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4. The Performance of Agricultural Marketing Cooperatives in Differentiated Product Markets

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4

The Performance of Agricultural Marketing Cooperatives in Differentiated Product Markets

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Introduction

Cooperative marketing theory for homogeneous products is reasonably well developed. Helmberger and Hoos (1962) explain the basic model for an agricultural cooperative that purchases raw agricultural product, transforms or processes it, and sells a homogeneous food product to food distributors. Others including Helmberger (1964), Youde and Helmberger (1966), Knutson (1966), Sexton (1986), and Cotterill (1987) have extended the Helmberger-Hoos model to analyze the performance of agricultural cooperatives under conditions of monopsony and oligopsony. Agricultural marketing cooperatives do have an impact on farm-first handler market prices and can, under fairly general conditions, perform a competitive yardstick role if these markets are plagued with buyer price distortions. Cooperative conduct can elevate the prices farmers receive for their raw product to the competitive level (Cotterill 1987: 207).

Some general work for the homogeneous product case has also analyzed the participation of marketing cooperatives in tight oligopolies (Mason and Eisenstat 1977, Mueller et al. 1987, Rogers and Marion 1990, Petraglia and Rogers 1991, and Royer and Bhuyan 1995). The only empirical study in this list (Petraglia and Rogers 1991) suggests that price-cost margins are low in industries where cooperatives have large market shares. This is consistent with a competitive yardstick effect if all industries are homogeneous. However, if product differentiation exists, this result is necessary but not sufficient. It does not explicitly show that the investor owned firms (IOFs) in markets where cooperatives have a large share have lower price-cost margins, and assuming similar costs, lower prices. The industry level relation between cooperatives' share and industry price-cost margin may be due to the heavier weight given to the cooperatives' low price-cost margins when cooperatives have a larger share. This low cooperative price-cost margin phenomenon may be due to higher costs and not lower processed product prices.

In 1979, the National Commission for Review of the Antitrust Laws clearly stated the primary concern about large and possibly dominant agricultural marketing cooperatives. They wrote:

> "Testimony before the commission shows that the threat of monopoly by some cooperatives is now substantial . . . In the future less than twenty cooperatives will control the nation's milk supply. Today it is not uncommon for one cooperative to dominate the national production of a single fruit. Some staple crop cooperatives apparently would like to attain similar market control of their commodities" (Mueller 1979a: 3).

In response Mueller explained why a commodity marketing cooperative cannot exercise market power:

> The antitrust commission never adequately analyzed the fact that the typical cooperative has no control over the supply of the product it markets. It cannot control the production of its own members, much less that of nonmembers. This lack of control over production severely limits a cooperative's ability to enhance prices. The inability to control supply makes the customary index of market power, a seller's share of the market, virtually meaningless when applied to agricultural cooperatives (Mueller 1979a: 3).

As in the famous Sun Maid Raisin case of the 1920's, any price elevation due to market power sows the seeds of its own destruction (Cotterill 1984). Members respond to higher prices, produce, and deliver more raw product to the cooperative. Absent a dumping or surplus disposal scheme, the cooperative must lower prices to sell it.

To date, agricultural marketing cooperative theorists have not focused much attention upon the role of agricultural marketing cooperatives as major marketers of leading and highly differentiated brands in some food industries. Recent empirical work by Wills (1985), Haller (1993), Cotterill and Haller (1994), and Haller and Cotterill (1995) analyze brand marketing by cooperatives. Wills reports that cooperative brands with similar market shares and advertising levels tend to have lower, but not significantly different, prices than their proprietary counterparts because of flatter share-price and advertising-price relationships (p. 190). Based on this result Wills concludes that cooperatives that have large share, differentiated brands behave no differently than similarly positioned IOFs. They do not "unduly" enhance price.

Wills' empirical work concurs with the legal economic analysis presented in Jesse et al. (1982). They conclude that cooperatives who exercise market power in a fashion similar to IOFs should not be singled out, via Section 2 of Capper-Volstead, for tougher standards of enforcement. They quote Mueller (1979b):

> The performance of cooperatives should be judged within the context of an economy where varying degrees of market power are the rule, not the exception, and a public policy environment in which little has or is likely to be done about existing entrenched power (p. 252).

> If it is deemed in the public interest to control directly the price performance of cooperatives that unduly enhance prices—and I think there is merit in such a policy—sound public policy argues for such a standard in all sectors of the economy (p. 261).

> Unless something is done to cope with the pervasive problem of undue price enhancement in other areas, pleas for hard-line enforcement of Section 2 of the Capper-Volstead Act seem unjustified (p. 262).

The Haller and Cotterill work is stronger than the Wills study and lessens the need for Mueller's parity doctrine because it suggests that, in some markets, cooperatives actually exercise less market power than a similarly situated IOF would. Haller and Cotterill report that the slope difference between cooperatives and IOFs is statistically significant, with cooperatives having a flatter share-price relationship. Moreover, their work is the first study to document that cooperative presence in differentiated product markets significantly lowers the prices of proprietary brands, i.e. cooperatives have a direct competitive yardstick effect on the price conduct of proprietary brand managers.

This paper focuses upon the theoretical basis for this competitive yardstick effect by agricultural marketing cooperatives in differentiated consumer product markets. We will formally present models of cooperative pricing in differentiated markets that are characterized by monopolistic competition or oligopoly. Questions that will be answered include: Does the competitive yardstick effect of cooperatives that cannot, or do not, control supply in oligopsonistic food processing markets (Cotterill

1987: 206-209) carry over to differentiated oligopolistic product markets? Also, can agricultural cooperatives do more than ensure noncollusive prices; can they provide the socially optimal number of brands (product variety)? Finally if agricultural marketing cooperatives control the supply of their members, how does such restraint influence brand prices? Specifically, should supply limiting conduct be sufficient evidence to prove undue price enhancement under the Capper-Volstead law, or is it conduct that merely allows the cooperative to market differentiated products in a fashion similar to investor owned firms (IOFs) that are not deemed in violation of the antitrust laws?

The Theory of Agricultural Marketing in Differentiated Product Markets

Product differentiation or product heterogeneity complicates the analysis of firm and market equilibrium. Consumers no longer consider products from different firms as perfectly fungible. Brands and brand loyalty exist due to real or perceived quality differences (Aaker and Biel 1993). Consequently profit maximizing firms face downward sloping brand level demand curves.

There are two general approaches to the analysis of product differentiation. Chamberlin (1933) presented a symmetric model that analyzes a representative consumer who desires product variety as well as low prices. Recent work using the symmetric model includes Deneckere and Davidson (1985). Hotelling (1929) introduced the spatial model of product differentiation which has subsequently been generalized by Salop (1979) and others.[2] In the spatial model, consumers that prefer one brand consider as substitutes only brands that are located near that brand. For example if driving on Interstate 90 across the country, when one is running low on gasoline, only one or two service exits in the immediate vicinity are going to compete for your business. Hotelling's original model was of the location of two sellers of food on a beach. The existence of end points in this line model affects equilibrium location. The two firms tend to cluster at the center of the beach so that each can capture a "hinterland" or one side of the beach. Salop showed that this clustering disappears when one eliminates end points by generalizing the model from a finite line to a circle model. Firms in equilibrium then locate equidistant from each other around the circle. Since a circle is in essence an infinite line this predicts that sellers on a beach would locate equidistant from each other.

Whether a particular industry conforms to the symmetric or spatial model of product differentiation is not trivial, and it is testable. Willig (1991) explains that if differentiation is symmetric then, when the price of one brand is elevated, customers are lost to other brands in proportion to their market share. However, if differentiation is spatial customers switch only to nearby brands and industry-wide market shares of other brands are not valid indicators of these brands' cross price elasticities. For example, shredded wheat accounts for only 3 percent of all breakfast cereal sales. Under symmetric differentiation, the brand's manager appears to have little market power because consumers can switch to the brands that account for the other 97 percent of the market. However, differentiation in the cereal industry is spatial. Shredded Wheat consumers regard other simple and healthy unsweetened cereals such as Post Grape Nuts, General Mills Total, and Kelloggs Special K as their next best substitutes. The fact that Kelloggs Frosted Flakes, Quaker Captain Crunch, and other kid cereals exist and have market shares that are roughly equal to those of these simple healthy cereals does not mean that shredded wheat buyers are equally likely to switch to kid cereals if the Shredded Wheat price goes up. Therefore Shredded Wheat's market share dramatically understates the ability of Shredded Wheat, by itself or possibly in concert with nearby brands, to elevate price over costs.

For modeling purposes we need not determine whether differentiation is symmetric or spatial. Each model generates brand level demand curves that have negative own price-slopes and positive cross-price effects for several brands. However, once we have presented several alternative models, the distinction, as will be explained below, helps us to determine which model may be most appropriate for particular food industries.

The theory presented here expands work on cooperative theory by Cotterill (1987). It relies heavily upon concepts introduced there as well as the standard graphical presentation of monopolistic competition for IOFs presented in Ferguson and Gould (1975, Chapter 11). In this paper we will assume each firm markets only one brand, so brand and firm are equivalent. We also assume that brands have identical cost curves, and, at a given price, industry demand is shared equally among n brands (Chamberlin's symmetry assumption). These assumptions make the graphical presentation tractable; however, our conclusions do not depend upon them. Deneckere and Davidson (1985) relax them and show that in equilibrium different brands can have different prices.[3]

As a first step we need to introduce the concepts of followship and nonfollowship demand. Followship demand is the demand curve that a brand manager faces when all brand managers in the industry raise or lower prices in tandem. Ferguson and Gould (1975) call this a proportional demand curve; because, under price followship each brand's proportion of industry output (market share) remains constant as prices rise and fall. A brand's followship demand curve is illustrated by D_1 in Figure 4.1.

A brand's nonfollowship demand curve gives the quantity demanded as its price changes but no other brands' prices change, i.e., no one follows the price change. Demand curve d_1 gives the nonfollowship demand for initial retail price (p_1, q_1). This curve is flatter than the followship demand because the brand captures market share as consumers switch from brands that do not lower price. The nonfollowship demand curve has slope because brands are differentiated and, as such, are imperfect substitutes. If the industry offered homogeneous products (perfect substitutes) the nonfollowship demand curve would be horizontal.

FIGURE 4.1 The Firm in Monopolistic Competition

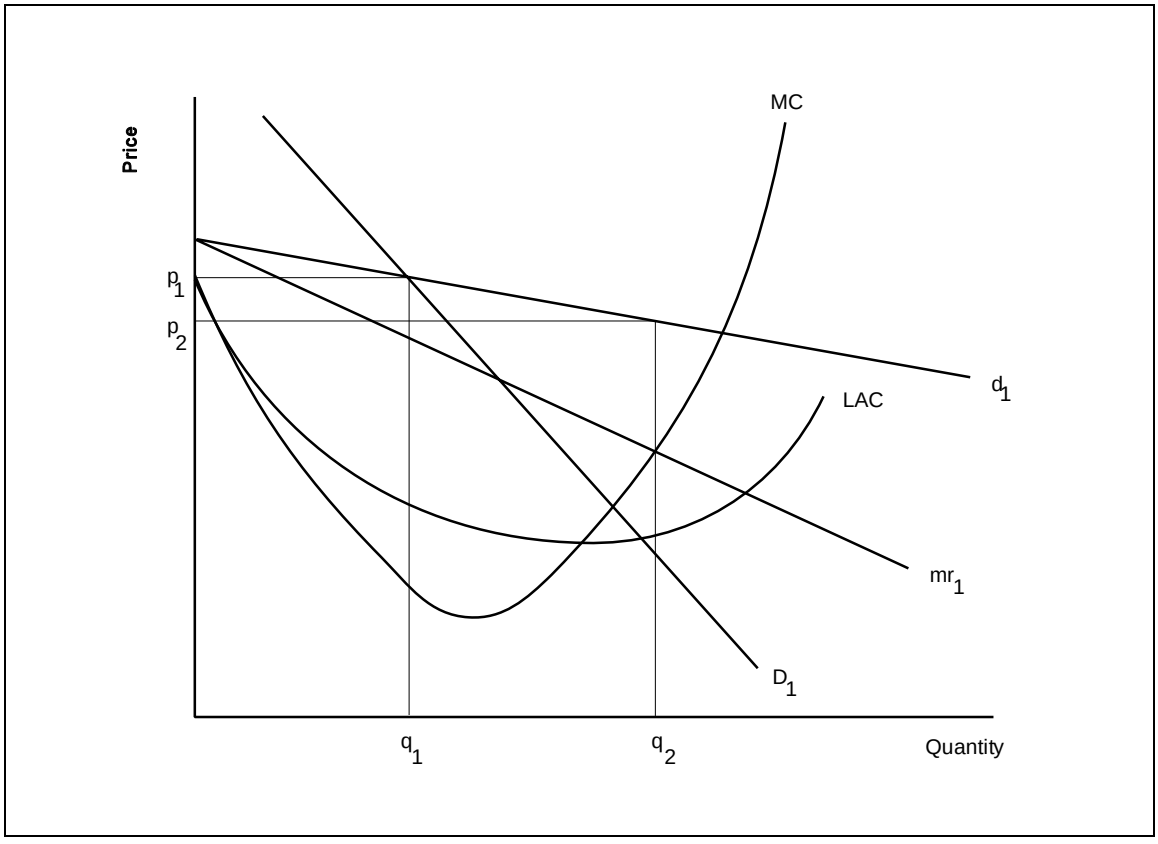


Figure 4.1 contains the cost and demand curves needed to analyze equilibrium in the processed product market. For an agricultural marketing cooperative the long-run average cost curve (LAC) is the sum of the nonagricultural inputs plus the price of the farm input, assuming one unit of agricultural input produces one unit of processed output. As output in this industry increases the price of the agricultural input may increase due to a positively sloped agricultural input supply curve. This farm level supply effect would contribute to the right-hand side positive slope of the LAC in Figure 4.1.

Assume initially that the IOFs and the cooperative maximize profits. Point (p_1, q_1) in Figure 4.1 is not an equilibrium point. Each brand manager thinks that others will not follow, and that lowering price to p_2 will sell output q_2, where nonfollowship marginal revenue equals marginal cost. Thus, the manager thinks he is maximizing profits. Since all managers think this way all prices decline, and output expansion is given by the followship demand curve, D_1, not d_1.

Figure 4.2 gives the short-run (assuming no entry by new brands) equilibrium for monopolistic competition. As managers lower price in pursuit of profits, the nonfollowship demand curve shifts down the followship demand; and, during this process, observed price-quantity points are always located on the followship demand curve, D_1. Once point (p_3, q_3) is attained equilibrium exists since each brands' nonfollowship marginal revenue (MR_3) is equal to marginal cost. No manager believes that changing price can increase profits. Each brand earns positive profits in this short-run equilibrium. In the long-run in monopolistic competition, entry of new brands in response to these economic profits will shift the followship demand schedules to the left and the nonfollowship demand curve will fall as managers

FIGURE 4.2 Short-Run Equilibrium in Monopolistic Competition or Long-Run Equilibrium in Oligopoly with Barriers to Entry

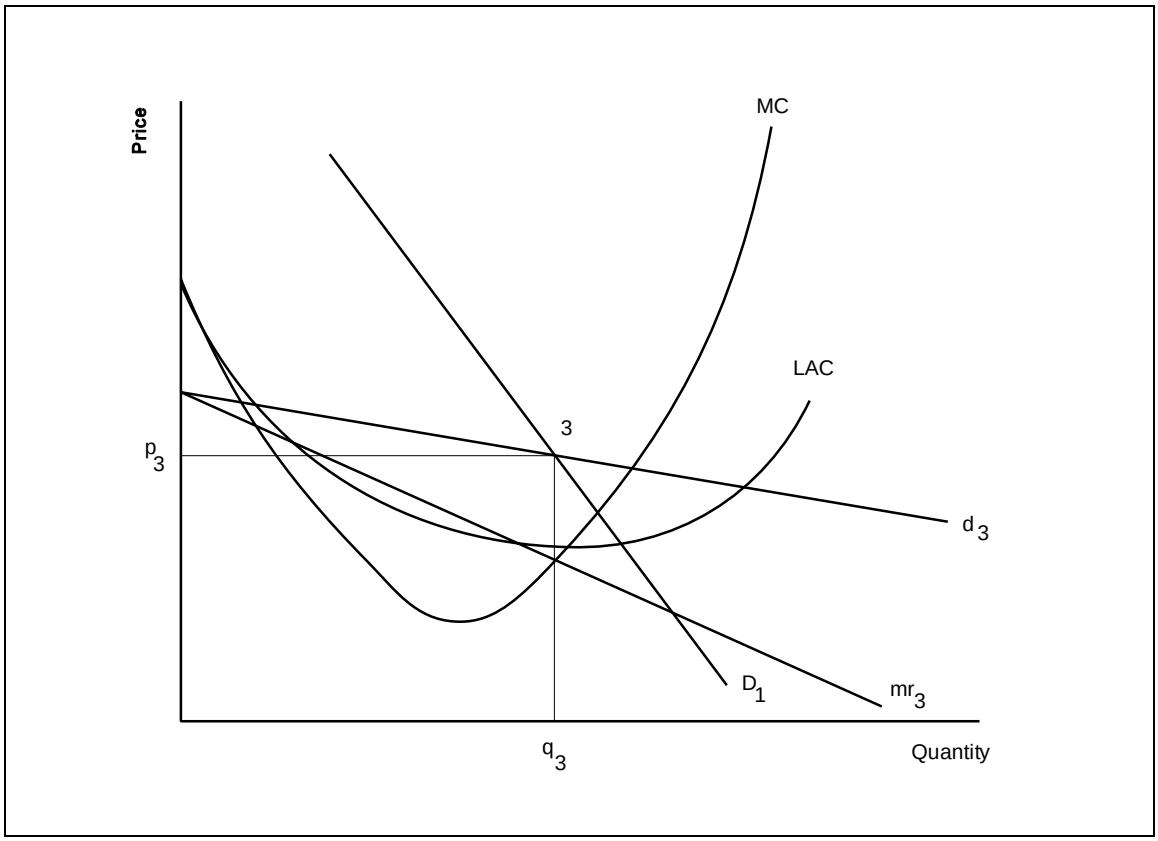
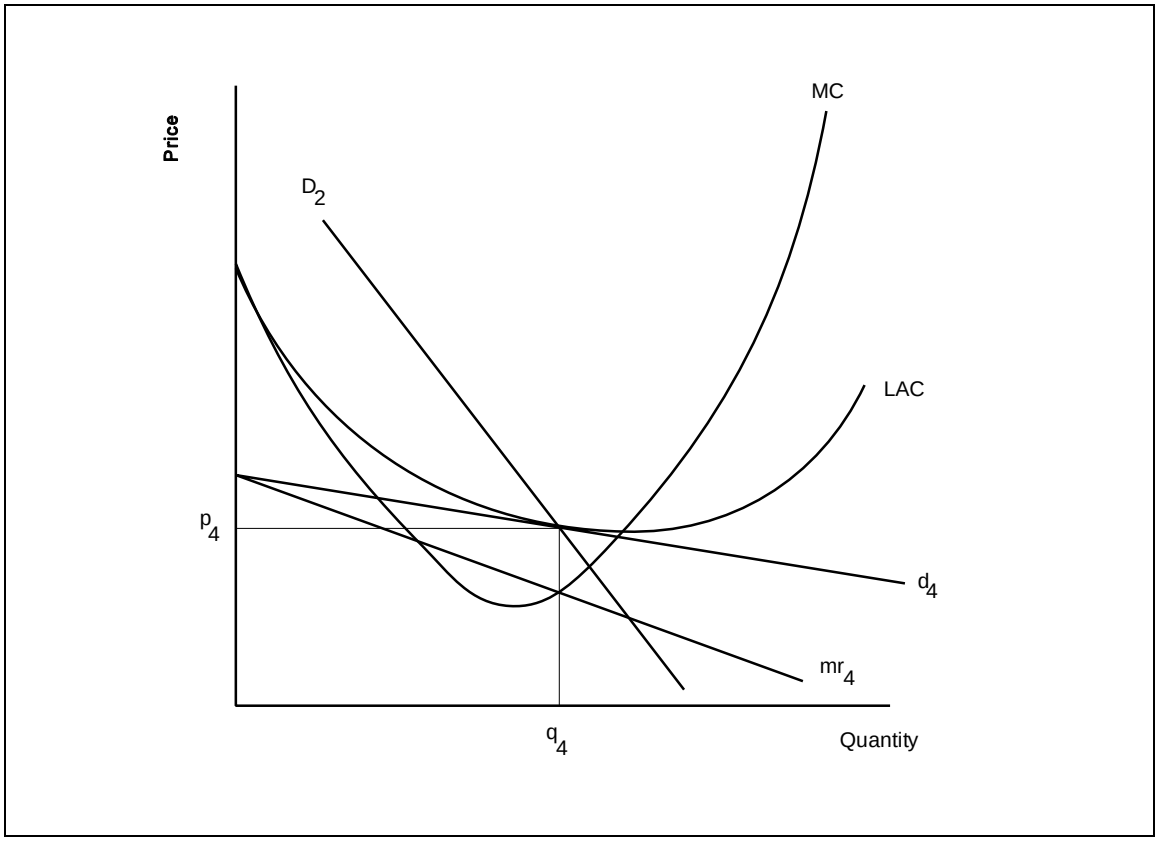


FIGURE 4.3 Long-Run Monopolistic Competition Equilibrium with Price Competition



continue to seek maximum profits. In long-run monopolistic competition with entry and price competition, equilibrium occurs where the nonfollowship curve is tangent to the long-run average cost curve. This is illustrated in Figure 4.3 by point (p_4, q_4). A cooperative can have no competitive yardstick impact on this equilibrium because there are no economic profits.

A different result occurs if one returns to Figure 4.2 and assumes that it describes an oligopoly with high entry barriers. Then, point (p_3, q_3) gives the joint profit maximizing equilibrium for brands. Cooperative conduct can now affect equilibrium. Assume, without loss of generality, that the industry is a duopoly with an IOF brand and a cooperative brand. As explained in Cotterill (1987: 199, 208-211), even if the cooperative brand manager wants to follow the IOF and maximize profits, if the cooperative pays out such profits to its members, has an open membership policy, and must sell all agricultural output as processed product in this market, then the cooperative must lower price to sell product. This is because farmers increase output when they receive marketing profits in proportion to patronage. The payments increase the price received for their raw inputs and farmers supply more product. As the cooperative lowers price to sell this increased output, consumers switch to the cooperative brand, and, as demand for the IOF brand shifts to the left, the profit maximizing price for the IOF also declines. Consequently, the cooperative and the IOF move down the followship demand curve towards the long-run average cost curve.[4]

Figure 4.4 is helpful for analyzing this open membership, competitive yardstick effect. As the cooperative and IOF move from point 3 down D_1, one might expect that both would attain the zero profit equilibrium at point 5. In fact the cooperative is in equilibrium here because price, p_5, is just sufficient to cover long-run average costs which are the price paid farmers for the raw input plus average costs but

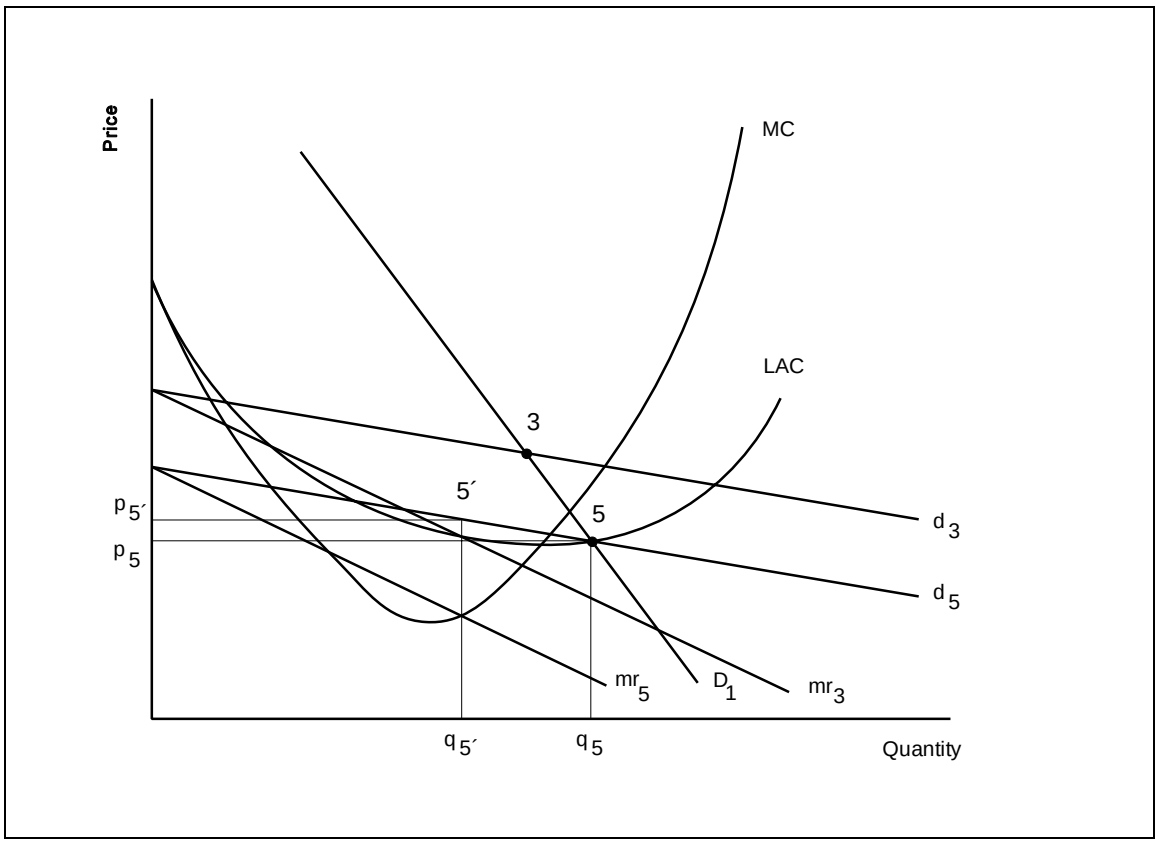
for the nonfarm input processing costs. A profit maximizing IOF, however, now truly faces non-followship demand curve d_5, because the cooperative does not raise price. The IOF maximizes profits at point 5′.

To summarize, if one had an industry with two IOF brands and high entry barriers, equilibrium would be at point 3. Then, if one of these brands was converted to a cooperative brand, prices would decline, assuming open membership, to $p_{5'}$ for the cooperative brand and $p_{5'}$ for the IOF brand. Thus, in duopoly with entry barriers, an open membership cooperative itself charges lower prices and also forces its IOF competitor to lower prices.

If the agricultural marketing cooperative has closed membership, different results can develop. As shown in Cotterill (1987: 204-206) closed membership supply curves are less elastic than open membership supply curves. Also reducing the number of members shifts the closed membership supply curve to the left. In Figure 4.4 this would shift the cooperative's, but not the IOFs', long-run average cost curves up. It is possible for membership to be so restricted that the cooperative's LAC intersects the followship demand curve at point 3. In this case the cooperative has no impact on IOF price and profits.

After paying for non-agricultural processing costs, farmer members of the closed membership cooperative capture the remaining amount of the joint profit maximizing price in a higher price for their farm product. Farmers that are not members and sell product to the IOF receive lower prices. This model seems to explain the Welch's-National Grape and Ocean Spray system wherein farms that have

FIGURE 4.4 The Open Membership (No Supply Control) Cooperative Competitive Yardstick Effect in an Oligopoly with Barricaded Entry



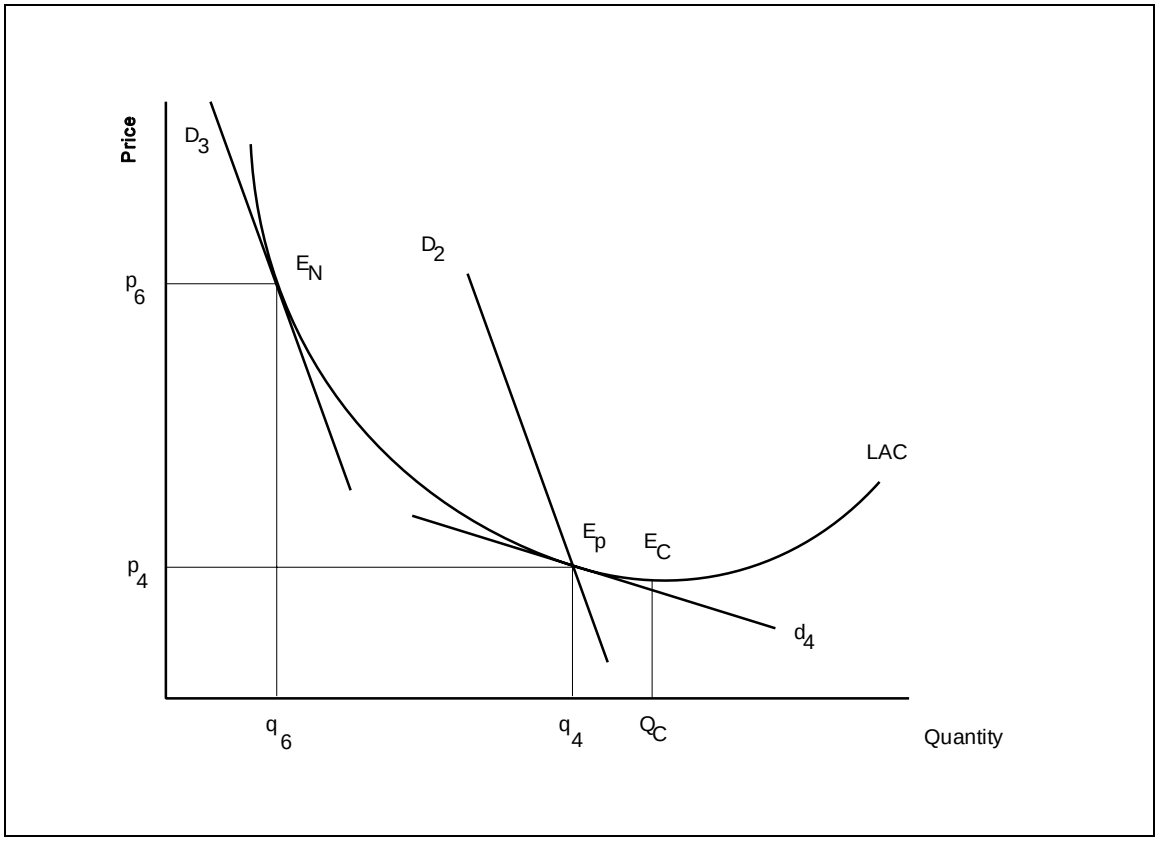
marketing rights through the cooperative are much more valuable than those that do not. The cooperatives "price premium" is capitalized into the value of the farm.

Is this supply control via restrictive membership policies in violation of the undue price enhancement provision of the Capper-Volstead law? The cooperative is exercising market power, but from the standpoint of consumers its conduct is no different than the IOF in this industry. The only difference is that the joint profit maximizing price-cost margin is distributed to the farmer patrons of the cooperative as higher farm prices rather than to investors in the IOF as profits. Only if one abandons the Mueller parity doctrine and holds cooperatives to a higher standard than IOFs, i.e., the competitive yardstick standard, are cooperatives that control supply, via closed membership or other means, necessarily in violation of Section 2 of Capper-Volstead.

Figure 4.5 illustrates a second possible long-run monopolistic competition equilibrium. Assume that firms do not compete on price, but compete in a nonprice fashion by introducing new brands. Movement from the short-run profit maximizing equilibrium (point 3 in Figure 4.2) occurs because, as new brands are introduced, the followship demand curve shifts to the left. Long-run equilibrium is attained when the followship demand curve is tangent to the long-run average cost curve. This non-price competition equilibrium is illustrated as point E_N (p_6, q_6) in Figure 4.5.

Point E_C at the minimum of the LAC denotes the long-run competitive equilibrium. Point E_P denotes the long-run monopolistic competition equilibrium with price competition. The increase in average costs for brands relative to the undifferentiated competitive equilibrium is the "true" cost of differentiation. E_P is Chamberlin's ideal output for a differentiated industry (Ferguson and Gould: 324).

FIGURE 4.5 Long-Run Monopolistic Competition Equilibrium with Nonprice Competition



The increase in cost when non-price competition prevails is represented by the difference between p_6 and p_4 in Figure 4.5. At E_N the industry has too many, high cost brands.

The classic example of a nonprice monopolistic competition equilibrium is retail food distribution in cities supplied by many small corner grocery shops that compete on location rather than price. Another example that comes to mind where firms follow each others' prices and compete by adding new brands is the ready-to-eat breakfast cereal industry. Over 150 brands are now offered. In this case, however, entry barriers exist (Schmalensee 1978, 1982) and consequently new brand introduction does not fully compete away profits. Since the cereal industry and many other food industries are spatially differentiated with entry barriers, the most relevant structural model is probably oligopoly with high entry barriers. If agricultural cooperatives are present in these industries, they can play a competitive yardstick role, or they can play for parity with IOFs.

Returning to the monopolistic competition equilibriums illustrated in Figure 4.5, an agricultural marketing cooperative can also clearly play a competitive yardstick role in an industry that has tendencies toward nonprice competition and the high cost, excessive brands equilibrium at E_N. An open membership cooperative forces IOFs to compete on price and drives equilibrium to point E_P in Figure 4.5. This result suggests that monopolistically competitive food industries with a tendency towards brand proliferation rather than price competition, e.g., cottage cheese, may have lower prices and fewer brands in markets where open membership agricultural cooperatives sell branded products. Concerning price, this in fact is the result reported by Haller and Cotterill (1995).

Notes

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[2]See also Neven (1985), Brander and Eaton (1984).

[3]See Cotterill et al. (1996) for further discussion of alternative behavioral specifications.

[4]Strictly speaking this equilibrating process is different than the independent profit maximizing conduct that generates the followship demand curve. Cooperatives must lower price to move members' product and IOFs are maximizing profits after the resulting shifts in their demand curves, rather than maximizing profit by moving along a perceived but chimeric nonfollowship demand curve. We assume, however, for ease of exposition that this process generates price-quantity points on D_1, the following demand curve.

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