

Shift-Share Analysis  
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This is a summary of just the calculations involved in three-part shift-share analysis. Shift-share is a decomposition of sectoral and total employment growth in a region. It breaks down the change in employment into three components which purportedly measure the contribution of various economic forces to that employment change. Use the following notation, where  $t$  indexes the time period, and  $i$  the industry:

$E_{us,t}$  = US aggregate employment at time  $t$   
 $E_{us,i,t}$  = US employment in industry  $i$  at time  $t$   
 $E_{city, i, t}$  = City employment in industry  $i$  at time  $t$

The *national component* (N) represents the contribution of national growth to local industry growth. It is measured as

$$N = \% \Delta E_{us,t} * E_{city, i, t-1}$$

The *industry component* (I) represents the contribution of national industrial growth to local industry growth. It is measured as

$$I = (\% \Delta E_{us,i} - \% \Delta E_{us,t}) * E_{city, i, t-1}$$

The *metropolitan component* (M) is the rest of local industry growth after N and I have been removed:

$$M = \Delta E_{city, i, t} - I - N$$

Here is an example. 2002 will serve as  $t-1$ , 2003 as time period  $t$ :

	US	Bigtown	US	Bigtown	US	Bigtown
	Manufacturing		Services		Total	
2002	10000	200	20000	800	30000	1000
2003	11000	230	25000	870	36000	1100

For the Bigtown manufacturing sector:

$$N = [(36000 - 30000) / 30000] * 200 = .20 * 200 = 40$$

which is to say, that if the Bigtown manufacturing sector was an average sector in an average city it would have grown at the average growth rate of the whole US economy, that is 20%, or by 40 workers.

$$I = \{ [(11000 - 10000) / 10] - .20 \} * 200 = (.10 - .20) * 200 = -20$$

which is to say that it wasn't an average sector, it was the manufacturing sector; we adjust downward by 20 jobs because the US manufacturing sector was growing more slowly than the aggregate US economy.

Thus if the Bigtown manufacturing sector was an average manufacturing sector we would expect it to grow by  $40 + (-20) = 20$  jobs. It did better than that, though:

$$M = (230 - 200) - 40 - (-20) = 10$$

which is to say that the Bigtown manufacturing sector outperformed the national manufacturing sector by 10 jobs.

For the service sector:

$$N = .20 * 800 = 160$$

$$I = (.25 - .20) * 800 = 40$$

the service sector outperformed the national economy as a whole, so I is positive in this case.

$$M = 70 - 160 - 40 = -130$$

The local service sector did not do as well as at the national level.

You can add these factors up for the whole local economy:

$$N = 40 + 160 = 200$$

If Bigtown had grown in an average way it would have added 200 jobs.

$$I = (-20) + 40 = 20$$

The sum of the industrial components is sometimes called the mix component. Because of the particular mix of employments in Bigtown, we would have expected an additional 20 jobs. Thus if the local economy had average performance, it would be expected to increase by  $200 + 20 = 220$  jobs. But it didn't

$$M = 10 + (-130) = -120$$

Local conditions were such that while Bigtown did modestly better than expected in manufacturing, but much worse than expected in the service sector, for a worse than expected gain of  $200 + 20 + (-120) = 100$  jobs.