This week we will look at the pattern of specialization of regions within the United States, using a 2014 dataset with 344 Metropolitan Statistical Areas (MSAs), and 489 occupational categories.

We will use two shapefiles:

1) *S:\teff\450\2020\arcview9\states.shp* This layer outlines each state. It's mainly used in this assignment to help us see where Economic Areas are located.

2) *S:\teff\450\2020\arcview9\tl_2012_us_cbsa.shp* This shapefile outlines each Core-Based Statistical Area (CBSA). There are two kinds of CBSAs: Metropolitan Statistical Areas and Micropolitan Statistical Areas.

There are two main theoretical perspectives explaining how and why regions specialize:

- **Export base theory**: Each region has a comparative advantage in a set of resources or factors of production, and produces goods intensively using these inputs, exporting to the rest of the world.

- **Central place theory**: Each region is arrayed in a hierarchical network, acting as a central place for more isolated regions, and itself relying on a more central region. A region's comparative advantage is mostly based on its place in the hierarchy, and trade is mostly conducted up and down the hierarchy, rather than with all other regions.

Specialization can be seen both by looking at industries and at occupations. We will look at occupations here, using a formula called a **location quotient**:

$$LQ_i = \frac{\left(\frac{X_i^r}{X^r}\right)}{\left(\frac{X_i^{US}}{X^{US}}\right)} = \frac{\left(\frac{\text{Employment in occupation } i \text{ in region } r}{\text{Total employment in region } r}\right)}{\left(\frac{\text{Employment in occupation } i \text{ in the US}}{\text{Total employment in the US}}\right)}$$

The data are found in *S:\TEFF\450\2020\arcview9\eeoMSA2016.xlsx*. There are two worksheets in this Excel workbook: *eeoMSA2016* contains labor force data, where each row is an MSA, each column is an occupation, and cell values are number of workers in that occupation in that MSA; *eeoCodes2016* provides a description of the occupational categories.

Copy *eeoMSA2016.xlsx* to your computer. Calculate the location quotients for each occupation in each MSA (I'll show you a relatively easy way to do this in class).

We can only join **.xls* excel files to our shapefiles, and **.xls* files have a limit of 256 columns (our worksheet has 492 columns). After calculating the location quotients, select 30 or so that you think might signal position in the central place hierarchy, or that might be indicative of a region's export base. Join a **.xls* file with these selected columns to the CBSA shapefile.

Here is your assignment: Try to visualize the hierarchy of central places in the United States in terms of the occupations. Which occupations are the best measures of high rank, and which are indicative of low rank? Which economic areas rank at the top? About where does Nashville fall in the ranking?

Produce at least four maps that succinctly present some insight into the regional division of labor. Next Monday, be prepared to give a group presentation to the class (no more than 5 minutes long), using these maps.