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MINNESOTA ECONOMIC INDICATORS: PART I

PURPOSE AND PRECEDENT

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MINNESOTA ECONOMIC INDICATORS: PART I. PURPOSE AND PRECEDENT

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Summary

Many statistical series on the Minnesota economy are currently prepared and periodically reported by several state and federal agencies. The Minnesota Department of Jobs and Training assembles numerous statistical series on industry employment, earnings and weekly hours, and personal and disposable income. The Minnesota Department of Revenue assembles a wide variety of tax and other revenue statistics and, also, data on business gross receipts and purchases. The Minnesota Department of Finance and the State Auditor assemble similar data series on Minnesota state and local income and expenditures. The Minnesota Department of Trade and Economic Development has had a long history of tracking the performance of the Minnesota economy with a host of industry employment, earnings, investment, and sales variables. The Metropolitan Council also publishes a variety of statistical series pertaining to the Twin Cities Metropolitan Region economy.

The task of assessing the current status of Minnesota economic indicators and the prospects for constructing, maintaining and using an index of state and local leading indicators is therefore a task that can be strongly supported within state government.

This report addresses two concerns in constructing, maintaining and using a set of Minnesota economic indicators.

- . Review and critique of existing U.S., state, and substate economic indicator series as they relate to the larger task;
- . Preparation of a Minnesota state and substate series of economic indicators.

Both topics require an overall conceptual framework for organizing the review and critique and, subsequently, the preparation of a set of state and local

leading economic indicators for Minnesota.

For Minnesota, a first step towards the construction and use of a series of monthly economic indicators is the identification of existing statistical series as candidates for a new Minnesota economic indicators series. Much effort is expended in preparing and reporting the existing statistical series. This effort can be made even more productive if directed towards the building and maintenance of a comprehensive series of Minnesota economic indicators.

A second step towards the construction and use of a Minnesota economic indicator series is the enrichment of the existing economic data series with additional variables pertaining to (1) consumption and distribution, (2) fixed capital investment, and (3) inventory investment. No agency presently collects and/or assembles all of these data in Minnesota.

A third step towards the construction and use of a Minnesota economic indicator series is the location of a central place for its preparation, validation, and interpretation. Typically, a university bureau of business and economic research has stepped forward to perform this task. More recently, private research and consulting firms, like Data Resources, Incorporated and Chase Econometrics, have stepped into this void. Most appropriate for this task is the state agency with a long-standing commitment to the maintenance of the principal statistical series reported by state government.

With the successful completion of these steps, the unending task still remains of always improving existing capabilities. In this case, the set of Minnesota economic indicators would complement and strengthen existing approaches to economic forecasting.

MINNESOTA ECONOMIC INDICATORS

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State and local economic indicators are prepared for several purposes, including their direct use in showing current conditions in state and local economies, particularly in indicating turning points in regional business cycles. They serve as an early warning system of imminent changes in regional business conditions and they also provide measures of the severity and scope of regional recessions.

U.S. economic indicators are the prototype of state and regional indicators. They are the U.S. counterpart of the state and substate regional indicators reviewed in this paper. Selected state and regional indicators are compared with the U.S. indicator series in coverage and construction. Uses of the state and substate indicator series in business and government also are compared with the corresponding U.S. series.

Minnesota economic indicators differ from U.S. economic indicators simply because the Minnesota economy is not identical to the U.S. economy. Even if the two economies were identical, the sampling frame for certain economic series, including the geographical scale of the activity itself, in many cases precludes preparation of accurate individual state and local indicator series.

U.S. Indicator Series

U.S. economic indicator series are published monthly by the U.S. Department of Commerce. These series were developed initially by Wesley C. Mitchell and colleagues in the National Bureau of Economic Research. They were refined and subsequently published in 1967 in the report, "Indicators of Business Expansions and Contractions," by Geoffrey H. Moore and Julius

Shiskin.

A cross-classification of current U.S. economic indicator series, by economic process and cyclical timing, is presented in Table 1. This classification shows 11 leading, four roughly coincident, and six lagging, indicators. Six economic processes are delineated to which the 11 leading indicators refer. The roughly coincident indicators cover only the employment-related and production-related processes, which pertain to investment, inventories, prices, and money supply.

The 11 leading indicators have provided an average lead time of 8.5 months for the four recessions in the past 20 years. This series has given numerous false starts (of recession that never took place). Two of the the series -- net change in inventories and index of net business formation -- are not available at the scheduled release time of the composite series. One of the indicators, M1, had outlived its usefulness by 1979 and was replaced by M2.

Modification of the 11-indicator series has been recommended. The main difficulty in the current leading indicator index is that much of the available data appears to need major redevelopment because of the fast changing economy. Most of the 11 series used in the index focuses on the goods producing sectors of the economy. Geoffrey Moore is leading a Columbia University group that is focusing more attention on the service sector in the construction of a new economic indicator series.

Geoffrey Moore (1978)¹ has noted that sometimes lagging indicators serve as leading indicators. The downturns of the lagging indicators have consistently preceded the upturns of the leading indicators while upturns in the lagging indicators have consistently preceded downturns in the leading indicators. This record goes back to 1885. Numerous studies have confirmed this relationship. Again, the U.S. experience in the interpretation and use

of its economic indicators serves as a model in the preparation and use of corresponding state and local indicator series.²

State and Regional Indicators

The kind of indicator presentation given by various local agencies varies considerably over the country. The simplest, and most frequent, has been merely to give out the most recent values and a discussion of their significance for a select list of indicators along with corresponding graphics showing their trends. Some regions, e.g. Duluth, also include a composite of coincident indicators. Relatively few construct a composite leading index.

One of the problems in developing composite indices for sub-national regions is in the selection of a reference cycle. Some regions use the national reference cycle or the GNP indicator. This is not entirely satisfactory since regional economic activity usually does not coincide with its U.S. counterpart. In many of the regional indicator models only nonfarm employment is used. There are tradeoffs in using this as the reference cycle: it is volatile, but it is readily available while a monthly GRP (Gross Regional Product) series is not.

State and regional economic indicators are now widely published by university bureaus of business and economic research and state planning agencies. Especially in the 1970's, the number of indicator series published increased sharply, in part as a response to the increasing severity of the general business cycle on state and local economies. Both Chase Econometrics and Data Resources, Incorporated found a ready market for their services in providing clients with individual state and major metropolitan area economic indicators and forecasts.

Most state and local economic indicators are confined to employment and unemployment, earnings and income, population and labor force, and state and

local revenues and expenditures. For some metropolitan areas, a consumer price index is derived, as well as selected financial series, like bank deposits and loans. Building permit data are collected, also, including number and value of buildings. Each of the statistical series is identified in the discussion of the prototype state and local indicator series.

Paul Kozlowski (1988), in a study of 19 published composite indexes of leading indicators (ILI), divided the various indicators series into seven groups (fig. 1): regional labor market conditions, regional investment conditions, regional financial conditions, regional demand conditions, national investment conditions, national financial conditions, and national demand conditions. The number of indicators used in the composite indexes varies from three to 11. The indexes are heavily dependent on the regional labor market conditions group and few used any national indicators.

Boston (DRI/Globe) indicator series.

Series of leading economic indicators were prepared by DRI for the Boston Globe in the early 1980s. These series are available individually and as a composite indicator. Six sectors of the New England economy are represented by the 10 leading indicator series, as follows:

| <u>Economic Sector and Indicator</u> | <u>Months Leading</u> | |
|---|-----------------------|---------------|
| | <u>Peak</u> | <u>Trough</u> |
| Employment and Unemployment | | |
| 1. Avg. weekly hrs. of prod. workers, mfg. (New Eng.) | 13 | 1 |
| 2. Inverse of layoff rate (New Eng.) | 11 | 5 |
| Consumption and Distribution: | | |
| 3. Pct. companies rptg. more orders received (Boston) | 15 | 6 |
| 4. Pct. companies rptg. slower deliveries (U.S.) | 11 | 7 |
| Fixed Capital Investment: | | |
| 5. New building permits (New Eng.) | 15 | 11 |
| Inventory Investment: | | |
| 6. Pct. companies repg. higher inventories (New Eng.) | 15 | 4 |
| Prices, Costs and Profits: | | |

| | | |
|--|----|----|
| 7. Index of stock prices (U.S.) | 9 | 8 |
| 8. Pct. chg. in prices of raw materials (U.S.) | 11 | 7 |
| Money and Credit: | | |
| 9. Money supply (U.S.) | 14 | 10 |
| 10. Chg. consumer installment credit outstanding | 11 | 4 |

Individual variables are plotted against total nonagricultural employment, which is used as standard of reference for determining upturns and downturns in regional business cycle.

Individual indicators in the DRI Boston Globe series were reported with leads of nine to 15 months at a peak and one to 11 months at a trough. Four of the indicators pertain to New England, one to the Boston area, one to the First Federal Reserve District, and four to the U.S. All indicators are seasonally adjusted.

The 10 component variables in the Globe/DRI ILI are weighted equally. Variables which display extreme volatility (i.e., average weekly hours, the layoff rate, new orders, housing permits, inventories, the index of sensitive prices, and the change in consumer installment debt outstanding) are included in moving average form. Production and income are not included in the ILI because most series in this group were reported with cyclical timing which has been roughly coincident rather than leading.

Minnesota DRI Series

Data Resources, Inc. developed a Minnesota index of leading economic indicators for the Star Tribune in the early 1980s (then known as the Minneapolis Star and Tribune). The index consisted of 10 indicators of which five were national measures and five were local measures. The local indicators were: initial unemployment compensation claims, housing permits, average work week in manufacturing, consumer installment credit, and regional stock prices. The national indicators were: new orders for consumer goods,

money supply (M2), raw materials prices, inventory-to-sales ratio, and vendor performance. They used nonagricultural employment as the reference cycle.

Michigan indicator series.

The Michigan metropolitan area indicator series was developed by Kuzlowski and associates for 11 Standard Metropolitan Statistical Areas in Michigan.³

Kuzlowski (1977, 1977, 1981) has proposed the construction and use of an ILI for specific small areas. The most recently proposed Kuzlowski-ILI (1981) is a composite of four local quarterly indicators, as follows:

1. Average workweek of production workers in local manufacturing industries;
2. Average weekly initial claims for unemployment insurance (inverted);
3. Constant dollar value of total deposits at local commercial banks;
4. Number of new private housing units authorized by building permit.

Each of the four quarterly series was classified as a good leading indicator of local business activity.

The forecasting performance of the composite Michigan ILI was evaluated according to several well-accepted criteria. The results generally showed that the composite ILI predicted turning points in the local business economies reasonably well.

Wisconsin ILI.

A composite index of leading indicators for Wisconsin is published by the Wisconsin Department of Industry, Labor, and Human Relations. A seasonally adjusted unemployment rate is used as the reference cycle. The six indicators included in the index are: average work week, average weekly overtime, average weekly initial claims, job openings received, net gain in business telephone access lines, and building plans examined. Weights for combining the indicators into one index are based on their correlation over time with the reference cycle.

South Carolina III.

The University of South Carolina and the South Carolina Employment Security Commission published monthly leading and coincident indices for the state. The reference cycle they use is the national business cycle. There are eight indicators included in the leading economic index: average manufacturing workweek, initial claims for unemployment insurance, nonfarm job openings unfilled, unemployment rate, average weeks claimed to insured employment, new business incorporations, and residential construction. The South Carolina coincident economic indicator also consists of eight indicators: total nonagricultural employment, textile and related employment, durables manufacturing employment, manhours in manufacturing establishments, weekly earnings, retail sales, new car registrations, and nonresidential construction.

Kentucky indicator series.

The series of Kentucky monthly indicators of economic activity, published quarterly (Kentucky Economy Review and Perspective) by the Kentucky Council of Economic Advisors, College of Business and Economics, University of Kentucky, were started in 1977. The individual series cover eight sectors of the Kentucky economy as follows:

Labor Force:

1. Labor force, total civilian
2. Employment, by place of residence (2)
3. Unemployment rate
4. Employment, nonagricultural wage and salary (10)

Hours and Earnings of Prod. Workers, Mfg.:

5. Average weekly earn. prod. workers, mfg. (2)
6. Average hourly earn. prod. workers, mfg. (2)
7. Average weekly earn. prod. workers, mfg. (2)

Index of Prices Received by Farmers (1972 = 100):

8. Index of prices rec. by Ky. farmers (2)

Mining:

9. Coal, physical output (2)
10. Average hourly earn., prod. workers (2)
11. Average weekly hours, prod. workers
12. Tax receipts, coal severance, total

Construction, No. of Priv. Res. Units:

13. Value of construction contracts, res. & non-res., no. of units (2)
14. Permit authorized construction
15. Value of permit authorized construction (2)

Retail Sales

16. Tax receipts
17. New passenger car registration

Finance and Insurance:

18. New loans made and acquired by Ky. S&LA
19. Sales of ordinary life insurance

Selected State Government Receipts:

20. Tax and nontax receipts (4)
21. Tax receipts, state and road fund, state share (2)

Several indicator series are represented by two or more subtotals, in the Kentucky series, as indicated by the numerical entries (in parentheses).

Unlike the Globe/DRI, Wisconsin, or the Michigan series, a Kentucky ILI is not available.

Current Minnesota State and Regional Indicators

Current Minnesota monthly and quarterly indicators of economic activity, which are reported in Review of Labor and Economic Conditions and its supplement, Current Minnesota Labor Market Conditions, are summarized in Table 2. The data series are compiled by the Research and Statistical Service Office, Minnesota Department of Jobs and Training. These series, like the Kentucky economic indicators, parallel corresponding U.S. data series published regularly by the U.S. Bureau of Labor Statistics and the U.S. Department of Commerce.

Industry-specific indicators are available, which represent employment, earnings and weekly hours series; these are identified by the numerical entries in parentheses. The monthly series are published by the 15th of the

second month following the month reported. The publication lag for the quarterly series is slightly greater than for the monthly series (relative to the last month in each quarter-year).

Several areas in Minnesota already compile business indicators. A set of indicators for the Mankato region (Mankato Area Business and Economic Review) is prepared by the Bureau of Business and Economic Research at Mankato State University. A series of 20 indicators is tabulated for the latest month and compared to the same month from the previous year. Some indicators are represented as indices, but no composite index is formed.

Economic indicators for Winona County are part of a quarterly report on the La Crosse Area (LaCrosse Area Business and Economic Review) put out by the University of Wisconsin - LaCrosse. Seven quarterly indicators are published covering labor force and construction activities. Only raw numbers are used (no indices are developed).

The Duluth Business Index, (Duluth Business Indicators) produced by the Bureau of Business and Economic Research at the University of Minnesota - Duluth, has been around for approximately 20 years.⁴ The monthly index is a coincident measure of economic activity for the City of Duluth. It is made up of 14 components: freight carloadings, bank debits, building permits, postal receipts, electric power (commercial and industrial), electric power (residential), number of electric customers, grain shipments, coal receipts, iron ore shipments, other lake cargo, Duluth nonagricultural employment, Duluth retail sales index, and Minnesota metal mining employment. Indicators are not seasonally adjusted. Indicators in dollar values are deflated and then each economic indicator is made into an index with a value of 100 for the base year 1967. These indices are combined to form the Duluth Business Index.

Coordination, Validation, and Maintenance of MEI

In a majority of states, a university research office serves as the central place for the coordination, validation, and maintenance of a state economic indicator series. In Minnesota, lack of such a central place necessitates alternate arrangements for accomplishing the same purposes.

In the validation of the Minnesota leading indicator series, a Minnesota Gross State Product (GSP) series could serve as an alternate (to the non agricultural wage and salary employment) reference series. Use of the Minnesota GSP would correspond to use of the U.S. Gross National Product in the evaluation of the 11 U.S. leading indicators. Much additional work is required, however, in the development of improved data sources and statistical procedures for deriving a monthly or quarterly Minnesota GSP series.

A leading indicator series must lead a peak or a trough in total nonagricultural wage and salary employment in Minnesota by at least three months to remain a viable candidate variable. To finally select a particular variable from the candidate list, a monthly series of this variable must be available for the 1970-1988 period.

An index of Minnesota leading indicators can be constructed from a small number of the economic indicators published periodically by the Minnesota Department of Jobs and Training and an even smaller number of additional statistical series available through the Federal Reserve Bank of Minneapolis. Such a Minnesota ILI would be comparable to the Michigan four-variable series. Its extensions could incorporate the same U.S. statistical series included in the Globe/DRI ILI.

Some cautionary notes: First, the Globe/DRI ILI is compared with total nonagricultural employment which, in itself is only roughly coincident with gross regional product. Generally, total nonagricultural wage and salary

employment coincides with changes in gross regional product. On the other hand, changes in employment in cyclically-sensitive industries, like construction and durable goods manufacturing, are more closely correlated with changes in gross regional product.

Second, use of total nonagricultural employment as a reference series for an ILI neglects the sometimes considerable effects of the agricultural sector on total economic activity.

Finally, maintenance of a MEI series is a continuing effort which depends, in part, on user support of this service function and, in part, on provider support of its wide use in special-purpose studies and forecasts.

Delivery and Use of Monthly Economic Indicators

If the existing economic data series were supplemented by additional data on (1) consumption and distribution (e.g., new orders received), (2) fixed capital investments (e.g., new plant expansion), and (3) inventory investment, then a set of Minnesota leading indicators, which closely paralleled the U.S. leading indicator series, could be prepared. Periodic business surveys to obtain part of the missing data may be needed in the future.

Given timely access to a set of leading indicators series of Minnesota statewide and substate leading economic indicators could become available for (1) the preparation of statewide and substate regional ILI series and (2) the preparation of statewide and substate regional economic forecasts based on the individual leading (and, also, roughly coincident) indicator series. The preparation of the ILI series would require prior agreement on a schedule of publication of the individual monthly economic indicators that would be consistent with the publication date of the ILI.

The ILI series would have a diversity of users insofar as it provides an early warning system of imminent turning points in state and substate economic

conditions. It would serve, also, as a readily accessed and widely understood measure of regional economic well-being. Thus, it would provide a complementary reference series for state economic and fiscal forecasts, particularly for those outside the inner circles of technical forecast providers and their associates and supervisors.

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Footnotes

1/ References noted are included in Selected References.

2/ A list of selected references covering all indicator series published monthly by the U.S. Department of Commerce was recently compiled by Geoffrey Moore which provides in-depth discussion of the conceptual and statistical development of each of the 24 indicator series -- 12 leading, 6 coincident, and 6 lagging. See: "Why Do the Leading Indicators Lead? An NBER Reading List," NBER Reporter, March 1978, pp. 16-17.

3/ This study was conducted under the auspices of the W. E. Upjohn Institute for Employment Research, Kalamazoo, Michigan. It included the following SMSA's: Ann Arbor-Ypsilanti, Battle Creek, Bay City, Detroit, Flint, Grand Rapids, Jackson, Kalamazoo, Lansing, Muskegon, and Saginaw.

4/ Duluth Business Indicators, Bureau of Business and Economic Research, University of Minnesota, Duluth, in cooperation with the Regional LMI Center, Department of Economic Security. See, also, Jerrold M. Peterson, Glenn O. Gronsett, and Pat Lam, Development of a regional business index: a case study of the ARBI, Working Paper No. 80-6, Bureau of Business and Economic Research, University of Minnesota, Duluth, 1980.

Table 1. -Classification of Composite Index Components by Economic Process

| Economic process Index | Employment and unemployment | Production and income | Consumption, trade, orders, and deliveries | Fixed capital investment | Inventories and inventory investment | Prices, costs, and profits | Money and credit |
|------------------------------|---|--|--|---|--|--|---|
| <i>Leading indicators</i> | Average weekly hours of production or nonsupervisory workers, manufacturing Average weekly initial claims for unemployment insurance, State programs | | Manufacturers' new orders in 1982 dollars, consumer goods and materials industries Vendor performance, percent of companies receiving slower deliveries | Index of net business formation' Contracts and orders for plant and equipment in 1982 dollars Index of new private housing units authorized by local building permits | Change in manufacturing and trade inventories on hand and on order in 1982 dollars, smoothed | Change in sensitive materials prices, smoothed Index of stock prices, 500 common stocks | Money supply M2 in 1982 dollars Change in business and consumer credit outstanding |
| <i>Coincident indicators</i> | Employees on nonagricultural payrolls | Personal income less transfer payments in 1982 dollars Index of industrial production | Manufacturing and trade sales in 1982 dollars | | | | |
| <i>Lagging indicators</i> | Average duration of unemployment in weeks | | | | Ratio, manufacturing and trade inventories to sales in 1982 dollars | Index of labor cost per unit of output, manufacturing (actual data as a percent of trend) | Average prime rate charged by banks Commercial and industrial loans outstanding in 1982 dollars Ratio, consumer installment credit outstanding to personal income |

1. Beginning with data for January 1984, this component has been suspended from the leading index.

Table 2. Current Monthly and Quarterly Economic Indicators for Minnesota, 1981.

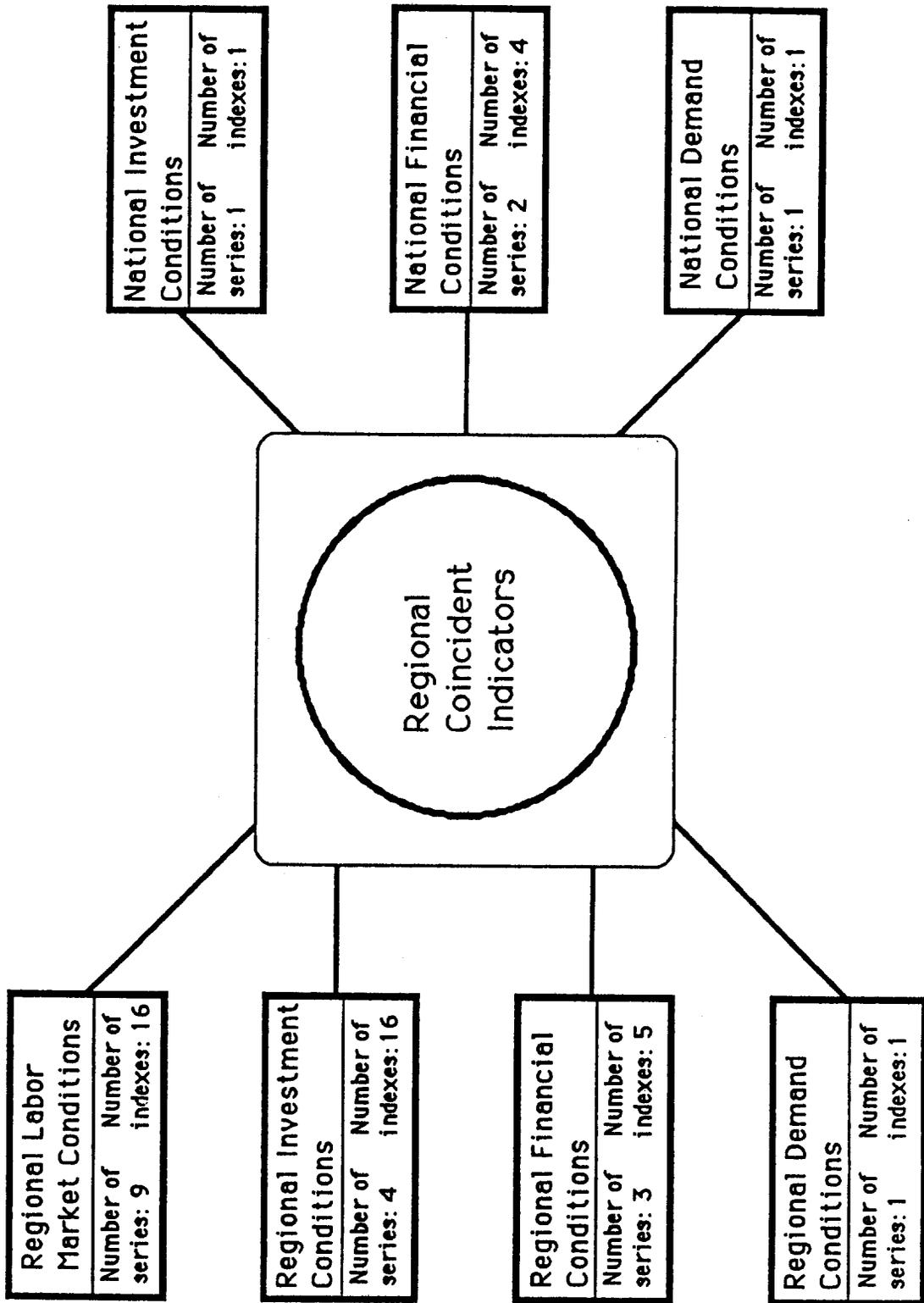
| Economic Indicator | Monthly | Quarterly |
|--|----------------------------|-----------|
| Labor Force (person count): | | |
| 1. Labor force, total civilian | X | X |
| 2. Employed | X | X |
| 3. Unemployment rate (2) <u>1/</u> | X | X |
| Work Force (job count): | | |
| 4. Work force, total civilian | X | |
| 5. Employed, agr. | X | |
| 6. Employed, nonagr. | X | |
| 7. Unemployment rate (2) | X | |
| Estimates of Labor Turnover, Mfg.: | | |
| 8. New hires | X <u>2/</u> | X |
| 9. Quits | X <u>2/</u> | X |
| 10. Layoffs | X <u>2/</u> | X |
| Persons Claiming Unemployment Benefits: | | |
| 11. Personal claiming benefits, number (6) | X <u>2/</u> | X |
| Nonagricultural Wage & Salary Employment, Hours & Earnings: | | |
| 12. Employment (42) | | |
| 13. Prod. workers, avg. weekly earn. (30) | X | X |
| 14. Prod. workers, avg. hourly earn. (30) | X | X |
| 15. Prod. workers, avg. weekly hrs. (30) | X | X |
| | X | X |
| Output and Expenditures: | | |
| 16. Retail sales | | |
| 17. Building permits authorized, priv. housing units (from U.S. Commerce) | X <u>2/</u> X <u>2/</u> | X X |
| Money and Credit Conditions: | | |
| 18. Discount rate (on 3-month treasury bill) | X <u>2/</u> | X |
| 19. Rate of conventional mortgage | | X |
| Income: | | |
| 20. Total personal income | | X |
| 21. Per capita personal income (2) | | X |
| 22. Real median family money income (2) | | X |
| 23. Earnings of wage and salary workers, mfg. (10) | | X |
| Prices: | | |
| 24. Consumer Price Index (5) | X <u>3/</u> | X |

1/ Unemployment rate for civilian labor force is reported monthly, by metropolitan area and nonmetropolitan counties.

2/ Available, also, by month, but currently not published.

3/ Available every other month.

Figure 1: Leading Indicator Groupings



Source: Kozlowski (1988), pg. 5.