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6

The Recent Evolution of Physical Retail Markets

Online Retailing, Big Box Stores, and the Rise of Restaurants

Francine Lafontaine and Jagadeesh Sivadasan

6.1 Introduction

Much has been written in recent years, in both the trade press and the academic literature, about the decline of US retailing, or the "retail apocalypse."[1] This decline has typically been traced back to changes in technology, including the advent of UPC codes and scanner technology, and the creation of radiofrequency identification (RFID), whose adoption improved logistical and warehousing capabilities. Together, these innovations spurred the growth of large general merchandise retail chains, such as Walmart and

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The bulk of this chapter focuses on the period 1999–2017 and was completed in January 2020, prior to the COVID-19 pandemic. Given the importance of this crisis for the retail sector, we have added a section 6.8 that undertakes a preliminary evaluation of the impact of the ongoing COVID-19 pandemic on the retail sector (including hotels and restaurants). We thank the organizers Michael Andrews, Aaron Chatterjee, and Scott Stern, and Shane Greenstein, Josh Lerner, Alexander Oettl, and other participants at the NBER pre-conference "Beyond 140 Characters: The Role of Innovation and Entrepreneurship in Economic Growth" (July 22–23, 2019) at Boston, and the participants at the final January 7–8, 2020, conference in Palo Alto for their support and comments. We especially thank our discussant Emek Basker for constructive and helpful comments at the Palo Alto conference; we have built on her suggestions in this final version of the chapter. We thank Jae Do Choi for research assistance. Any remaining errors are our own. For acknowledgments, sources of research support, and disclosure of the authors' material financial relationships, if any, please see https://www.nber.org/books-and-chapters/role-innovation-and-entrepreneurship-economic-growth/recent-evolution-physical-retail-markets-online-retailing-big-box-stores-and-rise-restaurants.

1. This notion of "retail apocalypse" has become so ingrained in the US that it has its own Wikipedia entry, which provides a long list of more than 50 references to related media stories.

Target, as well as the advent and growth of the Internet and resulting online retailing capabilities, themselves also supported by more efficient warehousing, logistics, and transportation operations (see Hortaçsu and Syverson 2015, various chapters in Basker 2016a, and papers cited therein).[2] To a large extent, then, the technologies that are associated with changing the face of the retail sector are not those developed by or necessarily for this sector, but rather the consequences of technological change occurring in other parts of the economy (e.g., Warehousing and Transportation, NAICS 48–49) that have had substantial implications for retailing.

In this chapter, we argue, using comprehensive data for the 1999–2017 period from the US Census, that the widely reported "retail apocalypse," illustrated by poignant stories of the exit of prominent chains (e.g., Borders, Circuit City, The Limited), presents an exaggerated picture of the decline of the brick-and-mortar retail sector in the aggregate. An important measurement issue (discussed in detail in section 6.2) plays a major role in explaining this discrepancy. Specifically, the definition of retail used by the Census does not fully account for the overall set of businesses that rely on the types of labor and real estate typically associated with the retail sector. This was not true in the (pre-1997) days of the old Standard Industrial Classification (SIC) system, which included restaurants in its definition. The newer NAICS (North American Industrial Classification System) classification scheme has separated restaurants from the retail sector, moving them to the sector Accommodations and Food Services (NAICS 72). Thus, the changing face of Main Street in many communities, where small retail stores are seemingly being replaced by a growing number of service-oriented businesses, especially restaurants, would imply a decrease in the official NAICS-based statistics about retailing. However, from the perspective of employment and usage of real estate, and we would argue from a "(wo)man on the street" perspective, it is not clear that "apocalypse" is an appropriate characterization of the transformation that we are witnessing.[3]

We document that the restaurant sector in particular showed remarkably strong growth, in terms of number of establishments, sales, and employ-

2. The chapters in the handbook (Basker 2016a) that complement our work include Basker (2016b), which examines the evolution of technology in the retail sector; Betancourt (2016), which examines distribution services; Carden and Courtemanche (2016), which focuses on general merchandise stores; Ellickson (2016), which examines the supermarket subsector; Foster et al (2016), which focuses on national retail chains; Ratchford (2016), which examines retail productivity; and Smith and Zentner (2016), which examines the effect of internet on retail markets. We use more recent data to extend analysis of related topics.

3. Other important measurement challenges are also associated with studying the retail sector, discussed in more detail in section 6.2. We further broaden the definition of retail to include services (e.g., auto repair and nail salons) and recreation (e.g., gyms, fitness centers, and yoga studios) in section 6.6.

ment, as well as payroll and value added, over the period in question.[4] Once restaurants are included, moreover, the broader physical retail sector had bounced back and, by 2017, exceeded its pre-Great Recession peak achieved in 2006 on a number of indicators. Despite this bounce back, we do find a significant drawn-out decline in the sector's share of aggregate value added, payroll, and number of establishments (employment share of physical retail, including restaurants, has held relatively steady) during 1999 to 2017. In other words, while the sector grew, it did so at a lower rate than the rest of the economy, and as such, there was a decline in the importance of the physical (inclusive of restaurants) retail sector in the overall economy during this time.

We begin our analyses by first investigating and confirming the negative impact that increased e-commerce has had on physical retail activity. Specifically, we find that sectors with the greatest increase in online sales during 1999–2017 (e.g., electronics, sporting goods, and furniture) also experienced the slowest growth in physical retail activity (in terms of number of establishments, employment, real sales, and real payroll). We then investigate the role of big box stores, emphasized by Hortaçsu and Syverson (2015). We find a stark flattening of the growth of big box stores' share of retail sales starting around 2009. Exploiting granular panel data from the US Census Bureau's county business patterns (CBP), we document that, contrary to expectations, the correlation between the growth of other physical activity and the growth of big box stores is actually positive across counties.

We next turn to a deeper investigation of the remarkable growth of restaurants. We first explore potential supply-side explanations. One possibility is that lower retail rental or property prices induced by the exit of other physical stores lowered fixed costs, which facilitated more entry by restaurants. However, aggregate data suggests a modest, if any, role for lower retail property prices; specifically, data from a National Association of Insurance Commissioners' report shows that the price indexes for retail commercial property bounced back to the pre-Great Recession levels by mid-2016, while retail vacancy rates have stayed stable at around 10 percent for several years (NAIC-CIPR 2017). Further, contrary to a pathway from exit of other physical stores to entry of restaurants, our analysis of county-level panel data

4. This strong growth in the restaurant sector was noted in an article in *The Atlantic* by Thompson (2017), which documented the strength of sales in food services relative to the rest of the retail sector (and termed this a "restaurant renaissance"). However, the strong performance in this sector has otherwise been underreported in the media. In a long and comprehensive report on Bloomberg.com, Townsend et al. (2017) present figures that portray a relatively gloomy picture of retail employment trends using Bureau of Labor Statistics (BLS) data, which relies on the NAICS classification, and thereby excludes restaurants (https://www.bls.gov/iag/tgs/iag44–45.htm). Following the NAICS definition, the BLS also classifies restaurants separately from retail, under the leisure and hospitality supersector (https://www.bls.gov/iag/tgs/iag70.htm).

on the growth of restaurants yields a positive correlation with the growth of other physical activity. That is, restaurant growth was slower in counties with relatively more decline in other physical retail activity. Thus, it appears that some locations have been successful in nurturing growth of all types of physical retail—big box stores, restaurants, and others—while other locations have seen a decline in all these physical retail activities.

The supply side explanation of lower fixed costs would, in most standard models, imply a reduction in the average scale of the restaurants.[5] We find that the data contradict this implication. In particular, we find that there was a significant increase in the real sales per restaurant, as well as employment per restaurant, during this period, suggesting an increase rather than a decrease in average scale. Further, if lower labor costs helped spur entry, we would expect lower growth of payroll per employee in the restaurant sector; in contrast, the data show significant growth in real payroll per employee for restaurants, notably faster than that for any other physical retail segments.

We next consider a demand-side explanation, albeit with limited aggregated data from the Bureau of Economic Data (BEA). We find evidence for a shift in expenditure from food at home (i.e., ingredients purchased from grocery stores and cooked at home) toward food away from home (i.e., at restaurants). Our back of the envelope calculations suggest that of the increase of roughly 150,000 restaurant establishments between 1999 and 2017, about 100,000 (or two-thirds of them) could be attributed to the increase in the share of restaurant expenditure.

We also investigate what types of restaurants grew and in what locations. We find evidence (from limited Yelp data) that the average quality as well as variety of restaurants has increased over recent years. Data from the CBP further show that both fast food and full-service restaurants grew, and that the growth of restaurants has been strongly positive in both rich and poor counties (though the number of bars has declined in poorer counties).

We address the question of whether the rise in restaurants was accompanied by a broader shift toward "servicification" of retail, by looking at the growth of three service and recreation sectors—repair services (NAICS 811), personal and laundry services (NAICS 812), and recreation (NAICS 713)—where a significant amount of the activity happens in establishments colocated with traditional physical retail establishments.[6] While we do find that some subsegments of services (specifically, personal service, including nail and hair salons) and recreation (specifically, fitness centers) experienced very strong growth, overall, these segments are small relative to traditional physi-

5. Technological change (e.g., facilitation of ordering over the Internet) could potentially be another pathway for a reduction of optimal scale, allowing for smaller restaurants to survive.

6. This analysis was prompted by comments from our discussant, Emek Basker, who showed that there has been strong growth in nail salons and fitness centers, albeit from a much smaller base level than restaurants, consistent with a shift toward more service/experience consumption in retail locations.

cal retail in terms of number of establishments, employment and payroll; and their shares in the aggregate (augmented to include these three sectors) physical retail remained largely flat during 1999–2017.

Finally, we examine emerging trends in retail by looking at data (from Crunchbase.com) on venture capital financing of retail-related startups. While most of the best-funded startups have a substantial online component, we find that a significant number of startups (e.g., delivery services) are in fact complementary to physical retail (and could facilitate entry by smaller physical retail firms). Of course, as discussed above, a dominant story in the retail sector over the past two decades has been the erosion of market share of physical retail stores due to competition from online merchants, such as Amazon. However, the recent purchase of Whole Foods has provided Amazon with a significant physical retail footprint, and the current trade press makes much of the complementarities between brick-and-mortar and online sales, and the importance of maintaining or developing physical locations for retail businesses (e.g., Kercheval 2014; Santa Cruz 2019).

As of this writing (mid-January 2021), the COVID-19 pandemic and associated adoption of social distancing norms and regulations have had a severe negative impact on the economy, with an overall decline in employment of over 8 million in December 2020 relative to December 2019 (per provisional Bureau of Labor Statistics [BLS] figures). Given the particularly large impact of the pandemic on the retail sector, we undertook a preliminary analysis of the evolving impact of the pandemic using data up to December 2020 from the US Census Advance Monthly Retail Trade Survey (MARTS) and monthly Current Employment (CE) statistics from the BLS, and using stock market data on retail stocks.[7] The data confirm a strong rebound overall for traditional retail by December 2020 from a severe initial negative impact of the pandemic in April, but with significant variation across subsectors. Specifically, and not surprisingly, we find a positive effect (in terms of aggregate sales and even employment) for grocery stores and online retailers, but sharp negative effects for restaurants and gas stations, and for nonessential retail goods sectors like clothing and electronics. The negative impact on restaurants, a sector that we highlighted above as a silver lining for an otherwise weak trend in brick-and-mortar retail, has been particularly striking and persistent throughout the crisis. Unlike other retail sectors (except gas stations), the percentage decline in cumulative year-to-date sales (compared to the prior year) was higher for restaurants in December 2020 than in April. While employment in the restaurant sector has rebounded somewhat from its largest year-on-year loss of 6.7 million jobs in April 2020, there has been a worrisome recent increase in year-on-year job loss from 2.6 million in November to 3 million in December 2020. The stock market data

7. Interestingly (and fortunately), the MARTS survey covers restaurants in addition to the NAICS retail subsectors. The BLS CE data is available for 3-digit NAICS subsectors.

are consistent with these aggregate trends, with online retailers and big box stores (clubs and supercenters) performing well, and restaurants and retail clothing firms being among the worst performers. The strong evidence that eating and speaking in groups in enclosed spaces is a significant risk for the spread of the disease has led to social distancing norms (adopted voluntarily or mandated by state governments) that have shifted consumption from restaurants toward eating at home and hence toward more grocery shopping. It seems clear that the prospects for the restaurant sector depend importantly on the control of the pandemic, which in turn appears to hinge on the rapid rollout of vaccines across the population. While we are circumspect about making long-term predictions given the unprecedented nature of this crisis, it is plausible that greater consumer familiarity with e-commerce platforms gained during the current lockdowns could help accelerate the growth of e-commerce and use of home delivery over the medium to long term, reinforcing some of the key trends already visible in the earlier data on venture capital investments (see section 6.7).[8] The duration of the crisis also may determine the extent to which restaurants, with their typically slim margins, will be able in the post-COVID era to reopen and regain the important role they have played in small towns and large cities alike.[9]

This chapter is organized as follows. In the next section, we discuss our data sources and some definitional and measurement challenges that arise in trying to capture the evolution of the retail sector using US Census and other data. In section 6.3, we document some of the trends we see in the retail sector in 1999–2017. We then turn, in section 6.4, to an analysis of potential drivers for the weak growth in physical retail stores during that time. Section 5.5 investigates potential supply and demand side explanations for the rise of restaurants and explores patterns in this rise across restaurant types and counties. Section 6.6 investigates broader servicification, by examining repair services, personal and laundry services, and recreation. Section 6.7 examines emerging trends in retail using venture capital data, and section

8. BLS data show a decline in employment relative to February 2020 of about 22.7 percent (about 2.31 million jobs) for restaurants (NAICS 722), and of 31.3 percent (about 0.30 million jobs) for clothing (NAICS 448), while general merchandise (+0.14 million, 4.6 percent) and building materials (+0.10 million, 7.1 percent) added the most jobs. The stock market data (as of January 8, 2020), show that all retail subsectors have recovered to pre-pandemic levels, but drugstores and clothing are notably weaker than the S&P500, while online retailers, home furnishing, and sporting goods stores outperformed the market. The strongest performing retail stocks include Etsy, Chewy, Wayfair, and Stamps.com, all major online retailers. The recovery of restaurant stocks suggests some potential good news, at least in terms of market expectations about the future of the sector. However, the weakest performing retail stocks include Groupon, Dave & Buster's, Arcos Dorados, and Denny's—all restaurant related stocks, and retail clothing firms. Note that some fast food stocks, including Chipotle and Domino's, have performed well, while the market appears less optimistic about the future of other prominent chains, including McDonald's and Yum! Brands, which have underperformed the market.

9. See e.g., https://www.nytimes.com/2020/05/07/us/coronavirus-restaurants-closings.html, and https://www.nytimes.com/interactive/2020/12/28/dining/restaurants-closings-usa.html.

6.8 presents preliminary analyses of the impact of the COVID-19 pandemic on the retail sector. Section 6.9 concludes.

6.2 Definitions, Data Sources, and Measurement Challenges

6.2.1 Defining the Retail Sector

The current industry classification scheme used by the US Census Bureau and other government statistical agencies, the North American Industry Classification System (NAICS), implemented for the Economic Census of 1997, defines retail to include 14 subcategories that encompass different goods retailing activities across two broad 2-digit codes (NAICS 44 and 45). This is the definition used in some recent research studies of the retail sector (e.g., Hortaçsu and Syverson 2015), as well as in many media stories on the widely reported "retail apocalypse" (e.g., Richter 2018; Townsend et al. 2017).

However, the earlier SIC, last revised in 1987, included what we term for brevity "restaurants" but is more precisely described as "Eating and Drinking Places" (SIC 58) in the broad retail sector (SIC codes 52–59). An important change made under the NAICS scheme was to move restaurants to a different major sector, NAICS 72, "Accommodation and Food Services," encompassing what we term for brevity as "hotels" (NAICS 721, Accommodation) and restaurants (NAICS 722, Food Services and Drinking Places).

We believe that including restaurants in the broader definition of retail can yield interesting insights, as consumers who see a shop replaced by a restaurant in their local town need not view this as a sign of crisis for what they view as retail. Relatedly, there is strong overlap in the inputs used by restaurants and the traditional NAICS retail sectors. In particular, some recent media articles contain anecdotal reports of restaurants taking over retail space from other traditional retail categories (e.g., Morris 2016; Takahashi 2018), and arguably there is significant overlap in labor markets as well.

Another important subsector worth examining separately, given the importance of e-commerce retailing, is that of nonstore retailers (NAICS 454), which includes online and catalog retailing, neither of which has traditionally included physical retail stores. Accordingly, in this chapter, we use the following breakdowns of retail industry aggregates and nomenclature:

- *Traditional Retail*, which includes retail per NAICS (NAICS 44–45), as well as restaurants (NAICS 722);
- *Traditional Physical Retail*, which is Traditional Retail as defined above, but excluding Nonstore retailers (NAICS 454);
- *Restaurants* (NAICS 722); and
- *Traditional Non-Restaurant Physical Retail*, which is traditional physi-

cal retail as defined above, but also excluding Restaurants (NAICS 722); in other words, this is NAICS 44–45 excluding 454.

6.2.2 Data Sources

For our work, we rely on several sources of data:

1. *Annual Retail Trade Survey (ARTS)*: This data source from the US Census Bureau provides annual sales data for retail subcategories. It also provides data on e-commerce activity levels. E-commerce activity data for the "Electronic Shopping and Mail-Order Houses" (NAICS 4541) or ESMOH, are provided separately and split by Merchandise line (see discussion in section 6.2.4). We accessed historical tables from the US Census Bureau websites; these tables help address some of the reclassification challenges discussed in section 6.2.4, as they provide consistent time series by classification codes (suitably adjusting historical data).

2. *County Business Patterns (CBP)*: These data, also provided by the US Census Bureau, include information on the number of establishments, employment, and payroll by NAICS in each county. One important limitation for employment data is that a significant proportion of these are suppressed (and reported as zero). We use a combination of interpolation and extrapolation in industry-county cells, along with the available employment range information (in the employment flag variable) to impute missing employment data. Note that in these data, employment is defined as all full- and part-time employees who were on the payroll during the pay period that includes March 12.[10] Because the extent of use of part-time employment could vary across sectors, caution must be exercised when comparing employment numbers. In part for this reason, in our analyses, we also pay attention to other outcome variables; in particular, value added (aggregated data available from BEA, discussed in point 3 below) and payroll (both aggregate and per employee) provide checks that are not affected by the variation in usage of part-time workers.

3. *BEA data*: We use two BEA tables, one with a breakdown of Personal Consumption expenditures (table 2.3.5) and one with a breakdown of value added by industry (table U), downloaded from the BEA websites. We also obtained county-level population and personal income per capita data from the BEA's regional economic accounts datasets available on the web.

4. *Yelp public-use microdata*: We use the Yelp dataset[11] to construct an aggregate annual measure of restaurant variety and quality (as discussed section 6.5.3). The Yelp dataset includes information about local businesses in 10 metropolitan areas across two countries. We undertake steps

10. See, e.g., definition of total employment provided online here: https://www.census.gov/quickfacts/fact/note/US/BZA110217.

11. We thank Alexander Oettl for pointing us to this data source. We accessed the data from: https://www.yelp.com/dataset/challenge.

to ensure validity of the data we use, including: (a) restricting attention to businesses with address information, review information, and time-series data; (b) restricting to restaurant businesses by matching a list of keywords in the "category" string; and (c) retaining only restaurants listed for states in the US.

5. *Crunchbase*: Crunchbase is an online platform that tracks data on companies and is an increasingly popular source for data on venture capital investments. We identify firms in retail-related activity during our study period (1999 to 2017) to provide some information on emerging technologies (in section 6.7). Related to the challenge of measuring innovation in the retail sector (discussed in section 6.2.4), we note a similar caveat about our measurement of startup retail activity using Crunchbase data that also arises from other large startups undertaking activity in retail-related activity. For example, Uber (a transportation/technology company) has a delivery service company (Uber Eats), and Alphabet (a technology company) is investing significantly in autonomous vehicles that have labor-saving implications for the retail sector. Many technology companies are also investing in warehouse, logistics, and e-commerce platforms that impact online retailing and hence affect the retail sector as well.

6.2.3 Heterogeneity in Retail—Auto Dealerships and Nonstore Retailers

While one might expect that retail activities are relatively similar for different types of goods, there are challenges when comparing activity levels across retail sectors, including the following:

Auto stores have significant sales but a small establishment/employment footprint. The automobile retailing (NAICS 441, Motor Vehicles and Parts Dealers) sector accounts for a large portion of retail sales that is not really representative of the level of economic activity in these dealerships because of the exceptionally high wholesale and unit prices in this sector compared to almost all other retail goods. In other words, this sector plays a less prominent role in terms of retail value added, employment, and number of establishments. Appendix figures 6.A.1 and 6.A.2 illustrate this point. They show that retail sales activity can be disproportionately affected by the fortunes of the automotive sector (e.g., the steep decline in the sector sales during the Great Recession had a significant impact of total retail sales), but the sector has a smaller role to play in explaining fluctuations in retail employment and number of establishments. Specifically, Figure 6.A.1 shows that the share of stores and employment of the auto sector relative to total retail are both low (less than 10 percent) and much more stable than their sales levels. In contrast, per figure 6.A.2, the sales share of restaurants understates the sector's contribution in terms of value added, employment and number of establishments.

Nonstore/online retailers have significant activities in other sectors. Another note of caution, for any analysis we undertake about nonstore retailers, is that a significant amount of labor input driving the sales levels achieved by the online retailers who form the main part of the nonstore sector would appear in the transportation and warehousing (48–49) industry classifications. Similarly, while technically categorized as "nonstore," these retailers now often do have retail establishments (and this physical presence has been growing over time). However, the count of establishments in this sector would not include the warehouses and storage facilities owned by nonstore retailers, such as Amazon; these would appear in transportation and warehousing again. To the extent that general merchandise and other stores that are in the Traditional Physical Retail Sector are also holding inventories in their stores, comparisons of their numbers of stores to the number of establishments associated with nonstore retailers in retail data are not comparing like to like.[12] Accordingly, sales or value added per employee or per establishment would need to be interpreted with caution, as we discuss again in section 6.5.

6.2.4 Other Measurement Challenges

In addition to the issues mentioned above that are specific to the measurement of economic activity in the retail sector and subsectors, there are additional measurement issues that are important to keep in mind as we proceed with our analyses. In particular:

Measuring innovation. As discussed above, transportation and warehousing, as well as the information technology sector and related technologies supporting these sectors provide vital inputs for the successful operations of online (and even physical) retail businesses. Thus, measuring innovation in the broad retail sector using traditional measures such as patenting is particularly challenging. For example, patents filed by online retailers like Amazon, or even technological innovations by traditional retailers like Walmart, are likely to be classified under patent classification codes related to the technology sector rather than to retail activity. Accordingly, a measure of patent counts in codes specifically linked to retail as a fraction of total patents filed in the US shows a miniscule level of patenting activity in this sector.[13] Appendix figure 6.A.3 shows that while patent counts have

12. We thank Ben Jones for raising this point at the pre-conference meeting. In particular, he noted that to the extent that the rise of online commerce is essentially shifting inventories from general merchandise and other physical retail stores to warehouses (and delivery using transportation workers rather than pickups by customers), the measured productivity benefits from the rise of online commerce would be lower than one may infer from the reduction of input use in the retail sector.

13. We thank Nathan Goldschlag for sharing USPTO patent count data by NAICS 4-digit sectors, which he and coauthors put together in connection with their work on patent concordances in Goldschlag, Lybbert, and Zolas (2019).

been going up in the retail sector, measured patenting in this sector constitutes less than 1.1 percent of total patents filed in the US. We believe that this measure significantly understates innovation in the sector, even in terms of patent counts. Moreover, because innovation affecting this sector comes from other sectors, and some of the innovation is related to changes in organizational structures as well, a patent-based measure for innovation in this sector simply does not capture much of the relevant innovative activity. For that reason, we do not pursue avenues to explain trends in this sector using such measures of technological change. Instead, in section 6.7, we frame our discussion of innovation around other sources of information.

Changes to industry classifications and related loss of data (apparently correlated with the extent of reduction in activity). Another challenge in studying the retail sector is that changes in the amount of economic activity in various sectors and subsectors have prompted several revisions to the NAICS, many of which have affected the retail sector in particular.[14] This classification, which was implemented with the Economic Census of 1997, was revised in 2002, 2007, 2012, and 2017. Our analyses were impacted by two major changes: (1) the codes for major subcategories of restaurant (full service and limited service restaurants) were changed in 2007, and (2) the code for Warehouse Clubs and Supercenters (which we term "big box" stores) was changed from NAICS 45291 (under the 2002 and 2007 NAICS versions) to NAICS 42311 (in the 2012 revision). While these changes call for extra care when collating the data, which we address below, some other changes are more difficult or infeasible to fully reverse. In particular, certain subcategories get folded into other more aggregate categories, likely because of a decline in economic activity in the subsector. For example, up to the 2007 version of the NAICS, music stores (NAICS 45211 Prerecorded Tape, Compact Disc, and Record Stores) were tracked in the broader subsector of NAICS 4512 (Book, Periodical, and Music Stores); this music stores subcategory was abandoned (i.e., was no longer tracked) from 2012 on, as the NAICS 2012 revision does not have a separate classification for these stores. Similarly, Camera and Photographic Supplies Stores (NAICS 44313) and Computer and Software Stores (44312) were tracked under Electronics and Appliance Stores (443), but in the NAICS 2012 revision, these subcategories were eliminated. These classification changes, and our desire to study trends over a relatively long time frame (1999 to 2017), require us in many cases to use data aggregated at the 3-digit NAICS code level, so that we can construct a comparable continuous data series for the period in question.

14. For a historical perspective on the development of the NAICS, and more information about changes implemented over time, see https://www.census.gov/eos/www/naics/history/history.html.

Imputing e-commerce data to retail sectors. A related classification challenge arises from the fact that e-commerce activity by online retailers is tracked in the ARTS based on product codes that do not directly relate to the NAICS classification scheme. We manually imputed NAICS 2012 codes to each of the merchandise lines, as documented in appendix table 6.A.1.[15]

6.3 Trends in Retail Sector Activity: A Decline in Brick-and-Mortar Goods Retailing and a Rise of Restaurants

In this section, we present data patterns for all Traditional Physical Retail (as defined in section 6.2.1) and break that down by Restaurants and Non-Restaurant Physical Retail, using data to 2017, the year of the last Economic Census as of this writing.

6.3.1 Trends in Number of Establishments

The most visible elements of retail are storefronts, with media stories on the retail apocalypse often focusing on closed storefronts and retail vacancies (e.g., Field 2018; Kestenbaum 2017; Kilgannon 2018). We examine whether those media stories of chain and other store closures reflect a broad decline in the number of brick-and-mortar establishments in the US, using data from the US Census Bureau's CBP.

Figure 6.1 panels a–c present trends in aggregate numbers of stores for Traditional Non-Restaurant Physical Retail, Restaurants, and Traditional Physical Retail, respectively. Consistent with the extensive media coverage of the "retail apocalypse," we show, in Figure 6.1a, that there was a sizable decline in the total number of establishments in the Traditional Non-Restaurant Physical Retail sector, from about 1.07 million establishments in 2007 down to 0.98 million in 2017, a nearly 10 percent reduction, with the bulk of the decline coincident with the time of the Great Recession (2008 and 2009). However, in figure 6.1b, we find that there has been a secular trend of strong growth in the number of restaurant establishments; despite a slowdown around the Great Recession, restaurant numbers have increased from about 475,000 establishments in 1999 to 650,000 establishments in 2017. This increase in restaurants more than offsets the decline in number of establishments in other physical retail, so that in figure 6.1c, the total number

15. One of the ARTS tables reports ESMOH data separated into NAICS categories. However, we did not use this categorization for two reasons. First, and as a practical limitation, we were unable to find this data series for the full 1999 to 2017 period; the two separate tables that we found covered data only from 2011 to 2017. Second, and importantly for our purposes, this table allocates most of the ESMOH sales into the NAICS 454 Nonstore retailer subsector (in 2017, the proportion allocated to nonstore retailers was 67.8 percent, or $269.4 billion of the total $397.5 billion). Because our goal is to find a good measure of the extent of penetration by online retailers in traditional categories, this very partial allocation of sales to traditional physical sales sectors means that these tables have very limited utility for us.

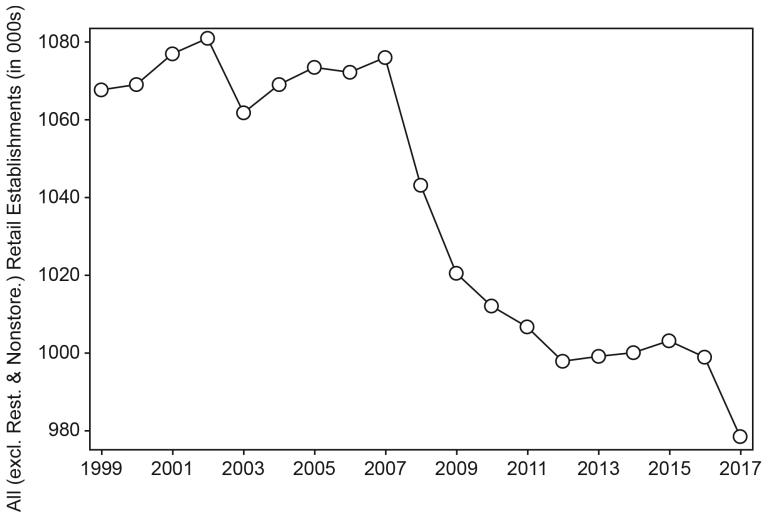


Fig. 6.1a Decline in number of traditional non-restaurant physical retail establishments

Source: Data are from the US Census Bureau's County Business Patterns (CBP) dataset.

Note: This figure presents the trend in the aggregate number of establishments in Traditional non-Restaurant Physical Retail, which is all retail per the current classification code (i.e., NAICS 44–45) less all nonstore (NAICS 454 which includes ecommerce and catalog) retailer establishments.

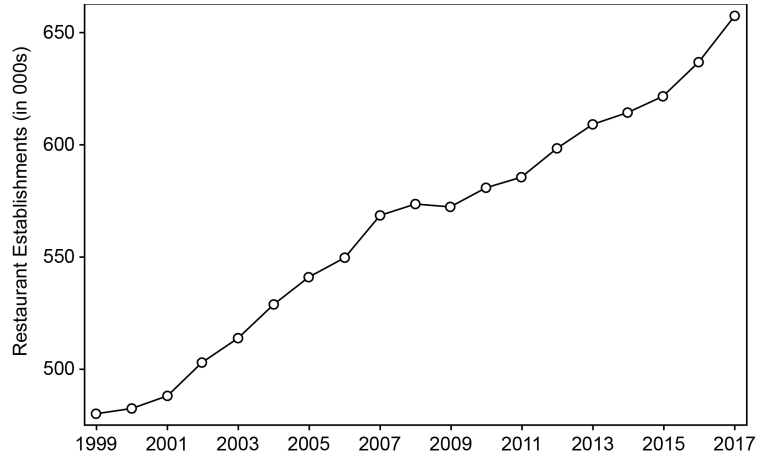


Fig. 6.1b Strong growth in number of restaurants

Source: Data are from the US Census Bureau's County Business Patterns dataset.

Note: Restaurants is NAICS sector 722.

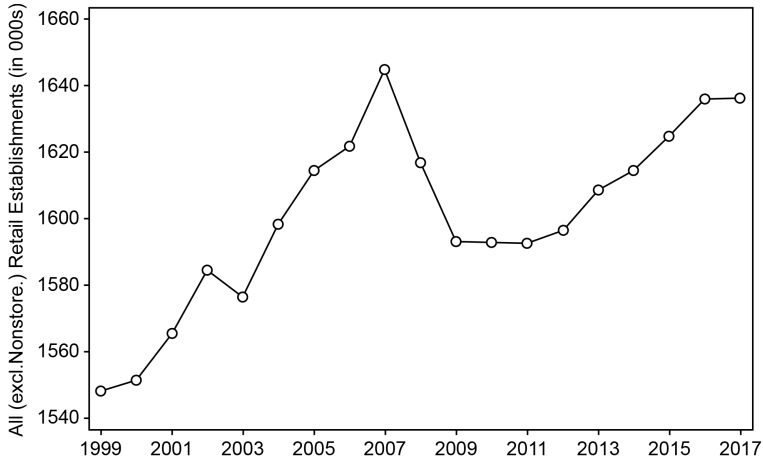


Fig. 6.1c Traditional physical retail (including restaurants) bounces back after the Great Recession

Note: This figure presents trends for "Traditional Physical Retail," which refers to all retail establishments (NAICS 44–45) plus restaurants (NAICS 722) but excluding nonstore establishments (454). Data are from the US Census Bureau's County Business Patterns dataset.

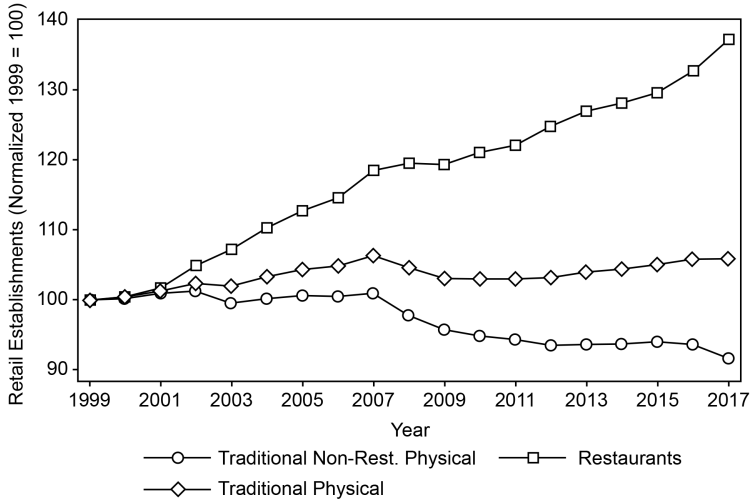


Fig. 6.1d Numbers of establishments—normalized trends in retail categories

Note: "Traditional Physical" refers to traditional (per old SIC classification) retail stores excluding nonstore establishments (to exclude establishments of ecommerce and catalog companies)—this is NAICS 44, 45 and 722 excluding Nonstore Retailers (454). "Traditional Non-Rest. Physical" is the "Traditional Physical" excluding restaurants (722). Restaurants refers to NAICS 722. Data on number of establishments are from the US Census County Business Patterns (CBP).

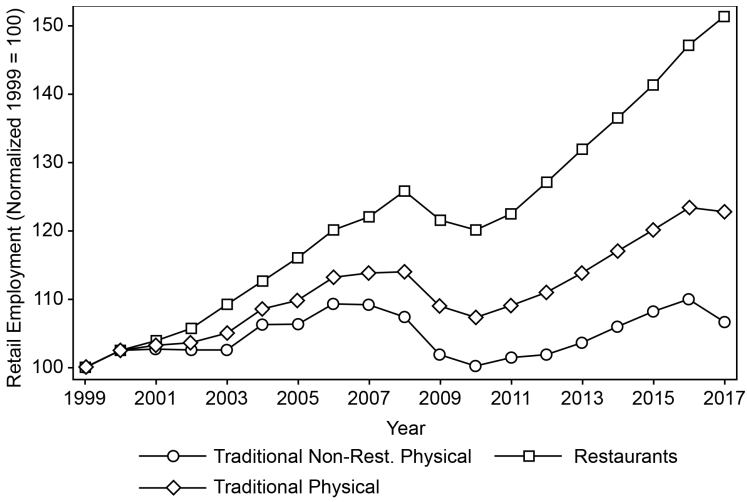


Fig. 6.2 Employment—normalized trends in retail categories

Source: Data on employment are from the US Census County Business Patterns (CBP).

Note: "Traditional Physical" refers to traditional (per old SIC classification) retail stores excluding nonstore establishments (to exclude establishments of ecommerce and catalog companies)—this is NAICS 44, 45 and 722 excluding Nonstore Retailers (454). "Traditional Non-Rest. Physical" is the "Traditional Physical" excluding restaurants (722). Restaurants refers to NAICS 722.

of traditional physical retail stores had bounced back almost all the way by 2017 (from a peak of about 1.64 million in 2007 to a trough of about 1.59 million in 2010, and back to about 1.63 million in 2017).

The interpretation of the decline in number of establishments in figure 6.1a, and of the trends in figures 6.1b and c, however, requires paying close attention to the vertical axes used. Figure 6.1d instead shows trends in terms of percentages by normalizing the 1999 level to 100 for each of the categories. This figure shows more clearly that the observed decline in figure 6.1a translates to somewhat less than a 10 percent decline in relative terms. Moreover, the stabilization from 2012 to 2016 is reassuring, though the further dip in 2017 may portend a further shakeout in the sector. Finally, the rise of the restaurant sector is evident in this figure as well, and we see that by 2017, the overall number of establishments in Traditional Physical Retail, as defined in this chapter, was about 5 percent above its 1999 equivalent (but still lower than its 2007 peak).

6.3.2 Trends in Employment

Figure 6.2 presents normalized trends in employment for retail subsectors, similar to figure 6.1d for establishments. We find a very similar pattern in employment as we did for establishments, except that even in the Tradi-

tional Physical Retail sector excluding restaurants, retail employment levels bounce back to the pre–Great Recession peak levels by 2016 (though there is again a notable dip in 2017). Restaurant employment shows a remarkably strong recovery from a decline coincident with the Great Recession, and this impetus from restaurants pushes employment in the overall Traditional Physical Retail sector to well above the pre–Great Recession levels.[16] Even after the dip in 2017, aggregate physical retail employment is about 21 percent above the 1999 levels.[17]

6.3.3 Trends in Sales, Value Added, and Total Payroll

Figure 6.3a shows the normalized trends for (real, in 1999 dollars) sales. Here, as for employment, we see that for the Non-Restaurant Traditional Physical Retail sector, there was a full recovery in sales to pre–Great Recession levels by 2017 (unlike the pattern for establishments in this sector). There is strong growth in restaurants, but the impact of this growth on total Traditional Physical Retail sales is more modest. This is in line with appendix figure 6.A.2 and the related discussion in section 6.2.3, which show that the sales share of restaurants in aggregate retail activity is considerably lower than their share in employment and establishments (implying lower sales per employee in the restaurant sector). We come back to this issue in section 6.5.

However, in terms of both aggregate real value added (figure 6.3b) and aggregate real payroll (figure 6.3c), we find that restaurants make a sizable contribution to the overall Traditional Physical retail sector. This is also in line with the larger value added and payroll share of total retail for Restaurants in figure 6.A.2. In particular, figure 6.3b shows that excluding restaurants, the traditional physical retail sector recovered to only a little below the 2007 peak in value added and total payroll, while including restaurants pushes the aggregate trend to above the 2007 indexed level. For both value added and payroll, the addition of restaurants leads to an increase of about 15 percent in the indexes for Traditional Physical Retail in 2017.

16. One caveat is that (as discussed in section 6.2.3), the employment variable in the CBP includes part-time employment. Because we are concerned, based on low average annual payroll per employee (see discussion in section 6.5.1.3), that the restaurant sector may have more than the typical—even relative to other retail—amount of part-time employment, we acknowledge that the total employment contribution from the restaurant sector to the retail sector corresponds to jobs with lower annual payroll per job than in other retail sectors. Nevertheless, as the analysis in section 6.3.3 shows, the restaurant sector experienced significant growth in value added and overall payroll, and this contribution helped both real value added and real payroll growth substantially (see figure 6.3).

17. We extend this figure to April 2020, using monthly data from BLS Current Employment statistics, in appendix figure 6.A.13, panel a. This shows that the trends seen in figure 6.2 largely continued up to March 2020, except for a small reversal in the growth of traditional non-restaurant physical retail. As we discuss in section 6.8.2, the ongoing COVID-19 crisis has triggered a historic plunge in employment levels, with only a partial recovery by December 2020.

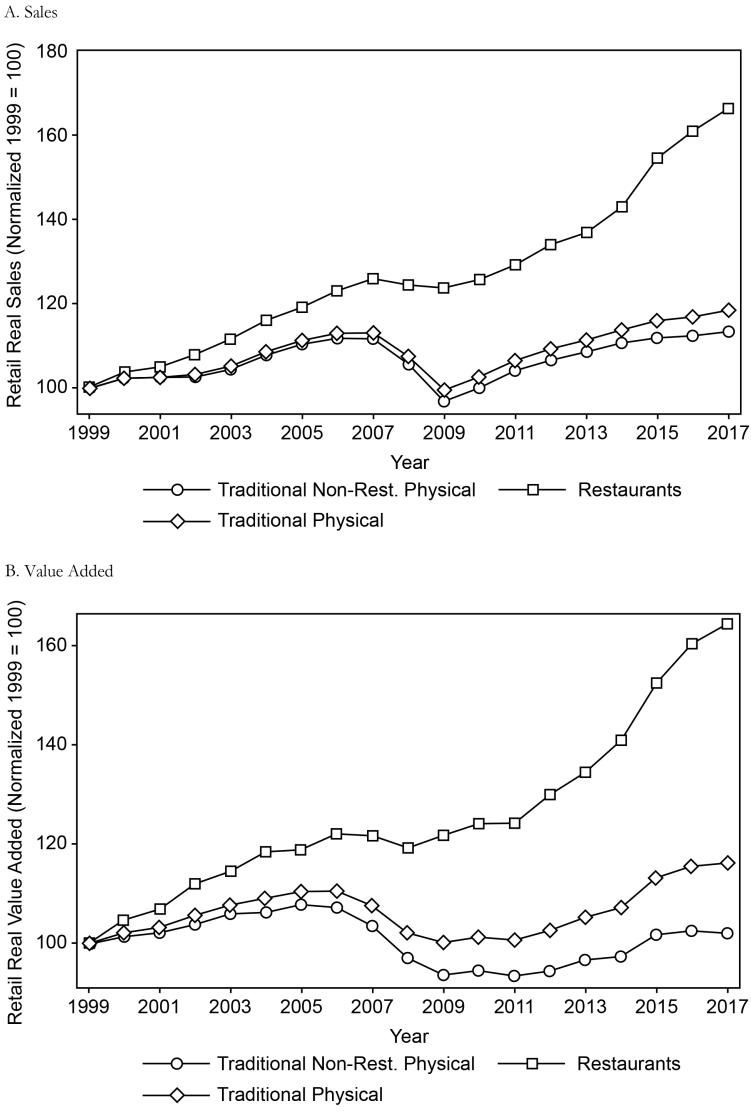


Fig. 6.3 Sales, value added, and payroll—normalized trends in retail categories

Source: Data on sales are from US Census Bureau's ARTS survey and antecedents, payroll are from the US Census Bureau's County Business Patterns (CBP) data, and value added are from the BEA.

Note: "Traditional Physical" refers to traditional (per old SIC classification) retail stores excluding nonstore establishments (to exclude establishments of ecommerce and catalog companies)—this is NAICS 44, 45, and 722 excluding Nonstore Retailers (454). "Traditional Non-Rest. Physical" is the "Traditional Physical" excluding restaurants (722). Restaurants refers to NAICS 722.

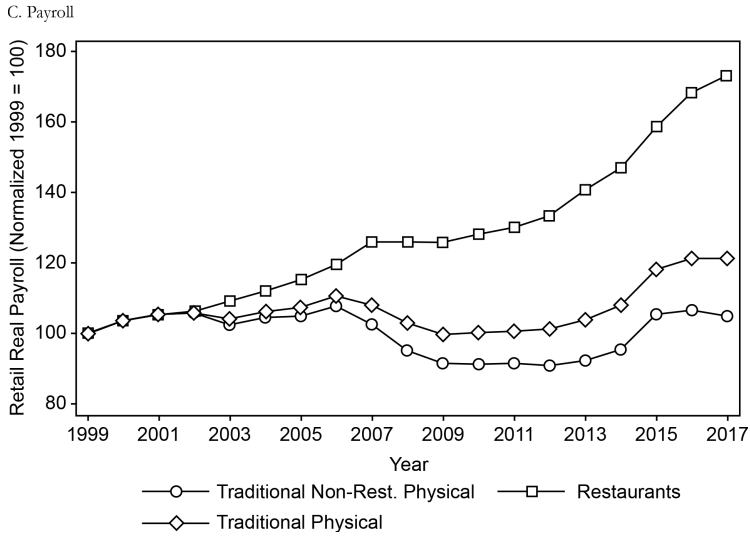


Fig. 6.3 (cont.)

6.3.4 Trends in Retail Share of the Overall Economy

The figures above suggest that, in general, the traditional physical retail sector inclusive of restaurants has bounced back to the pre-Great Recession peaks in level terms for establishments, and exceeded pre-recession peaks for employment, real sales, real value added and payroll.

However, because the rest of economy also experienced a strong (though drawn out) recovery from the Great Recession, these figures do not tell us how the different components of the retail sector fared *relative to the overall economy*. To understand this relative picture, in figure 6.4, we plot the trends for four indicators of the share of different components of retail in the overall economy, normalizing the share of each subcomponent in 1999 to 100.

Figure 6.4 shows that across all indicators, the share of restaurants in the overall economy has increased over 1999–2017, with shares of establishments and real value added increasing by about 20 percent, employment by about 30 percent, and real payroll by about 35 percent. Across all four indicators, traditional physical retail (excluding restaurants) shows significant decline in share of the overall economy: by about 20 percent for number of establishments and payroll, about 10 percent for employment, and about 28 percent for value added. The rise of restaurants is strong enough to more than offset the decline in the rest of traditional physical retail in terms of employment, so that employment in traditional physical retail including restaurants is higher in 2017 than in 1999. However, for the other three indicators, restaurant growth was insufficient to maintain retail's share in the overall economy. Thus, there is a small (about 7 percent) decline in the

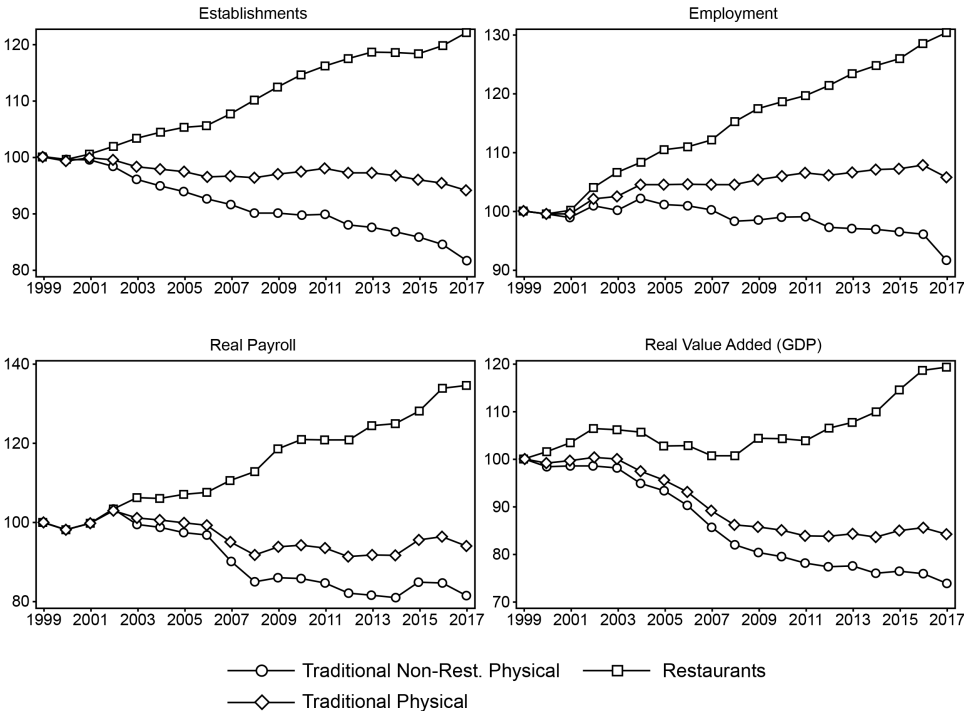


Fig. 6.4 Trends in retail share of the aggregate economy (normalized share in 1999 = 100)

Source: Data on establishments, employment and payroll are from the US Census Bureau's County Business Patterns (CBP) data and value added are from the BEA.

Note: "Traditional Physical" refers to traditional (per old SIC classification) retail stores excluding nonstore establishments (to exclude establishments of ecommerce and catalog companies)—this is NAICS 44, 45, and 722 excluding Nonstore Retailers (454). "Traditional Non-Rest. Physical" is the "Traditional Physical" excluding restaurants (722). Restaurants refers to NAICS 722.

share of establishments and payroll, and a steeper decline in the share of value added (about 16 percent), for traditional physical retail inclusive of restaurants.[18]

Overall, pre-COVID, we conclude that while restaurants have experienced an impressive rise relative to the rest of the economy, the traditional physi-

18. As discussed in section 6.8, we extend the figure for employment share of the aggregate economy, to April 2020 using BLS Current Employment statistics in appendix figure 6.A.13b. After 2017, the share of restaurants in the economy remained flat, while the share of traditional non-restaurant physical declined (similar to the sector's earlier decline in the other indicators). The plunge in employment triggered by the ongoing COVID-19 crisis initially (in April 2020) reduced the share of restaurants to even below the 1999 level; while there has been a rebound since, the recovery is only partial and restaurant share of private sector employment in December 2020 is well below the pre-pandemic peak.

cal retail (even inclusive of restaurants) has shrunk relative to the economy except in terms of employment.[19]

6.4 Innovation and the Slowdown of Non-Restaurant Traditional Physical Retail Activity: The Role of Online Retailing and Big Box Stores

Two main factors have been mentioned in the trade press and the academic literature (e.g., Hortaçsu and Syverson 2015) as main drivers of the decline in brick-and-mortar retail establishments or what we term Non-Restaurant Traditional Physical Retail: first, the development and growth of online retailing, and second, the growth of large general merchandise retail chains, in particular big box stores. By "big box," we mean chains of supercenters like Walmart and Target, as well as warehouse clubs, such as Costco and Sam's Club. Both online retailing and the success of big box stores arguably have been made possible by the development of new technologies permitting more efficient and better tracking of items as they move from manufacturers to consumers, including better inventory management, along with more efficient use of warehouse and transportation assets. In other words, exogenous technological innovation has allowed for growing scale economies that have benefitted national chains of very large general merchandise outlets and online retailers, which in turn have reduced demand for the products sold in Non-Restaurant Traditional Physical Retail stores (see Basker 2016a, which contains several chapters dedicated to technological and organizational changes in the goods retail sectors of the economy).

In this section, we examine in more detail the extent to which both sales by online retailers and big box stores have disrupted the retail sector. Figure 6.5 provides a summary by presenting how sales from these two sources have increased in terms of their share of the Traditional Retail sector (i.e., NAICS 44–45 plus NAICS 722).[20] This figure shows that in the first half of our study period, i.e., from 1999 to about 2010, the growth of big box stores was a more powerful trend, increasing share from about 4 percent of the market to nearly 9 percent, whereas in the same period online retailing grew from

19. We present a figure decomposing changes in the supersector share of GDP between 2017 and 1999 in appendix figure 6.A.4. Manufacturing and Retail sectors show the largest declines, while Finance, Professional services, and Education and health showed the largest gains over this period.

20. Figure 6.5 shows the aggregate share of ESMOH-Ecommerce, that is, e-commerce sales by firms in the NAICS 4541 (Electronic Shopping and Mail-order Houses) subsector, which includes online and catalog retailers, and hence, we believe that it includes Amazon and other big online retailers. We do not separate out e-commerce sales by retailers that operate mostly via brick-and-mortar stores, as this is small compared to ESMOH sales, and because such sales may not be competing but rather complementary activities for physical stores (e.g., for clothing stores that allow online customers to use stores for returns, and online orders from physical restaurants). Our analysis suggests that Restaurants (722), Clothing (448), Miscellaneous Stores (453), Motor Vehicles (441), and Sporting Goods (451) are the top subsectors in terms of direct e-commerce (i.e., e-commerce by physical retailers) share of subsector sales.

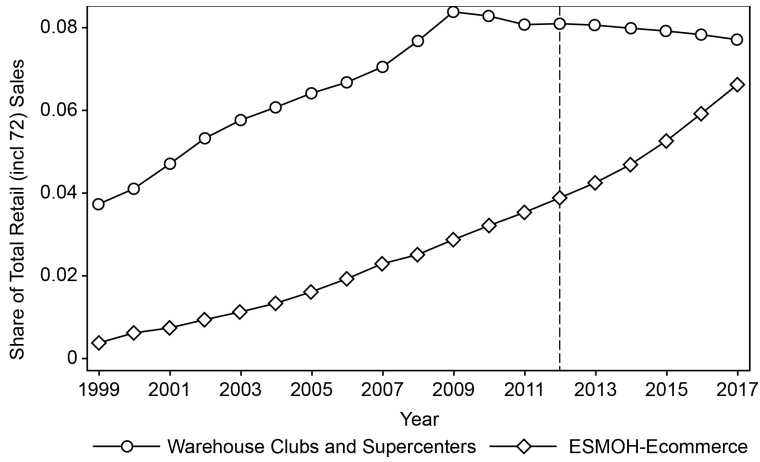


Fig. 6.5 Retail sales—trends for Big Box and non-store e-commerce

Source: Data are from US Census Bureau's Annual Retail Trade Survey (ARTS) and the Services Annual Survey (SAS) and their antecedents.

Note: Traditional Retail includes all subcategories of NAICS 44, 45 and 722. "Big Box" is the subsector 45291 (Warehouse Clubs and Supercenters) in the 2012 NAICS. ESMOH ecommerce refers to e-commerce by firms in the NAICS 4541 (Electronic Shopping and Mail-order Houses) subsector, which includes online and catalog retailers.

about 0.5 percent to 3.5 percent. However, in the latter half of our period, between 2009 and 2017, roles were reversed. In particular, there is a striking flattening of the share of big box stores starting in 2009, with their share actually declining slightly from about 8.5 percent in 2009 to 8 percent by 2017. In contrast, over that same time frame, online retailer e-commerce sales accelerated, increasing share from about 3.5 percent to 7 percent. Thus, it appears that the competition from big box stores has stabilized, while e-commerce competition shows no sign of slowing down.

In sections 6.4.1 and 6.4.2, we take a closer look at the trends for online retail and big box stores, and we undertake additional analyses to see whether competition from these sources explains variations in the decline of physical retail (excluding restaurants) over time and across US counties.

6.4.1 Nonstore Online Sales

The Census Bureau collects data on sales by nonstore retailers, under NAICS code 454. Within NAICS 454, retailers without physical (brick-and-mortar) stores are captured in the ESMOH (NAICS 4541) subsector. Specifically, the ESMOH subsector encompasses "establishments primarily engaged in retailing all types of merchandise using nonstore means, such as catalogs, toll free telephone numbers, or electronic media, such as interactive television or the Internet," per US Census Bureau documentation for

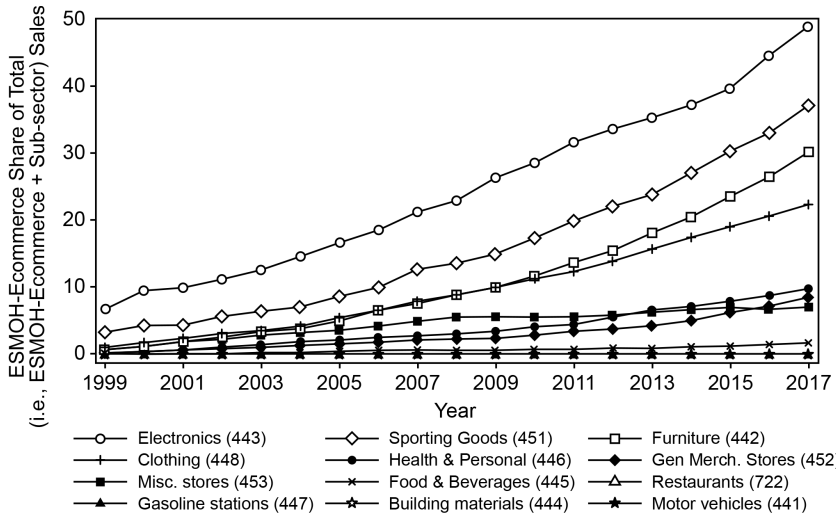


Fig. 6.6 Nonstore (ESMOH) ecommerce share of different retail sub-sectors

Source: This figure is based on imputing the breakdown of ESMOH ecommerce sales by merchandise lines in the US Census Bureau Annual Retail Trade Survey (ARTS) tables to individual retail NAICS codes (see Appendix Table 6.A.1 for the concordance used). Data on some merchandise lines for some years were suppressed in ARTS tables—these were interpolated on extrapolated based on data for adjacent years. *Note:* Categories sorted by 2017 share. Restaurants/Gasoline Stations/Building materials/Motor Vehicles are zero throughout.

the ARTS. It is a subsector in NAICS 44–45, which, as mentioned earlier, comprises all product retailing.

Because ESMOH includes non-ecommerce, primarily in the form of catalog sales, we can classify nonstore (NAICS454) retail sales into three subcategories: (1) ESMOH ecommerce (used in figure 5 discussed above), (2) ESMOH non-ecommerce, and (3) other nonstore retail sales. Appendix figure 6.A.5 shows how the level of retail sales achieved by retailers with no brick-and-mortar presence, as identified by the Census Bureau, has grown with the advent of the Internet. Panel B shows that, as a percentage of Traditional Retail (i.e., NAICS 44–45 plus restaurants; NAICS 722), nonstore retailing was a very minor component of retail in the late 1990s, at about 0.3 percent. This share increased (as seen earlier in figure 6.5) to about 7 percent of Traditional Retail sales, representing about $397.5 billion in sales in 2017.

This rise in e-commerce sales by online retailers has involved differential trends across retail subsectors, as illustrated in figure 6.6.[21] In particular, and in line with reports in the trade press (e.g., anecdotal explanations for the

21. See the last paragraph of section 6.2.3 for a discussion of how we imputed ESMOH data on e-commerce sales to retail subsectors.

bankruptcy of chains, such as Circuit City and Radio Shack), the data suggest that Electronic Stores (NAICS 443) faced the most intense competition from online sales, with the share of online retailers increasing from about 7 percent in 1999 to close to 50 percent in 2017. Sporting Goods (which also includes bookstores) was the subsector with the next highest penetration of online retailing, with shares increasing from below 5 percent in 1999 to about 37 percent in 2017. Somewhat surprisingly (given the likely high per item shipping costs), furniture stores are the next highest in terms of nonstore e-commerce share in 2017 (at 30 percent). Clothing stores are next, with about 22 percent in 2017, but then there is a sizable drop to the next subsector (Health and Personal Care Stores; NAICS 446) at just below 10 percent. The data yield no imputed e-commerce competition for Restaurants (722), Gasoline Stations (447), Building Materials (444) and Motor Vehicles (441).[22]

In figure 6.7 and corresponding table 6.1, we explore the correlation between the change in ESMOH e-commerce share between 1999 and 2016 for 11 traditional physical retail NAICS 3-digit sectors, and the decline in physical retail activity.[23] We find that, despite potentially significant measurement errors in the imputed e-commerce sales shares, there is a strong negative correlation between increases in e-commerce penetration and the level of retail activity by traditional retailers, as measured by the number of establishments, employment, sales, and payroll. Despite the small number of observations available, in table 6.1, we confirm the statistical significance of the negative correlation for two of our four measures of retail activity, namely, sales and total payroll (at the 5 percent level for sales and at the 10 percent level for total payroll).

Data limitations prevent a more granular investigation of the impact of online sales on physical retail activity. Nevertheless, the patterns in figure 6.7 provide solid support for several persuasive accounts from the trade press (e.g., Evangelista 2015) of the closure of physical stores (e.g., bookstores and electronic stores) that specifically refer to increased competition from online retailing as a trigger. Our results are also broadly in line with those of Chava et al. (2018), who use microdata from the National Establishment Time Series (NETS) to document a reduction in employment, sales, and entry,

22. Some of this result is likely due to one important source of measurement error, arising from a large unallocated "Other merchandise" category in the list of ESMOH merchandise lines, which had about $62.8 billion in e-commerce sales accounting for 16.13 percent of the total ESMOH e-commerce sales of $397.5 billion in 2017. The notes to the ARTS table describe this category as including "other merchandise such as collectibles, souvenirs, auto parts and accessories, hardware, and lawn and garden equipment and supplies"; hence it is likely that the imputed zero for the building materials subsector (NAICS 444, which includes lawn and garden equipment and supplies stores) and Motor Vehicles (NAICS 441, which includes 4413, Automotive Parts, Accessories, and Tire Stores) are underestimates, as they should include at least a portion of what is currently attributed to the "Other merchandise" category.

23. We chose 2016 as the end year of comparison, as the 2017 figures are the latest available and may be subject to revisions. In any case, there is only a modest difference in aggregate figures between 2016 and 2017 (see, e.g., figure 6.3).

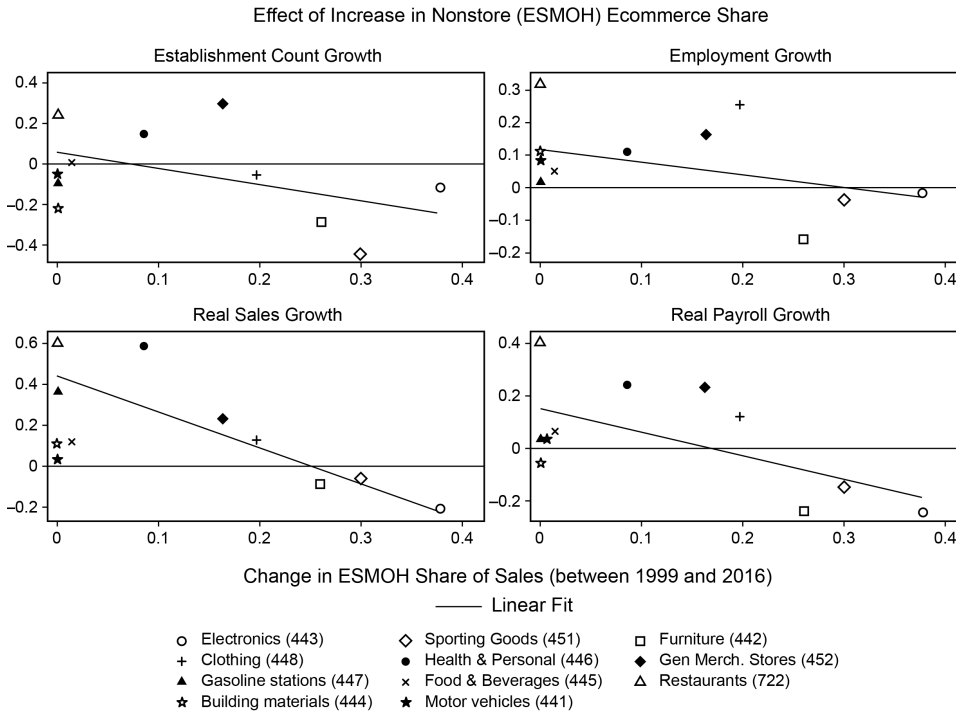


Fig. 6.7 Cross-industry outcomes: Correlation with ESMOH ecommerce penetration

Source: Establishment counts and employment from CBP, sales from ARTS and SAS (for restaurants); Excludes Nonstore retailers (454), and Misc. Stores (453).

Note: See table 6.1 for corresponding regression results. Y Growth = (Y2016 − Y1999)/Y1999.

and an increase in exit, of retail stores in counties nearest to e-commerce fulfillment centers. With the overall and sector-specific trends for online e-commerce (in figures 6.5 and 6.6) showing no signs of a slowdown, we expect pressure from online sales to continue to dampen physical retail activity in the most e-commerce-prone sectors of electronics, furniture, sporting goods, and clothing. Moreover, the current COVID-19 crisis is likely to only accelerate this effect as more customers, out of necessity, try out and become familiar with online shopping for such items.

6.4.2 The Role of General Merchandise Stores

In their overview paper on the evolution of US retail, Hortaçsu and Syverson (2015) use data up to 2012 to highlight the remarkable surge in the share of big box stores in retailing; in earlier work, Basker, Klimek, and Hoang Van (2012) documented this surge of general merchandise stores over the 1992–2007 period. The growth of this (NAICS 45291) subsector

Table 6.1 **Aggregate cross-industry exploration of the role of ESMOH e-commerce in the decline in physical stores**

	Establishment growth (1999 to 2016) (1)	Employment growth (1999 to 2016) (2)	Sales growth (1999 to 2016) (3)	Real payroll growth (1999 to 2016) (4)
Change in e-commerce share of sector (1999 to 2016)	−0.655	−0.440	−1.754**	−0.881*
	(0.481)	(0.285)	(0.695)	(0.391)
Constant	0.0338	0.139**	0.904***	0.154*
	(0.0888)	(0.0526)	(0.128)	(0.0722)
Observations	11	11	11	11
R-squared	0.171	0.209	0.414	0.360
Dependent variable mean	−0.0281	0.0768	0.797	0.0482
Dependent variable standard deviation	0.231	0.126	0.659	0.197
Mean of change in e-commerce share	0.112	0.112	0.112	0.112
Standard deviation of change in e-commerce share	0.129	0.129	0.129	0.129

Note: *, **, and *** denote statistical significance at 10%, 5%, and 1%, respectively.

was reflected also in figure 6.5, discussed above. Appendix figure 6.A.6 presents trends for big box and other general merchandise stores in dollar terms (panel A) and as a share of total traditional retail (i.e., NAICS 44–45 and Restaurants 722). The figures show that big box stores have grown from about a third of the general merchandise (NAICS 452) subsector to well above 50 percent of sales. While panel a of figure 6.A.6 shows that nominal sales continued to grow for big box stores through the entire 1999 to 2017 period, their growth slowed starting around 2008, as seen in a dramatic flattening of the trend in terms of share of retail sales (in appendix figure 6.A.6b just as in figure 6.5 above). Panel b also reveals that the non–big box stores in this subsector experienced considerable decline in their share of retail, so that the aggregate general merchandise subsector shrank from a peak of about 14.5 percent of retail sales (in 2009) to less than 12 percent in 2017. These trends suggest some challenges for stores in the general merchandise subsector, especially for non–big box general merchandise stores.[24]

These figures also confirm that while Hortaçsu and Syverson were correct to highlight the importance of the rise of big box stores up to the late 2000s as potentially more impactful than the rise of e-commerce in the same period, the rise of big box stores has stalled, so that since 2009, it seems likely that the continuing rise of e-commerce will be the prominent driver of changes in the physical retail sector. Having said that, with brick-and-mortar

24. In section 6.7, we discuss new approaches that physical retailers like Walmart are adopting, greater investments in online retailing, curbside pickups, and grocery home deliveries from stores, to defend and grow their market share.

retailers' increased involvement in online sales, and signs that e-commerce firms are finding their way into developing some brick-and-mortar presence, the lines between traditional and online retailing are blurring to an increasing degree as well, making it difficult to identify which is affecting which (see the discussion in section 6.7).

Despite the slowdown in big box share of retail starting in 2009, over the 1999 to 2016 time frame, this sector did see very significant growth. Did this growth reduce demand for other physical retail, especially since these supercenters and warehouse stores often carry a wide range of products that compete with almost every other retail store subsector? To investigate this in more granular detail, we use US Census Bureau CBP data and regress the 1999–2016 growth in measures of physical non-restaurant retail (i.e., NAICS 44–45 excluding nonstore retailers (454)) activity (specifically, the number of establishments and employment, with growth defined as $(Y2016 - Y1999)/Y1999$) on the growth in number of big box establishments in the county. Results are reported in table 6.2. We examine the effect of both a continuous measure of big box growth (in odd numbered columns) as well as a more flexible specification using dummy variables for different ranges of growth in the number of big box stores (in even numbered columns). In columns 5 to 7, we include variables to control for growth in county population and growth in county personal income. While we would not want to impute a causal interpretation to these regression results, these long-difference specifications are akin to using county fixed-effect regressions, and hence they control for omitted variable bias that would arise from omitted fixed county-specific characteristics (so long as they have static effects on the number of establishments and employment in the Non-Restaurant Traditional Physical Retail sector). Across all specifications, we find a strong *positive* correlation between growth of traditional retail activity and the growth of big box stores. As expected, population growth and income growth are also strongly positively correlated with growth in physical retail activity, but even in specifications controlling for these variables, we still find significant positive correlation between increases in big box presence and growth of the physical retail sector.

The results in table 6.2 contradict a narrative in which the growth of big box stores is associated with a decline in other retail physical activity over the full period of our data. Instead, these results suggest that places that saw increases in big box presence also saw a relative strengthening of other (non-restaurant) retail activity, even conditioning on income and population growth. We surmise that this occurs because big box stores expand in places that have a more than usual (over and above what is predicted from population and income growth) conducive environment for retail activity in general, rather than into less hospitable places where these stores try to replace other physical retail activity. Moreover, their presence in some

Table 6.2 **Traditional nonrestaurant physical retail growth and big box growth—long difference estimates**

Dependent variable: Growth (99 to 16) in Trad. (non-rest) Retail:	Estabs. (1)	Estabs. (2)	Emp. (3)	Emp. (4)	Estabs. (5)	Estabs. (6)	Emp. (7)	Emp. (8)
Growth in Big Box Estabs.	**0.0985*** **		**0.120*** **		**0.0512*** **		**0.0721*** **	
	(0.0087)		**(0.0074)**		**(0.0084)**		**(0.0065)**	
Big Box growth Cat 2 (growth=0)		−0.00634		0.0483		−0.00771		0.0445
		(0.0528)		(0.0452)		(0.0489)		(0.0380)
Big Box growth Cat 3 (growth>0 & <=1)		**0.0837***		**0.125*** **		**0.0477**		**0.0913*** *
		(0.0506)		**(0.0433)**		**(0.0469)**		**(0.0365)**
Big Box growth Cat 3 (growth>1)		**0.190*** **		**0.245*** **		**0.0840***		**0.139*** **
		(0.0506)		**(0.0433)**		**(0.0472)**		**(0.0367)**
Growth in county population					0.782***	0.781***	0.893***	0.903***
					(0.0336)	(0.0345)	(0.0259)	(0.0269)
Growth in county personal income (per capita)					0.276***	0.295***	0.701***	0.713***
					(0.0615)	(0.0621)	(0.0474)	(0.0484)
Constant	−0.108***	−0.132***	0.0238***	−0.0274	−0.333***	−0.350***	−0.443***	−0.487***
	(0.0103)	(0.0498)	(0.0087)	(0.0427)	(0.0353)	(0.0578)	(0.0272)	(0.0450)
Observations	3,088	3,088	3,088	3,088	3,088	3,088	3,088	3,088
R-squared	0.040	0.042	0.079	0.064	0.184	0.181	0.353	0.339

Note: Observations are weighted by county population. County population and income data are from the BEA regional economic accounts. (https://apps.bea.gov/regional/downloadzip.cfm). *, **, and *** denote statistical significance at 10%, 5%, and 1%, respectively.

Summary statistics for interpreting table 6.2

	Dependent variable: Growth in other (phys) retail establishments	Dependent variable: Growth in other (phys) retail employment	Growth in Big Box establishments	Growth in county population	Growth in county personal income (per capita)	Growth in Big Box establishments: breakdown by category bins			
						(Omitted) BB growth Cat 1 (gr < 0)	BB growth Cat 2 (gr = 0)	BB growth Cat 3 (gr > 0 & ≤ 1)	BB growth Cat 4 (gr > 1)
N	3,088	3,088	3,088	3,088	3,088	41	1,535	393	1,119
Mean	−0.013	0.140	0.968	0.159	0.531	−1.031	0.000	0.652	1.588
SD	0.335	0.290	0.677	0.169	0.090	0.787	0.000	0.225	0.349
P25	−0.139	−0.015	0.571	0.048	0.472	−2.000	0.000	0.500	1.294
P75	0.049	0.226	1.440	0.239	0.578	−0.400	0.000	0.857	2.000

Note: Observations are weighted by county population.

locations might drive other, potentially complementary, retailers to want to operate nearby.[25]

6.5 The Rise of Restaurants

In this section, we explore two broad (and potentially complementary) explanations for the rise in number of and economic activity in restaurants documented above: (i) a supply side explanation, where the increase in restaurants is induced by a reduction in retail real estate prices and retail wages,[26] and/or (ii) a demand side explanation, that the growth in the restaurant sector may have been propelled by a shift in expenditures/preferences away from other consumption, including home cooking, and toward restaurant food.

To explore explanation (i), in section 6.5.1, we examine data on real estate prices (section 6.5.1.1). And in section 6.5.1.2, we examine whether restaurant growth is directly negatively correlated with other physical retail growth, which would be the case if vacancies and displacement of workers from other physical retail activity played a role in the rise of restaurants. We explore trends in productivity and compensation in section 6.5.1.3. In section 6.5.2, we examine evidence for a shift in preferences toward restaurant food and explore a simple quantification of the impact of such a shift on restaurant activity. In section 6.5.3, we delve deeper into the expansion of restaurants to examine whether most of the growth was concentrated in a certain type of restaurant (in particular, limited service, or fast-food, versus full service restaurants) and the demographics of counties where the growth occurred.

6.5.1 Supply Side Factors and the Rise of Restaurants

6.5.1.1 Trends in Retail Real Estate Vacancies and Prices

The growth in online retailing and the growth of big box stores described above both would suggest a significant reduction in the demand for traditional retail space. Figure 6.8a shows the vacancy rate, at the national level, for retail (and other types) of commercial real estate. Figure 6.8b shows how the price of retail real estate has evolved over time. These figures, taken

25. For several years, Burger King was said to systematically locate its restaurants near McDonald's restaurants on the presumption that these were high-demand areas for fast food, and that the differentiation between the two chains in terms of products would allow them to capture some of that demand. Eaton and Lipsey (1982) argued that economies of scale and scope arising from multipurpose shopping trips lead to benefits from retail agglomeration that can be higher than the costs of locating close to competitors. See also Page (2007) for a theoretical paper that suggests that chains beget chains, based on a similar argument.

26. In simple, homogenous firm models, it is easy to show that a pure reduction in fixed costs, or pure reduction in variable costs, would lead to a higher equilibrium number of firms in the market.

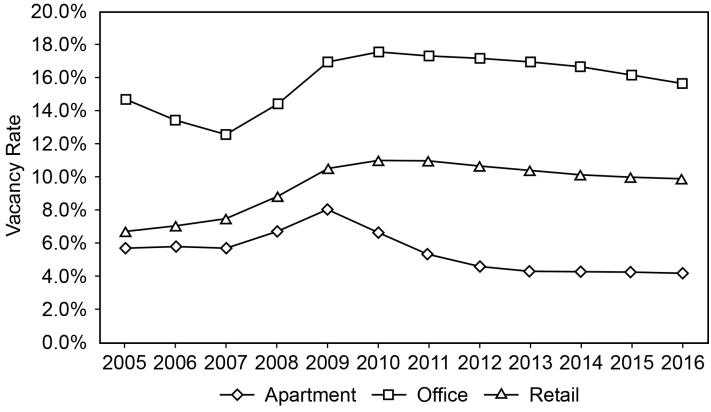


Fig. 6.8a Commercial real estate vacancies, by type

Source: From chart 3 in the "Capital Markets Special Report of the National Association of Insurance Commissioners and the Center for Insurance Policy and Research," https://www.naic.org/capital_markets_archive/170601.htm. Source data for the figure is cited as REIS Inc.

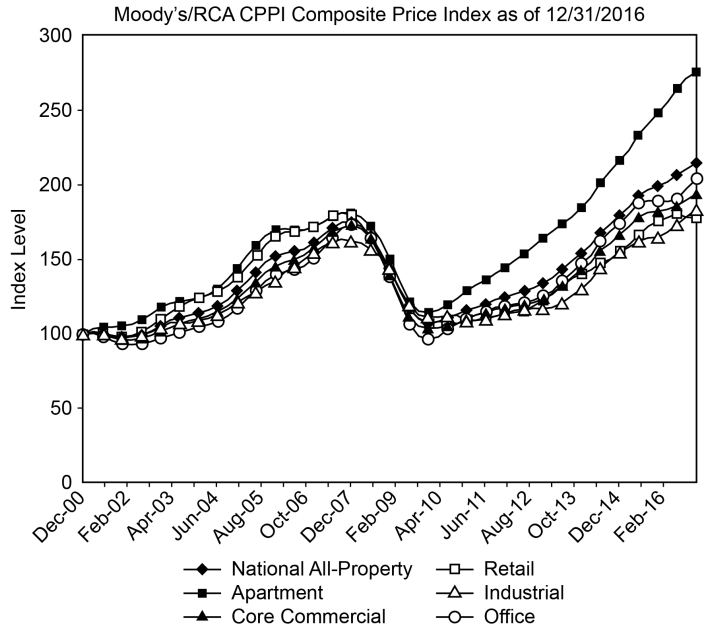


Fig. 6.8b Commercial real estate price index by property type

Source: From Chart 1 in the "Capital Markets Special Report of the National Association of Insurance Commissioners and the Center for Insurance Policy and Research," https://www.naic.org/capital_markets_archive/170601.htm.

Note: Core commercial includes retail, industrial and office. Core commercial includes retail, industrial, and office.

from NAIC-CIPR (2017), illustrate the large impact of the Great Recession in 2008–2009 on retail real estate. The effect on price is particularly pronounced, with the price index reaching about 175 right before the Great Recession (from 100 in 2000) and falling back down to almost 100 at the end of 2009. However, from that point on, the price recovers, reaching about 175 again in 2016.

Looking more closely at vacancies, figure 6.8a shows a sizable increase in the proportion of vacant retail space starting with the Great Recession, from a rate lower than 8 percent to a maximum of about 11 percent a few years later, in 2010–2011. The vacancy rate then decreases slowly, settling at 9.9 percent in 2016. This post-financial crisis rate is well above the rate of about 7 percent observed prior to the Great Recession, in 2005–2007.

While the data about vacancy rate and the price index for retail real estate clearly show the effect of the financial crisis of 2008–2009 on this market (an effect that was also very prominent in figures 6.1 and 6.3 for retail and restaurants), the evidence for a continued retail apocalypse way beyond the financial crisis is much less clear from these data. Instead, there is evidence of recovery from the Great Recession, with vacancy rates stabilizing, though at a higher level than before the recession, and the price index fully recovering by 2016.

We conclude that the growth in online retailing and general merchandise stores has been associated with reductions in the number of establishments and employment in the physical goods retail sector (NAICS 44–45), but that the effect on the retail real estate market has been less dramatic than might be expected: there is not the kind of secular reduction in the price of retail real estate, nor continued increases in the vacancy rate, that one might predict after the Great Recession based on the rate of growth in online retailing in particular. This, of course, is consistent with the idea that the demand for retail real estate at the aggregate level has not systematically declined over time or since the Great Recession. We would argue that this is likely due to the counterbalancing growth in the number of restaurants in the post-financial crisis, as shown in figure 6.2. In fact, the evolution of the price index in figure 6.8b is very similar to the evolution in the total number of establishments (the sum of establishments in NAICS 44–45 and restaurants) in figure 6.1d.

6.5.1.2 Correlation between Restaurant Growth and Traditional Non-Restaurant Physical Retail Growth at the County Level

As a further and more direct test of whether the rise in restaurants was induced by the decline in retail rents and wages, which themselves would be consequences of the collapse/apocalypse in the goods retail sector, we examined the correlation between restaurant growth and growth in the number of establishments or employment in such retail at the county level, using the US Census Bureau's CBP data.

In table 6.3, we show long difference regression results, where the depen-

Table 6.3 **Restaurant growth and growth in traditional non-restaurant physical retail activity**

Dependent variable: Growth (99 to 16) in Restaurant	Estabs. (1)	Emp. (2)	Estabs. (3)	Emp. (4)	Estabs. (5)	Emp. (6)	Estabs. (7)	Emp. (8)
Growth in other (Phys) retail establishments	**0.623*** (0.0108)**	**0.595*** (0.0123)**			**0.599*** (0.0110)**	**0.572*** (0.0126)**	**0.472*** (0.0105)**	**0.443*** (0.0123)**
Growth in non-restaurant phys. retail average payroll per worker			**−0.429*** (0.0391)**	**−0.382*** (0.0411)**	**−0.190*** (0.0277)**	**−0.154*** (0.0315)**	**−0.252*** (0.0244)**	**−0.232*** (0.0285)**
Growth in Big Box establishments					0.0303*** (0.0054)	0.0340*** (0.0061)	0.0049 (0.0048)	0.0129** (0.0056)
Growth in county population							0.639*** (0.0210)	0.634*** (0.0245)
Growth in county personal income (per capita)							0.274*** (0.0356)	0.529*** (0.0416)
Constant	0.321*** (0.0036)	0.411*** (0.0041)	0.454*** (0.0138)	0.529*** (0.0145)	0.354*** (0.0109)	0.429*** (0.0124)	0.150*** (0.0213)	0.0914*** (0.0249)
Observations	3,088	3,088	3,088	3,088	3,088	3,088	3,088	3,088
R-squared	0.519	0.433	0.038	0.027	0.531	0.443	0.640	0.552

Note: Observations are weighted by county population.

Summary statistics for interpreting table 6.3

	Dependent variable: Growth (99 to 16) in restaurant Estabs.	Dependent variable: Growth (99 to 16) in restaurant employment	Growth in other (physical) retail estabs.	Growth in other (physical) retail annual payroll per employee	Growth in Big Box estabs.	Growth in county population	Growth in county personal income (per capita)
N	3,088	3,088	3,088	3,088	3,088	3,088	3,088
Mean	0.313	0.404	−0.013	0.328	0.968	0.159	0.531
SD	0.289	0.303	0.335	0.131	0.677	0.169	0.090
P25	0.178	0.253	−0.139	0.287	0.571	0.048	0.472
P75	0.414	0.504	0.049	0.371	1.440	0.239	0.578

Note: Observations are weighted by county population.

dent variable is either the growth in number of restaurants in the county between 1999 and 2016 or the growth in the number of employees in that sector. The main explanatory variables are the growth in the number of establishments in Traditional Non-Restaurant Physical Retail and growth in average payroll per employee in that sector.[27] In our preferred specifications, we also control for growth in the number of big box stores, growth in county population, and growth in per capita income in the county.

In columns 1 and 2 of table 6.3, we find that there is a strong *positive* correlation between restaurant growth (both in terms of number of establishments and employment) and growth in the number of establishments in the brick-and-mortar goods retailing sector (NAICS 44–45 except nonstore retail). In columns 3 and 4, we find, as expected, that the average payroll per worker in the brick-and-mortar goods retailing sector is a deterrent to restaurant growth. In the remaining specifications, we show that the strong positive correlation between the growth in number of establishments in the brick-and-mortar goods retailing sector remains after we control for growth in the number of big box stores and demographics at the county level. Moreover, here again, as in table 6.2, we find that big box store growth is positively correlated with restaurant growth, and population and income growth are beneficial for restaurant growth as well.

Figure 6.9 presents a semi-parametric picture of the relationship between the growth in number of restaurants or restaurant employment on one hand and growth in the brick-and-mortar goods retailing sector on the other. Specifically, the figure reports the mean and the interquartile (p25 to p75) range for the growth rate for restaurants between 1999 and 2017, in 10 (population-weighted) deciles of county bins of growth in Traditional Non-Restaurant Physical Retail.[28] The graphs on the left confirm the results from the regression, that there indeed has been systematically higher growth of restaurants (both in terms of establishments in the top left panel, as well as employment

27. As mentioned in section 6.3, we do not have wage data in the CBP database. We use total payroll in the sector in the county and information about total numbers of employees in the sector to derive a measure of average yearly pay per worker. To the extent that some of the employment is part-time, this measure of average payroll indicates how much the average employee working the average number of hours brings home as compensation on a yearly basis. If all the employees were full-time, or if we knew hours worked, this measure could be further divided by the usual number of hours worked to yield a wage rate. However, we do not have data on hours worked, and we know many of the employees are in fact part-time, so we use "average payroll per employee" throughout.

28. The counties are divided into 10 groups with lowest to highest Traditional Physical Retail growth between 1999 and 2016. The *x*-axis shows the growth, so the top left panel of figure 6.9 has a mean Traditional Physical Retail physical establishments' growth rate of −38 percent. The population-weighting in the construction of the bins means (as indicated in the notes to the figure) that counties are divided into 10 groups with equal populations in each group; because the total US population in 2016 per the BEA data is about 320 million, each group refers to a collection of counties with population of about 32 million people. (The number of counties varies across bins as some bins may have a lot of low-population counties that together only have the population of a single large county in another bin.)

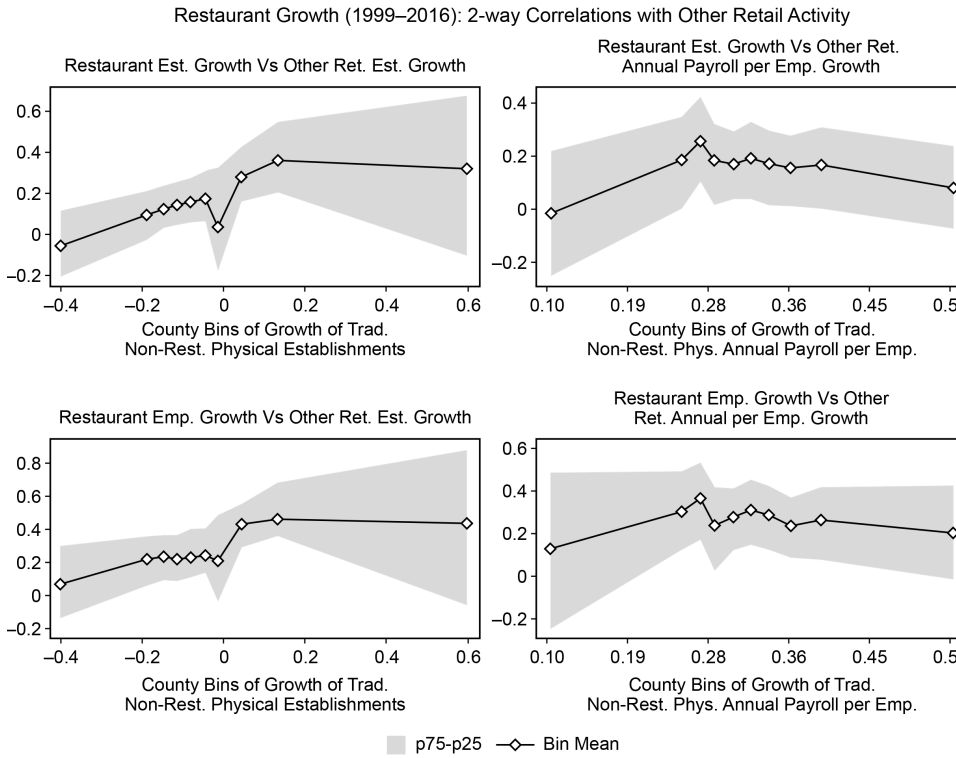


Fig. 6.9 Restaurant growth (between 1999 and 2016) vs. traditional non-restaurant physical retail activity

Note: Restaurants grew more where other physical retail grew, except in the counties with the highest growth in payroll per employee saw somewhat slower growth in restaurant establishments and employment. Growth = (Y2016—Y1999)/Y1999. County bins are 2016 population-weighted (i.e., each marker represents population of ~32 mn); *x*-axis represents (population-weighted means).

in the bottom left panel) in counties that experienced relatively lower decline or even positive growth in number of other physical retail establishments. The results in the panels on the right provide more nuance relative to the average negative effects we found in table 6.3 regarding compensation. Specifically, it appears that the growth in restaurants was lower in places with very low as well as very high growth in average payroll per worker in the physical goods retail sector. Thus, restaurant growth was focused on those counties with medium (.2 to .4) growth in the compensation of workers in the Traditional Non-Restaurant Physical Retail sector, not those with the highest but also not those with the lowest such growth.

In sum, these results indicate that restaurant growth is in fact stronger in places that experienced relatively less of a decline in other physical retail activity, suggesting that there is not a prominent role for a supply side expla-

nation (i.e., the increase in restaurants is not correlated with a reduction in demand for real estate or labor due to reductions in other physical retail).[29]

6.5.1.3 Productivity and Compensation

While labor and real estate cost reductions do not seem to have spurred the growth in the restaurant sector, it is possible that costs in this industry might have been reduced, or productivity increased, through some other channel (e.g., some innovation or other cost-side shocks). Figures 6.10 and 6.11 present some interesting data in this regard.

In figure 6.10, we use data on sales from the US Census Bureau ARTS, and on employment and establishments from the US Census Bureau CBP, to calculate how both real sales per establishment (top left panel) and employment per establishment (bottom left panel) have grown at a very rapid rate in the restaurant sector since the Great Recession. In particular, sales per establishment (in 1999 dollars) increased from about 600,000 in 1999 to about 720,000 in 2017, with steep increases between 2013 and 2016.

Note that real sales per establishment in part grew as a result of sizable increases in the number of employees per establishment (top right panel) in this sector, so the story on real sales growth is not simply one of increased productivity per employee. Nonetheless, the increase in real sales per establishment implies, in the context of a simple model of homogenous competitive firms, that the observed increase in number of establishments was not triggered by a reduction in the optimal scale of restaurants (as could result from reduced fixed costs). Thus, the evidence suggests that the increase in number of restaurants is not a story of entry of small, previously inframarginal entrants induced by lower rents/labor costs triggered by the decline of other physical retail.[30] In fact, evidence shown in figure 6.10 suggests that the average scale of restaurants increased, in terms of real sales (top left), employment (top right) and real payroll (top middle), during this period.

The direct evidence on payroll per employee also argues against an explanation based on a decline in labor costs induced by exit of other physical retail stores. In particular, the bottom middle panel indicates a strong

29. One possible explanation for the lack of a positive correlation across regions between the rise of restaurants and the decline of other physical retail is that converting a non-restaurant location to a restaurant involves significant remodeling costs. Estimates based on a survey of independent restaurant owners by restaurantowner.com (presented at https://www.restaurantowner.com/public/CTOSurvey-SummaryReport.pdf) suggest that remodeling costs are indeed significant; a conversion from one restaurant to another is estimated to cost $275,000, while conversion of a non-restaurant to a restaurant is at the median about 54 percent more expensive, at $425,000. Though this is cheaper than new construction for a restaurant (median cost to open of $650,000), the significant additional up-front expenditure involved could be a sufficient deterrent, along with negative local demand factors that have weakened physical retail, to discourage restaurant entry even with potentially declining rents. A second source (Walters 2018) indicates a higher cost, suggesting a customized kitchen build out could cost an additional $250,000.

30. Even with a heterogeneous firm model, an increase in entry triggered by a reduction in fixed costs could be expected to result in a decline in equilibrium firm revenue per establishment as the cutoff productivity level drops (e.g., Hopenhayn 1992).

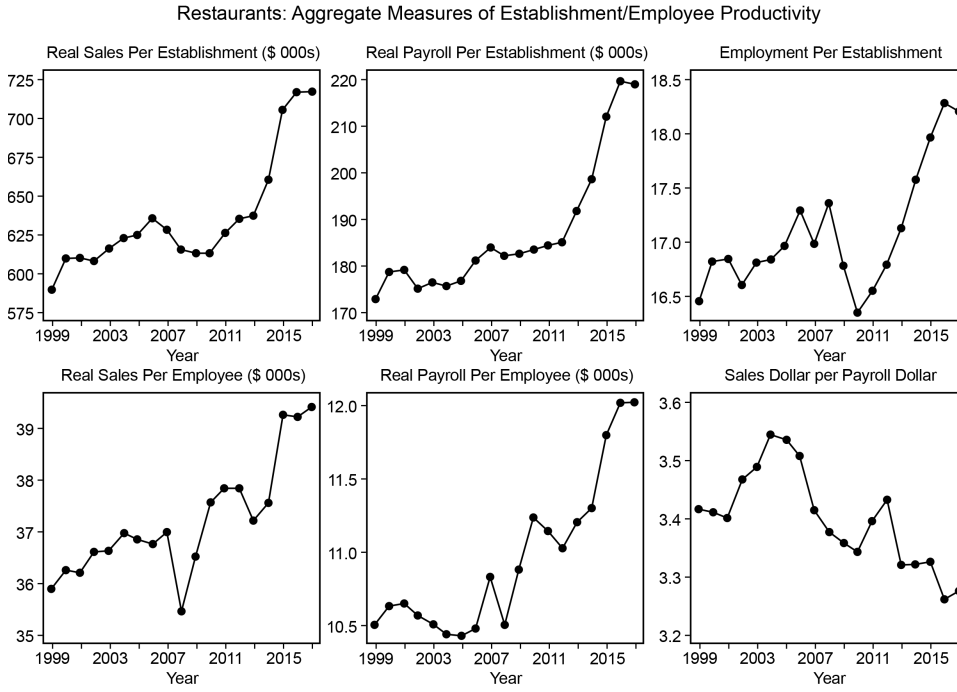


Fig. 6.10 Aggregate restaurant sector productivity

Note: These figures show trends in levels; see appendix figure 6.A.7 for normalized trends. Measures as based on national aggregates for the restaurant sector (722) in the numerator and denominator.

increase in real payroll per employee, suggesting compensation grew for restaurant workers over this period. The increases in real payroll per worker are large enough, in fact, to lead to overall decline in sales per dollar of payroll (bottom right panel).[31] Thus, while there has been labor productivity growth in this sector, the growth in real compensation has more than offset the benefits garnered by firms as a result of this productivity growth.

Figure 6.11 compares trends in labor productivity and compensation for workers in different retail sectors. In particular, it shows that real value added has been very stable throughout the period in all sectors except nonstore retailing. The latter's growth in value added should be interpreted with caution, because of the measurement issues discussed in sections 6.2.3 and 6.2.4, i.e., the idea that some of the labor that support sales in this sector likely appears under Warehousing and Transportation (NAICS 48–49) rather than under nonstore retail.

31. Both increased competition for workers and changing minimum wage laws in various jurisdictions are likely to be contributing to the growth in payroll per employee in the restaurant sector.

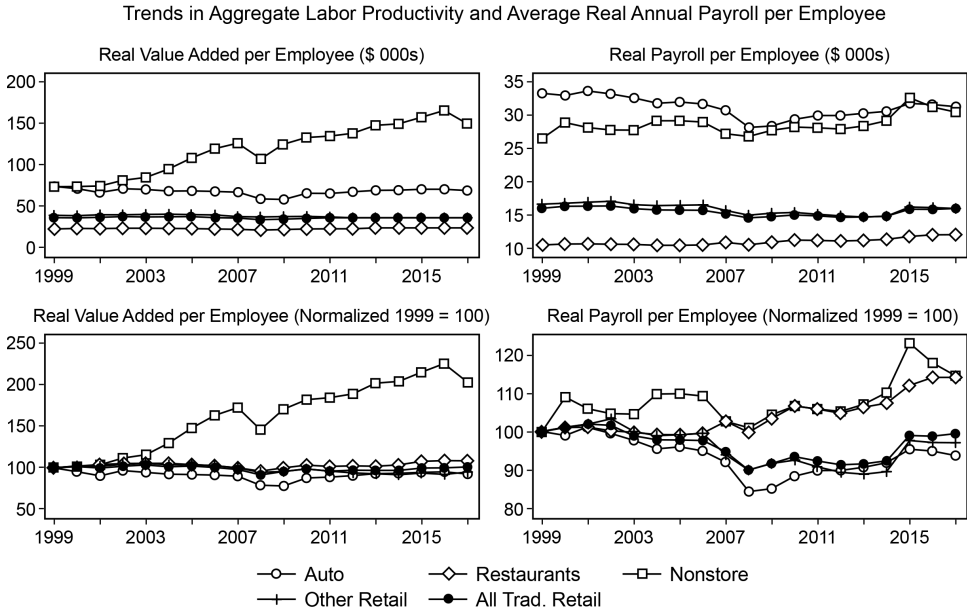


Fig. 6.11 Real value added and payroll, per employee (labor productivity and average annual payroll per employee)

Source: Data on sales are from US Census Bureau ARTS, employment and establishments are from the US Census Bureau County Business Patterns data, and value added are from BEA. Traditional retail is NAICS retail (NAICS 44–45)+ restaurants (NAICS 722). Data on value added are from BEA (https://apps.bea.gov/iTable/index_industry_gdpIndy.cfm), sales are from US Census Bureau ARTS, and other data are from US Census Bureau County Business Patterns.

Note: Auto refers to Motor Vehicles and Parts Dealers (NAICS 441), Nonstore refers to NAICS 454, and Restaurants refers to Food Services and Drinking Places (NAICS 722). Other Retail is total traditional retail (NAICS 44–45) less Auto and Nonstore.

Figure 6.11 (top panels) shows that real value added per worker, and real payroll per employee, are lower for restaurants than for other retail. This point provides a note of caution in interpreting some of the aggregate trends noted above. In particular, while the growth of restaurants has offset the decline in employment in the rest of the physical retail sector, figure 6.11 highlights the fact that the payroll per employee as well as contribution to GDP per employee (value added) in this sector are significantly lower than for other sectors. That is, we must be cautious when comparing employment numbers in restaurants to those in other physical retail sectors, because the range of payroll of around 10,000 to 12,000 per year per employee for restaurants is consistent with much of this work being part time, more so than what occurs in other retail sectors, even though some of them may also have part-time workers.

In terms of productivity and compensation, however, the main point with

regard to restaurants is that while sales per establishment, and real sales per employee, have gone up dramatically (per figure 6.10) over the period of interest, in reality, real value added per employee has not. At the same time, real payroll per employee has inched up (figure 6.10, and figure 6.11, right top and especially right bottom panels).

Overall, the data imply that the explanation for the rise of restaurants is unlikely to be a supply side one. The evidence suggests instead an increase in average restaurant size, and relative wage growth appears to be steeper for restaurants (see bottom right panel of figure 6.11) than for other retail segments. This suggests a demand side explanation, which we explore in section 6.5.2.

6.5.2 The Demand for Food away from Home

As our results above suggest that no good supply side explanation exists for the growth in the number of restaurants, in this subsection, we turn to an examination of potential demand side explanations. A study projecting demand for restaurant food (Stewart et al. 2004) noted that increases in household income typically increase demand for restaurant food. In addition, increases in the proportion of single-person and no-children-multiple-adult households were also expected by the study authors to increase restaurant demand.

We use BEA data on personal expenditures to derive estimates of expenditures on food. Specifically, the BEA reports spending on Food and Accommodations (consistent with NAICS code 72) in a "Personal Consumption Expenditures by Major Type of Product" table. Comparing the dollar expenditure numbers in the BEA data to sales data for NAICS 72 according to the ARTS data, we find that the ratio of aggregate expenditure to sales in this sector remains within a tight range, between 92 percent and 98 percent, for 1999–2017. Assuming that the same personal expenditure (per the BEA) to sale (per ARTS) ratio holds for subcategories in Food and Accommodations, we use the available sales for restaurants to arrive at an estimated personal expenditure on restaurant food (by multiplying restaurant sales by the expenditure-to-sales ratio for the "Food and Accommodation" aggregate sector).[32] The BEA table also separately reports "Food and beverages purchased for off-premises consumption" as a subgroup within nondurable goods, which we take as a measure of expenditures on "food at home."

In figure 6.12a, we present the resulting trends in the share of expenditures on "food at home" vs. the share of (imputed) restaurant expenditures. We find that, consistent with a shift in consumer preferences toward restaurant food, there has been a decline in the share of total expenditures on nonres-

32. That is, we estimate personal expenditures on restaurant food $E_r \equiv S_R \times (E_{FA}/S_{FA})$, where S_R is total yearly sales in NAICS 722; S_{FA} is yearly data on sales for Food and Accommodations (NAICS 72), which are available from ARTS; and E_{FA} is yearly expenditure on Food and Accommodations (available in the BEA table).

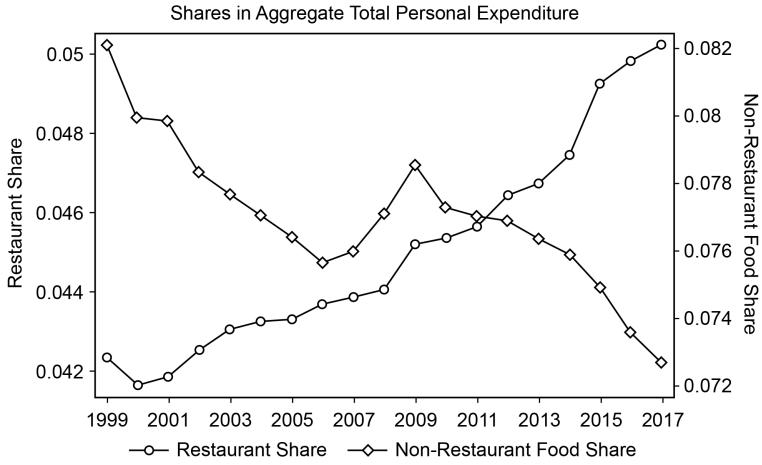


Fig. 6.12a Relative increase in restaurant expenditure share

Source: Data from BEA (https://www.bea.gov/data/consumers-spending/main), restaurant expenditure was imputed using the share of restaurant sales in Food & Accommodation per US Census Bureau's ARTS data.

taurant food from 8.2 percent to 7.2 percent (right axis), with an almost exactly offsetting increase in the share of restaurant food, from 4.2 percent to 5 percent (left axis).

We then undertake a simple quantification exercise to understand the role of this increase in share of expenditure on restaurant food in potentially explaining the observed increase in number of restaurants and employment in restaurants. To do this, we obtain a counterfactual number of restaurants in the absence of expenditure share growth by using the following simple relationship:

Projected number of restaurants in year t

= *share of restaurants in total personal expenditure in 1999*

× *observed total personal expenditure in year t*

× *observed sales to expenditure ratio for restaurants in year t / observed sales per restaurant in year t*

We project the counterfactual employment using a similar formula. Figure 6.12b shows the actual and predicted (counterfactual) trends in number of establishments in the left panel, and in employment in the right panel. The left panel shows that without the expenditure shift, the aggregate number of restaurants would have reached only 550,000 instead of the observed 650,000 in 2017 (using the observed sales per establishment each year, which itself grew during this period). Thus, of the roughly 150,000 increase in

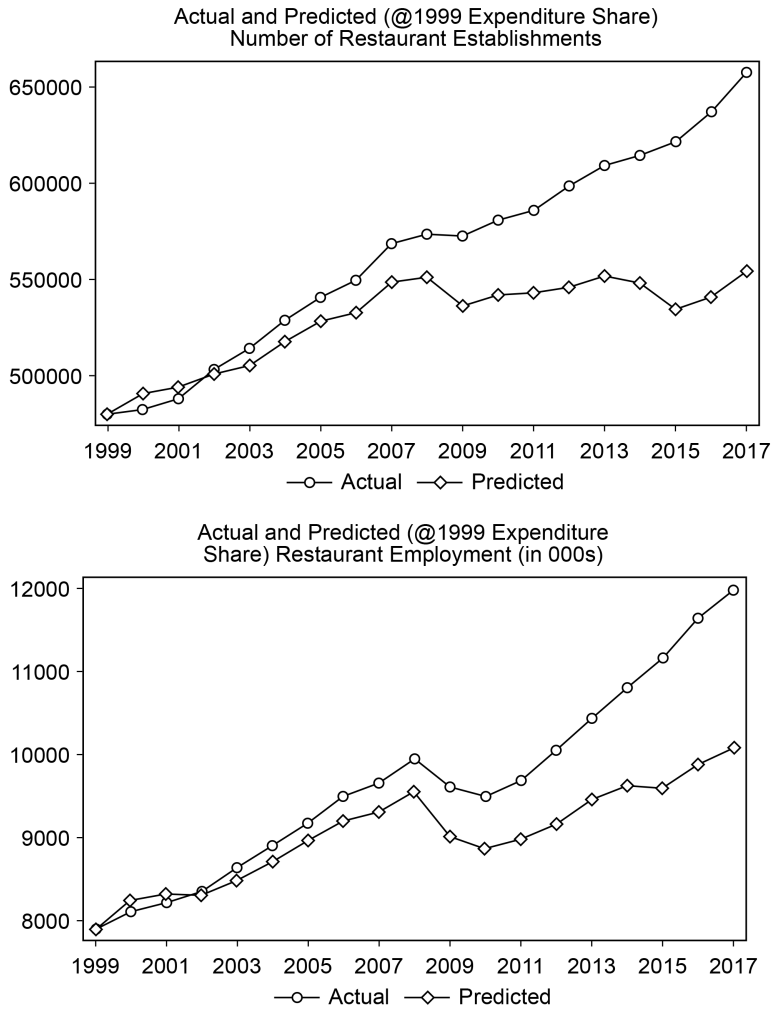


Fig. 6.12b A simple estimate of the role of expenditure shift in the growth of restaurants

Note: Increase in expenditure share explains about 50 percent of the increase in employment and two-thirds of increase in number of restaurant establishments. Predicted number is based on holding the expenditure share of restaurants constant at the 1999 level, and adjusting by actual restaurant sales per establishment, or per employee.

establishments between 1999 and 2017, about 100,000 (or two-thirds) could be attributed to the increase in share of restaurant expenditures. Similar calculations for restaurant employment suggest that about 2 million of the observed 4 million increase in restaurant employment (from 8 million in 1999 to 12 million in 2017) can be attributed to this shift in expenditures.

Albeit highly simplistic, these estimates suggest an important role for a shift away from expenditures on food at home toward more food consumed away from home to explain the rise in the number of, and employment levels in, restaurants during the period of our study.

6.5.3 What Types of Restaurants Grew and Where?

In this section, we take a closer look at the growth in the number of restaurants. In particular, we address two questions: (i) Is the restaurant sector growing by adding high-quality restaurants, as suggested by our earlier analyses showing both increasing establishment size and employee productivity; and (ii) is the growth focused on particular types of customers (i.e., growth in full service vs. limited service restaurants, which might indicate a focus on high or low income customers, or in counties with high or low income levels).

Restaurant quality. Figure 6.10 presented trends for establishments and sales and payroll per worker. The fact that all these have grown over the period of our study suggests an overall increase in the quality of establishments and of jobs at these establishments. We explore this further in figure 6.13, where we use data from Yelp to calculate an inverse Herfindhal-Hirshman Index (HHI) measure of restaurant variety, as well as the fraction of restaurants with a rating at or above four stars. The Yelp public use data covering only a small number of US Metropolitan Statistical Areas (MSAs), which limits the generalizability of our results. Nonetheless, we combine the data from the different US MSAs into a single aggregate time series for both the inverse HHI and ratings data over time. The resulting time series data suggest that consumers today have access to a greater variety of types of restaurants, and a greater fraction of highly rated restaurants, even relative to 2010.[33]

Rich vs. poor counties, and limited vs. full service. In figure 6.14, analogous to figure 6.9, we present a semi-parametric analysis to show how the two different categories of restaurants identified in the Economic Census (namely, limited service restaurants and full service restaurants) have grown and how this might differ in rich vs. poor counties. Limited service restaurants are those where patrons normally order their food at a counter rather than

33. In addition to the limitation that the Yelp data reflect only the years 2010 to 2018, and only a few MSAs with significant coverage (more than 5,000 restaurant-year observations in the full panel) of just six states (Arizona, North Carolina, Nevada, Ohio, Pennsylvania, and Wisconsin), with some limited coverage of two others (Illinois [2,861 observations] and South Carolina [1,535 observations]), we also note that the definition of restaurant varieties is not systematic. We define varieties by looking for keywords in the "categories" description string variable for nationalities (e.g., Indian, Chinese, Afghan) or regions (e.g., Arabic, Asian, Mediterranean), as well as food types (e.g., deli, diner, halal, sandwich). The full list of restaurant types we use is provided in appendix table 6.A.2.

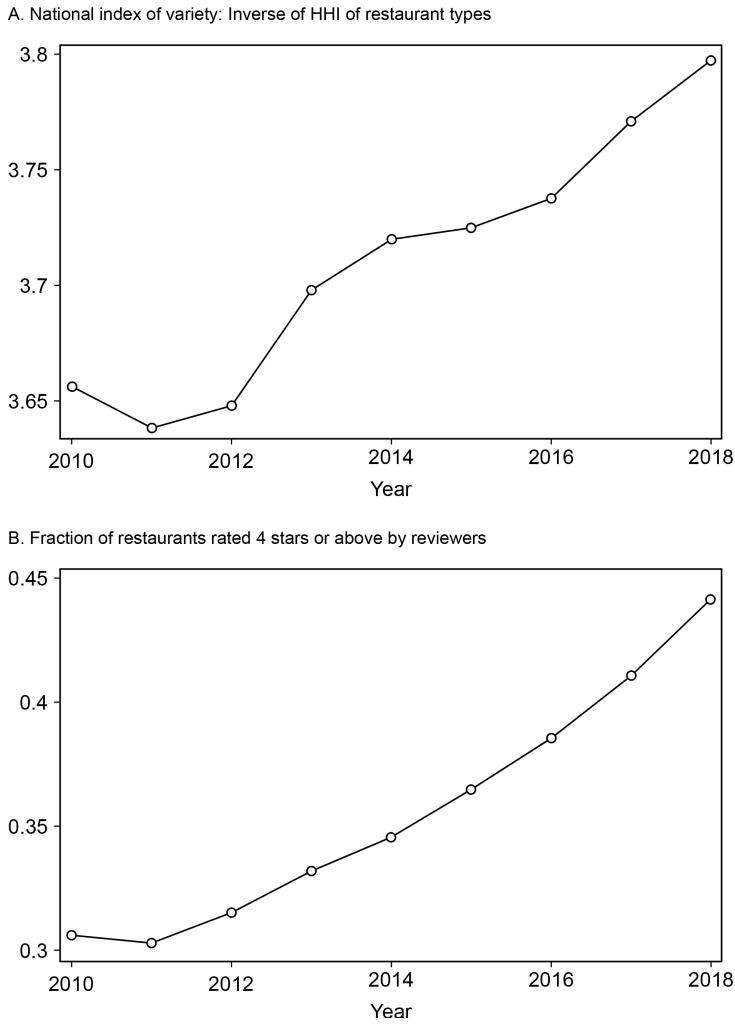


Fig. 6.13 Indicators of variety and quality of restaurants: Yelp restaurant data
Source: Yelp public dataset, https://www.yelp.com/dataset.

interacting with a server at their table; this category is often equated with fast food, although it also includes much more than the typical burger restaurant that this nomenclature conjures up. Full service restaurant refers to establishments where patrons are seated and order their food and are served while seated at their table. The figure shows strong positive growth across the full range of county income levels for both types of restaurants. In other words, both full service and limited service restaurants have grown in number across poor and rich counties. Bars (a small third category in the

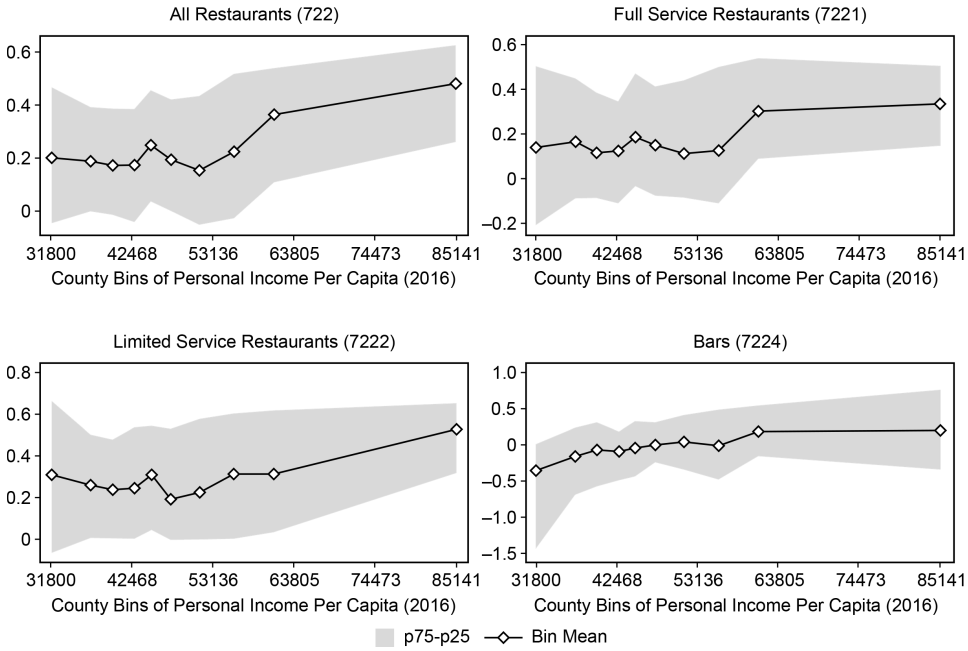


Fig. 6.14 Did restaurants grow in rich counties only? Restaurant categories employment growth (1999–2016): Correlations with county (2016) per capita income
Note: Growth = (Y2016−Y1999)/Y1999. County bins are 2016 population-weighted, that is, each marker represents population of ~32 million; *x*-axis represents (population-weighted means).

Food Services sector) have achieved slower growth generally (see appendix figure 6.A.8a), especially in poorer counties (appendix figure 6.A.8b).

Role of the largest chain restaurants. While many local restaurants are small businesses, there are also dominant firms, such as McDonalds, Starbucks, and Domino's, that have a very large presence in the sector and have grown considerably over the past couple of decades. Thus, an interesting question is whether the major restaurant chains have played an outsized role in the rise of restaurants overall. That is, could it be that the increase in establishments and sales is driven mostly by the expansion of the major chains? Comprehensive data on all restaurant chains are unavailable, but we have collated data on the number of establishments and sales for our time period for the top 200 (in terms of US sales) restaurant chains in the country. The data show (see appendix figure 6.A.9) that the shares of sales and establishments of the major restaurant chains held steady (or showed a slight increase) from 1999 to about 2009, but then have declined from that time on. We conclude that the rise of restaurants has not been primar-

ily driven by the growth of the largest chains in the US nor accompanied by an increase in revenue or establishment share for these chains.[34]

6.6 Broader Servicification of Retail: Repair Services, Personal Services, and Recreation

In this section, we broaden the scope of our analyses to include some retail service categories that were not included under the definition of retail sector under the old SIC classification, and also are not included under the NAICS codes, but they are delivered to consumers in brick-and-mortar establishments that are often co-located with traditional physical retail stores. The inclusion of these additional service and recreation categories may help capture a broader shift of retail locations away from sales of goods toward sales of services or experiences.[35]

In particular, we examine three NAICS categories: (i) Repair Services (NAICS 811), (ii) Personal and Laundry Services (NAICS 812), and (iii) Amusement, Gambling, and Recreation Industries (NAICS 713). Repair services include auto repair and household goods (including cellphone) repair establishments that also provide retail services to consumers and are often co-located with traditional retail stores in malls and downtown locations. Personal and Laundry Services include some retail-located service providers, such as dry cleaners, beauty and nail salons, and barber shops. Finally, while amusement parks are typically not co-located with traditional retail, anecdotal evidence suggests that major retail malls increasingly are adding entertainment facilities, and historically, malls have included such options as carousels and videogame parlors, which fall under NAICS 713.[36] Further, gyms and fitness centers, which are common in retail locations, fall under this broader subsector as well.

We begin by defining a new aggregate (augmented) retail as traditional physical retail, per our earlier definition, plus these three sectors. In figure 6.15, we present the trends in shares of aggregate augmented retail

34. The data are from *Nation's Restaurant News*, "Top 200 Restaurants," various years. Note that the set of chains included in the top 200 ranking is not constant over time, as some chains shrink over time and thereby exit the ranking, while others grow to make the list.

35. We thank our discussant, Emek Basker, for raising this important point and presenting evidence that some subsegments, including nail salons and fitness centers, also have experienced considerable growth over our time period. We build on her comment by looking at broader industry definitions that include nail salons (Personal and Laundry Services, NAICS 812), and fitness centers (Amusement Parks, Gaming and Recreation, NAICS 713), and also examining repair services (NAICS 811).

36. For example, a story in the *New York Times* (Corkery and Maheshwari 2019) discussed the case of a megamall development called "American Dream," which planned to open in late October 2019 with an ice-skating rink and a Nickelodeon amusement park, with plans (at the time) to add 300 stores in March 2020. The development was delayed, and in the meantime, some original tenants (including Toys'R'Us and Barneys) went bankrupt. More examples of entertainment and recreation options at malls are discussed in a *Chicago Tribune* article by Zumbach (2016).

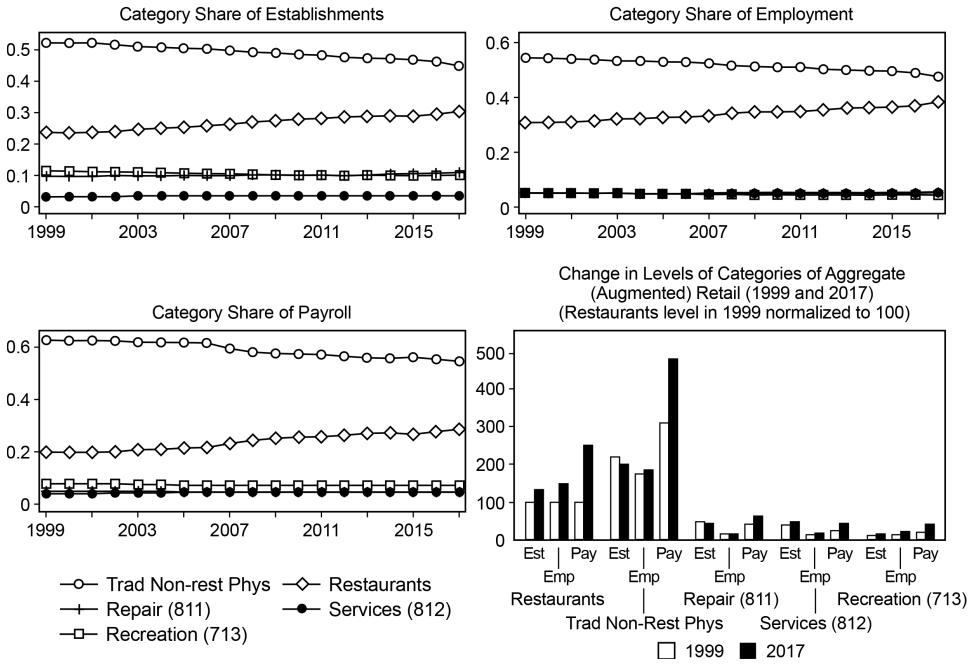


Fig. 6.15 Growth in Repair Services (811), Personal and Laundry Services (812) and Recreation (713)

Source: CBP, US Census Bureau.

Note: Aggregate (Augmented) Retail is Traditional Physical Retail + Repair (811) + Services (812) + Recreation (713).

for each of these three categories plus restaurants and traditional (non-restaurant) physical retail, separately for establishments (top left panel), employment (top right panel), and payroll (bottom left panel). All these figures confirm that, in terms of their contributions to the augmented retail sector, the shares of the three new sectors we include have not changed much at all during 1999–2017. In terms of establishments, the shares are roughly equal for repair (811) and services (812) and lower for recreation (713), but in terms of employment share, all three sectors are very similar. Moreover, their shares have remained relatively flat over time. In terms of payroll, the repair services sector has a persistently greater share relative to the other sectors, while recreation appears to have a very slight uptick in share relative to services. However, the figures confirm the narrative we discussed in the previous sections: whether one measures establishments, employment, or payroll, the dominant change in the past two decades, even when examining an "augmented" retail sector that includes these additional service and recreation categories, is that of a decline in the share of traditional non-restaurant physical retail sector, offset by a rise in the share of restaurants.

The patterns we see in shares, however, do not tell us about changes in levels. This is addressed in the bottom right panel in figure 6.15, where we present a summary picture of the levels of establishments, employment, and payroll in each of the subcategories, in 1999 and 2017. To allow for comparability and readability, we normalize the level for restaurants in 1999 to 100. This figure implies that between 1999 and 2017: (1) Across all three indicators (establishments, employment, and payroll), restaurants experienced significant growth; (2) the traditional non-restaurant physical sector experienced a small decline in number of establishments, but a small increase in employment and a large increase in total payroll; (3) the repair services, personal and laundry services, and recreation services sectors are much smaller than the restaurant sector on all three indicators; (4) given their small initial sizes, these three sectors saw only modest changes in the levels for our three indicators, much smaller than the changes we find for the restaurant and traditional (non-restaurant) physical retail sector; and (5) total payroll increased in the repair, services, and recreation sectors, but consistent with the share trends in the bottom left panel, this increase was not larger than the increase we see for restaurants or for the traditional (non-restaurant) physical retail sector.

Finally, for each of the three additional sectors, in appendix figure 6.A.10, we refine our analyses by focusing on the most important subsector in the sector. For repair services (panel of four sub-figures at top left), the auto repair segment is the dominant one. We find that this subsector has not grown in number of establishments or employment, but we see an upward trend in (nominal) total payroll. Overall, the auto repair's share of establishments and employment in total augmented retail has declined over our study period. For personal and laundry services, we examine personal services (NAICS 8121, which includes beauty and nail salons) vs. the rest (panel of four sub-figures at top right). We find that the personal services sector has grown considerably in terms of number of establishments and employment relative to the rest of the sector. Despite this strong growth, total payroll in this subsector has not grown that much more rapidly than in the rest of the sector, suggesting that the jobs in this subsector are not particularly well paid. The share of establishments providing personal services in the augmented retail sector increased by more than a percentage point (from about 4.7 to 6.1 percent), but the increase is much lower for employment and payroll. Finally, for the recreation sector, we examine fitness centers separately from the rest (panel of four sub-figures at bottom left); here also, we find that fitness centers have grown in number of establishments and employment at a more rapid pace than the rest of the sector. But again, the trend for overall payroll is flatter than the trend for establishments, suggesting that the work is not highly compensated in that subsector either. The share of fitness centers in the aggregate (augmented) retail went up on all three indicators, albeit less

than a percentage point for number of establishments and payroll, and about 1 percentage point (from about 1.4 percent to 2.4 percent) for employment.

6.7 Pre-COVID-19 Trends in Venture Financing of Retail and Retail Firm Strategies

In this section, we draw on pre-COVID media news stories, company annual reports, and data from Crunchbase (as of December 30, 2019) to discuss some trends that already were emerging in the retail sector before the COVID-19 pandemic, and that, because they are technology enabled, might prove to be particularly important in the industry at this time and going forward. In particular, as noted earlier, new firms are offering services or technology that complement traditional physical retail. Our (admittedly rough) manual classification of the top 24 best-funded retail-related start-ups (in appendix table 6.A.3) shows that 55 percent of the funding went to companies that provide complementary services. Specifically, DoorDash with about $2.1 billion, and Instacart with about $1.8 billion in funding by end of December 2019, are delivery services companies that help physical retail firms provide home delivery for customers.

- *Omnichannel strategy—physical retailers offering online shopping, and the blurring of boundaries*. Physical retail firms are investing in their online presence and realigning their supply chain and distribution to serve customers through a blend of (a) online ordering, packaging at warehouses, and delivery to customer homes from warehouses; (b) online ordering, collation of order in physical store, and delivery to customer homes; and (c) online ordering and curbside pickup. Walmart has been an aggressive proponent of this "omnichannel" strategy, with plans "to have grocery pickup available at 3,100 stores and same-day delivery from 1,600 stores, covering about 80 percent and 50 percent of the US population, respectively" by the end of 2019 (Redman 2019). A prominent investment for Store 8, Walmart's incubation arm, is Walmart InHome Delivery, which aims to deliver groceries not just to the customer's door, but also to stock them in the home refrigerator. Arguably, Amazon's acquisition of Whole Foods (in 2017), and the Prime Now service (launched in June 2018), which offers same-day delivery in select locations from Whole Foods stores, is an example of the reverse trend (namely, online retailers embracing an omnichannel strategy as well). News reports (e.g., Weise 2019) suggest that Amazon is contemplating a new chain that "would be built for in-store shopping as well as pickup and delivery."
- *Independent on-demand delivery firms teaming up with physical retailers*. Related to the above, some new independent delivery firms are team-

ing up with physical retailers. For example, emerging grocery delivery firms, including Instacart, Shipt, and Burpy, offer on-demand delivery services from local stores, with online ordering and "personal shoppers" picking and putting together the order and delivering it to customer homes. These services could enable physical retailers to provide the comfort and convenience offered by online retailers. DoorDash (the top of our retail startup list in appendix table 6.A.3) and other startups (e.g., GrubHub) provide home delivery services for customers to buy from a range of local restaurants.[37]

- *Traditional retailers investing in curbside pickup and BOPIS (buy online pickup in store or "click and collect")*. Some media stories suggest investments by grocery stores, general merchandise stores, and other retailers in allowing shoppers to buy online and pick up curbside or in store (termed "BOPIS"). An infographic report on invesp.com cites studies showing that 67 percent of shoppers in the US have used BOPIS, and that 49 percent of shoppers using BOPIS report making additional purchases while picking up items in store. The report also mentions that 90 percent of retailers plan to implement BOPIS by 2021.[38] One of Walmart's investment, JetBlack, is a startup aimed at personalized shopping for time-constrained parents in Manhattan.
- *Autonomous vehicles/drone-based delivery*. Amazon, Domino's, and others have announced plans to experiment with delivery using drones. Amazon's Prime Air page highlights the fully autonomous (no human pilot) delivery made on December 7, 2016. UPS was recently awarded certification to use drones on medical campuses,[39] but UPS indicated that the possibility of use in urban areas was uncertain. News reports suggest delivery startups, such as Postmates, are experimenting with delivery robots as well.[40] Per our search of Crunchbase data, there are few startups focused specifically on drone or autonomous vehicles delivery for retail; with Nuro developing autonomous vehicles (total funding of $1 billion, and recent test-drive partnership with Walmart),[41] Starship Technologies developing drones (funding of $82.2 million),

37. One emerging measurement issue is the rise of "virtual restaurants," which are nonstore restaurants (including some operated from home kitchens, or operated under another name from a given physical restaurant) that serve as "online ordering and home delivery only" entities (Isaac and Yaffe-Bellany, 2019). These firms may be difficult to identify, in standard firm datasets such as the CBP. For instance, the *New York Times* news story reports a restaurateur with four operations, only one of which is physical, and the other "three are "virtual restaurants" with no physical storefronts, tables or chairs . . . [that] exist only inside a mobile app, Uber Eats" (https://www.nytimes.com/2019/08/14/technology/uber-eats-ghost-kitchens.html).

38. https://www.invespcro.com/blog/buy-online-pick-up-in-store-bopis/.

39. https://www.nytimes.com/2019/10/02/us/UPS-drone-deliveries.html.

40. https://www.forbes.com/sites/amyfeldman/2019/08/20/starship-technologies-raises-40m-to-expand-its-food-delivery-robots-on-college-campuses/#68b4487b1cec.

41. https://corporate.walmart.com/newsroom/2019/12/10/walmart-to-test-drive-autonomous-grocery-deliveries-with-nuro.

and Marble focused on land-based courier robots (funding $10 million) being the most prominent. However, autonomous vehicle (AV) development has seen significant investment by other large companies, including Alphabet, Uber, and Tesla, as well as mainstream car manufacturers (Ford, GM). If these vehicles reach so-called full automation "Level 5" capability, it would be an important labor-saving technology with major implications for the structure of retail markets. However, this capability seems many years away (see, e.g., Noonan 2019).

- *Artificial intelligence (AI) investments to improve stocking, inventory management, and customer services*. Some traditional retail companies report making investments in AI technologies to reduce costs throughout the supply chain, as well as to respond to and answer customer questions. Examples of such investments by physical retailers include the Intelligent Retail Lab by Walmart's Store 8, Domino's investments in AI-enabled automated phone ordering,[42] Macy's On Call app for in-store assistance, Uniqlo's in-store Kiosks to recommend products, the experimental Sam's Club Now store that allows customers to map the most efficient route through the store and leave without going through the traditional checkout line, the Kroger App (which makes in-store recommendations), and Starbucks' AI-enabled voice ordering.[43] AI technologies are also used by online retailers (e.g., Amazon for product recommendations), so it is unclear whether AI would systematically benefit physical retailers more than e-commerce retailers, but these investments may be needed to keep physical stores in a strong competitive position relative to e-commerce retailers.
- *Technological innovations in the restaurant sector*. Pre-COVID, restaurant operators also were looking for technological solutions to address some known pain points. Examples from the casual dining segment include the use of tablets in restaurants, which facilitate interactions with servers (i.e., flagging to get a drink refill or the bill), apps to allow diners to check table times and put their names on wait lists remotely, and General Motors' Marketplace, which allows for making reservations, food ordering, and payment while driving.

6.8 Preliminary Assessment of the COVID-19 Crisis: Retail Trade Survey, BLS Current Employment Statistics, and Stock Market Response

While the main focus of this chapter is on assessing changes in the retail sector for 1999–2017, for which key data sources were available, the ongoing COVID-19 crisis is clearly an extremely consequential event, with potential

42. https://www.mobilemarketer.com/news/dominos-lets-ai-assistant-dom-handle-incoming-phone-orders/522111/.

43. https://www.forbes.com/sites/blakemorgan/2019/03/04/the-20-best-examples-of-using-artificial-intelligence-for-retail-experiences/#6ea201574466.

profound implications for the economy in general and for several subsectors in retail in particular. The retail sector has been particularly heavily impacted as demand for all activities outside the home has constricted, with very severe effects for restaurants as well as nonessential shopping at brick-and-mortar stores. Anecdotal evidence from media reports suggests increased demand, and hence increased employment, for grocery stores and large general merchandise retailers (such as Walmart and Costco), as well as increased hiring by Amazon and other online retailers as consumers shift toward online shopping, and cooking and eating at home.

In this section, we attempt to provide a more systematic picture of the effect of COVID-19 on the retail sector by examining three sources of data that include some information on recent trends in retail: (i) recently released US Census data from the Monthly Advance Retail Trade Survey (MARTS), with sales data up to December 2020; (ii) BLS monthly Current Employment (CE) statistics, the latest of which (released January 8, 2020) includes data up to December 2020; and (iii) the stock market performance of retail firm stocks, which provides the market's view of the long-term prospects for the large public retail firms.

6.8.1 Retail Sales Response (From US Census MARTS Data)

We present data from MARTS in appendix figure 6.A.11. This figure shows the percentage change in cumulative year-to-date (YTD) sales compared to the same point a year earlier, for April (to capture short-run effects after the start of the pandemic) and for December 2020 (to capture longer-term changes), with sectors sorted from most negative to positive changes for December 2020.

The largest declines in YTD sales as of December 2020 are for the clothing and restaurants sectors, followed by gas stations; electronics stores; and to a much smaller extent; furniture stores. Subsectors that include grocery sellers (Food and Beverages (NAICS 445) as well as General Merchandise Stores (452)) saw some increase relative to the previous year, reflecting the shift in expenditure away from restaurants. But the biggest gains were for online retailers (included in NAICS 454), consistent with widespread media reports of expansion and hiring by Amazon. Building materials saw an increase as well, consistent with media reports of a boom in DIY and home improvement projects by homebound consumers, and increased online sales by major companies (like Home Depot and Lowe's).[44] Finally, the sporting goods category shows an exceptional pattern, in that sales swung from a steep decline relative to prior year in April to growth relative to the prior year by the end of the year, with anecdotes suggesting increased consumer

44. E.g., see https://www.cnbc.com/2020/11/20/home-depot-and-lowes-earnings-boosted-by-pandemic-induced-nesting.html.

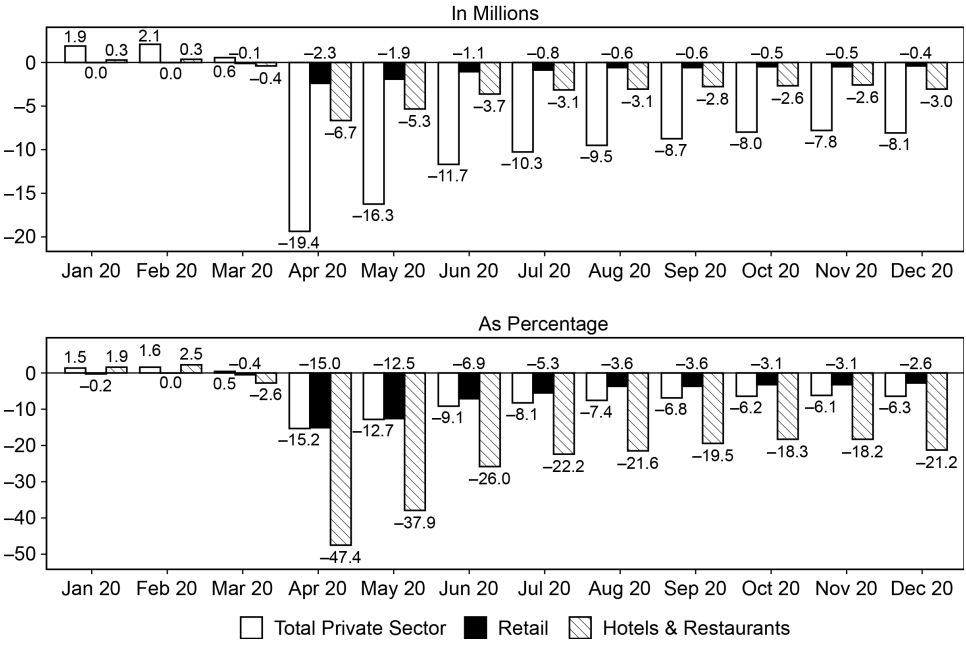


Fig. 6.16 Recent trends in employment growth. Covid-19 shock: Change in employment (relative to prior year-month)

Note: Data are from BLS Employment Statistics reports. Data for November and December 2020 are provisional.

expenditure on at-home fitness equipment and e-commerce sales by sporting goods retailers making up for reduced in-person shopping.[45]

6.8.2 Retail Employment Response in March and April 2020 (from BLS Data)

Figure 6.16 provides a summary of the effect of the pandemic on employment levels, using data from the BLS monthly Current Employment statistics. It illustrates the decline in employment (relative to the same month in 2019) for the private sector overall, for retail (per NAICS, i.e., excluding restaurants and hotels), and for hotels and restaurants (NAICS 722). The data show a significant rebound in the labor market from an overall employment loss of 19.4 million (in April 2020 compared to April 2019) to a much smaller, but still very substantial, deficit of 8.1 million jobs in December. The recovery was almost complete for the NAICS retail sector, as the deficit

45. E.g., see https://www.wsj.com/articles/dicks-sporting-goods-profit-and-e-commerce-sales-surge-11598441526.

is only 0.4 million (2.6 percent) by December. However, the restaurants and hotels sector experienced a much smaller recovery, going from a deficit of 6.7 million jobs in April to 3 million in December. The bottom panel of figure 6.16, which presents the decline in employment in percentage terms, shows that by December 2020, employment in the Hotels and Restaurant sector was still 21.2 percent below the December 2019 levels. Moreover, the figure shows that this sector experienced a further deterioration in employment in December relative to November 2020 (from 2.6 to 3.0 million), contributing to an increase in the job deficit for the private sector of the economy as a whole (which went up from 7.8 to 8.1 million in the same months).

Appendix figure 6.A.12 further illustrates the important reduction in employment in the Hotels and Restaurants sector compared to other segments of the economy, showing that it accounted for 36.7 percent of the overall decline in private sector employment between February and December of 2020, despite accounting for just 11.1 percent of private sector employment at the start of the pandemic, in February 2020. This figure also shows that the overall traditional retail sector, which includes online retail, was impacted to a much smaller degree by the pandemic relative to its share of employment.

To capture the severity of the recent decline, we present the long-run trends in retail employment in appendix figure 6.A.13 using monthly BLS data. Figure 6.A.13a illustrates well the historic nature of the COVID-19 shock, as the declines in March and April have led to employment levels for physical retail below the 1999 figures, though the subsequent rebound has lifted indexes back above the 1999 levels. Similar results are seen in figure 6.A.13b: for restaurants, the trend in terms of share of aggregate private sector employment plunged soon after the onset of the pandemic, reversing the gains accrued over a two-decade span. Again the rebound has lifted the share of employment in restaurants back above the levels from two decades ago. However, the recovery appears fragile over the last few months of data.

6.8.3 Stock Market Response

Finally, we present results from stock market data. Compared to data on past sales or employment trends, stock prices have the distinction of reflecting investor expectations about future prospects. However, there continues to be significant uncertainty about the pace of roll out of vaccines and other factors impacting the economy, reflected in higher market volatility (relative to prior years). Thus, the results here should be viewed with caution, representing an initial and noisy indicator of market expectations regarding the prospects of listed firms.

In appendix figure 6.A.14, we present trends in the stock index for different retail categories over the 1 year period from January 9, 2020, to January 8, 2021. The S&P 500 data is presented first as a benchmark, and the retail categories are shown in order of smallest to largest increase over this

period. We find the smallest increases are for drugstores, clothing (consistent with decline in expenditure in figure 6.A.11), grocery, and general and department stores. It is somewhat surprising that grocery stores don't show a big increase, despite the much-reported shift to eating at home, possibly because additional expenditure may have gone to clubs and supercenters, which show a strong increase, and meal delivery from restaurants or online vendors. Restaurant chain stock prices have rebounded after a steep short-run decline in the early days of the pandemic, a rebound that has occurred despite evidence presented above of a steep decline in sales and employment in that sector over the past several months. This market swing for restaurants combined with the flattening of stock prices for grocery stores is consistent with market expectations for a shift back of consumer expenditure toward restaurants after the pandemic. Unsurprisingly, the online retail category (which has Amazon as a prominent member) has climbed after the onset of COVID—the maintenance of high stock price levels for the subsector is consistent with the market expecting that behavioral shifts to online retailing induced by the pandemic may be persistent. Interestingly, home furnishings, sporting goods stores (likely related to the rebound in expenditure seen in figure 6.A.11), and specialty retail have also outperformed the market.

Overall, all three data sources (MARTS sales, BLS employment, and stock market data) suggest a short and possibly longer run shift in retail purchasing behavior toward online, as well as a shift away from restaurants toward eating at home (at least during the pandemic). As noted earlier, the unprecedented nature of the pandemic, and uncertainty about the pace of vaccine rollout and recovery, make it difficult to assess the long-term effects of this crisis. Nevertheless, we offer a couple of speculative predictions.

First, as noted in the media, during this crisis, many more consumers have become familiar with online ordering and the convenience of using home delivery services. As the pandemic period stretches out, some of this behavior could become more ingrained, which could portend a longer-term shift that accelerates the growth of e-commerce as well as newer delivery services discussed in section 6.7.

For restaurants, depressed demand—and limited capacity to serve what were once full rooms of customers—will continue so long as social distancing guidelines remain in place, and/or customers continue to feel unsafe in crowded locales (full service restaurants) or in long lines in front of cash registers (limited service restaurants). Unfortunately, unlike for durable goods retailers, there is little prospect of a rebound in demand that would make up for lost sales in these types of businesses, so that many restaurants may be forced to exit (as suggested by initial survey studies).[46] As important as many

46. E.g., https://www.grubstreet.com/2020/09/restaurant-closing-national-restaurant-association-survey.html.

of these businesses have been for their local communities, except for the traditional take-out or delivery model, it is not clear what other type of services might allow especially small local restaurant businesses to survive the likely protracted reduction in revenues that they are suffering through today and will continue to face in the near and perhaps even medium term. Because of the changing composition of economic activity toward more restaurants documented in this chapter, the economic consequences of the pandemic for retail, including restaurants, are perhaps of even greater concern today than they would have been otherwise. Restoring the vibrancy of the local retail landscape may require government assistance for new entrants, in addition to the ongoing Paycheck Protection Program that aims to sustain existing small and medium businesses.

6.9 Conclusion

In this chapter, we have discussed how the evidence about the so-called "retail apocalypse" is much less clear, and is in fact contradicted, if we examine sales or employment rather than the number of establishments or storefronts in retail. This is because sales and employment had bounced back to their pre–Great Recession levels by the end of 2017, while the number of establishments indeed is still lower today than it was before the Great Recession.[47] We noted that the changing face of retail in the US is mostly due to innovations that have arisen in other sectors of the economy, namely, in the logistics, warehousing, and transportation sectors, where cost-saving innovations and the capacity to track goods as they go from manufacturers to consumers have enabled the growth of large chains of general merchandise stores, such as Walmart and Target. And of course, the advent and growth of the Internet, along with these same innovations in warehousing and logistics, have had a large—and we expect will continue to have a large—effect on many segments of the physical goods retail sector. We also discussed briefly, in section 6.7, some innovations that brick-and-mortar stores are exploring, and even already exploiting, to address the needs of consumers.

Most important from our perspective, we documented throughout much of this chapter the remarkable growth in the restaurant sector during 1999–2017, and how, using what was the Standard Industrial Classification (SIC) version of the retail sector (which included restaurants), we found overall

47. Since our first presentation of these findings at the July 22–23, 2019, pre-conference for this volume, articles in the media have noted the strength of retail in government data. In particular, Woods (2019) notes the growing trends for the number of establishments in BLS data, and that the highly publicized closings of 40 chains (with Gymboree and Payless Shoes being the largest) accounted for only about 0.008 percent of all retail establishments. She also notes that the top 40 chain openings in the same period offset more than half of these closures, and she highlights the growth of restaurants, particularly relative to grocery stores.

growth in retail over the period of our study. We also showed that the number of restaurants grew in both lower and higher income counties and across types of restaurants (full vs. limited service, variety of food). The picture is less rosy for the retail sector in terms of its relative share of the economy. While the restaurant sector's share of the overall economy showed strong growth on all the indicators we examined (including establishment counts, employment, payroll, and value added), we found that, even inclusive of restaurants, the physical retail sector had shrunk between 1999 and 2017 relative to the overall economy (except in terms of employment), with about 16 percent decline in its share of aggregate GDP (value added), and about 7 percent decline in its shares of establishments and payroll.[48]

While the growth of restaurants has offset the decline in employment in the rest of the physical goods retail sector, figure 6.11 highlights that the payroll per employee as well as contribution to GDP per employee in the restaurant sector is significantly lower than for other sectors. The range of $10,000 to $12,000 per year for payroll per employee for restaurants also is consistent with much of this work being part time, more so than in other goods retailing sectors (which themselves tend to have part-time workers). However, there are signs that both worker productivity and pay had increased in the restaurant industry (figure 6.11).

We examined personal service categories that are often found in malls and other retail locations, and documented strong growth in those and in fitness clubs; but the broader service and entertainment/recreation categories are a small proportion of traditional retail, and this share has remained stable during 1999–2017. Thus, the shift toward more servicification and entertainment (per anecdotal evidence discussed in section 6.6) has not yet had a major impact on the aggregate retail landscape.

We find some evidence suggesting that the growth in the number and sales and employment in the restaurant sector was related to changing consumer tastes, from less food consumed at home to more food consumed away from home. Exploring the underlying factors that could explain this shift is beyond the scope of this chapter, but many articles in the trade press point to demographic changes along with increased desire for "experiences" outside the home along with less focus on purchasing durable goods among younger consumers as potential factors explaining the increased tendency to consume food outside the home. Moreover, we note that technology is increasingly being used in this sector as well, to relieve some of the pain points for consumers and increase efficiency as well. This, in turn, may lead to yet greater growth in this sector, as well as increases in productivity and

48. Over the 1999 to 2017 period, finance, professional services, and education and health care registered the biggest gains in share of GDP, while manufacturing and retail had the largest loss of share (appendix figure 6.A.4).

employee compensation. We leave further exploration of these issues and other potential explanations for the evolution of the retail sector broadly defined as avenues for future research.

As a postscript, the ongoing economic shock from the COVID-19 pandemic has severely negatively impacted the prospects of many brick-and-mortar retail firms. A full analysis of this shock as of this writing is limited by the uncertainty and volatility in the market and data about the pandemic and is beyond the scope of this chapter. A preliminary view based on an examination of the performance of retail stocks and of recently released US Census and BLS data suggests significant challenges for restaurants and nonessential goods merchants, while grocery store and online retailers, not surprisingly, appear to be relatively less affected, or have even benefited from the crisis. For restaurants in particular, voluntary or mandated social distancing, which may persist so long as the pandemic continues, will likely lead many customers to avoid even their favorite local eateries. It is our hope that, despite the small margins typical of these types of businesses, the dependence of local economies and communities on restaurants for both amenities and employment will encourage governments and local communities to find ways to support these businesses so they can bounce back on the other side of this crisis.

Appendix

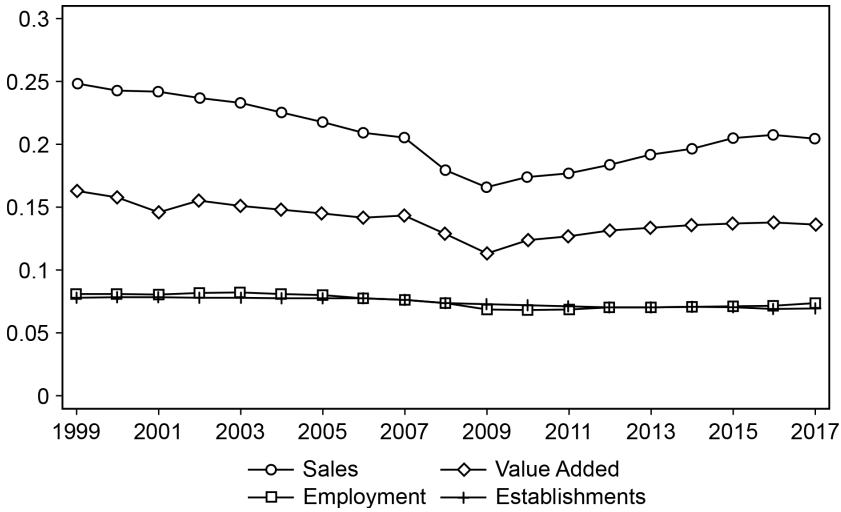


Fig. 6.A.1 Share of motor vehicle dealers in retail activity
Note: Traditional retail is NAICS retail (NAICS 44–45) + restaurants (NAICS 722)

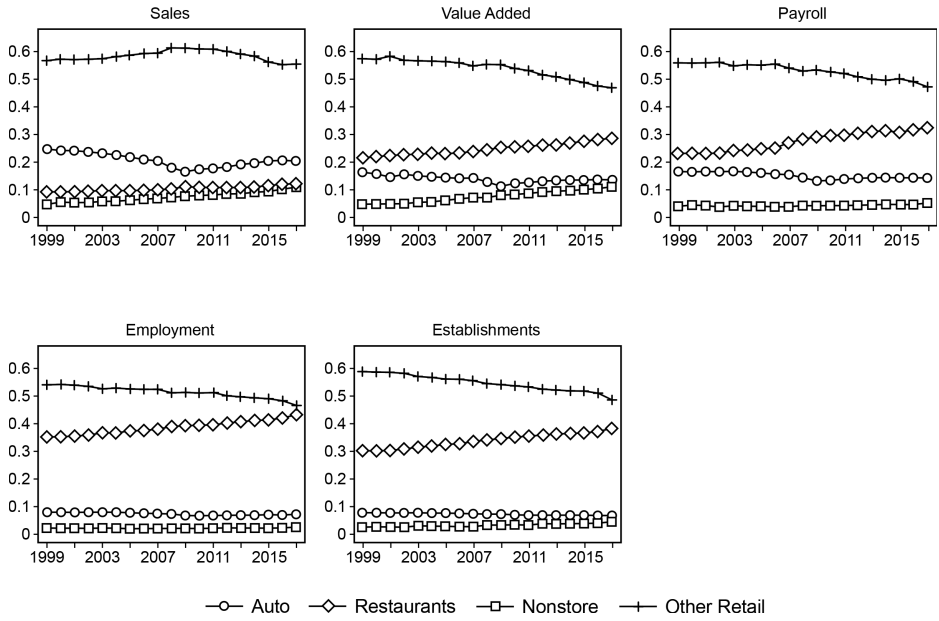


Fig. 6.A.2 Categorywise shares of sales, value added, establishments, and employment

Source: Data on value added are from BEA (https://apps.bea.gov/Table/index_industry_gdplndy.cfm), sales are from US Census Bureau ARTS, and other data are from US Census Bureau County Business Patterns.

Note: Traditional retail is NAICS retail (NAICS 44–45) + restaurants (NAICS 722).

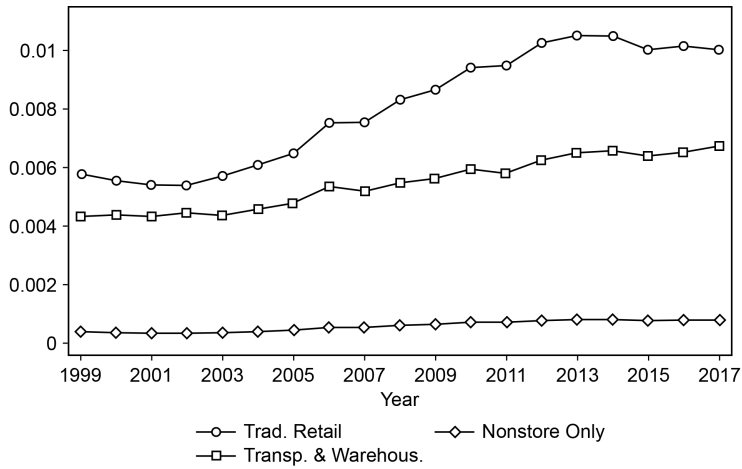


Fig. 6.A.3 Patent count share trends over time

Source: The data are from Goldschlag, Lybbert, and Zolas (2019), who concord UPSPTO patent classification codes to NAICS codes.

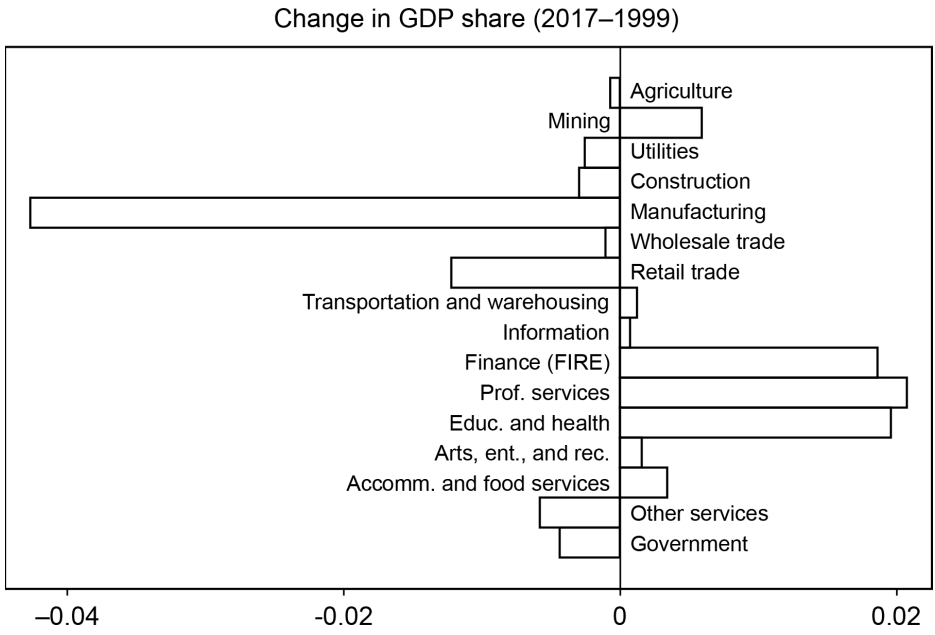


Fig. 6.A.4 Change in sector share of GDP

Source: Data are from BEA valued-added by industry statistics (release date October 29, 2019).

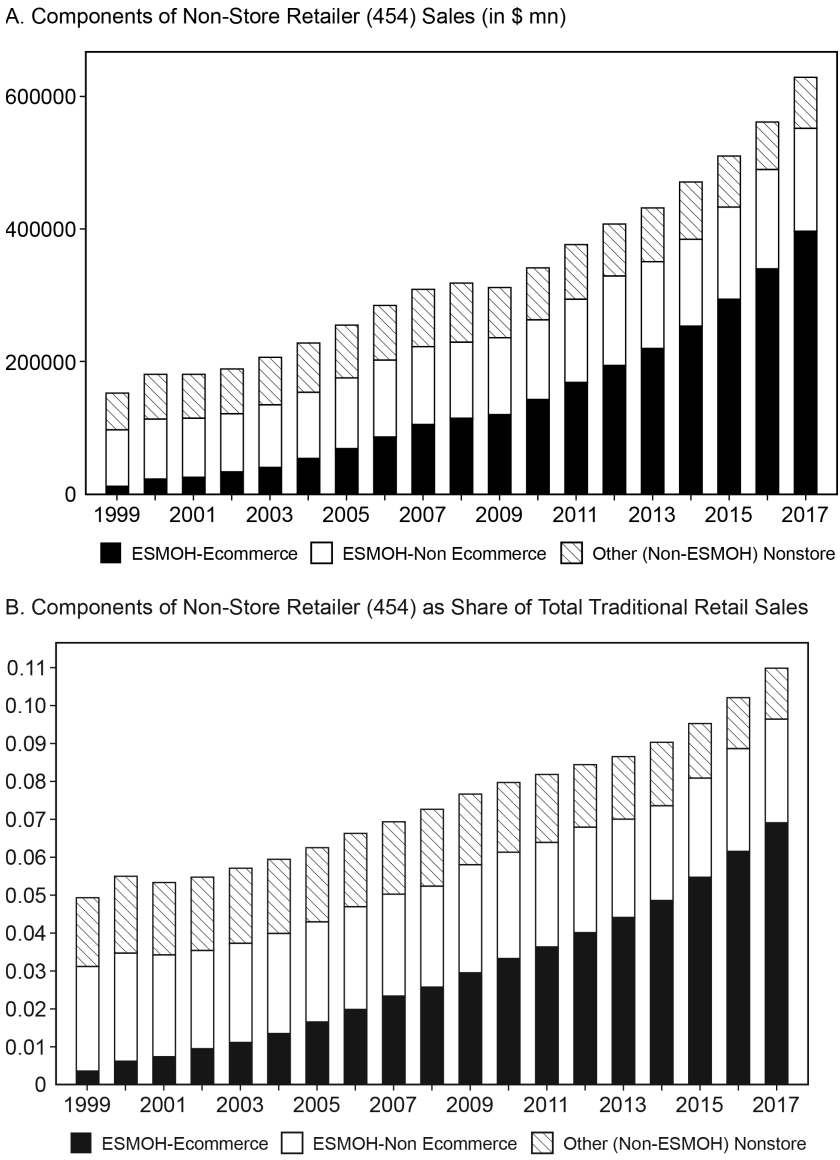


Fig. 6.A.5 Non-store sales—growth driven primarily by e-commerce

Source: ARTS & SAS, US Census Bureau.

Note: Traditional Retail includes all subcategories of NAICS 44, 45 and 722. ESMOH stands for NAICS 4541 (Electronic Shopping and Mail-order Houses). Other non-ESMOH Non-Store retailers (NAICS 454) includes Vending Machine Operators (NAICS 4542) and Direct Selling Establishments (4543). Data are from US Census Bureau's Annual Retail Trade Survey (ARTS) and the Services Annual Survey (SAS) and their antecedents.

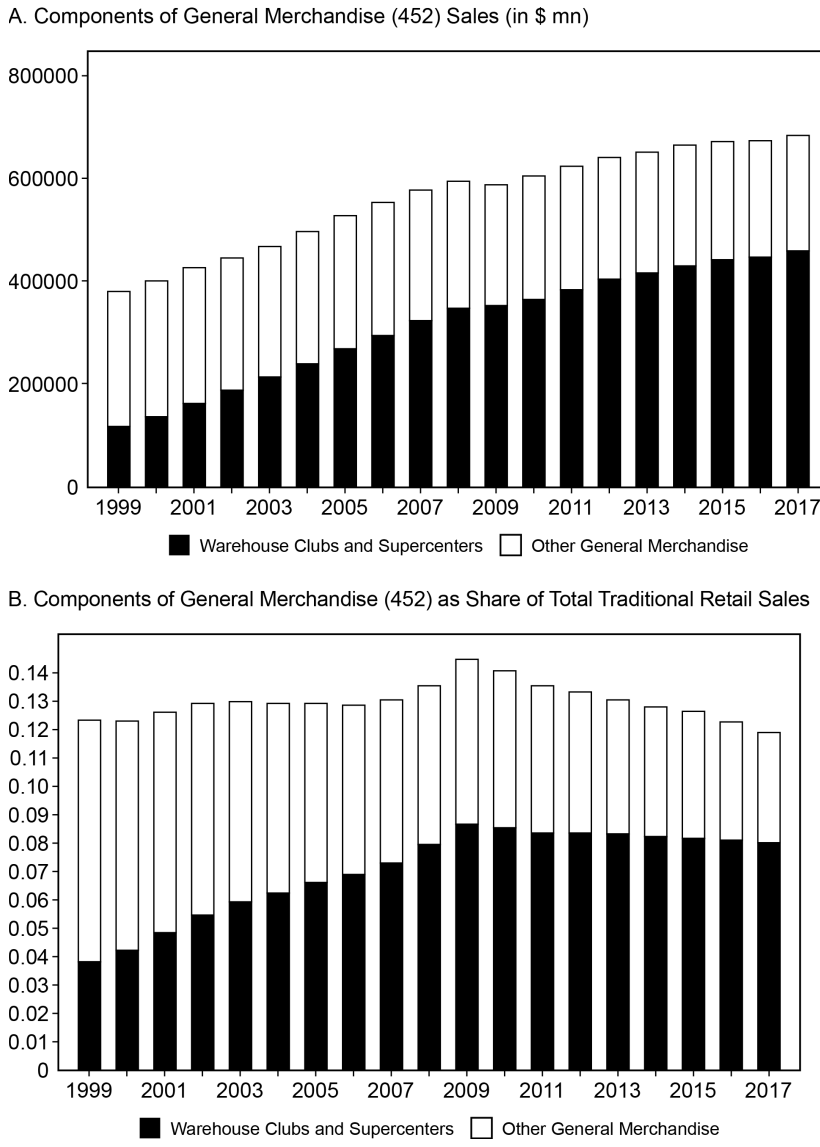


Fig. 6.A.6 Physical general merchandise sales—overall decline since 2009, Big Box share of total retail has flattened

Source: ARTS & SAS, US Census Bureau.

Note: Traditional Retail includes all subcategories of NAICS 44, 45 and 722. General Merchandise refers to NAICS 452, while "Big Box" is the sub-sector NAICS 45291 (Warehouse Clubs and Supercenters). Data are from US Census Bureau's Annual Retail Trade Survey (ARTS) and the Services Annual Survey (SAS) and their antecedents.

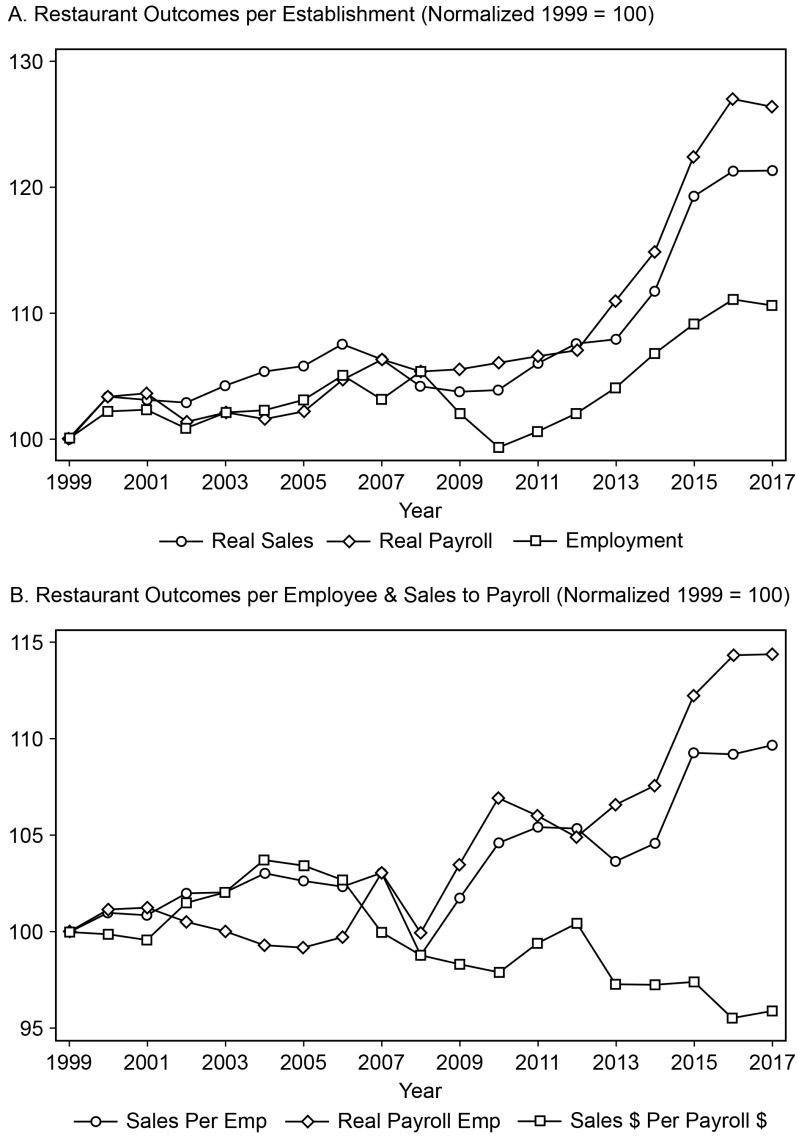
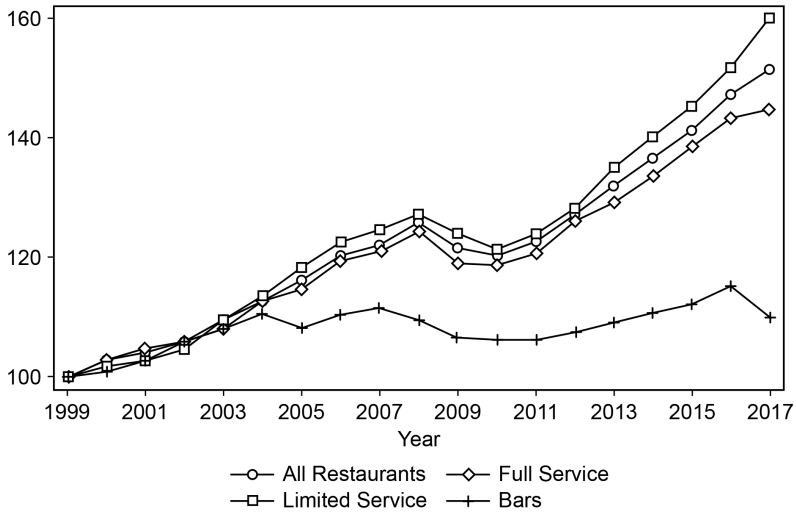


Fig. 6.A.7 Aggregate restaurant sector productivity—normalized trends

Note: These figures present normalized (1999 = 100) trends; see figure 6.A10 for level trends.

1. Aggregate Employment (Normalized 1999 = 100)



2. Aggregate Number of Establishments (Normalized 1999 = 100)

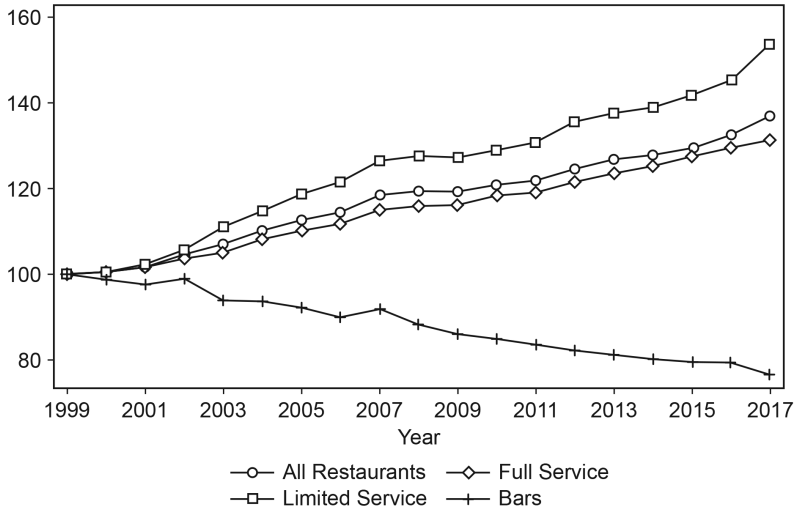
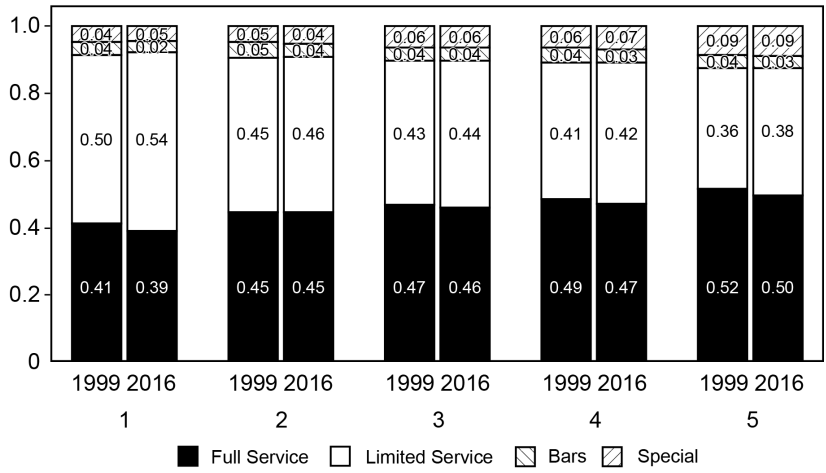


Fig. 6.A.8a Restaurant category-wise growth

1. Employment Shares of Restaurant Categories

By year and county population-weighted income quintiles



2. Establishment Shares of Restaurant Categories

By year and county population-weighted income quintiles

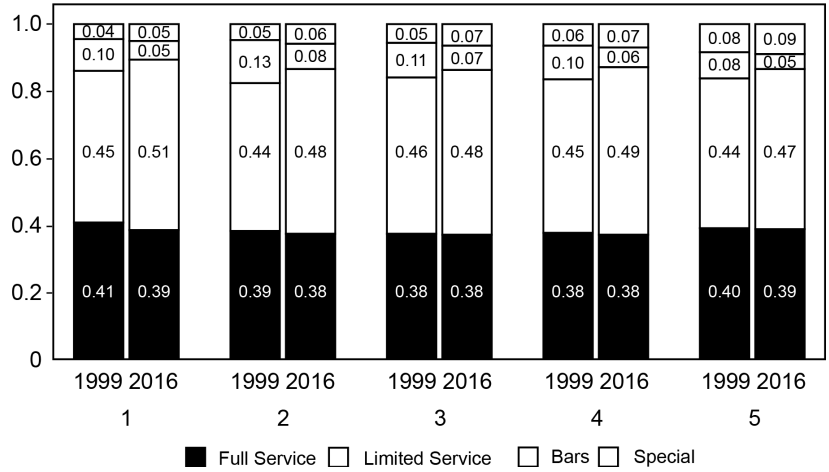


Fig. 6.A.8b Restaurant category-wise shares by income quintile, 1999 vs 2016

Note: County income quintiles are defined within year

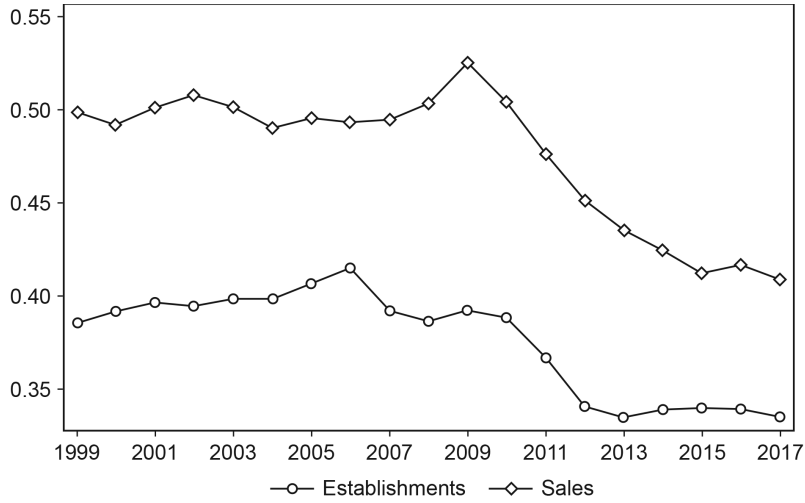


Fig. 6.A.9 Trends in share of the top 200 restaurant chains

Source: Data are from *Nation's Restaurant News*, "Top 200 Restaurants," various years.

Note: The set of chains included in the Top 200 ranking vary over time.

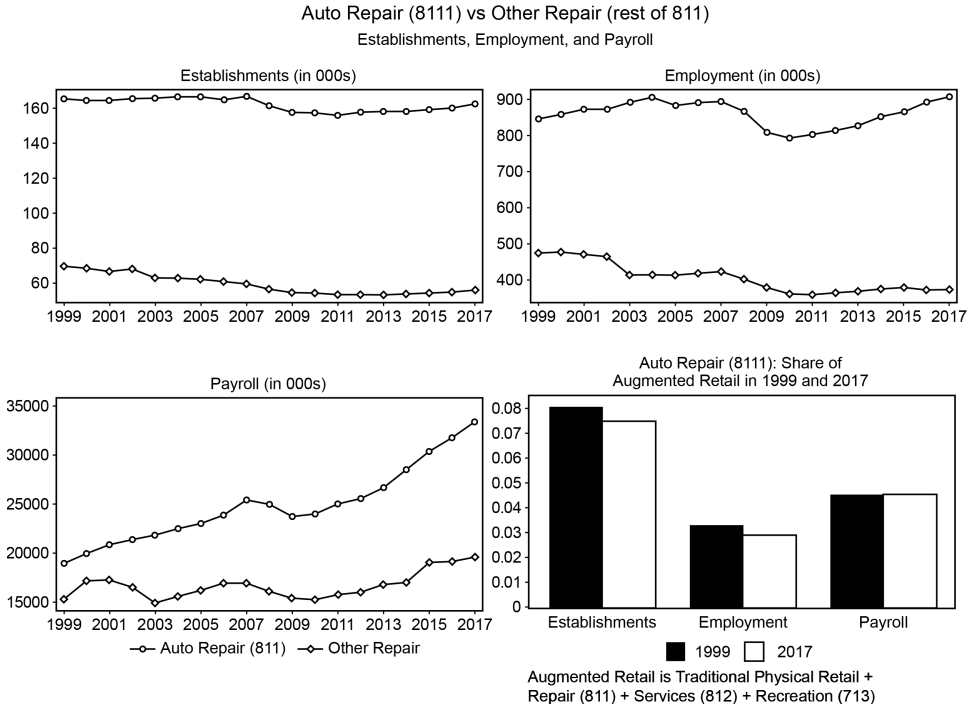
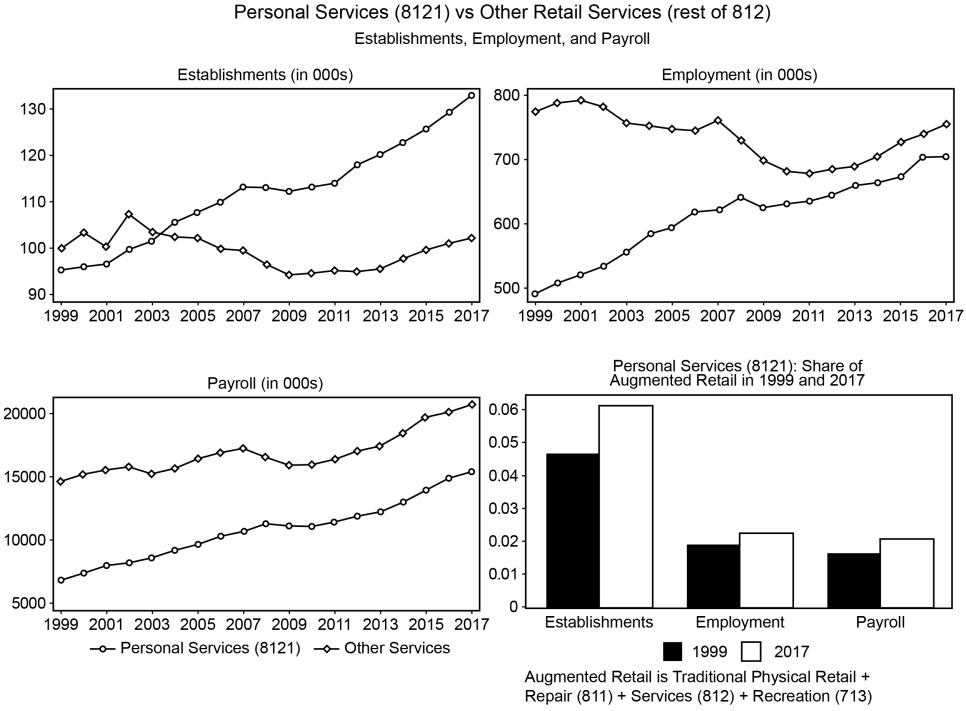


Fig. 6.A.10 Components of Repair (811), Services (812), and Recreation (713)

Source: CBP, US Census Bureau.



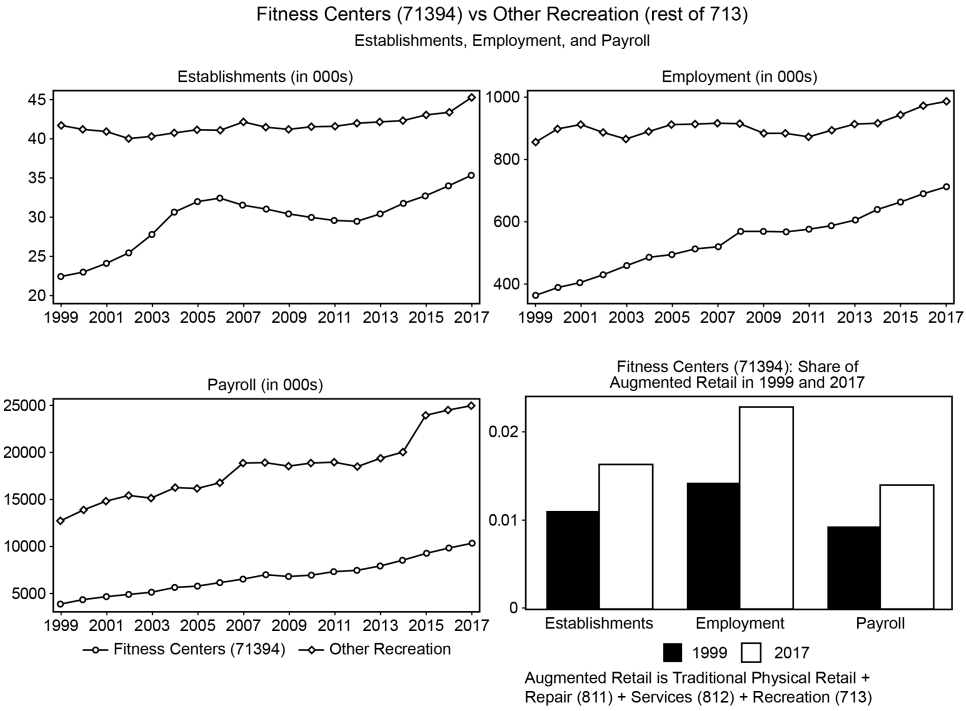


Fig. 6.A.10 (cont.)

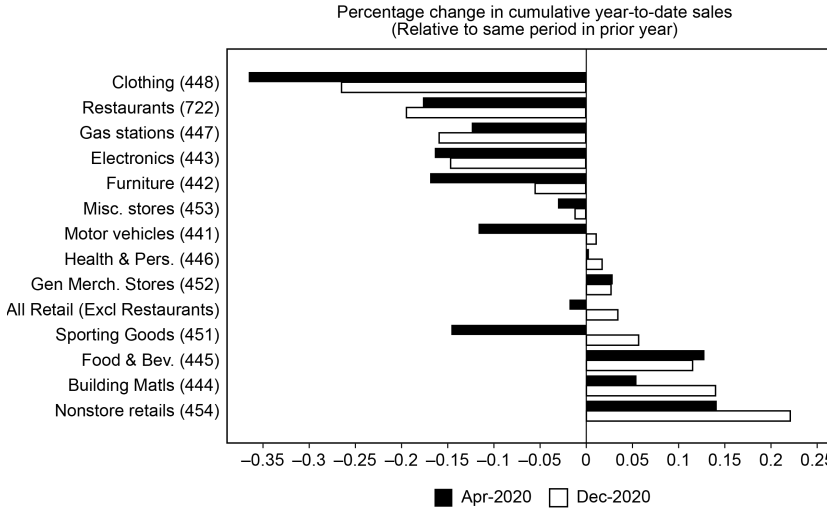


Fig. 6.A.11 Covid-19 shock: Change in cumulative year-to-date (YTD) retail sales in April and December 2020

Source: Data are from US Census MARTS dataset, accessed January 15, 2021, from https://www.census.gov/econ/currentdata/.

Note: Figures use unadjusted sales.

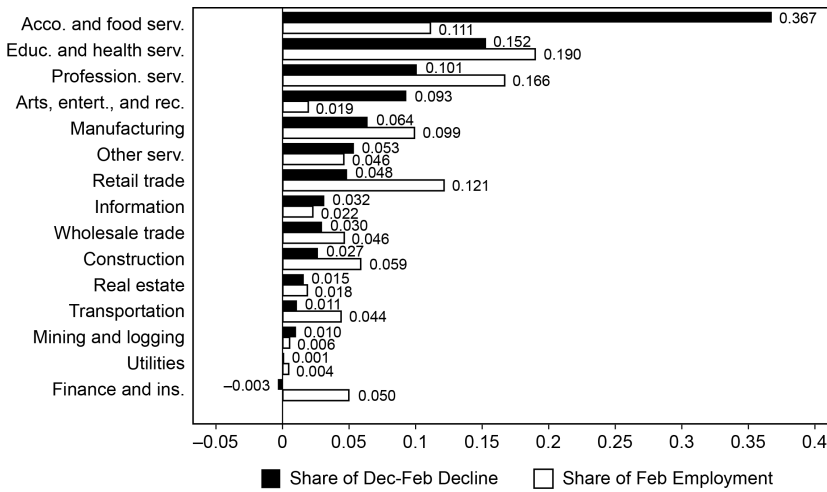
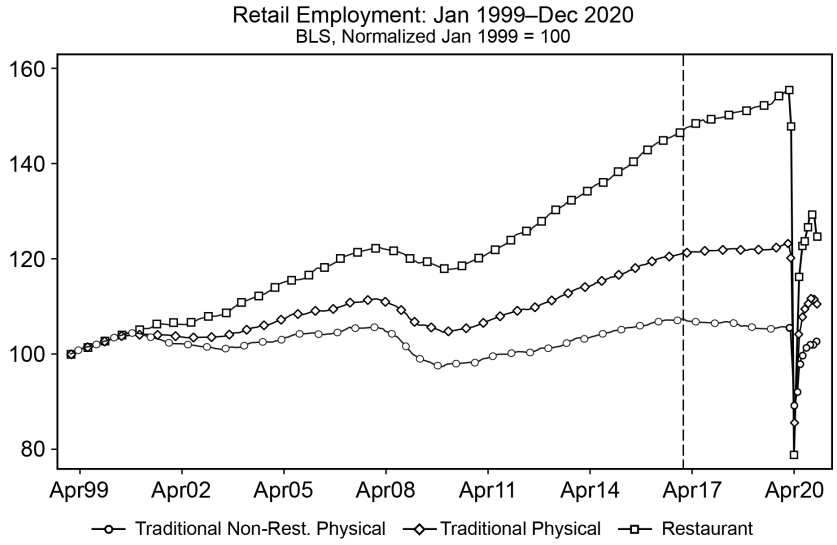


Fig. 6.A.12 Covid-19 Shock: Sector shares of Change in Aggregate Employment in December 2020, compared to February 2020

Source: Data are from BLS Current Employment statistics, https://download.bls.gov/pub/time.series/ce/ce.data.01a.CurrentSeasAE.

Note: Data for December are provisional. Data are the seasonally adjusted employment series for different sectors. Change in employment is (End-of-December Employment—End-of-February Employment). Share of "Level" in the title refers to the share of private sector employment level in February (red bars), i.e., End-of-February employment in sector divided by End-of-February total private sector employment.

A. Trends in Employment



B. Trends in Share of Total Private Sector Employment

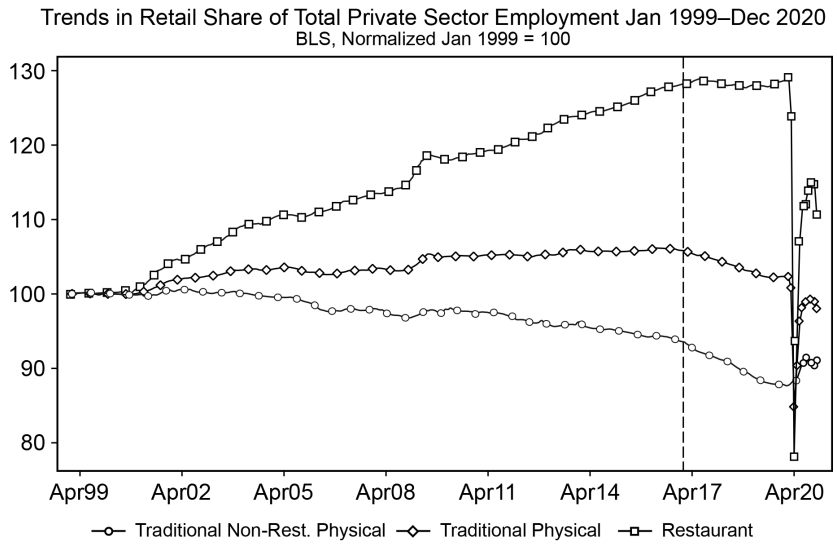


Fig. 6.A.13 Employment trends in retail: Monthly series January 1999 to December 2020, BLS CES data

Source: Data are from BLS Current Employment statistics, from https://download.bls.gov/pub/time.series/ce/ce.data.01a.CurrentSeasAE.

Note: Data for March and February are provisional. Data are the seasonally adjusted employment series for different sectors.

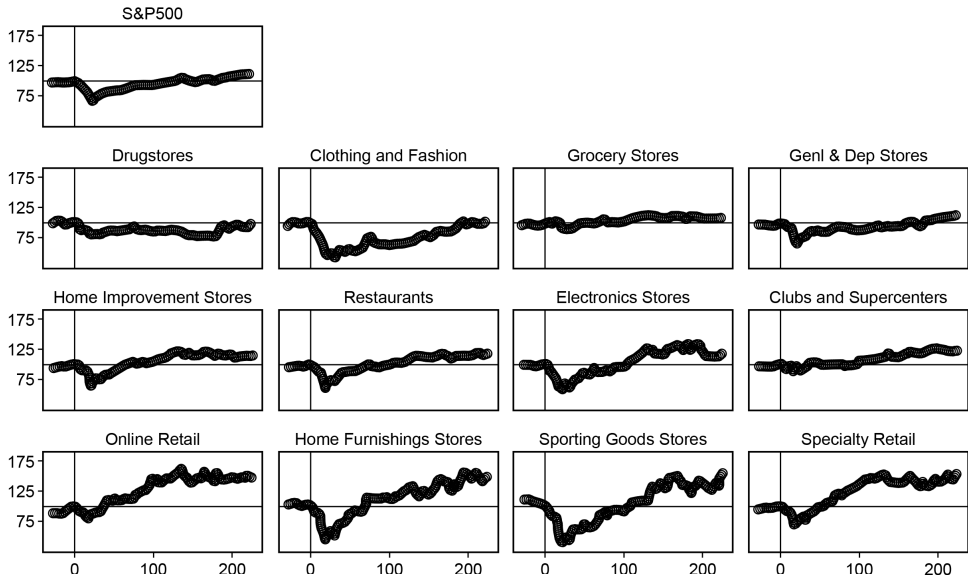


Fig. 6.A.14 Covid-19 shock: Trends in sector stock price indexes, January 9, 2020 to January 8, 2021

Note: Indexes are normalized to 100 on February 19, 2020; weights are market values at start of window. Day zero is set a February 19, 2020 pre-pandemic peak of S&P 500.

Table 6.A.1 Concordance of merchandise lines to NAICS 2012 codes

Merchandise lines (in ESMOH e-commerce data)	Imputed NAICS 2012 3-digit code	NAICS 2012 description
Books (includes audio books and e-books)	451	Sporting goods, hobby, musical instrument, and book stores
Clothing and clothing accessories (includes footwear)	448	Clothing and clothing access. stores
Computer and peripheral equipment, communications equipment, and related products (includes cellular phones)	443	Electronics and appliance stores
Computer software (includes video game software)	443	Electronics and appliance stores
Drugs, health aids, and beauty aids	446	Health and personal care stores
Electronics and appliances	443	Electronics and appliance stores
Food, beer, and wine	445	Food and beverage stores
Furniture and home furnishings	442	Furniture and home furnishings stores
Jewelry	448	Clothing and clothing access. stores
Audio and video recordings (includes purchased downloads)	443	Electronics and appliance stores
Office equipment and supplies	453	Miscellaneous store retailers
Sporting goods	451	Sporting goods, hobby, musical instrument, and book stores
Toys, hobby goods, and games	451	Sporting goods, hobby, musical instrument, and book stores
Other merchandise	452	General merchandise stores
Nonmerchandise receipts	499	Not classified

Table 6.A.2 **Frequency distribution by keywords used to define restaurant "varieties" in Yelp data**

Variety	Frequency	Percent	Variety	Frequency	Percent	Variety	Frequency	Percent
hot dog	79,530	50.15	chicken wings	337	0.21	gelato	33	0.02
american	13,046	8.23	buffet	324	0.2	mongolian	28	0.02
italian	10,164	6.41	street	243	0.15	portuguese	27	0.02
mexican	7,490	4.72	french	228	0.14	moroccan	25	0.02
burgers	5,396	3.4	bubble tea	227	0.14	british	24	0.02
chinese	5,210	3.29	southern	219	0.14	poke	23	0.01
sandwich	4,152	2.62	filipino	194	0.12	pub	22	0.01
tea	4,012	2.53	cafe	166	0.1	russian	22	0.01
ice cream	3,277	2.07	gluten-free	156	0.1	noodle	18	0.01
specialty	3,025	1.91	cajun/creole	155	0.1	indonesian	17	0.01
japanese	2,686	1.69	vegan	153	0.1	african	16	0.01
deli	1,976	1.25	asian	149	0.09	hungarian	16	0.01
bagel	1,135	0.72	pretzel	130	0.08	nepalese	16	0.01
donut	1,050	0.66	creperies	120	0.08	arabian	12	0.01
local	1,034	0.65	breweries	104	0.07	butcher	12	0.01
thai	961	0.61	middle eastern	98	0.06	polish	11	0.01
greek	923	0.58	spanish	98	0.06	belgian	10	0.01
fast food	866	0.55	fish & chips	87	0.05	argentine	9	0.01
soul food	808	0.51	shaved ice	80	0.05	soup	9	0.01
bakeries	758	0.48	kosher	79	0.05	comfort	7	0
wine	738	0.47	cupcake	77	0.05	european	7	0
indian	727	0.46	turkish	69	0.04	burmese	6	0
dessert	694	0.44	cuban	60	0.04	pakistani	5	0
barbeqe	504	0.32	ethiopian	54	0.03	halal	4	0
diners	498	0.31	cambodian	52	0.03	waffle	4	0
vietnamese	497	0.31	afghan	51	0.03	fondue	3	0
juice	493	0.31	taiwanese	51	0.03	poutineries	3	0
salad	492	0.31	brazilian	44	0.03	hot pot	2	0
hawaiian	466	0.29	irish	44	0.03	malaysian	2	0
mediterranean	442	0.28	german	42	0.03	diy	1	0
brunch	425	0.27	peruvian	37	0.02	honey	1	0
seafood	394	0.25	iranian	34	0.02	ukrainian	1	0
korean	352	0.22						
Total							**158,579**	**100**

Notes: See section 6.2.2 for description of Yelp public-use microdata.

Table 6.A.3 **Top 24 funded retail-related startups founded after 1998 per Crunchbase data (as of December 2019)**

Name	Description	Founding year	Total funding (to Dec 2019, USD million)	Complementary to physical retail?
DoorDash	DoorDash provides a delivery service that connects customers with local and national businesses.	2013	2,071.8	COMPLEMENT
Instacart	Instacart delivers groceries and home essentials from a variety of local stores.	2012	1,895.8	COMPLEMENT
Sears Holdings Corporation	Sears Holdings Corporation is a leading integrated retailer focused on seamlessly connecting the digital and physical shopping experiences	2005	1,710.0	NEUTRAL
Groupon	Groupon is a deal-of-the-day website that offers discounted gift certificates usable at local or national companies.	2007	1,387.0	COMPLEMENT
Affirm	Affirm is a financial technology services company that offers installment loans to consumers at the point of sale.	2012	1,020.0	COMPLEMENT
Postmates	Postmates powers local, on-demand logistics focused on fast deliveries from any type of merchant at scale.	2011	903.0	COMPLEMENT
Authentic Brands Group	Authentic Brands Group is a brand development and licensing company.	2010	875.0	NEUTRAL
Lineage Logistics	Lineage Logistics is a warehousing and logistics company built to deliver sophisticated, customized, and dependable cold chain solutions.	2012	700.0	COMPLEMENT
Jet	Jet operates an e-commerce platform that allows its member to shop online from various retailers.	2014	570.0	RIVAL
Rent the Runway	Rent the Runway is an online e-commerce website that allows women to rent designer apparel and accessories.	2009	541.2	RIVAL
Toast	Toast is an all-in-one point-of-sale and restaurant management platform for businesses in the food service and hospitality space.	2011	502.0	COMPLEMENT
Chewy	Chewy.com delivers pet happiness by conveniently shipping 500+ brands of pet food and goodies for free.	2011	451.0	RIVAL
Zume Pizza	Zume Pizza is a food delivery company that operates an automated pizza delivery platform.	2015	423.0	RIVAL
CloudKitchens	CloudKitchens is a real estate company that provides smart kitchens for delivery-only restaurants.	2016	400.0	COMPLEMENT
thredUP	thredUP is a fashion resale marketplace that enables individuals to buy and sell clothing for women and children.	2009	381.1	RIVAL

(*continued*)

Table 6.A.3 **(cont.)**

Name	Description	Founding year	Total funding (to Dec 2019, USD million)	Complementary to physical retail?
Wayfair	Wayfair is an online retailer of home products for bedroom, living room, kitchen and dining, home entertainment, bathroom, and more.	2002	358.0	RIVAL
MOD Super Fast Pizza	MOD Super Fast Pizza owns and operates a chain of pizza restaurants in the United States and the United Kingdom.	2008	352.0	NEUTRAL
Casper	Casper is a sleep startup that launches a comfortable mattress sold directly to consumers, eliminating commission-driven, inflated prices.	2013	339.7	RIVAL
TechStyle Fashion Group	TechStyle is a global membership fashion commerce company focused on reimagining the global fashion business.	2010	336.0	RIVAL
ezCater	ezCater is an online catering marketplace that allows individuals to order food from local caterers in the US	2007	319.8	COMPLEMENT
RetailMeNot	RetailMeNot is a marketplace for online coupons and deals that operates a portfolio of coupon and deal websites.	2007	299.5	NEUTRAL
Moda Operandi	The leading platform for fashion discovery. We connect consumers directly with established and emerging designers from around the world.	2010	293.7	RIVAL
Shift	Shift is an online marketplace for buying and selling used cars.	2013	293.0	RIVAL
Brandless	Brandless is a direct-to-consumer company providing household items.	2016	292.5	RIVAL
Total funding for top 24 companies			16,715	
Total complement funding			9,199	
Proportion complement			55.03 percent	

Notes: The data are from Crunchbase, as of December 30, 2019. We note a strong caveat that startups in other categories also operate and impact the retail market, e.g., Uber Eats is a competitor to DoorDash but is not listed here as Uber is not primarily a delivery startup. Similarly, Nuvo is primarily an autonomous vehicle startup, but it operates in the retail delivery space as well. Large online retailers (e.g., Amazon) are excluded if they were founded prior to 1999. Finally, funding data is missing for 55.6 percent (2,538 of 4,566) companies we identified as being involved in retail-related activity in the Crunchbase data.

References

Basker, Emek. 2012. "Raising the Barcode Scanner: Technology and Productivity in the Retail Sector." *American Economic Journal: Applied Economics* 4: 1–29.

———. 2016a. *Handbook on the Economics of Retailing and Distribution*. Cheltenham, UK: Edward Elgar Publishing.

———. 2016b. "The Evolution of Technology in the Retail Sector." In Basker, *Handbook on the Economics of Retailing and Distribution*, 38–53.

Basker, Emek, Shawn D. Klimek, and Van H. Pham. 2012. "Supersize It: The Growth of Retail Chains and the Rise of the 'Big Box' Store." *Journal of Economics and Management Strategy* 21: 541–82.

Betancourt, Roger R. 2016. "Distribution Services, Technological Change and the Evolution of Retailing and Distribution in the Twenty-First Century." In Basker, *Handbook on the Economics of Retailing and Distribution*, 73–96.

Carden, Art, and Charles Courtemanche. 2016. "The Evolution and Impact of the General Merchandise Sector." In Basker, *Handbook on the Economics of Retailing and Distribution*, 413–32.

Chava, Sudheer, Alexander Oettl, Manpreet Singh, and Linghang Zeng. 2018. "Impact of E-Commerce on Employees at Brick-and-Mortar Retailers." June 15. Georgia Tech Scheller College of Business Research Paper No. 18–23; 29th Annual Conference on Financial Economics & Accounting 2018. https://ssrn.com/abstract=3197326 or http://dx.doi.org/10.2139/ssrn.3197326.

Corkery, Michael, and Sapna Maheshwari. 2019. "After 15 Years, Dream Mall Finally Becomes a Reality." *New York Times*, October 24.

Eaton, B. C., and R. G. Lipsey. 1982. "An Economic Theory of Central Places." *Economic Journal* 92(365): 56–72.

Ellickson, Paul B. 2016. "The Evolution of the Supermarket Industry: From A&P to Walmart." In Basker, *Handbook on the Economics of Retailing and Distribution*, 368–91.

Evangelista, Benny. 2015. "How the 'Amazon Factor' Killed Retailers like Borders, Circuit City." SFGate.com, July 13. https://www.sfgate.com/business/article/How-Amazon-factor-killed-retailers-like-6378619.php.

Field, Hayden. 2018. "If Business Is Booming, Why Is Main Street America Still Full of Empty Storefronts?" *Entrepreneur*, November 29. https://www.entrepreneur.com/article/322979.

Foster, Lucia, John Haltiwanger, Shawn Klimek, C. J. Krizan, and Scott Ohlmacher. 2016. "The Evolution of National Retail Chains: How We Got Here." In Basker, *Handbook on the Economics of Retailing and Distribution*, 7–37.

Goldschlag, Nathan, Travis J. Lybbert, and Nikolas J. Zolas. 2019. "Tracking the Technological Composition of Industries with Algorithmic Patent Concordances." *Economics of Innovation and New Technology*. https://doi.org/10.1080/10438599.2019.1648014.

Hopenhayn, Hugo A. 1992. "Exit, and Firm Dynamics in Long Run Equilibrium." *Econometrica* 60(5): 1127–50.

Hortaçsu, Ali, and Chad Syverson. 2015. "The Ongoing Evolution of US Retail: A Format Tug-of-War." *Journal of Economic Perspectives* 29: 89–112.

Isaac, Mike,and Yaffe-Bellany, David. 2019. "The Rise of the Virtual Restaurant." *New York Times*, August 14, 2019.

Kercheval, Michael. 2014. "Why Online Retailers Continue to Open Brick-and-Mortar Stores." TechCrunch, October 31. https://techcrunch.com/2014/10/31/why-online-retailers-continue-to-open-brick-and-mortar-stores/.

Kestenbaum, Richard. 2017. "This Is What Will Happen to All the Empty Stores You're Seeing." *Forbes*, May 30. https://www.forbes.com/sites/richardkestenbaum/2017/05/30/this-is-what-will-happen-to-all-the-empty-stores-youre-seeing/#2566157c4bb7.

Kilgannon, Corey. 2018. "This Space Available." *New York Times*, September 6. https://www.nytimes.com/interactive/2018/09/06/nyregion/nyc-storefront-vacancy.html.

NAIC-CIPR. 2017. "Capital Markets Special Report." National Association of Insurance Commissioners & the Center for Insurance Policy and Research. https://www.naic.org/capital_markets_archive/170601.htm.

Noonan, Keith. 2019. "What Does the Future Hold for Self-Driving Cars?" The Motley Fool, October 18. https://www.fool.com/investing/what-does-the-future-hold-for-self-driving-cars.aspx.

Page, Scott E. 2007. "Why Chains Beget Chains: An Ecological Model of Firm Entry and Exit and the Evolution of Market Similarity." *Journal of Economic Dynamics & Control* 31: 3427–59.

Ratchford, Brian. T. 2016. "Retail Productivity." In Basker, *Handbook on the Economics of Retailing and Distribution*, 54–72.

Redman, Russell. 2018. "More Whole Foods Locations Get Prime Now Pickup: Amazon to Offer Grocery Delivery Service on Thanksgiving." *Supermarket News*, November 8. https://www.supermarketnews.com/online-retail/more-whole-foods-locations-get-prime-now-pickup.

Richter, Felix. 2018. "Who's Surviving the 'Retail Apocalypse'?" statista.com, April 17. https://www.statista.com/chart/13550/change-in-retail-store-count-by-category/.

Santa Cruz, Justine. 2019. "Why E-Commerce and Brick-and-Mortar Are Stronger Together." TotalRetail. https://www.mytotalretail.com/article/why-e-commerce-and-brick-and-mortar-are-stronger-together/.

Smith, Michael D., and Alejandro Zentner. 2016. "Internet Effects on Retail Markets." In Basker, *Handbook on the Economics of Retailing and Distribution*, 433–54.

Stewart, H., N. Blisard, S. Bhuyan, and R. M. Nayga, Jr. 2004. *The Demand for Food Away from Home. Full Service or Fast Food?* Agriculture Economic Report No. 829. Washington, DC: US Department of Agriculture, Economic Research Service.

Takahashi, Paul. 2018. "Restaurants Eat Up More Space in Malls." *Houston Chronicle*, May 18. https://www.houstonchronicle.com/business/article/Restaurants-eat-up-more-space-in-malls-12925642.php.

Thompson, Derek. 2017. "The Paradox of American Restaurants." *The Atlantic*, June 20. https://www.theatlantic.com/business/archive/2017/06/its-the-golden-age-of-restaurants-in-america/530955/.

Townsend, Matt, Jenny Surane, Emma Orr, and Christopher Cannon. 2017. "America's 'Retail Apocalypse' Is Really Just Beginning." Bloomberg.com, November 8. https://www.bloomberg.com/graphics/2017-retail-debt/.

Walters, Nicole. 2018. "Restaurant Start-Up Costs (A Breakdown for New Restauranteurs)." Blogpost, shopkeep.com. https://www.shopkeep.com/blog/restaurant-startup-costs-breakdown.

Weise, Karen. 2019. "Amazon Wants to Rule the Grocery Aisles, and Not Just at Whole Foods." *New York Times*, July 28.

Woods, Sharon. 2019. "The 'Retail Apocalypse' Is a Myth, and That's Good News for the Shopping Industry and Downtowns." *Public Square*, September 23. https://

www.cnu.org/publicsquare/2019/09/23/%E2%80%98retail-apocalypse%E2%80%99-myth-and-thats-good-news-shopping-industry-and-downtowns.
Zumbach, Lauren. 2016. "Shopping Centers Look to Entertainment, Recreation to Fill Empty Anchors." *Chicago Tribune*, September 16. https://www.chicagotribune.com/business/ct-retail-entertainment-0916-biz-20160916-story.html.

Comment

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Definitions

To understand the recent evolution of physical retail markets, it is useful to start by defining physical retail markets.

The retail sector, narrowly defined, consists of business establishments—stores—that primarily sell merchandise to consumers, generally without transformation. It is distinct from the wholesale sector, which sells merchandise to retailers (and sometimes transforms or packages the products).

In addition, the retail sector has long been considered distinct from other types of business that serve end customers and are often located in the same malls and streets as retailers but are primarily engaged in providing *services* rather than merchandise. For example, gyms are part of the arts, entertainment, and recreation sector; ceramics studios are classified under educational services; and hair salons, automotive repair shops, and dry cleaners are all classified under other services. Bank branches are classified in the finance and insurance sector, and rental locations (whether renting videos, formalwear, or furniture) are classified under real estate & rental & leasing.[1]

A major part of Lafontaine and Sivadasan's chapter (chapter 6, this volume) concerns restaurants, which provide both a good and a service. As noted by Lafontaine and Sivadasan, these were considered by the Census Bureau to be part of the retail sector under the Standard Industrial Classification (SIC) system used until 1997, but they are part of the accommodation and food services sector in the North American Industrial Classification System (NAICS), which has been used by the Census Bureau since 1997.

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1. Alternative classifications of businesses, based on type of customer or location, are feasible to create using the microdata collected by the Census Bureau.