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THE DEVELOPMENT AND ROLE OF THE
NATIONAL BUREAU'S
BUSINESS CYCLE CHRONOLOGIES

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ABSTRACT

A working definition, first formulated in the 1920's by Mitchell and revised in the 1940s, has been in use at the National Bureau for over fifty years and is still employed to identify and date business cycles. The NBER historical chronologies for England, France, and Germany as well as the United States have been intensively in economic research and are widely accepted. The U.S. chronology, which is being updated as promptly as the data allow, also has the important practical function of aiding the analysis of current business conditions and forecasting near-term cyclical developments. This paper discusses the main aspects of the NBER concept of business cycles; the early views and developments bearing on the construction of the chronologies; the problems and procedures involved; the characteristics and dependability of the historical reference dates; and the National Bureau's work in this field since World War II. Some recent uses of the U.S. dates to measure the duration, amplitudes, and diffusion of business expansions and contractions are illustrated. Finally, we show and discuss chronologies of "growth cycles," i.e., trend-adjusted business cycles, for 13 countries in the post-World War II period.

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THE DEVELOPMENT AND ROLE OF THE NATIONAL BUREAU'S BUSINESS CYCLE CHRONOLOGIES

I. Defining Business Cycles

Business cycles consist of recurrent sequences of expansions, downturns, contractions, and upturns in a great number of diverse economic activities. These movements are both sufficiently diffused and sufficiently synchronized to create major fluctuations in comprehensive aggregates of employment, production, real income, and real sales. They are as a rule asymmetric in that expansions typically exceed contractions in size and duration. (In earlier history, however, the differences in duration were relatively small and irregular, as will be shown below.) Of course, in any secularly growing economy, expansions must necessarily be on the average larger than contractions. It is a rare business cycle that does not contain a visible element of growth.

Persistent and pervasive fluctuations of this type are characteristic of the course of industrial economies with large sectors of private enterprise and markets relatively unconstrained by governments. They have accompanied the development of modern capitalism in the Western world. First systematic accounts are over a hundred years old (Juglar, 1862). Authoritative studies date the phenomenon back at least to the late eighteenth century.

As a rule, several years are required for the cumulative processes of business expansion and contraction to complete a round from peak to peak or from trough to trough. But business cycles, although recurrent, are in their directly observable manifestations nonperiodic, unlike the cycles of the seasons.¹ Indeed, they vary considerably in duration and as well as in intensity and scope, and do so in ways that appear to be largely unsystematic and unpredictable.

Seasonal movements, which are periodic but often quite variable in amplitude and incidence over the calendar year, may obscure the cyclical developments to an observer of current changes in individual time series. In addition, short erratic movements are likewise continually present in most economic indicators, and they too frequently impede the contemporaneous reading of business cycle signals. Historically, however, and looking across data representing many different variables, business cycles can be clearly distinguished from the other fluctuations in that they are usually larger, longer, and more widely diffused. Seasonal movements typically run their course within a year; most isolated random events also have repercussions of similar or shorter duration. Thus it is business cycles that usually dominate changes in the economy over spans of several years, just as seasonal and other shorter variations dominate many changes over spans of a few weeks or a few months. The developments across decades are, to be sure, primarily the work of forces of secular growth-rising population, labor force, and physical capital, as well as gains in productivity attributable to technological, educational, and organizational improvements. However, business cycles and long trends can and do interact in varied and subtle ways (about which more later).

A succinct definition of business cycles, first formulated in the 1920s, and revised in the 1940s, runs as follows:

Business cycles are a type of fluctuation found in the aggregate economic activity of nations that organize their work mainly in business enterprises: a cycle consists of expansions occurring at about the same time in many economic activities, followed by similarly general recessions, contractions, and revivals which merge into the expansion phase of the next cycle; the sequence of changes is recurrent but not periodic; in duration business cycles vary from more than one year to ten or twelve years; they are not divisible into shorter cycles of similar character with amplitudes approximating their own.²

This working definition, in substantially its present form, has been in use at the National Bureau of Economic Research for over fifty years, and is currently employed by the NBER to identify and date the U. S. business cycle. These dates are widely accepted by government, academic, and business analysts. The definition served as the basis for the National Bureau's pre-World War II business cycle chronologies for England, France, and Germany as well as the United States. With a modest adjustment, namely to allow activity to be measured relative to its long-run trend, the definition has been used to develop "growth cycle" chronologies for many countries. It has surely passed a severe test of time, considering all the far-reaching changes in the structure of modern industrialized economies and the character of contemporary business cycles.

The concept of "aggregate economic activity" is purposely vague, yielding to the recognition that what matters is the evolution over time of a vector of many diverse activities which are not readily reducible to any single aggregate.³ The reasons are in part economic: for example, in times past when prices fluctuated cyclically around a relatively stable level, GNP in current dollars was often a more sensitive indicator than GNP in constant dollars, was often in the recent era of long persisting inflation the opposite is generally the case. Business cycles involve multidimensional processes, in which quantities and prices, stocks and flows, outputs and inputs, real, monetary, and financial variables all tend to participate, albeit with many timing and amplitude differentials and at varying rates. The definition properly stresses that the expansions and contractions occur with rough synchronism in "many economic activities" (and, we would add, in a fair number of activities generally regarded as "noneconomic" as well). The high cyclical conformity or coherence of numerous variables, that is, the wide diffusion or pervasiveness

of business cycles was and remains their common and salient characteristic.

Statistical considerations are also important in this context. It is simply a fact that no single comprehensive measure of the nation's economic activity is available monthly or quarterly for a long historical period. Whether the aggregates refer to output, income, expenditures, or employment, they individually lack sufficient comparability of coverage and sufficient solidity of estimation over long stretches of time. It seems best therefore to rely on the evidence from a number of comprehensive indicators rather than any single one. Particular attention needs to be paid to the comovement of the economic variables, taking account of any systematic timing differences among them. This also helps to reduce the risk of drawing erroneous inferences from data containing measurement errors and biases due to changes in the quality of the information.

In addition to being pervasive, business cycles are also persistent, i.e., the expansions and contractions are congeries of serially correlated as well as cross-correlated movements in many activities. The requirement that business cycles not be "divided into shorter cycles of similar character with amplitudes approximating their own" has in practice meant that no rise or decline in aggregate output, employment, etc., is recognized as a cyclical movement unless it is at least as large as the smallest expansion or contraction in the historical record. Beyond that, no quantitative specifications are imposed upon either the amplitude or the scope of the cycles.

The only numerical limits mentioned refer to the duration of a full cycle (expansion and contraction) and they are broad: more than a year to ten or twelve years. Thus the range of admissible fluctuations is wide, accommodating short and long, weak and strong cycles. There is no recognition of any systematic distinctions in these respects: unlike some other contemporary

scholars (Schumpeter, 1939; Hansen, 1941, 1951; R. A. Gordon, 1952), Burns and Mitchell (1946, chs. 10 and 11) found no cogent reasons to differentiate a priori between "minor" and "major" or between "Kitchin" and "Juglar" cycles. However, this is a case of suspended judgment, not a definitive conclusion. Important differences clearly exist, e.g., inventory investment plays a central role in the short "Kitchin" cycles, whereas fixed capital investment is more instrumental in the longer "Juglar" cycles. But such distinctions, and more generally all considerations of causality, are viewed as matters to be treated in further research, not as parts of a tentatively accepted definition. The long waves of fifty to sixty years hypothesized by Kondratieff in 1926 are quite different phenomena whose precise nature, and even existence, has not yet been widely accepted. Schumpeter's 1935 hypothesis that each such long wave contains six Juglar cycles of from nine to ten years duration, while every Juglar is divisible into three Kitchin cycles of roughly forty months each, has also failed to be validated.

Burns and Mitchell make it clear that by their definition a mere slowing down or cessation of growth is not enough to qualify as a business cycle contraction: what is required is an absolute fall in "aggregate economic activity." Note, however, that this requirement has been modified in the recent work on "growth cycles." The rise and fall is not restricted to some limited measure of economic activity, e.g., production in manufacturing or corporate profits, sufficient to define a business cycle: the latter must be clearly reflected in economy-wide aggregates of output and employment. Moreover, contractions as well as expansions are taken to be cumulative movements, which implies that they cannot be very short. Historical evidence indicates, for example, that a decline of less than six months could not reach the dimensions that would qualify it as a cyclical contraction, in particular a

state in which a majority of industries experience falling demand (new orders or sales), production, and employment.

II. Early Views and Developments

Business cycles must be strictly distinguished from the various "crises" associated with foreign and civil wars, epidemics, bad harvests, earthquakes, isolated and transient monetary disorders, speculative "manias," and other episodic or random disturbances. Such events, whether due to acts of nature or of man, can disrupt the ordinary rhythm of economic life and cause much distress at any time, and they did so for ages under all forms of social organization. In contrast, business cycles, as defined above, "are found only in modern nations where economic activities are organized mainly through business enterprises and where individuals enjoy considerable freedom in producing, pricing, trading, and saving or investing" (Burns, 1968, p. 228).

In the early literature on the subject, business cycles have often been viewed as the natural way growth takes in modern capitalist economies. The latter have achieved historically unprecedented records of long-term development, e.g., approximately fivefold gains in output per capita in the United States, France, and Germany.⁴ Private enterprise thrived on and fostered advances in science and technology by seeking higher profits in surges of innovative investment. There was increasing division and specialization of labor as new techniques were introduced, new markets opened, new products discovered. Inevitably, this was associated with various frictions, difficult adjustments, and costly resource transfers in response to the (in large part unanticipated) shifts in demands and supplies.

Over decades, fairly smooth rising trends in population and labor force and much faster growth in the stock of reproducible capital can be broadly documented.⁵ Improvements from the progress of knowledge, new technologies,

and new skills kept raising the quality and marginal productivity of human and tangible capital. This was sufficient to prevent a downward trend in the profitability of new investment, which would otherwise have resulted, under the law of diminishing marginal returns, from the growing abundance of physical capital relative to labor and the nonreproducible natural resources.⁶ Over shorter periods, however, profit totals, margins, and rates were continually undergoing large fluctuations induced by movements in sales, in product prices relative to wages and costs of materials and finance, in investment, and in the demand and supply of credit. In turn, the rise and fall of profits, cash flow, and rates of return caused parallel movements in expectations of future profitability and hence in business decisions concerning production, employment, and investment. Changes in money and credit interacted with these general changes in economic expectations and activity.

To be sure, this is merely a brief, rough sketch of some trends in the classic era of industrialization, economic growth, and business cycles that originated about 200 years ago in Britain and spread worldwide in the past century. Some observers placed more stress on real factors: cyclical innovations and growth spurts, recurrent overinvestment, imbalances between production of capital and consumer goods, intersectoral shifts. Others emphasized monetary processes: changes in the supply of bank credit, discrepancies between market and equilibrium interest rates. Still others paid special attention to the role of uncertainty and failure of foresight, interdependent expectations and waves of errors of optimism and pessimism. Finally, the focus on cyclical changes in relative prices and profits is also compatible with important roles being played by other real forces as well as monetary and expectational variables. But it is generally correct to see the early theories of business cycles as mainly endogenous, i.e., concentrating on the internal relations of the economic system

rather than on the effects of external shocks; multicausal, i.e., concerned with interactions of the real, monetary, and expectational factors; and dynamic, i.e., incorporating elements of long-term growth into the analysis of short-term instability.⁷

The historical setting of business cycle phenomena suggests that they developed gradually along with the growing interdependence within and among the modern capitalist economies. The processes and institutions that mark this evolution include the buildup of fixed capital in progressively mechanized production requiring new sources of labor, energy, and materials; lessening of barriers to trade through advances in transportation and communications; and the spread of money transactions, banking and credit and investment finance. As these factors moved the market economies of the Western world onto higher levels of economic interdependence, strongly diffused and persistent business fluctuations emerged where previously disjointed acts of nature and man-made disturbances held sway. Since Juglar, 1862, it was widely recognized that the acute financial crises that happened from time to time are merely transitory events that cannot be well understood in isolation from the major problem of recurrent sequences of general expansions and contractions. Between 1894 and 1927, most of the leading scholars in the field (Tugan-Baranovskii, Aftalion, Mitchell, Spiethoff, Schumpeter) strongly endorsed and elaborated the conception of business cycles as a characteristic motion of the development of modern capital-creating, money-exchange, market-oriented economies.

The dating of the earliest business cycles is imprecise and impeded by severe limitations of the available data. Schumpeter (1939, vol. I, ch. VI.B, esp. pp. 223-224, 248-252) argued that capitalism goes "as far back as the element of credit creation" and that "there must have been also prosperities and depressions of the cyclical type" in the seventeenth and eighteenth century.

But he concedes to the critics of this view that wars, poor harvests, and other "noncyclical catastrophies" played a much greater role in the preindustrialization era than in the cycles of the later period.⁸

A reference chronology of cyclical turning points for eighteenth century England has been compiled from fragmentary but carefully assembled and explained chronicles and data by T. S. Ashton, and some of his results are summed up in Table 1. Bad harvests occurred frequently, causing shortages for small farmers who produced grain mainly for themselves and their livestock and depressing real wages of industrial workers, the demand for textiles and other manufactured products, and output of commodities subject to excise duties. Government revenue would fall at the same time as the costs of provisions for the navy and army rose. The resulting deficits tended to raise the costs of borrowing and to decrease public confidence. More grain had to be imported at high prices, adversely affecting the balance of payments and the domestic supply of credit. Large farmers may have benefitted from higher grain prices but overall the bad consequences prevailed.

Although Britain fought her wars on the seas or on alien soil, they were recurrent, protracted, and often associated with other disasters such as epidemics and famines. They had large but mixed effects on overall economic activity, since the extent to which they curtailed civilian consumption or increased production varied greatly, as did the extent to which they were financed by taxation vs. loans. The periods of decline, as dated by Ashton lasted longer, on average, than the periods of growth.

In sum, weather and wars seem to account for much of the fluctuation in economic fortunes before the industrial revolution in Britain of the 1780s. But endogenous economic and financial processes played an increasingly important role as well. Bank notes and commercial paper provided an elastic supply

of means of payment. Speculation in commodities and securities spread in prosperous times and financial crises accompanied or followed most of the peak dates (Ashton, ch. 5). Longer building cycles also persisted (op. cit., ch. 4, and John P. Lewis, 1965). Rostow (1980, pp. 37-38) compares the effects of bad harvests on real incomes and the balance of payments to the effects of oil price rises in 1973-74 and 1979 and the associated "supply-side recessions" in the United States and elsewhere. It is interesting to note that the Ashton dates suggest a sequence of sixteen "cycles" with durations concentrated heavily between 3 and 6 years and averaging about 5 years (whether measured from trough to trough or from peak to peak). This is very close to the average length of the 28 cycles identified in Great Britain in the NBER chronology for 1792-1932 (59 or 60 months, see Burns and Mitchell, 1946, p. 371).

III. Business Annals, Historical Statistics, and Reference Dates

The first step taken by the National Bureau of Economic Research (NBER) toward identifying historical business cycles shortly after its founding in 1920, was to compile comprehensive chronological records of changes in general economic conditions in the United States and England (1790-1925), France (1840-1925), Germany (1853-1925), Austria (1867-1925), and twelve other countries (1890-1925). These "business annals" were based on detailed studies of a large collection of official documents, reports by contemporary observers and students of economic history, periodicals, pamphlets, and books. The resulting volume by Willard Thorp (1926) lists several hundred sources. This was a major effort to extract year-by-year information on the spread, timing, duration, and intensity of past business fluctuations in the "great commercial nations," both old and new.

A second NBER project, also started in the early 1920s, was to collect statistical time series data on a variety of pertinent aspects of modern economies, and to subject them to a systematic analysis. These materials are more massive

yet, and they are obviously necessary as a basis for more precise quantitative results as well as to check the inferences from the business annals. However, it is also useful to check the inferences from the statistical data with the aid of the reports of contemporary observers and other documents underlying the annals. In short, the two collections of materials provide evidence that is to a large extent complementary.

The time series cover shorter periods than the annals, and are limited to four countries: the United States, England, France and Germany. The available statistical record shrinks rapidly as one goes back into the 1800s, and the series extending to the earliest decades covered by the British and U. S. business annals are very scanty. The early data are predominantly annual and their coverage and quality leave much to be desired. This makes the business annals indispensable for the study of the more distant past. Their materials enabled Thorp and the NBER staff to characterize each successive year covered according to the business conditions that prevailed. They called the generally good and bad times "prosperity" and "depression," respectively, the generally shorter upper and lower transition periods "recessions" and "revivals," often attaching to these terms such adjectives as "brief," "slow," "rapid," "mild," "moderate," or "severe." Frequently, the recessions and revivals were dated more closely within a year by such designations as "early" or "late," or even by months or seasons. Thus a single year would be occasionally classified into more than one of the four basic cycle phases.⁹

Although business annals and indexes of general economic activity may differ with respect to the mix of the processes covered, measurement errors, etc., Mitchell (1926, pp. 20-31) presents evidence of a generally close agreement between the two approaches on the fluctuations in the United States, 1875-1925, and in England 1855-1914. Even for the earlier cycles, back to 1796, there is

a fairly good correspondence between the recession dates based on the annals and those based on statistical series (mainly wholesale commodity prices).¹⁰

Table 2 compares the annual reference dates for the British and U. S. business cycles between 1790 and 1858, as estimated by Thorp from annals (U. S. through 1833) and by Burns and Mitchell from annals and time-series studies. A close correspondence between the cycles in the two countries is indicated. Eight of the peak and three of the trough dates coincide. The degree of synchronization is particularly high for the (more precisely determined) dates of financial crises, in 1815, 1825, 1836-37, 1847, and 1857. The business annals for other countries available for the later period reinforce the finding that many cycles had an international sweep, as do the more recent and statistically firmer NBER chronologies for the U. S., England, France, and Germany (see below). This again applies especially to the major cycles, which were often accompanied by financial crises or panics as in 1873, 1893, 1907, and 1929.

According to the annual chronologies in Table 2, the durations of business cycles in this era comprising seven decades of the rise of modern capitalism and industrialization averaged about $4\frac{1}{2}$ years in both Great Britain and the United States, whether measured from trough to trough or from peak to peak. The standard deviations of these estimates are close to 2 years. Most contractions did not exceed one or two years. Five of the fourteen identified cycles in either country fall into the early turbulent period of almost continuous wars that ended in 1815.

IV. Monthly Business Cycle Chronologies: Problems and Procedures

For the United States and Britain since 1854, for France since 1865, and for Germany since 1879, sufficient evidence could be assembled by the National Bureau to permit estimation of monthly, as well as quarterly and annual, reference chronologies of business cycles. The work involved a painstaking

collective effort. Burns and Mitchell (1946, p. 80) credit Kuznets for taking "a leading part in the preparation of the original set of reference dates" and Abramovitz, Moore, Shiskin, Garvy, and Walt Rostow, among others, for help in extending, revising, or criticizing the dates.

Before presenting and discussing the results (in the next section), we need to consider the main problems encountered in this research and the methods adopted to overcome them. The lack of a single sufficiently long and consistent measure of aggregate economic activity was already noted. There is no doubt that no time series exists to fill this role for any country. This applies even to the recent periods covered by the quarterly data on national income and product accounts, as will be argued later. For the years before World War II, these series are anyway fragmentary and not very dependable.

In constructing their "reference scales" of business cycles after World War I, the NBER team could draw on monthly series of production in manufacturing and mining, and of the number of factory employees. Before World War I, however, these data have a slender sampling basis and leave much to be desired. The series on bank clearings, wholesale prices, and interest rates are much longer. Historically, their cyclical sensitivity tended to be high, and the researchers found them on the whole very useful. Much reliance was placed, too, on a variety of indexes of business conditions, mostly in physical terms.

In sum, the historical records decrease both in volume and reliability when pushed back into the past. In general, they are more satisfactory for the United States than for the foreign countries, but the reverse is true in a few cases involving the data for unemployment and interest rates (Burns and Mitchell, 1946, pp. 73-76).

Given the limitations of the individual indicators, the task of identifying and dating the historical business cycles required the analysis of both the

voluminous business annals and numerous time series covering diverse activities. Before deciding when a peak (trough) occurred, it is necessary to determine whether the expansion (contraction) is of cyclical dimensions. To ascertain the critical characteristics of the scope and size of the economy's movement, there was no alternative to the laborious procedure of extracting common signals from the noisy indications of fallible data on a whole range of economic processes. This remains true even today when much better and more comprehensive cyclical indicator statistics are available, because the diffusion aspect of business cycles is as important as ever. It is still true as well, despite the great improvement in the data, that measurement errors are mostly unknown but often large. A careful comparative analysis of interrelated but independently derived time series can help reduce the effects of such errors on a business cycle chronology.

The working definition of business cycles cited above implies that peaks and troughs of time series representing a broad array of economic processes are not randomly interspersed but form alternating clusters. The clusters of peaks and troughs typically extend over many months, but it is also true that they show as a rule rather definite points of concentration (see, e.g., Moore, 1961, Chart 7-3 and text, pp. 196-202). These dates, around which most of the series reach their highest (lowest) local levels, indicate roughly the timing of the peaks (troughs) in the otherwise not observable "aggregate economic activity."

Of course, some series deserve more attention than others because they are more comprehensive, more significant economically, more adequate statistically, or more reliable with respect to their cyclical timing and conformity characteristics. Some series such as unemployment tend to rise in contractions and fall in expansions, hence they must be used in inverted form. Some series such as new orders for capital goods and construction contracts rise and fall early;

others such as the volumes of business inventories and loans typically move late; still others move early at peaks and late at troughs, or vice versa. These systematic differences in behavior, once known, can and should be taken into account in identifying and dating the generalized expansions and contractions--often by excluding them from the sample of series used in the procedure.

It should be clear that the monthly or quarterly dates of business cycle turns are of necessity uncertain estimates. No high degree of precision is generally possible here; the best achievable result is a chronology that is well supported by the most pertinent evidence one can obtain. But this is also a major result and worth much effort. A well-designed and well-tested chronology is a valuable tool in the analysis and understanding of business cycle phenomena, some of which at least are of prime interest to macroeconomic theory and policy. A common reference scale has many practical uses, one of them being to confer the advantage of economies of scale on the handling of large numbers of contemporaneous time series. As Burns and Mitchell said (1946, pp. 70-71), "If our analysis were restricted to a few time series, it would be simple to compare their specific cycles directly. But when the analysis covers hundreds of series, it is clumsy and wasteful to compare the timing of each series with every other; indeed, as clumsy and wasteful as it would be to express the exchange value of each commodity in terms of every other commodity." Other analytical uses of the business cycle chronologies, for international comparisons and the measurement of relative durations, amplitudes, and spread of cyclical movements are illustrated below (Chart 1 and Tables 4, 6, and 7).

V. The NBER Business Cycle Chronologies for 1854-1938

Table 3 shows the monthly, quarterly, and annual lists of reference dates compiled by the National Bureau for the periods before World War II. The bulk

of this information comes from Burns and Mitchell, as cited. Only a few of the dates, all referring to the U. S. cycles in 1919-38, were subsequently changed in light of additional and revised data. The resulting shifts were small. Two dates were shifted by one month and two were shifted by two months.

The quarterly and annual dates are necessary for working with time series cast in the corresponding time units, in particular where monthly data are not available, but the monthly dates are basic since only they permit observation of cyclical behavior in the essential detail (Burns and Mitchell, 1946, pp. 80-81). Hence the monthly dates control the others and should be given preference and used wherever possible.

If the monthly choice falls in the mid-month of the quarter, that quarter is always taken as the quarterly reference date. If it falls on the first or third month, the quarterly turn is placed either in the quarter in which the reference month is located or in the quarter adjacent to that month, according to the indications of a sample of important economic series measured by quarters (including monthly data converted to quarterly).

Annual records alone are a poor guide to dating, since they obscure some mild and short business cycles. Phases of 12 months or less that overlap two calendar years (mostly contractions) have been frequent, particularly in the United States since the 1870s. Independent annual dating can miss the short business cycles and combine two or even three of them into one, while producing only a rough one-to-one correspondence with the longer cycles in the monthly chronology. There is ample statistical evidence that this is a serious measurement problem (Burns and Mitchell, ch. 6, esp. p. 262). Hence the adopted procedure is to set monthly reference dates first and then make the annual ones match them as well as possible. However, the annual turns are intended to identify the years in which the overall activity in the economy reached a high

or a low point, and these years need not always coincide with those in which the corresponding monthly peaks or troughs fall. When the monthly date occurs early in the year t , the annual date may well be the year $t-1$; similarly, when the monthly turn is late, the annual one will often be the year $t+1$.

According to these chronologies, business cycles have indeed been recurrent but not periodic in each of the countries covered. Contractions ranged from 7 to 65 months in the United States, 6 to 81 months in Britain, 8 to 68 months in France, and 12 to 61 months in Germany. The corresponding ranges for expansion are 10 to 50, 8 to 64, 8 to 62, and 16 to 61 months. The shortest full-cycle durations (measured from peak to peak or from trough to trough) are 17 months for the United States and Great Britain, 24 months for France, and 34 months for Germany; the longest are 101, 135, 110, and 122 months, respectively.

However, these measures are based on rare outliers; there is considerably more of a central tendency among business cycles than they suggest. For example, declines lasting from 10 months to 2 years account for 67 percent (43 out of 64) of the business contractions recorded in Table 3. Expansions lasting $1\frac{1}{2}$ to $3\frac{1}{2}$ years represent 66 percent (42 out of 64) of all observations in this category. Full cycles lasting $2\frac{1}{2}$ to $5\frac{1}{2}$ years account for 64 percent (41 out of 64) of all cycles measured from trough to trough. These ranges contain half or more of the corresponding listings for each of the four countries covered.

It is important to note that business cycles have tended to be shorter in the United States than in the foreign countries. Thus the period 1854-1938 witnessed 21 U. S. cycles averaging four years and only 16 British cycles averaging $5\frac{1}{3}$ years. For 1879-1938, the comparison is as follows:

1879-1938	<u>United States</u>	<u>Great Britain</u>	<u>France</u>	<u>Germany</u>
Number of cycles (T to T)	17	13	14	10
Mean duration (months)	48	65	53	64

Chart 1 uses a schematic form to compare the timing of business cycle peaks and troughs in the four countries. It suggests a fairly high overall degree of correspondence between the chronologies, as shown by the following summary.

	<u>Peaks</u>		<u>Troughs</u>	
	<u>Number</u>	<u>Percent</u>	<u>Number</u>	<u>Percent</u>
Matched turns for				
all four countries	44	62	48	64
three countries	18	25	18	24
two countries	2	3	2	3
Unmatched turns	<u>7</u>	<u>10</u>	<u>7</u>	<u>9</u>
Total	71	100	75	100

A closer look at the diagram makes it clear that much of the time, notably during the four decades 1879-1919, the conformity between the business cycles in the three European countries was very close, while the United States followed a different pattern of shorter and more frequent fluctuations. In the earlier years, the movements were generally less synchronized, in part because of the annual dating for France and Germany. In the 1920s and 1930s, the European countries were much less in phase with each other than in the preceeding forty years, but the degree of conformity between their cycles and those in the United States increased.¹¹

VI. On The Dependability of Historical Reference Dates

In the early U. S. business cycles, the average length of contractions was close to that of expansions, whereas more recently expansions have become much longer. This is clearly so according to the following measures of mean duration of the cyclical phases dated by the NBER.

	<u>1834-55</u>	<u>1857-82</u>	<u>1885-99</u>	<u>1900-18</u>	<u>1919-37</u>	<u>1948-82</u>
Number of cycles	5	5	5	5	5	8
Expansion, months (\bar{E})	26	31	22	26	26	45
Contraction, months (\bar{C})	24	28	19	20	19	11
Ratio, \bar{E}/\bar{C}	1.1	1.1	1.2	1.3	1.4	4.1

Fluctuations of trend-adjusted aggregates in the post-World War II period show alternating phases of high and low growth that have similar durations (e.g., in 1948-75 for the U. S., these phases lasted on the average 20 and 18 months, respectively). In such "growth cycles" (see section VIII below) the near symmetry is persistent and understandable because the fluctuations are measured from a long-run upward trend laid flat, as it were; that is, the growth element is eliminated. In contrast, the secular trend is retained in the measurement of business cycles as defined by the NBER, so that stages of less than average but positive growth are included in expansions and only the periods of sufficiently large and broad absolute decline qualify as contractions.

Accordingly, one might expect business cycle expansions to be significantly longer than contractions on the average over long periods of economic development. If so, one might also be somewhat surprised by, and suspicious of, the near equality of the early \bar{E} and \bar{C} measures listed above.

These views are not compelling: conceivably, the averages could reflect

the dominance of lengthy periods of slow decline among the contractions and of short periods of rapid growth among the expansions. But it is also possible that some of the historical reference dates refer to growth cycles rather than business cycles, i.e., that some of the phases designated as actual declines in the overall economic activity represent merely phases of low (less than the trend) growth rates. The limitations of data available for the identification of the early cycles, and the consequent reliance on business annals and selected indexes of business conditions, might well have produced a certain bias in this direction. This applies in particular to the period 1834-52, the segment of the NBER reference cycle chronology for which there are no comprehensive measures or indexes of economic activity without trend adjustments.

A partial reappraisal of the evidence for the United States confirms that generally the contractions in NBER chronology do represent cyclical declines in either real income and output, or money income and spending, or both the real and the nominal aggregates (Zarnowitz, 1981). It is important to note that, historically, both groups of variables deserve a thorough consideration. In the recent era of inflation, the cycles are mainly in the real aggregates, but in the past, when the price level fluctuated and long periods of deflation occurred, the cycles were often more pronounced in the nominal aggregates.

Nevertheless, a few episodes are doubtful. All of these go back to the 19th century. (The 1918-19 and 1926-27 contractions have been questioned by some investigators but there is sufficient evidence in favor of their inclusion.¹²) The most dubious is the 1845-46 phase, but 1869-70, 1887-97, and 1899-1900 are also uncertain. Given the limited information on hand, it seems impossible to refute the hypothesis that these were periods of below-average growth rather than actual declines. Fewer doubts attach to some other minor contractions (Zarnowitz, 1981, pp. 494-505).

If the four periods just listed were treated as growth cycle slowdowns instead of business cycle contractions, the differences between the \bar{E} and \bar{C} duration measures would be substantially increased. The tabulation below illustrates these effects.

	<u>1834-1855</u>		<u>1854-1919</u>	
	<u>5 cycles</u>	<u>4 cycles</u>	<u>16 cycles</u>	<u>13 cycles</u>
Expansion, months (\bar{E})	26	36	27	37
Contraction, months (\bar{C})	24	27	22	23
Ratio, \bar{E}/\bar{C}	1.1	1.3	1.2	1.6

Comparisons of the NBER and other chronologies disclose very few discrepancies and provide no good reasons for revisions (see references in note 14). Comparisons with indexes of business activity (both trend-adjusted and, after 1882, unadjusted) also point to a very high degree of correspondence between the cycles identified by the National Bureau and the consensus of fluctuations revealed by the best available information from time-series data. Indeed, in most cases there is a one-to-one agreement between the NBER dates and the cyclical turning points in these indexes.¹³

Table 4 provides some evidence on how well the U. S. chronology fits the cyclical movements in business activities phase by phase. It shows the percentages of series rising during each expansion and falling during each contraction for 18 indicators of commercial and industrial activity (production, trade, orders, bank clearings) and 28 indicators of prices and financial activity (commodity and security prices, interest rates, bonds and shares traded, business failures). The series that tend to move countercyclically

are inverted and allowance is made for fixed leads or lags--the timing characteristics of the indicators. The diffusion measures are predominantly high: about half of the phase percentages in columns 1-3 exceed 90, three quarters exceed 80, and practically all exceed 50. However, the percentages tend to be higher for the series that rise during expansions than for those that decline during contractions (compare the entries in lines 1-20 and 30-49). The overall averages range from 80 to 97 percent (lines 25 and 54). Thus the represented variables are shown to have participated with substantial regularity in the successive business cycle expansions and contractions dated by the National Bureau, exhibiting a generally high level of cyclical conformity.

The diffusion ought to be positively correlated with the amplitude of cyclical fluctuations, that is, those movements which are more widely spread among the various sectors, industries, and processes of the economy would also be expected to be larger in terms of the most comprehensive measures of economic activity that are available. Table 4 provides some evidence that this is indeed so. Here amplitudes are measured by the average of three trend-adjusted indexes of business activity which cover the entire period 1854-1933 (column 4) and by the average of four indexes without trend adjustments which begin in the 1870s or later (column 5). For either set of measures, the phases that rank higher according to the amplitudes tend to have larger diffusion, i.e., higher proportions of series conforming with respect to the direction of the economy's movement (see the sections on "Averages," lines 21-29 and 50-58, in the table).

We conclude that the NBER historical reference dates of U. S. business cycles receive strong support from the phase-by-phase behavior of both the individual indicators and the weighted combinations of various time series (indexes of business activity). However, it is important to keep in mind the obvious fact that the chronologies cannot be made more reliable than the avail-

able information permits. The true cyclical movements in the economy at large cannot be observed directly without comprehensive, nonduplicative measures of aggregate economic activity, but it is only for the most recent decades that the required statistical data exist. The series used as proxies for such measures could either underestimate or overestimate the true movements. Perhaps the greater risk is that of overestimation because the data appear to represent the cyclically sensitive sectors of the economy, notably manufacturing, better than they do the other sectors. Still, the NBER-designated phases provide about as good approximations to the historical incidence of business expansions and contractions as the data allow. On the other hand, considerable uncertainty attaches to the precise dates of some of the early reference turns.

In comparison with the U. S. dates, Burns and Mitchell (1946, p. 113) assessed the NBER chronologies for the foreign countries as being "at least tolerable, if not equally good, approximations," while listing a few particular doubts and difficulties.¹⁴ Independent compilations of turning points show on the whole good agreement on the identification of the cycles; some more serious discrepancies arise because of differences in how the cycles are defined and divided into phases.¹⁵

VII. The U.S. Business Cycle Chronology Since 1933

Since World War II the National Bureau's work in this field has been directed towards (1) maintaining the U.S. business cycle chronology along the lines previously established and (2) developing the concept of a growth cycle chronology and applying it to the U.S. and other major industrial countries. In this section we discuss the chronology of the recent U.S. business cycles, while the following section is devoted to growth cycles.

Table 5 gives the monthly, quarterly and annual business cycle dates for the United States from 1933 to 1982, together with the durations of contrac-

tions, expansions and full cycles.¹⁶ Ten cycles have occurred in the past 49 years, or about one every five years. In the preceding 143 years, from 1790 to 1933, there were 34 cycles, or about one every four years. Hence the frequency of cycles has diminished somewhat. But the biggest change that the chronology reveals is the shift in the length of contractions compared to expansions. In the period for which only annual dates are available, 1790 to 1855, contractions averaged about 24 months, expansions 31 months. Then from 1854 to 1933, when monthly dates are available, the average durations are 22 and 25 months respectively. But since 1933 the average contraction has lasted only 11 months while expansions have averaged 49 months (27 months when the wartime expansions are excluded).

In other words, since the depression of the early 1930's, the contraction phase of the business cycle has been reduced by about a year, while the expansion phase has been extended by two years. Before 1933, recessions lasted almost as long as expansions. Since then, expansions have been more than four times as long as recessions: the economy has been in recession less than twenty percent of the time.

Recessions have not only become shorter but also much more uniform in length. Using the standard deviation as a measure, the variability among contractions in 1790-1855 was 18 months; in 1854-1933, 14 months; while in 1933-82 it was only 3 months. In this sense, recessions have become more predictable. On the other hand, expansions have become less uniform in length. Between 1790 and 1855 the standard deviation of durations of expansions was 18 months, the same as for the contractions. From 1854 to 1933, the standard deviation of expansions was 9 months. But from 1933 to 1983, it was 27 months. Expansions have become nine times as variable as contractions.

It is not our purpose here to investigate the reasons for this shift in

variability, or for the shift in the length of expansions relative to contractions. The latter appears to be connected with the rising trend of prices since the 1930's which in turn may be related to the stronger effort of government to control recessions (See Moore, 1983, Ch. 15). But this is a worthy subject for further study.

The length of a period of rise or fall in aggregate economic activity is one of the criteria considered in establishing the business cycle chronology. The size and scope of the movement are also considered. Measures of these dimensions, for all the expansions between 1949 and 1982 are given in Table 6, while all the contractions since 1920 are covered in Table 7. Measures similar to these, but somewhat more extensive, have been used by the National Bureau staff in deciding what intervals should be classified as expansions or contractions and what the peak and trough dates should be.¹⁷

Study of the tables will reveal one development that led to a shift in this procedure during the 1960's. During the three expansions 1949-60 and during the five recessions 1923-38 and 1948-49, GNP in current dollars moved in wider swings than did GNP in constant dollars. Prices moved up and down with the business cycle, enhancing the current dollar swings. Since 1960, apart from a small one-quarter decline in 1982, current dollar GNP has not declined at all. Whereas before 1960 the current dollar aggregates for GNP, sales and income had figured importantly in the determination of the business cycle chronology, since the 1960's they have played no role at all. As long as the rate of inflation remains persistently positive, this practice is likely to continue.

The tables make it clear that not only have recessions become shorter, but that they have become milder as well. None of the recessions since 1948 have approached the Great Depression in depth, nor have they come close to the

major depressions of 1920-21 or 1937-38. All have been in a class either with the fairly sharp recession of 1923-24 or the mild recession of 1926-27. The tables record considerable "progress toward economic stability" (Burns, 1960).

A word should be said about the problem of identifying business cycles contemporaneously. How soon a peak or trough can be recognized depends partly upon how rapidly the economy descends from the peak or rises from the trough. It also depends upon one's ability and willingness to make forecasts, for example, that a decline in the several measures of aggregate activity will last as long and go as deep as in previously recognized recessions, and that the declines will be widespread. Since the National Bureau's decisions on dates have not depended on forecasts, turns in the business cycle have been recognized only with a lag. For example, the trough date for the most recent recession, November 1982, was determined by the National Bureau of Economic Research in July 1983. Even that involved a presumption that the recovery then underway would continue and ultimately develop the characteristics of a business cycle expansion.

One way to reduce this recognition lag has recently been developed by the authors in a paper on sequential signals of recession and recovery (Zarnowitz and Moore, 1982). The signals are based upon smoothed short-run growth rates in the composite leading and coincident indexes published by the Department of Commerce. When these growth rates reach certain pre-determined levels, a preliminary signal of a peak or trough occurs. If and when they reach another set of levels, a second signal is passed, and so on with a third and final signal. Safeguards against false signals are built into the system. Historical tests have shown that the signals would have identified each of the U.S. business cycle peaks and troughs since 1949 without undue delays or false signals. One of the potential uses for the system is to activate or deactivate counter-cyclical policies.

VIII. Growth Cycle Chronologies

A modification of the concept of business cycles employed in the chronologies discussed above was developed by Mintz at the National Bureau in the 1960s (Mintz, 1969, 1974). The growth cycle represents a fluctuation around the long-run growth trend of a nation's economy, i.e., a trend-adjusted business cycle. Chronologies based upon this concept, using the classical business cycle definition cited above but applying it to data from which long-run trends have been eliminated, are shown in Table 8 and Chart 2. The dates mark the approximate time when aggregate economic activity was farthest above its long-run trend level (peak) or farthest below its long-run trend level (trough).

The specific procedures used to establish these chronologies, initiated by Moore and Klein at the NBER in 1973, are as follows:

1. Measures of aggregate economic activity such as industrial production, gross national product, personal income, employment, unemployment and sales of goods and services are expressed in physical units or in constant prices, seasonally adjusted, and their long-run trend removed. The trend-fitting procedure, called the phase-average trend, provides a fairly flexible growth trend that is substantially free of the shorter-term cyclical movements in the series (Boschan and Ebanks, 1978).

2. For each of the above series computer-selected peaks and troughs are derived from the deviations of the seasonally adjusted data from the growth trend. The program for turning point selection is described in Bry and Boschan, 1971.

3. These turning points are visually inspected and sometimes altered by shifting the date, omitting the turn, or adding another turn. These changes are relatively rare, affecting perhaps five percent of the turning points.

4. Median dates in the clusters of peaks and troughs formed by all the series mentioned above are computed.

5. A composite index based on the above series prior to their adjustment for trend is constructed, the growth trend is removed from the index, and turning points are selected in the deviations from trend.

6. The clusters of dates, the median dates and the composite index dates are inspected and a decision is made on which monthly date best represents the consensus. These dates are the growth cycle peaks and troughs.

Comparisons of growth cycle and business cycle chronologies show that the number of growth cycles during a given period usually exceeds the number of business cycles, because slowdowns that sometimes occur during long business cycle expansions become actual contractions in the trend-adjusted figures. In the United States, for example, such slowdowns occurred in 1951-52, 1962-64 and 1966-67, interrupting the long business cycle expansions from 1949 to 1953 and from 1961 to 1969. Hence growth cycles are, on average, shorter than business cycles. Another difference is that peaks in the growth cycle usually occur some months before the corresponding peaks in the business cycle, because activity usually slows before a business cycle peak is reached. Growth cycle and business cycle troughs tend to be more nearly simultaneous. As a result of these differences, expansions and contractions are more nearly symmetrical, in both duration and amplitude, in growth cycles than in business cycles. Also, the variability in duration and in amplitude is more nearly uniform as between expansions and contractions of growth cycles. The international connections among growth cycles since World War II seem to be about as pervasive as those among business cycles prior to the war (compare Charts 1 and 2).

The continuing public concern with slowdowns in growth, some of which turn into declines in aggregate economic activity and some of which do not, justifies further attention to this concept of the business cycle. So also does the growing concern with the international spread of economic fluctuations, since slowdowns in one country may become substantial declines in another. The widening use of both business cycle and growth cycle chronologies in many countries testifies to the value of this well-tested tool for research and public understanding.

Footnotes

¹The term "cycles" is often applied to measurable and recurrent but non-periodic fluctuations in sciences other than economics, as noted by Wesley Mitchell who refers to sun-spot cycles which "varied in length from 7 to 17 years since 1788" (see his "Introduction" to Willard L. Thorp, 1926, pp. 32-33).

²Burns and Mitchell, 1946, p. 1; for the earlier version, see Mitchell, 1927, p. 468.

³The term itself entered the definition in 1946; in Mitchell, 1913 and 1927, there is less apparent emphasis on overall aggregates and more on the collective concept of "a species of fluctuations in the economic activities of organized communities" or in "activities which are systematically conducted on a commercial basis" (1927, p. 488). The development of the national income and product accounts between 1927 and 1946 is of course highly relevant here.

⁴In periods 1834-43 to 1963-67, 1831-40 to 1963-66, and 1850-59 to 1963-67, respectively. In the older developed countries of Europe and in Japan, population almost tripled and total output increased by a factor of at least fifteen over a century. These growth rates are far greater than those which can reasonably be assigned to earlier eras. See Kuznets, 1971, pp. 10-33 and 303-305; also, U. S. Department of Commerce, Bureau of the Census, 1973.

⁵For the United States between 1869 and 1955, for example, the net capital stock per member of labor force is estimated to have grown at least 14 percent per decade, according to Kuznets, 1971, pp. 64-67. (This covers not only the very large component of business plant and equipment, but also housing, inventories, and claims against foreign countries.)

⁶For a discerning discussion of the nature and working of this process, see Fellner, 1956, esp. chs. 4 and 8.

⁷The above characterizations apply broadly to most of the principal contributors to the literature on business cycles in the period between the 1890s and the 1930s: Tugan-Baranovskii, Bouniatian, Aftalion, Pigou, Hawtrey, Robertson, Mitchell, Spiethoff, Schumpeter, and Hayek. For a review and references, see Haberler, 1937 (new fifth edition, 1964).

⁸Schumpeter (1939, vol. I, pp. 224-225) refers to Mitchell and Spiethoff as having a "strong aversion to admitting that we may speak of cycles . . . before the end of the eighteenth century, while others, historians among them, do not hesitate to go far beyond that.

⁹In addition to these aggregate characteristics, the annals also provide brief references to conditions in the main industries, markets, or sectors of each economy in year.

¹⁰For a compilation of early data on U. S. business cycles, see W. B. Smith and A. H. Cole, 1935, pp. 3-84.

¹¹Cf. Morgenstern, 1959, ch. II, for a discussion of the international timing of business cycles, 1879-1938.

¹²Eckler, 1933, and Gilbert, 1933, omit the 1918-19 contraction; Axe-Houghton, 1931; Hubbard, 1936; and Ayres, 1939, omit the 1926-27 contraction. See Burns and Mitchell, 1947, Table 27 and text, pp. 107-110, for a comparison of the NBER with these and two other independently compiled chronologies (Kitchin, 1923, and Persons, 1931). The available data indicate that 1918-19 is appropriately viewed as a sui generis end-of-the-war recession along with the similar short 1945 episode. The 1926-27 recession is marginal but also supported by the preponderance of the evidence. See also Zarnowitz, 1981, p. 504.

¹³See Burns and Mitchell, 1946, Chart 10 and text, pp 111-113, for the check provided by the "standard pattern of short-term fluctuations in American business activity" from Frickey, 1942. Also see Zarnowitz, 1981, Tables 3 and 4 and text, pp. 494-504, for comparisons with several indexes of trade and industrial activity and deflated bank clearings.

¹⁴The German contraction 8/1903-2/1905 is acknowledged to be "dubious," the French dates in the 1860s and 1870s, and also after 1932, to be in need of careful reexamination.

¹⁵Matthews (1959, pp. 215-226) stresses the longer cycles of 7-10 years' duration, especially for Great Britain. Friedman and Schwartz (1982, p. 74) omit the 1901 trough and the 1903 peak recognized in the NBER chronology for Britain. In his German chronology published in 1955, Spiethoff, 1955, skips the contraction of 1903-04 about which Burns and Mitchell had some doubts of their own (on German chronologies, see Bry, 1960, App. B, pp. 474-480). These authors concentrate on the characterization of annual data.

¹⁶The pre-World War II monthly NBER chronologies presented in Table 3 include the cycles through the 1938 troughs, for the United States and other countries. But a new epoch in the U.S. economic history and policy opened after the traumatic experience of the Great Contraction in 1929-33, and we find it instructive to cover in Table 5 all subsequent reference dates and durations. (Note that, therefore, the individual dates for the 1933-37-38 cycle are included in both tables.)

¹⁷The National Bureau sources for the successive U. S. reference dates in the post-World War II period are: Moore, 1961, vol. I, pp. 104-105 (through 1958)' NBER Annual Reports for 1961 (Moore, pp. 38-41), and 1962 (Moore, pp. 65-66); supplement to National Bureau Report 8, May 1971 (Fabricant); NBER Annual Reports for 1975 (Moore, pp. 23-26; Zarnowitz and Boschan, pp. 26-29) and 1977

(Zarnowitz and Boschan, pp. 34-38). A comprehensive report on the 1973-76 developments, which shows in detail how the chronology for this period was derived, is Zarnowitz and Moore, 1977. Since 1980, the turning points for the United States are identified by the National Bureau's Committee on Business Cycle Dating; on the composition and work of the Committee and the analysis behind its decisions concerning the recession and recovery of 1980, see Zarnowitz and Moore, 1981. The NBER U. S. chronology is published in the U. S. Commerce Department's monthly report on cyclical indicators entitled Business Conditions Digest (BCD).

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TABLE 1

Economic Fluctuations in England, 1700-1802

<u>Trough</u>	<u>Peak</u>	<u>Financial Crisis</u>	<u>Poor Harvest, Short Supplies of Grain</u>	<u>War</u>
1700	1701	Feb.-Mar. 1701		War of the Spanish Succession since 1701
1702	1704	Oct.-Dec. 1704		
1706	1708	Aug.-Dec. 1710	1708-09	Victories in 1703-04, reverses in 1705
1712	1714	July-Dec. 1715		Peace 1714
1716	1717-18	Mar. 1719; Aug.-Dec. 1720		War with Spain; Aug. 1718-1720
1722	1724-5	Oct.-Dec. 1726	1725-26	Abolition of duties on British exports, 1722
1727	1728		1728-29	New War with Spain, 1727-29
1730	1733	Oct.-Dec. 1733		
1734	1738		1740-41	
1742	1743			War with France, 1744-48
1746	1746	Sept. 1745-Apr. 1746		
1748	1751			
1755	1761	June-Dec. 1761	1757-58	Seven Years War, 1756-63
1763	1764	July-Oct. 1763	1767-68	
1769	1771-2	June 1772-Jan. 1773	1773-75	
1775	1777	Jan.-Apr. 1778		U.S. War of Independence 1776
1781	1783	Sept. 1783-Jan. 1784	1782-84	Franco-Spanish coopera- tion against British 1778-81; Peace 1783
1784	1787	May-June 1788	1788-90	
1789	1792	Nov. 1792-Apr. 1793		
1794	1796	Feb.-June 1797	1796-98	War with France, 1793-1802
1798	1799	Aug.-Nov. 1799	1799-1800	
1800	1802			

Source: Ashton, 1959. See ibid., pp. 172-173 (for columns 1-3), ch. 2 (for column 4), and ch. 3 (for column 5).

TABLE 2

**Annual Reference Dates and Duration of Business Cycles
in Great Britain and United States
1790-1858**

A. Great Britain^a

Dates of Peaks and Troughs by Years		Duration in Years			
		Contraction	Expansion	Full Cycle	
Trough (T) (1)	Peak (P) (2)	(P to T) (3)	(T to P) (4)	(T to T) (5)	(P to P) (6)
	1790				
1793	1796	3	3		6
1797	1802	1	5	4	6
1803	1806	1	3	6	4
1808	1810	2	2	5	4
1811	1815	1	4	3	5
1816	1818	1	2	5	3
1819	1825	1	6	3	7
1826	1828	1	2	7	3
1829	1831	1	2	3	3
1832	1836	1	4	3	5
1837	1839	1	2	5	3
1842	1845	3	3	5	6
1848	1854	3	6	6	9
1855	1857	1	2	7	3
1858		1		3	
Mean duration (years)		1.5	3.3	4.6	4.8
Standard deviation (years)		0.8	1.5	1.5	1.8

Table 2
(concluded)

B. United States^b

Dates of Peaks and Troughs by Years		Duration in Years			
		Contraction	Expansion	Full Cycle	
Trough (T) (1)	Peak (P) (2)	(P to T) (3)	(T to P) (4)	(T to T) (5)	(P to P) (6)
1790	1796		6		
1799	1802	3	3	9	6
1804	1807	2	3	5	5
1810	1812 ^c	3	1 1/2	6	4 1/2
1812 ^c	1815	1/2	3	2	3 1/2
1821	1822	6	1	9	7
1823	1825	1	2	2	3
1826	1828	1	2	3	3
1829	1833	1	4	3	5
1834	1836	1	2	5	3
1838	1839	2	1	4	3
1843	1845	4	2	5	6
1846	1847	1	1	3	2
1848	1853	1	5	2	6
1855		2		7	
Mean duration (years)		2.0	2.6	4.6	4.4
Standard deviation (years)		1.5	1.5	2.4	1.6

^aSource: Burns and Mitchell, 1946, Table 16, p. 79.

^bSource: 1790-1833, Thorp, 1926, pp. 113-126; 1834-1855, Burns and Mitchell, 1946, Table 16, p. 78.

^cIn 1812 there is first a "brief recession," then a revival. The corresponding duration measures are based on the assumption that the recession occurred in the first half of the year, before the outbreak of the war with England (for evidence, see Thorp, 1926, pp. 42 and 117).

TABLE 3

Business Cycle Chronologies and Durations To 1938

A. United States, 1854-1938

Dates of Peaks and Troughs				Duration in Months			
By Months and Quarters		By Calendar Years		Contraction	Expansion	Full Cycle	
Trough (T)	Peak (P)	Trough (T)	Peak (P)	(P to T)	(T to P)	T to T	P to P
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dec. 1854(IV)	June 1857(II)	1855	1856		30		
Dec. 1858(IV)	Oct. 1860(II)	1858	1860	18	22	48	40
June 1861(III)	Apr. 1865(I)	1861	1864	8	46	30	54
Dec. 1867(I)	June 1869(II)	1867	1869	32	18	78	50
Dec. 1870(IV)	Oct. 1873(III)	1870	1873	18	34	36	52
Mar. 1879(I)	Mar. 1882(I)	1878	1882	65	36	99	101
May 1885(II)	Mar. 1887(II)	1885	1887	38	22	74	60
Apr. 1888(I)	July 1890(III)	1888	1890	13	27	35	40
May 1891(II)	Jan. 1893(I)	1891	1892	10	20	37	30
June 1894(II)	Dec. 1895(IV)	1884	1895	17	18	37	35
June 1897(II)	June 1899(III)	1896	1899	18	24	36	42
Dec. 1900(IV)	Sept. 1902(IV)	1900	1903	18	21	42	39
Aug. 1904(III)	May 1907(II)	1904	1907	23	33	44	56
June 1908(II)	Jan. 1910(I)	1908	1910	13	19	46	32
Jan. 1912(IV)	Jan. 1913(I)	1911	1913	24	12	43	32
Dec. 1914(IV)	Aug. 1918(III)	1914	1918	23	44	35	67
Mar. 1919(I)	Jan. 1920(I)	1919	1920	7	10	51	17
July 1921(III)	May 1923(II)	1921	1923	18	22	28	40
July 1924(III)	Oct. 1926(III)	1924	1926	14	27	36	41
Nov. 1927(IV)	Aug. 1929(III)	1927	1929	13	21	40	34
Mar. 1933(I)	May 1937(II)	1932	1937	43	50	64	93
June 1938(II)		1938		13		63	

Averages

21 Cycles, 1854-1938

Mean duration (months)	21	26	48	48
Standard deviation (months)	14	11	18	20

35 Cycles, 1790-1938^a

Mean duration (months)	23	28	50	50
Standard deviation (months)	16	14	24	20

TABLE 3 cont.

B. Great Britain, 1854-1938

Dates of Peaks and Troughs				Duration in Months			
By Months and Quarters		By Calendar Years		Contraction	Expansion	Full Cycle	
Trough (T)	Peak (P)	Trough (T)	Peak (P)	(P to T)	(T to P)	T to T	P to P
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dec. 1854(I55)	Sept. 1857(IV)	1855	1857		33		
Mar. 1858(I)	Sept. 1860(IV)	1858	1860	6	30	39	36
Dec. 1862(IV)	Mar. 1866(II)	1862	1866	27	39	57	66
Mar. 1868(II)	Sept. 1872(IV)	1868	1873	24	54	63	78
June 1879(II)	Dec. 1882(I)	1879	1883	81	42	135	123
June 1886(II)	Sept. 1890(III)	1886	1890	42	51	84	93
Feb. 1895(I)	June 1900(II)	1894	1900	53	64	104	117
Sept. 1901(IV)	June 1903(II)	1901	1903	15	21	79	36
Nov. 1904(IV)	June 1907(II)	1904	1907	17	31	38	48
Nov. 1908(IV)	Dec. 1912(I)	1908	1913	17	49	48	66
Sept. 1914(III)	Oct. 1918(III)	1914	1917	21	49	70	70
Apr. 1919(II)	Mar. 1920(II)	1919	1920	6	11	55	17
June 1921(II)	Nov. 1924(IV)	1921	1924	15	41	26	56
July 1926(III)	Mar. 1927(II)	1926	1927	20	8	61	28
Sept. 1928(III)	July 1929(III)	1928	1929	18	10	26	28
Aug. 1932(III)	Sept. 1937(III)	1932	1937	37	61	47	98
Sept. 1938(III)		1938		12		73	

Averages16 Cycles, 1854-1938

Mean duration (months)	26	37	63	64
Standard deviation (months)	19	18	29	33

29 Cycles, 1790-1938^a

Mean duration (months)	22	39	60	62
Standard deviation (months)	16	18	24	28

TABLE 3 cont.

C. France, 1865-1938

Dates of Peaks and Troughs				Duration in Months			
By Months and Quarters		By Calendar Years		Contraction	Expansion	Full Cycle	
Trough (T)	Peak (P)	Trough (T)	Peak (P)	(P to T)	(T to P)	T. to T	P to P
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dec. 1865	Nov. 1867	1865	1866		23		
Oct. 1868	Aug. 1870	1868	1869	11	22	34	33
Feb. 1872	Sept. 1873	1871	1873	18	19	40	37
Aug. 1876	Apr. 1878	1876	1878	35	20	54	55
Sept. 1879	Dec. 1881	1879	1882	17	27	37	44
Aug. 1887	Jan. 1891	1887	1890	68	41	95	109
Jan. 1895(I)	Mar. 1900(I)	1894	1900	48	62	89	110
Sept. 1902(III)	May 1903(II)	1902	1903	30	8	92	38
Oct. 1904(III)	July 1907(III)	1904	1907	17	33	25	50
Feb. 1909(I)	June 1913(III)	1908	1913	19	52	52	71
Aug. 1914(III)	June 1918(II)	1914	1917	14	46	66	60
Apr. 1919(II)	Sept. 1920(III)	1918	1920	10	17	56	27
July 1921(III)	Oct. 1924(III)	1921	1924	10	39	27	49
June 1925(III)	Oct. 1926(III)	1925	1926	8	16	47	24
June 1927(III)	Mar. 1930(I)	1927	1930	8	33	24	41
July 1932(III)	July 1933(III)	1932	1933	28	12	61	40
Apr. 1935(I)	June 1937(II)	1935	1937	21	26	33	47
Aug. 1938(III)		1938		14		40	
Averages							
Mean duration (months)				22	29	51	52
Standard deviation (months)				16	15	23	25

TABLE 3 concluded

D. Germany, 1879-1932

Dates of Peaks and Troughs				Duration in Months			
By Months and Quarters		By Calendar Years		Contraction	Expansion	Full Cycle	
Trough (T)	Peak (P)	Trough (T)	Peak (P)	(P to T)	(T to P)	T to T	P to P
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Feb. 1879(I)	Jan. 1882(I)	1878	1882		35		
Aug. 1886(III)	Jan. 1890(I)	1886	1890	55	41	90	96
Feb. 1895(I)	Mar. 1900(II)	1894	1900	61	61	102	122
Mar. 1902(I)	Aug. 1903(III)	1902	1903	24	17	85	41
Feb. 1905(I)	July 1907(II)	1904	1907	18	29	35	47
Dec. 1908(IV)	Apr. 1913(I)	1908	1913	17	52	46	69
Aug. 1914(III)	June 1918(II)	1914	1917	16	46	68	62
June 1919(II)	May 1922(II)	1919	1922	12	35	58	47
Nov. 1923(IV)	Mar. 1925(II)	1923	1925	18	16	53	34
Mar. 1926(II)	Apr. 1929(II)	1926	1929	12	37	28	49
Aug. 1932(III)		1932		40			77
Averages							
Mean duration (months)				27	37	64	63
Standard deviation (months)				18	14	24	29

SOURCE: National Bureau of Economic Research

Note: For a basic statement of the method of determining business cycle peaks and troughs, see Burns and Mitchell, 1946, ch. 4. Some of the dates shown there (p. 78) have been revised.

^aCombines the observations in Table 2 for 1790-1855 (converted from annual to monthly durations) with observations in this table for the subsequent cycles through 1938.

TABLE 4

**Measures of Diffusion and Amplitude of Business Cycles,
United States, 1854-1933**

Line	Business Cycle Expansion ^a	Percent of Series Rising		All Series Covered ^d	Average Percentage Rise (Rank)	
		Commercial and Industrial Activity ^b	Prices and Financial Activity ^c		Three Trend- Adjusted Indexes ^e	Four Indexes Not Adjusted for Trend ^f
		(1)	(2)	(3)	(4)	(5)
1	1854-57	100	67	75	12.3 (2)	
2	1858-60	100	86	88	16.8 (8)	
3	1861-65	100	89	90	18.1 (11)	
4	1867-69	100	67	79	6.9 (1)	
5	1870-73	88	60	72	18.4 (12)	
6	1879-82	100	93	97	27.6 (18)	58.1 (15)
7	1885-87	94	92	93	22.7 (14)	49.6 (11)
8	1888-90	100	55	76	16.6 (6)	34.2 (5)
9	1891-93	89	54	67	16.3 (5)	20.8 (1)
10	1894-95	100	75	85	25.3 (15)	37.6 (8)
11	1897-99	94	96	96	26.6 (17)	54.4 (13)
12	1900-02	100	82	89	14.2 (4)	36.8 (7)
13	1904-07	100	96	98	20.2 (13)	45.8 (9)
14	1908-10	94	96	96	25.6 (16)	47.5 (10)
15	1912-13	100	86	91	13.6 (3)	24.0 (2)
16	1914-18	94	89	91	29.8 (19)	54.4 (12)
17	1919-20	100	89	93	17.9 (10)	30.9 (3)
18	1921-23	100	82	89	38.0 (20)	54.5 (14)
19	1924-26	100	71	83	17.8 (9)	34.5 (6)
20	1927-29	94	75	83	16.7 (7)	31.6 (4)
Averages						
<u>1854-1929^g</u>						
21	Smallest (ranks 1-5)	98	71	80	12.7	
22	ranks 6-10	99	75	85	17.2	
23	ranks 11-15	96	82	88	20.9	
24	Largest (ranks 16-20)	96	91	94	29.5	
25	All	97	80	87	20.1	
<u>1879-1929^h</u>						
26	Smallest (ranks 1-5)	97	71	82		28.3
27	ranks 6-10	99	84	90		40.4
28	Largest (ranks 11-15)	96	90	93		54.2
29	All	97	82	88	21.9	41.0

Table 4
continued

Line	Percent of Series Declining			All Series Covered ^d	Average Percentage Fall (Rank)	
	Business Cycle Contraction ^a	Commercial and Industrial Activity ^b	Prices and Financial Activity ^c		Three Trend- Adjusted Indexes ^e	Four Indexes Not Adjusted for Trend ^f
		(1)	(2)	(3)	(4)	(5)
30	1857-58	100	100	100	21.0 (10)	
31	1860-61	100	100	100	14.1 (6)	
32	1865-67	100	83	85	11.4 (4)	
33	1869-70	40	89	71	7.9 (1)	
34	1873-79	50	100	79	26.9 (15)	
35	1882-85	88	100	94	27.9 (16)	21.1 (11)
36	1887-88	89	68	78	11.2 (3)	10.2 (4)
37	1890-91	83	79	80	17.0 (9)	11.0 (5)
38	1893-94	94	100	98	30.7 (18)	28.8 (14)
39	1895-97	89	79	83	24.3 (14)	17.4 (8)
40	1899-00	67	64	65	14.4 (7 1/2)	9.9 (3)
41	1902-04	94	79	85	14.4 (7 1/2)	14.8 (6)
42	1907-08	94	100	98	29.5 (17)	27.0 (12)
43	1910-12	78	82	80	12.0 (5)	8.4 (2)
44	1913-14	94	88	90	23.2 (13)	18.3 (9)
45	1918-19	83	57	67	22.0 (12)	18.6 (10)
46	1920-21	100	100	100	34.7 (19)	27.1 (13)
47	1923-24	83	94	89	21.8 (11)	17.0 (7)
48	1926-27	67	68	67	9.3 (2)	8.4 (1)
49	1929-33	100	100	100	75.1 (20)	
Averages						
<u>1857-1933^g</u>						
50	Smallest (ranks 1-5)	75	78	76	10.4	
51	ranks 6-10	89	84	86	16.2	
52	ranks 11-15	80	83	82	23.6	
53	Largest (ranks 16-20)	95	100	98	39.6	
54	All	85	86	85	22.4	
<u>1882-1927^h</u>						
55	Smallest (ranks 1-5)	77	72	74		9.6
56	ranks 6-10	89	87	83		17.2
57	Largest (ranks 11-14)	94	84	98		26.0
58	All	86	83	84	20.9	17.0

Table 4 (Notes)

SOURCES: Columns 1-3: Burns and Mitchell, 1946, Tables 23 and 24, pp. 102-103; columns 4 and 8: Moore, 1961, vol. I, Table 3.6, pp. 104-105; column 5: Zarnowitz, 1981, Table 4, p. 500, based on NBER files. Number of series covered: Column 1, 17-18 (before 1879, 8 or fewer); column 2, 15-28 (before 1879, 11 or fewer); column 3, 32-46 (before 1879, 19 or fewer).

^aIdentified by years of turning points in the NBER monthly reference chronology (Table 3).

^bIncludes 10 indexes of general business activity, 4 series on orders for investment goods, 2 on production, and 2 on foreign trade. For detail, see Burns and Mitchell, 1946, Table 21, pp. 98-99.

^cIncludes 9 indexes of general or wholesale prices, 6 series on wholesale prices for individual commodities, 9 series on volume of trade, prices, and yields in money and security markets, and 4 series on business failures. See ibid.

^dIncludes the 46 series in the groups in notes b and c.

^eSince 1879, the figures are averages based on three seasonally and trend-adjusted indexes: American Telephone and Telegraph Company index of business activity, index of industrial production and trade constructed by Warren M. Persons and continued by the Barron's Publishing Company, and Ayres' index of business activity compiled by the Cleveland Trust Company. Before 1879, the entries are for Ayres' index alone. The rise from the specific cycle trough to specific cycle peak in each index is taken as a percentage of the average level of the index during the full specific cycle (trough to trough), and the fall from specific peak to specific trough is taken as a percentage of the same base. The amplitude measures are ranked from smallest (1) to largest (20). Because the indexes are trend-adjusted, the contraction amplitudes are approximately the same, on average, as the expansion amplitudes.

^fThe indexes, adjusted for seasonal variations but not for trends, are: (1) Bank clearings (1875-1918) and bank debits (1919-30). NBER data (Macaulay, 1938, Table 30, pp. A289-A296) deflated by Carl Snyder's index of general price level; (2) Axe-Houghton index of trade and industrial activity (1879-1929) furnished by A. W. Axe and Co., New York; (3) Babson index of physical volume of business activity (1889-1929) furnished by Babson's Reports Inc.; (4) American Telephone & Telegraph Co. (1899-1929), Chief Statistician's Division (a confidential release, Sept. 6, 1944). For details, see Zarnowitz, 1981, pp. 499-502.

^gThese expansions and contractions are divided into four groups according to the ranks recorded in column 4: the mildest ones (ranks 1-5), the most vigorous or severe (ranks 16-20), and two intermediate groups. The entries are simple arithmetic means of the corresponding figures in the columns above.

^hThese expansions and contractions are divided into three groups according to the ranks recorded in column 5: the mildest ones (ranks 1-5), the intermediate (ranks 6-10), and the most vigorous or severe (ranks 11-15 for expansions, 11-14 for contractions). The entries are simple arithmetic means of the corresponding figures in the columns above.

TABLE 5

Business Cycle Chronologies and Durations, United States, 1933-1982

Dates of Peaks and Troughs				Duration in Months			
By Months and Quarters		By Calendar Years		Contraction	Expansion	Full Cycle	
Trough (T)	Peak (P)	Trough (T)	Peak (P)	(P to T)	(T to P)	T to T	P to P
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Mar. 1933(I)	May 1937 (II)	1932	1937		50		
June 1938(II)	Feb. 1945 (I)	1938	1944	13	80W	63	93
Oct. 1945(IV)	Nov. 1948(IV)	1946	1948	8W	37	88	45
Oct. 1949(IV)	July 1953(II)	1949	1953	11	45W	48	56
May 1954(II)	Aug. 1957(III)	1954	1957	10W	39	55	49
Apr. 1958(II)	Apr. 1960(II)	1958	1960	8	24	47	32
Feb. 1961(I)	Dec. 1969(IV)	1961	1969	10	106W	34	116
Nov. 1970(IV)	Nov. 1973(IV)	1970	1973	11W	36	117	47
Mar. 1975(I)	Jan. 1980(I)	1975	1979	16	58	52	74
July 1980(III)	July 1981(III)	1980	1981	6	12	64	18
Nov. 1982(IV)		1982		16		28	

Averages

10 cycles, 1933-1982

Mean duration (months)	11	49	60	59
Standard deviation (months)	3	27	26	31

30 cycles, 1854-1982

Mean duration (months)	18	33	51	50
Standard deviation (months)	12	20	21	23

44 cycles, 1790-1982

Mean duration (months)	20	33	52	51
Standard deviation (months)	15	20	24	22

Source: National Bureau of Economic Research

TABLE 6 MEASURES OF THE DURATION, VIGOR AND DIFFUSION OF EXPANSIONS

Business Cycle Trough Business Cycle Peak Duration (months)	Oct. 1949 July 1953	May 1954 Aug. 1957	Apr. 1958 Apr. 1960	Feb. 1961 Dec. 1969	Nov. 1970 Nov. 1973	Mar. 1975 Jan. 1980	July 1980 July 1981	Average, Seven Expansions
Business Cycle	45	39	24	106	36	58	12	46
GNP, current dollars	42	39	30	a	a	a	a	n.a.
GNP, constant dollars	48	39	24	105	45	60	15	48
Industrial Production	45	35	21	104	43	48	12	44
Nonfarm employment	44	31	23	109	47	59	12	46
Increase (percent) ^b								
GNP, current dollars	43.8	24.0	16.3	a	a	a	a	n.a.
GNP, constant dollars	28.1	13.2	11.3	49.2	17.1	24.3	4.4	21.1
Industrial Production	50.1	23.7	26.0	78.9	25.9	37.4	9.6	35.9
Nonfarm employment	17.7	9.1	7.5	33.7	11.9	19.1	1.9	14.4
Unemployment Rate								
Minimum	2.5	3.6	4.9	3.3	4.5	5.5	7.1	4.5
Decrease	-5.3	-2.3	-2.4	-3.6	-1.4	-3.3	-0.6	-2.7
Rate of Increase (percent per year)								
GNP, current dollars	10.9	6.9	6.2	a	a	a	a	n.a.
GNP, constant dollars	6.4	3.9	5.5	4.7	4.3	4.4	3.5	4.7
Industrial Production	11.4	7.6	14.1	6.9	6.6	8.3	9.6	9.2
Nonfarm employment	4.5	3.4	3.8	3.2	2.9	3.6	1.9	3.3
Diffusion (percent)								
Nonfarm industries,								
maximum percentage								
with rising employment,								
with date when								
maximum was reached ^c	100	95	92	91	86	85	73	89
	July 1950	May 1955	Jan. 1959	Dec. 1965	Mar. 1972	Feb. 1977	Oct. 1980	

^aNo cycle.^bPercentage change from trough month or quarter in the series to the peak month or quarter, over the intervals shown. For the unemployment rate the minimum figure is the lowest for any month during the expansion, and the decreases are from the highest month to the lowest, in percentage points.^cBased on changes in employment over six month spans, centered on the fourth month of the span, in 30 nonagricultural industries, 1948-59; 172 industries, 1960-71; 186 industries, 1972-81.

Source: U.S. Department of Commerce, U.S. Department of Labor, Board of Governors of the Federal Reserve System, National Bureau of Economic Research.

TABLE 7. MEASURES OF DURATION, DEPTH, AND DIFFUSION OF RECESSIONS, 1920-82

Business Cycle Peak:		Jan. 1920	May 1923	Oct. 1926	Aug. 1929	May 1937	Feb. 1945
Business Cycle Trough:		July 1921	July 1924	Nov. 1927	Mar. 1933	June 1938	Oct. 1945
Duration (months)							
Business cycle		18	14	13	43	13	8
GNP, current dollars		n.a.	6	12	42	9	6
GNP, constant dollars		n.a.	3	3	36	6	n.a.
Industrial production		14	14	8	36	12	27
Nonfarm employment		n.a.	n.a.	n.a.	43	11	22
Depth (percent) ^b							
GNP, current dollars		n.a.	-4.9	-3.0	-49.6	-16.2	-11.9
GNP, constant dollars		n.a.	-4.1	-2.0	-32.6	-13.2	n.a.
Industrial production		-32.4	-17.9	-7.0	-53.4	-32.4	-38.3
Nonfarm employment		n.a.	n.a.	n.a.	-31.6	-10.8	-10.1
Unemployment Rate		11.9c	5.5c	4.4c	24.9c	20.0	4.3
Maximum		+10.3c	+2.6c	+2.4c	+21.7c	+9.0	+3.4
Increase							
Diffusion (percent)							
Nonfarm industries, maximum							
percentage with declining		97	95	71	100	97	n.a.
employment, and date when							
maximum was reached ^d		Sept. 1920	April 1924	Nov. 1927	June 1933	Dec. 1937	

Table 7, continued

Business Cycle Peak:	Nov. 1948	July 1953	Aug. 1957	Apr. 1960	Dec. 1969	Nov. 1973	Jan. 1980	July 1981
Business Cycle Trough:	Oct. 1949	May 1954	Apr. 1958	Feb. 1961	Nov. 1970	Mar. 1975	July 1980	Nov. 1982
Duration (months)								
Business cycle	11	10	8	10	11	16	6	16
GNP, current dollars	12	12	6	3	a	a	a	3
GNP, constant dollars	6	12	6	9	6	15	3	6
Industrial production	15	9	13	13	13	9	16	16
Nonfarm employment	13	14	14	10	8	6	4	17
Depth (percent) ^b								
GNP, current dollars	-3.4	-1.9	-2.8	-0.6	a	a	a	-0.4
GNP, constant dollars	-1.5	-3.2	-3.3	-1.2	-1.0	-4.9	-2.3	-3.0
Industrial production	-10.1	-9.4	-13.5	-8.6	-6.8	-15.3	-8.5	-12.3
Nonfarm employment	-5.2	-3.5	-4.3	-2.2	-1.5	-2.9	-1.4	-3.1
Unemployment rate								
Maximum	7.8	5.9	7.3	6.9	5.9	8.8	7.7	10.7
Increase	+4.5	+3.4	+3.7	+2.0	+2.6	+4.3	+2.2	+3.6
Diffusion (percent)								
Nonfarm industries, maximum			88	80	80	88	77	79
percentage with declining		87						
employment, with date when	90							
maximum was reached ^d	Feb. 1949	Mar. 1954	Sept. 1957	Oct. 1960	May 1970	Jan. 1975	Apr. 1980	Aug. 1982

n.a. = Not available.

aNo decline.

^bPercentage change from the peak month or quarter in the series to the trough month or quarter, over the intervals shown. For the unemployment rate the maximum figure is the highest for any month during the contraction, and the increases are from the lowest month to the highest, in percentage points.

^cThe maximum figures are annual averages for 1921, 1924, 1928, and 1933 (monthly data not available). Increases, in percentage points, are for 1919-1921, 1923-1924, 1926-1928, and 1929-1933.

^dSince 1948 based on changes in employment over six month spans, centered on the fourth month of the span, in 30 nonagricultural industries, 1948-59; 172 industries, 1960-71; 186 industries, 1972-82. Prior to 1948 based on cyclical changes in employment in forty-one industries.

Source: U.S. Department of Commerce, U.S. Department of Labor, Board of Governors of the Federal Reserve System, National Bureau of Economic Research. For a fuller version of this table, see Solomon Fabricant, "The Recession of 1969-1970," in The Business Cycle Today, V. Zarnowitz, ed. (New York: National Bureau of Economic Research, 1972), pp. 100-110.

Table 8

GROWTH CYCLE PEAK AND TROUGH DATES, THIRTEEN COUNTRIES, 1948-83 (Revised June 1984)																	
Peak or Trough	United States	Australia	Belgium	Canada	France	Italy	Japan	South Korea	Nether- lands	Sweden	Swit- zer land	United Kingdom	West Germany	Three Coun- tries	Four Coun- tries	Six Coun- tries	Seven Coun- tries
P	7/48			5/50							2/50						
T	10/49																
P	3/51	4/51		4/51					7/50		3/51	3/51	2/51				
T	7/52	11/52		12/51					6/52		2/53	8/52					
P	3/53			3/53			12/53										
T	8/54			10/54			6/55						2/54	8/54			
P	2/57	8/55		11/56	8/57	10/56	5/57		10/56		6/57	12/55	10/55	2/57	5/57	2/57	2/57
T	4/58	1/58		8/58	8/59	7/59	1/59		5/58		9/58	11/58	4/59	4/58	2/59	2/59	5/58
P	2/60	8/60		10/59										2/60			2/57
T	2/61	9/61		3/61										2/61			5/58
P	5/62			3/62	2/64	9/63	1/62		3/61		4/64	3/61	2/61	4/62	3/61	3/61	2/62
T	10/64			5/63	6/65	3/65	1/63		2/63			2/63	2/63	2/63	2/63	2/63	2/63
P							7/64									7/64	
T							2/66										
P	6/66	4/65		3/66	6/66				11/65	2/65		2/66	5/65	2/66	3/66		3/66
T	10/67	1/68		2/68	5/68			8/66	8/67	7/67	5/68	8/67	8/67	3/67	5/68	5/68	10/67
P	3/69	5/70		2/69	11/69	8/69	6/70	1/69	11/70	7/70	5/70	6/69	5/70	5/69	5/70	6/70	8/69
T	11/70	3/72		12/70	11/71	9/72	1/72	3/72	8/72	7/72	1/71	2/72	12/71	11/70	2/72	2/72	8/71
P	3/73	2/74		2/74	5/74	4/74	11/73	2/74	8/74	6/74	4/74	6/73	8/73	10/73	7/74	11/73	11/73
T	3/75			10/75	6/75	5/75	3/75	6/75	7/75		8/75	8/75	5/75	3/75	8/75	9/75	5/75
P				5/76		12/76		7/76	9/76								
T		10/77		12/77		10/77			11/77	7/78							
P	12/78			10/79	8/79	2/80	2/80		12/79			6/79	2/80	9/79	2/80	2/80	2/80
T				5/80										8/80			
P		6/81		6/81										8/81			
T	12/82	5/83		11/82			6/83					6/83	7/83	10/82	4/83	2/83	2/83

Note: The three, four, six and seven country chronologies are based on composite indexes of output, income, employment and trade, weighted by each country's GNP in 1970, expressed in U.S. dollars. The three countries include the United States, Canada and Japan. The four countries are the United Kingdom, West Germany, France and Italy. The six countries include these four plus Canada and Japan, and the seven countries include the United States as well. The chronologies begin at different dates because appropriate data are not available earlier. The absence of a recent date does not necessarily mean that a turn has not occurred.

Source: For the United States, National Bureau of Economic Research. For other countries, Center for International Business Cycle Research.

Chart 1 (Notes)

For each country, the lines connect the dates of business cycle peaks (upper turning points) and troughs (lower turning points). Thus the upward-sloping segments of each country line represent expansions; the downward-sloping segments, contractions. The dashed links () between the country lines connect the matched peaks or troughs for two or more countries. The sign "x" denotes an unmatched turn.

For France before 1865 and for Germany before 1879, the reference dates are annual. They are plotted at mid-point of the given calendar year and connected with (-.-.) lines. All other reference dates are monthly and they are connected with solid() lines.

German annual turning points 1855-1963 estimated from Walther G. Hoffman, 1965, by W. W. Rostow, 1980, pp. 38-39. All other dates are from Burns and Mitchell, 1946, pp. 78-79.

CHART 1. Timing of Reference Cycles for Four Countries and Matched Turning Points, 1854-1938

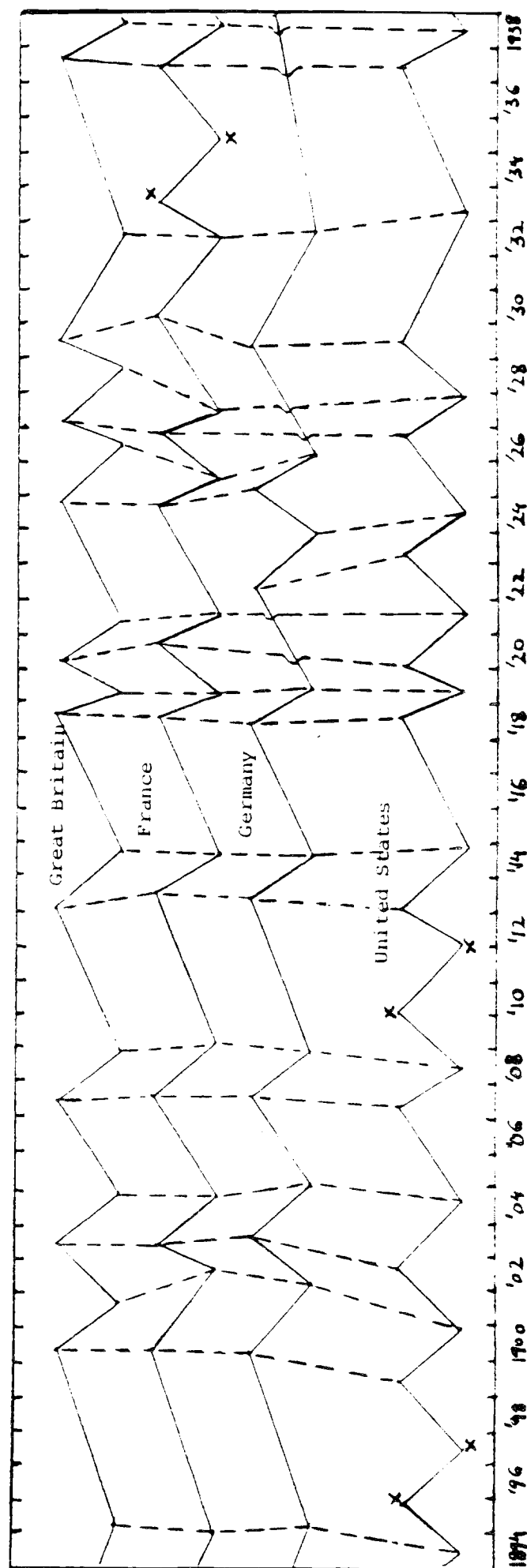
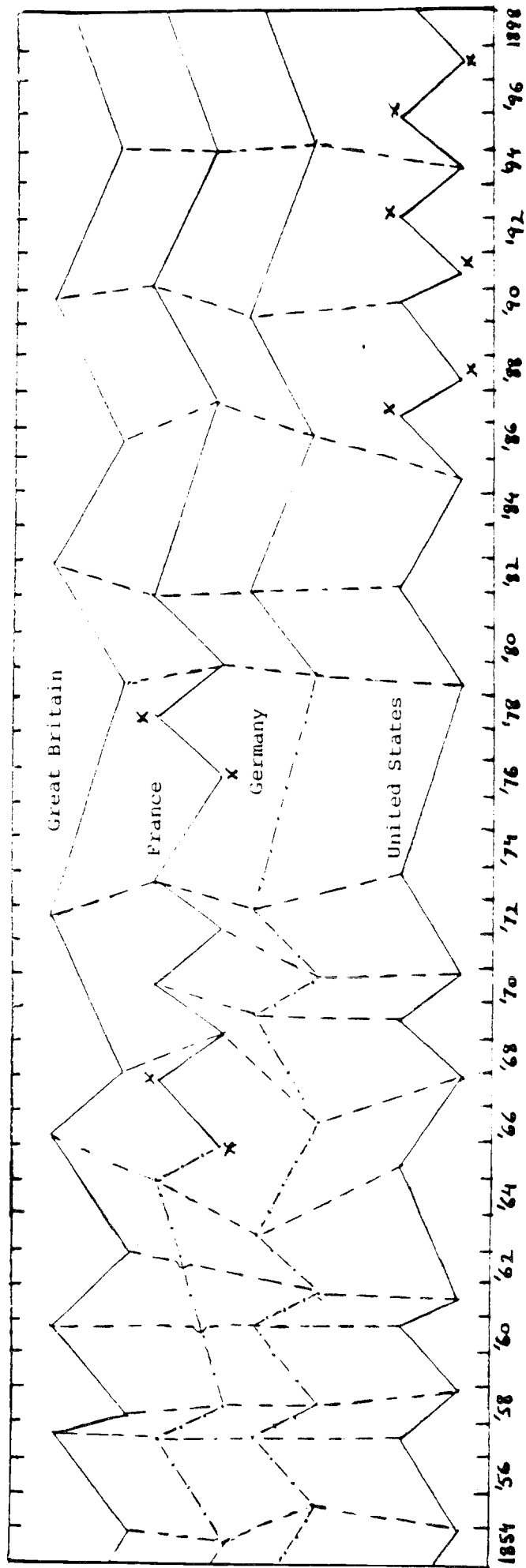
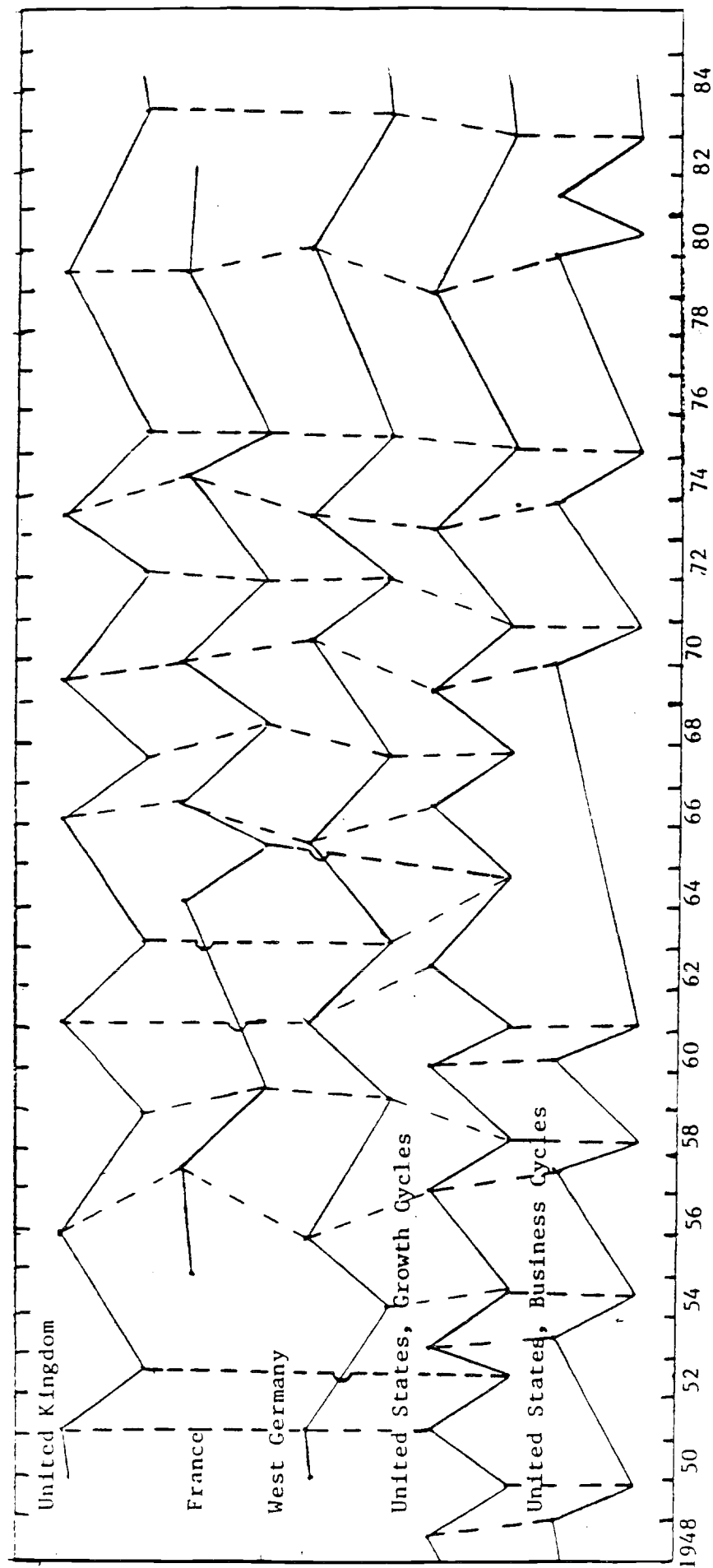


Chart 2. TIMING OF GROWTH CYCLES FOR FOUR COUNTRIES AND MATCHED TURNING POINTS, 1948-83



Note: The chronologies begin and end at varying dates depending upon whether the data are considered for the purpose of deciding a turning point. An important factor is whether the procedure for fitting trends at the ends of series yields sufficiently dependable results. The initial dates also depend upon whether a sufficient number of the required series are available.