Turning points of the price cycles have had a tendency to lag behind the turning points in the reference-pattern, and this is especially pronounced in the series of regulated prices. Only the index of stock prices has shown a tendency towards cyclical lead. Furthermore, as might be expected, cyclical amplitude is greater in 'free' than in regulated prices. But the amplitude of the long contraction in the cycle 1926–32 has been relatively great in all series. On the whole, the price series show smooth cyclical movements, that is, they are disturbed by few irregular fluctuations.

d. Employment and Wages

The employment and wages group includes five series of employment and two series of wages:

1. Unemployment in trade unions. This series gives the number of unemployed as a percentage of the total membership of reporting unions. The percentages are end-of-the-month figures for male and female workers.
2. Part-time employment in trade unions. The figures, as above, are end-of-the-month percentages of total membership.
3. Applicants for positions. This series gives the number of male applicants per 100 openings during the course of each month, reported by employment agencies.
4. Full unemployment in: a. production goods industries; b. consumption goods industries. The two series are end-of-

the-month percentages of trade union membership. They exclude seasonal industries and are available only since 1925. 5. Regulated wages per hour: a. skilled; b. unskilled workers. The series are given in *Pfennige* per hour and are weighted arithmetic averages of wages for full-time workers in important industries.

Number of specific cycles. Since unemployment tends to increase when general business activity declines, and to fall off when general activity expands, the direction of the cyclical movement in unemployment series is inverse to that of concurrent cycles in most other economic series. If we delimit an unemployment cycle from high to high (rather than from low to low), then two cycles that agree quite closely in temporal limits with the post-inflation reference-cycles are apparent in the various series reflecting the number of jobless workers. The series of unemployment in production and consumption goods industries begin only in January 1925; nevertheless, they give evidence of the cyclical contraction during 1925–26.

The two wage series show only one cycle during the entire period 1924–33. However, both show a pronounced retardation in their advance during the reference-cycle contraction of 1925–26 (see Chart 1).

Duration. The cyclical fluctuations in the unemployment series agree closely with the reference-cycle pattern in respect of their total duration and the relative duration of their phases of expansion and contraction. The length of the contraction in

TABLE 13

CYCLICAL BEHAVIOR OF SERIES RELATING TO EMPLOYMENT AND WAGES, 1924–1933

(1)	(2)	(3)			(4)			(5)		(6)		
SERIES	NUMBER AND DELIMITING DATES OF SPECIFIC CYCLES	DURATION IN MONTHS			LEAD (–) OR LAG (+) OF SPECIFIC TURNING POINTS WITH RESPECT TO REFERENCE TURNING POINTS IN MONTHS			CONFORMITY TO BEHAVIOR OF THE TWO REFERENCE CYCLES		AMPLITUDE OF SPECIFIC CYCLE		
		EXPANSION	CONTRACTION	FULL CYCLE	FIRST LOW	HIGH	SECOND LOW	REFERENCE CYCLE EXPANSION	REFERENCE CYCLE CONTRACTION	EXPANSION	CONTRACTION	FULL CYCLE
1. Unemployment in trade unions	2 Nov'23–Jun'26	18	13	31	0	+2	+3	–	–	–146	+166	312
	Jul'26–Jul'32	16	57	73	+3	–5	–1	–	–	–94	+260	354
2. Part-time employment in trade unions	2 Nov'23–Jan'26	18	8	26	0	+2	–2	–	–	–359	+153	512
	Feb'26–Feb'33[1]	21	64	85	–2	–5	+6	–	–	–160	+171	331
3. Applicants for positions (male)	2 Jan'24–May'26	13	15	28	+2	–1	+2	–	–	–93	+160	253
	Jun'26–Jun'32	17	56	73	+2	–5	–2	–	–	–52	+327	379
4. Full unemployment in *a. production goods industries*	1 Jun'26–Sept'32	17	58	75	+3	–4	+1	–[2]	–[2]	–91	+262	353

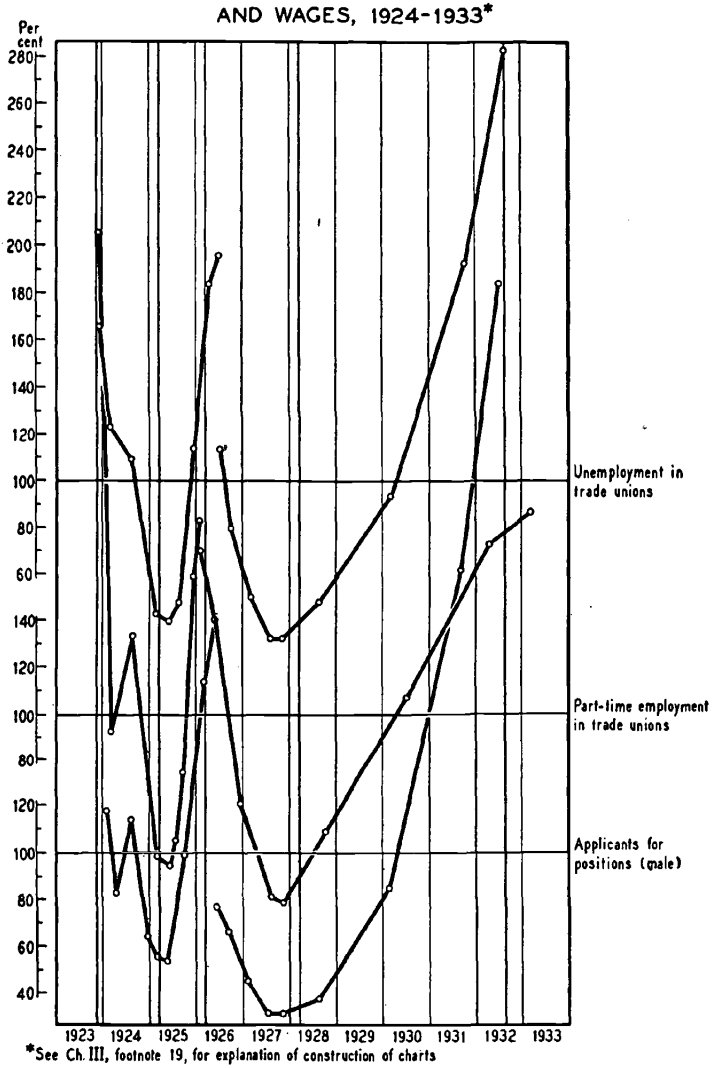
b. consumption goods industries	1 May'26–Oct'32	17	60	77	+2	−5	+2	−[2]	−[2]	−89	+212	301
5. Regulated wages												
a. skilled workers	1 Feb'24–Apr'33[1]	81	29	110	+3	+32	+8	+ +	− +	+56	−27	83
b. unskilled workers	1 Mar'24–Apr'33[1]	80	29	109	+4	+32	+8	+ +	− +	+57	−26	83

[1] Tentative final low.

[2] Comparison is possible with only the second of the two reference cycles because of the brevity of the series.

CHART 5

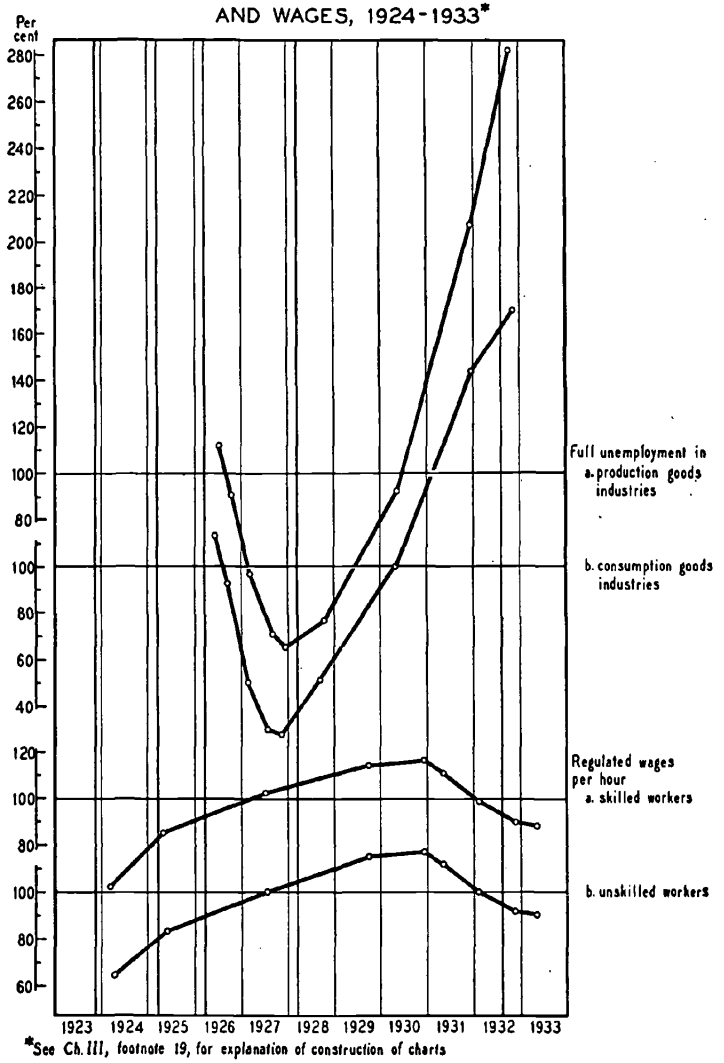
CYCLICAL BEHAVIOR OF SERIES RELATING TO EMPLOYMENT AND WAGES, 1924-1933*



*See Ch. III, footnote 19, for explanation of construction of charts

CHART 5 (CONT.)

CYCLICAL BEHAVIOR OF SERIES RELATING TO EMPLOYMENT AND WAGES, 1924-1933*



*See Ch. III, footnote 19, for explanation of construction of charts

the second post-inflation cycle is somewhat more pronounced in these series than in the corresponding reference-cycle. The five unemployment series show an expansion in this cycle ranging from 16 to 21 months, and a contraction ranging from 56 to 64 months. Corresponding figures for the reference-cycle 1926–32 are 24 and 53 months. The wages series show one long cyclical expansion period (80 and 81 months) and a relatively short contraction (29 months in both).

Timing. The turning points of the unemployment cycles (considered as inverted) deviate but little from the corresponding reference lows and highs. The average deviations are: from reference high of March 1925, 1.7 months; from reference low of March 1926, 2.4 months; from reference high of March 1928, 4.8 months; from reference low of August 1932, 2.4 months. The high point in the single cycle in wages is late—November 1930. The retardation of the expansion notable in both wage series, probably a reflection of the 1925–26 contraction in general business, began approximately in November 1925 and ended about February 1927. Thus its terminal points lag considerably behind the high and low points delimiting the reference contraction, March 1925 and March 1926.

Conformity. The cycles apparent in the various unemployment series conform inversely (as is to be expected) to the corresponding reference-cycles. The wage series' cyclical movement conforms to the sec-

ond reference-cycle, for it shows a net rise during the reference expansion and a net fall during the reference contraction. Also, it shows a degree of conformity to the first cycle, as its rate of advance during the reference expansion (1924–25) was greater than its rate of advance during the reference-cycle contraction (1925–26).

Amplitude. Outstanding in the unemployment series is the greater cyclical amplitude of contraction than of expansion. In both cycles, with one exception (the first cycle in part-time employment), the rise in contraction was considerably greater than the fall in expansion. The cyclical amplitude in the contraction phase of the second cycle was especially severe. However, the *rate* of cyclical fall and rise was greater in the first cycle than in the second. Cyclical amplitude of unemployment in production goods industries exceeded that of unemployment in consumption goods industries by 8 per cent in expansion and 20 per cent in contraction. The amplitude of the cycle in wages was much milder than the amplitude in the unemployment cycles.

General observations. The cyclical behavior of employment in the years 1924–33 is thus seen to be fairly consistent with what has already been established as the characteristics of the general cycles in German economy in the post-inflation period. The only notable exception is in respect of amplitude: most of the unemployment series show greater rise in the contraction of 1925–26 than fall in the expan-

sion of 1924–25. In many other types of series examined, that contraction is relatively mild. Doubtless, a rising trend in unemployment throughout the post-inflation period tended to increase the amplitude of contraction. The cyclical behavior of regulated, or tariff, wages resembles that of regulated prices, in that the former did not conform closely to the reference-pattern, that changes in their direction of cyclical movement seem to have lagged considerably behind similar changes in the reference-cycles and that their cyclical amplitude was relatively small.

Irregular movements superimposed upon the cyclical swings in unemployment correspond with those noted in the discussion of the cyclical behavior of industrial production. Unemployment rose sharply in the middle of 1924 and fell off in the autumn. Again, unemployment declined for several months in the middle of 1929 (beyond a mere seasonal decline), that is, in the midst of a cyclical contraction. These irregularities appear to reflect, first, the halting recovery of 1924, and second, the widespread compensatory revival that followed the winter of 1928–29 (see Ch. II, Part A, Sec. 4, a).

e. Business Organization and Enterprise

Five series comprise the group, Business Organization and Enterprise:

1. Business enterprises
   a. a monthly series of the organization of new co-partnerships, individual proprietorships.

b. a monthly series of the dissolution of co-partnerships, individual proprietorships.

2. Business failures—a monthly series of the number of failures of all types of business organization.

3. An annual series of the percentage of

a. profits to capital of the German joint-stock companies (*Aktiengesellschaften*), in the fiscal years, July 1 to June 30, 1924–32.

b. losses to capital of the German joint-stock companies, in the fiscal years, July 1 to June 30, 1924–32.

Number of specific cycles. Two series, organization of enterprises and business failures, show two cycles in the period 1924–33. The cycles in business failures are, of course, inverted. Dissolution of business enterprises shows three cycles in the post-inflation period; middle of 1924 to end of 1927, end of 1927 to early 1929, early 1929 to autumn of 1932. These three cycles are superimposed upon one long swing, 1924–32. The two annual series, percentage profits and losses of the joint-stock companies, which cover only the fiscal years from 1925–26 to 1929–32, show one cycle, 1926–32.

Duration. The two cycles in organization of enterprises and business failures agree fairly well in temporal delimitation with the post-inflation reference-cycles. In both series the period of contraction in the cycle 1926–32 is much longer than the period of expansion. Dissolution of enterprises is characterized by two long cycles and one short cycle. The annual profits and losses series show an expansion

TABLE 14

CYCLICAL BEHAVIOR OF SERIES RELATING TO BUSINESS ORGANIZATION AND ENTERPRISE, 1924–1933

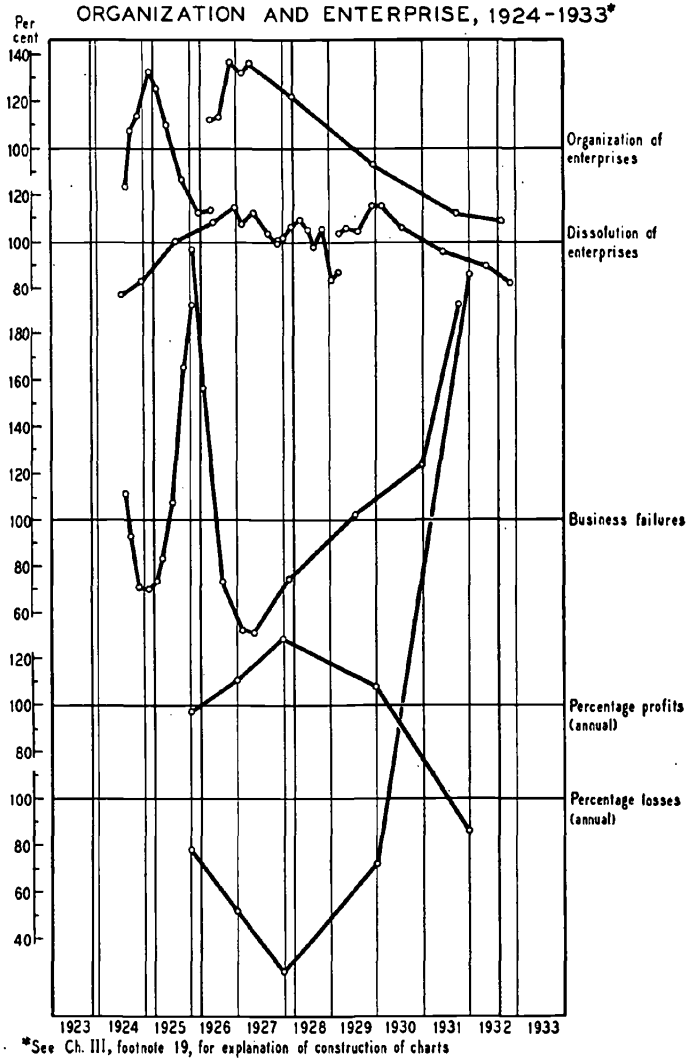
(1)	(2)	(3)			(4)			(5)		(6)		
SERIES	NUMBER AND DELIMITING DATES OF SPECIFIC CYCLES	DURATION IN MONTHS			LEAD (−) OR LAG (+) OF SPECIFIC TURNING POINTS WITH RESPECT TO REFERENCE TURNING POINTS IN MONTHS			CONFORMITY TO BEHAVIOR OF THE TWO REFERENCE CYCLES		AMPLITUDE OF SPECIFIC CYCLE		
		EXPANSION	CONTRACTION	FULL CYCLE	FIRST LOW	HIGH	SECOND LOW	REFERENCE CYCLE EXPANSION	REFERENCE CYCLE CONTRACTION	EXPANSION	CONTRACTION	FULL CYCLE
1. *a. Organization of enterprises*	2 Jul'24–May'26	8	14	22	+8	0	+2	+	+	+79	−64	143
	Jun'26–Aug'32	10	65	75	+2	−12	0	+	+	+35	−83	118
b. Dissolution of enterprises	3 Jun'24–Oct'27	29	11	40	+7	+20	+19	+	−	+49	−30	79
	Nov'27–Feb'29	8	8	16	+19	+3		−	+	+25	−36	61
	Mar'29–Oct'32	11	33	44			+2			+25	−48	73
2. Business failures	2 Jul'24–Dec'25	8	9	17	+8	0	−3	+	−	−51	+126	177
	Jan'26–Sept'31	16	53	69	−3	−11	−11	−	−	−170	+173	343
3. *a. Percentage profits*	1 1925/26–1931/32[1]	2 yrs	4 yrs	6 yrs	0	0	0	+[2]	+[2]	+31	−82	113
b. Percentage losses	1 1925/26–1931/32[1]	2 yrs	4 yrs	6 yrs	0	0	0	−[2]	−[2]	−53	+301	354

[1] Tentative final low.

[2] Comparison is possible with only the second of the two reference cycles because of the brevity of the series.

CHART 6

CYCLICAL BEHAVIOR OF SERIES RELATING TO BUSINESS ORGANIZATION AND ENTERPRISE, 1924-1933*



*See Ch. III, footnote 19, for explanation of construction of charts

period of two years and a contraction period of four years.

Timing. Two series, as indicated above, agree with the reference-pattern in respect of the number of cycles. Their high point in the first cycle, and low point between the two cycles 1924–26 and 1926–32, show small deviation from the corresponding reference turning points, but the deviation of their high point from the reference high in the cycle 1926–32 is large. Turning points of the two annual series agree closely with the lows and high of the reference-cycle 1926–32.

Conformity. Two series, organization of enterprises and the annual series of profits, conform positively to the second post-inflation reference-cycle; the first also conforms to the reference-cycle 1924–26. The business failures series shows a net rise during the expansion as well as during the contraction period of the reference-cycle 1924–26. However, its *rate* of rise in the contraction is greater than in the expansion. During the reference-cycle 1926–32, business failures and annual losses conform inversely, as is to be expected.

Amplitude. Organization of enterprises and business failures, especially the latter, show relatively wide cyclical swings. The percentages of profits and losses, too, in view of the fact that they are annual series, show a large amplitude in the cycle 1926–32.

General observations. The characteristics of the reference-cycle 1926–32, then, are definitely reflected

in the behavior of all the above series except dissolution of enterprises. The preceding reference-cycle, 1924–26, is less clearly apparent in the three series covering that period.

f. Domestic Trade

Ten series, reflecting various aspects of merchandising, volume of trade and transportation, have been considered as representative of domestic trade activity in Germany during the post-inflation period.

A. MERCHANDISING

1. Sales of consumers' cooperatives: a monthly series of the average weekly sales per member of the *Zentralverband der deutschen Konsumgenossenschaften,* which is by far the largest of the German associations of consumers' cooperatives.
2. Sales of department stores: a monthly index (on the base, 1925 = 100) of the total sales of all German department stores.

B. VOLUME OF TRADE

3. Reichsbank clearings: a monthly series of the volume of funds transferred through the clearing section of the Reichsbank. These clearings represent, in general, settlements between banks and the larger business enterprises.
4. Postal check traffic: a monthly series of the volume of funds transferred through the postal check system, which is the ordinary means of settling small accounts other than by cash.
5. Bills drawn: a series of the volume of domestic bills drawn each month, based upon the returns from the stamp tax on bills of exchange.

6. Value of goods exchanged: a quarterly series of the estimated volume of sales of goods, based upon the yield of the turnover tax.

C. TRANSPORTATION

7. Car loadings: a monthly series of the average daily number of Reichsbahn freight cars put at the disposal of shippers.
8. Railway freight traffic: a monthly series of the total volume of goods, in tons, carried by the Reichsbahn.
9. Railway freight receipts: a monthly series of the total income of the Reichsbahn from the transportation of goods.
10. Railway passenger receipts: a monthly series of the total income of the Reichsbahn from the transportation of passengers and baggage.

Number of specific cycles. Six series—department store sales, postal check traffic, and the four transportation series—show two well-defined cycles during the period 1924–32. These two cycles run parallel to the post-inflation reference-pattern. Superimposed on the contraction phase of the second cycle apparent in the freight transport series is a marked movement of decline and rise from the autumn of 1928 to the summer of 1929. The three series, sales of consumers' cooperatives, Reichsbank clearings and value of goods exchanged, show but one cycle in the years 1924–32. However, the expansion phase in all three series is interrupted by a retardation during the winter of 1925–26. The series, bills drawn, shows three cycles from 1924 to 1933.

Duration. The two specific cycles shown by the six series noted above agree fairly well with the ref-

erence-cycles in respect of total duration. The first cycle is short, ranging between 22 and 34 months, and the second cycle is long, varying between 72 and 85 months. Furthermore, in all but one of these series, the expansion phase in the first cycle is somewhat longer than the contraction phase; but in the second cycle there is less agreement with the reference-pattern in this respect, for in four of the six series expansion is relatively long. The single cycle apparent in three series covers the entire post-inflation period. It has an expansion of about 66 months and a contraction of approximately 43 months. The duration of the first of three cycles apparent in bills drawn agrees closely with that of the reference-cycle 1924–26.

Timing. Low and high points of the series with two cyclical fluctuations show much the same relation to reference turning points as has been noted in most other series. The high point of the first cycle and the subsequent low deviate but slightly from the corresponding reference high and low. Their mean deviations are, respectively, 2.9 months and 2.3 months. The timing of the high of the second cycle, however, varies considerably from one series to another. The average deviation of this cyclical point (in the seven series) from the reference high is 9.4 months; most of this deviation is accounted for by lags behind the reference point. The final low point deviates much less from the corresponding reference point—3.5 months. The high point and final

TABLE 15

CYCLICAL BEHAVIOR OF SERIES RELATING TO DOMESTIC TRADE, 1924–1933

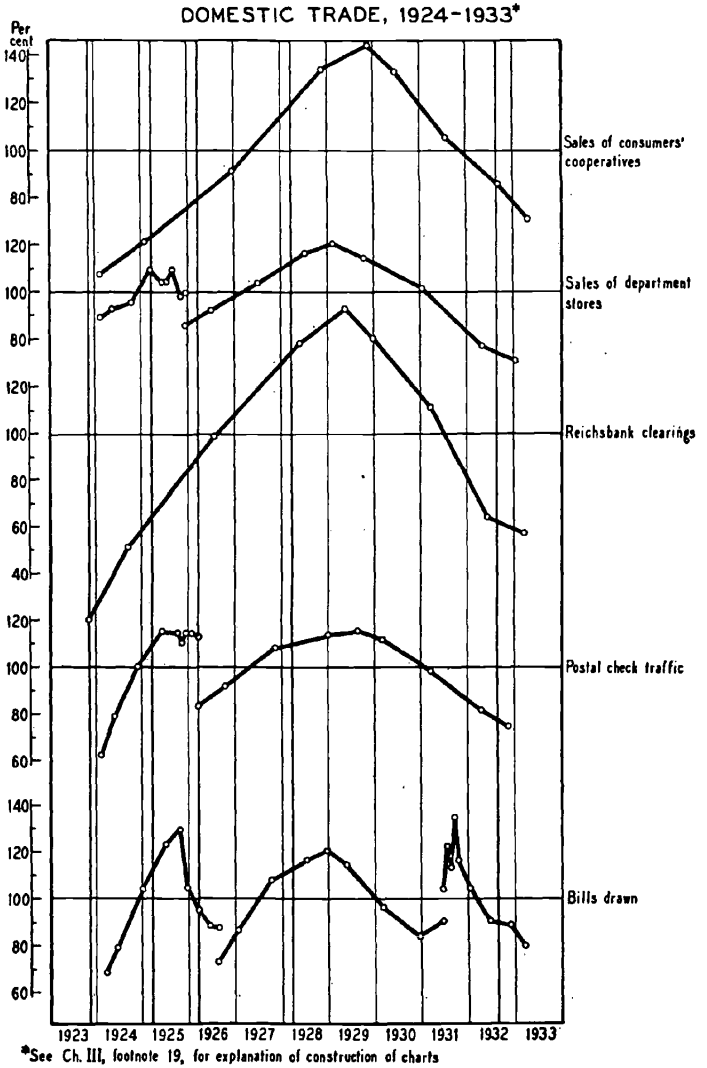
(1)	(2)	(3)			(4)			(5)		(5)		
SERIES	NUMBER AND DELIMITING DATES OF SPECIFIC CYCLES	DURATION IN MONTHS			LEAD (–) OR LAG (+) OF SPECIFIC TURNING POINTS WITH RESPECT TO REFERENCE TURNING POINTS IN MONTHS			CONFORMITY TO BEHAVIOR OF THE TWO REFERENCE CYCLES		AMPLITUDE OF SPECIFIC CYCLE		
		EXPANSION	CONTRACTION	FULL CYCLE	FIRST LOW	HIGH	SECOND LOW	REFERENCE CYCLE EXPANSION	REFERENCE CYCLE CONTRACTION	EXPANSION	CONTRACTION	FULL CYCLE
A. MERCHANDISING												
1. Sales of consumers' cooperatives	1 Jan'24–Mar'33[1]	69	41	110	+2			+	–	+105	–78	183
						+19	+7	+	+			
2. Sales of department stores	2 Jan'24–Nov'25	16	6	22	+2	+2	–4	+	+	+37	–22	59
	Dec'25–Dec'32[1]	38	47	85	–4	+10	+4	+	+	+43	–57	100
B. VOLUME OF TRADE												
3. Reichsbank clearings	1 Oct'23–Feb'33	66	46	112	–1			+	–	+161	–117	278
						+13	+6	+	+			
4. Postal check traffic	2 Jan'24–Feb'26	20	5	25	+2	+6	–1	+	+	+73	–9	82
	Mar'26–Oct'32	41	39	80	–1	+16	+2	+	+	+37	–47	84
5. Bills drawn	3 Feb'24–Jul'26	19	10	29	+3	+6	+4	+	+	+81	–51	132

	Aug'26–May'31	28	30	58	+4	+8		+	+	+50	−51	101
	Jun'31–Feb'33[1]	4	17	21			+6			+53	−55	108
6. Value of goods exchanged	1 IQ'24–IVQ'32[1]	63	42	105	+3			+	+	+60	−55	115
						+14	+3	+	+			
C. TRANSPORTATION												
7. Car loadings	2 Jan'24–Jan'26	13	11	24	+2	−1	−2	+	+	+61	−12	73
	Feb'26–Aug'32	25	54	79	−2	−1	0	+	+	+30	−47	77
8. Railway freight traffic	2 Jan'24–Mar'26	13	13	26	+2	−1	0	+	+	+43	−20	63
	Apr'26–Jul'32	23	53	76	0	−1	−1	+	+	+36	−67	103
9. Railway freight receipts	2 Jul'23–Jan'26	19	11	30	−4	−1	−2	+	+	+115	−28	143
	Feb'26–Jan'32	42	30	72	−2	+16	−7	+	+	+46	−71	117
10. Railway passenger receipts	2 Aug'23–Jun'26	22	12	34	−3	+3	+3	+	+	+123	−26	149
	Jul'26–Mar'33[1]	35	46	81	+3	+14	+7	+	+	+27	−60	87

[1] Tentative final low.

CHART 7

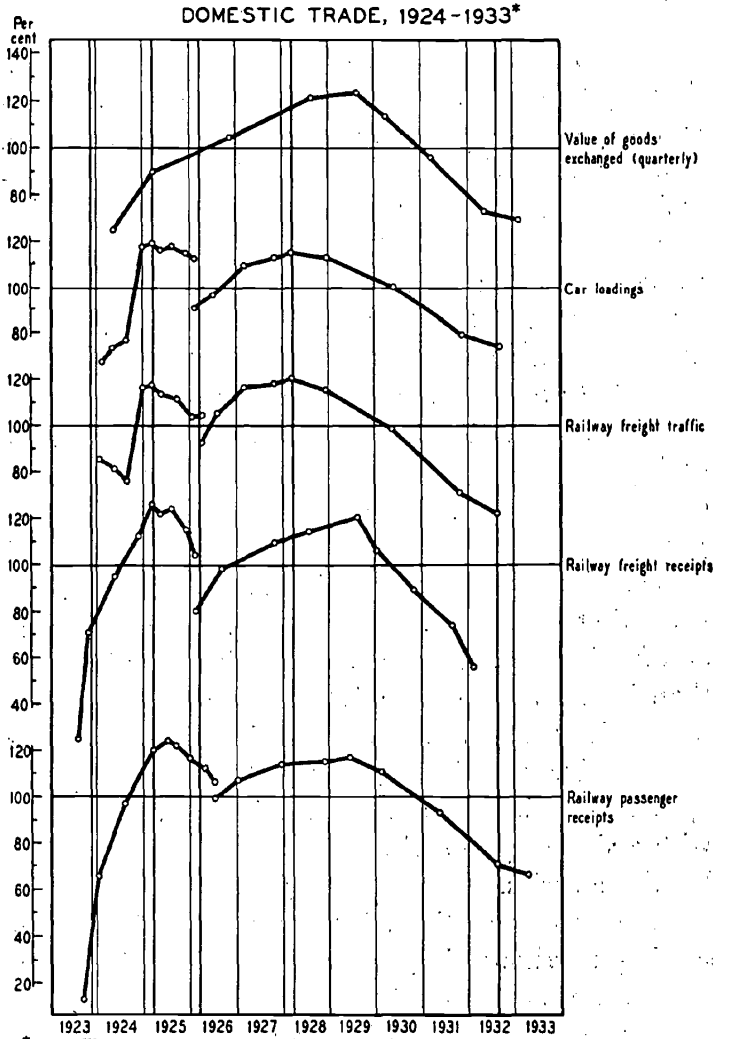
CYCLICAL BEHAVIOR OF SERIES RELATING TO DOMESTIC TRADE, 1924-1933*



*See Ch. III, footnote 19, for explanation of construction of charts

CHART 7 (CONT.)

CYCLICAL BEHAVIOR OF SERIES RELATING TO DOMESTIC TRADE, 1924-1933*



*See Ch. III, footnote 19, for explanation of construction of charts

low point in the three one-cycle series lag considerably behind the second reference-cycle high.

Conformity. The movement of the cycles in all ten series conforms closely to the reference-pattern. In only two series does a specific cycle fail to run a course parallel to the contemporary reference-cycle, namely: Reichsbank clearings and sales of consumers' cooperatives do not show net declines during the first reference contraction, 1925–26. But even in these two series the *rate* of rise was less during that phase than it had been during the reference period of expansion.

Amplitude. In all series passing through two cycles the amplitude of the first expansion is considerably greater than the amplitude of the subsequent contraction. This is especially marked in the transportation series. The second contraction phase in all these series is of greater cyclical amplitude than the preceding expansion. Furthermore, the *rate* of rise and fall in the first cycle is greater in every instance than in the second cycle. Thus there is close agreement with the observations already made regarding the relative amplitudes of the two post-inflation cycles. Wide swings are evident in the three series with a single cycle each, and in the only series that has three cycles.

General observations. The various series representing merchandising, volume of trade and railway transportation, then, afford further evidence of the significance of a 'reference-cycle pattern'. In general,

there is seen to be close agreement in cyclical characteristics, both between series in this group and between them and those representing other types of economic activity. 'Irregular movements' in the cycles of the railway freight series are similar to those apparent in series of industrial production, employment and foreign trade: a sharp decline in the middle months of 1924, the period of 'halting revival', and a fall and rise from the autumn of 1928 to the summer of 1929. Both of these movements are evident, although somewhat less so, in the other series of this group. The series of the volume of trade show a sudden rise in the autumn of 1931—probably a reflection of widespread efforts to liquidate accounts after the summer credit crisis. This explains the pronounced cyclical rise in the volume of bills drawn between June and October 1931.

g. Foreign Trade

Eight series have been selected as representative of the volume of Germany's imports and exports of goods:

1. Value of imports: giving the monthly value (in millions of Reichsmarks) of the goods imported into Germany. Three main components of this series are also considered here:

   a. value of raw materials and semi-manufactured goods imported, which in post-inflation years have constituted approximately half of the total value of imports.

   b. value of manufactured goods imported, which have constituted between 14 and 18 per cent of total imports.

c. value of foodstuffs and beverages imported, comprising from 28 to 35 per cent of total imports.

2. Value of exports: giving the monthly value (in millions of Reichsmarks) of goods exported from Germany. Three principal components of this series, too, are here examined:

a. value of raw materials and semi-manufactured goods exported, which have constituted between 21 and 26 per cent of the total value of exports in the post-inflation period.

b. value of manufactured goods exported, which have constituted approximately 70 per cent of German exports.

c. value of foodstuffs and beverages exported, comprising but 5 to 6 per cent of total exports.

Number of specific cycles. All eight series—the main series of imports and exports, together with their components—have passed through two cycles in the years 1924–33. All the import series show two clearly-defined cycles, agreeing closely in respect of timing with the reference-cycle pattern. The export series, however, show slightly less conspicuous cycles, the contraction phase of the first cycle in the more important export groups being mild in amplitude and of short duration.

Duration. The phases of the specific cycles of the import series agree closely with those of the reference-cycles in total and relative duration. In the more important import groups the expansion and contraction phases of the first cycle are about equal in duration, but in the second cycle contraction is from 121 to 294 per cent longer than expansion. In the export series, the first cycle is approximately one

year longer than the first post-inflation reference-cycle, and the expansion phase of that cycle is of considerably longer duration than the contraction phase. The second cycle apparent in the export groups has lasted approximately six years, and is not yet ended. Here the contraction is already from 49 to 96 per cent longer than expansion.

Timing. The low and high points of the import series for the most part show but small deviation from the reference turning points. Turning points of the export series, with only one exception, lag behind the reference points.

Conformity. As is evident from the foregoing remarks regarding duration and turning points, the cycles apparent in the import series run a course parallel to the reference-pattern. In the export series, conformity to the first reference-cycle occurs only in exports of manufactured goods and in the relatively unimportant series, exports of foodstuffs and beverages. However, all series conform to the second reference-cycle.

Amplitude. The amplitudes of cyclical swings of the import series are notably wider than those of the export series. The full swing in the first cycle is approximately 110 per cent greater in the general import series than in the general export series; in the second cycle, about 31 per cent greater. Amplitudes of both cycles in the component import series are also considerably greater than in the component export series, with one exception: the second cycle

TABLE 16

CYCLICAL BEHAVIOR OF SERIES RELATING TO FOREIGN TRADE, 1924–1933

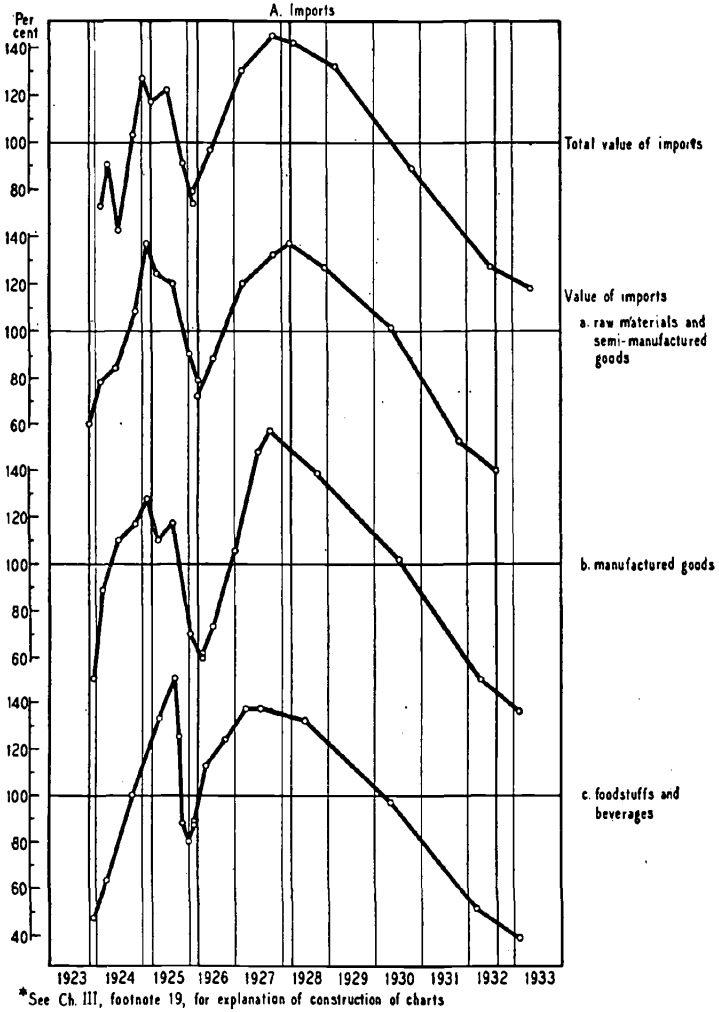
(1) SERIES	(2) NUMBER AND DELIMITING DATES OF SPECIFIC CYCLES	(3) DURATION IN MONTHS			(4) LEAD (−) OR LAG (+) OF SPECIFIC TURNING POINTS WITH RESPECT TO REFERENCE TURNING POINTS IN MONTHS			(5) CONFORMITY TO BEHAVIOR OF THE TWO REFERENCE CYCLES		(6) AMPLITUDE OF SPECIFIC CYCLE		
		EXPANSION	CONTRACTION	FULL CYCLE	FIRST LOW	HIGH	SECOND LOW	REFERENCE CYCLE EXPANSION	REFERENCE CYCLE CONTRACTION	EXPANSION	CONTRACTION	FULL CYCLE
1. Value of all imports	2 Jan'24–Jan'26	11	13	24	+2	−3	−2	+	+	+80	−65	145
	Feb'26–Apr'33[1]	26	61	87	−2	0	+8	+	+	+78	−115	193
Value of imports												
a. raw materials and semi-manufactured goods	2 Oct'23–Feb'26	15	13	28	−1	−2	−1	+	+	+85	−64	149
	Mar'26–Jul'32	24	53	77	−1	−1	−1	+	+	+76	−108	184
b. manufactured goods	2 Nov'23–Mar'26	14	14	28	0	−2	0	+	+	+121	−106	227
	Apr'26–Jan'33	18	64	82	0	−6	+5	+	+	+103	−127	230
c. foodstuffs and beverages	2 Nov'23–Jan'26	21	5	26	0	+5	−2	+	+	+132	−97	229
	Feb'26–Jan'33	17	67	84	−2	−9	+5	+	+	+79	−117	196

2. Value of all exports	2 Jan'24–Feb'27	30	7	37	+2	+16	+11	+	–	+59	–10	69
	Mar'27–Feb'33[1]	26	46	72	+11	+13	+6	+	+	+50	–97	147
Value of exports												
a. raw materials and semi-manufactured goods	2 Jan'24–Apr'27	34	5	39	+2	+20	+13	+	–	+132	–43	175
	May'27–Mar'33[1]	24	47	71	+13	+13	+7	+	+	+47	–113	160
b. manufactured goods	2 Mar'24–Sept'26	20	10	30	+4	+8	+6	+	+	+56	–18	74
	Oct'26–Feb'33[1]	31	46	77	+6	+13	+6	+	+	+45	–88	133
c. foodstuffs and beverages	2 Dec'23–Feb'27	15	23	38	+1	0	+11	+	+	+106	–56	162
	Mar'27–Mar'33[1]	26	47	73	+11	+13	+7	+	+	+125	–166	291

[1] Tentative final low.

CHART 8

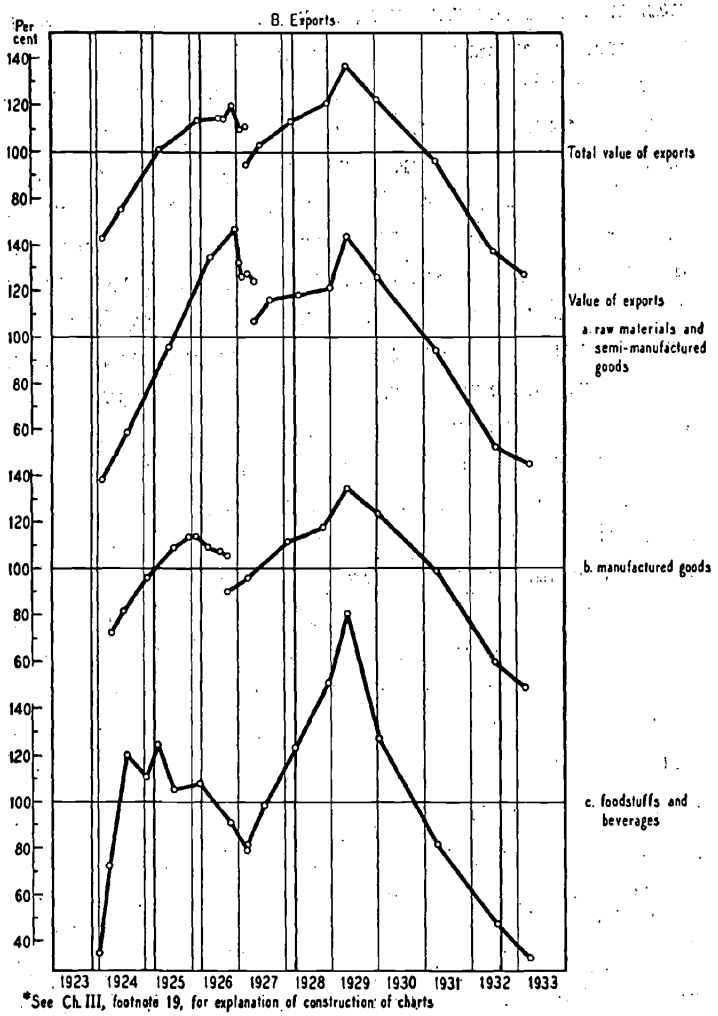
CYCLICAL BEHAVIOR OF SERIES RELATING TO FOREIGN TRADE, 1924-1933*



*See Ch. III, footnote 19, for explanation of construction of charts

CHART 8 (CONT.)

CYCLICAL BEHAVIOR OF SERIES RELATING TO FOREIGN TRADE, 1924-1933*



*See Ch. III, footnote 19, for explanation of construction of charts

in the foodstuffs and beverages group. Except for this group and for the second cyclical contraction in the raw materials group, the amplitudes of both expansion and contraction, as well as of the full swing, are greater in each of the import series than in the corresponding export series. As noted above, the decline in exports during the first cycle was relatively mild. In every instance the amplitude of expansion in the first cycle and of contraction in the second cycle is pronounced. Manufactured goods imported show the widest swings evident in the imports group; on the other hand, manufactured goods exported were the most stable of the three export subdivisions.

General observations. Commodity imports, on a value basis, appear to have corresponded closely to the accepted pattern of general business cycles in the post-inflation German economy. Closest conformity is exhibited by the cyclical movement in imports of raw materials and semi-manufactured goods, which are intimately related to fluctuations in industrial production. All import series here considered show wide cyclical amplitudes, especially the imports of manufactured goods, for which demand has probably been relatively elastic.[23] Exports of commodities have

[23] Contraction during the second cycle, evident in the imports of foodstuffs and beverages and of manufactured goods, was moderate until the end of 1929. Thereafter the decline became steeper in foodstuffs and beverages, and much steeper in manufactured goods. Continuing decline of domestic purchasing power must have led to relatively greater reduction in the consumption of manufactured goods from abroad than of imported foodstuffs, many of which appear to be highly essential to Germany. This difference in behavior during contraction

shown less conformity to the reference-pattern. Contraction in the first cycle apparent in the most important export group—manufactured goods—lagged behind the contraction in the first reference-cycle, 1924–26, and was of relatively small amplitude. Although recession in 1926 in the economies of a number of Germany's neighbors may have depressed its export trade somewhat, general business conditions abroad were probably not such as to make for a pronounced reduction in its exports. The second cyclical decline in the volume of exports set in more than a year after contraction had become apparent in general business in Germany. It is likely that this was a reflection of the beginning of recession in mid- or late 1929 in most of the leading industrial nations (see Sec. 4, International Relationships of German Business Cycles). Both import and export series substantiate the observation made above that the amplitudes of the cyclical expansion during 1924 and 1925 and during the contraction since 1928 and 1929 were especially large.

Outstanding irregular movements in the import series are apparent in mid-1924 and from the winter of 1928–29 to late spring of 1929 (see Chart 1). The first of these irregularities is doubtless related to factors making for widespread interruption in the recovery of 1924 (see Ch. II, Part A, Sec. 1, b). The short period of rise, 1928–29, superimposed on the

may offer a measure of the relative elasticities of demand for the two groups of commodities.

contraction that had begun early in 1928 (most marked in imports of raw materials and semi-manufactured goods), is further evidence of the short revival of industrial production and domestic trade that appears to have been compensatory for the effects of the iron industry lockout and the severe winter (see Ch. II, Part A, Sec. 4, a). Another slight revival superimposed upon contraction is apparent in the export series (especially exports of manufactured goods) during 1931 (see Chart 1). Increased pressure to liquidate stocks, together with incentives to sell goods abroad before the imposition of higher tariff duties in certain of Germany's foreign markets, were perhaps factors relevant to this irregular movement.

4. INTERNATIONAL RELATIONSHIPS OF GERMAN BUSINESS CYCLES

A study of the cyclical fluctuations in German economy since the currency stabilization raises several interesting questions concerning the extent of their coincidence with fluctuations in the economies of other countries. Was the course of German fluctuations independent of the economic fortunes of Germany's neighbors? How close was the relationship between German fluctuations and an international cyclical 'pattern'? Is there evidence of increasing temporal conformity between German cycles and the cycles of other countries?

It has often been observed that, before the War, the great business 'crises' had an international sweep. Crises embracing many parts of the world—and particularly those parts considered highly capitalistic—occurred in 1890–91, in 1900–01, in 1907–08 and in 1912–13. Of course, no crisis struck everywhere with equal severity.

Furthermore, there is reason to believe that before the World War there was a tendency towards increasing international similarity in other aspects of cyclical fluctuations. This view is supported by the collection of *Business Annals,* published in 1926 by the National Bureau of Economic Research. In that compilation the course of cyclical business fluctuations is traced over a long period and over a wide area. A digest of contemporary opinions concerning industrial, commercial, labor, credit and agricultural conditions, as well as non-economic occurrences, is carried back to 1790 for the United States and England; to 1840, for France; to 1853, for Germany; to 1867, for Austria; and to 1890, for Italy, The Netherlands, Russia, Sweden, Canada, Australia, South Africa, Argentina, Brazil, British India, Japan and China. In his introductory chapter, Wesley C. Mitchell concludes that "the international similarity in phase in business cycles increased on the whole with the passage of time", and that "the network of business relations has been growing closer and

firmer, at the same time that it has been stretching over wider areas".[24]

Dr. Mitchell's study reveals a good deal of similarity between the German cyclical movement and the 'international pattern'. A comparison is made between German cycles and the cycles of the United States, England, France and Austria, during the period 1867–1925. Fifty-nine years of the economic life of four pairs of nations, making a total of 236 years, were considered. Of this number, there were 104 years of agreement in cyclical phase of Germany and four other countries, 91 years of partial agreement, and 41 years of opposition. Comparison of England with the same set of countries shows 120 years of agreement, 81 years of partial agreement, and 35 years of opposition. For France, the figures are: agreement, 101 years; partial agreement, 89; and opposition, 46; for the United States: agreement, 90 years; partial agreement, 84 years; and opposition, 62 years. That is, the German cyclical movement shows a high correlation with the cycles of the other countries—a correlation that is only slightly less than that of England.

Furthermore, Dr. Mitchell has sketched what he calls an 'international pattern' of business cycles for the period 1890–1925. This pattern presents four cycles between 1890 and 1918. Germany's economic fluctuations correspond quite closely with this pattern, except that there was one more cycle in Ger-

[24] Pp. 90, 96.

many, from the beginning of 1904 to the end of 1905, than was called for by the 'international pattern'.

Thus, until the end of the War, German business cycles seemed to be in rather close agreement with the so-called international cycles. Dr. Mitchell's study would indicate that this similarity of cyclical movement was disrupted after the Armistice. "The breaking of economic bonds by the War, and the tardiness of their restoration after the Armistice, interfered with this process of synchronizing cycles. But the non-economic factors, which played so large a rôle after 1914, had much the same character and influenced business among all the belligerents in much the same way, so long as hostilities lasted. Since 1918, economic fortunes have diverged widely. Presumably the business forces tending toward convergence are gradually resuming their wonted sway." [25]

The "Conspectus of Business Fluctuations in Various Countries" [26] indicates that disorganization and depression began in Germany immediately after the Armistice, and lasted until the spring of 1921. Then there was something of a revival, which was checked in the summer of 1922, giving way to increased disorganization and depression during the remainder of that year and 1923. This fluctuation is quite out of accord with the international pattern which indi-

[25] Pp. 90–1.
[26] Pp. 75–87.

cates "recession in 1918; very brief and mild depression early in 1919; quick revival in 1919; prosperity in 1919–20; recession in 1920; severe depression in 1921–22; revival in 1922–23." [21] It is obvious that the events during the years immediately after the end of the War—particularly the internal political disorder and the currency inflation—must have tended to isolate Germany's economy from that of the rest of the world. However, as was remarked above (Ch. I, Sec. 1) there is reason to believe that Germany after the currency stabilization would be more subject to foreign economic influences than before the War.

In order to compare the German post-stabilization cycles with those of other countries, recourse has been taken to a method generally similar to that of Dr. Mitchell.

First, a conspectus (Table 17) that allows rapid comparison of phases of cyclical fluctuations in Germany and fourteen other countries during every half year from the beginning of 1924 to the end of 1932 has been prepared. The fourteen nations selected for comparison with Germany are the United States, Great Britain, France, Italy, Sweden, Canada, Japan, Belgium, Czechoslovakia, The Netherlands, Austria, Denmark, Poland and Switzerland. Most of these nations are highly developed in industry, trade and finance, and occupy places of importance in the foreign trade of Germany or of some other nation on

[21] *Business Cycles*, p. 442.

the list. They are nations, then, whose cycles should be expected to follow an 'international pattern' most closely.

This table is based largely upon statistical data in the quarterly publication of the Institut für Konjunkturforschung, *Vierteljahrshefte zur Konjunkturforschung* (Berlin, 1926–33); and upon the various issues of the *Statistisches Jahrbuch des deutschen Reichs* (Berlin, 1924–32). Some reference has also been had to Thorp's *Business Annals,* to the National Industrial Conference Board's series, *A Picture of World Economic Conditions* (1928, 1929, 1930); to the economic quarterlies of the *Frankfurter Zeitung (Die Wirtschaftskurve . . .* 1924–32); the League of Nations study, *The Course and Phases of the World Economic Depression* (Geneva, 1931). Time series reflecting significant aspects of each nation's economy—industrial production, employment, commodity prices, domestic trade, money and credit conditions, security markets and foreign trade—have been translated into qualitative terms pertaining to each half-year period. It must be emphasized that only the general tendency, the major direction of change apparent in these aspects is indicated. Table 18a is intended to present the degree of likeness or difference between the contemporary economic fortunes of Germany and each of the fourteen other countries. It is apparent from Table 17 that the conditions cannot always be called quite similar or decidedly unlike. "Thus it is necessary to recognize

at least three types of relations between the synchronous phases of business cycles in different countries —agreement, partial agreement and opposition." The arbitrary definitions followed by Dr. Mitchell have been adopted for the purposes of Tables 18a and 18b.[28]

Table 18b indicates the degree of likeness between cyclical fluctuations of Germany and each of nine other countries during the period 1900–14.[29]

Tables 19a and 19b are summaries of Tables 18a and 18b. They give the number of instances of agreement, partial agreement and opposition during each half year from the beginning of 1924 to the end of 1932, and during each year from 1900 to 1914.

Table 20a indicates the number and percentage of periods of agreement and difference of phase in the cyclical fluctuations of Germany and each of the fourteen other countries (enumerated in Table 17)

[28] "Agreement includes

(1) Years in which two countries pass through the same phase or phases of a cycle.

(2) Years in which two countries pass through at least two corresponding phases, though one may enter a third phase.

Partial agreement includes

Years in which two countries pass through phases of the cycle which succeed one another.

Opposition of phases includes

Years in which opposite phases of cycles occur, whatever intermediate phases are noted.

The relative severity of recessions in different countries is not taken into account."

Business Annals, p. 90.

[29] This table is based upon the Conspectus of Business Conditions in Various Countries, *ibid.*, Table 10, pp. 75–87.

during the period 1924–32; Table 20b presents the same data for Germany and nine other countries (enumerated in Table 18b) during the periods 1900–14 and 1924–32.

The tables afford no reason to believe that recent events contradict the conclusion of Dr. Mitchell in his study of the international relationships among business cycles from 1867 to 1925 that there is "a general trend toward uniformity of business fortunes."[30] There is indication of rather close international similarity of phase in the cyclical fluctuations since 1926, and the German cycle of 1926–32 has shown much the same sort of agreement with the cycles of other countries as was true in the decade before the War. "The intimacy of relations is probably understated" by the tables, for they "take no account of the shifting relations of lead and lag in the influence exercised by business conditions in one country upon business conditions in the other country with which it is compared." [31]

The records of the first two and a half years after the German stabilization—that is, 1924–26—indicate no very marked correspondence between the fluctuations in Germany and those in the larger capitalistic countries. The War broke the international economic relationships of Germany, and the post-War period of political and financial difficulties interfered with their restoration. This was also true of

[30] *Ibid.*, p. 93.
[31] *Ibid.*, p. 90.

other European nations. National economic fortunes diverged widely for nearly a decade after the Armistice. Inflation, political instability, difficulties of stabilization—these and other factors, affecting many nations at different times, and in varying degree, tended to interfere with a synchronizing of cyclical fluctuations.

After the beginning of 1927, however, a growing international similarity is apparent. Indeed, it is possible again to speak of an 'international pattern': prosperity in 1927–29; recession in 1929–30; depression in 1930–32. The more immediate difficulties of stabilization had been overcome, not only in Germany, but also in Great Britain, France and Italy. The British coal strike made for a revival of business activity in several nations, notably Germany. Undoubtedly, an important factor making for convergence was the increasing international penetration of loan fund capital—a development that was of particular significance for German economy. It is possible that the slow recession in Germany, beginning in the second half of 1928, and anticipating by almost a year the decline in the economic activity of other nations, was a reflection of its extreme sensitiveness to changes in international credit conditions. Finally, 1930, 1931 and 1932 are characterized by almost world-wide depression. The economic condition of Germany—considered in its cyclical aspects—in these years was strikingly similar to that of most of the other industrial nations.

As would be expected from the intimacy of their business relations, the cycles of Czechoslovakia, The Netherlands, Poland and Switzerland are more highly correlated with the German cycles than are the cycles of other countries. The least agreement would seem to have existed between the cycles of France, Italy and Denmark on the one hand, and those of Germany, on the other. The continuance of currency inflation in France and Italy for some years after the German stabilization and the currency deflation in 1926 in Denmark may account in part for this divergence.

As we suggested in Ch. I, Sec. 1, it is probable that the post-War changes in German economy have made Germany more sensitive to foreign economic forces than it was before the War. If this be true, it is to be expected that there will be an increased tendency towards correlation between the cyclical fluctuations in Germany and in other industrial nations.

TABLE 17

CONTEMPORARY PHASES OF BUSINESS CYCLES IN FIFTEEN COUNTRIES, 1924–1932, BY HALF-YEARS

	1924		1925	
	I	II	I	II
GERMANY	Depression; revival; temporary check	Revival	Revival; prosperity	Recession
UNITED STATES	Mild depression	Revival	Prosperity	Prosperity
GREAT BRITAIN	Depression	Depression	Depression	Depression
FRANCE	Prosperity	Prosperity	Prosperity	Prosperity
ITALY	Moderate prosperity	Moderate prosperity	Prosperity	Prosperity
SWEDEN	Moderate prosperity	Moderate prosperity	Moderate prosperity	Moderate prosperity
CANADA	Recession	Mild depression	Revival	Prosperity
JAPAN	Depression	Depression	Depression	Revival
BELGIUM	Revival	Moderate prosperity	Recession	Revival
CZECHOSLOVAKIA	Revival	Revival	Revival; prosperity	Prosperity; recession
NETHERLANDS	Revival	Revival	Moderate prosperity	Moderate prosperity; recession
AUSTRIA	Revival	Recession	Recession	Depression
DENMARK	Revival	Prosperity; recession	Recession	Depression
POLAND	Recession	Recession; revival	Prosperity; recession	Recession
SWITZERLAND	Revival	Revival	Prosperity	Recession

TABLE 17 *(cont.)*

CONTEMPORARY PHASES OF BUSINESS CYCLES IN FIFTEEN COUNTRIES, 1924–1932, BY HALF-YEARS

	1926		1927	
	I	II	I	II
GERMANY	Depression; revival	Revival	Revival	Prosperity
UNITED STATES	Prosperity	Moderate prosperity	Moderate prosperity	Slight recession
GREAT BRITAIN	Depression	Deep depression	Depression	Revival
FRANCE	Prosperity	Recession	Mild depression	Revival
ITALY	Recession	Recession	Depression	Depression
SWEDEN	Prosperity	Prosperity	Prosperity	Prosperity
CANADA	Prosperity	Prosperity	Prosperity	Slight recession
JAPAN	Uneven prosperity	Uneven prosperity	Uneven prosperity	Recession
BELGIUM	Moderate prosperity	Moderate prosperity	Prosperity	Prosperity
CZECHOSLOVAKIA	Depression	Revival	Revival	Moderate prosperity
NETHERLANDS	Recession; depression	Revival	Uneven prosperity	Prosperity
AUSTRIA	Depression	Depression; revival	Revival	Prosperity
DENMARK	Depression	Depression	Depression	Depression; revival
POLAND	Depression	Revival	Prosperity	Prosperity
SWITZERLAND	Depression	Revival	Revival	Prosperity

TABLE 17 *(cont.)*

CONTEMPORARY PHASES OF BUSINESS CYCLES IN FIFTEEN COUNTRIES, 1924–1932, BY HALF-YEARS

	1928		1929	
	I	II	I	II
GERMANY	Prosperity; recession	Recession	Recession	Depression
UNITED STATES	Revival	Prosperity	Prosperity	Recession
GREAT BRITAIN	Recession	Depression	Recovery	Recession
FRANCE	Prosperity	Prosperity	Prosperity	Prosperity
ITALY	Revival	Revival	Uneven prosperity	Recession
SWEDEN	Moderate prosperity	Moderate prosperity	Moderate prosperity	Moderate prosperity
CANADA	Revival; prosperity	Prosperity	Prosperity	Recession
JAPAN	Revival	Moderate prosperity	Moderate prosperity	Recession
BELGIUM	Moderate prosperity	Moderate prosperity	Moderate prosperity	Recession
CZECHOSLOVAKIA	Moderate prosperity	Moderate prosperity	Moderate prosperity	Recession
NETHERLANDS	Moderate prosperity	Moderate prosperity	Moderate prosperity	Mild recession
AUSTRIA	Prosperity	Prosperity	Prosperity	Prosperity; recession
DENMARK	Revival; prosperity	Prosperity	Prosperity	Prosperity
POLAND	Prosperity	Prosperity	Prosperity; recession	Recession
SWITZERLAND	Prosperity	Prosperity	Prosperity	Prosperity

TABLE 17 *(cont.)*

CONTEMPORARY PHASES OF BUSINESS CYCLES IN FIFTEEN COUNTRIES, 1924–1932, BY HALF-YEARS

	1930		1931	
	I	II	I	II
GERMANY	Depression	Depression	Depression	Depression
UNITED STATES	Depression	Depression	Depression	Depression
GREAT BRITAIN	Depression	Depression	Depression	Depression
FRANCE	Uneven prosperity	Recession	Recession	Depression
ITALY	Depression	Depression	Depression	Depression
SWEDEN	Uneven prosperity	Recession	Depression	Depression
CANADA	Depression	Depression	Depression	Depression
JAPAN	Depression	Depression	Depression	Depression
BELGIUM	Depression	Depression	Depression	Depression
CZECHOSLOVAKIA	Depression	Depression	Depression	Depression
NETHERLANDS	Recession; depression	Depression	Depression	Depression
AUSTRIA	Depression	Depression	Depression	Depression
DENMARK	Prosperity	Recession	Depression	Depression
POLAND	Depression	Depression	Depression	Depression
SWITZERLAND	Recession	Recession	Depression	Depression

TABLE 17 *(cont.)*

CONTEMPORARY PHASES OF BUSINESS CYCLES IN FIFTEEN COUNTRIES, 1924–1932, BY HALF-YEARS

	1932	
	I	II
GERMANY	Depression	Hesitant revival
UNITED STATES	Depression	Depression
GREAT BRITAIN	Depression	Hesitant revival
FRANCE	Depression	Hesitant revival
ITALY	Depression	Hesitant revival
SWEDEN	Depression	Depression
CANADA	Depression	Depression
JAPAN	Hesitant revival	Revival
BELGIUM	Depression	Hesitant revival
CZECHOSLOVAKIA	Depression	Depression
NETHERLANDS	Depression	Depression
AUSTRIA	Depression	Depression
DENMARK	Depression	Depression
POLAND	Depression	Depression
SWITZERLAND	Depression	Depression

TABLE 18a

EXTENT OF AGREEMENT AND DIFFERENCE OF PHASE IN THE BUSINESS CYCLES OF GERMANY AND EACH OF FOURTEEN OTHER COUNTRIES

1924–1932 by half-years

(AGREEMENT IN PHASE WITH GERMANY = +
PARTIAL AGREEMENT IN PHASE WITH GERMANY = ±
OPPOSITION IN PHASE TO GERMANY = —)

	1924		1925		1926		1927		1928		1929		1930		1931		1932	
	I	II	I	II	I	II	I	II	I	II	I	II	I	II	I	II	I	II
United States	±	+	±	±	—	±	±	±	—	±	±	±	+	+	+	+	+	±
Great Britain	±	±	—	±	+	±	±	±	+	±	—	±	+	+	+	+	+	+
France	—	±	±	±	—	—	±	±	±	±	±	—	—	±	±	+	+	+
Italy	—	±	±	±	±	—	±	—	—	—	±	±	+	+	+	+	+	+
Sweden	—	±	±	±	—	±	±	+	±	±	±	—	—	±	+	+	+	±
Canada	—	±	+	±	—	±	±	±	±	±	±	±	+	+	+	+	+	±
Japan	±	±	—	—	—	±	±	±	—	±	±	±	+	+	+	+	±	+
Belgium	±	±	—	—	—	±	±	+	±	±	±	±	+	+	+	+	+	+
Czechoslovakia	±	+	+	±	+	+	+	+	±	±	±	±	+	+	+	+	+	±
Netherlands	±	+	+	±	±	+	±	+	±	±	±	±	±	+	+	+	+	±
Austria	±	—	—	±	±	±	+	+	±	±	±	±	+	+	+	+	+	±
Denmark	±	—	—	±	±	±	±	—	—	±	±	—	—	±	+	+	+	±
Poland	—	±	±	+	±	+	±	+	±	±	±	±	+	+	+	+	+	±
Switzerland	±	+	±	+	+	+	+	+	±	±	±	—	±	±	+	+	+	±

TABLE 18b

EXTENT OF AGREEMENT AND DIFFERENCE OF PHASE IN THE BUSINESS CYCLES OF GERMANY AND EACH OF NINE OTHER COUNTRIES

1900–1914 by years

(AGREEMENT IN PHASE WITH GERMANY = +
PARTIAL AGREEMENT IN PHASE WITH GERMANY = ±
OPPOSITION IN PHASE TO GERMANY = —)

	1900	1901	1902	1903	1904	1905	1906	1907	1908	1909	1910	1911	1912	1913	1914
UNITED STATES	+	—	—	—	—	±	+	+	+	—	—	—	±	+	±
GREAT BRITAIN	+	+	+	±	—	+	+	+	+	±	±	+	+	+	±
FRANCE	+	+	+	+	±	±	+	—	±	±	±	+	+	+	±
ITALY	+	—	—	±	±	±	+	+	+	±	—	±	±	+	±
SWEDEN	—	±	+	+	±	±	+	+	+	±	±	+	+	+	—
CANADA	+	—	—	±	±	±	+	+	±	±	±	+	+	+	±
JAPAN	—	+	±	+	±	—	±	+	+	+	+	+	+	±	—
NETHERLANDS	±	±	+	±	—	±	+	—	±	—	±	+	+	±	—
AUSTRIA	+	+	+	±	—	±	+	—	±	±	—	±	—	—	±

TABLE 19a

NUMBER OF INSTANCES OF AGREEMENT, PARTIAL AGREEMENT, AND OPPOSITION OF PHASE IN THE CYCLICAL FLUCTUATIONS OF GERMANY AND EACH OF FOURTEEN OTHER COUNTRIES[1]

1924–1932 by half-years

PERIOD	AGREEMENT	PARTIAL AGREEMENT	OPPOSITION
1924, I	0	9	5
II	4	8	2
1925, I	3	6	5
II	2	10	2
1926, I	3	5	6
II	4	8	2
1927, I	3	11	0
II	7	5	2
1928, I	1	9	4
II	0	13	1
1929, I	0	13	1
II	0	10	4
1930, I	9	2	3
II	10	4	0
1931, I	13	1	0
II	14	0	0
1932, I	13	1	0
II	5	9	0

[1] See Table 18a for names of the fourteen countries.

TABLE 19b

NUMBER OF INSTANCES OF AGREEMENT, PARTIAL AGREEMENT, AND OPPOSITION OF PHASE IN THE CYCLICAL FLUCTUATIONS OF GERMANY AND EACH OF NINE OTHER COUNTRIES[1]

1900–1914 by years

YEAR	AGREEMENT	PARTIAL AGREEMENT	OPPOSITION
1900	6	1	2
1901	4	2	3
1902	5	1	3
1903	3	5	1
1904	0	5	4
1905	1	7	1
1906	8	1	0
1907	6	0	3
1908	5	4	0
1909	1	6	2
1910	1	5	3
1911	6	2	1
1912	6	2	1
1913	6	2	1
1914	0	6	3

[1] See Table 18a for names of the fourteen countries.

TABLE 20a

NUMBER AND PERCENTAGE OF PERIODS OF AGREEMENT AND DIFFERENCE OF PHASE IN THE BUSINESS CYCLES OF GERMANY AND EACH OF FOURTEEN OTHER COUNTRIES[1]

1924–1932

GERMANY AND	PERIOD COVERED	NO. OF PERIODS	NUMBER OF PERIODS OF			PERCENTAGE OF PERIODS OF		
			+	±	—	+	±	—
UNITED STATES	1924–1932	18	6	10	2	33	56	11
GREAT BRITAIN		18	8	8	2	44	44	11
FRANCE		18	3	10	5	16	56	28
ITALY		18	6	7	5	33	39	28
SWEDEN		18	4	10	4	22	56	22
CANADA		18	6	10	2	33	56	11
JAPAN		18	5	9	4	28	50	22
BELGIUM		18	7	8	3	39	44	17
CZECHOSLOVAKIA		18	11	7	0	61	39	0
NETHERLANDS		18	8	10	0	44	56	0
AUSTRIA		18	7	9	2	39	50	11
DENMARK		18	3	9	6	17	50	33
POLAND		18	8	9	1	44	50	6
SWITZERLAND		18	9	8	1	50	44	6
FOURTEEN OTHER COUNTRIES	1924–1932	252	91	124	37	36	49	15
FOURTEEN OTHER COUNTRIES	1924–1926 (I)	70	12	38	20	17	54	29
FOURTEEN OTHER COUNTRIES	1926–1932 (II)	182	79	86	17	44	47	9

[1] See Table 18a for explanation of symbols.

TABLE 20b

NUMBER AND PERCENTAGE OF PERIODS OF AGREEMENT AND DIFFERENCE OF PHASE IN THE BUSINESS CYCLES OF GERMANY AND NINE OTHER COUNTRIES[1]

1900–1914; 1924–1932

PERIOD COVERED	NO. OF PERIODS	NUMBER OF PERIODS OF			PERCENTAGE OF PERIODS OF		
		+	±	—	+	±	—
1900–1908	63	27	22	14	43	35	22
1907–1914	72	31	27	14	43	38	19
1924–1926 (I)	45	5	26	14	11	58	31
1926–1932 (II)	117	47	58	12	40	50	10
1924–1932	162	52	84	26	32	52	16

[1] See Table 18b for names of the nine countries and for explanation of symbols.