

WORKING PAPERS

Dynamics in 7

Dynamics in a Mature Industry:
Entry, Exit, and Investment

**Dynamics in a Mature Industry:
Entry, Exit, and Growth of Big-Box Grocery Retailers**

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Abstract

This paper measures market dynamics within the U.S. grocery industry (defined as supermarket, supercenter and club retailers). We find that the composition of outlets changes substantially, roughly 7%, each year, and that store sizes have increased as the result of growth by supercenter and club retailers. We find significant changes in the relative position of brands in markets over time. These changes are largely the result of expansion (or contraction) by incumbents rather than entry or exit. There is little entry or exit, except by small firms. Moreover, only in small markets do entrants gain substantial market share.

JEL Codes: D40, L4, L81

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I. Introduction

Entry and exit by firms are driving forces of economic growth and key elements of the competitive process. For example, recent research finds that virtually all of the labor productivity growth in the retail sector in the late 1990s was the result of entry and expansion of high productivity firms and the exit of less productive firms (Foster et al. 2006). Antitrust authorities too have long recognized that entry into markets can play an important role in maintaining competition. The U.S. government's primary policy document describing merger policy, the 2010 Department of Justice/Federal Trade Commission Horizontal Merger Guidelines, states that, "a merger is not likely to enhance market power if entry is so easy that the merged firm and its remaining rivals in the market, either unilaterally or collectively, could not profitably raise price or otherwise reduce competition."² However, determining whether entry would be easy and sufficient to replace the loss of competition resulting from a merger has proven to be difficult. Werden and Froeb (1988), for example, examine models with Cournot and Bertrand competition and find that with plausible levels of sunk costs that anticompetitive mergers

refer to as the “big-box grocery retailing industry.” This industry is a particularly interesting and important industry in which to study entry. Retail markets are often viewed as markets in which entry and expansion should be relatively easy, and the threat of entry is often seen to be sufficient to maintain competition (U.S. v. Syufy Enterprise (1990)). Indeed, relative to some sectors, the requirements to enter a retail market are not particularly onerous. Retailers need to identify an effective location and obtain permission from local regulators to open an establishment. The sunk costs of entry (e.g., the cost of structures and permits), in particular, are likely much lower than in most industries. Notwithstanding the perceived ease of entry and expansion, mergers in retail markets are often subject to material antitrust review. Between 1998 and 2007, for example, the FTC investigated supermarket mergers affecting 153 antitrust markets and challenged mergers in 134 of those markets.⁴ Evidence on observed market dynamics in a retail market provides important information which can allow regulators to predict how likely potential entry or expansion by incumbents can be in lessening the competitive impact of mergers.

supermarkets owned by small chains (with less than 100 stores). Brand entry by chains operating large supermarket chains, however, is much more rare, and exit by large supermarket chains is three times as likely as entry (reflecting, in large part, the relative decline of traditional supermarkets). Entry by clubs and supercenters into non-rural markets is rare, however, this is largely a result of the fact that the firms operating these formats are already participants in most larger U.S. markets at the beginning of our sample period. In contrast to traditional supermarket retailers, we observe virtually no exit by firms operating clubs stores and supercenter retailers. We also find that other than in the smallest geographic markets, entrants rarely gain substantial (larger than 5%) revenue shares in the two years following entry. Thus, while entry is common for small firms, it is rare to observe entrants obtain a substantial share of industry revenue shortly after market entry.

Third, we find that within market expansion and contraction by incumbent retail brands is responsible for more, often much more, of the change in the number of stores operated by retail brands than either entry or exit. Supermarket chains added 963 stores

Our paper adds to a recent and growing literature analyzing market dynamics in retail markets. These papers fall into two broad categories. Literature in the first category examines a broad set of retailers over time rather than focusing on a narrow class of retailers serving a single industry market. Foster et al. (2006) estimate productivity growth in the U.S. retail sector using data from three rounds of the U.S. Census of Retail Trade (CRT) (1987, 1992, 1997)

different retail formats: traditional supermarkets, club stores, and supercenters. Our market excludes a number of retail formats that carry but do not specialize in selling food and other household goods, and firms that specialize in food but do not offer one-stop-shopping. Drug stores, convenience stores, and traditional mass merchandisers (non-supercenter outlets of firms such as Target, Kmart, and WalMart), for example, only offer a limited selection of food items and offer few of the perishable items which most consumers purchase weekly such as fresh meat and produce. These different retail formats are likely distant substitutes to big-box food retailers, and their exclusion is therefore unlikely to mask important industry dynamics.⁶

A traditional supermarket is defined as a self-service retailer selling a full line of food products (including grocery, meat, and produce).⁷ There is substantial variation across geographic markets in establishment size, services offered, and the number of retail outlets operated by a supermarket firm. Not surprisingly, population density and the price of land are important in determining the size of supermarkets. In old, densely populated urban areas supermarkets are small, often with less than 20 thousand square

(with more than 100 stores).⁸ While these groups are somewhat arbitrary, the sample is divided fairly evenly with 29% of stores operated by independents, 25% of supermarkets owned by small chains, and the remaining 46% of supermarkets owned by large chains.

Supercenters are an important and rapidly growing big-box grocery retail format. Supercenters are typically larger than 180,000 square feet, combining both a large supermarket and a large mass-merchandise within the same store. The most well-known supercenter retailer, Wal-Mart, opened its first supercenter in 1988 and is now the U.S.'s largest food retailer.⁹

The third big-box grocery retail format is the club store. Club stores are high volume retailers that typically charge members an annual fee and offer a limited selection of a broad variety of products, including food items, usually in relatively large packages at significant volume discounts. A key difference between club stores and traditional supermarkets or supercenters is product selection; supermarkets or supercenters typically

traditional supermarkets are much smaller retailers than either supercenters or club stores. The largest supermarkets (the 90th percentile of the large chain distribution is roughly \$475 thousand per week) have similar estimated weekly sales than the smallest club stores and supercenters (the 10th percentile is \$625 and \$425 thousand per week, respectively). Supermarkets in large chains are both larger and have greater revenue, on average, than supermarkets in small chains, although there is considerable overlap in the two distributions. In contrast, independents are much smaller and have much lower revenue than either large or small supermarket chain outlets. Finally, supermarkets in large chains appear somewhat more homogeneous than those in small chains: both the standard deviation of store size and estimated weekly establishment sales are smaller for large chains than small chains despite a significantly larger mean.

Market Types

In order to define market entry and exit we must first define the geographic regions in which firms in the big-box grocery retail industry operate.¹¹ Unfortunately, market definition is not obvious and very different approaches have been taken in the literature. Many studies which focus on localized competition between retailers use relatively small geographic market definitions such as a county. This definition is reasonable when using a demand-side definition of a market: consumers do not travel far to purchase food and are likely most familiar with the retailers in operation near where they live and work. Empirical work suggests that localized competition is relevant in affecting supermarket pricing (See *e.g.*, Basker and Noel (2009)). A very narrow geographic market definition, however, ignores commercial connections with surrounding counties that affect firm store opening and closing decisions. Therefore a more expansive definition of geographic markets may be appropriate for explaining a firm's decision to incrementally expand the size of its chain. For example, a supermarket chain that is present only in Los Angeles County, California will be more likely to open a

¹¹ We are not attempting to construct antitrust markets (product and geographic) like those described in the *Horizontal Merger Guidelines*. Instead, as we describe in great detail below, we are focusing on identifying the set of similar retailers providing similar retail services (big-box-grocery retailing) and the geographic regions in which the firms either currently operate stores or could readily expand. In most cases, antitrust markets are likely smaller than the markets we consider here.

new establishment in Ventura County, California than in Fairfax County, Virginia.¹² Consumers in Ventura County will likely be familiar with the brand name of the Los Angeles based chain, a distribution network is already present, and experienced employees may be transferred to the new store without the various costs of relocation. Ellickson (2007), for example, defines the geographic regions in which retailers compete by focusing on the supply side: the distribution area used by supermarkets (corresponding to the region that stores can be served by a single distribution center). Ellickson argues that this definition is appropriate because firms can expand their operations within these broad regions with relatively little additional fixed or sunk costs and so it better reflects the level at which the firm is operated. Using this definition, Ellickson divides the U.S. into 51 geographic markets.

Our goal is to define markets that divide the U.S. into a series of mutually exclusive and completely exhaustive regions where each region is composed of political regions (counties) that share important commercial connections. By defining markets using commercial connections we incorporate the demand and supply concepts used in previous work in defining local retail markets. This is the approach taken by the Office of Management and Budget (OMB) in its construction of regional markets. We use two OMB geographic designations to construct these markets – Core Based Statistical Area (CBSA) and Combined Statistical Area (CSA). A CBSA is defined as a set of adjacent counties connected to a common urban core of at least 10,000 residents by commuting ties. A CSA is a consolidation of contiguous CBSAs that have a weaker but still significant employment interchange.¹³ The rule we used in constructing geographic markets was to create the largest connected region. That is, if a store is in a county that belongs to a CBSA, the market for that store was defined to be at least as big as that

other.¹⁴ These geographic markets may consist of a single county or as many as 33 counties. The typical number of counties in a market is small, the median being 1 and the 95th percentile being 4. The median population for a market consisting of a single county is 10,627. The market with the largest population in our data, New York-Northern New Jersey-Long Island, NY-NJ-PA, consists of 30 counties.

In presenting our results we have grouped these geographic markets into four categories based on estimated population: Rural/Small City, Medium City, Large City, and Metro. Rural/Small City market corresponds to any market with a population under 100,000; Medium City corresponds to a unit for which the population is at least 100,000 but less than 1,000,000; Large City corresponds to a unit for which the population is at least 1,000,000, but less than 5,000,000; while Metro corresponds to a unit for which the population at least 5,000,000. While these break points do not evenly divide the U.S.

III. Data

Our primary dataset comes from A.C. Nielsen's Trade Dimensions retail database. Each year, the firm creates a census of all retail outlets in the U.S. for a number of retailing industries including, for example, supermarkets, club stores, liquor stores, convenience stores, and restaurants. We have obtained data for conventional supermarkets, supercenters, and club stores.¹⁶ Our dataset consists of annual observations including the location, size, estimated sales, a unique store number, the owner of the store, and estimated number of employees of each supermarket, supercenter, and club store in the U.S. from 2004 through the fall of 2009. A nice feature of the dataset is that every store location has a unique identification number that allows us to track stores over time. For example, we can observe if a location changes ownership or whether a supermarket that closes for a time and reopens as another supermarket. Additionally, the dataset contains information on the ownership of different chains which is important because many firms operate multiple retail brands, sometimes even within a relatively small geographic area.

We have also obtained annual county-level information from the Census including population estimates that allow us to construct and categorize the geographic markets in which the firms compete.

IV. Results

In this section we present the paper's empirical findings. First, we show that while the number of retail out

develop some stylized facts describing within market dynamics. We find that market entry and exit by independent supermarkets and supermarkets operated by small chains is relatively common but that entry by large chain retailers is considerably rarer. Further, other than in relatively small markets, entrants rarely gain significant revenue shares within two years of market entry. We also find that market expansion and contraction by incumbent brands is responsible for more within market growth (contraction) than either entry or exit. Finally, we measure the change in relative market share- within market gains by expanding firms and contraction by shrinking firms, and find evidence that the relative position of retail brands changes significantly in many markets during our sample period.

Changes in the Composition of Retail Outlets

We begin by presenting a simple count of the number of retail outlets operated each year for each of the five retailer types (Table 3). In Table 3, we see that the number of retail outlets in the industry has been relatively constant, at roughly 31,000, between 2004 and 2009. This aggregate stability masks a significant change in the composition of retail outlets being operated over time. During our sample period the number of outlets operated as supermarkets declined by roughly 5% while the number of supercenters and club outlets expanded by 53.1% and 16.4%, respectively. Similarly, as shown in Figure 1, we see the revenue received by supermarkets has declined substantially, from 66.6% to 57.6%, while revenue shares for supercenters and clubs increased over the period – from 21.1% to 29.4% and from 12.3% to 13.0%, respectively.

openings and closings for the years 2005 through 2008 relative to the total number of stores operated within each retail format.¹⁸

The results in Table 4 describe how new, closed, and continuously operated stores compare throughout the U.S. without controlling for market type (rural or metro markets) or firm. Store size and revenue, however, vary significantly across both retail firms and markets. To examine how opening, closing, and continuously operated stores compare holding these factors fixed, we have estimated equations (1)-(3) below separately for chain supermarkets, club stores, and supercenters where in each equation i denotes the store, j the chain, and k the market that store is located in. Each estimating equation includes controls for market type (medium markets, large markets, and metro markets) and separate indicator variables for each chain owner.²⁰

$$(1) \log(\text{Weekly Grocery Revenue})_{ijk} = a + b \text{Opening}_{ijk} + c \text{Close}_{ijk} + \sum_l \text{Market Type}_l^1 + \sum_j \text{Chain}_j^j + e_{ijk}$$

$$(2) \log\left(\frac{\text{Total Weekly Revenue}}{\text{Total Employees}}\right)_{ijk} = a + b \text{Opening}_{ijk} + c \text{Close}_{ijk} + \sum_l \text{Market Type}_l^1 + \sum_j \text{Chain}_j^j + e_{ijk}$$

both newly opened stores and continuously operated stores controlling for the chain owner and the market type. For chain supermarkets, however, newly opened stores are slightly more productive (roughly 1%) than continuously operating stores. More surprisingly, exiting independent supermarkets have virtually the same productivity as continuing supermarkets, while newly opened independent supermarkets are the most productive.²¹

Entry and Exit

There are many potential definitions of entry into a retail market. For instance, one of the primary factors differentiating competing retailers is the locations of the retailers' stores. When a retailer operating in a city opens up a store in a new neighborhood some consumers who had not previously considered the retailer as an option now consider the retailer as being in the choice set. In this sense, expansion within a broader geographic market could be viewed as market entry.

Operators of chain supermarkets often enter a region by purchasing an existing retailer and continuing to operate stores in that region under that retailer's brand name. Ahold, one of the largest U.S. operators of chain supermarkets in the U.S., does not operate any stores in the U.S. under its corporate name. Over time, Ahold has purchased supermarket chains such as Stop-and-Shop in the Northeastern U.S. and Giant Supermarkets in the Mid-Atlantic region, while maintaining their existing brand names. Although acquisitions of this type clearly represent a change in corporate control and the entry of a new firm (rather than a brand) into a region, the set of products available to consumers (and hence the set of retailers) do not change as the result of the transaction.

(1,605) are by independent supermarket firms.²⁶ The average medium sized city, for example, experiences 1.45 entries by new independent firms while metro markets experience, on average, 57 entries by independent supermarkets. Brand entry by small chain supermarkets is also common, with roughly 3.58 entry events in the average metro market, but less frequent than the entry of independents. Entry by large supermarket chains is much rarer. Large city and metro markets, on average, experienced only 0.83 and 0.68 entry events by large supermarket chains. Entry by supercenter and club retailers is also relatively unlikely in medium, large and metro markets. However, the reason entry is infrequent is because only a small number of firms operate these formats, and these firms were already operating in most large cities and metro areas by the beginning of 2004.²⁷ Finally, while entry of supercenters into rural/small city markets is relatively rare – the mean market experienced only 0.14 entry events – most supercenter entry occurred in these markets (223 of 247 entry events).

Panels B and C provide a breakdown of brand entry separately for firm entry and banner entry. By comparing Panels B and C, we see that small chain supermarkets, club stores, and supercenters are much more likely to begin operating a new brand in a market as a result of firm entry than by banner entry. For example, consumers in metro markets are about twice as likely, on average, to observe a new brand operated by a small supermarket chain entering a market (2.5) than to see an incumbent chain begin operating a new banner (1.08). In contrast, brand entry by large supermarket chains in metro and medium markets is, on average, about as likely the result of firm entry as incumbent firms introducing a new banner. For club and supercenter firms, most of banner entry is the result of WalMart opening Sam's club stores in markets where it is already operating supercenters or the reverse.

Table 7 presents the total number of brand exit events and the mean number of brand exit events by retailer and market type for all exits (Panel A), firm exits (Panel B), and banner exits (Panel C). As with entry, brand exit from a market is most common for independent and small chain supermarkets (rows 1 & 2 of Panel A). Brands operated by

²⁶ Recall that by independent firms operate a single retail outlet so that, by construction, for independent firms brand and firm entry are equivalent.

²⁷ Three retail brands (BJs, Costco, and Sam's Club) account for 99.3% of clubs stores and three brands (WalMart, Target, and Meijer) account for 93.2% of supercenters in 2008. At least one supercenter was operating in 11 of the 12 metro areas and in 39 of the 40 large cities at the beginning of the time period.

large chain supermarket retailers, however, are much more likely to exit than enter during our sample period. The mean metro market sees 1.75 brands operated by a large chain

Figure 3 shows that all retailer types frequently attain significant revenue share in rural/small city markets in the two years following entry. For example, entering supermarkets owned by independents in the 25th, 50th, and 75th percentile of the market share distribution attain a market shares of roughly 4%, 7%, and 21%, respectively (top panel of Figure 3). Entering supermarkets owned by either small or large supermarket chains appear to gain larger market shares, with a median market share of roughly 14%. In rural markets, clubs and especially supercen

entrants (with a median revenue share of 60%). Again, we conclude that outside of the smallest markets, entrants rarely obtain substantial revenue shares.²⁹

Changes in Store Composition within Markets

The entry and exit of a retail brand is not the only process that changes the set of retailing options available to consumers. Firms operating retail brands often expand or contract their operations within a market. This within market expansion and contraction by incumbent retail brands is responsible for more, often much more, of the change in the number of stores operated by brands within a market than either entry or exit. Our goal is here is to measure how much expanding brands grow and contracting brands shrink within the markets they operate during our sample period. To do this we first categorize each brand as either expanding (increasing the number of stores in operation), contracting (decreasing the number of stores in operation), or unchanged for each market and time period they are market participants. We then measure total expansion within a market in a time period as the number of stores added by expanding retail brands operating in that market in that time period. Similarly, aggregate contraction in a market is defined as the sum of all net reductions in the number of stores operated by contracting retail brands in a market in period t .

Table 8 presents the total number of stores added by expanding brands, and the mean number of stores added by expanding brands by retailer and market type. We see that market expansion is common and often results in significant growth by expanding brands within a market. The mean metro market, for example, saw expanding club retailers add 4.5 stores. In the average large city market expanding small and large chain supermarkets added 5.3 and 11.33 stores, respectively. To scale the relative importance of within market expansion reported in Table 8, we have calculated the number of stores added to markets as the result of both firm and banner entry in Table 9.³⁰ Comparing Tables 8 and 9, we see that in all but the smallest sized markets, within market expansion by incumbent retailers is much more important than entry in accounting for aggregate

²⁹ Our findings do not imply that entry does not have localized effects. Entrants almost certainly obtain a much larger revenue share within neighborhoods in which their establishments are located. Instead, our results show that outside of the smallest markets entrants rarely obtain significant revenue shares within two years in the relatively broad geographic markets we have defined.

³⁰ The store counts in Table 9 correspond to the entry events presented in Panel A of Table 6.

within market brand growth. For instance, in the average metro market growth resulting from entry of brands operated by large supermarket chains resulted in the addition of 10 stores while expansion by incumbent chains resulted in 24.25 new stores.

Similarly, within market contraction accounts for a large fraction of the reduction in the number of stores operated by brands within a market. However, as we show below the relative importance of contraction and exit is far more similar than expansion and entry in explaining brand growth. Table 10 presents the average number of stores closed by incumbent retailers in different sized markets during our sample period. As with exit, we see that within market contraction by club and supercenter retailers is quite rare (only 9 supercenters and 10 club outlets were closed by incumbent firms throughout the U.S.). Contraction by brands operated by small and large chain supermarket retailers were much more common. The average metro market saw 23.5 and 38.5 stores closed by contracting small and large chain supermarkets. To compare the relative importance of exit and contraction in explaining within market changes in the size of brands, we have calculated the average number of stores closed as the result of exit by retailer and market type during our sample period (Table 11).³¹ In comparing Tables 10 and 11, we see that within market contraction is responsible for more store closures than exit by chain supermarkets in large city and metro markets. In the average large city market contracting brands operated by small and large chain retailers closed 4.3 and 10.3 stores while brands operated by exiting small and large chain supermarkets closed 2.28 and 8.1 stores. In medium sized markets, however, store closures caused by within market contraction are nearly the same as those caused by exit for chain supermarkets.

Within Market Changes in the Size of Retail Brands

We have shown that between 2004 – 2009 the number of retail outlets operated by big-box food retailers has remained roughly constant while relatively new retail formats, clubs and supercenters, have grown at the expense of traditional supermarkets. We have also shown that within market expansion and contraction by chain supermarkets explains a larger fraction of within market brand growth than either market entry or exit. In this

³¹ The store counts in Table 11 correspond to the exit events presented in Panel A of Table 7.

For example, if within a market growing brands add 30 stores while shrinking brands close 20 stores, we would measure the net churn among brands as 20 stores (growing brands replaced 20 of the stores closed by shrinking brands). If big-box grocery retailers operated 100 stores in that market in 2004, we would say that market churn for that market is 20%.

We present the results from this calculation in a frequency histogram (Figure 5)

We present the results from this calculation as a frequency histogram (Figure 6) separately for metro, large, and medium markets. There is considerably more churn among the size of firms operating within markets than retail brands within markets. When measuring churn among retail brands no metro market experiences turnover of greater than 25% (see Figure 5). In contrast, when measuring churn at the firm level one metro market experienced churn of 50%. The median market experienced firm turnover of about 12%, 17%, and 19% in medium, large, and metro markets, respectively. This is compared to the retail brand churn of 8%, 12%, and 11%, for the median market in medium, large, and metro markets.

V. Conclusion

This paper measures market dynamics within the big-box grocery retailing industry in the U.S. during a recent six year period. Despite being a mature industry -- with roughly 31,000 outlets each year during our sample period-- we observe substantial changes in the stock of stores in operation. In particular, the fraction of retail outlets operated as supercenters and club stores has grown rapidly at the expense of traditional supermarkets. However, even traditional supermarket retailers continue to upgrade the stock of stores they operated as supermarkets. During our sample period supermarket retailers opened new outlets representing roughly 2% of the stores in operation each year.

Our findings have important implications for studies of market dynamics. While entry and exit by small firms was a common feature of big-box grocery retailing, collectively entry and exit were responsible for only a fraction of the change in the relative size of retail brands operated within a market. Further when entry occurs, outside of the smallest markets, entrants rarely quickly gain a substantial share of market revenue. However, the failure of entrants to rapidly expand does not imply that local retail markets are best viewed as static oligopolies. In fact, we see significant turnover in the number of stores operated by different retail brands in most medium and large city and metro markets during our sample period. For example, the median metro market saw growing brands collectively expand their operations by 11% at the expense of shrinking brands. Our findings suggest that competition in these markets is significant and largely driven by interactions between firms operating incumbent brands.

References

- Baker, Jonathan. 2003. "Responding to Developments in Economics and the Courts: Entry in the Merger Guidelines," *Antitrust Law Journal*, 71, 189-206
- Basker, Emek. 2005a. "Job Creation or Destruction? Labor Market Effects of Wal-Mart Expansion," *Review of Economics and Statistics*, 87 (1), 174-83
- Basker, Emek. 2005b. "Selling a cheaper mousetrap: Wal-Mart's effect on retail prices," *Journal of Urban Economics*, 58 (2), 203-29
- Basker, Emek and Michael Noel. 2009. "The Evolving Food Chain: Competitive Effects of Wal-Mart's Entry into the Supermarket Industry," *Journal of Economics and Management Strategy*, 18 (4), 977-1009
- Basker, Emek, Shawn Klimek, and Pham Hoang Van. 2010. "Supersize it: The Growth of Retail Chains and the Rise of the "Big-Box" Retail Format," *mimeo*
- Berger, Allen, Seth Bonime, Lawrence Goldberg, and Lawrence White. 2004. "The Dynamics of Market Entry: the Effects of Mergers and Acquisitions on entry in the Banking Industry," *Journal of Business*, 77 (4) 797-834
- Ciccarella, Stephen, David Neumark, Junfu Zhang. 2008. "The Effects of Wal-Mart on Local Labor Markets," *Journal of Urban Economics*, 63 (2), 405-30
- Courtemanche, Charles and Art Carden. 2011. "Competing Costco and Sam's Club: Warehouse Club Entry and Grocery Prices." NBER Working Paper 17220
- Ellickson, Paul. 2007. "Does Sutton Apply to Supermarkets," *RAND Journal of Economics*, 38 (1), 43-59
- Ellickson, Paul and Paul Grieco. 2011. "Density versus Differentiation: The Impact of Wal-Mart on The Grocery Industry" *mimeo*
- Federal Trade Commission (FTC). 2008. *Horizontal Merger Investigation Data Fiscal Years 1996-2007*. Washington, DC: FTC
- FTC. 2010. "FTC Challenges A&P's Proposed Acquisition of Pathmark Supermarkets," available at: <http://www.ftc.gov/opa/2007/11/pathwork.shtm>.
- Geroski, P.A. 1995. "What do We Know About Entry?" *International Journal of Industrial Organization*, 13, 421-440

Foster, Lucia, John Haltiwanger, and C.J. Krizan. 2006. "Market Selection, Reallocation, and the Restructuring in the U.S. Retail Trade Sector in the 1990s," *Review*

Tables and Figures

Table 1: Distribution of Store Size and Revenue of Conventional Supermarkets, Supercenters, and Club Stores

Retailer Type	Weekly Revenue (\$ Thousands)							Store Size (Thousands of Square Feet Grocery Selling Space)						
	Mean	Standard Deviation	Percentile					Mean	Standard Deviation	Percentile				
			10	25	50	75	90			10	25	50	75	90
Conventional Supermarkets: Independent Store	102	67	50	70	90	125	175	13.5	8.7	5	8	12	17	25
Small Chain (2-100 Stores)	196	159	70	90	150	225	375	24.4	13.3	10	15	22	32	42

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Table 5: Regression of Store Characteristics on Indicators for Opening and Closing Stores

Store Characteristic	VARIABLES	Independent Supermarkets	Chain Supermarkets	Supercenters	Clubs*
Log of Weekly Grocery Revenue	Opening Stores	-0.0551*** (0.0183)	-0.0507*** (0.0117)	-0.154*** (0.0140)	-0.128*** (0.0189)
	Closing Stores	-0.106*** (0.0140)	-0.262*** (0.0123)	-0.319*** (0.0432)	-0.149*** (0.0302)
	Chain Fixed Effects	n/a	Yes	Yes	Yes
	Region Type Controls	Yes	Yes	Yes	Yes
	Observations	9778	25560	3405	1259
	R-squared	0.062	0.641	0.479	0.646
	Log of Grocery Square Footage	Opening Stores	-0.280*** (0.0299)	-0.0198* (0.0116)	-0.0443*** (0.00709)
Closing Stores		-0.164*** (0.0207)	-0.0527*** (0.00914)	-0.0684** (0.0346)	-0.0652*** (0.0231)
Chain Fixed Effects		n/a	Yes	Yes	Yes
Region Type Controls		Yes	Yes	Yes	Yes
Observations		9778	25560	3405	1259
R-squared		0.036	0.558	0.259	0.455
Log of a Store's Total Weekly Revenue per Employee		Opening Stores	0.0577 (0.0368)	0.0144* (0.00857)	-0.110*** (0.0142)
	Closing Stores	0.00426 (0.0171)	-0.222*** (0.0123)	-0.268** (0.107)	
	Chain Fixed Effects	n/a	Yes	Yes	
	Region Type Controls	Yes	Yes	Yes	
	Observations	9778	25560	3405	
	R-squared	0.007	0.347	0.391	

Standard errors calculated assuming clustering by geographic market.

* The number of employees in club stores was not included in the data, so that we could not calculate revenue per employee.

Source: Author calculations using grocery retail data provided by AC Nielsen's Trade Dimensions database covering 2004 – October 2009.

Table 7: Number of Exit Events, Stores Closed as a Result of Exit, and Average Number of Exit Events by Market and Retailer Type

Firm Type	Total US		Average Number of Events Within a Market Type			
	Exit Events	Stores Involved in Exit	Rural/ Small City	Medium City	Large City	Metro
Panel A: All Banner Exits (Brand Exit)						
Independent	1,980	1,980	0.27	1.84	10.23	54.92
Small Chain	547	703	0.19	0.59	1.38	3.25
Large Chain	408	1,117	0.14	0.49	0.95	1.75
Supercenter	10	11	0.00	0.01	0.13	0.08
Club	1	1	0.00	0.00	0.03	0.00
Total Count	2,946	3,812				
Panel B: Banner Exit through Firm Exit (Firm Exit)						
Independent	1,980	1,980	0.27	1.84	10.23	54.92
Small Chain	360	463	0.14	0.37	0.63	1.58
Large Chain	292	880	0.11	0.36	0.53	0.75
Supercenter	10	11	0.00	0.01	0.13	0.08
Club	1	1	0.00	0.00	0.03	0.00
Total Count	2,643	3,335				
Panel C: Continuing Firm Exits Banner (Banner Exit)						
Small Chain	187	240	0.05	0.23	0.75	1.67
Large Chain	116	237	0.03	0.13	0.43	1.00
Supercenter	0	0	0.00			

Table 8: Total and Mean Number of Stores Added as a Result of Within Market Expansion of Incumbent Brands by Retailer and Market Type

Retailer Type	Mean Number of Stores Added in Market Type				Total Stores Added
	Rural/ Small City	Medium City	Large City	Metro	Net Growth in Expansion
Small Chain (2-100 Stores)	0.04	0.88	5.30	26.75	822
Large Chain (> 100 Stores)	0.02	1.07	11.33	24.25	1,060
Supercenter	0.01	1.20	8.73	17.17	888
Club	0.00	0.08	1.40	4.50	130
Number of Markets in 2004	1,593	261	40	12	2,900

Source: Author calculations using grocery retail data provided by AC Nielsen's Dimensions database covering 2004 – October 2009.

Table 9: Total and Mean Number of Stores Added as a Result of Banner Entry by Retailer and Market Type

Retailer Type	Mean Number of Stores Added in Market Type				Total Stores Added
	Rural/ Small City	Medium City	Large City	Metro	Entry Events
Small Chain (2-100 Stores)	0.11	0.67	1.38	6.58	492
Large Chain (> 100 Stores)	0.09	0.52	1.93	10.00	473
Supercenter	0.14	0.18	0.18	0.42	289
Club	0.01	0.10	0.20	0.08	50
Number of Markets in 2004	1,593	261	40	12	1,304

Figures

Figure 1: Estimated Share of Gross Revenue by Retailer Type

Figure 2: Ratio of Store Openings and Closings to Total Stores in Operation by Retailer Type

Figure 3: Distribution of Revenue Share of Entry Firms in Second Year Following Entry by Retailer and Market Type

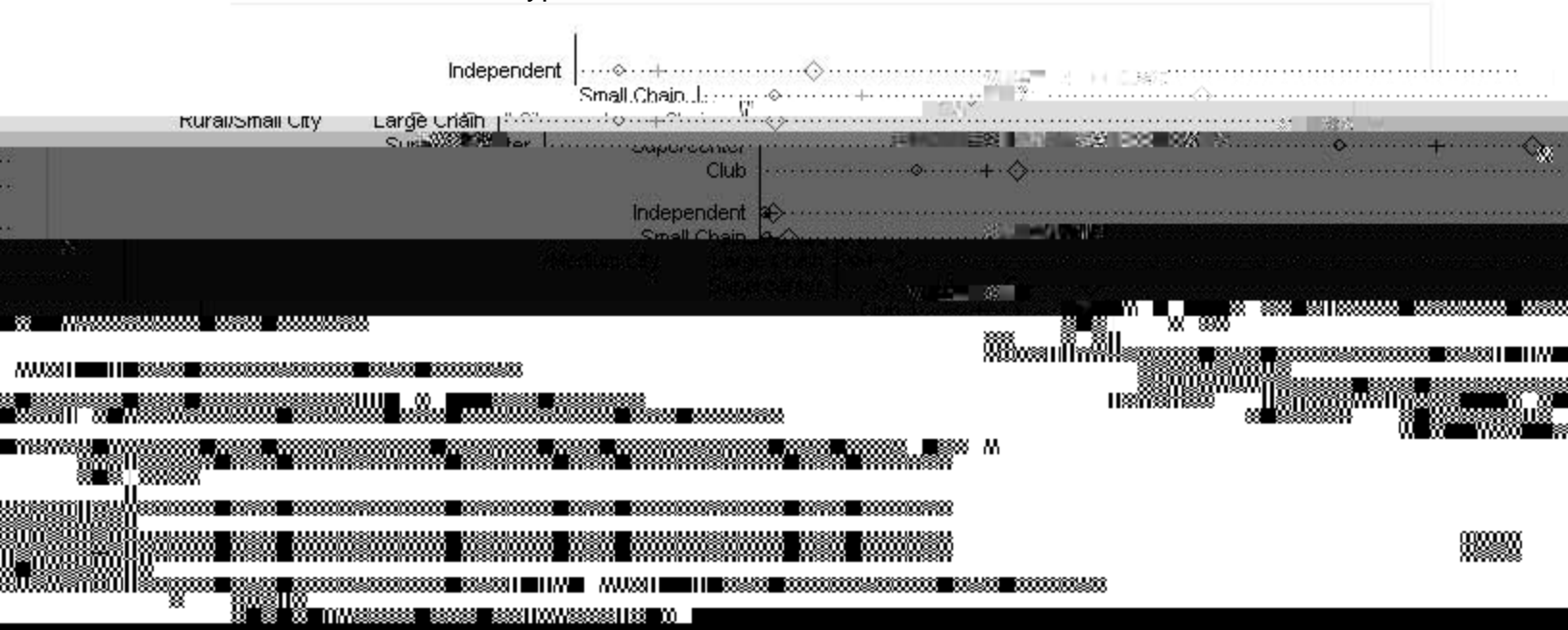


Figure 4: Distribution of Revenue Share of Entry Brands Operated by Incumbent Firms in Second Year Following Entry by Retailer and Market Type

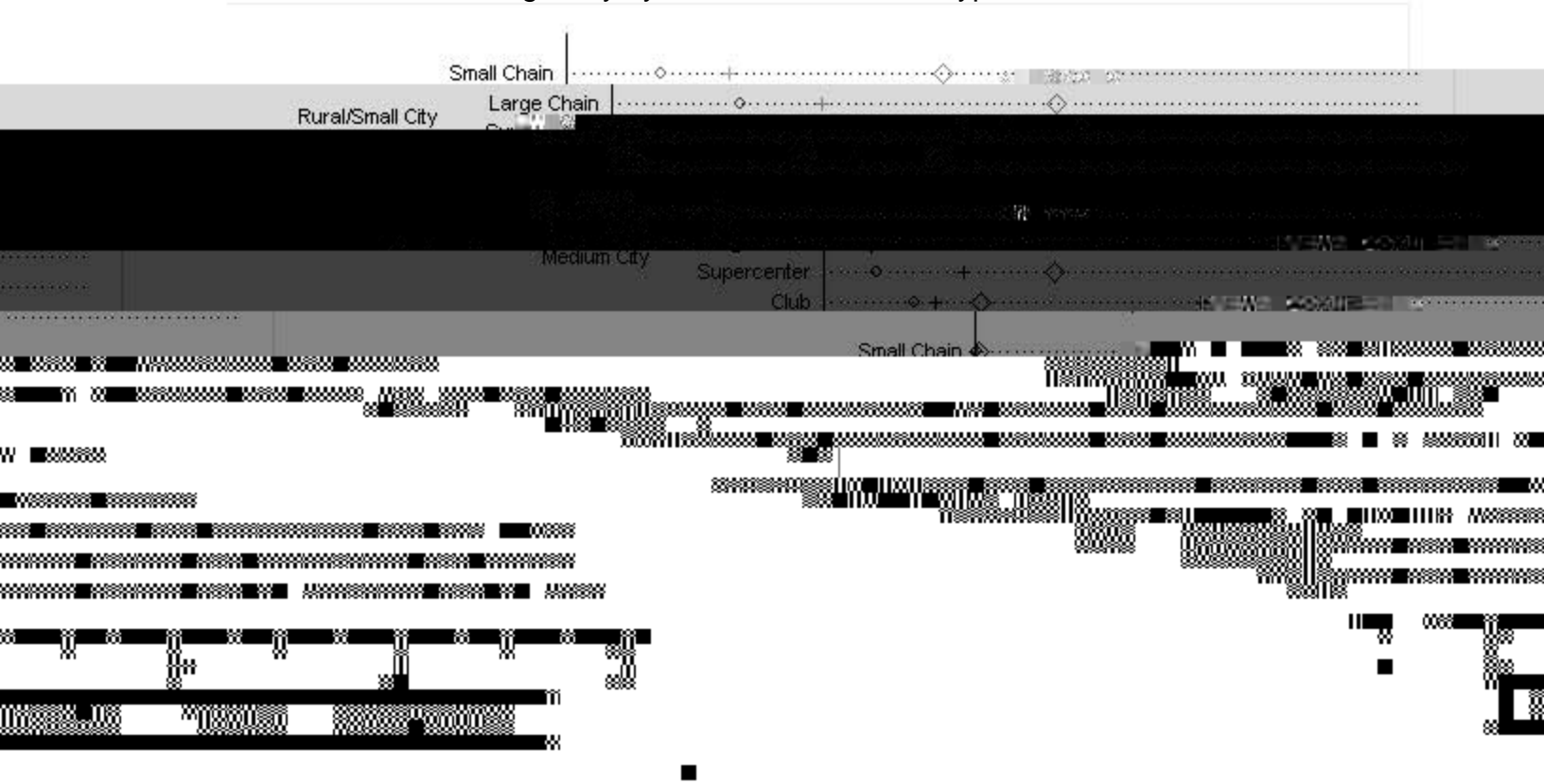


Figure 5: Frequency Histogram of ~~Bar~~ Churn by Market Type