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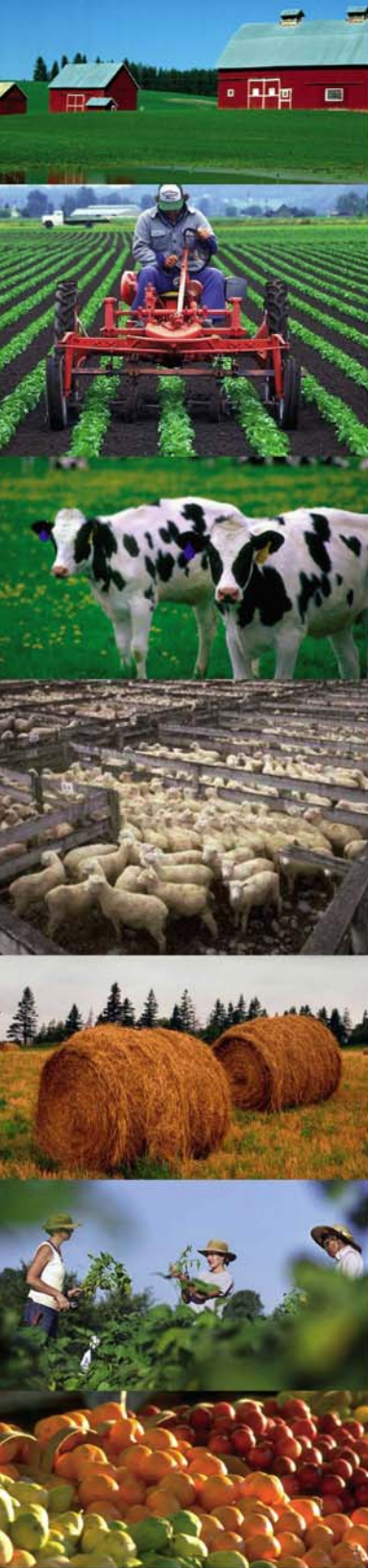
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FSRG Publication



Structural Changes in Food Retailing:

Six Country Case Studies

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**Food System
Research Group**



FSRG Publication, November 2009

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The authors thank Kate Hook for her editorial assistance.
Any mistakes are those of the authors. Comments are encouraged.

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Chapter 1: Introduction and Literature Review

Kyle Stiegert

1. INTRODUCTION

Since the 1990s, the progress of increased globalization and foreign direct investment (FDI) has altered considerably the economic landscape for most nations. These changes are noteworthy for the food retailing sector due primarily to the introduction and expansion of multinational, large scale food retailers. Consolidation of the food retailing sector has left many countries with only a handful of large-scale domestic and foreign retailers in dominant market positions. This has led to increased concern about the market power of food retailers, both as sellers and buyers. Consumers, farmers, food processors/manufacturers and other intermediaries in the food retail system often perceive limited options to confront this new and emerging market structure. The early stages of this trend began when large-scale European retailers such as Carrefour, Metro, and Tesco opened stores in overseas markets. In recent years, major US retailers like Wal-Mart and Costco also have been active in locating stores in foreign countries. The entrance of foreign retailers significantly affects the competitive structure among food retailers and the marketing system of host countries. It is, therefore, of considerable interest to investigate the internationalization process within food retailing. For selected countries, this book describes the characteristics and market structure of food retailing and analyzes factors affecting structural change, including the internationalization process.

2. OUTLINE OF THE BOOK

The book uses six country case studies to examine structural change in food retailing and its impact on agricultural producers and the national economy. Country case studies were selected to provide coverage of different continents and differing levels of national development. As developed countries, United States, Germany, and Australia represent North America, Europe, and Oceania. As newly industrialized countries, Korea and Brazil represent Asia and South America. Poland is included to represent a nation transitioning from a Soviet-style command economy to a capitalist one.

Each of the case studies presents a general trend toward a more concentrated food retailing structure. Although there are many differences among cases, the unmistakable march toward a food industry with dominant domestic and international food retailers is presented and discussed. The evidence to date indicates that these changes have not been translated into significant price hikes at the retail level. In many ways this is not surprising. In an effort to establish a market footprint, new entrants often compete on price terms, which may cause short-term periods of competitive conditions. However, once these markets settle into relatively stable structures, oligopoly firms are less apt to compete on price. While some cases provide empirical evidence of significant vertical market power exercised by concentrated food retailers, other country cases showed opposite or ambiguous results regarding this relationship.

Major findings from country case studies follow. In Germany, the most important structural change in food retailing during the last four decades is an increasing concentration of stores with a rising store size, combined with the growing role of discount stores. Consumers benefited from an intensive price competition despite the higher market shares of leading food retailers. The analysis of market conduct, in terms of price formation and pricing strategies, revealed a typical situation of imperfect competition. However, the German experience highlighted that increasing concentration in food retailing does not necessarily imply that more market power is exerted at the expense of consumers. Competitive markets can be associated with a high concentration level as long as a strong competitive fringe, e.g., discounters, challenges the large chains in food retailing.

In Australia, food retailing is highly concentrated. With strong takeover and merger activities, the two dominant supermarket groups (Coles and Woolworths) now control about 80 percent of grocery sales. The high market shares of the two dominant supermarket chains, and allegations of uncompetitive conduct in dealing with suppliers, has resulted in a number of government enquiries into the retailing sector. The major winners from this expansion of market share by the major chains were consumers, in terms of deregulated trading hours, greater product choice, lower prices, and the convenience of one-stop shopping. On the other hand, although there was little formal evidence, it was widely believed that large retailers have the capacity to exercise market power against input suppliers, including farmers, and that they use this market power to reduce input prices.

In Korea, the entrance of major global retailers facilitated rapid development of discount stores and large-scale retailers. The development of large-scale food retailers has significantly affected consumers, producers, and the overall food marketing system. As the number of stores operated by large-scale retailers has increased, more fresh food items are shipped directly from shippers in producing areas to the retailers. Consumers have apparently benefited from lower prices while agricultural producers have received higher prices. As the market shares of major supermarket and discount store chains increased sharply in recent years, food handlers and farmers have been concerned about market power exercised by dominant food retailers. Local shippers complain about trade practices of large-scale retailers, and, more fundamentally, are concerned about possible market power exercised by dominant large-scale food retailers.

The Brazilian retail sector has been concentrated since 1990. As a consequence, three firms have dominated the retail market. The increase in market concentration may strengthen firms' market power, allowing them to earn large profits. However, the intense process of turnover can coerce firms to seek efficiency as a growth strategy and may preclude them from using market power. The main issue is to identify which effect has prevailed in Brazilian retail. The empirical analysis carried out in this study as well as other empirical analyses using aggregated variables appear to indicate the prevalence of efficiency gains. In opposition, some studies that used less aggregated variables found support to the market-power hypothesis. In addition, the Brazilian experience suggests that

retailers use their market power mainly by means of transferring their costs to suppliers, which cannot be identified through price behavior. Several mechanisms are employed by retailers to obligate suppliers to be responsible for cost items that had traditionally been a retailer-incurred cost.

In Poland, structural change in grocery retailing has been particularly rapid given the transformation from a socialist to a market economy. In the first half of the 1990s, the number of stores increased sharply due to deregulation. In particular, the number of very small stores grew and then declined again, but nevertheless remained at a much higher level than under socialism. A parallel boom occurred in the case of large retail outlets, in particular hypermarkets and supermarkets. This positive development raised the overall sales area in Poland's retailing sector and was driven by high FDI from major European food-retailing chains. Thus, the Polish food-retailing system is characterized by a dual structure of small shops and a growing proportion of large store types. This development has been accompanied by increasing concentration ratios.

The US chapter contains a detailed historical view of food retailing trends, a discussion of major antitrust disputes, and a review of the current competitive condition. The US food retailing sector remains dominated by domestic chains but the advent of supercenters such as Wal-Mart has provided for significant restructuring. The top four retail chains control over half the US market. More importantly, many parts of the country are only served by one or two food retailers opening up the case for greater market power in those regions. While pricing patterns do not signal a major concern about market power in response to increased concentration, more research is needed to determine if any cost savings or gains from buyer power resulting from these structural changes are not passed to consumers in the form of lower prices.

3. IMPACT OF DOMINANT FOOD RETAILERS: REVIEW OF THEORIES AND EMPIRICAL STUDIES

3.1. Market Power vs. Efficiency

There are two opposite perspectives on the competition of food retailing industries. While one group of industrial organization scholars are concerned about the existence of market power of concentrated food retailers, industry people and the other group of scholars focus more on efficiency gain due to increased concentration.

In estimating retail market power, the traditional structure-conduct-performance (SCP) approach can be applied by aggregating prices of products sold in supermarkets into indices. These studies seek to explain the relationship between grocery prices and market structure variables along with demand and cost variables. Studies such as Hall et al. (1979), Lamm (1981), Newmark (1990), Marion et al. (1993), and Binkley and Conner (1998) have examined the relationship between average retail food prices and four firm concentration ratios, using cities as the unit of observation.

There are several cross-sectional empirical studies that show a significant positive relationship between industry concentration and prices charged by retailers. Using a market-basket price index of 94 branded food products (excluding meat and produce),

Marion et al. (1979) found that both four-firm concentration and firm market shares were positively related to the price index. In their study, retail concentration was measured based upon metropolitan-area sales concentration data. Cotterill (1986) verified these results for a sample of 35 stores in 18 mostly small, isolated Vermont towns and cities. Cotterill and Harper (1994) further verified positive concentration-price relationship for a sample of 34 local markets in and around Arkansas. Cotterill (1999) also reached similar conclusions as to the impacts of retailer concentration on food prices.

However, Kaufman and Handy (1989), studied 616 supermarkets chosen from 28 cities, found that both firm market share and a four-firm Herfindahl index were negatively but insignificantly correlated with price. Newmark (1990) also obtained a negative and insignificant coefficient on four-firm concentration in a study of the price of a market basket of goods for 27 cities.

Some researchers tried to prove the existence of food retailers' market power utilizing New Empirical Industrial Organization (NEIO) frameworks. Park and Weliwata (1999) developed an empirical model of the US food retailing industry examining industry competitive conditions and shifts in the index of market power. In this study in which industry demand function and marginal cost equation was jointly estimated, index of market power was estimated low although significantly different from zero over the period from 1983 to 1992 when mergers and acquisition were widespread in the food retailing industry.

Developing and estimating an empirical model of pricing behavior for food retail firms in France, Gohin and Guyomard (2000) reported evidence that French food retail firms did not behave competitively. They estimated that more than 20 and 17 percent of the wholesale-to-retail price margins for dairy products and meat products respectively, can be attributed to oligopolistic and oligopsonistic distortions.

In the case of produce, there are two studies to estimate monopolistic and monopsonistic power of retailers to producers using NEIO frameworks. Richards and Patterson (2003) examined retailer market behavior in the selling and buying of apples, oranges, grapes, and grapefruits. Sexton et al. (2003) examined the market for iceberg lettuce, packaged salads, and tomatoes.

These two studies estimated the degree of monopolistic and monopsonistic power based upon estimated costs of retailers and the retail data set containing weekly price and sales information on selected produce commodities. Retail data were obtained from Information Resources Incorporated for 20 retail grocery chains, operating in six metropolitan markets (Albany, Atlanta, Chicago, Dallas, Los Angeles, and Miami) over a two-year period (January 1998-December 1999). Within these regions, the data cover small, medium, and large supermarket retailers. Mass merchandisers, such as warehouse clubs and supercenters, are not represented.

The results of these two empirical studies can be summarized as follows. Consumer prices in excess of competitive prices were evident for Washington state apples, California oranges, Florida grapefruit, California fresh grapes, California and Florida tomatoes, and California and Arizona iceberg lettuce. Retailers' ability to hold shipper prices below

competitive prices were found in Florida grapefruit, Washington state apples, and iceberg lettuce, but not for California and Florida tomatoes, California grapes, and California oranges.

Contrary to academics' concern about market power of concentrated retailers, there is widespread agreement within food retailing that competition has intensified in recent decades (Food Marketing Institute, 2005 and Deloitte, 2005). Rationale is as follows. They point to the more than a dozen types of retailers that vie for market share. Food retailers today include conventional supermarkets, superstores, natural and organic outlets, limited assortment stores, convenience stores, farmers markets, internet shopping, and gasoline/convenience stores. The competition with food service, including fast foods, has also intensified as 45 percent of food expenditures are spent on food service. The growth of the US population is minimized, so food retailers can grow only by taking business away from competitors. Industry margins are so thin that several food chains have gone bankrupt. While these are reasonable and predictable reactions from the owners of food industry capital, they are not sufficient to insure the public that food markets are structured to always provide the best prices and qualities. Firms exit the market for many reasons, and the effect of a market exit may be to the detriment of consumer welfare. While having differentiated retail formats may lead to greater competition, differentiation as a rule is a source of market power.

3.2. Vertical Relationship between Food retailers and Food producers: Vertical Restraints, Fees and Services Enforced by Retailers

Fees and Services

There have arisen many concerns about the growing unbalanced relationship between large-scale food retailers and agricultural producers/processors as food retailers consolidate. Retail buyer power can drive procurement prices lower leading greater consolidation in food processing, lower farm prices, and lower land values. In dealing with the issues related to consolidation in food retailing and dairy, Hendrickson et al. (2001) addressed negative aspects of food retailing concentration as follows. Because of consolidation, retailers are now in a position to dictate terms to food manufacturers who then force changes back through the system to the farm level. Perhaps 50-75 percent of the total net profit for large retailers comes from retailer fees from slotting allowances, display fees, presentation fees, "pay-to-stay" fees and failure fees.

As the balance of power shifts to retailers, smaller entities in all parts of the food system are placed at a disadvantage. The retailer fees in place at most of the larger retail stores present barriers to smaller processors and/or farmers wishing to place products on the retail shelf. Such restructuring presents critical problems for consumers and communities in inner urban and rural areas that are no longer profitable for global food clusters.

The US House of Representatives (1999) also raised concern about consolidation among agribusiness, questioning the economic viability of small farms and rural communities threatened due to horizontal mergers and acquisitions among food marketing

firms, and vertical integration among handlers and producers. Among issues related to consolidation among food marketing firms, one central issue is the slotting fee charged by grocery chains to food manufacturers. Defined as a lump sum, upfront payment that a food manufacturer must pay to a supermarket for access to its shelves, the slotting fee has been controversial, is it anticompetitive or not?

The slotting fee itself is lawful unless it is a form of commercial bribery. It can be regarded as an ordinary price discount that is likely to be passed through to consumers if retail market is competitive. Although the slotting fee is anticompetitive in the sense that it could block the sales of small manufacturers through exclusive arrangement, it is argued that industry concentration matters when explaining the characteristics of the slotting fee. If retailers are competitive, it is more likely that an exclusive agreement is not harmful for consumers.

Agricultural producers are basically against slotting fees. Fresh fruit and vegetable producers regard slotting fees as off-invoice fees which reduce prices paid to producers as a result of the buying group's market power. Producers also think that slotting fees and off-invoice payments to secure business relationships result in reducing consumer choice and access to produce. Today, produce companies are being asked by some retailers to pay flat fees apart from the invoice costs just to continue to do business. These rebates and allowances were once tied to promotions, advertising and sampling programs; today they are more likely to be flat fees unrelated to any incentives or performance. Small- to medium-sized grower-shippers are particularly vulnerable to these demands, but even the largest produce companies are concerned about such practices.

Besides fresh food producers, processed food producers see slotting fees as anticompetitive practices that raise retail prices and limit consumer choices. They also argue that slotting fees make it hard for producers to increase product lines.

However, retailers justify the existence of slotting fees in highly competitive market conditions. They regard slotting fees as inevitable since producers are competing for limited shelf space and there are costs and risks of introducing new products, such as unsold items, warehouse slots, and category management. Retailers also recognize that small producers began complaining about slotting fees as they lost competitiveness in the market in terms of quality, variety, and competitive pricing.

To better understand trade practices between retailers and shippers in the marketing of fruits and vegetables, Economic Research Service (ERS) of USDA and its cooperators conducted personal interviews with shippers, supermarket retailers, and wholesalers (Calvin et al., 2001). Produce-marketing, retailer-shipper agreements traditionally centered on quantity and price considerations, and now more off-invoice marketing and trade practices are included in retailer and shipper transactions. Trade practices cover both fees (such as volume discounts and slotting fees) and services such as automatic inventory replenishment, special packaging, and requirements for third-party food safety certification. Trade practices also refer to the overall structure of a transaction such as long-term relationships or contracts versus daily sales with no continuing commitment. The specific provisions of transactions between buyers and sellers are, however, not open

to the public. By surveying shippers, wholesalers, and retailers, this study compared trade practices in 1999 with those prevalent in 1994.

The study indicated that most shippers believed that the number of retail customers had declined, and the majority viewed this as harmful. With declining retail customers, most shippers thought they had less negotiating power and were more fearful of losing accounts if they did not comply with buyer requests. In terms of marketing channels, it was shown that the share of sales to conventional retailers was either stable or declining for all products, and the share of shipper sales to mass merchandisers increased across all commodities. While the total number of buyers may not have changed much for most shippers over the last five years, the importance of the largest buyers has increased slightly. In the case of vertical coordination methods, it was reported that using contracts was becoming more common, while daily sales and advance sales declined.

The study also reported that the incidence and magnitude of fees and services associated with transactions had increased from 1994 and to 1999. Fees paid to retailers are usually around 1 percent of sales for grapes, oranges, grapefruit, and tomatoes, and range from 1 to 8 percent for bagged salads. Forty-eight percent of the fees requested by retailers were new during the last five years and 41 percent of shippers had lost accounts when they did not comply with a fee request from a retail or mass-merchandise buyer.

The most frequent type of fee is the volume discount, a trade practice that has been used for years. Volume discounts might not be anticompetitive because volume incentives can promote a more stable relationship between suppliers and retailers. As the retailer buys more units from the supplier, costs per unit decline. Shippers and retailers may both gain efficiencies in marketing by increasing the size of accounts.

Supermarkets recently began using slotting fees, long used for dry grocery items, for procuring fresh produce. Slotting fees are common for fresh-cut produce and may be either requested by retailers or offered by shippers. Bagged-salad shippers reported that shippers, not retailers, first introduced slotting fees in an attempt to increase market share from their competitors. Slotting fees were reported to range from \$10,000 to \$20,000 for small retail accounts, and up to \$2 million to acquire the entire business of a large multiregional chain. Slotting fees are, however, not reported by grape, orange, grapefruit, and tomato shippers.

During study period, requests for marketing services by retailers increased. Shippers seems to believe they receive more benefits from providing services than from paying fees, as they may obtain advantages relative to competitors. According to shippers, the most common service requested is third-party food safety certification, followed by returnable plastic containers. Meanwhile, retailers reported that they requested shippers provide such services as private-label product items, category management, electronic data interchange, special transportation arrangements, new types of packaging, and third-party food safety certification. Although increased fees and services are reported in the produce industry, it is still unclear whether these new trade practices are the results of increased retailer market power over shippers.

Coalescing Power

If both retailers and producers have market power, we may have a different situation. Concentration on both sides of a market would produce coalescing power, i.e., the adversaries would combine to effectively increase the existence of power against others in markets up or down the market channel (Cotterill, 2006). The existence of coalescing power is analyzed as a factor leading to increases in consumer prices and decreases in raw product prices paid to farmers. Dobson and Waterson (1997) showed theoretical coalescing power is the outcome in a wholesale market where manufacturers and food retailers are locked in a bilateral monopolistic situation. Although they did not analyze the symmetric issues for the raw product market, it is expected that coalescing power between retailers and manufacturers would lower raw material product prices paid to farmers. Cotterill (2006) showed actual cases of coalescing power in the New England fluid milk market in the United States since 2000.

3.3. Market Power Studies

The literature on food retail pricing under imperfect competition is extensive and, in many ways, captures advances in the general theories of industrial organizations and in the econometric methodologies used to evaluate those theories. The early literature viewed the structure of an industry as a stage for firm conduct and eventual performance. Thus, the fewer firms in the industry, the higher the prices and, subsequently, the higher the profits. This eventually became a foundation for the reduced form equation estimation in the structure-conduct-performance (SCP) paradigm. Early studies tested the SCP paradigm across multiple industries, in an attempt to determine if increasing or larger levels of concentration led to higher firm profits. The Demsetz (1973) critique suggests that higher profits may be due to the superior efficiency of firms, not due to their use of market power. The use of accounting data to compute the firm's or industry's profit margin rarely equals true economic profit and may not represent costs correctly. Thus, accounting profits may not represent the true relationship between concentration and economic profits (Anderson, 1993). This, along with difficulty in interpreting the results of concentration-profit studies, decreased interest in performing research that concerned the relationship between concentration and profits.

As concentration-profit studies began to lose their appeal, those who believed in the SCP paradigm decided it was only natural to examine the relationship between price and concentration, instead of profits and concentration. Price is an embedded component in the price-cost margin used in concentration-profit studies. This allowed an easy extension of the SCP paradigm since price data was generally easier to access, and interpretations were easier to formulate. Since the first price-concentration study by Stigler (1961), well over 100 concentration-price studies have been performed across numerous industries, including cement, gas stations, airlines, banking, and supermarkets, where the results "seem to give overwhelming support to the concentration-price hypothesis" (Weiss, 1989). It is easy to demonstrate the relationship between market concentration and prices. Following Cowling and Waterson (1976), we consider the generalized Cournot model,

with constant and different marginal costs across firms and homogeneous goods. Firm profits are

$$\pi_i = pq_i - c_i q_i \quad (i = 1, \dots, n) \quad (1)$$

where p is the inverse demand function

$$p = p(Q) = p(q_1, q_2, \dots, q_n) \quad (2)$$

Assuming profit-maximizing behavior, the first-order conditions are

$$\frac{\partial \pi_i}{\partial q_i} = p + q_i p'(Q) \frac{\partial Q}{\partial q_i} - c_i = 0 \quad (3)$$

where

$$\frac{\partial Q}{\partial q_i} = 1 + \frac{\partial \sum_{j \neq i} q_j}{\partial q_i} = 1 + \lambda_i \quad (4)$$

and λ_i is the i^{th} firms conjectural variation, which represents the aggregated response of all firms in the industry to the quantity decisions of firm i . Rearranging (2-3) and dividing by p , we arrive at

$$\frac{p - c_i}{p} = -\frac{s_i}{\eta} (1 + \lambda_i) \quad (5)$$

where η is the market elasticity of demand. Summing across all firms in the industry, we can define the average industry markup as:

$$\frac{p - \bar{c}}{p} = -\frac{HHI}{\eta} (1 + \lambda) \quad (6)$$

where \bar{c} is industry marginal costs and $HHI = \sum_{i=1}^n s_i^2$ which is the Herfindahl-

Hirshman Index of market power. If the industry follows a Cournot strategy where $\lambda = 0$ (firms choose quantities assuming other firms will not react), industry profitability is a simply ratio of seller concentration (as measured by the Herfindahl-Hirschman Index) over the demand elasticity, consistent with the SCP framework..

To our knowledge, the earliest price-concentration study in grocery retailing (Mori and Gorman, 1966) tested the relationships between various structural characteristics and market performance for 23 cities. Essentially, they concluded that market share held by the largest firms in a market was not an effective variable in explaining differing price levels among cities. Furthermore, they concluded that the degree of price competition was found to be largely individual city structural relationships dependent on possible factors such as independent firm management goals, market area growth, and recent entry of new firms. A study commissioned by the US Joint Economic Commission (Marion et al., 1977, 1979a,b) focused on the organizational and competitive performance of the food retailing industry from 1970-74, focusing particularly on the price and profit performance of large US grocery chains, and the impact on the competitive environment. The price-performance section of the study performed an analysis of competitive forces on the grocery-price level of three grocery chains located in 36 US metropolitan areas. The level of prices in different

markets was examined by computing consumer cost for a market basket containing 110 products. The authors revealed that, *ceteris parabis*, prices were positively related to the CR4 variable and relative firm market share. It was estimated that monopolistic price overcharges, which were calculated over 263 Census metropolitan statistical areas (MSA) in 1974, were roughly \$662 million. The conclusion was that substantial market power exists in grocery retailing in many markets, which results in consumers paying considerably higher prices than if competition were more effective. They concluded that food prices and retail operating expenses would be significantly reduced by actions leading to lower market concentration and lower market shares for firms that now hold dominant positions in some markets.

Other studies in the SCP tradition followed. Hall et al. (1979) tested the relationship between wholesale-retail marketing margins and concentration for the US retail beef industry across different retailing regions of the United States. The null hypothesis that higher retail concentration did not influence the beef wholesale-retail marketing margins was rejected. They estimated that a 10 percent increase in the concentration level in a metropolitan area would increase the price margin by over four percent. The authors concluded that “the degree of concentration existing in a market does appear to be an important factor affecting the price-cost marketing margin in a particular region” (Hall et al., 1979). Lamm (1981) looked at the nature of the price-structure relationship for the food retailing industry using firm market shares and one- through four-firm concentration ratios as structural measures. The analysis indicated that the choice of a market structure measure is important for determining the nature of the structure-price relationship in the food retailing industry.

An equally important finding was the identification of a positive relationship between food prices and market concentration, providing further evidence that a higher degree of seller concentration is one cause of differences in intercity food prices. While Lamm’s results are usually recognized as evidence of a positive relationship between food prices and market concentration, he compared the CPI-Food CPI at Home index across markets, which the BLS specifically states is not an acceptable procedure. The CPI series data are not meant to perform cross-sectional analysis; they are MSA specific and are not consistent with other MSA index numbers, which questions the validity of Lamm’s results. Cotterill (1983) studied price and service levels in Arkansas as well as neighboring cities from surrounding states. He found that a firm’s price level is positively related to HHI, in most cases at the one-percent significance level. The warehouse supermarket binary variable was negative and significant, while warehouse store impact was negative and significant. Neither growth nor per capita income had a statistically significant impact on prices. Square feet of selling space was estimated in quadratic form as well, which was highly significant, suggesting that average store size is strongly related to price. Cotterill (1983) ran many smaller subsample regressions as well, with similar results occurring for most regressions. However, the subsample of only Arkansas retailers revealed that prices were negatively and significantly related to income, which was a rather “astounding result.” (Cotterill, 1983)

Meyer et al. (1983) examined the extent to which a high degree of local concentration would raise prices and lower quality, while presenting a new geographic definition of the relevant retailing market. The data used consisted of 183 item prices collected from multiple stores in the two California cities analyzed. Using paired t-tests, Meyer et al. (1983) found a strong significant price difference between concentrated and unconcentrated markets. In the study, the neighborhood was the market extension, not the entire metropolitan area as in other studies, so they assumed that neighborhoods with high concentration levels had significantly higher prices.¹ The authors also observed (but did not test empirically) that stores in monopoly locations offered the lowest level of services. Meyer et al. (1983) suggested that future analyses view market power at a very local level, not on the larger defined metropolitan statistical areas, which may understate the effects of concentration on price.

Cotterill (1986) studied Vermont supermarket retailers with respect to 1) how the price level of a firm in a market relates to measures of local market structure, 2) how prices of firms are related to firm-specific characteristics, and 3) which measures of market concentration are most strongly related to price level and how they compare to firm market share. Eighteen different markets across Vermont were used in the analysis, which consisted of 35 supermarkets. Cotterill (1986) found, after controlling for the variation in firm-specific characteristics, that market concentration, as measured by the HHI or concentration ratios, had a significant positive impact upon firm price levels. He concluded that Ravenscraft's 1980 study, which tried to isolate the independent effects of cost economies and market power on profitability, may not be generalized to markets with imperfect information and/or product heterogeneity. Cotterill (1986) concluded that profitability related to market share is due to share related market power, not cost economies.

In two studies, Marion (1993, 1998) used updated data to evaluate the role of warehouse store market share in supermarket pricing. His results from these studies generally supported the hypothesis that the introduction of warehouse stores and the increase in warehouse store market share affect food prices negatively. However, when the warehouse share exceeded 30 percent, the annual change in price became positive, indicating that the market's reaction to the warehouse store format had played out. Marion's results were consistent with the hypothesis that warehouse stores constitute a strategic group that is sufficiently interdependent with other supermarket formats and is an important competitive force that increases rivalry and leads to substantial consumer benefits.

Binkley and Connor (1998) examined the long-run supermarket-pricing pattern across different US markets. The "new competitive environment," as they called it, was the new food retailing market where warehouse stores and fast food restaurants compete with supermarkets for consumer food purchases. The intent was to study market characteristics that explained the long-run average retail prices of two broad classes of grocery goods: "wet" or fresh, perishable goods and "dry" or pre-packaged, branded foods. Additionally,

¹ Neighborhoods were defined as an area where residents were likely to confine their shopping.

they attempted to assess the impact of fast-food restaurants in the food retailing market. They found evidence that the nature of retail market competition affects different price groupings in different ways. The dry goods were less strongly affected by market competition, which reflects that branded goods are priced more uniformly across the US than are produce and other non-branded items. A positive significant value was found for concentration with respect to dry goods, but a negative insignificant value was found for wet goods. Binkley and Connor (1998) also determined that supermarkets responded to warehouse store competition by lowering prices more for wet goods, which the warehouse stores typically do not stock. They believed that huge differences observed in the analysis reflected discriminatory pricing patterns. The use of selected prices from store advertisements generated an image of strength and low prices for supermarkets, in goods of interest aimed at particular consumer segments. The results depicted a changing market, with serious competition arising from not only new formats of grocery retailing, such as the warehouse store, but also from the restaurant industry.

Due to the model identification problems associated with the SCP framework, researchers specified the new empirical industrial organization (NEIO) model, which explicitly uses the structure of the oligopoly model, to test economic theory. The NEIO econometric models utilize the first order conditions for profit maximization, a market demand function, and an endogenous relationship for the conjectural variation variable (Wen, 2001). These models then produce an estimate for the conjectural variation, which is the degree to which a firm takes into account its rivals' reactions to its own output choices.

To better understand the NEIO approach, we demonstrate the relationship between market share and prices, utilizing framework of Harris (1986, 1988), and later revisited by Cotterill (1993a), which used a dominant-firm oligopoly model under product differentiation.

Consider the profit-maximizing pricing decision of a dominant firm engaged in competition with a few rival firms (i.e., a member of a dominant oligopoly group, such as a supermarket submarket). We can define the dominant firm's demand as:

$$q_1 \equiv q(q_m(p_1, \dots), q_r(p_1, \dots)) \quad \text{Eq. (13)}$$

where

q_m = market demand

q_r = rival's summed supply

p_1 = price received by firm 1

Differentiating (Equation 13) with respect to p_1 gives us:

$$\frac{\partial q_1}{\partial p_1} = \frac{\partial q_1}{\partial q_m} \frac{\partial q_m}{\partial p_1} + \frac{\partial q_1}{\partial q_r} \frac{\partial q_r}{\partial p_1} \quad \text{Eq. (14)}$$

Then, noting that optimal inventory decisions are made at

$$q_r = q_m - q_1 \quad \text{Eq. (15)}$$

in equilibrium. It then follows that:

$$\frac{\partial q_1}{\partial q_m} = 1 \quad \text{and} \quad \frac{\partial q_1}{\partial q_r} = -1 \quad \text{Eq. (16)}$$

Multiplying and dividing through (Equation 14) with q^m and q^r yields the own-price elasticity of demand

$$\eta_1 \equiv \frac{\partial q_1}{\partial p_1} \frac{p_1}{q_1} = \frac{\partial q_m}{\partial p_1} \frac{p_1}{q_m} \frac{q_m}{q_1} - \frac{\partial q_r}{\partial p_1} \frac{p_1}{q_r} \frac{q_r}{q_1} \quad \text{Eq. (17)}$$

or

$$\eta_1 = \eta_m \frac{q_m}{q_1} - \theta_p^s \frac{q_r}{q_1} \quad \text{Eq. (18)}$$

where

η_1 is the own-price elasticity of demand for the dominant firm

$\eta_m < 0$ is the elasticity of market demand with respect to the dominant firm price.

$\theta_p^s \begin{matrix} > \\ < \end{matrix} 0$ is the conjectural own-price elasticity of rival supply. It is the perceived percent change in rival supply for a one percent change in dominant firm price.

Now, recognizing that $\frac{q_m}{q_1}$ is the inverse market share of the dominant firm $\left(\frac{1}{s_1}\right)$, it

follows that $\frac{q_r}{q_m}$ is equal to $1-s_1$, the market share of the remaining firms, leading to the following result:

$$\eta_1 = (\eta_m - \theta_p^s(1-s_1))/s_1 \quad \text{Eq. (19)}$$

We see that the dominant firm's own-price elasticity is a function of its market share, elasticity of market demand, and rival's supply conjecture.

The profits for the dominant firm are:

$$\pi_1 = p_1 q_1 - c(q_1) \quad \text{Eq. (20)}$$

Therefore, the dominant firm would set its profit-maximizing price where

$$\frac{\partial \pi_1}{\partial p_1} = q_1 + \left(p_1 - \frac{\partial c}{\partial q_1} \right) \frac{\partial q_1}{\partial p_1} = 0 \quad \text{Eq. (21)}$$

Then, from (Equation 15), it follows that $\frac{\partial q_1}{\partial p_1} = \frac{\partial q_m}{\partial p_1} - \frac{\partial q_r}{\partial p_1}$, then (Equation 21)

becomes

$$q_1 + \left(p_1 - \frac{\partial c}{\partial q_1} \right) \left(\frac{\partial q_m}{\partial p_1} - \frac{\partial q_r}{\partial p_1} \right) = 0 \quad \text{Eq. (22)}$$

Rearranging (Equation 22) and dividing by q_1 reveals

$$\left(p_1 - \frac{\partial c}{\partial q_1} \right) \left(\frac{\partial q_m}{\partial p_1} - \frac{\partial q_r}{\partial p_1} \right) \frac{1}{q_1} = -1 \quad \text{Eq. (23)}$$

Then multiplying and dividing through by q_m and q_r , and multiplying through by p_1 yields

$$\left(\frac{\partial q_m}{\partial p_1} \frac{1}{q_1} \frac{q_m}{q_m} \frac{q_r}{q_r} p_1 - \frac{\partial q_r}{\partial p_1} \frac{1}{q_1} \frac{q_m}{q_m} \frac{q_r}{q_r} p_1 \right) = - \frac{p_1}{\left(p_1 - \frac{\partial c}{\partial q_1} \right)} \quad \text{Eq. (24)}$$

Which, following from (Equations 17 and 18), reduces to

$$\eta_m \left(\frac{1}{s_1} \right) - \theta_p^s \left(\frac{1-s_1}{s_1} \right) = - \frac{p_1}{\left(p_1 - \frac{\partial c}{\partial q_1} \right)} \quad \text{Eq. (24)}$$

Then, inverting (Equation 24) and multiplying by -1 yields

$$pcm_1 = \left(\frac{p_1 - MC_1}{p_1} \right) = \left(\frac{-\eta_m + \theta_p^s (1-s_1)}{s_1} \right)^{-1} \quad \text{Eq. (25)}$$

or

$$pcm_1 = \frac{1}{\eta_1}$$

where pcm_1 and MC_1 are the price-cost margin and marginal cost for the dominant firm, respectively. Assuming the simplest case of identical marginal costs across firms, the profit maximizing price-cost margin may be written as:

$$pcm_1 = \frac{(p_1 - MC)}{p_1} = \frac{1}{\eta_1} = \frac{s_1}{-\eta_m + \theta_p^s (1-s_1)} \quad \text{Eq. (26)}$$

The firm price-cost margin equals the inverse of its own price-elasticity of demand.

Solving for p_1 from (Equation 26) gives us:

$$\frac{(p_1 - MC)}{p_1} = \frac{1}{\eta_1} \Rightarrow 1 - \frac{MC}{p_1} = \frac{1}{\eta_1} \Rightarrow 1 - \frac{1}{\eta_1} = \frac{MC}{p_1} \Rightarrow p_1 = \frac{MC}{1 - \frac{1}{\eta_1}} \quad \text{Eq. (27)}$$

$$\text{or } p_1 = \frac{MC}{1 - \frac{s_1}{-\eta_m + \theta_p^s (1-s_1)}}$$

In the special case where the firm's conjectural rival supply response elasticity, θ_p^s , is zero, which implies no perceived change in the rival's supply responses due to the dominant firm's actions, then (Equation 27) reduces to:

$$p_1 = \frac{MC}{1 - \frac{s_1}{\eta_m}} \quad \text{Eq. (28)}$$

Even in a constant marginal cost case, a firm's price can vary, and is a positive function of market share. Cotterill (1993a) argued that the higher prices that large profit-maximizing firms charge are due to the market power that differentiation confers; not higher costs.

By taking the partial derivative of (Equation 26) with respect to market share, we get:

$$\frac{\partial pcm_1}{\partial s_1} = \frac{-\eta_m + \theta_p^s(1-s_1) - s_1(-\theta_p^s)}{(-\eta_m + \theta_p^s(1-s_1))^2} \quad \text{Eq. (29)}$$

which reduces to:

$$\frac{\partial pcm_1}{\partial s_1} = -\eta_1^{-2}(\eta_m - \theta_p^s)s_1^{-2} \quad \text{Eq. (30)}$$

which is > 0 if $\theta_p^s \geq 0$ or $\eta^m < \theta_p^s < 0$

Because costs are constant in (Equation 26), this implies that the partial derivative of price with respect to market share is positive. Harris (1988) also demonstrated that pcm_1 is positively related to market share when marginal costs are not constant. In retrospect, when market share is a function of costs, as hypothesized by Demsetz (1973), we have an ambiguous sign for the price share derivative. Demsetz (1973) hypothesized that higher market share firms have higher prices due to product differentiation and market power and/or higher costs, or they may have lower prices due to lower costs. Many papers have used the NEIO approach to evaluate many specific food products. The purpose of this book is to provide important perspectives about macro-trends in food retail pricing. Thus, our discussion here will cover a representative sample of the NEIO work in a way that captures the breadth of analytical methods and topics covered.

Concerns about the altered structure in the food retailing industry due to leveraged buyouts, mergers, acquisitions and financial restructuring during the 1980s, as well as increasing concentration levels resulting from the altered structure led Park and Weliwita (1999) to examine competitive conditions in the US food retailing industry from 1967 to 1992. A model of firm conduct incorporated financial variables into the industry cost function to control for the effect of changes in industry financial structure on the costs. They found that, because of merger activity and leveraged buyouts, financial leverage increased and shifted from short-term liabilities to long-term debt. This allowed the industry to become more concentrated and segmented, which led to the exertion of market power.

Analyzing the wholesale beef market, Schroeter, Azzam, and Zhang (2000) addressed the problem of measuring bilateral market power. Three equilibrium benchmarks (bilateral price-taking, manufacturer price-taking, and retailer-price taking) were evaluated. The authors conclude that food retailers enjoy buyer market power in the wholesale market, but manufacturers do not have any form of a countervailing market power. A study by Kadiyali, Chintagunta, and Vilcassim (2000) measured the power of market channel members in an attempt to understand the reasons for market power in the refrigerated juice and canned tuna markets. They found that market power has increasingly shifted from manufacturer to retailer due in part to intense competition among manufacturers, the introduction of private label brands, and increased concentration at the retail level.

Several studies focused on the topic of asymmetric price responses. This condition arises when cost increases are found to quickly lead to price increases but cost decreases do not quickly lead to price decreases. Carman and Sexton (2005) focus on market power in their analysis, looking at prices of milk with different fat contents. Their results suggest

the existence of imperfect competition among retailers. Azzam (1999) focused on spatial competition in the presence of re-pricing cost, where the decision to buy from a particular store is based on the cost of the milk and the travel cost to the store. To analyze the issue of asymmetric price transmission, both short-run and long-run transmission will be analyzed. Hansen et al. (1994) differentiated between short-run and long-run asymmetry, where short-run asymmetry is a result of quicker response to increases or decreases in cost than that of the opposite movement in the same periods, initial months. In the presence of short-run asymmetry, long-run asymmetry could, or could not occur. Long-run asymmetry results if after full adjustments to an increase and decrease in equal-size cost has transpired, the resulting retail price is different from what it was before the changes in cost happened. Like with short-run asymmetry, long-run asymmetry can occur without short-run asymmetry. Overall, short-run asymmetry is seen as a temporary effect, while long-run asymmetry is seen as a permanent effect. See also Kinnucan and Forker (1987) and Romain et al. (2002) for additional analysis of the price asymmetry phenomena.

Unlike previous studies that focused on specific markets or industries, Peltzman (2000) looked for evidence of asymmetric price transmission in 77 consumer and 165 producer goods categories in an attempt to generalize how prices respond to cost changes using monthly data from 1978 to 1996. The results of the consumer and producer goods categories overwhelmingly pointed to positive asymmetric relationships in the respective markets, suggesting positive asymmetry is a fact of life in industrial markets. Only after long time lapses, eight months, was there evidence of the gap narrowing between input price increases and decreases. Peltzman (2000) also estimated how quickly a change in the wholesale price of a typical brand was reflected in the retail price of that brand in a specific store, using 357 pairs of individual UPCs at four stores from a leading supermarket chain in the Chicago metropolitan area. The results indicated there was no evidence of asymmetric behavior; there was a complete absence of any systematic asymmetry when the response of a single decision maker to its own costs was studied.

Peltzman (2000) found that, with respect to producer goods, less input volatility was associated with more asymmetry, and the structure of the market “matters” but in a way that resists easy labeling. Fewer competitors (in numbers) were associated with more asymmetry but a more concentrated market (in HHI) was associated with less asymmetry. It also appeared that the more fragmented the supply chain to retailers, the more asymmetric the price changes realized.

Price dispersion studies focus on the distribution of prices across sellers of the same item. When price dispersion is present, it allegedly reflects market inefficiency, a direct violation of the Law of One Price (Stigler, 1961). The dispersion is attributed to search costs, market power, or attributes of the item sold or retailer involved in the selling process. Early studies presented mixed results on whether a price gap between sellers exists. Groom (1966) and Alcala and Klevorick (1971) found no relationship between market prices and average incomes, while Kureuther (1973) found that poor neighborhoods had higher food prices. In a study of the Irish grocery market, Walsh and Whelan (1999) modeled the price dispersion between related brands within product categories for

independent Irish retailers. Since the shops in the study were small “corner grocer” stores, the shops did not carry the full range of available brands; subsequently, the presence of price dispersion between related brands in the market reflected different price patterns of averaged brand prices across different shops or consumer groups. The focus was to determine whether the dispersion in the market price of related brands within products in the Irish grocery market was an outcome of “monopoly type” or “competitive type” pricing over heterogeneous consumer segments. Their results provided evidence that product category brand specialization leads to price dispersion within products of the market. However, price dispersion between related brands within products was estimated to increase with the level of brand choice and firm competition in the product, which was consistent with “competitive type” pricing across consumers. Additional evidence suggests that imperfect consumer switching abilities become more elastic in some consumer segments compared to others in response to competitive forces. They revealed that brand pricing across consumer groups induced different degrees of localized imperfect price competition rather than pricing across segments that extract consumer willingness to pay.

Hayes (2000) examined whether food prices are higher in poor, urban neighborhoods compared to more affluent locations. His results suggested that food stores offer discounts to consumers who have greater price elasticities of demand and not to consumers with inelastic demand. Additionally, poor white, and Hispanic neighborhoods had market prices considerably lower than those found in affluent white neighborhoods, while prices in poor black neighborhoods did not significantly differ from affluent white neighborhoods.

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