Understanding Location Quotient

Overview

Location quotient (LQ) is basically a way of quantifying how concentrated a particular industry, cluster, occupation, or demographic group is in a region as compared to the nation. It can reveal what makes a particular region "unique" in comparison to the national average.

In more exact terms, location quotient is a ratio that compares a region to a larger reference region according to some characteristic or asset. Suppose X is the amount of some asset in a region (e.g., manufacturing jobs), and Y is the total amount of assets of comparable types in the region (e.g., all jobs). X/Y is then the regional "concentration" of that asset in the region. If X' and Y' are similar data points for some larger reference region (like a state or nation), then the LQ or *relative* concentration of that asset in the region compared to the nation is (X/Y) / (X'/Y').

LQ for Industries and Industry Clusters

Industry LQ is a way of quantifying how "concentrated" an industry is in a region compared to a larger geographic area, such as the state or nation. The basic uses of industry LQs (and, by extension, for clusters and occupations as well) include these:

- To determine which industries make the regional economy unique.

- To identify the "export orientation" of an industry and identify the most export-oriented industries in the region.

- To identify emerging export industries beginning to bring money into the region.

- To identify endangered export industries that could erode the region's economic base.

The following explanation assumes we are talking about industry LQs, but is applicable to clusters as well (which are simply sets of several industries whose data is aggregated for the purpose of LQ calculations).

Industry LQs are calculated by comparing the industry's share of regional employment with its share of national employment. Suppose that Breweries (NAICS 31212) account for 0.16% of all regional jobs but only 0.015% of all national jobs. The region's LQ for Breweries would then be (.16 / .015) = 10.67, meaning that Breweries are nearly 11 times more concentrated in the region than average.

Location quotient tells a much different story than merely job numbers or job growth. Industries with high LQ are typically (but not always) export-oriented industries, which are important because they bring money into the region, rather than simply circulating money that is already in the region (as most retail stores and restaurants do). Industries which have both high LQ and relatively high total job numbers typically form a region's economic base. Economic developers and government officials need to pay particular attention to these industries not only for the jobs they provide, but also for their multiplier effect—the jobs they create in other dependent industries like retail trade and food services. (For a true multiplier and job creation analysis, see the Industry Tool of the Economic Impact module.)

LQ is augmented by two other pieces of information: size of industry/cluster/occupation in terms of jobs, and percent change in LQ over a given time period. A high-LQ industry with a small number of jobs may be an export-oriented industry, but is not vital to the region's economy. A large, high-LQ industry with declining LQ over time, however, is endangering the regional economy.

Consider an example: a city like Detroit, will have high-LQ industries in the manufacturing sector, specifically industries related to automobile and light truck manufacturing. This quantifies the well-known fact that automobiles are Detroit's major export. Because these industries also have very high total

employment, a decline in employment or LQ indicates trouble for the entire economy. Growing employment paired with declining LQ, however, merely indicates that the industry is not growing as fast in the region as it is in the national economy.

Another example: an area like Sun Valley, Idaho will show high-LQ industries in hospitality sectors like hotels/motels and food services. This again quantifies Sun Valley's economic dependence on tourism, hospitality, and recreation—one of its major "export" industry clusters. Another large, high-LQ industry in Sun Valley is private households, which quantifies the concentration of wealthy home-owners who have out-of-region sources of income and employ workers like cooks, maids, groundskeepers, chauffeurs, etc.—and whose presence is another major driver of the local economy, though it is not what we typically think of as an "export."

The LQ "Bubble Graph"

Our location quotient graph for industries and industry clusters (a "bubble" type graph) is based on work done at Purdue University. The vertical axis has the basic LQ measurement, while the horizontal axis shows the percent change in LQ over time. Entities like industries are plotted as circles (or "bubbles"), with the circle size corresponding to their relative size (in jobs). When used to plot demographic groups, the size of the bubbles corresponds to the size of that group in absolute terms. For the purposes of this explanation, we'll focus on interpreting the LQ graph for industries/clusters/occupations. The graph's four quadrants can usefully categorize various types of industries, occupations, or clusters.
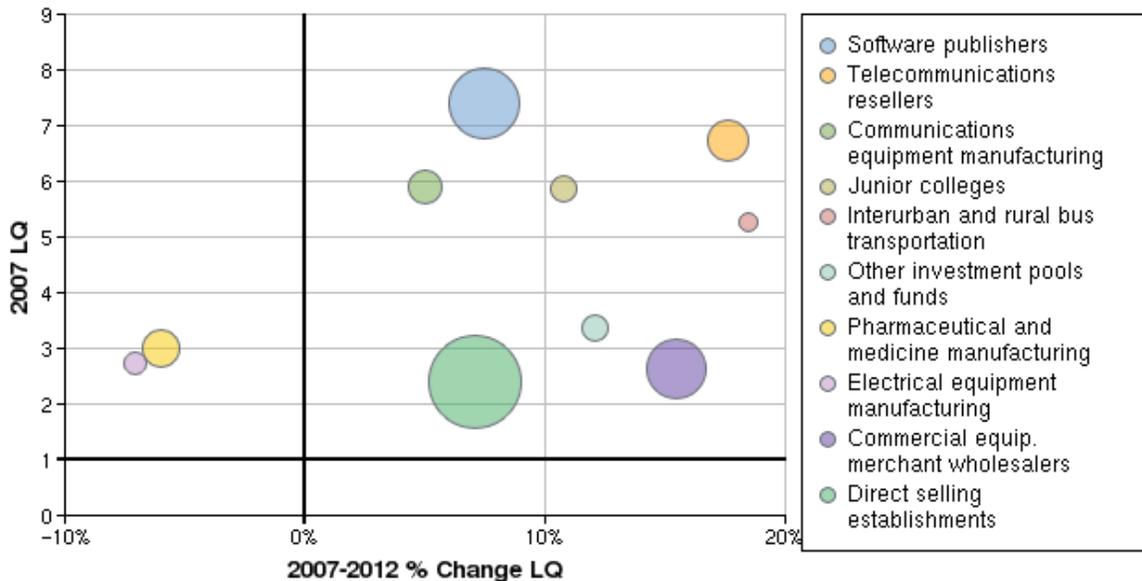
The following interpretation is oriented toward industry data. If you are dealing with clusters, the interpretations generally apply since clusters are just groups of industries. If you are interpreting occupation data, keep in mind that occupational growth and decline are tied to the performance of the major industries that employ workers in those occupations. Occupational LQ is simply a more workforce-oriented way of examining industry trends. You can translate occupations to industries through the Inverse Staffing Patterns report in the Occupation tool of the Economic Forecaster.

- An industry in the upper right quadrant is more concentrated in the region than average, and also is becoming more concentrated over time. These industries are "standouts" that distinguish the regional economy and are doing so more every year—and they are especially important if they are also large in terms of jobs. Large industries in this quadrant are both important and high-performing, which means they will have increasing workforce demand. Small industries in this quadrant are emerging, high-potential regional export industries that should be developed further.

- The lower right quadrant contains industries which are not yet as concentrated in the region as they are at the national level, but are becoming more concentrated over time. If they continue this trend, they will eventually move across the horizontal axis into the upper right-hand quadrant. We might call them "pre-emergent" industries, having the potential to contribute more to the region's economic base.

- The upper left quadrant contains industries that are more concentrated in your region than average, but whose concentration is declining. If a mid-size or large industry or cluster is in this quadrant, it is an important warning that the region is losing a major part of its export base and should form planning and investment priorities accordingly. If the region does not bolster these industries or replace them with other export industries, it will likely enter a general recession. A large occupation in this quadrant usually indicates that the major industry employing people in that occupation is in decline.

Finally, the lower left quadrant contains industries/clusters/occupations which are less important regionally than nationally and are also declining in employment. Industries here could be warning signs that your region needs to attract more businesses in those industries in order to maintain an economy that is sufficiently balanced and diversified in comparison to the national economy.

LQ for Occupations

LQ for occupations are calculated by dividing the regional concentration of an occupation by the state or national concentration of that same occupation. So suppose that Registered Nurses in a region account for 0.10% of all jobs, while in the nation they account for 0.09% of all jobs. The LQ of nurses in the region is thus (.1 / .09 = 1.11). This means that the region has a higher than average concentration of nurses.

High-LQ occupations are important because they are generally employed by high-LQ industries, which tend to be export-oriented and form the majority of the region's economic base. High-LQ occupations thus provide a workforce-oriented perspective of the region's economic base. Such occupations are vital for the continued prosperity of the region.

The occupation LQ bubble graph is similar to the industry LQ bubble graph.

LQ for Competencies (Skills, Knowledge, and Abilities)

The Career Pathways module includes some reports that give LQs for skills, knowledge, and abilities (we'll refer to all of these categories as "competencies" for simplicity). Competency LQs are calculated using the concentrations of regional occupations that require those competencies, along with O*NET information about what level of competency each occupation requires. The level of the competency is added up across all occupations requiring it and weighted by the regional employment in each occupation.

These LQs can reveal competencies in which your region is outperforming or lagging behind the nation, as well as which competencies your regional economy depends on. High-LQ competencies will be found in high-LQ occupations, which are also generally found in high-LQ industries. Such industries are generally the region's export-oriented industries, which form its economic base. High-LQ competencies are thus the competencies that are vital for the region's continued economic stability and growth.

LQ for Demographic Groups

Location quotient is useful in demographic studies because it shows what makes the region's demographics unique in comparison to its state and/or the nation. For example, if age groups over 60 have an LQ greater than 1, then the region has a higher than average concentration of residents over 60. If the percent change in LQ is positive, then the over-60 age group in the region is also growing faster than the nation.

"State LQ" calculates the regional LQ(s) by dividing the regional concentration of a demographic group by the state concentration. "National LQ" calculates the regional LQ(s) by dividing regional concentration by national concentration. For example, suppose that in a certain region, 7.5% of the population is age 60 to 64. In the region's state, this age group composes 6% of the population, while in the nation it composes 5.8% of the population. This group is thus 1.25 times more concentrated in the region than the state (7.5% divided by 6%), and 1.29 times more concentrated in the region than the nation (7.5% divided by 5.8%). So the state LQ would be 1.25 and the national LQ would be 1.29. If the region contains areas in two or more states, then the average concentration in all those states is the basis for the LQ calculation.

LQ numbers can be useful for many different analyses, such as the challenge of an aging workforce or the need to create more employment opportunities for a certain ethnic group. Suppose 25% of the population of your region is composed of people with Hispanic ethnicity, while only 10% of the national population has Hispanic ethnicity. The LQ of Hispanics in the region as compared to the nation (national LQ) is thus (25 / 10) = 2.5, meaning that Hispanics are 2.5 times more concentrated in the region than the nation. This helps to quantify the region's demographic uniqueness and thus inform policy.