FORECASTING WITH LEADING INDICATORS: REGIONAL ECONOMIC SENSE OR NONSENSE?

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Leading indicators have a long history of usefulness in short-run economic forecasting for national economies. Their use in a regional setting has a shorter history, and the construction of composite indexes composed of leading indicators is a relatively recent phenomenon. Kozlowski [13] has shown that such indexes achieve a primary forecasting objective by signaling significant shifts in the cyclical phase of regional economic activity in advance of the occurrence over several business cycles. He also has demonstrated that these indexes have some potential for forecasting quantitative changes in key regional variables, although they typically are not used in that manner.

Composite indexes of leading indicators have been developed and now are used in many states and metropolitan areas. Table 1 lists regional indexes by source, number of components, and frequency of data. These indexes vary in terms of frequency of data (sixteen are based on monthly time series and seven on quarterly data) and the number of components which ranges from as few as three to as many as 11. The component structure itself also varies greatly among these regions. For example, the Kentucky and Arizona indexes include the most components. The former has 83 percent and the latter 30 percent of its components drawn from labor market time series. At the low end is the Pennsylvania index which has only three components, two of which are labor market series. Overall, labor market indicators account for 44 percent of all series used to construct the composite indexes listed in Table 1. These range from more than 75 percent in Idaho, Kentucky, and South Carolina to 25 percent in Colorado, Fort Wayne, and Philadelphia. It should be noted that indicators of investment processes account for only 20 percent of all series utilized and that the Kentucky index does not incorporate any time series reflecting regional

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investment processes, although it has the most components among the group.

An explanation of the performance of a composite index of leading indicators resides in the behavior of its components. In order to understand why such indexes lead regional aggregate economic activity, it is necessary to analyze the cyclical movements of individual components. In a spatial setting there needs to be some theoretical foundation; otherwise the composite index models may represent statistical regularities in regional economies without providing an explanation about such behavior.

The wide variation in the component structure of regional leading indicator indexes gives the distinct impression that each regional composite represents a special case study of patterns endemic to a state or a metropolitan area. This article examines the patterns of cyclical timing behavior of the component series in a group of regional composite indexes over a 14 year period from 1972 to 1985 during which three business cycle peaks and troughs occurred. The issue of whether regional leading indicator models reflect acceptable theoretical explanations of regional business cycles or are merely *ad hoc* statistical approaches to short-run forecasting is addressed.

Composite Indexes: Theory and Construction

Leading indicators are short-run forecasting devices that provide advance signals of shifts in the cyclical phase of a regional economy. They provide early warning signals of a shift from expansion to recession or from recession to recovery. Cyclical movements in individual indicators are highly variable and, as a result, composite indexes have been constructed to capture and summarize the behavior of numerous individual series. These indexes, constructed from sets of leading economic time series, are designed to change cyclical phase prior to changes in regional coincident indicators such as production, income, and employment or some combination of these indicators that yields a regional reference cycle.

Recent regional research demonstrates that recessions and recoveries usually are preceded by changes in composite indexes of leading indicators (Kozlowski [13]). Even for composite indexes, the lead times are variable. The indexes share a propensity to generate false signals from time to time. Although composite indexes are not perfect predictors of cyclical changes in regional economies, their

record appears to be reasonably good even though they vary widely in terms of how they are constructed.

The construction of composite indexes is a sequential process of component selection and weighting in order to compute a weighted average that summarizes the behavior of the selected leading indicators. In most cases, components are seasonally adjusted and weights derived from regression analysis, factor analysis, or amplitude adjusted techniques. These procedures account for the volatility of individual components or their effects in explaining and forecasting the movements of selected regional variables. Lesage and Magura [14] have attempted to devise optimal weights for a leading indicator model of employment in several metropolitan areas.

The focus here is the component structure of a group of indexes and the cyclical timing of individual series. Component structure refers to the regional economic processes represented by the index models. Leading indicator models are not designed to determine causes of regional business cycles, but represent one element of causality; that is, the notion of a temporal ordering of cyclical turning points.

Although no unified theory of business cycles exists, economists have developed an economic rationale for the behavior of leading indicators that represent key processes in a national economy. (See Moore [18] and Zarnowitz and Moore [29].) That rationale is derived from a sequence of events approach to short-run forecasting that provides a general theoretical framework. Because cyclical swings manifest themselves as sequences of events in private enterprise economies, processes selected for leading indicator models are symptomatic of broad based changes. This should be the case whether a national or regional index is being constructed. Economic processes that tend to lead aggregate activity are likely to reflect anticipations and commitments. The rich tradition of research about these types of activities and their measurement is summarized by Moore [17].

The behavior of profits is a case in point because profits are a leading indicator. Why do profits lead aggregate economic activity; begin to fall, for example, while the economy is still expanding? The explanation is found in the behavior of costs (labor costs and interest rates) that rise in the latter part of an expansion and in the slowdown in productivity growth. Because costs rise faster than prices, profit margins fall. This dims business prospects, setting the stage for cuts in production, employment, and income. Although this pattern varies from one business cycle to the next, it has been repeated regularly. In

addition, monetary and real factors exert varying impacts from cycle to cycle, and external shocks also play a role. Research of recent vintage by Long and Plosser [15] and McCallum [16] on national business cycles focuses on monetary and real causes of cyclical swings.

In short, a wide range of economic processes can be expected to exhibit cyclical behavior. Leading indicators should cover key aspects of numerous processes in order to capture a temporal sequence in regional economies. Regional analysts are restricted by data limitations, and they cannot tap the wealth of time series available for the national economy. Nevertheless, the component structure of regional indexes of leading indicators should represent economic processes that are temporally significant.

Component Structure

Nine indexes were selected for analysis from the list in Table 1. This group includes five states: Nebraska, Ohio, South Carolina, Texas, and Wisconsin and four metropolitan areas: Detroit, Fort Wayne, Memphis, and Toledo. Selection was based on availability of data as well as information provided by source agencies for each index and its components for the 1972 to 1985 period. Total wage and salary employment was used as a key coincident indicator for evaluating the performance of the regional leading indicators.

Figure 1 organizes 21 indicators from the selected group of nine indexes into general categories and lists the number of published indexes. For example, four series representing regional investment conditions were components that were found in 18 published indexes. Three series representing regional financial conditions were found in seven indexes. This organization of components does not represent an optimal categorization of what ought to be included in regional indexes; it is, instead, a more modest reflection of what actually exists among the group of indexes examined.

The groups in Figure 1 reveal that regional indexes are heavily dependent upon indicators of regional labor market processes. Kentucky and South Carolina are excellent examples of a high concentration on labor market processes. Nine of 11 components of the Kentucky index and six of eight of the South Carolina index are labor market indicators. The former includes: total man-hours in manufacturing; man-hours in nondurable manufacturing; man-hours in durable manufacturing; total nonagricultural wage and salary

employment; total manufacturing employment; employment in coal, rubber, and plastic products manufacturing; employment in tobacco manufacturers; earnings in total manufacturing; and earnings from distilled liquor manufacturing. For South Carolina, labor market indicators include: the average work week in manufacturing, initial claims for unemployment insurance, nonfarm job openings unfilled, total unemployment rate, unemployment insurance benefits, and the ratio of average weeks claimed to insured employment. At the other extreme is the index for the Fort Wayne MSA that includes only initial claims for unemployment insurance. The latter is the most frequently used labor market indicator, appearing in 20 of 23 indexes listed in Table 1 and eight of nine indexes examined below. This finding is not surprising because initial claims have been used extensively as a leading indicator for the national economy, and data are usually available weekly as part of the unemployment compensation program in each state. For the nine indexes examined below, labor market indicators accounted for 46 percent of the components, which is virtually equal to the proportion for all of the indexes listed in Table 1.

The Arizona index is the most diversified. Regional labor market indicators accounted for 30 percent of its components; regional investment indicators, 20 percent; regional demand indicators, 10 percent; regional production indicators, 30 percent; national demand indicators, 10 percent; and national financial indicators, 10 percent. The wider range of processes covered by the Arizona index results from data generated from surveys of purchasing management associations in that state over a period of time. This allows the use time series for regional inventory changes, delivery times, new orders, and production. None of the other regional indexes exhibited such diversity of coverage. A larger number of components in a regional index was not necessarily associated with broader coverage of economic processes. For the nine indexes analyzed below, the opposite was the case, especially with respect to labor market conditions.

The Empirical Record

The timing of cyclical swings for the regional indicators was compared to that of wage and salary employment, a key coincident indicator of economic activity. Production and income series are also representative coincident measures of regional activity, but monthly or quarterly production and income measures are not available for most

regions. This leaves employment as the most useful, albeit imperfect, proxy for aggregate activity across regions. Because data were available for the group of nine indexes and covered 14 years from 1972 to 1985, cyclical timing for the leading indicators could be measured against six turning points in each regional employment reference series.

Specific cycle turning points were determined for the regional employment series and each leading indicator according to criteria employed by the National Bureau of Economic Research and summarized by Bry and Boschan [3]. Cyclical movements in regional series were defined on a peak-trough-peak basis for the 14 year period, and they were required to adhere to criteria on minimum duration and amplitude that effectively eliminate brief random fluctuations. Movements in the regional series that conform to these criteria were recognized as specific cycles. They were divided into two phases, contractions and expansions, with the turning point dates representing peaks and troughs.

Leads, lags, and coincidences were calculated between each regional employment series and the associated component series from that region's index. The timing characteristics for the entire period are summarized by economic category in Table 2. Average lead times and standard deviations provide a description of each indicator's leading behavior as well as its lead timing variability over several cyclical turning points. The leading percentage measures the proportion of the turning points at which a component series actually led employment in its region.

As a group, the indicators from the regional labor market conditions category displayed leads at 71 percent of the turning points in employment. This is not a high value. However, three series (1, 2, and 3 of Table 2) stand out as leading indicators: the hours worked and real earnings in manufacturing and initial claims for unemployment insurance. The latter was a component in eight of nine indexes examined, while the average work week in manufacturing was utilized in six and weekly earnings in manufacturing in two. Each performed reasonably well, although some lags were evident at peaks and troughs.

There is also a high degree of variability in the lead times for most of the labor market indicators at turning points. Although this is notable, it is a characteristic of leading indicators that has been observed in the voluminous research on national business cycles. This variability in lead timing is one of the reasons for combining several series into a

composite index instead of relying on the signals emanating from a single indicator.

The leading behavior of series 1, 2, and 3 is supported by business cycle theories on sequential changes. For example, the average work week (AWH) and real earnings (AWE) in manufacturing are related as:

AWE = W/P(AWH).

If AWH leads, then AWE will lead also, unless the real wage (W/P) in a region's manufacturing sector is countercyclical. Because of the costs involved, manufacturers tend to adjust hours worked before adding to or reducing the workforce. Is the real wage also a leader? A fall in the real wage prior to a peak in regional economic activity suggests that employers may be resisting increases in nominal wages in the latter part of a regional expansion or that collective bargaining contracts have locked in cost-of-living adjustments below actual inflation rates for a period of time. The procyclical behavior of real wages is documented at the national level. Such behavior in regions may allow regional analysts to substitute real earnings for average weekly hours in regions where the latter fails to lead sufficiently and/or exhibits an unacceptable degree of volatility or timing variability.

Series 9, a diffusion index of employment changes, also exhibited acceptable leading behavior during the period, but it was only used in the index for the Memphis MSA. Although the behavior of this manufactured series results from economic changes that can be explained, it contains considerable random noise. Nevertheless, a smoothed version is worth considering as a component in other regional indexes, given its long lead times and relatively high leading percentage.

Indicators of regional investment and financial conditions represent processes that long have been associated with monetary and investment theories of business cycles. The traditional view holds that slowdowns in monetary growth and increases in interest rates have adverse impacts on interest-sensitive real spending. Firms may react to a subsequent rise in costs and lowered profit margins by slowing production rates, cutting hours worked, and reducing the workforce through layoffs. Within a region, such a slowdown in production, employment, and income lowers demand and spreads in a multiplied fashion through a regional economy. Although economists disagree about the impacts of monetary fluctuations on real variables, most

share a view that monetary changes contribute to business cycles in the U.S. Shifts in the cyclical phase of regional economic activity are likely to be related to monetary changes through links to interest-sensitive spending such as fixed investment, accumulation of inventories, and consumer durable products.

Table 2 shows seven indicators representing regional investment and financial conditions. Series 10, residential housing units authorized by building permit, represents a commitment to residential fixed investment spending that is sensitive to financial conditions and leads aggregate economic activity. It was used in eight of the nine indexes examined. This residential construction series exhibited long lead times and a high leading percentage at peaks and troughs in regional employment. Cyclical contractions in employment always were preceded by declines in commitments to residential investment spending, with lead times averaging nearly 15 months. Leads were long at troughs as well, averaging about six months. The other regional investment series (11, 12, and 13) also moved as expected. Declines in business incorporations, for example, usually were followed by decreases in employment. However, the latter three were not utilized as extensively as the series for residential investment. As a group, regional investment indicators displayed leads 94 percent of the time, and the consistently long lead times suggest that regional investment processes may reflect early signs of cyclical changes in regional economies.

Regional financial conditions were represented by three series: total deposits at financial institutions (constant dollars), change in credit outstanding, and consumer installment loans (constant dollars). The deposits series was used in five of the nine indexes examined and exhibited relatively long lead times, especially at peaks. Its lower leading percentage is somewhat deceptive, however, because these regional deposits series did not recover during the brief 12 month national expansion in 1980 to 1981. The real value of deposits began their cyclical declines in the late 1970s, and most continued to fall through 1982. Consequently, the brief and weak upturn in regional employment following the 1980 recession was not preceded by a recovery in deposits. If this period is excluded, then the leading percentage is 100 percent for peaks and 80 percent for troughs. This indicator is a regional equivalent of M2. Its behavior shows that monetary growth does decline before regional recessions occur.

Roberts and Fishkind [23] have demonstrated that this regional financial variable can be linked quantitatively to real variables.

Linkages to national economic conditions are not extensive in regional composite indexes of leading indicators. Four national series were used as components, but only in three indexes. These series represent regional linkages to national financial, investment, and demand conditions. As Table 2 shows, the leading behavior of the national indicators was good during the period, with relatively long lead times evident for these national processes. Series 20 and 21 are components of a Detroit index, and they represent linkages to the national economy via the major export industry in the region. Inventory investment is represented by the U.S. dealers' days supply of new cars. An increase in stocks above desired levels results in cutbacks in production in an attempt to reduce any involuntary accumulation. This type of inventory behavior has a long history as a contributor to business cycles. Its timing relative to regional employment indicates that it not only contributes to cyclical swings, but that it is also a leading indicator in that region. The index of consumer sentiment is a reasonably good predictor of spending on automobiles, the major export product of the region. Its long lead times contribute to the predictive capabilities of that regional index. Overall, series 20 and series 21 reflect an export-base linkage to the region via national economic activities.

National financial conditions were linked to regional economic activity through series 18 and 19, the real money stock and an index of stock prices. A money stock variable was included in only three of 23 published indexes listed in Table 1 and in only one of nine examined here. Standard & Poor's index of 500 stock prices was utilized in only one of the published indexes. Both financial series exhibited leading behavior, but the constant-dollar value of M2 performed better in terms of average leads and the leading percentage. Stock prices long have been associated with business cycles in the U.S. in terms of both causal impacts and symptomatic changes. The money real stock seems to be more closely related to business cycle phenomena, however, because the economic consensus stresses monetary fluctuations as a primary factor in U.S. business cycles. Some recent research on real business cycles has questioned that role.

Given the preponderance of monetary fluctuations as an explanatory variable in business cycle research, it is worth considering whether cyclical swings in M2 can contribute to the predictive

capabilities of regional indexes of leading indicators. Although the measures in Table 2 are suggestive, they are based on only one index that included M2 as a component. Table 3 contains cyclical timing summaries for all nine of the regions examined. The turning points in M2 lead those of employment with relatively long lead times and small variances. Moreover, M2 performed well during the 1980 to 1981 period, although the leads at the peak in 1980 are considerably shorter than at the earlier peaks. Over the entire period, leads for M2 averaged 13.9 months at peaks and 9.0 months at troughs across the nine regions. In addition, M2 led regional employment 96 percent of the time at peaks and 100 percent at troughs; a remarkably good performance given the wide variation in industrial structures among these regions.

Sector Indexes: Long Leaders and Short Leaders

As noted earlier, a large proportion of the indicators used as components reflect labor market conditions only, with some indexes having as high as 80 percent of their components selected from that category. Although those composite indexes may perform reasonably well, they provide considerably less information about the cyclical behavior of the regional economy than if the component structure was more diversified and more representative of sequential changes that may occur. If sufficient indicators are available, then it is possible to develop sector indexes that represent sequential economic processes and empirical timing characteristics.

Following the work by Moore [18] for the national economy, indicators for the nine regions examined were classified as long leaders if the average lead at peaks was about 12 months or more, the average lead at troughs was about three months or more, and no lags or coincidences were observed at no turning point in employment. Based on these criteria, all indicators of regional labor market conditions were classified as short leaders except for series 9, the percent of industries reporting employment increases. This series for the Memphis MSA differs from the other labor market indicators in the sense that it is broadly based on regional economic conditions instead of representing a single aspect of labor market conditions such as job openings. Regional investment indicators and several national indicators exhibited relatively long lead times and a high leading percentage during the period. These were classified as long leaders.

The economic information content of a regional composite index can be examined by separating components according to long leading and short leading behavior. This division effectively separates labor market indicators from investment and financial indicators, thereby permitting analysis of behavior by economic category as well as by empirical timing characteristics.

Figure 2 shows two sector indexes of leading indicators for South Carolina, one representing monetary/investment conditions and another representing labor market conditions. The published index for South Carolina was selected from the group because it has many components and 75 percent of those represent labor market conditions. The national monetary indicator, M2 (constant dollars), was added as a long leader for the state given the importance of monetary phenomena in business cycle theory as well as the empirical record reported in Table 3. The long leaders for the state include residential housing units authorized by building permit, new business incorporations, and the real value of M2.

The combined behavior of the long leaders for monetary/investment conditions is shown in Panel (A) of Figure 2. Lead times averaged 12 months for peaks and three months for troughs. This is a remarkably good performance given that the 1972 to 1985 period included the brief expansion in 1980 (the shortest of the post World War II period). Early warnings of impending shifts in the cyclical phase of employment were signalled by this monetary/investment index for the South Carolina economy well in advance of the actual occurrence.

A sector index for the short leaders of labor market conditions is shown in Panel (B). This sector index is composed of series 1, 3, 4, 5, 7, and 8 from Table 2. Several characteristics are worth noting. First, leads at peaks for the labor market index averaged seven months, with each peak lagging the peak of the monetary/investment index. Second, the labor market index provided no early warnings of recoveries. The troughs in this index coincided with cyclical lows in employment in 1980 and 1982 and lagged in 1975, a record hardly consistent with the forecasting purpose of leading indicators. Third, segments (1) and (2) of Panel (B) show clear false signals of impending cyclical declines. Those downturns in 1976 and 1984 were not followed by cyclical declines in the state's employment. The combined labor market variables, which exhibit leading characteristics individually, misrepresent cyclical swings in the region because of these false signals. During those two years, growth in employment in this state was

more closely aligned with the behavior of the monetary/investment index that continued to expand.

The correlation of lead times for all cyclical turning points for the two sector indexes is +.91, indicating a strong empirical linkage between the two. This result indicates that the actual behavior of the two sector indexes reflects economic theory in the sense that early signals of cyclical declines appear in monetary/investment processes prior to changes in regional indicators of labor market conditions. Thus, the analysis of sector indexes provides useful information about sequential changes in regional economies in addition to helping focus attention on possible sources of false signals that emanate from composite indexes from time to time.

In terms of the overall composite index, the heavy reliance on labor market indicators (75 percent in this case) not only limits the economic interpretation of its movements, but also accounts for false signals in the index similar to those shown in Panel (B) of Figure 2. The South Carolina case is not unique, however. An analysis of sector indexes for the Memphis MSA and Wisconsin yields similar results. In each of the three regions, labor market indicators account for more than 50 percent of the components of the index of leading indicators. Investment and monetary phenomena are not well represented.

The results suggest that not much additional information is forthcoming by using a relatively large number of labor market series in a composite index of leading indicators. In some cases, this may be counterproductive because it may contribute to poorer timing behavior as well as forecasting errors. A lack of diversification in the component structure appears to be a major contributor to false signals of recessions that are major forecasting errors for composite indexes. Moreover, advance signals of recoveries are neither strong nor clear for many of the labor market series utilized.

Conclusions

The behavior of the components of regional indexes of leading indicators points to a structural dimension linked to theoretical foundations that support the cyclical forecasting capabilities of such indexes. The timing measures suggest that forecasting with leading indicators makes economic sense in a sequential manner. In most cases, however, the economic rationale is not stated explicitly. Cyclical changes in financial conditions, national and regional, and

changes in regional investment were followed by changes in labor market conditions and then by changes in aggregate coincident indicators represented by employment in this study. Elements of these sequential processes were found in the component structure for a group of regional indexes, but they were not well developed. This is especially the case with respect to monetary factors.

Although regional indexes of leading indicators make economic sense, a great deal of variability was found among regions in terms of component structure. In many cases, diversification in coverage of economic processes was not great, with labor market indicators dominating many composite indexes. Given the role of monetary and investment processes in business cycles and export base analysis in regional economics, the challenge for regional analysts is to integrate key factors of each into leading indicator models. This may improve not only the economic interpretation of cyclical movements in regions, but also the empirical performance of the composite indexes themselves.

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Table 1
Regional Composite Indexes of Leading Indicators

Area	Source	Number of Components	Frequency
Arizona	Arizona State University	10	monthly
Battle Creek MSA	W.E. Upjohn Institute	7	quarterly
Colorado	Denver Post	8	monthly
Detroit MSA	Detroit Edison	6	monthly
Florida	Southeast Bank	7	monthly
Fort Wayne MSA	Indiana-Purdue University	4	monthly
Georgia	University of Georgia	6	monthly
Grand Rapids MSA	W.E. Upjohn Institute	7	quarterly
Idaho	Department of Employment	6	monthly
Illinois	University of Illinois	7	monthly
Kalamazoo MSA	W.E. Upjohn Institute	7	quarterly
Kentucky	University of Kentucky	11	monthly
Memphis MSA	Memphis State University	4	monthly
Michigan	W.E. Upjohn Institute	7	quarterly
Muskegon MSA	W.E. Upjohn Institute	7	quarterly
Nebraska	University of Nebraska	5	monthly
Ohio	Ohio Data Users Center	5	quarterly
Pennsylvania	Penn. State University	3	monthly
Philadelphia	Federal Reserve Bank	4	monthly
South Carolina	University of South Carolina	8	monthly
Texas	Inside Texas, Inc.	5	monthly
Toledo MSA	Toledo Chamber of Commerce	5	quarterly
Wisconsin	Department of Industry, Labor & Human Relations	6	monthly

*This listing includes indexes that have been published during the last ten years and for which at least some documentation exists. It does not include all regional composite indexes because the number that actually exists is not known. See **References** for more information on these 23 indexes.

Table 2
Cyclical Timing Summaries

Index Components	Peaks			Troughs			Total
	Aver. Lead	Std. Dev.	% Lead.	Aver. Lead	Std. Dev.	% Lead.	Lead. Percent
Regional Labor Market Conditions							
1. Average Weekly Hours - Mfg.	7.4	7.8	78	4.7	6.2	72	75
2. Average Weekly Earnings - Mfg.	9.3	7.3	100	4.7	2.6	100	100
3. Initial Claims for Unemployment Insurance	10.7	7.7	88	2.7	3.8	79	83
4. Job Openings	15.5	4.2	67	0.5	3.9	17	42
5. Unemployment Insurance Benefits	9.0	10.4	67	+0.3	0.6	0	33
6. Average Overtime Hours - Mfg.	+0.5	7.8	50	+0.5	2.1	50	50
7. Unemployment Rate	14.0	1.4	67	+1.5	2.1	0	33
8. Average Weeks Claimed to Insured Employment	7.3	6.4	67	+0.3	0.6	0	33
9. % of Industries Reporting Employment Increases	14.7	9.5	100	14.7	9.5	67	83
Regional Investment Conditions							
10. Residential Housing Units Authorized by Building Permit	98	14.9	7.7	100	6.3	5.2	96
11. New Business Incorporations	8.4	8.3	88	3.8	5.3	88	88
12. Business Plans Examined	7.0	7.1	100	6.0	4.2	100	100
13. Net Gain in Business Phone Line Access	4.3	2.3	100	8.3	4.9	100	100
Regional Financial Conditions							
14. Total Deposits (deflated)	17.2	8.3	67	4.6	7.8	53	60
15. Change in Credit Outstanding	16.0	14.2	67	2.0	9.6	67	67
16. Consumer Installment Loans (deflated)	5.5	0.7	67	+3.0	4.2	0	33

Table 2 (continued)
Cyclical Timing Summaries

Index Components	Peaks Aver. Lead	Peaks Std. Dev.	Peaks % Lead.	Troughs Aver. Lead	Troughs Std. Dev.	Troughs % Lead.	Total Lead. Percent
Regional Demand Conditions							
17. Prices of Farm Products	8.7	2.1	100	6.3	4.2	100	100
National Financial Conditions							
18. Money Stock - M2 (constant $)	14.7	6.0	100	10.3	9.3	100	100
19. Standard & Poor's Index of Stock Prices	8.0	10.5	67	5.0	3.5	100	83
National Investment Conditions							
20. New Car Inventories - US Dealers' Days Supply	16.0	12.5	100	5.7	4.7	100	100
National Demand Conditions							
21. Index of Consumer Sentiment - University of Michigan	100	19.0	9.6	100	2.3	0.6	100
Other Indicators							
22. Ratio of Coincident to Lagging Indexes	100	7.7	9.1	100	5.0	3.6	100

Note: + indicates that series exhibited an average lag instead of lead

Table 3
Lead Timing Summaries for M2 Relative to Regional Employment

	M2 Turning Points					
	1973 Peak	1975 Trough	1978 Peak	1980 Trough	1980 Peak	1981 Trough
Average Lead	16.2	2.9	19.7	2.7	5.8	21.6
Standard Deviation	2.6	1.5	4.4	1.3	4.7	5.0

Figure 1
Leading Indicator Categories

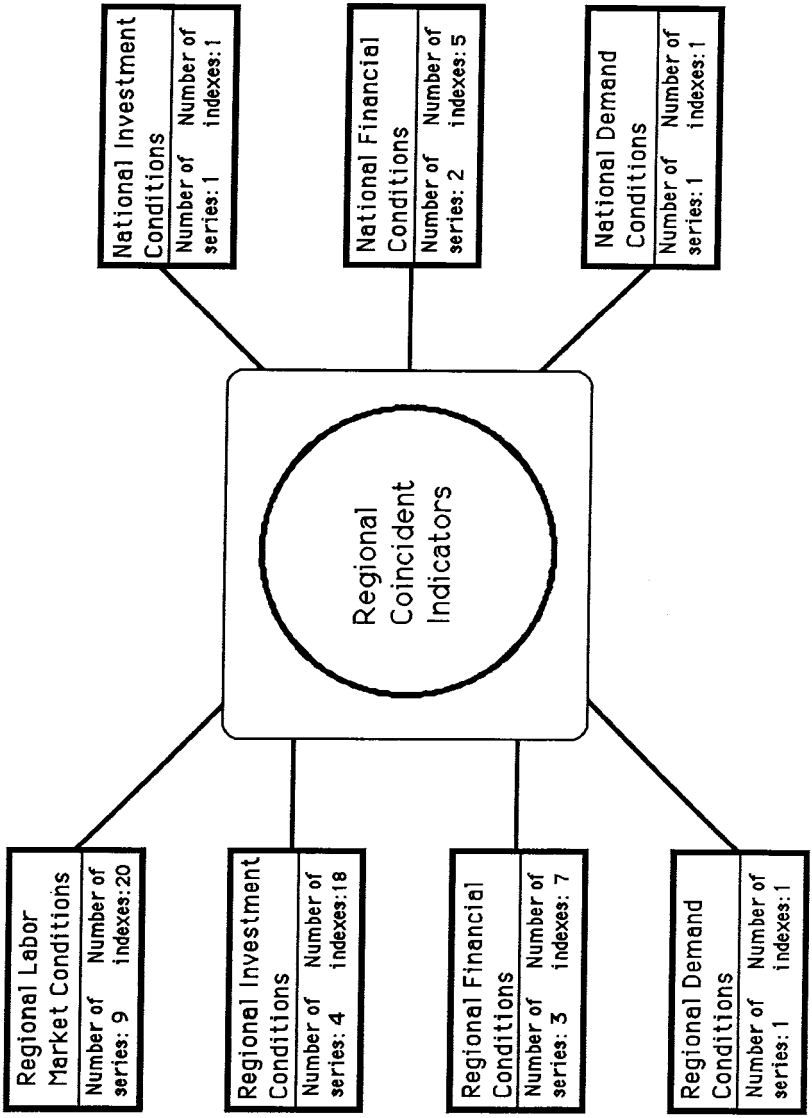

Figure 2

Sector Indexes of Leading Indicators--South Carolina
(Shaded Areas are Cyclical Downswings in Employment)