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Volume Author/Editor: Geoffrey H. Moore

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Chapter Title: A New Leading Index of Employment and Unemployment

Chapter Author: Geoffrey H. Moore

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Chapter 22

A New Leading Index of Employment and Unemployment

One of the composite leading economic indicators published by the U.S. Commerce Department is the "marginal employment adjustments" index. Its title derives from the fact that its components reflect employment adjustments typically made by employers and employees during an early stage of the business cycle. Three of the four components pertain to manufacturing: the average workweek, the accession rate, and the layoff rate. The fourth, initial claims for unemployment insurance, is broader in scope. The workweek reflects changes in the amount of overtime or in the number of workers employed part time; such adjustments can usually be made more promptly, and are easier to reverse when necessary, than decisions to hire and fire. The accession rate includes persons newly hired as well as those rehired after layoff, and the layoff rate includes both temporary and permanent layoffs. Initial claims represent the number of persons currently applying for unemployment compensation, rather than those who are already receiving it.

Each of the four series typically leads at business cycle peaks and leads or is roughly coincident at troughs. Thus, the composite of the

The author wishes to thank Richard Conger, who did the statistical work underlying this chapter. Research for the project was supported by a grant from the Economic Development Administration of the U.S. Department of Commerce; however, that agency bears no responsibility for the content of the chapter. For further details on the new index, including historical and current data, please contact the Center for International Business Cycle Research, Rutgers University.

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four series has led at every one of the seven business cycle peaks and six troughs between 1948 and 1980. The leads at troughs, however, have been short; for four of the six troughs, the lead was only one month. At peaks, the leads averaged twelve months, and none was shorter than eight months.

One reason the leads are long at peaks and short at troughs is that the index, as well as each of its components, displays virtually no long-term growth. At its earliest peak, in January 1948, the index was 102.5 (1967 = 100). At its latest peak, in December 1978, the index stood at 99.1. Because the marginal employment adjustments index does not reflect the substantial growth of the economy during the intervening thirty years, its flat trend tends to produce early peaks and late troughs when compared with aggregate economic activity. This characteristic is a disadvantage for some purposes and an advantage for others. Warnings of a recession one year or more ahead are apt to be discounted, in view of the inevitable uncertainties, while signs of recovery one month ahead of the event are of limited value. On the other hand, the marginal employment adjustments index can be expected to be symmetrical in its behavior with respect to the peaks and troughs of some important economic indicators, such as the unemployment rate, the employment ratio, or the capacity utilization rate, which are also largely trendless.

There is a need, therefore, for a leading index in two forms, one with a trend corresponding to the growth in the economy, the other without. The trend requirement can be met by the same procedure used in the Commerce Department's comprehensive leading index, namely, reverse trend adjustment. Here the long-term trend in the index is set equal to a "target trend" observed over a certain period, and the current figures are adjusted by the same monthly increment required to achieve the target trend in the given period. In addition, it would be desirable to take advantage of component series that are available promptly, and at the same time reduce the considerable weight given to manufacturing in the existing index (three out of four series). Less emphasis on a single sector may reduce the size of subsequent revisions of the index and smooth out erratic fluctuations, especially if the expanded sector coverage is provided by series from different sources.

With these objectives in mind, the Rutgers Center for International Business Cycle Research has constructed a new index based upon four components. Two are included in the existing index: average workweek and initial claims. The third series is average weekly overtime hours in manufacturing. This is a component of the average workweek, but is included as well because it is smoother and less fre-

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quently affected by holidays. The fourth series is the ratio of voluntary to involuntary part-time employment. The cyclical movements in this ratio are attributable primarily to the denominator, which reflects employers' decisions to shorten work hours in response to current or anticipated adverse business conditions. It behaves as a leading indicator at peaks and is roughly coincident at troughs.¹ It is based on data from the Current Population Survey of households and hence is statistically independent of the other series in the index, which are based on the Bureau of Labor Statistics establishment survey (average workweek and overtime hours) or unemployment insurance records (initial claims). Also, it covers all sectors of the economy, not just manufacturing.²

Hence the new index includes two series that are restricted to manufacturing (average workweek and overtime hours) and two that are broader in scope (initial claims and part-time employment ratio). Only two of the series are from the same data source. Moreover, all the components are usually available by the end of the first or second week of the month following the month to which they refer. As a result, the new leading index is compiled by the Rutgers Center concurrently with other employment data, and about three weeks earlier than the existing index. In its original form the index has virtually no long-run trend, but it is also compiled with a growth trend equal to that used in the Commerce Department's leading, coincident, and lagging indexes, namely 3.3 percent annually, or 0.272 percent per month.³

The new index without the target trend factor yields results very similar to those from the present index. Five of the turning points are in the same month in both indexes, one is six months earlier in the new index, six are a month later, and one is two months later. Thus the new index is often not quite as prompt as the existing one in reaching its high and lows. However, the new index is somewhat smoother. Its relation to the unemployment rate is shown in Table 22-1. It reaches its highs and lows prior to the corresponding turns in unemployment in every instance except the January 1948 peak, and the average lead is about six months. Hence the new index should prove to be a useful leading indicator of unemployment, especially if, as we expect, it is less subject to revision than the present index.

Not only does the new index lead, but the magnitude of its changes are rather closely correlated with subsequent changes in the unemployment rate. (See Figure 22-1.) For example, a regression of the year-to-year change in unemployment on the change in the new index during the last six months of the preceding year yields a corre-

Table 22-1. Relationship of the Unemployment Rate and the New Leading Index of Employment (without Target Trend) to the Business Cycle, 1948-1980 (in months).

Business Cycle	Lead (-) or Lag (+) at Business Cycle Turns		Lead (-) or Lag (+) of New Index at Turns in Unemployment Rate
	Inverted Unemployment Rate	New Leading In- dex of Employ- ment without Target Trend	
Peak November 1948	-10 ^a	-10 ^a	0 ^a
Trough October 1949	0	-5	-5
Peak July 1953	-1	-8	7
Trough May 1954	+4	-1	-5
Peak August 1957	-4	-21	-17
Trough April 1958	+3	0	-3
Peak April 1960	-2	-11	-9
Trough February 1961	+3	-2	-5
Peak December 1969	-7	-14	-7
Trough November 1970	+9	0	-9
Peak November 1973	-1	-7	-6
Trough March 1975	+2	0	-2
Peak January 1980	-6	-13	-7
Mean lead or lag			
At peaks	-4	-12	-8
At troughs	-4	-1	-5
At both turns	-1	-7	-6

^aInitial month of series. Hence peak might have been earlier and index might have led the unemployment rate.

lation coefficient of -0.90 during the period 1949-1980 (thirty-one observations). Thus, by this simple method, the unemployment rate was forecast for the year ahead with an average error of about one-half percentage point.⁴

The new index with the target trend bears a fairly close relationship to nonfarm employment. (See Figure 22-2.) However, the trend is steeper because the trend rate of growth in nonfarm employment is 2.2 percent annually, compared with the 3.3 percent target trend in the new index; the latter figure was selected to permit comparison with series other than nonfarm employment. The new index leads employment at twelve of the thirteen peaks and troughs between 1948 and 1980, and is coincident once. The average lead is three months and the leads are about as long at troughs as at peaks (Table 22-2).

Figure 22-1. Relation of New Leading Index of Employment to the Unemployment Rate, 1972-1980.

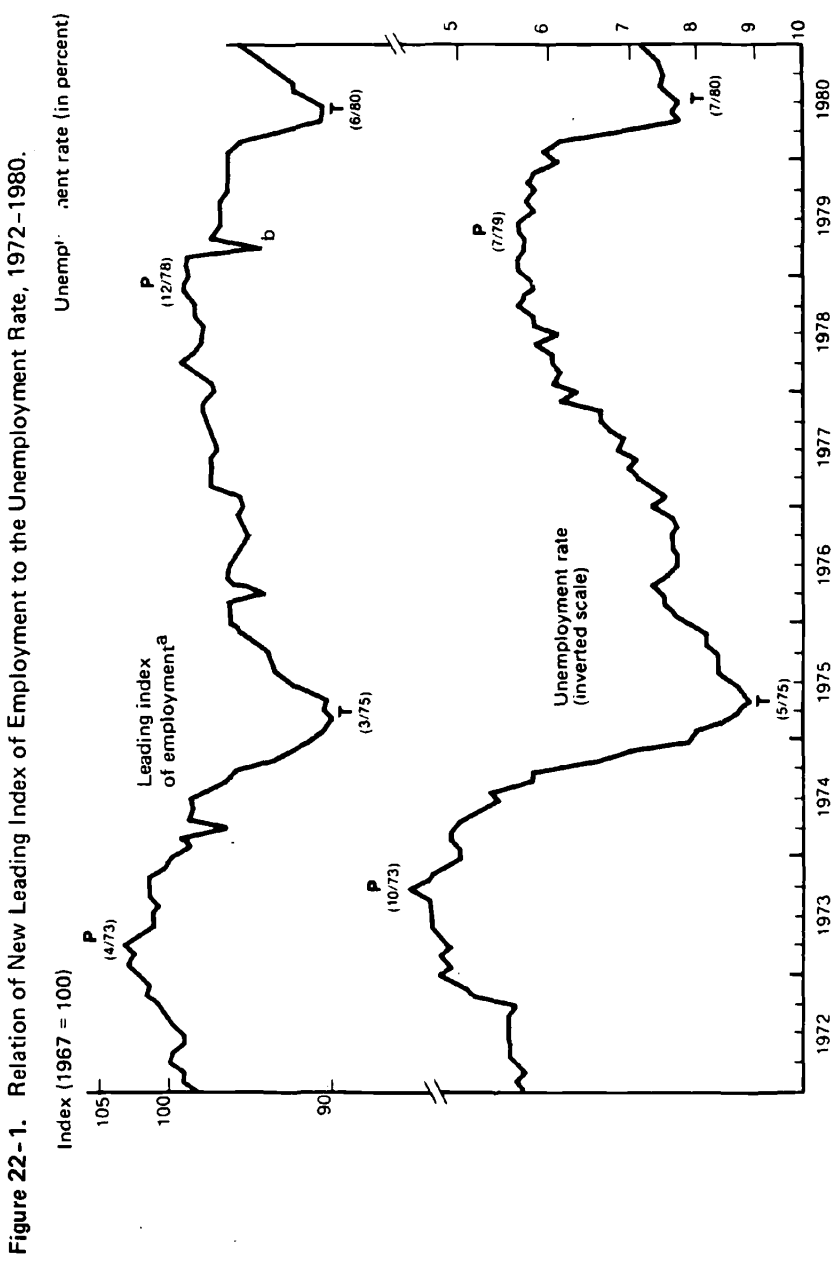
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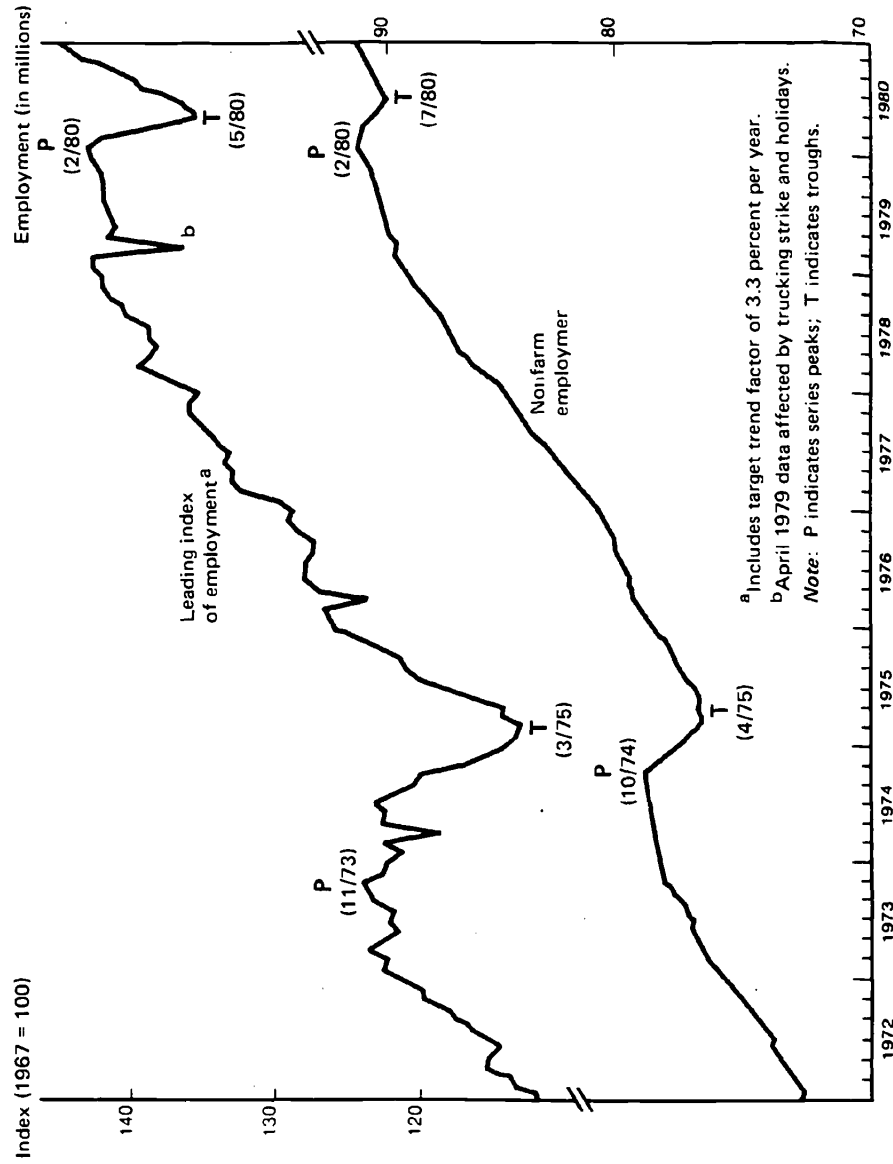
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^aExcludes target trend.
^bApril 1979 data affected by trucking strike and holidays.
 Note: P indicates series peaks; T indicates troughs.

Figure 22-2: Relation of New Leading Index of Employment to Nonfarm Employment, 1972-1980.



^a includes target trend factor of 3.3 percent per year.
^b April 1979 data affected by trucking strike and holidays.
 Note: P indicates series peaks; T indicates troughs.

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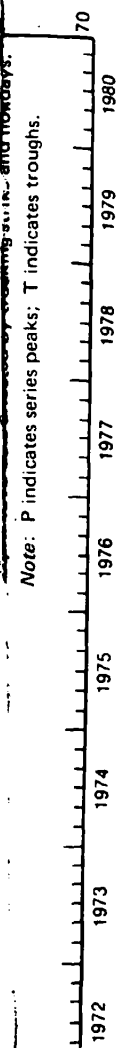
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Table 22-2. Relationship of Nonfarm Employment and the New Leading Index of Employment (with Target Trend) to the Business Cycle, 1948-1980 (in months).

Business Cycle	Lead (-) or Lag (+) at Business Cycle Turns		
	Nonfarm Employment	New Leading Index of Employment with Target Trend ^a	Lead (-) or Lag (+) of New Index at Turns in Employment
Peak November 1948	-2	-4	-2
Trough October 1949	0	-6	-6
Peak July 1953	-1	-3	-2
Trough May 1954	+3	-2	-5
Peak August 1957	-5	-8	-3
Trough April 1958	+1	0	-1
Peak April 1960	0	-3	-3
Trough February 1961	0	-2	-2
Peak December 1969	+3	0	-3
Trough November 1970	0	0	0
Peak November 1973	+11	0	-11
Trough March 1975	+1	0	-1
Peak January 1980	+1	0	-1
Mean lead or lag			
At peaks	+1	-2	-4
At troughs	+1	-2	-2
At both turns	+1	-2	-3

^aTarget trend is that used in *Business Conditions Digest* composite indexes, 0.272 percent per month.

Compared with the existing index of this type, the new leading index of employment and unemployment has a broader economic coverage and is available more promptly. In its trendless form the new index is comparable with other series that are essentially trendless, such as the unemployment rate, employment ratio, or capacity utilization rate. It consistently leads the unemployment rate at both peaks and troughs by about six months on average. The index is also constructed with a trend, in which form it is comparable with series that grow with the economy, such as the employment level, which it leads by two or three months at both peaks and troughs. The new index, therefore, offers an early warning of cyclical shifts in employment and unemployment.



POSTSCRIPT: AN UPDATE ON LEADING AND COINCIDENT EMPLOYMENT INDEXES

Two additional components have been included in the leading employment index. The *layoff rate* is the ratio of the number of job losers on layoff to total civilian employment. The *short-duration employment rate* is the percentage of the labor force who has been unemployed for less than fifteen weeks. Both these series, treated invertedly in the index, have usually led downturns and upturns in the business cycle, as well as in employment and unemployment. Data for these as well as the other four components are available for a given month on the first Friday of the following month. Prompt availability is one of the hallmarks of this leading index.

A coincident employment index is also constructed on the same date. It contains three series pertaining to employment and two to unemployment (treated invertedly). The selection takes advantage of all three of the major sources of information about labor market conditions. The household survey produces figures on the *total number employed* and the *unemployment rate*. The establishment survey provides the *number of nonfarm jobs on payrolls* and *nonfarm employee hours* (which avoids double counting persons on more than one payroll). The *insured unemployment rate* pertains to the very large fraction of the experienced workforce covered by insurance. The definitions, concepts, and sample size of these sources vary. By lumping the five series into an index, the result is a less erratic and more reliable indicator of the ease or tightness of the labor market, whose turning points have been very nearly coincident with the business cycle. In this respect it differs from two of its components, the total and insured unemployment rates, which have tended to lag at business cycle troughs and to lead at peaks.

NOTES TO CHAPTER 22

1. See Chapter 18 of the first edition of this book (Cambridge, Mass.: Ballinger, 1980).
2. Since this was written a fifth leading indicator has been included in the index: the *layoff rate*. It is based upon household survey data on the number of job losers on layoff divided by total civilian employment.
3. The trend rates are compound monthly rates between average levels during the peak-to-peak specific cycles 1948-1953 and 1974-1979. The target trend is the average for the four components of the coincident index: nonfarm employment, real personal income less transfer payments, industrial production, and real manufacturing and trade sales. It is almost the same as the rate for real gross national product. See *Business Conditions Digest* (March 1979): 107 for more details.
4. See also Geoffrey H. Moore "Forecasting Unemployment with a Leading Index," *Monthly Labor Review*, 1983.

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