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Antitrust Analysis of Supermarket Retailing: Common Global Concerns that Play Out in Local Markets

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ABSTRACT

This paper reviews the basic antitrust standards for the supermarket industry including definition of product and geographic markets and the exercise of coordinated and unilateral market power. It surveys the structure-conduct-performance and the New Empirical Industrial Organization literature to highlight alternative tests for supermarket power. The focus is a supermarket chain's ability to exercise buyer as well as seller power. Recent research on vertical pricing topics including noncompetitive pricing games, double marginalization, private labels, vertical foreclosure, vertical price leadership and price transmission expand the analysis to market channel pricing issues. The availability of comprehensive scanner data, new economic theory and extensive computing power now allows one to estimate food manufacturer and supermarket retailer pricing conduct in the wholesale market jointly with retailer conduct in the consumer market.

Keywords: market definition, market power, Nash Bertrand conduct, manufacturer Stackelberg conduct, price cost margin, market concentration, price transmission rate

I. Introduction

Supermarkets are truly a global phenomena. Moreover, food systems seem to be converging, towards a hybrid of U.S. and European practices (Cotterill 1997). European researchers predict that as few as three or four truly global multinational supermarket companies, e.g., Carrefour, Royal Ahold, and Wal-Mart, will serve as channel captains for the distribution of food to consumers worldwide (e.g. Wrigley et al., 2005). Whether or not this degree of consolidation occurs remains an open question. Either way one has an increasing need to analyze supermarket performance, especially their impact on market channels, and other stakeholders including food manufacturers, consumers and farmers.

This is a common global concern that plays out in local markets. There is considerable research on the Australian situation. Griffith (2004) and Australian Parliament (1999) review supermarket performance and discuss policy options. Rather than “carry coal to Newcastle,” this paper reports on similar research in the U.S. and U.K but will discuss Australian research when it illustrates points in the general argument.

The paper is organized as follows. First up is horizontal market power. Important subtopics include product and geographic market definition, market structure, and the measurement of unilateral and coordinated market power in local supermarket oligopolies.¹ Then the focus is on vertical relationships in the market channel including double marginalization, the introduction of private label products, countervailing and coalescing power, and vertical market foreclosure, including the exercise of buyer power by supermarkets. Finally comes the need to recognize the impact of noncompetitive market channels on price transmission when analyzing changes in agricultural policies and mergers.

¹ A more comprehensive review would include research on barriers to entry (Cotterill and Haller 1992) and the effect of financial leverage on product market competition (Chevalier 1995).

II. Measurement of Horizontal Market Power in the Supermarket Industry:

The Australian Competition Commission defines market power as ...

“the ability of a firm to behave persistently in a manner different from the behavior that a competitive market would enforce on a corporation facing otherwise similar cost and demand conditions.” [ACCC, 1999].

Market power is an issue in horizontal and vertical merger policy in nearly all countries.

Mergers that tend to substantially lessen competition, i.e., increase the exercise of market power, are often prohibited. (FTC 1997, US DOJ 1984, EU 2004, ACCC 1999). Monopolization and anti-competitive pricing practices, including outright price fixing, are other areas of concern.

IIa. Market Definition and Concentration in Relevant Antitrust Markets

The relevant market for measurement of horizontal market power has two dimensions: product and geographic. The U.S. Federal Merger Guidelines find a set of products or a geographic area to be an antitrust market if a hypothetical monopolist who controls all commerce in the set can elevate price by a small but significant nontransitory amount in a profitable fashion. (FTC, 1997, p. 6).

Since 1979 the F.T.C. has maintained that supermarket sales is the relevant market for supermarkets, not some broader category of food purchases. Today, the supermarket sales product market definition includes the supermarket component of hypermarkets such as a Wal-Mart supercenter, but it does not include sales from wholesale or club stores such as Sam's, Costco, or BJ's, or limited assortment stores such as Aldi. The U.K. Competition Commission has confirmed a similar product market definition process and result for analysis of market power questions in UK the supermarket industry. “We conclude that the market is for one-stop grocery shopping carried out in stores of 1,400 square meters (about 15,000 square feet) or more.” (UK Competition Commission, 2000, p. 2).

In Australia the Parliament's 1999 study of food retailing "Fair Market or Market Failure" took no position on the relevant product market but noted that it had a strong influence on the position of the nation's top three chains. The Woolworths, Coles, and Franklin supermarket chains captured only 43% of "total take home food and liquor" (Joint Select Committee, p. 41). The Australian Bureau of Statistics used census data to find that the top three supermarkets had 75.4% of the grocery market (includes smaller stores and convenience stores) in 1997-98. Neither of these conforms to current U.S. or UK product market definition for supermarkets. In 2005 with the demise of the third ranked chain, Franklins, the top two, Coles and Woolworths, account for over 75% of grocery sales and an even higher share of supermarket sales in Australia.

Geographic markets for the sale of supermarket products are inherently local, not regional or national. Most consumers frequent supermarkets within a few miles of their home. "One stop shopping patterns are primarily local with consumers rarely traveling more than 10 minutes in urban areas and rarely more than 15 minutes elsewhere to do their main weekly shopping." (UK Competition Commission, 2000, p. 2). Store trading areas, however, overlap in urban areas. Geographical barriers such as rivers, demographic barriers such as racially segmented urban neighborhoods, and the population density in urban areas are features that define antitrust geographic markets that are larger than individual store trading areas but smaller than large metropolitan areas. In Australia supermarket concentration in many local geographic markets is even higher than national concentration (see JSC p. 14 chart).²

² One important qualification to this market definition exercise is clearly recognized by antitrust authorities in the U.S. and Europe. An antitrust market may be narrower if price discrimination is possible (e.g. FTC, 1987, p. 7).

IIIb. Competitive Effects Analysis

Only recently have European and Anglo-American analysis of market power effects in noncompetitive markets converged to a common framework. Traditionally, Anglo-American analysis focused upon what is now called coordinated effects (FTC 1997). Today in Washington, the unwritten rule is that one needs at least three firms in an antitrust market for effective competition, i.e. no coordinated effect problem. Ivaldi et al. (2003a) describe how U.S. and European Union antitrust agencies currently analyze coordinated effects. High concentration, even with high barriers to entry, are necessary but not sufficient to establish tacit collusion. Following Stigler the agencies look for facilitating practices that have no justification in a competitive market as evidence of deviation from competitive conduct.

In the European Union the original antitrust focus was on what is now called unilateral effects. Recently dominance has been generalized to analyze margins and more generally market power in differentiated product markets (Ivaldi et al. 2003b). As the number of firms (brands) in a differentiated product market declines, a firm's perceived demand curve becomes less elastic and the optimal price and price-cost margin increases. A firm (brand) manager unilaterally elevates price thereby creating an antitrust injury without tacit or explicit collusion. One estimates and uses elasticities to demonstrate how a merger between brands that are close substitutes leads to elevated prices.

Note that, unlike the coordinated effects or homogeneous product dominant firm analysis, this elasticity based analysis of unilateral market power does not require one to define a product or geographic market, compute market shares, and infer merger impact from the level of shares and pricing conduct.

Returning to the retail supermarket industry, empirical analysis over the past 30 years illustrates how much, or how little, we know about coordinated and unilateral effects in local antitrust markets and how analysis of market power has evolved. Marion et al (1979) designed a study of the supermarket industry for the Joint Economic Committee (JEC) of the U.S. Congress to evaluate the Demsetz efficiency as well as the market power hypothesis. The JEC demanded and the top 17 supermarket chains provided, subpoena, detailed profit and price data for their operations in local markets. Using local market price-cost margins for individual chains Marion et al estimated several concentration-profit models. They generally found positive and significant relationships in several different data sets including one that focused upon the profitability of a single firm's operations (A&P) across many local markets. Such intra-firm studies focus most squarely on local market power and efficiency effects because they abstract from interfirm variation in accounting and financial practices, managerial practices, vertical integration, private label programs, buying power, store layout, and merchandising practices.

To determine whether the higher profits in more concentrated local markets was due to market power or efficiency Marion et al. constructed and analyzed local market price indices and found a positive and significant relationship between a firm's price level and concentration.³ Moreover both studies specified a firm's market share position relative to concentration and also found profit and prices to be significantly and positively related to firm position. Higher prices, not Demsetz efficiency, was the source of higher profits in more concentrated markets.

Since then concentration-price studies in several other local market industries report similar results. In response Demsetz and others advanced what has become known as the

³ Many commonly available price indices such as the U.S. Consumer Price Index are not constructed in a fashion that measures antitrust price phenomena. One must measure prices on a fixed set of products, and one must aggregate them into weighted price indices that reflect the importance of each product in the representative consumers' grocery basket Geithman and Marion (1993) is an excellent source for understanding price aggregation procedures.

Demsetz quality critique. They note that a positive concentration or market share price relationship could be due to larger firms having higher quality in a differentiated product industry such as food retailing (Anderson 1993). Cotterill (1986), however, finds a strong intra-firm share-price relationship for each of two supermarket chains that operated in several local markets. Since “quality” is reasonably uniform across a chain store’s operations in several local markets, these share-price correlations are not due to quality. Cotterill (1999) explicitly modeled store characteristics, service levels and prices in a simultaneous equations system to test the Demsetz quality and market power hypotheses jointly. Controlling for quality effects, concentration and market share continued to be positively related to price.

With the advent of New Empirical Industrial Organization NEIO, reduced form analysis of market structure profit and price relationships fell out of favor. The Fisher-McGowan critique of accounting measures of profitability—essentially an assertion that one can never use accounting profits to measure economic profits—was one of the primary reasons for the advance of structural econometric NEIO models of demand and cost conditions to estimate price cost margins and are use them as indices of market power. Also, very few of the concentration-profit or concentration-price studies controlled for market structure endogeneity. Yet Froeb and Werden (1991) found that the bias in price studies likely result in an understated concentration-price relationship.

As evidenced by 1) the use of a local market, cross-section, intra-firm technique by Ashenfelter in *FTC v Staples* (Baker 1997), 2) the FTC block of Royal Ahold’s acquisition of Pathmark (Cotterill 1999), and 3) the UK Competition Commission report (2000), the cross section concentration-price method still has traction. In *FTC v. Staples*, Ashenfelter found no relationship between market share and price at the store level, however, a strong positive

relationship exists when the market was defined as a larger urban geographic area. The U.K. Competition Commission curiously tested only store level models. They report that local market structure matters for pricing at Tesco but not Safeway. Sainsbury the other leading chain submitted no store level price data (U.K. Competition Commission, 2000, p. 128).

In this paper we will classify NEIO research as first or second generation. First generation studies focus upon the following: homogeneous products aggregated to the national level, and a census industry category that is often larger than the relevant antitrust product market. Readily available data, rather than economic theory or the policy issue, typically drive this choice. Such aggregate NEIO analysis requires restrictive assumptions that limit its usefulness for antitrust analysis. To aggregate across firms one must assume a homogeneous product and Gorman polar firm level cost functions wherein firms have constant and identical marginal costs. If one relaxes Cournot to estimate a conjectural variation parameter or more generally a “market power parameter” to avoid the recent critique of C.V. models (e.g. Kim and Knittel) all firms in these aggregate homogeneous product models in equilibrium have the same C.V. parameter value. The constant cost and C.V. power parameter constrain market shares to equal values. In fact in most industries market shares are not equal.

Some C.V. models estimate a conjectural elasticity parameter. Then in equilibrium the product of a firm’s market share and its C.V. parameter are equal across firms. This means that a large share firm must have a lower C.V., an unattractive constraint.

Often NEIO studies must make other assumptions to accommodate aggregate data. For example in an analysis of market power in the Australian retail meat sector Hyde and Perloff assume that Sydney retail and wholesale meat prices measure national prices to analyze national meat disappearance data. For a study of retail market power one would have a more relevant

study if they had found quantity data for Sidney, and analyzed market power in that antitrust market.

Recent “second generation” NEIO research goes beyond homogenous product markets and aggregate industry level estimation to analyze individual firm and brand level pricing conduct in differentiated product markets. Firm and brand level scanner data for food products permits estimating a brand level price elasticity matrix. To date most studies focus upon only unilateral effects by using an estimated demand system to recover price cost margins and simulate a merger impact assuming Nash-Bertrand competition. Early examples that focus on market power at the manufacturer level are Hausman et al. (1994) for beer and Cotterill (1994) for breakfast cereal. These two studies and many subsequent brand level studies use panel data features to specify retail prices in other cities as instruments for endogenous retail prices.⁴ If one specifies the cost side, i.e. uses classical exogenous cost shift variables to identify the demand system, then one can measure coordinated as well as unilateral power effects (e.g. Cotterill and Samson 2002). In addition to recovering price cost margins, one can test for alternative pricing games, including Nash Bertrand or Stackelberg conduct.

Two second generation NEIO studies have addressed supermarket pricing power. Cotterill, Putsis and Dhar (2000) analyze the demand for aggregate national brand and private label products across 125 food categories and 59 local market. To pool and compare prices across categories they use a logarithmic first difference model. This measures percent change in price, quantity and other variables. On the supply side they estimate reaction functions to analyze pricing interaction between branded and private label product. Four-firm grocery concentration is specified in both reaction functions to test for higher price levels in more concentrated local retail markets. They report a positive and significant (5%) relationship

⁴ For a critique of this approach see Bresnahan (1997).

between the percent change in branded price and the change in grocery concentration between 1991 and 1992. For private label price the relationship is positive and significant at the one percent level. Moreover the coefficient in the PL equation is twice the coefficient in the NB equation. Supermarket retailers in more concentrated markets use their market position to increase profits from the sale of private label. This result is consistent with leading supermarket chains using PL to bargain for lower wholesale NB prices and thus optimizing profits in the category by increasing brands prices less than private label.

Another second generation NEIO study focuses upon supermarket retail price determination in a very advanced fashion. Smith (2000) adapts the discrete choice demand model to analyze spatial unilateral pricing power at the store level by supermarket chains. Smith combines data on known firm price-cost margins for the total UK with two other data sets, one on store characteristics for each supermarket in the study and the other on the food shopping behavior of 115,000 consumers in the study area. He estimates the equilibrium price for each store as well as own and cross price elasticities at the store level. Smith finds that demerger in local markets (splitting up multi-store holdings of a chain in local markets) reduces prices between 2 and 3.8% in the UK markets that he investigates. Mergers between various pairs of firms increase prices as much as 7%.

Note that this study rejects the Fisher McGowan critique and uses accounting profits to estimate prices.⁵ The use of aggregate (at the national UK level) accounting-based price-cost margins to estimate pricing in individual supermarkets, however, is a far reach. His analysis would benefit from access to disaggregate local firm-in-market level accounting price-cost margins. Smith's resurrection of accounting price cost margins, however, suggests that

⁵ Nevo (2000) and Hausman et al. (1997) also use accounting price cost margins, but in a different fashion.

examination of price cost margins at the store, firm and market level and their relationship to market structure is useful if carefully done.

Turning now to merger enforcement policy in the U.S., in practice there are two prongs to retail merger analysis. The first prong follows the merger guidelines. One identifies the relevant market, computes HHI pre and post merger, examines competitive effects, barrier to entry, and efficiencies, and weighs the pro and cons. The other prong is consistent with Smith, but much simpler. One examines business documents such as customer draw studies to define supermarket trade areas. One identifies adjacent stores that are close substitutes. If there are not too many the FTC may pursue a “fix it first” strategy. They obtain divestiture of the overlapping stores to other third firms to preserve competition in that area of the market. For example, using this method the FTC and New England Attorney Generals obtained the divestiture of 31 supermarkets from the Royal Ahold-Stop and Shop merger in New England (Cotterill, 1999). Recent studies by the FTC and others, however, have concluded that this “fix it first” approach is fraught with difficulty. Divested chain stores often don’t do well under third party ownership (Parker and Balto, 2000). Third party buyers that can sustain or expand a divested store simply do not exist in many markets.

Vertical Market Power

The sequence of markets and industries between farmers and consumers, also has important implications for performance. As in the horizontal dimension the two primary dimensions of performance are efficiency and market power. Here, we retreat from the new Institutional Economics of contracts and focus squarely on open market pricing in a channel that has oligopostic manufacturing and retailing industries.

IIIa. Vertical Pricing Games

Vertical pricing strategies can take several different forms. The simplest vertical models are those that specify fixed or proportional markup conduct by manufacturers and retailers. One can formally specify and test for these non-strategic “rules of thumb” pricing rules within the context of vertical pricing games.

Choi (1981) gives the theory for three alternative vertical games for retailers and manufacturers. Under vertical Nash pricing manufacturers maximize profits assuming retail price changes by the same amount as the wholesale price. This 100% price transmission allows manufacturers to identify wholesale demand from observed retail demand. Under vertical Nash retailers maximize profits assuming that changes in retail prices have no impact on wholesale prices.

In a manufacturer Stackelberg model, retailers play vertical Nash but manufacturers know the retailers reaction function to wholesale prices and use it to set price when maximizing profit. In a retailer Stackelberg game the converse holds. Retailers know and use manufacturer reaction functions, while manufacturers continue to play vertical Nash.

Cotterill and Putsis (2001) test for proportional retail markup, vertical Nash, or manufacturer Stackelberg conduct for national brand and private label products in each of six categories across 59 local markets for 1991 and 1992. They generally reject proportional markup behavior by retailers and find that vertical Nash conduct is more common than manufacturer Stackelberg for private label than branded products. This is consistent with the general understanding that brand manufacturers have more knowledge about retailers and more pricing power than private label manufacturers. Froeb et al. explain that the FTC now rejects fixed and proportional retail markup models. They declare: “retailers do not play the passive

role ... i.e. simply marking up the wholesale price of goods to cover their costs” (Froeb et al., 2004, p. 368).

IIIb. Private Label Pricing Strategy: Competitive Retailers

Private label products are a prominent feature of nearly all industrialized food systems including Australia. Moreover they are not a new or recent innovation. In the 1960’s the U.S. National Food Commission completed an extensive study of private label activity (NCFM). At that time private label was seen as a vertical integration strategy by large chains with little buying power in the wholesale market. Chains faced “brand monopolists” in the manufacturing sector. To thwart their pricing power the supermarkets integrated into the processing of products such as milk and bread, and contract integrated into areas such as canned and packaged grocery items. The result was more consumer choice, lower prices, and a more competitive food manufacturing industry (NCFM).

IIIc. Countervailing or Coalescing Power

With his countervailing power hypotheses J. K. Galbraith posed a different solution to manufacturer power. He argued that the solution to power on one side of the market was to develop power to develop on the other side. The obvious examples of his time were labor unions that sought to countervail powerful large corporate employers, and agricultural bargaining cooperatives. In the resulting bilateral monopoly situation price and other terms of trade are indeterminate but for bargaining. Walter Adams and others, however, argued that concentration on both sides of a market would produce coalescing power, i.e. the adversaries would combine to affectively increase the exercise of power against others in markets up or down the market channel.

Dobson and Waterson analyze these two competing hypotheses for the U.K. supermarket industry. Their theoretical analysis begins with the premise that manufacturers and supermarkets are locked in a bilateral monopoly situation in the wholesale market, i.e. countervailing power exists. They demonstrate that coalescing power is the outcome and consumers pay higher prices when supermarkets also have market power in the retail market (Dobson and Waterson, 1997 p. 428). Dobson and Waterson did not analyze the symmetric issue for the raw product market, however if manufacturers have buyer power there one would expect a symmetric result. Coalescing power between retailers and manufacturers would lower raw product prices to farmers.

IIId. Vertical Market Foreclosure and Price Leadership

There also is an important dynamic dimension to the exercise of market power in a vertical channel by retailers and manufacturers. The growth of supermarket chains to market dominance can reinforce anti-competitive conduct in the retail market via strategic moves in the vertical dimension. For example in *Toys R Us v. FTC*, 221F3d 928 (7th Circuit, 2000) the court found that this leading toy retailer was able to require toy manufacturers to offer less favorable terms of trade to other toy retailers, thereby hurting its rivals and reinforcing its market power at retail.

Consider a second vertical strategic game that may be more pernicious because it shares power gains with rival firms in the channel, and thus may more likely escape detection and persistently damage consumers. A dominant retail firm can extract cost concessions from a food processor that effectively force a dominant processor to charge other retailers higher wholesale prices. Yet now rather than use its cost advantage to start a price war at retail to damage competitors, the advantaged dominant retailer elevates prices so that competitors, whose costs

are higher, make more not less profits than before. The dominant firm's price leadership scheme, also increases its own profits and the profits of the processor profits (from higher priced sale to the retail fringe firms). The result is coalescing power against consumers.

This situation has existed in the New England fluid milk market since 2000 (Cotterill 2003 et al.) Royal Ahold via its Stop and Shop supermarket chain has had a dominant market share at retail (50%) due primarily to horizontal mergers during the 1990's. In 2000 it closed its milk plant and negotiated a 20 year strategic alliance with the Dean Foods milk processing company that thereafter supplied over 80% of New England supermarket milk.

In 2003 Stop and Shop paid the raw market price plus 53 cents per gallon for milk delivered into its stores. Competing supermarket chains pay 10 cents per gallon more for the same supply. Stop and Shop has led prices up so that retail margins over the past five years are \$1.50 per gallon. In store marginal costs are 20-25 cents per gallon and fully allocated costs are 40-50 cents per gallon. Therefore all supermarket chains are capturing approximately \$1 per gallon as a power premium and the processor earns a share as well. This vertical collusion game escapes Robinson-Patman prosecution in the U.S. because the cost discount granted to the powerful buyer does not damage other retailers.

Although not perfectly verified many market observers believe this coalescing power was also used against farmers. Big Y, a large regional supermarket chain that initially opted to receive its milk from the number three fluid processor recently threatened to switch to the dominant processor if it could not pay a lower wholesale price. The demand was so substantial that the processor went to its farmer cooperative supplier and demanded a lower raw milk price, otherwise it claimed it would lose the retail account and go out of business. Agri-Mark, the threatened regional co-op with annual sales of over \$500 million and over 1,400 members could

not sell to Dean Foods because a competing national cooperative has a nationwide full supply contract with that dominant processor. To keep their fluid market, in this situation, farmers in the regional cooperative cut price. This is positive proof that when it comes to the exercise of buyer power against farmers, the truth is often found in analysis of the institutional details in relevant antitrust markets rather than aggregate national analysis.

IIIe. Double Marginalization

Market concentration and coalescing power between food manufacturers and retailers can go too far for their own good. A market channel with two successive monopolists that seek to maximize profits suffers double marginalization. This is the case no matter which vertical pricing game they play. The move from two (or more) monopolies in a market channel to one monopoly lowers retail and wholesale prices, increase output, and increases total channel profit.⁶

In many countries consolidation at retail and in the processing industries has, in fact gone so far that the operative question is how can firms in the channel eliminate double or even triple marginalization? The latter can arise when one has farmer cooperatives, marketing boards, or agricultural policies that elevate prices as well as powerful manufacturers and retailers.

Focusing on the wholesale market, vertical integration eliminates double marginalization. However, a supermarket chain can't buy all of its suppliers nor can a monopolist in a particular manufacturing industry buy all supermarket chains.

There are two ways that double marginalization can be reduced. One benefits retailers and the other can benefit retailers and/or manufacturers. The first is private label. Mills (1995) specifies an address utility model with manufacturer Stakkelberg vertical conduct to demonstrate that introduction of a private label product by the retailer eliminates double marginalization. Consumers benefit through lower prices and the retailer captures all of the increase in profits.

⁶ See Cotterill 2000 for a recent analysis in the context of food industries.

The Mills model's basic predictions are consistent with observed market phenomena including the following: retail gross margins are higher on private label than branded products,⁷ the relative price difference between brands and private label varies directly with brand advertising intensities and inversely with private label market share, own price elasticities of demand for brands vary inversely with private label market share, and private label share falls if a cost component such as raw product cost, that is common to both increases (Mills, 1995, p. 513).

A second way to eliminate double marginalization in a fashion that can benefit manufacturers as well as retailers is any "supply chain management" policy that allows a manufacturer and retailer to jointly set the wholesale and retail prices. Trade promotions do this, slotting allowances do not. Thus the rise of double marginalization issues in the vertical market channel predicts that trade promotions will increase in importance rather than disappear. Rather than cause excess inventory problems, trade promotions solve the problem.⁸ Cotterill (2000b) provides an analysis of trade promotions that eliminate double marginalization.

III.f. The Exercise of Buyer Power Against Farmers

Concentrated retailers and food manufacturers may also be able to increase profits by lowering prices paid to farmers if farmers are unorganized, have no alternative markets, are susceptible to price discrimination, or have no marketing board or agricultural price policy to countervail buyer power. The New England fluid milk industry example illustrates this point.

In theory, empirical measurement of buyer power in a food marketing channel is not perfectly symmetric to the analysis of seller power. First consider market definition. Product market definition at retail, e.g. ready to eat cereal that uses corn, wheat, or rice, can be very

⁷ Curiously, the UK Competition Commission study did not find this (UKCE, p. 2).

⁸ Supply chain management is often regarded as a logistics exercise. In fact logistic analysis suggests substantial cost savings if retailers would eschew hi-lo retailing with its reliance on trade promotions and move to every day low prices (EDLP).

different from product market definition in the raw market, e.g. the sale of corn. When defining markets one must consider sales to the away-from-home market (restaurants and institutions) and possibly export. In theory retailer and manufacturer buying conduct may be tempered by these options for sellers. In practice one needs to carefully investigate these contingencies and look for price discrimination by buyers that segments what otherwise would appear to be a global market for a commodity.

Carstensen (2004) finds that large and dominant buyers have even more incentive than similar sized firms on the selling side of a market to exert both unilateral and coordinated market power. Unilaterally lowered input pay prices benefit the firm by reinforcing the ability to profit or capture new customers. Cheating on a coordinated effort to lower input prices, i.e. paying a higher price for raw materials, does not have the output enhancing effect that a cheater in a seller's cartel obtains from a price cut. This fact also translates into stronger incentives for a buyer's cartel in auction markets and contracting schemes in other markets that shift risks onto farmers and lowers raw product prices.

IV. Price Transmission in an Imperfectly Competitive Market Channel

When farm prices drop and retail prices don't policy concerns about non-competitive food marketing channels surface in agricultural and antitrust policy areas. For example, this is a major concern of dairy farmers in the U.S. (Cotterill et. al. 2003) and in Australia. In the United Kingdom one of the main reasons for the Competition Commission study of supermarket retailing was "a public perception of ... an apparent disparity between farm and retail prices ... which is seen as evidence by some that grocer multiples were profiting from the crisis in the farming industry (Competition Commission, 2000, p. 3).

In his classic article Gardiner (1975) developed a model for a competitive market channel. Gardner demonstrated that even if farm production and the marketing industry are perfectly competitive and if constant returns to scale exists in marketing, there is not a unique and stable relationship between farm and retail prices. In other words there is no sound economic reason to expect that retail prices should be related to farm prices. One response to Gardiner was a concerted effort by empirically oriented economists to ascertain under what more restrictive conditions one could estimate the relationship between farm and retail prices and be confident that the empirical result captured economic behavior.

The most common approach is Hein's (1980) model. Hein assumes perfect competition, constant returns to scale, and fixed proportion production technology in the marketing industry. He also assumes a perfectly elastic supply of nonfarm inputs to the marketing industry, unidirectional shocks to the system that emanate from shifts in the farm supply curve, and static equilibrium.

Under these conditions Heins constructs a fixed-markup model (Hein, p. 11 p. 14) where the coefficients on the raw agricultural product price and other input prices are the Leontieff production function coefficients. Since the model has a fixed markup, the price transmission rate depends only on the Leontieff production coefficient for the agricultural input. If it takes one unit (.5 units) of raw product to produce a unit of finished product, e.g. milk, then the price transmission rate is 100% (50%).

McCorriston and coauthors were among the first to present a model of price transmission with a noncompetitive market sector (McCorriston, 2002). They specify two successive market channel industries, manufacturing and retailing, however they continue to assume homogeneous product in a NEIO quantity CV model. With linear demand and constant marginal costs, double

marginalization in this type of model produces a 50 percent transmission rate for each monopolist and a 25% channel transmission rate. Logarithmic demand with constant own price elasticity in conjunction with constant marginal costs always produces price transmission rates in excess of 100%.

Cotterill (1998) uses Bertrand oligopoly models to analyze price transmission in a differentiated product market. Price rather than quantity is the strategic choice variable. In these models a second order derivative, the derivative of the own price elasticity, determines whether price transmission in an oligopoly is less or greater than 100%. Cotterill also finds that price transmission is always greater than 100% in noncompetitive markets where a firm chooses to maximize brand sales given a desired target level of profits, including a loss leader strategy.

Two important conclusions follow. First, for policy analysis if one assumes perfect competition all benefits of agricultural policy deregulation flow to consumers when in fact a significant portion may remain with non-competitive channel firms. Second, one must use a more flexible demand system to measure market power and price transmission than the linear, logarithmic, or semi-log demand specification that is used in many NEIO models. Using an LA/AIDs model and estimation results for the carbonated soft drink industry Cotterill (1998, p. 12) shows that cost pass thru rates range from 73% for Royal Crown cola to 107% for Coca Cola and 110% for private label. Kim (2004) specifies and estimates a discrete choice demand model for brands of American cheese in the U.S. He reports price transmission rates as low as 30%.

Another functional form that nicely fits price transmission analysis is the generalized Box-Cox demand model. One can estimate the Box-Cox transformation parameter, λ , and different values give different functional forms ranging from linear (50% CRTR) to semi-logarithmic (100% CRTR) to log-log (greater than 100%). Bettendorf and Verboven (2000)

specify a model with a Box-Cox demand form, however they were not able to estimate λ . Instead they fix it at the linear, quadratic, and full logarithmic demand form values, estimate and compare results. Moreover their results are not at the brand or firm level in an industry that is clearly differentiated. They use a Cournot homogenous product model at the market level to analyze price transmission in the Dutch coffee industry because only aggregate data are available.

V. Implications for Research

Clearly the most important conclusion from this review of market power in the supermarket industry is the need for disaggregate analysis at the relevant product and geographic market level. Econometric studies are certainly desirable; however, case studies of firm conduct in relevant antitrust markets also provide credible evidence. If products are differentiated this feature should also be incorporated into either type of study rather than assume homogenous products. As one moves upstream from retailers towards farmers the relevant market may become broader and more homogenous; however, one must carefully examine the opportunities for buyer based price discrimination in what would otherwise appear to be a broad homogenous product market, even a global market.

The Fisher McGowan critique of accounting profits has always been questionable. After all if accounting profits say nothing about economic profits then the world's capital markets are a fantasy and capitalist economies are rudderless. Recently three leading NEIO studies have used accounting price cost margins. Although out of fashion for 25 years, careful analysis of PCM's at the brand, or firm, as well as the market level can provide insight on market power, quality and efficiency questions. Reduced form models that analyze price levels in local market industries such as supermarket retailing have never gone out of style; however, relatively little

research has been done in this area over the past ten years. The collection of price data and aggregation into an appropriate price index for antitrust analysis is a very large scale endeavor. This retards research in the area.

Price transmission in non competitive market channels needs considerably more research. One way to proceed would be to compute the price transmission rates that are implicit in NEIO studies that estimate price cost margins as power indices. It would be interesting to reveal the constraints on price transmission in these models. Any future NEIO models should be sufficiently flexible to allow for price transmission above or below 100%. Another issue that has received virtually no attention is price transmission from retailers back to farmers. It is important when buyer power is a concern.

Research needs to identify and examine the vertical pricing games being played and evaluate the impact on manufacturer as well as retail margins (Chidmi et al. 2005). Most of the business-oriented literature on vertical strategic alliances and value chain management focuses only on efficiency and ignores market power. As argued here vertical pricing practices such as trade promotions, inherently inefficient in a logistics world, may enhance allocative efficiency by reducing double marginalization. Other vertical conduct can reinforce anticompetitive conduct in the horizontal dimension, and hurt farmers and/or consumers.

Food marketing is a very diverse and complex process. Advances in theory, and empirical methods give us ample methods. Now all we need is the data, and it does exist!

References:

- Anderson, K.B. (1993) Structure-Performance Studies of Grocery Retailing: A Review, in Cotterill, R.W. (ed.), *Competitive Strategy Analysis in the Food System*, Westview Press, Boulder, pp.203-219.
- Australian Competition and Consumer Commission (1999) Merger Guidelines, Legislative Services, Canberra, Australia.
- Baker, J.B. (1997) *Econometric Analysis in FTC v. Staples*, before American Bar Association's Antitrust Section, Economics Committee, 18 July 1997, Washington, DC.
- Bettendorf, L. and Verboven, F. (2000) Incomplete Transmission of Coffee Bean Prices: Evidence from the Netherlands, *European Review of Agricultural Economics* 27, 1-16.
- Bresnahan, T.F. (1997) Comment on "The Apple-Cinnamon Cheerios War: Valuing New Goods, Identifying Market Power, and Economic Measurement." In *The Economics of New Goods*, T. Bresnahan and R. J. Gordon, eds., NBER Studies in Income and Wealth No. 58, The University of Chicago Press.
- Carstensen, P.C. (2004) *Buyer Power and Merger Analysis – The Need for Different Metrics*, Proceedings of the Workshop on Merger Enforcement held by the Antitrust Division and the Federal Trade Commission, 17 February 2004, Washington, DC, USA.
- Chevalier, J.A. (1995) Capital Structure and Product-Market Competition: Empirical Evidence from the Supermarket Industry, *American Economic Review* 85, 415-435.
- Chidmi, B., R. A. Lopez, and R. W. Cotterill (2005) Decomposing Market Channel Profits: The Case of Ready-to-Eat Cereals in Boston, Food Marketing Policy Center, University of Connecticut, Storrs, CT, February.
- Choi, S.C. (1991) Price Competition in a Channel Structure with a Common Retailer, *Marketing Science* 10, 271-296.
- Commission of the European Communities (2004) Guidelines on the Assessment of Horizontal Mergers under the Council Regulation on the Control of Concentrations between Undertakings, Brussels, Belgium.
- Cotterill, R.W. (1986) Market Power in the Retail Food Industry: Evidence from Vermont," *Review of Economics and Statistics* 68, 379-386.
- Cotterill, R.W. (1994) An Econometric Analysis of Brand Level Demand for Breakfast Cereal: Product Market Definition in Unilateral Market Power Effects, *Expert Report in State of N.Y. v. Kraft General Foods 93 civ.0811 [KMW]*, New York.

- Cotterill, R.W. (1997) The Food Distribution System of the Future: Convergence Towards the U.S. or U.K. Model?, *Agribusiness* 13, 123-135.
- Cotterill, R.W. (1998) Estimation of Cost Pass Through to Michigan Consumers in the ADM Price Fixing Case, *FMPC Issue Paper 39*, University of Connecticut, Storrs.
- Cotterill, R.W. (1999) An Antitrust Economic Analysis of the Proposed Acquisition of Supermarkets General Holdings Corporation by Ahold Acquisition Inc., *FMPC Issue Paper 46*, University of Connecticut, Storrs.
- Cotterill, R.W. (2000a) Continuing Concentration in the US: Strategic Challenges to an Unstable Status Quo, in Ramsay, W. (ed.), *The Global Food Industry: Strategic Directions*. Financial Times Monograph Series, London.
- _____. (2000b) The Economics of Private Label Pricing and Channel Coordination, in Galizzi, G. and Venturini, L. (ed.), *Vertical Relationships and Coordination in the Food System*. Physica-Verlag:Herdelberg, Heidelberg, pp. 39-60.
- Cotterill, R.W. (2003) The Impact of the Northeastern Dairy Compact on New England Consumers: A Report from the Milk Policy Wars, *FMPC Issue Paper 77*, University of Connecticut, Storrs.
- Cotterill, R.W. and Haller, L.E. (1992) Barrier and Queue Effects: A Study of Leading U.S. Supermarket Chain Entry Patterns, *Journal of Industrial Economics* 40, 1-14.
- Cotterill, R.W. and Putsis, W.P. Jr. (2001) Do Models of Vertical Strategic Interaction for National and Store Brands Meet the Market Test?, *Journal of Retailing*, 77, 83-109.
- Cotterill, R.W., Rabinowitz, A.N. and Tian, L. (2003) *Milk Market Channel Structure: Its Impact on Farmers and Consumers, and the Inadequacies of Antitrust Enforcement as a Foundation for Dairy Policies: Evidence from the Northeast Dairy Industry*, U.S. Senate Judiciary Committee Hearing on Monopsony Issues in Agriculture: Buying Power of Processors in our Nation's Agricultural Markets, 10 October 2003, Washington, D.C., USA.
- Cotterill, R.W. and Samson, P.O. (2002) Estimating a Brand Level Demand System for American Cheese Products to Evaluate Unilateral and Coordinated Market Power Strategies, *American Journal of Agricultural Economics* 84, 817-823.
- Cotterill, R.W., Dhar, R. and Putsis, W.P. Jr. (2000) Assessing the Competitive Interaction Between Private Labels and National Brands, *Journal of Business* 73, 109-137.
- Dobson, P.W. and Waterson, M. (1997) Countervailing Power and Consumer Prices, *the Economic Journal* 107, 418-430.

- Federal Trade Commission (2002) Study Needed to Assess the Effects of Recent Divestitures on Competition in Retail Markets, *GAO Report to Congressional Requests*, United States General Accounting Office, Washington, D.C.
- Federal Trade Commission and Department of Justice (1997) 1992 Horizontal Merger Guidelines. Available from URL: <http://www.ftc.gov/bc/docs/horizontal.htm>
- Froeb, L., Hosken, D. and Pappalardo, J (2004) Economics Research at the FTC: Information, Retrospectives, and Retailing, *Review of Industrial Organization* 25, 353-374.
- Froeb, L.M. and Werden, G.J. (1991) Endogeneity in the Concentration-Price Relationship: Cause and Consequences, *Economic Analysis Working Paper, Antitrust Division of the U.S. Department of Justice*, Washington, D.C.
- Gardner, B.L. (1975) The Farm-Retail Price Spread in a Competitive Food Industry, *American Journal of Agricultural Economics* 57, 399-409.
- Geithman, F.E. and Marion, B.W. (1993) Testing for Market Power in Supermarket Prices: A Review of the Kaufman-Handy/ERS Study, in Cotterill, R.W. (ed.), *Competitive Strategy Analysis in the Food System*, Westview Press, Boulder, pp.253-292.
- Griffith, G.R. (2004) The Impact of Supermarkets on Farm Suppliers, *The Australian Economic Review* 57, 329-336.
- Hausman, J. (1997) Valuation of New Goods under Perfect and Imperfect Competition, in Bresnahan, T. and Gordon, R.J. (ed.), *The Economics of New Goods*, The University of Chicago Press, Chicago.
- Hyde, C.E. and Perloff, J.M. 1998, "Multimarket Market Power Estimation: The Australian Retail Meat Sector, *Applied Economics*, vol. 30, pp. 1169-76.
- Hein, D.M. (1980) Markup Pricing in a Dynamic Model of the Food Industry, *American Journal of Agricultural Economics* 62, 10-18.
- Ivaldi, M., Jullien, B., Rey, P. and Tirole, J. (2003a) *The Economics of Tacit Collusion*, IDEI Final Report for DG Competition, European Commission, Brussels, Belgium.
- _____. (2003b) *The Economics of Unilateral Effects*, IDEI Final Report for DG Competition, European Commission, Brussels, Belgium.
- Kim, D. and Knittel C.R. (2004) Biases in Static Oligopoly Models? Evidence from the California Electricity Market, NBER Working Paper 10895, Cambridge, MA.
- Kim, D. (2004) Estimation of the Effects of New Brands on Incumbents' Profits and Consumer Welfare: The U.S. Processed Cheese Market Case, *Review of Industrial Organization* 25, 275-294.

- Marion, B., Mueller, W., Cotterill, R., Geithman, F., and Schmelzer, J. (1979) *The Food Retailing Industry: Market Structure, Profits and Prices*. Praeger Publishers, New York.
- McCorriston, S. (2002) Why Should Imperfect Competition Matter to Agricultural Economists?, *European Review of Agricultural Economics* 29, 349-371.
- Mills, D.E. (1995) Why Retailers Sell Private Labels, *Journal of Economics and Management Strategy* 4, 509-528.
- National Commission on Food Marketing (1966) *Special Studies in Food Marketing*, US Government Printing Office, Washington, DC.
- Parker, R.G. and Balto, D.A. (2000) The Evolving Approach to Merger Remedies, *Antitrust Report May 2000*. Available from URL: <http://www.ftc.gov/bc/docs/horizontal.htm>
- Reviron, S. Chappuis, J.M. and Barjolle, D. (2003) *Vertical Alliances for Origin Labeled Food Products: What is the Most Relevant Economic Model for Analysis?*, Proceedings of the 80th EAAE Seminar: New Policies and Institutions for European Agriculture, 24-26 September 2003, Ghent, Belgium.
- Scheffman, D.T. and Coleman, M. (2003) *Quantitative Analysis of Potential Competitive Effects from a Merger*, Proceedings of FTC/DOJ Joint Workshop on Merger Enforcement, 17-19 February 2004, Washington, D.C., USA.
- Secretary of State for Trade and Industry (2000) *Supermarkets: A Report on the Supply of Groceries from multiple stores in the United States*, Competition Commission, London.
- Smith, H. (2004) Supermarket Choices and Supermarket Competition in Market Equilibrium, *Review of Economic Studies* 71, 235-263.
- Toys “R” US Inc. v. Federal Trade Commission (2000) United States Court of Appeals for the Seventh Circuit, *US Court Case No. 221 F.3d 928*.
- U.S. Department of Justice (1984) *Non-Horizontal Merger Guidelines*.,
- Wrigley, N., Coe, N.M., and Currah, A. (2005) Globalizing Retail Progress, *Human Geography* 29, Forthcoming.

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