Independent Grocery Stores in the Changing Landscape of the U.S. Food Retail Industry

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Abstract:
Independent grocery stores are a large part of the U.S. food retail industry. They play an important role in ensuring food access, but it is unclear how they have been affected by changes in the food retail industry over these last few decades. This study uses Nielsen TDLinx data to examine independent retailers in 2015 and how they have changed from 2005 to 2015. We find that in 2015, at least half of the food retailers were independent in 44% of the counties, but that their share of sales was low. From 2005 to 2015, the total number of grocery stores increased but the number of independent retailers stagnated beginning at the onset of the Great Recession, causing the share of independent retailers to decline. The greatest growth during this period were from small-format chain stores.

Background

Food retailers are an important part of the American diet. Although the share of food-away-from-home expenditures nearly doubled since 1970, more than half of the food expenditures continued to be from food retailers as of 2012 (ERS 2017a). Independent food retailers are grocery stores whose owner operates fewer than four outlets simultaneously, often owned by an individual or family.[1] These stores operate differently from chains, possibly struggling with less bargaining power or store name loyalty among customers, but play an important role in ensuring food access and may be more aware of local area's needs. Furthermore, these stores are a large part of the food retail industry and the U.S. economy. According to the National Grocers Association (NGA) (2015), independent grocery stores generated $131 billion in sales, or nearly 25% of all

Frequently Used Terminology

Listed below are terminology frequently used throughout this report:

- Independent stores: stores where the owner operates fewer than four outlets simultaneously
- Chain stores: stores where the owner operates four or more outlets simultaneously
- Nontraditional food retailers: non-grocery stores whose primary sales are from nonfood products that also sell a limited selection of food products (e.g., drug stores that sell food)
- Large-format grocery stores: supermarkets, warehouse stores, and supercenters
- Small-format grocery stores: specialty food stores, limited assortment supermarket, and superettes
- Supermarket: grocery store with annual sales of $2 million or more
- Limited assortment supermarket: grocery store with a limited selection of items among fewer categories
- Specialty food stores[2]: grocery store that primarily offers organic or gourmet food, and typically has an expanded fresh and/or prepared food department
- Supercenter: consists of a full-line supermarket and a full-line discount merchandiser under one roof
- Warehouse stores: grocery store that offers limited services, sells bulk food, and frequently acts as a supplier to small-format stores
- Superette: grocery store with sales of $1 million to $2 million annually.

[1] This is the definition used by TDLinx, which is the primary dataset used in this paper.
[2] In TDLinx, this category is classified as "natural/gourmet food supermarkets." However, because of recent discussions on which foods should be labeled as "natural" (e.g., foods containing ingredients using genetic engineering), we chose to refer to it as "specialty food stores" instead (U.S FDA 2016; Rock 2016).

U.S. grocery sales in 2015.[3] In addition, these stores were responsible for almost one million jobs and over $30 billion in wages. Nevertheless, it is unclear how independent retailers and their role in the food industry have changed over the last decade.

The food retail industry has undergone several changes over the last few decades. Mergers and acquisitions rose in the late 1990s and again after 2010, resulting in a higher concentration of sales in food retail (Harris et al. 2002; DePillis 2013; Duff and Phelps 2016). From 1996 to 2013, the percentage of sales among the top four retailers increased by about 20%, reaching nearly 40% ($256 billion) by 2013 (ERS 2016). In addition, a growing number of nontraditional food retailers – including mass merchandisers, supercenters, and drug stores – began to sell food alongside nonfood products from 1985 to 2000 (Harris et al. 2002; Martinez 2007). In response, the average size of supermarkets increased, with some offering nonfood products as well, while the number of conventional supermarkets declined. The share of sales from nontraditional stores also increased from 13.7% in 2000 to 21.5% in 2011, mostly among supercenters and warehouse club stores (ERS 2016).

The growth in nontraditional food retailers, particularly supercenters, was partially driven by consumers' demand for one-stop multi-purpose shopping, or households purchasing both food and nonfood products from the same location. Seminal studies, such as Hotelling (1929) and Losch (1938), set the foundation by explaining that stores locate in a given market area to maximize the potential number of consumers.[4] These models have been expanded to account for the clustering of heterogeneous retailers (e.g., Huff 1963), which allowed consumers to conduct one-stop multi-purpose shopping. Other retailers – particularly large-format ones – responded by providing a wider assortment of products (e.g., Leszczyc, Sinha, and Sahgal 2004). These large-

[3] NGA identifies independent stores as those that are privately owned.
[4] See Craig, Ghosh, and McLafferty (1984) for a review of these studies.

format stores tend to have higher overhead costs and require greater areas of land, resulting in a higher minimum consumer threshold and making it less likely that they will locate in the center of a city.

It is unknown how independent grocery stores have been affected by these changes in the food retail industry. Large-format food retailers attract consumers by offering a variety of products, some offering both food and nonfood products, while small-format grocery stores tend to locate in convenient areas, sometimes next to other types of retailers. Although some small-format grocers have been aligning with wholesalers to remain competitive (Martinez 2007), others may have struggled to remain open, particularly during the Great Recession. However, some independent retailers may have continued to thrive by locating in regions with fewer large-format chains. Hanner et al. (2015) find that smaller, independent retailers exhibit the greatest churn among firms in terms of entry and exit, highlighting the uncertainty of the performance and status of independent grocers in the U.S.

By locating in areas with fewer chain stores, independent grocery stores play an important role for food access. Studies have found that areas with a high percentage of low-income individuals, as well as rural areas, are dominated by independent food retailers; there are relatively few chain stores in these communities (e.g., Chung and Myers 1999; Block and Kouba 2005; Powell et al. 2007). Counties with a higher median-income have fewer independent stores and more chain stores; the average size of the establishment is larger as well (Schuetz et al. 2012). Small-format grocery stores also mitigate food insecurity by improving physical access to grocery stores, particularly for those who have limited access to transportation (Bonanno and Li 2014). In addition, stores with higher rates of SNAP redemptions are more likely to be independently owned, particularly in rural areas (King, Leibtag, and Behl 2004). Although

independent stores can remain competitive by locating in these areas, the recent decline in rural grocery stores has been attributed to the closure of independent stores that are unable to compete with chain stores opening in nearby areas (Bailey 2010).

Studies have raised concern about the prices and availability of healthy products at independent stores, although these studies tend to focus on small-format independent stores and convenience stores (e.g., Chung and Myers 1999). Studies have found that consumers shopping at supermarkets purchase healthier food (e.g., fruits and vegetables), even in comparison to supercenter purchases (Zenk et al. 2005; Volpe, Okrent, Leibtag 2013; Volpe, Kuhns, and Jaenicke 2017). However, others have found that the prices of certain products were lower at independent stores, suggesting that these stores may target particular needs of local residents (e.g., Block and Kouba 2005).

Given the potential effect of independent stores on food access and healthfulness of purchases, it is important to consider how independent stores are performing today and how they have changed over the last decade. This report examines the following: (1) the number of chain and independent food retailers, (2) the share of independent food retailers as a percentage of all grocery stores, and (3) the share of sales from independent retailers, and how all of these have changed over the last decade. We provide a basic overview and conduct an in-depth analysis of the associated county characteristics.

Data

This report uses Nielsen TDLinx data to examine independent food retailers across the U.S. The dataset provides a comprehensive list of food retailers, distinguishing between independent and

chain stores, and provides an estimate of annual sales for each store.[5] TDLinx classifies stores as independent if the owner is operating fewer than four outlets simultaneously. It is important to note that stores that are part of a franchise, such as Giant Eagle Market, are categorized as independent stores if the owner is operating only one store.[6] Thus, if a franchise is considered to operate more similarly to a chain store than an independent store, our analyses would overstate the total number of independent stores and their sales, and understate the number of chain stores.

We limit our analysis to the 48 contiguous states and the District of Columbia, resulting in a total of 3,108 counties in 2015.[7] In addition, we restrict our analysis to stores identified as grocery stores, excluding other store types that may sell food, such as convenience or drug stores.[8] TDLinx separates grocery stores into six categories: 1) supermarkets – traditional grocery stores with annual sales of $2 million or more; 2) limited assortment supermarkets – limited selection of items among fewer categories; 3) specialty food stores – primarily offers organic or gourmet food, and typically has an expanded fresh and/or prepared foods department; 4) supercenter – consists of a full-line supermarket and a full-line discount merchandiser under one roof; 5) warehouse stores – offers limited services, sells bulk food, and frequently acts as a supplier to small-format stores; 6) superette – sales of $1 million to $2 million annually.

To examine county characteristics associated with our main variables of interest, we incorporate data from the Census Bureau's Population Estimates Program (PEP) and Small Area

[5] The dataset contains this information for all open stores in June of each year. Thus, the total number might not be consistent for the entire year, but because the information is gathered at the same time each year, we believe it provides an accurate depiction of the overall annual trend. Because TDLinx provides an estimated range of annual sales for each store, we take the median of each bracket for our sales analyses.
[6] In 2016, 5% of all grocery stores had an independent owner and were part of a franchise. Thus, given that 43% of all grocery stores were independently owned that year, this suggests about 12% of the independent stores were part of a franchise.
[7] There were 3,109 counties in years 2005 to 2013. Starting in 2014, the Census Bureau combined FIPS code 51515 under 51019, resulting in a total of 3,108 counties in 2014 and 2015.
[8] The types of food retailers we include are limited assortment, natural/gourmet, and conventional supermarkets; warehouse grocery stores; superettes; and supercenters.

Income and Poverty Estimates (SAIPE), and the Rural-Urban Continuum from ERS. These datasets provide annual estimates of county characteristics that could influence the number of independent stores in the county, such as population and median-income, which reflect market size and purchasing power, respectively. We also include proportions of residents by race and ethnicity, specifically the percentage of blacks, other minorities, and Hispanics. We classify counties with an ERS Rural-Urban Continuum code of 1, 2, and 3 as urban; 4, 6, and 8 as rural adjacent to urban; and 5, 7, and 9 as rural not adjacent to urban.[9] We differentiate rural counties adjacent and not adjacent to urban counties because stores in adjacent rural counties may be able to benefit from their proximity to urban counties (i.e., spillover effects, particularly along the border), while those not adjacent to urban counties are more likely to be remote.[10]

Methodology

We begin our discussion of independent stores in 2015 and how they have changed over the last decade by providing descriptive statistics, specifically illustrating their distribution across counties, store types, and general trends. In addition, we conduct a closer examination of the relationship between county characteristics and (1) the number of independent and chain retailers, (2) the share of grocery stores that are independent, and (3) the share of sales from independent retailers. To address (1), we use a negative binomial model. The model is structured to evaluate counts of events that are over-dispersed, making it the ideal model to examine the number of independent and chain retailers.[11] For (2) and (3), we use a generalized linear model

[9] The ERS Rural-Urban Continuum follows the official metro and non-metro definitions from the 2013 Office of Management and Budget. For more information, see https://www.ers.usda.gov/data-products/rural-urban-continuum-codes/documentation/.

[10] Although we recognize other demographic characteristics may also affect a store's location decision, we wanted to keep the explanatory variables consistent throughout this report. Thus, we limited our explanatory variables to those that would be available for every year from 2005 to 2015.

[11] See Greene (2011) for more details.

with a logit transformation of the response variable and a binomial distribution. This method is ideal for fractional dependent variables that include a large portion of zeros and ones.[12] To examine the annual changes for each of these variables from 2005 to 2015, we run a pooled OLS regression.[13]

For each of the three variables of interest, we examine its relationship to the following county characteristics: population, household median-income, race and ethnicity, and whether the county is urban or rural (adjacent or not adjacent to an urban county). Population indicates the overall market size, or all potential consumers, while median-income reflects their purchasing power. We also include an indicator for the county's rurality and the percentage of minorities because past studies have found a greater number of independent stores in counties with a high percentage of minorities and in rural areas (e.g., Powell et al. 2007).

Independent Grocery Stores across the U.S.

Independent grocery stores are a large part of the food retail industry, generating 25% of all grocery sales in 2015 (NGA 2015). However, these stores are not evenly distributed across the U.S. Examining the number of independent stores across the U.S. per capita, or divided by county population, illustrates that most counties (55%) had less than one store for every 10,000 people, excluding counties that had no independent stores (15%) (Figure 1). Although these counties without any independent stores are scattered throughout the U.S., a large portion are located in the south and east. In contrast, among counties with at least one independent store,

[12] See Papke and Wooldridge (1996) and Baum (2008) for details on this methodology.
[13] A large portion of the share of independent stores were clustered at 0 and 100. Thus, as a robustness check, we also conducted the estimations with a tobit model with a lower bound of -100 and an upper bound of 100. The magnitudes are similar, and the sign and significance remain the same.

about 21% had at least 2 stores for every 10,000 people, largely located in the Great Plains region and western states.

There was a large share of independent retailers throughout several counties across the U.S. in 2015, particularly in the west, Great Plains, and northeast (Figure 2). At least half of the food retailers were independent in 44% of the counties, with at least 75% independent retailers in 589 counties (19% of all counties). Many counties with a large share of independent retailers were low-income and low-access (LILA) counties, particularly in the west and Great Plains (ERS 2017b).[14] The low-access measure of LILA counties examines accessibility to large-format stores. Thus, the large share of independent retailers in LILA counties indicates that small-format independent stores were located in areas with limited access to large-format stores. LILA counties with a low share of independent stores (e.g., in Texas and Missouri) could indicate that small-format chain stores also located in these counties. However, it could also be that these residents had to travel far to purchase food from a retailer or only had convenience stores in the county.

Despite the large share of independent retailers, the share of their *sales* was relatively low across the U.S. (Figure 3). Only 576 counties (19%) had at least 50% of sales from independent retailers, with sales of at least 75% in 463 counties (15%). Most of these counties were located in the Great Plains region, although there were a few scattered across the U.S., mostly in rural counties. The only LILA counties with a large share of independent retailers' sales were in the Great Plains region and a few counties in southeastern states; their share of sales was low in the remaining LILA counties. The contrast of high shares of independent retailers but low shares of their sales in LILA counties could be an indication that even if there are more independent stores

[14] Low access is defined as being more than 1 mile (10 miles) from the nearest supermarket, supercenter, or large grocery store in an urban (rural) tract.

nearby, residents continue to commute to the large-format store further away for most of their shopping. Ploeg et al. (2015) found that, on average, households do not shop at the store closest to them, suggesting that other factors play a larger role. It could also be that there are numerous small-format independent stores and one large-format chain store that has higher sales on average.

On average, there were more small-format independent stores than chain stores in 2015 (Figure 4 and 5). Among all chain stores, 67% were supermarkets, whereas only 33% of independent stores were supermarkets. In contrast, 58% of independent stores were superettes (grocery stores with sales of $1 million to $2 million annually), compared to only 1% of chain stores. The second largest category for chain stores was supercenters: 15% of all chain stores. Based on the proportion of independent and chain stores by type, we combine supermarkets, warehouse stores, and supercenters as "large-format stores," and specialty food stores, limited assortment supermarkets, and superettes as "small-format stores" for our analyses in this study.

The share of sales from each store type was similar to the distribution of stores. About 85% of sales were from superettes and supermarkets for independent stores, while for chain stores, 91% of sales were from supercenters and supermarkets (Figure 6 and 7). Among independent stores, although there were nearly twice as many superettes than supermarkets, the share of sales from supermarkets was more than double the sales from superettes: 58% for supermarkets and 27% for superettes. For chain stores, the share of sales from supermarkets (63%) was nearly twice the share from supercenters (28%). The share of sales from supercenters was larger than its share of stores, largely from the share of sales from limited assortment supermarkets only being 2%, which is much lower than its share of stores.

Large-format chain stores dominate the food retail market. Among these stores, there were an average of 7.68 chain stores in each county and only 2.27 independent stores (Table 1). However, among small-format stores, there were a greater number of independent stores (4.65) than chain stores (1.51). In counties with a poverty rate greater than 20%, there were more than double the number of large-format chain stores compared to large-format independent stores (1.99 and 4.14, respectively). However, in counties with a poverty rate greater than 30%, the number of large-format chain stores dropped to 2.81, whereas independent stores increased slightly to 2.07. On average, these counties had the greatest number of small-format independent stores. This suggests that large-format chain stores tend to not locate in counties with high poverty rates; primarily, small-format independent stores locate in these communities instead, coinciding with the results of previous studies (e.g., Block and Kouba 2005; Powell et al. 2007). Separating counties by median-income generates similar results, although the number of independent stores fell in counties with a lower median-income.

As expected, urban counties had a much greater average number of stores, with the fewest in rural counties not adjacent to urban counties. Among large-format stores, urban counties had four times the number of chain stores than independent stores, whereas small-format independent stores outnumbered small-format chain stores three to one. This general relationship is maintained for all rural counties as well, although the magnitude of the differences are smaller.

As expected, counties with a larger population had a greater number of independent and chain stores, regardless of store size (Table 2).[15] However, there were more chain stores in

[15] To interpret the results of the negative binomial regression, we calculate the incident rate ratio by subtracting one from the exponent of the coefficient to determine the percentage change, all else equal. We include the coefficients from the negative binomial regression in Table A1.

counties with larger populations; counties with an additional 10,000 individuals had 1.9% more independent stores and 2.4% more chain stores. For each $10,000 increase in median income, chain stores increased by 13%; there were 0.1% fewer independent stores but the result was insignificant (Table A1). For each additional percentage of blacks in the county population, the percentage of independent stores increased by 1.5% but only increased by 0.4% for chain stores. Similarly, for each additional percentage of Hispanics, independent stores increased by 1.2% but chain stores only increased by 0.4%. The relationship switched for other minorities: independent stores increased by 0.8% for each additional other minority but chain stores increased by 1.3%. Although the increase was much smaller, the percentage increase of chain stores in areas with a higher percentage of blacks differs with past studies findings (e.g., Powell et al. 2007). Part of the reason for this difference could be from our analysis examining a broader county level area rather than by tract or zip code.[16] It could also be from a difference in classifications of store types. Nevertheless, the effect of minorities is relatively small for both store types compared to the other independent variables.

Both chain and independent stores were more likely to be located in an urban county in 2015. Compared to urban counties, there were 34% fewer independent stores in rural counties adjacent to an urban county and 42% fewer in rural counties nonadjacent to an urban county. The percentages were higher for chain stores: there were 50% fewer in rural counties adjacent to an urban county than an urban county and 61% fewer in a rural county nonadjacent to an urban county. These results could be an indication that independent stores are more likely to enter rural counties. However, it could also be that there are a similar number of chain and independent stores in rural counties, and that chain stores outnumber independent stores in urban counties.

[16] Powell et al. (2007) uses zip code level data from the 2000 Census.

Although examining the number of independent and chain retailers can provide insight into the areas stores are entering, there are areas that both store types prefer, such as counties with high consumer demand (i.e., a large population). Conversely, there are areas with relatively fewer stores, such as rural counties. Thus, we examine the share of grocery stores that are independent in an area, or the share of independent grocery stores.

The share of large-format independent stores was lower in counties with a larger population, indicating that large-format chain stores outnumbered large-format independent stores (Table 3). For a county with one million more individuals, it would be 18% less likely that a randomly selected large-format store would be independent.[17] The share of independent stores was also greater in counties with a higher percentage of blacks and a lower median-income, and in rural counties. In rural counties adjacent to urban counties, a store is 21% more likely to be independent; in those nonadjacent to urban counties, a store is 32% more likely to be independent. The share of all independent stores was negatively associated with the proportion of other minorities and positively associated with rural counties not adjacent to urban counties, but these become insignificant when separated by size. The only statistically significant result for small-format independent stores was the higher share of independent stores in counties with a lower median-income.

The share of sales from independent stores generates similar results; it was greater in counties with a lower population, percentage of other minorities and Hispanics, and median-income. It was also associated with a higher percentage of blacks and rural counties. Among large-format stores, these associations are maintained and remain significant for all except rural counties adjacent to urban counties. However, among small-format stores, the share of sales from

[17] We obtain the odds ratio by taking the exponent of the coefficient. By subtracting one from the odds ratio, we can estimate the probability that a store will be independent rather than a chain store.

independent stores is only significantly higher in counties with a lower population and median-income.

Change Over the Last Decade: 2005 to 2015

The Great Recession (December 2007 to June 2009) was the worst economic downturn since the Great Depression. In addition, the recovery was prolonged, with employment returning to pre-recession levels in May 2014.[18] Combined with growing concentration in the food retail industry, the economic downturn led to independent grocery stores struggling over the last decade. Market-level concentration in the U.S. today greatly exceeds national concentration, and many geographic markets are dominated by a small number of food retailers. Rahkovsky and Volpe (2017) show that the average four-firm concentration ratio across 27 large U.S. metropolitan areas is 63% and the average eight-firm concentration ratio is 84%.

From 2005 to 2015, the total number of grocery stores increased by 7% from 47 to 51 thousand stores; however, the share of independent retailers declined (Figure 8). Although the number of chain and independent stores began increasing in 2006, chain stores continued to increase rapidly while independent stores stagnated at the onset of the Great Recession. As a result, the share of independent stores fell by about 3% from 2007 to 2015. The number of small-format chain stores more than doubled from 2006 to 2015, while the number of small-format independent stores only increased by 6% (Table A2). In addition, large-format chain stores increased by 5% while large-format independent stores decreased by 6%.

Large-format chain stores had over $400 billion in sales from 2005 to 2015 while sales from all independent stores never reached $100 billion, indicating that large-format chain stores

[18] This is based on total nonfarm employment from the Bureau of Labor Statistics Current Employment Statistics.

dominated the food retail industry (Table A3). Given the large difference in sales, we examine the relative changes in sales for independent and chain stores in real dollars (i.e., adjusted for inflation). Over these eleven years, the share of sales from independent stores decreased, despite a slight increase from 2009 to 2012 (Figure 9). Sales among independent stores declined by 15% while increasing by 5% for chain stores. The increase among chain stores was mostly from small-format chain stores. Their sales increased by $21 billion, or 132%, driven by specialty food retailers more than doubling over this period. Sales among small-format independent stores increased as well, but only by $1 billion (6%). Large-format chain stores also had an increase of sales ($2 billion or 0.5%), but among large-format independent stores, sales declined by almost $11 billion (25%).

The rapid growth among small-format chain stores made it possible for their sales to surpass those from small-format independent stores. Sales from small-format independent stores were about $6 billion greater than those from small-format chain stores in 2005, but after being surpassed in 2009, small-format independent stores had $13 billion less in sales by 2015 (Table A3). The decline in sales among chain stores was driven by large-format chain stores; each year, small-format chain store sales never declined over the last decade.

Although the total number of food retailers increased over the last decade, examining county-level changes illustrates significant variation across the U.S. (Figure 10). The total number of food retailers declined in 969 counties (31%), among which 30 counties (1% of all counties) had an increase of more than five stores. In contrast, food retailers increased in 1,146 counties (37%); 211 counties (7%) had an increase of more than five stores.[19] On average, the

[19] The total number of counties (3,108) includes the 40 counties that never had a grocery store. Without these stores, the percentage of counties that had a decline in food retailers increases to 32% while the percentage increase remains the same at 37%.

total number of stores increased in urban counties, particularly among small-format stores. The average number of small-format stores also increased in rural counties while it decreased for large-format stores. Nevertheless, the increase in LILA tracts from 2010 to 2015 was driven by an increase in low-income tracts; the number of low-access tracts declined during this period, primarily from the continued increase in supercenters and large grocery stores (Rhone et al. 2017).

The number of independent food retailers declined in 1,116 counties (36%) and increased in only 915 counties (29%), resulting in a decreasing share of independent retailers in most counties (Figure 11). The share of independent retailers declined in 1,269 counties (41%), by more than 25% in 274 (9% of all counties), and increased in 897 counties (29%) by more than 25% in 166 (5%). There was no change among the remaining counties, which were located mostly in the Great Plains region. The decline was driven by large-format independent stores, which decreased on average in both urban and rural counties while small-format independent stores increased. Nevertheless, the changes in the share of independent stores was partially because the number of chain stores only decreased in 600 counties (19%).

Changes in the share of independent food retailers resemble changes in their share of sales, although the latter has been more moderate, particularly for counties in the Midwest and south (Figure 12). Nevertheless, half of the counties (1,556) had a decrease in the share of sales from independent stores over the last decade – 253 (8% of all counties) by more than 25%; the share of sales increased in only 866 counties (28%), with 90 counties (3% of all counties) increasing by more than 25%. The decline in the share of sales was driven by the 1,992 counties (64%) that had an increase in chain store sales, although 1,197 counties (39%) also had a decrease in independent store sales, mostly from large-format independent stores. On average,

although small-format independent stores and all chain stores had an increase in sales, large-format independent stores had a decline in sales in both urban and rural counties. This suggests that chain stores attracted patrons away from independent stores, or that consumers were at least purchasing more from chain stores, particularly among large-format stores. This insight provides motivation for further research on the nature of recent competition in the food retail industry.

The number of independent and chain stores increased in counties with a growing population, regardless of size (Table 4). Chain stores were more responsive to population growth: if the population increased by 100,000, chain stores increased by seven but independent stores only increased by five. Counties with a 1% increase in the percentage of blacks had an increase of 53 of independent stores and 11 fewer chain stores. Most of these changes were driven by changes in small-format stores; the magnitudes for large-format independent and chain stores were small and insignificant. Conversely, in counties where the percentage of other minorities increased by 1%, large-format independent stores decreased by 5 while small-format chain stores increased by 11. Considering the large increase of small-format chain stores throughout the decade, this could be an indication that small-format chain stores were replacing large-format independent stores. The results for changes in the percentage of Hispanics were statistically insignificant for all store types.

Compared to urban counties, rural counties were more likely to have an increase of independent stores and less likely to have an increase of chain stores, indicating the continued important role of independent grocery stores in rural communities. The results are statistically significant across all store types except for large-format chain store, although the magnitude remains negative. Small-format chain stores increased slightly in counties where median income decreased; the results were insignificant for the remaining store types.

Although examining changes in the number of retailers provides insight on where stores entered from 2005 to 2015, it does not take into account the initial number of stores in the county. For example, a store entering a county with only one store would be considered the same as entering a county with 100 stores, although the effect on the area would be vastly different. Thus, we also examine the annual percentage change in the number of retailers.

The results for the percentage change in retailers resemble those from changes in the number of stores: the percentage of retailers increased in counties with increasing populations, independent stores increased in counties with an increasing percentage of blacks, and chain stores were less likely to increase in rural counties (Table 5). In counties where the population increased by 1,000 individuals, the percentage change was much larger for small-format chain stores – a 4% increase. In contrast, small-format independent and chain stores increased by about 1%, and large-format chain stores increased by 0.7%. In addition, changes in the percentage of other minorities and Hispanics had different results. For a 1% increase of other minorities, large-format chain stores decreased by 1.3%; small-format chain stores increased by 1%, but the result was statistically insignificant. In counties where Hispanics increased by 1%, small-format chain stores increased by 1.5%.

Most of the results were insignificant for changes in the share of independent stores and their sales, particularly after separating stores by size (Table 6). A growing percentage of blacks was associated with a growing share of independent stores and their sales. Sales among large-format independent stores were also positively associated a growing share of other minorities, suggesting that these stores may be important for counties with a high percentage of minorities. It could also be that stores offering a wide variety of ethnic foods tend to be independent, despite large-format chain stores expanding their product variety. Remote, rural areas had a growing

share of small-format independent stores and their sales. Changes in population had no effect on changes in the share of independent stores and their sales. The changes in median-income indicate that as the overall purchasing power of a county declines, the share of independent stores and their sales increase among small-format stores but decrease among large-format stores.

Conclusion

Independent grocery stores continue to be a large part of the food retail industry, despite their declining numbers since the onset of the Great Recession. These stores continued to grow in counties with a growing population and percentage of blacks, resulting in a higher share of independent stores and their sales in counties with a higher proportion of minorities. Independent stores continue to play a large role for rural communities, particularly those not adjacent to urban counties.

Although most of the chain stores continue to be a large-format, small-format chain stores had the greatest growth over the last decade, particularly among specialty food stores. The growth in these stores could be reflecting consumers' demand for organic, "fresh" food, reflecting small-format stores specializing in this area to compete with large-format stores (Dunson 2015). In contrast, small-format independent stores are mostly comprised of superettes, which may not be as attractive to consumers. Furthermore, small-format chain stores may be able to operate similarly to large-format retailers if the chain is large enough. They may have more bargaining power or their own private label, allowing them to set lower prices.

There has been a decline in large-format independent stores, while large-format chain stores have continued to grow. In 45% of the counties where the number of large-format

independent stores declined, the number of chain stores increased. Although large-format chain stores increased in 43% of the counties where large-format independent stores declined, this suggests that food access became more limited in over half of the counties. Although the decline began with the Great Recession, the greatest decline occurred between 2014 and 2015, suggesting that large-format independent retailers continue to face difficulties. More research is needed to understand the reason for this decline and what the potential effects could be.

It remains unclear how the food retail industry will be affected if the share of independent stores continues to decline. Market concentration could increase, particularly if mergers and acquisitions among chain stores continue. Food access may become a greater concern, particularly in remote rural areas. The continued decline of large-format independent retailers may increase food access concerns in areas where population is declining. However, this may become less problematic if small-format chain stores continue to grow – assuming they offer a wider selection and lower prices – and if grocery delivery services expand, particularly through online sites. Although these grocery delivery services are currently predominantly in large cities, if technological advancements make it more feasible to reach a broader area, it could improve access to healthy foods, particularly in remote, rural areas. However, it could also have a negative effect on traditional brick and mortar grocery stores.

It will be important for future studies to examine changes in the food retail industry over these coming years, particularly to examine how consumers are affected. In addition to overall accessibility, these changes may affect consumers' overall diet quality through its effect on prices and product availability. Overall shopping behavior may also change if grocery delivery services continue to expand, which may force grocery stores to offer more products or specialize

in certain areas, particularly among independent stores. It is essential for future studies to examine how consumers are affected by these changes.

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Table 1. Average Number of Stores by County Characteristics, 2015

	Independent stores		Chain stores		Number of Counties
	Large	Small	Large	Small	
All counties	2.27	4.65	7.68	1.51	3,108
Poverty rate > 20%	1.99	4.49	4.14	0.72	731
Poverty rate > 30%	2.07	4.69	2.81	0.40	113
Median income < $30,000	0.85	1.39	1.20	0.33	66
Median income < $40,000	1.10	2.01	2.74	0.37	735
Urban	4.41	10.06	16.75	3.53	1,160
Rural adjacent to urban	1.14	1.61	2.78	0.38	1,026
Rural not adjacent to urban	0.83	1.23	1.70	0.22	922

Note: We combine supermarkets, warehouse stores, and supercenters as "large-format stores" and specialty food, limited assortment supermarkets, and superettes as "small-format stores." TDLinx classifies stores as independent if there are fewer than four outlets in a given year; all others are classified as chain stores.

Table 2. Percentage change results for number of independent and chain stores, 2015.

	Independent Stores			Chain Stores		
	All	Small	Large	All	Small	Large
population	1.85%***	1.90%***	1.39%***	2.44%***	2.21%***	2.23%***
% black	1.50%***	1.92%***	1.33%***	0.42%**	1.97%***	0.34%**
% other minorities	0.84%***	0.90%***	1.00%***	1.30%***	1.86%***	1.32%***
% Hispanic	1.15%***	1.34%***	1.23%***	0.43%**	0.45%	0.48%***
rural adjacent to urban	-33.49%***	-35.72%***	-34.50%***	-49.71%***	-59.24%***	-50.25%***
rural not adjacent to urban	-42.01%***	-41.94%***	-44.76%***	-61.07%***	-68.91%***	-61.74%***
median income	-0.11%	-0.46%	2.42%	12.73%***	15.27%***	13.44%***
observations	3,108	3,108	3,108	3,108	3,108	3,108
state FE	yes	yes	yes	yes	yes	yes

Note: We combine supermarkets, warehouse stores, and supercenters as "large-format stores" and specialty food, limited assortment, and superettes as "small-format stores." TDLinx classifies stores as independent if there are fewer than four outlets in a given year; all others are classified as chain stores. *** p<0.01, ** p<0.05, * p<0.1

Table 3. Results for share of independent stores and sales, 2015.

	Share of Independent Stores			Share of Sales from Independent Stores		
	All	Small	Large	All	Small	Large
population	-0.106	0.044	-0.198*	-0.865*	-0.560***	-1.013*
	(0.069)	(0.070)	(0.118)	(0.451)	(0.167)	(0.555)
% black	0.788***	0.320	0.571*	0.782**	-0.074	0.728*
	(0.233)	(0.342)	(0.322)	(0.338)	(0.344)	(0.427)
% other minorities	-0.816**	-0.075	-0.529	-1.565***	-0.510	-1.037*
	(0.379)	(0.582)	(0.514)	(0.503)	(0.561)	(0.630)
% Hispanic	-0.382	-0.029	-0.492	-1.359***	-0.223	-1.262**
	(0.261)	(0.373)	(0.352)	(0.405)	(0.373)	(0.524)
rural adjacent to urban	0.188***	-0.031	0.141*	0.218**	0.100	0.142
	(0.057)	(0.085)	(0.077)	(0.094)	(0.086)	(0.113)
rural not adjacent to urban	0.274***	-0.105	0.118	0.461***	0.037	0.238*
	(0.070)	(0.098)	(0.091)	(0.106)	(0.098)	(0.128)
median income	-17.760***	-8.890***	-18.690***	-29.110***	-13.760***	-30.710***
	(2.509)	(3.217)	(3.276)	(4.262)	(3.403)	(5.292)
constant	0.205	0.403	-0.034	-0.130	0.492*	-0.168
	(0.190)	(0.291)	(0.248)	(0.292)	(0.294)	(0.355)
observations	3,108	3,108	3,108	3,108	3,108	3,108
state FE	yes	yes	yes	yes	yes	yes

Note: Standard error in parentheses. To make the results more legible, population and median income are in millions. We combine supermarkets, warehouse stores, and supercenters as "large-format stores" and specialty food, limited assortment, and superettes as "small-format stores." TDLinx classifies stores as independent if there are fewer than four outlets in a given year; all others are classified as chain stores. *** p<0.01, ** p<0.05, * p<0.1

Table 4. Results for change in number of independent and chain stores, 2005 – 2015

	Δ in Independent Stores			Δ in Chain Stores		
	All	Small	Large	All	Small	Large
Δ in population	0.055***	0.039***	0.016***	0.074***	0.048***	0.026***
	(0.002)	(0.002)	(0.001)	(0.001)	(0.0008)	(0.001)
Δ in % black	52.700***	51.190***	1.506	-11.400***	-8.602***	-2.798
	(4.134)	(3.721)	(1.782)	(2.740)	(1.507)	(2.320)
Δ in % other minorities	-6.643	-1.668	-4.975**	5.911*	10.660***	-4.752
	(5.403)	(4.863)	(2.329)	(3.581)	(1.969)	(3.033)
Δ in % Hispanic	-2.372	-1.171	-1.201	0.494	0.192	0.302
	(3.054)	(2.749)	(1.317)	(2.024)	(1.113)	(1.714)
rural adjacent to urban	0.087***	0.057***	0.030***	-0.066***	-0.050***	-0.017
	(0.022)	(0.019)	(0.009)	(0.014)	(0.008)	(0.012)
rural not adjacent to urban	0.117***	0.068***	0.048***	-0.068***	-0.049***	-0.020
	(0.024)	(0.022)	(0.010)	(0.016)	(0.009)	(0.013)
Δ in median income	-0.005	-0.003	-0.002	-0.005*	-0.003**	-0.002
	(0.004)	(0.004)	(0.002)	(0.003)	(0.001)	(0.002)
constant	-0.063	-0.031	-0.032	-0.123***	0.015	-0.138***
	(0.066)	(0.059)	(0.028)	(0.043)	(0.024)	(0.037)
observations	31,088	31,088	31,088	31,088	31,088	31,088
State FE	yes	yes	yes	yes	yes	yes
Year FE	yes	yes	yes	yes	yes	yes

Note: Standard error in parentheses. To make the results legible, population and median income are in thousands. We combine supermarkets, warehouse stores, and supercenters as "large-format stores" and specialty food, limited assortment, and superettes as "small-format stores." TDLinx classifies stores as independent if there are fewer than four outlets in a given year; all others are classified as chain stores.
*** p<0.01, ** p<0.05, * p<0.1

Table 5. Results for percentage change in number of independent and chain stores, 2005 – 2015

	Δ in Independent Stores			Δ in Chain Stores		
	All	Small	Large	All	Small	Large
Δ in population	0.908**	1.365***	1.100***	0.855***	3.881***	0.657***
	(0.365)	(0.388)	(0.300)	(0.203)	(0.242)	(0.203)
Δ in % black	-0.118	1.435*	0.098	0.151	-0.021	-0.164
	(0.695)	(0.739)	(0.571)	(0.387)	(0.461)	(0.386)
Δ in % other minorities	0.167	-0.400	0.037	-1.359***	0.985	-1.296**
	(0.908)	(0.965)	(0.747)	(0.505)	(0.603)	(0.505)
Δ in % Hispanic	0.550	1.501***	-0.192	-0.027	0.470	-0.146
	(0.513)	(0.546)	(0.422)	(0.286)	(0.341)	(0.285)
rural adjacent to urban	-0.006	-0.007*	-0.006*	-0.005**	-0.025***	-0.002
	(0.004)	(0.004)	(0.003)	(0.002)	(0.002)	(0.002)
rural not adjacent to urban	-0.002	-0.005	-0.001	-0.010***	-0.026***	-0.006***
	(0.004)	(0.004)	(0.003)	(0.002)	(0.003)	(0.002)
Δ in median income	-0.134	-0.398	0.199	-0.159	-0.443	0.171
	(0.660)	(0.702)	(0.543)	(0.367)	(0.438)	(0.367)
constant	0.022**	-0.012	-0.007	0.003	0.010	0.001
	(0.011)	(0.012)	(0.009)	(0.006)	(0.007)	(0.006)
observations	31,088	31,088	31,088	31,088	31,088	31,088
State FE	yes	yes	yes	yes	yes	yes
Year FE	yes	yes	yes	yes	yes	yes

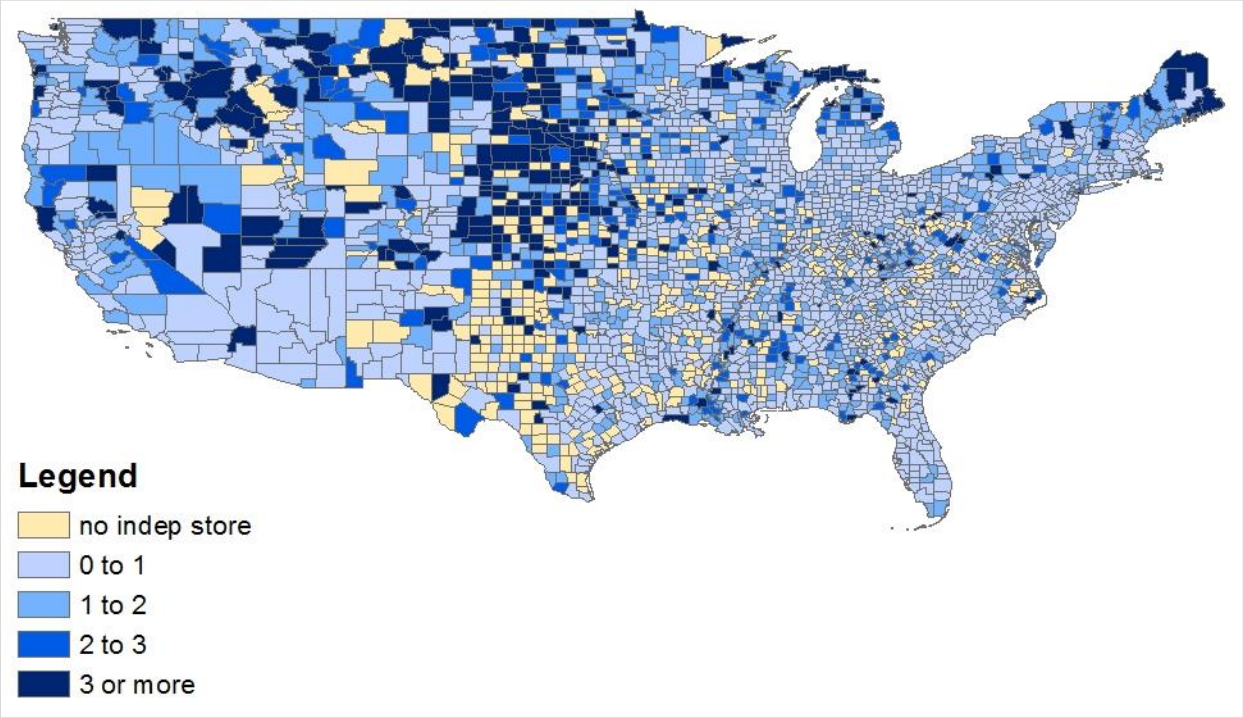
Note: Standard error in parentheses. To make the results legible, population and median income are in thousands. We combine supermarkets, warehouse stores, and supercenters as "large-format stores" and specialty food, limited assortment, and superettes as "small-format stores." TDLinx classifies stores as independent if there are fewer than four outlets in a given year; all others are classified as chain stores.
*** p<0.01, ** p<0.05, * p<0.1

Table 6. Results for change in share of independent stores and sales, 2005 – 2015

	Δ in Share of Independent Stores			Δ in Share of Sales from Independent Stores		
	All	Small	Large	All	Small	Large
Δ in population	-0.003	-0.026	0.005	0.001	-0.041	0.003
	(0.014)	(0.027)	(0.014)	(0.013)	(0.028)	(0.013)
Δ in % black	47.630*	-58.050	22.150	44.850*	-45.340	17.360
	(25.950)	(51.920)	(25.910)	(23.790)	(53.390)	(24.190)
Δ in % other minorities	-8.295	-97.280	42.750	71.880**	-75.960	81.510***
	(33.920)	(67.860)	(33.870)	(31.100)	(69.780)	(31.630)
Δ in % Hispanic	-9.292	53.350	-35.050*	-24.340	67.600*	-33.190*
	(19.170)	(38.360)	(19.140)	(17.580)	(39.440)	(17.870)
rural adjacent to urban	0.040	0.174	0.053	0.0131	0.286	0.033
	(0.135)	(0.270)	(0.135)	(0.124)	(0.277)	(0.126)
rural not adjacent to urban	0.255*	0.804***	0.001	0.082	0.922***	-0.107
	(0.150)	(0.300)	(0.150)	(0.138)	(0.309)	(0.140)
Δ in median income	-0.011	-0.015	0.026	-0.002	-0.028	0.036
	(0.025)	(0.049)	(0.025)	(0.023)	(0.051)	(0.023)
constant	0.321	0.220	-0.181	-0.877**	-0.345	-1.065***
	(0.411)	(0.823)	(0.411)	(0.377)	(0.846)	(0.383)
Observations	31,088	31,088	31,088	31,088	31,088	31,088
State FE	yes	yes	yes	yes	yes	yes
Year FE	yes	yes	yes	yes	yes	yes

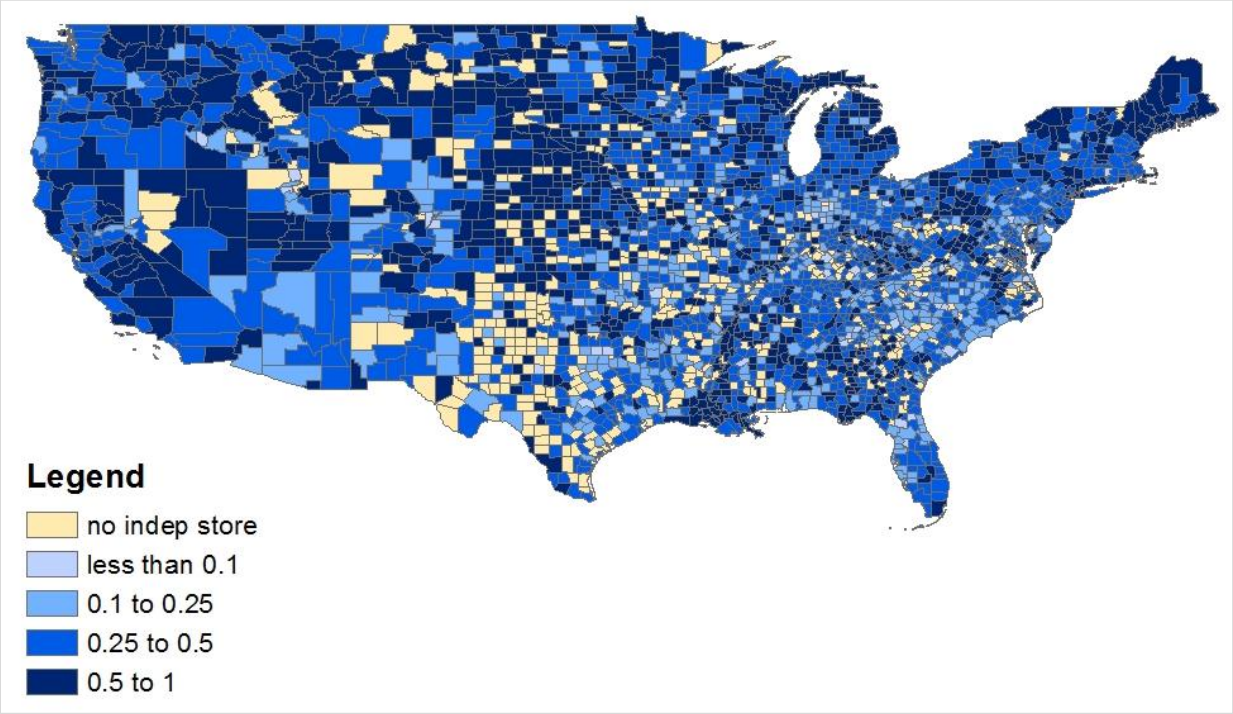
Note: Standard error in parentheses. We combine supermarkets, warehouse stores, and supercenters as "large-format stores" and specialty food, limited assortment, and superettes as "small-format stores." TDLinx classifies stores as independent if there are fewer than four outlets in a given year; all others are classified as chain stores.
*** p<0.01, ** p<0.05, * p<0.1

Figure 1. Number of independent retailers across the U.S. per capita, 2015.



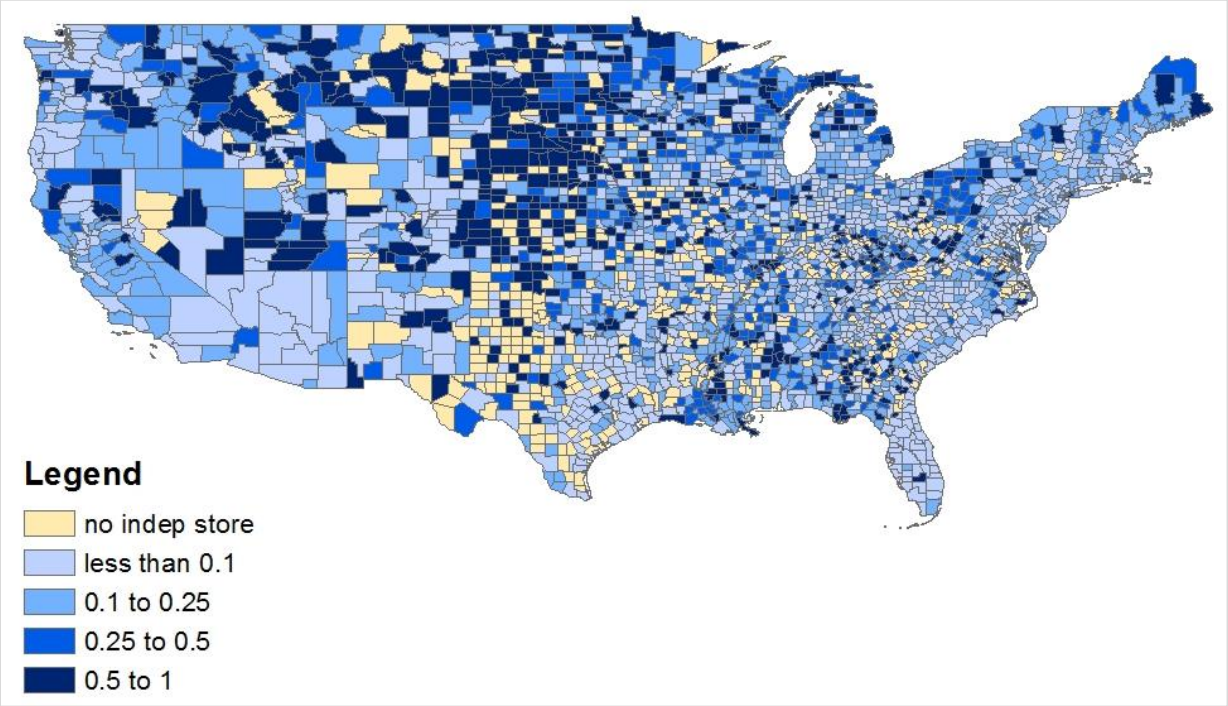
Source: Nielsen TDLinx
Note: TDLinx classifies stores as independent if there are fewer than four outlets in a given year; all others are classified as chain stores.

Figure 2. Share of independent retailers across the U.S., 2015.



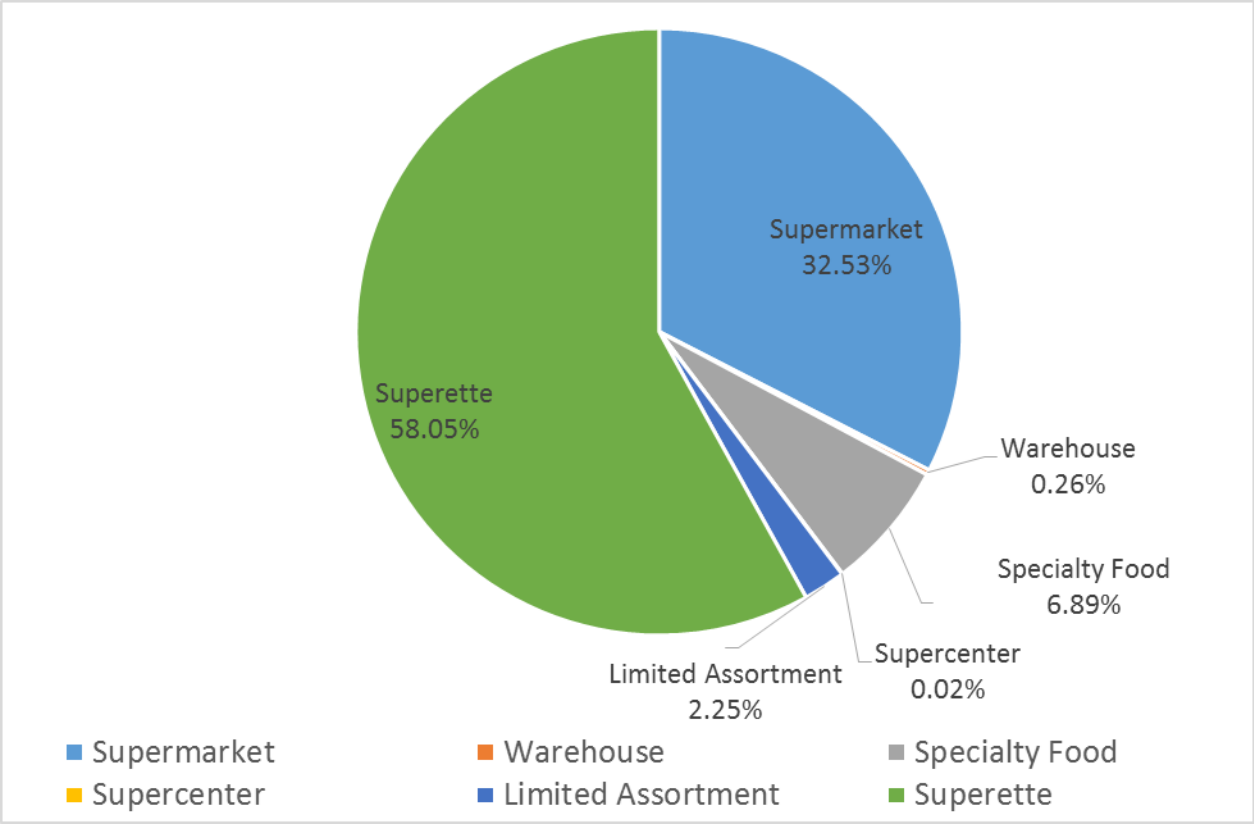
Source: Nielsen TDLinx
Note: TDLinx classifies stores as independent if there are fewer than four outlets in a given year; all others are classified as chain stores.

Figure 3. Share of sales from independent retailers across the U.S., 2015



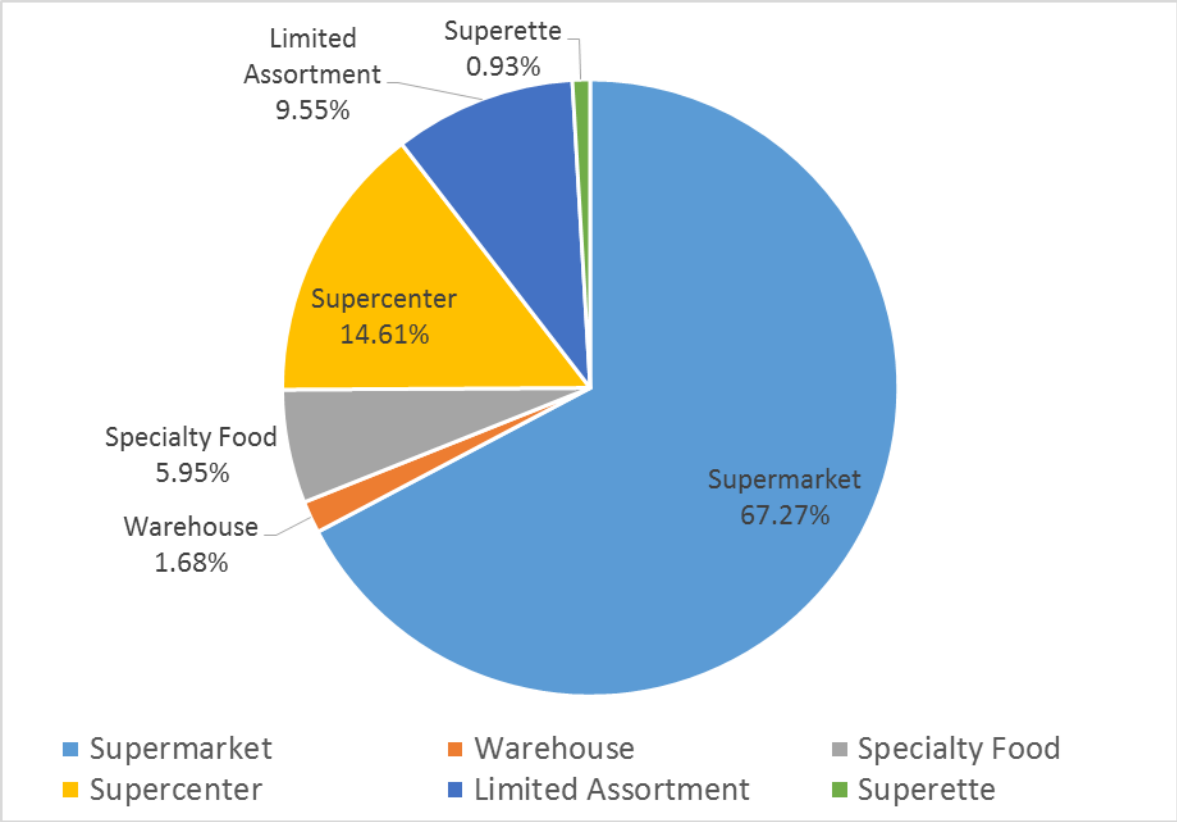
Source: Nielsen TDLinx
Note: TDLinx classifies stores as independent if there are fewer than four outlets in a given year; all others are classified as chain stores.

Figure 4. Independent Stores by Type, 2015



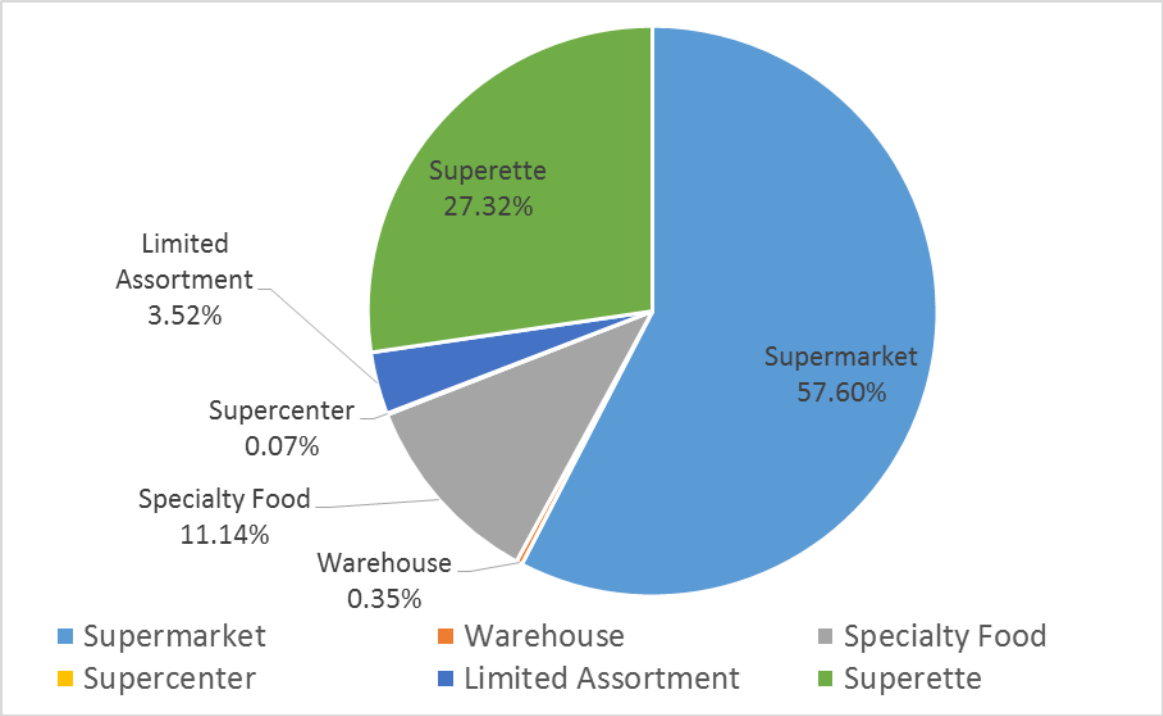
Source: Nielsen TDLinx

Figure 5. Chain Stores by Type, 2015



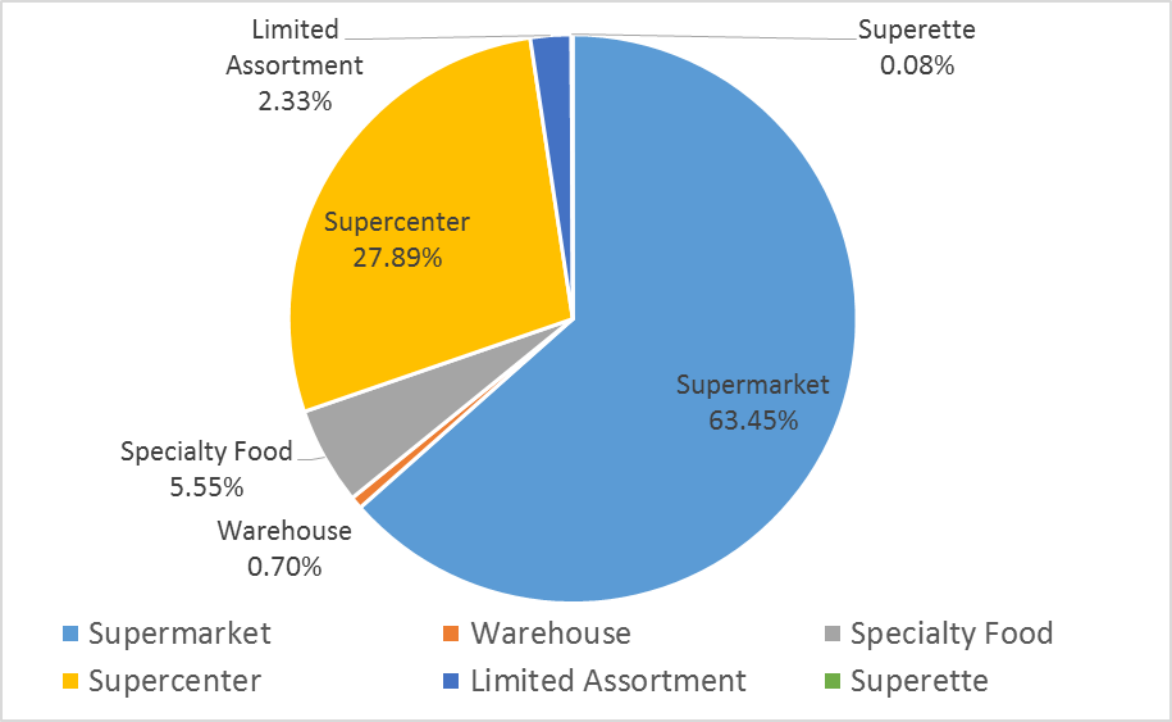
Source: Nielsen TDLinx

Figure 6. Sales from independent stores by type, 2015



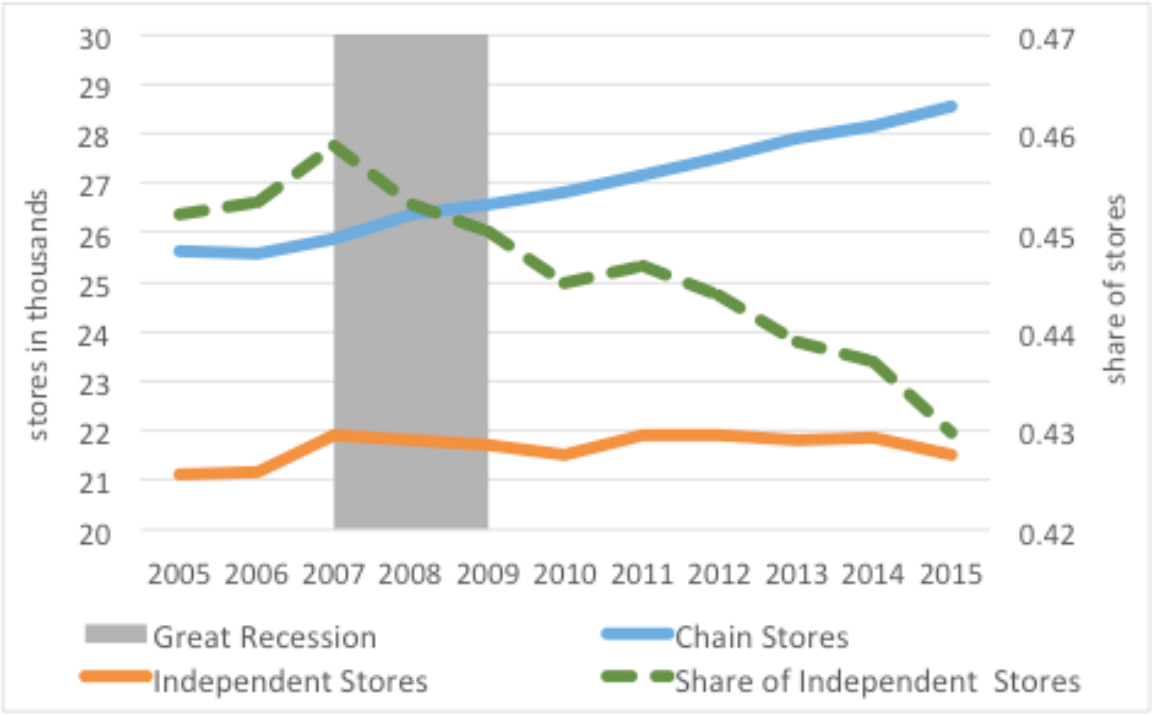
Source: Nielsen TDLinx

Figure 7. Sales from chain stores by type, 2015.



Source: Nielsen TDLinx

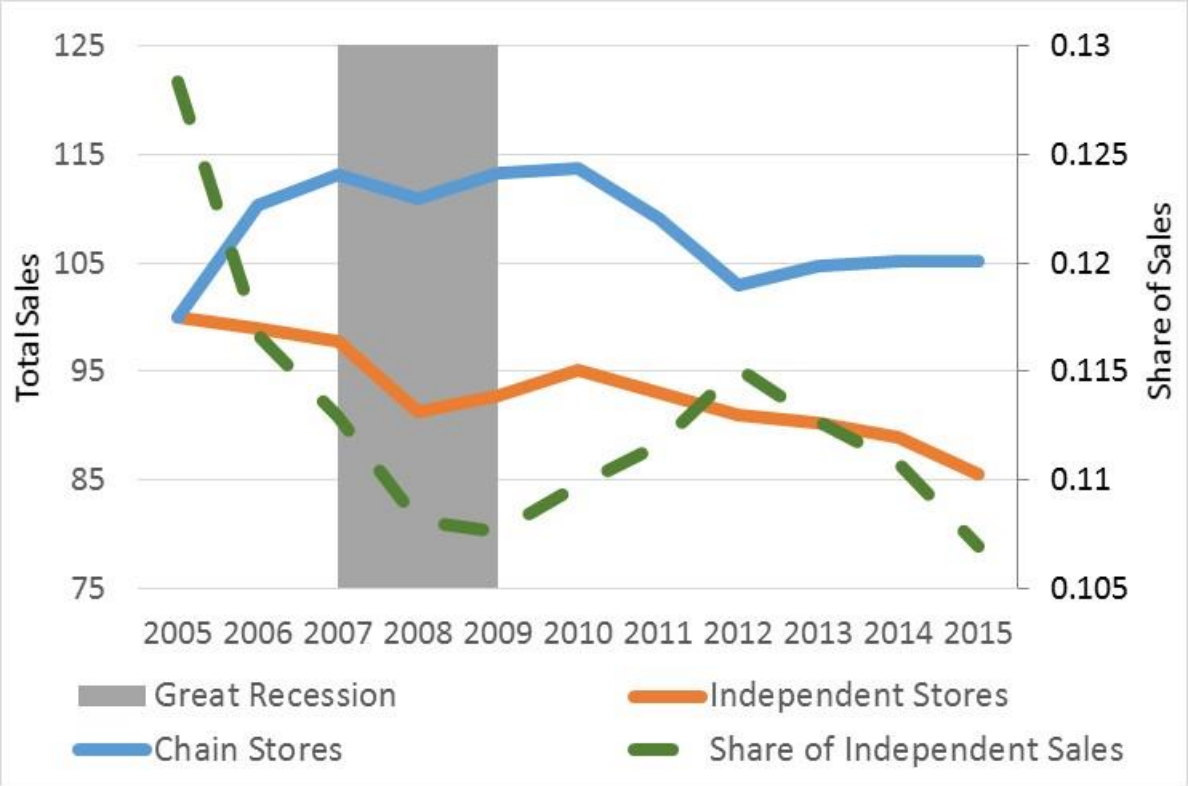
Figure 8. Total number of independent and chain stores, 2005 – 2015



Source: Nielsen TDLinx

Note: TDLinx classifies stores as independent if there are fewer than four outlets in a given year; all others are classified as chain stores.

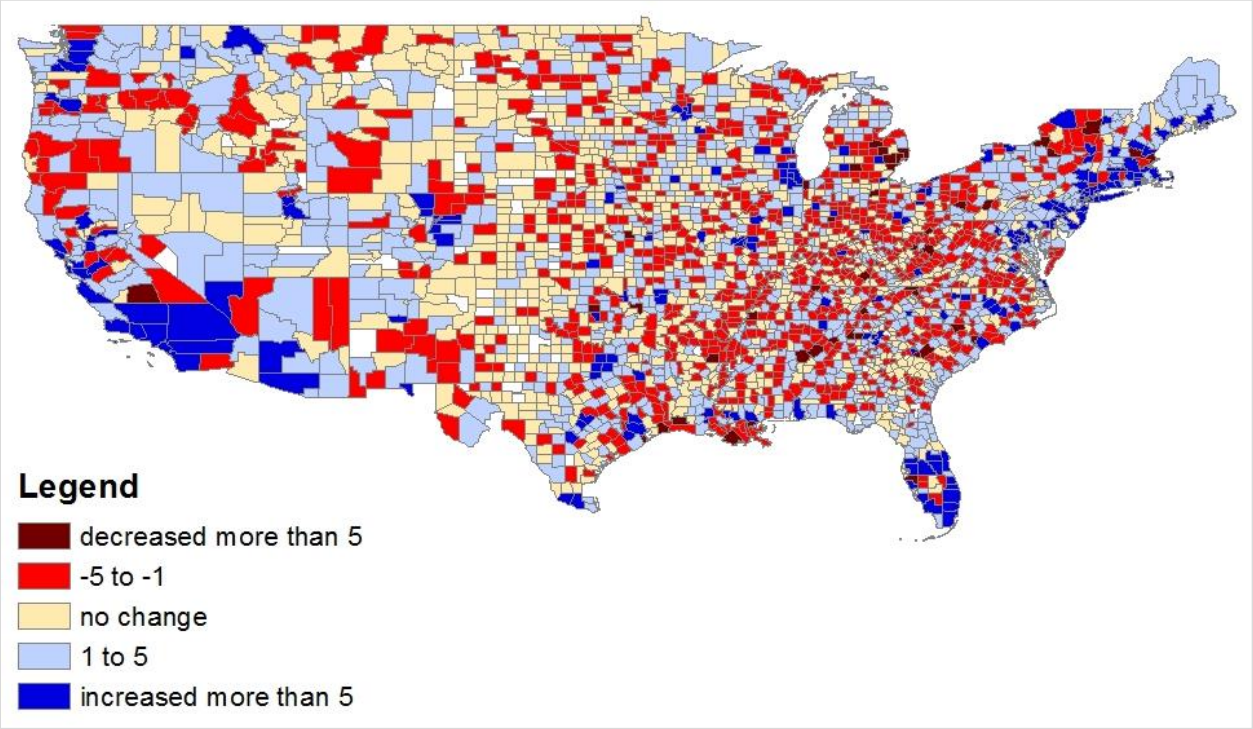
Figure 9. Total sales, 2005 – 2015, benchmarked to 2005 = 100



Source: Nielsen TDLinx

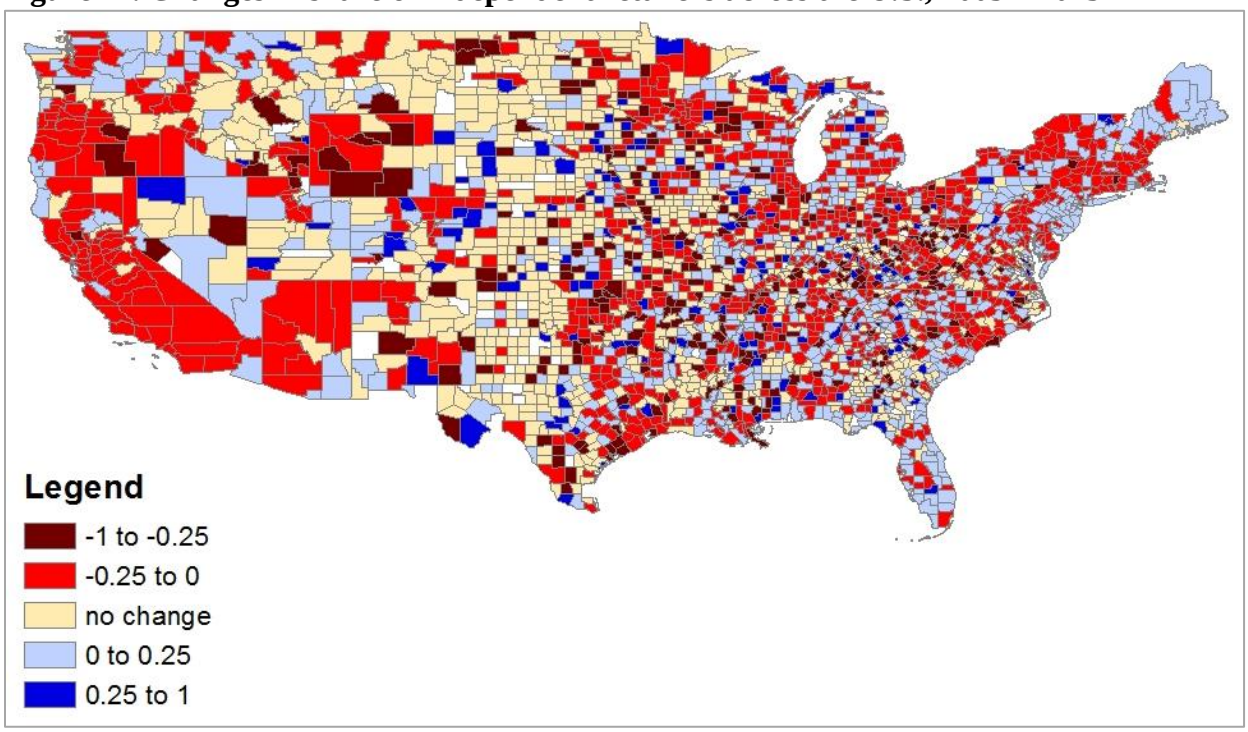
Note: Sales are benchmarked in their real values (i.e., adjusted for inflation using 2005 dollars). TDLinx classifies stores as independent if there are fewer than four outlets in a given year; all others are classified as chain stores.

Figure 10. Changes in total retailers across the U.S., 2005 – 2015



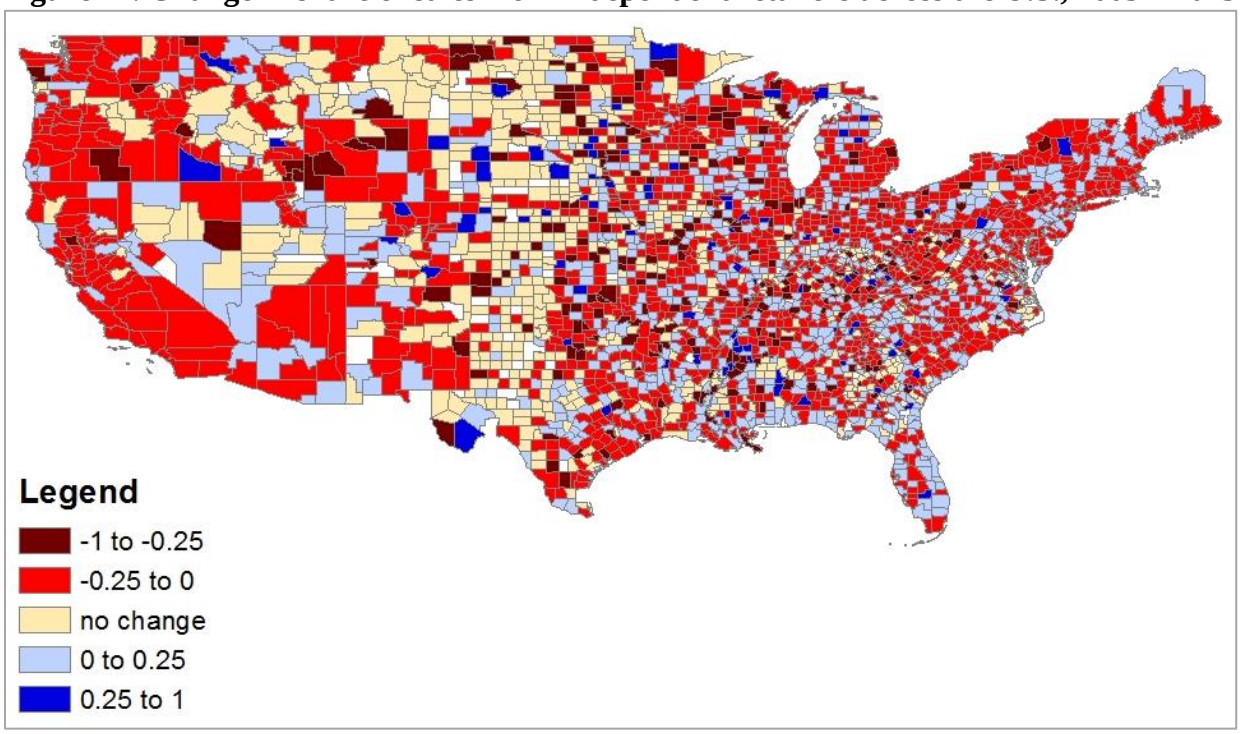
Source: Nielsen TDLinx

Figure 11. Changes in share of independent retailers across the U.S., 2005 – 2015



Source: Nielsen TDLinx
Note: TDLinx classifies stores as independent if there are fewer than four outlets in a given year; all others are classified as chain stores.

Figure 12. Change in share of sales from independent retailers across the U.S., 2005 – 2015



Source: Nielsen TDLinx
Note: TDLinx classifies stores as independent if there are fewer than four outlets in a given year; all others are classified as chain stores.

Table A1. Negative binomial coefficients for number of independent and chain stores, 2015.

	Independent Stores			Chain Stores		
	All	Small	Large	All	Small	Large
population	0.018***	0.019***	0.014***	0.024***	0.022***	0.022***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
% black	0.015***	0.019***	0.013***	0.004**	0.020***	0.003**
	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)	(0.002)
% other minorities	0.008***	0.009***	0.010***	0.013***	0.018***	0.013***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.006)	(0.003)
% Hispanic	0.012***	0.013***	0.012***	0.004**	0.005	0.005***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)	(0.002)
rural adjacent to urban	-0.408***	-0.442***	-0.423***	-0.687***	-0.898***	-0.698***
	(0.041)	(0.050)	(0.052)	(0.042)	(0.078)	(0.042)
rural not adjacent to urban	-0.545***	-0.544***	-0.593***	-0.944***	-1.168***	-0.961***
	(0.047)	(0.058)	(0.061)	(0.049)	(0.099)	(0.049)
median income	-0.001	-0.005	0.024	0.120***	0.142***	0.126***
	(0.016)	(0.019)	(0.020)	(0.017)	(0.028)	(0.017)
constant	1.006***	-0.123	0.554***	1.288***	-1.563***	1.234***
	(0.135)	(0.174)	(0.161)	(0.139)	(0.260)	(0.136)
observations	3,108	3,108	3,108	3,108	3,108	3,108
state FE	yes	yes	yes	yes	yes	yes

Note: Standard error in parentheses. To make the results more legible, population and median income are divided by 10,000. We combine supermarkets, warehouse stores, and supercenters as "large-format stores" and specialty food, limited assortment, and superettes as "small-format stores." TDLinx classifies stores as independent if there are fewer than four outlets in a given year; all others are classified as chain stores. *** p<0.01, ** p<0.05, * p<0.1

Table A2. Total Number of Independent and Chain Stores by Size

	Number of Independent Stores		Number of Chain Stores		Share of Independent Stores	
	Small	Large	Small	Large	Small	Large
2005	13,475	7,638	2,653	22,969	83.55%	24.96%
2006	13,695	7,484	2,799	22,769	83.03%	24.74%
2007	14,711	7,212	3,052	22,823	82.82%	24.01%
2008	14,696	7,138	3,252	23,124	81.88%	23.59%
2009	14,629	7,105	3,377	23,165	81.25%	23.47%
2010	14,400	7,115	3,548	23,285	80.23%	23.40%
2011	14,668	7,261	3,745	23,432	79.66%	23.66%
2012	14,689	7,232	3,933	23,556	78.88%	23.49%
2013	14,528	7,295	4,332	23,568	77.03%	23.64%
2014	14,705	7,158	4,553	23,610	76.36%	23.26%
2015	14,452	7,058	4,691	23,855	75.49%	22.83%

Source: Nielsen TDLinx

Note: We combine supermarkets, warehouse stores, and supercenters as "large-format stores" and specialty food, limited assortment, and superettes as "small-format stores." TDLinx classifies stores as independent if there are fewer than four outlets in a given year; all others are classified as chain stores.

Table A3. Total Sales of Independent and Chain Stores by Size, in $1000s

	Sales of Independent Stores		Sales of Chain Stores		Share of Sales from Independent Stores	
	Small	Large	Small	Large	Small	Large
2005	$21,562,500	$42,170,000	$15,609,500	$417,089,504	58.01%	9.18%
2006	$21,657,694	$41,406,084	$18,867,702	$458,646,400	53.44%	8.28%
2007	$24,080,678	$38,211,344	$20,823,582	$468,699,264	53.63%	7.54%
2008	$22,770,016	$35,408,504	$21,811,156	$457,999,264	51.08%	7.18%
2009	$23,234,452	$35,864,316	$23,965,422	$466,106,400	49.23%	7.14%
2010	$24,732,100	$35,934,632	$25,703,366	$466,351,328	49.04%	7.15%
2011	$24,392,800	$34,930,556	$25,855,940	$446,397,632	48.54%	7.26%
2012	$24,038,844	$33,945,296	$26,529,532	$419,163,584	47.54%	7.49%
2013	$23,757,158	$33,808,192	$29,303,802	$423,807,808	44.77%	7.39%
2014	$23,709,148	$32,957,950	$34,235,272	$420,649,920	40.92%	7.27%
2015	$22,890,390	$31,630,592	$36,233,780	$419,122,496	38.72%	7.02%

Source: Nielsen TDLinx

Note: We combine supermarkets, warehouse stores, and supercenters as “large-format stores” and specialty food, limited assortment, and superettes as “small-format stores.” TDLinx classifies stores as independent if there are fewer than four outlets in a given year; all others are classified as chain stores.