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

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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 the introduction of private label products, countervailing and coalescing power, vertical market foreclosure, double

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[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).

marginalization, the exercise of buyer power by supermarkets against upstream industries

including farmers, and price transmission in noncompetitive market channels.

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

Market power is the ability to perceptually influence price and/or other terms of trade in a

market. The Australian Competition Commission gives a more detailed definition that correctly

stresses such influence must be non transitory. Market power is …

> "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

A common first step for economic analysis of any of these issues for the supermarket

industry in a country should be to define the market where the alleged conduct occurs. Antitrust

markets often differ from more general market constructs in economics and reported national

government statistics. 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, 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.

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.

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).

Available market statistics from several countries including the U.S., UK, Switzerland, and Australia, indicate that many relevant antitrust markets for the analysis of supermarket pricing are very concentrated. For example, in the U.S in 1998 in 31 of the top 100 Metropolitan Statistical Areas four-firm supermarket concentration was above 80% (Cotterill, 2000a, p. 150). In the United Kingdom in 1998/99 the Competition Commission found that the top four supermarket chains accounted for 65.4% of national sales. In Switzerland, at the national level, two chains account for 80% of supermarket sales (Reviron et. al. 2003, p. 14). In Australia, national CR_3 is about 75%. Local market concentration is higher than it is in the national statistics because not all firms compete in all local markets. In Australia, for example the distribution of the top three supermarkets across local market areas is very unbalanced (See JSC, p. 14 chart).

II.   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. Sheffman and Coleman (2004) and Ivaldi et al. (2003a) describe how U.S. and European Union antitrust agencies currently analyze

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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. In 1985 two research pieces suggested that dominance could be generalized to analyze margins and more generally market power in differentiated product markets. Deneckere and Davidson (1985) demonstrated that as the number of firms (brands) in a differentiated product market declined, 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. Also in 1985 Baker and Bresnahan specified a residual demand framework to estimate the own and cross price elasticities between a small set of brands of beer. They used these elasticities to demonstrate how a merger between brands that are close substitutes leads to elevated prices. Since the advent of scanner data in the 1990's one can estimate complete brand level demand systems rather than use the residual reduced form approach. Ivaldi et al. (2003b) provide an excellent survey of this approach.

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

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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.[2]

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 have

similar results. In response Demsetz and others advanced what has become known as the

Demsetz quality critique. They argue 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

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[2] 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 and market power hypotheses jointly. Controlling for quality effects, concentration and market share continued to be positively related to price.

With the advent of NEIO, reduced form analysis of market structure profit and price analysis 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 the use of a local market, cross-section, intra-firm technique by Ashenfelter in FTC v Staples (Baker 1997), the FTC block of Royal Ahold's acquisition of Pathmark (Cotterill 1999), and 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).

For the past 15 years scanner data at the supermarket chain and brand level in local markets allow advanced economic analysis that is also relevant to antitrust. In this paper we will classify New Empirical Industrial Organization (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 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 models in equilibrium have the same 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. These models are only a "macro" approximation to an unknown firm level "micro" strategic game. More detailed knowledge of firm and brand level strategy are often critical for antitrust policy.

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 anti-trust study if they had found quantity data for Sidney, a local 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. These studies can measure both unilateral and coordinated power effects (Cotterill and Samson, 2002); however, to date most focus upon only

unilateral effects by using an estimated demand system to 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. Unlike many NEIO studies, these two studies and many subsequent brand level studies use panel data features to specify retail prices in other cities rather than cost shifters in a city as instruments for endogenous retail prices. One ignores the cost side of oligopoly, estimates the demand side, and using a game solution concept, e.g. Nash-Bertrand, and in some cases, recover price cost margins and/or marginal costs.

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 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 (splitting up multi-store chains 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%.

This study is a very clever, even brilliant, application of the most recent NEIO techniques to supermarket retailing. Note that it rejects the Fisher McGowan critique and uses accounting profits. If these aggregate (at the national UK level) accounting-based price-cost margins have empirical content for analysis of market power in local markets then analysis of disaggregate local market level accounting price-cost margins also has probative value.[3]

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

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[3] Nevo (2000) and Hausman et al. (1997) also use accounting price cost margins.

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 the 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 retailer 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 Stakkelberg 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 Stakkelberg 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 Stakkelberg 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 for private label than branded products. This is consistent with the general understanding that brand manufacturer 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 (e.g. the labor market) was to develop power to develop on the other side. In the resulting bilateral monopoly situation price and other terms of trade are indeterminant 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 reinforcing and protecting its market power at retail.

Consider a second vertical strategic game that may be more pernicious because it shares power gains with more 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

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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 price. The demand was so substantial that the processor went to its farmer cooperative supplier and demanded a lower raw 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.[4]

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

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[4] See Cotterill 2000b for a recent analysis in the context of food industries.

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.

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,[5] 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

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

than cause excess inventory problems, trade promotions solve the problem.[6] Cotterill (2000b)

provides an analysis of trade promotions that eliminate double marginalization.

IIIf. 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 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

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

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[6]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).

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.

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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 or follow 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 channel firms. Second, one must use a more flexible

demand system to measure market power and price transmission than the linear or logarithmic

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 demand, 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

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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. 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 a non competitive market channel needs considerably more research. One way to proceed would be to compute the price transmission rates that are implicit in several different 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.

Finally, we need more second generation NEIO research to identify the vertical pricing games that firms play in food marketing channels. Also 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.

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

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