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Using Employment Data to Better Understand Your Local Economy

Tool 4. Shift-Share Analysis Helps Identify Local Growth Engines

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Summary

Local economic growth has a number of causes. In many cases, local businesses enjoy a competitive advantage, and growth within that industry spurs growth in the entire economy. In other cases, local industry growth simply mirrors national trends. Separating the role of local and national effects on current regional employment trends has long bedeviled many community development practitioners. *Shift-share analysis* is a useful tool for overcoming this challenge.

Overview: Shift-Share Examines the Engines of Growth

Generally, local employment changes are more or less concentrated in certain industries than they are in the nation as a whole. Most often, this difference is rooted in the region's industrial structure. For example, an area with several rapidly growing industries might display a high rate of overall employment gain. Likewise, a region with several declining industries might experience significant job losses. In examining the regional labor market merely knowing that employment changes have occurred is not sufficient.

The ability to separate local growth factors from national growth factors is an important aspect of understanding your local economy. By identifying industries that your region is particularly competitive in, you are in a position to focus economic development efforts on areas most likely to be successful.

Shift-share analysis is used to account for the competitiveness of a region's industries and to analyze the local economic base. The analysis is primarily used to decompose employment changes within an economy over a specific period of time into three contributing factors:

1. Growth that is attributable to growth of the national economy.
2. Growth that is attributable to the mix of faster or slower than average growing industries.
3. Growth that is attributable to the competitive nature of the local industries.

The technique facilitates comparisons between the local economy of interest and the larger economy. Specifically, shift-share helps analyze whether a particular local economy has witnessed a faster or slower growth rate in employment than the larger (national or state) economy has observed. Shift-share also helps explain these differences to some extent. For example:

- Are observed differences in growth rates due to differences in employment mix found at the local level relative to that observed in the larger economy?
- Or are differences due to the competitive advantage or disadvantage that the specific local economy has relative to the larger economy?

Components of Regional Industry Employment Change

As stated above, the shift-share analysis decomposes local industry employment change into three components:

- The *national growth share* refers to local job growth that is attributed to national economic growth. Specifically, if the nation is experiencing employment growth, it is reasonable to expect that this growth will positively influence your area. This

component describes the change that would be expected due to the fact that the local area is part of a dynamic national economy. In the first part of a shift-share analysis we examine the national growth share, or the number of jobs lost or gained in a region if total employment in the region had changed at the same rate as overall national employment.

- Some industries add jobs more rapidly than others; some lose jobs. The *industrial mix share* component reflects differences in industry "mix" between the local and national levels. The mix-factor examines how national growth or decline of a particular industry translates into local growth or decline of that industry. Thus, this component represents the effects that specific industry trends at the national level have had on the change in the number of jobs in the region.

- Even during periods of prosperity, growth is uneven—some regions and some industries grow faster than others. This is usually attributed to some local comparative advantage such as natural resources, linked industries, or favorable local labor situations. The *local share* describes the extent to which unique local factors relate to regional industrial employment growth or decline. The local component aids in identifying a local area's economic strengths and represents how a region's competitive position can contribute to regional job growth.

The key question is: What can we learn about the performance of a local economy by understanding these three components?

Analytical Method

This section describes how to calculate each of the three growth components described above. Using data from Table 1 on page 4, it includes an example to help clarify the concepts.

To conduct the three-step analysis you need the following data for at least two points in time:

- Local industry employment data.
- National industry employment data.

In general, the rule of thumb is to use data from the most recently available year and compare it to 5 years earlier. Note, however, that the results will change—sometimes dramatically—based simply on the choice of years! Appropriate county-level data sources include County Business Patterns and BEA-REIS. These sources are described more fully in the introduction to the series.

National Growth Share

This component measures the number of jobs created locally due to national economic trends. To calculate this component, you simply multiply the base year employment (1993 in our example) for *each industry* by the *national average* employment growth rate over the time period (1993 to 1998 in our example; relevant figures are in bold). See Table 2 on the next page as an example. Adding these results up over each industry yields the national growth component for the entire local economy.

NGS = industry employment x national average growth rate of total employment

Note: To calculate the appropriate growth rate, use the following formula:

Growth = (employment in 1998 – employment in 1993) / employment in 1993

Interpretation: The overall national growth component shows that, if the local economy was identical to the national economy, then the county should have grown by 32,491 jobs between 1993 and 1998. However, the data from Table 1 shows that the county only added 29,954 jobs during this period. This suggests that the county is not performing as well as the national average. The other components of the shift-share analysis can help identify why this happened.

Looking a bit closer at the analysis, we do see that the service and finance industries added more jobs than expected if they performed at the national average (for example, 12,923 actual jobs versus 8,014 predicted jobs for services). All other industries added less than expected at national averages.

Obviously, the changes (gains or losses) in employment that occur at the local level do not exactly follow the overall national trend. Why might this be the case? Two reasons are described below.

Table 1. BEA-REIS Employment Data for the U.S. and Lancaster County: 1993 and 1998.

United States				
Industry	1993	1998	Change in Jobs	Percent Change
Total Employment (in thousands)	141,996	160,199	18,202	**12.8%**
Farm Employment	3,130	3,127	–3	–0.1%
Manufacturing Employment	18,712	19,569	857	4.6%
Retail Employment	23,467	26,710	3,244	13.8%
Finance and Real Estate Employment	10,502	12,230	1,728	16.5%
Service Employment	41,811	49,898	8,087	19.3%
All Other Employment	44,375	48,665	4,291	9.7%
Lancaster County				
Industry	1993	1998	Change in Jobs	Percent Change
Total Employment	253,463	283,417	**29,954**	11.8%
Farm Employment	7,951	7,977	26	0.3%
Manufacturing Employment	58,516	61,229	2,713	4.6%
Retail Employment	44,752	50,339	5,587	12.5%
Finance and Real Estate Employment	16,193	18,547	2,354	14.5%
Service Employment	62,518	75,441	12,923	20.7%
All Other Employment	63,533	69,884	6,351	10.0%

Table 2. National Growth Share Calculations.

Industry	1993 County Employment		National Employment Growth Rate		National Growth Share
Farm Employment	7,951	x	12.8%	=	1,019
Manufacturing Employment	58,516	x	12.8%	=	7,501
Retail Employment	44,752	x	12.8%	=	5,737
Finance and Real Estate Employment	16,193	x	12.8%	=	2,076
Service Employment	62,518	x	12.8%	=	8,014
All Other Employment	63,533	x	12.8%	=	8,144
County National Growth Share					32,491

Industrial Mix Share

Some industries add jobs more rapidly than others and some lose jobs. The "mix" component helps you determine if the local industry is weighted toward industries that are growing faster or slower than the national average. To calculate this component, simply multiply the base year local employment in each industry (here 1993) by the difference between the sector's national growth rate and the national economy's overall growth rate (see Table 3). Adding these results up over each industry yields the industrial growth component for the entire local economy.

IMS = local industry employment x (national *industry* growth rate - national *average* growth rate)

Interpretation: The overall industrial growth component of -2,736 means that Lancaster County has nearly 2,800 jobs less than it would have if its structure were identical to the nation. The retail, finance, and service industries are growing faster than the national average, while the remaining sectors are growing slower. The negative industrial mix means that the local economy grew slower than the national average, *independent of the national influence*.

Local Share

This component helps you determine whether local industries are growing faster or slower than similar industries at the national level. Accordingly, the local share is often interpreted as indicating whether local businesses are more or less competitive than the national average. To calculate the local share, you simply need to multiply employment in the base year (here 1993) by the difference between the local and national industry growth rates (see Table 4). Adding these results up over each industry yields the competitive growth component for the entire local economy.

Table 3. Industrial Mix Share Calculations.

Industry	1993 County Employment		Industry's National Growth Rate		National Employment Growth Rate		Industry Mix Share
Farm Employment	7,951	x	(–0.1%	–	12.8%)	=	–1,027
Manufacturing Employment	58,516	x	(4.6%	–	12.8%)	=	–4,823
Retail Employment	44,752	x	(13.8%	–	12.8%)	=	449
Finance and Real Estate Employment	16,193	x	(16.5%	–	12.8%)	=	589
Service Employment	62,518	x	(19.3%	–	12.8%)	=	4,077
All Other Employment	63,533	x	(9.7%	–	12.8%)	=	–2,001
County Industrial Mix Share							–2,736

Table 4. Local Share Calculations.

Industry	1993 Employment		County Industry Growth Rate		National Industry Growth Rate		Local Share
Farm Employment	7,951	x	(0.3%	–	–0.1%)	=	34
Manufacturing Employment	58,516	x	(4.6%	–	4.6%)	=	34
Retail Employment	44,752	x	(12.5%	–	13.8%)	=	–599
Finance and Real Estate Employment	16,193	x	(14.5%	–	16.5%)	=	–310
Service Employment	62,518	x	(20.7%	–	19.3%)	=	832
All Other Employment	63,533	x	(10.0%	–	9.7%)	=	208
County Local Share							199

LS = local industry employment x (*local* industry growth rate —*national* industry growth rate)

Interpretation: According to the local share component, 199 of all new jobs in Lancaster County are attributable to its relative competitive position—in a sense, the county *itself* created a greater share of employment growth than the nation did on average. In addition to overall growth, the analysis can also be used to examine how individual industries have fared competitively. Here, we see that all industries but two had positive local shares.

Keeping in mind, however, that this is a descriptive tool rather than a diagnostic one is important. The shift-share analysis does not tell us *why* some local industries are more competitive and why some are less competitive—differences may be due to technology, management, or worker productivity. A more in-depth analysis of local versus national industries is required to sort out the sources of these differences. Potential factors could include access to natural resources, local wage rates, workforce productivity, or regional transportation networks.

Adding It Up

After calculating the national growth, industrial mix, and local shares, you should make sure your math is right. To do so, simply add up the three shares; their total should equal the total local employment change over the period.

Total Employment Change = National Growth Share + Industry Mix Share + Local Share

29,954 = 32,491 + (-2,736) + 199

How This Information Is Used in Economic and Community Development

Once again, you should spend some time interpreting the data. When looking at shift-share analysis, consider the following questions:

1. Compared to other regions, does the community seem highly competitive in any particular industry? What is the source of this competitiveness?
2. Does this information support popular perceptions? Or, does the analysis uncover surprising areas of economic strength?
3. Are observed differences in growth rates due to differences in employment mix found at the local level relative to that observed in the larger economy? Or are differences due to the competitive advantage or disadvantage that the specific local economy has relative to the larger economy?

A Few Caveats

Noting that shift-share is a simple analytical technique that does not account for many factors is important. Keep several things in mind when digging into the results:

- The technique minimizes the impact of issues such as business cycles.
- The method falls short in actually identifying comparative advantages.
- A shift-share industrial analysis is a "snapshot" of two particular points in time, and the results are sensitive to the period of time chosen.
- Finally, shift-share is sensitive to differences caused by levels of industrial detail.

Shift-share analysis does, however, offer a simple, straightforward approach to separating out the national and industrial contributions from local or regional employment growth. This makes it a valuable addition to the practitioners' toolbox.

Conclusion

Shift-share analysis examines the sources of changes in local employment growth or decline. By using shift-share, you can identify local advantages, as well as pinpoint growth or potential growth industries. Like many other economic tools, the shift-share technique is a descriptive tool that should be used in combination with other analyses help better understand the region's key industries.

Shift-share, and the local share component in particular, can point to industries that enjoy local comparative advantage. It cannot, however, identify what the actual comparative advantage is. Identifying which factors have contributed to the local area outperforming national growth is important.

Identifying whether the large gainers or losers are typically exporters is also important. (Remember: You can use the location quotient tool to identify importing and exporting industries.) Exporting industries are important because they pull in dollars from outside of the local region, thus serving as a growth engine.

For More Information

The data needed for calculating shift-share components is available from the Bureau of Labor Statistics (www.bls.gov) or the Department of Commerce (home.doc.gov/). For Pennsylvania, much of the data and analysis used in this series is available on-line via Penn State's Center for Economic and Community Development (cecd.aers.psu.edu/). In addition, this Web site also provides educational materials and analyses for better understanding trends in the state economy.

The state's Center for Workforce Investment Analysis at the Department of Labor and Industry is Pennsylvania's designated provider of employment statistics (www.dli.state.pa.us). On their Web site you can find a variety of statistics related to employment, wages, and unemployment for the state, metropolitan areas, and counties.

Other potential data sources are outlined in the section on indicators in the introduction.

Warren Kriesel, an agricultural economist at the University of Georgia, has put together a nifty interactive website that will generate a shift-share analysis at the one-digit SIC level for any county or group of counties in the U.S. for the years 1980-2000. The web address is www.rcr.uga.edu/guide/sshare1.html.

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