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Volume Author/Editor: Klein, Philip A. and Geoffrey H. Moore

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Chapter 6

IS THERE A WORLD CYCLE?

INTRODUCTION

In 1959 Oskar Morgenstern examined how business cycles spread from country to country, concentrating his attention on the role of financial markets in major industrialized economies (the United States, Great Britain, Germany, and France), during the gold-standard era of 1870–1949 and the interwar period, 1925–38.[1] These countries and periods had been the basis of previous NBER studies.

Later, in the course of an analysis of foreign trade, Mintz developed the concept of a "world cycle" and attempted to quantify it. Her research included consideration of diffusion indexes of business cycles (three countries, 1879–1938; fifteen countries, 1890–1931); diffusion indexes of imports (thirty-four to forty-one countries, 1947–53; twenty countries, 1954–61); and indexes of world imports (1880–1965) and of world manufacturing production (1879–1938).[2] From these data she developed a chronology of world import cycles from 1881 to 1959 and applied it to the analysis of U.S. and British exports and trade balances (see also Chapter 8).

Arthur B. Laffer summarized the results of a number of efforts to derive a world cycle chronology or to measure the correlation among fluctuations in different countries. These efforts included an annual chronology (1890–1932) devised by Moses Abramovitz (who based his work on Willard Thorp's *Business Annals* for eighteen countries), which was updated by Laffer to 1949–1960. He also reviewed studies

of the intercountry correlation of unemployment rates, stock prices, interest rates, and wholesale prices.[3] To varying degrees, these researchers discovered evidence of synchronized economic movements among developed countries. More recently, Bert Hickman and Stefan Schleicher found evidence of the synchronization of growth rates in industrial production and real GNP in sixteen countries, but observed less synchronization in rates of change in consumer prices, wage rates, or the monetary base.[4]

At this point, the line of reasoning taken by W. C. Mitchell in 1927 to explain the tendency toward international synchronism should be recalled:

> The basis of this trend toward unity of economic fortunes among communities organized on the European model is that each phase in a business cycle, as it develops in any area, tends to produce the same phase in all the areas with which the first has dealings. Prosperity in one country stimulates demand for the products of other countries, and so quickens the activities in the latter regions. . . . Further, prosperity, with its sanguine temper and its liberal profits, encourages investments abroad as well as at home, and the export of capital to other countries gives an impetus to their trade. A recession checks all these stimuli. A severe crisis in any important center produces quicker and graver results. Demands for financial assistance raise interest rates and reduce domestic lending power in other centers; apprehensions regarding the solvency of international houses may start demands for liquidation in many places; the losses which bankruptcies bring are likely to be felt by business enterprises the world over.[5]

Mitchell's comments, which suggested that instability would tend toward international synchronism, raises significant questions. To what extent have the major industrial market-oriented economies, in fact, moved in synchronous cycle phases during the postwar period? Can one locate a country (or countries) from which prosperity spread to other countries? If so, is it customarily the same country? Whether or not the expansions and contractions are stimulated by changes originating in one country, do these fluctuations spread rapidly enough to other countries to give the appearance of synchronous movements, or do they spread more slowly and possibly with differential lags so that the synchronous movement Mitchell hypothesized fails to materialize?

Most of the earlier work on these questions, by Mitchell, Morgenstern, Mintz, and others, tested whether or not one could establish evidence of international *classical* cycles. Morgenstern, for example, focused on Britain, France, Germany, and the United States and concluded that the four were in the same phase (classical expansion or contraction) about half the time during 1879–1932.[6] For the post-

war period we shall search for evidence of synchronous periods or phases of *growth* cycle expansion and contraction on an international scale.

ALTERNATIVE INTERNATIONAL GROWTH CYCLE CHRONOLOGIES

In attempting to develop an index that represents fluctuations in the market-oriented world, we have experimented with a number of possibilities. An obvious measure, from the vantage point taken in this book, would be the composite index we have developed for ten industrialized countries. The primary drawback to such an index is that, as the reader can appreciate, some countries have provided data for a far shorter period of time than the thirty-plus years covered by the economic record for the major countries.

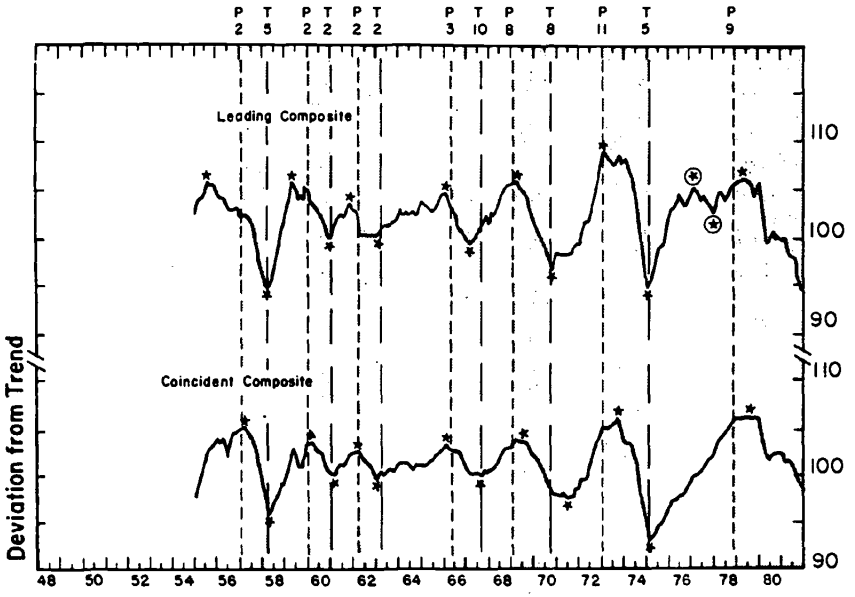
Accordingly, we have settled on a seven-country composite index, combining the roughly coincident indexes for the United States, Canada, the United Kingdom, France, Italy, West Germany, and Japan. These countries represent more than half of the noncommunist world's trade, and their combined GNP is a considerable portion of the total GNP of the market-oriented world as well.

A chronology based upon the trend-adjusted, coincident index for these seven countries is presented in Figure 6-1 and Table 6-1. It is useful to compare the seven-country index to chronologies comprised of a selection of these countries. The six-country index, for example, may be used to examine how growth recessions in the United States are reflected in other countries. The four-country index enables us to consider the relations between European and non-European nations. In addition to these indexes we shall use data prepared by the Federal Reserve Bank of St. Louis on the growth rates in eight industrial economies, which revealed four international growth recessions in the period 1955-73.[7] The peaks occurred in 1955, 1960, 1964, 1969, and 1973; the troughs in 1958, 1961, 1967, and 1971. The chronology represents years in which there is an international consensus of high growth rates or low growth rates in real GNP, industrial production, imports, and exports.[8]

This chronology has the obvious disadvantage of being based on annual data. One would expect peak growth rates to precede the peaks in trend-adjusted indexes, since the indexes do not reach their peaks until the *growth rate* has fallen below the *trend rate.* Barring a sudden, sharp drop the growth rate begins to decline before that. Similarly, the troughs in the growth rate may precede the troughs in trend-adjusted indexes, since the trough in the indexes is not reached

Figure 6-1. International Composite Indexes, by Timing.

Part A. Seven-Country Indexes (United States, Canada, United Kingdom, West Germany, France, Italy, and Japan)

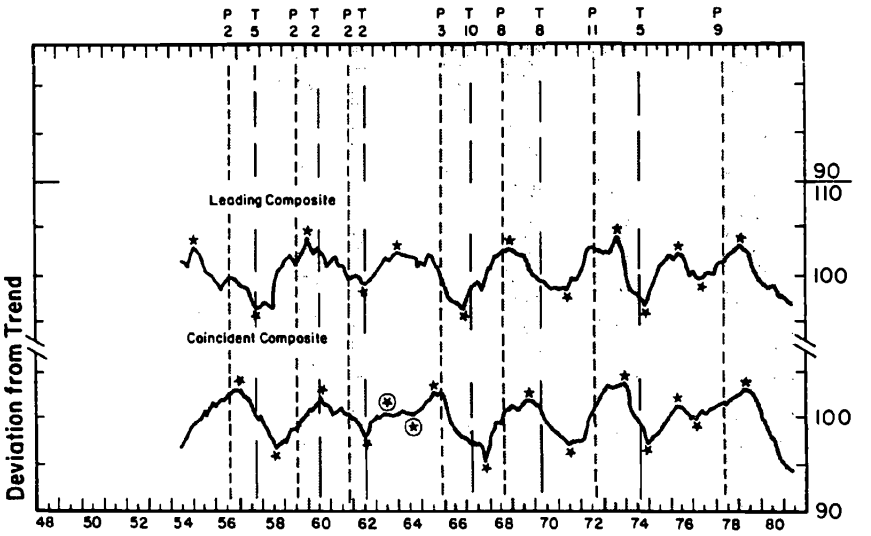


until the growth rate has risen above the trend rate. Table 6-1 bears out these expectations, despite the differences in the countries covered and in the economic data employed. The monthly composite index of all the roughly coincident indicators for the seven countries shows clear cyclical movements, corresponding to similar movements in the annual data for the eight countries in the Federal Reserve report.

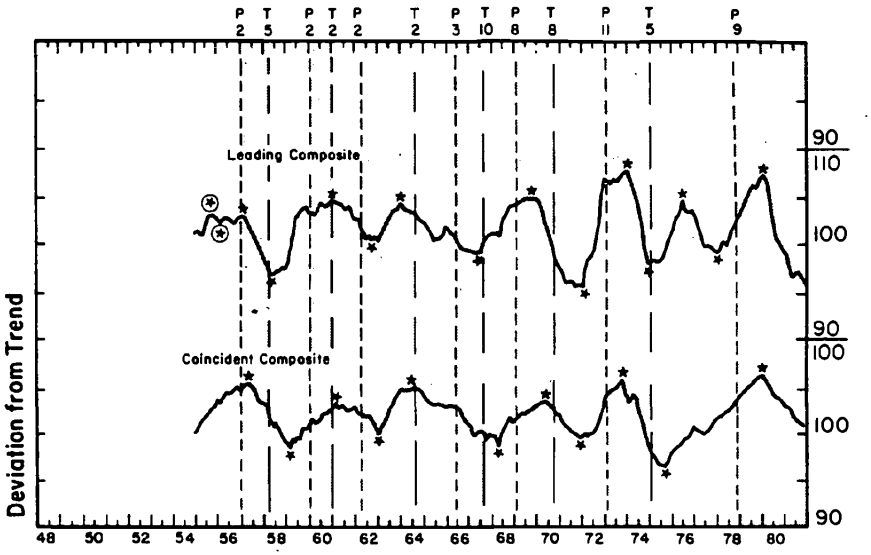
We turn now to how the international chronology, based on the seven-country composite index, differs from the individual chronologies of each country. The seven-country index produces a chronology of cycles that matches on a one-to-one basis those in the United States, Belgium (despite its brief length), and Sweden. Three countries reflect the index on a one-to-one basis except for the absence of a recession in 1960-61 in the United Kingdom, West Germany, and France. Canada reflects the international index perfectly except for an extra cycle in 1976-77, a cycle one finds in the Netherlands as well (the latter also skips the 1960-61 recession). The Japanese chronology is similar to the seven-country chronology, but its 1964-66 recession does not match the 1966-67 recession in the other

Figure 6-1. continued

Part B. Six-Country Indexes (Canada, United Kingdom, West Germany, France, Italy, and Japan)



Part C. Four-Country Indexes (United Kingdom, West Germany, France, and Italy)



Note:
Vertical P and T lines based on coincident index, seven countries.

Table 6-1. Three International Growth Cycle Chronologies, 1954-80.

Peaks Trend-Adjusted Index, Monthly			*Troughs Trend-Adjusted Index, Monthly*		
Seven-Country[a]	*Six-Country*	*Four-Country*	*Seven-Country*	*Six-Country*	*Four-Country*
2/57	2/57	5/57			
			5/58	2/59	2/59
2/60	3/62	3/61			
			2/61		
2/62					
			2/63	2/63	2/63
3/66	7/64	3/66			
			10/67	5/68	5/68
8/69	6/70	5/70			
			8/71	2/72	2/72
11/73	11/73	7/74			
		12/76	5/75	9/75	8/75
9/79	2/80	11/79			10/77

Note:
a. Chronologies are based on composite indexes of trend-adjusted, roughly coincident indicators. The seven-country index includes the United States, Canada, West Germany, the United Kingdom, France, Italy, and Japan; the six-country index excludes the United States. The four-country index includes the United Kingdom, West Germany, France, and Italy.

countries. Italy is the most divergent, skipping the 1960-61, 1962-63, and 1966-67 recessions and exhibiting extra recessions in 1963-65 and 1976-77.

Despite its limited geographic range, we believe that the seven-country, composite coincident index provides the best currently available chronology of world growth cycles. We will make further use of it, therefore, in the next two sections to make various comparative analyses.

UTILIZING WORLD CYCLE CHRONOLOGIES

It is, of course, possible to consider the behavior of a number of different kinds of economic activity, within individual economies or among several economies via trade and financial flows, during international recessions and the intervening expansions. Such analyses permit detection of systematic differences in the operation of economic variables with respect to these presumed international cycle phases. It should be underscored, however, that here, as with indica-

Table 6-2. Consilience of Cycle Phases in Ten Market-Oriented Economies with Cycle Phases in the International Chronology.

	In Phase		*Out of Phase*	
Country	*Number of Months*	*Percent*	*Number of Months*	*Percent*
United States	202	77	60	23
Canada	254	86	42	14
United Kingdom	194	78	53	22
West Germany	178	71	72	29
France	200	83	40	17
Belgium	120	68	56	32
Italy	168	61	108	39
Netherlands	215	77	63	23
Sweden	78	48	83	52
Japan	235	86	38	14
All Countries	1,844	75	615	25

Time Periods Covered:	*Number of Months*	*Dates*
International Composite Index[a]	281	Feb. 1957—Sept. 1979
United States	262	Feb. 1957—Dec. 1978
Canada	296	Nov. 1956—June 1980
United Kingdom	247	Nov. 1958—June 1979
West Germany	250	April 1959—Feb. 1980
France	240	Aug. 1957—Aug. 1979
Belgium	176	Oct. 1964—June 1979
Italy	279	Nov. 1956—Feb. 1980
Netherlands	278	Oct. 1956—Dec. 1979
Sweden	161	Feb. 1965—July 1978
Japan	273	May 1957—Feb. 1980

a. Includes seven countries. See Table 6-1.
Source: Figure 6-1.

tors of cyclical changes, accurate analysis depends on the selection of valid turning points. In any attempt to date an international growth cycle the customary difficulties are compounded. Nevertheless, our international cycle is a fairly general one in the sense that nearly every turn in the international cycle is matched by a turn in each of the countries. In addition, very few countries exhibit extra cycles, or do so infrequently.

This finding suggests that Mitchell was essentially correct in 1927 when he pointed out the trend "toward unity of economic fortunes." Table 6-2 illustrates in somewhat simplified form, the degree of consilience between the ten countries in our sample and the international composite index. In general, the degree of consilience for all these countries over the available period is remarkably high. In only one country, Sweden, were cycles out of phase as much as half the time. As regards consilience, then, the postwar experience with

Table 6-3. Leads and Lags of Growth Cycle Turns in Ten Market-Oriented Economies at International Growth Cycle Turning Points, 1954-73.

	Number of Leads	Number of Coincidences		Number of Lags	Total Number of Timing Comparisons	Average Lead (-) or Lag (+), in Months	
		Rough	Exact			Median	Mean
		At Peaks					
United States	3	4	2	2	7	0	-2
Canada	3	5	2	2	7	0	-1
United Kingdom	6	3	0	0	6	-4	-6
West Germany	4	1	0	2	6	-6	-4
France	1	3	0	4	5	+3	+3
Italy	1	1	1	2	4	+2	+2
Belgium	2	1	0	2	4	0	0
Netherlands	3	1	0	3	6	0	+2
Sweden	1	0	0	2	3	+7	+2
Japan	1	2	1	3	5	0	+3
All Countries	25	21	6	22	53	+2	-3
		At Troughs					
United States	3	4	2	1	6	0	+1
Canada	1	3	0	5	6	+3	+1
United Kingdom	1	3	1	3	5	+3	+3
West Germany	1	3	2	2	5	0	+3
France	0	2	0	4	4	+5	+5
Italy	0	1	1	2	3	+5	+9
Belgium	1	1	0	2	3	+13	+4
Netherlands	1	4	2	2	5	0	+3
Sweden	1	1	0	2	3	+11	+15
Japan	2	2	0	2	4	+2	+2
All Countries	11	24	8	25	44	+3	+5

		At Peaks and Troughs					
United States	6	8	4	3	13	0	-1
Canada	4	8	2	7	13	+1	0
United Kingdom	7	6	1	3	11	-2	-2
West Germany	5	4	2	4	11	0	-1
France	1	5	0	8	9	+3	+4
Italy	1	2	2	4	7	+5	+5
Belgium	3	2	0	4	7	+5	+4
Netherlands	4	5	2	5	11	0	+2
Sweden	2	1	0	4	6	+9	+8
Japan	3	4	1	5	9	+5	+3
All Countries	35	45	14	47	97	+2	+2

Source: Figure 6-1.

growth cycles resembles the prewar experience with classical cycles quite closely.

Another point, though, can be raised concerning the validity of a world growth cycle. Our attention has so far focused on whether growth swings are widespread and synchronous among industrial countries. If that tendency were weak, as it no doubt is in the case of crop yields per acre in different countries, we should not be inclined to say there is a world cycle at all, even though there might be fluctuations. On the other hand, we might still legitimately ask whether these general movements are in the nature of random fluctuations over the years. Growth rates might be synchronous across countries but random through time. In the case of crop yields, which are strongly influenced by vagaries in the weather, the movements through time are virtually random.[9] A 1974 study of annual growth rates in sixteen countries during 1950-69, applied to GNP, exports, imports, and output of agriculture, manufacturing, and construction, found that "fluctuations are in most cases not statistically distinguishable from those generated by a random process."[10] The length of runs up or down in the rates of growth was tested for each fluctuation. In a random series of such rates, runs of one year are expected to be most frequent, two-year runs less frequent, and so on (see the first reference cited in Note 9). The authors noted that similar tests applied to quarterly or monthly data might yield a different result, but this would not necessarily reduce the significance of the fact that, *when aggregated into annual time units*, growth rates in many economic series in many countries have the characteristics of random series over time.[11] They remain, however, related from one country to another as we have shown.

We turn now to the question of whether or not many cyclical episodes are triggered by the same country. We should like to examine this question at some future point by analyzing the interrelationships between leading indicators of various sorts of activities and the subsequent impact of the indicators on aggregate economic activity, and we will undertake some initial steps along this line in the following section. Here, we consider simply the timing relationships among the growth cycle chronologies for the ten countries under review.

According to Table 6-3 at peaks there was a clear tendency for the United Kingdom and West Germany to lead and for France, Italy, Sweden, and Japan to lag. Belgium and the Netherlands were as likely to lead as to lag. The United States led at only three of the seven recessions, although the earlier period shows close coincidence, while the later peaks show leads. At troughs the dispersion is slightly smaller, although the United States has led the world index up from

Table 6-4. Sequence of Turns at International Growth Cycle Turning Points, Ten Countries, 1954-79.

Country	Rank Order of Turns at Peaks[a]							Average Rank, Seven Peaks
	2/57	*2/60*	*2/62*	*3/66*	*8/69*	*11/73*	*9/79*	
United States	6.0	2.0	6.0	7.5	2.0	1.0	1.0	3.6
Canada	5.0	1.0	5.0	6.0	1.0	5.0	5.0	4.0
United Kingdom	2.0	n.a.[b]	2.5	5.0	3.0	2.0	2.5	2.8
West Germany	1.0	n.a.	1.0	3.0	6.0	3.0	8.0	3.7
France	7.5	n.a.	n.a.	7.5	5.0	7.0	4.0	6.2
Italy	3.5	n.a.	n.a.	n.a.	4.0	6.0	8.0	5.4
Belgium	n.a.	n.a.	n.a.	1.0	9.0	9.0	2.5	5.4
Netherlands	3.5	n.a.	2.5	4.0	10.0	10.0	6.0	6.0
Sweden	n.a.	n.a.	n.a.	2.0	8.0	8.0	n.a.	6.0
Japan	7.5	n.a.	4.0	n.a.	7.0	4.0	8.0	6.1
	Rank Order of Turns at Troughs							
	5/58	*2/61*	*2/63*	*10/67*	*8/71*	*5/75*		*Average Rank, Six Troughs*
United States	1.0	1.0	5.0	5.0	1.5	1.5		2.5
Canada	3.0	2.0	4.0	6.0	1.5	8.5		4.2
United Kingdom	4.0	n.a.	3.0	3.0	7.0	7.0		4.8
West Germany	7.0	n.a.	3.0	3.0	5.0	3.5		4.3
France	6.0	n.a.	n.a.	7.0	4.0	5.0		5.5
Italy	8.0	n.a.	n.a.	n.a.	10.0	3.5		7.2
Belgium	n.a.	n.a.	n.a.	8.0	3.0	8.5		6.5
Netherlands	2.0	n.a.	3.0	3.0	9.0	6.0		4.6
Sweden	n.a.	n.a.	n.a.	1.0	8.0	10.0		6.3
Japan	5.0	n.a.	1.0	n.a.	6.0	1.5		3.4

Notes:
a. Turns are ranked from longest lead (1) to shortest lead or longest lag (5).
b. n.a. = Not available, either because index does not cover the period or does not show a corresponding turn.
Source: Figure 6-1.

Table 6-5. Leads and Lags of International Composite Indexes at their Respective Growth Cycle Turning Points.

	Lead (-) or Lag (+), in Months, of Leading vs. Coincident Index at Growth Cycle Peaks and Troughs							
	P 5/57	*T 2/59*	*P 3/61*	*T 2/63*	*P 2/64*	*T 3/65*	*P 3/66*	*T 5/68*
Four-Country[a] Indexes	-21	-9	-7	0	+8	n.m.[d]	n.m.	-9
	P 2/57	*T 2/59*	*P 3/61*	*T 2/63*	*P 7/64*	*T 5/68*	*P 6/70*	*T 2/72*
Six-Country[b] Indexes	0	-8	-1	-4	-6	-11	-7	0
	P 2/57	*T 5/58*	*P 2/60*	*T 2/61*	*P 2/62*	*T 2/63*	*P 3/66*	*T 10/67*
Seven-Country[c] Indexes	-17	-3	-9	-2	-3	-12	0	-6

Notes:
a. United Kingdom, West Germany, France, and Italy.
b. Canada, United Kingdom, West Germany, France, Italy, and Japan.
c. United States, Canada, United Kingdom, West Germany, France, Italy, and Japan.
d. n.m. = No matching turn.

recession more often (three times) than any other country. Japan led twice. No other country led the world index up more than once. Taking peaks and troughs together, we find that the individual country turns, based on the medians, occurred within three months of the international turn for every country except France, Italy, Belgium, and Sweden, all of which lag.[12]

Another way of looking at the evidence is shown in Table 6-4, which records the sequence in which the matching peaks and troughs in the ten countries occurred. The first country to turn is given a rank of one, the last a rank of ten. When a country is not available at a given turn (designated by n.a.), the highest possible rank is reduced by one. When two or more countries turn in the same month, a tie is indicated by averaging the two rankings. Since no country attains a rank of one at more than two of the seven peaks, it is clear that no country can be said to lead invariably the other countries into recession. On the other hand, the United States has a rank of one at two of the troughs, and is tied for first at two more, so that at four of the six troughs the United States was one of the first countries to turn. It is not unreasonable, therefore, to conclude that, according to

Table 6-5. continued

Lead (-) or Lag (+), in Months, of Leading vs. Coincident Index at Growth Cycle Peaks and Troughs (continued)							*Average Lead (-) or Lag (+), in Months*					
							Median			*Mean*		
P 5/70	*T* 2/72	*P* 7/74	*T* 8/75	*P* 12/76	*T* 10/77	*P* 11/79	*P*	*T*	*P&T*	*P*	*T*	*P&T*
-9	0	-2	-1	+1	+4	-2	-2	0	-2	-5	-2	-4
P 11/73	*T* 9/75	*P* 2/80										
+3	-7	0					0	-7	-4	-2	-6	-4
P 8/69	*T* 8/71	*P* 11/73	*T* 5/75	*P* 9/79								
-4	-9	-9	-2	-6			-6	-4	-6	-7	-6	-6

the above data, the United States tends to lead other countries out of recession. At peaks, however, the role of initiator shifts from country to country, seemingly at random. This point has not generally been recognized.[13]

LEADING AND LAGGING INDICATORS OF INTERNATIONAL CYCLE TURNS

The previous section described the validity and usefulness of an international growth cycle chronology (based on summary measures of cyclical activity) and the construction of a composite index (based on the roughly coincident indicators for each country). An alternative approach is to relate turns in national leading or lagging indicators to the international cycle chronology.

A comparison based on international composite indexes of all leading and coincident indicators is given in Figure 6-1 and Table 6-5. The indexes in the table have been computed three ways: the first including all seven countries in our "world composite indexes," the second excluding the United States, and the third limited to four European countries. By omitting the U.S. data, the results are independent of any of the U.S. information that was used to classify the indicators as leading or lagging. As Figure 6-1 shows, the leading indexes trace out each of the cycles identified by the coincident indexes, thus helping to confirm their validity. The table records the

timing of the cycles in the leading indexes vis-à-vis the coincident indexes. As a rule, at each of the international growth cycle turns, the leading index turns before the coincident index. There are very few exceptions to this expected order—in the seven-country index, the 1966 peak is the sole exception. For the six-country index, there are four exceptions—three exact coincidences for the leading index and one three-month lag. For the four-country index, there are five exceptions—two are exact coincidences and three are lags. Thus, by the strictest standards of expected behavior even the four-country leading index leads the coincident index at two-thirds of the individual turns.

When we examine whether one country seems to trigger the spread of economic instability internationally, the behavior of the leading indicators at international turns is clearly of considerable importance. Careful inspection of the leads shown in Table 6-6 for peaks reveals a variety of outcomes. Not only is there diversity in the length of the lead among countries at individual peaks, there is also diversity within individual countries at different peaks. Moreover, the length of the lead at peaks varies from peak to peak. There does not seem to be any firm rule, therefore, for the leading, coincident, or lagging indicators of any country to lead the other countries into recession. The situation is similar at troughs. No single country seems regularly to act as bellwether in leading the industrial economies into or out of recession.

The ordering of turns in the entire sequence from leading to lagging indicators at the international cycle turning points does not significantly alter our previous conclusion that instability is not customarily set off by one particular country. The United States, Canada, and the United Kingdom have usually been among the first, while France, Italy, Belgium, and Sweden have usually been among the last to participate in changes in the international cycle, both at peaks and troughs, and for all three categories of indicators. In order to understand which country will lead other countries into recession or into recovery at any particular point in time, it is clearly essential to examine specific economic developments for each nation. However, neither the economic situation in a particular country nor the particular set of economic policies developed in any country has, based on our evidence, resulted in its consistently turning first. The picture is more complete if we include the timing of leaders and laggers because our perspective on instability recognizes that one cyclical phase tends to merge into the next. Our emphasis on growth cycles rather than classical cycles has not produced any evidence suggesting that this perspective should be changed.

Table 6-6. Timing at International Growth Cycle Turning Points, Composite Indexes of Leading, Roughly Coincident, and Lagging Indicators, Ten Countries.

	Lead (-) or Lag (+) at Peaks, in Months							*Leading*	
Leading	*2/57*	*2/60*	*2/62*	*3/66*	*8/69*	*11/73*	*9/79*	*Median*	*Mean*
United States	-17	-9	n.m.[a]	0	-6	-9	-6	-8	-7.8
Canada	-11	-6	-3	-2	-5	+4	+4	-3	-2.7
United Kingdom	n.m.	+1	n.m.	-16	-12	-8	+2	-8	-6.6
West Germany	-18	+6	n.m.	-13	0	-10	-7	-9	-7.0
France	+6	n.m.	-9	+3	+6	+6	0	+5	+2.0
Italy	n.a.[b]	+8	n.m.	n.m.	0	-4	n.a.	0	+1.3
Belgium	n.a.	n.a.	n.a.	n.a.	-1	+2	+1	+1	0
Netherlands	-21	n.m.	-12	+2	+12	+5	+5	+4	0
Sweden	n.a.	n.a.	n.a.	-4	+3	+6	n.m.	+3	+1.7
Japan	-1	n.m.	-6	n.m.	+6	+3	+5	+3	+1.4
	Lead (-) or Lag (+) at Peaks, in Months							*Coincident*	
Roughly Coincident	*2/57*	*2/60*	*2/62*	*3/66*	*8/69*	*11/73*	*9/79*	*Median*	*Mean*
United States	+1	0	+2	0	-5	0	-9	0	-1.6
Canada	-4	-4	+1	0	-6	+3	0	0	-1.4
United Kingdom	-14	n.m.	-11	-1	-3	+9	-3	-3	-3.8
West Germany	-16	n.m.	-12	-11	+11	-9	+5	-10	-5.3
France	+9	n.m.	n.m.	+4	+5	+8	+5	+5	+6.2
Italy	n.a.	n.a.	n.m.	n.m.	+7	+5	n.a.	+6	+6.0
Belgium	+3	n.m.	n.m.	-24	+16	+2	+4	+3	0
Netherlands	-5	n.m.	-11	-4	+17	+9	+5	0	+1.8
Sweden	n.a.	n.a.	n.a.	-10	+9	+6	+3	+5	+2.0
Japan	0	n.m.	-6	-20	+3	-1	+5	-1	-3.8

(*Table 6-6. continued overleaf*)

Table 6–6. continued

	Lead (–) or Lag (+) at Peaks, in Months							*Lagging*	
Lagging	*2/57*	*2/60*	*2/62*	*3/66*	*8/69*	*11/73*	*9/79*	*Median*	*Mean*
United States	+7	+3	+6	+8	+2	+8	+7	+7	+5.9
Canada	–1	+1	+7	+4	+3	+8	+7	+4	+4.1
United Kingdom	–11	n.m.	–11	+4	+11	+3	+7	+3	+1.6
West Germany	n.a.	n.a.	n.a.	–2	+13	0	n.a.	+6	+5.5
France	n.a.	n.a.	n.a.	n.a.	+2	+12	n.a.	+7	+7.0
Italy	n.a.	n.a.	n.a.	n.a.	+13	+13	n.a.	+13	+13.0
Belgium	n.a.	n.a.	n.a.	+10	+12	+14	+8	+11	+11.0
Netherlands	n.a.	n.a.	–9	+4	+12	+9	+5	+5	+4.2
Sweden	n.a.	n.a.	n.a.	+6	–3	n.m.	n.a.	+2	+1.5
Japan	+6	n.m.	+3	–16	+15	+8	+11	+7	+4.5

	Lead (–) or Lag (+) at Troughs, in Months						*Leading*	
Leading	*5/58*	*2/61*	*2/63*	*10/67*	*8/71*	*5/75*	*Median*	*Mean*
United States	–3	–2	n.m.	–6	–9	–2	–3	–4.4
Canada	–6	–3	–3	+1	–7	+16	–3	–0.3
United Kingdom	+1	n.m.	–11	–11	–5	+2	–5	–4.8
West Germany	+9	n.m.	+3	–8	0	–6	0	–0.4
France	+6	n.m.	–7	+8	+6	+4	+6	+3.4
Italy	+2	n.m.	+23	n.m.	+3	+37	+13	+16.25
Belgium	n.a.	n.a.	n.a.	+4	–4	+5	+4	+1.7
Netherlands	–6	n.m.	0	–11	+3	+5	0	–1.8
Sweden	n.a.	n.a.	–1	+6	+11	+33	+8	+12.3
Japan	+3	n.m.	–4	n.m.	+6	–3	0	+0.5

Roughly Coincident	Lead (-) or Lag (+) at Troughs, in Months						Coincident	
	5/58	2/61	2/63	10/67	8/71	5/75	Median	Mean
United States	-1	0	+9	0	-9	+2	0	0
Canada	+3	0	+5	+4	-9	+5	+4	+1.3
United Kingdom	+6	n.m.	0	+1	+6	+6	+6	+3.8
West Germany	+9	n.m.	0	-2	+11	+3	+3	+4.2
France	+15	n.m.	n.m.	+7	-3	+4	+6	+5.8
Italy	n.a.	n.a.	n.m.	n.m.	+19	0	+10	+9.5
Belgium	+9	n.m.	n.m.	+7	+11	+6	+8	+8.3
Netherlands	0	n.m.	0	+1	+15	+2	+1	+4.5
Sweden	n.a.	n.a.	n.a.	-3	+9	+37	+9	+14.3
Japan	+8	n.m.	-1	-19	+8	-3	-1	-1.4

Lagging	Lead (-) or Lag (+) at Troughs, in Months						Lagging	
	5/58	2/61	2/63	10/67	8/71	5/75	Median	Mean
United States	+3	+5	+21	+5	+7	+7	+6	+8.0
Canada	+7	+4	+1	+13	+15	+33	+10	+12.2
United Kingdom	+10	n.m.	+9	+8	+8	+11	+9	+9.2
West Germany	n.a.	n.a.	n.a.	+2	+12	+9	+9	+7.7
France	n.a.	n.a.	n.a.	+8	+12	+6	+8	+8.7
Italy	n.a.	n.a.	n.a.	+17	+17	+6	+17	+13.3
Belgium	n.a.	n.a.	n.a.	+12	+13	+9	+12	+11.3
Netherlands	+3	n.m.	0	+4	+12	+9	+4	+5.4
Sweden	n.a.	n.a.	n.a.	-2	n.m.	-15	-8	-8.5
Japan	+15	n.m.	+4	-13	+13	-45	+4	-5.2

Notes:
a. n.m. = No matching turn.
b. n.a. = No indicator available.

NOTES TO CHAPTER 6

1. Oskar Morgenstern, *International Financial Transactions and Business Cycles* (New York: NBER, 1959), especially pp. 32-73.

2. Ilse Mintz, *Trade Balance during Business Cycles: United States and Britain since 1880*, Occasional Paper No. 67 (New York: NBER, 1959; and *Cyclical Fluctuations in the Exports of the United States since 1879*, Studies in Business Cycles No. 15 (New York: NBER, 1967).

3. Arthur B. Laffer, "The Phenomenon of Worldwide Inflation: A Study in International Market Integration," June 1974. (Unpublished.)

4. Bert Hickman and Stefan Schleicher, "The Interdependence of National Economies: Evidence from the Link Project," *Weltwirtschaftsliches Archiv* 114, Heft 4 (1978): 642-708.

5. W. C. Mitchell, *Business Cycles, The Problem and Its Setting* (New York: NBER, 1927), p. 446.

6. Morgenstern, *International Financial Transactions*, p. 45.

7. Geoffrey H. Moore, "The State of the International Business Cycle," *Business Economics* (September 1974).

8. An alternative that we have not explored, which would provide wider geographic coverage, would be to trend-adjust the United Nations quarterly index of industrial production.

9. See W. Allen Wallis and Geoffrey H. Moore, *A Significance Test for Time Series and Other Ordered Observations*, Technical Paper No. 1 (New York: NBER, 1941), pp. 36-42; Geoffrey H. Moore, "Harvest Cycles" (Ph.D. dissertation, Harvard University, 1947).

10. Joseph A. Licari and Mark Gilbert, "Is There a Postwar Growth Cycle?" *Kyklos* 27, no. 3 (1974).

11. A different kind of test was applied to the duration of business cycle expansions and contractions measured in months. The distribution of durations was not significantly different from what would be expected in a series whose first differences were randomly ordered in time (J. Huston McCulloch, "The Monte Carlo Cycle in Business Activity," *Journal of Economic Inquiry* 13 (September 1975): 303-20). Tests were applied to the NBER business cycle chronologies for the United States (1854-1970), France (1865-1938), Germany (1879-1932), and Great Britain (1854-1938). A similar result for U.S. expansions and contractions (1854-1957) was obtained by Arthur M. Okun, "On the Appraisal of Cyclical Turning Point Predictors," *Journal of Business of the University of Chicago* 33, no. 2 (April 1960): 101-20. These results are not inconsistent with those for annual growth rates cited in the text, since growth rates are obtained by differencing. The practical implication of these tests is that knowledge of how long an expansion or contraction has already lasted is of little use in predicting when it will end. See E. E. Anderson, "Further Evidence on the Monte Carlo Cycle in Business Activity," *Journal of Economic Inquiry* 15, no. 2 (April 1977): 269-76.

12. In a recent study of U.S. growth cycle timing compared to the timing of a number of Pacific Basin countries, we found that the United States generally led at growth cycle turns for all the countries surveyed except Taiwan. See Philip A. Klein, "Forecasting Growth Cycles with Indicators in Pacific Basin Countries," *Columbia Journal of World Business* (Fall 1983): 3-19. Another recent study of synchronization in international business cycles is Colin Lawrence, "The Role of Information and the International Business Cycle," *Journal of International Economics* 17 (1984): 101-120.

13. In this connection, P. A. Klein has compared matched turns of classical cycle turning points for the United States and the United Kingdom for the periods available (1854-1938) and concluded that U.S. turns were apt to lag British turns (at both peaks and troughs) prior to World War II. For a comparable period (1879-1932), the average suggested a small lag for United States turns behind German turns, both at peaks and troughs. However, this was the result of a fairly long lag at both peaks and troughs in the earlier period (1879-1914) and a fairly long lead in the period covering the interwar years. See Klein, *Business Cycles in the Postwar World: Some Reflections on Recent Research* (Washington, D.C.: American Enterprise Institute, 1976), Table 7, p. 30.