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A Disaggregated View of Market Concentration in the Food Retail Industry

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Abstract

The U.S. food retail sector has experienced substantial change in market concentration over the last three decades. To understand how the change in concentration might impact consumers, researchers would ideally focus on geographic markets that mimic where consumers actually shop. This report investigates the changes in food retailing market concentration at the national, State, Metropolitan Statistical Area (MSA), and county levels in the United States from 1990 to 2019, using data from the National Establishment Time Series dataset. The research finds that food-retailing market concentration at the county level is much higher than estimates of concentration using national-level data. Food retailing markets in rural and small nonmetro counties are considerably more concentrated than food retailing markets in metro and large nonmetro counties. Further, the study documents a significant rise in food retailing market concentration in the United States over the last three decades, at the national level as well as the State, MSA, and county levels during the period. Finally, the study shows that when excluding the largest food retailer, the concentration in retailing at the national and State level, markets would have been lower, but at the MSA and county level, markets would have been higher for most of the period analyzed.

Keywords: food retail industry, grocery stores, warehouse clubs, superstores, supercenters, Herfindahl–Hirschman Index, HHI, National Establishment Time Series, NETS, market concentration.

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Contents

USDA Economic Research Service
U.S. DEPARTMENT OF AGRICULTURE

A report summary from the Economic Research Service *January 2023*

A Disaggregated View of Market Concentration in the Food Retail Industry

Eliana Zeballos, Xiao Dong, and Ergys Islamaj

What Is the Issue?

The food retail sector has experienced substantial consolidation and structural change over the last three decades. The potential ramifications of these changes on concentration in the food retail sector has led to interest among researchers, policymakers, and consumers. Due to data limitations, most existing studies and reports have focused on providing and analyzing concentration measures of the food retail industry at the national level. While these measures can provide information about national trends, the measures can potentially mask differing trends in localized markets (such as at the Metropolitan Statistical Area (MSA) and county levels)—which are likely more relevant for consumers, food-retail competitors, and policymakers. To understand how the change in concentration might impact consumers, researchers would ideally focus on geographic markets that mimic where consumers actually shop such as at the State, MSA, or county levels. This report investigates the changes in the market concentration—a measure of the extent to which market shares are concentrated between firms of the retail food sector at the national, State, MSA, and county levels in the United States over the 1990–2019 period.

What Did the Study Find?

The authors report several key results:

- First, the study finds significant increases in food retailing market concentration measured by the Herfindahl–Hirschman Index (HHI) in the United States over the last three decades at the national, State, MSA, and county levels.
- Second, food retailing market concentration at the county level is considerably higher than at the national, State, and MSA levels.

ERS is a primary source of economic research and analysis from the U.S. Department of Agriculture, providing timely information on economic and policy issues related to agriculture, food, the environment, and rural America.

- Although the market was less concentrated at the national level, the food retailing market concentration at the national level increased at a much faster pace than it did at the county level (458 percent, compared to 94 percent) from 1990 to 2019.
- These results are in line with:
  - Entry of large national "nontraditional" food retailers into the food sector (e.g., supercenters).
  - Growth and consolidation of large national food retailers.
- Food retailing markets in rural and small nonmetro counties are considerably more concentrated than food retailing markets in metro and large nonmetro counties.
- Finally, the study shows when excluding the largest nationwide retailer, concentration in food retailing at the national and State level, markets would have been lower, but at the MSA and county level, markets would have been higher for most of the period analyzed.

How Was the Study Conducted?

To make meaningful comparisons across geographical areas and across time, this report uses a unique dataset, the National Establishment Time Series (NETS), to calculate the market concentration of food retailing from 1990 to 2019. The NETS database provides detailed location, annual sales, and employment information for each retail establishment. This report uses the reestimated annual sales of NETS by Marchesi and Zeballos (2022) that applies a sales per employee ratio, which is calculated using the Economic Census for each North American Industry Classification System (NAICS) code by firm size. The comprehensive retail coverage of NETS allows inclusion of nearly all establishments with a significant portion of food sales that are likely substitutes to each other. The inclusion of nontraditional food retailers (such as warehouse clubs, superstores, and supercenters) is critical, as these types of retailers have seen the most significant growth in the past 30 years. With this uniquely comprehensive and detailed dataset, the report calculates the market share of each food retail firm and the local market food concentration, as measured by the Herfindahl-Hirschman Index at the national, State, MSA, and county levels.

A Disaggregated View of Market Concentration in the Food Retail Industry

Introduction

U.S. consumers, businesses, and Government entities spent $808 billion on food-at-home in 2019 (USDA, ERS, 2022a), an increase of 36.2 percent since 1990 after adjusting for inflation. Food purchases, roughly 13 percent of household expenditures, are the third largest U.S. consumer spending category behind housing and transportation (Chelius and MacLachlan, 2021). In 2019, food sales by the 20 largest food retailers accounted for 64 percent of total food sales. This number is more than double the sales value in 1990 (31 percent). Similarly, the shares of food sales by the top four and eight largest food retailers at the national level have been steadily increasing from 1990 to 2019 (USDA, ERS, 2022b). While national statistics on food retailing can provide a snapshot of the average market concentration in the United States, national averages can mask local heterogeneity and trends (Rossi-Hansberg et al., 2021). More granular information on local market concentration would indicate if local food retail markets are more or less concentrated, which could be useful to policymakers.

This report documents the structure and trend of the food retailing market concentration not only at the national level, but also at the State, Metropolitan Statistical Area (MSA),[1] and county levels in the United States from 1990 to 2019, using data from the National Establishment Time Series dataset. The composition and number of food retailers available for households can differ substantially across localities, which make the local market concentration—for which data are not often available—an important consideration and perhaps a more relevant measurement for policymakers than national market concentration (Richards and Pofahl, 2010; Saitone and Sexton, 2017; Sexton and Xia, 2018).

Two key factors have led to increasing food retail market concentration: (1) the entry and rapid expansion into the food retail sector of large nontraditional food retailers (such as warehouse clubs, superstores, and supercenters) and (2) mergers and acquisitions of existing traditional supermarkets (Ellickson, 2016; Hanner et al., 2015). The share of food retail spending at traditional supermarkets dropped from 80 percent in 1990 to approximately 62 percent in 2012. Most of the change in spending has shifted to nontraditional food retailers, with the share of supercenters increasing from 3 percent to 18 percent during the same period (Volpe et al., 2017). On the other hand, traditional supermarkets have undergone mergers and acquisitions that started in the mid-to-late 1990s (Sexton, 2010). Both the entry of nontraditional food retailers and mergers of traditional food retailers have led to increasing market concentration and to some food retail chains becoming national, which has altered the market structure of food retail at both the local and national levels.

For households, the set of food retailers realistically accessible is confined by spatial distance; the average U.S. household travels roughly 4 miles to its preferred store for the majority of food purchases (Ver Ploeg et al., 2015). Recent studies examining entry of new food retailers also show that competition is highly localized within a 1- to 3-mile radius of a store (Arcidiacono et al., 2020; Ellickson and Grieco, 2013).

While local markets can become more competitive with new entrants, market concentration can further increase if new entrants dominate or drive out local competition. A recent study that focused on food retail

[1] The general concept of a metropolitan or micropolitan statistical area is that of a core area containing a substantial population nucleus, together with adjacent communities having a high degree of economic and social integration with that core.

markets shows that local concentration increased from 1990 to 2015, with significant differences between rural and urban markets and exits of independent grocery stores (Cakir et al., 2020). Furthermore, the study shows that rural areas have higher food retail concentration. High market concentration might be especially common in the food retail sector, as the high (and endogenous) fixed cost of food retail naturally results in five to six firms in most MSAs (Ellickson, 2007).

Researchers have debated the implications of increased market concentration, which is one measure that can potentially gauge the competitiveness of the market. OCED (2021) further detail how market concentration is one of several possible measurements of competitiveness. An increase in market concentration could signal the potential for food retailers to exercise market power and for possible negative impacts for consumers and producers (Richards and Pofahl, 2010 ; Sexton, 2010; Sexton and Xia, 2018). In particular, food retailers compete through other nonprice attributes, along with price (Bonanno and Lopez, 2009)—offering different services, quality, prices, variety, and amenities (Ellickson, 2016). Thus, differences in local market structures can lead to varying degrees of competition, resulting in different pricing, service quality, and product variety—all factors that consumers care about.

One study found that prices rise with local food retail concentration at the MSA level and that a 5-percent increase in concentration would increase prices by 18 percent and decrease food consumption by 2–5 percent (Hovhannisyan et al., 2019). However, other studies have cast doubt on the link between prices at the product level and local concentration. A study by Ma et al. (2019) shows that supermarkets do not raise prices for USDA Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) products in local markets, or as a function of market concentration or the establishment's market shares. Further studies (such as DellaVigna and Gentzkow (2019) and Dong (2022)) show that most U.S. food, drugstore, and mass-merchandise chains charge nearly uniform prices across stores and ignore wide variations in consumer demographics, concentration, and competition in local markets. These studies reinforce the idea that food retailers do not necessarily charge prices based on local concentration but instead price at the national level. Other recent work suggests that the market structure of food retailing might resemble monopolistic competition—where each store location is a localized monopoly by being slightly differentiated from its competitors in product offerings, amenities, and distance.

Numerous studies have also examined the impact of large retailer entry into a given market, and the associated decrease in retailer concentration, on local competition in prices, product variety, and quality (Hausman and Leibtag, 2007; Matsa, 2011; Courtemanche and Carden, 2014; Bauner and Wang, 2019). Findings suggest that retailers compete in nonprice dimensions at the local level. Another avenue of research that examines price changes after mergers in areas of differing market concentration finds that food retailer mergers in already highly concentrated markets are frequently associated with price increases, and mergers in less concentrated markets are often associated with price decreases (Hosken et al., 2018). Further, understanding the market structure of food retail can inform discussions on improving access to affordable and healthy food, especially for low-income households (Ellickson, 2016). In particular, information on local food retail market concentration can help shed light on the market structure in areas of low food access (Bitler and Haider, 2010; Bonanno, 2012). As market concentration and competition can influence food retailers' entry, pricing, and product assortment decisions, local food retail market concentration can provide insights into how high- and low-income households are impacted differently by market concentration. For example, one study found high- and low-income households perceive prices and variety of products offered in local markets differently (Handbury, 2021). The local food retail market concentration can also help shed light on low food access areas with persistent high levels of concentration.

For suppliers, food retailers serve as "midstream" intermediaries between consumers and producers. Thus, increases in market concentration of food retailers can also lead to more monopsony (single-buyer) buying

power from food retailers. In tandem with increasing vertical consolidation and contracts, for example, farmers—and especially smaller farmers—are often left with limited buyers, which can impact their revenues and income (Saitone and Sexton, 2017). However, the full implications of increasing market concentration to farmers, firms, and consumers across the food supply chain is complex (Sexton and Xia, 2018).

These factors highlight the importance of having detailed information on both national and local food retailer concentration trends. However, public information on concentration measures for food retailing in local markets is extremely limited because detailed sales data for food retailers are often proprietary (Saitone and Sexton, 2017). This report attempts to fill this information gap by using a novel dataset to provide comprehensive statistics on the food retail market concentration at the State, MSA, and county levels for the past 30 years across the United States (excluding U.S. territories). The report analyzes the trends of food retail market concentration in terms of the Herfindahl–Hirschman Index (HHI) for food retail sales at the above three levels between 1990 and 2019.

Data and Methods

National Establishment Time Series (NETS)

Estimates of food sales can vary across different data sources, as the classification of food stores is not uniform for these sources. To make meaningful comparisons across geographical areas and across time, this report uses one single dataset, the National Establishment Time Series (NETS) database. NETS is a longitudinal database that records the sales, employment figures, growth, and performance of industry peers for specific business locations across time. Dun & Bradstreet and Walls & Associates created NETS by using Dun & Bradstreet's archival data from surveys of establishments (Walls & Associates, 2013). Each unit of observation in NETS reports the annual sales revenue and the number of employees for an establishment, from 1990 to 2019. Due to the detailed and granular level of the data, NETS has been intensively used in recent studies. As NETS tracks the sales and number of employees for individual-level establishments, NETS provides a rich and unique panel dataset that allows us to examine the change in food sales across different food establishment types in varying geographic locations.

NETS contains information from business establishments from a comprehensive list of industries, and the database categorizes establishments using the North American Industry Classification System (NAICS) and the Standard Industrial Classification (SIC) numeric codes. NETS also reports whether the primary market has changed over time. Retailers are differentiated by the items they sell and the services they provide.

One challenging issue is how to identify the set of food retailers constituting a market to be analyzed as all retailers that sell food—which include supermarkets, drug stores, and convenience stores—are unlikely to be perfect substitutes. Following Hosken et al. (2018), this report limits the analysis to those food retailers more likely to be substitutes—large retailers that sell a sufficient variety of food for consumers to purchase all of their food for a week, often referred to as "one-stop-shopping." Three food-retailing formats provide consumers with "one-stop-shopping" in the United States: traditional supermarkets, supercenters, and warehouse clubs (Rossi-Hansberg et al., 2021), and this report uses the corresponding two NAICS codes in the analysis:

- 445110 - Supermarkets and Other Grocery (except Convenience) Stores: This industry comprises establishments primarily engaged in retailing a general line of food, such as canned and frozen foods, fresh fruits and vegetables, and fresh and prepared meats, fish, and poultry. In 2019, supermarkets were the

most common retail format offering one-stop shopping—accounting for approximately 92 percent of the roughly 132,600 establishments, 67 percent of food sales, and 57 percent of the employees.

- 452311 - Warehouse Clubs, Supercenters, and Superstores: This industry also comprises establishments primarily engaged in retailing a general line of groceries—including a significant amount and variety of fresh fruits, vegetables, dairy products, meats, and other perishable groceries. These types of stores also offer a general line of new merchandise—such as apparel, furniture, and appliances. In 2019, warehouse clubs, supercenters, and superstores accounted for 8 percent of the food retail establishments studied, 33 percent of food sales, and 43 percent of the employees.

This report does not include certain retail formats—such as limited-assortment stores and discount variety stores—that have undergone growth recently (Cleary et al., 2018; Cleary and Chenarides, 2022), as most of these formats carry limited food products and account for less than 10 percent of household food-at-home expenditures (Volpe et al., 2017).

Recent literature has shown that NETS captures the food environment relatively well compared to the official U.S. Bureau of the Census's Economic Census and the County Business Patterns (CBP) (Cho et al., 2019; Rummo et al., 2015 and Ma et al., 2013). Although the number of establishments and employees reported by NETS have similar aggregate trends compared to the County Business Patterns, aggregate food sales trends in NETS do not align with those observed by the Food Expenditure Series (Zeballos and Merchasi, 2022). This difference is likely due to a significant portion of sales data in NETS being imputed from firm-level employment numbers, in particular, using employment data to estimate the volume of sales (Barnatchez et al., 2017; Crane and Decker, 2019). To more accurately estimate food sales, this report follows the correction methodology developed by Zeballos and Marchesi (2022) of applying a sales per employee ratio, which is calculated using the Economic Census for each NAICS code by firm size. Firm size is measured by the number of employees (i.e., firms with less than five employees, firms with five to nine employees, etc.). The corrected food sales compare well against the aggregate trends observed by the USDA, ERS Food Expenditure Series.[2]

To isolate food spending from total annual sales (as most retailers also sell nonfood products), this report uses product and services codes. The codes were developed by the U.S. Bureau of the Census and detail the percentage of sales by product and by contributing industry. Following the methodology of the USDA, ERS Food Expenditures Series, the PS Codes that are selected are related to food and nonalcoholic beverages sold for off-premise consumption. Using these percentages, the portion of food-at-home sales is calculated for each establishment in NETS, based on the NAICS code.

Concentration Ratios

A concentration ratio (CR) is the total market share of the largest prespecified number of firms in a given market. For example, a CR-4 is the total market share of the four largest firms in a market. In this report, we present the top 4 (CR4), top 8 (CR8), and top 20 (CR20) food retailers at the national level from 1990 to 2019.

Herfindahl–Hirschman Index

The Herfindahl–Hirschman Index (HHI) is one of the most commonly used and accepted measures of market concentration in the academic literature and by policymakers. The HHI is calculated by squaring the

[2] The Food Expenditure Series is a comprehensive dataset that measures the U.S. food system—quantifying the value of food acquired in the United States by type of product, outlet, and purchaser.

market share of each firm competing in a specific market and then summing the resulting numbers, as shown in equation 1. The market share of a firm is calculated by dividing the sales of the firm by the total sales of all firms in the market. One advantage of HHI compared to the concentration ratio is that HHI applies more weight to larger firms. Additionally, the HHI also uses all firms in a market rather than a subset. If no stores exist in the market, the HHI is excluded.

Equation 1

$$HHI = (MarketShareFirm_1)^2 + (MarketShareFirm_2)^2 + \ldots + (MarketShareFirm_N)^2$$

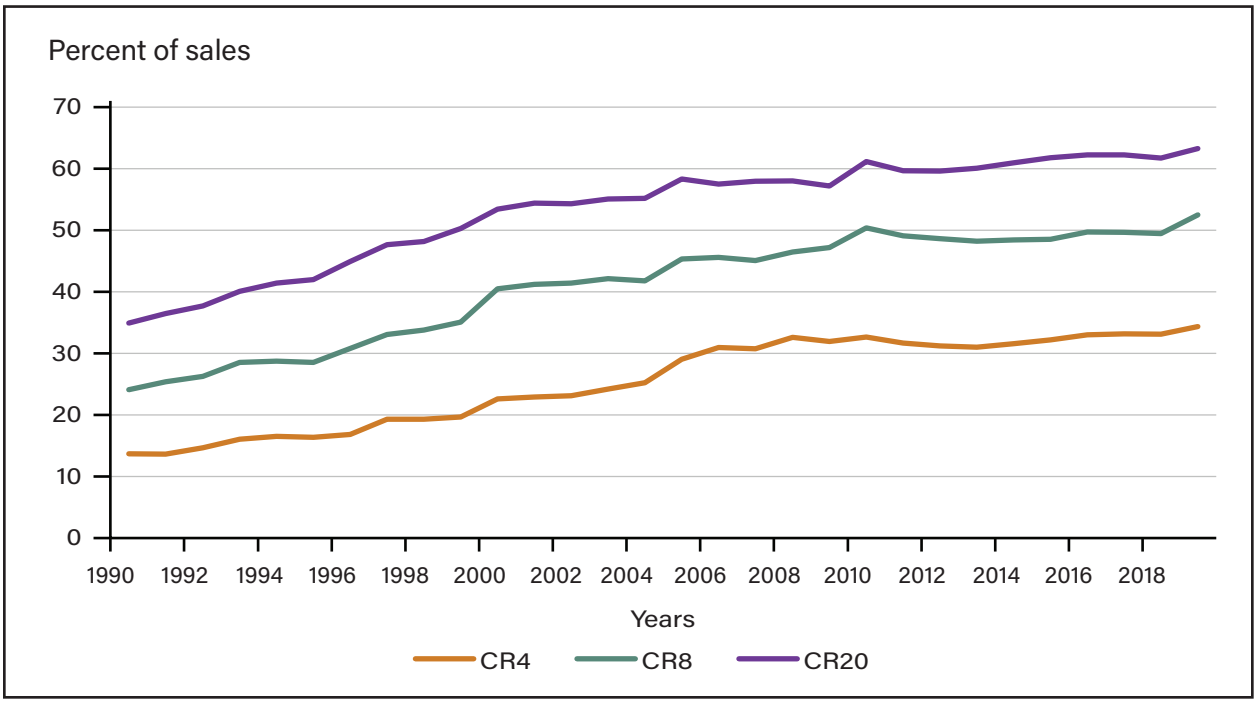
Increasing HHI values indicate higher levels of market concentration, with HHI approaching 0 if a market is occupied by a large number of firms of relatively equal size. The HHI reaches its maximum of 10,000 points when a market is controlled by a single firm. For context, HHI can also provide a measure of the equivalent number of equal-sized competitors in the market. For example, a HHI of 1,500 represents 6.6 equal-sized competitors in the relevant market and a HHI of 2,500 represents 4 equal-sized competitors (N = 1/HHI*10,000).

Results

Concentration in the Food Retail Industry During the Past Three Decades

Figure 1 presents the concentration ratios of the top 4 (CR4), top 8 (CR8), and top 20 (CR20) food retailers—common measurements of concentration for market power—at the national level from 1990 to 2019. Results show that the 20 largest food retailers totaled $680 billion in 2019, which accounts for 63 percent of food sales in the United States. The CR4, CR8, and CR20 ratios slightly declined in the United States after the 2008–09 Great Recession, which is consistent with Cho and Volpe (2017). However, the longer-term trend of consolidations upturned around 2012–14, with all indicators showing an increase in market concentration between 2012 and 2019. Specifically, the top 4 food retailers (CR4) accounted for 31 percent of food sales in 2012 and grew by 3 percentage points to account for 34 percent of total sales in 2019. Similar trends occurred for CR8 and CR20 (USDA, ERS, 2022B).

Figure 1
National CR4, CR8, and CR20 ratios for food sales, 1990–2019



Notes: CR4 = top 4; CR8 = top 8; CR20 = top 20. Food sales are estimated based on the sales per employee ratio calculated by the number of employees and the North American Industry Classification System (NAICS) code. NAICS included: 445110 (supermarkets and other grocery, except convenience) stores) and 452311 (warehouse clubs and supercenters). Food sales are calculated using the U.S Bureau of the Census' Economic Census product lines statistics on the percentage of sales of food.

Source: USDA, Economic Research Service, using data from the National Establishment Time Series (NETS).

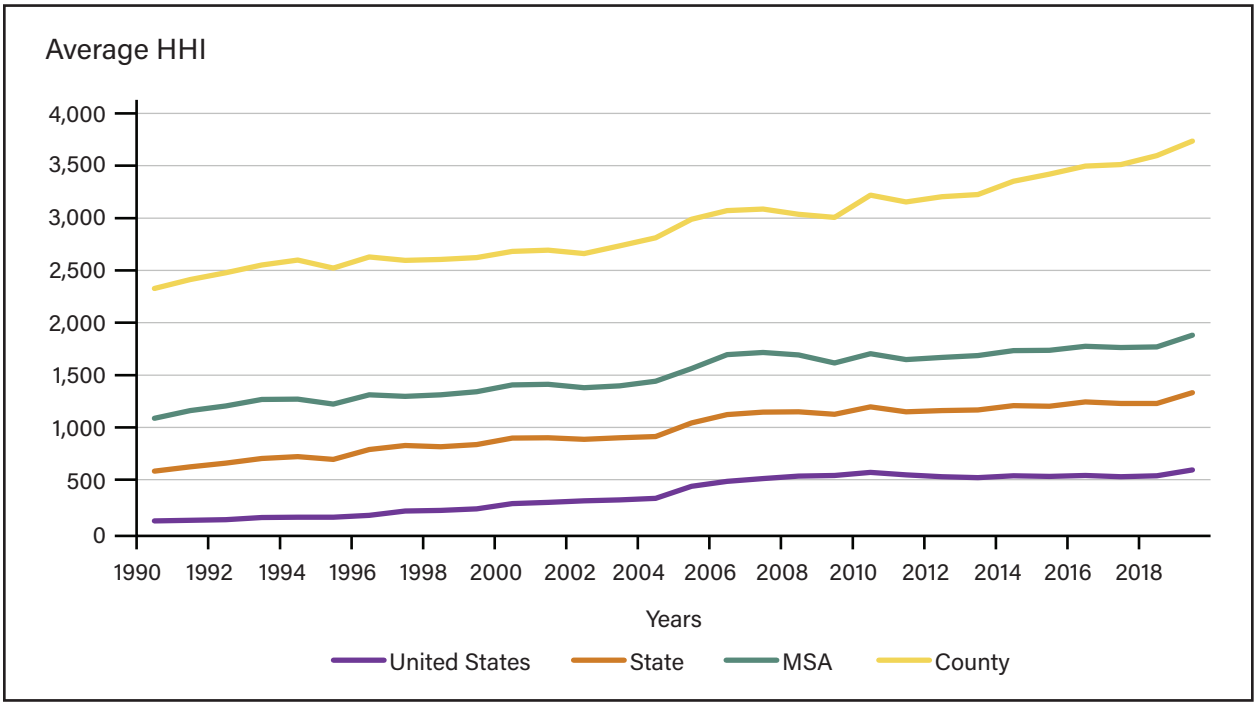
Concentration in the Food Retail Industry by Geographic Region

We also provide the HHI of food retail markets at the State, MSA, and county levels, which are more disaggregate administrative units than the United States as whole. Figure 2 shows the national-, average State-, average MSA-, and average county-level Herfindahl–Hirschman Index (HHI) of food retail markets from 1990 to 2019. The market concentration of food retailers is the lowest at the national level, at 106 in 1990 and has steadily risen to 593 by 2019, which is equivalent to 94.3 and 16.9 equal sized competitors in the national market, respectively. These numbers are significantly lower than most industries (Grullon et al., 2019). However, as the market areas become more disaggregated, the market concentration in 2019 increases dramatically from 593 (national) to 1,332 (State) to 1,881 (MSA) to 3,737 (county)—equivalent to 16.9 (national), 7.5 (State), 5.3 (MSA), 2.7 (county) equal-sized firms. The variation reflects that grocery and other traditional food retailers are often regional, with independent stores also maintaining a portion of the market (Cho and Volpe, 2017).

Notably, there is a substantial increase in market concentration even between aggregating at the MSA versus county levels. At the MSA level, on average, food retail concentration is higher than at the national level, and concentration is even higher once the market is defined at the county level. The county level may be the more realistic market area, with recent evidence that the average distance from home to food retailers stores visited over the week is between 4 and 10 miles for consumers (Taylor and Villa-Boas, 2016; Ver Ploeg et al., 2015). Across time, HHI measures show that all four levels of aggregation steadily increased from 1990 to 2019.

Figure 2

The Herfindahl-Hirschman Index for national-, State-, MSA-, and county-level markets between 1990 and 2019

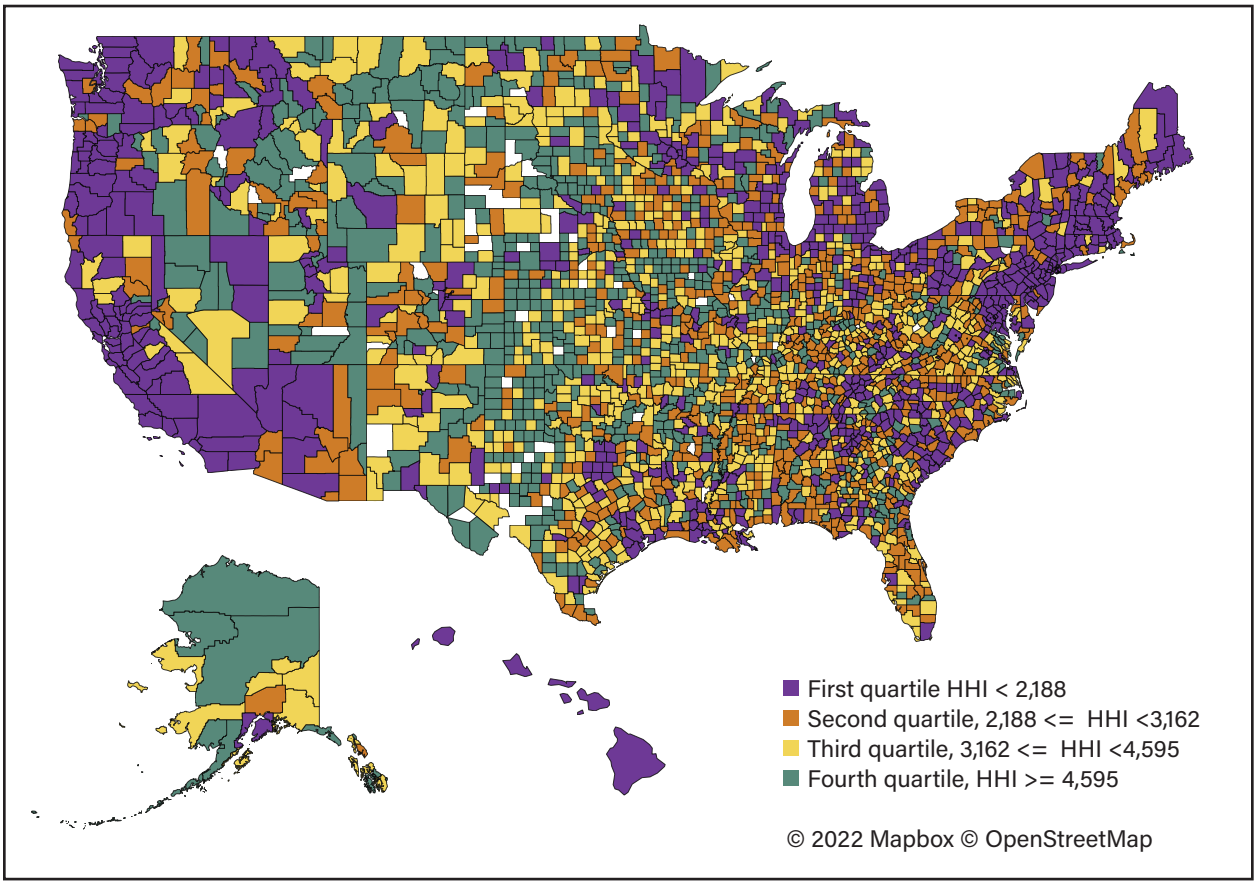


Notes: HHI = Herfindahl–Hirschman Index. MSA = Metropolitan Statistical Area. Food sales are estimated based on the sales per employee ratio calculated by firm size and the North American Industry Classification System (NAICS) code. NAICS included: 445110 (supermarkets and other grocery (except convenience) stores) and 452311 (warehouse clubs and supercenters). Food sales are calculated using the U.S Bureau of the Census' Economic Census product lines statistics on the percentage of sales on food.

Source: USDA, Economic Research Service, using data from the National Establishment Time Series (NETS).

In figure 3, counties are classified by their level of concentration into quartiles. Counties with lower concentration are mostly on the Coasts, while counties in rural areas and other Western counties have higher concentration levels.

Figure 3
County level Herfindahl-Hirschman Index (HHI) in 2019, by quartile

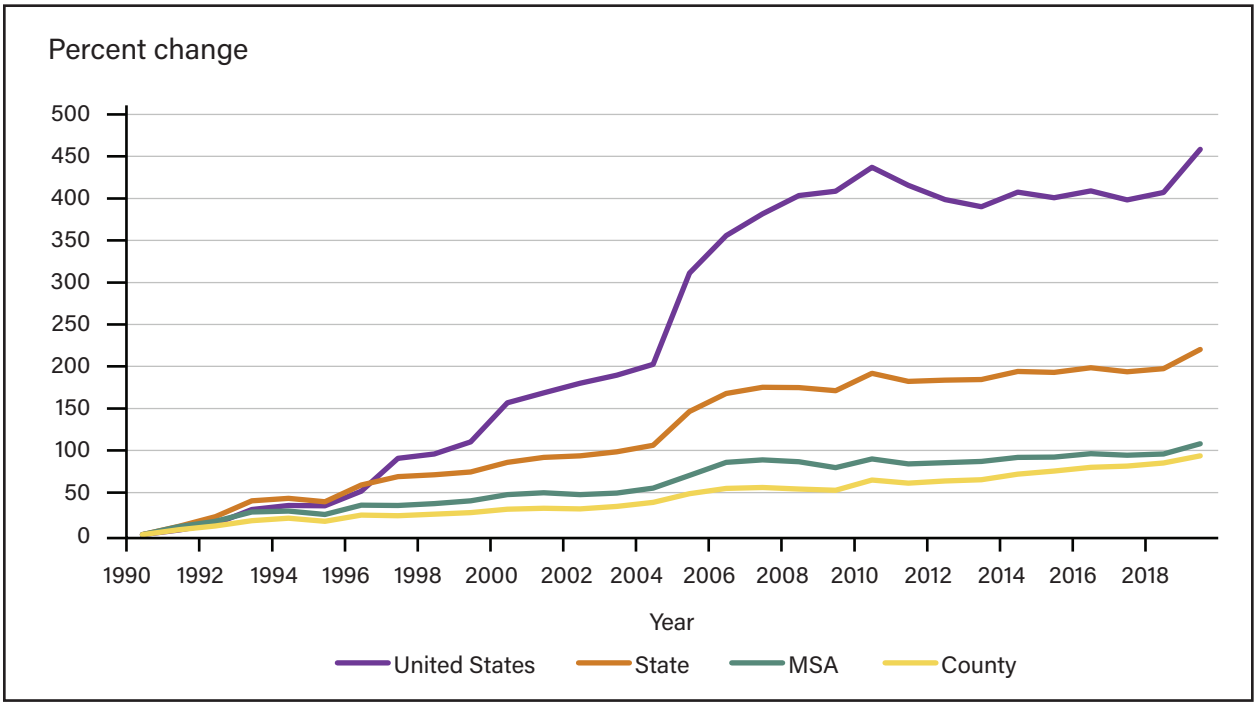


Source: USDA, Economic Research Service, using data from the National Establishment Time Series (NETS).

Figure 4 shows the average changes of HHI for every year, measured in percentage terms compared to 1990 for all four geographic levels. National HHI concentration has had the largest increase, up by 458 percent in 2019 compared to 1990. These changes are in line with the recent trends of large national retailers increasingly consolidating to form major retailers. The increase at the local county market level is smaller; the county-level HHI measures have increased 94 percent in the past 30 years.

Figure 4

Percentage change in Herfindahl-Hirschman Index for national-, State-, MSA-, and county-level markets between 1990 and 2019



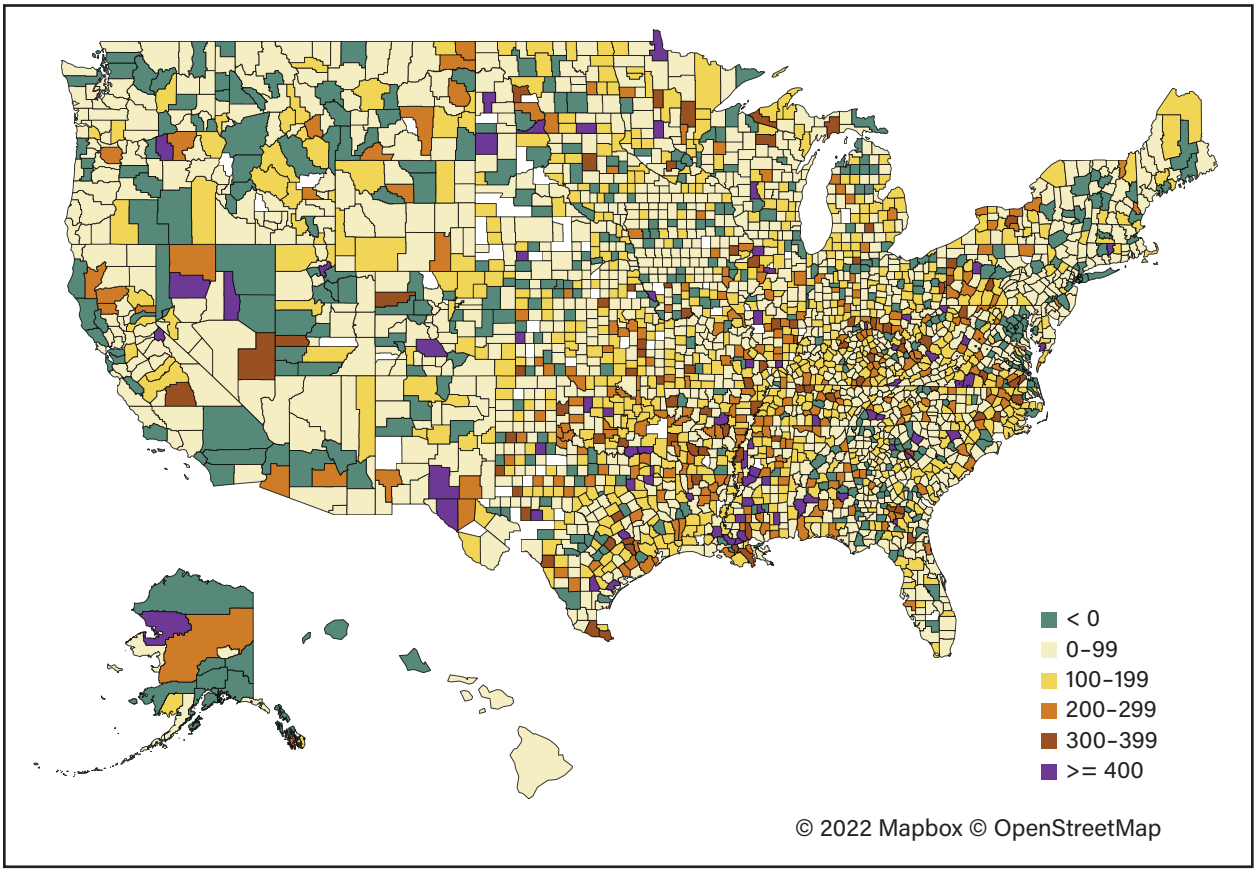
Notes: HHI = Herfindahl–Hirschman Index. MSA = Metropolitan Statistical Area. Food sales are estimated based on the sales per employee ratio calculated by firm size and the North American Industry Classification System (NAICS) code. NAICS included: 445110 (supermarkets and other grocery (except convenience) stores) and 452311 (warehouse clubs and supercenters). Food sales are calculated using the U.S Bureau of the Census' Economic Census product lines statistics on the percentage of sales on food.

Source: USDA, Economic Research Service, using data from the National Establishment Time Series (NETS).

To highlight the change across the United States, figure 5 provides a county-level map categorized by HHI increases from 1990 to 2019. Results show that counties exhibited very heterogeneous changes in HHI between those years. A significant portion of counties experienced decreases in market concentration and are marked in green. However, the majority of counties seem to have undergone slight increases in market concentration (between 0 and 199). A small share of counties experienced more drastic increases, with changes in HHIs of 400 and higher.

Figure 5

Percentage changes in Herfindahl-Hirschman Index between 1990 and 2019, county level

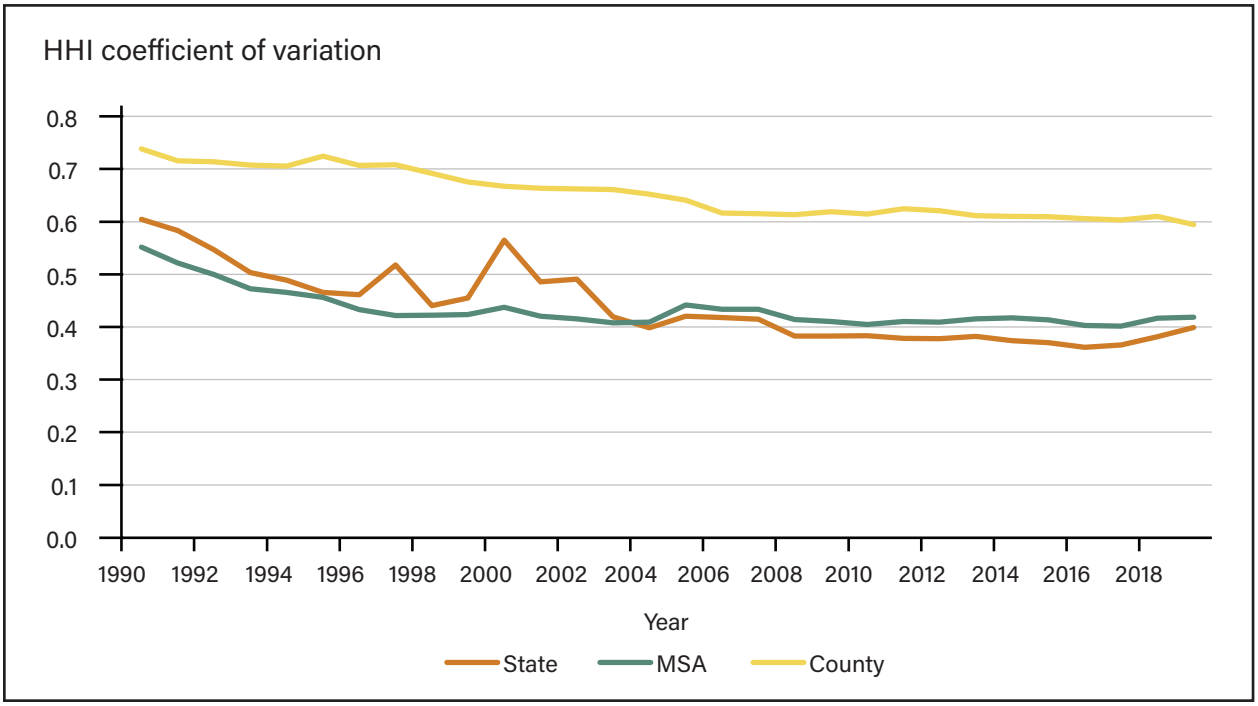


Notes: HHI = Herfindahl–Hirschman Index. Food sales are estimated based on the sales per employee ratio, calculated by firm size and the North American Industry Classification System (NAICS) code. NAICS included: 445110 (supermarkets and other grocery (except convenience) stores) and 452311 (warehouses, clubs, and supercenters). Food sales are calculated using the U.S. Bureau of the Census' Economic Census product lines statistics on the percentage of sales on food.

Source: USDA, Economic Research Service, using data from the National Establishment Time Series (NETS).

Figure 6 shows the coefficient of variation, which is the standard deviation divided by the mean of HHI measures for State-, MSA-, and county-level markets between 1990 and 2019 to shed some light on the heterogeneity of market concentrations across geography. At the MSA and county levels, the coefficient of variation of HHI decreased from 1990 to 2006 by 16.5 percent and 21.4 percent, respectively. From 2006 to 2019, the coefficient of variation of HHI at the MSA and county levels decreased by less than 4 percent, which indicates the degree of variation in market concentration at the MSA and county levels has not significantly changed since 2006. At the State level, the coefficient of variation of HHI followed similar patterns as at the MSA level, except with more variability from 1996 to 2006.

Figure 6
Coefficient of variation of Herfindahl-Hirschman Index for State-, MSA-, and county-level markets between 1990 and 2019



Notes: HHI = Herfindahl–Hirschman Index. MSA = Metropolitan Statistical Area. Food sales are estimated based on the sales per employee ratio calculated by firm size and the North American Industry Classification System (NAICS) code. NAICS included: 445110 (supermarkets and other grocery (except convenience) stores) and 452311 (warehouse clubs and supercenters). Food sales are calculated using the U.S Bureau of the Census' Economic Census product lines statistics on the percentage of sales on food.

Source: USDA, Economic Research Service, using data from the National Establishment Time Series (NETS).

Concentration in the Food Retail Industry by Rural Versus Nonrural Areas

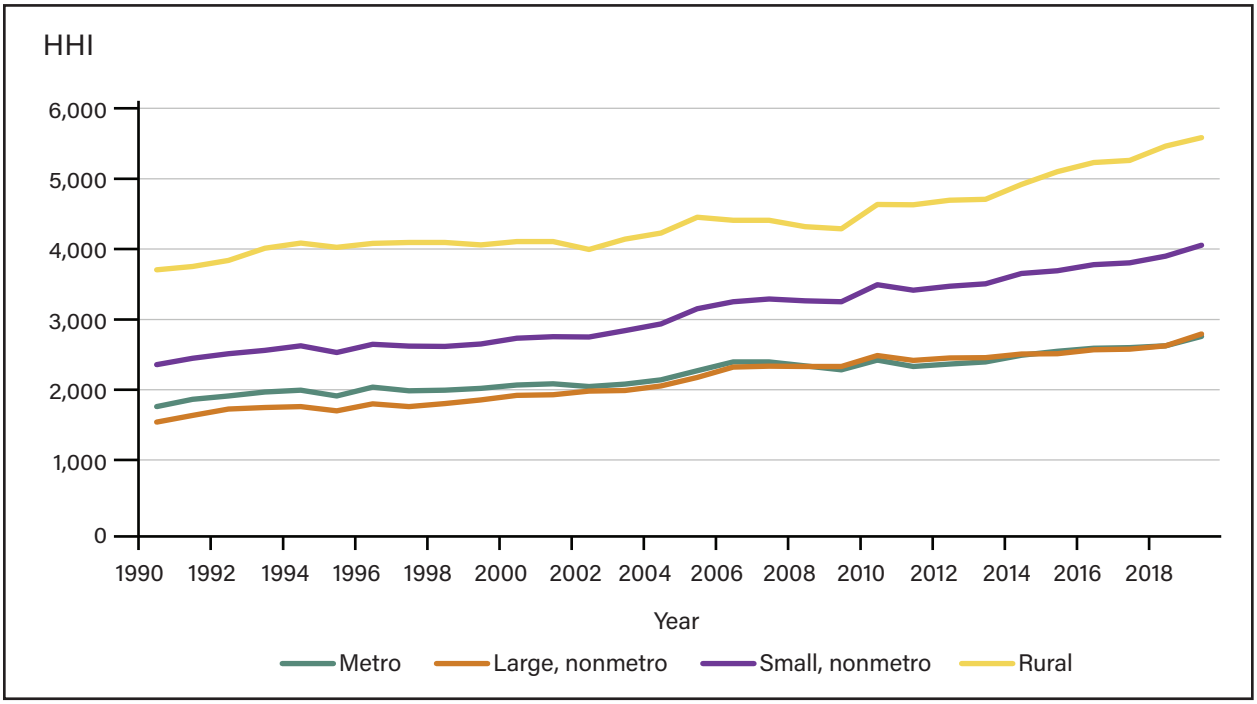
Recent studies have highlighted the differences in the food retail landscape between rural and nonrural areas (Stevens et al., 2021; Cakir et al., 2020). This report further divides the trends in HHI concentration between metro (metropolitan), large nonmetro, small nonmetro, and rural counties, using the USDA, ERS rural-urban continuum codes.[3] Results show that the market concentrations across all four county types increased over time (figure 7). Metro and large nonmetro counties had less-concentrated markets, with an average HHI of 2,758 and 2,794 in 2019, respectively. Small nonmetro counties had a significantly higher average HHI of 4,053 and rural counties have the highest average HHI at 5,584 in 2019. The results are consistent with those from Stevens et al. (2021) and Cakir et al. (2020) and provide further evidence that rural residents often have limited choices for different food retailers. Moreover, market concentrations across all four regions steadily increased over time.

Figure 8 shows the coefficient of variation of HHI measures for metro, large nonmetro, small nonmetro, and rural counties between 1990 and 2019 to shed some light on the heterogeneity of market concentrations across geography. The coefficient of variation decreased the most in rural areas from 1990 to 2019 at 24

[3] Each county is assigned one of 9 codes, and we further classify the codes as follows: metro (code = 1, 2 or 3); large nonmetro area (code = 4 or 5; nonmetro areas with urban population of 20,000 or more, adjacent or not to a metro area); small nonmetro area (code = 6 or 7; nonmetro areas with urban population of 2,500 to 19,999, adjacent or not to a metro area); rural (code = 8 or 9; completely rural).

percent, followed by metro areas at 18 percent, small nonmetro areas at 17 percent, and large nonmetro areas at 12 percent, which was the lowest decrease.

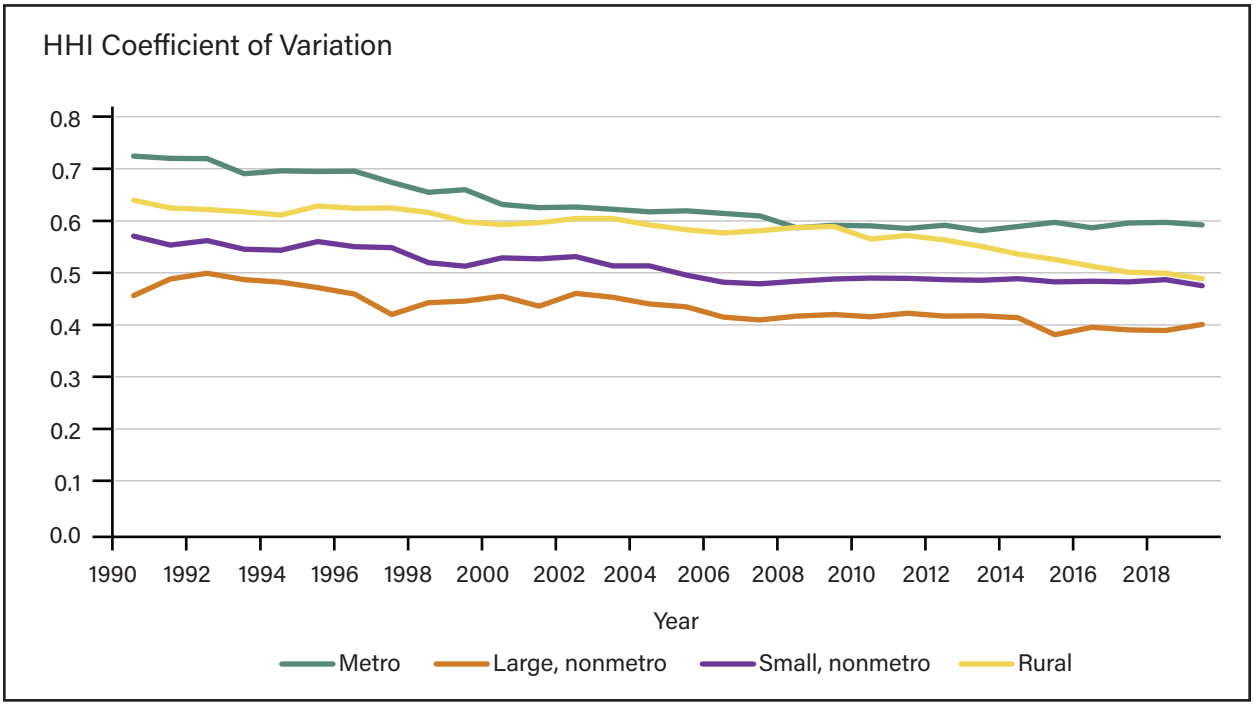
Figure 7
The Herfindahl-Hirschman Index for metro, large nonmetro, small nonmetro, and small county-level markets between 1990 and 2019



Notes: HHI = Herfindahl–Hirschman Index. Food sales are estimated based on the sales per employee ratio calculated by firm size and the North American Industry Classification System (NAICS) code. NAICS included: 445110 (supermarkets and other grocery (except convenience) stores) and 452311 (warehouse clubs and supercenters). Food sales are calculated using the U.S Bureau of the Census' Economic Census product lines statistics on the percentage of sales of food.

Source: USDA, Economic Research Service, using data from the National Establishment Time Series (NETS).

Figure 8
Coefficient of variation of Herfindahl-Hirschman for metro, large nonmetro, small nonmetro, and small county-level markets between 1990 and 2019



Notes: HHI = Herfindahl–Hirschman Index. Food sales are estimated based on the sales per employee ratio calculated by firm size and the North American Industry Classification System (NAICS) code. NAICS included: 445110 (supermarkets and other grocery (except convenience) stores) and 452311 (warehouse clubs and supercenters). Food sales are calculated using the U.S Bureau of the Census' Economic Census product lines statistics on the percentage of sales on food.

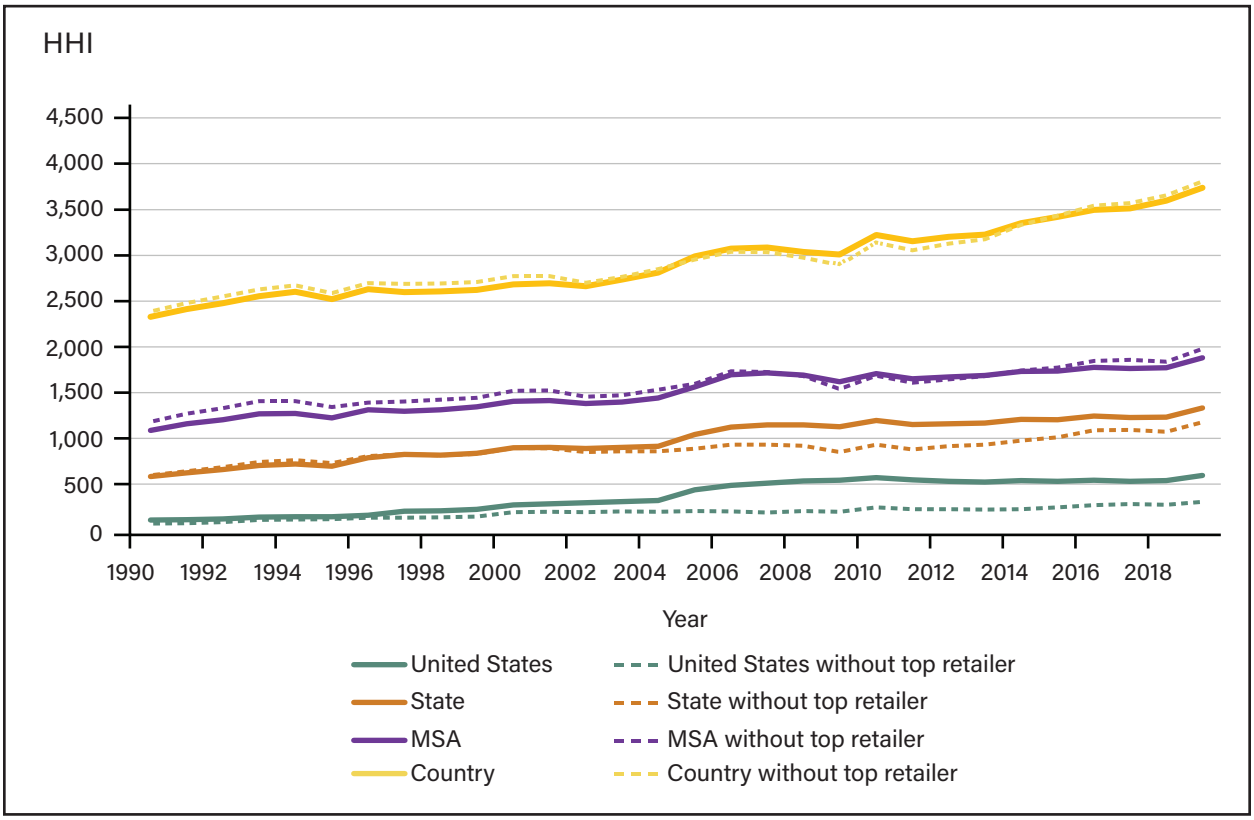
Source: USDA, Economic Research Service, using data from the National Establishment Time Series (NETS).

Concentration in the Food Retail Industry Without the Top Retailer

Following Rossi-Hansberg et al. (2021), this report explores the contribution of the top firm to the market concentration trends in the food retail industry by excluding the top national firm of each year. Figures 9 and 10 present the HHI for different geographic levels and the changes with respect to 1990, excluding the top food retailer. These figures show that excluding the top retailer results in national and State concentration trends that are less pronounced, which is expected. However, trends at the MSA and county level remain similar when the top food retailer is excluded and the trends even present a slightly higher concentration in the first half of the period analyzed. Figure 10, in particular, shows how much the growth in the national market concentration can potentially be attributed to the top food retailer.

Figure 9

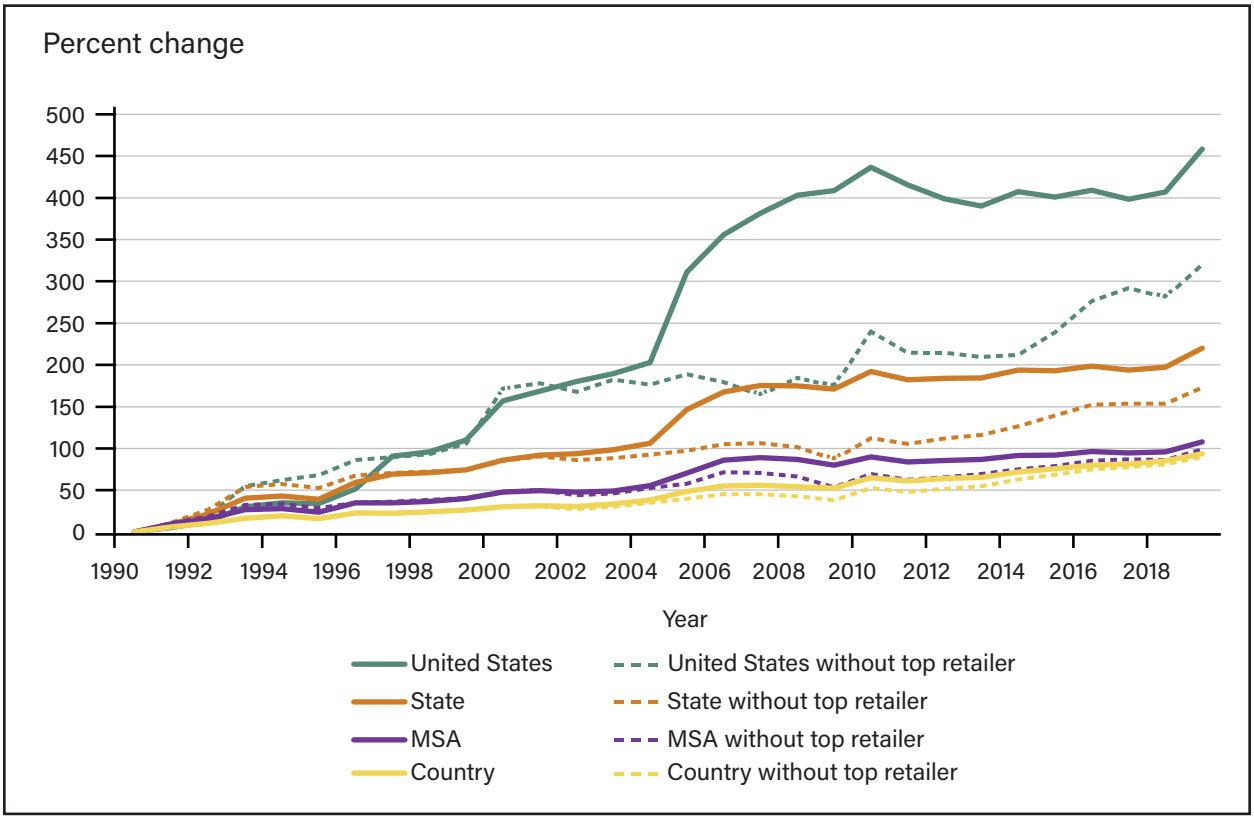
The Herfindahl-Hirschman Index for national-, State-, MSA-, and county-level markets between 1990 and 2019, excluding the top food retailer



Notes: HHI = Herfindahl–Hirschman Index. MSA = Metropolitan Statistical Area. Food sales are estimated based on the sales per employee ratio calculated by firm size and the North American Industry Classification System (NAICS) code. NAICS included: 445110 (supermarkets and other grocery (except convenience) stores) and 452311 (warehouse clubs and supercenters). Food sales are calculated using the U.S Bureau of the Census' Economic Census product lines statistics on the percentage of sales on food.

Source: USDA, Economic Research Service, using data from the National Establishment Time Series (NETS).

Figure 10
Percentage change in Herfindahl-Hirschman Index for national-, State-, MSA-, and county-level markets between 1990 and 2019, excluding the top food retailer



Notes: HHI = Herfindahl–Hirschman Index. MSA = Metropolitan Statistical Area. Food sales are estimated based on the sales per employee ratio calculated by firm size and the North American Industry Classification System (NAICS) code. NAICS included: 445110 (supermarkets and other grocery (except convenience) stores) and 452311 (warehouse clubs and supercenters). Food sales are calculated using the U.S Bureau of the Census' Economic Census product lines statistics on the percentage of sales on food.

Source: USDA, Economic Research Service, using data from the National Establishment Time Series (NETS).

Discussion and Implications for Future Research

This report documents the market concentration of the food retail industry in the United States at the national, State, MSA, and county levels between 1990 and 2019 using a novel dataset: the National Establishment Time Series (NETS). The results show increasing market concentration as the geographic area shrinks from the national to county level. Given that consumers shop within a limited region, the county-level findings address a gap in the current literature and public information. In particular, results based on the Herfindahl–Hirschman Index (HHI) measure of market concentration show that food retailer markets had an average HHI of 3,737 (2.7 equal-sized firms) at the county level in 2019. In contrast, the more publicly available measures of HHI at the national level show only an average HHI of 593, masking the higher market concentration at the local level.

Furthermore, results show that market concentration has steadily increased between 1990 and 2019, a finding consistent with the numerous studies highlighting consolidation and mergers across the food retail sector. Most of the growth has been due to the increased market presence of national and regional retailers and results show that the national HHI has increased more than 458 percent compared to 94 percent at the county level. Results also show a large difference in market concentration between metro, smaller nonmetro, and rural counties.

In the past three decades, the food retail sector has been revolutionized by consolidation and industry changes. Two major economic forces may help explain these changes in the brick-and-mortar food retail industry. First, large retailers that have not primarily sold food products have entered the food retail market and are now competing with traditional food retailers. Supercenters and mass merchandisers are examples of "nontraditional" food retailers that have been competing with traditional food retailers due to their substantial offering of food products and have been growing rapidly in new areas. Other new retail formats, such as discount stores and dollar stores, are continuing this trend (Chenarides et al., 2021a; 2021b). The second force is the growth of existing food retailers, which has been greatly accelerated in the past decades by national and large regional retailers, consolidating horizontally through mergers and acquisitions. The potential price and nonprice ramifications of the changing local food retail market concentration can impact consumers, producers, and especially low-income households with food accessibility challenges.

The study has several limitations. Our definition of the market area, even at the county level, relies on administrative boundaries and might not reflect the actual competitive market areas for food retailers (e.g., some consumers might cross county boundaries rather than shopping within a county, and county areas are not uniform; see Ellickson et al., 2020).[4] Furthermore, chains are not identical as they often differentiate themselves in terms of various products, service quality, advertising, and other attributes. As we reestimated food sales, the correction may raise a potential concern. For a robustness check on the correction, the HHI is calculated using employment rather than sales (appendix 1). Finally, this report includes and excludes certain types of food retailers and, therefore, might not reflect the true nature of competition. For example, dollar stores are rapidly expanding into rural areas, which warrants further research (Chenarides et al., 2021a; 2021b).

The trends captured in this report are ex-post, and the future direction of market concentration may change. One growing trend is online food retailing, which could disrupt brick-and-mortar food retailing and dramatically alter competition. However, current data suggest online food shopping only comprises a small market share. The U.S. Bureau of the Census (2019) shows that although online shopping has increased sharply in the past decade, it still represents only 11 percent of the total retail trade and this number is much lower for food stores. Specifically, e-commerce sales in food and beverage stores increased 56 percent from 2016 to 2017 but only represent 0.5 percent of total sales in the food sector. However, the Coronavirus (COVID-19) pandemic has altered the entire food sector and induced a large increase in online food shopping (Ellison et al., 2021). Furthermore, USDA, Food and Nutrition Service has launched pilot programs for online usage of SNAP (Supplemental Nutrition Assistance Program) redemptions, which were traditionally only possible in person. All of these changes might impact the existing trends of market concentration and present important research opportunities.

[4] Our market concentration measures should not be evaluated for merger considerations (see Hosken and Tenn, 2016) for specific analysis used in horizontal merger analysis in retail markets.

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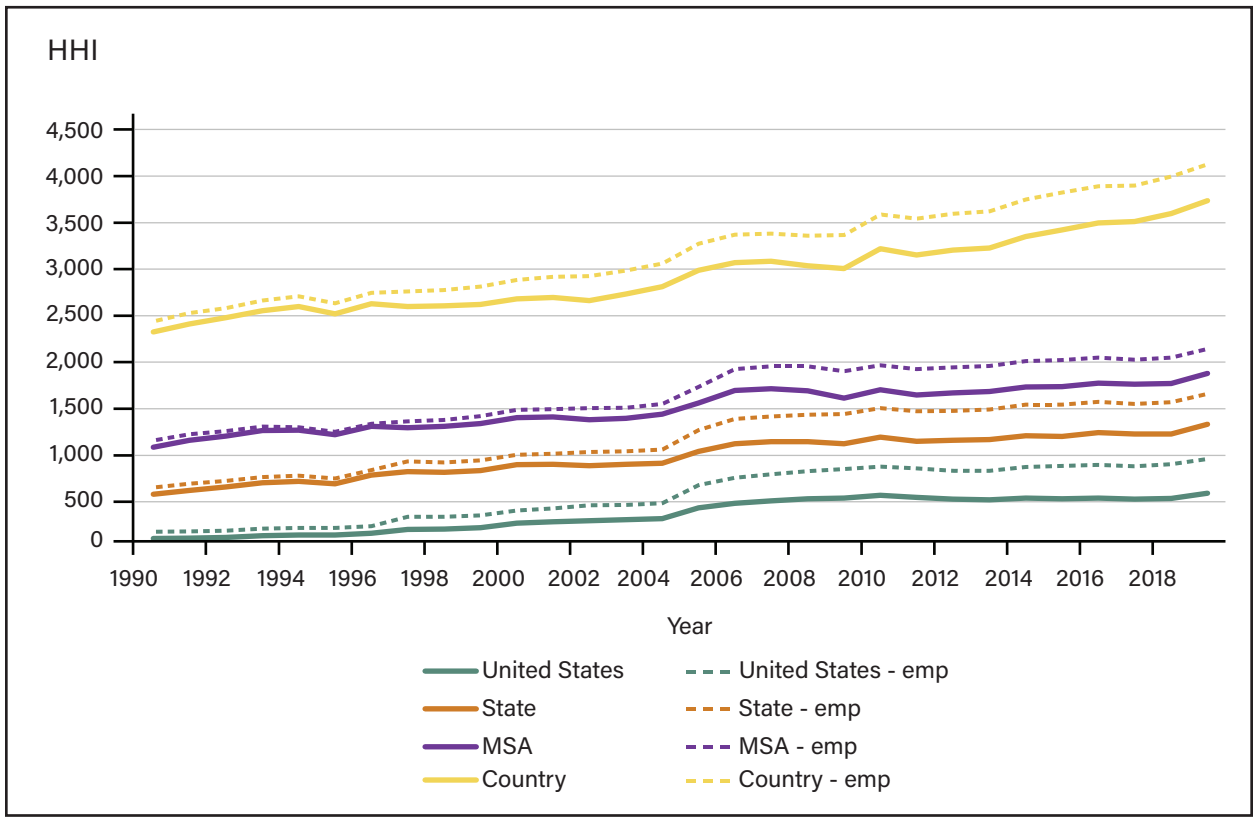
Appendix A: Concentration in the Food Retail Industry Using Employment Rather Than Sales Data

As we re-estimated food sales following the correction methodology developed by Zeballos and Marchesi (forthcoming) to ensure aggregated food sales trends align better with trends observed by the Food Expenditure Series, the correction may raise a potential concern. As a robustness check, the HHI is calculated using employment rather than sales, and results show similar trends for each market area level in appendix figures A.1 and A.2.

Figure A.1
The Herfindahl-Hirschman Index for national-, State-, MSA-, and county-level markets between 1990 and 2019 using employment data

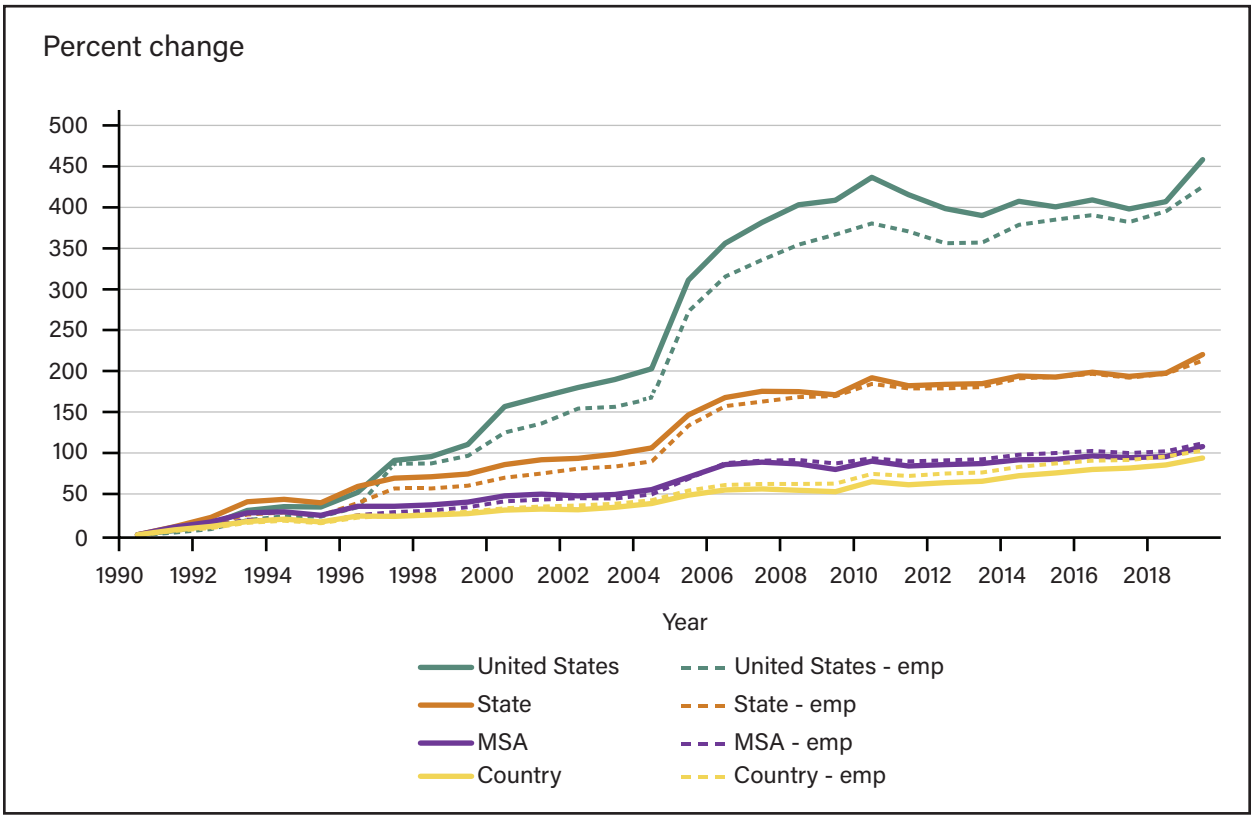


Notes: HHI = Herfindahl–Hirschman Index. MSA = Metropolitan Statistical Area. Emp = employment.

Source: USDA, Economic Research Service, using data from the National Establishment Time Series (NETS).

Figure A.2

Percentage Change in Herfindahl-Hirschman Index for national-, State-, MSA-, and county-level markets between 1990 and 2019 using employment data



Notes: HHI = Herfindahl–Hirschman Index. MSA = Metropolitan Statistical Area. Emp = employment.

Source: USDA, Economic Research Service, using data from the National Establishment Time Series (NETS).