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8 The Regularity of Business Cycles

8.1 Introduction

Do business cycles have predictable periodicities? Do their phases die of old age? Or are the observed fluctuations merely random walks without past regularities of predictive value? These questions are central to modern macroeconomic dynamics and they have prompted a considerable amount of theoretical and empirical analysis. Yet the answers differ, with no apparent convergence to an agreement. There is much support for the notion that business fluctuations are just random deviations from growth trends, but also for theories that stress the essential regularity of features and even the uniformity of causes of expansions and contractions in macroeconomic activity.

This analytical situation is clearly both unsatisfactory and not uncommon. It could be due to any or all of the following: the controversial nature of the underlying issues and strong prior beliefs of the inquirers; neglect or selective use of the evidence; loose concepts and diversity of the business cycles of experience.

In this chapter, an attempt is made to comprehend the problems behind this apparent impasse by reviewing the literature and historical evidence. This approach lacks the terse elegance, but also the frequently spurious precision, of a single quantitative model or formula: the informed judgment it yields may well be more dependable.

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Past studies, at the National Bureau of Economic Research (NBER) and elsewhere, have shown a persistence of sequential relationships and interactions among time series representing a wide range of economic, financial, or other variables. The common features of business cycles observed in the principal market-oriented economies consist mainly of the structure of lags and correlations connecting these "cyclical indicator" series. On the whole, this line of work suggests the existence of a recursive system that plays a central role in the generation and propagation of business cycles. It stresses the endogenous and deterministic, rather than the exogenous and random, elements of the process but stops short of expecting the longer-than-seasonal business fluctuations to have similar durations and amplitudes over time. This report is concerned only with the overall dimensions of business cycles, not with the characteristic interplay of the indicators, but the measures it presents are generally consistent with the view of the cycle just outlined.

The next section examines the implications of the NBER chronologies and other findings for the question, How regular in duration have business cycles been? There are brief discussions of the hypotheses and evidence concerning the incidence and coexistence of cycles with different periods—short, intermediate, and long. Some new pieces of evidence are introduced and assessments made. The analysis is extended to fluctuations in detrended series ("growth cycles") for the United States and other major countries since 1948.

The third section considers different theories for what they imply about the regularity of business cycles. The relevant concepts vary over a wide range: linear models with damping and white-noise shocks, models of the "political business cycle," and nonlinear models with limit cycles or irregularly oscillating growth. The problem of asymmetry in cyclical behavior deserves and receives particular attention, and some data and tests bearing on it are provided. I then approach the questions raised in the opening paragraph above in a different way, by considering the role of calendar versus historical time, and the predictability and costs of business cycles. The last section sums up the results.

8.2 Durations and Periodicities

8.2.1 Business Cycle Chronologies

The earliest dates of business cycle peaks (P) and troughs (T), compiled in annual terms from limited but well-explored information, suggest that between 1790 and 1860 both Great Britain and the United States experienced business cycles of the same overall frequency (14) and average duration (about 4.5 years). Table 8.1, however, also indicates that the individual phases and cycles varied greatly in length for both countries but particularly for the United States. Relative to the corresponding mean durations, the standard deviations tabulated for Britain have a range of 30%–63% and an average of

Table 8.1 Duration of Business Cycles in Great Britain and the United States, Annual, 1790–1858

		Expansion (T to P)		Contraction (P to T)		Cycle (T to T)		Cycle (P to P)	
Period	No. of Cycles	Mean (1)	S.D. (2)	Mean (3)	S.D. (4)	Mean (5)	S.D. (6)	Mean (7)	S.D. (8)
				Great Britain					
1792–1826	7	3.6	1.5	1.1	0.4	4.7	1.5	4.7	1.4
1826–1858	7	3.0	1.5	1.6	1.0	4.6	1.6	4.6	2.3
1792–1858	14	3.3	1.5	1.3	0.7	4.6	1.5	4.6	1.8
				United States					
1790–1826	7	2.8	1.6	2.4	1.9	5.1	3.0	4.6	1.5
1826–1855	7	2.4	1.5	1.7	1.1	4.1	1.7	4.2	1.7
1790–1855	14	2.6	1.5	2.0	1.5	4.6	2.4	4.4	1.6

Sources: Great Britain: Burns and Mitchell 1946, table 16, p. 79; United States: 1790–1833, Thorp 1926, pp. 113–26; 1834–55, Burns and Mitchell 1946, table 16, p. 78. See also Moore and Zarnowitz 1986, table A.2 and pp. 743–46.

Note: All entries are durations in years. P stands for peaks and T for troughs according to the annual chronologies. S.D. = standard deviation.

42%; for the United States the range is 33%–79% and the average is 54%. In Britain all but two of the expansions lasted 2–5 years and all but two of the contractions lasted 1 or 2 years. In the United States four expansions were shorter than 2 years and one was longer than 5 years; four contractions exceeded 2 years.

For periods between 1854 and 1938, monthly and quarterly as well as annual lists of reference dates are available for the two countries from the NBER study by Burns and Mitchell (1946); the chronologies for France and West Germany are somewhat shorter. The summary measures in table 8.2 indicate a substantial dispersion of the durations of business cycles and their phases as dated by the NBER. The S.D./mean ratios (coefficients of variation) average 40%–60% for expansions, close to 70% for contractions, and over 40% for full cycles, based on the longest periods listed (lines 4, 11, 14, and 17). The ranges of duration in months for the cycles before 1939 are as follows:

	United States	Great Britain	France	West Germany
Expansions	10–50	8–64	8–62	16–61
Contractions	7–65	6–81	8–68	12–61
Full cycles (T to T)	28–99	26–135	24–95	28–102

Thus conventional measures show large differences over time between the observed fluctuations in general economic activity, in terms of both overall length and division by upward and downward movements, for each of the four

Table 8.2 Duration of Business Cycles in Four Countries, Monthly, 1854–1982 and Subperiods

Period	No. of Cycles	Expansion (T to P) Mean (1)	Expansion (T to P) S.D. (2)	Contraction (P to T) Mean (3)	Contraction (P to T) S.D. (4)	Cycle (T to T) Mean (5)	Cycle (T to T) S.D. (6)	Cycle (P to P) Mean (7)	Cycle (P to P) S.D. (8)
United States—All Cycles									
1. 1854–1919	16	27	10	22	14	48	19	49	18
2. 1919–1945	6	35	26	18	14	53	22	53	32
3. 1945–1982	8	45	28	11	4	56	27	55	30
4. 1854–1982	30	33	20	18	12	51	22	51	24
United States—Peacetime Cycles[a]									
5. 1854–1919	14	24	7	22	14	46	19	47	19
6. 1919–1945	5	26	15	20	13	46	16	45	28
7. 1945–1982	6	34	15	11	4	46	13	44	19
8. 1854–1982	25	27	12	19	13	46	16	46	20
Great Britain									
9. 1854–1919	11	42	13	30	22	70	29	73	30
10. 1919–1938	5	26	24	20	10	47	21	45	33
11. 1854–1938	16	37	18	26	19	63	29	64	33
France									
12. 1865–1919	11	32	16	26	18	58	25	61	28
13. 1919–1938	6	24	11	15	8	39	14	38	10
14. 1865–1938	17	29	15	22	16	51	23	52	25
West Germany									
15. 1879–1919	7	40	15	29	20	69	24	69	30
16. 1919–1932	3	29	12	23	15	40	18	53	22
17. 1879–1932	10	37	14	27	18	63	25	64	28

Sources: Burns and Mitchell, 1946, table 16 and chap. 4; Moore and Zarnowitz 1986, table A.3 and pp. 745–54.

Note: All entries are durations in months. For abbreviations see note to table 8.1.

[a]Exclude the wartime expansions (Civil War, World Wars I and II, Korean War, and Vietnam War), the immediate postwar contractions, and the full cycles that include wartime expansions and postwar contractions.

countries covered. But these statistics include outliers—some very long and very short expansions and contractions—which are relatively few and far between. It is important to allow for stochastic and exogenous elements in business cycle dynamics.

Here one might note first the tendency of wartime expansions to be protracted and of immediate postwar contractions to be brief. This is most apparent for the United States, mainly because peacetime expansions were on the whole longer in the other countries. When wartime cycles are excluded, substantially lower variability measures result, as shown in table 8.2 for the

United States (cf. lines 1–4 and 5–8). The coefficients of variation are reduced from 61% to 44% for expansions and from 43% to 35% for trough-to-trough cycles, 1854–1982.

The requirements for periodicity can be relaxed by treating the extreme-duration *classes* as "outliers." Ten of the 14 U.S. peacetime cycles of 1854–1919 had expansions in the range of 1.5–2.5 years, and 10 had contractions in the range of 1–2 years. All but 2 of these cycles (86%) lasted 2.5–4.5 years from trough to trough. This way of looking at the duration figures brings out better their central tendency, that is, the predominance in this era of American economic history of relatively short business cycle phases as defined by the NBER.

Note that even this truncation still leaves room for much variability (the 1-year ranges amount to a doubling of the lengths of the phases). Nevertheless, some contributors to the field are content to bestow the attribute of "periodicity" upon fluctuations so distributed.[1] This may be semantically legitimate, but the common practice seems to define periodicity more strictly. At any rate, judging from the NBER historical chronologies alone, business cycles are indeed best described as "recurrent but not periodic." This characterization is part of the much-quoted working definition of Mitchell 1927 and Burns and Mitchell 1946, which has survived well several decades of active research applications and testing.

In Europe business cycles were on the average longer and hence fewer than in the United States. Thus in the common period 1879–1938 trough-to-trough cycles numbered 17, 13, 14, and 10 in the United States, Great Britain, France, and Germany, respectively. The mean duration of the American cycles in that period was 4 years; the corresponding figures for the other economies are approximately 4.5–5.5 years. To account for most of the early cycles in the foreign countries, it is necessary to work with ranges of several years. Of the 11 British cycles of 1854–1919, for example, 7 lasted 4.5–8 years; 9 expansions were 2.5–4.5 years long, and 7 contractions were 2–3.5 years long. The results for France and West Germany are not very different.[2]

The average duration of phases during the interwar period (1919–38) is similar to that for the earlier decades in the case of the United States (table 8.2, lines 5 and 6). The phases are shorter than their pre-1919 counterparts elsewhere, except for the long contractions in Britain, where the economy was

1. A very clear example is Britton 1986; see pp. 1–4 for his general discussion of this issue with references to the literature. For an alternative treatment, see ch. 2 above.

2. Friedman and Schwartz raise the possibility that the greater number of turning points in the NBER reference chronology for the United States as compared with the United Kingdom may be due to the relatively greater abundance of statistics for the United States (1982, pp. 308–9). They note that the extra U.S. turns are concentrated primarily in the pre-1914 period, for which the U.K. chronology was based on scanty data; but also that the role of the British economy in the world was changed drastically by World War I, which may have also altered the pattern of the U.K. cyclical behavior. Their own chronologies differ little from those of the NBER: they omit two of NBER's U.K. dates (the 1901 trough and the 1903 peak) and add two U.S. dates (the 1966 peak and the 1967 trough) (1982, p. 74).

generally depressed much of that time (lines 9–10, 12–13, and 15–16). The dispersion measures are relatively high, reflecting the particularly diverse experiences of this turbulent era.

8.2.2 Multiple-Period and Long-Wave Hypotheses

The Burns-Mitchell definition imposes on business cycles certain minimum requirements of amplitude and scope as well as length, but only in very general and flexible terms. It thus allows for a great diversity of behavior, yet it treats the cycle as a single category. But some scholars prefer to use different concepts, which lead to hypotheses of several interacting cycles, each with its own characteristic frequency. It is then the combination of concurrent cycles with different intensities and durations that produces the seeming lack of periodicity. Different factors are responsible for major and minor cycles and perhaps still shorter subcycles. The existence of one or two types of a much longer wave comprising a number of the NBER-dated business cycles has also been asserted and investigated. It is clear that these approaches require more complex analyses and larger data bases than the common-cycle hypothesis.

Here it is important to recognize that business cycles involve numerous activities and are not adequately represented by specific cycles in any single variable; also, that no comprehensive time series exist to cover their long and varied history. For these reasons, it is more difficult to assess the relative amplitudes than the relative durations of business cycles, and indeed we know less about the former than the latter. But tests of models with multiple periodicities must rely on differences in the size as much as on those in the length of general economic fluctuations.

It is of course likely that durations and amplitudes of cyclical movements are positively correlated. The prevalence of short and mild recessions is consistent with this presumption. But the relationship is not easy to document and probably not strong, though it seems clearer for expansions than contractions (ch. 7, sec. 6; also Moore 1961, pp. 86–93). Certainly, the length of fluctuations is not a very reliable indicator of their size. Some of the U.S. contractions were long and severe (1839–43, 1873–79, 1929–33); some were long but moderate (1882–86, 1902–4); still others were short but severe (1907–8, 1937–38). Similar examples can be found for other countries.

Over nearly 150 years between the American Revolution and the low point of the Great Depression, U.S. wholesale prices followed long upward trends in three periods (1789–1814, 1843–64, and 1896–1920) and long downward trends in three intervening periods (1814–43, 1864–96, and 1920–32). In each of the intervals of secular inflation (deflation) expansions were long (short) relative to contractions. This relationship was also repeatedly observed and confirmed in the British, French, and West German data (Burns and Mitchell 1946, ch. 11; Moore 1983, ch. 15; Zarnowitz and Moore 1986, pp. 525–31). The dates of the uptrend-downtrend sequences in the price levels provide fair approximations to the "long waves" proposed by Kondratieff in

1926 and adopted with various modifications and interpretations by a number of economists over the years.[3] The long price movements are attributable largely to trends in money and credit creation and related influences of gold discoveries and wars. In the short run, prices generally tend to move procylically around their longer trends, which presumably reflects a dominant role of fluctuations in aggregate demand.

A downswing phase of a long wave is supposed to be associated with average growth rates of technological innovation, capital formation, and industrial production that are lower than those in the preceding and following upswing phases. According to van Duijn 1983 (pt. 3), the results based on composite indexes aggregated across the main capitalist economies are broadly consistent with these hypotheses, whereas the tests for the individual countries tend to be negative, which is attributed to "national peculiarities" (p. 154). But there are so few of the long-wave phases that such results can hardly be conclusive. The evidence for the "1st Kondratieff" (before 1842–51) is shown to be defective. In the post–World War II period, the "4th Kondratieff" prosperity phase is dated 1948–66, followed by a "recession" in 1966–73 and a "depression" in 1973–. But this chronology is, to say the least, doubtful. The 1970s and 1980s have been much less depressed than the previous periods so classified, 1872–83 and 1929–37. Growth rates have declined but are positive most of the time in most places, and there is no general deflation and financial crisis.

More generally, the problem of identifying the long-wave turns with the available data is a truly formidable one (for early times, because of the paucity and defects of the information; for recent times, because of inevitable truncations and revisions). The smoothing out of the effects of other, much more pronounced movements (both the shorter cycles and the longest trend) presents no lesser difficulty. Several old and new tests of the long-wave and composite-cycle hypotheses produced largely negative results (Burns and Mitchell 1946, ch. 11; Adelman 1965; Howrey 1968). But here again the scarcity of relevant observations is a major problem, particularly for the tests based on spectral analysis. This recently favored method is well suited for the task of discovering hidden periodicities but only in relatively long, stationary, and homoscedastic time series, that is, under conditions that clearly do not obtain in the past context.

There is much disagreement about the very existence of some of the long waves even among the supporters of the concept, and more disagreement yet about the timing of the waves and their phases. This is in sharp contrast to business cycles, where chronologies from different sources are not very different and the NBER reference dates are widely accepted and used. There is

3. These include Schumpeter (1939); Dupriez (1947, 1978); Rostow (1978, 1980); Mandel (1980); and van Duijn (1983), who provides a useful critical survey of literature and evidence.

probably no better proof that the uncertainties surrounding the long waves are indeed unusually large.

Industrial production and early estimates of total output, when smoothed to reduce the influence of shorter business cycles, show 15- to 20-year fluctuations in the growth rates for the United States between 1840 and 1914. These movements, clearly associated with waves in the level of construction activity, are known as Kuznets cycles. Their explanation relies heavily on the role of population growth and notably the tides of immigration from Europe as sources of both additional labor supply and demand for new housing and other capital goods. The demographic forces are treated as interacting with economic developments, not as exogenous variables. Other important factors in these analyses include growth retardations in Europe, territorial and railway expansions in America, changes in the current balance and international capital flows, and constraints on the money supply under the prevailing specie standard.

Much has been learned from the literature dealing with these developments (e.g., Kuznets 1930; Burns 1934; Long 1940; Abramovitz 1964; Easterlin 1968). But some of the central elements in the Kuznets cycles as sketched above are now recognized as belonging to history. This type of fluctuation, therefore, is no longer evident in recent times, even though it is probably not entirely unrelated to long-term deviations from trends in the interwar and post–World War II periods (Abramovitz 1968; Rostow 1975).

8.2.3 Major and Minor Cycles

Unlike the deeply hidden long wave and the building cycle that apparently ceased to operate some time ago, major and minor cycles certainly exist as two very different categories, at least at the descriptive level. One can hardly object to this distinction as exemplified by the sequences of 1929–33–37 (the deepest contraction and a large but still incomplete recovery, both very long) and 1957–58–60 (a moderate and short interruption of growth). What is not so clear is how to define the major and minor cycles more precisely: whether they constitute a true, systematic dichotomy, and whether at least some major cycles consist of two or more minor ones.

Juglar (1862) was the first to observe that fluctuations in prices, interest rates, and other financial variables often lasted about 7–11 years. Kitchin (1923) stressed the primacy of 3- to 4-year cycles; the major cycles were to him "merely aggregates" of two or three minor ones (p. 10). In time it came to be widely believed that business investment in machinery and equipment plays a central part in the major, or Juglar, cycles, and inventory investment in the minor, or Kitchin, cycles. The former involve longer decision and implementation lags than the latter. Fixed capital lasts for years and cannot be adjusted to desired levels nearly as quickly as inventories that are normally disposed of in days, weeks, or at most months.

The NBER chronologies cannot be dichotomized into the Kitchin and the Juglar durations. Of the 14 cycles in Great Britain from 1792 to 1858, 6 lasted 3–4 years, 6 lasted 5–6 years, and 2 lasted 7 years each from trough to trough. The corresponding U.S. cycles include 3 of 2 years each, 4 of 3–4 years, 4 of 5–6 years, and 3 of 7–9 years. The monthly data used for 1854–1938 permit more detail. Let the classes of 30–54 months and 78 months or more serve as the Kitchin and Juglar durations, respectively: they would account for 31% and 25% of the observations for Britain, and 71% and 10% for the United States. The rest would fall in between, except for a few very short fluctuations. These measures, then, are definitely affirmative only on the historical prevalence of short cycles in the U.S. chronology.

Schumpeter (1935) held that "every Juglar so far observed . . . is readily . . . divisible into three cycles of a period of roughly forty months" (p. 8).[4] Nor surprisingly, no arrangement of the NBER consecutive business cycles into groups of three corresponds to the Juglar dates attributable to Schumpeter. Instead, his nine Juglar cycles marked off by troughs between 1848 and 1932 can be approximated by four groups of two cycles each, four of three cycles each, and one single cycle (Burns and Mitchell 1946, pp. 440–42).

But there is no good reason to insist on any particular fixed scheme of so many Kitchins per Juglar, and a more relaxed approach may be more instructive. When major cycles are marked off by troughs of severe depressions according to the U.S. monthly reference dates (in 1879, 1894, 1908, 1921, and 1933), their successive periods are roughly 15, 14, 13, and 12 years. The corresponding dates for Great Britain are not far off and they yield similar durations, namely, 16, 14, 13, and 11 years. These periods include 4, 4, 4, and 3 successive business cycles in the United States, and 2, 3, 3, and 3 business cycles in Great Britain. Burns and Mitchell admit that this result "suggests a fair degree of uniformity" and, upon further analysis, find some evidence of "a partial cumulation of successive cycles." Nonetheless, they conclude that "the [observed] relations are not sufficiently regular . . . to justify us in regarding the business cycles separated by severe depressions as subdivisions of long cycles" (1946, p. 460).

This is a tentative judgment conditioned by the deficient, available data, not a decisive rejection of all notions of periodicity. But whatever configurations of minor and major cycles may have prevailed in the half century here considered, they did not continue in the following era. The short but severe slump of 1937–38 occurred only 5 years after the end of the Great Contraction of 1929–33. After World War II, U.S. business expansions grew much longer and their durations more dispersed, in comparison with the pre-1945 and especially the pre-1919 cycles. This was due in large part, but by no means only, to the

4. Schumpeter also calculated that "the two complete Kondratieff units . . . contain each of them six cycles of from nine to ten years' duration." He attributed periodicities of 54–60 years, 9–10 years, and 40 months or "somewhat less" to the Kondratieff, Juglar, and Kitchin cycles, respectively. His full treatment admits some exceptions (1939, 1:161–74).

incidence of wars (cf. lines 1–8, cols. 1–2, in Table 8.2). On the other hand, contractions became much shorter and much less variable (cols. 3–4). Of the eight recessions since 1948, even the longest and largest (1973–75, 1981–82) were far less severe than earlier depressions, such as those of 1920–21 and 1937–38, let alone 1929–33 (see ch. 2, sec. 2.2, above; Moore and Zarnowitz 1986, pp. 767–71).

Thus if major cycles were to be defined as involving deep depressions, they could not be found at all in the economic history of the United States after the 1930s. What can clearly be identified is fluctuations in growth rates of total output that lasted longer than the average business cycle. Specifically, in 1948–55 and 1955–61, real GNP rose at compound annual rates of 4.4% and 2.2%, respectively. This period of 13 years included four recessions. In 1961–73 growth measured in the same terms was 4.0%; in 1973–86 it was 2.3%. This period of 25 years also included four recessions. But no indication of any definite periodicities emerges from this division.

To see this, note that the first of these two extended retardations was less than half the length of the second one, and the end of the latter is as yet undetermined. Note also the uneven incidence of business cycle phases within the two periods: 1948–55 and 1955–61 include two recessions each, 1961–73 only one, and 1973–86 three. Since 1973, growth rates fell well below the previous experience and expectations in all major capitalist economies. This may be due to a variety of sources of changes in labor and capital productivity distinguished in the studies of "growth accounting" (Maddison 1987). Oil price rises have attracted particular attention, but policy errors and disruptions first of high inflation and then disinflation are probably also among the major immediate causes of what happened.

To be sure, there is room for different interpretations of history, the more so the earlier and less reliable are the data. Long-wave proponents such as van Duijn perceive three Juglars in the postwar era, 1948–57, 1957–66, and 1966–73 (1983, ch. 9). But there was no business recession in the United States in 1966, only a short and mild slowdown; also, this breakdown does not produce any large differences between growth rates in output for the aggregate of the major countries (1983, p. 154).

Matthews (1959, pp. 208–10), using troughs in all contractions of manufacturing production except the shortest ones, counts seven major cycles for the United States between 1876 and 1938, with durations averaging 9 years (standard deviation, 3; range, 4–13). But he observes that "the periodicity is not really very good" and that "the circumstances surrounding the middling depressions were so diverse that it is difficult to regard them as the manifestation of a regular cyclical tendency" (1959, p. 211). Hence, he sees "distinct forces making for periodicity" at work only in the cycles of 3–4 and about 20 years, which were dominated by movements in inventory investment and house-building, respectively (1959, p. 214–15). For Great Britain, Matthews notes the early dominance of major cycles (of which four occurred in the relatively peaceful period 1825–65) ranging from 8 to 12 years and averaging 10 years (in addition to more numerous shorter and milder fluctuations). Between 1874 and 1907 four additional peak-to-peak cycles in national income occurred, lasting from 7 to 10 years and averaging 8 years, but these are attributed mainly to an alternation of two much longer, unsynchronized swings in domestic and foreign investment, a situation seen as unlikely to recur (1959, pp. 215–26).

In short, it is fair to say that direct inferences from time-series data in annual or shorter units, without resort to any elaborate smoothing or filtering procedures, lend little support to the concept of well-defined periodicities that apply to economic fluctuations across time and space. It is in the work of those authors who are sympathetic or committed to this concept that the problems encountered by the periodicity hypotheses are most visible.

8.2.4 Fluctuations in Detrended Series

The measures in Table 8.1 and 8.2 are based on the consensus of movements in time series that include long-term trends as well as cyclical fluctuations (only the seasonal variations are routinely removed). Alternative chronologies have been constructed from comovements of cyclical dimensions found in trend-adjusted data. In the upward (downward) phases of these "growth cycles," the economy grows at an average rate higher (lower) than its long-term trend rate. Hence not only absolute declines but also sufficiently large and long slowdowns can and do give rise to such detrended cycles.

Retardations often precede contractions, and then growth cycles have shorter upward phases, earlier peaks, and longer downward phases than the corresponding business cycles; that is, they are more nearly symmetrical. Sometimes a major slowdown occurs but no contraction follows, as in 1951–52, 1962–64, and 1966–67 in the United States (more recently, the period 1984–86 also turned out to fall into the same category). So growth cycles outnumber business cycles. However, it is also possible for a low-growth phase to include a short and incomplete business cycle recovery, though only one case of this sort has been documented so far: 1975–82 witnessed two business cycles but only one growth cycle.

When very strong upward trends prevail, growth cycles may replace business cycles; that is, phases of below-normal but still positive growth occur instead of contractions. In the long sweep of modern history, this appears to have happened on a large scale only in Europe and Japan during the great post–World War II reconstruction of the 1940s and 1950s. The condition may therefore be a temporary and uncommon one, except perhaps for small nations engaged in the process of rapid industrialization and buildup of exports. It is the observed postwar development that led to the contemporary definition of "growth cycles" and their dating for many countries (Mintz 1969; Klein and Moore 1985).

Since trends vary across the different indicator series for each country and generally also over time, their elimination might well reduce both the temporal variability and the spatial differentiation of the observed fluctuations. One would therefore wish to compare growth cycles with business cycles with respect to their regularities.

Table 8.3 suggests, first, considerable similarity between the durations of growth cycles in the principal economies with relatively unrestricted private enterprise and trade. The high-growth phases averaged 30–39 months for eight of the countries covered; 22 and 19 months for the United States and Canada. The low-growth phases averaged 17–22 months, except for United Kingdom and West Germany, with 28 and 30 months, respectively. Total growth cycles, whether marked off by troughs or peaks, lasted on the average a little over 4 years (about 5 years for Switzerland and 3 years for Canada, to take the range). Some of the discrepancies reflect differences in the time coverage. Inspection of the dates of successive growth cycles in the different countries reveals a good deal of correspondence between these chronologies. This confirms the old lesson that most of the larger fluctuations are transmitted or diffused internationally (see Moore and Zarnowitz 1986, sec. 8, for detail).

Second, the variability of growth cycle durations over time is less than that of business cycles but still large. For the United States, 1948–82, standard deviations are 50%, 52%, 45%, and 34% of the mean lengths of high-growth phases, low-growth phases, trough-to-trough growth cycles, and peak-to-peak growth cycles, respectively. The corresponding ratios for business expansions, contractions, and total cycle durations are 61%, 67%, 43%, and 47%. The range is 25–93 months for growth cycles; 28–117 months for business cycles. The results for other countries are similar; for example, the ranges of growth cycles in Japan, the United Kingdom, France, and West Germany are 40–99, 42–94, 41–70, and 41–98 months.

It is important to recognize that growth cycles are more difficult to identify than business cycles and are not as well defined and measured. In recent years, it was often taken for granted that trends and cycles have different causes and effects. They used to be treated as independent, for example, the long trend in real GNP as a deterministic function of time and the cycle as a stationary second-order autoregressive process around that time trend (Kydland and Prescott 1980; Blanchard 1981). This is now being strongly challenged by the view that the trends are themselves stochastic, and total output as well as other important macroeconomic series are stationary only after differencing (Nelson and Plosser 1982).

In an instructive article, Harvey (1985) argues in favor of a structured approach to modeling time series as containing unobserved stochastic trend and cycle components. He finds the properties of annual series on output, unemployment, consumer prices, and stock prices to be very different for periods ending in 1947 (with starting dates from 1860 to 1909) and the period 1948–70. For the earlier years "the cycle is an intrinsic part of the trend rather than

Table 8.3 Duration of Growth Cycles in 10 Countries, 1948–1983

			Duration (months)							
			High Growth (T to P)		Low Growth (P to T)		Cycle (T to T)		Cycle (P to P)	
Country	Period[a] (1)	No. of Cycles[b] (2)	Mean (3)	S.D. (4)	Mean (5)	S.D. (6)	Mean (7)	S.D. (8)	Mean (9)	S.D. (10)
1. United States	1948–82	9	22	11	21	11	44	20	41	14
2. Canada	1950–82	11	19	10	17	6	36	13	38	12
3. Japan	1953–83	6	35	17	18	3	48	13	53	19
4. Australia	1951–83	7	30	12	22	7	52	17	53	11
5. United Kingdom	1951–83	6	31	11	28	11	62	19	56	11
6. West Germany	1951–83	6	30	14	30	10	59	20	58	13
7. France	1957–79	5	33	19	20	6	47	16	52	19
8. Italy	1956–80	5	33	16	22	12	54	29	56	21
9. Netherlands	1950–79	7	30	14	19	5	51	16	49	18
10. Switzerland	1950–75	5	59	22	22	16	61	34	69	15

Source: For the United States, NBER. For other countries, Center for International Business Cycle Research.

Note: Growth cycle turning points mark the approximate dates when aggregate economic activity was farthest above its long-run trend level (P) or farthest below its long-run trend level (T). The selection of dates was based on visual inspection of computer-selected turns in coincident indicators for each country (such as GNP, personal income, employment, industrial production, and retail sales—in real terms, seasonally adjusted, and detrended). S.D. = standard deviation.

[a] From the first year with an identified growth cycle turn (P or T) to the last year with such a turn. The chronologies begin at different dates according to the availability of data. The absence of a recent date does not necessarily mean that a turn has not occurred.

[b] From P to P or from T to T, whichever number is larger.

a separate component that can just be added on afterwards." For 1948–70 "a faint cycle can be detected . . . [but a] stochastic trend model is sufficient," whereas "after 1970 . . . it could be argued that the reintroduction of a cyclical component is desirable" (p. 225). Not surprisingly, the short cycles of the early postwar period appear only faintly when annual units are used. The dispute continues but there is increasing evidence that the permanent components in business cycles are much larger than was previously assumed (Campbell and Mankiw 1987a, 1987b). All this may be interpreted as a revival of certain time-honored ideas: that trends are not very stable over long periods of time but subject to intermittent or sequential changes; that trends and cycles interact in various ways; and that, therefore, the separation of trends and cycles may be associated with serious errors (see ch. 7 for further discussion of this topic and references).

8.2.5 How Regular Are Investment Cycles?

What evidence is there that inventory investment is a source of minor cycles and fixed investment a source of major cycles? Studies of the historical record indicate that the relative importance of changes in business inventories is very large in short and weak fluctuations and much smaller in the long and strong ones, whereas the opposite is typically the case for investment in plant and equipment. Stocks of goods held for current production and sale are generally subject to prompter and less costly adjustments than stocks of structures and equipment on hand. Indeed, inventory investment is visibly more volatile than investment in plant and equipment. It is likely to drop in any recession, mild or severe, but will also at times show declines of some persistence during long business expansions. Fixed-capital investment has fewer "extra" movements of this kind. Yet comprehensive series on real investment of all types have a high degree of cyclical conformity; that is, they tend to move in broad swings whose duration and timing match well the business cycles as dated by NBER. If there are any systematic differences in periodicities here, they appear not to be sharp enough to be demonstrable by simple methods of comparing "specific cycles" in individual time series with "reference cycles" in aggregate economic activity.

The techniques of spectral analysis are well designed to serve the purposes of detecting and examining cyclical patterns or periodicities in large samples of data on stationary processes. They have been successfully used as such in the natural sciences and engineering. In econometric applications their usefulness is often limited by the small size of available samples of consistent data and the prevalence of nonstationary processes.

Most economic aggregates contain strong upward trends. Their short-period changes are highly autocorrelated and small relative to their contemporaneous levels. The power spectra estimated for such series show sharp peaks at the lowest, steep declines at rising, and flat declines at the highest frequencies.[5] Such convex curves relating power inversely to frequency (hence positively to the cycle period) were found to be relatively smooth, except for peaks at seasonal frequencies, and have been labeled "the typical spectral shape" (Granger 1966). In a spectrum so dominated by the long movement of the series, cyclical features turned out to be very diluted and difficult to identify. But this was soon recognized as a technical problem, not a proof of the unimportance of business cycles in general. For series that are trendless or detrended, more interesting spectra can be estimated. Differencing is often recommended and used. Howrey (1972) calculates spectra for real GNP and its major expenditure components in both first-difference and linear-detrended form. He finds using the change series preferable, but the results are generally consistent. His conclusion is that "these estimates indicate, from a descriptive point of view, the reality of three- to five-year business cycles, particularly in the investment series" (p. 617). The relative peaks that emerge lack statistical significance according to conventional tests, but this result is attributed to the shortness of the time series used.[6]

Another large problem in empirical applications of the analysis relates to the degree of smoothing used to produce the spectral density estimates. For very long consistent time series that may contain a large number of cycles, smoothing with weighted moving averages with many constants (a "truncation point" equal to one fourth or one third of the sample size, for example) can be appropriate. For the short series (small samples) usually available in economics, such smoothing may be too heavy. Hillinger (1986) contends that it results in attenuation of spectral peaks at business cycle frequency bands as in the "typical" spectral shapes. He presents unsmoothed spectra for quarterly series for 1960–84, which show pronounced peaks only at business cycle periods (roughly in the ranges of 3.5–8 and 3.5–10 years for West Germany and the United States, respectively). But the unsmoothed spectra, like the closely related periodograms, have unsatisfactory properties of their own and, in particular, lack consistency.[7]

Figures 8.1–8.4 and table 8.4 present the results of an exploratory application of spectral analysis to quarterly seasonally adjusted series on investment in inventories, equipment, nonresidential structures, and housing for the

5. This would be so whether the trends are deterministic or stochastic, and whether the underlying time-series models are of the ARIMA class or AR(1) with coefficients close to 1. For a discussion of the broad range of interpretations of spectra with this shape, see Granger and Newbold 1977, pp. 53–55, 63–65.

6. See Howrey, 1972, p. 624, where references to Adelman 1965 and Howrey 1968 are used to argue that studies of longer series "indicate more strikingly the relative importance of business-cycle variation."

7. That is, the variance of the estimate does not tend to zero as the sample size tends to infinity. Also, the covariance between estimates at different frequencies decreases steadily with the sample size, so that for long series the risk of finding spurious periodicities is high. But these are strong reasons to use high degrees of smoothing for large samples (increasing relative to the sample size); they are not good arguments for applying long moving averages to spectra of very short series that cover few business cycles.

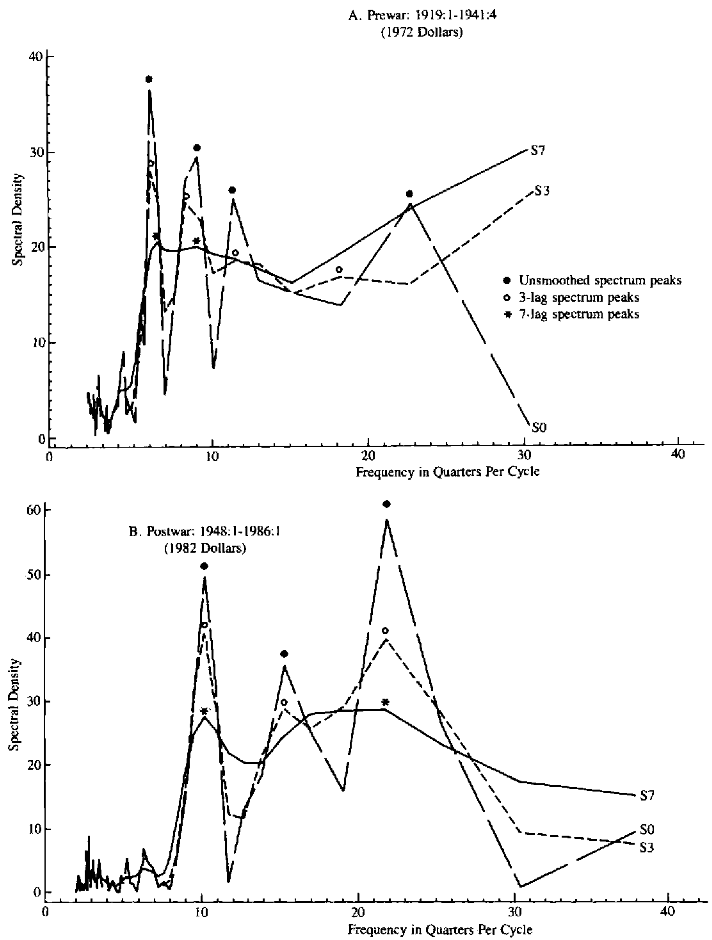

Fig. 8.1 Spectra for change in business inventories

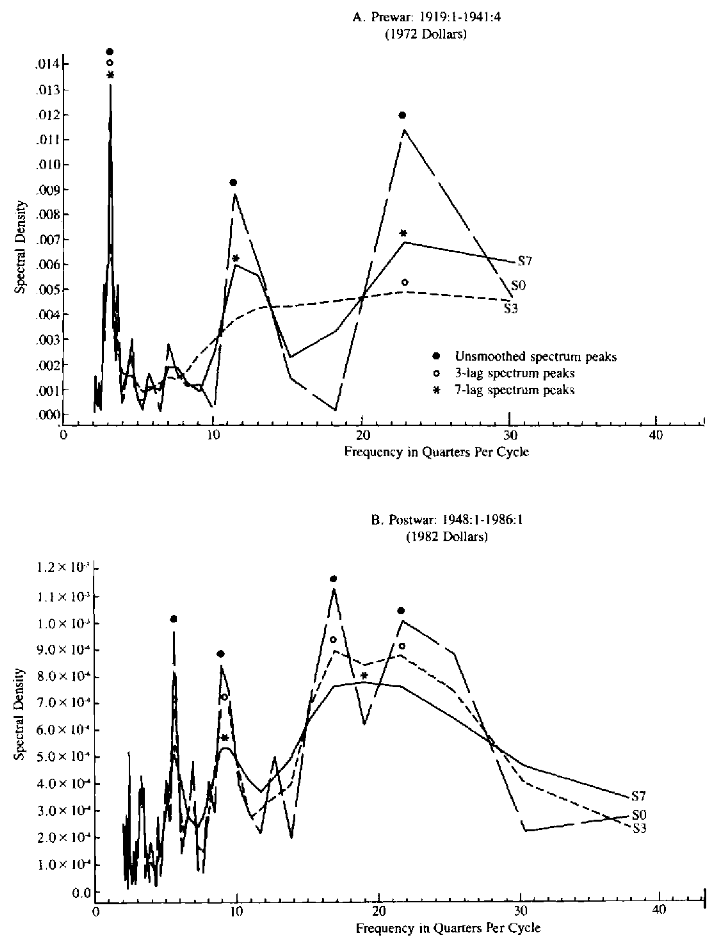

Fig. 8.2 Spectra for producers' durable equipment

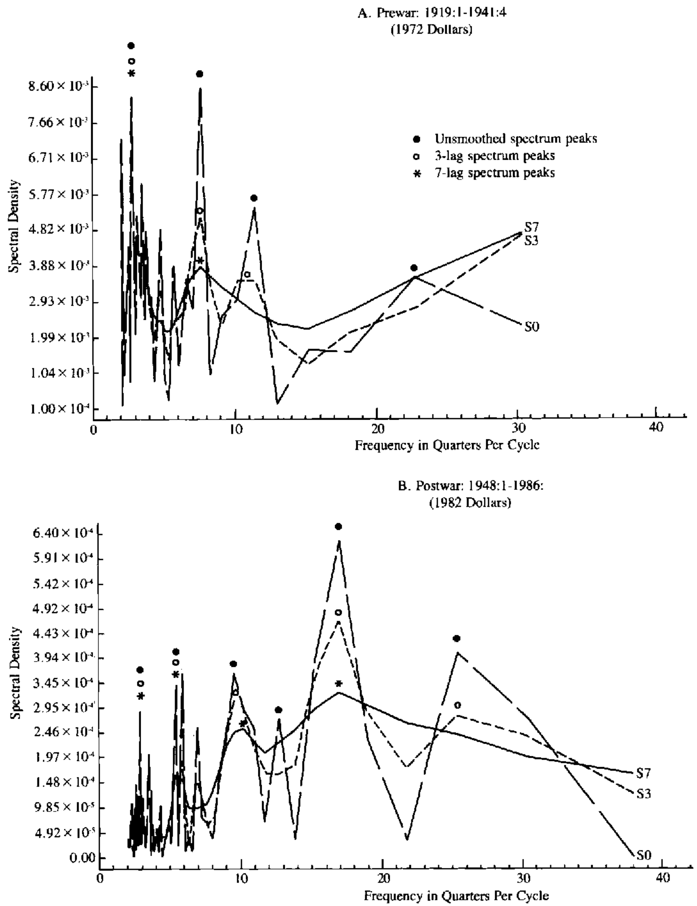

Fig. 8.3 Spectra for nonresidential structures

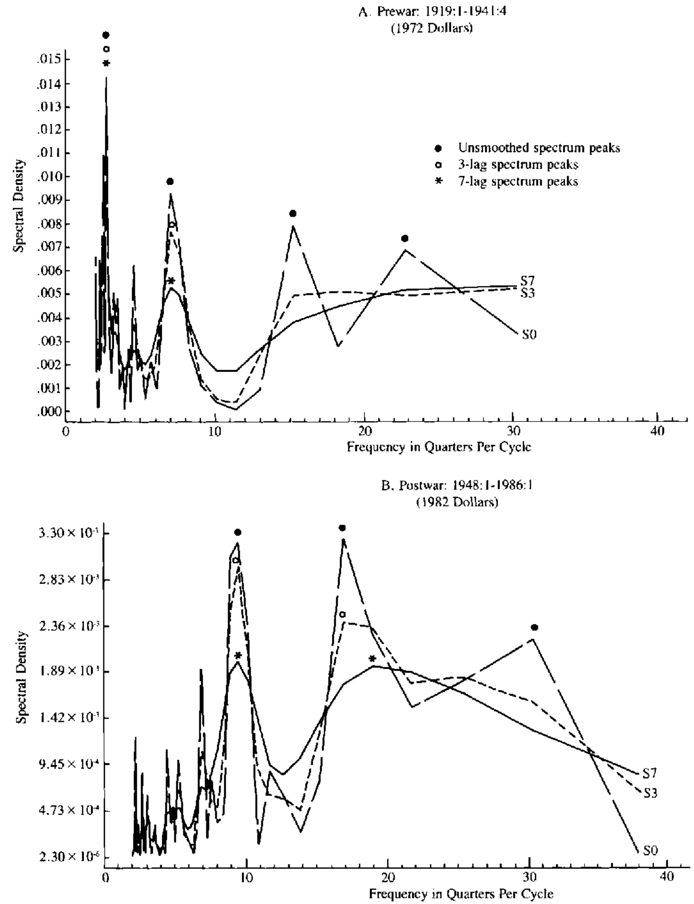

Fig. 8.4 Spectra for residential fixed investment

Table 8.4 Peaks in Unsmoothed and Smoothed Spectra for Quarterly Series of Investment in Equipment, Nonresidential Structures, Inventories, and Housing, 1919–41 and 1948–86

		Spectral Peaks (months)[b]							
		1919:1–1941:4[c]				1948:1–1986:1[d]			
Line	Type of Spectra[a] (degree of smoothness)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Change in Business Inventories[e]								
1	Unsmoothed (S0)	18	27	34	68	(19)	30	46	65
2	Two lags (S3)	18	25	(34)	(55)	(19)	30	46	65
3	Four lags (S7)	19	(27)	. . .	. . .	(19)	30	. . .	(65)
	Producers' Durable Equipment[f]								
4	Unsmoothed (S0)	9	(21)	34	68	17	27	51	65
5	Two lags (S3)	9	(21)	34	68	17	28	(51)	(65)
6	Four lags (S7)	9	(21)	. . .	(68)	17	28	(57)	. . .
	Nonresidential Structures[f]								
7	Unsmoothed (S0)	8	21	46	68	9	28	51	76
8	Two lags (S3)	8	21	(55)	. . .	9	28	51	76
9	Four lags (S7)	8	21	. . .	. . .	(9)	30	51	. . .
	Residential Fixed Investment[f]								
10	Unsmoothed (S0)	8	23	34	68	(9)	28	51	91
11	Two lags (S3)	8	23	(34)	. . .	(9)	28	51	. . .
12	Four lags (S7)	8	23	. . .	. . .	(9)	28	57	. . .

Sources: 1919–41, Gordon and Veitch 1986 (updated version of data in Balke and Gordon 1986). 1948–86, Bureau of Economic Analysis, U.S. Department of Commerce, national income and product accounts.

[a]See figs. 8.1–8.4 for plots of these spectra and their peaks.

[b]Entries in parentheses refer to low or flat peaks.

[c]Estimates based on data in 1972 dollars.

[d]Estimates based on data in 1982 dollars.

[e]Inventory investment component of real GNP, used as reported.

[f]Change in the logarithms of the series (quarterly log differences).

United States, 1919–41 and 1948–86. Unsmoothed and lightly smoothed (3-lag and 7-lag) spectra are examined.[8] The post–World War II data come from the national income and product accounts compiled by the U.S. Department of Commerce, and the prewar data are new estimates by Gordon and Veitch (1986), all in constant dollars. The series on change in business inventories required no transformation; the other series, which show approximately log-linear trends, are cast in the form of relative rates of change (specifically, log differences).

The inventory series for 1948–86 show well-articulated peaks at periods of

8. The spectral windows were obtained with simple triangular weighting: 1 2 1 for the 3-lag and 1 2 3 4 3 2 1 for the 7-lag smoothed spectra. The SAS/ETS SPECTRA procedure was used in the calculations (see *SAS/ETS User's Guide*. 5th ed. [Cary, N.C.: SAS Institute, 1984], ch. 18).

30, 46, and 65 months in both the unsmoothed (S0) and 3-lag (S3) spectra. In the 7-lag (S7) spectrum, there is also a peak at 2.5 years and a gently rising plateau between 4 and 5.5 years. The prewar S0 has peaks at 18, 27, 34, and 68 months; S3 matches the first three of these well and the next one poorly; S7 is relatively high between 1.5–2 years only (cf. figs. 8.1A and 8.1B and table 8.4, lines 1–3). The strong procyclical movements of inventory investment in both the prewar and the postwar years is well documented (for a recent study of the 1929–83 period, see Blinder and Holtz-Eakin 1986). Measurement errors in the inventory investment data for the pre-1929 period may be responsible for the relative weakness of business cycle indications in the smoothed spectra for 1919–41.[9]

The 1948–86 spectra for producers' durable equipment show relative peaks at frequencies very similar to those located in the corresponding spectra for inventory investment, and these peaks show up in the smoothed curves as well, although much flattened. The 30- and 50-month peaks also appear, and more strongly, in the postwar spectra for both nonresidential and residential structures, but here there are some signs of much shorter and much longer cycles as well (cf. figs. 8.2–8.4 and table 8.4).

In the 1919–41 period, the 68-month cycle peaks appear in the S0 spectra for all three categories of fixed investment as well as for the change in business inventories but disappear or show up but weakly in the smoothed curves. The same is true of the 34-month peaks, except for nonresidential structures, where this cycle seems to be at least 1 year longer. The fixed-investment spectra also suggest some very short (9-month) and short (about 2-year) cycles.

In view of the unresolved problems and doubts noted earlier in this section, it seems best to treat these results simply as provisional without trying to test them in any formal way. Yet they are suggestive. The spectral peaks in table 8.4, col. 7, correspond to periods of 46, 51, and 57 months, all very close to the average durations of business cycles before and after World War II (53–56 months, see table 8.2, lines 2 and 3). The longest cycles, represented by relative peaks near 5.5–6.5 years (table 8.4, cols. 4 and 8), also fit in well with the observed durations of major macroeconomic fluctuations since 1919. This is not the case for those spectral peaks of inventory investment that correspond to periods of 1.5–2.5 years, which are shorter even than the average growth cycles of about 3.5 years (cf. table 8.4, lines 1–3, and table 8.3, line 1). But these results are at least in rough accord with the general notion that inventory investment generates short fluctuations, and indeed graphs of other

9. See Gordon and Veitch 1986, app. pp. 328–35, for a description of the data. Since their estimates of inventory investment were derived as residuals, they may have larger errors than the other series, especially for the early years covered. The Chow-Lin 1971 interpolation method was used to convert the annual series to quarterly observations. For producers' durable equipment, industrial production of producers' goods served as the basis for the interpolation; for plant and housing, industrial and residential building contracts and construction indexes were similarly employed.

spectrum estimates show similar local maxima (Howrey 1972; Hillinger 1986).

The observation that seems most difficult to explain is the apparent prominence of very short fluctuations in all divisions of fixed investment. More generally, the limitations of analyses and evidence of this type need to be stressed. Too many periodicities emerge in unsmoothed spectra; too few survive even relatively light smoothing. Aggregation across these and other components would be expected to produce much weaker and probably less periodic fluctuations in total output and employment.

8.3 Models and Problems

8.3.1 Limit Cycles and Random and Exogenous Shocks

Certain theories can produce strictly periodic fluctuations: a classic example is the nonlinear model of a limit cycle bounded between exogenously given "floor" and "ceiling" growth trajectories.[10] In the deterministic case, if the parameters of this model were to remain constant, the cycles would repeat themselves perfectly. This, of course, is not the observed or expected outcome, so random shocks must be added to nonlinear models too, but they play a relatively small role in systems with limit cycles. Major departures from periodicity may require changes over time in the basic parameters of models in this class. Such changes are indeed likely in a world with structural change and occasional large disturbances (e.g., wars). They are contemplated in discussions of some of these models but are not incorporated in the models or otherwise explained.

Random disturbances do have an essential part in the dynamically stable (i.e., damped) linear models, which, unless repeatedly shocked, cannot produce a continuing cycle. The output of such damped systems is represented

10. In Hicks 1950 the floor and ceiling lines have identical slopes equal to the long trend growth rate. The floor is set by the minimum rate of gross investment, which includes an autonomous part and maintenance of the current stock of capital; the ceiling is set by the limits on the resources available at full employment. Net investment is in large part induced by lagged changes in output. with a high value for the accelerator coefficient. Interacting with the lagged consumption-income (multiplier) relation. this accelerator would. in the unconstrained case. cause output to grow exponentially. But once set in motion by some initial impulse. an expansion will be slowed upon reaching the ceiling. and in the resulting downswing the accelerator is suspended until positive growth is again resumed when output falls to the floor and starts moving up along it.

It is important to note that the model could be relaxed in several ways to allow for differentiation of the endogenous and self-perpetuating cycles that it produces. (1) The accelerator could be such as to correspond to a cyclically explosive. rather than a monotonically explosive. solution. (2) Investment that is "autonomous"—that is. caused by factors other than the change in output—may fluctuate. say for technological or financial reasons. (3) Weak cycles may occur in which the ceiling is not reached. (4) Some variations may be admitted in the rate of growth of full-employment output and in the sizes and lag patterns of the accelerator and multiplier. See Hicks 1950. ch. 9.

by a second-order linear difference equation with a white-noise term u, that is, $y = ay_{-1} - by_{-2} + u$, with complex roots and $b < 1$ in absolute value (also, $a^2 < 4b$). When b is very close to unity, there is little damping and the periodicity is relatively high and easy to recognize; when b is lower (say, near 0.8), damping is strong and periodicity is weak and no longer visible. (For a demonstration of these relations by means of long-run stochastic computer simulations, see Britton 1986, pp. 7–9.)

It is only the small white-noise shocks densely distributed through time that serve as a possible source of periodicity in the damped linear models. Large specific shocks that are discontinuous and sporadic are likely to make business cycles and their phases less, rather than more, regular. Such disturbances can be caused by wars, large strikes and bankruptcies, price bubbles, foreign debt and financial crises, price cartel actions, and major shifts in fiscal and monetary policies. They will be particularly important when autocorrelated, which they probably often are. The conclusion of Blanchard and Watson (1986) that business cycles are affected by both small and large shocks but dominated by neither (and hence not "all alike") is plausible but as yet not well established.

As illustrated in chapter 9, simulations of large econometric models show them to possess weak cyclicality properties, to which relatively little is contributed by random noise. Serially correlated error terms in the model equations and exogenous variables have stronger effects, but generally the macroeconometric models are heavily damped and fail to account for much of the cyclical instability observed in past and recent data (Hickman 1972; Eckstein and Sinai 1986).

8.3.2 Government and the Business Cycle

The political business cycle (PBC) is a simple idea suggestive of periodicity: government policies aimed at winning elections for the party in power manage to manipulate inflation and unemployment so as to generate inverse cycles in the two variables, with turning points associated with the electoral campaigns and voting dates. Where the latter are fixed, as in the case of the 4-year presidential cycle in the United States, the so-induced fluctuations should have a strong tendency to be periodic. This hypothesis led to a considerable amount of interesting work on popularity functions relating electoral results to macroeconomic variables and reaction functions relating instruments to potential targets of economic policies. But the results vary and on the whole fail to be clearly supportive of the PBC models. This is not surprising, because it is doubtful that the contemplated policies can be sufficiently well timed and executed and, also, that the public will continually accept, or be fooled by, such policies if they succeed and tolerate them if they fail.

Business cycles go back a long time during the era of relatively small governments of limited economic functions and influence; but they have changed in various ways since, reflecting the evolution of the modern economy in both its private and public aspects (R. J. Gordon 1986). It is certainly important to study these changes and the role of government transactions, institutions, and policies in contemporary macroeconomic dynamics. But increasingly it is recognized that the most promising way to proceed in this direction is by treating the government as part of the endogenous process generating the economy's movement. Government policymakers as well as private agents react to actual and expected economic developments in pursuit of their objectives, despite the important (though partial) differences in the motivations, nature, and effects of their actions. There is both conflict and cooperation in the resulting process, with elements of complex games among the major partners, notably central banks and treasuries on one side and financial markets, business associations, and labor unions on the other.

Much hard work will have to be done to improve our understanding of these interactions, but some aspects of the story can be captured by extensions of current textbook models of the relations between output and interest rates (IS-LM) and output and prices (AD-AS). Fiscal and monetary policies affect IS and LM, respectively, and hence aggregate demand (AD); they also respond to shifts in IS, LM, AD, and aggregate supply (AS) that are caused by forces outside the government. What is needed is (1) to make the system dynamic by introducing lags and/or nonlinearities and (2) to make the policy variables endogenous by specifying how they react to changes in economic conditions. (However, this does not, in principle, preclude allowing for autonomous and stochastic elements in government actions, which are probably often substantial.)

The simplest approach is to use lags in the determination of prices (P) as well as output (Q), which may be due to slow and uncertain information, costs of rapid adjustments, desired implicit or explicit contract arrangements, or deviations from perfect competition. If then AD shifts up so that Q exceeds its full-employment level (Q^N) at the existing level of prices, there will occur a gradual upward adjustment in P and eventually also in expected prices (P^e). This will cause wages and other costs to rise and hence AS to move up, so that over time Q will fall back to Q^N. If AD shifts down and Q declines below Q^N, lagged downward adjustments of P and P^e will follow, so AS will move down and Q will slowly rise back to Q^N. The driving force here is the variation in demand; supply adjusts at prices and wages that are predetermined and slow to change, which explains the long lags involved.[11]

The fluctuations in AD could be the work solely of real forces in the private economy, as in the accelerator-multiplier interaction models, or solely of changes in money supply dominated by central-bank actions, as in a simple

11. In the presence of a long-term upward trend in P, this model would focus on the relation between Q/Q^N and the actual and expected inflation rates (p and p^e). When $Q/Q^N > 1$, inflation would accelerate (i.e., p and p^e would increase); when $Q/Q^N < 1$, p and p^e tend to decline. Another modification of the model is that some authors dispense with the concept of a short-run upward-sloping AS curve, keep the vertical AS curve at full employment, and work directly with shifts in the horizontal predetermined price levels. (Examples of these different treatments can be found today in most of the popular macroeconomic texts.)

exogenous monetarist model. An early formal model that combines real and monetary factors within a private economy is Hicks 1950 (chs. 11 and 12), where an IS-LM cobweb-type cycle is superimposed upon the nonlinear-accelerator core part of the system. This monetary cobweb results from the joint operation of long distributed lags in consumption and investment and shorter discrete lags in the demand for and supply of "bank money." This is an endogenous theory of a "monetary crisis" leading to a sharp rise in liquidity preference (a "credit crunch" in the more recent parlance).

Early students of business cycles saw no particular reason to give much attention to government activities. Keynesians have long treated the government as exogenous and having a large potential for reducing instability by countercyclical fiscal policies, income transfers and subsidies, or insurance schemes that keep up the volume of autonomous spending. The idea that government actions may be strongly destabilizing is still more recent, being due mainly to the rise of monetarism and its emphasis on the exogeneity and importance of monetary policy.

In the currently prevalent linear stochastic models, fiscal and monetary operations can produce either destabilizing shocks or stabilizing interventions, depending on how well they are timed, quantified, and executed. Some actions are taken to correct previous actions newly discovered to have been in error. So this approach permits a comprehensive treatment of policies and related variables, which can be revealing—if not pushed too hard.

Consider a monetary acceleration intended to revive a sluggish economy that has a cumulative lagged effect of fanning a business expansion into an inflationary boom, whereupon restrictive measures are taken that shift AD back and replace excess demand with excess supply. The concept of a cycle driven by such policy errors was popularized by the persistent monetarist criticism of the Federal Reserve, whose discretionary policies were time and again described as doing "too much too late." But it is hard to see how this argument can be generalized, and there is no sufficient evidence to support an attempt to do so. It would indeed be strange for such failures not to give rise to caution and learning but rather to be recurring with much the same negative results. Government miscalculations may well be common, but they do not offer a good basis for explaining the long existence and wide diffusion of business cycles.[12]

8.3.3 Nonlinearities

In linear models, time lags that cause overshooting in adjustments to equilibrium are essential to produce fluctuations in response to shocks. Nonlinear

12. In her (unpublished) comments on this chapter, Anna Schwartz has suggested that actions of monetary authorities may be endogenous in relation to minor cycles but not major cycles. Hence the absence of deep depressions in the post–World War II period could reflect caution and learning by the authorities. I agree that this may indeed be a partial reason for the postwar moderation of the business cycle (see ch. 2).

models can explain endogenously the existence and amplitude of a limit cycle without any shocks and explicit lags. (This is shown by a long line of work, from Kaldor 1940 and Goodwin 1951 on nonlinear investment-saving processes and cyclical profit shares to Schinasi 1982 on the integration of such functions and an IS-LM model with a government budget constraint.) But limit-cycle models need shocks to diversify the cycles and lags to determine their periods. And after all, it stands to reason that a successful explanation of how the "real world" economies move will have to include all these elements—random or exogenous disturbances and delayed reactions as well as nonlinearities.

Technical and scientific advances are facilitating work with reasonably comprehensive yet comprehensible models. Empirically, much is known about the role of leads and lags in business cycles. The part played by shocks is not so well understood and is more controversial despite (or perhaps because of) the current predominance of linear models that rely heavily on outside impulses of all sorts. The neglect of nonlinearities may well have led to an overstatement of the importance of random factors and perhaps also of policy changes treated as exogenous.

Nonlinear models now cover a wide range of business cycle theories: much of the work has Keynesian and some has Marxian flavor, but classical and neoclassical ideas are also represented (see the essays in Goodwin, Krüger, and Vercelli 1984 and in Semmler 1985). Grandmont (1985) shows that persistent deterministic fluctuations will emerge in an overlapping-generations (OLG) model in which markets clear and perfect foresight is obtained along the transition path through a sequence of periodic competitive equilibria. The basic condition is simply that the older agents have a greater preference for leisure. With the specified lag structure, cycles of different periods will typically coexist. The model has classical properties and generates some observed comovements, but it also suggests the possibility of an effective countercyclical monetary policy.[13]

Introduction of nonlinearities is necessary for modeling and analyses of a variety of theoretical ideas such as (1) time irreversibilities or ratchet effects employed in some early models of consumption and cyclical growth (Duesenberry 1949; Smithies 1957; Minsky 1959) and (2) discontinuities or jumps at certain parameter values that can differentiate the length of cycle phases or impose irregular fluctuations on long-term growth (from Goodwin 1951 to

13. Compare related results on other applications of the OLG approach that yield multiple rational-expectations solutions (ch. 2, sec. 4.6 gives a brief summary). Grandmont's system has the classical dichotomy: equilibrium prices are proportional to the stock of money, whereas the real variables are determined in the goods market. Prices are positively correlated with output, and real interest rates are inversely correlated with output.

In contrast, a nonlinear model of capital accumulation in Foley 1986 shows how monetary and fiscal policies can fail to reduce cyclical instability and may even increase it. Here the accelerator amplifies the cycle, but liquidity effects eventually constrain it.

Day 1982, for example).[14] For these and other good reasons, this field of study is a promising and active one; but the work done so far is lopsidedly devoted to manipulations of highly aggregative and abstract models. What is badly needed is the development of tested knowledge of where the nonlinearities in the economy are located, how important they are, and what effects they have. This will require much careful examination of existing, and perhaps also collection of new, empirical data.

8.3.4 Asymmetries

An important point that did receive some attention recently is the possibility of basically asymmetrical cyclical behavior manifested in contractions that are on the average shorter and steeper than expansions. The view that such an asymmetry exists is far from new; as shown below, it found support in long historical evidence and was endorsed by some prominent economists several decades ago. But linear techniques are not capable of representing or explaining this type of behavior.

Mitchell (1927, pp. 330–34) noted that frequency distributions of month-to-month changes in trend-adjusted indexes of business activity for periods between 1875 and 1925 are slightly skewed to the left in each case. He wrote that "abrupt declines usually occur in crises; the greatest gains . . . come . . . as reactions after sudden drops"; also, "the number of declines is smaller than the number of advances, but the average magnitude of the declines is greater." He concluded that "business contraction seems to be a briefer and more violent process that business expansion."

Keynes appears to have narrowed the asymmetry from the total phases of rise and fall to the peak and trough zones. He wrote of "the phenomenon of the *crisis*—the fact that the substitution of a downward for an upward tendency often takes place suddenly and violently, whereas there is, as a rule, no such sharp turning-point when an upward is substituted for a downward tendency" (1936, p. 314).[15]

Table 8.5 shows average amplitude values (i.e., rates of change or slopes) for cyclical upswings and downswings in several long historical series with adjustments for secular trends. The measures are reproduced from Mitchell 1927 and Burns and Mitchell 1946 (or based on the data given therein; see notes to the table). For Mitchell's series in trend-adjusted form, the number of month-to-month increases tends to exceed that of declines only slightly (col. 2), whereas the absolute size of increases tends to be smaller than that of declines by varying differentials (cols. 3 and 4). The deposits series provides

14. The variety of slopes and shapes of the partly smooth, partly oscillating growth trajectories produced by recently developed purely deterministic models is remarkable (see Day 1982, fig. 1, p. 407), but it must be noted that these movements are much less persistent and more "chaotic" than those observed in economic aggregates during business cycles.

15. Hicks held a similar view of the asymmetry but less strongly. He related it to the "monetary deflation" that may accompany the real downturn and make it more severe (1950, pp. 115–18, 106–62). Keynes explained the "crisis" mainly by "a sudden collapse in the marginal efficiency of capital" (1936, p. 315).

Table 8.5 Average Rates of Rise and Fall in Indexes of Business Activity, Unadjusted and Trend-Adjusted Monthly Data for the United States, 1875–1933

	No. of Cycles[a]	Percentage Expanding[b]	Average Relative Amplitude per Month[c] Rise	Fall	Rise	Fall
	Trend-Adjusted Data[d]				Unadjusted Data	
	(1)	(2)	(3)	(4)	(5)	(6)
Deflated clearings (Snyder)						
1875–1923 (M)	12	52	2.0	2.2	. . .	. . .
1884–1933 (B-M)	13	. . .	0.6	1.9	0.8	2.0
Clearings index (Frickey)						
1875–1914 (M)	10	51	4.0	4.2	. . .	. . .
1884–1914 (B-M)	9	. . .	0.7	1.6	1.0	1.8
AT&T index						
1877–1925 (M)	13	52	2.5	2.7	. . .	. . .
1900–1933 (B-M)	9	. . .	1.1	1.8	1.3	1.9
Deposits index (Snyder)						
1875–1923 (M)	13	47	3.0	2.8	. . .	. . .
Trade index (Persons)						
1903–1924 (M)	6	53	2.8	3.3	. . .	. . .
Pig iron production						
1897–1933 (B-M)	15	. . .	2.5	4.0	2.4	4.7
Railroad bond fields (Macaulay)						
1860–1931 (B-M)	16	. . .	0.62	0.65	0.56	0.94

Sources: (M) Mitchell 1927, tabulation on p. 333 and text, pp. 326–34. (B-M) Burns and Mitchell 1946, table 97, p. 291, and text, pp. 280–94.

[a]Number of complete specific cycles covered (trough-to-trough or peak-to-peak, whichever is larger). In (B-M) only corresponding cycles that show up in both unadjusted and trend-adjusted data are included (see n. *e*).

[b]Number of rises plus half the number of no change expressed as percentage of all month-to-month changes covered (calculated from data in Mitchell 1927, p. 333).

[c]Based on relative deviations from trend ordinates (M) or specific-cycle relatives (B-M).

[d]Trends calculated by original sources as smooth functions of time (oscillatory for bond yields, upward for the other series).

[e]Cycles in 1864–58, 1899–1905, and 1909–14 are omitted as noncorresponding.

the only exception here. The measures of Burns and Mitchell show the downswings as being on the average steeper (more rapid) than the upswings in every case. The differences are relatively large for both the unadjusted and the trend-adjusted series, except for railroad bond yields, where the trend is oscillatory (indeed downward most of the time; see Burns and Mitchell 1946, chart 36, p. 275).[16]

16. For electricity output in 1921–33, a strongly growing series, the rise and fall amplitudes are 1.0 and 0.8 in the unadjusted data and 0.5 and 0.7 in trend-adjusted data, respectively. This is an example of an asymmetry that is concealed by the trend in the original series, but it is based on two corresponding series only (Blatt 1983, p. 231).

Blatt finds the results reported by Burns and Mitchell for the detrended series to be very significant economically and statistically and infers that "a pronounced lack of symmetry is the rule" (1980; 1983, p. 232). He views this as a strong contradiction of the Frisch-type random shock theory of business cycles, which implies symmetrical fluctuations around trend.

De Long and Summers (1986) estimate coefficients of skewness in quarterly growth rates of real GNP and industrial production from post–World War II data for the six major OECD countries. The asymmetry hypothesis implies negative skewness. The estimates have negative signs in 9 out of 12 cases, but they are generally small relative to the calculated standard errors. For the United States, annual data show more evidence of negative skewness than quarterly data, particularly for GNP in the postwar period. Surprisingly, the skewness is positive (but not significant) for the U.S. quarterly real GNP series in 1891–1915 and 1923–40. The authors conclude (p. 176) that "it is reasonable in a first approximation to model business cycles as symmetric oscillations about a rising trend" since "GNP growth rates and industrial production growth rates do not provide significant evidence of asymmetry."

It would seem that this inference is too strong and probably premature, being based on uncertain assumptions and evidence. The standard errors of skewness are estimated from Monte Carlo simulations that assume the growth rates to be stationary third-order autoregression processes. The reasoning of Mitchell, Keynes, and Hicks attributes the asymmetry largely to the occurrence of sharp downturns in investment and/or monetary stringencies and financial crises. This is a plausible hypothesis, but it leads us to expect more asymmetry in the earlier era than after World War II; however, the De Long-Summers results unaccountably show the opposite. The GNP data inevitably are much less reliable for the former period. The Mitchell and Burns series used in table 8.5, though limited and partly overlapping in coverage, provide more observations and may well be on firmer ground. The evidence based on them is also less general and conclusive than it was interpreted to be, but it certainly should not be ignored or dismissed.

Neftçi (1984) rejects the null hypothesis of symmetry for unemployment in the United States in 1948–81 on the strength of tests applied only to data on the direction (not size) of changes in several series of jobless rates. De Long and Summers are critical of such tests for sacrificing power, but their own results confirm those of Neftçi even more strongly: quarterly U.S. data show positive skewness in unemployment and negative skewness in employment, both significant at the 5% level. However, they find no evidence of asymmetries in quarterly unemployment series for the five other OECD countries in 1950–79. This last result, though, relies heavily on difficult trend adjustments for large rises in European unemployment after 1973 assumed to be noncyclical; if not so detrended these series would appear strongly skewed. There is much that is unexplained and uncertain about these findings.[17]

17. When detrended and plotted to appropriate scales, the unemployment rate and (inverted) industrial production show closely similar fluctuations (see chart in De Long and Summers 1986,

It is true that the appearance of strong asymmetries in unadjusted time series is due to a large extent to the prevailing secular growth, and so is the fact that business expansions are much longer than contractions, as noted by De Long and Summers. But even series that contain no upward trends or from which such trends have been eliminated as well as possible often show visibly asymmetric behavior of the envisaged type. If no asymmetries occurred, the upswing and downswing phases of growth cycles should be about equal in length on the average over time. But table 8.3 shows that high-growth phases were typically longer than low-growth phases (cf. cols. 3 and 5).

Table 8.6 lists the differences between the average durations of high-growth and low-growth phases: they are all positive (col. 1). For the United States, Canada, and the United Kingdom, they are small (1–3 months); for West Germany, the difference is near zero. For the other six countries, they are much larger (9–17 months) and statistically significant at 2.5%–15% levels; the strongest evidence that high-growth phases tend to be longer comes from the measures for Japan, Australia, and the Netherlands (cols. 2–4).

Other indications that nonlinearities are neglected or concealed by currently popular methods of econometric and time-series analysis are scattered in recent literature (Blatt 1978; Britton 1986, pp. 50–52; Neftçi 1986). The conclusions range all the way from saying that these methods are very deficient (Blatt) to saying that they are the best available and unscathed by a search for asymmetries (De Long and Summers). Actually the search has so far been short and weak. The evidence is not very strong but on balance it suggests that business cycles do have potentially important nonlinear characteristics. Further research on this front is certainly needed.

8.3.5 Do Expansions Die of Old Age?

Late in 1985 many observers greeted the third anniversary of the continuing business expansion with a touch of worry. As measured by NBER, only 1 of the 6 peacetime expansions since 1945 lasted more than 39 months. Of the 14 comparable phases in 1854–1919, none survived more than 3 years, and of the 5 in 1919–45, only 1 did. Late in 1986 the same reasoning led to even stronger fears of a downturn. But by mid-1987 the expansion was nearing the peacetime record set recently in 1975–79 (58 months), and few forecasters expected a recession in the near future; and by early 1990 the new record exceeded the old one by more than 2 years. Far from being self-evident, the popular expectation that as an expansion grows older, the probability of its terminating increases should be viewed as a hypothesis open to much doubt and in need of full examination.

If business fluctuations were just random walks, then their past would have

p. 175). The timing differences between the two are partly systematic but small. Charts for other countries display much the same cyclical patterns in the corresponding series (Klein and Moore 1985, ch. 4 and app. 4A and 4B.) The test results may overstate the differences in skewness between output and employment.

Table 8.6 **Differences in Average Durations of High-Growth and Low-Growth Phases for 10 Countries, 1948–1983**

Country and Period Covered	Difference HG minus LG[a] (mo.) (1)	Degrees of Freedom[b] (2)	Standard Error (s_Δ)[c] (3)	t-Statistic[d] (4)
1. United States, 1948–82	1.3	17	4.94	0.26
2. Canada, 1950–82	2.0	18	3.74	0.54
3. Japan, 1953–83	17.2	10	7.14	2.41[e]
4. Australia, 1951–83	8.7	13	4.86	1.79[f]
5. United Kingdom, 1951–83	2.9	11	6.19	0.47
6. West Germany, 1951–83	0.2	11	6.63	0.03
7. France, 1957–79	13.2	8	8.76	1.51[g]
8. Italy, 1956–80	11.2	8	8.97	1.25[h]
9. Netherlands, 1950–79	11.2	12	5.59	2.01[f]
10. Switzerland, 1950–75	16.8	8	11.96	1.40[g]

Source: Table 8.3.

[a]HG = average duration of high-growth phases; LG = average duration of low-growth phases.

[b]Equals $N_1 + N_2 - 2$, where N_1 = number of HG phases and N_2 = number of LG phases.

[c]$s_\Delta = \left[\frac{(N_1 - 1)s_1^2 + (N_2 - 1)s_2^2}{N_1 + N_2 - 2}\right]^{1/2} \left(\frac{N_1 + N_2}{N_1 N_2}\right)^{1/2}$, where s_1^2 and S_2^2 are variances of HG and LG phases, respectively.

[d]Entry in col. 1 divided by entry in col. 3.

[e]Significant at the 2.5% level.

[f]Significant at the 5% level.

[g]Significant at the 10% level.

[h]Significant at the 15% level.

no predictive value, and in particular the probability of a peak (trough) in any month of an ongoing expansion (contraction) would be a constant independent of the age of the phase. Indeed, McCulloch (1975) presents tests showing that the probability of termination is equal for "young" and "old" expansions, once the movement has exceeded some minimum duration, and that the same applies to contractions. This suggests to him that business fluctuations are merely like the "Monte Carlo cycles" the superstitious gamblers misperceive in their luck at casinos or racetracks, that is, pseudocycles with "no periodicity, rhythm, or pattern except perhaps a trend" (p. 303).

On the other hand, Neftçi (1982) offers a formula for an "optimal" prediction of cyclical downturns, one component of which is the probability of a peak this month based just on the length of the expansion to date. (The other is the probability of observing this month's value of the percentage change in the index of leading indicators when the trend in that index is upward.) Neftçi estimates the probabilities by smoothing the distributions of the observed phase durations and percentage changes in the leading index. Thus he expects the duration of an expansion in itself to be of some help in predicting the peak (mutatis mutandis, the same applies to contractions and troughs). A degree of success is claimed for this approach, and some modifications improve it further (Palash and Radecki 1985; de Leeuw, Missouri, and Robinson 1986; Niemira 1991).

McCulloch's tests present some technical problems: it seems that small changes in the underlying assumptions and data can lead to very different conclusions (de Leeuw 1987). But even if his results were entirely acceptable, his interpretation of them is not. Business cycles need not be strictly periodic to differ radically from purely random movements. The many important regularities well documented in studies of domestic, foreign, and international business fluctuations simply cannot be reconciled with the notion of "Monte Carlo cycles." Business cycles are far too persistent and pervasive for that, and they contain far too many common features with common explanations. In both relatively short and long, small and large expansions and contractions, some variables conform strongly, others weakly, some positively, others inversely. There are also systematic differences in cyclical amplitudes—and numerous recurring timing sequences as some variables tend to lead and others lag—at business cycle peaks and/or troughs.

Like the authors cited above, Hamilton (1989) models the business cycle as an outcome of a Markov process that switches between two discrete states, one representing expansions, the other contradictions. However, he assumes that the state transition probabilities are independent of the phase durations. This implies a constant hazard function $\lambda(\tau) = \lambda$ (where λ is the probability that a process will end after a duration, τ, given that it lasted until τ) and a memoryless exponential distribution of durations $f(\tau) = \lambda e^{-\lambda\tau}$ (Kiefer 1988). Diebold and Rudebusch (1990a), using NBER-designated business cycle phases, find that the null hypothesis of no duration dependence is not contradicted by the small sample of observations on postwar expansions. There is, however, some evidence of duration dependence in prewar expansions, postwar contractions, and, particularly, full cycles over the entire period covered (1854–1982). These results imply a weak stochastic form of periodicity, that is, a clustering tendency of intervals between successive peaks *or* troughs (and, at times, between successive peaks *and* troughs). They are entirely consistent with the historical analysis provided earlier in this chapter.

Neftçi's and related exercises suggest that the potential contribution of the phase duration measures and associated probabilities to the problem of forecasting business cycle turning points is likely to be modest, though probably not zero, as hypothesized by McCulloch. It would indeed be surprising to find otherwise. The probability of a peak during an expansion or of a trough during a contraction is clearly not just or even largely a function of the duration of the phase. Various combinations of internal stresses and imbalances with external disturbances, including major policy errors, can cut the life of an economic recovery short or bring on an unsustainable boom. Conversely, well-chosen policies and other favorable developments can prolong an expansion by helping to keep a slowdown in the economy from sliding into an absolute decline or a speedup from creating inflationary demand pressures. A recession may in itself create the conditions for the next upturn, or the recovery may be accelerated by stimulative policies.

What matters primarily, then, is not the passage of calendar time but what happens over time in and to the economy in motion. It is historical and psychological time, filled with events and processes, perceptions and actions. This is, of course, generally so in human affairs. There is a simple corollary: knowledge of the current phase of the business cycle and its age can help but must not be used in isolation. Its proper role is to assist in the interpretation of the contemporaneous movements of the economy by enabling us to compare systematically the present with the historical patterns of the indicators.

8.3.6 Predictability and Costs

Business cycle turning points, particularly peaks, tend to be associated with unusually large forecasting errors (see ch. 13 and 14 below). If the durations of expansions and contractions had been highly stable over extended periods, forecasters (and indeed economically active and observant people in general) should have long learned how to predict the timing of these phases with considerable accuracy. The fact that economic downturns and to a lesser extent upturns cause much surprise is therefore a strong prima facie argument against the hypothesis that business cycles are periodic. Since major slowdowns and recessions produce individual losses and social distress, there are surely major incentives to improve the related forecasts and decisions. Moreover, in the presence of continuing and recognizable periodicities, ways would presumably be found to reduce cyclical instability or to adjust to it so that it did relatively little harm to the economy at large.

Indeed, no grave and persistent economic and social problems are caused by seasonal fluctuations despite their broad diffusion and large quantitative importance. This is so because the seasonal cycles are generally close to being periodic and predictable. Business people, workers, and consumers possess much accumulated knowledge of how to cope with this type of anticipated instability, and there exist various institutional and market arrangements to help. True, seasonal variations have stochastic components that can be a source of significant forecasting and decision errors, but these are properly matters of private concern. In contrast, recurrent slumps that generate declines in sales, production, and incomes along with rises in unemployment clearly belong to the sphere of public interest, and so do recurrent inflationary or speculative booms.

It is certainly possible to conceive of causes of highly periodic, persistent, and costly cycles in total output and employment. They would have to be exogenous, inevitable, and themselves periodic. The classic case here is the weather cycle, whether due to variations in sunspot intensity or other factors (Jevons 1884; Moore 1914). But today such explanations lack all plausibility.

Moreover, such hypothetical externally imposed cycles would resemble seasonal fluctuations much more than business cycles.[18]

In short, the considerations of predictability and costs argue against the idea that business cycles are strongly and stably periodic. The existence of limited and variable periodicities, however, cannot be excluded.

8.4 Summary and Conclusions

The historical chronologies of business cycles provide evidence that is on the whole inconsistent with the hypothesis of strong overall periodicity, according to which these fluctuations tend to be of constant length. True, over long stretches of time similar average durations are obtained for the principal economies (about 4 years in the United States, 5 years in Great Britain), and most cycles fall within the ranges of ± 1 year around these means. But the dispersion measures for all cycle durations are large in absolute and relative terms everywhere. There is a sharp contrast in this respect between business cycles and the almost strictly periodic seasonal fluctuations.

Nevertheless, examples of approximate periodicity limited in time exist and deserve attention. Thus the 1958–82 turning-point comparisons, autocorrelations, spectral analysis, and autoregressions for the United Kingdom all support the statement that the "appearance of the trade cycle . . . is unusually, although not uniquely, periodic" (Britton 1986, p. 52). But a major (and fully recognized) difficulty with these results is that 25 years of data is a slender basis for determining cycles whose typical length may be 5 years. Yet over longer periods the structure of the economy is likely to change in ways that would alter the periodicity.[19]

Spectral analysis indicates a relative concentration of power around frequencies corresponding to the average duration of business cycles (near 4.5 years). Since these techniques are applied to trendless or detrended series, the average growth cycle duration (about 3.5 years) may be more relevant here, and spectral peaks that approximate it are found as well. These estimates, however, are of uncertain significance, and the approach also suggests other periodicities, including some that are clearly outside the range of observed nonseasonal fluctuations.

These observations suggest that business cycles defy simple characterizations, showing a strong tendency to recur and at times even near periodicity,

18. They would be longer and perhaps less regular than normal seasonal fluctuations, hence their social costs should be higher. But it could hardly be beyond the individual and collective ingenuity of people to find, in time, effective ways to reduce and allocate the burdens of such anticipated instability.

19. In fact, Britton's results for earlier periods in the modern history of Great Britain and for the United States since 1960 differ from his results for the United Kingdom in 1958–82, and the differences depend greatly on methods of estimation. Unlike for the United Kingdom, the evidence of periodicity for the United States (based on unemployment data) is found to be "relatively weak and doubtful" (1986, p. 44; for detail see ibid., chs. 1 and 4).

along with great diversity and evolution of phase durations. It is difficult but necessary to recognize such phenomena in the theoretical work on the subject.

Periodic business cycles are represented in the theoretical literature by a variety of models. The nonlinear accelerator-multiplier interactions can produce a limit cycle. Where elections are periodic, a political business cycle could conceivably have a parallel rhythm. These models have some rather evident and serious problems, and it does not redound to their advantage that they can generate periodicity that is more exact and general than consistent with likelihood and observation. But this does not mean that nonlinearities may safely be neglected; on the contrary, they are probably important and their empirical identification is much needed. In particular, there are some indications of asymmetrical cyclical behavior. One set of these is provided by historical trend-adjusted series whose downswings tend to be steeper than upswings. Another consists of estimated durations of growth cycle phases in the post–World War II period: for most countries surveyed, the periods of above-average growth tend to be longer than the periods of below-average growth.

The variability in length of business expansions and contractions is sufficiently large for the timing of cyclical turning points (particularly peaks) to be, demonstrably, very difficult to forecast. The age of a phase alone is not of much help in predicting the date of its end: what matters more is the dynamics of the evolving business situation. The regularity of business cycles manifests itself primarily in aspects of such dynamics—persistent comovements of specific indicators, the leads and lags involved, and so on. There is no evidence that close and lasting periodicities exist in the recurrence of socially costly recessions here or abroad, and there are good general reasons why they are not visible. Important hidden periodicities may well exist, although even they are not likely to be unique, well-defined, and stable.