ORGANIZATIONAL STRUCTURE AND ENTRY DECISIONS:

A Study of the Retail Home Improvement Sector from 2005-2011

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Abstract

Though entry games have been richly studied in the economics literature, little is known about the effect of organizational structure on entry decisions. In this paper, we directly study the effect of organizational structure on entry decisions, using data from the retail home improvement industry. We find that the presence of rival stores decreases probability of entry and that the presence of corporate stores decreases entry more than the presence of cooperative stores. Crucially, our results show that the way firms respond to the presence of other firms differs significantly by structure: corporate firms are less likely than cooperatives to enter in the presence of rivals. Specifically, corporate firms are 21.7 percentage points less likely than cooperative firms and 12.0 percentage points less likely to enter in response to a one unit increase in the natural log of corporate firms. Finally, we present preliminary results that suggest that these effects cannot simply be explained by the difference in store sizes among corporate and cooperative firms.

Introduction

Though entry games have been richly studied in the economics literature, little is known about the effect of organizational structure on entry decisions. Studies done on organizational structure and firm strategy have examined the effects of franchising and capital structure. In this paper, we directly study the effect of organizational structure on entry decisions, using data from the retail home improvement industry.

The retail home improvement industry has five dominant players, Ace, Do It Best, True Value, Home Depot and Lowe's. The three former firms are cooperatives, and the latter two chains are corporate firms. Cooperative firms are owned by individual retailers and allow owner-operators to act as a larger entity, negotiating for greater discounts from manufacturers and advertising collectively. On the other hand, corporate firms are publically traded, owned by shareholders, and own every store that they operate. We examine how these structural differences affect entry decisions. Given that the cooperative structure is prevalent among grocery stores, some hotel chains, and pharmacies, the analysis here will hopefully allow us to better understand the dynamics underlying a variety of retail settings.

Literature Review

There has been extensive study of entry games in the economics literature. Seminal papers in the field by Bresnahan and Reiss have investigated entry in monopoly markets and entry in concentrated markets, finding that competitive conduct changes quickly as the number of incumbents in a market increases.^{1, 2}

Entry models have also been estimated by Berry and Scott Morton, among others. Berry constructs a model of sequential entry in the airline industry, treating entry decisions as indicative of underlying profitability.³ Scott Morton adapts Berry's model in her analysis of entry in the generic pharmaceutical market and finds that organizational experience predicts entry: firms tend to enter markets with characteristics similar to the firm's existing portfolio of drugs.⁴

Research has also been done on entry in retail settings. Jia examines the impact of chain stores on retailers and communities, incorporating the size of scale economies into her analysis and thereby relaxing the commonly-used assumption that entry into different markets is independent; she finds that having a chain store in a market makes 50% of discount stores unprofitable.⁵ Her results conflict with Igami's. Igami studies the entry of large supermarkets in Japan and finds that the entry of large supermarkets induces the exit of existing large and medium size competitors but improves

¹ Timothy F. Bresnahan and Peter C. Reiss, "Entry in Monopoly Markets," *The Review of Economic Studies* 57, no. 4 (October 1990): 531, doi:10.2307/2298085.

² Timothy F. Bresnahan and Peter C. Reiss, "Entry and Competition in Concentrated Markets," *Journal of Political Economy* 99, no. 5 (October 1991): 977–1009, doi:10.1086/261786.

³ Steven T. Berry, "Estimation of a Model of Entry in the Airline Industry," *Econometrica* 60, no. 4 (July 1992): 889, doi:10.2307/2951571.

⁴ Fiona M. Scott Morton, "Entry Decisions in the Generic Pharmaceutical Industry," *RAND Journal of Economics* 30, no. 3 (1999): 421, doi:10.2307/2556056.

⁵ Panle Jia, "What Happens When Wal-Mart Comes to Town: An Empirical Analysis of the Discount Retailing Industry," *Econometrica* 76, no. 6 (2008): 1263–1316, doi:10.3982/ECTA6649.

the survival of small supermarkets.⁶ He takes this as evidence that store size is an important dimension of product differentiation.

Toivanen and Waterson also examine entry in a retail setting, looking at data from the UK fast food industry. They find that market structure is important in entry and that the presence of rivals increases expected market size; the logic being that firms are uncertain about the true profitability of a given market and use their observations of rivals' presence to update their own beliefs.⁷ Ellickson, Houghton, and Timmins look at retail chains as well, delving into the size and sources of chain advantage that arise from chain economies in purchasing, logistics, knowledge sharing, and pooled advertising resources.⁸

On the organizational structure side, Lafontaine has researched franchising extensively. She finds that the main variable affecting the survival of a franchised store is the years the franchisor has been in business before starting to franchise.⁹ Her paper with Kosova and Perrigot finds sizeable performance differences between franchised and company-owned hotels, though these differences are small and insignificant once choice of organizational form is endogenized.¹⁰ A working paper of hers on McDonald's expansion abroad found that increased ownership control (franchise vs. company owned) significantly decreases the speed at which new outlets are added to close the gap between the target and actual number of stores in the market.¹¹

Research has also been done on capital structure and exit decisions. Kovenock and Phillips find that rival firms are less likely to close plants and more likely to invest when the market share of leverage firms is higher, showing that firms' decisions account for the financial state of competing firms.¹²

As the literature stands, entry has been studied extensively, and there has been some research on the impact of structure –organizational form and financial leverage –on firm strategy and performance. The aim of this research is to contribute to this area of research by studying organizational structure's impact on entry.

⁶ Mitsuru Igami, "Does Big Drive Out Small?: Entry, Exit, and Differentiation in the Supermarket Industry," *Review of Industrial Organization* 38, no. 1 (January 2011): 1–21, doi:10.1007/s11151-011-9278-8.

⁷ Otto Toivanen and Michael Waterson, "Market Structure and Entry: Where's the Beef?" *RAND Journal of Economics* 36, no. 3 (Fall 2005): 680–99.

⁸ Paul B. Ellickson, Stephanie Houghton, and Christopher Timmins, "Estimating Network Economies in Retail Chains: A Revealed Preference Approach," *The RAND Journal of Economics* 44, no. 2 (June 2013): 169–93, doi:10.1111/1756-2171.12016.

⁹ Francine Lafontaine and Kathryn L. Shaw, "Franchising Growth and Franchisor Entry and Exit in the U.S. Market: Myth and Reality," *Journal of Business Venturing* 13, no. 2 (March 1998): 95–112, doi:10.1016/S0883-9026(97)00065-7.

¹⁰ Renáta Kosová, Francine Lafontaine, and Rozenn Perrigot, "Organizational Form and Performance: Evidence from the Hotel Industry," *SSRN Electronic Journal*, 2007, doi:10.2139/ssrn.1034082.

¹¹ Francine Lafontaine and David Leibsohn, "Beyond Entry: Examining McDonald's Expansion in International Markets (Working Paper)" (USC FBE Applied Economics Workshop, Los Angeles, CA, 2004).

¹² Dan Kovenock and Gordon M. Phillips, "Capital Structure and Product Market Behavior: An Examination of Plant Exit and Investment Decisions," *Review of Financial Studies* 10, no. 3 (July 1997): 767–803, doi:10.1093/rfs/10.3.767.

Industry Overview

The retail home improvement industry includes stores that sell home repair and maintenance products, such as tools, plumbing equipment, electrical supplies, paint, and garden products. These stores sell to homeowners and to the construction industry. They are distinguished from other retailers selling similar goods (namely lumber and paint stores) by the fact that each store sells a wide array of products. Home improvement stores are different from big-box stores in that they primarily offer goods used for home renovation and that they have a deeper product offering of these goods.

Structural Differences

The home improvement retail industry features five dominant firms, two of which are corporate firms and three of which are cooperative firms. In the period from 2005 to 2011, these firms comprised 85% of all home improvement stores. Cooperative firms saw the number of stores that they operated shrink over that period, while the corporate stores on net expanded the number of stores that they operated.

	2005	2006	2007	2008	2009	2010	2011	Total
Ace	4,102	4,043	4,003	3,971	3,875	3,811	3,779	27,584
Do It Best	3,299	3,681	3,477	3,432	3,433	3,359	3,238	26,316
Home Depot	1,713	1,838	1,927	1,993	2,005	1,969	1,967	23,919
Lowe's	1,099	1,237	1,386	1,530	1,648	1,697	1,724	13,412
True Value	4,156	3,995	3,952	3,752	3,615	3,481	3,365	10,321
Total	15,402	15,802	17,047	16,992	17,944	17,731	17,614	16,980
Proportion of top 5	93.29%	93.62%	86.50%	86.38%	81.23%	80.75%	79.90%	85.67%

Table 1: Number of stores by firm, all counties

This is not surprising, considering how differently corporate and cooperative firms are organized. Corporate firms are large, publically traded entities. Home Depot and Lowe's are respectively the world's largest and second largest home improvement retailers. The stores that they operate are large, averaging over 100,000 square feet and selling between 35,000 to 45,000 products.^{13, 14} Corporations owns all the stores that they operate, meaning they have greater control over individual stores than cooperative firms do. And as corporations, they have deeper access to financial markets than cooperative firms.

Cooperative firms have a fundamentally different structure. While they do have headquarters, their operations are more decentralized because independent owners operate each store; owners of each store control everyday operations, while the central office develops advertising campaigns, negotiates with manufacturers, provides financing, and offers guidance on how to run that store. Owners generally contribute a portion of their earnings to the cooperative and are subject to the cooperative's branding requirements, product mix requirements, and membership fees. As for how decision-making works, owner operators purchase shares of stock, which endows them with voting rights in and rebates from the cooperative.

¹³ Home Depot, "Annual Report," n.d., http://media.corporate-ir.net/media_files/irol/63/63646/annual2006.pdf.

¹⁴ Lowe's Companies, "Form 10K," Annual Report, (February 3, 2006), http://services.corporate-ir.net/SEC.Enhanced/SecCapsule.aspx?c=95223&fid=4100308.

Not only are the two structures organized differently, but they also see themselves as competing differently. Corporate firms compete on the bases of price, store location, customer service, and depth of merchandise.¹⁵ Cooperative firms, as exemplified by Ace, realize that the average transaction at their stores are about half of receipts in larger retailers and believe their competitive edge lies in convenience.¹⁶ Thus, cooperative firms focus on having a convenient location, helpful service, and fast checkouts.¹⁷

In contrast, corporate firms compete more aggressively on price. Lowe's promises to beat competitors' prices by 10%, should a consumer find a lower price on an identical product elsewhere.¹⁸ It is unsurprising that corporate firms would compete more aggressively on price, as they are able to leverage their larger buying power for larger discounts from manufacturers.

These dynamics underlying competition manifest themselves in firms' entry decisions. From an interview with the new sales manager of Ace, we learned that the chain pays particular attention to site location. The firm scrutinizes a potential store's visibility from the road, its neighboring stores, and parking availability. It takes care to locate itself next to retailers that regularly receive high traffic, such as grocery stores and pharmacies. Given that convenience is key to its competitive strategy, it is unsurprising that these considerations factor heavily into its entry decision.

A final note: there appears to be differentiation between the stores that cooperative firms and corporate firms open. Beyond the fact that corporate stores are generally larger than cooperative stores, the transition tables (Tables 22a-f in the appendix) show that there is very little change in ownership between cooperative and corporate hands; cooperative stores almost always stay cooperative stores, and the same is true for corporate stores.

Models

Model 1

The framework used in this paper is taken from Scott Morton's analysis of generic pharmaceutical entry, with adjustments made for this particular institutional setting. The model is a simultaneous entry game featuring competition and heterogeneous potential entrants. We assume complete information. In each period, firms choose whether to enter a given market; firms already present in a market re-evaluate their entry decision each period. Firms enter when their expected profit in a market is positive, and if firms do not enter, they earn no profit in that market.

Since we lack data on prices, quantities, and firms' fixed costs, we cannot determine the precise character of firms' cost functions and consumers' demand functions. Therefore, we estimate a reduced form profit equation for each firm in each entry opportunity. Expected profit is:

$$\pi_{i,t,s} = R_{i,t,s}(f(N_{\text{Cooperative}_{i,t-1}}), g(N_{\text{Corporate}_{i,t-1}}), X_{i,t}) - C_{i,t}(Y_{i,t}, Z_{i,t,f}) + \varepsilon_{i,t,s})$$

¹⁵ Home Depot, "Annual Report," 4.

¹⁶ "Ace Hardware Business Opportunity Offers Convenience and Service – The Tools for Success," Ace Hardware, accessed October 5, 2015, https://www.myace.com/invest/why-ace/how-we-compete.

¹⁷ Ibid.

¹⁸ Lowe's Companies, "Form 10K," 6.

where R represents the revenue function and C represents the cost function. $\varepsilon_{i,t,s}$ is the error term and is assumed to have the normal logistic distribution. Variables are indexed by i, t, f, and s where i represents county, t represents year, f represents firm, and s represents structure. Revenue depends on the number of cooperative and corporate stores present in that market and X, the vector of market characteristics that drive demand. We specify f and g to be natural log functions, as in Berry's 1992 analysis of the airline industry: using the natural log function means that we assume that more stores present in a county make entry less likely and that each additional store present in the market has a diminishing impact on entry.

On the demand side, there are two types of consumers that buy home improvement goods (construction companies purchasing supplies for their projects and individuals buying goods to repair their living units). We capture both in X, including market characteristics that capture the construction sector's demand and others that capture the individual's demand. On the cost side, Y represents market specific entry costs, and Z represents firm specific entry costs in each market. Because we lack specific data on factors that should shift firm's fixed costs (such as real estate and permit costs), we have assumed that firms' fixed costs are the same. In specifications with county fixed effects, we assume that firms' fixed costs differ across markets but are the same in each market.

We assume there the same factors drive demand for both corporate and cooperative chains and that firms predict the number of stores that are going to be present from the number of stores that were present in the previous year. In a similar vein, firms estimate demand and cost factors using the value of factors in the previous year. Finally, we assume that entry decisions are independent of each other, though empirical work in the field has found such decisions to be correlated.¹⁹

Firms decide to enter based on their expected profit is positive and do not enter when their expected profit is negative. Thus we have:

	{	1	$\text{if } \pi_{i,t,s} \ge 0$
y =	ł	0	$\text{if } \pi_{i,t,s} < 0$

where y is the dependent variable (whether the firm of a cooperative or corporate structure is present in the market or not).

We use the logistic regression to estimate the model:

$$Pr(y_{i,t,s}=1 \mid W) = Pr(\pi_{i,t,s} \ge 0 \mid W) = Pr[\epsilon_{i,t,s} > -W\beta \mid W]$$
$$= 1 - \frac{e^{-(W\beta)}}{1 + e^{-(W\beta)}} = \frac{e^{W\beta}}{1 + e^{W\beta}}$$

where W is the full set of explanatory characteristics ($N_{cooperative i, t-1}$, $N_{corporate i, t-1}$, $X_{i,t}$, $Y_{i,t}$, and $Z_{i,t,f}$.). We estimate the β 's on W using maximum likelihood estimation.

¹⁹ Scott Morton, "Entry Decisions in the Generic Pharmaceutical Industry," 424.

Model 2

We estimate an ordered logit model with the same latent function and same assumptions as in specification 1. We assume proportionality – that the distance between each choice is equivalent.²⁰ The dependent variable is the number of stores that a firm has in the market. The number of stores that a firm can have in a market is concatenated at 4 (only 1% of data in our relevant subset has more than 4 stores).

The model is thus:

$$\pi_{i,t,s} = R_{i,t,s}(f(N_{Cooperative_{i,t-1}}), g(N_{Corporate_{i,t-1}}), X_{i,t}) - C_{i,t}(Y_{i,t}, Z_{i,t,f}) + \epsilon_{i,t,s}$$

We assume firms will locate more stores in a county when their expected profit from that county is higher. The values that y takes will depend on where $\pi_{i,t,s}$ is relative to threshold points, κ .

$$\begin{array}{ll} y=0 \mbox{ if } & \pi_{i,t,s} \leq \kappa_1 \\ y=1 \mbox{ if } \kappa_1 < \pi_{i,t,s} \leq \kappa_2 \\ y=2 \mbox{ if } \kappa_2 < \pi_{i,t,s} \leq \kappa_3 \\ y=3 \mbox{ if } \kappa_3 < \pi_{i,t,s} \leq \kappa_4 \\ y=4 \mbox{ if } \kappa_4 < \pi_{i,t,s} \end{array}$$

The probability that a firm will select a certain y is given by:

$$Pr(y = 0) = 1 - \frac{e^{W\beta - \kappa_1}}{1 + e^{W\beta - \kappa_1}}$$
$$Pr(y = j) = \frac{e^{W\beta - \kappa_j}}{1 + e^{W\beta - \kappa_j}} - \frac{e^{W\beta - \kappa_{j+1}}}{1 + e^{W\beta - \kappa_{j+1}}} \text{ for } j = 1, 2, 3$$
$$Pr(y = 4) = \frac{e^{W\beta - \kappa_4}}{1 + e^{W\beta - \kappa_4}}$$

We estimate the β 's and the cutoff values κ .

Data

Data on home improvement stores came from Nielsen TDLinx. This dataset collected data from all home improvement stores in the United States in February, starting in 2005 and ending in 2011. The data included the physical location of each store, store size (in thousands of square feet), and name of the company that owned the store.

These data were supplemented by various sources: the American Community Survey (ACS) provided county-level data on demographics, such as population, income, employment, number of housing units, age of housing units, and the number of owner and renter occupied units. While the ACS offered a rich set of variables, the data files were reported in five-year summary files (ex: 2005-2009, 2006-2010, etc.), which means that we did not have specific county-level data for each year. Thus, our use of the ACS data captures only trends in county-level demographics.

²⁰ One would test this assumption using the Brant test. This, however, was not done here.

Fuel prices were gathered from the US Energy Information Administration (EIA). Data from the EIA measured monthly on-highway diesel cost and were used to construct yearly estimates of fuel costs faced in the year prior to the survey. These costs were reported on a regional (multi-state) basis.²¹ Using regional level data for fuel cost is appropriate, since transport from distribution center to store location generally requires transportation across states.

CPI data were procured from the Bureau of Labor Statistics. The CPI index for each year was calculated by creating a yearly estimate from monthly averages (the months selected were February of the previous year to January of the year of survey). A few limitations with using this data are that CPI is calculated for only urban consumers and is only reported on a regional (multi-state level). Many counties in our sample are not urban, and the level of disaggregation means CPI functions as only a rudimentary proxy for consumers' costs.

Data on building permits and value of construction done in each county came from the Building Permits Survey (BPS), which collects data on new privately owned residential construction. As fewer than 5% of all privately owned housing units in the United States are built in areas that do not require building permits, the BPS offers comprehensive data on residential construction patterns at the county level.

The Annual Survey of Manufactures (ASM) provided county-level data on employment, establishment count, and payroll in the retail and construction sectors. And lastly, the US Census Gazetter files were the source of land area data that was used to calculate population density.

Market Definition

Defining a market as a county

The working definition of a market for this paper is the county. We recognize the limitations of using the county as a market proxy; stores across county lines can be part of the same market, as some consumers certainly traverse county boundaries to buy home improvement goods. Ideally, we would construct a drive-time isochrone for each store, using consumer surveys to specify drive-time, the time that they would be willing to spend traveling to buy a home improvement item.

However, though construction would be feasible, analysis of such isochrones would be intractable due to current data limitations. We aim to examine the impact of market-level supply and demand characteristics and such data is not available for the isochrones that we would draw. Thus, we choose to analyze counties as markets, recognizing the limitations of such analysis – especially given that we do not control for cross county leakages.

²¹ Regions, as demarcated by the EIA: West Coast: WA, OR, NV, CA, AZ, AK, HI Rocky Mountain: MT, ID, WY, UT, CO Midwest: ND, SD, NE, KS, OK, MN, IA, MO, MI, WI, IL, IN, OK, KY, TN Gulf Coast - NM, TX, AR, LA, MS, AL East Coast: New England: ME, VT, NH, MA, CT, RI Central Atlantic: NY, PA, MD, DE, NJ Lower Atlantic: WV, VA, NC, SC, GA, FL

Selecting subset of counties

Graphs 1-10: Location of stores by firm



Next, we examine where firms compete in the United States, noting that both structures were present in roughly the same regions in 2011 as they were in 2005. The graphs above demonstrate that cooperative firms are present in more areas of the country than corporate firms are; namely they

have a considerably larger presence in the Midwest than corporate firms. We hypothesize that this difference is due to population.

We proceed to investigate store presence by population. Graph 11 shows that cooperative firms are more likely to be present in counties with smaller population than corporate firms are. Graph 12, which clusters firms together by structure, shows that cooperative firms locate fewer stores in high population areas than they do in comparatively lower population areas. We decide to focus our analysis on the middle population quartiles to examine the effect of factors other than population on entry decisions.

Graph 11: Store Frequency by ln(county population), by Firm





Exploring dynamics in the middle quartiles

Looking at the middle quartiles, we see that cooperative stores on net contracted in the period from 2005 to 2011 and that corporate firms on net expanded. Over the seven year period, the five firms owned on average 86% of home improvement stores.

	2005	2006	2007	2008	2009	2010	2011	Total
Ace	1,234	1,218	1,196	1,154	1,107	1,072	1,054	8,035
Do It Best	1,373	1,562	1,486	1,456	1,447	1,399	1,347	10,070
Home Depot	117	146	154	162	167	163	162	1,071
Lowe's	156	183	216	238	255	262	266	1,576
True Value	1,392	1,319	1,311	1,233	1,191	1,154	1,125	8,725
Total	4,488	4,632	4,967	4,840	5,247	5,140	5,110	34,424
Proportion of top 5	95.19%	95.60%	87.84%	87.67%	79.42%	78.79%	77.38%	85.98%

Table 2: Number of stores by firm, middle quartiles

Rates of entry also changed over time. Rates of entry for all firms declined from their rates in 2006. This is unsurprising, as the Great Recession dampened demand for home improvement goods, making entry less enticing in the later years of our period of study. The main takeaway for exits is that corporate firms have much lower rates of exit than cooperative firms do.

Table 3: Entries, as proportion of stores in the previous year

		En	try			
	2006	2007	2008	2009	2010	2011
Ace	0.119	0.019	0.017	0.025	0.028	0.028
Do It Best	0.169	0.031	0.020	0.038	0.013	0.014
Home Depot	0.261	0.085	0.067	0.044	0.000	0.006
Lowe's	0.205	0.177	0.117	0.077	0.032	0.015
True Value	0.076	0.036	0.012	0.011	0.015	0.015

Table 4: Exits, as proportion of stores in the previous year

Exit								
2006	2007	2008	2009	2010	2011			
0.148	0.030	0.042	0.058	0.054	0.046			
0.052	0.060	0.042	0.048	0.044	0.051			
0.000	0.007	0.000	0.013	0.006	0.012			
0.000	0.000	0.014	0.000	0.000	0.000			
0.098	0.043	0.065	0.040	0.037	0.036			
	2006 0.148 0.052 0.000 0.000 0.098	E 2006 2007 0.148 0.030 0.052 0.060 0.000 0.007 0.000 0.000 0.098 0.043	EEUEU 2006 2007 2008 0.148 0.030 0.042 0.052 0.060 0.042 0.000 0.007 0.000 0.000 0.000 0.014 0.098 0.043 0.065	EEXIE 2006 2007 2008 2009 0.148 0.030 0.042 0.058 0.052 0.060 0.042 0.048 0.000 0.007 0.000 0.013 0.000 0.000 0.014 0.000 0.098 0.043 0.065 0.040	Exit 2006 2007 2008 2009 2010 0.148 0.030 0.042 0.058 0.054 0.052 0.060 0.042 0.048 0.044 0.000 0.007 0.000 0.013 0.006 0.000 0.000 0.014 0.000 0.007 0.008 0.043 0.065 0.040 0.037			

Descriptive Statistics

We proceed to perform descriptive analysis on our data. First, we describe the level of variation in our data. Tables 5 and 6 show number of counties in which cooperative and corporate firms varied their strategy in any way (by entering, exiting, expanding, or contracting in a market). Cooperative firms display greater variation than corporate firms do, and in the middle quartiles population subset, cooperatives displayed some variation in strategy 7% of the time, while corporates displayed variation only 1% of the time.

Table 5: Variation in strategies played (all counties)

	Cooperatives	Corporates
2006	19.61%	4.52%
2007	8.88%	3.68%
2008	7.57%	3.28%
2009	7.63%	2.55%
2010	6.35%	1.43%
2011	6.07%	0.64%
6 year average	9.35%	2.68%

Table 6: Variation	on in s	trategies	played	(middle quartile	s)
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	Cooperatives	Corporates
2006	16.47%	2.12%
2007	6.51%	1.49%
2008	5.06%	1.08%
2009	5.26%	0.93%
2010	4.32%	0.39%
2011	4.13%	0.16%
6 year average	6.96%	1.03%

We next compare all counties to our subset of counties to understand how our analysis of the middle quartiles may be constrained. We find that the two populations are significantly different – the middle population quartiles have significantly lower incomes, CPI's, levels of new construction, and fuel costs. The middle quartiles also have older homes, higher retail wages, and a higher ratio of resident owned to rental housing units. These differences mean our results cannot be extrapolated to all counties. But given that cooperative and corporate firms compete together mainly in the middle quartiles, this does not undermine the thrust of our analysis.

			All Counties		
Variable	Ν	Mean	Std. Dev.	Min	Max
population density (persons/km2)	109795	100.43	672.17	0.014894	27415.37
population (persons)	109795	98400.87	314361.50	41	9974203
median number of rooms	109795	5.57	0.46	2.4	7.5
median year housing structure built	109775	1972.90	11.22	1939	2002
median rent paid	109785	661.29	187.28	99	2001
units permitted for new construction	105600	383.36	1452.60	0	50823
value of units permitted	105600	6100000.00	227000000.00	0	8.67E+09
cost of on highway diesel fuel	109795	2.73	0.55	1.776667	3.941583
CPI	109795	201.72	11.78	182.275	234.1738
number of construction establishments	109265	259.34	675.81	1	14046
per capita income	109785	23266.28	5584.60	7772	64381
ratio of owner-owned/rental units	109795	0.73	0.08	0	0.947254
distance to nearest distribution center	109795	245.72	403.42	0.153269	6352.416
ln_lag_coop	94110	1.01	0.76	0	5.159055
ln_lag_corp	94110	0.34	0.60	0	4.234107

Table 7: Summary statistics (all counties)

Table 8: Summary statistics (middle quartile)

	Middle Quartile				
Variable	Ν	Mean	Std. Dev.	Min	Max
population density (persons/km2)	54890	34.11	126.46	0.16	2525.49
population (persons)	54890	29697.88	14591.91	11100	66662
median number of rooms	54890	5.54	0.39	3.7	7.4
median year housing structure built	54890	1974.58	9.19	1940	2000
median rent paid	54890	631.44	135.11	331	1673
units permitted for new construction	53955	90.74	137.95	0	2719
value of units permitted	53955	14200000	26400000	0	818000000
cost of on highway diesel fuel	54890	2.72	0.55	1.78	3.94
CPI	54890	200.88	11.36	182.28	234.17
average retail wage	54820	400.23	61.52	0	888
number of construction establishments	54820	84.92	67.1	4	883
per capita income	54890	21820.68	4548.22	7772	64381
ratio of owner-owned/rental units	54890	3.03	1.02	0.39	12.84
distance to nearest distribution center	54890	197.23	253.76	0.15	5361.38
ln_lag_coop	47010	0.93	0.58	0	2.71
ln_lag_corp	47010	0.13	0.28	0	1.39

All counties, vs. median population quartile						
Variable	t-statistic	p-value				
population density (persons/km2)	31.5935	0.0000				
population (persons)	72.2610	0.0000				
median number of rooms	12.2381	0.0000				
median year housing structure built	-32.4637	0.0000				
median rent paid	36.9699	0.0000				
units permitted for new construction	64.8907	0.0000				
value of units permitted	66.1269	0.0000				
cost of on highway diesel fuel	3.7402	0.0002				
CPI	13.9709	0.0000				
average retail wage	-4.2326	0.0000				
number of construction establishments	84.4871	0.0000				
per capita income	56.2295	0.0000				
ratio of owner-owned/rental units	-29.8316	0.0000				
distance to nearest distribution center	29.7585	0.0000				
ln_lag_coop	21.9418	0.0000				
ln_lag_corp	89.601	0.0000				

Table 9: Differences between all counties and middle quartiles

We now turn our attention to comparing the counties in the middle quartiles in which cooperatives are present to those where corporates are present. We find significant differences between these markets: markets where cooperatives are present are farther away from distribution centers and have fewer people, older homes, lower fuel costs, lower CPIs, lower retail wages and lower incomes, compared to counties were corporates are present .

Table 10: Summary statistics for where cooperatives are present (middle quartiles)

	Cooperative, Present				
Variable	Ν	Mean	Std. Dev.	Min	Max
population density (persons/km2)	17714	25.75	66.63	0.16	1580.1
population (persons)	17714	31543.33	14682.58	11100	66662
median number of rooms	17714	5.56	0.4	3.7	7.1
median year housing structure built	17714	1973.49	9.39	1940	2000
median rent paid	17714	635.28	126.22	331	1461
units permitted for new construction	17488	98.55	138.41	0	2719
value of units permitted	17488	15600000	26600000	0	8.18E+08
cost of on highway diesel fuel	17714	2.72	0.55	1.78	3.94
CPI	17714	201.14	11.7	182.28	234.17
average retail wage	17686	403.68	58.43	0	764
number of construction establishments	17686	97.19	72.91	5	883
per capita income	17714	22311.09	4337.49	7772	64381
ratio of owner-owned/rental units	17714	3.03	0.98	0.56	10.54
distance to nearest distribution center	17714	220.74	244.38	0.48	4461.83
ln_lag_coop	15106	0.88	0.56	0	2.56
ln_lag_corp	15106	0.16	0.31	0	1.39

	Corporate, Present				
Variable	Ν	Mean	Std. Dev.	Min	Max
population density (persons/km2)	2618	69.25	180.22	0.91	1580.1
population (persons)	2618	44410.66	12938.41	11130	66662
median number of rooms	2618	5.53	0.35	4.3	7
median year housing structure built	2618	1977.11	9.07	1942	1997
median rent paid	2618	689.35	148.78	421	1671
units permitted for new construction	2609	150.86	180.23	0	1502
value of units permitted	2609	23500000	32800000	0	3.33E+08
cost of on highway diesel fuel	2618	2.79	0.53	1.78	3.94
CPI	2618	203.16	11.72	182.28	234.17
average retail wage	2604	429.37	48.44	0	771
number of construction establishments	2604	132.81	82.67	23	883
per capita income	2618	22930.66	4463.84	13668	45514.96
ratio of owner-owned/rental units	2618	2.62	0.84	0.56	6.41
distance to nearest distribution center	2618	156.86	291.32	0.15	4357.26
ln_lag_coop	2347	1.15	0.56	0	2.64
ln_lag_corp	2347	0.13	0.27	0	1.1

Tables 11: Summary statistics for where corporates are present (middle quartiles)

Table 12: Comparing counties where corporates are present to where corporates are present

Cooperative Present vs. Corporate Present							
Variable	t-statistic	p-value					
population density (persons/km2)	-12.2272	0.0000					
population (persons)	-46.6401	0.0000					
median number of rooms	4.0152	0.0001					
median year housing structure built	-18.9739	0.0000					
median rent paid	-17.6785	0.0000					
units permitted for new construction	-14.2129	0.0000					
value of units permitted	-11.7399	0.0000					
cost of on highway diesel fuel	-6.2768	0.0000					
CPI	-8.2333	0.0000					
average retail wage	-24.5601	0.0000					
number of construction establishments	-20.8268	0.0000					
per capita income	-6.6527	0.0000					
ratio of owner-owned/rental units	22.7871	0.0000					
distance to nearest distribution center	10.6781	0.0000					
ln_lag_coop	-21.7306	0.0000					
ln_lag_corp	4.904	0.0000					

Results and Discussion

Model 1

We run our logit model, the outputs of which are in the appendix (table 24). We focus our analysis on the marginal effects, as we cannot interpret the magnitude of the coefficients estimated by logistic regression.

Marginal Effects

The marginal effect tells us the change in probability of y=1 for a one-unit change in the independent variable.

For the logit, the marginal effect is:

$$\frac{\partial p(W)}{\partial w_{r}} = \frac{\partial G(\beta W)}{\partial w_{r}} = \frac{e^{W\beta}}{(1 + e^{W\beta})^{2}}\beta_{r}$$

Table 13 shows the marginal effects from the logit model estimated, where firm and year fixed effects were included. We estimate robust and clustered standard errors to account for heteroskedasticity and correlation among observations. Though assuming that correlation among firms in the same structure is most consistent in our model, we also estimate standard errors clustered by firm, as clustering by structure may discount observations too heavily, given that correlations at the firm level may more accurately reflect reality.

We see that increases in per capita income, number of construction establishments, and units permitted correlate with increased probability of entry by a firm, though an increase in the value of permits correlates with a decreased probability of firm entry. Population increases the probability that firms enter, though this effect is not significant once standard errors are clustered.

As for the main variables of interest – the competitive effects—we see that increased numbers of either type of store decrease probability of entry, with an one-unit increase in the natural log of cooperative stores decreasing probability by 5% and a one-unit increase in the natural log of corporate stores leading to a 19% decrease in the probability of entry, though this effect is significant only at the 0.1 level when standard errors are clustered by structure.

We next examine the marginal effects produced by logistic regressions performed at the structure level, presented in tables 14 and 15. Loosely comparing corporates and cooperatives, we see that increases in population density make corporates more likely to enter, but cooperatives less likely to enter; increases in population and per capita income make both more likely to enter.

For cooperatives, a one unit increase in the natural log cooperative stores reduces the chance of entry by 4.1%, while a one unit increase in the natural log of corporate stores decreases chance of entry by 11.4%; these effects are significant at the 0.01 level. For corporates, an increase in one unit of the natural log of cooperative stores reduces probability of entry by 2.8%, while an increase in the natural log of corporate stores reduces entry by 8.1% (these effects are significant at the 0.01 level).

Table 13: Marginal effects at the means from logistic regression *Dependent variable: present/not*

	Robust SE	Clustered SE, by structure	Clustered SE, by firm
VARIABLES	Predicted prob.	Predicted prob.	Predicted prob.
population density	-0.000163***	-0.000163	-0.000163
	(0.0000309)	(0.000272)	(0.000147)
population	5.89e-06***	0.00000589	5.89e-06*
	(0.00000279)	(0.00000563)	(0.00000327)
per capita income	7.48e-06***	7.48e-06***	7.48e-06***
	(0.00000933)	(0.0000016)	(0.00000165)
CPI	-0.00321***	-0.00321**	-0.00321
	(0.000751)	(0.00157)	(0.00226)
owned/rented units	-0.0138***	-0.0138	-0.0138
	(0.00288)	(0.0274)	(0.0148)
construction establishments	0.00153***	0.00153***	0.00153***
	(0.0000819)	(0.000504)	(0.000421)
median year structure built	-0.00462***	-0.00462	-0.00462*
	(0.000348)	(0.00413)	(0.00276)
median rent	-0.000122***	-0.000122***	-0.000122
	(0.0000319)	(0.000014)	(0.000119)
median number of rooms	-0.0705***	-0.0705***	-0.0705**
	(0.00775)	(0.00424)	(0.0296)
ln(lag cooperative stores)	-0.0536***	-0.0536**	-0.0536***
	(0.00509)	(0.0259)	(0.0169)
ln(lag corporate stores)	-0.185***	-0.185*	-0.185***
	(0.0105)	(0.107)	(0.0633)
units permitted	0.000231***	0.000231***	0.000231***
	(0.0000505)	(0.0000764)	(0.0000856)
value of permits	-2.13e-09***	-2.13e-09***	-2.13e-09***
	(0.00000000272)	(0.000)	(0.00000000173)
fuel	0.696***	0.696	0.696**
	(0.0823)	(0.507)	(0.302)
distance to distribution center	-7.74e-05***	-7.74e-05***	-7.74e-05**
	(0.0000117)	(0.0000118)	(0.0000333)
retail wage	-0.0000103	-0.0000103	-0.0000103
	(0.0000543)	(0.000144)	(0.000104)
Observations	46010	46010	46010

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

NOTE: All predictors at their mean value.

Table 14: Marginal effects at the means from logistic regression, cooperative subset *Dependent variable: present/not*

_

VARIABLES	Predicted prob.	Predicted prob.
population density	-0.000459***	-0.000459***
	(0.0000566)	(0.000102)
population	2.11e-06***	2.11e-06*
population per capita income	(0.00000361)	(0.00000118)
per capita income	6.94e-06***	6.94e-06***
	(0.00000125)	(0.0000243)
CPI	-0.00479***	-0.00479
	(0.00105)	(0.00368)
owned/rented units	0.00387	0.00387
	(0.00367)	(0.00386)
construction establishments	0.00216***	0.00216***
	(0.000117)	(0.000519)
median year structure built	-0.00836***	-0.00836***
	(0.00046)	(0.00291)
median rent	-0.000124***	-0.000124
	(0.0000413)	(0.000187)
median number of rooms	-0.0827***	-0.0827
	(0.0102)	(0.0542)
In(lag cooperative stores)	-0.0408***	-0.0408***
	(0.00655)	(0.0079)
ln(lag corporate stores)	-0.114***	-0.114***
	(0.0127)	(0.0304)
units permitted	0.000184***	0.000184
	(0.0000666)	(0.000121)
value of permits	-2.35e-09***	-2.35e-09***
	(0.00000000382)	(0.00000000241)
fuel	1.208***	1.208***
	(0.117)	(0.289)
distance to distribution center	-8.43e-05***	-8.43e-05*
	(0.0000141)	(0.0000509)
retail wage	-0.000109	-0.000109
-	(0.000071)	(0.000111)
Observations	27606	27606
	Standard errors in parenthese	25

Omitted firm dummy is Ace

	Robust SE	Clustered SE, by firm
VARIABLES	Predicted prob.	Predicted prob.
population density	5.67e-05***	0.0000567
population density	(0.0000156)	(0.000037)
population	4.81e-06***	4.81e-06***
F oF definition	(0.00000176)	(0.00000486)
per capita income	2.84e-06***	2.84e-06***
FF	(0.00000589)	(0.00000791)
CPI	0.000433	0.000433
	(0.000486)	(0.000748)
owned/rented units	-0.0311***	-0.0311***
	(0.00248)	(0.00654)
construction establishments	0.000236***	0.000236*
	(0.0000459)	(0.000123)
median vear structure built	0.00191***	0.00191***
,	(0.000256)	(0.0000422)
median rent	-8.11e-05***	-0.0000811
	(0.0000222)	(0.0000792)
median number of rooms	-0.0154***	-0.0154***
	(0.00593)	(0.005)
ln(lag cooperative stores)	-0.0277***	-0.0277***
	(0.00331)	(0.00851)
ln(lag corporate stores)	-0.0811***	-0.0811***
	(0.00737)	(0.0148)
units permitted	6.32e-05***	6.32e-05*
L	(0.0000232)	(0.0000339)
value of permits	-4.86e-10***	-4.86e-10***
•	(0.00000000134)	(0.00000000111)
fuel	-0.0579	-0.0579**
	(0.0517)	(0.0292)
distance to distribution center	-5.39e-05**	-0.0000539
	(0.0000227)	(0.000101)
retail wage	0.000174***	0.000174***
-	(0.0000352)	(0.0000142)
Observations	18404	18404
	Standard errors in parentheses	
	*** p<0.01, ** p<0.05, * p<0.1	1
N	DTE: All predictors at their mean	value

Table 15: Marginal effects at the means from logistic regression, corporate subset *Dependent variable: present/not*

Omitted firm dummy is Home Depot

It appears that the presence of more firms of either type reduces probability of entry (as the presence of more firms decreases the expected profits in a market). Moreover, it appears that the type of firms that are present matters: for both cooperatives and corporates, the presence of a corporate firm decreases likelihood of entry more than the presence of a cooperative firm does. This would make

sense, as corporate stores are generally substantially larger and have greater sales volume than cooperative stores, meaning they would lower expected profits by more than the presence of a cooperative store would.

To more rigorously examine differences in entry decisions by structure, we turn to an interacted version of our logit model, interacting structure with population, income, and the variables that capture competitive effects. These interaction terms are all highly significant under specifications with robust standard errors and standard errors clustered by structure (see table 27 in the appendix). This is evidence that population, income, and the presence of other stores affects firms of cooperative and corporate structures differentially.

To interpret this difference, we calculate the marginal effects at the means for population, income, and the competitive effects for corporate firms and the same marginal effects at the means for cooperative firms. We then difference the two so that we can isolate how changing structure affects marginal effects of these variables at the same means. Table 16 reports the level and significance of these differences.

	Conventional SE	Robust SE	Clustered SE, by structure	Clustered SE, by firm
population	0.0000162***	0.0000162***	0.0000162***	0.0000162***
	(0.000000691)	(0.00000675)	(0.00000277)	(0.00000107)
per capita income	-0.00000356**	-0.00000356*	-0.00000356***	-0.00000356
	(0.00000176)	(0.00000186)	(0.00000116)	(0.0000116)
ln(lag coop)	-0.2169539***	-0.2169539***	-0.2169539***	-0.2169539***
	(0.0125444)	(0.0126877)	(0.0230513)	(0.0284204)
ln(lag corp)	-0.1201632***	-0.1201632***	-0.1201632***	-0.1201632**
	(0.0274886)	(0.0294724)	(0.0124668)	(0.0511248)

Table 16: Difference in marginal effects at the means (corporate – cooperative)

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

NOTE: All predictors at their mean value.

The differenced marginal effects confirm that population, income, and the number of cooperative and corporate stores affect cooperative and corporate firms differently. Corporate firms are more likely to enter with increases in population than cooperative firms are, but less likely to enter with increases in per capita income than cooperatives are. At mean levels, corporate firms are 21.7% less likely to enter with a one unit increase in the natural log of the number of cooperative firms than cooperative firms are also 12.0% less likely to enter with a one unit increase in the log of corporate firms than cooperative firms are.

Thus, the evidence suggests that presence of either cooperative and corporate stores decreases the likelihood of entry for both types of firms, and that the presence of corporate stores decreases the chance of entry more than the presence of cooperative firms for both types of firms. Results from the interacted version of our models suggest that corporate firms are less likely to enter as the number of cooperative and corporate stores increases than cooperative stores are, and that this

difference more pronounced for cooperative stores than for corporate stores. The rest of the analysis aims to bolster these results.

Model 2

Next, we model entry decisions using ordered logistic regression. Again, we examine the marginal effects at the means for the variables, as the coefficients are difficult to interpret.

For the ordered logit, the marginal effects are:

$$\begin{split} \frac{\delta p}{\delta w_r} &= -[F'(W\beta - \kappa_1)]\beta_r \text{ for } y = 0\\ \frac{\delta p}{\delta w_r} &= [F'(W\beta - \kappa_j) - F'(W\beta - \kappa_{j+1})]\beta_r \text{ for } j = 1, 2, 3 \text{ (corresponding to } y = 1, 2, 3, \text{ respectively})\\ \frac{\delta p}{\delta w_r} &= [F'(W\beta - \kappa_4)]\beta_r \text{ for } y = 4 \end{split}$$

where F(z) is the logistic function $\frac{e^z}{1+e^z}$.

Tables 31 and 32 in the appendix present the marginal effects at the means. These results support the conclusion that increasing numbers of cooperative and corporate stores mean that firms are less likely to enter. Greater presence of corporate stores has a greater negative effect on chance of entry than the presence of cooperative stores does; an additional unit in the natural log of corporate stores increases the chance of a firm staying out of a market by 18.3%, while the same increase for cooperative stores leads to a 4.3% increase in the probability of a firm not entering that market.

Looking at ordered logistic regressions performed on cooperative and corporate firms separately (tables 33 and 34 in the appendix), we see that at mean levels of all the other variables, a one-unit increase in the natural log of cooperative stores increases the chance of staying out of the market by 3.0%, while a one unit increase in the natural log of corporate stores increases the chance of staying out of the market by 13.8%. For corporate firms, a similar narrative emerges: an one-unit increase in the natural log of cooperative stores increases a firm's likelihood of staying out of the market by 2.8%, while a one unit increase in the natural log of corporate stores increases the chance that a corporate firm will stay out of the market by 8.0%.

County Fixed Effects

Next, we introduce county fixed effects into our analysis. Table 17 presents the results for a logit model with interaction terms and county fixed effects. We see that the interaction terms for population and the competitive effects are all highly significant, adding to the evidence that the presence of either cooperative or corporate stores affects firms differentially by structure. But because county fixed effects logit models have very limited interpretations, we use a linear probability model.²²

Table 18 presents the results of a linear probability model with interaction terms and county fixed effects. We see that the presence of cooperative or corporate stores decreases likelihood of entry, as it did in the logit models. There is also evidence that population, income, and the presence of cooperative and corporate stores affects firms differentially by structure. However, these effects –

²² STATA's clogit and xtlogit commands eliminate the fixed effects but do not actually estimate their value. While inserting 3000+ dummy variables into the ordinary logistic regression may have been feasible, such a method exceeded standard computing power.

main effects and interaction terms-are not significant once standard errors are clustered at the structure level.

N	County FE, Robust		County FE, Clustered SE by structure		County FE, Clustered SE by firm 42745	
	Coefficient	SE	Coefficient	SE	Coefficient	SE
population density	-0.015978**	0.0067509	-0.015978	1.9995	-0.015978	1.044091
population	0.0004565***	0.0001446	0.0004565	0.0038089	0.0004565	0.0047866
population (corp)	0.000067****	7.48E-06	0.000067***	7.33E-07	0.000067***	0.000011
per capita income	-0.0000389	0.0000643	-0.0000389	0.0001032	-0.0000389	0.0005227
(corp)	0.0000331*	0.0000188	0.0000331	0.0000764	0.0000331	0.0000618
CPI	0.1465435***	0.0549959	0.1465435	0.9044611	0.1465435	0.7886545
own to rent ratio	0.0160266	0.1649143	0.0160266	1.358158	0.0160266	1.391371
construction est.	-0.0000488	0.004861	-0.0000488	0.0188522	-0.0000488	0.039655
median year built	0.1005602**	0.0441087	0.1005602	1.758884	0.1005602	1.092391
median rent median number of	-0.005943***	0.0018802	-0.005943	0.0128662	-0.005943	0.0149432
rooms	1.105869*	0.597999	1.105869	2.404838	1.105869	6.493644
ln(lag coop)	-9.210149***	0.2809222	-9.210149***	0.3195372	-9.210149***	1.196949
ln(lag coop) (corp)	-2.265132***	0.1778133	-2.265132***	0.4755941	-2.265132***	0.5381289
ln(lag corp)	-10.20057***	0.3829568	-10.20057***	1.936155	-10.20057***	1.725673
ln(lag_corp) (corp)	1.217717***	0.3926819	1.217717***	0.1113112	1.217717***	0.4619015
units permitted	-0.0008552	0.0008953	-0.0008552	0.0040592	-0.0008552	0.0046285
value of permits	-5.6E-09	4.80E-09	-5.6E-09	1.19E-08	-5.6E-09	1.77E-08

1.478386

0.0003345

0.0024359

0.514027

1.017688

2.209831

1.010205

1.519515

0.5032982

0.0951185

0.1445267

(omitted)

0.0913754

Table 17: Logistic regression, county fixed effects Dependent variable: present/not

1.297353

-0.0000253

-0.6127251

-1.968058*

-4.207349*

-2.732207***

-4.139852***

-3.653452***

-0.1566178*

0

-0.6552642***

-0.3600687***

-0.0010581***

fuel

year

firm Do It Best

distribution center

structure (corp)

Home Depot

True Value

Lowe's

2007

2008

2009

2010

2011

retail wage

*** p<0.01, ** p<0.05, * p<0.1

0

1.297353

-0.0010581

-0.0000253

-0.6127251

-1.968058

-4.207349

-2.732207

-4.139852

-3.653452***

-0.1566178***

-0.6552642***

-0.3600687***

14.45489

0.0013627

0.0094371

8.017535

16.03133

32.14296

15.40621

24.88446

1.188218

0.0457085

0.2136134

(omitted)

0.0837906

1.297353

-0.0010581

-0.0000253

-0.6127251

-1.968058

-4.207349

-2.732207

-4.139852

-3.653452***

-0.1566178***

-0.6552642***

-0.3600687***

0

18.37771

0.0007041

0.0162078

8.826858

17.82734

37.31121

13.41527

26.07632

1.502638

0.0066958

0.2032082

(omitted)

0.0925394

Table 18: Linear probability model, county fixed effectsDependent variable: present/not

	Robust SE		Clustered SE, by structure		Clustered SE, by firm	
Ν	4601	10	46010	46010		
R-squared	0.67	02	0.6702		0.6702	
	Coefficient	SE	Coefficient	SE	Coefficient	SE
population density	-0.0005648***	2.2020E-04	-0.0005648	0.0005	-0.0005648	0.0003
population	0.0000395***	4.6000E-06	0.0000395	0.0000	0.0000395***	0.0000
population (corp)	0.00000331***	2.3200E-07	3.31E-06	0.0000	0.00000331	0.0000
per capita income	-0.00000215	2.3200E-06	-2.15E-06	0.0000	-0.00000215	0.0000
per capita income (corp)	-0.0000016***	5.6500E-07	-1.6E-06	0.0000	-0.0000016	0.0000
СРІ	0.0116429***	2.1766E-03	0.0116429	0.0055	0.0116429**	0.0033
own to rent ratio	0.0142718**	5.7151E-03	0.0142718	0.0060	0.0142718*	0.0056
construction est.	0.0000589	2.0350E-04	0.0000589	0.0002	0.0000589	0.0001
median year built	0.0061453***	1.5248E-03	0.0061453	0.0020	0.0061453***	0.0011
median rent	-0.0004011***	6.2200E-05	-0.000401	0.0001	-0.0004011***	0.0000
median number of rooms	0.0709185***	2.1475E-02	0.0709185*	0.0084	0.0709185***	0.0100
ln(lag coop)	-0.7863656***	6.2183E-03	-0.786366	0.2177	-0.7863656***	0.1127
ln(lag coop) (corp)	-0.2379531***	4.8242E-03	-0.237953	0.0509	-0.2379531***	0.0281
ln(lag corp)	-1.002022***	1.3663E-02	-1.002022	0.4642	-1.002022**	0.2407
ln(lag_corp) (corp)	0.0535976***	1.2568E-02	0.0535976	0.0752	0.0535976	0.0428
units permitted	-0.0000907**	4.2800E-05	-9.07E-05	0.0000	-0.0000907**	0.0000
value of permits	5.1E-10**	2.2400E-10	-5.12E-10	0.0000	5.1E-10**	0.0000
fuel	0.122195*	7.0663E-02	0.122195	0.0379	0.122195*	0.0510
distribution center	-0.000085***	1.3900E-05	-0.000085***	0.0000	-0.000085***	0.0000
retail wage	-0.0000535	8.6600E-05	-0.0000535*	0.0000	-0.0000535	0.0000
year						
2007	-0.0622568***	2.1773E-02	-0.062257	0.0270	-0.0622568*	0.0276
2008	-0.1735528***	4.2372E-02	-0.173553	0.0546	-0.1735528**	0.0495
2009	-0.3657686***	9.5826E-02	-0.365769	0.1122	-0.3657686**	0.1005
2010	-0.2227884***	4.0091E-02	-0.222788	0.0530	-0.2227884***	0.0395
2011	-0.3439769***	6.0498E-02	-0.343977	0.0864	-0.3439769***	0.0714
corp	-0.0969506***	1.3155E-02	-0.096951	0.0066	-0.0969506**	0.0268
firm						
Do It Best	-0.0234398***	4.6483E-03	-0.02344	0.0101	-0.0234398**	0.0053
Home Depot	-0.0217568***	3.4105E-03	-0.021757	0.0119	-0.0217568**	0.0063
Lowe's	0	(omitted)	0	(omitted)	0	(omitted)
True Value	-0.0378497***	4.6610E-03	-0.0378497**	0.0021	-0.0378497***	0.0012
constant	-14.54209***	2.9824E+00	-14.54209***	2.5507	-14.54209***	1.6987

Table 19: Linear probability model, county fixed effects *Dependent variable: number of stores firm has in county*

	Robust S	E	Clustered SE, by	structure	Clustered SE, by	y firm
Ν	46010		46010		46010	
R-squared	0.7224		0.7224		0.7224	
	Coefficient	SE	Coefficient	SE	Coefficient	SE
population density	-0.0003335	0.0002	-0.0003335	0.0008	-0.0003335	0.0004
population	0.0000511***	0.0000	0.0000511	0.0000	0.0000511***	0.0000
population (corp)	-0.00000224***	0.0000	-0.00000224	0.0000	-0.00000224	0.0000
per capita income	-0.00000558	0.0000	-0.00000558	0.0000	-0.00000558	0.0000
per capita income						
(corp)	-0.00000692***	0.0000	-0.00000692	0.0000	-0.00000692*	0.0000
CPI	0.0192383***	0.0039	0.0192383**	0.0009	0.0192383**	0.0048
own to rent ratio	0.0256309***	0.0089	0.0256309	0.0041	0.0256309**	0.0076
construction est.	0.0006356*	0.0004	0.0006356	0.0004	0.0006356*	0.0003
median year built	0.0096631***	0.0024	0.0096631	0.0027	0.0096631***	0.0017
median rent	-0.0006366***	0.0001	-0.0006366**	0.0000	-0.0006366***	0.0000
median number of						
rooms	0.0937252***	0.0334	0.0937252*	0.0095	0.0937252***	0.0201
ln(lag coop)	-1.535692***	0.0112	-1.535692	0.4478	-1.535692***	0.2332
ln(lag coop) (corp)	-0.5077022***	0.0091	-0.5077022	0.0853	-0.5077022***	0.0684
ln(lag corp)	-1.145769***	0.0199	-1.145769	0.5053	-1.145769**	0.2680
ln(lag_corp) (corp)	0.1853572***	0.0190	0.1853572	0.0997	0.1853572*	0.0745
units permitted	-0.0000625	0.0001	-0.0000625	0.0000	-0.0000625**	0.0000
value of permits	-0.000000000799**	0.0000	-0.000000000799*	0.0000	-0.000000000799***	0.0000
fuel	0.129252	0.1227	0.129252	0.0327	0.129252**	0.0353
distribution center	-0.0001582***	0.0000	-0.0001582*	0.0000	-0.0001582**	0.0000
retail wage	-0.0000747	0.0001	-0.0000747*	0.0000	-0.0000747	0.0001
vear						
2007	-0.0945616**	0.0375	-0.0945616**	0.0041	-0.0945616	0.0447
2008	-0.2689689***	0.0733	-0.2689689**	0.0101	-0.2689689**	0.0629
2009	-0.5407638***	0.1660	-0.5407638***	0.0082	-0.5407638***	0.0846
2010	-0.3963109***	0.0711	-0.3963109*	0.0435	-0.3963109**	0.1107
2011	-0.5675648***	0.1054	-0.5675648**	0.0348	-0.5675648***	0.1196
2011	0.5075010	0.1021	0.0070010	0.0210	0.5075010	0.1190
corp	0.4627719***	0.0206	0.4627719**	0.0206	0.4627719***	0.0353
eorp	0	0.0200	01102//19	0.0200	01102//19	0100000
firm						
Do It Best	0 1103600***	0.0072	0 1103600	0.0204	0 1103600***	0.0105
Home Depot	-0.0243172***	0.0072	-0.0243172	0.0204	-0.0243172**	0.0071
Lowe's	0.0243172	(omitted)	0.0243172	(omitted)	0.0243172	(omitted)
True Volue	0 0270600***	0.0070	0 0270600*	0.0027	0 0270600***	0.0020
The value	0.02/9009	0.0070	0.02/9009*	0.0037	0.02/9009****	0.0020
constant	-22.41108***	4.7772	-22.41108	4.2780	-22.41108***	3.5987

*** p<0.01, ** p<0.05, * p<0.1

Regressions at the structure level are included in the appendix (Tables 35 and 36). For cooperatives, a 10% increase in the number cooperative stores decreases likelihood of entry by 8.7% (significant at the 0.01 level, with standard errors clustered by firm), and a 10% increase in the number corporate stores decreases likelihood of entry by 0.8% (not significant at the 5% level – but just barely, once standard errors are clustered by firm). For corporate firms, a 10% increase in the number of cooperative firms reduces likelihood of entry by 0.28% (not significant at standard significance levels, with standard errors clustered by firm), and a 10% increase in the number of corporate firms reduces likelihood of entry by 0.28% (not significant at standard significance levels, with standard errors clustered by firm), and a 10% increase in the number of corporate firms reduces likelihood of entry by 11.5% (significant at the 5% level, with standard errors clustered by firm).

errors clustered by firm). These results suggest differentiation among structure types, as the presence of the same type affects likelihood of entry much more so than presence of a different type.

We also construct a linear probability model version using the number of stores that a firm has in a county as the dependent variable (tables 19, as well as 37, 38, and 39 in the appendix). We again see that the presence of cooperative and corporate stores decreases likelihood of entry. The same holds true when these regressions are done on the structure level. These results, however, are inconsistent when it comes to testing the claim that the presence of corporate stores decreases likelihood of entry more than cooperative stores.

But we caution that we cannot rely on these results; if anything, they provide only preliminary insights into how county fixed effects may change our results. And that is because linear probability models have severe limitations: there are no bounds on the values that the dependent variable can take, leading to nonsensical predictions. Moreover, in the case where the dependent variable takes values of 0 or 1, the error term has a binomial distribution, not a normal distribution, which means that tests of significance are invalid.

Thus, the results from the linear probability models are in no way dispositive and should be interpreted with great caution. They confirm that the presence of cooperative and corporate stores decrease the likelihood of entry for both cooperative and corporate firms. They do not, however, offer much evidence that these effects differ by structure.

Conclusion

In this paper, we study the effects of organizational structure on entry decisions. We find evidence that increased presence of cooperative or corporate stores decreases the likelihood of entry for both types of firms, and that increased presence of a corporate store decreases the likelihood by more than an equivalent increase in cooperative stores would.

Results from interacted logit models –with and without county fixed effects – find significant differences by structure: at mean levels, corporate firms are more likely to enter with increases in population but less likely to enter with increases in per capita income than cooperative firms are. Crucially, at mean levels, corporate firms are 21.7% less likely to enter with a one unit increase in the natural log of the number of cooperative firms and 12.0% less likely to enter with a one unit increase in the log of corporate firms than cooperative firms are.

In short, the analysis from this study suggests that structure plays a role in firms' entry decisions. Firms of different structures consider demand characteristics like population differently and treat competitors of different structure types differently. That said, this is only preliminary evidence: a tractable interpretation of the logit model with county fixed effects would shed insight. Moreover, this research does not explain the sources of structural differences that affect entry decisions. It could be that differentiation in store size among cooperative and corporate stores –that results from structural differences— accounts for how firms differentially treat the presence of cooperative and corporate rivals (though evidence presented in "Extension" suggests otherwise). Further investigation is necessary.

Directions for further research are numerous. In the appendix, we extend this research and present preliminary results for a model of quantity choice. A logical next step would be building a two stage

model of entry, the first where the firm decides to enter, and the second, in which the firm chooses quantity, conditional on having decided to enter. Examining product differentiation in this context would also be important. In particular, using Mazzeo's framework to endogenize product type decisions and measure how the effects of competitors differ by product type here would help us understand the links between structure, product differentiation, and firm strategy.²³ Moreover, one could build a model of incomplete information, using methods similar to Seim to analyze the effect of organizational structure on entry decisions.²⁴

Exploring the link between organizational structure and firm strategy is area rife for future research. The results produced from the analysis here are a promising step in understanding the link between organizational structure and entry decisions.

²³ Michael J. Mazzeo, "Product Choice and Oligopoly Market Structure," *RAND Journal of Economics* 33, no. 2 (2002): 221, doi:10.2307/3087431.

²⁴ Katja Seim, "An Empirical Model of Firm Entry with Endogenous Product-Type Choices," *RAND Journal of Economics* 37, no. 3 (September 2006): 619–40, doi:10.1111/j.1756-2171.2006.tb00034.x.

Appendix

Extension

We present the preliminary results of a Cournot model, where firms compete by choosing quantity. Quantity here is total number of square feet that a firm has in a county. We employ simplifying assumptions – that each square foot supplied to a county is the same, regardless of whether it is supplied by a corporate or cooperative firm and that the relationship between the regressors and the dependent variable is a linear one, namely that increasing the number of square feet in a county from 0 to 1 is the same as from 1 to 2.

Our results show significant differences by structure and support the conclusions in the primary analysis: the more square feet of stores of either type in a county, the fewer square feet a firm will locate in that county. This effect is larger for "corporate square feet" than for "cooperative square feet." As our dependent variable is the number of square feet that a firm has in a county, this differential can no longer be explained by the fact that corporate stores are generally larger, indicating that structure likely has a role to play. Moreover, mirroring the primary analysis, corporate stores allocate less square footage than cooperatives do, when more cooperative square feet or corporate square feet are present in a county.

A word of caution – these results are not robust. They are not significant at standard levels once county fixed effects are added and standard errors are clustered at the structure level. More research should be done to using such a model of quantity choice, ideally making play of the capacity choice game conditional on a firm having decided to enter.

	Robust SE		Clustered SE, by structure		Clustered SE, by firm	
N R-Squared	46010 0.193)	4601 0.19	0 3	46010 0.193	
	Coefficient	SE	Coefficient	SE	Coefficient	SE
pop_dens	-0.0049635***	0.0004762	-0.0049635*	0.0005424	-0.0049635**	0.0011165
pop_dens_corp	0.0265779***	0.0047451	0.0265779***	0.0000484	0.0265779**	0.0089737
population	0.0000975***	7.30E-06	0.0000975**	2.89E-06	0.0000975***	0.0000204
population_corp	0.0007293***	0.000031	0.0007293***	2.08E-06	0.0007293*	0.0003036
percap_income	0.0001051***	0.0000241	0.0001051	0.0000205	0.0001051**	0.0000246
percap_income_corp	0.0003593***	0.0000888	0.0003593***	1.52E-06	0.0003593	0.0002398
CPI	-0.0377654	0.0305543	-0.0377654	0.0656941	-0.0377654	0.1088678
CPI_corp	0.0028718	0.0358564	0.0028718	0.0015592	0.0028718	0.0530353
own_to_rent	0.4957875***	0.0716706	0.4957875**	0.0334362	0.4957875*	0.2234133
own_to_rent_corp	-3.772053***	0.2550093	-3.772053***	0.0081879	-3.772053**	1.071998
constr_est_~t	0.0497801***	0.002352	0.0497801**	0.003937	0.0497801**	0.0113438
constr_est_count_corp	-0.002339	0.0083146	-0.002339**	0.0000679	-0.002339	0.0331272
year_built	-0.1901498***	0.0088407	-0.1901498	0.0314687	-0.1901498**	0.05803
year_built_corp	0.4249707***	0.0338596	0.4249707**	0.0010386	0.4249707**	0.1042354
rent	-0.002653***	0.0007606	-0.002653	0.0013142	-0.002653	0.0037043
rent_corp	-0.0038267	0.0032257	-0.0038267**	0.0002495	-0.0038267	0.0108296
rooms	-1.868436***	0.2004709	-1.868436*	0.2057946	-1.868436	1.057237
rooms_corp	-0.8188132	0.7377019	-0.8188132**	0.0222857	-0.8188132	1.546188
ln_coop_sqft	-0.3443344***	0.0485977	-0.3443344**	0.020898	-0.3443344**	0.0834276
ln_coop_sqft_corp	-2.636743***	0.2131129	-2.636743***	0.0069202	-2.636743**	0.8917505
ln_corp_sqft	-0.8167085***	0.0391314	-0.8167085**	0.046332	-0.8167085**	0.2002707
ln_corp_sqft_corp	-1.405335***	0.2252035	-1.405335***	0.0100825	-1.405335***	0.193816
units permitted	0.0070662***	0.0012796	0.0070662	0.0018768	0.0070662***	0.001843
units_permitted_corp	0.0060188	0.0054769	0.0060188***	5.89E-06	0.0060188	0.0032615
value_permits	-5.96E-8***	8.09E-09	-5.96E-8***	5.45E-10	-5.96E-8**	1.41E-08
value_permits_corp	-4.14E-08	2.87E-08	-4.14E-8***	5.49E-10	-4.14E-8**	1.45E-08
fuel	8.330499**	3.498318	8.330499	22.42168	8.330499	11.67579
fuel_corp	0.8930639	0.6601685	0.8930639**	0.0170399	0.8930639	0.9321854
dist_center	-0.0009783***	0.0002825	-0.0009783	0.0008705	-0.0009783	0.001159
dist_center_corp	-0.0049872***	0.0013475	-0.0049872***	0.0000307	-0.0049872	0.0062566
retail_wage	-0.0069497***	0.0013031	-0.0069497*	0.0009033	-0.0069497*	0.0029984
retail_wage_corp	0.0146306***	0.0049569	0.0146306***	0.0000784	0.0146306**	0.0042161
constant	375.8563***	19.76751	375.8563	103.3099	375.8563**	130.0146

Table 20: Results from OLS (with firm and year fixed effects)Dependent variable: number of square feet firm has in county (in thousands)

*** p<0.01, ** p<0.05, * p<0.1

Table 21: Results from OLS, county fixed effects (with firm and year fixed effects)Dependent variable: number of square feet firm has in county (in thousands)

	County Fixe Robus	ed Effects, t SE	County Fix Clustered SE	ted Effects, by structure	County Fixe Clustered S	ed Effects, E by firm
Ν	4601	10	460)10	46010	
R-Squared	0.628	87	0.62	287	0.623	87
	Coefficient	SE	Coefficient	SE	Coefficient	SE
pop_dens	-0.1061259***	0.035908	-0.1061259	0.0689668	-0.1061259**	0.0354875
pop_dens_corp	0.0165614***	0.0026718	0.0165614*	0.0016538	0.0165614**	0.005281
population	0.0029347***	0.0002935	0.0029347	0.001301	0.0029347**	0.0007399
population_corp	0.00029***	0.0000193	0.00029	0.0002404	0.00029	0.0001695
percap_income	-0.000049	0.0001136	-0.000049	0.0000693	-0.000049	0.0000583
percap_income_corp	0.0002658***	0.0000572	0.0002658	0.0000971	0.0002658*	0.0001159
СРІ	0.7122765***	0.114749	0.7122765	0.5607056	0.7122765	0.343044
CPI_corp	0.0294941	0.0237981	0.0294941	0.0054628	0.0294941	0.0520017
own_to_rent	1.554986***	0.2477035	1.554986	0.7672004	1.554986**	0.4425432
own_to_rent_corp	-1.534673***	0.1556066	-1.534673	1.062189	-1.534673*	0.6362698
constr_est_~t	-0.0158976	0.013203	-0.0158976	0.0086035	-0.0158976	0.0096308
constr_est_count_corp	-0.0164013***	0.0050841	-0.0164013	0.014132	-0.0164013	0.0162107
year_built	0.0126836	0.0694707	0.0126836	0.0991028	0.0126836	0.0534957
year_built_corp	0.2071497***	0.0210128	0.2071497	0.0728033	0.2071497**	0.0579271
rent	-0.0230467***	0.0031193	-0.0230467	0.0109217	-0.0230467**	0.0057399
rent_corp	0.0015659	0.0021903	0.0015659	0.0045051	0.0015659	0.0054643
rooms	4.410703***	1.032952	4.410703	1.270849	4.410703***	0.7236201
rooms_corp	-0.7495209	0.462139	-0.7495209*	0.0788476	-0.7495209	0.9521894
ln_coop_sqft	-4.575857***	0.0888909	-4.575857	1.862975	-4.575857**	1.087893
ln_coop_sqft_corp	-3.216628***	0.1326308	-3.216628	1.213788	-3.216628**	0.7788339
ln_corp_sqft	-15.19012***	0.1724137	-15.19012	7.580699	-15.19012**	3.992554
ln_corp_sqft_corp	1.43482***	0.1577238	1.43482	1.175704	1.43482*	0.6567907
units permitted	-0.0109819***	0.0030204	-0.0109819	0.0073659	-0.0109819**	0.0039261
units_permitted_corp	0.006418	0.0041152	0.006418*	0.0008154	0.006418**	0.0022825
value_permits	-2.86E-8*	1.57E-08	-2.86E-08	1.88E-08	-2.86E-08	1.60E-08
value_permits_corp	-1.76E-08	2.03E-08	-1.76E-08	2.10E-08	-1.76E-08	1.87E-08
fuel	13.87675***	4.09123	13.87675	7.21089	13.87675**	4.350254
fuel_corp	0.2992683	0.3891307	0.2992683	0.5052833	0.2992683	0.4752223
dist_center	-0.0022935***	0.000707	-0.0022935	0.0012004	-0.0022935	0.002056
dist_center_corp	-0.0027482***	0.0008596	-0.0027482	0.0014153	-0.0027482	0.0024626
retail_wage	-0.0031109	0.0043793	-0.0031109*	0.0004822	-0.0031109	0.0016987
retail_wage_corp	0.0018301	0.0031157	0.0018301	0.0073382	0.0018301	0.0062416
constant	-259.783	135.406	-259.783*	34.22304	-259.783**	70.96965

Table 22:	Transition	tables	(all	counties)

22a.

2005-2006										
	Exit	Ace	Do It Best	Home Depot	Lowe's	True Value	Other	Total (2005)		
Entry		472	548	153	142	388	60	1763		
Ace	586	3447	44	0	0	25	0	4102		
Do It Best	255	4	3038	0	0	1	0	3298		
Home Depot	28	0	0	1685	0	0	0	1713		
Lowe's	4	0	0	0	1095	0	0	1099		
True Value	411	118	46	0	0	3581	0	4156		
Other	79	2	4	0	0	0	948	1033		
Total (2006)	1363	4043	3680	1838	1237	3995	1008			

22b.

2006-2007											
	Exit	Ace	Do It Best	Home Depot	Lowe's	True Value	Other	Total (2006)			
Entry		133	128	99	154	177	1315	2006			
Ace	167	3858	11	0	0	4	3	4043			
Do It Best	247	3	3322	0	0	1	107	3680			
Home Depot	10	0	0	1828	0	0	0	1838			
Lowe's	5	0	0	0	1232	0	0	1237			
True Value	199	8	15	0	0	3769	4	3995			
Other	133	1	0	0	0	1	873	1008			
Total (2007)	761	4003	3476	1927	1386	3952	2302				

22c.

2007-2008										
	Exit	Ace	Do It Best	Home Depot	Lowe's	True Value	Other	Total (2007)		
Entry		149	117	81	150	60	107	664		
Ace	166	3817	17	0	0	2	1	4003		
Do It Best	193	1	3279	0	0	3	0	3476		
Home Depot	15	0	0	1912	0	0	0	1927		
Lowe's	6	0	0	0	1380	0	0	1386		
True Value	246	4	14	0	0	3687	1	3952		
Other	93	0	4	0	0	0	2205	2302		
Total (2008)	719	3971	3431	1993	1530	3752	2314			

22d.

	2008-2009											
	Exit	Ace	Do It Best	Home Depot	Lowe's	True Value	Other	Total (2008)				
Entry		133	144	39	117	48	1217	1698				
Ace	205	3736	26	0	1	1	2	3971				
Do It Best	179	0	3241	0	0	10	1	3431				
Home Depot	27	0	0	1966	0	0	0	1993				
Lowe's	0	0	0	0	1530	0	0	1530				
True Value	173	5	17	0	0	3556	1	3752				
Other	161	1	5	0	0	0	2147	2314				
Total (2009)	745	3875	3433	2005	1648	3615	3368					

22e.

2009-2010											
	Exit	Ace	Do It Best	Home Depot	Lowe's	True Value	Other	Total (2009)			
Entry		157	74	6	51	50	156	494			
Ace	206	3641	24	0	0	0	4	3875			
Do It Best	174	3	3253	0	0	1	2	3433			
Home Depot	42	0	0	1963	0	0	0	2005			
Lowe's	2	0	0	0	1646	0	0	1648			
True Value	162	10	7	0	0	3430	6	3615			
Other	121	0	1	0	0	0	3246	3368			
Total (2010)	707	3811	3359	1969	1697	3481	3414				

22f.

	2010-2011										
	Exit	Ace	Do It Best	Home Depot	Lowe's	True Value	Other	Total (2010)			
Entry		114	69	2	30	57	213	485			
Ace	145	3658	5	0	0	2	1	3811			
Do It Best	193	2	3161	0	0	0	3	3359			
Home Depot	4	0	0	1965	0	0	0	1969			
Lowe's	3	0	0	0	1694	0	0	1697			
True Value	167	4	2	0	0	3306	2	3481			
Other	90	1	1	0	0	0	3322	3414			
Total (2011)	602	3779	3238	1967	1724	3365	3541				

Table 23: Transition tables (middle quartiles)

23a.

2005-2006										
	Exit	Ace	Do It Best	Home Depot	Lowe's	True Value	Other	Total (2005)		
Entry		146	230	30	31	106	9	552		
Ace	181	1025	16	0	0	3	0	1225		
Do It Best	71	2	1289	0	0	1	0	1363		
Home Depot	0	0	0	115	0	0	0	115		
Lowe's	0	0	0	0	151	0	0	151		
True Value	136	35	18	0	0	1197	0	1386		
Other	15	0	3	0	0	0	195	213		
Total (2006)	403	1208	1556	145	182	1307	204			

23b.

2006-2007										
	Exit	Ace	Do It Best	Home Depot	Lowe's	True Value	Other	Total (2006)		
Entry		23	49	12	32	47	400	563		
Ace	36	1167	4	0	0	2	2	1211		
Do It Best	93	2	1431	0	0	0	37	1563		
Home Depot	1	0	0	141	0	0	0	142		
Lowe's	0	0	0	0	181	0	0	181		
True Value	56	1	3	0	0	1253	0	1313		
Other	36	0	0	0	0	1	163	200		
Total (2007)	222	1193	1487	153	213	1303	602			

23c.

2007-2008										
	Exit	Ace	Do It Best	Home Depot	Lowe's	True Value	Other	Total (2007)		
Entry		20	30	10	25	15	27	127		
Ace	50	1129	5	0	0	1	0	1185		
Do It Best	63	0	1421	0	0	0	0	1484		
Home Depot	0	0	0	150	0	0	0	150		
Lowe's	3	0	0	0	210	0	0	213		
True Value	85	0	4	0	0	1212	0	1301		
Other	31	0	1	0	0	0	571	603		
Total (2008)	232	1149	1461	160	235	1228	598			

23d.

2008-2009										
	Exit	Ace	Do It Best	Home Depot	Lowe's	True Value	Other	Total (2008)		
Entry		29	55	7	18	13	514	636		
Ace	66	1073	4	0	1	0	2	1146		
Do It Best	70	0	1381	0	0	6	1	1458		
Home Depot	2	0	0	158	0	0	0	160		
Lowe's	0	0	0	0	234	0	0	234		
True Value	49	1	5	0	0	1169	1	1225		
Other	33	0	4	0	0	0	561	598		
Total (2009)	220	1103	1449	165	253	1188	1079			

23e.

2009-2010										
	Exit	Ace	Do It Best	Home Depot	Lowe's	True Value	Other	Total (2009)		
Entry		31	19	0	8	18	53	129		
Ace	59	1037	2	0	0	0	1	1099		
Do It Best	64	0	1378	0	0	0	2	1444		
Home Depot	1	0	0	162	0	0	0	163		
Lowe's	0	0	0	0	251	0	0	251		
True Value	44	2	2	0	0	1133	3	1184		
Other	38	0	0	0	0	0	1032	1070		
Total (2010)	206	1070	1401	162	259	1151	1091			

23f.

2010-2011										
	Exit	Ace	Do It Best	Home Depot	Lowe's	True Value	Other	Total (2010)		
Entry		30	19	1	4	17	89	160		
Ace	49	1020	0	0	0	0	1	1070		
Do It Best	71	1	1327	0	0	0	2	1401		
Home Depot	2	0	0	160	0	0	0	162		
Lowe's	0	0	0	0	259	0	0	259		
True Value	42	0	2	0	0	1105	2	1151		
Other	26	1	1	0	0	0	1063	1091		
Total (2011)	190	1052	1349	161	263	1122	1157			

Table 24: Logistic regression Dependent variable: present/not

	Robust SE		Clustered SE, by structure		Clustered SE, by firm	
Ν	46010	0	4601	0	46010	0
	Coefficient	SE	Coefficient	SE	Coefficient	SE
population density	-0.0007452***	0.0001	-0.0007452	0.0012	-0.0007452	0.0007
population	0.0000269***	0.0000	0.0000269	0.0000	0.0000269*	0.0000
per capita income	0.0000342***	0.0000	0.0000342***	0.0000	0.0000342***	0.0000
CPI	-0.0147039***	0.0034	-0.0147039**	0.0071	-0.0147039	0.0103
own to rent ratio	-0.0632613***	0.0132	-0.0632613	0.1260	-0.0632613	0.0682
construction est.	0.0070104***	0.0004	0.0070104**	0.0022	0.0070104***	0.0019
median year built	-0.0211569***	0.0016	-0.0211569	0.0187	-0.0211569*	0.0126
median rent	-0.0005581***	0.0001	-0.0005581***	0.0001	-0.0005581	0.0005
median number of rooms	-0.3225864***	0.0355	-0.3225864***	0.0168	-0.3225864**	0.1353
ln(lag coop)	-0.2450822***	0.0233	-0.2450822**	0.1205	-0.2450822***	0.0781
ln(lag corp)	-0.848116***	0.0480	-0.848116***	0.4974	-0.848116***	0.2929
units permitted	0.0010579***	0.0002	0.0010579***	0.0004	0.0010579***	0.0004
value of permits	-9.8E-9***	0.0000	-9.8E-9***	0.0000	-9.8E-9***	0.0000
fuel	3.183228***	0.3771	3.183228	2.2965	3.183228**	1.3692
distribution center	-0.0003541***	0.0001	-0.0003541***	0.0001	-0.0003541**	0.0002
retail wage	-0.000047	0.0002	-0.000047	0.0007	-0.000047	0.0005
year						
2007	-0.7237837***	0.0940	-0.7237837	0.6112	-0.7237837*	0.3891
2008	-1.449085***	0.1698	-1.449085	1.1899	-1.449085*	0.7786
2009	-3.788551***	0.4385	-3.788551	2.9226	-3.788551**	1.8546
2010	0.059993	0.0604	0.059993	0.1413	0.059993	0.3021
2011	-1.560764***	0.1791	-1.560764	1.3284	-1.560764*	0.9501
structure (corp)	-2.131623***	0.0381	-2.131623***	0.1036	-2.131623***	0.0576
firm						
Do It Best	0.0442737	0.0312	0.0442737***	0.0058	0.0442737***	0.0055
Home Depot	-0.4685744***	0.0463	-0.4685744***	0.0169	-0.4685744***	0.0142
Lowe's	0	(omitted)	0	(omitted)	0	(omitted)
True Value	-0.1351095***	0.0313	-0.1351095***	0.0058	-0.1351095***	0.0052
_cons	37.75773***	3.3248	37.75773	33.4217	37.75773	24.5357

N	Robust SE 27606		Clustered SE, by firm 27606		
	Coefficient	SE	Coefficient	SE	
population density	-0.0018525***	0.0002	-0.0018525***	0.0004	
population	0.0000085***	0.0000	0.0000085*	0.0000	
per capita income	0.000028***	0.0000	0.000028***	0.0000	
CPI	-0.0193024***	0.0043	-0.0193024	0.0148	
own to rent ratio	0.0155938	0.0148	0.0155938	0.0156	
construction est.	0.0087167***	0.0005	0.0087167***	0.0021	
median year built	-0.0337194***	0.0019	-0.0337194***	0.0117	
median rent	-0.0004998***	0.0002	-0.0004998	0.0008	
median number of rooms	-0.3335646***	0.0413	-0.3335646	0.2188	
ln(lag coop)	-0.1646642***	0.0264	-0.1646642***	0.0319	
ln(lag corp)	-0.4602819***	0.0512	-0.4602819***	0.1225	
units permitted	0.0007437***	0.0003	0.0007437	0.0005	
value of permits	-0.0000000946***	0.0000	-0.0000000946***	0.0000	
fuel	4.87056***	0.4737	4.87056***	1.1675	
distribution center	-0.0003399***	0.0001	-0.0003399*	0.0002	
retail wage	-0.0004407	0.0003	-0.0004407	0.0004	
year					
2007	-1.170992***	0.1161	-1.170992***	0.3755	
2008	-2.325729***	0.2135	-2.325729***	0.7966	
2009	-5.941319***	0.5520	-5.941319***	1.8157	
2010	-0.0501017	0.0721	-0.0501017	0.4525	
2011	-2.544779***	0.2265	-2.544779**	1.0920	
firm					
Do It Best	0.0484507	0.0309	0.0484507***	0.0083	
True Value	-0.1340488***	0.0310	-0.1340488***	0.0053	
constant	59.82165***	3.8742	59.82165**	26.4609	

Table 25: Logistic r	egression,	cooperative	subset
Dependent variable	: present/i	not	

Table 26: Logistic regression, corporate	subset
Dependent variable: present/not	

	Robust SE		Clustered SE, by firm		
Ν	18404		18404		
	Coefficient	SE	Coefficient	SE	
population density	0.0008617***	0.0002	0.0008617*	0.0005	
population	0.000073***	0.0000	0.000073***	0.0000	
per capita income	0.0000432***	0.0000	0.0000432***	0.0000	
CPI	0.0065811	0.0074	0.0065811	0.0105	
own to rent ratio	-0.4725861***	0.0404	-0.4725861***	0.1590	
construction est.	0.0035923***	0.0007	0.0035923**	0.0014	
median year built	0.0290562***	0.0040	0.0290562***	0.0043	
median rent	-0.0012315***	0.0003	-0.0012315	0.0014	
median number of rooms	-0.2340856***	0.0895	-0.2340856**	0.1054	
ln(lag coop)	-0.4211109***	9*** 0.0498 -0.4211109**		0.1825	
ln(lag corp)	-1.231727*** 0.1132 -1.231727**		-1.231727***	0.0690	
units permitted	0.0009595***	i95*** 0.0004 0.0009595**		0.0004	
value of permits	-0.0000000738***	0.0000	-0.00000000738***	0.0000	
fuel	-0.8800095	0.7862	-0.8800095	0.5543	
distribution center	-0.0008191**	0.0003	-0.0008191	0.0016	
retail wage	0.0026487***	0.0005	0.0026487***	0.0001	
year 2007	0 2225214*	0 1000	0 2225214	0.2050	
2007	0.5525514*	0.1999	0.5525514	0.2950	
2008	0.5763967	0.3543	0.5763967	0.5104	
2009	1.254804	0.9125	1.254804	1.0407	
2010	0.1/58/2	0.1414	0.1/58/2	0.3/11	
2011 C	0.6192433*	0.3759	0.6192433	0.6959	
firm	0.5110500***	0.0520	0.5110502***	0.0065	
Lowe's	0.5110/03***	0.0530	0.5110/03***	0.0265	
constant	-59.82987***	8.2581	-59.82987***	3.7764	

Ν	Robust 46010	SE 0	Clustered SE, by structu 46010		Clustered S 460	E, by firm 10
	Coefficient	SE	Coefficient	SE	Coefficient	SE
population density	-0.0008349***	0.0001376	-0.0008349	0.001135	0008349	0.0006306
population	8.23e-06***	1.33E-06	0.00000823***	3.73E-07	8.23e-06**	3.23E-06
population (corp)	.0000668 ***	2.11E-06	.0000668***	1.97E-06	.0000668***	0.0000115
per capita income	.0000369***	4.66E-06	.0000369***	0.0000122	.0000369***	0.0000133
per capita income	0000004***		0.0000004***		0000224	0.0000447
(corp)	0000224***	6.99E-06	-0.0000224***	2.03E-06	0000224	0.0000447
CPI	01634***	0.0034887	01634***	0.0063497	01634	0.0110531
own to rent ratio	06414//***	0.0134354	06414//	0.1301053	0641477	0.069/158
construction est.	.00/28/4***	0.00038/3	.00/28/4***	0.0019952	.00/28/4***	0.001/258
median year built	0213635***	0.0016046	0213635	0.0188965	0213635*	0.013005
median rent	0005454***	0.0001465	0005454***	0.0000747	0005454	0.0005638
rooms	3201739***	0.0365247	3201739***	0.0253249	3201739**	0.1551725
ln(lag coop)	0471709*	0.0255102	0471709	0.1753595	0471709	0.0967278
ln(lag coop) (corp)	9074955***	0.0498585	9074955***	0.0732111	9074955***	0.211306
ln(lag corp)	56414***	0.0496068	56414***	0.1637766	56414***	0.1443171
ln(lag_corp) (corp)	3956216***	0.1231137	3956216***	0.1001631	3956216***	0.1531585
units permitted	.0009011***	0.0002252	.0009011***	0.0002	.0009011**	0.0003555
value of permits	-9.14e-09***	1.26E-09	-9.14e-09***	5.07E-10	-9.14e-09***	8.39E-10
fuel	3.470182***	0.3895375	3.470182*	2.087539	3.470182***	1.274716
distribution center	0003777 ***	0.0000538	0003777***	0.000085	0003777**	0.0001652
retail wage	.000118	0.0002537	.000118	0.0009002	.000118	0.000583
year						
2007	7955705***	0.0962619	7955705	0.5512267	7955705**	0.3650021
2008	-1.591634***	0.1751217	-1.591634	1.073579	-1.591634**	0.7356099
2009	-4.146565***	0.4535066	-4.146565	2.645976	-4.146565**	1.745309
2010	.0491068	0.0610071	.0491068	0.1175388	.0491068	0.3217623
2011	-1.715609***	0.185103	-1.715609	1.19781	-1.715609*	0.915886
corp	-2.952185***	0.1569084	-2.952185***	0.1007088	-2.952185***	0.7870413
firm						
Do It Best	.0517414*	0.0302955	.0517414***	0.0047157	.0517414***	0.0053942
Home Depot	5189555	0.0532961	5189555***	0.0151283	5189555***	0.0127041
Lowe's	0	(omitted)	0	(omitted)	0	(omitted)
True Value	1320507***	0.0304016	1320507***	0.0013553	1320507	0.0043749
constant	37.97899***	3.357346	37.97899	33.8619	37.97899	25.74864

Table 27: Interacted logistic regression Dependent variable: present/not

Table 28: Ordered logistic regressionDependent variable: number of stores firm has in county

	Robust SE 46010		Clustered SE, by structure		Clustered SE, by firm	
Ν			46	46010		46010
	Coefficient	SE	Coefficient	SE	Coefficient	SE
population density	-0.0006796***	0.0001401	-0.0006796	0.0011996	-0.0006796	0.0006516
population	0.0000309***	1.16E-06	0.0000309	0.0000204	0.0000309	0.0000119
per capita income	0.0000373***	3.97E-06	0.0000373	7.71E-06	0.0000373	6.10E-06
CPI	-0.0181099***	0.0033143	-0.0181099	0.0067916	-0.0181099	0.0197753
own to rent ratio	0.0084373	0.0126758	0.0084373	0.1344504	0.0084373	0.0741334
construction est.	0.0070516***	0.0003192	0.0070516	0.0021594	0.0070516	0.0016224
median year built	-0.0254077***	0.0014859	-0.0254077	0.0171908	-0.0254077	0.0125111
median rent	-0.0008267***	0.0001369	-0.0008267	0.000033	-0.0008267	0.0005682
median number of rooms	-0.3681372***	0.03397	-0.3681372	0.0243614	-0.3681372	0.1289362
ln(lag coop)	-0.1967033***	0.022415	-0.1967033	0.1196794	-0.1967033	0.0795617
ln(lag corp)	-0.8352718***	0.044707	-0.8352718	0.376903	-0.8352718	0.2400536
units permitted	0.0012377***	0.0001985	0.0012377	0.0000767	0.0012377	0.0003638
value of permits	-0.0000000113***	1.18E-09	-1.13E-08	1.81E-09	-1.13E-08	1.54E-09
fuel	4.309756***	0.3557089	4.309756	2.236345	4.309756	1.23587
distribution center	-0.0003659***	0.0000552	-0.0003659	0.0000604	-0.0003659	0.0001738
retail wage	-0.000466*	0.0002388	-0.000466	0.0007706	-0.000466	0.0005511
year						
2007	-1.004988***	0.0885728	-1.004988	0.5919199	-1.004988	0.3616876
2008	-1.976965***	0.1593003	-1.976965	1.142736	-1.976965	0.7227752
2009	-5.161077***	0.4130467	-5.161077	2.825286	-5.161077	1.690273
2010	0.0748026	0.0586851	0.0748026	0.1075129	0.0748026	0.4315909
2011	-2.12858***	0.1680046	-2.12858	1.264615	-2.12858	0.9237687
structure (corp)	-2.165092***	0.0362098	-2.165092	0.1199209	-2.165092	0.079507
firm						
Do It Best	0.2728232***	0.0294866	0.2728232	0.0011818	0.2728232	0.0084661
Home Depot	-0.4689912***	0.0453539	-0.4689912	0.025339	-0.4689912	0.0213227
Lowe's	0	(omitted)	0	(omitted)	0	(omitted)
True Value	0.0103234	0.0288117	0.0103234	0.0104155	0.0103234	0.0073099
cut off 1	-44.15961	3.095713	-44.15961	30.37406	-44.15961	24.69069
cut off 2	-42.21	3.095297	-42.21	30.60079	-42.21	24.88024
cut off 3	-40.89756	3.094655	-40.89756	30.57651	-40.89756	24.92446
cut off 4	-39.69075	3.093937	-39.69075	30.56352	-39.69075	24.9996

*** p<0.01, ** p<0.05, * p<0.1

Table 29: Ordered logistic regression, cooperative subset *Dependent variable: number of stores firm has in county*

Ν	Robust SE 27606		Clustered SE, b 27606	y firm
	Coefficient	SE	Coefficient	SE
population				
density	-0.0017639***	0.0002	-0.0017639***	0.0003
population	0.0000174***	0.0000	0.0000174***	0.0000
per capita income	0.0000313***	0.0000	0.0000313***	0.0000
CPI	-0.0220866***	0.0039	-0.0220866	0.0289
own to rent ratio	0.0904504***	0.0137	0.0904504***	0.0261
construction est.	0.0085236***	0.0004	0.0085236***	0.0017
median year built	-0.0361957***	0.0016	-0.0361957***	0.0113
median rent median number	-0.0008425***	0.0002	-0.0008425	0.0008
of rooms	-0.3786646***	0.0377	-0.3786646**	0.1701
ln(lag coop)	-0.1191921***	0.0249	-0.1191921***	0.0315
ln(lag corp)	-0.5574142***	0.0478	-0.5574142***	0.1457
units permitted	0.0011656***	0.0002	0.0011656**	0.0005
value of permits	-0.000000124***	0.0000	-0.0000000124***	0.0000
fuel	5.794149***	0.4173	5.794149***	0.5979
distribution				
center	-0.000342***	0.0001	-0.000342	0.0002
retail wage	-0.0009276***	0.0003	-0.0009276*	0.0005
year				
2007	-1.398795***	0.1027	-1.398795***	0.2784
2008	-2.740339***	0.1866	-2.740339***	0.6092
2009	-7.043619***	0.4845	-7.043619***	1.2352
2010	-0.0047462	0.0678	-0.0047462	0.6290
2011	-2.978206***	0.1976	-2.978206***	0.9662
firm				
Do It Best	0.2750663***	0.0286	0.2750663***	0.0081
True Value	0.0166721	0.0281	0.0166721***	0.0045
cut off 1	-62.98474	3.4181	-62.98474	24.7915
cut off 2	-61.14714	3.4169	-61.14714	24.9573
cut off 3	-59.81753	3.4161	-59.81753	25.0316
cut off 4	-58.60223	3.4155	-58.60223	25.1455

Table 30: Ordered logistic regression, corporate subset *Dependent variable: number of stores firm has in county*

Ν	Robust SE 18404		Clustered SI 1840	E , by firm 4
	Coefficient	SE	Coefficient	SE
population density	0.0009025	0.0002385	0.0009025	0.0004588
population	0.0000733	2.38E-06	0.0000733	0.0000166
per capita income	0.0000456	9.01E-06	0.0000456	0.0000202
CPI	0.0070274	0.0073689	0.0070274	0.0096262
own to rent ratio	-0.4718474	0.0403532	-0.4718474	0.1614176
construction est.	0.0035314	0.0006634	0.0035314	0.0011848
median year built	0.0294872	0.0039728	0.0294872	0.0052782
median rent	-0.0013349	0.0003495	-0.0013349	0.0015686
median number of				
rooms	-0.2343328	0.089861	-0.2343328	0.1168877
ln(lag coop)	-0.4194911	0.0495641	-0.4194911	0.1823167
ln(lag corp)	-1.210726	0.1131117	-1.210726	0.0922192
units permitted	0.0008934	0.0003486	0.0008934	0.0004489
value of permits	-7.12E-09	2.01E-09	-7.12E-09	9.16E-10
fuel	-0.8461923	0.7832863	-0.8461923	0.508264
distribution center	-0.0008437	0.0003559	-0.0008437	0.0017161
retail wage	0.002669	0.0005343	0.002669	0.0000571
year				
2007	0.3235347	0.1995012	0.3235347	0.2827076
2008	0.5600936	0.3532624	0.5600936	0.4883321
2009	1.204622	0.9091352	1.204622	0.9752536
2010	0.1679867	0.1410911	0.1679867	0.368639
2011	0.5912112	0.3747875	0.5912112	0.6670038
firm				
Lowe's	0.520715	0.0531258	0.520715	0.0296065
cut off 1	60.85517	8.284348	60.85517	5.837754
cut off 2	65.84727	8.286532	65.84727	5.503046

Robust SE								
VARIABLES	<i>0 Stores</i> Predict. prob.	<i>1 Store</i> Predict. prob.	2 Stores Predicted prob.	<i>3 Stores</i> Predict. prob.	4 Stores Predict. prob.			
population density	0.000149***	-0.000108***	-2.87e-05***	-8.37e-06***	-3.71e-06***			
	(0.0000307)	(0.0000223)	(0.0000059)	(0.00000173)	(0.000000773)			
population	-6.77e-06***	4.92e-06***	1.30e-06***	3.80e-07***	1.68e-07***			
	(0.00000256)	(0.00000019)	(0.000000522)	(0.0000000179)	(0.0000000927)			
per capita income	-8.17e-06***	5.94e-06***	1.57e-06***	4.59e-07***	2.03e-07***			
	(0.0000087)	(0.00000634)	(0.000000169)	(0.000000503)	(0.000000231)			
CPI	0.00397***	-0.00289***	-0.000764***	-0.000223***	-9.87e-05***			
	(0.000726)	(0.000528)	(0.00014)	(0.0000413)	(0.0000185)			
owned/rented units	-0.00185	0.00134	0.000356	0.000104	0.000046			
	(0.00278)	(0.00202)	(0.000535)	(0.000156)	(0.0000691)			
construction establishments	-0.00155***	0.00112***	0.000298***	8.68e-05***	3.84e-05***			
	(0.0000701)	(0.0000516)	(0.0000141)	(0.00000457)	(0.0000234)			
median year structure built	0.00557***	-0.00405***	-0.00107***	-0.000313***	-0.000139***			
	(0.000325)	(0.000238)	(0.0000643)	(0.0000201)	(0.00000958)			
median rent	0.000181***	-0.000132***	-3.49e-05***	-1.02e-05***	-4.51e-06***			
	(0.00003)	(0.0000218)	(0.0000058)	(0.00000171)	(0.00000762)			
median number of	0.0807***	-0.0587***	-0.0155***	-0.00453***	-0.00201***			
	(0.00745)	(0.00543)	(0.00145)	(0.000437)	(0.000201)			
ln(lag cooperative stores)	0.0431***	-0.0313***	-0.00830***	-0.00242***	-0.00107***			
	(0.00492)	(0.00359)	(0.000953)	(0.000283)	(0.000127)			
ln(lag corporate stores)	0.183***	-0.133***	-0.0353***	-0.0103***	-0.00455***			
	(0.00982)	(0.00721)	(0.00194)	(0.000617)	(0.000309)			
units permitted	-0.000271***	0.000197***	5.22e-05***	1.52e-05***	6.75e-06***			
	(0.0000435)	(0.0000317)	(0.00000841)	(0.00000248)	(0.00000111)			
value of permits	2.47e-09***	-1.79e-09***	-4.75e-10***	-1.39e-10***	-6.14e-11***			
	(0.00000000258)	(0.00000000188)	(0.000000000501)	(0.0000)	(0.0000)			
fuel	-0.945***	0.687***	0.182***	0.0531***	0.0235***			
	(0.0779)	(0.0569)	(0.0151)	(0.00463)	(0.00216)			
Distance to dist. center	8.02e-05***	-5.83e-05***	-1.54e-05***	-4.51e-06***	-1.99e-06***			
	(0.0000121)	(0.00000881)	(0.0000234)	(0.00000689)	(0.00000314)			
retail wage	0.000102*	-7.42e-05*	-1.97e-05*	-5.74e-06*	-2.54e-06*			
	(0.0000524)	(0.000038)	(0.0000101)	(0.0000295)	(0.00000131)			
Observations	46010	46010	46010	46010	46010			
Standard erro	Standard errors in parentheses. All predictors at their mean value. *** p<0.01, ** p<0.05, * p<0.1							

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Table 31: Marginal	effects at the	means for	ordered I	logistic	regression,	robust SE

	Clustered SE, Firm						
	0 Stores	1 Store	2 Stores	3 Stores	4 Stores		
VARIABLES	Predict. prob.	Predict. prob.	Predict. prob.	Predict. prob.	Predict. prob.		
population density	0.000149	-0.000108	-0.0000287	-0.00000837	-0.00000371		
	(0.000143)	(0.000101)	(0.0000296)	(0.0000854)	(0.00000383)		
population	-6.77e-06**	4.92e-06**	1.30e-06***	3.80e-07***	1.68e-07**		
	(0.0000263)	(0.0000208)	(0.000000413)	(0.000000141)	(0.000000731)		
per capita income	-8.17e-06***	5.94e-06***	1.57e-06***	4.59e-07***	2.03e-07***		
	(0.00000132)	(0.00000106)	(0.00000267)	(0.000000122)	(0.000000743)		
CPI	0.00397	-0.00289	-0.000764	-0.000223	-0.0000987		
	(0.00431)	(0.00306)	(0.000884)	(0.000258)	(0.000129)		
owned/rented units	-0.00185	0.00134	0.000356	0.000104	0.000046		
	(0.0162)	(0.0117)	(0.00317)	(0.000926)	(0.000411)		
construction establishments	-0.00155***	0.00112***	0.000298***	8.68e-05***	3.84e-05**		
	(0.00035)	(0.00023)	(0.0000956)	(0.0000286)	(0.0000171)		
median year structure built	0.00557**	-0.00405**	-0.00107*	-0.000313	-0.000139		
	(0.00268)	(0.00172)	(0.000652)	(0.000208)	(0.000106)		
median rent	0.000181	-0.000132	-0.0000349	-0.0000102	-0.00000451		
	(0.000123)	(0.0000838)	(0.0000265)	(0.00000845)	(0.00000437)		
median number of rooms	0.0807***	-0.0587**	-0.0155***	-0.00453***	-0.00201***		
	(0.0292)	(0.0238)	(0.0047)	(0.00111)	(0.000276)		
ln(lag cooperative stores)	0.0431**	-0.0313**	-0.00830***	-0.00242**	-0.00107**		
	(0.0175)	(0.0136)	(0.00287)	(0.000986)	(0.000494)		
ln(lag corporate stores)	0.183***	-0.133***	-0.0353***	-0.0103***	-0.00455**		
	(0.0526)	(0.041)	(0.00926)	(0.00319)	(0.00204)		
units permitted	-0.000271***	0.000197***	5.22e-05***	1.52e-05***	6.75e-06***		
	(0.0000812)	(0.0000635)	(0.0000155)	(0.00000377)	(0.0000258)		
value of permits	2.47e-09***	-1.79e-09***	-4.75e-10***	-1.39e-10***	-6.14e-11***		
	(0.00000000331)	(0.00000000222)	(0.00000000108)	(0.0000)	(0.0000)		
fuel	-0.945***	0.687***	0.182***	0.0531**	0.0235**		
	(0.265)	(0.169)	(0.0702)	(0.0228)	(0.0113)		
distance to distribution center	8.02e-05**	-5.83e-05*	-1.54e-05**	-4.51e-06***	-1.99e-06***		
	(0.0000391)	(0.0000313)	(0.00000613)	(0.00000145)	(0.000000446)		
retail wage	0.000102	-0.0000742	-0.0000197	-0.00000574	-0.00000254		
	(0.00012)	(0.0000832)	(0.0000253)	(0.0000778)	(0.00000357)		
Observations	46010	46010	46010	46010	46010		

Table 32: Marginal effects at the means for ordered logistic regression, clustered SE, by firm

Standard errors in parentheses.

All predictors at their mean value.

			Robust SE		
	0 Stores	1 Store	2 Stores	3 Stores	4 Stores
VARIABLES	Predicted prob.				
	_		_	_	
population density	0.000436***	-0.000193***	-0.000160***	-5.67e-05***	-2.65e-05***
	(0.0000579)	(0.0000262)	(0.0000212)	(0.0000761)	(0.0000363)
population	-4.29e-06***	1.90e-06***	1.57e-06***	5.59e-07***	2.61e-07***
	(0.00000331)	(0.000000149)	(0.00000123)	(0.000000461)	(0.000000229)
per capita income	-7.73e-06***	3.42e-06***	2.83e-06***	1.01e-06***	4.70e-07***
	(0.00000112)	(0.00000502)	(0.000000413)	(0.000000148)	(0.000000706)
CPI	0.00546***	-0.00242***	-0.00200***	-0.000710***	-0.000332***
	(0.000969)	(0.000432)	(-0.000355)	(0.000128)	(0.0000602)
owned/rented units	-0.0224***	0.00990***	0.00819***	0.00291***	0.00136***
	(0.00339)	(0.0015)	(0.00125)	(0.000452)	(-0.000213)
construction establishments	-0.00211***	0.000933***	0.000771***	0.000274***	0.000128***
	(0.0000993)\	(0.0000461)	(0.0000384)	(0.0000148)	(0.00000797)
median year structure built	0.00895***	-0.00396***	-0.00328***	-0.00116***	-0.000544***
	(0.000405)	(0.000193)	(0.000155)	(0.0000608)	(0.0000318)
median rent	0.000208***	-9.22e-05***	-7.62e-05***	-2.71e-05***	-1.27e-05***
	(0.0000372)	(0.0000165)	(0.0000137)	(0.0000049)	(0.000023)
median number of rooms	0.0936***	-0.0415***	-0.0343***	-0.0122***	-0.00569***
	(0.00933)	(0.00419)	(0.00345)	(0.00126)	(0.000607)
ln(lag cooperative stores)	0.0295***	-0.0130***	-0.0108***	-0.00383***	-0.00179***
	(0.00617)	(0.00275)	(0.00226)	(0.000807)	(0.000377)
ln(lag corporate stores)	0.138***	-0.0610***	-0.0504***	-0.0179***	-0.00837***
	(0.0118)	(0.00532)	(0.00437)	(0.00161)	(0.000807)
units permitted	-0.000288***	0.000128***	0.000105***	3.75e-05***	1.75e-05***
	(0.0000561)	(0.000025)	(0.0000206)	(0.0000736)	(0.0000348)
value of permits	3.06e-09***	-1.35e-09***	-1.12e-09***	-3.98e-10***	-1.86e-10***
	(0.00000000353)	(0.00000000158	(0.0000000013)	(0.0000)	(0.0000)
fuel	-1.432***	0.634***	0.524***	0.186***	0.0870***
	(0.103)	(0.0469)	(0.0383)	(0.0144)	(0.00714)
distance to distribution center	8.45e-05***	-3.74e-05***	-3.09e-05***	-1.10e-05***	-5.14e-06***
	(0.0000144)	(0.0000644)	(0.0000053)	(0.00000189)	(0.00000906)
retail wage	0.000229***	-0.000102***	-8.39e-05***	-2.98e-05***	-1.39e-05***
Observations	27606	27606	27606	27606	27606

Table 33: Marginal effects at the means for ordered logistic regression, cooperative subset

Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

NOTE: All predictors at their mean value.

		Robust SE		
	0 Stores	1 Store	2 Stores	
VARIABLES	Predicted prob.	Predicted prob.	Predicted prob.	
	1	1	1	
population density	-5.94e-05***	5.89e-05***	4.66e-07***	
F ·F ······	(0.0000158)	(0.0000157)	(0.00000159)	
population	-4.82e-06***	4.79e-06***	3.79e-08***	
I I I I I I I	(0.00000174)	(0.00000173)	(0.0000000746)	
per capita income	-3.00e-06***	2.97e-06***	2.36e-08***	
I I I I I I I I I I I I I I I I I I I	(0.00000587)	(0.00000582)	(0.0000000666)	
СРІ	-0.000462	0.000459	0.00000363	
	(0.000484)	(0.00048)	(0.0000388)	
owned/rented units	0.0310***	-0.0308***	-0.000244***	
	(0.00247)	(0.00245)	(0.00005)	
construction establishments	-0.000232***	0.000230***	1.82e-06***	
estuctionnents	(0.0000437)	(0.0000434)	(0.00000476)	
median year structure built	-0.00194***	0.00192***	1.52e-05***	
	(0.000256)	(0.000254)	(0.0000354)	
median rent	8.78e-05***	-8.71e-05***	-6.90e-07***	
	(0.0000227)	(0.0000225)	(0.00000225)	
median number of rooms	0.0154***	-0.0153***	-0.000121**	
	(0.00595)	(0.0059)	(0.0000518)	
ln(lag cooperative stores)	0.0276***	-0.0274***	-0.000217***	
	(0.0033)	(0.00328)	(0.0000494)	
ln(lag corporate stores)	0.0796***	-0.0790***	-0.000626***	
	(0.00739)	(0.00734)	(0.00013)	
units permitted	-5.88e-05**	5.83e-05**	4.62e-07**	
	(0.0000229)	(0.0000228)	(0.000000195)	
value of permits	4.68e-10***	-4.64e-10***	-0***	
	(0.00000000132)	(0.00000000131)	(0)	
fuel	0.0556	-0.0552	-0.000437	
	(0.0515)	(0.0511)	(0.000413)	
distance to distribution center	5.55e-05**	-5.51e-05**	-4.36e-07**	
	(0.0000232)	(0.000023)	(0.000002)	
retail wage	-0.000176***	0.000174***	1.38e-06***	
Observations	18404	18404	18404	

Table 34: Marginal effects at the means for ordered logistic regression, corporate subset

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

NOTE: All predictors at their mean value.

Table 35: Linear probability model, county fixed effects, cooperative subset *Dependent variable: present/not*

	Robust SE		Clustered SE, by firm	
Ν	27606		27606	
R squared	0.6798		0.6798	
	Coefficient	SE	Coefficient	SE
population density	0.0004304**	0.0001787	0.0004304*	0.0001357
population	0.0000148***	5.56E-06	0.0000148	5.83E-06
per capita income	-0.00000489	3.07E-06	-0.00000489*	1.50E-06
CPI	0.0002009	0.0029014	0.0002009	0.002932
own to rent ratio	0.0038892	0.0079075	0.0038892	0.0091825
construction est.	0.0003453	0.0002518	0.0003453***	0.0000332
median year built	0.007622***	0.0020741	0.007622***	0.0005735
median rent	-0.0002075**	0.0000831	-0.0002075*	0.0000552
median number of	0.050400544	0.00051.41	0.0504005*	0.015/050
rooms	0.0584397**	0.028/141	0.0584397*	0.0176252
In(lag coop)	-0.9145125***	0.0061001	-0.9145125***	0.0246829
ln(lag corp)	-0.078769***	0.0207997	-0.078769*	0.0185702
units permitted	-8.58E-06	0.0000499	-8.58E-06	0.0000326
value of permits	-2.28E-10	2.55E-10	-2.28E-10	8.79E-11
fuel	0.0342375	0.091205	0.0342375	0.0800666
distribution center	-0.0000949***	0.0000177	-0.0000949*	0.0000231
retail wage	-0.0000416	0.0001156	-0.0000416	0.0000646
year 2007	-0.0033651	0 0283588	-0.0033651	0 0440762
2007	-0.0425394	0.0551646	-0.0425394	0.0712823
2000	-0.0990286	0.1241823	-0.0990286	0.1412471
2009	-0.0990200	0.0534581	-0.0990200	0.0497742
2010	-0 1220697	0.0794253	-0 1220697	0.0968401
2011	-0.1220097	0.0774255	-0.1220077	0.0900401
firm				
Do It Best	-0.0295881***	0.0043347	-0.0295881***	0.001022
True Value	-0.0392977***	0.0043391	-0.0392977***	0.0005132
constant	-14.34218***	4.065129	-14.34218***	1.12469

Table 36: Linear probability model, county fixed effects, corporate subset *Dependent variable: present/not*

	Robust SE		Clustered SE, by firm	
Ν	18404		18404	
R squared	0.8506		0.8506	
	Coefficient	SE	Coefficient	SE
population density	-0.0010812***	0.0002404	-0.0010812*	0.0001639
population	0.000035***	4.55E-06	0.000035*	4.30E-06
per capita income	2.62E-06	1.75E-06	0.00000262*	3.67E-07
CPI	0.0139886***	0.0019119	0.0139886***	0.0002052
own to rent ratio	0.0109073***	0.0033409	0.0109073**	0.0008412
construction est.	-0.0003699*	0.000214	-0.0003699	0.00012
median year built	0.0007332	0.0011007	0.0007332	0.0011325
median rent	-0.000264***	0.0000496	-0.000264*	0.0000322
median number of rooms	0.0298197**	0.0151015	0.0298197*	0.0041911
ln(lag coop)	-0.0291995***	0.0075628	-0.0291995	0.0086984
ln(lag corp)	-1.206723***	0.0103636	-1.206723**	0.0785078
units permitted	-0.0001022**	0.00005	-0.0001022	0.0000176
value of permits	-0.00000000491*	2.63E-10	-0.000000000491*	5.16E-11
fuel	0.1462316**	0.0615221	0.1462316**	0.0091163
distribution center	-0.0000471**	0.000024	-0.0000471	0.0000157
retail wage	-0.0000538	0.0000673	-0.0000538	0.0000441
year				
2007	-0.0877103***	0.0190713	-0.0877103**	0.0037954
2008	-0.1939973***	0.0374143	-0.1939973***	0.0008011
2009	-0.3951564***	0.0843679	-0.3951564***	0.0041111
2010	-0.2021612***	0.0345733	-0.2021612**	0.0053746
2011	-0.3257116***	0.053449	-0.3257116***	0.0013135
firm				
Lowe's	0.013439***	0.0020244	0.013439	0.0025777
constant	-5.290656**	2.144749	-5.290656	2.373159

		County	Fixed Effects			
			Clustered	SE, by		
	Robust	SE	structu	ure	Clustered SE	, by firm
Ν	46010	1	4601	0	46010)
R-squared	0.7224	Ļ	0.722	24	0.7224	1
	Coefficient	SE	Coefficient	SE	Coefficient	SE
pop_dens	-0.0003335	0.0002	-0.0003335	0.0008	-0.0003335	0.0004
population	0.0000511***	0.0000	0.0000511	0.0000	0.0000511***	0.0000
population_corp	-0.00000224***	0.0000	-0.00000224	0.0000	-0.00000224	0.0000
percap_income	-0.00000558	0.0000	-0.00000558	0.0000	-0.00000558	0.0000
percap_income_corp	-0.00000692***	0.0000	-0.00000692	0.0000	-0.00000692*	0.0000
CPI	0.0192383***	0.0039	0.0192383**	0.0009	0.0192383**	0.0048
own_to_rent	0.0256309***	0.0089	0.0256309	0.0041	0.0256309**	0.0076
constr_est_~t	0.0006356*	0.0004	0.0006356	0.0004	0.0006356*	0.0003
year_built	0.0096631***	0.0024	0.0096631	0.0027	0.0096631***	0.0017
rent	-0.0006366***	0.0001	-0.0006366**	0.0000	-0.0006366***	0.0000
rooms	0.0937252***	0.0334	0.0937252*	0.0095	0.0937252***	0.0201
ln_lag_oth~op	-1.535692***	0.0112	-1.535692	0.4478	-1.535692***	0.2332
ln_lag_coop_corp	-0.5077022***	0.0091	-0.5077022	0.0853	-0.5077022***	0.0684
ln_lag_oth~rp	-1.145769***	0.0199	-1.145769	0.5053	-1.145769**	0.2680
ln_lag_corp_corp	0.1853572***	0.0190	0.1853572	0.0997	0.1853572*	0.0745
units_permi~d	-0.0000625	0.0001	-0.0000625	0.0000	-0.0000625**	0.0000
value_permits	-7.99E-10**	0.0000	-7.99E-10*	0.0000	-7.99E-10***	0.0000
fuel	0.129252	0.1227	0.129252	0.0327	0.129252**	0.0353
dist_center	-0.0001582***	0.0000	-0.0001582*	0.0000	-0.0001582**	0.0000
retail_wage	-0.0000747	0.0001	-0.0000747*	0.0000	-0.0000747	0.0001
year						
2007	-0.0945616**	0.0375	-0.0945616**	0.0041	-0.0945616	0.0447
2008	-0.2689689***	0.0733	-0.2689689**	0.0101	-0.2689689**	0.0629
2009	-0.5407638***	0.1660	-0.5407638**	0.0082	-0.5407638***	0.0846
2010	-0.3963109***	0.0711	-0.3963109*	0.0435	-0.3963109**	0.1107
2011	-0.5675648***	0.1054	-0.5675648**	0.0348	-0.5675648***	0.1196
corp	0.4627719***	0.0206	0.4627719**	0.0206	0.4627719***	0.0353
firm						
Do It Best	0.1103699***	0.0072	0.1103699	0.0204	0.1103699***	0.0105
Home Depot	-0.0243172***	0.0055	-0.0243172	0.0121	-0.0243172**	0.0071
Lowe's	0	(omitted)	0	(omitted)	0	(omitted)
True Value	0.0279609***	0.0070	0.0279609*	0.0037	0.0279609***	0.0020
constant	-22.41108***	4.7772	-22.41108	4.2780	-22.41108***	3.5987

Table 37: Linear probability model, county fixed effects *Dependent variable: number of stores firm has in county*

^{***} p<0.01, ** p<0.05, * p<0.1

Table 38: Linear probability model, county fixed effects, cooperative subset *Dependent variable: number of stores firm has in county*

N R squared	Robust SE 27606 0.7745		Clustered SE, by firm 27606 0.7745	
	Coefficient	SE	Coefficient	SE
population density	0.0009195***	0.0002524	0.0009195**	0.0001494
population	0.000023***	8.94E-06	0.000023*	5.76E-06
per capita income	-0.0000119***	4.64E-06	-0.0000119*	3.62E-06
CPI	0.0110679**	0.0052879	0.0110679	0.0082647
own to rent ratio	0.0157751	0.0121564	0.0157751	0.0138532
construction est.	0.0011006**	0.0004653	0.0011006	0.0004034
median year built	0.0113856***	0.0033467	0.0113856**	0.0017518
median rent	-0.0004544***	0.0001284	-0.0004544**	0.0000984
median number of				
rooms	0.0791652*	0.044946	0.0791652	0.0426536
ln(lag coop)	-1.801899***	0.0110953	-1.801899***	0.0408384
ln(lag corp)	-0.1653506***	0.0348184	-0.1653506**	0.0222938
units permitted	0.0000325	0.0000806	0.0000325	0.0000254
value of permits	-5.44E-10	4.61E-10	-0.00000000544**	1.05E-10
fuel	0.0428473	0.1617277	0.0428473	0.0511599
distribution center	-0.0001533***	0.0000316	-0.0001533**	0.000025
retail wage	-0.0000588	0.0001696	-0.0000588	0.000121
vear				
2007	-0.0600724	0.0500165	-0.0600724	0.0859991
2008	-0.1858686*	0.0979688	-0.1858686	0.1110064
2009	-0.3475757	0.2202178	-0.3475757	0.1342327
2010	-0.3258413***	0.0976893	-0.3258413	0.1972462
2011	-0.432247***	0.1423294	-0.432247	0.2066567
firm				
Do It Best	0 0981144***	0.0068196	0 0981144***	0.0016844
True Value	0.0255863***	0.0068288	0.0255863***	0.0005324
	0.0255005	0.0000200	0.0233003	0.0003324
constant	-23.04058***	6.595693	-23.04058**	4.84672

Table 39: Linear probability model, county fixed effects, corporate subset	
Dependent variable: number of stores firm has in county	

	Robust SE		Clustered SE, by firm	
N	18404		18404	
R squared	0.8501		0.8501	
	Coefficient	SE	Coefficient	SE
population density	-0.0013894***	0.0003319	-0.0013894**	0.0001075
population	0.0000361***	4.59E-06	0.0000361*	4.66E-06
per capita income	0.00000309*	1.80E-06	0.00000309*	2.88E-07
CPI	0.0146375***	0.0019582	0.0146375**	0.0004003
own to rent ratio	0.0109644***	0.0033908	0.0109644**	0.0004473
construction est.	-0.0003812*	0.0002175	-0.0003812	0.0000922
median year built	0.0004871	0.0011174	0.0004871	0.0005353
median rent	-0.0002765***	0.0000503	-0.0002765***	0.0000215
median number of rooms	0.0274385*	0.0153775	0.0274385***	0.0018628
ln(lag coop)	-0.0302012***	0.0077387	-0.0302012	0.0084592
ln(lag corp)	-1.226359***	0.0108439	-1.226359**	0.0806438
units permitted	-0.0001097**	0.0000503	-0.0001097	0.000023
value of permits	-0.00000000486*	2.64E-10	-0.00000000486**	3.21E-11
fuel	0.1495154**	0.0625043	0.1495154**	0.007287
distribution center	-0.0000431*	0.0000241	-0.0000431	0.0000162
retail wage	-0.0000744	0.0000694	-0.0000744	0.0000435
year				
2007	-0.0908884***	0.0195563	-0.0908884**	0.0021724
2008	-0.2008819***	0.0383248	-0.2008819**	0.0046821
2009	-0.4091206***	0.0862765	-0.4091206**	0.010908
2010	-0.2114961***	0.0354269	-0.2114961***	0.0024931
2011	-0.3389139***	0.0549519	-0.3389139**	0.0078252
~				
tirm	0.0140500***	0.0000650	0.0149502	0.000<470
Lowe's	0.0148592***	0.0020658	0.0148592	0.0026478
constant	-4.935/8**	2.171216	-4.93578	1.306908

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