A New Look at Economic Indexes For the States in the Third District

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When someone asks, "How's the economy doing?" it's often not clear which measure to point to. Should we refer to the unemployment rate, job growth, or some broader measure like the change in gross domestic product (GDP)? Likewise, if we want to understand where the economy is headed, which statistic should we look at: new unemployment insurance claims, housing permits, or perhaps some stock market index? Each of these statistics has some information. But none has all the information we are looking for, and they sometimes give conflicting signals about where we are in the business cycle. For example, in January and February 1994, employment declined in Pennsylvania, but the unemployment rate went down as well. A partial solution to this dilemma is to com-

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bine several measures into a composite index of current or future economic activity. The Conference Board, a business membership and research organization, publishes monthly coincident and leading economic indexes for the nation. And under the auspices of the National Bureau of Economic Research (NBER), James Stock and Mark Watson have developed alternative coincident and leading indexes for the nation. Using a model based on Stock and Watson's, the Philadelphia Fed developed coincident indexes for the states in the Third Federal Reserve District (Pennsylvania, New Jersey, and Delaware) and leading indexes for Pennsylvania and New Jersey.[1]

A number of factors suggest that revisions of those indexes are in order. For example, there have been changes in the data available for use in the indexes. Moreover, some recent adjustments to the original Stock and Watson model allow us to incorporate quarterly data into the monthly coincident indexes. We have also revised the way we determine trends in the state indexes. Since the leading indexes for the states are forecasts of the coincident indexes, new coincident indexes require a revision of the leading indexes. These revised indexes have some distinct advantages over the original ones.

THE NEW COINCIDENT INDEXES FOR THE THREE STATES

The new coincident indexes for the three states in the Third District are estimated in much the same way as the original indexes. But we have changed some variables included in the indexes and altered the way we determine the long-term trend of the indexes. The cyclical fluctuations in the new indexes are more pronounced than those in our original indexes. And in the new state indexes, differences in the long-term trends more accurately reflect differences in the long-run growth of the states' underlying economies.

The New Coincident Indexes Use the Same Methodology as the Original Indexes. In the late 1980s James Stock and Mark Watson developed an econometric model that estimated changes in the underlying "state of the economy." These changes are not observed directly but are reflected in a number of indicators, such as industrial production or personal income, that are tracked by government agencies or private organizations. Using the estimated changes in the state of the economy, Stock and Watson constructed a coincident index of the national economy. We used the basic Stock and Watson model to construct coincident indexes for each of the three states in the Third District, which we refer to as the economic activity indexes for the states. (See *Estimating the Coincident Indexes*.)

Some issues arise in constructing state indexes that do not arise in constructing a national index. First, fewer monthly indicators are available at the state level than at the national level. Second, even though economic activity indexes are primarily meant to trace cyclical movements in the economy, users are likely to compare the long-term trends in the indexes from one state to another. It is important, then, that these trends be calculated in the same way for each state.

A Limited Number of Monthly Indicators Are Available to Create Composite Indexes at the State Level. The original economic activity indexes for Pennsylvania and New Jersey included data on nonfarm employment, the unemployment rate, average hours worked in manufacturing, and retail sales. Retail sales data were not available for Delaware, and the U.S. Department of Commerce stopped publishing monthly retail sales data for the other two states in 1997. Since

[1]See Theodore M. Crone, "New Indexes Track the State of the States," January/February 1994 *Business Review,* and Theodore M. Crone and Kevin Babyak, "Looking Ahead: Leading Indexes for Pennsylvania and New Jersey," May/June 1996 *Business Review*. These indexes, which are released to the press monthly, are posted on the Philadelphia Fed's web site at http://www.phil.frb.org/econ/regdata.

then, the economic activity indexes for all three states have been based on the three employment-related indicators. One goal in revising the economic activity indexes was to broaden the scope of the indicators used in the model beyond the employment data.

One possibility for expanding the scope of the data was a series of monthly industrial electricity sales by state published by the Department of Energy. While industrial electricity sales do not provide the type of comprehensive measure of industrial output for the states that industrial production provides for the nation, they do provide some measure of industrial activity in a state.

A modification of the Stock and Watson model allowed us to broaden further the scope of the indicators in the economic activity indexes by incorporating variables that are published only quarterly rather than monthly.[2] This modification allowed us to include in the state indexes real personal income minus transfer payments, a variable that has always been a component of the national coincident index.[3] Transfer payments, such as Social Security and veterans' pensions, are excluded from our personal income measure because the economic activity indexes are primarily a measure of state business cycles, and transfer payments are insulated from the business cycle. Personal income less transfer payments is the most comprehensive measure of a state's economy that is available quarterly. It includes wages and salaries as well as interest, rents, and dividend income, all of which are influenced by the business cycle.[4]

With these changes in the components, the economic activity indexes for the states now include five indicators — nonfarm employment, the unemployment rate, average hours worked in manufacturing, industrial electricity sales, and real personal income minus transfer payments. (See *Variables Included in Coincident Indexes* for a comparison of the components of these economic activity indexes with the components of the Conference Board's and Stock and Watson's coincident indexes.)

The Trend in the New Economic Activity Indexes Is Based on Personal Income Growth. Because users will undoubtedly compare growth in the state indexes over longer periods of time, it is important that the long-term growth of the indexes be calculated in the same way for each state. The determination of the long-term trend is not as important for the national index because it is not regularly compared with similar indexes for other countries. In the original Stock and Watson model, the trend in the coincident index was the weighted sum of the trend of the components. Each component's weight de-

[2]Quarterly variables are incorporated into the model by distributing the quarterly change over the three months of the quarter. Alan Clayton-Matthews is responsible for this modification of the Stock and Watson model and also for a C++ program that incorporates the modification. See Alan Clayton-Matthews and James H. Stock, "An Application of the Stock/Watson Index Methodology to the Massachusetts Economy," *Journal of Economic and Social Measurement* Vol. 25, 1998/1999, pp. 183-233, and Alan Clayton-Matthews, *DSFM Manual*, February 23, 1999, mimeo, University of Massachusetts at Boston.

[3]Real personal income data are published monthly at the national level. We deflated nominal personal income published quarterly at the state level by the national CPI to get real personal income.

[4]Although dividend income is less likely than interest or rent to originate in the state in which it is reported, interest, rents, and dividends are not available separately at the state level. Personal income comes out with a lag of about three months, compared with the other variables in the economic activity indexes, so the most recent values of the indexes will always be preliminary. Gross state product (GSP) is theoretically a better measure of output at the state level than personal income. Conceptually, GSP measures all income generated by production in the state, and if it were available on a quarterly or monthly basis and in a timely manner, it would be the appropriate indicator of a state's business cycle. But GSP is available only annually and with a lag of several years. The latest GSP data are for 1998.

Variables Included in Coincident Indexes

Conference Board	Stock and Watson	Economic Activity Indexes Described in This Article
Employees on nonagricultural payrolls	Hours worked by employees in nonagricultural establishments	Employees on nonagricultural payrolls
Real personal income minus transfer payments (monthly)	Real personal income minus transfer payments (monthly)	Real personal income minus transfer payments (quarterly)
Industrial production	Industrial production	Industrial electricity sales
Real manufacturing and trade sales	Real manufacturing and trade sales	
		Average hours worked in manufacturing
		Unemployment rate

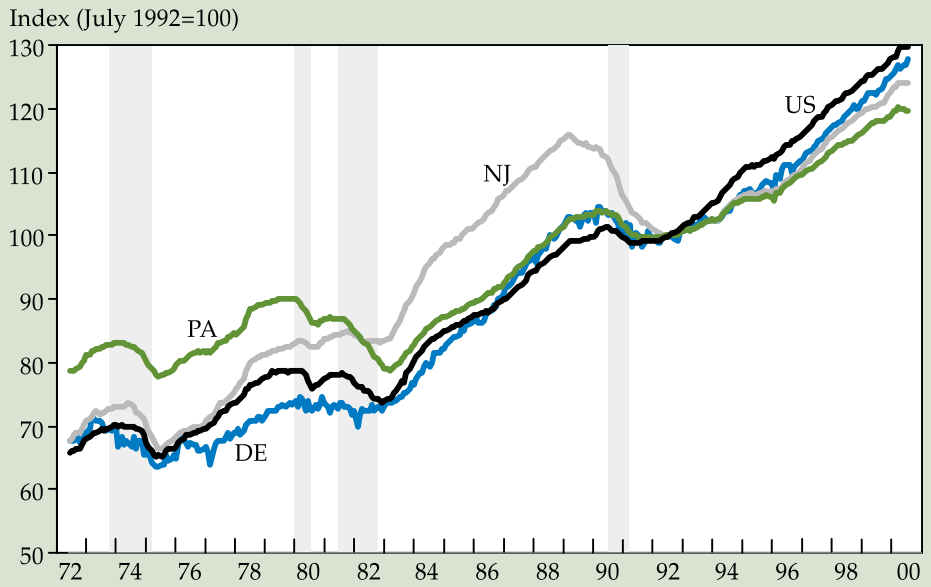
pended on how much it contributed to the average monthly change in the index.[5]

In the national coincident index developed by Stock and Watson, all the components trend up with the economy as a whole, providing the index with a significant positive trend. At the state level, the situation is different. There are fewer monthly or quarterly variables from which to choose, and some of those variables, such as average hours worked in manufacturing or the unemployment rate, show no significant trend. The more these variables reflect the business cycle in a given state, the more they affect the trend of a standard Stock and Watson index. Since these variables show no significant trend, giving them greater weight reduces the long-run growth of the state index. This becomes especially important in comparing indexes between states. If one component has more weight in determining the long-term growth of the index for one state than for another, the two state indexes will not be comparable.

Instead of weighting the components, we used a comprehensive measure of the state's economy to set the trend for the state's economic activity index. The long-term growth in a state's index is set equal to the long-term growth in real personal income minus transfer payments in the state. From July 1972 to July 2000, Delaware's

[5]For example, if, on average, 20 percent of the monthly change in the coincident index as estimated by the model was determined by the change in industrial production and 30 percent of the monthly change was determined by the change in personal income, the long-term trend in the coincident index would be determined 20 percent by the trend in industrial production and 30 percent by the trend in personal income.

FIGURE 1: Economic Activity Indexes



The shaded areas on this graph represent the official NBER recession dates.

new index increased 89 percent, New Jersey's 83 percent, and Pennsylvania's 52 percent (Figure 1).[6]

The New Indexes Show Economic Downturns in Each of the States Corresponding to the National Recessions. The business-cycle dating committee of the NBER determines the official dates for the beginning and end of national recessions. The peaks and troughs of the Conference Board's coincident index correspond exactly to the official recession dates since 1973. The peaks and troughs of Stock and Watson's index correspond to the official dates except for one month's difference at the trough in 1982. We also constructed a national index using variables corresponding to the ones we used in our state indexes.[7] All the peaks and troughs of this index

[6]If we had used the weighted average of the trend in the components to set the trend in the composite index, the long-term growth for Delaware's index would have been unchanged. The growth in New Jersey's index would have been considerably lower (26 percentage points), and growth in Pennsylvania's index would have been somewhat lower (13 percentage points). We reset the trend by making the standard deviation and mean of the log difference of the index conform to the standard deviation and mean of the log difference of personal income over the period covered by the indexes. See Appendix B in the article by Alan Clayton-Matthews and James Stock for the appropriate formula for this conversion (see footnote 2 for complete reference).

[7]Since we did not have a consistent monthly national series of industrial electricity sales from the Department of Energy, we used the series collected by the Federal Reserve System. Also, to keep our national index consistent with the state indexes, we used quarterly personal income data for the index.

are within one month of the official dates of the national recessions (Figure 2 and Table). There are no official dates for recessions and expansions at the state level. Like our national index, however, the indexes for each of the three states in the Third District experienced a decline in the last four national recessions.[8] But if we look at the cyclical peaks and troughs of the state in-

FIGURE 2: Periods of Decline in Economic Activity Indexes

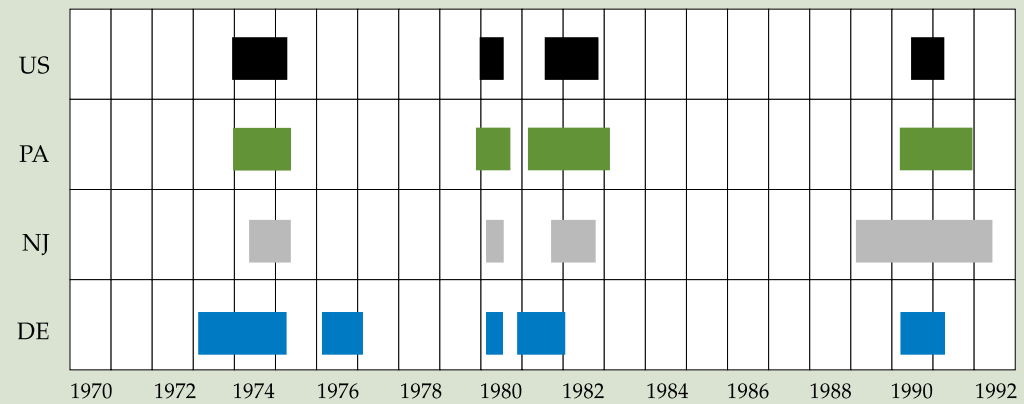


TABLE: Peaks and Troughs of Business Cycles

	Economic Activity Indexes				Official U.S. Recessions
	PA	**NJ**	**DE**	**US***	
Peak	Dec 1973	May 1974	Feb 1973	Dec 1973	Nov 1973
Trough	May 1975	May 1975	Apr 1975	Apr 1975	Mar 1975
Peak			Feb 1976		
Trough			Feb 1977		
Peak	Nov 1979	Feb 1980	Feb 1980	Dec 1979	Jan 1980
Trough	Sep 1980	Jul 1980	Jul 1980	Jul 1980	Jul 1980
Peak	Feb 1981	Sep 1981	Nov 1980	Jul 1981	Jul 1981
Trough	Feb 1983	Oct 1982	Jan 1982	Nov 1982	Nov 1982
Peak	Mar 1990	Feb 1989	Mar 1990	Jun 1990	Jul 1990
Trough	Dec 1991	Jun 1992	Apr 1991	Apr 1991	Mar 1991

*The economic activity index for the U.S. is the one calculated for this article. It is estimated from the same variables as the state indexes except that the industrial electricity data are from the Federal Reserve rather than the Department of Energy.

dexes, these downturns or state recessions do not correspond exactly to the downturns in our national index, and the dates of the downturns differ from one state to another. This indicates that the state economies generally contract and expand with the national economy, but the onset and length of the contractions and expansions in the states differ from those in the nation and in other states.

The peaks and troughs of the new state indexes are close to the turning points in the current versions of our original indexes.[9] The cyclical fluctuations, however, are more pronounced in the new indexes. In every recession in each of the three states, the percentage decline is greater in the new index than in the original one. And in every expansion, the percentage increase is greater in the new index than in the original one. Thus, when measured by the revised indexes, recessions are deeper, and expansions are stronger.

As measured by our new indexes, three of Pennsylvania's four recessions since the early 1970s have begun earlier than the nation's, and all four have been longer in terms of months of economic decline. The longest and deepest decline in Pennsylvania's index was from February 1981 to February 1983. The longest period of decline in any of the state indexes occurred in New Jersey from 1989 to 1992. This downturn lasted 40 months, far longer than the official U.S. recession or the corresponding downturn in our national index. On the basis of the total decline in New Jersey's index, this recession was also the most severe in the state in the last 30 years.[10] Delaware's index indicates that the state experienced a serious downturn between February 1976 and February 1977 that does not correspond to any national recession.[11] Delaware's economic activity index declined 6.3 percent over those 12 months. Most of the decline occurred in the first two months of 1977 when the region suffered from severe winter weather and a temporary shortage of natural gas. The natural gas shortage resulted in some plant closings and a large number of temporary layoffs in Delaware.

The new economic activity indexes confirm that the current expansion has been the longest in the last 30 years in each of the three states. The expansion is likely the longest in each state's history, just as the current national expansion is the longest in American history.

THE NEW LEADING INDEXES FOR THE THREE STATES

Business persons, investors, and policymakers tend to be more interested in where the economy is going than in where it has been, so composite indexes of leading indicators often get more attention than indexes of coincident indicators. Stock and Watson supplemented their national coincident index with an index of lead-

[8]Of course, every decline in a state's index should not be considered a cyclical downturn or recession. Recessions are significant declines in overall economic activity that last several months. We labeled as cyclical downturns or state recessions only those declines in which the period between the peak and trough of the state index was at least four months, i.e., more than one quarter.

[9]The peaks and troughs of the new state indexes are within two months of the corresponding peaks and troughs of the current versions of our original indexes.

[10]New Jersey's economic activity index declined 13.8 percent in the 1989-92 recession. The Pennsylvania state index declined 9.6 percent in the 1981-83 recession. Delaware experienced its most severe recession in 1973-75, when the index declined 11.2 percent.

[11]It is not as easy to recognize recessions in Delaware as in the other two states from the graph of the economic activity indexes because Delaware's index is more volatile from month to month than the indexes for the other two states. The composite index for Delaware is more volatile because the underlying data series for Delaware are more volatile. Delaware is a much smaller state than the other two, and each data series in Delaware's index changes direction more frequently than the series for either of the other two states.

ing indicators, which is a six-month forecast of their coincident index.[12] In the mid-1990s we developed leading indexes for Pennsylvania and New Jersey using the same type of time-series model that Stock and Watson used but different forecasting variables.[13]

The New Leading Indexes for the States Are Based on the Same Basic Model as the Original Indexes but Slightly Different Variables. Our new leading index model uses the economic activity index for each state as well as various state, regional, and national variables to forecast the nine-month-ahead change in the state's economic activity index.[14] This forecast of the nine-month percentage change in the state's current economic activity index is the state's leading index. (See *Variables Included in Leading Indexes* for a comparison of the variables used in our state leading indexes with the variables used in Stock and Watson's and the Conference Board's leading indexes.)

In the original leading indexes for Pennsylvania and New Jersey, we used two state variables — initial unemployment insurance claims and a six-month moving average of housing permits. We also used a national variable that measured interest rate spreads, that is, the difference in the yield between long- and short-term public debt or between public debt and private debt.[15] In the Pennsylvania model we also included the diffusion index for vendor delivery time from the Philadelphia Fed's *Business Outlook Survey*.

In our new leading index model for each state, we included initial unemployment claims and the index of vendor delivery time as they appeared in the original models. The Census Bureau altered the definition of housing units in January 2000. Therefore, to get a consistent series we included only permits for structures of fewer than five units.[16] The interest rate spread in our new leading index model is the yield on 10-year Treasury bonds minus the fed funds rate, the overnight rate that banks charge one another.[17] With this new model we produced a

[12]This is a vector autoregression (VAR) model in which the past values of all the variables in the system are used to forecast each of the variables in the system. In the forecasting equation for the national coincident index, Stock and Watson used four lags for the coincident index itself and various numbers of lags for the other variables.

[13]See the article by Crone and Babyak (footnote 1 has the complete reference).

[14]In the forecasting equations for the state economic activity indexes, we used four lags on all the variables in the system. In the forecasting equations for the other variables, we followed the Stock and Watson model and included only one lag of each of the variables in the system.

[15]Interest rate spreads are helpful in forecasting the national economy. See Ben S. Bernanke, "On the Predictive Power of Interest Rates and Interest Rate Spreads," Federal Reserve Bank of Boston, *New England Economic Review* (November/December 1990). For Pennsylvania, our original leading index used the difference between the yield on 10-year Treasury bonds and one-year Treasury notes, and for New Jersey, the original index used the difference between the rates on six-month commercial paper and six-month Treasury bills. In 1997 the Federal Reserve Board stopped publishing the six-month commercial paper rate.

[16]According to the new definition, a housing unit does not have to have its own eating facilities; these can be shared. Thus units in many retirement communities in which eating facilities are shared are considered individual housing units under the current definition but not under the previous one. This change in definition mostly affects permits for buildings of five units or more.

[17]We also produced leading indexes using the spread between the yield on 10-year Treasury bonds and one-year Treasury notes. But the spread between the yield on 10-year Treasury bonds and the fed funds rate produced a smaller in-sample root mean squared error for the leading indexes. Our economic activity indexes do not extend far enough back in time to produce out-of-sample root mean squared errors for the leading indexes at the beginning of the 1973-75 recession.

Variables Included in Leading Indexes

Conference Board	Stock and Watson	Leading Indexes Described in This Article
	Stock and Watson's coincident index	The state's economic activity index
Building permits for new private housing units	Building permits for new private housing units	Building permits for new units in buildings of fewer than five units in the state
Initial unemployment claims	Part-time workers in nonagricultural industries because of lack of full-time work	Initial unemployment claims in the state
Vendor delivery performance (National Association of Purchasing Management Survey)		Vendor delivery performance (Philadelphia Fed's Business Outlook Survey of manufacturers in the Third Federal Reserve District)
Yield on 10-year Treasury bonds minus the fed funds rate	Yield on 10-year Treasury bonds minus yield on one-year Treasury notes	Yield on 10-year Treasury bonds minus the fed funds rate
	Interest rate on six-month commercial paper minus rate on six-month Treasury bills	
	Yield on 10-year Treasury bonds	
Average hours worked in manufacturing		
Manufacturers' new orders for consumer goods and materials (constant dollars)		
Manufacturers' new orders for nondefense capital goods (constant dollars)	Manufacturers' unfilled orders for durable goods (constant dollars)	
	Trade weighted nominal exchange rate between the U.S. dollar and the currencies of the UK, Germany, France, Italy, and Japan	
Money supply (M2) in constant dollars		
S&P 500 index of stock prices		
Index of consumer expectations (University of Michigan)		

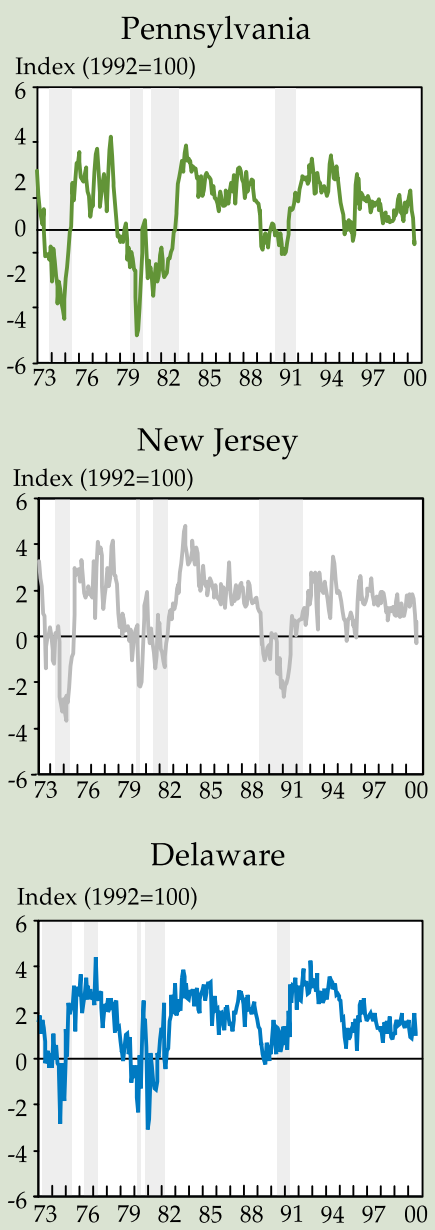
leading index for Delaware as well as for Pennsylvania and New Jersey.

How Have the New Leading Indexes Performed? In judging the performance of a leading index, we have to consider not only how well it predicts recessions and the subsequent expansions but also the number of false recession signals it produces. We must also determine what constitutes a signal of recession or expansion. Our leading indexes are forecasts of the nine-month changes in the state economic activity indexes. If the forecasts were perfect, any negative reading of the index would signal a decline in the state's economy. But forecasts are not perfect, so one might want to observe more than one negative reading of the leading index before predicting a downturn in the state's economy or state recession. For example, a commonly used rule of thumb for the Conference Board's national leading index is that three successive declines signal a recession within the next nine months. Are there any obvious rules of thumb for our leading indexes for the states?

The new leading indexes for Pennsylvania, New Jersey, and Delaware are graphed in Figure 3. The shaded areas on the graphs represent the state recessions as determined by our new economic activity indexes, that is, the time between the cyclical peaks and troughs of the coincident economic activity indexes. The experience of the last three decades gives us some idea of how many negative readings of the leading index are likely to precede a recession in each state.

All four recessions in Pennsylvania since the early 1970s have been preceded by at least three consecutive negative readings of the state's leading index. The lead times ranged from one to 11 months. For example, consider the 1990-92 recession in Pennsylvania. The state's leading index registered eight consecutive negative readings from May through December 1989. If we use the rule of thumb of at least three consecutive negative readings as a signal for recession, Pennsylvania's new leading index has not pro-

FIGURE 3: Leading Indexes



The shaded areas on these graphs represent periods of decline in the economic activity indexes for the respective states.

duced any false recession signals. Although there were several negative readings in 1995 and early 1996, there were never three in a row. The preliminary numbers for June and July 2000 were also negative. Pennsylvania's index has not performed as well in signaling recoveries as in signaling recessions. The index signaled the end of the recession in 1991 with eight consecutive positive readings. But there was only one positive reading before the recoveries in 1980 and 1983, and in 1975, the index turned positive only in the first month of the recovery.

New Jersey's new leading index does not have quite as good a record as Pennsylvania's in predicting state recessions. Three of the four recessions in New Jersey since the early 1970s were preceded by a series of two to four negative readings. But the index turned negative only in the first month of the state recession that began in 1989. Moreover, there were two consecutive negative readings in 1995 that were not followed by a downturn. New Jersey's index predicted the state recoveries in 1982 and 1992 with six or more positive readings in a row, but there were no positive readings before the recoveries in 1975 and 1980.

Delaware's new leading index does not perform as well as Pennsylvania's or New Jersey's.[18] It failed to predict the 1976-77 downturn that was specific to Delaware. Of the four remaining recessions since the early 1970s, Delaware's leading index produced five consecutive negative readings prior to the downturn in the state between February and July 1980. There were a few negative readings prior to the 1990-91 recession, including two consecutive ones nine months before the downturn. The index turned negative only after the beginning of the recessions in 1973-75 and 1980-82. Delaware's leading index has a better record at signaling recoveries than recessions. If we exclude the 1976-77 downturn when the index never turned negative, Delaware's leading index turned positive before the beginning of each expansion since the early 1970s. There was only one positive reading before the upturn in mid-1980, but there were at least four positive readings before the other recoveries. Even though Delaware's leading index exhibits a clear cyclical pattern, it has not been a very reliable predictor of recessions and so is less useful than the leading indexes for the other two states.

REVISIONS HAVE MEANT IMPROVEMENTS

Changes in the data available for the economic activity indexes and the leading indexes for Pennsylvania, New Jersey, and Delaware have led us to revise the indexes, and these revisions have resulted in some clear improvements. The scope of the data used in the economic activity indexes is much broader; it includes more than employment-related data. Long-term trends in the state indexes are now comparable, and the cyclical fluctuations are more pronounced, and therefore easier to recognize, in each state's index.

The new leading indexes for Pennsylvania and New Jersey have better records at predicting recessions and recoveries than the latest versions of the original indexes. Revisions also enabled us to construct a leading index for Delaware.

These revised economic activity and leading indexes will supplant the indexes that have been released monthly by the Federal Reserve Bank of Philadelphia. But these new indexes will also need to be revised some day as further improvements are made in modeling indexes and as changes occur in the data available for constructing them.

[18]One reason for the poorer performance of Delaware's leading index is that the state's economic activity index is more volatile from month to month than the indexes for the other two states and, therefore, more difficult to forecast.

APPENDIX: Estimating the Coincident Indexes

The Stock and Watson model assumes that the change in the underlying "state of the economy" is reflected in several indicators but that each indicator is influenced by other forces as well. Thus, for each published indicator (I) in the model there is an equation $\Delta I_t = a + b\Delta S_t + u_t$, where ΔI is the change in the published indicator, ΔS is the change in the unobserved "state of the economy," a and b are parameters, and u is an error term, which includes any change in the published indicator that is unrelated to a change in S. ΔS_t is assumed to follow an autoregressive process, that is, $\Delta S_t = c + d_1\Delta S_{t-1} + d_2\Delta S_{t-2} + e_t$. The model is estimated using standardized log differences, that is, the difference in the log of the variable in period t divided by the mean difference in the log of the variable over the entire sample period. Thus, the parameters a and c do not have to be estimated. From a system of equations with several monthly indicators, Stock and Watson estimate the other parameters in the model and the change in the state of the economy (ΔS_t). The coincident index is set equal to 100 for a particular month (in our case, July 1992) and the estimated changes in the state of the economy are used to construct the level of the index before and after that date.*

Our state models include data on payroll employment, the unemployment rate, average hours worked in manufacturing, industrial electricity sales, and personal income minus transfer payments. The electricity data required a great deal of editing before they could be used in the model. The monthly data are from the Energy Information Administration Form 826. The monthly series, however, does not begin until 1986, and our economic activity indexes go back to 1972. Fortunately, the Department of Energy supplied us with annual data prior to 1986 so we could backcast the monthly series to 1972 and benchmark the backcasted data to the annual series. Moreover, data for some utilities were missing in various months so we used only those utilities for which data were available or could be easily estimated for all months. We used data from four major utilities in Pennsylvania (Duquesne Light Company, PECO Energy, PPL, and West Penn Power Company); three major utilities in New Jersey (Atlantic City Electric Company, Jersey Central Power and Light, and Public Service Electric and Gas Company); and three utilities in Delaware (Delmarva Power and Light, City of Dover, and City of Newark). We backcasted the data for the years prior to 1986 based on the 1986-98 relationship between monthly industrial electricity sales, manufacturing employment, and heating and cooling degree days. We adjusted the backcasted data so that the sum of the months in each year prior to 1986 equaled the annual total made available by the Department of Energy and based on the Energy Information Administration Form 861. For this adjustment we multiplied each month's backcasted data by the ratio of the annual total from the Department of Energy to the sum of the 12 months that we had estimated using manufacturing employment and heating and cooling degree days. After the backcasting we seasonally adjusted the entire series.

In our state models the equations for each of the indicator variables except the unemployment rate is estimated using only the current month's value of the "state of the economy." The equation for the unemployment rate also contains two lags of the "state of the economy" because the peaks of the unemployment rate often lag the troughs of recessions. The coefficient on the current "state of the economy" is statistically significant in each of the equations for the state indexes, indicating that each of these indicators reflects the "state of the economy," or business cycle, in our three states.

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*See James Stock and Mark Watson, "New Indexes of Coincident and Leading Economic Indicators," *NBER Macroeconomic Annual* (1989), pp. 351-94. For a less technical description of the model, see my 1994 *Business Review* article (complete citation is in footnote 1).