11.481J / 1.284J / ESD.192J Analyzing and Accounting for Regional Economic Growth
Spring 2009

For information about citing these materials or our Terms of Use, visit: http://ocw.mit.edu/terms.
1. Shift-Share Analysis ("Mix-Share")

An analysis tool to measure change in regional economic structure:

The change in regional employment can be viewed as the net of three effects, which are:

- National Share (share of employment growth), NS, in industry i

\[ NS_i = e_i^{t-1}(E^t/E^{t-1}) \]

where: 
- \( e \) refers to regional employment,
- \( E \) refers to national employment,
- \( i \) refers to industry i, and
- \( t \) and \( t-1 \) refer to beginning and ending time periods

(If no subscript, then figure is the total)
• Industry Mix (share of employment growth), IM, in industry I

\[ IM_i \equiv e_i^{t-1} \left( \frac{E_i^t}{E_i^{t-1}} - \frac{E^t}{E^{t-1}} \right) \]

• Regional Shift (differential growth rate, region minus national), RS in industry i

\[ RS_i \equiv e_i^{t-1} \left( \frac{e_i^t}{e_i^{t-1}} - \frac{E_i^t}{E_i^{t-1}} \right) \]

These three effects can be generalized as:

\[ e_i^t \equiv NS_i + IM_i + RS_i \]

The regional proportion, (or "share")

\[ RP_i \equiv e_i^{t-1} \left( \frac{E_i^t}{E_i^{t-1}} \right) = NS_i + IM_i \]

\[ \text{Note the subscripts here.} \]
Simple model:

\[ e_i^t = R P_i + R S_i \]

If \( e_i^t = R P_i \), then regional employment growth in i is growing at the same rate as the nation and there's no shift as \( R S_i = 0 \).

If \( R S_i \neq 0 \), then region grows at different rate.

Applications for Shift-Share:

- Change the unit of analysis (i.e. region, city/town, nation, parent region)
- Multi-period analysis
- Use other measurement other than employment
- Forecasting short-run employment and changes.
Limitations of this method:

• Incapable of handling multi-variables during one analysis process, i.e. just employment, value added, etc.

• Attribute the economic changes to the three effects but fail to explain further why these factors influence economic growth at regional level

• Can not distinguish favorable or undesirable changes
Stevens and Moore test variations on shift-share to see which formulation offers forecasts with the lowest "error."

["Error" can take on different definitions, depending on whether sign and/or absolute deviation from the actual value is used.]

• The regional shift term can be highly variable: It is seen to change sign, even over short periods.

• Regional shift is an indicator of comparative advantage, but high shifts in one period and lead to a reversal in the next, as factor price-changes from the first period drive cause negative shift in later period. (And vice-versa.)

• The IM and RS values are not independent of one another. They can be backwardly linked. RS shifts can come from this effect.
When using as a forecasting technique, keep the intervals short if possible and use a credible national economic forecast.

Shift-share is used as the basis for the REMI economic model, in which the shift factor for a regional industry is modeled as a function of production costs in the region. This connects shift-share with mainstream economic logic.