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11.481J / 1.284J / ESD.192J Analyzing and Accounting for Regional Economic Growth
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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_i , in industry i

$$NS_i \equiv e_i^{t-1} (E^t / E^{t-1})$$

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_i , in industry i

$$IM_i \equiv e_i^{t-1} (E_i^t / E_i^{t-1} - E^t / E^{t-1})$$

- Regional Shift (differential growth rate, region minus national), RS_i in industry i

$$RS_i \equiv e_i^{t-1} (e_i^t / e_i^{t-1} - E_i^t / E_i^{t-1})$$

These three effects can be generalized as:

$$e_i^t \equiv NS_i + IM_i + RS_i$$

The regional proportion, (or "share")

$$RP_i \equiv e_i^{t-1} (E_i^t / E_i^{t-1}) = NS_i + IM_i$$

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Note the subscripts here.

Simple model:

$$e_i^t = RP_i + RS_i$$

If $e_i^t = RP_i$, then regional employment growth in i is growing at the same rate as the nation and there's no shift as $RS_i=0$.

If $RS_i \neq 0$, 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.