

Regional Spotlight: Surveying the South Jersey Economy

After 25 years and two recessions, how well has our South Jersey Business Survey tracked the local economy?

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BY MICHAEL TREBING

The South Jersey Business Survey has been asking firms the same questions every quarter without interruption for 25 years, providing a consistent basis for observing ups and downs in the area’s economy. The Philadelphia Fed has conducted this survey in cooperation with the Chamber of Commerce Southern New Jersey, whose members make up the survey’s respondents. After a quarter-century, we have enough results in hand to look at how useful the survey’s indexes have been as economic indicators. The Philadelphia Fed, of course, is not the only party with an interest in knowing how meaningful the survey’s results are for gauging current and future business conditions in South Jersey. Firms, community groups, state and local policymakers, and others increasingly rely on survey-based measures to round out their views of the economy and to help inform their decisions. Although qualitative, survey data can still provide valuable information that is timelier than or unavailable from other sources.

So, how can we test whether the survey’s structure and methodology remain valid? How do survey-based measures enhance our understanding of economic fluctuations? Does the South Jersey survey do a reliable job of picking up on economic conditions later reflected in the official hard data on employment and other vital measures? Are improvements to the survey warranted? We look first to the structure of the survey’s indexes and then explore how its results correlate with nonsurvey indicators and such phenomena as local economic shocks and recessions.

The Membership List: Pros and Cons

Each quarter, we send a short survey, comprising 12 questions, to the members of the Chamber of Commerce Southern New Jersey. The questionnaire asks for basic information about changes in business conditions for the current quarter and a few questions about firms’ expectations for the next six months. Begun in the second quarter of 1991, the survey asks participants to check boxes indicating whether overall business activity in the region over the past quarter increased, decreased, or stayed the same,

and likewise for four indicators of conditions at their firm—sales, prices paid, prices received, and employment (Figure 1). It also asks for their expectations for some of the same indicators over the next six months. No quantitative information such as actual dollar amounts or volumes is requested, although participants can voluntarily comment about economic conditions or special factors relevant to their business.

Using a sample from an organization such as the Chamber of Commerce raises concerns regarding incentives for participating that create the potential for statistical bias. When a sample is not representative of the population intended to be measured,

FIGURE 1
The Value of 25 Years of Data
South Jersey Business Survey questionnaire.

Federal Reserve Bank of Philadelphia		
South Jersey Business Survey (Fourth Quarter 2016)		
Current		
Please describe current activity for the Fourth Quarter 2016 compa		
	Lower	Same
Region		
General business activity for the region	<input type="radio"/>	<input type="radio"/>
Company		
General business activity for your company	<input type="radio"/>	<input type="radio"/>
Company Measures		
Total sales	<input type="radio"/>	<input type="radio"/>
Number of employees	<input type="radio"/>	<input type="radio"/>
Prices received for your own products	<input type="radio"/>	<input type="radio"/>
Prices paid for raw materials (not labor or	<input type="radio"/>	<input type="radio"/>

statisticians worry about selection bias. Essentially, chamber members are self-selected, inasmuch as they join the organization for some purpose such as to network, gain visibility or legitimacy in the community, or as a part of a community relations strategy, which in the case of banks could be a way to fulfill their legal requirement to serve the needs of their communities under the Community Reinvestment Act.¹ Statisticians and analysts who have studied the motivations and behavior of individuals responding to business surveys have identified both intrinsic and extrinsic motivational factors that might contribute to a statistically biased sample or impinge on the consistency of reporting over time.²

So, the question arises: Why use a list of firms from a business networking organization and not a probability sample? Ideally, one would collect a random sample of all businesses in the region of interest. That is, the firms being surveyed should reflect the industrial makeup, size, and location of the region under study. Unfortunately, a probability sample is difficult to construct and maintain for a regional survey, as it requires identifying a wide base of appropriate firms and getting them to consistently volunteer to respond to the questions. Therefore, we rely on the chamber of commerce list for

a ready source of information on a region of southern New Jersey that matches its membership. Chambers of commerce typically attract a meaningful slice of a community's or a region's employers by providing membership benefits including networking, timely information, and business advocacy. Unlike many local chambers that represent a single township or borough, the Chamber of Commerce Southern New Jersey's membership is spread across a large region, primarily encompassing southern New Jersey, Greater Philadelphia, and northern Delaware.³ This wide net mitigates potential bias, as the pool of respondents should be a reasonable representation of the region. If you have a representative mix of respondents, reporting bias becomes less of an issue.

How Representative Is the Sample?

Given its less than ideal method of sampling, can the South Jersey Business Survey still yield useful information? First we need to know how well the list represents the firms in the region and how we might evaluate it against a statistically relevant standard.

The geographic coverage of the sample is concentrated in southern New Jersey

(Figure 2). Over the past year, nearly 80 percent of the responding firms have come from four counties: Camden (32 percent), Burlington (29 percent), Atlantic (9 percent), and Gloucester (8 percent). Smaller percentages are located in New Jersey counties to the north and south of those four, and 8 percent are in Pennsylvania.

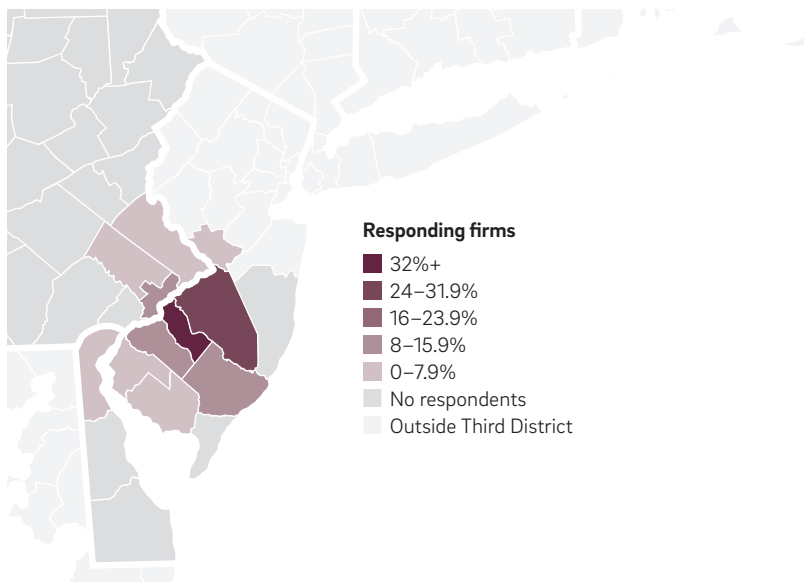
Conveniently for comparison purposes, nearly 70 percent of our responding firms are located within the Camden metropolitan division, which consists of Burlington, Camden, and Gloucester counties and which represents nearly 45 percent of employment for the territory we describe as South Jersey—those New Jersey counties that lie within the Third Federal Reserve District: Atlantic, Burlington, Camden, Cape May, Cumberland, Gloucester, Mercer, Ocean, and Salem (Figure 3).

Because the Bureau of Labor Statistics releases monthly employment data for the Camden division, we have a way of testing whether our survey's indicators line up over time with changes in economic conditions as measured by the official regional employment count. Firms on the overall South Jersey chamber membership list employed about 360,000 workers in 2016, and for the firms that responded, their collective number of employees ranged from 90,000 to 110,000. The survey

FIGURE 2

Chamber Membership Largely Overlaps Survey Focus

Percentage of South Jersey Business Survey respondents by county.

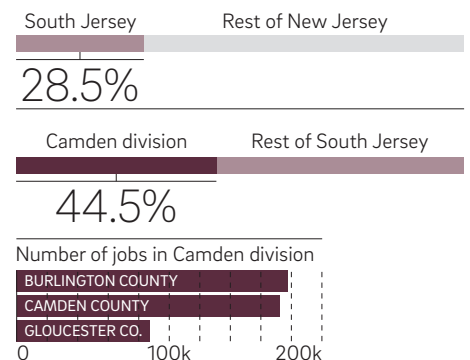


Source: Federal Reserve Bank of Philadelphia Research Department.

FIGURE 3

Official Data on Jobs Allow for a Meaningful Test

Camden division private employment relative to South Jersey & the whole state.



Source: Bureau of Labor Statistics.

Note: Employment figures are for private jobs in all industries from the third quarter 2016 Quarterly Census of Employment and Wages.

captures information from both large and small organizations. The median size respondent has about 36 employees. Given that the division is home to about 438,000 jobs, the coverage is substantial enough to provide a meaningful test.

Another way to assess the suitability of our sample is to compare the industry breakdown of the responding firms with how employment is distributed among industries in the region and state (Figure 4). The survey covers most subsectors, including government. Nonprofit organizations are also subsumed in some of the subsectors such as arts and entertainment and education and health. Comparing the industry distribution of our sample against industry employment shares for the state and the Camden division, the two most prominent industries in the survey are professional and business services (38 percent) and financial services (19 percent). These two categories are overrepresented compared with their prevalence in the Camden division, though they are closer to the state's industry distribution. At the opposite extreme, government and transportation, utilities, and trade are underrepresented in the 2016 survey samples compared with the Camden division and state.

Regardless, a reasonably representative mix of questionnaire recipients is valuable only to the extent that enough of them respond. The chamber's membership list contains contacts for about 1,000 firms that are tagged by location, industry, and workforce size. From this list, we have averaged over 250 responses for each quarterly survey over the past year. More than 44 percent of the firms invited to participate have responded at least once, and 22 percent have responded more than once. In our experience conducting the Manufacturing Business Outlook Survey and, anecdotally, in the experience of other Federal Reserve Banks that conduct business surveys, this is a very good response rate. The Philadelphia Fed's pledge of confidentiality to participants and the fact that the survey is intended to benefit public knowledge may help to explain its high rates of participation and repeat responders.

Why Conduct a Qualitative Survey?

The value of the survey's data stems from scarcity of two kinds. First, its information on employment is timelier than hard employment data from other sources. Even quantitative employment data that are especially rich in detail are available only with a lag of several months. Qualitative data from surveys may fill gaps until these data are available. For example, quarterly employment data for the Camden metro division are available with a lag of two months, compared with the qualitative survey data, which are released four to six weeks earlier. Additionally, information on production, sales, or any useful measure of economic change is not available until years later. For example, manufacturing value-added data based on the Census Bureau's census of manufactures (every five years) or annual survey of manufactures are not available until two years later, and the data are collected on an annual basis from relatively small samples.

For quantitative data on services other than employment, the problem is more a lack of information than a lag, even at the national level. Considering the paucity of regional data, particularly on the service

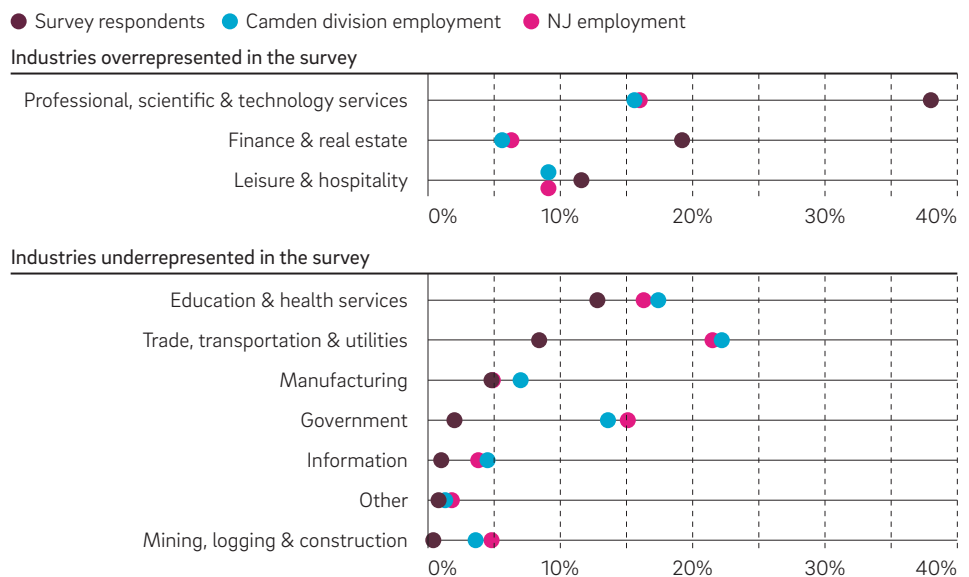
sector, the South Jersey survey helps fill a void when it comes to understanding local economic conditions. Timely data on services are increasingly valuable because, over the past 50 years, the share of U.S. output attributable to goods-producing industries has fallen from 47 percent to 26 percent, while service-providing industries now account for about 63 percent of private sector U.S. GDP and 77 percent of private sector regional output. Additionally, the service sector has been responsible for essentially all of the net job gains over the past 20 years, both nationally and regionally.

Moreover, the survey collects more detail on sales, prices, and expectations, which enhances its usefulness. The relatively cyclical nature of some service sectors also increases the survey's value as a business barometer. The service industries that are most represented in the survey are also the most sensitive to the business cycle. During recessions, construction and manufacturing output typically decline more severely than services. However, the most sensitive service industries have been professional business services; trade, transportation and utilities; finance and real estate; and leisure and hospitality—the same industries

FIGURE 4

Survey Captures All Industries

Industry breakdown of firms responding to South Jersey Business Survey versus industry employment for region and state.



Source: Bureau of Labor Statistics via Haver Analytics.

most represented in the survey, making up 77 percent of responding firms. The industries least sensitive to the business cycle have been government, education, and medical services, and they represent less than 15 percent of the respondents. For forecasting turning points in the business cycle, or even accelerations or decelerations in growth, it may be advantageous to have cyclically sensitive firms in the sample in order to pick up these changes in an overall index, even though the result may be a less representative sample.

Survey Design Considerations

The South Jersey survey is structured so as to elicit the direction of change; respondents are asked to indicate an increase, decrease, or no change in various business conditions. Conducting this type of survey has several advantages compared with collecting hard economic statistics. Because they do not require specific numbers, qualitative questionnaires are easier to answer and less intrusive into a firm's affairs. Surveys of this kind take about two minutes to complete, helping ensure a high response rate. There is some reason to believe that respondents

may view sharing information about their business conditions as a duty. Although the body of research on business survey participants is relatively small, it seems reasonable to suppose that some respondents may also be motivated by self-interest. For instance, firms may see such a survey as an opportunity to have their voices heard on business problems or trends that they believe are being neglected or are poorly understood by policymakers.

From the collection perspective, a qualitative survey can be conducted inexpensively, tabulated quickly, and reported promptly. In the case of the successful Philadelphia Fed Manufacturing Business Outlook Survey, a large percentage of responses come from chief executives, financial officers, or other individuals in a position to know the details of the questions being posed. The accuracy of individual responses is periodically verified through telephone conversations with respondents, and focus groups with respondents have suggested a high degree of accuracy.

Another advantage of a qualitative survey is that the core questionnaire can be supplemented with special questions on topics of interest to the Philadelphia

Fed's understanding of regional economic conditions. Examples have included evaluating the impact of strictly regional events such as Hurricane Sandy and the local employment effects of the Affordable Care Act. Often the questions are coordinated with other Federal Reserve Banks, providing broader coverage geographically and across industries. The consistency of the questionnaire also adds considerable value to the South Jersey survey. The questions have changed very little over time and are posed according to a set quarterly timetable.

Both of these features create considerable value for measurement, and diffusion index summaries provide a way of drawing comparisons over time and across regions, bringing us to our central question: How do the survey indexes compare with official employment statistics and other measures of regional economic performance?

The Survey's Track Record

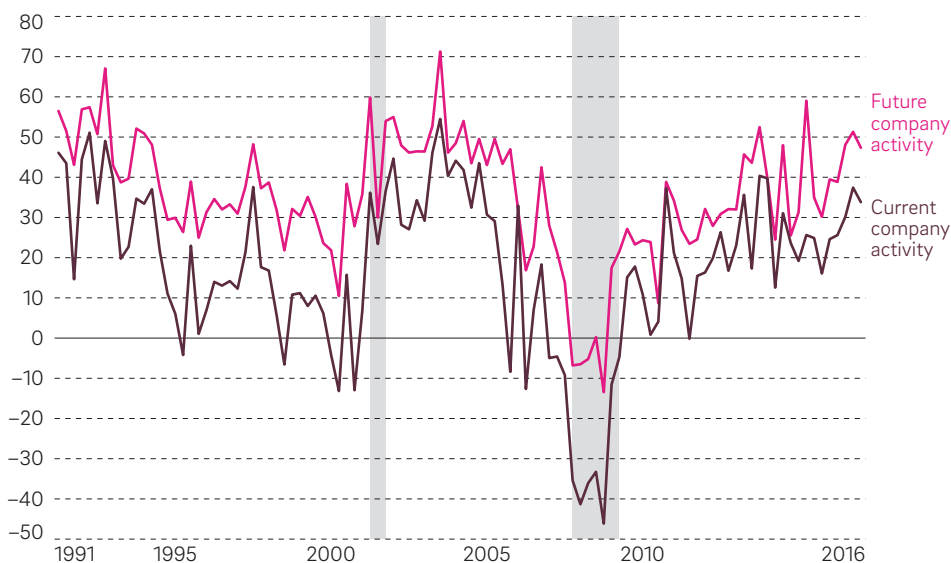
The survey's longevity allows us to observe how it has behaved over its 25-year history, encompassing two complete business cycles, including the Great Recession. The survey's current company index, which we consider its headline statistic because it provides the most comprehensive information on overall conditions, has coincided closely with official U.S. recession dates. It moved into negative territory in the second quarter of 2001 and the first quarter of 2008 (Figure 5). The current conditions index's movement in tandem with the official recession dates, which are determined many months later, is a valuable characteristic, inasmuch as a negative reading, by definition, indicates that more firms report declines than those that report increases.

For the two recessions, the average reading of the current index was -20.9, compared with an average reading of 17.1 during nonrecession periods (Figure 6). During the Great Recession, which was far more severe, the current conditions index averaged -24.8 and reached a series low of -40.5 in the fourth quarter of 2008 (Figure 5). The greatest difference has been in the current diffusion index for regional

FIGURE 5

Current Index Has So Far Moved in Sync with Recessions

South Jersey Business Survey current and future general activity indexes, Q2 1991–Q4 2016.



Source: Federal Reserve Bank of Philadelphia Research Department.

FIGURE 6

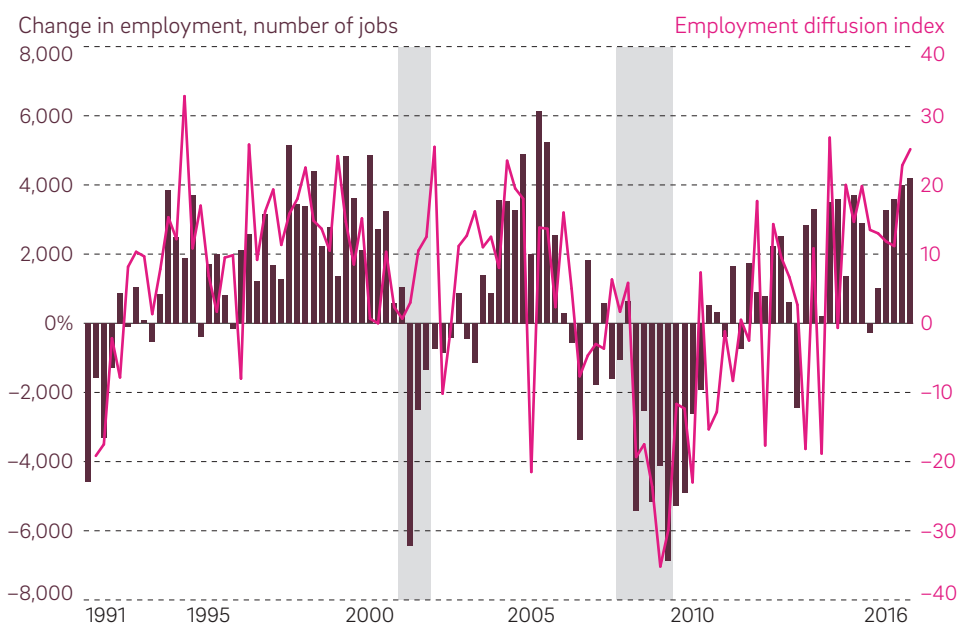
Reliable Indicators of Current and Future Conditions

Average difference between recession and nonrecession index averages, Q2 1991–Q4 2016. (Nonrecession average minus recession average.)

	CURRENT INDEXES FOR			FUTURE INDEXES FOR		
	Nonrecession	Recession	Difference	Nonrecession	Recession	Difference
Regional activity	1.1	-57.9	59.0	17.6	-8.5	26.1
Company activity	17.1	-20.9	38.0	35.4	17.6	17.8
Total sales	15.1	-18.9	34.0	33.8	14.5	19.3
Total employees	6.4	-18.7	25.1	17.6	2.6	15.0
Prices paid	24.3	22.4	1.9	25.9	20.4	5.5
Prices received	1.5	-8.9	10.4	11.5	2.1	9.4

FIGURE 7

25 Years of Remarkable Similarity to Hard Data on Jobs



Sources: Bureau of Labor Statistics via Haver Analytics; Federal Reserve Bank of Philadelphia Research Department.

FIGURE 8

Higher Correlation with State vs. Camden Division Employment

Correlation of South Jersey survey indexes with percent change in employment in different regions.

Employment	Employment index	Activity index	Regional activity index
Camden division employment	0.56	0.51	0.53
New Jersey employment	0.63	0.55	0.58
Philadelphia metro employment	0.63	0.51	0.52

Sources: Bureau of Labor Statistics via Haver Analytics; Federal Reserve Bank of Philadelphia Research Department.

Note: Employment change is calculated as the change in nonfarm employment from the last month of the previous quarter to the last month of the current quarter.

activity, which averaged 59 points lower during recessions than during nonrecession quarters. Although the survey’s price indexes have also been lower during recessions, the differences were much smaller: 1.9 points lower for current prices paid and 10.4 points lower for prices received. Firms’ outlook as measured by forward-looking indexes, moderated during recessions, decreasing an average of 26 points for the survey’s future regional index and decreasing 15 points for the future employment index. In addition, the current company index has led the past two recessions. The sign and magnitude of the index, therefore, have been reliable indicators of current conditions, suggesting that the survey has a use in assessing current conditions ahead of the release of the hard data.

The statistics that make up the diffusion indexes provide a more detailed story of business cycle patterns. Knowing the share and type of firms reporting the increases and decreases tells us a great deal about the breadth and composition of economic change across the region. For example, employment, which is a lagged indicator, can be evaluated by reviewing what types of firms cut their payrolls and by how much over time. During the seven quarters that the Great Recession lasted, for example, an average of nearly 30 percent of the firms reported cutting employment. Similarly, price changes are influenced by business downturns. During those same seven quarters, an average of 25 percent of firms reported cutting their prices.

How Well Correlated with Employment Data?

The current employment diffusion index summarizes the responses to the survey’s question about employment changes from the previous quarter. A positive index reading should correlate with growth in employment at chamber members’ firms. That is, when the reading is positive, more firms have indicated they are adding workers than have indicated they are subtracting workers.

So, what relationship do we see between the employment diffusion index and two statistical measures: nonfarm employment in the Camden division and

in New Jersey as a whole?⁴ The index behaves remarkably similarly to official Bureau of Labor Statistics changes in employment, especially when viewed over the full 25 years (Figure 7). During the Great Recession, Camden division employment declined at the same time as the current employment index. Even after the recession, employment did not increase for several years. The current index signaled employment growth slightly earlier than did the hard data. This behavior is consistent with the fact that employment is a lagged indicator of the health of the overall economy. In subsequent quarters, the acceleration in employment gains has also been evident in the higher readings of the current employment index.

How well does the survey's employment index correlate with actual employment across different geographies? Statistically, the survey index has a higher correlation with overall New Jersey employment data than with Camden division employment data (Figure 8).

The index's correlation with employment data for the state was on par with the coefficient for the Camden division alone. A comparison of the survey's other

indexes also shows a positive relationship between company-level activity and the regional activity index, which is firms' appraisal of the region. The employment index has the highest correlation with actual employment, as one would expect.

See *The Logic of Diffusion Indexes.*

Correlation with Our Coincident Indexes

The correlation of the survey's indexes with another indicator of New Jersey's economic performance, the Federal Reserve Bank of Philadelphia's state coincident indicator for New Jersey, suggests the survey is a potentially suitable signal of the area's economy.

Although not as timely as surveys, the coincident indicators were intended to fill the delay of several months between the release of official state GDP and other hard data on the state such as employment, work hours, and personal income. The coincident indexes combine four state-level indicators to summarize current economic conditions in a single statistic.

For the 25-year history of the survey, the statistical correlation between its

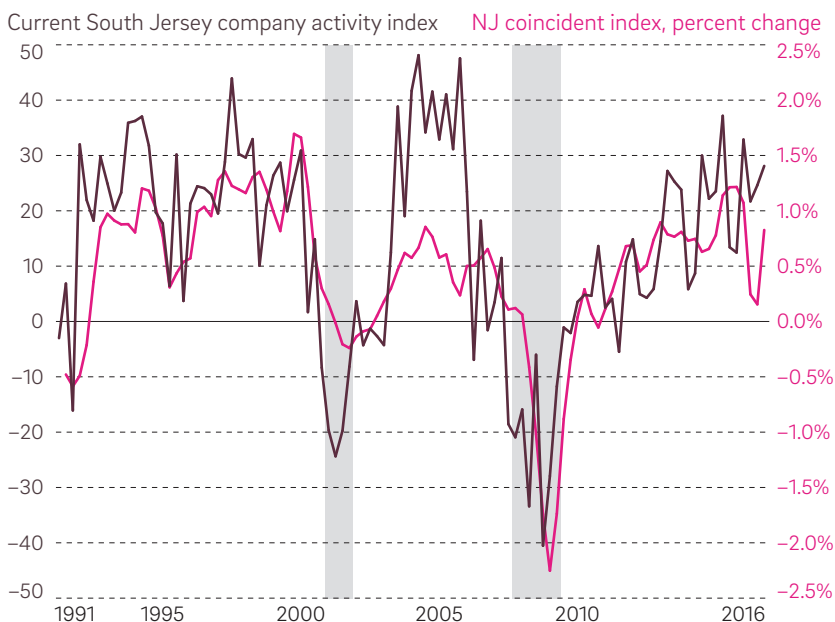
current company activity index and the quarterly change in the New Jersey coincident index is 0.60 (Figure 9), with 1.00 indicating a perfect correlation. The survey's index closely traces the declines during the two recessions. In fact, for both recessions, the survey index had dipped slightly below zero slightly ahead of the coincident index. Likewise, during recovery periods the index moved back above zero around the same time as the coincident index and closely followed the official start and end dates of U.S. recessions.

These patterns indicate that the survey's indicators could be useful in tracking and forecasting turning points in the regional economy. The Philly Fed's manufacturing survey indexes also have significant predictive power in explaining monthly changes at both the state and national levels. Similarly, the manufacturing survey's current activity index is useful in predicting changes in the New Jersey coincident index.⁵ The findings support the idea that incorporating the survey's indexes into our state or regional coincident indexes could provide useful information, since they provide timely data that are correlated with business activity.⁶

FIGURE 9

South Jersey Index Signaled Recessions Before State Index

Current company activity index and New Jersey coincident index.



Source: Federal Reserve Bank of Philadelphia Research Department.

The Logic of Diffusion Indexes

For each question in the South Jersey Business Survey, we calculate a diffusion index to gauge whether most firms are experiencing increases or decreases for each indicator. We first calculate the percentages of firms reporting increases, decreases, and no change, then subtract the percentage decrease from the percentage increase. The resulting diffusion index can theoretically vary from 100, when all firms report an increase, to -100, when all firms report a decrease. The midpoint is 0, when the percentage of firms reporting increases equals the percentage reporting decreases.

However, the survey responses have never been unanimous, so the diffusion index's values have always landed somewhere between -100 and 100. The index values computed by other Federal Reserve Banks have been similar. The closer the index is to either extreme, the more

diffuse, or widespread, is the reported increase or decrease in the indicator.

By measuring the diffusion, or spread, of survey responses, diffusion indexes reflect the way changes in the pace of economic activity are propagated across firms. For example, in an economic expansion, the first effects are usually felt by just a few firms. When they experience a pickup in business, they step up production to meet the stronger demand. They buy more raw materials and machinery, hire more labor, and so forth. This process repeats itself at the firms that supply materials to the first few expanding firms, and the higher employment leads to higher incomes and more spending, which boost other firms and whole industries, spreading through the economy. As growth proliferates, statistical measures of the level of activity and sales begin to rise, confirming in detail the process first reflected by the increase in diffusion indexes signaling the beginning of the expansion. Over the survey's 25-year history, these characteristic patterns of change, especially during recessions and recovery periods, are its most distinctive feature (Figure 10).

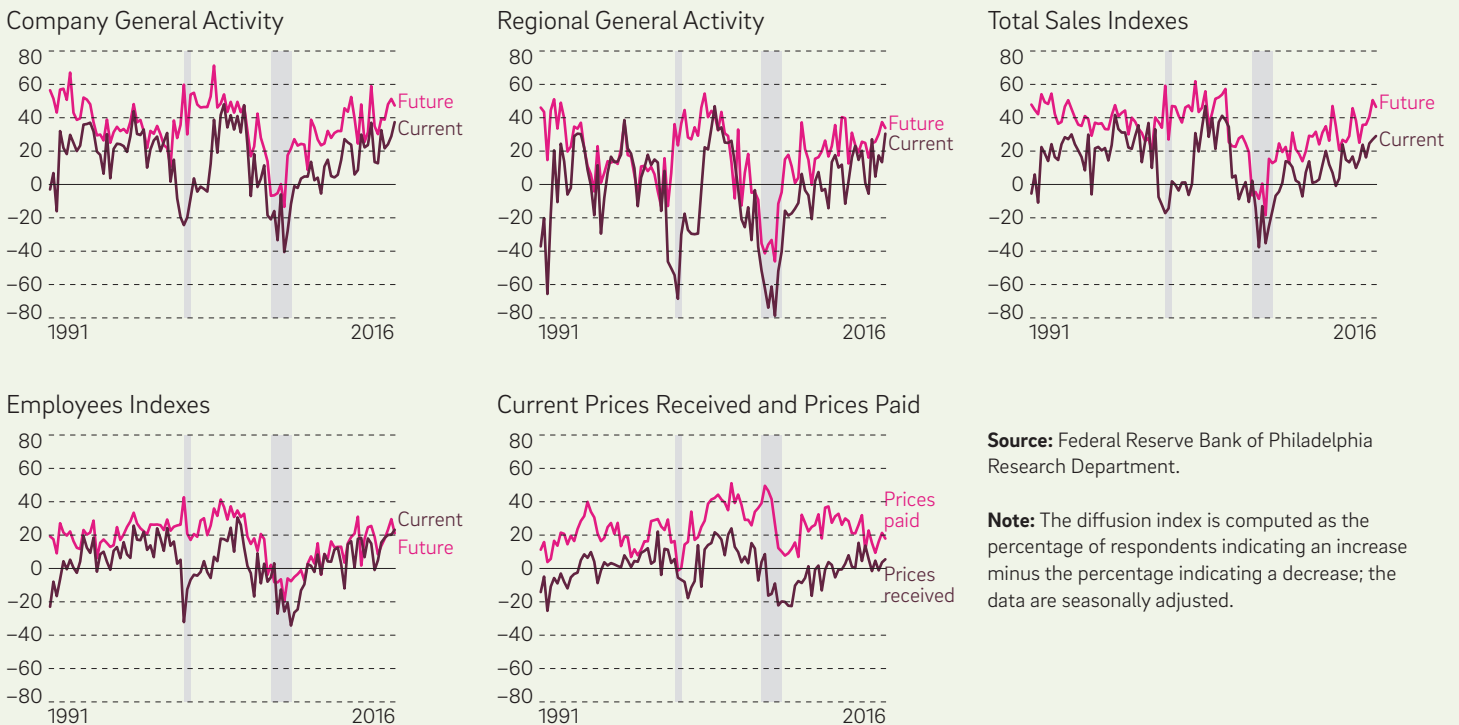
How successful is the South Jersey survey's diffusion index in predicting actual outcomes, such as official employment for the region? Our model (and the logic of constructing a diffusion index) suggests that the index will be positive when reflecting growth and negative when reflecting contraction. Statistics of goodness of fit summarize the discrepancy between expected values and what is actually observed using a model as a framework. A goodness of fit measure, such as an R-squared statistic, which is derived from a linear regression, serves the purpose. The index and employment growth clearly have a positive correlation, with a 0.56 correlation coefficient (Figure 11).

To model the relationship, a regression line is fit to the relationship, which is also shown. The linear fit appears to describe the relationship expected. In addition to the positive slope that is expected, the y-intercept value is near zero (0.1). Therefore, the model that fits the relationship best suggests that a value of zero for the diffusion index is associated with a near-zero growth in employment. Also, this provides a quantitative relationship between the index and actual employment.

FIGURE 10

Consistent Patterns of Change, Especially Around Recessions

Diffusion indexes of the South Jersey Business Survey, Q2 1991–Q4 2016.



Source: Federal Reserve Bank of Philadelphia Research Department.

Note: The diffusion index is computed as the percentage of respondents indicating an increase minus the percentage indicating a decrease; the data are seasonally adjusted.

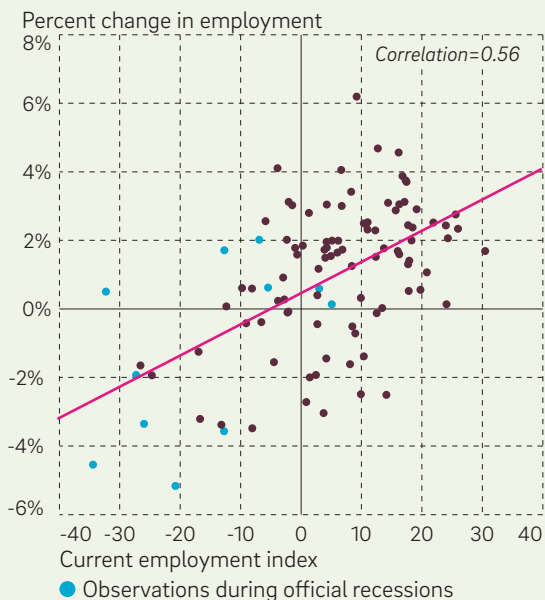
Another way of looking at the result is that the index yields the correct direction of change about 75 percent of the time. Moreover the R^2 value of .31 can be interpreted as the share of variation in employment growth explained by the diffusion index alone. This shows that the diffusion index could be useful in forecasting employment. Of course, including other information about employment trends can improve this forecast even more. In more basic terms, the index can improve forecasting ability, which is the best measure of value, statistically speaking.

The Philadelphia Fed also produces diffusion indexes for other regional surveys that we conduct, notably the Manufacturing Business Outlook Survey, which has been conducted monthly since 1968 and is widely followed as a barometer of both regional and national manufacturing conditions. We added the Nonmanufacturing Business Outlook Survey in 2011. The Federal Reserve Banks of New York, Richmond, Dallas, and Kansas City have built upon the success of the Philadelphia Fed and now produce similar indexes for manufacturing and nonmanufacturing sectors in their districts.

FIGURE 11

A Clearly Positive Correlation with Employment Growth


Quarterly employment percent change vs. employment index.



Sources: Bureau of Labor Statistics via Haver Analytics; Federal Reserve Bank of Philadelphia Research Department.

Conclusions

Considering its simple design and modest statistical sophistication, the South Jersey Business Survey has provided useful insight into the region’s real-time business conditions, especially for business services. Its value as a regional economic analysis tool is in keeping with the many other business surveys that are used to supplement hard data on economic performance. The cyclical behavior of the survey’s indexes and their significant correlation with other measures of economic performance, such as employment and our coincident indicators, suggest they will continue to be useful measures of regional economic performance.

The documented usefulness of the survey also supports using this framework to survey other regions where greater coverage and more timely data are desired. For instance, obtaining a larger sample, expanding its coverage to adjacent regions, and weighting the results by size and industry characteristics are possible ways of making the survey more informative. Using its indexes to supplement the measures used to construct state or metro area coincident indicators is another potential application. The support of the Chamber of Commerce Southern New Jersey is important to assure the survey’s continuation; both the chamber and the Philadelphia Fed benefit. The chamber provides a continually updated pool of potential respondents, and the Philadelphia Fed returns information useful to businesses along with the opportunity for chamber members to contribute to public knowledge about the regional economy. 

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Notes

1 Therefore, there are two forms of selection bias—selection upon joining the organization and selection upon filling out the survey.

2 Vanessa Van Grinsven and her coauthors considered both the cost of participating (time and effort) and motivating factors to better understand response behavior.

3 See its website, http://www.chambersnj.com/CCSNJ/About_Us/CCSNJ/About.aspx?hkey=8c8c81c4-8b8e-4f58-ba62-abaaf8368e1e.

4 The three-county Camden division is part of the larger Philadelphia metropolitan statistical area but can be analyzed as a distinct subregion.

5 A statistical regression model was used to evaluate the relationship between the quarterly change in the coincident and the diffusion index. See my 2008 report with Leonard Nakamura and my 2013 *Business Review* article with Tim Schiller. When used as an explanatory variable, the diffusion index is statistically significant in explaining changes in the coincident index. Moreover, it provides useful and timely information when controlling for the information provided by the coincident indicator by itself. That is, it can improve forecasting performance when included in a forecasting model.

6 Maria Arias and her coauthors, for example, use available statistics capturing various aspects of local activity in constructing indexes for the 50 largest U.S. metropolitan statistical areas.