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A FORMAT TUG-OF-WAR

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ABSTRACT

We review major changes in the economics of the US retail sector over the past 15-20 years and discuss what these portend for the future evolution of retail. The sector has been shrinking in relative size over the long term, though this stopped around the onset of the Great Recession. Retail has experienced stronger-than-average productivity growth that has not been accompanied by commensurate wage growth. The main forces shaping the retail landscape in recent decades have been the expansions of two formats: e-commerce and warehouse clubs. While both formats have been the subject of study and discussion, we find evidence that warehouse clubs have had to this point a greater effect on retail than e-commerce has. This impact has been manifested in changes in the retail sector's scale, concentration, dynamism, and urbanization. Thus while e-commerce will continue to expand and physical retail will further evolve in the coming years, the physical format is unlikely to meet its demise soon.

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The past 15-20 years have seen substantial and visible changes in the way US retail business is conducted, with many formerly dominant companies and formats in the sector—for example, Sears, Radio Shack, JCPenney, Circuit City, and a number of shopping malls—struggling to adjust and sometimes suffering fatal blows. Some sectors of retail, like traditional department stores as well as book and music stores, have seen large declines in sales and employment. Explanations about what is happening in the retail sector have dominated by two powerful and not-fully-consistent narratives: a prediction that retail sales will migrate online and physical retail will be virtually extinguished, and a prediction that future shoppers will virtually all be heading to giant format physical stores like warehouse clubs and supercenters.

Online e-commerce in retail has been a cultural phenomenon and target of substantial attention in the business and technology media since the late 1990s; many of the most famous “dotcom” busts of the late 1990s were e-retailers. E-commerce has doubtlessly affected important elements of technology, demand, and market structure in the retail sector. Extensive research in the economics literature has explored the rise of e-commerce and its effects on various retail markets (for a survey, see Lieber and Syverson 2012). While physical retail hasn’t been killed off by online retail yet, the possibility is often raised. The “death of retail”, a term that according to Google Trends emerged in 2009, has been declared in multiple forums.

But although online retail will surely continue to be a force shaping the sector going forward and may yet emerge as the dominant mode of commerce in the retail sector, its time for supremacy has not yet arrived. Retail sales through the physical format of warehouse clubs and supercenters (which we will sometimes shorthand as “warehouse clubs”) offer large product lines goods such as apparel, furniture, and appliances as well as a full line of groceries. Examples include the well-known warehouse clubs Costco and Sam’s Club as well as the grocery-plus-department-store formats found in Walmart Supercenters. This segment of the retail sector is just plain large. Its four largest firms accounted for almost 8 percent of total retail sales in 2012. This is almost 50 percent more than *all* e-commerce retail sales in that year. We discuss evidence below indicating that this segment has had a greater effect on the shape of retail over the past 15-20 years than has e-commerce. The current scale and influence of this single sector of physical retail relative to all of e-commerce suggests that while physical retail is likely to continue evolving in the coming years, it is unlikely to meet its demise soon. At the very least, it suggests the potential for an extensive future role for “bricks-and-clicks” hybrids that combine e-commerce and physical platforms.

In this essay, we review changes that have taken place in US retail along these and other dimensions. We begin with an overview of the retail sector as a whole, which over the long term has been shrinking as a share of total US economic activity and in terms of relative employment share. The retail sector has experienced stronger-than-average productivity growth, but this has not been accompanied by commensurate wage growth. We then turn to specific discussions of the aforementioned two main forces shaping the retail landscape in recent decades: e-commerce and warehouse clubs. We then look more broadly at changes across the structure of the retail sector, including scale, concentration, dynamism, and degree of urbanization. We conclude with a discussion of the likely future course of the retail sector.

Overview of the US Retail Sector

When we refer to “retail,” we are abiding by the sector definitions used by statistical agencies in the United States and many other countries. The North American Industry Classification System (NAICS) used by the statistical agencies of the Canada, Mexico, and the United States defines retail trade as entities “engaged in retailing merchandise, generally without transformation, and rendering services incidental to the sale of merchandise.” Similarly, the International Standard Industrial Classification (ISIC) defines the sector as “re-sale (sale without transformation) of new and used goods to the general public, for personal or household consumption or utilization.” These definitions have two important commonalities. First, retail sells “merchandise” or “goods”—that is, physical objects. Second, it sells these objects without transformation. These two conditions rule out economic activities that many might think of as retail or at least occur in retail-like settings (like strip malls, sidewalk storefront shops). For example, the definition rules out restaurants and bars (the physical objects provided are transformed) as well as personal services like barbers, nail salons, repair shops, and the like.¹ The establishments that *are* included in the sector are stores that sell untransformed goods ranging from automobiles to zippers as well as nonstore retailers, who by definition are “organized to serve the general public, but their retailing methods differ.” The nonstore retailer definition explains that these different methods involve “reach[ing] customers and market merchandise with methods, such as the broadcasting of ‘infomercials,’ the broadcasting and publishing of direct-response advertising, the

¹ Restaurants and bars *were* included in the retail sector under the older Standard Industrial Classifications (SIC) taxonomy used in the United States before 1997. Unless otherwise noted, statistics reported below from that period have been adjusted to remove these establishments.

publishing of paper and electronic catalogs, door-to-door solicitation, in-home demonstration, selling from portable stalls (street vendors, except food), and distribution through vending machines. Establishments engaged in the direct sale (nonstore) of products, such as home heating oil dealers and home delivery newspaper routes are included here.”

The Long Arc

The retail sector’s share of total (nonfarm) employment was slightly above 10 percent in 1954. It stayed near this level until around 1970, at which point it started to rise steadily toward a peak of 12.2 percent in 1987. Since then it has fallen back to its current level near 11 percent. Retail’s share of value added has not followed this up-and-down pattern. Instead, it experienced a secular decline throughout the period (though at varying rates), dropping from its 1954 start at 8.7 percent to its current level just under 6 percent. Figure 1 shows the evolution from 1954-2014 of retail’s share of US economic activity in terms of both employment and value added.

One thing to keep in mind regarding interpretation of these long run patterns is that, as discussed above, retail by definition sells physical goods. Goods consumption as a share of the economy has seen a long-run decline. Thus relative to total goods consumption, retail has not been shrinking over the long run. In 1954, retail value added equaled 21.7 percent of the value added of the private goods-producing sectors (agriculture, forestry, fishing, and hunting; mining; construction; and manufacturing) minus net goods exports. In 2014, this share was about 24 percent, though it has fallen from a peak of 29 percent in the late 1990s. It is also worth noting that regardless of any drops in overall shares of economic activity, retail’s employment and value added *levels* trended upward throughout this period.

Interestingly, regardless of longer-run trends, the retail sector has seen little change in its share of economic activity since the onset of the Great Recession. Its employment and value added shares have held steady at 11.1 percent and 5.9 percent, respectively, since 2008. An impending “death of retail” certainly does not reveal itself in the aggregates.

The fact that the sector’s value added share has been consistently smaller than its employment share indicates that value added per employee, a measure of labor productivity, is lower in retail than in the economy overall. The magnitude of this difference is substantial. In 2014, value added per employee in the nonfarm economy was \$124,000, while in retail it was roughly half this level, \$66,000. While some of this difference reflects lower average hours per employee in retail, hours differences are not large enough to explain the labor productivity gap. Bureau of Labor Statistics (BLS) data indicate retail workers averaged about 31.4 hours per week in 2014, about 10 percent below the 34.5 hour average for all

nonfarm workers. Value added per worker-hour in retail is therefore still about 40 percent lower than its level in the economy overall.

This difference in labor productivity is reflected in part in an average earnings gap between retail and the overall economy. Total labor compensation per employee in 2013 (the latest year for which data are available at this writing) in the retail sector was just above \$35,000, as compared to the analogous nonfarm-economy-wide value of \$65,000. Again, even adjusting for the fact that the typical employee in retail works fewer hours, retail compensation per hour is still 40 percent lower in retail, commensurate with the value added gap.

Retail's labor productivity gap was even larger three decades ago, however. The sector has been catching up. While there is some disagreement across data sets in the patterns of productivity growth since 2003—value-added per worker reported by the Bureau of Economic Analysis levels off around 2003 while the Bureau of Labor Statistics output-per-hour labor productivity metric continues to rise through 2014—both series agree that labor productivity growth in the retail sector has outpaced that in the broader economy since 1987. Specifically, real value added per worker in retail in the BEA data grew about 80 percent between 1987 and 2014 (2.2 percent per year). Value added per worker rose only 50 percent over the same period (1.5 percent per year) for the entire nonagricultural economy. Retail output per hour according to the BLS productivity data grew 110 percent (2.9 percent per year) from 1987-2013, in contrast to a 70 percent gain (2.1 percent per year) for all nonfarm private businesses.

Some research has delved into the possible microfoundations of this sector-wide productivity growth. Foster, Haltiwanger, and Krizan (2006) document that within-store productivity growth accounts for a relatively minor portion of sector-wide productivity growth in US retail. Instead, the reallocation of activity across stores drives most of the gains in overall retail productivity, which in turn occurs both through the entry of new, more efficient firms replacing a set of less efficient exiting ones, as well as through successful firms adding new stores (rather than expanding their existing ones).² Doms, Jarmin, and Klimek (2004) find that retail establishments' productivity levels and growth rates are correlated with their rates of investment in information technologies. This potential for productivity growth driven by information technology evokes Basker's (2012) examination of earlier retail-sector productivity gains harnessed in the sector through the introduction of barcodes. The Institute for Competitiveness and Prosperity (2010) finds, using the World Management Survey data (for example,

² This dominance of reallocation of activity across heterogeneous-productivity stores rather than productivity growth within stores also appears to exist in other countries' retail sectors, as Bronnenberg and Ellickson explain in this issue.

see Bloom, Lemos, Sadun, Scur, and Van Reenen 2014), that larger retailers employ better management practices than do smaller ones in both the United States and Canada. The increase in scale in the sector discussed below has also coincided with greater product variety in many settings. This too could be a source of productivity growth, and could be especially relevant for e-commerce as noted by Brynjolfsson, Smith, and Hu (2010).

While it is unclear whether these relationships between technology, management, variety, and productivity are causal, the patterns do suggest possible channels through which productivity shapes the success and survival of retailers. It is also interesting to note that while many of these proposed productivity drivers involve digital and other information technologies, they are as likely to be operating on the “back end” of retail (selection of offerings, distribution, inventory management, and so on) as on the customer-facing “front end” (websites, online advertising, etc.). Thus the productivity gains of information technologies need not be harnessed exclusively or even primarily through e-commerce retailing. The continued importance of physical operations is a theme we return to below.

Whatever the sources of retail sector productivity changes, labor earnings growth in the sector has not kept up with them. Total real labor compensation per employee in retail, as reported by the US Bureau of Economic Analysis (BEA) industry accounts, rose an average of 1.2 percent per year from 1987-2003, but fell from 2003-09 and has changed little since, resulting in a decline in real compensation of -0.4 percent per year from 2003-13. In this sense, the qualitative pattern in retail is not unlike the divergence between productivity and some measures of labor compensation during the past several decades (for example, as discussed in Mishel 2012). The quantitative nature of the gap is more extreme in retail. The analogous figures for the entire (nonagricultural) economy were 1.4 percent per year from 1987-2003 and 0.7 percent per year from 2003-13. Thus, retail compensation has not even kept up with compensation growth (already lagging behind productivity) in the economy overall. Data from the BLS industry-occupation wage data, available only since 1997, are consistent with this interpretation. Average real annual compensation in the industry across all occupations rose from \$28,200 in 1997 to \$32,300 in 2003, which is 2.3 percent per year on average, and began to fall afterward, averaging -0.5 percent growth per year from 2003-14.³

³ These compensation measures are measured on a per employee basis, so they will not reflect differences in hours per employee across time or sectors. As noted above, however, data from the Bureau of Labor Statistics indicate that average weekly hours per worker in retail are only about 10 percent less than for workers in the overall economy. To explain the differential growth in compensation per worker since 1987, hours in retail would have needed to have dropped an average of 0.6 percent per year relative to those in the overall economy from 1987-2013.

All in all, while retail labor productivity growth averaged around 2.5 percent per year between 1987 and 2014, average labor earnings growth was only about 0.6 percent during those years, with earnings actually falling after 2003. Labor compensation's share of value added in the retail sector dipped from 57.6 to 54.5 percent between 1997 and 2013. The combination of productivity gains and drops in labor compensation has reduced the sector's unit costs. These cost drops have been captured by two parties: consumers pay a lower retail margin on goods they buy, and payments to the sector's capital holders have risen. Regarding consumers, according to the BEA's annual input-output tables retail margins as a share of sales of all commodities fell from 5.0 percent to 4.7 percent over 1997-2013, and margins on personal consumption expenditures in particular dropped from 11.9 to 10.6 percent during the period. (For reference, total commodity sales were \$29.7 trillion in 2013 and personal consumption expenditures were \$11.5 trillion.) As to capital owners, gross operating surplus—the part of industry value added not paid as labor compensation or taxes on production—rose from 23.2 percent of value added in 1997 to 24.9 percent in 2013.

Retail Sub-Industry Changes

These sector-wide trends hide variations in the fortunes of specific industries within the retail sector. Figure 2 shows the evolution of employment since 1990 in each of the 12 three-digit NAICS retail industries, the largest industrial subcategorization within the sector.

Total retail employment has grown 17 percent since 1990. Every component three-digit industry in the sector but one also saw employment growth. The exception was gasoline stations, which saw employment drop by about 2 percent. The industries with the fastest growth rates were building material and garden stores (39 percent employment growth over the period); sports, hobby, and music stores (32 percent); and health and personal care stores (30 percent). Of the sector's total employment growth of 2.3 million since 1990, from 13.3 to 15.6 million, the three industries contributing the largest portion of these gains were general merchandise stores (gained 630,000 employees), motor vehicles and parts sellers (+400,000); and building materials and garden stores (+360,000). Nonstore retailers, the industry in which the vast majority of online retail occurs, saw 27 percent employment growth over the period. However, the industry's relatively small size meant that this robust growth rate still only accounted for 5 percent of overall retail employment growth. We return to the role of retail e-commerce below.

The three-digit industry experiencing the largest drop in its employment *share* within retail was food and beverage stores, dropping from 21.0 percent to 19.5 percent of retail sector employment

between 1990 and 2014. Gas stations' share fell to 9.0 percent from 10.0 percent. On the other hand, general merchandise stores experienced the largest share gain, from 19.0 to 20.3 percent, followed by motor vehicles and parts (despite a drop during the Great Recession), which saw its share rise from 11.3 to 12.1 percent.

While many of these employment patterns are mirrored in these industries' share of total retail sales, one interesting distinction is that the two industries that initially accounted for the largest share of sales—motor vehicles and parts dealers and food and beverage stores—have both seen substantial drops in sales shares over the past 25 years. After peaking at 27 percent of retail sales, motor vehicles and parts share dropped as low as 19 percent during the Great Recession, before partially recovering to 22 percent. The decline of employment in food stores was steadier, with their share falling from 20 percent in 1992 to 14 percent in 2013.

An obvious question to ask is what factors drove these changes, both sector-wide aggregates and the differences across its component industries. The postulated effect of e-commerce on bricks-and-mortar retailers could well have differential effects across industries. So could the growth of large-format retail outlets like warehouse clubs. We explore retail e-commerce in more detail in the next section, and then turn to large-format retail in the following section.

E-commerce in Retail

The growth of e-commerce has received extensive attention in the business media and academic literature. Between 2000 and 2014, the fraction of all retail sales accounted for by e-commerce has risen steadily from 0.9 to 6.4 percent, according to figures from the US Census Bureau.⁴ The increasing share reflects an 11-fold increase in nominal annual e-commerce sales from 2000 to 2014, in contrast to a 55 percent increase in nominal retail sales during that time. However, even with its recent rapid growth, the miniscule base from which this expansion grew means online commerce is still a small part of retail activity.

⁴ The US Census Bureau defines e-commerce as “transactions sold on-line whether over open networks such as the Internet or proprietary networks running systems such as Electronic Data Interchange (EDI),” where EDI is itself defined as “the structured transmission of data between organizations by electronic means...to transfer electronic documents or business data from one computer system to another computer system...without human intervention.” EDI is more applicable to B2B e-commerce than the B2C transactions that define the retail sector (Lieber and Syverson 2012).

The vast majority of retail e-commerce sales—about 85 percent in 2013—occur in the Electronic Shopping and Mail-Order Houses industry (NAICS 45411), a subindustry of nonstore retailers, commonly abbreviated ESMOH.⁵ This sub-industry accounted for only 7.8 percent of the retail sector’s shipments and 2.2 percent of its employment. In 2013, 63 percent of ESMOH sales qualified as e-commerce by the Census definition (and the employment shares of the “Electronic Shopping” and “Mail-order Houses” subindustries were around 55 and 45 percent, respectively). Online sales were 19 percent of ESMOH activity in 2000, so again, the rise has been substantial. But it is worth remembering that there several types of retail activities that don’t happen in a physical store and also are not e-commerce, even in the retail industry where e-commerce is most dominant.

The three product categories that account for the most online retail sales by Electronic Shopping and Mail-Order Houses are clothing, accessories, and footwear (18 percent of ESMOH e-commerce sales); an “other merchandise” catch-all that includes collectibles, souvenirs, auto parts and accessories, hardware, lawn and garden equipment and supplies, and jewelry (15 percent); and furniture (10 percent).

The remaining 15 percent of online retail sales not taking place within Electronic Shopping and Mail-Order Houses are made by establishments whose primary activities are physical in nature. Among these, the largest share of e-commerce sales comes from motor vehicles and parts dealers. They account for 11 percent of total retail e-commerce sales (that is, about 70 percent of non-ESMOH e-commerce). The large volume in the motor vehicles and parts stores industry means that these e-commerce sales still only account for 2.9 percent of that industry’s sales.⁶ Clothing and accessories stores are the only other industry that account for more than 1 percent of retail e-commerce sales. Here too this online activity is a small share—1.4 percent—of the industry’s total sales.

We combined the product-specific data on e-commerce sales within the Electronic Shopping and Mail-Order Houses category along with e-commerce sales by establishments outside ESMOH to compute online sales as a fraction of total sales for a number of specific products. The shares for 2013 are reported in Table 1 in decreasing order of e-commerce intensity, along with the 2013 total sales of

⁵ The Electronic Shopping and Mail-Order Houses category is described in the NAICS classification manual as “An industry group comprising establishments primarily engaged in retailing all types of merchandise using non-store means, such as catalogs, toll free telephone numbers, or electronic media, such as interactive television or computer. Included in this industry are establishments primarily engaged in retailing from catalog showrooms of mail-order houses.” According to at least one financial information website (<https://ycharts.com/companies/AMZN>), Amazon is classified as operating primarily in this industry.

⁶ Note that franchise law restrictions make it extremely difficult for new auto dealers to actually make sales using online-only platforms. See Scott Morton, Zettelmeyer, and Silva-Risso (2001) for more discussion.

the product—whether by e-commerce channel or not. The total e-commerce sales of these product classes accounted for 65 percent of all retail e-commerce sales in 2013. (Some products sold in high volume online, such as airline tickets, are not considered retail sales as they do not fit the goods-based definition of “merchandise.”)

In a result that will surprise no one, the most e-commerce intensive product category in the data is the music and videos category, with 79.6 percent of all sales in 2013 conducted via e-commerce. Books and magazines were the second most dependent on online retail platforms, with 44.1 percent of their sales online. Following that were computer hardware and software at 32.9 percent and toys, hobbies, and games at 28.8 percent.

Music and videos therefore appear to have almost saturated their e-commerce potential. But online retail still has considerable ability to expand in other categories the future. Indeed, the e-commerce shares of some of the largest product classes—such as clothing, accessories, and footwear; drugs, health, and beauty; and food and beverages—are the lowest. To attempt to quantify the likely expansion, we fit S-curves (specifically, logistic diffusion curves) to the products’ e-commerce shares using available annual data from 1999-2013. Of course, this exercise is highly speculative. We do not have many data points on which to fit the curves. For some products the problem is worse because e-commerce sales are not reported in some years due to confidentiality or data quality reporting restrictions. Further, we assume a saturation parameter of 1; that is, we assume that given enough time, potentially all of these products may be sold completely on line.⁷

With those reservations duly stated, the diffusion curve estimates suggest that many of the product categories could see considerable share growth over the next decade. Of the product classes all but two (drugs, health, and beauty, as well as food and beverages) are projected to hit 50 percent e-commerce shares by 2025 (the music and videos category has already surpassed this level, of course). The same products are all projected to reach 75 percent e-commerce shares by 2031. Some of these product classes have sales that are quite substantial, with a few categories having total sales of over \$100 billion in 2013. These results suggest it is not outlandish to believe that annual online sales might increase by hundreds of billions of dollars over the next decade.

⁷ The estimates of the S-curves are available in the Appendix. We also estimated a specification that fit products’ saturation levels (i.e., asymptotic shares) as separate parameters to allow for the possibility that sales of certain products never completely move to online platforms. However, this yielded unrealistically low estimates of asymptotic share. Perhaps this was because we were often extrapolating diffusion curves before an obvious inflection point. To our eye that estimation routine appeared to take any excuse for an inflection point in the data as bona fide, with the routine typically projecting a product’s asymptotic share as less than 5 percentage points above its observed share in 2013.

On the other hand, while substantial, this potential growth relative to retail sales overall is still modest. Total e-commerce retail sales in 2013 were \$260 billion, or 5.8 percent of total retail. Even supposing all categories projected to reach 50 percent online sales by 2025 actually hit 100 percent, that is only the 2013 equivalent of an additional \$570 billion of online sales. The share of e-commerce in total retail sales would still be less than 20 percent in that (rather extreme) case. To this point, recall that the largest tracked categories in terms of total retail sales have the noticeably smallest online shares. Until online sales diffuse more deeply into these categories (our diffusion curves predict 50 percent shares by the late 2030s for the drugs and food product classes, though we are extrapolating extensively in these cases), the bulk of retail will remain physically based.

We are wary about putting too much weight on these results due to the caveats mentioned above, but a conservative interpretation would be that there will be considerable across-product variation in the timing and depth of the growth of e-commerce. More broadly, predictions of an impending demise of physical retail have been greatly exaggerated. Even rather optimistic projections about e-commerce growth still leave a considerable amount of activity to physical establishments in coming years.

The Rise of the Warehouse Club Retail Format

Not only should we expect physical formats to remain a substantial factor in the retail sector over the foreseeable future, over the most recent past decades a particular physical format has arguably had an even greater impact on retail than has e-commerce. That is the warehouse club.

Some basic summary statistics offer prima facie evidence of the outsized role of the emerging format in the sector.

The retail sector is divided by the NAICS taxonomy into twelve three-digit industries, as shown above in Figure 2. In turn, these three-digit retail industries are subdivided into 27 four-digit and 58 five-digit subindustries. Electronic Shopping and Mail-Order Houses had the second-largest growth rate in nominal sales between 1992 and 2013 among the five-digit subindustries, experiencing a tenfold rise from \$35 billion to \$348 billion. However, the fastest growth rate was observed in Warehouse Clubs and Supercenters (NAICS 45291). The NAICS manual describes the industry comprising “establishments known as warehouse clubs, superstores or supercenters primarily engaged in retailing a general line of groceries in combination with general lines of new merchandise, such as apparel, furniture, and appliances.” While the federal statistical agencies cannot report the industry classification of any specific

identifiable establishment or firm, clearly the well-known discount warehouse clubs like Costco and Sam’s Club fit this definition. It also appears that the newer, larger-format Walmarts (“Walmart Supercenters”—those that carry a full line of groceries), Targets (“SuperTargets”), Kroger Marketplace, and Meijer stores fit in here as well. However, this category requires that the store offer a general line of groceries, which means many “big-box” format stores do *not* fall within this industry. Sales in the Warehouse Clubs and Supercenters subindustry grew 10.5 times over between 1992 and 2013, from \$40 billion to \$420 billion. In both growth rates and actual dollars, then, the expansion of this subindustry outstripped growth in ESMOH.

A direct comparison of some of the major players in each segment bolsters the notion that warehouse club growth has exceeded the astounding growth in e-commerce. Amazon, perhaps the largest company operating in Electronic Shopping and Mail-Order Houses in terms of revenues, reported in annual financial filings an increase in US sales of about \$38 billion between 2000 and 2013.⁸ The largest warehouse club chain, Costco, saw its US sales rise by \$50 billion over the same period. The Sam’s Club warehouse club division of Walmart added \$32 billion in growth during this time.

More specific elements of the timing of the warehouse clubs boom also point to its role in driving the decline of alternative specific retail formats. Figure 3 plots employment for the four component industries of the general merchandise stores industry (NAICS 452), of which warehouse clubs and supercenters is one component, along with discount department stores, non-discount department stores, and a residual other general merchandise category. Employment in each of the first three industries grew at roughly the same pace throughout the 1990s. At the turn of the millennium, however, the series diverge. Warehouse club employment starts climbing swiftly, roughly doubling between 2000 and 2014, with only a mild hiccup in 2009. Employment at traditional (non-discount) department stores, on the other hand, began shrink. In total, warehouse clubs have added 660,000 jobs between 2000 and the start of 2015 even as traditional department stores have shed 350,000 jobs. The patterns in sales revenues are even starker. Between 1992 and 2013, as warehouse clubs saw a 10.5-fold increase in nominal sales, traditional department stores revenues *fell* by 18 percent, down 37 percent in nominal revenues from their 1999 peak. (For context, the Consumer Price Index rose 66 percent during this period.)

The retail sector has therefore seen a major shift in the way that stores selling multiple varieties of merchandise operate, with a shift from the traditional service-oriented department store toward a

⁸ Amazon only offers geographic breakouts of revenues into North America and International categories. We assumed 90 percent of North American sales are to the US.

lower-cost model that in some dimensions borrows the logistics techniques of wholesale sector. While some high-end department stores have been able to stave off decline by focusing on higher-income shoppers desiring extensive service, those in the middle have struggled.

The coincident timing of the expansion of warehouse clubs and the contraction of traditional department stores points to the possibility that the former grew at least partially at the expense of the latter. Some of the most substantial changes within the retail sector may be largely incidental to the growth in online commerce rather than a result of it.

The geographic and across-product patterns in the data also point to the expansion of warehouse clubs as a key driver of the contraction of the old line department stores. Using County Business Patterns data from 2003 and 2013, we regress the ten-year change in a county's number of establishments classified as department stores on the county's change in warehouse stores. We also included the county's change in its logged total establishments across all industries to control for overall economic growth in the county, as well as the change in the log number of retail establishments to control for any county-specific changes across the entire retail sector. The results indicate that counties that saw larger increases in the number of warehouse club stores (relative to growth in the size of the county's overall economy and its retail sector specifically) saw larger declines in their number of department stores. The coefficient indicates that every extra warehouse club store is associated with a drop in the number of department stores of 0.686 (s.e. = 0.086). Mean changes in counties' store counts were 0.67 for warehouse clubs and -0.40 for department stores, so the mean increase in warehouse clubs quantitatively predicts the mean change in department stores reasonably closely.⁹

To gauge the broader local effects of warehouse clubs across retail segments, we repeated this exercise while replacing the county's change in the number of department stores with its change in store counts for 10 of the product categories explored above in the e-commerce diffusion analysis (computer and software stores were dropped as a separate industry in the 2012 CBP, so we do not include them in our analysis). In 5 of the 10 product categories, warehouse club expansion in a county

⁹ For the full results of the regressions described here, see the Appendix. Our sample contained 3136 counties. There are 3196 counties in the CBP data; 60 were dropped because they did not have at least one retail establishment in either 2003 or 2013. If we run the specification using changes in logged department store and warehouse club establishments, which limits the sample to 835 counties with nonzero establishment counts of both types in both years, the estimated elasticity is -0.193 (s.e. = 0.031). Both results are robust to also including the change in the number of ESMOH establishments in the county, though the magnitude of the warehouse club count coefficient falls by about one-third in the levels specification. While one might at first glance suspect it is unlikely for the ESMOH sector to have local effects given the nature of their business, Hortaçsu, Martinez-Jerez, and Douglas (2009) show that a disproportionate amount of online-platform-based transactions occur take place between a buyer and seller living in the same narrowly defined geographic region.

had a negative and significant (5 percent level) association with the growth in that product's stores in the same county. Four categories exhibited an insignificant relationship: electronics and appliances, sporting goods, clothing and accessories, or food and beverages. There was a positive and significant relationship between warehouse club growth and drugs, health and beauty stores.

Shifts in Retail Market Structure

The patterns in the retail sector involving e-commerce and warehouse club stores have been accompanied by a number of systematic changes in retail market structure that we document in this section. These include increases in the average scale of retail operations, increasing concentration within the industry, a reduction in business dynamism, and a modest shift in retail activity toward more populated areas.

Increase in Scale

The average scale of operations has been increasing in retail. Based on the comprehensive Statistics of US Businesses data, between 1998 and 2012 average retail firm size (measured by employment) grew by 18 percent, from 19.3 to 22.8 employees per firm. This rise considerably exceeded the more modest 4 percent change, from 19.4 to 20.2 employees per firm, in the overall US economy. Just over half of this increase in size came from a larger scale of operations at the individual retail establishment (that is, the individual store), which grew from 12.8 to 13.9 employees per establishment. The remainder came from an increase in the average number of establishments per retail firm from 1.51 to 1.63. In contrast, virtually all of the increase in average firm size throughout the broader economy was the result of an increase in establishments per firm rather than employees per establishment. This increase in retail operational scale is part of a global trend (as discussed by Bronnenberg and Ellickson, 2015).

This shift in mean size of retail firms was completely due to growth in the upper tail of the firm size distribution. Figure 4 shows the fraction of retail employment accounted for by firms of various size categories. All size categories of fewer than 500 employees, which include 99.7 percent of all retail firms, saw drops in their share of retail employment. Of the 8.9 percentage point gain in 500+ employee firms' share, 3.9 percentage points came from a drop in the share of firms with between 20 and 99 employees. Again, these patterns echo qualitatively similar but quantitatively smaller shifts in the overall economy, where 500+ worker firms saw a share gain of 2.6 percentage points.

The scale of shopping centers—collections of retail establishments owned by different firms—has also increased over the long run, though has been stagnant for the past decade. According to figures from the International Council on Shopping Centers, the average shopping center size in the US grew from about 77,000 square feet in 1970 to 92,000 square feet in 2014.¹⁰ However, it has been at that 92,000 square foot level since 2004, so much of the scale up occurred before the growth in establishment and firm sizes discussed above.

One potential factor could be pushing toward greater scale in the retail sector is the increasing importance of network economies among chain stores. For example, economies of scale in procurement, logistics, or brand, would all encourage a larger scale of operations, at least at the firm level. There has been extensive research on these network mechanisms in retail (for example, Holmes 2001; Ellickson 2007; Jia 2008; Holmes 2011; Ellickson, Houghton, and Timmins 2013; Nishida 2015). In addition to the potential effect of network economies on productivity growth in the retail sector, Bertrand and Kramarz (2002) that the absolute scale of the sector itself might be affected. They show that entry regulations in France that discouraged large retail formats stunted the growth of the retail sector overall.

Again, the warehouse clubs and supercenters retail format plays an important role in explaining these sector-wide patterns. In 1998, employment in the warehouse clubs industry was just under 450,000, already a nontrivial 3.2 percent of overall retail employment. By 2012, employment in the warehouse clubs industry was nearly 1.4 million, almost 10 percent of the sector's 14.8 million total. Average firm employment in the industry rose 13-fold from 1998 to 2012, though most of this was through expansions in the format's number of stores per firm (from 13.0 to 161) rather than employees per store (251 to 270). Scale growth in retail would have been notably less in absence of the expansion of warehouse club companies. Excluding warehouse clubs, average employment per retail firm grew only 10 percent as opposed to the 18 percent gain once warehouse clubs are included.

The story is less clear when it comes to considering how growth of the Electronic Shopping and Mail-Order Houses sector affected the size of retail operations. We found in previous work with coauthors that the advent and diffusion of e-commerce skewed the size distribution to the right in the two retail industries we examined: bookstores and auto dealers (Goldmanis, Hortaçsu, Syverson, and

¹⁰ The Council defines a shopping center as “a group of retail and other commercial establishments that is planned, developed, owned and managed as a single property, typically with on-site parking provided.” The Council provides data on shopping center counts by size category. We computed the overall average center size by assuming the average size center within each category was at the simple mean between the category's endpoint square footages. Centers in the largest category (over 1,000,000 square feet) were assumed to have an average size of 1,250,000 square feet.

Emre 2010). The mechanism leading to this change was that e-commerce technologies reduced search costs and led to a concomitant increase in consumers' ability to substitute among sellers. This favored lower-cost, higher-quality firms within the industry, pushing a greater share of activity toward them. While we only empirically tested this mechanism for two industries in the retail sector, conceptually it could act more broadly across other retail markets. This would imply that e-commerce also had a part in increasing the typical scale of operations in the sector. On the other hand, the more direct, compositional effect of ESMOH on scale in retail pushes in the direction opposite the sector-wide trend. Average scale in ESMOH has *fallen* as the industry has grown. While average employment per firm in the industry was 25.7 in 1998, it had dropped by more than half, to 12.6, by 2012. Almost all of this change was the result of a decline in average employment per establishment from 23.5 to 12.1 rather than a reduction in establishments per firm. Companies with 500 or more employees accounted for 58.7 percent of the industry's employment in 1998, but only 48.9 percent in 2012. Thus the upscaling of the typical retail business has happened not because of scale changes within ESMOH, but in spite of it. These numbers indicate that the representative ESMOH firm isn't Amazon; it is instead more likely to be a small vendor selling its wares using Amazon's platform.

Interestingly, and evoking the earlier results that labor compensation has lagged productivity growth in the retail sector, there is no clear firm-size wage premium in retail, at least as measured via payroll per employee from the Statistics of US Businesses data (which is itself compiled from tax data). As shown in Table 2, payroll per retail employee was \$25,500 in 2012. For comparison, average compensation for workers at retail firms with more than 500 employees—the segment that had seen the sector's growth—was only \$23,200. There is a positive wage gradient among smaller retail firms; average compensation at retail firms with between 100 to 499 employees was \$32,800 while it was \$24,200 for firms with fewer than five employees, for example. But the level falls considerably at the largest firms. This pattern is not driven by fewer hours per employee in large retail companies. Bureau of Labor Statistics hours data don't offer breakouts by firm size, but the 2013 Current Population Survey indicates that average weekly hours (among both full and part time workers) were 38.0 in retail firms with fewer than 500 employees and 36.0 in larger firms. This 6 percent gap is not enough to close the over 30 percent difference in compensation per employee. This reversal of the wage gradient with firm size also stands in contrast to the overall private economy, where average payroll in 2012 ranged from a low of \$34,400 for firms with five to nine employees to \$52,600 for those with more than 500

employees. This pattern is consistent with a large set of research documenting a firm size wage premium (for example, Troske 1999).¹¹

Concentration

As retail firms have become larger, the sector has also become more concentrated. While comprehensive data from the 2012 Economic Census (the most recent) are not yet available, Table 3 indicates a clear trend toward concentration based on the changes observed between the 1997 and 2007 Economic Censuses. The largest four firms in the retail sector accounted for 7.9 percent of total retail sales in 1997. By 2007, that was 12.3 percent. The market shares accounted for by the largest eight, 20, and 50 firms also increased substantially over the period.

Focusing again on warehouse clubs specifically, while concentration did mildly increase during the period, what is most notable is how concentrated the industry already was by 1997. The four-firm concentration ratio at that time was 89.6 percent, and the eight-firm ratio was 99.4 percent. Despite the huge expansion of this subindustry, it only became more concentrated by 2007, with the four- and eight-firm concentration ratios having risen to 93.9 and 99.9 percent, respectively. In 2007, the four largest warehouse clubs companies accounted for 7.8 percent of *all* retail sales (up from 3.0 percent in 1997).

Again, the changes observed in Electronic Shopping and Mail-Order Houses move opposite the sector-wide trends. The industry is considerably less concentrated than warehouse clubs and if anything has become slightly less so over time. Its four-, eight-, 20-, and 50-firm concentration ratios in 1997 were 24.4, 32.0, 47.3, and 63.3 percent. These values shifted to 21.1, 32.4, 46.2, and 59.1 percent in 2007. These changes are likely related to the drop in the average scale of ESMOH businesses discussed above.

Declining Dynamism

US retail has also seen a downward trend in business dynamism, at least as measured by firm entry and exit rates or the amount of job reallocation across firms. Decker, Haltiwanger, Jarmin and Miranda (2014) show that, echoing patterns observed in the broader economy, the share of the retail sector's employment accounted for by young firms has been shrinking since 1982. Firms that were

¹¹ The reversal of the firm-size wage gradient that we find here is qualitatively similar to, though much larger than, what Cardiff-Hicks, Lafontaine, and Shaw (2015) found in CPS data. They also found a nonmonotonic pattern in retail wages with firm size, even controlling for standard worker observables. While they defined the sector more expansively than we do, we found similar results in their subsample that overlaps with our sector definition. We thank them for making their data available to us.

under six years old (and thus relatively recent entrants into the sector) accounted for 27 percent of retail employment in 1982. That had fallen to 20 percent by 1992, 16 percent by 2002, and 14 percent by 2012. This rate of decline is larger than the entry slowdown observed in the overall economy during the same period.

Jarmin, Klimek, and Miranda (2005) point to one potential explanation for this reduction in the number and size of young retail firms that is consonant with the results above. Namely, the sector's activity has shifted away from small companies, especially those with only one store—the proverbial “mom and pop” operations. Much of the entry activity in earlier years was likely due to these types of operations. However, it should be noted that the fact that the slowdown in dynamism is happening economy-wide, which indicates that additional factors might be at play within retail.

Urbanization

One other shift in market structure, quantitatively less notable than the changes in scale or concentration, is a move in the retail sector's activity toward more populated areas. In 2003, 1.3 percent of retail establishments were located in the smallest quintile of counties (as measured by total employment across all sectors). The fractions in the second, third, and fourth quintiles were 3.1, 6.2, and 12.4 percent, respectively. The remaining 77.0 percent were in the largest quintile of counties. By 2013, this fraction had grown to 78.0 percent, while dropping in each of the other quintiles. The fractions in the first through fourth quintiles were 1.2, 2.8, 5.8, and 12.2 percent.

Over the same period, the warehouse stores and Electronic Shopping and Mail-Order Houses industries, both already much more likely to locate in more populated areas in 2003 (with 74.8 and 86.1 percent of their respective establishments located in the largest quintile of counties), saw slight changes in these fractions by 2013, but in opposite directions. The share of warehouse clubs establishments in the largest quintile fell to 72.6 percent as the industry's total number of establishments rose 69 percent. For ESMOH, the share in the largest quintile rose to 88.3 as the total number of establishments increased by almost 94 percent.

What's Next for US Retail

The future trajectory of the retail sector can be broken down into specific questions about overall growth, growth of subindustries like e-commerce and warehouse clubs, productivity, payments to factors, and costs to final goods consumers.

For overall growth, the key question is whether the long-run trend of the retail sector shrinking relative to the rest of the economy will continue, or whether instead the shorter-run stable share seen since 2008 will hold.

For some product categories, the online component of retail shows no sign of slowing its expansion at this point, though it may reach saturation for some within the next decade. The growth of the warehouse club and supercenter format has equaled that of e-commerce since 2000, and evidence on the timing, location, and market structure changes in retail suggest that the format has in recent years played an even stronger role in shaping the sector than did online retail. That said, sales growth of this subindustry since 2007 has fallen somewhat relative to the relatively constant growth of e-commerce.

If the retail sector continues to see labor productivity gains in excess of the economy-wide average, its employment share will fall even if its value added share remains constant. Continued productivity growth for the retail sector as a whole is certainly plausible: after all, average sales per employee is considerably higher in Electronic Shopping and Mail-Order Houses (at \$1.17 million in 2013) than in retail overall (\$296,000).

One can imagine the future of retail sector as being pulled in one direction by the growth e-commerce, which involves smaller employment firms, less market concentration, more geographical dispersion, and higher productivity. At the same time, the sector is being pulled in another direction by the warehouse club superstores, with higher employment firms, very high market concentration, location near population centers, and lower productivity relative to online channels. While warehouse stores have had more influence on the sector to this point, e-commerce has had its own effects and may be growing in relative importance. Perhaps this concurrent expansion and strength of e-commerce and a physical format portends a retail future not dominated by either, but rather with a substantial role for a “bricks-and-clicks” hybrid. The formats may end up being as much complements as substitutes, with online technologies specializing in product search and discovery and physical locations facilitating consumers’ testing, purchase, and returns of products (A.T. Kearney, 2014).

In the end, whatever type of format sculpts the future of the sector will shape not just a considerable share of economic activity but also the look and feel of our public spaces. Physical retail is a necessarily social and public process. Our archetypal views of historic eras often involve the look of the retail space of that time, from the town squares and downtown streets of the early and mid 20th century, to the malls of the 1980s, to the more recent big-box store islands floating in parking lot seas. The market will determine much about the space in which we will shop. It will also determine much

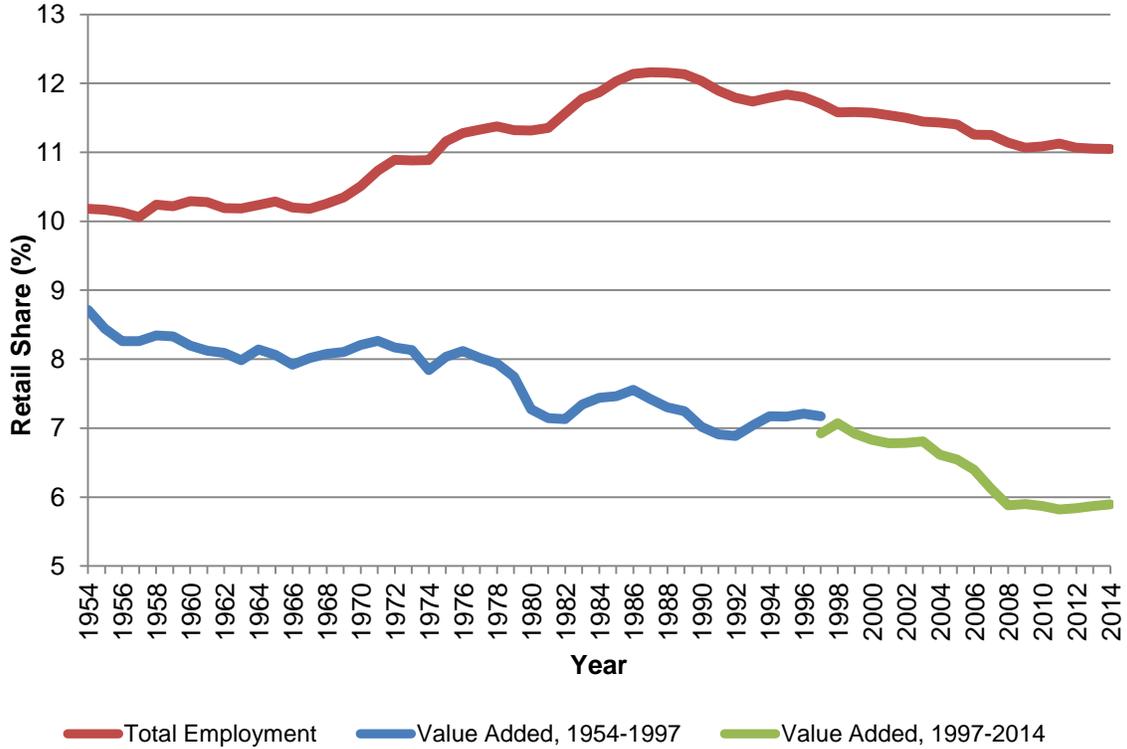
about *with whom* we shop, including the possibility that we end up mostly shopping alone, at our homes. Regardless of how the sector evolves in the future, it is likely to present a rich vein of economic issues to explore.

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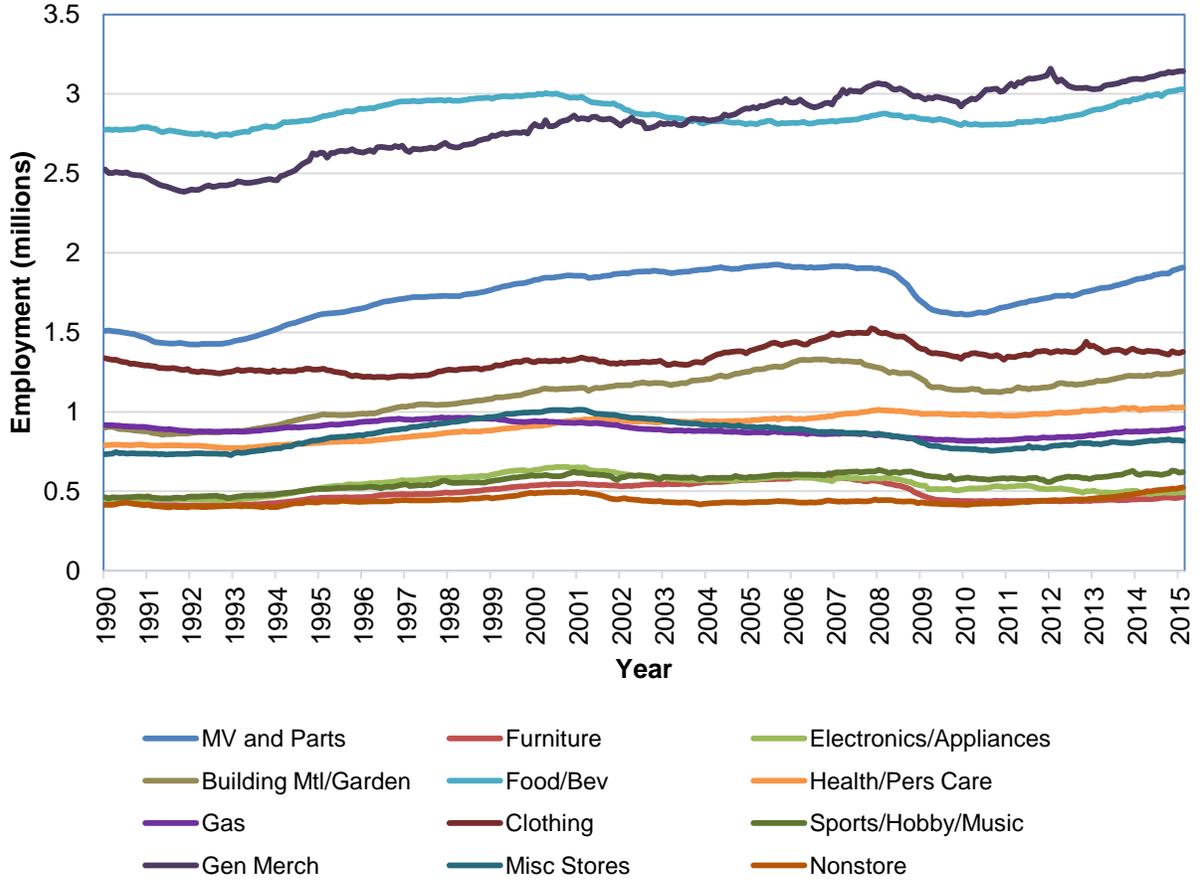
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Figure 1. Retail's Share of Total Employment and Value Added, 1954-2014



Source: Authors' calculations from Bureau of Labor Statistics Current Employment Survey data and the Bureau of Economic Analysis value-added-by-industry data. The Bureau of Economic Analysis data have a series break in 1997; values for both series are shown in 1997.

Figure 2. Retail Employment by Its NAICS 3-digit Component Industries, 1990-2015



Source: BLS Current Employment Survey data.

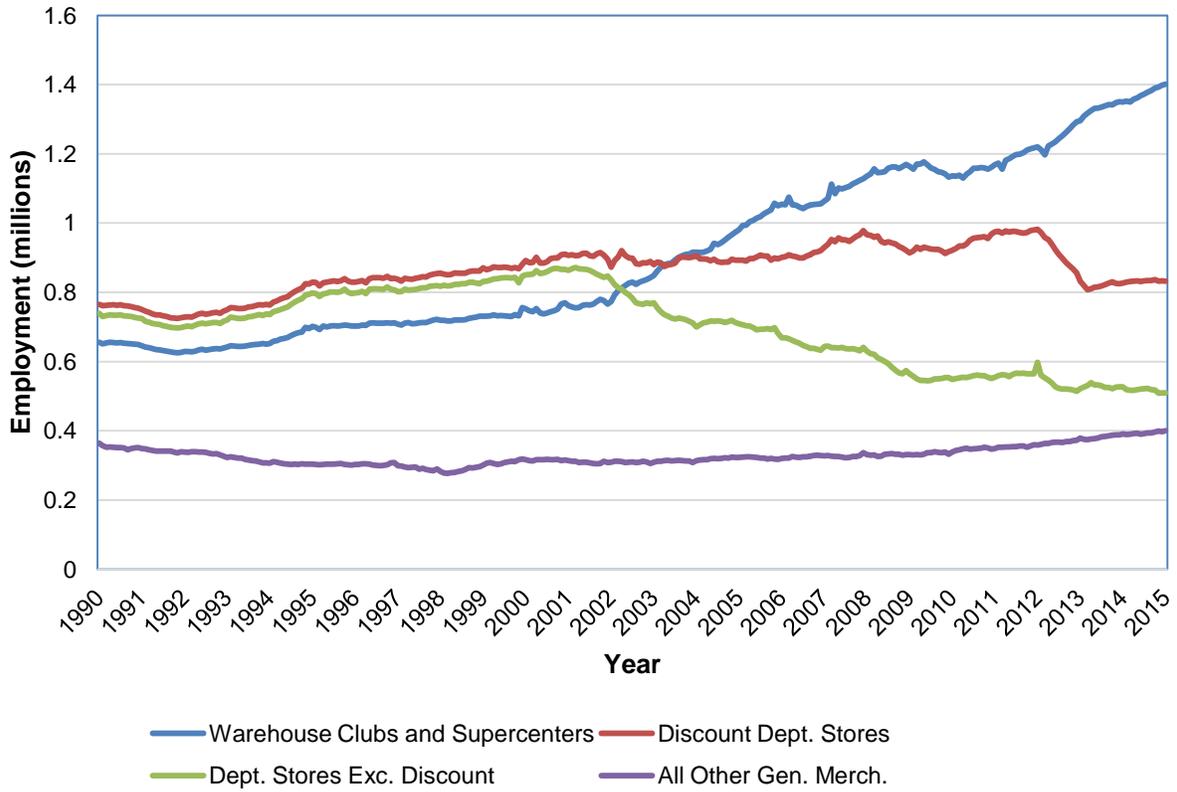
Table 1

Product-Specific E-commerce as a Share of Product Total Sales

Product Category	E-commerce share of retail sales, 2013	Total retail sales (e-commerce and not), 2013	Projected year that the product's e-commerce share will be (italics mean reached in the data already):			
			25 percent	50 percent	75 percent	90 percent
Music and videos	79.5 percent	\$11.8 B	<i>2005</i>	<i>2009</i>	<i>2012</i>	2016
Books and magazines	44.1	23.9	<i>2009</i>	2015	2021	2028
Computer hardware and software	32.9	62.3	<i>2006</i>	2017	2028	2038
Toys, hobbies, and games*	28.8	25.5	<i>2011</i>	2017	2023	2028
Electronics and appliances	18.2	102.6	<i>2013</i>	2017	2021	2026
Furniture	17.5	118.0	2016	2022	2028	2035
Sporting Goods	16.9	54.1	2016	2022	2029	2035
Office equipment and supplies*	16.9	24.6	2014	2020	2026	2032
Clothing, accessories, and footwear	14.9	291.1	2017	2024	2031	2038
Drugs, health, and beauty	4.7	374.5	2028	2037	2045	2054
Food and beverages	0.9	650.9	2032	2039	2045	2051

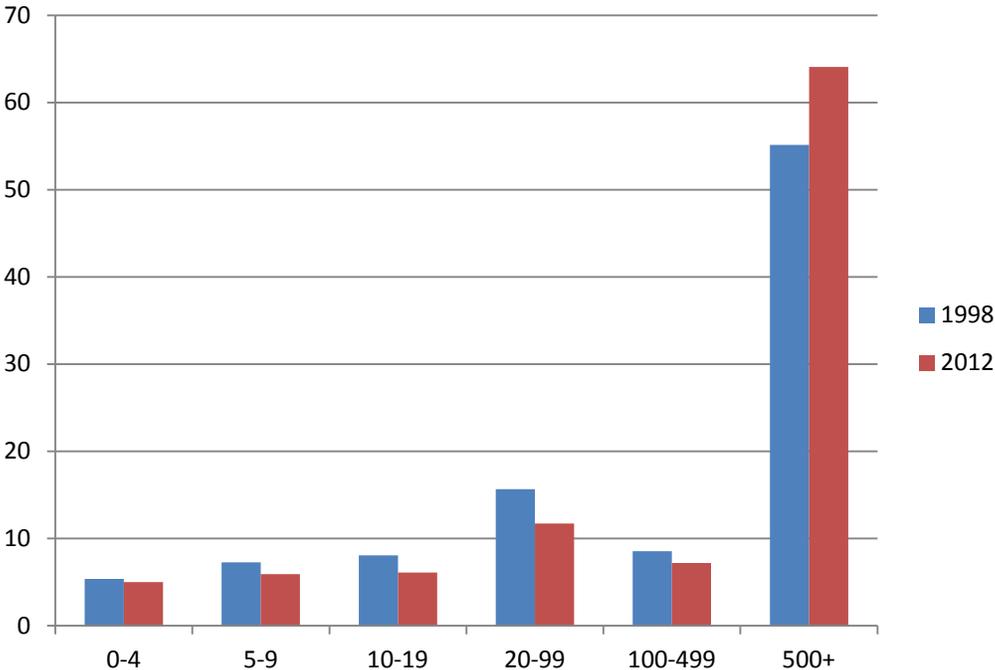
Source: Authors' calculations from US Census Retail E-stats. We computed shares by dividing the sum of the product category's e-commerce sales within and outside Electronic Shopping and Mail-Order Houses by the sum of total ESMOH sales of the product and total sales of the product's corresponding retail industry. Most product categories in the ESMOH breakout correspond directly to a NAICS store-based retail industry; when not, we apportioned non-ESMOH e-commerce sales proportional to that product's share of total sales within the industry. Computer hardware and software numbers, reported separately in the ESMOH data, were combined for the sake of comparability with the figures from computer and software stores (NAICS 44312). An asterisk denotes that the product's 2013 data is extrapolated from changes during 2010-2012 due to missing 2013 data. The projections are predictions from a logistic diffusion model fit to products' observed e-commerce shares through 2013. Figures in italics were reached within the sample. The model assumes the saturation (asymptotic) share of each product is 100 percent; earlier attempts to estimate the saturation share as an additional parameter gave unrealistically low long-run shares.

Figure 3. General Merchandise Retailing Employment by Industry Group, 1990-2015



Source: BLS Current Employment Survey data.

Figure 4. Share of Retail Employment by Firm Size, 1998 and 2012



Source: Authors' calculations from the Statistics of US Business data.

Table 2. Average 2012 Annual Payroll per Employee, by Firm Size

Firm Size Category (Number of Employees)	Retail Sector	Overall Economy
Total	\$25,500	\$46,700
0-4	24,200	40,300
5-9	23,600	34,400
10-19	26,300	36,500
20-99	32,800	40,400
100-499	35,500	44,900
500+	23,200	52,600

Source: Authors' calculations from the Statistics of US Business data.

Table 3. Changes in Concentration in the Retail Sector, 1997-2007

Share of sector sales accounted for by:	1997	2007
4 largest firms	7.9 percent	12.3 percent
8 largest firms	11.7	17.5
20 largest firms	18.5	25.4
50 largest firms	25.7	33.3

Source: US Economic Census.

Appendix

A. Estimates of Product-Specific E-Commerce Diffusion Curves

In the text, we discussed predicting logistic diffusion curves (i.e., S-curves) by retail product segment. The raw data on the fractions of the product segments' retail sales that are e-commerce is constructed using the following Census data sets:

1. US Electronic Shopping and Mail-Order Houses (NAICS 45411) - Total and E-commerce Sales by Merchandise Line: 2013-1999
2. Estimated Annual Sales of US Retail and Food Services Firms by Kind of Business: 1992 Through 2013
3. US Retail Trade Sales - Total and E-commerce: 2013-1998

Each product segment's fraction of e-commerce sales is assumed to follow a logistic diffusion curve governed by the following equation: $Y_t = \frac{L}{1 + Ae^{-Bt}}$, where Y_t is the fraction of the segment's total retail sales classified as e-commerce at time t , L is the saturation parameter (the asymptotic e-commerce fraction, here set $L = 1$ for all product segments), and A and B are estimated parameters.

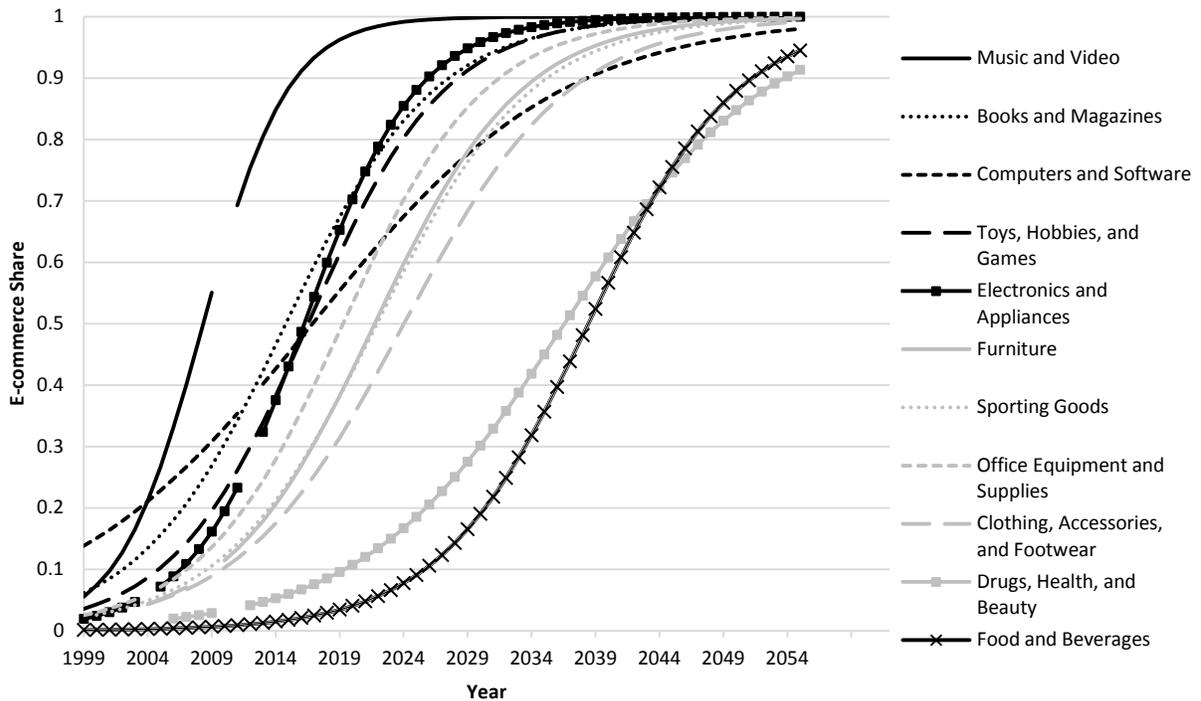
By transforming the observed shares using the function $y_t = \ln\left(\frac{L}{Y_t} - 1\right)$, we can estimate the linearized form of the diffusion curve $y_t = \alpha - Bt + \varepsilon_t$, where $\alpha = \ln A$, and ε_t is an error term. We then retransform the fitted values of this estimated linearized curve using the inverse of the function above to obtain the predicted diffusion curves.

Below are two sets of results. Table A1 provides an overview of the diffusion curve estimates, including the number of observations available to estimate each product segment curve, the estimated curvature parameter B , and the R^2 of the estimated (linearized) equation by retail segment. Figure A1 plots the predicted diffusion curves for each product class (note that these are the predicted values even during the within-sample period before 2014, though no predicted points are plotted for product-years within the sample for which we do not have data).

Table A1. Diffusion Curve Analysis Overview

Product Category	N	Estimated Curvature Parameter, B	R^2
Music & Videos	14	0.30	0.984
Books & Magazines	15	0.17	0.961
Computer Hardware & Software	14	0.10	0.857
Toys, Hobbies, & Games	14	0.19	0.964
Electronics & Appliances	13	0.23	0.927
Furniture	8	0.17	0.986
Sporting Goods	14	0.17	0.956
Office Equipment & Supplies	13	0.18	0.879
Clothing, Accessories, & Footwear	10	0.15	0.989
Drugs, Health, & Beauty	6	0.13	0.999
Food & Beverages	15	0.17	0.905

Figure A1. Predicted Diffusion Curves



B. Warehouse Club Entry and Retail Responses

Table A2 shows the full results of the regressions (described in the text) relating warehouse club entry in a county to the change in the number of establishments in other retail industries between 2003 and 2013, controlling for overall economic and retail sector growth in the county. Data come from the US Census County Business Patterns Complete County Files for the years 2003 and 2013.

Table A2. Warehouse Club Entry and Change in Other Retail Industries' Establishments

	Δ Department Stores	Δ Books & News Stores	Δ Hobby, Toy, & Games Stores	Δ Electronics & Appliances Stores	Δ Furniture Stores
$\Delta \ln(\text{total estabs})$	0.779* (0.191)	0.754 (0.298)	0.710* (0.215)	1.798* (0.681)	4.113* (1.033)
$\Delta \ln(\text{retail estabs})$	0.880* (0.155)	0.093 (0.465)	0.506 (0.244)	3.586* (0.864)	2.546 (1.393)
Δ Warehouse stores	-0.686* (0.086)	-1.539* (0.278)	-0.689* (0.157)	0.989 (0.466)	-5.466* (0.963)
Constant	0.181* (0.060)	-0.386 (0.213)	-0.119 (0.112)	-0.118 (0.328)	-0.487 (0.686)

	Δ Sporting Goods Stores	Δ Office & Stationary Stores	Δ Clothing & Accessories Stores	Δ Health & Personal Care Stores	Δ Food & Beverages Stores
$\Delta \ln(\text{total estabs})$	2.117* (0.396)	0.516* (0.168)	12.11* (2.303)	4.709* (1.355)	8.721* (3.015)
$\Delta \ln(\text{retail estabs})$	1.164* (0.304)	0.256 (0.171)	9.884* (1.927)	7.400* (2.048)	16.39* (5.090)
Δ Warehouse stores	-0.0412 (0.172)	-0.547* (0.093)	2.378 (1.021)	6.443* (0.896)	0.401 (0.657)
Constant	-0.0646 (0.123)	-0.177* (0.066)	-0.710 (0.726)	0.232 (0.694)	0.796 (1.217)

Notes: This table reports the results of regressing the 2003-2013 change in a county's number of establishments in various retail industries (column heads) on the county's change in warehouse stores. We also included the county's change in its logged total establishments across all industries to control for overall economic growth in the county, as well as the change in the log number of retail establishments to control for any county-specific changes across the entire retail sector. N = 3136 counties. An asterisk denotes significance at the 5 percent level.