

# Shift-Share Analysis

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Summer II 2016

## Overview

A shift-share analysis is used to examine employment growth or decline in a region (state, MSA, etc.). Imagine that over a period of time a local industry, such as tech, gains employees, or an industry such as manufacturing loses employees. We might first ask “What about national conditions?” If the entire economy gained or lost employment during that period, the performance of the local economy may be better or worse. We may next ask “What about the national industry?” If manufacturing is losing jobs across the country, a local economy that loses manufacturing jobs but *not as much* may in fact have a very healthy local manufacturing economy. If tech is growing around the country, a local economy that gains tech jobs but *not as much* may in fact have a fairly weak local tech economy. The remainder after accounting for national and industrial conditions is the “local share”, and can give an indication whether a local economy is doing well or poorly, and what the local industrial drivers are.

## Data

First, download the file Shift-Share Template.xls. This file contains national employment data for economic sectors from 1990 to 2015. You will need to download analogous data for a metropolitan area in order to conduct a shift-share analysis for the area. The professor will demonstrate using data from the Philadelphia-Camden-Wilmington MSA. Therefore, you may choose any MSA *except* Philadelphia.

Begin on the BLS Databases, Tables & Calculators by Subject page at <http://www.bls.gov/data/>. Scroll down to the Employment section. The second entry should be “Employment, Hours, and Earnings - State and Metro Area (Current Employment Statistics - CES)”. Click the yellow button for “Multi-Screen Data Search”.<sup>1</sup> Then follow along on the subsequent web pages:

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<sup>1</sup>Note the “One-Screen Data Search” may be easier to use, but (a) requires Java to be installed and enabled on your computer, and (b) provides less information during the data

1. Seasonal (Screen 1 of 7): Check “Not Seasonally Adjusted” and click Next Form.
2. Datatype (Screen 2 of 7): Select “01 All Employees, In Thousands”. Click Next Form.
3. State (Screen 3 of 7): Select a state of interest. On the next screen we will be selecting a metropolitan area. Metropolitan areas can cross state borders. Choose the state associated with the “principal city” of the MSA. Click Next Form.
4. Area (Screen 4 of 7): Select a metropoltian area of interest. Click Next Form.
5. Supersector (Screen 5 of 7): Select *all* the two-digit supersectors in the listbox and click Next Form.
6. Industry (Screen 6 of 7): NAICS codes are hierarchical. NAICS sectors are two digit codes, e.g. NAICS 42 is Retail Traide, which appears in this list as 42000000. In order to restrict our selection to sectors and supersectors, enter ??000000 in the Code textbox (at the bottom) and hit the Search button. The list is now restricted to codes with any two characters followed by six zeroes. Select *all* of the industries in the listbox and click Next Form.
7. Year (Screen 7 of 7): In spite of the name, you are not selecting the year on this page. This just shows the codes representing the data series you have chosen. Hit the Retrieve Data button.
8. The output page will show the data in a difficult to use format. (Each sector will be a separate table, and the table will show rows by year and months by column.) In order to get the table in a usable format, click the link for “More Formatting Options” in the upper right.
9. On the next page, check the following settings:
  - Select view of the data = “Multi-series table”. Make sure that only “Original Data Value” is checked (should be the default).
  - Select the time frame for your data. Check:
    - All years
    - Select one time period: Annual Data
  - Output Type: HTML table. In spite of the name, when you get to the next page you will have the option of downloading an Excel spreadsheet.

Your selections should look like this:

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selection process, so a little more obtuse for new users.

## Databases, Tables & Calculators by Subject

Select view of the data	Select the time frame for your data	
<input type="radio"/> Table Format <input type="radio"/> Column Format <input checked="" type="radio"/> Multi-series table	<input checked="" type="radio"/> All years	<input type="radio"/> Specify year range: From: 1990 To: 2016
<input checked="" type="checkbox"/> Original Data Value <input type="checkbox"/> 1-Month Net Change <input type="checkbox"/> 3-Month Net Change <input type="checkbox"/> 12-Month Net Change <input type="checkbox"/> 1-Month Percent Change <input type="checkbox"/> 3-Month Percent Change <input type="checkbox"/> 12-Month Percent Change	<input type="radio"/> All Time Periods	<input checked="" type="radio"/> Select one time period: Annual Data January February March April May

Output Type: (select one)	Graphs	Annual Averages
<input checked="" type="radio"/> HTML table OR <input type="radio"/> Text comma delimited ▾	<input type="checkbox"/> include graphs	<input type="checkbox"/> include annual averages

Then hit the Retrieve Data button.

## Using the Shift-Share Spreadsheet

1. Open the file **Shift-Share Template.xls**. Look at the sheet named **Shift-Share Table**. What you see is a list of economic supersectors, which are extremely broad collections of industries. Supersectors which are indented are subgroups. For example, 41, 42, and 43 are subgroups of 40, and the numbers in those rows (if reported, see step 4) will add up to the value for the parent row.

The columns are where we will enter formulae to understand the national, industry, and local effects in employment growth or decline.

2. Determine your start and end years. The United States economies experienced recessions from July 1990 to March 1991, March 2001 to November 2001, and December 2007 to June 2009. Employment troughs came in 1991, 2003, and 2010, while employment peaks came in 2001 and 2007. In each group one person should do a shift-share analysis for one of the following periods:
  - a. 1991 – 2001, trough to peak growth during the Clinton years

- b. 2001 – 2007, peak to peak growth from the tech bubble to housing bubble
- c. 2010 – 2013, the Great Recession recovery period
- d. 1990 – 2015, the entire period we have data for

Enter the start year in cell C2 and the end year in cell D2.

3. The national data are available on the sheet named **National Employment**. Copy the data for your start year to column G and for your end year to column H. The number of cells should fit exactly.
4. Not every metropolitan area will report data for every supersector. Nondisclosure rules require BLS to suppress the data for groupings with fewer than three firms, or where one firm has 80% or more of area employment. Your metropolitan area may be missing some of these lines, or some may be smashed together into pseudosectors like 15, which is just a grouping of 10 and 20 used to avoid disclosure rather than a “real” supersector. Before transferring your metropolitan data to this form, make sure that there are no missing lines, and add any rows if necessary. By adding an entire row, the supersectors should stay aligned with the national data that you have already copied into columns G and H. **You do *not* have to delete any lines which are missing from your data.**
5. Now copy over the metropolitan data you downloaded prior to class. If you followed the instructions, your data should be in the same format as the data on the **National Employment** sheet, although you may not have the exact same supersectors. Paste the start year data into column C and the end year data into column D.

Now, make sure your supersectors match up with the row headings. Insert cells or delete cells using the “shift up” or “shift down” option to get your two columns of pasted data to line up with the correct supersectors.

6. Now that we have the data, we need to calculate the shares. First, we need to know the absolute change (difference) in employment level for each supersector. Then we need to convert this into a percentage (divide the difference by the starting value). Then we figure out the national, industry, and local effects in percentage terms. Finally, we calculate the actual number of jobs gained or lost by multiplying this percentage by the starting value.
  - a. In cell E3 enter **=D3-C3**.
  - b. In cell F3 enter **=E3/C3**. Then format this cell to display as a percentage by clicking the percent icon on the toolbar, or going to Format → Cells in the menu.
  - c. We need to do the same thing for national growth, so copy cells E3 and F3 and paste them into I3 and J3. Note that the formulae have changed so that I3 is set to **=H3-G3**. This is because we entered the formulae using *relative references*. In effect, when we entered the

formula in cell E3, the spreadsheet software doesn't interpret D3 as literally column D, row 3, it interprets it as "go one cell to the left on the same row". So when you paste this formula into a new cell, the formula gets updated.

- d. The first component of the shift-share is the national share. This is the growth that is expected due to national growth in the economy as a whole (all industries). This value appears in cell J3, the percent change in employment in supersector 00 Total Nonfarm. We want this value to appear in all rows of column K. In order to paste the formula so that it does *not* change when we copy it, we are going to use *absolute references* by putting a dollar sign in front of the column and row. So in cell K3 enter `=J$3`. Format the cell to display percentages.
  - e. The second component of the shift-share is the industry share. This is the growth that is expected due to industry growth at the national level. This is just industry growth minus national growth. So in cell M3 enter `=J3-K3`. Format the cell to display percentages. (Note, since line 3 *is* the total economy, this value will be 0.)
  - f. The final component of the shift-share is the local share. This is the growth that is "left over" after national and industry growth is accounted for. It is sometimes referred to as competitive advantage, because it is supposed to quantify undefined aspects of the local economy that lead to higher or lower than expected growth. This is equal to the local growth in that industry minus the national growth in that industry. In cell O3 enter `=F3-J3`.
  - g. Now we want to know the actual numbers of jobs added or lost, so we multiply these percentages by the start year employment in each industry. In cell L3, enter `=C3*K3`. Notice that we are using the absolute references (\$) to pin the start year values to column C, while allowing the row to vary. Now we can copy this cell and paste it into cells N3 and P3. Note how the formulae have changed.
  - h. The entire top row of our table is now complete. Because we have used a combination of absolute and relative cell references, we can copy this row down to fill the rest of the table. Select the entire block of cells from the top row to the bottom row (the empty row for the supersector 93 Local Government). Now hit Ctrl+D on your keyboard (Cmd+D on the Mac?), or go to Edit→Fill→Down on the menu.
7. Your table should now be complete. Discuss with your group how your metropolitan area performed during each of the time periods. Overall, the national economy has lost manufacturing jobs and gained service sector jobs. Did your metro benefit from its industrial mix, or was it harmed by it? Are there any supersectors for which your metro has a competitive advantage, i.e. has outperformed the national industry? Has government employment been important to the local economy?

## ASSIGNMENT

Turn in your Excel spreadsheet, and some comments (a paragraph or two is fine) about your discussion with your group about the components of growth and decline in your metropolitan area.