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7 Business Cycles and Growth

7.1 Introduction

Is the long-term trend of the economy—growth—substantially influenced by the short-term movements—business cycles—and, if so, how? Are business cycles subject to major secular changes? Are these fluctuations the natural way growth takes in private-enterprise economies or are they mainly due to some outside shocks that could be avoided or reduced? Should their analysis be based on trend-unadjusted or on trend-adjusted time-series data?

These are major questions that have received considerable attention in economic literature, but they are difficult and still debated. In this chapter I shall attempt to contribute to the discussion of some aspects of how business cycles and growth are related.[1]

It is generally agreed that the process of long-term economic growth is "real" in nature: driven by increases in the quantity and productivity of human and physical resources (capital in the most general sense) and measured by the advances in output and wealth per capita. Business cycle theories, on the other hand, disagree on the relative roles of real and monetary factors. Those who emphasize the latter (changes in money supply, bank reserves and credits, the price level, and interest rates) have logically good reasons to assert that

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1. The volume in which what follows was first published commemorated my esteemed teacher, Erich Preiser. Preiser's first book (1933) contains a characteristically concise and lucid analysis of the process of capital accumulation, which he considered central to the understanding of both the long trend and business cycles. For other contributions to the study of growth, fluctuations, and their interface, see Preiser 1959, 1961, 1967a, and 1967b.

secular growth is not much affected by short-run fluctuations in nominal demand. Hence, they raise no objections in principle to the idea that trends and cycles are separable.

In practice, this conception leads to the measurement and analysis of "growth cycles"—movements in aggregate economic activity defined by the consensus of fluctuations in comprehensive indicators adjusted for their long-term trends. This view of business cycles as movements in the deviations from trend has a long history. However, the approach did not escape considerable difficulties and criticism in the past. Now growth cycles have come to enjoy a new popularity. This paper looks at this development from a historical perspective and examines its sources and chances to endure.

7.2 Trend-Cycle Interactions

The trend-cycle interactions are varied and in part subtle. Measures of secular growth are most meaningful for the longest periods over which some reasonable, stable trend fits the data well, and they must be calculated to avoid cyclical bias. For example, measuring the trend from a business cycle trough year to a peak year results in overestimation of the average growth rate; from a peak to a trough year, in underestimation. The selected initial and terminal years should therefore be in the same cyclical phase or have similar cyclical characteristics, for example, about the same unemployment or capacity utilization rates. This severely restricts the range of appropriate comparisons.[2]

Over long intervals measured in decades, trends dominate the business cycle, so here the cyclical bias, though often nonnegligible, matters less. Growth has been historically pervasive and persistent in the modern era, as illustrated by the following facts. Nearly every business expansion in the United States has carried total output and employment beyond the levels reached at the peak of the preceding cycle.[3] The recoveries in these variables have usually been faster after severe depressions than after mild declines (despite this, however, the recovery to the previous peak level has as a rule taken longer when the preceding contraction had been severe).[4]

2. See U.S. Bureau of the Census 1966. This publication (pt. V) presents real GNP growth rates for all possible combinations of initial and terminal years between 1890 and 1964 (the unemployment-rate estimates are not available before 1890). This amounts to 2,850 calculated growth rates for U.S. output. Out of these, only 360 (13%) refer to periods for which the unemployment rates (u) differ by less than 0.025 percentage points per year (i.e., $|u_i - u_n|/n < 0.025$, where the subscripts denote the initial and terminal years, and n is the number of years covered). For a more relaxed definition of "similar" u rates (difference of less than 0.1 point/year), the number of periods is 993 (34%). The number of all periods bounded by business cycle peak years between 1890 and 1964 is 190, out of which 36 (19%) would refer to similar unemployment rates on the first definition and 101 (53%) on the second.

3. The one conspicuous exception is the expansion of 1933–37, which followed the Great Contraction of 1929–33. Although among the longest and largest on record, it started from an unprecedentedly low level and was incomplete in the sense that even at its end unemployment was very high and per capita output lower than at the preceding peak.

4. For an interpretation of these findings and evidence, see Moore 1961, vol. 1, ch. 3, esp. pp. 86–109.

Over short intervals measured in years, the business cycle effects are typically preponderant. Therefore, serious errors are likely to result from the (unfortunately frequent) practice of evaluating and projecting growth rates on the basis of comparisons between arbitrary short unit periods that are relatively close to each other in time.[5]

The cyclical movements vary greatly in amplitude and duration. Severe depressions such as those of 1873–79, 1893–97 (interrupted only by a brief and incomplete recovery in 1894–95), 1907–8, 1920–21, 1929–33, and 1937–38 reduced growth strongly for some considerable time. Vigorous expansions such as those of 1879–82, 1897–99, 1908–10, 1921–23, 1938–45, 1949–53, and 1961–69 (the last three in wartime periods) raised the growth rates correspondingly. However, no less than 33 complete business cycles occurred in the United States between 1834 and 1975, and most of them have been mild. Short cycles make up a larger majority yet. Only 9 of the expansions have lasted longer than 3 years, and 5 of these were associated with major wars; about half (17) lasted 2 years or less. Contractions have been typically shorter than expansions: 25 (85%) did not exceed 2 years and 11 (33%) did not exceed 1 year. It is a historical fact that few peacetime cycles resulted in major disruptions of the secular growth trend of the U.S. economy.

This does not mean at all, however, that growth has been uniform or that no connection exists between cyclical variability and growth. In a century of U.S. progress, it is possible to identify several periods characterized by relatively high economic stability and several others during which stability was comparatively low. Table 7.1 shows that the average annual rates of growth in the economy's output (or real income) were generally higher in the former than in the latter segments.

The selection of the periods in both categories was guided by close inspection of charts for the available long time series on aggregate economic activity as well as by accounts in the literature on economic trends and fluctuations.[6] Each of the chosen segments comprises a number of complete business cycles measured from peak to peak (three contain 2 cycles each, four 3 cycles, and one 4 cycles). The four periods of "high" stability add up to 47 years, and so

5. The minimum distance should logically be at least one complete business cycle (measured from peak to peak, trough to trough, or between centered cycle averages). But business cycles vary greatly in duration and many are relatively short (see text below).

6. Friedman and Schwartz (1963a, p. 677) write: "We have characterized four segments of the 93 years of displaying a relatively high degree of economic stability: 1882–92, 1903–13, 1923–29, 1948–60. Each has also displayed a high degree of stability of the year-to-year change in the stock of money; the remaining periods have shown appreciably greater instability of the year-to-year change in both money and income." Table 7.1 uses the first three periods unchanged but extends the last one to 1948–69, to include the long expansion of the 1960s. My choice of the relatively unstable periods also agrees broadly with several characterizations by Friedman and Schwartz, who refer to "the disturbed years from 1891 to 1897" (p. 104) and "the years of economic turmoil" 1914–21 (p. 189). The 1930s, of course, witnessed the most severe contraction of modern times in 1929–33, then an "erratic and uneven" revival and another "unusually deep" contraction in 1937–38, which "proceeded at an extremely rapid rate" (p. 493). The large changes in the years of World War II and its immediate aftermath were due to the preparation for and conduct of wartime activities, inflation, and finally demobilization accompanied by a recession.

Table 7.1 Growth Rates in Selected Periods of Relatively High and Low Economic Stability, GNP in Constant Dollars, 1882–1980

Line	Years[a] (1)	No. of Business Cycles (years) Covered[b] (2)	Growth Rates in Real GNP (%) Average[c] (3)	S.D.[d] (4)
	A. Periods of Relatively High Economic Stability[e]			
1	1882–1892	3 (10)	5.3[f]	6.7[f]
2	1903–1913	3 (10)	3.4	6.1
3	1923–1929	2 (6)	3.5	3.8
4	1948–1969	4 (21)	3.9	2.6
	B. Periods of Relatively Low Economic Stability[e]			
5	1892–1899	2 (7)	3.1	6.8
6	1913–1923	3 (10)	2.4	8.6
7	1929–1948	3 (19)	2.5	9.4
8	1969–1980	2 (11)	2.7	3.1
	C. Summary[g]			
9	"High"-stability periods	12 (47)	4.0 (3.7)[h]	4.4 (3.7)[h]
10	"Low"-stability periods	10 (47)	2.6	7.4

Sources: Kendrick 1961 (GNP in 1929 dollars, 1879–1908); U.S. Department of Commerce, Bureau of Economic Analysis (GNP in 1958 dollars and in 1972 dollars, 1909–80); Nutter 1962 (combines U.S. estimates by Edwin Frickey, Solomon Fabricant, Warren Persons, and others). Most of the historical data and measures are taken from U.S. Bureau of the Census 1966.

[a]For each period listed in this column, the initial and terminal dates are business cycle peak years according to the NBER reference chronology for the United States.

[b]Number of complete peak-to-peak cycles from the initial to the terminal year. The number of years covered is shown in parentheses.

[c]Average annual growth rate between the initial and the terminal year, computed by the compound interest rate formula.

[d]Standard deviation, based on the annual growth rates for all years in the given period, as identified in cols. 1–2.

[e]See text.

[f]Industrial production (NBER, Nutter) estimates are used for the years 1882–88, real GNP (Kendrick) estimates for the years 1889–92 (the annual Kendrick figures begin in 1889). A comparison of the corresponding figures that are available for both series (decade averages for 1869–79 and 1979–88 and annual data for 1889–92) suggests enough similarity of relative change to permit the combined use of these estimates (e.g., the average annual growth rates based on the decade averages are 6.0% for industrial production, 6.3% for real GNP). If industrial production figures only were used for 1882–92, the entries in line 1, cols. 3 and 4, would have been 5.0% and 6.6%, respectively.

[g]Entries in line 9 refer to the periods in part A (lines 1–4); entries in line 10 refer to the periods in part B (lines 5–8). The entries in col. 2 are totals; those in cols. 3 and 4 are averages weighted by the number of years in each period.

[h]The first number covers all four periods in lines 1–4; the number in parentheses excludes the period 1882–92; that is, it covers the three periods in lines 2–4.

do the four periods of "low" stability (table 7.1, col. 2). Taken together, the comparisons refer to 94 years out of the total of 98 years covered (1882–1980). The data are most trustworthy for the 35 years after World War II and least trustworthy for the 32 years before World War I.

It is noteworthy that the effects of large business contractions outweigh those of major wartime expansions in two periods, 1913–23 and 1929–48. These segments belong to the low-stability, low-growth group B (lines 6 and 7). The 1948–69 period, which includes the Korean War and most of the Vietnam War, is classified in the high-stability, high-growth group A (line 4). The years 1969–80 witnessed the winding up of the Vietnam War and inherited little of its expansionary but most of its delayed inflationary effects. This period belongs in group B (line 8). Contemporaries have little doubt about the much discussed contrast between the turbulent 1970s, dominated by seemingly uncontrollable inflation, recessions, and energy problems, and the economically much more placid and prosperous decades of the 1950s and 1960s.

After the selection of the periods, standard deviations (s) of the annual growth rates within each of them were computed from historical statistics on real GNP (see table 7.1 for sources). These measures, shown in column 4, are consistent with the classification of the periods into the two categories: in terms of weighted averages, for example, s is 4.4 for group A and 7.4 for group B (lines 9 and 10). The average annual rates of growth in real GNP (g), calculated by the compound interest formula between the initial and terminal years of each period, are listed in column 3. They are throughout higher for the relatively more stable than for the less stable segments. On the average, g is 4.0% for group A, 2.6% for group B.

Table 7.1 is interesting and suggestive but far from conclusive. It is difficult to apply standard tests of statistical significance to results of this kind, since inevitably the data are uncertain, the sets of measures small, and the usual assumptions for inference from samples of independent, identically distributed observations appear to be of dubious validity. If all this is disregarded, test statistics are obtained which cannot reject the null hypothesis that the difference between the mean growth rates for groups A and B is due to chance.[7]

Moreover, I see no good general reason to expect any definite and uniform relationship between long-term growth and cyclical variability. It is possible for strong growth on the supply side to reduce the depth and duration of recessions (viewed primarily as declines in aggregate demand). But the opposite

7. The ratio of the (unbiased) variance estimates is 2.8, which according to the F-distribution with parameters (46, 46) is significant at both the 5% and the 1% levels; hence, the hypothesis of equal variances for the two groups would be rejected. However, an analysis of variance indicates that the within-group dispersion of the growth rates dwarfs the between-groups dispersion. This applies to both sets A and B as well as to the combination of the two. (The grand mean of the growth rates for all the individual years is 3.5%; the corresponding standard deviation is 6.2%.) On these tests, the "true" (population) means in the two sets A and B may not be different after all.

causal chain is no less plausible; that is, a more stable expansion of demand may generate more rapid growth. Strong recurrent spurts in demand (caused, e.g., by monetary accelerations) or in supply (caused, e.g., by uneven flows of technological innovation and business investment) can result in both more instability and more growth. Pronounced business cycles have certainly been a feature of many nations in the stage of rapid industrialization, while backward countries stagnated with relatively little economic instability but also little economic growth. In sum, one cannot help being agnostic here: different arguments and models can be made readily but there are few solid generalizations.

Still, one important proposition finds considerable support in experience as well as theory, namely, that both protracted high unemployment and protracted high inflation impede growth. Underutilization of productive capacities tends to reduce investment and tilt downward the potential (full employment) output curve. Uneven and largely unanticipated inflation (the usual type) impairs the signaling function of relative prices and acts as a bad tax, distorting resource allocation, hindering saving and productive investment, and fostering speculative activities.

7.3 Growth and Instability after World War II

In periods of substantial stability and satisfactory growth, the always attractive idea that the business cycle may have been conquered or rendered obsolete gains considerable publicity and acceptance. This often reflects a high confidence in government institutions and actions. In the 1920s, it was the Federal Reserve monetary policies that many hoped would maintain prosperity. In the 1960s, it was the tax cuts and fiscal fine-tuning generally. Unfortunately, the "return" of the business cycle has repeatedly proved such ideas to be pipe dreams or at least quite premature.

In the quarter century after World War II, however, business cycles have indeed been mild by historical standards. In Western Europe and Japan, sustained declines in the levels of output, employment, and real income and spending occurred only sporadically. Instead, alternations of above-average and below-average growth in these indicators of aggregate economic activity were observed recurrently, and the involved slowdowns soon came to be treated much as the mild recessions, partly because they had similar adverse effects on business and labor market conditions and partly because of heightened public sensitivity to any lapse from the high-growth path that lasted long enough to be widely recognized and decried.

The main reason for the apparent temporary suspension in these countries of the "classical" business cycle was clearly the extraordinary outburst of rapid growth from the nadir of the enormous destruction and deprivation of the mid-1940s. The economic legacy of World War II was here not only devastation of industry but also huge backlogs of unutilized, highly skilled re-

sources and unsatisfied demand. Once reasonably sound currencies and free markets were restored, and international trade and capital flows revitalized, an era of great reconstruction, new investment, and technological progress set in to last a generation. As long as this favorable climate lasted, employment and output had steep upward trends, and cyclical setbacks assumed the form of retardations of growth rather than absolute declines. Thus it was not until 1966–67 that West Germany experienced its first postwar recession, with an actual decline (which was still quite moderate) in real GNP, industrial production, and related measures of overall economic activity.

In the United States and Canada, there was no wartime destruction, hence no stimulus of domestic reconstruction, but the backlog of demand after the war shortages was massive, and the incentives and resources for rapid growth were on hand, too. The widely expected postwar depression never materialized. The worldwide expansion of industry and trade obviously benefited the North American countries greatly. It is generally recognized that four business contractions as defined traditionally by the National Bureau (i.e., cumulative and widely diffused declines in activity) have occurred in the United States between 1948 and 1961, but all of them were mild. Then came the long economic expansion in the 1960s, which persisted beyond the expectations of most economists, although not without being modified by two mild slowdowns and presumably prolonged, first by a major tax reduction and later by the intensification of the war in Vietnam. At this point, the substantial moderation of the U.S. business cycle when compared with the pre–World War II patterns became quite apparent, and the important question was what accounts for that change and how lasting it would be.[8]

Of the domestic factors, one that is well documented and most probably important is the shift in the industrial composition of employment from cyclically highly sensitive sectors such as manufacturing, mining, and construction to relatively recession-proof sectors such as trade, services, and finance (Moore 1980, ch. 4; Zarnowitz and Moore 1977). Before the onset of the Great Inflation of the 1970s, most of the explanations of the relative shortness and mildness of recent recessions have also given much credit to institutional changes, notably the "built-in stabilizers" and bank deposit insurance. Discretionary fiscal and monetary policies had a mixed record but not without some relative successes (for further discussion and references, see Zarnowitz 1972a).

The loose term "stagflation" often used to describe the developments since about 1969 evokes the image of a slow-moving economy with sharply rising prices, but this is not exactly accurate. The cyclical fluctuations in this decade

8. To some, the events suggested that the business cycle in its traditional sense was, if not dead, too mild and sporadic to merit much interest. There was also rising interest in the "political cycle"—theories of how errors in macroeconomic stabilization policies or election-year politics can generate cyclical instability. But these interpretations did not turn out to have much long-term significance (see Lundberg 1968; Bronfenbrenner 1969; Zarnowitz 1972).

were relatively frequent and sharp, not only in real activity but also in the rate of inflation. The recessions became international in scope and more severe, but they were still short, even including the one in 1974–75, by historical comparisons. However, the average growth rates did decline considerably, and tendencies developed for both inflation and unemployment to drift upward (apart from their shorter cyclical movements). It was increasingly recognized that the expansion of the government's share and role in the economy has *de*-stabilizing and growth-inhibiting effects. Macroeconomic policies in this period oscillated between attempts to combat inflation and attempts to combat unemployment, with poor timing and for the most part indifferent or perverse results.

The decrease in the frequency, duration, and amplitude of business recessions has been accompanied by other changes, such as a reduction in the sensitivity of industrial prices to declines in final demand and an increase in the cyclical responsiveness of interest rates (Cagan 1966, 1975). That business cycles have changed significantly in various respects since the cataclysms of 1929–45 is hardly surprising when one considers the nature and scope of the concurrent changes in the economies, societies, and political systems involved. The changes in the cyclical behavior have been labeled "secular," but here caution is indicated if the term is meant to convey irreversible alterations or trends that can be projected. There is much evidence of, and good economic reasons for, the long-term shift in the composition of employment from goods-producing to service-producing industries, but it is not impossible to envisage technological change and organized efforts that would halt and even reverse that shift. Drastically different economic policies could alter the cyclical sensitivity of prices and interest rates.

In this respect, it is interesting to note that studies of business cycles in the pre–World War II era have not been able to document any strong *secular* or *discontinuous* changes in cyclical behavior.[9] Many industries undergo similar "life cycles"—phases of initially slow, then rapid, and finally again slow growth or possibly decay—as they introduce new products and techniques that flourish for some time but eventually encounter increasingly effective competition from newer and still better endowed industries. However, the economy comprises at any time all industries, at all their various life-cycle stages, so the industry growth patterns "wash out" in the aggregation, and the overall growth rates show no particular long-term evolution.[10]

9. See Burns and Mitchell 1946, ch. 10, where several tests are reported to have shown that the effects of secular changes on the following have been absent or slight: (1) the duration and amplitude of specific and business cycles; (2) business cycles and economic stages (Mills's hypothesis that the cycles tend to get shorter in the stage of rapid growth receives little support from the data); (3) business cycles before and after 1914.

10. Indeed, none of the once-popular theories of unidirectional trends in economic growth and instability such as Marx's projections of increasing pauperization and crises or Hansen's secular stagnation have been validated by tests of historical data.

With regard to *cyclical* changes in cyclical behavior, that is, the existence and nature of any patterns of long fluctuations, the results are mixed and in large part inconclusive. The Kondratieff swings of 50–60 years are hardly *general* as posited, for they show up mainly in prices, not production, and consist of too few episodes to be testable. Favorable evidence is cited for the notion that business cycle expansions have tended to be longer and contractions shorter during the upward phases of the long waves in prices than during the downward phases (Burns and Mitchell 1946, pp. 431–40; Moore 1980, pp. 31–32). However, history also shows that growth and deflation have not been incompatible; for example, over the decade 1869–79 as a whole, the price level declined strongly and almost continuously, while real income rose greatly (Friedman and Schwartz 1963a, pp. 29–44). There is much more evidence in support of the "Kuznets cycles," usually of some 15–25 years' duration, which have been traced back at least to the first half of the 19th century and are associated mainly with fluctuations in the growth of population, labor force, net immigration, building construction, and business formation (Burns 1934; Kuznets 1961; Abramovitz 1964; Easterlin 1968). But these movements, too, are much less general than the shorter business cycles, and much less is known about them.

In sum, the only types of movement that can be counted on to persist and matter for the economy as a whole are still only the two that are plainly visible in the comprehensive measures of economic activity and performance—the long-term growth and the business cycle. Both vary over time but retain their essential characteristics so that one can say about either that "plus ça change, plus c'est la même chose." Some of the changes in trends and cycles are significant and (at least partly and ex post) explainable but all elude any strict categorization and prediction. All of this applies to any of the developed economies with large private-enterprise sectors, despite the many differences among them.

7.4 Trend-Adjusted Fluctuations

The period of post–World War II reconstruction and international expansion of industry and trade may have been unique for the length of time during which growth in so many countries persisted at rates so high as to make business recessions rare and mild. Under more ordinary circumstances, such periods seem unlikely to last very long; and surely one lesson of recent history is that attempts to perpetuate them by inflationary policies are both ill-advised and ill-fated.

It was not accidental that the interest in growth cycles increased greatly on a worldwide scale as the good times with few recessions seemed to have no end. The many resulting studies, covering several countries, started appearing during the 1960s and continued into the next decade (Mintz 1969, 1974; Shi-

nohara 1969, p. 76; Matthews 1969, p. 101; Waterman 1967; Sachverständigenrat zur Begutachtung der gesamtwirtschaftlichen Entwicklung 1968, pp. 100ff.; Tichy 1972, pp. 37ff.).

However, the idea of growth cycles, far from being new, has a rather long and interesting history. Methods of adjusting time series for seasonal variations and secular trends were applied early and frequently in statistical studies of business cycles. They resulted in several widely used indexes of general business conditions and trade for the United States, Germany, and Great Britain, all published between 1919 and 1926 in the form of seasonally adjusted series of percentage deviations from estimated trend (sometimes called "normal") curves.[11]

In his 1927 volume, Wesley Mitchell reviewed at length without basic disagreement the contemporary statistical techniques of time-series analysis and trend adjustment.[12] He did raise several "particularly insistent" questions about the existence and direction of any causal relation between the trends and the cyclical fluctuations, but only to note that they await answers which will require much further investigation (p. 233). In 1946, however, Burns and Mitchell argued against the sole reliance on trend-adjusted data in business cycle analysis on the ground that "cyclical fluctuations are so closely interwoven with . . . secular changes in economic life that important clues to the understanding of the former may be lost by mechanically eliminating the latter" (1946, p. 270). They favored conversion of the data into "cycle relatives," that is, percentages of the average value of the series during each completed cycle. This method eliminates in a stepwise manner the "intercycle" trends but retains the "intracycle" trends.

Full trend adjustment does suppress some part of the change that occurs during business cycles, which is a disadvantage insofar as the growth effects that are thus missed are of interest to the analyst.[13] On the other hand, working with deviations from trend should result in greater uniformities of the cyclical measures because the variance due to the secular change is eliminated or reduced. Isolating such uniformities can be instructive, and they turn out to be indeed much stronger after than before trend adjustments.[14] Thus a case

11. The U.S. indexes include those constructed by Warren Persons of Harvard University in 1919 and 1923; the statistical division of AT&T in 1922; Carl Snyder of the Federal Reserve Bank in New York in 1923 and 1924; and Edwin Frickey of Harvard in 1925. The work of Persons was particularly influential. Similar indexes were also prepared for Germany by E. W. Axe and H. M. Flinn in 1925, and for Great Britain by Dorothy Thomas in 1926.

12. Mitchell 1927, ch. 3, sec. 3, pp. 202–61; see also sec. 6, pp. 290–357, for a comprehensive discussion of the indexes identified in n. 11.

13. Consider, e.g., the industry life cycles noted earlier in the text. As Mitchell put it: "The inclusion of intracycle trends in cycle relatives helps to reveal and to explain what happens during business cycles. Rapidly growing industries affect business cycles otherwise than do industries barely holding their own or shrinking" (1951, p. 13).

14. For an early account of how cyclical measures tend to be more alike for trend-adjusted than for unadjusted data, both among and within series, see Burns and Mitchell 1946, ch. 7. On some confirming evidence from recent growth cycle studies, see text below.

can be made for a dual analysis addressed to both the classical business cycle and the growth cycle: useful lessons, which moreover should be largely complementary, can be drawn from cyclical measures based on both trend-unadjusted and trend-adjusted time series.[15]

An old and difficult practical problem in growth cycle analysis is that its results depend significantly on how and over what period the trend is fitted and whether and how it is extrapolated. Trends vary greatly and can be measured in many different ways, each of which has its particular strengths and limitations. Mathematical formulas (e.g., linear, quadratic, exponential, and logistic functions of time) often produce good approximations over limited historical periods only and lack the flexibility required to reflect the variations over time displayed by long-term movements in many economic time series. If moving averages are used to estimate such movements, they must be based on periods longer than the average duration of the cycles so as to yield smooth curves that cut through, and contain no significant elements of, the short-term fluctuations in the series. But when the moving-average period is too long, the advantage of greater flexibility is lost again; and even a reasonable choice of the period may not ensure that the trend is free of all traces of the cycle. Furthermore, the moving average must be centered, which implies the need for extrapolation at the beginning and end of the series over periods equal to half the number of months incorporated in the moving average.

In the NBER approach, which has been gradually improved over the past decade and is now widely applied in international studies, a flexible, smooth, nonlinear, and not necessarily monotonic trend is estimated by interpolation between segments of the series determined with the aid of long-term (75-month or 25-quarter) moving averages. Although no single ideal method of trend estimation exists, this procedure has been tested on many series and shown to have considerable merit for the purpose at hand. Its great advantage, moreover, is that it has been consistently applied to the main cyclical indicators for all large and many small industrialized, market-oriented economies. This work, a part of a large collaborative effort supported by several international and national organizations, was initiated in 1973 by Geoffrey Moore and Philip Klein (see Moore 1980, ch. 5).

The more technical detail on the adopted technique and a graphic illustration of how it works can be found in the literature (see Boschan and Ebanks 1978, pp. 332–35). It should be noted that the specific cycles in the resulting deviation-from-trend series are identified in the same way as those in the trend-unadjusted series.

The reference chronology of growth cycles is established by a close examination of the so-processed data for a country's main comprehensive indicators

15. Mitchell (1951, p. 14) recognizes that such double analyses would "add to our knowledge" but notes that they "would be so expensive as to reduce greatly the number of series we could cover." Present computational techniques remove this problem.

of economic activity (such as the series on total output, real income and sales, industrial production, employment). The criteria and procedures are practically the same as those employed in the NBER reference chronology of business cycles.[16] The difference is that growth cycle dates are derived from the observed consensus of the corresponding turning points in the *deviations from trend,* whereas business cycle dates are derived from the consensus of the turning points in the *levels* of the same indicators.

The schematic diagram for the United States in figure 7.1 (first panel) shows that a growth cycle downturn preceded each of the seven business cycle peaks of the 1948–80 period. In the last three cycles (since 1969), the low-growth phases lasted as long as 8–13 months before deteriorating into absolute declines. Thus, here retardations gave early and repeated (though admittedly still uncertain) signals of recession. On the four earlier occasions, in 1948–60, the leads of the decline in growth at peaks were much shorter, from 2 to 6 months. This shift may in part be attributable to the increased role of services: the rise in their output helped to offset the decline in output of goods and structures, and did so more efficiently in recent times. Also, the economy may have been propped up temporarily in the late stages of the recent expansions by buying and speculative activities associated with inflationary expectations and low real interest rates, which discouraged saving.

In sharp contrast to the early timing of the peaks, the troughs of the growth cycles coincided with those of the business cycles in each case except one (there was a short lag in 1954). On three occasions—in 1951–52, 1962–64, and 1966–67—low-growth phases interrupted business expansions but did not terminate them (i.e., here the slowdowns ended in a resumed high growth, not in a decline). Thus, as would be expected, growth cycles are more frequent than business cycles, for example, there were 10 growth cycle downturns in the 1948–80 period for the United States but 7 recessions.[17]

Growth cycles, then, tend to be relatively symmetrical: the U.S. record since 1948 yields average durations of 22 and 18 months for the high-growth and low-growth phases, respectively. In contrast, business cycles in the same period show a strong asymmetry: the expansions lasted on the average 49 months; the contractions, 10 months. The expansions have varied in duration much more than the high-growth phases have (the respective standard deviations are 27 and 11 months). Other important measures for growth cycles also show greater uniformity than their counterparts for business cycles. In particular, leading indicators, which are sensitive to all kinds of disturbances, tend to turn down in anticipation of business slowdowns as well as contractions.

16. On the identification of peaks and troughs of business cycles and growth cycles, see the brief statement and references in Moore 1980, ch. 1.

17. In figure 7.1, the latest U.S. recession was assumed to have ended in August 1980, which was also taken to mark the end of the latest low-growth phase. This date was tentative, based on the evidence available at the time of the writing, February 1981. Subsequent data revisions, however, identified July 1980. See Zarnowitz and Moore 1981.

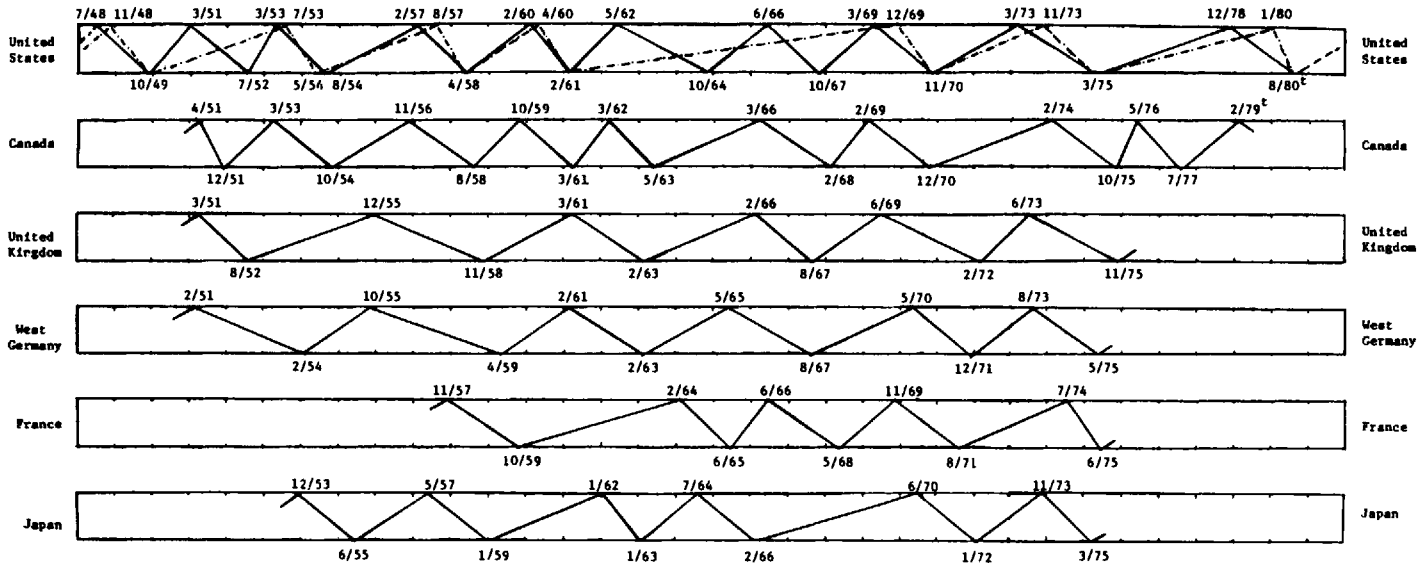

Fig. 7.1. Timing of business cycles in the United States and growth cycles in six countries, 1948–80

Sources: For the U.S. business cycle and growth cycle chronologies, NBER; for the growth cycle chronologies of the other countries, Center for International Business Cycle Research.

Note: In each panel, the lines connect the dates of the consecutive peaks and troughs in growth cycles for the given country. The peak dates are listed above each panel, and the trough dates below. In the panel for the United States, the dashed lines connect the dates of the consecutive peaks and troughs in business cycles. The peak dates are listed above the panel, and the trough dates below, except where they coincide with the corresponding growth cycle dates. ^{t} = tentative.

Hence, they have a better record of forecasting growth cycles than of forecasting business cycles (the slowdown predictions are treated as "extra turns" when attention is focused exclusively on the recessions).

The U.S. chronologies are more complete and better documented than those for most other countries, and the latter are in recent times predominantly limited to growth cycles. However, I have little doubt that many of the U.S. results (e.g., those concerning the greater frequency, symmetry, and relative predictability of growth cycles compared with business cycles) apply about equally to other developed market-oriented economies. Studies by Mintz and by Moore and his associates, as well as others abroad, indicate that "leading, coincident, and lagging indicators behave in much the same way in relation to growth cycles in other industrial countries as they do in the United States" (Moore 1980, p. 24).

Figure 7.1 suggests that most of the recent growth cycles have been international in scope, including those slowdowns that did not become recessions in the United States. That is, the low-growth phases of 1951–52, 1962–64, and 1966–67 had counterparts in Europe (indeed, as noted earlier, the first German recession after World War II occurred in 1966–67, overlapping the last of these episodes). The 1953–54 recession in the United States had but weak and spotty repercussions abroad (virtually limited to Canada and Japan). The recessions of 1957–58 and 1969–70 had more visible counterparts, although most of these took the form of growth retardations rather than absolute declines.[18] It is clear that the most serious recessions in the post–World War II period occurred in 1974–75 in all the countries covered and elsewhere in the trading world; most of these declines were preceded by slowdowns in 1973. The expansions that followed were soon, in 1976–77, interrupted by another cluster of low-growth phases, but not in the United States, where the next slowdown occurred only in 1979, followed by a brief but substantial decline in 1980. This last recession, too, spread internationally.

Figure 7.1 confirms what has long been observed and understood: business fluctuations tend to spread among countries linked by trade and financial transactions reflecting the international movements of goods, services, and capital. Expansions stimulate foreign trade and investments; slowdowns and recessions discourage them. The cyclical pattern of the U.S. economy impresses itself strongly upon a close partner of a relatively small economic size such as Canada. The diagrams for West Germany and the United Kingdom exemplify another close timing relationship. To be sure, there are also deviations, but the common rhythm is unmistakable for all the countries covered (and it extends to many others). It is often suspected that the chain of influence

18. In particular, in West Germany these were just mild slowdowns. France seems to have had more of a decline in 1958 only. The United Kingdom had lengthy retardations of a more pronounced variety and much less growth generally, but here too outright declines were rare and short. Japan, with the highest rates, also had the most frequent slowdowns outside of the United States and Canada, notably a sizable one in 1957–58.

runs mainly from the biggest country to the others (with the United States exporting its prosperity and its recessions), but this need not always be so: the proper model is one of multilateral interactions. In any event, the leads and lags disclosed by the chronologies vary greatly and cannot tell us much about the direction of the forces involved in the international transmission of cyclical movements.

7.5 Historical Dates and Durations of U.S. Business Cycles

According to the NBER chronology of U.S. business cycles, expansions have grown longer and contractions shorter. Table 7.2 demonstrates these tendencies by comparing the summary statistics on the durations of cycle phases for several periods, before and after such dividing years as 1855, 1919, and 1945. Wartime expansions have lasted longer than most of the others, but their exclusion does not alter the above finding (cf. table 7.2A, cols. 3 and 4). Before 1919, the peacetime expansions were on the average little longer than the contractions in business activity (the figures are 24 and 22 months, respectively). Afterward, they were more than twice as long (the corresponding averages are 32 and 15 months), and this despite the fact that the comparison includes the long depression of the 1930s and excludes three long wartime expansions. The vivid shift indicated by the average measures is somewhat further elaborated by the frequency distributions of short, intermediate, and long expansions and contractions (table 7.2B).

Of course, the data available to the NBER analysts for their work on identifying and dating the business cycles of history increased hugely in quantity and improved substantially in quality over time.[19] For the early decades, very few adequate time series exist, least of all in the most desirable form, which is comprehensive monthly or quarterly data on income, production, and employment. Here it was necessary to rely in the main on three sources, beginning with the descriptive evidence from "business annals" of contemporary opinion about the stage and spread of fluctuation in economic activity (Thorp 1926). The annals were next checked against indexes of business conditions and other series of broad coverage. Finally, arrays of cyclical turns in the more important monthly and quarterly series on individual processes were ascertained and closely examined so as to sharpen the choice of the reference dates.[20]

These studies of business cycle history replaced the concentration on financial crises, panics, and deep depressions, which was characteristic of the ear-

19. For example, U.S. industrial censuses are no more frequent than decennial from 1810 to 1899. They are quinquennial from 1888 to 1919, biennial to 1929, and irregular until the annual series of intercensal surveys begins in 1949. The data problems for the study of business cycles in other countries are on the whole greater yet. (The NBER chronologies extend over long stretches of time: for Great Britain, back to 1792; for France, to 1840; and for Germany, to 1866.)

20. For more on this procedure, see Burns and Mitchell 1946, pp. 76ff.

Table 7.2 **The Duration of Business Cycles in the United States, 1834–1980**

A. Average Measures, by Phase and Period

Line	Period (1)	No. of Cycles (2)	Mean Duration (S.D.), Months[a] All Expansions (3)	Peacetime Expansions[b] (4)	All Contractions (5)	All Cycles (6)	Peacetime Cycles[c] (7)
1	1834–1855[d]	5	26 (20)	[e]	24 (15)	50 (23)	[e]
2	1854–1919	16	27 (10)	24 (7)	22 (14)	48 (19)	46 (19)
3	1919–1945	6	35 (26)	26 (15)	18 (13)	53 (22)	46 (16)
4	1945–1980	7	49 (27)	39 (12)	10 (3)	60 (27)	49 (11)
5	1834–1980	34	33 (20)	27 (13)	19 (13)	52 (21)	47 (17)

B. Frequency Distributions, by Phase and Period

Line	Period (1)	Expansions: 18 mos. and shorter (2)	19–36 mos. (3)	37 mos. and longer (4)	Total (5)	Contractions: 12 mos. and shorter (6)	13–24 mos. (7)	25 mos. and longer (8)	Total (9)
				Number					
6	1854–1919	3	12	1	16	3	10	3	16
7	1919–1980	1	5	7	13	7	5	1	13
8	1854–1980	4	17	8	29	10	15	4	29
				Percentage					
9	1854–1919	19	75	6	100	19	63	19	100
10	1919–1980	8	38	54	100	54	38	8	100
11	1854–1980	14	59	28	100	34	52	14	100

Source: National Bureau of Economic Research (for all reference dates used, except for August 1980, a tentative choice for the last trough; see fig. 7.1 and n. 17).

[a]Standard deviations of the duration estimates, in months, are given in parentheses.

[b]Excludes the Civil War and World War I expansions (line 2), the World War II expansion (line 3), and the Korean War and Vietnam War expansions (line 4). In line 5, all five of these wartime expansions are excluded.

[c]Excludes the cycles that contain the wartime expansions. See n. *b*.

[d]Measures in this line are based upon calendar year dates.

[e]No major wars in this period (but note that the short war with Mexico coincided with the expansion of 1846–47). Same as entry to the left.

lier work in this area, with efforts to examine all business contractions, the mild ones as well as the severe ones. Mitchell noted that "the same developments which make it wise to substitute the concept of recession for the concept of crisis make it wise to recognize the shorter segments into which the long swings are frequently divisible. This change reduces the typical duration of American cycles to roughly one-half of the estimate commonest among theoretical writers" (1927, pp. 386–87). By the same token, the approach nearly doubles the number of basic observations (cycles) to be analyzed, acknowledging the great diversity of these fluctuations in length and size, but emphasizing their continuity. It presumes that the most severe and the mildest contractions are not of an entirely different species, even though they are certainly of a very different order of magnitude.

However, where consistent, comprehensive time series on the main aspects of aggregate economic activity are not available, the severity of business contractions and the vigor or expansions cannot be estimated with adequate confidence.[21] The evidence from business annals is deficient and susceptible of bias. Allowing for the lags of recognition, the consensus of contemporaries can determine rather well *that* business conditions have deteriorated or improved on a large scale and approximately *when* such shifts happened; it cannot tell us nearly as well just *how much* they deteriorated or improved. In a growing economy, downturns will attract more attention than upturns.[22] After a strong expansion, a mild decline (or even only a slowdown, if sufficiently long and diffused) may cause as much discomfort and alarm as a larger decline coming after a weaker expansion.[23] Hence it is possible that observers would tend to overstate the dimension of some of the movements in the former category, perhaps even mistaking at times a major retardation for a business contraction.

Time-series data permit some verification of the lessons from business annals. Moreover, they add valuable, though severely limited, quantitative information even for the earliest times covered. There are annual quantity series for individual but important items and monthly data for wholesale commodity prices, stock prices, bond prices, short-term interest rates, and (later) bank clearings. As noted before, indexes of business activity, which represent

21. This has been fully recognized by those who have done most to help remedy this situation. Thus Burns and Mitchell (1946, p. 402) state flatly, "Unfortunately, we lack at present reliable measures of the amplitude of successive business cycles." This conclusion still holds at least for the first half of the period covered by the NBER chronology.

22. Referring to the duration estimates derived from business annals, Mitchell (1927, pp. 421–22) states: "Our measurements are based solely upon the intervals between recessions. It would be desirable to check the results by a second set, based on the intervals between revivals. We have not attempted such a check, because business commentators have paid less attention to the upward than to the downward turning points of business cycles." (Note: In this discussion, business cycles are treated as having four phases—prosperity, recession, depression, and revival. The terms "recession" and "revival," then, refer to the turning zones.)

23. This is certainly consistent with the recent experience in fast-growing economies such as Japan.

weighted combinations of such series, have been popular in the early statistical studies of business cycles. It is unfortunate, however, that for the period before 1875 these indexes exist exclusively in trend-adjusted form. Clearly, it is difficult to distinguish business cycles from growth cycles in series that show deviations from trend only.

In this context, it is important to recall that the expansions and contractions of the early business cycles in the NBER chronology tend to be of nearly equal length—much like the phases of growth cycles and very unlike those of the later business cycles, in which the expansions are much longer than the contractions (compare lines 1–2 with lines 3–4 in table 7.2). Given this observation, and the limitations of the materials available for the identification of the early cycles, it is natural to ask whether some of these fluctuations may not be in the nature of growth cycles rather than business cycles. The reliance on business annals and trend-adjusted indexes, in particular, might well have produced a certain amount of bias in that direction.

The question, far from being purely academic or pedantic, is important in a basic sense, since it involves the reading of contemporary as well as historical trends. Thus it is well worth knowing whether business expansions have in fact grown longer and contractions shorter—or whether the evidence in table 7.2, which confirms that they have, is seriously flawed by a lack of consistency in the measurement of the fluctuations over time.

7.6 Amplitudes of Cyclical Movements: Contractions or Retardations?

Do all the "contractions" dated in the NBER reference chronology represent actual declines in economic activity or do some of them represent phases of below-average growth? It is much easier to raise this question than to answer it with sufficient confidence, for the already familiar reason that the data are so limited. A thorough review of the NBER chronology and the underlying materials is beyond the scope of this paper. Still, even a partial reexamination of the evidence could be of some help here, at least in determining the dimensions of the problem.

Table 7.3 reviews the period 1834–82, that is, that segment of the NBER reference cycle chronology for which there are no comprehensive measures or indexes of economic activity without trend adjustments. A comparison of columns 2 and 4, and of columns 3 and 5, shows that each of the NBER cycles corresponds to a cycle recognized in the U.S. business annals. It is this broad parallelism that interests us here, not the timing discrepancies, which seem considerable but are mainly due to the inevitable vagueness of the annals in this respect.

The measures in columns 6–11 are based on the only index of business activity in the United States available for these early decades, the Cleveland Trust Company index compiled in 1931 and intensively used by Ayres (1939). This is a weighted combination of trend-adjusted series on prices, physical

Table 7.3 **Business Cycle Chronologies and Measures of Amplitude and Duration Based on Trend-Adjusted Time Series, United States, 1834–82**

	NBER Reference Dates for Business Cycle			Business Annals[a]		Ayres's (Cleveland Trust Company) Index of Business Activity							
						Date and Value[b] of				Change[c]		No. of Months[d]	
Line	Peak (1)	Trough (2)	Peak (3)	Timing of Revival (4)	Timing of Recession (5)	Local	Low (6)	Local	High (7)	High to Low (8)	Low to High (9)	Below Trend 910)	Above Trend (11)
1	not avail.	1834	1836	L34–E35	Mid-37	10/34	−7.4	2/37	+21.0	−13.5[e]	+28.4	16	23
2	1836	1838	1839	L38–E39	Fall 39	4/38	−11.8	3/39	+15.2	−32.8	+27.0	18	15
3	1839	1843	1845	L43–E44	May 45	2/43	−19.1	2/46	+ 4.5	−34.3	+23.6	68	9
4	1845	1846	1847	E47	L47	6/46	− 1.4	6/47	+14.3	− 5.9	+15.7	1[f]	24
5	1847	1848	1853	L48	L53–E54	12/48	− 5.4	3/54	+14.6	−19.7	+20.0	17	55[g]
6	1853	Dec. 1854	June 1857	L55	Mid-57	12/54	− 3.8	5/56	+10.1	−18.4	+13.9	6	27
7	June 1857	Dec. 1858	Oct. 1860	1859	L60	1/58	−13.0	9/60	+ 4.7	−23.1	+17.7	18	15[h]
8	Oct. 1860	June 1861	Apr. 1865	L61	L65	7/61	− 9.8	4/64	+ 9.8	−14.5	+19.6	23	27
9	Apr. 1865	Dec. 1867	June 1869	1868	E70	11/65	−14.0	6/69	+ 4.9	−23.8	+18.9	11	23[i]
10	June 1869	Dec. 1870	Oct. 1873	E71	Mid-73	10/70	− 4.8	1/73	+14.6	− 9.7	+19.4	5	33
11	Oct. 1873	Mar. 1879	Mar. 1882	L78–E79	L82	2/78	−12.7	1/81	+11.7	−27.3	+24.4	70	50

Sources: Cols. 1–3, Burns and Mitchell 1946, table 16, p. 78; cols. 4–5, Thorp 1926, ch. 1; cols. 6–11, Ayres 1939, app. A, table 9, col. 1.

[a]L denotes "late" (last half or quarter); E denotes "early" (first half or quarter). In referring to years, the first two digits are omitted.

[b]Refers to the lowest (col. 6) and highest (col. 7) value of the index in the given cycle, in percentage deviations from trend. The corresponding dates shown do not always coincide with the dates of business cycle troughs and peaks designated by Ayres.

[c]Amplitude of decline (−) in col. 8 and of rise (+) in col. 9, based on the corresponding entries in cols. 6 and 7.

[d]Months during which the index shows negative values (including the low in col. 6) are given in col. 10; months during which the index shows positive values (including the high in col. 7) are given in col. 11. Refers to consecutive months, except as noted below.

[e]From a high of +6.1 in 2/1832 to the low of −7.4 in 10/34 shown in col. 6.

[f]Except for the single low month of 6/1846, the index remained positive from 9/1845 through 6/1848, i.e., over intervals of 9 months and 24 months (as shown in col. 11).

[g]From 12/1849 through 9/1854, with two minor interruptions of 1 month each.

[h]From 3/1859 through 9/1859 and from 3/1860 through 10/1860 (small negative values in the 5 intervening months).

[i]From 7/1868 through 12/1869 and from 4/1870 through 8/1870 (small negative values in the 3 intervening months).

quantities, and pecuniary volumes of transactions or trade. As such, it contains considerable information but in a form that lends itself to much popular use and misuse: it ought to be handled with great care and caution. In particular, it is important to recognize that the annual movements in the index have a different meaning from the monthly movements, because the former reflect mainly changes in production and trade and the latter changes in commodity and security prices (the monthly series used as interpolators). Also, like other early indexes, this composite refers in large measure to durable goods, whose cyclical sensitivity tends to be high, which means that it may overstate the fluctuations of the economy at large.[24]

Contemporary testimonies and data broadly agree on the earliest developments covered, including a moderate decline in 1833–34, an expansion accompanied by much speculation in land through 1836, a financial panic followed by an incomplete recovery in 1837–38, and finally one of the longest and deepest depressions in U.S. history, marked by sharp deflation and repudiation of, or postponement of payments on, large amounts of private and state debts. In sharp contrast to that depression, which ended in 1843, the NBER-designated contraction of 1845–46 was a mild affair, which indeed is open to serious doubt: the episode may well have been one of a mere growth cycle retardation. Ayres speaks of "a minor dip in business in 1846": his index stays positive, that is, above "normal," in all months but one from September 1845 through June 1848 (table 7.3, line 4).[25] The business annals describe a suspiciously short cycle in terms that are inconclusive but, compared to those used elsewhere, quite mild.[26] Moreover, several independent studies using mainly annual data on the volume of domestic and foreign trade fail to confirm the occurrence of a business contraction in these years. They suggest

24. In the period under review, the index comprised detrended series on commodity and security prices, imports and exports, ship construction, coal production, tons of registered shipping, and government finance (before 1855); later, pig iron consumption, railroad freight ton-miles, blast furnace activity, rail production, locomotive production, miles of new railroads, canal freight, and cotton consumption. For details, see Ayres 1939, app. C, pp. 204–5. Although the composition of the index is different for the years before and after 1855, tests for an overlap period are reported to indicate a very substantial similarity of the results from the two sets of series.

The Ayres index, now published by Ameri Trust Company (Cleveland) is reproduced in graphical form in many widely used economic textbooks, as a rule without any explanation. Although its historical use can be justified, its current use appears highly questionable (e.g., its entire course since 1961 is shown as somehow persisting well above its zero "long-term trend" line).

25. Ayres (1939, p. 11) stresses that in 1846 there was "no real depression. It may well be that conditions were then developing which may have initiated a real depression, but that renewed business activity was temporarily stimulated by the government expenditures of the Mexican War."

26. As summarized by Thorp (1926, p. 124), there was in 1845 a "slump ascribed to political difficulties. May: return to activity. October": in 1846, there was a "slackening of activity to dullness" and, since May, war with Mexico and "severe pressure in money market." Mitchell notes in his introduction to Thorp's volume (pp. 42–43) that the annals imply for 1845–46 a cycle of about 1 year's duration when measured between successive recessions (i.e., downturns). This would have been a very short cycle indeed and one difficult to reconcile with the Burns-Mitchell 1946 definition, which has business cycles exceed 1 year in length.

a single business cycle between 1843 and 1848, with only a mild setback in 1845–46.[27]

The years 1853–54 saw rising interest rates and strongly declining security prices, and these financial developments dominate the accounts of the recession in Thorp's annals as well as in the statistical studies by Ayres and Cole. But the evidence of a contraction in real terms is weak, except with respect to business fixed investment. The construction of new railroad mileage dropped sharply, but Cole's index representing mainly the physical volume of domestic trade increased about 5% in 1854. Wholesale commodity prices show very little softness in this episode. Thus, here too, despite the general agreement in the literature, there is some room for doubt about the genuineness of the contraction (as distinct from undoubted financial trouble and a business slowdown).

Data are still scanty for the next 15 years, which include the Civil War, but they provide general support for the business contractions with the NBER-dated troughs in 1858, 1861, and 1867 (table 7.3, lines 7–9). It is fairly clear, however, that the last two of these were relatively mild, and the designation of 1865–67 as a contraction finds no support in annual production data, which show increases.[28] The latter observation applies a fortiori to the 1869–70 episode, which was much milder and shorter yet. Indeed, it is puzzling how to explain even a mild contraction at a time of the greatest acceleration in railroad investment. A careful study, which notes this fact, suggests that short-lived financial difficulties may have discouraged inventory accumulation, which played a relatively large role at the time (Fels 1959, pp. 96–97).

Again, it is possible that in terms of production, all that happened was a phase of below-average growth rather than an actual decline of cyclical proportions. In the absence of reliable, comprehensive data on intrayear output changes, no firm conclusion can be reached. But there is another important factor here, namely, the decidedly downward trend in prices, which prevailed for about 30 years after the Civil War. In such deflationary times, cyclical movements show up much more strongly in nominal (current dollar) aggregates of income and spending than in their real (constant dollar) aggregates.

27. Bullock and Micoleau (1931, p. 153) state that "the movement of foreign trade and that of commodity prices do not point to a depression or even a serious recession in business in 1846." Detrended indexes of the volume of domestic and foreign trade constructed by A. H. Cole from series on tonnage carried on canals and railroads, of vessels built, total merchandise shipped to and from abroad, etc., show declines in all NBER recession years during the period 1830–62, except in 1846 and 1854 (Cole 1930, p. 172; also Smith and Cole 1935, chs. 12 and 20). W. Gilbert (1933, p. 141) concludes that after 1843, "a level high enough to be characterized as prosperity was not achieved before 1846 and that the years 1844 and 1845 cannot be called prosperous years but rather years of broken and halting revival."

28. Frickey's index of industrial and commercial production (1899 = 100) has the following values: 13 in each of the 3 years 1860–62, 15 in 1863, 17 in both 1864 and 1865, 19 in both 1866 and 1867, and 20, 22, and 23 in 1868, 1869, and 1870, respectively. After adjustment for secular trend, the index fluctuates in broad conformity with the NBER chronology, declining in 1860–62, 1864–65, 1866–67, and 1869–70 (Frickey 1947, pp. 125–29).

(In inflationary times, the opposite is the case, as shown by recent experience.) Presumably, the high degree of price flexibility existing at the time has mitigated the output fluctuations. But a perceived deflationary trend generates expectations of further price declines, which are to some extent self-fulfilling (just as inflation generates partly self-validating expectations of further price rises). Such expectations are worrisome and can be seriously destabilizing, particularly since they are always clouded by uncertainty. The changes over time in the price level are generally quite uneven—for example, the deflation of 1865–96 was interrupted by several relatively short and weak upward price movements, mainly during business expansions. Thus price expectations are as a rule only roughly verified by the overall trend and often falsified by the shorter movements. Moreover, the dispersion of the changes in individual prices is high. The uneven declines in prices, values, and spending during the period under review were undoubtedly hurting many people. Business cycles are not, and cannot be, isolated from these developments. They cannot, therefore, be judged by their "real" elements alone.

The 1873–79 contraction was exceptionally long and by most accounts and measures very severe (see table 7.3, line 11, and table 7.4, line 1, which contains some additional information). However, the available evidence is heavily weighted with nominal series—prices, bank clearings, railroad revenues, imports—which fell sharply: the physical-volume series show shorter and smaller declines, mostly between 1873 and 1876.[29]

Beginning in the late 1870s, more comprehensive statistics are available monthly, and not only in trend-adjusted form. Table 7.4 lists the amplitudes of cyclical movements—percentage declines without trend adjustments, and an average of three indexes with such adjustments. This is useful information, but it must be interpreted with care, since each of these aggregates has considerable limitations and there is a considerable amount of duplication among them.[30]

29. Friedman and Schwartz (1963a, pp. 43–44) note that "the steady decline in prices from 1873 to 1879 probably led contemporary observers and certainly led later observers to overstate the severity of the contraction in terms of real output. . . . The contraction was severe. Yet an analyst who assessed the contraction on the basis of physical volume series alone would regard it as shorter in length and far less severe than it has generally been judged." Similarly, Fels (1959, p. 107) states that the "depression of the 1870s," though second only to that of 1929–33 in monetary statistics, was "nevertheless, in terms of output . . . singularly mild." This is strongly supported by Frickey's data.

30. Bank clearings outside New York City (the exclusion is designed to lessen the impact of financial transactions, largely in the stock and bond markets) have been widely used in the literature as a measure of aggregate economic activity. Since 1919, the better series of bank debits (also outside New York City and deflated) is used. See Macaulay 1938, table 30; Frickey 1942, pp. 338, 360–61; and Garvy 1959.

The Axe-Houghton index, which starts in 1879, is based on pig iron production, imports, bank clearings outside New York City, and revenue per mile of selected railroads. The Babson index is a base-year weighted aggregate of seasonally adjusted physical-volume or constant-dollar series, with coverage expanding from 11 to 33 components. It includes manufactures, minerals, agricultural marketings (but not farm production proper), construction, railway freight ton-miles, electric power, and foreign-trade volume. The weights are value-added data. See Moore 1961, 2:39–40,

The series used in table 7.4 show expansions and contractions corresponding to the NBER business cycle reference dates in all instances but two: the Babson index of physical volume of business activity did not decline in 1890–91 and the deflated bank debits paused but did not fall in 1926–27. However, a few of these movements have been questioned; for example, Ayres's index shows a mild decline in 1926–27, but he disregards it in his chronology, and the same applies in the case of Axe and Houghton.[31]

Despite the shortcomings of the underlying data, the amplitude measures in table 7.4 rank the cyclical episodes sensibly, that is, in broad agreement with the judgments expressed in the most informed and careful studies of American business cycles.[32] However, the rankings differ depending on whether trend-adjusted or unadjusted indexes are used. As would be expected, the declines are generally much larger and the rises much smaller in the former than in the latter series (cf. cols. 4 and 5 with the corresponding entries in cols. 6–13).

The fact that not only the trend-adjusted but also the unadjusted series match all but a few of the turning points in the NBER chronology can be said to confirm the latter in a broad and conditional sense. This means that it is primarily the occurrence of these cyclical movements approximately in the indicated periods that is supported by the data, rather than the precise dates of the peaks and troughs. It also means that the quality of the evidence depends on the degree to which the indexes used reflect the true cyclical movements in the economy at large. These movements cannot be observed well without more comprehensive, nonduplicative measures of aggregate economic activity. The available series, used as proxies for such measures, could either

for more detail. The AT&T index is described as "primarily a measure of manufacturing activity and the physical movement of commodities" (see Rorty 1923, pp. 159–60). In 1922, it comprised 12 items (identified with weights in Mitchell 1927, p. 295), but in earlier years its coverage was much slimmer. These three indexes (Axe-Houghton, Babson, and AT&T) are available without trend adjustments.

The trend-adjusted indexes used to compute the average cyclical amplitudes in cols. 4 and 5 of the table are those by Ayres and AT&T, plus the index presented and described in Persons 1931, pp. 8–9, 91, 111, 131, and 152–56.

31. See Ayres 1939, p. 45, and Axe and Houghton 1931. Ayres speaks of "a minor business downturn in 1927 which was not sufficiently important to be considered as marking the end of a cycle." But Burns and Mitchell (1946, p. 109) observe that "this decline [in the Ayres index] is a trifle longer and at least as large as the 1887–88 decline, and definitely larger though a little shorter than the 1869–70 decline, both of which Ayres considers as marking the end of a business cycle. A similar remark applies to Axe and Houghton." See also Burns and Mitchell 1946, table 27, p. 108 and text, for more on the comparison of NBER and other chronologies.

32. Burns and Mitchell (1946, table 156, p. 403) use the trend-adjusted indexes of Ayres, Persons, and AT&T to rank the amplitudes of U.S. expansions and contractions in 1879–1933. Moore (1961, table 3.6, pp. 104–5) extends these measures to cover the period 1854–1958. It should be noted that our review ends in 1929 and so excludes the Great Contraction of 1929–33 and the much shorter but deep contraction of 1937–38. The 1926–27 episode is believed to be the last one for which the data leave some uncertainty as to the nature of the cyclical developments involved. Hence, given my present objective, there was no point in going beyond the cycles of the 1920s.

Table 7.4 **Measures of Amplitude of Cyclical Movement for Three Trend-Adjusted and Four Unadjusted Indexes of Business Activity, United States, 1873–1929**

	NBER Reference Dates for Business Cycles			Three Trend-Adjusted Indexes[a]: Average Change		Deflated Bank Clearings[b]		Axe-Houghton Index of Trade and Industrial Activity[c]		Babson index of Physical Volume of Business Activity[d]		AT&T Index of Industrial Activity[e]	
Line	Peak (1)	Trough (2)	Peak (3)	High to Low (4)	Low to High (5)	Fall (%) (6)	Rise (%) (7)	Fall (%) (8)	Rise (%) (9)	Fall (%) (10)	Rise (%) (11)	Fall (%) (12)	Rise (%) (13)
1	Oct. 1873	Mar. 1879	Mar. 1882	−33.6[f]	+31.5	n.a.[g]	+89.7[h]	n.a.	+46.5[i]				
2	Mar. 1882	May 1885	Mar. 1887	−32.8	+26.0	−17.6	+62.2	−24.6	+37.1				
3	Mar. 1887	Apr. 1888	July 1890	−14.6	+21.3	−12.3	+36.4	− 8.2	+32.1				
4	July 1890	May 1891	Jan. 1893	−22.1	+21.1	−10.2	+23.0	−11.7	+16.8	n.m.[j]	+22.7[k]		
5	Jan. 1893	June 1894	Dec. 1895	−37.3	+27.8	−29.8	+39.6	−29.7	+37.3	−26.9	+35.9		
6	Dec. 1895	June 1897	June 1899	−25.2	+27.9	−16.0	+56.8	−20.8	+58.9	−15.3	+47.6		
7	June 1899	Dec. 1900	Sept. 1902	−15.5	+12.9	− 9.4	+30.9	− 8.8	+36.3	−12.2	+41.4	− 9.2	+38.5
8	Sept. 1902	Aug. 1904	May 1907	−16.2	+24.7	−10.5	+41.3	−17.1	+39.4	−14.2	+48.1	−17.6	+54.4
9	May 1907	June 1908	Jan. 1910	−29.2	+24.4	−25.4	+42.2	−31.0	+59.3	−22.7	+43.6	−29.1	+44.9
10	Jan. 1910	Jan. 1912	Jan. 1913	−14.7	+14.4	− 6.4	+16.1	−10.6	+25.6	− 9.0	−23.3	− 7.8	+30.8
11	Jan. 1913	Dec. 1914	Aug. 1918	−25.9	+35.7	−14.9	+59.2	−19.8	+49.2	−18.9	+56.8	−19.5	+52.3
12	Aug. 1918	Mar. 1919	Jan. 1920	−24.5	+19.5	−10.1	+37.4	−14.1	+23.2	−28.6	+34.2	−21.5	+28.9
13	Jan. 1920	July 1921	May 1923	−38.1	+36.7	−13.9	+24.2	−32.7	+68.5	−32.3	+65.0	−29.4	+60.1
14	May 1923	July 1924	Oct. 1926	−25.4	+21.7	− 7.5	n.m.	−22.7	+36.1	−17.2	+28.0	−20.5	+39.4
15	Oct. 1926	Nov. 1927	Aug. 1929	−12.2	+14.9	n.m.	+54.5[l]	−10.0	+21.6	− 9.5	+25.2	− 5.8	+24.9

Sources: See Table 7.3, for cols. 1–3 and on the Ayres index. Cols. 4–13: NBER files; Macaulay 1938, table 30, pp. A289–A296; Persons 1931; Rorty 1923, pp. 159–60 (AT&T index, trend adjusted). See also nn. *b*, *c*, *d*, and *e* below.

[a]Ayres's index of business activity compiled by the Cleveland Trust Company; index of industrial production and trade constructed by Warren M. Persons; and AT&T index of business activity. The Persons index begins in 1875; the AT&T index, in 1877. Each index is expressed in percentage deviations from its base (trend) line, and changes are computed between the extreme values of these deviations in each cycle; the entries below are averages of the corresponding changes in the three indexes.

[b]1875–1918, bank clearings; 1919–30, bank debits. NBER data (Macaulay), deflated by Carl Snyder's Index of General Price Level. Not adjusted for trend. Seasonally adjusted. Series begins in 1875.

[c]Furnished by E. W. Axe and Company, New York. Not adjusted for trend. Seasonal adjustment by compiler. Series begins in February 1879.

[d]Furnished by Babson's Reports, Inc. Not adjusted for trend. Seasonal adjustment by compiler. Series begins in January 1889.

[e]AT&T, Chief Statistician's Division (a confidential release, 6 Sept. 1944). Not adjusted for trend. Seasonal adjustment by compiler. Series begins in 1899.

[f]Based on the declines in the Ayres index, 1873–78, and in the Persons index, 1875–78.

[g]n.a. = data not available.

[h]Measured from the trough in 3/1878 to the peak in 6/1883; disregards a downward movement in the series from 7/1881 to 1/1882. See Burns and Mitchell 1946, chart 30, p. 255.

[i]Measured from the low of 2/1879 to the peak of 8/1882; disregards a downward movement in the series from 3/1880 to 1/1881.

[j]n.m. = no movement in the series corresponds to the NBER reference dates.

[k]Measured from the low in 9/1889 to the peak in 3/1892.

[l]Measured from the trough in 9/1923 to the peak in 11/1929.

underestimate or overestimate the true movements, but the greater risk would seem to be that of overestimation because the data appear to represent the cyclically sensitive sectors of the economy such as manufacturing better than they do the other sectors.

Of course, the serious nature of several contractions listed in table 7.4 is not in doubt. The decline in 1882–85 was among the longest and rather severe, although again more so in prices and money transactions than in production.[33] Generally poor business conditions and a protracted deflation characterized the 4½-year period from the beginning of 1893 to mid-1897, which saw two major contractions separated only by an abortive revival from the middle of 1894 through 1895. The debacles of 1907–8 and 1920–21 were both relatively short but very severe. There was also a serious decline in production and real income in the years 1913 and 1914, which was fully reversed only in 1915 by the inflow of orders from abroad as World War I intensified.[34]

The other contractions were definitely much milder, and some of them may well have been marked by retardations rather than absolute declines in total output. The one in 1887–88 is described as a brief "slight recession" in the business annals; it does not register as a decline in a number of important series but only as a retardation; and it is omitted from cyclical chronologies by some scholars.[35] The next contraction on the NBER list, attributed to monetary disturbances originating abroad in mid-1890, although shorter yet, is viewed as more pronounced, but not by much. After a brief but vigorous expansion following the depressed years 1893–97, another extremely mild contraction is identified by NBER in 1899–1900, which also does not show up in annual measures of output and real income.[36]

The first contraction of this century, in 1902–4, was rather lengthy but cer-

33. Frickey's (1947) annual index of industrial and commercial production (1899 = 100) has a peak of 48 in 1883 and a trough of 46 in 1885; in trend-adjusted form, the decline is from 109 (percentage of trend) in 1882 to 93 in 1885. See also Fels 1959, pp. 128–31.

34. For further evidence on the above episodes, see Fels 1959, chs. 10 and 11; Frickey 1947; Friedman and Schwartz 1963a, pp. 99–102, 108–13, 156–58, 196–97, and 231–32.

35. In particular by Kitchin (1923, pp. 10–16). Fels (1959, p. 142), agrees "that 1887–88 was about as mild as any contraction worthy of the name. The only difference of opinion to be found in the literature is whether it should be recognized as a cyclical contraction at all." He lists several monthly series for banking, imports, and railroad traffic and earnings that show no cyclical peaks in this period but also notes that investment in railroads and buildings did weaken. Frickey's index assumes the values 54, 60, and 61 in 1886, 1887, and 1888; in trend-adjusted form, the corresponding readings are 103, 107, and 104.

36. Beginning in 1889, annual figures on the value of net national product in 1929 dollars are available from Kendrick 1961. This series, due to Kuznets and Kendrick, shows increases of 4.3% and 2.7% in the "trough" years 1891 and 1900, respectively (in contrast to sizable declines in the depressed years 1893–94 and 1896). Similarly, Frickey's unadjusted index rises in both 1889–91 and 1899–1901 (but declines when trend adjusted in both 1891 and 1900). The monthly Babson index, which has a relatively good coverage of industrial output, moves along a low plateau but shows no decline from its beginning in 1889 through early 1891 (see n. 30 and table 7.4, line 4). For further information, see Friedman and Schwartz 1963a, pp. 94 (chart 8), 104, 136 (chart 13), and 139; also Fels 1959, pp. 166–71.

tainly not severe. Still, there is no reason to question that it was a true decline in aggregate economic activity as both real net national product and the index of industrial and commercial production had small losses (of about 1.8% and 1.5%, respectively) in 1904. Similarly, the contraction of 1910–12 was mild, although it too lasted about 2 years. Prices fell markedly in this period, while real net national product increased only slightly in 1910 (by 0.8%) and the index of industrial and commercial production fell 3.3% in 1911.[37]

The 1918–19 contraction as dated by the National Bureau was extremely brief (7 months) so it is not surprising that it is not registered in annual data. The amplitude measures of table 7.4, however, show it to have been more serious than most of the contractions discussed previously. It seems appropriate to regard it as a sui generis end-of-the-war recession along with the similarly short 1945 episode.

The last two cycles to be considered are those of 1923–29, a period of calmness before the storm, characterized by relatively stable economic growth and fairly stable prices. The contraction of 1923–24 was moderately brief and mild, but the Babson index suggests that it saw a decline in industrial production similar to those that occurred in 1895–97 and 1913–14 (cf. lines 6, 11, and 14 in table 7.4). The nature of the extremely mild 1926–27 phase is much more questionable, however. As already noted, some investigators excluded this movement from their cyclical chronologies (see n. 31). They may not have consistently followed their own criteria in doing so, but from the present point of view more doubt is justified. Even the sensitive industrial production indexes (Federal Reserve Bank, Babson) fell but relatively slightly—about 8% or 9%—in this period, and there is no good evidence that real income and total output declined, although money income probably did, a little, along with prices (R. A. Gordon 1951, p. 208, and references therein; also Friedman and Schwartz, 1963a, pp. 197 (chart 16) and 288).

In sum, this reappraisal suggests 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. In my view, it is necessary to consider both groups of variables: in the recent inflationary era, the cycles are mainly in the real aggregates, but in the past, when the price level fluctuated and long periods of deflation occurred, they were often more pronounced in the nominal aggregates.

Nevertheless, there are a few doubtful episodes. All of these go back to the 19th century, unless the recession of 1926–27 is questioned, which is a difficult, marginal case. The 1845–46 phase is most dubious, but 1869–70 is also of uncertain nature as are 1887–88 and 1899–1900. It seems impossible to refute the hypothesis that these were periods of below-average growth rather

37. The Nutter index of industrial production, based in large part on Frickey's data, shows a very similar decline in the same year (see ref. in table 7.1). See Friedman and Schwartz 1963a, pp. 173–74.

than actual declines. The same may apply to a few other minor contractions mentioned before, but it seems prudent not to press the matter. Although some factors point to retardations, others (such as the length of some of the phases or the behavior of prices and monetary and current-dollar series) point to the possibility of mild declines.

Suppose the four periods just listed are treated as growth cycle slowdowns, not business cycle contractions. This would make some business cycle expansions longer and larger. The effects on the averages are illustrated in table 7.5, which compares the figures from table 7.2, lines 1 and 2, with their counterparts, for fewer cycles obtained by including the slowdowns in expansions. Clearly, the differences between expansions and contractions are much increased. But the contrast with the business cycles of 1919–80 (based on the NBER chronology as in table 7.2, lines 3 and 4), though attenuated, is still in evidence.

7.7 Summing Up

This concluding section sums up a few points.

1. Severe depressions reduce economic growth strongly for some time; vigorous expansions, which often follow, have similar transitory effects in the opposite direction. Most of the cyclical movements, however, are short and mild. The last hundred years can be about evenly divided between a set of four periods of relatively high stability and a set of four periods of relatively low stability, each period being a sequence of two, three, or four complete peak-to-peak business cycles. In one set, the standard deviation of the annual growth rates in real GNP is 4.4%; in the other it is 7.4%. The corresponding average annual growth rates are 4.0% and 2.6%. These remarkably symmetric results suggest that growth was generally higher when stability was greater. Presumably, instability of aggregate demand and of the general price level impedes growth. However, long-term growth and cyclical variability depend partly on common and partly on different factors, and there seems to be no good general reason to expect any simple and stable relationship between them.

Table 7.5 Alternative Estimates of Duration of U.S. Business Cycles, 1834–1980

		Mean Duration (Standard Deviation), Months	
Period	No. of Cycles	Expansions	Contractions
1834–1855	5	26 (20)	24 (15)
1834–1855	4	36 (22)	27 (15)
1854–1919	16	27 (10)	22 (14)
1854–1919	13	37 (19)	23 (16)
1919–1980	13	43 (26)	14 (9)

2. Business cycles have changed in several important ways under the impact of the developments initiated during and after the cataclysms of the depression and war of 1929–45. Recessions are perceived as having decreased in frequency, duration, and amplitude; the apparent reasons for this lie in structural, institutional, and policy changes that have been much studied. But the process also introduced new destabilizing and growth-inhibiting elements. The recent changes in cyclical behavior are not necessarily irreversible alterations or trends that can be extrapolated.

3. The mildness of economic fluctuations after World War II led to a revival of the interest in growth cycles, that is, cyclical movements in trend-adjusted indicators. A great deal of valuable information for many countries has by now been assembled and evaluated on this basis. Growth cycles are relatively symmetrical in duration, in contrast to the recent business cycles, which consist of long expansions and short contractions. Measures of several important aspects of growth cycles show greater uniformity than their counterparts for business cycles. A comparison of the timing of recent growth cycles in the market-oriented economies linked by trade and financial transactions suggests a strong element of international diffusion of these movements.

4. The expansions and contractions of the early business cycles in the NBER chronology tend to be of nearly equal length, much like the phases of growth cycles and very unlike those of the more recent business cycles. But the early part of the chronology had to be constructed from very limited materials in the absence of the comprehensive monthly and quarterly indicators of economic activity that became available only in the past 40 years or so. Some of the early fluctuations could be in the nature of growth cycles rather than business cycles. Their identification relied to a considerable extent on business annals and trend-adjusted indexes of business conditions, which may be suspected of inducing some bias in this direction. A reexamination of the list of U.S. business cycles from 1834 through 1929 discloses some episodes regarding which there are good reasons to doubt that they involved general contractions in economic activity and not just phases of below-average growth. These instances are few, but they would be sufficient to cause a significant underestimation of expansions relative to contractions in the early (19th century) cycles. The doubts cannot be fully resolved with the limited information that is available.