

**How Do Industry Human Resource Practices Change?
The Impact of Competition on the Retail Food Sector**

by

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Abstract

The rise of supercenters and the entry of Wal-Mart into food retailing have dramatically altered the competitive environment in which many retail food stores operate. While a great deal of attention has been paid to the effects of changes in the competitive landscape on traditional food retailers' marketing and pricing tactics, less explored are the impacts on employees, and in particular on the hiring, promotion, and compensation policies adopted by businesses in the sector. Indeed, the encroachment of non-traditional food sellers with very different cost structures and human resource strategies onto the turf of more traditional supermarkets may have repercussions in the retail food industry not only for wages and job turnover, but also for the structure of internal labor markets within establishments and firms in the industry. In this study, we investigate whether increasing competition from non-traditional food sellers as well as consolidation among more traditional grocery stores affect human resource strategies in the retail food industry by examining survival patterns, employment trends, and compensation and promotion policies among establishments and firms in different, and often rapidly evolving, competitive atmospheres. We integrate information about establishments and firms as well as local area characteristics from the Economic Census and Business Register with data on workforce composition from the Longitudinal Employer Household Dynamics (LEHD) database.

Competition, Wages and Job Turnover in the Retail Food Sector

Introduction

The rise of supercenters and the entry of Wal-Mart into food retailing have introduced new ways of doing business into many service industries. Wal-Mart's flat management structure is as different an approach as are its pricing, marketing and distribution strategies. The sheer size of these new players and the influence of their business practices give rise to a number of questions. How does an industry's labor market adjust in response to such competitive shocks? Do existing firms revamp the way in which they hire, promote, and compensate employees? Or do firms with older ways of doing business simply contract and exit, and get replaced by newer firms that follow the new way of doing business?

The retail food industry is a particularly interesting industry to provide answers to these questions. Firms in the industry have traditionally operated with hierarchical and centralized human resources practices. Within the retail food sector, the majority of positions are relatively low-wage, there are not high levels of differentiation by skill, and a large proportion of workers are young and part-time. However, there has been rapid transformation in the industry in recent years in the form of declining unionization and technological change. Meanwhile, firms in the sector have faced increasing competition from non-traditional food sellers.

The case study literature has already provided a rich understanding how a few select firms in the industry have adjusted their human resources strategies in response to the competitive entry in retail food. This paper expands on this by providing a detailed empirical analysis of a very large longitudinal dataset on employers and employees combined with industry-specific understanding. The analysis builds upon the derived from case study research

to create new firm-level measures of firm hiring, promotion, and wage-setting practices and then longitudinally examines the adjustment of firms and workers over a five year period.

The paper is organized as follows. In the next section, we describe the supermarket industry, including recent trends in consolidation, technological adoption, and competition from non-traditional food retailers for consumers' food dollars. The following section discusses the relevant literature exploring firm survival, productivity, and internal labor markets. We then describe our data and measures of internal labor markets, followed by the empirical results and conclusion.

Background

Retail Food Industry

Over the past several decades, the retail food industry has undergone rapid transformation on a number of dimensions. Born in the early 1900s, supermarkets have evolved over time from small, independently owned full-service establishments to large, administratively centralized, horizontally and sometimes even vertically integrated self-service chains. The major transformation to what we now know as supermarkets occurred largely in the 1950s, with larger stores and expanded selection appearing alongside the growth of suburbia. One-stop shopping became a core principle in the industry as the role of women in society changed and food preferences shifted. The major players in the industry responded to the social changes by expanding their product selection and service variety, augmenting their hours of operation, and increasing store size (Walsh 1993).

In the 1980s, changes in the legal and regulatory environment as well as rising competition from both domestic and foreign sources compelled traditional supermarket chains to consolidate. What was once a highly fragmented and undifferentiated industry that had little

regional overlap began seeing more cross-region development. Two types of supermarkets developed during the period: those that compete on the basis of service and quality, and those that compete on the basis of price. The latter were often modeled in part on new entrants to the industry, including European hypermarkets and domestic mass merchandise discounters. As consolidation continued and establishment sizes increased, mom and pop stores were driven out of local markets, and the total number of stores declined, continuing a trend that began in earnest in the late 1970s (Seth and Randall 1999).

As competition from warehouse clubs, mass merchandisers, supercenters, convenience stores, restaurants, and others in the grocery arena heightened in the 1990s, supermarkets were forced to reevaluate many of the ways in which they conducted their business operations. Power balances between wholesalers and retailers as well as between retailers and workers are shifting in the once stable industry as supermarkets attempt to position themselves to survive in the face of changing competitive conditions. Improving the efficiency of their supply-chain and warehousing operations is one major topic that has come to the fore in the retail food industry (Larson 1997). Increasing concentration among retail food firms has provided them greater control over their suppliers and a better ability to manage their supply-chain relationships (Cotterill 1999). Technological change, including scanning technologies, computerized inventory-control methods and systematic tracking of customers' buying habits, have been "de-skilling" to the extent that they eliminate the need for some manual tasks within stores, but have also "up-skilled" some positions by requiring a greater degree of computer literacy and technical knowledge (Hochner et al. 1988, Walsh 1993).

Another aspect of business operations that supermarkets have had to confront is their human resource practices. Unions have traditionally held substantial sway in the industry;

indeed, in part because of union protection, supermarket jobs were among the most highly paid and highly coveted retail jobs only several decades ago (Hughes 1999). However, the 1980s saw major concessions by the unions (Hochner et al. 1988). During the decade, two-tier wage agreements proliferated in the industry; these agreements generally resulted in new hires being paid much less than more tenured workers. While supermarkets remain more unionized than most of the retail industry, unions' influence continues to fade as supermarkets adjust their hiring and promotion tactics to minimize costs while at the same time ensuring an adequate level of service for customers. In 1993, 25% of grocery store workers were unionized, down from 31% ten years earlier (Hughes 1999).

A major factor influencing productivity in food retailing is the emergence of new store formats and the associated pressure on labor productivity. Emerging competitive conditions in food retailing resulted in negative labor productivity growth over 1987-1999, the only two-digit retail sector reporting a decline. Consumers have shifted away from conventional grocery stores for food purchases, moving to superstores and hypermarkets. The number of grocery stores declined from 1987-1997 by 8% (in contrast to the increase for the overall retail sector noted by Jarmin, Klimek, and Miranda 2001) while overall store space increased. Sieling, Friedman, and Dumas (2001) comment on the wide range of new technologies and work processes designed to improve customer service that employees are expected to master. The introduction of continuous replenishment programs to control inventories, electronic data interchange, and computer assisted ordering, and standard bar codes have a positive effect on labor productivity. Food retailers continue to experiment with an expanded range of specialized services (ranging from delicatessens to specialized meat and fish departments to film developing to video rental). These

service offerings are more labor intensive and make additional demands on internal training and expertise of employees.

The interaction of all these factors – heightened competition, deunionization, technological change that has favored higher-skilled workers, changing consumer preferences, and evolving store formats and offerings – has had major impacts on employees in the supermarket industry. Within stores we have seen a more stark bifurcation into a large group of lower skilled jobs and a small group of more highly skilled positions (Hochner et al. 1988). The days when a 16-year old bagger might aspire to move up the job ladder within a store and eventually become a manager are all but gone. As store sizes have grown and formats have changed, supermarkets have in many ways become a whole number of stores under one roof. Firms have increasingly found it preferable to have people trained in management and personnel practices in top spots, even if those people are not entirely familiar with the nitty-gritty of everyday work in the lower-level jobs (Walsh 1993).

How do firms adjust?

Several different strands of the research literature have focused on the ways in which firms adjust their business practices. Caves (1998) summarized the extensive research on turnover and mobility of firms, most of which has concentrated on the manufacturing sector. Entry and exit are typically concentrated in the smallest size classes of firms so that the size distribution or concentration of firms is stable over time. Entering firms show a high degree of heterogeneity in their initial size when entering, reflecting both the structure of the entered market and their perceived management and production capabilities.

Work by Haltiwanger, Lane, and Spletzer (2001) has shown that firms in narrowly defined industries exhibit very different outcomes in terms of productivity, wages, growth, and

survival. These firms also exhibit very different choices in terms of technology, organizational structure, size, and factor mix. It is apparent that there is much heterogeneity and persistence in the ways firms produce and do business, and that learning and selection effects play large roles in these processes. They show that heterogeneity and persistence in productivity both extends to and is related to firm workforce composition. They suggest that the underlying source of these different outcomes is differences in firms' endowment of key factors such as technology, capital, organizational structure, and the ability of managers. Furthermore, they find that new firms that make mistakes in recognizing their initial endowment either adjust their workforce as they learn about their capabilities or exit through a competitive selection mechanism.

How do firms in the retail sector adjust?

Research in the adjustment of firms in the retail sector has focused on analyzing entry and exit patterns and the impact on productivity dynamics. Jarmin, Klimek and Miranda (JKM, 2001) examined firm entry and exit patterns in the U.S. retail sector from 1977 to 1997 using the Longitudinal Research Database at the U.S. Census Bureau. JKM highlight two interesting trends in the retail sector. While retail employment has increased dramatically and the number of retail establishments has grown, the number of retail firms has shown a slight decline. The driving force behind this trend is the growth in the size and number of establishments within multi-unit retail firms. The employment share of multi-unit retailers has increased rapidly since 1977, accounting for 67% of employment in the retail sector by 1997. Employment shares for multi-unit food and beverage stores, which exceed the average for the retail sector as a whole, actually declined slightly between 1992 and 1997 (from 77% to 74%). General merchandise stores, which initiated entry into food retailing during this period, exhibit even more highly

concentrated patterns in employment, with multi-unit stores accounting for 97% of paid employees.

JKM further examine cohorts of entering firms observed in five-year intervals between 1977 and 1997. New plants account for the overwhelming proportion of all new employment. Exit rates are high during the initial years after entry and the employment shares of cohorts decline even as the cohort gains experience. Firms that enter with new plant construction represent the most productive entrants, attaining the largest relative size among entrants, the highest survival rates, and the most stable employment shares. The general conclusion is that patterns of entry and exit in retail trade mimic those evident in the manufacturing sector. The role of firm diversification and new plant entrants and exits in the retail sector are relatively high compared to the manufacturing sector.

Foster, Haltiwanger, and Krizan (FHZ, 2002) develop productivity decompositions for the retail sector using the Census of Retail Trade. FHZ find that reallocation effects, which reflect shifts of inputs and outputs away from less productive to more productive establishments, have little effect on productivity growth in the retail sector. Net entry accounts for virtually all of labor productivity growth in retail so that, absent churning, retail trade would not exhibit any productivity growth. Exiting establishments are substantially less productive than incumbents while entering establishments initially attain about the same productivity as incumbents. FHZ acknowledge that organizational and structural changes in retail trade are driving the pace of entry and exit. A key contribution of this analysis is to identify the role of evolving firm managerial techniques and industry competitive conditions in influencing both reallocation among existing firms and entry and exit patterns.

Internal Labor Markets

ILMs are generally characterized by long-term employment relationships, and most hiring is done from within the firms for positions other than low-level “port-of entry” jobs. In firms with ILMs, wages are related to job characteristics and are relatively unresponsive to changes in the external labor market. Evidence supporting (though not proving) the existence of ILMs includes the persistence of firm wage differentials over time, the extent of upward mobility and returns to seniority within firms, and limited external hiring other than at ports of entry. Some studies find evidence that ILMs continue to play an important role in the economy, despite changes in market competition or deregulation (e.g., Groshen and Levine 1998). Other studies suggest that the external market exerts a strong influence on firms’ wage setting and promotion practices, and that firms have only a limited ability to set wages (e.g., Lazear and Oyer 2003, Bertrand 1999).

Evidence of ILMs in the retail sector as a whole is rather limited. The retail sector has lower levels of average pay, higher turnover, and less upward mobility than other sectors of the economy. Within the retail sector, however, supermarkets have, in the past, provided a subset of retail jobs that were better paid and provided some upward mobility, particularly in locations with more unionized stores. One recent case study found that while career ladders are less common than in the past, management training opportunities are still provided for workers without requiring specific educational credentials. This is consistent with the store stated goal of promotion from within (Hughes 1999). In general, however, while anecdotal stories abound of store managers and executives who have worked their way up, the actual level of upward mobility is constrained by the small number of managerial positions relative to the large number of entry-level jobs and by the lack of training opportunities. One study of supermarkets found that while department heads are often hired from within, store managers are not (Walsh 1993).

Over the past several decades, the predominant type of job in the supermarket industry has changed from a full-time, relatively well paid position (often unionized), to a job with irregular and part time hours, low pay, and few options for training and career advancement (Hughes 1999).

Other case studies of the service sector have suggested that there is a segmentation of the customer base that is, to some extent, mirrored in a segmentation of the job structure. Firms in the service sector may target their product and pricing strategies towards the high-end customer or to the mass market, with jobs in the high-end stores offering higher wages and promising better customer service (Bernhardt et al., 2001). However, retail industries including supermarkets are generally not known for innovative or high-performance human resources practices. Indeed, the typical food retailer maintains a hierarchical and centralized approach to labor (Ben-Ner et al., 1999). Ben-Ner et al. note that even though a higher percentage of food than nonfood firms utilized employee participation in decision-making in 1980, the pace of adoption of these practices in the 1980s and 1990s by non-food firms was much more rapid than for food firms. Similarly, survey information from The Supermarket Panel, an annual, nationwide survey of supermarkets that collects data on store characteristics, operating practices, and performance through The Food Industry Center at the University of Minnesota, highlights the limited role of human resource practices in the industry.⁷ King, Jacobson, and Seltzer (2002) calculate a human resource score from this survey which measures a store's adoption of human resource practices. Their index consists of four components: new employee training, key employee training, proportion of full-time employees, and the use of incentive-based and non-cash types of compensation. Conventional grocery stores score lower than stores in other format

⁷ Data collection procedures for the 2002 Supermarket panel are described in detail by King, Jacobson, and Seltzer (KJS, 2002) along with the development of a human resources (HR) score for individual stores.

categories across each component of the HR index. KJS summarize the link between HR practices and store performance by suggesting that the failure to adopt moderately progressive human resources practices can adversely affect firm performance. The limited evidence available suggests that there is heterogeneity in the wage and ILM structure in the retail food industry, and that firms may respond only sluggishly to changes in the external market.

Much of the empirical literature regarding supermarket responses to changing economic conditions has focused on firms' and establishments' pricing and marketing strategies. The effects of supermarket concentration on prices overall is not clear-cut (Cotterill 1986, Kinsey 1998b). Cotterill and Haller (1992) analyze entry patterns of the top 20 supermarkets in 129 MSAs between 1972 and 1981. Their findings suggest that there exist strategic barriers to entry in the retail food sector; controlling for a number of other factors, entry into a market is negatively related to market concentration.

A growing number of studies have examined the effects of changing product market competition on employment. Basker (2003) finds that the entry of Wal-Mart into an area has a positive short-run effect on retail industry employment at the county level that diminishes over time (but remains positive). Wholesale employment falls slightly in the aftermath of a Wal-Mart entry, which Basker attributes to Wal-Mart's vertical integration. However, in retail sectors where Wal-Mart does not directly compete, the company's entry has little effect on employment. This is taken as evidence that Wal-Mart merely substitutes for other retailers and does not create any agglomeration externalities. Basker recognizes that Wal-Mart Supercenters compete directly with grocery stores, but does not make an attempt to quantify their effects on grocers specifically.

Bertrand and Kramarz (2001) present evidence from the French labor market that suggests that greater product market competition in the retail industry promotes job creation. They show that regional zoning boards, which must approve the creation or expansion of any large retail store, often pose significant barriers to entry in the market, but that these barriers varied across regions and over time. They go on to estimate that these barriers, whether measured directly by approval rates or predicted by the political composition of boards, dampened retail employment growth. They conclude that product market competition may be critical in stimulating healthy employment growth.

Past empirical work has established a link between greater product market competition and the structure of the employment relationship. Bertrand (1999) finds that increased import competition reduces firms' ability and willingness to shield workers from external labor market conditions. Using exchange rate movements as proxies for import competition, Bertrand finds evidence that competition increases the sensitivity of wages to current unemployment and decreases the sensitivity of wages to the unemployment rate that prevailed at the time of hiring. Another study by Cannon et al. (2000) provides evidence that employers have become more flexible in compensation setting over the past two decades, arguing that increased competition, perhaps the result of globalization and greater reliance on contingent workers, have weakened implicit contracts between firms and workers.

Data

Evaluating the effects of changes in the competitive landscape on internal labor markets and worker outcomes in retail food requires a longitudinal employee-employer matched data set that incorporates detailed worker, establishment, and local area characteristics. The three main

data sets used in this study are the 1992 and 1997 Economic Censuses, the 2001 Business Register, and the Longitudinal Employer Household Dynamics (LEHD) database.

Establishment and firm characteristics as well as local area characteristics are derived from the Economic Censuses and from the Business Register.⁸ The Economic Census is conducted in years ending in “2” and “7.” In these universal surveys, which capture nearly all economic activity in the U.S., the Census collects highly detailed information at the establishment level regarding business operations. The surveys are tailored for particular industries in order to collect information relevant to specific sectors of the economy. For example, the Retail Economic Census collects information on floorspace and checkouts from establishments. The variables we gather for establishments from the 1992 and 1997 Economic Censuses include detailed industry category, total revenues, product lines, floorspace, employment, payroll, and age.⁹

The Business Register is comprised of administrative records, mainly from the Internal Revenue Service (IRS). The register also incorporates data from the Social Security Administration (SSA) and the Bureau of Labor Statistics (BLS). Information from the IRS, which is primarily at the EIN level, is supplemented with information from the Company Organization Survey to help fill in gaps for individual establishments within multi-unit EINs. The Business Register acts as a universe file to control questionnaire mailing and data processing for the Economic Censuses that are conducted every five years. Given its structure and function, the register contains a substantially shorter list of variables describing each establishment. The variables we gather for establishments from the 2001 register include detailed industry category, total revenues, employment, and payroll. Total revenues in many cases must be imputed.

⁸ See Appendix 1 and Appendix 2 for a more complete discussion of the Retail Economic Census and the Business Register data that are used in this paper.

⁹ We thank Ron Jarmin for kindly sharing his establishment/firm age database with LEHD for this research project.

We integrate this information with earnings and turnover data from the Longitudinal Employer Household Dynamics (LEHD) Program at the U.S. Census Bureau. We take advantage of a new LEHD database that enables us to match workers with past and present employers, together with employer and worker characteristics (Abowd, Lane, and Prevost 2000). This database consists of quarterly records of the employment and earnings of almost all individuals from the unemployment insurance systems of 29 US states in the 1990s and early 2000s.¹⁰ These type of data have been extensively described elsewhere (Haltiwanger, Lane, and Spletzer 2000), but it is worth noting that there are several advantages over household based, survey data. In particular, the earnings are quite accurately reported, since there are financial penalties for misreporting. The data are current, and the dataset is extremely large. Since the scope of the data is the full universe of employers and workers¹¹, movements of workers across earnings categories and across employers can be accurately tracked. Thus new measures of promotion, hiring, and wage setting practices can be created for each firm in the dataset, for each year in which the corresponding Economic Census data is also available. The Unemployment Insurance records have also been matched to internal administrative records containing information on date of birth, place of birth, race, and sex for all workers, thus providing limited demographic information. This study is also one of the first to exploit the geographic information that exists

¹⁰ As of March 2004, the partner states whose data were being processed were: CA, CO, FL, IA, ID, IL, KS, KY, MD, MN, MO, MT, NC, NJ, NM, OK, OR, PA, TX, VA, WA, WI, and WV. Additional partner states include: AR, DE, GA, MI, ND, and ME. This is an ongoing project and additional states are expected to join this program. Because of the sensitivity of these data it is worth noting that the data are anonymized before they are used in any Census Bureau projects, i.e. all standard identifiers and names are stripped and replaced by a unique “Protected Identification Key.” Only Census Bureau employees or individuals who have Special Sworn Status are permitted to work with the data, and there are serious penalties for disclosing the identity of an individual or business. Any research must be for statistical purposes only, and must be reviewed by the Census Bureau and other data custodians. Under Title 13 of the U.S. code, any breach of confidentiality can result in prosecution in which violators are subject to a \$250,000 fine and/or 5 years in jail.

¹¹ Stevens’ “Employment that is not covered by state unemployment insurance laws” LEHD TP 2002-16 describes coverage issues related to the LEHD database.

on the dataset. In particular, the physical location of each establishment is geocoded to the latitude and longitude level, as is the place of residence of each worker (from 1999 on).

For this study, LEHD data from three states were available that could be linked with the Economic Census and other sources noted above. Analysis is done at the county-SEIN level, which corresponds to an establishment except where a firm has more than one establishment within a county. In that case the data cannot be disaggregated to the establishment level. (We refer to the unit of analysis as an establishment in this paper, keeping in mind that in some cases there may be more than one establishment owned by the same firm in a county.)

For our analysis of county-SEIN level internal labor markets in the retail food industry, we focus on establishments classified as grocery stores (SIC 54111) and that have at least 15 full-quarter workers and 30 flow workers. Full-quarter workers are defined as workers who appear in quarter t , $t-1$, and $t+1$. Flow workers are defined as workers who appear in at least one quarter and, by definition, include but are not limited to full-quarter workers. In essence, flow workers are potentially more transient than full-quarter workers, and the distinction between the two is particularly important in the retail food industry given its high amount of churn. In placing these restrictions on employee counts, we balance the need to have establishments with sufficiently large employee bases to support internal labor markets against the need for a sufficient number of observations at the county level to make meaningful inferences.

Trends in the Retail Food Industry

This study focuses on traditional supermarkets and grocery stores as defined by SIC 54111, and examines how the wage structure and turnover for these establishments varies over time and in response to changing competitive conditions. Over the past decade, the competitive environment in food retailing has changed dramatically. Non-traditional food sellers, including

wholesale and warehouse membership clubs, supercenters, convenience stores and discount drug stores have been invading ground that traditional supermarkets have long claimed. Supercenters that carry a full line of groceries and general merchandise under one roof and that advertise “everyday low prices” (EDLP) are particularly menacing challenges to traditional supermarkets (Seth and Randall 1999).

Consolidation among grocery stores is rampant, and concentration among traditional supermarkets is high and rising. Table 1 presents concentration ratios for the industry over the past decade; the CR-4 represents the share of sales in a given area accounted for by the top four firms in that area, and the CR-10 is similarly defined for the top ten firms.

Table 1: Concentration Ratios Among Food Retailers

	1992	1997	2001
National			
CR-4	0.18	0.21	0.37
CR-10	0.32	0.39	0.56
Three-State Sample			
CR-4	0.36	0.42	0.55
CR-10	0.56	0.59	0.69

As Table 1 reveals, the top four grocery stores (SIC 54111) nationally captured about 37% of industry sales in 2001, and the top ten captured roughly 56%. Only a few years ago, the numbers were significantly lower; in 1997, the top four stores had 21% of sales, and the top ten 39%. Contrast that to 1992, when 18% of industry sales were in the hands of the top four supermarket firms, and 32% in the hands of the top ten. Similarly, in our three state sample, the top four grocery stores captured about 55% of industry sales in 2001, and the top ten captured roughly 69%. These shares are substantially higher than in the 1990s, when the top firms held significantly less sway in our sample.

Mass merchandise discount stores, supercenters, warehouse or wholesale membership clubs, and others have garnered a steadily increasing share of the retail food market, taking advantage of consumers' increasing preference for low-priced, convenient, one-stop shopping. Trends in the industry at the county level are presented in Table 2.

Table 2: County Level Statistics on Retail Food Employment and Competition

	National (N=3141)			Three-State Sample (N=260)		
	1992	1997	2001	1992	1997	2001
Means						
Number of Supermarkets	23.4	21.3	21.0	48.5	45.1	46.5
Supermarket Employment	745	789	808	1473	1518	1526
Supermarkets' Share of Grocery Sales	0.81	0.75	0.72	0.83	0.78	0.76
Clubs' Share of Grocery Sales	0.01	0.01	0.02	0.01	0.02	0.03
Discounters/Supercenter's Share of Grocery Sales	0.02	0.05	0.07	0.01	0.04	0.06
CR-4	0.87	0.89	0.91	0.83	0.85	0.88
Counties with CR-4 > 0.90	48%	58%	67%	36%	46%	53%
Herfindahl Index	3426	3867	4361	2854	3182	3555
Medians						
Number of Supermarkets	10	8	7	15	13	11
Supermarket Employment	207	215	210	336	378	352
Supermarkets' Share of Grocery Sales	0.83	0.78	0.75	0.84	0.8	0.78
Clubs' Share of Grocery Sales	0	0	0	0	0	0
Discounters/Supercenter's Share of Grocery Sales	0	0.02	0.04	0.01	0.03	0.04
CR-4	0.9	0.94	0.96	0.84	0.88	0.91
Herfindahl Index	2878	3276	3715	2388	2641	2953

The mean and median of each variable are provided due to the fact that a limited number of very large counties affect the means more so than the medians. Between 1992 and 1997, the median number of supermarkets per county nationwide fell from 10 in 1992 to 7 in 2001, while the average number dropped from 23.4 to 21.0.¹² As the number of firms in markets fell, industry

¹² This discussion is based on national trends, though the tables include the same measures for the three-state sample. The main difference between the sample and national data is that the sample contains more large counties,

sales became increasingly concentrated in the hands of a few major players. The median four-firm concentration ratio across counties rose from 0.90 to 0.96 between 1992 and 2001, while the average rose from 0.87 in 1992 to 0.91 in 2001. In 67% of counties nationwide, the CR-4 was greater than 0.90 in 2001, a large jump from the 48% of counties that had a CR-4 in excess of 0.90 in 1992. Consolidation in the supermarket sector occurred amidst significant declines in the share of grocery sales accounted for by traditional food sellers. In the average county, the share of grocery sales accounted for by supermarkets fell from 81% in 1992 to 72% in 2001.

Table 3 presents further evidence of the extent to which there has been consolidation in the grocery industry and expansion among mass merchandisers.

Table 3: County-Level Changes in Food Retail Sales and Store Types

	1992-2001	
	National (N=3141)	3-State Sample (N=260)
Number of Supermarkets		
Counties with Decline	69%	76%
Counties with No Change	14%	7%
Counties with Rise	17%	17%
Number of Mass Merchandisers & Supercenters		
Counties with Decline	4%	3%
Counties with No Change	66%	56%
Counties with Rise	30%	41%
Number of Warehouse Clubs		
Counties with Decline	1%	2%
Counties with No Change	90%	84%
Counties with Rise	9%	14%
Share of Grocery Sales Acct. for by Traditional Food Sellers		
Counties with Decline	72%	72%
Share of Grocery Sales Acct. for by Clubs, Merchandisers, & Supercenters		
Counties with Rise	56%	70%

so that there are more supermarkets and supermarket employment per county in the sample than the national average. The trends in shares of non-supermarkets are similar, however.

As Table 3 shows, in 69% of counties nationwide, the number of traditional supermarket or grocery store establishments fell between 1992 and 2001 (in 14% it remained the same). In contrast, in 30% of counties the number of mass merchandise discounters and supercenters rose (in only 4% did it fall) and in 9% the number of wholesale clubs rose (in only 1% did it fall). Counties experiencing declines in the number of supermarkets far exceeds the number experiencing rises; 69% of counties nationally witnessed the number of supermarkets fall between 1992 and 2001, whereas only 17% saw the number rise. Meanwhile, while 30% of counties nationally experienced a rise in the number mass merchandisers and supercenters between 1992 and 2001, only 4% saw a decline. This as 72% of counties watched the share of grocery sales accounted for by traditional food sellers fall and 56% saw the share accounted for warehouse clubs, mass merchandisers, and supercenters rise.

The climb in concentration in the retail food industry at the county level is striking. Larger chains continue to crowd out or acquire smaller, weaker rivals. However, consolidation among traditional food retailers does not directly translate into a less competitive atmosphere or fewer choices for consumers. In most areas, consumers continue to have a wide variety of options in procuring their groceries. Variety, however, is not coming from the sheer number of what we would consider traditional supermarket establishments, but rather from the growth of alternatives to these establishments. Indeed, external threats to the industry are in large part responsible for the recent trend toward consolidation within the sector.

Empirical Approach

Internal Labor Market Measures

The LEHD data enable us to measure different aspects of internal labor markets directly. Because we have universe data on workers within each firm, we can measure the key aspects –

promotion, hiring and the pattern of wage setting – identified by Lazear and Oyer (2003). Given that many internal labor market concepts are based on the way in which workers move up in a firm, we split the workforce into earnings quintiles, and describe each of these aspects vis-à-vis the quintiles. Clearly, the retail food industry is quite idiosyncratic in that many workers are part-time and transitional by choice, rather than career retail food workers – so for that reason, the analysis often focuses on the promotion and wage growth of workers who are in the second, rather than bottom, quintile.

There is a multiplicity of possible measures of internal labor markets. We choose two potential candidates for each of the dimensions – promotion, hiring, and wage-setting practices. The separate measures of promotion practices are the fraction of workers hired into the second earnings quintile in 1997 who are in higher quintiles by 2002, as well as the wage growth between 1997 and 2002 for workers hired into the second quintile. Hiring practices are captured by the turnover rate of all workers in the establishment, and the turnover rate of workers in the second earnings quintile. Wage-setting patterns in the firm are summarized by the median log earnings in the firm as well as the 90/10 earnings ratio. These measures are summarized for 1997 and 2002 in Table 4.

Table 4: Summary Statistics for ILM Measures

	1997	2002
Promotion Practices		
Worker Upward Mobility*	13.8%	14.3%
Worker Wage Growth**	25.5%	32.3%
Hiring practices		
Overall Turnover***	33.4%	20.8%
Turnover in Second Quintile	42.0%	27.3%
Wage setting practices		
Median Earnings	8.28	8.35
90/10 Ratio	1.78	1.66

Number of observations	1,060	1,083
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* Proportion of workers who were hired into second quintile five years prior who were in higher quintile

** Five-year average of wage growth of workers in second quintile

*** Turnover represents accessions plus separations divided by employment

An examination of the measures' summary statistics in Table 4 and the correlations in Table 5 reveals that each of these measures is related: there is substantial correlation across all the measures but one, worker wage growth

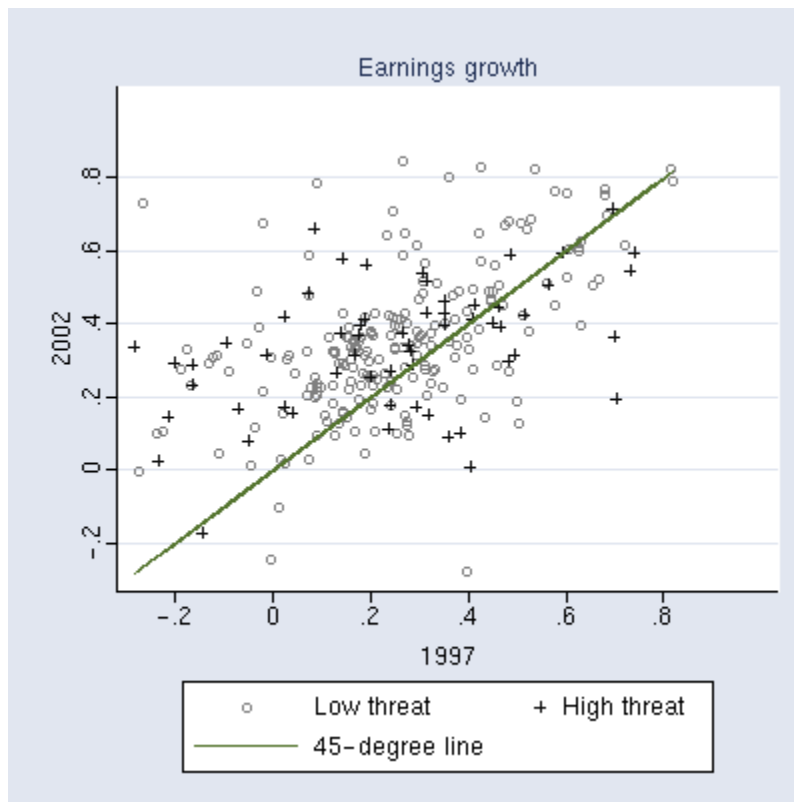
Table 5: Correlations Among ILM Measures

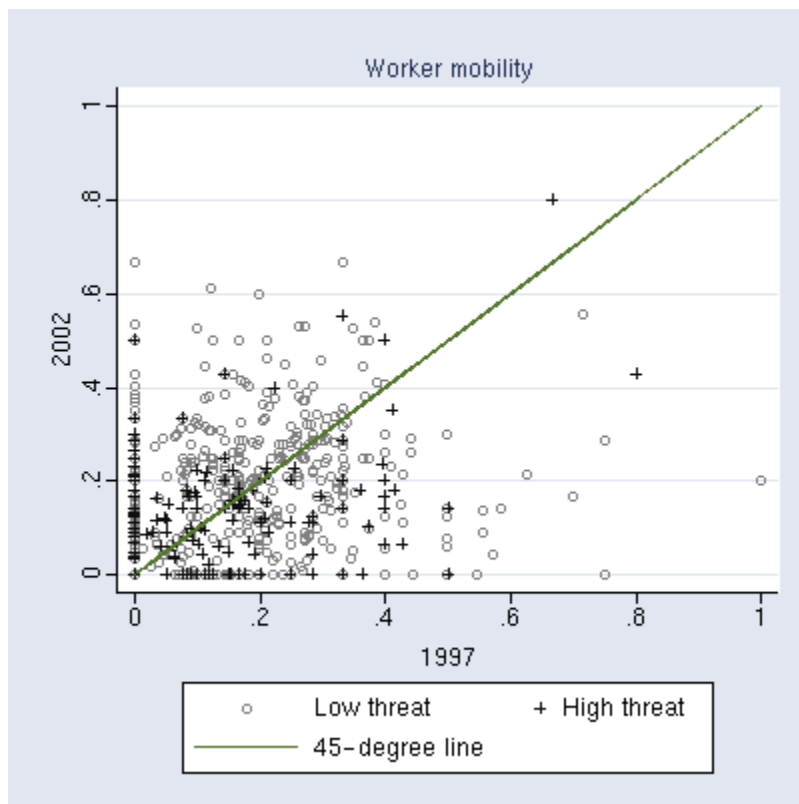
	Promotion Practices		Hiring Practices		Wage Setting Practices	
	Worker mobility	Worker wage growth	Overall Turnover	Turnover in 2 nd Quintile	Median 90/10 Earnings ratio	
Promotion Practices	1	1				
	.157*					
Hiring Practices	-.224*	-0.054	1	1		
	-.210*	-0.05	.866*			
Wage Setting Practices	.271*	0.08	-.270*	-.325*	1	
	-.120*	0.003	.277*	.264*	-.368*	1

A similar graphical examination that plots, for each establishment, the value of three of the ILM measures in 1997 and 2002, reveals that these measures are not random outcomes in each establishment. The first graph in figure 1 depicts earnings growth, measured as the log change in a worker's earnings from his first quarter of work. The second graph plots worker turnover, the accession rate plus the separation rate for workers in the 2nd quintile of the establishments wage distribution. The third graph shows the same type of graph for worker mobility, measured as the percentage of workers who were in the 2nd quintile five years earlier that have now risen to a higher quintile within the firm. Each of these graphs tells a similar story. Establishments appear

to make different human resource choices deliberately – there is a wide variation across each measure – and these choices are persistent as can be seen in the clustering of points around the 45° line.

Figure 1: Persistence of ILM Measures





A second perusal of Figure 1 above suggests that the threat of competition appears to have little impact on changes in human resource practices. Those establishments in competitive counties (marked with a + in the figure and defined as a county in which greater than 5% of grocery sales are from mass merchandisers) seem no more or less likely than those that have no competition (marked with a o in the figure and covering the remaining counties) to have changed their practices. The pattern of + and o's is evenly distributed above and below the 45-degree line. The lack of a pattern in changes in firm's human resource practices in reaction to the threat of mass merchandisers does not, however, imply that this threat has had no implications in the retail food industry. As the next section explores, there are other margins along which firms might be reacting.

What are the patterns of change due to firm and job reallocation?

Given that there is little change within firm's choice of human resource strategy, there are two other ways in which industry human resource practices can change. The first is through job reallocation: firms with one type of human resource allocation contract employment and other expand. The second is through firm reallocation: old firms using one type of human resource practices are replaced by new firms. Well-known examples of this in the retail industry abound – Wal-Mart's flat management structure came to dominate the retailing sector as stores and employment expanded to eclipse the much more hierarchical K-mart. We now turn to describing the potential role of external competitive threats – such as the entry of mass marketers, wholesale clubs, or other types of retail food competition – on the entry, exit, and employment growth of firms.

Since the major research question which we are interested in addressing is whether or not the advent of wholesale club stores or mass merchandisers affects human resource strategies in

the retail food industry, it is useful to summarize the multiple measures of ILMs created from the LEHD data into one index.¹³ For the purposes of this paper, we somewhat arbitrarily classify firms as having an internal labor market if they have the following set of characteristics: medium or low worker turnover; medium or high worker mobility; and medium or high wage growth AND at least one of these three measures is classified in the top third.¹⁴

Table 6 lists summary statistics for ILM and non-ILM firms. By definition, the ILM firms have lower turnover, a higher proportion of worker mobility (as measured by phq2) and higher within job earnings growth. In addition, ILM firms are larger and have a more highly educated workforce, as might be expected.

Table 6: Characteristics of ILM/Non-ILM establishments

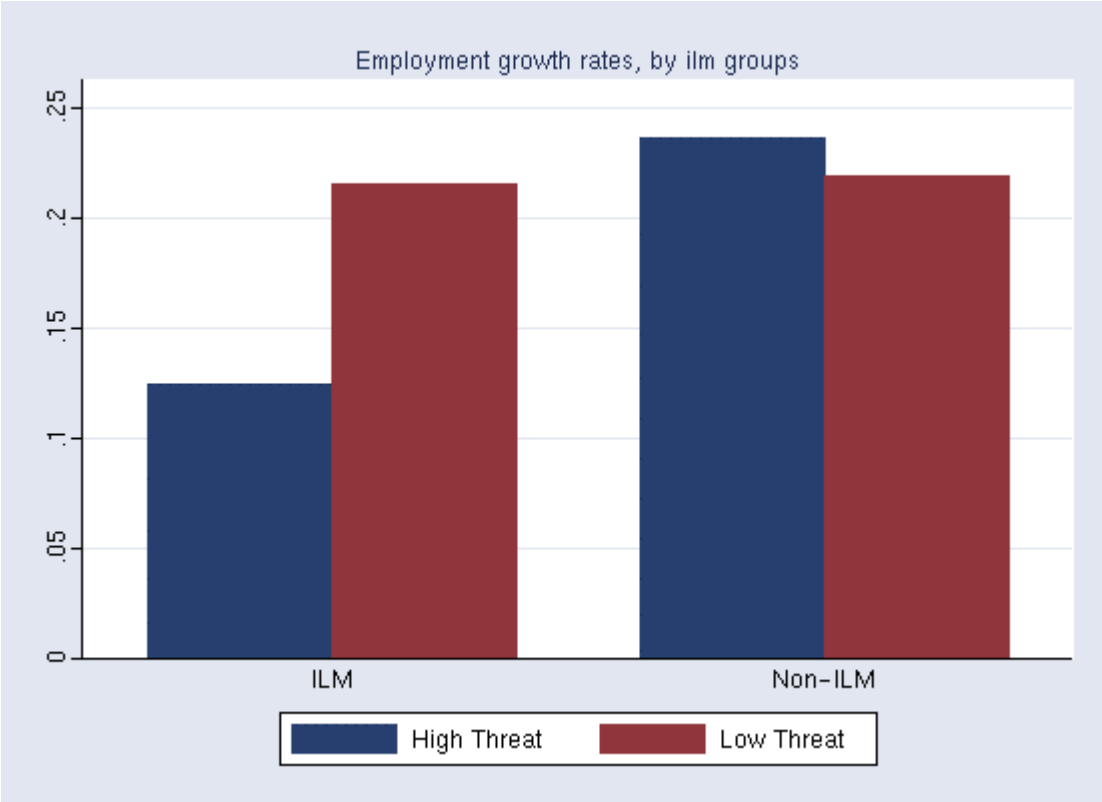
	1997	
	ILM	Non-ILM
Frequency	308	752
Total Employment	137,371	94,291
EIN-County Employment	446	125.4
Full-Quarter Worker Turnover (WTR_F)	17.0%	40.0%
Proportion of Workers in 2nd Quintile Moving in Higher Quintile (PHQ2)	23.2%	1.0%
Log Wage Growth of 2nd Quintile Workers (LEG2)	41.5%	17.6%
Fraction of Full-Quarter Workers with Education of 12 or Less (ED_1_F)	45.4%	49.8%
Fraction of Full-Quarter Workers with Education Between 12 and 16 (ED_2_F)	31.8%	30.4%
Fraction of Full-Quarter Workers with Education Greater than 16 (ED_3_F)	22.8%	19.8%

¹³ We plan in the next draft of the paper, to use the case study knowledge of the industry to classify certain firms into ILM/non ILM categories, and use a dichotomous model with these multiple measures as predictor variables. This will create less arbitrary classification weights. We will also create an “intermediate” classification for firms that cannot be clearly classified.

¹⁴ We separate each measure into thirds and classify them as low, medium, and high.

Figure 2 begins to demonstrate how increased competition from mass merchandisers affects the employment growth of ILM and non-ILM retail food stores differently. Firms that have ILMs appear to grow much slower in areas where there is a great deal of competition from mass merchandisers relative to firms with ILMs in regions with less competition. Meanwhile, non-ILM firms appear to do almost equally well in areas where there is a high degree of competition from non-traditional food sellers compared to areas where there is a relatively low degree of competition. These results suggest that differences in employment growth are more closely linked with the combination of the existence of an ILM and a strong competitive threat than they are with either factor alone.

Figure 2: Employment Growth Rates For ILM and non-ILM Firms



Establishments in areas where competition is relatively high also appear to have different survival rates than those that do not. Figure 3 shows five-year survival rates for both ILM and non-ILM firms according to whether or not they are in a high threat county. Clearly, ILM firms have higher survival rates than do non-ILM firms; however, survival rates drop from 80% if they are in a low-threat county to 60% if they are in a high threat county. For non-ILM firms, the difference between high and low threat counties is much smaller.

Figure 3: Survival Rates Among ILM Firms and Non-ILM Firms



Clearly these graphical and tabular results are only indicators of a possible pattern, since in general firms that we identify as ILMs are, relatively large and tend to have very different workforce compositions. We consequently run straightforward descriptive regressions that summarize the impact of a competitive threat (defined and introduced separately) on firm employment growth and survival.

Our empirical measure of competitive threat faced by grocery stores is the food sales shares of retailers outside of the grocery store industry. To allow for differential impacts of different kinds of competition, we further divide these sales shares into the shares of mass merchandisers, warehouse club stores, and other stores (which includes stores in SIC 54 other than grocery stores such as convenience stores and delis, as well as potentially restaurants and other retail establishments that sell grocery items). In Table 7 we report the estimates of several linear and probit regression model specifications that use these competition measures as predictor variables. Our dependent variables in these analyses are employment change and establishment survival. Further, separate estimates are obtained for ILM and non-ILM establishments that are reported in the odd and even columns of Table 7, respectively. The first two columns present estimates with no controls other than the competition measures and the concentration ratios. The final two columns contain estimates that further add controls for education level and the county unemployment rate. For the sake of clarity, we only present the coefficient estimates associated with the three competition threat variables and the concentration ratio.

Table 7: Regression Results

	(1) ILM	(2) Non-ILM	(3) ILM	(4) Non-ILM
	No Controls		County & Education Controls	
Regressions for employment change				
Mass Share	-0.119 (0.334)	-0.066 (0.711)	-0.082 (0.504)	-0.070 (0.696)
CR-4	-0.045 (0.866)	-0.349 (0.459)	0.151 (0.614)	-0.425 (0.384)
Club Share	0.213 (0.001)**	0.091 (0.500)	0.181 (0.009)**	0.070 (0.622)
CR-4	0.075 (0.770)	-0.345 (0.459)	0.284 (0.333)	-0.433 (0.373)
Other Share	-0.199 (0.010)*	-0.129 (0.289)	-0.147 (0.070)+	-0.142 (0.263)
CR-4	0.031 (0.905)	-0.313 (0.502)	0.137 (0.634)	-0.412 (0.395)

	(1) ILM	(2) Non-ILM	(3) ILM	(4) Non-ILM
	No Controls		County & Education Controls	
Probit regression on exit				
Mass Share	0.153 (0.066)+	0.054 (0.328)	0.115 (0.145)	0.020 (0.714)
CR-4	0.236 (0.220)	0.787 (0.000)**	-0.100 (0.630)	0.611 (0.000)**
Club Share	-0.125 (0.011)*	-0.155 (0.002)**	-0.076 (0.140)	-0.129 (0.014)*
CR-4	0.211 (0.245)	0.717 (0.000)**	-0.085 (0.674)	0.551 (0.001)**
Other Share	0.199 (0.000)**	0.161 (0.000)**	0.121 (0.022)*	0.134 (0.001)**
CR-4	0.233 (0.201)	0.727 (0.000)**	-0.019 (0.924)	0.577 (0.000)**

When we peruse the regression results presented in Table 7, we find that the effect of competitive threats is quite different by both type of threat, and what type of human resource management practices the establishment engages in. Briefly, non-ILM stores appear to neither suffer nor enjoy any employment changes as a result of the introduction of any of the three new types of retail chains – mass merchandise stores, wholesale clubs, or the other category. There do appear to be substantial, albeit contradictory effects of club stores and mass merchandising stores on ILM establishments – even after controlling for workforce characteristics.¹⁵ An increase in warehouse club store food sales share has a statistically significant positive effect on employment change for ILM establishments. On the other hand, increases in the shares of sales for mass merchandisers and other retailers that sell groceries have negative impacts on employment change for ILM establishments (albeit an insignificant one for mass merchandisers). One interpretation of the former result is that grocery stores compete with club warehouses by increasing the variety of goods offered or hours of operation, both of which necessitate increase in employment. Across the different specifications, for both non-ILM and ILM firms, higher concentrations of retail food establishments as measured by the four-firm concentration ratio have no effect on employment change.

Focusing on the second panel, both types of grocery stores, those with ILMs and those without, are less likely to exit with the entry of club stores into their market. An increase in the sales share of other retailers has the opposite effect on the exit rate of grocery stores, raising the probability exit by a significant amount for both firms with ILMs and those without ILMs. Entry of mass merchandisers also boosts the likelihood of grocery store exit for both ILM and non-ILM firms, although increases the likelihood of exit much more so for firms with ILMs than for firms without ILMs. This result complements the finding that ILM firms contract more than non-

¹⁵ The same results hold after controlling for size as well.

ILM firms when the threat posed by mass merchandisers is greater. A high level of concentration within the retail food industry helps predict exit of non-ILM firms, but has no significant effect on ILM firms. This result suggests that larger firms and ILMs are a successful strategy for competing against other grocery stores, even if they are not successful against non-traditional food retailers.

In sum, the results suggest that, within the grocery store industry, increased competition from other retailers and mass merchandisers increased the exit rate of all types of grocery store establishments. Among those that survive, employment grows less at firms threatened by mass merchandisers and other retailers that are invading the grocery arena than at firms that are not as threatened.

Conclusions and Future Directions

Despite rapid changes in the competitive landscape of food retailing in recent years, supermarkets and grocery stores do not appear to have made rapid adjustments in their human resource policies. While we find evidence of considerable heterogeneity in HR practices across retail food establishments, these practices are quite persistent even in the face of new external competition. Increased competition from other, non-traditional retailers such as mass merchandisers increased the exit rate of all types of grocery store establishments, and among those that survive, employment grows.

Technology, changing consumer preferences, and competition from non-traditional food retailers have led to major changes in supermarket operations, pricing and supply chain strategies over the past decade. Yet, in terms of human resource practices, these firms seem slow to respond to external forces. Our analysis of employer-employee matched data supports the

conclusions of case studies that find that, while HR practices vary among food retailers, these practices are quite persistent over time.

Establishments with ILMs, which are likely to be larger, more established firms, do appear to respond differently to competition than those without ILMs. ILM establishments in low-threat areas are much more likely to survive than ILM establishments in high threat areas or non-ILM establishments (regardless of the level of competitive threat). There is a significant positive effect on employment change for ILM establishments associated with increased warehouse club food sales, which may be due to stores increasing hours of operation or expanding product line in response to this form of competition. The effect of competition on supermarkets from warehouse club stores appears to differ from the threat of mass merchandisers, perhaps reflecting differences in product line, pricing, and marketing strategies between these types of retailers.

Two main future directions are planned. First, we plan to refine our categorization of retail food establishments into those with and without internal labor markets using additional sources of data from case studies. This approach will provide a less arbitrary classification scheme, and may also allow us to identify a group of stores that does not fit neatly into the ILM/non-ILM dichotomy. In addition, in future analyses we would like to expand the analysis to include more states, which would increase the sample size and provide more variation in the external competition measures. Further analyses to examine wage setting and hiring and promotion practices are also planned in order to provide more information on the variability and persistence of HR practices in the retail food industry. We plan to further investigate the differences between the various retail categories, and in particular what fraction of club warehouses, supercenters, etc. meet the definition of ILM in order to better explain the

relationship between ILMs and firm survival and growth. This work will contribute to our growing understanding of firm response to competitive market changes and particularly to the impacts of those adjustments on employees.

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Appendix 1: Retail Economic Census Data¹⁶

The Retail Economic Census is conducted in years ending in “2” and “7.” Data for each year is contained in three files that can be linked by establishment-level Census Form Numbers (CFNs). The main file is the base file, which contains the universe of establishments in the industry. Responses to questions asked to all establishments, including sales, payroll, employment, industry, and location, are housed in this file. Some responses to long-form questions are contained in the base file, such as top two product lines. However, most of the data collected from the long-forms are in the trailer and lines files. These files are constructed somewhat differently in each of the Census years, and this must be taken into account. The trailer file contains the answers to essentially all of the questions asked on the long form except for those asked on the short form and information about specific product line sales.

The extent to which we have valid responses to long-form questions varies substantially by SIC, with SICs dominated by smaller establishments having much lower response rates and SICs with larger establishments having much higher rates in general. The lines file contains information about product line sales for all establishments that receive the long form. Again, the extent to which we have responses to lines questions varies by SIC, with SICs dominated by smaller establishments having much lower response rates and SICs with larger establishments having much higher rates. I only take lines data when an establishment reports having grocery sales in particular (product code 0100 and its components). If lines data are reported and the grocery product code does not show up, then I assume grocery sales to be zero. I also incorporate an establishment age file created by Ron Jarmin at the CES. This file contains establishment years of birth and death (if applicable) and (parent) firm years of birth and death (if applicable). These two sets of variables are often one and the same.

The base, trailer, lines, and age data sets are combined to form one larger data set that captures all the relevant information we have about establishments in 1992 and 1997. There is one data set for each year. I first match this data with geographic data (by county) to get information about individual counties (population, whether in an MSA, etc.). I keep only establishments that are in SICs 52-59, and create the following dummies for the SICs in which we are interested:

54111 or 54115	Grocery Stores
54, not 54111, 54115, or 54116	Other SIC 54
(53993 or 53990) & (Employment \geq 100 or Payroll \geq 1mil)	Warehouse Clubs
(54112 or 54116) & (Employment \geq 100 or Payroll \geq 1mil)	Mass Merchandisers
(531122 or 54116) & (Employment \geq 100 or Payroll \geq 1mil)	Supercenters

We only have breakouts for 531121 (“Discount or Mass Merchandising Department Stores”), 531122 (“Supercenters”), and 54116 (“Supermarket/General Merchandise Combination Stores”) for 1997. In 1992, 531121 and 531122 are piled into 531120 (“Discount or Mass Merchandising

¹⁶ A more complete appendix describing both the Retail Economic Census and Business Register data used in this paper is available upon request.

Department Stores”) and 54116 is included with 541110 (“Grocery Stores”). Also, 541110 is the SIC for Grocery Stores in 1992 (541150 does not exist in 1992), and 541150 is the SIC for Grocery Stores in 1997 (541110 does not exist in 1997).

Using the national sample, I impute missing values for several variables of interest. First, I impute missing grocery sales lines figures. By 2-digit SIC, I regress (the natural log of) grocery sales on a quartic of (the natural log of) total sales, (the natural log of) payroll, (the natural log of) employment, and dummies for state, 6-digit SIC, whether the alpha operates in more than one state (0,1), whether the alpha operates in more than one county within a given state (0,1), whether the alpha operates more than one store within a given county (0,1), and whether the establishment operates year-round or not (0,1). Outside of SIC 53 and 54, I impose that, unless an establishment explicitly reports having positive grocery sales, establishments have zero grocery sales. For establishments in SICs 53 and 54, as long as predicted grocery sales are non-negative and do not exceed total sales, we use predicted grocery sales, using the posterior distribution of standard errors (i.e. we replace missing values by a predicted value plus a random residual).

For missing floorspace observations, we run the (the natural log of) floorspace on the same set of covariates listed above, but impute floorspace for establishments in all SICs 52-59. Using actual and predicted floorspace, we can calculate variables such as sales per square foot, share of sales from groceries, etc.

Finally, we compute a number of establishment-level, alpha-level, and county-level variables. For the county, we have the various concentration measures and competition measures.

Appendix 2: Business Register

Administrative records, mainly from the Internal Revenue Service (IRS) represent the foundation of the Business Register. The register also incorporates data from the Social Security Administration (SSA) and the Bureau of Labor Statistics (BLS). Information from the IRS, which is primarily at the EIN level, is supplemented with information from the Company Organization Survey to help fill in gaps for individual establishments within multi-unit EINs. The Business Register acts as a universe file to control questionnaire mailing and data processing for the Economic Censuses that are conducted every five years. Given its structure and function, the register contains a substantially shorter list of variables describing each establishment. The variables we gather for establishments from the 2001 register include detailed industry category, total revenues, employment, and payroll.

For each year, the business register consists of two files, the single-unit (SU) and multi-unit (MU) files. A host of special restrictions and caveats apply to each. I follow Foster (1999) in using the Business Register to construct a representative data set for analysis. Briefly, I take all active establishments (positive payroll) defined as retail (SICs 52-59) in 2001 from the SU (excluding submasters) and MU files, eliminating all ghosts and duplicates.

Sales data are missing for many SU and all MU records. Further, the specific content of this field varies somewhat depending on the type of income tax return filed by a business; it generally

refers to gross receipts or sales less returns and allowances. Information pertaining to the submasters on the SU file provides information about EIN-level sales for the establishments on the MU file. For multi-establishment EINs, for those where we have sales numbers on the SU file, I divvy up sales reported by EINs (all of which are reported on the SU file, no matter what the actual structure of the organization) by payroll shares. I do this for both current year sales (using current year payroll) and prior year sales (using prior year payroll). “Prior” year sales often do not correspond literally to the prior calendar year, but instead to sales reported on a fiscal-year basis and thus not at the same time as payroll and employment are reported. Payroll as opposed to employment shares are used because these data appear to be more reliable and less often imputed (1% for payroll as opposed to roughly 25% for employment according to CES documentation), and I assign zero weight to establishments designated corporate offices (i.e. corporate offices are assumed to have zero sales).

I impute sales figures in the business register where they are missing. For the regression-based imputation, as the left-hand side variable I use current year sales if it exists and prior year sales otherwise. I first take logs of all relevant variables. For the regressions, I also exclude the top and bottom 1% by 2-digit SIC of sales observations to help reduce the influence of outliers and focus on the “middle” of the distribution. By 2-digit SIC, I regress (the natural log of) sales on a quartic interaction of (the natural log of) payroll and (the natural log of) employment as well as dummies for state, 6-digit SIC, whether the alpha operates in more than one state (0,1), whether the alpha operates in more than one county within a given state (0,1), whether the alpha operates more than one store within a given county (0,1), and the legal form of an establishment (which might affect the way in which it reports sales). I also run a separate regression excluding employment. For all establishments, as long as predicted sales are non-negative, we use predicted sales, using the posterior distribution of standard errors (i.e. we replace missing values by a predicted value plus a random residual). At this point the sales numbers, particularly for establishments that are members of multi-unit EINS, are quite noisy.

To arrive at food & sundry sales, we apply the following shares to total sales by establishment:

Grocery Stores (54111 or 54115)	0.80
Other SIC 54 (54, not 54111, 54113, 54115, or 54116)	0.80
Gas/Convenience (54113)	0.50
Warehouse Clubs ((53993 or 53990) & (Employment \geq 100 or Payroll \geq 1mil))	0.61
Mass Merchandisers (Not Supercenters) (531121 & (Employment \geq 100 or Payroll \geq 1mil))	0.10
Supercenters ((531122 or 54116) & (Employment \geq 100 or Payroll \geq 1mil))	0.41

Finally, we compute a number of establishment-level, alpha-level, and county-level variables. For the county, we have the various concentration measures and competition measures.