The Long and the Short of It:
Recent Trends and Cycles in the Third District States

BY THEODORE M. CRONE

Most discussions of business cycles focus on the national economy. But regional cycles are also important, and they can vary significantly from one region to another. Analysis of regional cycles can help businesses plan investments, project sales, decide whether to enter new markets, or identify trend growth in current ones. A look at the economies of the Third District states—Pennsylvania, New Jersey, and Delaware—illustrates how trends and cycles can differ even among neighboring states. In this article, Ted Crone traces the historical patterns of the three states' economies but warns that noting such patterns is not a substitute for detailed current analysis.

In early 2001, the longest economic expansion in U.S. history came to an end. The recession that followed served to remind us that even the most advanced economies continue to experience cycles of expansion and contraction. Most discussions of business cycles focus on the national economy. But regional cycles are important as well, and they can vary significantly from one region to another. For businesses whose markets are concentrated in one state or a few neighboring states, regional trends and cycles are crucial for projecting sales, planning production, and making capital investments. Businesses that want to diversify across states or regions seek to serve markets whose cycles do not always coincide with one another. Firms also need to identify trend growth in the markets they serve to make rational investment decisions.

Ted Crone is a vice president and economist in the Research Department of the Philadelphia Fed.

An analysis of the economies of the three states in the Third Federal Reserve District (Pennsylvania, New Jersey, and Delaware) illustrates how trends — long-run growth of economic output — and cycles — fluctuations around the trend — can differ even among neighboring states. Among the three District states, economic growth over the past two decades has been stronger in Delaware and New Jersey than in the nation; Pennsylvania's growth, however, has been weaker than the national average. But for each of the three states, trend growth has varied considerably over the past 20-some years. Also, economic downturns have generally been more severe in Pennsylvania than in the U.S. or in the neighboring states of New Jersey and Delaware, but this has not been true for each downturn. While historic patterns are helpful in analyzing state economies, trends can change and every business cycle is different; therefore, an understanding of historic patterns is important but only as a guide not as a substitute for detailed current analysis.

MEASURING A STATE'S ECONOMY

Business writers and financial commentators often refer to "the U.S. economy," "the regional economy," or "the local economy." To what are they referring? It's not just the stock market; it's not just the banking industry; it's not just manufacturing. It is all of these and more. "The economy" in this sense includes all the activity that goes into providing the goods and services that a nation, a region, or a locality produces and distributes over a given period of time. At the national level, we measure economic activity every quarter by adding up the monetary value of all those goods and services; we call this measure gross domestic product (GDP).

But how do we measure a state's economy and calculate its growth? State governments and the

federal government produce a number of measures, and each has its advantages and disadvantages.

Gross state product (GSP), published by the national Bureau of Economic Analysis, is the state counterpart to gross domestic product for the nation. As such, it is the most comprehensive measure of output in a state. If GSP were available monthly or quarterly, it would be the ideal measure for establishing the trend and the cycles in a state's economy. Unfortunately, GSP is available only on an annual basis, and it is published with a considerable lag.[1] Since economic downturns are measured in months rather than years, changes in annual GSP are not a good measure of the length and depth of these downturns. Moreover, because GSP data are released with a lag, they are not useful for current analysis of the business cycle. But other state data are published more frequently and without such a long lag.

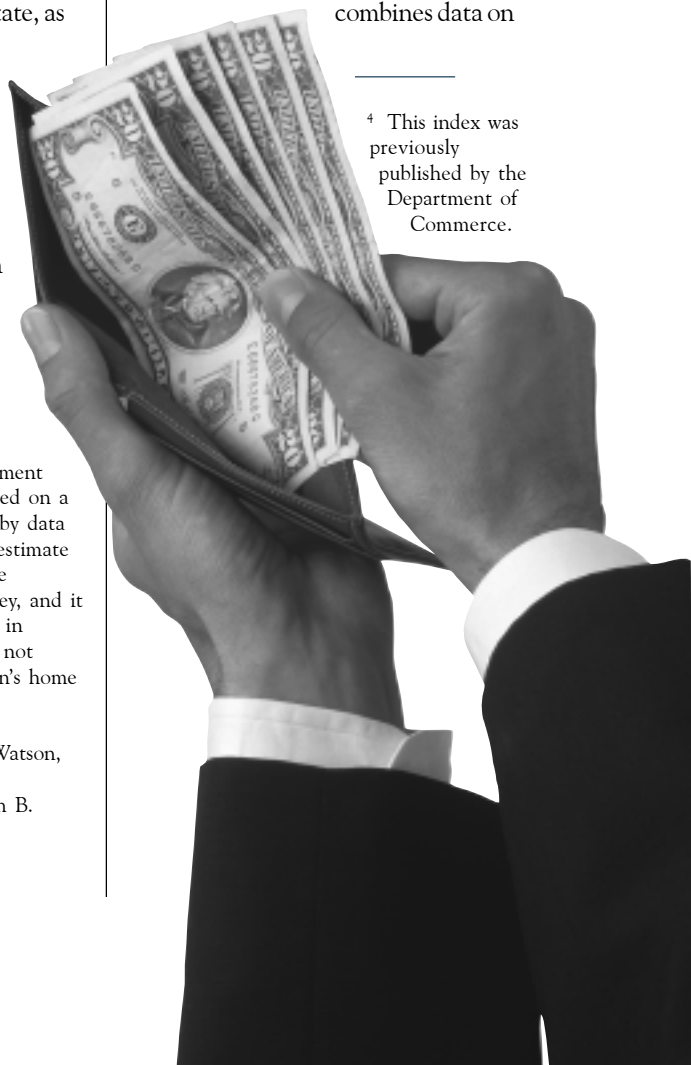
The Bureau of Economic Analysis also publishes personal income at the state level on a quarterly basis. Most components of personal income (for example, wages, proprietors' income, interest, and rent) represent payments to the workers, owners, or lenders who contribute in some way to production. These payments are measures of the value added in the economy.

But personal income also has some drawbacks as a measure of economic activity in the state. For example, transfer payments such as social security benefits and government pensions are included in personal income, but they do not represent payment for current production. Other components of personal income in a state, such as dividends, interest, and rents, may reflect production that took place outside the state and should not be included in a measure of the state's economic activity. Also, state personal income is published quarterly and with some lag. Quarterly data are better than annual data for analyzing business cycles, but monthly data would be preferable. Moreover, state personal income data are normally released about four months after the end of a quarter, so they are not as current as other data on the state's economy.

Personal income also has some drawbacks as a measure of economic activity in the state.

Monthly employment and unemployment data are published at the state level, and they are available before the end of the following month. Most analysts view the monthly nonfarm employment number, derived from a survey of establishments in the state, as the best current measure of a state's economic activity.[2] At the national level, the cyclical changes in nonfarm employment are highly correlated with changes in GDP with a slight lag,[3] and the monthly change in nonfarm employment is a major factor in dating the peaks and troughs of U.S. business cycles. But employment, or the total number of nonfarm jobs, is an imperfect measure of the output of a state's economy for a couple of reasons. First, the total number of jobs does not account for the number of hours worked. Second, a change in productivity — output per hour worked — can affect output without any change in employment.

The lack of a timely monthly indicator of output at the national or regional level has led to the search for a composite monthly index of economic activity that combines information from several indicators. Perhaps the best known composite index for the U.S. economy is the coincident index published by the Conference Board.[4] It combines data on



[1] When this article was completed in early 2003, the latest available GSP data were for the year 2000.

[2] There is a second statewide employment measure, residential employment, based on a household survey and supplemented by data from the establishment survey. This estimate of employment is less precise than the estimate from the establishment survey, and it includes residents whose jobs may be in neighboring states. These jobs would not contribute to production in the person's home state.

[3] See James H. Stock and Mark W. Watson, "Business Cycle Fluctuations in U.S. Macroeconomic Time Series," in John B. Taylor and Michael Woodford, eds., *Handbook of Macroeconomics, V.I-A.* (Elsevier, 1999), pp. 3-64.

[4] This index was previously published by the Department of Commerce.

nonfarm employment, personal income minus transfer payments, the Federal Reserve Board's index of industrial production, and manufacturing and trade sales.[5]

In the late 1980s, James Stock and Mark Watson developed an alternative index of monthly activity for the U.S. economy using essentially the same indicators but based on a statistical model to estimate the "underlying state of the economy."[6] Recently, the Federal Reserve Bank of Philadelphia published coincident indexes for each of the 50 states based on a Stock and Watson-type model.[7] Most of the data series that Stock and Watson and the Conference Board use for their indexes, however, are not available at the state level. The state indexes are based on monthly nonfarm employment, the unemployment rate, average hours worked in manufacturing, and quarterly wage and salary disbursements, adjusted for inflation.[8] For comparison purposes, I have also estimated a U.S. index using the same variables as in the state indexes.[9] The analysis of trends and cycles in the three states in the Third District is based on these indexes for the states and the comparable national index (Figure 1).

DISTINGUISHING TRENDS FROM CYCLES

A classic recession is characterized by an absolute decline in output and other measures of economic activity. In the United States, the National Bureau of Economic Research (NBER) determines the official dates for the beginning and end of these recessions. The four official recessions since 1980 were marked by a decline in the U.S. economic activity index that I have constructed (Figure 1). Official recessions are indicated by the shaded bars in the figure. Besides official recessions, however, there are other periods when jobs become more difficult to find, growth in output slows even if output does not decline, and the unemployment rate rises slightly. We sometimes hear the refrain: "It may not be a recession, but it sure feels like one." In the midst of each of the last two expansions, the U.S. economy experienced a period of slow growth.[10] These

[5] The data for personal income and trade sales are adjusted for inflation.

[6] See James H. Stock and Mark W. Watson, "New Indexes of Coincident and Leading Economic Indicators," *NBER Macroeconomics Annual* (1989), pp. 351-94; James H. Stock and Mark W. Watson, " A Probability Model of the Coincident Economic Indicators," in Geoffrey Moore and K. Lahiri, eds., *The Leading Economic Indicators: New Approaches and Forecasting Records* (Cambridge University Press, 1990,) pp. 63-89. For a less technical description of this model, see Theodore M. Crone, "New Indexes Track the State of the States," Federal Reserve Bank of Philadelphia *Business Review*, January/February, 1994, pp. 19-31. Stock and Watson use the same monthly series as the Conference Board with one exception: They use total hours worked in nonagricultural establishments rather than nonfarm employment.

[7] Theodore M. Crone, "Consistent Economic Indexes for the 50 States," Federal Reserve Bank of Philadelphia, Working Paper 02-7/R (June 2003). Sufficient data are not available to calculate these indexes prior to 1979. These indexes can be found at www.phil.frb.org/econ/stateindexes/index.html.

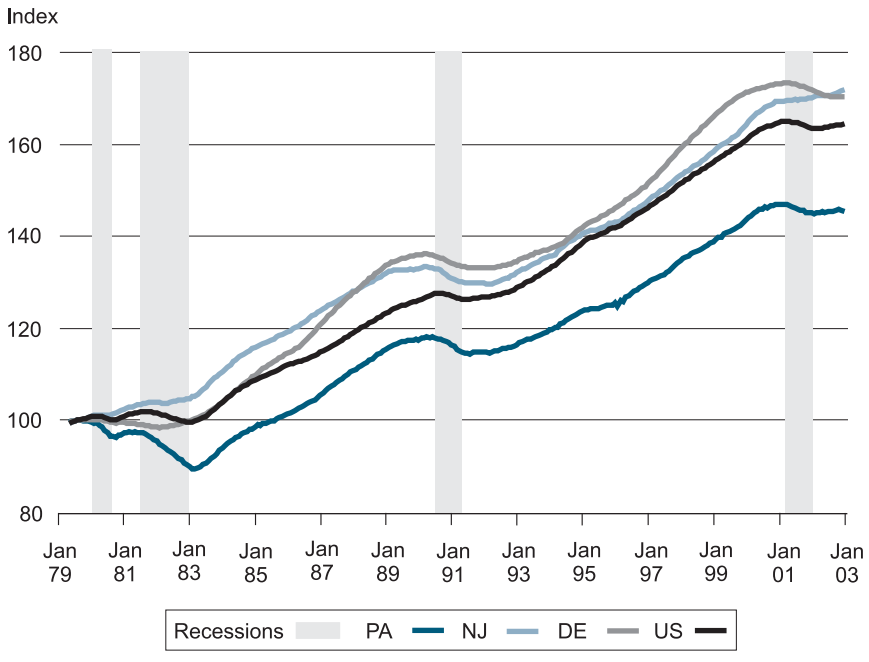
[8] Since the indexes are meant to reflect output at the state level, each state's index is adjusted so that the long-run growth in the index is equal to the long-run growth in the state's GSP.

[9] To make this national index comparable to the state indexes, the national wage and salary data are taken from the quarterly personal income report for the states, and the average increase in the U.S. index is set to the average for the combined GSP for all 50 states.

[10] In the long expansion of the 1980s, a period of slow growth occurred in 1985-86; in the expansion of the 1990s, a period of slow growth occurred in 1995. See Victor Zarnowitz and Ataman Ozyildirim, "Time Series Decomposition and Measurement of Business Cycles," The Conference Board, Economics Program Working Paper Series 01-04 (December 2001).

FIGURE 1

Economic Activity Indexes



periods are often called growth recessions because economic growth dips below its current trend.

To identify these growth recessions, we need to distinguish the current trend from the cyclical movement in economic activity. The simplest definition of trend growth is some long-run average, for example, the average growth of real GDP in the post-World War II period. This understanding of trend growth was common in the 1960s and 1970s. But it is not difficult to imagine that structural changes in the economy, such as a reduction of trade barriers, or changes in the rate of innovation and productivity growth could change trend growth. So in the 1980s some economists began to look for evidence of identifiable breaks in trend growth in the U.S. economy. Others thought of the trend as changing from one period to the next. This debate about how to characterize trend growth has not been settled.[11] It seems reasonable to assume, however, that trend growth can and does change over time. Marianne Baxter and Robert King have developed a commonly used statistical technique to separate a slowly evolving trend from the cyclical movements in any data series that exhibits trends and cycles.[12] I use their technique to separate trend from cycle in the economic activity indexes for the states and the nation.

SIGNIFICANT DIFFERENCES IN TREND GROWTH AMONG THIRD DISTRICT STATES

A cursory glance at some common measures of economic activity illustrates how widely total growth has varied among Pennsylvania, New Jersey, and Delaware over the past 20-some years (Table 1). The table shows total growth for real GSP, real personal income, and nonfarm employment for each of the three states and the U.S. between 1979 and 2000.[13] By these measures, New Jersey and Delaware generally outperformed the nation while Pennsylvania lagged far behind. For example, real output (GSP) more than doubled in New Jersey and Delaware, but it increased at only about half that rate in Pennsylvania. There is only one exception to this pattern of slower than average growth in Pennsylvania and faster than average growth in Delaware and New Jersey. New Jersey's output and income grew faster than the nation's, but jobs grew more slowly. In effect, New Jersey's economy has shifted toward jobs with higher productivity and earnings.

Since trends can vary over time, the total growth reported in Table 1 does not indicate what trend growth would be for a state at any point in time. Figure 2 shows the trend components of the state and national indexes derived using Baxter and King's technique.

> Labor force growth varies more at the state level than at the national level.

Trend growth varies over time for all three states and the U.S., and it varies more for the states than for the nation.[14] It's not surprising that trends change more at the state level than at the national level. Growth in the labor force

[11] See Francis X. Diebold and Glenn D. Rudebusch, "Five Questions about Business Cycles," *Economic Review*, Federal Reserve Bank of San Francisco, 2001, pp. 1-15.

[12] See Marianne Baxter and Robert G. King, "Measuring Business Cycles: Approximate Band-Pass Filters for Economic Times Series," *Review of Economics and Statistics*, 81(1999), pp. 575-93. Business cycles are represented by periods of slower-than-average growth followed by faster-than-average growth that last 18 months to eight years. Longer run movements in the data represent the trend. This technique also filters out short-term irregular movements in a series (less than 18 months).

[13] We chose this time span because the economic activity indexes we use in this article begin in 1979 and GSP is not available after 2000.

[14] Monthly trend growth for the U.S. ranges from 0.29 percent to 0.02 percent, with a standard deviation of 0.08 percent. For Pennsylvania, the range of monthly trend growth is 0.35 percent to -0.11 percent, and the standard deviation is 0.13 percent. For New Jersey, the range is 0.32 percent to 0.04 percent, and the standard deviation is 0.08 percent. For Delaware, the range is 0.41 percent to zero percent, and the standard deviation is 0.12 percent. Figure 2 plots the trend of the log of each index, so that the slope of the line is approximately the growth rate.

TABLE 1

Total Growth for Measures of Economic Activity 1979-2000 (Percent)

	Real GSP	Real Personal Income	Nonfarm Employment
US	89.5	70.8	45.7
PA	55.3	40.7	18.4
NJ	102.2	73.8	32.0
DE	107.8	80.3	63.6

is a major factor in how fast an economy can grow, and at the state level, growth of the labor force is affected not only by international migration but also by migration between the states. Therefore, labor force growth varies more at the state level than at the national level.[15] Also, firms can move more easily from state to state than they can from one country to another. These relocations can change the structure of a state's economy and its trend growth.

The most obvious feature in Figure 2 is the gap between the trend component in Pennsylvania's economy and the trends in the U.S. and the neighboring states.[16] The slower trend growth in Pennsylvania in part reflects very slow labor force growth in the state. On average, Pennsylvania's labor force increased only about 0.7 percent a year between 1979 and 2002. Moreover, the state's economy was traditionally dominated by manufacturing industries that were in decline in the last two decades of the 20th century, and in Pennsylvania, other industries did not expand to take the place of those that were on the wane.[17] Although Pennsylvania's trend growth has generally been slower than the nation's, it did surpass the national average for a four-year period in the mid-1980s and a two-year period in the late 1990s.[18] These episodes illustrate that even states like Pennsylvania with low overall trend growth can have spurts of growth that push them temporarily above the national average.

Among the three states in the Third District, New Jersey has had the most consistent trend growth over the past 22 years.[19] Higher productivity rather than increased employment generated most of the growth in New Jersey. However, in the period between January 1987 and November 1996, New Jersey's trend dropped below the national trend. It is difficult to pinpoint the causes of the lower trend in New Jersey during this period, but changes in federal and state tax laws may have played a role. Changes in the federal income tax law in 1986 lengthened the depreciation schedule for income-producing property. This change seems to have had a greater impact in New Jersey than in other states. The value of both residential and nonresidential construction contracts declined 60 percent or more in New Jersey after the 1986 tax changes. These declines were

[15] The standard deviation of the annual change in the labor force in Pennsylvania from 1979 to 2002 was almost twice the standard deviation of the change in the nation. In New Jersey, the standard deviation in the annual change in the labor force was almost two and a half times the standard deviation of the change in the nation, and in Delaware, the standard deviation of labor force growth was more than three and a half times the standard deviation of the national growth.

[16] Because the trend is a moving average, a large negative decline in the economy can result in a slower trend around that period. The two severe downturns in the early 1980s probably contributed to the lower trend for Pennsylvania in the early 1980s.

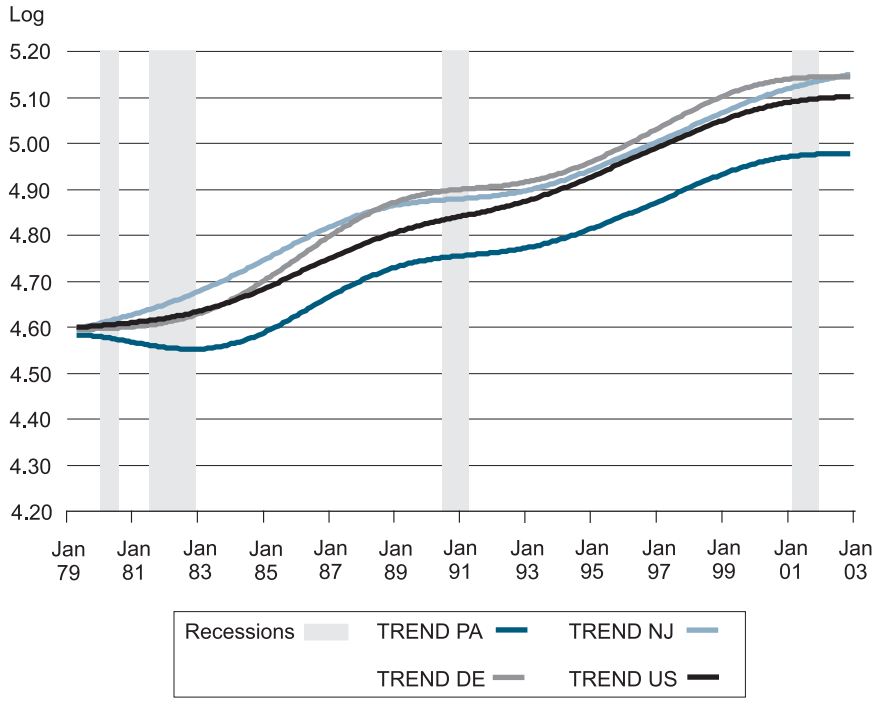
[17] For a discussion of some of the economic forces behind this decline in the state's manufacturing sector, see Theodore M. Crone, "Where Have All the Factory Jobs Gone—and Why?" Federal Reserve Bank of Philadelphia *Business Review* (May/June 1997).

[18] The state had higher trend growth than the nation from December 1984 to November 1988 and from June 1997 to October 1999. Since 1979, Pennsylvania has generally had slower trend growth than New Jersey; however, for a five-year period (August 1985 to November 1991), Pennsylvania had faster trend growth than New Jersey. In two short periods since 1979 (December 1990 to December 1992 and December 1999 to October 2002), Pennsylvania also had faster trend growth than Delaware.

[19] See footnote 14 for the ranges and standard deviations of monthly trend growth in the three states.

FIGURE 2

Trend Component of the Economic Activity Indexes



much greater than the declines at the national level. New Jersey state income taxes were also raised significantly in 1990 to cover a state budget deficit. This too may have slowed growth in the state's economy.

Trend growth has varied more in Delaware than in either of the other two states in the Third District. Delaware's faster overall growth is primarily due to very rapid trend growth in the mid- to late 1980s. In 1981 Delaware passed the Financial Center Development Act, which encouraged banks, especially credit card banks, to locate in the state.[20] This act had a profound effect on the structure of the state's economy. Jobs in the finance, insurance, and real estate sector increased between 8 percent and 18 percent every year between 1982 and 1988.[21] These high rates of growth were not sustained in the 1990s, but growth in the broad financial services sector in Delaware still outpaced growth at the national level. Jobs in finance, insurance, and real estate comprised only 5 percent of Delaware's jobs in 1981 but more than 12 percent in 2002.

Trend growth has varied not only among the three states in the Third District but within each state over time. But certain patterns stand out. Pennsylvania's trend has been significantly lower than that of the other two states, and Delaware's trend has varied more over time than the trends in the other two states.

[20] See Janice M. Moulton, "Delaware Moves Toward Interstate Banking: A Look at the FCDA," Federal Reserve Bank of Philadelphia *Business Review* (July/August 1983).

[21] This compares with growth rates between 1.5 percent and 5.5 percent for the U.S. in those years. Employment data on the components of the finance, insurance, and real estate sector in Delaware are not available prior to 1984.

BUSINESS CYCLES IN THE THREE STATES: DIFFERENCES IN TIMING AND DEPTH

The classic understanding of a business cycle includes an expansion of economic activity followed by a recession or contraction and a revival of activity that leads to the next expansion.[22] In the classic definition of a business cycle, a recession is a period of sustained absolute decline in economic activity, and an expansion is a period of increasing levels of activity. The ability to distinguish between trends and cycles allows us to apply business-cycle analysis to those periods in which the cyclical component of the national or state economy is rising or declining. Figure 3 shows the cyclical components of the economic activity indexes for the United States and the three states in the Third District. Those periods in which the economy falls below its trend — i.e., when the line goes below zero — are called growth recessions. According to Figure 3 there have been two growth recessions in the national economy since 1979 that were not associated with classic recessions — one in the mid-1980s and one in mid-1990s.[23] However, since the economy tends to grow more slowly for some months before a classic or a growth recession, the cyclical component of the economy begins to decline before the beginning of the recession. We will refer to periods when the cyclical component is declining as cyclical downturns, and since the late 1970s, they have always been longer than the official recessions. We will refer to periods in which the cyclical component is rising as cyclical expansions.

In the classic definition of a business cycle, a recession is a period of sustained absolute decline in economic activity, and an expansion is a period of increasing levels of activity.

After recessions end and the overall economy begins to expand, the cyclical component may remain negative for several months even as it rises from its low point.

Cyclical Downturns in the Tri-State Region. How do the cyclical downturns in the three states compare to the national downturns? We can look at the peaks and troughs of the cyclical component of the state and national economic indexes as well as the total decline in the cyclical component in each downturn (Table 2). Pennsylvania has suffered the same number of cyclical downturns since 1979 as the U.S., and Pennsylvania's downturns have generally been the same length as or shorter than the corresponding national downturns.[24] But the timing of Pennsylvania's downturns differed somewhat from the timing of national downturns. Five of the six downturns since 1979 began earlier in Pennsylvania than in the U.S. And Pennsylvania's

[22] The classic description is found in Arthur F. Burns and Wesley C. Mitchell, *Measuring Business Cycles*, NY: National Bureau of Economic Research, 1946.

[23] In their decomposition of trends and cycles in the U.S. economy, Zarnowitz and Ozyildirim (2001) find growth recessions in the U.S. economy during the same two periods.

[24] The exceptions are the downturn in 1979-80, which lasted two months longer in Pennsylvania than in the U.S., and the most recent cyclical downturn that began in 2000.

FIGURE 3

Cyclical Component of the Economic Activity Indexes

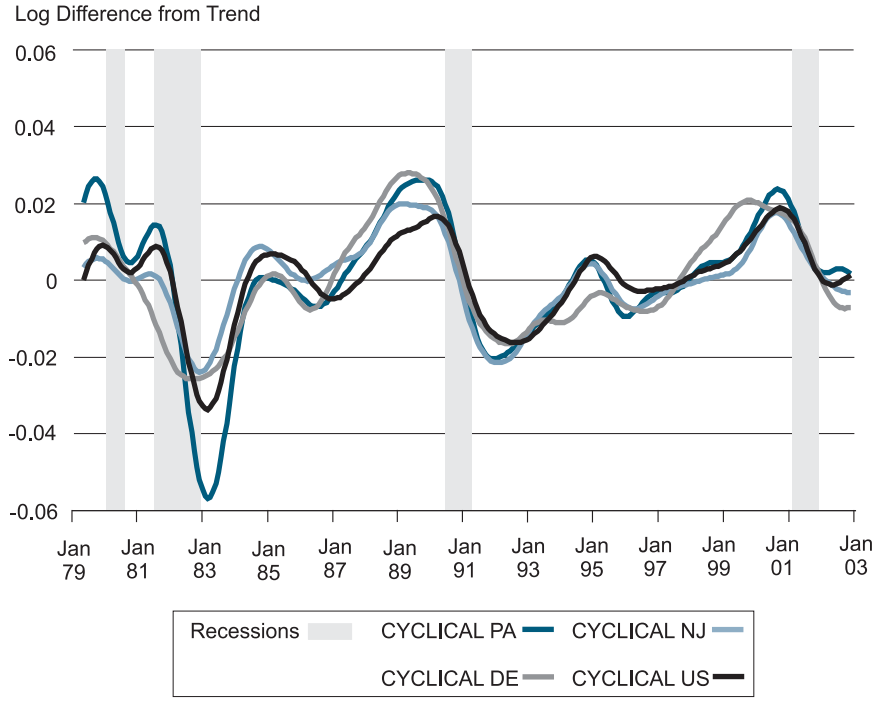


TABLE 2

Changes in the Cyclical Components of Economic Activity Indexes During Cyclical Downturns

	PA	NJ	DE	US
Peak	Sep-79	Sep-79	Aug-79	Nov-79
Trough	Sep-80	Oct-80		Sep-80
Total % Change Peak to Trough	-2.2	-0.6		-0.7
Peak	Jul-81	May-81		Jul-81
Trough	Feb-83	Nov-82	Aug-82	Feb-83
Total % Change Peak to Trough	-6.9	-2.5	-3.6	-4.2
Peak	Nov-84	Sep-84	Feb-85	Feb-85
Trough	Jun-86	Mar-86	Apr-86	Dec-86
Total % Change Peak to Trough	-0.8	-0.9	-0.9	-1.2
Peak	Oct-89	Feb-89	Apr-89	Mar-90
Trough	Dec-91	Feb-92	May-92	Aug-92
Total % Change Peak to Trough	-4.6	-4.1	-4.4	-3.2
Peak	Nov-94	Dec-94	Mar-95	Feb-95
Trough	Jan-96	Apr-96	Aug-96	Jun-96
Total % Change Peak to Trough	-1.5	-1.2	-0.5	-0.9
Peak	Sep-00	Aug-00	Nov-99	Oct-00
Trough	—	—	—	—

cyclical downturns have generally been more severe than the corresponding national ones; that is, the percentage decline in the cyclical component of the state's economy has been greater than the decline in the nation's economy.[25]

Like Pennsylvania, New Jersey has suffered the same number of cyclical downturns as the U.S. since 1979. Also, all New Jersey's downturns have begun earlier than their U.S. counterparts, and most have been shorter. New Jersey experienced less severe downturns than the nation through most of the 1980s. The two cyclical downturns between 1989 and 1996, however, were more severe in New Jersey than in the nation. This is the same period in which trend growth in New Jersey dipped below the national average, so the state's economic growth suffered on both counts.

The cyclical pattern in Delaware's economy has differed in a significant way from the patterns in the nation and the other two states in the Third District. Delaware suffered one long cyclical downturn between August 1979 and August 1982 — a period that spanned two downturns for the nation and for the other two states in the region. Despite the length of the cyclical downturn in Delaware in the early 1980s, the cyclical decline in Delaware was less severe than the decline at the national level between 1981 and 1983. From 1989 to 1992, however, the cyclical component of Delaware's economic activity index had a much larger percentage loss than the nation's. This downturn was also longer in Delaware than in the nation. But the length of the cyclical downturns in the three states has not always corresponded to their relative severity.

[25] The one exception is the downturn in Pennsylvania between November 1984 and June 1986. The decline in Pennsylvania was less than the decline at the national level.

Cyclical Expansions in the Tri-State Region. Just as Pennsylvania's cyclical downturns have been more severe than the national downturns, cyclical expansions in the state have also been stronger (Table 3). In short, Pennsylvania's economy is more sensitive to the business cycle than the U.S. economy. Part of the explanation for the more pronounced business cycles in Pennsylvania is that the state's economy is more heavily weighted toward the manufacturing sector than is the nation's.[26] And manufacturing industries are more cyclically sensitive than other industries. Just as economic downturns have tended to begin earlier in Pennsylvania than in the nation, three of the last five cyclical expansions have begun earlier in the state than in the nation, and the other two have begun at the same time.

New Jersey's cyclical patterns differed somewhat between the 1980s and the 1990s. In the 1980s, the state's cyclical expansions were shorter than the national expansions, and they were also weaker in terms of total growth (Table 3). That pattern was reversed in the 1990s: New Jersey's cyclical growth in expansion periods surpassed the nation's cyclical growth, and the state's expansions were the same length as or longer than the nation's. In both decades, however, New Jersey's expansions tended to begin earlier than the corresponding expansions at the national level, just as cyclical downturns tended to begin earlier in New Jersey.[27]

The pattern of cyclical expansions is more difficult to characterize in Delaware than in the other two states in the Third District. Delaware had fewer cycles than the nation in the 1980s. In two of Delaware's cyclical expansions — the one in the second half of the 1980s and the one in the second half of the 1990s — cyclical growth at the state level was greater than the national average. In the other expansion, cyclical growth at the state level lagged growth at the national level (Table 3). Finally, while most cyclical expansions have begun several months earlier in Delaware than in the nation, there is one exception. The expansion in the late 1990s began slightly later in Delaware.

Timing of Cyclical Movements in the Region. We have seen that cyclical downturns in Pennsylvania and New Jersey generally begin before the corresponding national downturns; the same is true of cyclical expansions in all three states in the region. But there are exceptions. So can we say that movements throughout the entire cycle for any of the states lead or lag movements at the national level?

Table 4 presents correlations between changes in the cyclical component of each state's index and changes in the nation's cyclical component during both downturns and expansions. The column marked "t" shows the correlation between changes in the same month for both the state and the nation. The columns to the left of "t" show correlations between changes at the national level and previous months' changes in the states. The columns to the right of "t" show correlations between the changes at the national level and future months' changes for the states. For example, the correlation between the change in the national cyclical component and the change in Pennsylvania's cyclical component six months earlier is 0.619 while the correlation between the

TABLE 3

Changes in the Cyclical Components of Economic Activity Indexes During Cyclical Expansions

	PA	NJ	DE	US
Trough	Sep-80	Oct-80		Sep-80
Peak	Jul-81	May-81		Jul-81
Total % Change Trough to Peak	1.0	0.2		0.7
Trough	Feb-83	Nov-82	Aug-82	Feb-83
Peak	Nov-84	Sep-84	Feb-85	Feb-85
Total % Change Trough to Peak	5.9	3.3	2.8	4.1
Trough	Jun-86	Mar-86	Apr-86	Dec-86
Peak	Oct-89	Feb-89	Apr-89	Mar-90
Total % Change Trough to Peak	3.4	2.0	3.6	2.2
Trough	Dec-91	Feb-92	May-92	Aug-92
Peak	Nov-94	Dec-94	Mar-95	Feb-95
Total % Change Trough to Peak	2.6	2.6	1.3	2.3
Trough	Jan-96	Apr-96	Aug-96	Jun-96
Peak	Sep-00	Aug-00	Nov-99	Oct-00
Total % Change Trough to Peak	3.4	2.5	2.9	2.2

[26] In 2002, 15.1 percent of Pennsylvania's nonfarm employment was in manufacturing compared to 12.8 percent for the nation. In 1979, the gap was even wider—28.9 percent for Pennsylvania and 23.4 percent for the U.S.

[27] The one exception was the 1980-81 expansion that began later in New Jersey.

TABLE 4

Correlations Between Changes in Cyclical Component of U.S. Index and State Indexes at Various Leads and Lags of the State Index

	t-6	t-5	t-4	t-3	t-2	t-1	t	t+1	t+2	t+3	t+4	t+5	t+6
PA	0.619	0.725	0.816	0.887	0.933	**0.952**	0.944	0.908	0.848	0.764	0.663	0.549	0.426
NJ	0.770	0.835	0.883	0.911	**0.919**	0.904	0.867	0.811	0.736	0.645	0.542	0.430	0.313
DE	0.673	0.683	**0.685**	0.680	0.666	0.644	0.615	0.578	0.534	0.486	0.434	0.378	0.320

change in the national cyclical component and the change in Pennsylvania's cyclical component one month earlier is 0.952. The current national change is more closely associated with the one-month earlier change in Pennsylvania than with the six-month earlier change.

All the correlations in Table 4 are positive, but the highest correlations are with state changes in months preceding the national change. In general, cyclical movements in the region precede cyclical movements at the national level — by one month for Pennsylvania, two months for New Jersey, and four months for Delaware. Moreover, changes in Pennsylvania have the highest correlations with changes at the national level, and changes in Delaware have the lowest correlations. Delaware may give us the earliest signal of a cyclical change at the national level but the signal is weak.

Business-Cycle Patterns in the Three States: Opportunity to Diversify? Table 5 shows correlations between changes in the cyclical components of the three state indexes. Cyclical movements in Pennsylvania and New Jersey are very similar; they are highly correlated. The correlation is not as strong, however, between New Jersey and Delaware, and it is weakest between Pennsylvania and Delaware. The weaker correlations between Delaware and the other two states suggest that there is some room for firms to diversify their markets within the tri-state region. This assumes, of course, that a firm's business is dependent on the local economy, such as might be the case for a small chain of restaurants or fitness centers. A manufacturing firm that sells its products nationwide could not protect itself from downturns in manufacturing by locating some of its facilities in Delaware.

WHAT CAN WE LEARN FROM THIS ANALYSIS?

Most economic series show that Pennsylvania has had the weakest economy among the three states in the Third District in the last two decades. An analysis of trends and cycles shows that Pennsylvania's poor performance has been due not only to its lower trend growth but also to more severe cyclical downturns. The state's economy has been more volatile than the national economy. Both New Jersey and Delaware have had higher trend growth and, in general, less severe cycles than the nation. But this did not preclude them from having a much more serious downturn than the nation between 1989 and 1992.

Delaware's trend growth has been less consistent than that of the other two states, and cycles in Delaware have been considerably different from those in the other two states and the U.S. These differences may make it difficult to predict cyclical movements in Delaware, but differences in the cyclical components of the state indexes suggest that firms can find diverse markets in the tri-state region.

Finally, a careful reading of cyclical conditions in the region may provide an indication of what lies ahead for the national business cycle. In all three states, cyclical movements precede movements at the national level. The signals are strongest in Pennsylvania and weakest in Delaware.

The patterns illustrated in this breakdown of the states' economies into trends and cycles should only be a guide and not a substitute for careful analysis of current data. None of the three states has *always* had a higher or lower trend than the national average, and none of the states has been a safe haven in every economic downturn.

TABLE 5

Correlations Between Contemporaneous Changes in the Cyclical Component of the State Indexes

	Correlation
PA-NJ	0.88
PA-DE	0.61
NJ-DE	0.76