

High and low-skilled employment “hot spots” in St. Louis

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RESEARCH QUESTIONS

1) To what extent do low-skilled jobs cluster near high-skilled jobs?

To a large extent, private sector high and low-skilled jobs cluster near one another. Figures 1 and 2 show, with exceptions for shipping and warehousing centers, “hot spots” for high and low-skilled jobs are both concentrated in the St. Louis’s central corridor. Throughout the city, low-skilled jobs concentrate near high-skilled jobs. Correlation coefficients of high and low-skilled jobs are very high: .96 and .98 in 2009 and 2017 respectively. These correlations indicate a very high degree of employment clustering for jobs of all skill levels.

2) Do employment “hot spots” persist over time?

Yes, Figures 1 and 2 show little has changed in the locations of private employment hot spots for high and low-skilled workers in the eight years separating the two study years. Correlation coefficients for high-skilled and low-skilled job locations in 2009 and 2017 are 0.91 and 0.87, respectively. In both 2009 and 2017, employment “hot spots” for college-educated jobs were found only in the central corridor. Unsurprisingly, the high-skilled employment “hot spots” were driven by the downtown area and the city’s two largest hospitals. In both study years, we found high-skilled jobs to be more tightly concentrated than low-skilled jobs. This is illustrated by the Lorenz curves in Figure 3. Jobs for workers holding a high school diploma or less are distributed across more census blocks than jobs for workers with a bachelor’s degree or higher.

DATA & METHODS

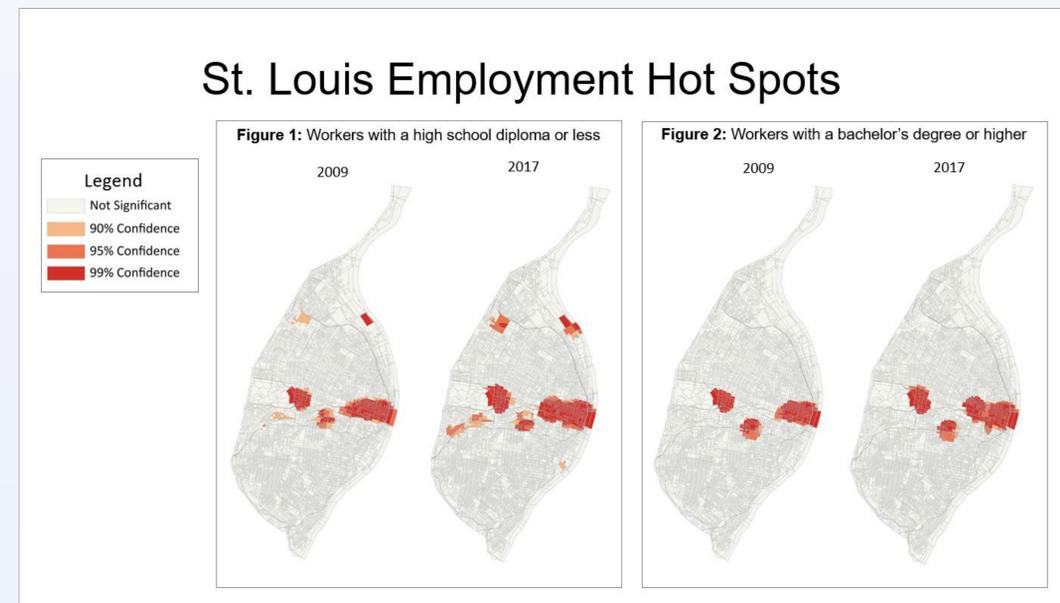
This study was performed using Longitudinal Employer-Household Dynamics (LEHD) data. The spatially disaggregated LEHD data used in this study are developed from a variety of administrative data sources and are released annually by the Census Bureau. This study uses Workplace Area Characteristics (WAC) for private sector primary jobs for years 2009 and 2017 in St. Louis city. This dataset contains block-level counts, for all 9,577 census blocks, for total employment and a variety of demographic, educational, and industry subgroups. We exclude public-sector jobs, and each worker is counted only once in his or her highest paying job. We define high-skilled jobs to be those held by workers with a bachelor’s, graduate, or professional degree, and we define low-skilled jobs as those held by workers with a high school diploma or less. To create the high school or less group, we aggregated the “high school or equivalent” and “less than high school” educational subgroups reported by LEHD.

Hot spots were calculated using Esri’s ArcGIS Pro software. Global Moran’s I statistics were run for high and low-skilled jobs in both study years using the “zone of indifference” parameter at 250 meter intervals, with starting and ending distance bands of 250 meters and 3 kilometers. In each of the 4 cases, spatial autocorrelation was maximized using a distance band of one kilometer. These one kilometer distance bands were used to run “hot spot” analyses, again with the zone of indifference weights matrix parameter. Resulting Z-scores were used to create the hot spot maps.

RESULTS

The “hot spot” analysis identified blocks with significant positive spatial autocorrelation. It showed that high Z-score values from local G_i^* calculations were tightly concentrated for high and low-skilled jobs in both study years. Blocks that had Z-scores above significant critical values in 2009 were overwhelmingly likely to report significant values again in 2017. This tells us the areas of St. Louis with the most job concentration did not move over time. In 2017, analysis of low-skilled jobs indicated a total of 904 blocks had significant positive spatial auto correlation at the 90 percent confidence level. The analysis of high-skilled jobs for the same year showed just 788 blocks with significant positive spatial autocorrelation at the 90 percent confidence level.

The “hot spot” analysis found no census blocks to have significant negative spatial autocorrelation. Nearly three-fourths of the blocks have no jobs at all, resulting in extremely low mean values for each of the four variables. Blocks containing large employers report values high above the mean number of jobs per block. However, it is not possible for blocks to report values far below the mean, as no block can have fewer than zero employees. These maps, in Figures 1 and 2 show that employment hot spots for high and low educated workers overlap to a large degree and these patterns of concentration are stationary over time.



Figures 3 and 4 plot the Z-scores for high and low-skilled jobs in 2009 and 2017. The correlation coefficient relating the concentration of high-skilled jobs to the concentration of low-skilled jobs rose slightly between the two study years, starting at .96 in 2009 and rising to .98 in 2017. This shows that between these two study years, St. Louis jobs became more concentrated

The Lorenz curves in Figure 5 depict how the cumulative proportions of high and low-skilled jobs relate to the cumulative proportion of census blocks for 2017. The graph clearly shows that a small portion of the blocks contain nearly all the jobs. City wide, the 23 percent of blocks account for 100 percent of the jobs. Low-skilled jobs are slightly less concentrated than high skilled jobs, but in both cases, over half the total jobs are located in the top 5 percent of blocks.

If these clustering patterns persist, we expect that thousands of low-skilled jobs will follow the creation of high-skilled jobs near NGA-W’s new North City campus.

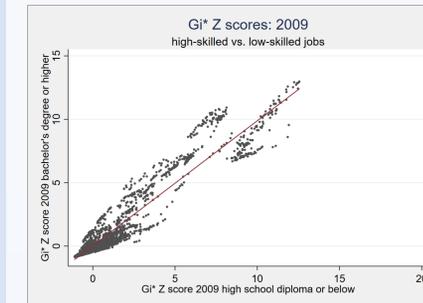


Figure 3: Scatter graph of local G_i^* Z-scores for high versus low-skilled jobs in 2009. Correlation coefficient = 0.96.

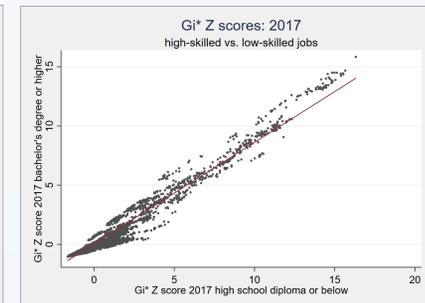


Figure 4: Scatter graph of local G_i^* Z-scores for high versus low-skilled jobs in 2017. Correlation coefficient = 0.98.

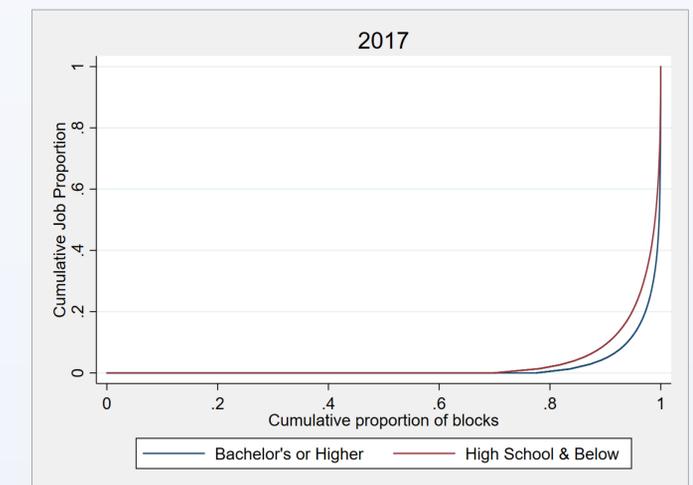


Figure 5: Lorenz curve reporting share of jobs versus share of census blocks for Saint Louis city

QUESTIONS FOR FURTHER ANALYSIS

- 1) What factors lead to concentrations of high and low-skilled private sector jobs?
- 2) What can we learn about commuting patterns to and from employment hot spots?
- 3) How do employment concentration patterns in St. Louis compare to other cities?

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