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**President's Report
and Future Research
Possibilities**

**ON THE CLASSIFICATION OF RECENT CYCLICAL EXPERIENCE
JOHN R. MEYER AND DANIEL H. WEINBERG**

In recent National Bureau research fresh assessments have been attempted of some age-old questions concerning the classification and description of market economy business cycles.¹ Two important changes in the empirical facts of cyclical behavior have largely motivated these reassessments. The first is the seeming emergence of a systematic bias in public policy toward achieving lower unemployment at the expense of somewhat greater and more persistent price inflation. The second is that declines in absolute measures of output have become increasingly rare in the market economies of Europe, Japan, and North America—though we may well wish to revise this judgment if current difficulties persist much longer!

Perhaps the most formal recognition of this new awareness about cyclical phenomena is the definition of so-called growth cycles, in which a declining rate of growth, rather than an *absolute* decline, defines an economic retardation or recession. Similarly, an increasing emphasis is placed on real rather than monetary measures of cyclical performance. It has been

found, for example, that the leading indicators, first developed at the National Bureau and now maintained by the Department of Commerce, are for many purposes more useful when measured in deflated than in original values.²

As an approach to the classification of cyclical phenomena, both the shift in emphasis to the use of real rather than money measures and the development of the growth cycle concept must be deemed significant adaptations and, in all probability, improvements in the state of the art. Their utility, however, may be compromised by new departures in economic policy and cyclical behavior. As we have argued in previous National Bureau annual reports,³ it seems safe to assert that, at a minimum, it is less than fully edifying under modern business cycle conditions to adhere to a two-phase scheme that differentiates only between recessions (as defined, say, by traditional National Bureau procedures) and periods of nonrecession. The remarkably "unconventional" character of recent experience would seem to lend nothing but credence to that view.

Specifically, we suggested that a four-phase classification scheme might suit modern cyclical circumstances rather better than a two-phase

This introduction is adapted from a paper, "On the Usefulness of Cyclical Taxonomy," presented by the authors on June 25, 1975 at the 12th annual CIRET meeting in Stockholm, Sweden.

1. Ilse Mintz, "U.S. Growth Cycles," *Explorations in Economic Research*, Vol. I, No. 1, summer 1974. John Meyer and Daniel Weinberg, "On the Classification of Economic Fluctuations," *Explorations in Economic Research*, Vol. II, No. 2, spring 1975. The discussion in the opening paragraphs of this report draws heavily on the findings reported in depth in that article.

2. The Commerce Department has recently adopted a new leading indicators index that emphasizes deflated values. See monthly *Business Conditions Digest*, Department of Commerce, for details.

3. John R. Meyer, "The New Realities of the Business Cycle," National Bureau of Economic Research, Inc., *53rd Annual Report*, September 1973.

scheme.⁴ Indeed, a "four-stage taxonomy" would seem implicit in much of current forecasting and popular discussions of the business cycle. These four cyclical stages might be defined to a first approximation (and in expected sequence) as follows:

1. *Recession*—a period of some duration in which total aggregate activity declines somewhat from previous peak levels and is widely diffused throughout the economy.

2. *Recovery*—the early expansion out of a recession during which prices are relatively stable, total output is expanding, and productivity gains are pronounced.

3. *Demand-pull inflation*—a period during which production is at capacity constraints but effective demand is even greater, thus resulting in rising prices and declining productivity.

4. *Stagflation*—a situation of stagnation or very slow growth at a relatively high level of activity mixed with price inflation.

To test this four-stage scheme (and, in addition, to test the general adequacy of a more "mechanized" approach to cyclical classification) we applied multivariate discriminant analysis to time series data on the performance of the United States economy, starting with February 1947. These dates not only correspond roughly to the emergence of the new policy orientation, but also to when good quarterly and monthly data on aggregate economic performance in the United States first became available. By a combination of prior knowledge of the cyclical history of the post-World War II period in the United States and application of the discriminant analysis, we arrived at a classification of the period from February 1947 through September 1973 (the last date on which we had data for our original analysis) into a four-phase

scheme (see Table I-1).

The only major instance in which the four-way specification seemed to fail totally was in the years 1958 through 1960, although even this result was not totally unanticipated since there was much discussion during that period about the abortive character of the 1958–1959 recovery. In addition, we found that the period from 1953 to 1958 could be defined as either a four-stage cycle, in which the fourth, or stagflation, phase was extremely abbreviated, or as a three-stage cycle in which the stagflation stage was totally eliminated. We would stress, moreover, in keeping with the hypothesis that modern business cycles may be as much a product of conscious policy decisions as of "automatic" market forces, that we do not suggest the "inevitability" of these four phases. They could occur or not occur depending on the policy choices made. Accordingly, we did not consider the absence of a clear-cut stagflation phase in some postwar cycles as necessarily a major failing.

The average values for the variables used in carrying out the classification scheme for the four cyclical stages, as defined in Table I-1, are shown in Table I-2. These averages more or less conformed with our (and, we believe, most other) prior expectations about the differences in the different cyclical stages. There remains, though, the usual question of whether our results are a curious and unique artifact of the particular sample that we used. That is, would we find a similar classification sensible and meaningful for other economies or other time periods? A particularly interesting exercise, obviously, would be to extrapolate beyond our original sample period, ending in September 1973, into the stormy and highly unique cyclical experiences of 1974 and early 1975.

The discriminant analysis, for example, can be used to make cyclical classifications for the months of late 1973 on through 1974 and into the first quarter of 1975 (the most recent period for which data are available at the time of this writing). This exercise, of course, also provides an extrapolative test of the generality of our analytical scheme. The results from such a forward extrapolation (giving those months after September 1973 a diffuse or null prior, i.e., an equal prior probability of occurrence of each

4. Of course, in advancing a four-phase scheme it could be said that we were echoing very traditional concepts, built around sinusoidal alterations derived from physical analogs. However, our four-phase scheme was rather more behavioral—and certainly less regular or periodic—than that suggested by a sine curve. Two inflection points and two turning points, unless augmented by behavioral explanations and hypotheses, do not necessarily connote much about economic conduct. In pursuing a four-phase behavioral description of the cycle, we could be said to be resurrecting early concepts advanced by Wesley Mitchell. See Wesley C. Mitchell, *Business Cycles: The Problem and Its Setting* (New York: National Bureau of Economic Research, 1927).

TABLE I-1
Classification of U.S. Business Cycles into a Four-Stage Scheme
February 1947 through September 1973

Starting Dates			
Recession	Recovery	Demand-Pull	Stagflation
?	?	?	May 1948
December 1948	November 1949	July 1950	January 1951
November 1953	August 1954	March 1955	—
September 1957	May 1958	—	—
June 1960	February 1961	May 1965	December 1967
January 1970	December 1970	January 1973	?

TABLE I-2
Average Value of Variables for Four Cyclical Stages^a since World War II

Variables	Recession	Recovery	Demand-Pull	Stagflation	Average, All Periods	Availability ^b
Money GNP ^c	-0.79	8.43	8.48	6.46	6.66	Q
Real GNP (1958 dollars) ^c	-2.69	6.56	4.07	3.29	3.79	Q
Govt. surplus (+) or deficit (-) as percent of GNP	-1.14	-0.64	1.47	0.17	0.05	Q
Gross gov't. expenditures ^c	6.35	5.32	10.22	14.40	8.74	Q
GNP price deflator ^c	1.82	1.89	4.41	3.20	2.87	Q
Consumer price index ^c	1.37	1.47	4.49	3.71	2.78	M
Food only ^c	0.99	0.98	6.30	3.12	2.93	M
All commodities other than food ^c	-0.34	1.03	3.64	2.80	1.93	M
Wholesale price index ^c	-0.93	1.43	6.08	1.39	2.39	M
Industrial commodities only ^c	-0.82	1.44	5.44	1.89	2.33	M
N.Y. Stock Exchange composite price index ^d	0.20	1.15	0.19	0.07	0.51	M
Compensation per manhour ^c	2.38	5.12	6.25	7.47	5.51	Q
Output per manhour ^c	1.57	4.68	2.41	2.36	3.09	Q
Unit labor cost ^c	0.78	0.44	3.84	5.12	2.42	Q
Prime rate ^e	-0.142	0.028	0.096	0.065	0.029	M
Corporate bond rate ^e	-0.010	-0.005	0.042	0.037	0.016	M
Money supply ^e						
M1	1.74	3.99	2.96	3.85	3.33	M
M2	4.79	7.02	5.33	3.83	5.55	M
Unemployment rate ^f	5.46	5.76	4.08	3.29	4.73	M
Net exports as percent of GNP	0.36	0.20	0.45	0.22	0.30	Q

a. The dates of the cyclical stages are shown in Table I-1.

b. Q = data available on a quarterly basis; M = data available on a monthly basis. Data available from source only on a quarterly basis (Q) were interpolated by a smoothing procedure so that they could be used on a monthly basis for discriminant analysis.

c. Percent change; seasonally adjusted at an annual rate.

d. Percent change.

e. Change per month.

f. Seasonally adjusted at an annual rate.

TABLE I-3
Extrapolation of Basic Analysis

Date		Posterior Probability of			
Year	Month	Recession	Recovery	Demand-Pull	Stagflation
1973	Oct.	0.470*	0.028	0.442	0.060
	Nov.	0.540*	0.004	0.441	0.015
	Dec.	0.687*	0.003	0.310	0.000
1974	Jan.	0.496	0.000	0.504*	0.000
	Feb.	0.991*	0.000	0.009	0.000
	Mar.	0.000	0.000	0.998*	0.002
	Apr.	0.000	0.000	1.000*	0.000
	May	0.000	0.000	1.000*	0.000
	Jun.	0.026	0.011	0.963*	0.000
	Jul.	0.001	0.001	0.998*	0.000
	Aug.	0.651*	0.001	0.348	0.000
	Sep.	1.000*	0.000	0.000	0.000
	Oct.	1.000*	0.000	0.000	0.000
	Nov.	1.000*	0.000	0.000	0.000
	Dec.	1.000*	0.000	0.000	0.000
1975	Jan.	1.000*	0.000	0.000	0.000
	Feb.	1.000*	0.000	0.000	0.000
	Mar.	0.972*	0.028	0.000	0.000

* Most probable group.

cyclical phase, in the discriminant analysis) are shown in Table I-3.

Several aspects of these results are quite interesting. First, and most pronounced, the discriminant analysis seems to waver between identifying late 1973 and early 1974 as recession and demand-pull. The discriminant extrapolations suggest that November and December 1973, as well as January and February 1974 are periods of recession. The analytical specification then swings back to demand-pull, lasting at least until mid-summer. Explanations for this ambivalence are not too difficult to identify. The identification of late 1973 and early 1974 as recession corresponds to the Arab oil embargo and its impact on the U.S. economy. The re-emergence of demand-pull in March 1974 reflects the end of that embargo and the impending removal of price and wage controls on the U.S. economy, formally ended in April. Obviously, uncertainty over whether the economy was really in demand-pull or recession in late 1973 and early 1974 creates some difficulties in dating when the current U.S. recession may have begun.

Another striking aspect of these projections

into late 1973 and 1974 is that the evidence would tentatively suggest that stagflation was skipped in this most recent cyclical round. At most, one could argue that there was perhaps a touch of stagflation in October 1973, and this would seem meaningful only if one adopted November 1973 as the starting date for the recession. In short, the U.S. economy apparently moved almost directly from demand-pull into recession either in November 1973 or August 1974.

The virtual absence of any identifiable stagflation in late 1973 and 1974 conflicts with an oft-expressed view that the U.S. economy during 1974 was in a classic stagflation. The discriminant analysis indicates that this was certainly not the case by postwar precedents. Earlier stagflations have been periods characterized, as the statistics in Table I-2 indicate, by somewhat slow, but *not* negative rates of growth in total output and real GNP. The 1974 experience, by contrast, was one of quite dramatic declines in real GNP combined with sharp price inflation. This mix has led some observers to suggest that a new hybrid or terminology is needed to describe the 1974 experience, such

as "slumpflation" or "inflationary recession."

The situation would not, moreover, be significantly clarified if more traditional methods of defining the cycle were used instead of the discriminant analyses. In fact, considerable disagreement exists among traditional cycle analysts in the United States about whether the starting date of the current U.S. recession should be placed at November 1973 or August 1974. In short, the ambivalence so evident in the discriminant analyses is also to be found in the conventional analyses—a hardly surprising fact in that the same underlying source data are used in both.

Charting, for example, is a time-honored method of analyzing cyclical data. Thus, those arguing for an August 1974 date as the beginning of the current U.S. recession could use diagrams such as those shown in Figure I-1 to suggest that an August 1974 starting date charts better against the historical evidence on earlier

recessions than a November 1973 beginning. From the charts in Figure I-1, it does seem on balance that this may be so (though the answer depends to some extent on exactly how one "eyes" the data). In rebuttal, those favoring the November 1973 starting date would argue that a similarity of charting patterns is not so important as ascertaining the date when economic activity in general more or less reached peaks, regardless of causal factors or reasons; what is deemed significant by these analysts is that November 1973 is the date of so many cycle peaks. Inflation, moreover, may account for some of the divergences in tracking patterns: the revised leading indicators, based mainly on deflated data, track the historical experience rather well with November as the starting date.

The complications inherent in doing an immediate or hasty diagnosis by conventional means can also be seen by looking at the data in Table I-4. The National Bureau's standard tests

TABLE I-4

The 1973–1974 Business Cycle Experience as Seen at Various Times
During that Period (Assuming November 1973 as Start of a Recession)

	End of May 1974	Early July 1974	Early Nov. 1974	Early Jan. 1975
Duration in months of decline in				
GNP current \$	c	c	c	c
GNP constant \$	3	6	9	9
Industrial production	4	4	4	12
Nonfarm empl.	2	2	2	2
Depth * (percent)				
GNP current \$	c	c	c	c
GNP constant \$	-1.6	-2.1	-2.7 ^d	-2.7 ^d
Industrial production	-2.4	-2.4	-2.4	-4.3
Nonfarm empl.	-0.2	-0.2	-0.2	-0.6
Unemployment rate				
Maximum	5.2	5.2	6.0	7.1
Increase	+0.6	+0.6	+1.4	+2.5
Diffusion (percent)				
Nonfarm industries:				
maximum percentage with declining employment ^b	52 Jan. '74	52 Jan. '74	52 Jan. '74	60 Nov. '74

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

b. Based on changes in employment over six-month spans in thirty nonagricultural industries, centered on the fourth month of the span.

c. No decline.

d. As of the third quarter of 1974.

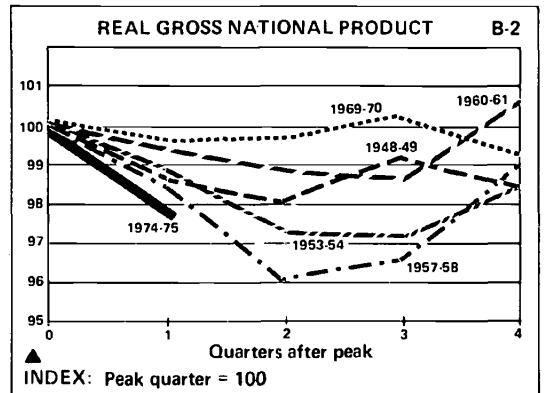
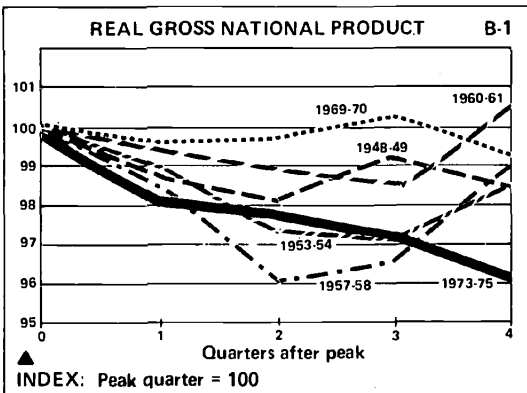
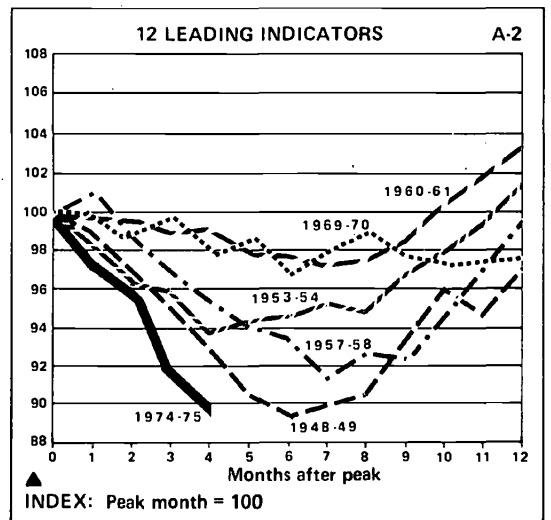
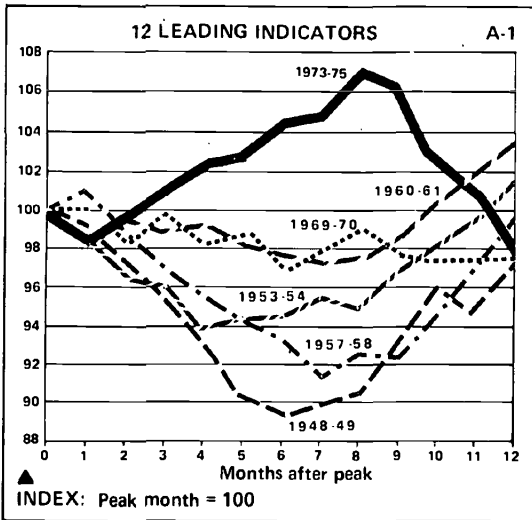
for the existence of a recession are embodied in the so-called three D's: duration, depth, and diffusion. In Table I-4 some conventional measures of these three D's are shown as they might have been seen at various times during 1974 and early 1975. Actually, the numbers in this table have been "purified" because all the numbers are reported as *if* corrections in the series available today were also available on the dates shown in the column headings; that is, the analysis was not further obfuscated by incorporating preliminary figures that were later corrected.

Even without this complication, the figures are hardly unambiguous guides to the 1974

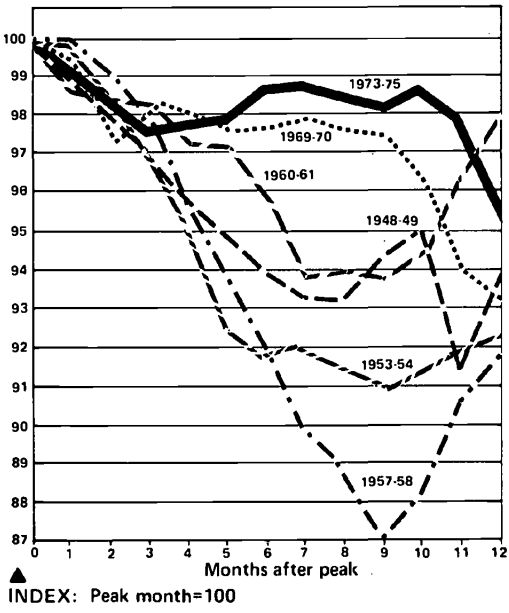
experience. They again show, as in the discriminant analysis, that the economy, after moving downward for four months after November 1973, then stabilized and moved sideways for some while. This is particularly true of industrial production and unemployment. The analysis is also again complicated by continuing inflation. It took until the first quarter 1975 for the current dollar GNP figures to turn down. Nevertheless, very substantial weaknesses in the economy are also evident beginning as early as November 1973 and persisting throughout 1974. Thus, even if the economy is not deemed to be in recession beginning in November 1973, it is clearly and continuously in a rather weakened

Figure I-1

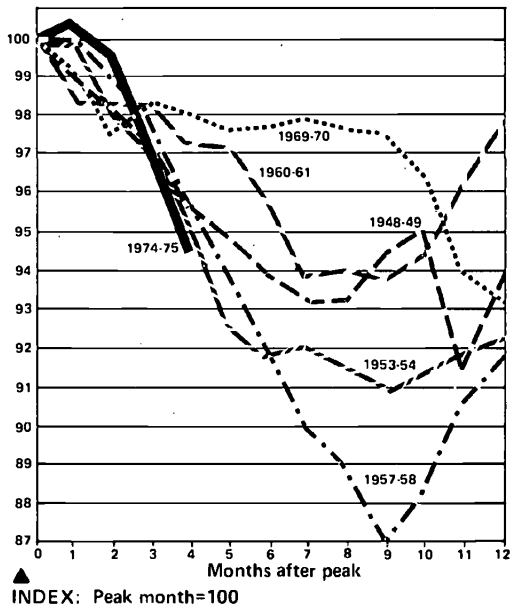
Charts of Recent Times Series Behavior



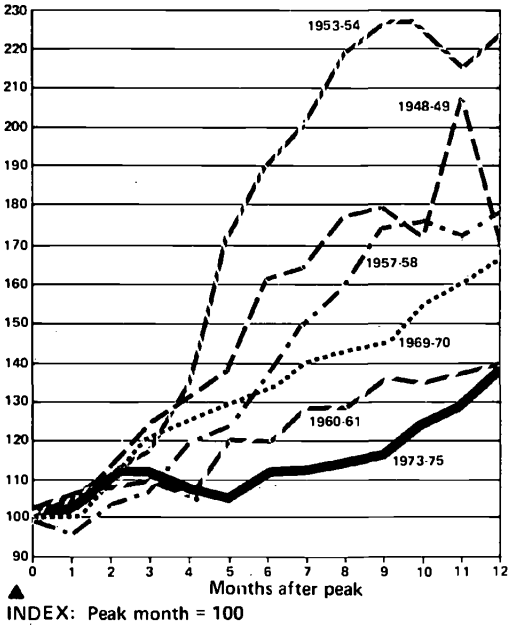
FEDERAL RESERVE BOARD PRODUCTION INDEX C-1



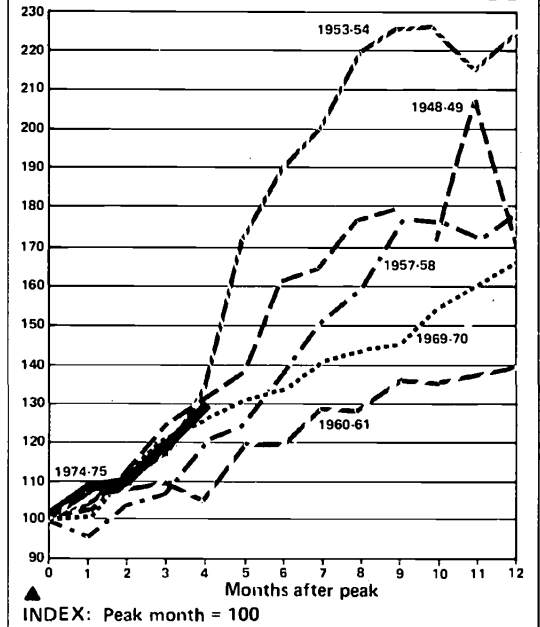
FEDERAL RESERVE BOARD PRODUCTION INDEX C-2



UNEMPLOYMENT RATE D-1



UNEMPLOYMENT RATE D-2



SOURCE: *Quarterly Business Conditions Analysis*, Irwin L. Kellner, Vice President and Economist, Manufacturers Hanover Trust Company (March 1975), pages 2 and 4.

state after that date. After August the weaknesses only become more evident, more pronounced, and more diffused.

Obviously, these findings are not encouraging when one considers the potential usefulness of taxonomic exercises for prompt and timely identification of the "cyclical pathology" for policy purposes. Specifically, both conventional visual techniques for doing cyclical classifications and our discriminant analyses are remarkably ambivalent about both the character and the timing of recession's onset in the United States during late 1973 and 1974. Both approaches can be used to build a case for either November 1973 or August 1974 as the starting date of the current U.S. recession. Accordingly, a simple dichotomous classification of current experience as being either a recession or not a recession would not seem too promising for establishing meaningful policy guidelines, at least if the current recession experience is not too atypical.

Classification is, of course, simply a reflection of the current status of many different series and variables that one might expect those making policy decisions to scrutinize. Given the ambiguities of translating these data into a taxonomy, the policymaker would seem well advised to go back to the primary sources instead of relying on any secondary classification derived from these underlying data. The moral is

surely obvious: an aggregate label of the economy as being in recession or not in recession really does not convey all that much information. The policymaker, with a variety of different policy options at his disposal, must go beneath simple dichotomous labels to determine a sensible selection from these options.

Mechanization or minimization of the "human factor" in the cyclical classification process seemingly does little to alter this conclusion. Specifically, our mechanized, or computerized discriminant analysis yields much the same, and conflicting, signals as do more conventional analyses. To some extent, of course, one might consider that a triumph for the computer. Given the same information as the human analyst, it ends up with the same uncertainties and vagaries! In the present state of the art, therefore, no substitute seems available for intensive, detailed, and perhaps highly subjective and personalized, scrutiny of the underlying data by those who must make private or public policy assessments. Perhaps, then, the major contribution that cyclical taxonomy will make will be to contribute to our historical understanding of cyclical phenomena in market economies. That, of course, is not necessarily a trivial contribution, but it is not the same as saying that cyclical taxonomies are important tools for immediate policy decisions as well.