The Role of Cooperatives in Increasingly Concentrated Markets

The Role of Cooperatives in Increasingly Concentrated Agricultural Markets

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Market power is a significant issue at various stages of many agricultural markets, and cooperatives, actively or potentially, play an important role in these concentrated markets.

In this paper, I discuss first the features of agricultural markets that are relatively unique from an industrial organization perspective. I argue that agriculture's special features compel the development of unique modeling approaches to study industrial organization issues in agriculture.

I then consider the role that cooperatives play or prospectively play in concentrated markets as countervailers of the market power of non-cooperative firms, and then proceed to examine the possible exercise of market power by farmers through their cooperatives. This issue has arisen from time to time in the United States (e.g., Federal Trade Commission Staff and Baumer, Masson and Masson) and is currently a topic of considerable interest in Europe (e.g., Bergman; Tennbakk).

Next I contemplate this policy tradeoff and suggest the appropriate dimensions of competition policy towards co-operatives to enable them to act as procompetitive forces but also discourage anticompetitive behavior.

Finally I consider the "flip side" of the issue concerning the exercise of market power by cooperatives, namely the issue of whether cooperatives as an organizational form are well suited to compete effectively in today's increasingly concentrated markets.

Some Unique Structural Characteristics of Agricultural Markets

Farm products are inputs into subsequent production processes that result ultimately in the delivery of finished products to consumers. Rogers and Sexton have argued that competition in the markets for raw agricultural products differs fundamentally from competition for generic inputs such as labor, capital and energy. They further argue that understanding market power in agriculture requires use of models that incorporate the unique structural characteristics of agricultural markets, including the presence of cooperatives, rather than models adapted routinely from the traditional industrial organization (IO) literature. Competition for most nonagricultural inputs exceeds competition for the outputs they produce because firms cross product market boundaries to compete for these inputs, and there is essentially no branding among input buyers to diminish price competition among them. Moreover, these inputs are mobile geographically, which limits the exercise of oligopsony power even in geographic settings in which relatively few buyers prevail.

This view of input markets does not apply, however, to first-handler markets for raw agricultural commodities. Rogers and Sexton identified four distinctive structural characteristics of these markets:

C1. The products are often bulky and/or perishable, causing shipping costs to be high, restricting the products' geographic mobility, and limiting farmers' access to only those buyers located close to the production site.

C2. Processors' needs for agricultural products are highly specialized. Other inputs cannot normally be substituted for a given farm product, nor can the given farm product substitute readily for agricultural product inputs in alternative production processes.

C3. Farmers are specialized to the supply of particular commodities through extensive investments in sunk assets. The crop itself in most cases represents a sunk asset wherein, for example, an investment in tree stock, once made, is irreversible. Sunk assets represent exit barriers for farmers and cause raw product supply to be inelastic, in many cases perfectly inelastic.

C4. Marketing cooperatives, bargaining associations, and marketing orders—institutions of seller power— are present or potentially present in the market and raise concerns about the exercise of market power by cooperatives. Without the protection of the Capper-Volstead Act and the Agricultural Marketing Agreement Act, these organizations would represent per se violations of the Sherman Act.

C1 and C2 are crucial to defining input markets for agricultural products. Collectively, they assert that the relevant markets for raw agricultural products are typically narrower with respect to both product class and geography than the markets for the finished products they produce. Thus, C1 and C2 contradict the general proposition that relevant buyer concentration will be less than seller concentration. High buyer concentration in the relevant market coupled with inelastic supply of the farm commodity (C3) jointly signal the strong potential for buyer market power.

The prototype agricultural market characteristics also call into question the common view that concentration in agricultural markets can be analyzed readily using the standard tools of industrial organization (IO). First, markets with costly product transport (C1) are by definition spatial markets, yet the classic IO models ignore the spatial dimension. Second, traditional IO models are incapable of accommodating the inelastic short-run supply relationships common in agriculture. These models assume production and purchases are determined jointly with price and that producers have smooth, continuous marginal cost functions. In industries in which the supply is already committed at all prices above the marginal harvest costs, growers and buyers in each harvest period are essentially bargaining over the terms of trade for a fixed volume of product. Third, marketing cooperatives, bargaining associations and marketing orders (C4) are largely absent from other sectors of the economy and, thus, infrequently a part of traditional IO models.

Evidence of Buyer Concentration in Food Markets

The Census of Manufacturing data for the fifty-three food and tobacco industries, identified by four-digit SIC codes in the 1992 census, show that most industries have experienced decreasing firm numbers and increasing seller concentration over time.[1] Moreover, the sector's largest 100 firms accounted for two-thirds of its value added. Even without adjust-

ing for proper market definitions, the data indicate that both consumers of finished food products and sellers to the processing industries now face fewer and more dominant firms. Although trends in farm production include decreasing farm numbers and increasing farm size, the imbalance between the number and size distribution of farmers and that of the firms they sell to has worsened since 1960.

Rogers and Sexton recently provided an updated view of structure in the food and tobacco processing industries. Most of the fifty-three food and tobacco industries contained in the census do not define relevant input markets because (a) input markets are often local or regional in geographic scope (C1) and (b) the four-digit industry categories are too broad (C2). Table 1, reproduced from Rogers and Sexton, addresses this first problem for nine industries in the 1987 census by moving to the SIC five-digit product class data or even to more narrow classifications.[2] The average four-digit, four-firm concentration ratio (CR4) is 37.8, and four of the nine industries have CR4 $\leq$ 30. However, the five- and seven-digit classifications have an average CR4 of 61.3, with twenty-four of the thirty-eight national product markets having CR4 $\geq$ 50, a commonly used benchmark for separating markets into workable competitive and noncompetitive groups.

Consider, for example, the meat and poultry industries. Plants in these product categories are highly specialized and, even though the finished products may be good substitutes, the raw agricultural products are not substitutes into production. In these cases the five-digit product class data are needed to provide a basis for meaningful assessments of the input market structure. Similar conclusions hold for the flour and other grain mills and vegetable oil mills categories. Table 1 documents that, generally, the number of firms and plants falls and CR4 rises when one moves from industry data (four-digit) to product class data (five or more digits). In canned fruits, the relevant input markets are often so narrow that the seven-digit level of detail is necessary to attain the proper market definition. To illustrate, note that, although eighty-one firms canned fruits in 1987, only five and eleven processed cranberries and olives, respectively. Thus, whereas canned fruits may represent a relevant output market class, it is far too broad for analysis of competition in the raw product markets because the vast majority of fruit processors do not compete, for example, for olives or for cranberries.

The problem of using national census data to make inferences about local/regional markets is even more vexing. The national data will typically represent lower bounds on the relevant geographic input market concentration.[3] Two examples from Rogers and Sexton illustrate the general problem. In 1987 twenty sweet corn canners and twenty-four frozen sweet corn processors operated with production scattered across much of the country, contributing collectively to a relatively unconcentrated market for processed sweet corn. However, the relevant raw product input markets may be highly concentrated, given the geographic immobility of raw sweet corn (Jesse et al.). Similarly seventy-two broiler processors operated in 1987 with CR4 = 42. These firms are located predominantly in the "broiler belt" that stretches from the Mid-Atlantic to Eastern Texas. Shipping of refrigerated and "super chilled" chickens has allowed the output market to continually enlarge in geographic scope, but the input markets remain local, often a fifty-mile radius around a processor.

Cooperatives are directly relevant to market conduct in agriculture because they enable their members to integrate around oligopsony processors and may also influence oligopsonists' behavior by acting as yardsticks of competition, issues addressed in the next section. For the 100 largest marketing cooperatives, Table 1 lists

Table 1. Concentration in Food and Tobacco Processing Industries, 1967 to 1992

SIC	Name	All Companies Co	Est	VS	CR4	Top 100 Co-ops Co-op	Est	VS Share
2011	Meat packing plant products	1328	1434	41227	39	1	2	0.1
20111	Beef, not canned or made into sausage	218	265	21684	58	0	0	0.0
20112	Veal, not canned or made into sausage	52	53	379	64	0	0	0.0
20113	Lamb and mutton, not canned or made into sausage	38	41	380	73	0	0	0.0
20114	Pork, fresh and frozen	132	161	8406	38	0	0	0.0
2015	Poultry and egg processing	284	463	14371	29	3	16	5.0
20151	Young chickens	72	161	7452	42	2	12	7.1
20153	Turkeys, incl. frozen, whole and parts	41	57	1645	38	1	3	2.5
20159	Liquid, dried and frozen eggs	39	47	495	41	0	0	0.0
2033	Canned fruits and vegetables	462	647	12244	28	26	63	13.7
20331	Canned fruits, except baby foods	81	120	2085	49	9	25	38.6
2033128	Canned cranberries and sauce	5	10	107	>96	1	6	(D)
2033136	Canned olives, incl stuffed	11	11	280	87	3	3	56.5
2033190	Other canned fruits, excl olives, cranberries	69	101	1698	55	6	16	32.5
20332	Canned vegetables, except hominy and mushrooms	99	214	2298	42	3	10	8.8
20333	Canned hominy and mushrooms	21	26	166	66	1	1	1.5
20335	Canned vegetable juices	37	49	310	78	3	4	18.8
20336	Catsup and other tomato sauces, pastes, etc.	94	148	3024	55	1	6	5.0
20338	Jams, jellies, and preserves	55	77	664	57	4	7	10.6
2033A	Canned fruit juices, nectars, and concentrates	95	133	2344	48	9	18	14.4
2033B	Fresh fruit juices and nectars, single strength	188	295	951	35	14	25	16.3
20866	Noncarbonated soft drinks, including fruit drinks	286	504	2427	54	15	40	32.8
2034	Dehydrated fruits, vegetables, and soups	107	132	2079	37	3	4	14.2
20343	Dried and dehydrated fruits and vegetables	52	82	1544	41	3	4	19.1
2034313	Raisins	11	13	334	80	1	1	(D)
2034315	Prunes	10	24	265	88	1	1	(D)
2034330	Dehydrated potatoes (-29,-31)	8	11	173	90	0	0	0.0
2035	Pickles, sauces, and salad dressings	344	382	4479	40	3	3	1.8
20352	Pickles and other pickled products	78	102	1000	48	0	0	0.0
2037	Frozen fruits and vegetables	194	258	6254	30	7	13	8.4
20371	Frozen fruits, juices, ades, drinks, & cocktails	89	114	2482	41	6	10	13.3
20372	Frozen vegetables	86	147	3645	42	3	9	5.4
2037248	French-fried potatoes, incl -49 other potatoes	31	50	1853	77	1	1	(D)
2037290	Other frozen vegetables	69	110	1792	27	2	8	(D)
2041	Flour and other grain mill products	237	358	4690	44	1	1	1.0
20411	Wheat flour, except flour mixes	75	185	3219	54	1	1	1.4
20413	Corn mill products	55	98	561	59	0	0	0.0
2076	Vegetable oil mill products, n.e.c.	20	23	490	70	3	3	4.3
20761	Linseed oil	6	7	105	98	1	1	15.0
20762	Vegetable oils	29	39	218	67	2	2	1.4
2099	Food preparations, n.e.c.	1510	1658	10671	23	7	12	0.6
2099761	Dried,dehydrated potatoes, packed w/other ingred	8	11	(D)	99	0	0	0.0
2099771	Head rice packaged w/other ingredients	12	17	225	91	2	4	(D)
2099783	Macaroni & noodles w/other ingredients	30	42	536	80	0	0	0.0
2099921	Perishable prepared salads	84	86	359	46	1	1	(D)
2099935	Vegetables, peeled or cut for the trade	22	25	78	61	0	0	0.0
2099F	Peanut butter	41	48	848	70	1	1	0.6
2099G25	Honey, blended and churned	14	16	79	74	0	0	0.0 a

Note: 4 digit company and establishment counts are from industry classifications, whereas the 5 and 7 digit are product class data, hence it is possible for their counts to exceed the 4-digits counts.
Co = number of companies Est = number of establishments VS = value of shipments in $millions
If the number of cooperatives was less than 5, the VS Share was estimated if possible, else (D).
(D) = Census cannot disclose the value.
a = Sioux Honey Associatioin has the #1 position in retail sales, but it must not be among the 100 largest ag marketing coops, but Census cannot say.

the number of co-ops and establishments in the product-class categories and their combined market shares. The co-op share is positively related to the importance of the agricultural input in the production process and negatively related to the industry's ratio of value added to shipments. Much of cooperatives' involvement in food marketing is missed, however, when only food processing industries are examined because cooperatives have a major presence in the first-handler markets that are classified outside of food processing.

How Do Cooperatives Countervail Processor/Handler Market Power?

In this section, I consider the vehicles through which cooperatives may countervail the oligopsony power of processor/handlers and thereby enhance the competitiveness of first-handler markets and increase both producer and consumer welfare. To focus the discussion, I consider a simple model that incorporates C3, inelastic farm supply. For example, given a perishable crop, any period's supply, Q_t, is the product of planting decisions made months or years previously and, thus, is fixed and independent of the current market price. The harvest is $H_t \leq Q_t$ to account for instances in which price drops so low that it does not pay to harvest the entire crop. The harvest determines the retail price through consumers' aggregate demand function, which is specified as

$$(1)\quad P^r_t = F(H_t, \mathbf{X}_t),$$

where H_t denotes total volume shipped, $\mathbf{X}_t$ represent demand shifters, and $\partial P^r/\partial H < 0$.[4]

When the product is procured competitively, the derived demand at the farm is determined by subtracting from the retail demand all costs of marketing the product from farm to retail. The per-unit marketing cost function can be written as

$$(2)\quad M_t = M(H_t, \mathbf{W}_t),$$

where $\mathbf{W}_t$ represents a vector of prices of inputs used in marketing the product from the farm to consuming markets (e.g., processing costs, transportation services and grocery store labor). Farm demand for the competitive marketing case can be expressed as:

$$(3)\quad P^f_t = G(H_t, \mathbf{X}_t, \mathbf{W}_t) = F(H_t, \mathbf{X}_t) - M(H_t, \mathbf{W}_t).$$

Let per-unit harvest costs be constant with respect to the volume harvested: $C_t = Co_t$, and let Q^* represent the solution to $G(\cdot) = Co_t$, the intersection of the farm demand with the harvest cost function. Crop volumes in excess of Q^* will not be harvested because the farm price is insufficient to reimburse the variable harvest costs. Thus, whenever $Q_t > Q^*$, $H_t = Q^*$ and the farm price is determined solely by per-unit harvest costs, Co_t, and is independent of the retail price.

Under competitive marketing conditions the farm price is, therefore, determined under either of two alternative regimes:

$$(4)\quad \begin{cases} P^f_t = Co_t & \text{with prob} = \lambda_t \\ P^f_t = G(H_t, \mathbf{X}_t, \mathbf{W}_t) & \text{with prob} = 1 - \lambda_t, \end{cases}$$

where λ_t denotes the probability that farm price is constrained to the level of harvest costs. Farmers as owners of the factor in fixed supply, the available harvest, receive all rents, if any, from sale of the product under perfect competition.

Now consider farm price determination under conditions of imperfect competition in the market for the purchase of the farm product. Equation (3) no longer represents buyers' derived demand for the farm product. Rather, it represents the marketing sector's theoretical

ability to pay for alternative volumes of the product.

For $Q_t > Q^*$, farm price is again determined by the level of harvest costs, i.e., the marketing sector, regardless of its competitive structure, is unable to offer a price that compensates variable harvest costs for harvest volumes in excess of Q^*. For $Q_t < Q^*$, there exists a per-unit surplus, S_t, equal to the retail price minus marketing and farm harvest costs:

$$(5)\quad S_t = S(H_t, \mathbf{X}_t, \mathbf{W}_t, Co_t) = G(H_t, \mathbf{X}_t, \mathbf{W}_t) - Co_t.$$

Given $\mathbf{X}_t$, $\mathbf{W}_t$, and Co_t, S_t is fixed by the level of H_t. It is decreasing in H_t for all $H_t \in [0,Q^*)$. Figure 1, with Co_t normalized to equal zero, illustrates S_t for three alternative volumes of harvest. The existence of $S_t > 0$ in weeks when $Q_t < Q^*$ implies a range of indeterminacy for the farm price. It may vary between Co_t and $G(\cdot)$ based upon the division of surplus between growers and buyers.

Thus, under imperfect competition, supply and demand do not uniquely determine a farm price, and distribution of S_t between buyers and farmers must depend upon the relative bargaining power of the two parties. Let γ_t, $0 \le \gamma_t \le 1$, represent the farmers' share of the surplus. For $H_t < Q^*$, the increment by which farm price exceeds harvest costs is determined by the product of the available surplus, $S(\cdot)$, and the farm share, γ_t. The process describing farm price determination under imperfect competition is then as follows:

$$(6)\quad \begin{aligned} P^f_t &= Co_t && \text{with prob} = \lambda_t \\ P^f_t &= Co_t + \gamma_t[G(H_t, \mathbf{W}_t, \mathbf{X}_t) - Co_t] && \text{with prob} = 1 - \lambda_t. \end{aligned}$$

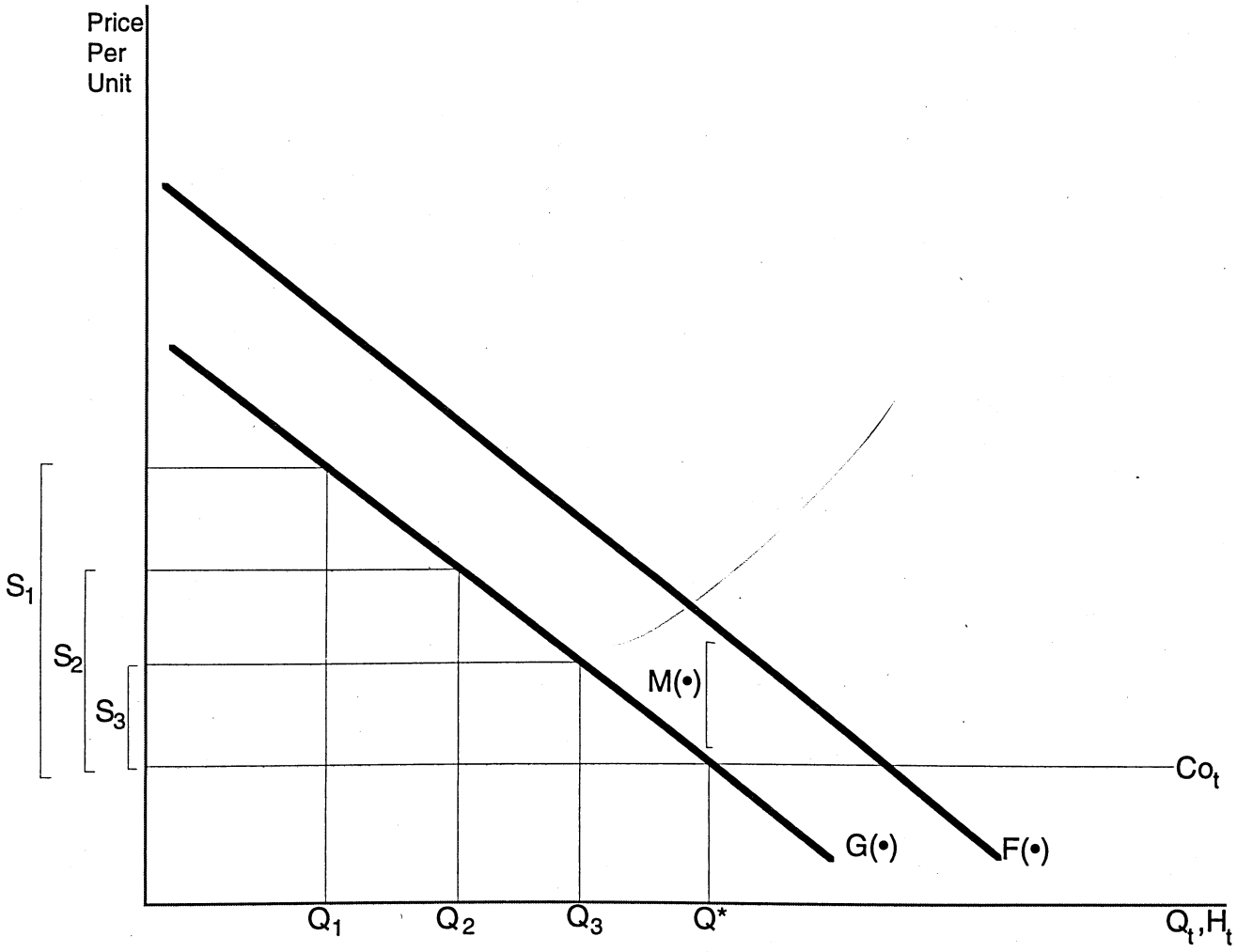
In this simple model, the consequences of monopsony power are solely distributional. Because farm supply is inelastic, there is no deadweight loss. When supply is somewhat elastic, the exercise of oligopsony power will, by reducing sales, reduce farm prices, raise consumer prices and cause a social loss.

Application of this model to California lettuce by Sexton and Zhang indicated that buyers were successful in capturing on average 93.5 percent of the market surplus and relegating growers to roughly zero profits.

More generally, we may consider that γ_t is determined by the structural characteristics of the market including degree of buyer concentration and the presence of marketing cooperatives or bargaining organizations. What role may cooperatives play in mitigating this power? A first alternative, and one explored in detail in Sexton (1986), is that growers may simply integrate around the oligopsony power by forming a cooperative to market the farm commodity themselves. In terms of the model, if a cooperative can operate with the margin M_t defined in (2) and return all remaining revenues to farmers, they receive prices based on (4), i.e., the competitive market price. In this idealized scenario, cooperation eliminates the oligopsony exploitation and any social loss associated with it by effectively setting $\gamma_t = 1$.

The reality of competing in concentrated markets may prevent the idealized cooperative solution from being attained. In subsequent work with Terri Sexton (R.J. and T.A. Sexton, 1987) and Rob Innes (R. Innes and R.J. Sexton, 1993), I examined actions incumbent firms with market power could undertake to prevent cooperatives from exercising their potential. Sexton and Sexton showed how limit pricing could be used by an incumbent firm to prevent entry by a cooperative. In this model an organized coalition of farmers was assumed to be in place. Deterrence of the coalition's entry into production and sales was attained only through offering the coalition's members sufficiently favorable price terms to eliminate their economic incentive to form the cooperative.

Figure 1. Price Determination for a Commodity with Inelastic Short-Run Supply



Essentially, the Sexton and Sexton model offers a particular solution to the bargaining problem posed over the disposition of the surplus S_t defined in (5) and measured through the share parameter γ_t. By threatening credibly to enter production through a cooperative, the farmer coalition is able to make a take-it-or-leave-it offer to the incumbent producer that ensures the members of returns equivalent to what they could attain through cooperative production. In the model of this section, the incumbent would be able to capture surplus based only on any entry costs, $F \geq 0$, the cooperative would incur. Of course a cooperative is credible only in those cases for which $F < S(\cdot)$. The incumbent captures F, leaving the farmers the amount of surplus equal to $S(\cdot) - F$, and, therefore, $\gamma_t = (S - F)/S$.[5]

This model, too, may present a more idealized view of the role of cooperatives in countervailing market power than can actually occur in many competitive settings. Farmers are often not organized and can become organized only at a cost. Fulton, in fact, has argued recently that society is becoming increasingly individualistic, a trend he views as inimical to the collective spirit conducive to cooperatives. Such a trend towards individualism can be interpreted as raising the transactions costs of organizing and operating on a cooperative basis.

Innes and Sexton (1993) modeled formally the process whereby cooperative coalitions may emerge. Coalition formation is costly in this model but exhibits economies of size in that organizing costs increase at a decreasing rate in the numbers of members in the coalition. In this setting, the opportunity for farmers to collectively countervail buyer market power is greatly diminished.

First, the incumbent is able to convert the buyers' organizing costs into profit that would not be attainable if he had to bargain collectively with an organized coalition. Second, Innes and Sexton show how the incumbent can use discriminatory pricing strategies to "divide and conquer" the farmers based on their inability to act in their collective interest.

Divide-and-conquer pricing can emerge in practice through special pricing arrangements given to certain farmers that diminish their incentives to participate in a farmer cooperative.[6] Without the participation of these farmers, the collective power of the remaining farmers is diminished, and they can be "conquered" with a lesser sacrifice in profit by the incumbent than if he had to deal with the total coalition of farmers. Although Innes and Sexton discuss policy alternatives, such as prohibitions on price discrimination, that lessen incumbents' opportunities to engage in divide-and-conquer pricing, the message is that, in the generalized setting in which farmers are unorganized and organizing is costly, the ability to countervail market power through cooperatives is greatly diminished relative to the outcomes indicated in works such as Sexton (1986) and Sexton and Sexton (1987).

The final means through which cooperatives may countervail buyer market power in concentrated markets is through the yardstick-of-competition effect espoused originally by Nourse. His reasoning in the seminal 1922 article still resonates powerfully today: If cooperatives are providing better services and prices to farmers than are competing for-profit firms, these firms must follow suit or lose patrons to the cooperative. A key to the competitive yardstick is, thus, that the cooperative be willing and able to accommodate new members.

Helmberger's work was a first attempt to model formally the yardstick effect. An open-membership cooperative serving members at cost would force rival firms to operate on a similar zero-profit basis, thereby causing the competitive market outcome to be attained.[7] However, a closed-membership cooperative presents, at best, an indirect yardstick effect by

offering a benchmark price by which farmers can compare the prices they receive from noncooperative marketers. This effect is very important in certain markets, and it is not uncommon for contracts to peg the price received by farmers to the price offered by the cooperative operating in the market.

An unappealing feature of Helmberger's model is the starkness of the results attained: No direct yardstick effect for a closed-membership cooperative and a very powerful yardstick effect (i.e., attainment of the competitive solution) for an open-membership cooperative. Sexton (1990) used a spatial markets framework (C1), and showed that an open-membership cooperative's yardstick effect became moderated in these settings because costly product transport limits distant farmers' access to the cooperative and enables noncooperative handlers to maintain some market power over those farmers.

Fulton points out an interesting twist on the yardstick effect in modern, increasingly concentrated markets. He observes that the indirect yardstick effect relies upon farmers being able to observe alternative price offers, including those available through cooperatives. Fulton further notes that organized markets are disappearing in many industries, being replaced by vertical integration and detailed production-marketing contracts. Prices are difficult to observe in these settings, and, moreover, price is only one of many terms specified in typical contracts, making it rather hard to evaluate a cooperative's terms relative to those offered by competing noncooperatives. Valuation of patronage refunds received through a cooperative is an additional complicating issue in this respect.

Evaluating Possible Market Power Abuses by Agricultural Cooperatives

A concern in both the United States and Europe is that marketing cooperatives may sometimes abuse their positions in the market and exercise power to the detriment of consumers. The economic basis for these concerns is analyzed in this section. A key concept used here is that of the residual demand facing a single seller or two or more sellers considering merger. The residual demand facing a seller is total market demand (expressed as a function of the price charged by the firm) less the collective supply at each price from all other sellers of the product. For example, the residual demand for a monopolist is the market demand. The residual demand for a competitive seller is flat (perfectly elastic) at the prevailing market price.

Residual demand measures a firm's ability to influence prices, taking into account the response of all competing firms. The flatter or more elastic is the residual demand, the less opportunity the firm has to raise prices above the competitive level and exercise market power. Residual demand facing a given firm hinges upon the total demand for the firm's product and the aggregate supply relationship for the competing suppliers of the product. If competing suppliers have a very inelastic supply response due, for example, to short-run capacity constraints, residual demand facing a given firm may be rather inelastic. Conversely, if rivals are able and willing to expand supply rapidly in response to any price change, a given firm will have a relatively elastic residual demand and little or no market power.[8] The residual demand concept readily incorporates competition through international trade. Trade expansion in an importing country will tend to reduce the market power of its domestic firms because introducing international trade brings exporting countries' excess supply curves into the calculation of residual demand for the domestic firms.

Marketing cooperatives are generally ill suited to the exercise of market power for two fundamental reasons:

1. Most marketing cooperatives' output levels are determined implicitly by the

levels of production chosen by their farmer members. Individual farmers are perfect competitors. Thus, even if farmers collectively have market power through their cooperative, the market power will not be exercised if each farmer makes production decisions independently. The cooperative usually represents a "home" for its members' production. In other words, the cooperative processes and sells whatever production its members supply.

2. Membership in cooperatives in market economies is voluntary, and seldom does any single cooperative control the complete market supply of a product. Without significant control of the market, attempts by a cooperative to restrict output and raise price will be undermined by free ridership. Other sellers will benefit from restriction of supply by the cooperative without bearing the cost. Therefore, they will earn superior returns relative to the cooperative, be able to bid away its membership, and undermine the attempted exercise of market power.

These factors are powerful and pervasive. The key to understanding when and how cooperatives might exercise market power lies in evaluating circumstances when these factors do not apply. In the case of the first factor, cooperatives' most direct route to supply control is to restrict deliveries of members and/or restrict membership into the cooperative.[9] This conduct is not anticompetitive in its consequences if there are alternative outlets for the production of those whose supply is rationed or those who are excluded from membership. Cooperatives may have efficiency motivations for imposing restrictions on membership or member deliveries. Short-run processing or handling capacity constraints justify supply restrictions as do attempts to maintain product quality in certain cases. Thus, supply restrictions by a cooperative do not constitute evidence per se of an attempt to exercise market power. However, restriction of supply by a cooperative that has a dominant market position is apt to be anticompetitive.

A second, less direct route to the exercise of supply control involves restricting strategically the flow of product across alternative market outlets and practicing price discrimination. This behavior has been alleged against U.S. marketing cooperatives (Federal Trade Commission; Masson and Eisenstat; Baumer, Masson and Masson) and is of concern also in Europe (Bergman). Price discrimination is profitable in principle whenever a firm faces multiple selling markets, residual demand elasticities facing the firm differ across the markets, and the markets can be segmented so that resales from low-price to high-price markets can be prevented. Raw agricultural products are usually transformed into multiple finished product forms, and often the demand elasticities differ across the markets. Examples are the demands for fluid versus manufactured milk products, fresh versus processed fruits and vegetables, and grains and meats for human consumption versus animal feed. For products that are traded internationally, a firm usually faces more competitors, and, hence, more elastic residual demand, in its export markets than in the domestic market.

In all of these examples, a seller with substantial control over the raw product supply can increase profits relative to the competitive market outcome by restricting sales and raising price in the inelastic demand market(s) and consequently "dumping" additional product in the elastic demand market(s). This behavior induces a social loss because marginal willingness to pay is not equated across markets.

Price discrimination by cooperatives is a concern because it can occur in the absence of any controls on member production and because

many agricultural product markets can be segmented based either on product form (e.g., fresh vs. processed uses) or space (e.g., domestic vs. export markets). However, for price discrimination to be successful, a single seller or multiple sellers in collusion must have substantial control over the allocation of product across markets, or free riding (excessive selling into the high-price market) will work to undermine the scheme.

In the United States the main evidence of anticompetitive behavior among marketing cooperatives involves allegations of price discrimination against dairy cooperatives. Masson and Eisenstat estimated that U.S. dairy cooperatives succeeded in raising retail fluid milk prices by $0.07 to $0.10 per gallon, with an annual loss to consumers of $71 million from 1967 to 1975, when the behavior was halted by antitrust action.[10]

Analysis of market power abuses by U.S. cooperatives is often difficult to disentangle from the effects of marketing orders. Strong U.S. cooperatives have often been rather effective in controlling decision making under marketing orders. Examples are the citrus order, dominated by the Sunkist cooperative, in which considerable evidence of price discrimination between fresh and processed markets existed prior to the order's recent termination (Shepard). Sexton, Kling and Carman found evidence of geographic market power for Florida celery, for which sales are regulated by a marketing order and all sellers belong to a single cooperative. Sexton and Sexton (1994) argue that these abuses are attributed properly to marketing orders rather than to the cooperatives themselves. U.S. milk marketing is also controlled by marketing orders, but the estimates of loss obtained by Masson and Eisenstat involve price discrimination over and above what was mandated through the marketing orders.

Masson and Eisenstat, and Baumer, Masson and Masson, argue that the monopoly power in U.S. milk markets needed to exercise price discrimination was caused by a wave of mergers among milk marketing cooperatives during the 1960s. They also argue that these mergers would have been challenged under the Clayton Act had the merging parties not been cooperatives.[11] Bergman notes that Swedish cooperatives, although fewer in number than U.S. cooperatives, control collectively 70 to 100 percent of the supply of most agricultural markets. He also argues that European antitrust laws are generally weaker than comparable U.S. laws.

Appropriate Competition Policy Toward Cooperatives

The goal of competition policy regarding cooperatives should be to facilitate their opportunity to address market failure and countervail market power, while limiting the opportunity for cooperatives themselves to exercise market power. The theoretical basis for cooperatives to play a procompetitive role in addressing market failures is quite strong and arguably justifies limited exemption from competition laws even though empirical evidence on the subject is rather limited. Economic theory defines a relatively limited set of market conditions when cooperative market power is a concern and comparatively broad conditions when cooperatives play a procompetitive role. However, the U.S. experience in dairy indicates that the potential for anticompetitive behavior exists if cooperatives, either through mergers or marketing agreements, control collectively a large share of the relevant market and begin cooperating with each other rather than competing. For this reason, I believe competition policy should not exempt mergers among marketing cooperatives from review under the competition laws. Rather, it is appropriate to evaluate proposed mergers to determine their likely effects on competition.[12]

The market shares of the proposed parties to a cooperative agreement is not the key criterion

in evaluating the competitive consequences of an agreement, although agreements among sellers with a small collective market share are certain to be innocuous from a competition perspective. Rather, the key criteria are:

1. Elasticity of market demand for the product(s) being produced.
2. Elasticity of supply at prices above the competitive level for competitors to the agreement, including export competition.
3. Market conditions relative to the exercise of price discrimination.

The policy issue of cooperatives imposing restrictions on deliveries and entry/exit of members is difficult because such restrictions can be motivated by efficiency considerations, or they can be attempts to exercise market power. U.S. marketing cooperatives do have the right under the Capper-Volstead Act to restrict entry into the cooperative and to engage in marketing contracts that may restrict deliveries of their members. Especially among cooperatives marketing fruit and nut commodities, it is rather common to engage in one or both of these practices. However, European cooperatives have often been denied such rights as, for example, in Sweden.

The key issues in evaluating restrictions on member deliveries are similar to those addressed in the literature on exclusive dealings. U.S. courts have often found exclusive dealings to violate the antitrust laws, but these rulings have been criticized by proponents of Chicago School economics, such as Bork, who argue that such agreements are signed for efficiency reasons and, thus, are procompetitive. Efficiency-based motivations to restrict membership and/or member supply relate to short-run capacity constraints in the cooperative plant and to issues of product quality. Most analyses of processing costs indicate that per-unit costs are roughly constant as a function of output up to near the level of capacity, at which point they rise rapidly. The efficiency cost to a cooperative that is unable to control its supply can, therefore, be significant.

Heterogeneity in quality of members' production can be handled in a number of possible ways: grades can be set prior to the production being merged at the cooperative plant, with premiums and discounts set appropriately. Alternatively, the cooperative can maintain separate pools for different grades of product, with each pool accruing its own revenues and costs and payments to farmers determined accordingly. Such practices may, however, entail high transactions costs. It may make sense for the cooperative to specialize in marketing production of a specific quality type and exclude from membership producers who fail to meet that quality standard.

The word "quality" in this context can refer to physical characteristics of the farm product being produced or to characteristics of the farm itself, such as the size of the operation or its location relative to the cooperative plant. Very small farmers or those located a long distance from the plant impose greater costs on the cooperative relative to other members. Perhaps the cooperative can adjust payment levels to account for differing costs of service. Or perhaps it is administratively costly or politically infeasible to set such practices into place. The efficient response may be to limit membership to farmers that meet certain standards. An investor-owned firm would have the option to choose whichever combination of these methods made the most sense. To restrict a cooperative's choices under the competition laws is inimical to efficiency and may also create a competitive disadvantage for the cooperative.

Agreements such as exclusive contracts that restrict members' exit may also be efficient. Assuring supply of raw product through long-term contracts can be a very valuable input into investment planning for a cooperative. It can also facilitate marketing because the coopera-

tive can safely enter into supply agreements with processors and handlers located further downstream. Long-term agreements have the potential to reduce transactions costs of market exchange. They also have the potential to play this role in facilitating transactions between a cooperative and its members. For example, a chronic problem facing U.S. cooperatives is that members tend to defect from the cooperative during years of low supply and high prices. Various factors, such as cooperatives' tendency to delay payments to farmers, make it hard for cooperatives to compete effectively in these market conditions. Loss of membership during these times can be very detrimental to the cooperative and to the long-run interests of the members, making it prudent to restrict members mobility through long-term marketing contracts, if members are willing to sign such agreements.

A further, and perhaps under-appreciated, benefit of long-term contracts between a cooperative and its members is their role in countervailing market power. Innes and Sexton (1993, 1994) have shown that a crucial strategic dimension for farmers or consumers to countervail market power is their ability to commit to unified marketing or purchasing decisions. Without this ability, incumbent firms are able to diminish the farmers' or consumers' collective power through discriminatory practices that effectively "divide and conquer" them. Thus, in attempting to countervail buyer monopsony power or seller monopoly power, the ability to commit to a collective effort through long-term agreements may be crucial to the success of the venture.

These procompetitive and efficiency-based motivations for restrictions on member mobility in the market must be balanced against the fact that such agreements might be used for anticompetitive purposes. When a cooperative has a dominant market position, restricting membership and/or restricting member supplies is a direct route to the exercise of market power. Similarly, long-term member agreements that restrict exit can be used by a dominant cooperative to foreclose entry by tying up the raw product supply, which Masson and Eisenstat allege is precisely what U.S. dairy cooperatives did.

My view is that based upon the preponderance of the evidence, competition laws should not restrict agreements between a cooperative and its members and should not restrict cooperative membership policy unless the cooperative provides an essential product or service that is unavailable elsewhere. It seems especially clear that cooperatives and their members should be able to freely strike long-term agreements. Although this type of laissez faire policy toward cooperative membership policy possibly opens the door to anticompetitive behavior, such behavior should be rather easy to recognize and deal with through competition policies, such as the Sherman Act, to control monopolizing behavior.

Can Cooperatives Compete Effectively in Increasingly Concentrated Markets?

While some in the United States and Europe may worry about the exercise of market power by cooperatives, many others are concerned that cooperatives will become increasingly unable to compete in modern, concentrated markets. The bases for concern are several, and I examine and evaluate the arguments briefly in this section.

The essential feature of oligopoly/oligopsony competition is strategy. In contrast to perfect competition and pure monopoly/monopsony, a firm in an oligopoly/oligopsony industry must take into account how its rivals will react to its actions. Strategies in imperfect competition are also multifaceted, involving much more than merely a decision over how much output to produce. Imperfectly competitive firms have power over price, so price is a key strategy variable. Imperfect competition and product differentiation are often synonymous, so adver-

tising and promotion decisions must also be made. Similarly, advantages relative to rivals can be attained through strategic investments in production capacity and research and development. In food marketing especially, product coverage is also crucial, with retailers expressing strong preferences for marketers who are able to stock full lines of various product categories.

The concern is that cooperatives are best suited to pursue a production orientation and do not fare well relative to for-profit rivals in an environment in which other strategic factors assume primacy over production decisions. In particular, a cooperative that acts as a "home" for its members' production has no power over price regardless of the structure of the market in which it operates, except for whatever opportunities storage provides to regulate the flow of product to market or market segmentation provides to practice price discrimination.

Cooperatives are naturally suited to market a single product. Most were organized for that purpose. Transitions to market multiple products are more difficult for cooperatives than for for-profit marketers. Cooperatives must operate on an at-cost basis and develop financing mechanisms to allocate revenues and costs to each of the products they market. In practice, finding a fair allocation is exceedingly difficult. For-profit marketers need not worry about allocating revenues and costs to each product line and, moreover, can use revenues from certain product lines to support or cross-subsidize emerging lines. Classic examples are provided by the tobacco companies' use of cigarette revenues to develop a major presence in a wide range of food industries. Cooperatives have taken some steps to develop multiple product lines through joint ventures and agencies in common (e.g., see the discussion in Cotterill), but it seems undeniable that the obstacles cooperatives face and the transactions costs they incur in setting up these apparatus exceed those incurred by for-profit rivals.[13]

Research by Rogers has established clearly that cooperatives advertise less as a percentage of their sales share than do for-profit food marketers. The trend in cooperatives' advertising share is static. Rogers attributes this behavior to cooperatives' production orientation and to their primary presence in the first-stage levels of processing, wherein product differentiation and branding are unimportant. The horizon problem is an additional important factor causing cooperatives to reject branding and product differentiation strategies.[14] Such strategies pay off over the long run, and current members rationally reject such strategies if they do not expect to benefit from them. Another factor is that single-commodity marketers cannot use the cash flow from other product lines to subsidize a developmental phase in a new product line.

In many food industries the tendency of cooperatives to advertise relatively little has been surmounted partially through industry-wide generic advertising programs run through the auspices of state or federal marketing order programs. An extensive literature on these programs indicates that they tend to generate a very high rate of return (Alston, Norton and Pardey). However, these programs have faced a withering set of legal challenges. The demise of these programs coupled with cooperatives' disinclination to invest heavily in advertising and promotion could have significant negative impacts on entire industries.

An extensive IO literature exists concerning the use of investment decisions in plant capacity and in research and development to achieve strategic advantages. Various authors have demonstrated how expanding in advance of the market is an effective strategy to gain advantage over extant rivals and discourage new entrants. Similarly, advantages accrue to successful innovators in races to conduct research and development. The horizon problem looms again as a key factor inhibiting cooperatives' opportunities to compete successfully in these arenas of nonprice competition. Investments in

plant growth pay off only over the long haul, especially investments that "anticipate" market growth. The same applies to investments in research and development. The riskiness of these investments may also limit cooperatives' use of them. Diversified corporations can effectively spread risk across multiple enterprises. Cooperatives organized to market a single commodity have no such opportunity.[15]

Conclusions

This paper has analyzed some key facets of cooperatives' role in increasingly concentrated agricultural markets. Cooperatives' role as a force to countervail the market power of for-profit buyers was examined from multiple perspectives. In a frictionless market, this role can be performed very effectively simply by integrating around market distortions. In reality, entry costs and organizing costs may impede the effectiveness of cooperatives in this pursuit.

Cooperatives afford farmers organizing rights not found in other sectors of the economy and raise the potential that in certain situations these rights might be abused, resulting in the exercise of market power. The bases of these claims was evaluated and appropriate competition policies to govern cooperatives were suggested. These concerns are most important for European countries in which cooperatives have large market shares in several key industries.

Finally, the problems cooperatives face in competing in imperfectly competitive markets were examined. These problems owe to the unique organizational structure of cooperatives and probably cause them to operate at a disadvantage in respect to strategic aspects of competition such as pricing, advertising and investments in capacity and research and development.

Notes

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1. The discussion in this section focuses on market structure in food processing. Relevant market structure data on fresh market sales are practically nonexistent. However, market power issues are also important in these markets due to increasing consolidation among the grocery retailers, the major buyers of food for fresh market sales, coupled with inelastic supply of these generally perishable crops.
2. Information on concentration at the five- and seven-digit classifications will not be available from the 1992 census.
3. Differences between concentration in national markets and local input markets will be minimized if companies operate establishments in each local market. Table 1 demonstrates, however, that this tends not to be the case. For the nine four-digit industries depicted in the table, the ratio of establishments to companies is only 1.20.
4. Sexton and Zhang develop this model in more detail, including developing market demand from multiple regional or local demand functions using a spatial market integration concept.
5. This bargaining outcome, which results from the coalition's ability to make a take-it-or-leave-it offer to the incumbent, can be contrasted with various other possible outcomes that have been offered in the extensive literature on bargaining. Nash's bargaining solution to this problem is just $\gamma_t = \alpha_t$, where $0 \leq \alpha_t \leq 1$ is the coalition's relative bargaining power. When the parties have equal bargaining power, $\gamma_t = 0.5$. Rubinstein's solution to the infinite horizon, alternating offers bargaining game in this model is $\gamma_t = 1/(1 + \delta)$, where δ, $0 \leq \delta \leq 1$, is the discount rate, in the case where the coalition makes the first offer, and the solution is $\gamma_t = \delta/(1 + \delta)$ when the incumbent makes the first offer. As the time between offers goes to zero, Rubinstein's solution converges to the equal division solution of Nash.
6. Bunje discusses the use of these types of strategies in an agricultural bargaining context.
7. An exception to this conclusion would occur if the for-profit firms were able to operate with lower

costs than the cooperative. In these cases, the for-profit firms would be limited to recovering rents attributable to their efficiency advantage. See Sexton and Iskow concerning the relative economic efficiency of cooperatives.

8. Empirical methodologies to estimate residual demands facing sellers are discussed by Baker and Bresnahan, and Scheffman and Spiller, while Durham and Sexton extend the analysis to the estimation of residual supply facing input buyers.
9. Tennbakk, for example, in her recent work on cooperatives in duopoly markets, assumes that the cooperative will regulate its members' deliveries. The only justification is appeal to earlier work by Zusman, which showed how such an outcome could be attained through majority-rule voting.
10. However, other studies that have attempted to measure the impact of cooperatives on market price (Wills; Haller; and Petraglia and Rogers) reveal no general tendency for cooperatives to raise consumer prices and, rather, find the presence of cooperatives associated with lower consumer prices.
11. The Capper-Volstead Act does not specifically address mergers among cooperatives. However, no mergers among U.S. cooperatives have been challenged.
12. This position is in accord with the views articulated by the U.S. Federal Trade Commission; Masson and Eisenstat; and the National Commission for the Review of the Antitrust Laws and Procedures.
13. A related problem for cooperatives is year-around procurement of product, especially in the produce arena. Retailers commonly demand year-around sourcing, and for-profit marketers face no obstacles in procuring off-season supplies from Latin American producers and elsewhere. Cooperatives have made inroads in this direction as well, but face greater obstacles such as limitations on the amount of nonmember business that can be conducted.
14. See Harris, Stefanson and Fulton for a discussion of efforts through so-called "new generation cooperatives" to mitigate the effects of the horizon problem.
15. Hendrikse argues that cooperatives' relatively more ponderous decision-making structure may actually be an advantage in some risky market settings. In his model, a cooperative will reject relatively more of both "good" projects and "bad" projects than will a for-profit rival.

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