**Adding Confidence to the Regionalization of Input Output Tables**

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**Introduction**

Input Output (IO) tables are a useful asset in the tool box of the regional scientist. However regional Input Output tables are expensive and time consuming to construct and in nations without commercial companies providing the data like IMPLAN the work is often left to academics in ad hoc projects. Due to these constraints methods have been developed to statistically regionalize national tables using the simple Location Quotient (LQ). The reliability of these methods has been continually questioned within the literature (see for example, Smith and Morrison 1974, Harrigan 1980 as well as Flegg et al (1995)).

This paper sets out a new method to aid in the construction of regionalized IO tables by utilizing the Delta method to generate confidence intervals around the point estimate LQ values. The work identifies the statistical problem of relying on a single cut off value. This work uses UK and Welsh data to test this new method and shows the uncertainty associated with LQ’s.

**LQ Method of Adjustment**

- Defined as the ratio between the regional and national proportion of output or employment attributable to a sector.
- They are calculated from estimated sectorial information at a subnational level and results in a point estimate.
- If LQ <1 then sector is under represented in the region.
- If LQ >1 then sector is over represented in the region.
- Regionalization is done by reducing the size of the coefficient for those sectors under represented, whilst increasing the import coefficient’s by the corresponding amount.

**Delta Method For LQ CI**

- Estimate the variance associated with a LQi value, the Delta method is adopted (see Oehlert, 1992), which utilises the Taylor series expansion. The Taylor series is the representation of any given function by an infinite sum of terms.
- These are calculated from the values of its derivatives at a single point (see Thomas and Finney, 1996).

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LQi = \frac{x_i}{n_i} \div \frac{x}{n}
\]

- Assumption is made that the reference area is partitioned into k non-overlapping regions.
- It is assumed that the distribution of xi is binominal with the parameters of total population ni, and the true incidence rate pi.
- An assumption is made that x/n is fixed not random (the incidence rate is the same in all areas for an industry, ignoring any spatial variation).

**Results**

- Out of 218 Welsh sectors 46 have LQ values above the cut-off of 1.00, 15 have the potential to fall below this value.
- Out of the 172 whose LQ values are below 1.00, 22 have the potential to go above the cut-off value.
- 30% of the total 218 sectors could be wrongly regionalized.

**Conclusions**

- LQ’s have a significant degree of variance.
- Sectors should be evaluated both in terms of the traditional cut of value of 1 but also the level of certainty.
- Confidence intervals should be integrated into the regionalization procedure.