

# **GEOSPATIAL MAPPING OF COMMUNITY SOCIOECONOMIC STATUS WITH PUBLIX AND WHOLE FOODS LOCATIONS**

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## **BACKGROUND**

The location of supermarkets can often be taken for granted, but in metropolitan areas, supermarket location can be affected by socioeconomic considerations. These socioeconomic considerations can directly affect communities. Access to healthy food choices can be crucial to determining the health profile of a community. If certain communities lack access, then it is likely that negative health outcomes will follow. Though identifying health outcomes for each community might be too lofty of a goal, it is possible to identify if there is a relationship between the location of select supermarkets and community socioeconomic status.

The present geospatial demographic study was a replication of mapping by cultural studies scholar K. Wayne Yang aimed at showing that high-end supermarkets were located in affluent communities. Yang (2010) presented a series of maps by Gus D'Angelo that examined the relationship between affluence and the location of different amenities in Oakland, California. These amenities included Starbucks, traditional banking institutions, and major supermarkets. With the goal of showing that Albertson's, Andronico's, Safeway, and Whole Foods markets were located in affluent, white communities, Yang indeed found that 16 of 19 major supermarkets were found outside of low socioeconomic urban core of Oakland.

Given that the some of the supermarket chains in Yang's maps were specific to either California's Bay Area or the Western United States, the present study examined Publix and Whole Foods locations only. Both chains are common throughout the South and likely to be found in affluent areas. In an article from the *Washingtonian*, a Whole Foods executive held that decisions on Whole Foods locations took into account the population density, education, and a number of other demographics of an area. In the same article, an executive from an economic development group cited that educational attainment was the single most important factor for determining the location of a Whole Foods---his reasoning was that more educated consumers were likely to opt for more expensive organic foods (Kashino, 2015).

Contextualizing the central interest of the study to the state of South Carolina, three affluent, metropolitan areas were chosen to be examined. Since Whole Foods supermarkets are likely to be found in affluent or metropolitan areas, Charleston, Greenville, and Richland counties were the foci of the geospatial study as they housed the central cities of South Carolina's three largest metropolitan statistical areas (MSAs).

The identification of these counties as affluent was based on two recent research briefs. First, a report from the South Carolina Commission for Minority Affairs observed a metropolitan nature of affluence such that these counties were found to be affluent across a number of socioeconomic indicators including poverty, unemployment, per capita income, and median household income (Carter, 2018a). The metropolitan affluence hypothesis was also confirmed in a whitepaper that utilized a modified computation of the Economic Innovation Group's Distressed Communities Index (DCI) (Carter, 2018b). This more precise measure identified the counties based on socioeconomic index scores.

In addition to these three counties being considered affluent, a few other counties within each of the three corresponding metropolitan areas were affluent. Located in the Charleston-North Charleston MSA, Berkeley, Charleston, and Dorchester counties were classified as “affluent” in the aforementioned Commission for Minority Affairs report and found to be “prosperous” in Carter’s (2018b) computation of the DCI. In the whitepaper utilizing the DCI, Kershaw, Lexington, and Richland counties, which comprised the Columbia MSA, were found to be either “prosperous” or “comfortable” (Carter, 2018b). Finally, the Greenville MSA was comprised of three counties determined to be affluent. Greenville County was found to be “prosperous”, while Anderson and Pickens counties were “comfortable.”

## **PURPOSE OF STUDY**

Pockets of deprivation may exist within affluent areas. The purpose of the present study was to use high-end supermarkets to examine whether their locations were related to socioeconomic status. The working hypothesis was that these supermarkets would be located in affluent communities with higher educational attainment. Though the three counties were some of the most affluent in the state of South Carolina, access to quality supermarkets might have been unequal within the counties.

## **MEASURING SOCIOECONOMIC STATUS**

The determinant of community socioeconomic composition was the aforementioned Distressed Communities Index (DCI). The DCI classifies geographic areas into quintiles based on scores ranging from 0 to 100 with higher scores indicating higher distress and lower scores denoting relative affluence. The first quintile, with scores ranging between 0 and 20, denotes “prosperous” geographic areas. Scores between 20 and 40 fall into the second quintile, which indicates “comfortable” geographic areas.

The third quintile, “mid-tier”, corresponds to DCI scores between 40 and 60. Distress scores between 60 and 80 correspond to “at-risk” geographic areas. The fifth and final quintile, with scores ranging from 80 to 100, denotes a “distressed” area. Though the naming conventions for the quintiles are self-explanatory, they can be collapsed into three general socioeconomic groupings with “distressed” and “at-risk” quintiles being socioeconomically deprived, “mid-tier” denoting middle-class socioeconomic status, and “comfortable” and “prosperous” quintiles being classified as affluent.

To yield the DCI, a mean ranking is computed across seven socioeconomic indicators including the percentage of residents without high school diplomas, housing vacancy rate, unemployment rate for ages 25 to 64, percent below poverty, median income ratio, change in employment, and change in business establishments (Economic Innovation Group, 2018).

In Carter’s (2018b) modification of the measure, a mean ranking was computed across four of the seven indicators, which included percent below poverty, percent without high school diplomas, unemployment rate for ages 16 to 64, and county-to-state median income ratio. For example if a county average a ranking of 46 out of South Carolina’s 46 counties, that would have yielded a distress score of 100 ( $[(46/46) \times 100]$ ), indicating a “distressed” county. Conversely, a county that had a mean rank of 2 across the 46 counties would have yielded a score of 4.34 ( $[(2/46) \times 100]$ ), denoting that it was a “prosperous” county.

Since the present study examined census tracts rather than counties, a tract-to-state median income ratio was used in lieu of the county-to-state median income ratio. With census tracts serving as proxies for communities, the DCI determined whether the tracts or communities were “distressed”, “at-risk”, “mid-tier”, “comfortable”, or “prosperous”.

## MEAN VS. MEDIAN DISTRESS METRICS

The problem with using a mean metric as the DCI does presents itself when there are extreme values across geographic areas. For example, if a geographic area is extremely high in poverty but the median income ratio is middling, the DCI value may falsely show that it is a middle-class community. This would give the impression that a community was doing well economically when it in fact was not. Conversely, if poverty was low with a low median income ratio, then the DCI score might show more socioeconomic distress when it may in fact be a middle-class community. The methodological concern pointed out here is that in locales where there are stark disparities between the different socioeconomic indicators, an area's true socioeconomic status may be masked. This could either overestimate or underestimate the affluence of a geographic area. When samples are skewed, the preferable measure of central tendency should be the median because it will be more representative of the data set (Wilson, 2005). Unlike the original DCI computation, a median computation of distress can find a "true middle" that will not be affected by extreme disparities. This points to the earlier methodological concern of disparities between indicators masking the socioeconomic status of a geographic area. Thus, both median and mean Distressed Communities Indices were calculated for each of the three counties examined with the aim of determining which distress metric should be preferred.

### TABLEAU STORY POINTS

Story Points by Tableau facilitate the communication of data in a narrative form. Story points were utilized in the present study to show a variety of maps that corresponded to the central interests of the study. On page 4, the opening story point for the Richland County mapping set can be observed. The opening story point was

consistent across each of the three counties examined in that it introduced four maps of interest. As observed, each story point contained four panes with maps. The top left map marked all communities with Publix or Whole Foods locations in green. The top right pane identified all low education census tracts with pink color coding. A low education geographic area, as defined by the U.S. Department of Agriculture, is one in which 20 percent or more of the population aged 25 or over does not have a high school diploma (USDA ERS, 2015). The bottom left pane showed community socioeconomic status categories based on the median distress computation, while the bottom right pane displayed socioeconomic categories that corresponded to the mean distress calculation.

Though the percentage of residents without high school diplomas is figured into the Distressed Communities Index, it was still important to look specifically at the educational attainment of communities with Publix or Whole Foods supermarkets. Though the purpose of the study was to examine whether there was a relationship between supermarket location and overall socioeconomic status, observing education specifically tested the conjecture of the supermarket executive form Kashino's (2015) article who identified high educational attainment as a key factor in Whole Foods locations.

On page 4, only the opening story point was displayed. With a total of four story points, each of the other three story points for each county filtered out data based on the goals of the study. The first story point following the opening filtered out communities with Publix or Whole Foods locations to simultaneously note educational attainment, median distress, and mean distress. The second story point following the opening filtered "prosperous" and "comfortable" tracts with the median distress metric to determine how many Publix or Whole Foods supermarkets were located in affluent communities. Finally, affluent communities were filtered with the mean distress metric to make the same determination regarding affluence and supermarket locations.

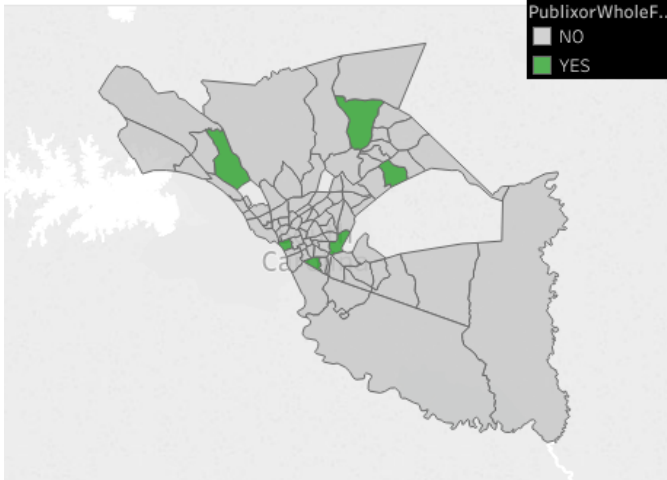
Marked in green by location, there were six census tracts with either Publix or Whole Foods supermarkets in Richland County, South Carolina.

Of the six census tracts with Publix or Whole Foods locations, none were low education tracts, as measured by the percentage of residents without high school diplomas. Using the median distress metric, four of the tracts ..

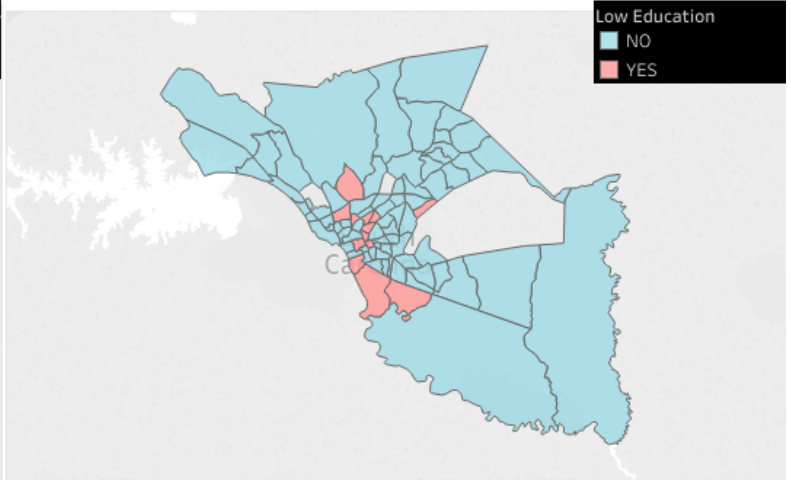
Prosperous and comfortable tracts derived from the median distress metric were filtered. The filtering showed that four of the six census locations could be identified to be in either designation. Specifically, all four census tracts with either ..

Prosperous and comfortable tracts derived from the average distress method were filtered. The filtering showed that four of the six census tracts with either supermarket chain were affluent. Of the four locations, two were "prosperous..

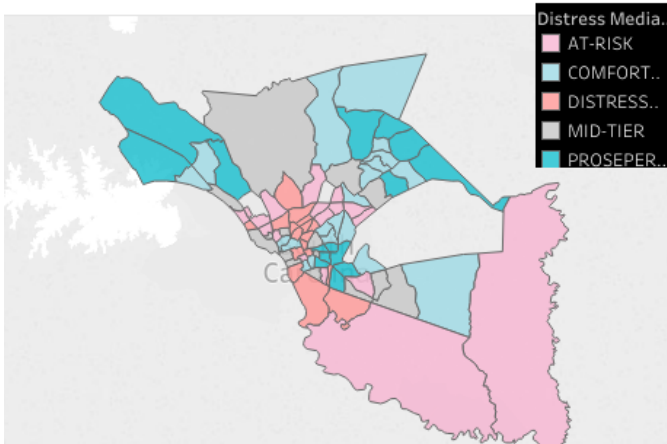
Publix or Whole Foods



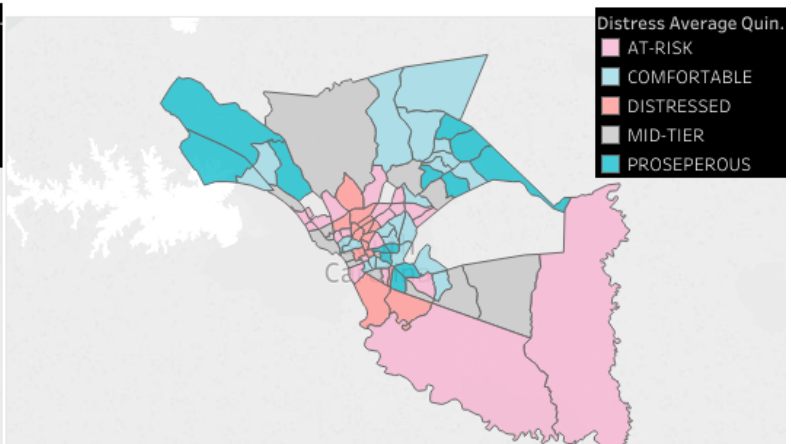
Low Education



Median Distress



Mean Distress



## **DISCUSSION AND RESULTS**

### **CHARLESTON DISCUSSION**

The mean distress metric found six communities in Charleston County with Publix or Whole Foods locations to be "comfortable", one "prosperous", and one "mid-tier." Conversely, the median distress metric found two of the eight tracts with Publix or Whole Foods locations to be either "mid-tier" or "at-risk." Though the mean metric presented a stronger case for the relationship between affluence and supermarket locations, the median distress metric represented a true middle. Overall, there was still a strong relationship between supermarket and higher socioeconomic status across both mean and median distress metrics.

### **COLUMBIA DISCUSSION**

The mean and median distress metrics identified the same two tracts with Publix or Whole Foods locations to be "mid-tier." Four of six locations were found to be in affluent communities by both the median and mean distress metrics. Specifically, the median distress metric found each of the four locations to be in "prosperous" communities. The mean distress metric split the four affluent tracts such that two supermarkets each were in "comfortable" and "prosperous" tracts. In Richland County, the median distress metric actually provided stronger evidence of the relationship between the two supermarket chains and affluence in that all communities with either Publix or Whole Foods were either "prosperous" or "mid-tier."

### **GREENVILLE DISCUSSION**

The mean and median distress metrics both identified the same six Publix or Whole Foods locations to be in "comfortable" tracts. Where they differed were in their designations of the five Publix locations in less affluent tracts. The median metric identified two Publix locations to be in "distressed" tracts, one in an "at-risk" tract, and two in "mid-tier" tracts. The mean distress metric identified one of the aforementioned "distressed" tracts from the median metric as "at-risk" and one of the "at-risk" tracts from the median metric to be "mid-tier." One "distressed" tract and two

"mid-tier" tracts with Publix or Whole Foods locations were consistent across mean and median metrics. Overall, the mean distress metric proved a slightly stronger relationship between supermarket location and socioeconomic status as it identified two deprived communities with Publix and Whole Foods locations whereas the median distress metric identified three deprived communities to have supermarket locations.

### **GENERAL DISCUSSION**

Regarding the relationship between supermarket location and education, Greenville County was the only county of the with Publix or Whole Foods locations in low education communities. Across the three counties, 92% of communities with Publix or Whole Foods were not low education areas, clearly establishing the education is a key factor in Publix and Whole Foods locations. Without considering the distinction between "prosperous" and "comfortable" affluent communities, both Richland and Greenville counties identified the same affluent communities to have Publix or Whole Foods locations. In Greenville County, 55% of Publix or Whole Foods locations were in affluent communities. In Richland County, 67% of locations for the two supermarket chains were in affluent communities. Charleston County was noteworthy both because it had the strongest relationship between supermarket location and socioeconomic status and because due to differences in the identification of affluent communities between the two distress metrics. The mean and median distress metrics identified 88% and 75% of supermarkets to be in affluent communities, respectively. Overall, median and mean distress metrics were equally proficient in establishing the relationship between the two supermarket chains and affluence. Though this was the case, it would be more mathematically sound to use the median distress metric. Additionally, the median metric better identified less affluent communities with supermarket locations. Given its ability to both identify the central purpose of the study and not overestimate affluence, the median distress metric should be the preferred computation method in future studies.



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