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Agricultural Cooperatives and Market Performance in Food Manufacturing

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Support for the cooperative yardstick hypothesis was found using a standard structure-performance model that was extended to include a cooperative market share variable and was estimated with a large cross-section of food manufacturing markets. Market concentration and advertising intensity were positively related to price-cost margins. In addition, the aggregate market share of the one hundred largest agricultural marketing cooperatives was inversely related to price-cost margins. The magnitude of the effect was largest in the more concentrated markets. This suggests that, where cooperatives have vertically extended themselves into food processing, more competitive outcomes are found even in highly concentrated markets.

The structure of the vast majority of markets within the domestic farm sector, ignoring government programs, has historically fit the definition of a competitive industry—a large number of atomistic firms producing a homogeneous good, each facing a perfectly elastic demand function with no imposing barriers to entry or exit. In contrast, the food marketing sector began a structural transformation during the late 1800s, from one that served demand for predominately unprocessed foods, toward a more concentrated one handling increasing amounts of processed food. Currently, unprocessed foods comprise only 10% of wholesale and retail sales, while processed foods account for 75%, and non-food grocery items the remaining 15% (Marion 1986).

The growth in importance of very large, capital intensive, diversified food manufacturing firms resulted from the need to achieve economies of scale in mass production, distribution, and control over new food processing technologies (Marion 1986). Given the perishability and bulkiness of most farm products, individual farmers face a marketing environment where buyers of raw agricultural output have significant power. In addition,

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processors often possess market power in the output markets. Such a structural setting leaves both farmers and consumers subject to possible abuses of market power.

The food and tobacco processing sector has been dominated by its largest firms during most of this century, but the degree of domination by the very largest firms has accelerated during the last fifteen years. While the Census of Manufactures counts over fifteen thousand food and tobacco processing firms, the one hundred largest have accounted for the bulk of the sector's economic activity, and their dominance has increased over time. By 1988, the one hundred largest accounted for nearly 70% of the sector's value-added (Rogers and Marion 1990). Even among the one hundred largest, the largest of the large accounted for this increased domination.

The increase in aggregate concentration is related to both increased diversification of the largest firms and increased market concentration. The increased market concentration leaves farmers selling to fewer processors and consumers buying from firms that have sufficient market power to raise prices over costs. Farmers have long felt they faced a spatial monopsony or oligopsony when selling their agricultural output, and the cooperative movement was an attempt to address this power imbalance.

More than any other legislation, it was the Capper-Volstead Act that sought to improve farmers' economic welfare without injuring consumers in the process. Agricultural economists provided theoretical models that showed cooperatives could improve both the financial lot of farmers as well as that of consumers by entering stages of the food system responsible for market power abuses. This theoretical foundation has largely prevailed, although challenges began to emerge that questioned whether cooperatives could gain and abuse market power.

Market Power and Cooperatives

Debate continues over whether the limited antitrust exemption enjoyed by cooperatives can lead to excessive use of market power. Certainly agricultural cooperatives have grown into large organizations with some holding important market positions. Along with such growth have come periodic challenges to favorable public policy granted cooperatives. In the late 1970s, the National Commission for the Review of Antitrust Laws and Procedures concluded "The threat of monopoly by some cooperatives is now substantial" (Rogers and Marion 1990). In 1988, Daniel Oliver, then-chairman of the Federal Trade Commission, claimed "There was no good reason to continue the antitrust exemption for agricultural cooperatives" (Rogers and Marion 1990). Even today the press is often suspicious of the large agricultural cooperatives that dominate some industries with the *Wall Street Journal* (March 18, 1993, p. A2) referring to Sunkist Growers, Inc., as "the OPEC of the citrus industry" and noting that if it were broken up "the U.S. consumer may eventually benefit."

Concern over cooperatives' possible excessive market power to enhance prices and thus compromise market performance has been a central factor in a number of antitrust investigations. Torgerson (1978), in assessing cooperative market power, states cooperatives, as well as other enter-

prises, have to recognize the risks associated with possessing market power and, more importantly, with how the public fears it might be used. The important question is whether there is a difference between market power held by a cooperative and that held by an investor-owned firm (IOF).

Cooperatives have not kept pace with the increased size and domination by the largest food and tobacco manufacturers. The increased domination by the one-hundred largest firms is almost exclusively the result of the merger activity of the leading twenty food and tobacco firms, none of which is an agricultural cooperative. By 1988 the top twenty food and tobacco firms controlled 40% of the sector's value-added. This was up sharply from the 1967 level and contrasts to a steady share of value-added held by the firms ranked from twenty-one to one hundred largest (Rogers and Marion 1990). Rogers and Marion found that there were no agricultural cooperatives among the fifty largest food and tobacco processors in 1982 measured by value-added. Since cooperatives are often more prevalent in commodity-oriented markets, they ranked higher when sales, rather than value-added was the size measure. But no cooperatives were among the twenty largest food processors in 1982 based on food sales, and only four ranked in the twenty-one to fifty largest group (Rogers and Marion 1990).

Nevertheless, agricultural cooperatives have a significant presence in food processing. In 1982, sixty-eight of the one hundred largest agricultural cooperatives were involved in food processing and accounted for 7.2% of the sector's value of shipments (Rogers and Marion 1990). Their combined share of shipments was higher in the more commodity-oriented products that involved minimal processing and used large volumes of their members' output. For example, in this study, the one hundred largest cooperatives held 64% of the manufactured butter industry yet none of the highly differentiated breakfast cereal industry.

Market Performance and the IO Model

The central question here is whether market performance is improved, hindered, or unaffected when agricultural cooperatives hold a significant position in a processed food market. Cooperative theory developed from the early work of Nourse (1922), then by the more formal modeling of Helmberger and Hoos (1962), and extended by researchers such as Cotterill (1987), predicts improved performance in markets where cooperatives are present through the competitive yardstick effect. In short, when an open membership agricultural cooperative vertically integrates into an imperfectly competitive market, the theory predicts the market outcomes move toward those associated with perfect competition. Whenever positive profits exist in the processing market, either due to short-run disequilibrium or, more importantly, from market power, an open membership cooperative will benefit both farmers selling to the processor and consumers buying from the processor. The interest here is to test the theoretical expectation in the processor's output market by determining if the degree of cooperative participation in processed food markets is associated with improved market performance.

Industrial organization (IO) theory provides a basic model to explain market performance. In the basic paradigm, market conditions combine

with elements of market structure and firm conduct to determine market performance. Market performance is a multidimensional concept that ranges from technical and allocative efficiency to questions regarding the distribution of wealth. In this study we restrict our interest to a measure that emphasizes efficiency—the market's price-cost margin (PCM), often called the Lerner index of market power. In addition, we feature market structure in determining a market's PCM and estimate a standard cross-sectional model linking market structure and performance, modified only by including a new variable to test the cooperative yardstick hypothesis. The other variables are the traditional market structure factors substantiated in the industrial organization literature through thirty-five years of theoretical and empirical research.

No attempt was made to challenge the basic industrial organization model that has generated numerous empirical studies linking market structure to market performance. That literature is enormous and has been the subject of several major review articles. (For a general review of the literature see Schmalensee 1989, and Scherer and Ross 1990; and for an overview specific to food manufacturing see Connor et al. 1985.) Although such cross-sectional studies have fallen out of favor, Schmalensee (1989) argues that such studies deserve attention and need replication but should remain modest in their claims. As he states, "Cross-sectional studies rarely if ever yield consistent estimates of structural parameters, but they can produce useful stylized facts to guide theory construction and analysis of particular industries" (p. 952). It is in that vein that we amend a standard, structure-performance model to include a measure of cooperative participation to shed light on the market performance effect agricultural cooperatives have in a large cross-section of food and tobacco manufacturing markets.

Data for the 1982 Price-Cost Margin Study

The critical data to test whether cooperatives improve market performance in food processing required both traditional Census of Manufactures data for 1982 and a special tabulation of the Census. Considerable care was used to align Census industry and product class data with meaningful economic markets. Generally, the Census five-digit Standard Industrial Classification (SIC) product class best approximates a relevant economic market. Whenever this was not the case, either the four-digit industry data were used or Census was asked to provide data that better reflected an economic market. Four-digit data were preferred twice (e.g., the four-digit beer industry was used rather than its five-digit product classes: bottled beer, canned beer, and so on) and Census constructed twelve special observations by combining either two related, four-digit SICs (e.g., the beet and cane sugar industries were combined) or five-digit SICs (e.g., broilers combined SIC 20161 and 20171). In 1982, the Census had a total of 161 five-digit SICs in food (SIC 20) and tobacco (SIC 21) manufacturing, and after the above substitutions were made, along with a deletion of a few observations that still failed to approximate an economic market (e.g., SIC 20999, miscellaneous food and kindred products), we had 134 meaningful economic markets to form the cross-sectional data set. These obser-

vations represented 90% of the total value-of-shipments (VOS) in food and tobacco manufacturing industries (see Petraglia and Rogers 1991 for complete details and a listing of the data set).

The special tabulation provided data for the one hundred largest agricultural marketing cooperatives, based on a master list of all agricultural cooperatives provided by Agricultural Cooperative Service of the U.S. Department of Agriculture to the Census, which selected the top one hundred by their value-of-shipments or sales in SICs 20; 21; 514 (less 5141) Wholesale Trade, Groceries and Related Products; and SIC 515 Wholesale Trade, Farm Product Raw Materials. For each food and tobacco industry (four-digit SIC), product class (five-digit SIC), and each specially created observation, the Census gave the VOS attributable to the one hundred cooperatives as a group. In several cases, confidentiality rules would not allow the Census to disclose the VOS value, but in those cases estimates were made based on: (1) which of the market's leading eight positions were held by a cooperative (which was not subject to disclosure rules), (2) market concentration (CR4, CR8, and CR20), (3) the number of the top one hundred cooperatives, (4) the number of plants they operated in the market (also not a disclosure problem), and (5) the total VOS left to be allocated to the nondisclosed observations. Such a procedure gave estimates subject to only minimal error, and the data allowed several checks on the estimates. For example, since the five-digit VOS values for each four-digit industry had to sum to the four-digit VOS total, we could check our estimated values done at the product class level against the total for the four-digit industry (see Petraglia and Rogers 1991 for details).

The 1982 Price-Cost Margin Model

An empirical structure-performance regression model was constructed by merging the theoretical basis of the structure-performance models within the industrial organizational paradigm with cooperative performance theory. This required constructing the traditional structural variables used to explain market performance, as well as a new variable to measure the extent of cooperative participation in a market. The basic model is:

$$PCM_i = \beta_0 + \beta_1[NL]_i + \beta_2[A/S]_i + \beta_3[CR4]_i + \beta_4[MES]_i + \beta_5[KO]_i + \beta_6[G]_i + \beta_7[\%CO\text{-}OP]_i + \epsilon_i, \qquad i = 1,\ldots,134$$

where:

PCM = price-cost margin (percent),
NL = dichotomous geographic dispersion control variable,
A/S = advertising-to-sales ratio (percent),
CR4 = four-firm concentration ratio (percent),
MES = minimum efficient scale given by midpoint plant size (percent),
KO = capital-output ratio (percent),
G = nominal growth rate of VOS between Census year (percent),
%CO-OP = percentage of market's VOS accounted for by cooperatives,
ϵ = stochastic error term.

Expected signs for the parameters are as follows:

$$\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \text{ and } \beta_6 > 0$$
$$\beta_7 < 0$$

With the exception of the last variable, %CO-OP, this is the model used by Rogers (1987) in his study of the structure-price-cost margin relationships in food and tobacco manufacturing over time from 1954 to 1977, although he limited his sample to only national industries and hence did not include a national-local control variable. Rogers' specification was based on Weiss' (1974) preferred approach based on his review of nearly fifty structure-performance studies. Although the basic model has a linear form, empirical tests for nonlinearity with regard to both advertising intensity (A/S) and concentration (CR4) will be done since the literature has suggested both of these variables may have a nonlinear relationship with PCM. The standard variables used in the model are discussed in Rogers as well as in the general reviews cited previously, but a brief discussion of each is included here along with a more thorough treatment of the new cooperative participation variable.

Price-Cost Margin (PCM): The dependent variable used to measure market performance was the PCM calculated from Census data as a proxy measure of the Lerner index—the extent to which the market price exceeds marginal cost. Theoretically, it is bounded between 0 (perfect competition) and the reciprocal of the market's price elasticity of demand (monopoly). In an oligopoly setting, under Cournot assumptions, the market's PCM, where a weighted average marginal cost for the industry is used, equals the market's Herfindahl-Hirschman concentration index divided by the market's price elasticity (Scherer and Ross 1990).

The Census proxy measure has the advantage of using the same level of aggregation (establishments) as the other Census variables, and hence it avoids the problems associated with firm diversification that limit the approaches using firm profit data. The Census PCM amounts to the margin over average (not marginal) materials and labor costs as a percentage of price. The main disadvantage of the Census measure is that it includes such things as advertising expenses, central office expenses, and depreciation expenses. Studies using the Census PCM approach attempt to diminish this problem by including control variables for these items. Following Rogers (1987), we include advertising and the capital-output ratio in the model but not other central office expenses. Weiss (1974) found central office expenses to be an insignificant variable in his reworking of a PCM study, which provides some justification for its omission. The Census PCM used in this study had sufficient variation for a cross-sectional study as it ranged from a low of 2%, to a high of 58% with a mean value of 25% and a standard deviation of 13.4%.

Geographic-Dispersion (NL): Since the concentration ratios reported in the Census of Manufactures presume a national market size, they are likely to underestimate the true concentration of local/regional markets. To account for this problem we use a 0-1 variable, with 0 designating a national market and 1 a local/regional market. If concentration is positively related to PCM as expected and Census concentration ratios are

underestimated for non-national markets, then NL should be positive as it adjusts for the bias in CR4. Although some studies have incorporated a continuous variable that attempts to account for differentials in the geographic size of markets, the measure is a rough proxy and has received mixed results in empirical studies. We elected to use the binary variable included in the Census special tabulation that classified twenty-four of the 134 observations as local/regional markets.

Advertising-to-Sales Ratio (A/S): Mass media advertising, which comprises approximately 50% of all advertising expenditures reported to the IRS, is the main instrument for creating and maintaining product differentiation in food and tobacco products (Connor et al. 1985). The advertising-to-sales ratio (A/S) is the best available measure of the degree of product differentiation that exists in a processed food industry. Higher margins should be possible with greater degrees of product differentiation that allow price premiums and prevent entry from eroding the higher margins. Since advertising expenditures remain in the PCM calculation, the econometric test of significance must be against a null of one, rather than the more traditional zero, to test the market power effect from product differentiation.

The numerator of A/S includes the advertising expenditures in six measured media for network and spot television, network radio, newspaper supplements, magazines, and outdoor advertisements, all of which are directed at final consumers. The data were from Leading National Advertisers, Inc. 1982, but the expenditures were reassigned to the Census product classes used in the special tabulation. The denominator was the SIC's value-of-shipments.

Historically, cooperatives have formed in markets that coincide with farmer-member interests. These markets typically do not lend themselves to much product differentiation. Hence, there is likely to be some multicollinearity between where cooperatives account for a large percentage of an industry's VOS and the industry's A/S ratio, but by including both in the model we can test the cooperative effect while controlling for effects created by advertising and maintained product differentiation.

Concentration (CR4): The central interest of structure-performance studies has been the relationship between concentration and market performance. All such studies included some measure of concentration or firm market share. Although the theoretical relationship between PCM and concentration given earlier used the Herfindahl-Hirschman index (H), we use the four-firm concentration ratio. The CR4 has a longer history and was used by Rogers (1987) and was available for all 134 observations, whereas H was missing for seventeen observations, typically the more concentrated markets. Empirically the choice between CR4 and H makes only minor differences (we did use both with similar results, see Petraglia and Rogers 1991). The CR4 serves as an indicator of past barriers to entry and measures the likelihood of collusion, either tacit or direct. Margins should be higher the greater the CR4, all else equal.

Minimum Efficient Scale (MES): MES serves as a technical barrier to entry created by economies of scale. With a U-shaped average cost curve, the MES value occurs at the minimum average cost. Should the average

cost curve first decline and then display constant costs, the MES value is the minimum output level consistent with minimum average cost. Theory suggests the larger the MES, the higher the PCM can be without attracting entry. Despite its theoretical appeal, the empirical proxies available suffer substantial shortcomings. The method of calculating MES in this study relies on the midpoint-plant size approach calculated from Census data. Although this approach has been shown to be highly correlated with economic engineering estimates, which are superior but limited because of their expense (Connor et al. 1985), the approach still suffers from being limited to plant-level economies of scale rather than firm level. Also it has an upward bias whenever constant costs are found, since large firms can expand beyond MES levels without a cost disadvantage.

Capital-Output Ratio (KO): The KO variable allows rough adjustments for the normal return on investments required to attract capital to an industry and for depreciation costs. Its purpose is to control for the differing capital intensities across industries to reduce the likelihood of a spurious relationship between CR4 and PCM. Also, high capital requirements can be associated with barriers to entry, unless capital markets are perfect. It was calculated from Census data as Gross Fixed Assets/VOS, expressed as a percent. Margins should be higher with increasing capital-intensities, all else equal.

Growth (G): The growth rate is another control variable to account for abnormally high margins that occur whenever investments in new capacity fail to keep pace with rapidly growing demand. Such growth exerts upward pressure on both prices and margins. The growth variable measured the value-of-shipments nominal growth rate between Census years 1977 and 1982 in percent.

Percentage Cooperative Sales (%CO-OP): This is the only new variable that was added to the standard structure-performance model and allows an empirical test of the competitive yardstick effect of cooperatives on market performance. It measures the percent of a market's value-of-shipments accounted for by the one hundred largest agricultural cooperatives. The measure follows the work of Jesse and Johnson (1980) where they illustrated the competitive yardstick effect by considering the open membership (OM) cooperative-to-IOF ratio of an industry. They demonstrated that the ability to control the finished processed product's price depends on the finished product's output, which is directly related to the control of the supply of the processed product's input, i.e., the farmer's output. Processing cooperatives that do not control their members' output will process larger quantities, thereby increasing the supply of the finished product, than would IOFs whenever market conditions allow above-normal profits to be earned at the processing stage. This difference links the supply of finished product to the share held by OM cooperatives. With larger cooperative shares the market processes a larger quantity of finished output at a lower price. Hence, an inverse relationship between the extent of cooperative participation and the level of the PCM is expected.

Central to the theory's conclusion of improved market performance is the OM assumption, which prevents effective supply control (ignoring other methods of supply restrictions). If the cooperative has a restrictive mem-

bership policy, then this improved performance is unlikely to emerge and can even be inferior to that of an IOF processor. The nature of the data provided on the top one hundred agricultural marketing cooperatives does not reveal their membership policies or their identities. Hence, we proceed with an assumption, supported by Youde's (1978) empirical study, that the top one hundred cooperatives have predominately OM policies.

Since the dependent variable is the price-cost margin, we must also assume equal efficiency between IOFs and cooperative processors. Otherwise, the inverse relationship we expect between %CO-OP and PCM could be interpreted as indicating cooperatives have higher costs, not lower prices. Wills (1985) avoided this problem by using relative prices instead of price-cost margins and found cooperatives have lower prices than IOFs in processed food products given the same market conditions. Combining that finding with the recent review of the literature on the relative efficiency of cooperatives by Sexton and Iskow (1993) where they state "we conclude that there is little credible evidence to support . . . that investor-owned firms are more efficient than comparable cooperatives," we trust that the PCM will provide a credible test of the original hypothesis.

For the 134 food and tobacco manufacturing markets, the %CO-OP variable varied from zero (forty-six observations, including all tobacco markets in SIC 21 and bakery markets in SIC 205) to a high of 64% in butter, with a mean of 8.7% and a standard deviation of 12.8%.

Results of the 1982 Price-Cost Margin Study

The model was first estimated by OLS with each independent variable entered as an additive effect, but further testing showed the advertising-to-sales ratio should include a second-order A/S term. This suggests that advertising-created product differentiation contributes positively to margins, but at a diminishing rate. The nonlinear effect from concentration was not supported, and substituting the Herfindahl-Hirschman index as an alternative concentration measure gave similar results to those reported here. (For complete results that include the actual tests see Petraglia and Rogers 1991. The estimated coefficients had only minor differences with none having a sign or significance level affected.) As can be seen in table 1, advertising intensity, concentration, and growth had the standard positive estimated coefficients, and all were statistically significant, whereas MES and KO were positive but insignificant. These results, except for the insignificance of KO, were consistent with Rogers' findings for 1977. The estimated coefficient for the new addition to the standard structure-performance model, %CO-OP, was negative and significant, supporting the cooperative yardstick effect.

To explore further the hypothesis that cooperatives would move an industry's PCM toward the competitive level, the sample was split into low ($CR4 < 52.5$, $n = 70$) and high ($CR4 \geq 52.5$, $n = 64$) concentration groups based on the sample's mean CR4 value. Since PCMs are positively related to market concentration, the negative effect from cooperatives should be most apparent in the more concentrated industries. The results from the two groups are also shown in table 1, and the splitting of the data was

Table 1.—Regression Results Explaining Price-Cost Margins in Food and Tobacco Product Classes, 1982

	All Product Classes n = 134	Low Concentration n = 70 (CR4 < 52.5)	High Concentration n = 64 (CR4 ≥ 52.5)
Dependent Variable	PCM	PCM	PCM
Constant	4.77	7.07	2.03
NL	7.10*	4.60*	5.76
	(3.26)	(2.34)	(.96)
A/S	5.11(*)	6.03(*)	4.13(*)
	(5.99)	(5.13)	(3.48)
A/S^2	−0.29*	−0.39*	−0.21*
	(−3.63)	(−3.34)	(−1.96)
CR4	0.17*	0.11	0.24*
	(3.38)	(1.18)	(2.09)
MES	0.27	0.13	0.41
	(1.22)	(0.42)	(1.32)
KO	0.07	0.25*	−0.08
	(1.21)	(3.82)	(−.85)
G	0.10*	−0.01	0.19*
	(3.98)	(−.39)	(4.56)
%CO-OP	−0.20*	−0.12*	−0.35*
	(−3.07)	(−2.14)	(−2.14)
$\bar{R}^2$	.58	.58	.60

( ) beneath estimated coefficients are t-statistics.
(*) coefficient significantly > 1 at the .05 significance level.
* coefficient significantly different than 0 at the .05 significance level.

justified by a Chow test. In both groups the adjusted R^2 was nearly the same as in the combined estimation (.58% or .60%).

The subset of less concentrated product classes revealed MES, CR4, and G to be statistically insignificant factors in determining PCM, while the estimated coefficient for NL, A/S, A/S2, KO, and %CO-OP were significant and their signs consistent with expectations. In the more concentrated markets NL fell to insignificance, which is not surprising given only two observations were classified as local/regional markets. Concentration, CR4, was positive and significant suggesting markets must reach some level of concentration before a positive, linear relationship with PCM is evident. Capital-intensity, KO, was insignificant in the concentrated sample, unlike in the unconcentrated sample, suggesting differing capital intensities explains PCMs in only the unconcentrated industries. Growth was the other variable that reached significance in the more concentrated markets, suggesting only the concentrated markets benefit from the upward pressure growth exerts on margins.

The comparison between the two groups with regard to %CO-OP is of greater interest to this study. Although the variable was negative and

significant in each sample, the magnitude of the effect was nearly three times as large in the more concentrated group. In the unconcentrated sample, the %CO-OP estimate indicates that a 10-percentage-point increase in the aggregate sales share of the top one hundred cooperatives would result in a decline in the PCM of 1.2 percentage points, all else constant. More dramatically, in the more highly concentrated group where market power opportunities should be more likely, the same increase in the aggregate sales share by these cooperatives would result in a 3.5-percentage-point decline in the PCM. Given the main hypothesis was that cooperatives would move markets toward the competitive solution, this is an important finding since one would expect greater departures from the competitive ideal as concentration increased, all else equal. The predicted PCMs from holding all variables at their mean values, except for CR4 and %CO-OP, demonstrates this result. The predicted PCM for a concentrated market with a CR4 of 80 without cooperatives is nearly 30%, whereas if the percentage cooperative share is relatively high at 40% this predicted PCM falls to 15%, despite the high concentration.

Conclusion

This study has empirically demonstrated that the percentage of industry sales attributable to cooperatives has a significant negative effect on price-cost margins, consistent with the theoretical competitive yardstick effect of cooperatives. Within the food manufacturing sector, agricultural cooperatives were associated with improved market performance. As farmers continue to face struggle in a marketing environment becoming more complex and increasingly concentrated in the hands of large, diversified investor-owned firms, cooperatives still seem entitled to the limited antitrust exemptions of the Capper-Volstead Act. Indeed, within food and tobacco processing markets, any abuses of market power are more likely from large, investor-owned firms rather than the agricultural cooperatives that have vertically entered food processing. Possible abuses of market power by cooperatives in other sectors of the food system were not examined in this paper, thus our conclusions do not apply to all markets where cooperatives operate.

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