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THE ROLE OF FARMER COOPERATIVES IN A CHANGING AGRICULTURAL ECONOMY

Ralph D. Christy

The establishment of farmer cooperatives in the U.S. as an institutional remedy for agricultural market failures has been an accepted policy alternative for over 50 years. However, many of the agricultural sector's unique conditions for which cooperatives were first introduced have changed. It may be timely, therefore, to reconsider the role of farmer cooperatives in matured industrial food markets.

While many significant changes have occurred within agriculture, the impact of cooperatives on market performance has been difficult to ascertain. Ideally it would be useful to trace out the economic results of introducing cooperative enterprise as an institutional alternative within food markets. However, this approach is plagued with data and conceptual problems (Dulter), despite some recent research on the economic performance of farmer cooperatives which has shown promising results (Babb and Lang). The purpose of this paper is not to address the question of economic performance but to focus on: 1) the recent trends and status of farmer cooperatives, 2) the major factors associated with cooperative growth, in terms of conceptual and empirical evidence, and 3) the role(s) for cooperatives in matured markets.

RECENT GROWTH TRENDS AND PRESENT STATUS OF U.S. AGRICULTURAL COOPERATIVES

Table 1 presents growth trends of marketing cooperatives, supply cooperatives, and service cooperatives,¹ by number of cooperatives, number of cooperative members, and

gross business sales. The 1969-1970 USDA Agricultural Cooperative Service survey identified 4,834 marketing cooperatives compared with 3,743 in 1981, a 23 percent reduction in the number of marketing cooperatives in the United States over the ten-year period. The number of members has likewise declined, reflecting the general decline in overall numbers of marketing cooperatives. Gross business sales reversed an upward trend during the seventies, indicating that cooperatives were growing larger in size even though fewer in number. Starting in 1982 this trend reversed, as indicated by a reduction of 8.9 billion dollars in gross business volume between 1981 and 1983.

Since the 1969-1970 survey, some 567 supply cooperatives have gone out of business, a decline of approximately 20 percent since 1970. Also, Table 1 reveals that the number of supply cooperative members has declined from 3,222,435 to 2,552,510. Gross business sales, on the other hand, increased four fold over the ten-year period of 1970 to 1980, but, thereafter, gross business sales have fallen off 4 billion dollars.

In 1970, approximately 181 service cooperatives existed compared to 134 in 1983, a reduction of about 26 percent. In recent years, the number of service cooperatives has increased. However, while the number of associations steadily increased, the number of members grew erratically over the ten-year period. The 1970 survey accounted for 29,800 service cooperative members; the 1981 survey, for 27,236; and the 1983 survey, for 94,609 members. Gross business sales of service cooperatives quadrupled from \$391,176,000 in 1970 to \$1,468,316,000 in 1983.

¹ Marketing cooperatives are associations whose primary business is marketing farm products for members. Farm supply cooperatives are those whose farm supply business accounts for more than 50 percent of total dollar volume. Service cooperatives perform major functions (such as trucking, storing, and drying) related to the marketing of farm supply activities (USDA).

Ralph D. Christy is an Associate Professor, Department of Agricultural Economics and Agribusiness, Louisiana State University. Invited paper presented at the annual meeting of the Southern Agricultural Economics Association, Nashville, Tennessee, February 1-4, 1987. Invited papers are routinely published in the July *SJAE* without editorial council review but with review of the copy editor (as per Executive Committee action June 25, 1982).

The author wishes to acknowledge the helpful comments of Elin Epperson, Steve Henning, Roger Hinson, Al Schupp, and John Staatz on earlier drafts of this paper.

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TABLE 1. NUMBER, MEMBERSHIP, AND BUSINESS VOLUME OF FARMER COOPERATIVES IN THE UNITED STATES, SELECTED YEARS, 1969-1983.^a

Year	Number of Cooperatives	Number of Members	Gross Business Volume ^b (\$1,000)
Marketing Cooperatives			
1969-70	4,834	3,102,745	18,388,420
1972-73	4,897	3,117,980	25,110,774
1975-76	4,658	2,811,858	39,402,165
1979	3,825	2,530,733	53,668,810
1981	3,743	2,452,219	70,161,551
1983 ^c	3,647	2,307,630	61,209,412
Supply Cooperatives			
1969-70	2,775	3,222,435	5,986,359
1972-73	2,801	2,988,050	8,841,293
1975-76	2,731	3,056,071	15,553,673
1979	2,507	3,060,020	22,669,818
1981	2,356	2,855,963	30,127,323
1983 ^c	2,208	2,552,519	26,052,783
Service Cooperatives			
1969-70	181	29,800	391,176
1972-73	156	21,905	502,800
1975-76	146	38,450	855,277
1979	113	36,433	1,053,559
1981	112	27,236	1,190,385
1983 ^c	134	94,609	1,468,316

^a Source: USDA

^b Gross volume includes intercooperative business.

^c Preliminary.

Generally, the overall decline in the number of farmer cooperatives of all types reflects, in part, a continuing reorganization in the structure of agriculture. The reduction is generally due to recent increases in mergers, acquisitions, and consolidations. A similar trend is occurring within most agricultural markets.

Commercial farmers comprised the highest proportion of cooperative membership in the Northern Plains and Lake states (72 and 68 percent), among dairy farmers (75 percent), and among farmers with sales of \$100,000 and over (69 percent) (Wilkins). Quoting from Wilkins:

The lowest level of cooperative membership of commercial farmers was in the South Central region, among "other" and livestock farmers and among farmers with sales under \$20,000. Regionally, cooperative membership was greatest among commercial dairy farmers in the Lake states (79 percent) and cash grain farmers in the Northern Plains (76 percent). Membership was lowest for commercial livestock farmers in the South Central region (26 percent).

In absolute numbers, most cooperative memberships held by commercial farmers, their partners, and family members were in the Corn Belt and Eastern regions. Cash grain farmers predominated in the Corn Belt and dairy farmers in the Eastern region. The level of cooperative membership increased as the size of farms increased for all types of farms. (p. 4)

The farm gate market share for cooperatives has increased in most input and product markets over the past three decades (Table 2). Kraenzle, Street, and Richardson report that cooperatives have increased their share of the farm fertilizer sales by 138 percent, of farm chemicals by 169 percent, and of petroleum by 73 percent since 1952. Their shares of feed and seed purchases have maintained and declined, respectively. On the products side, cooperative market shares for all commodities have increased with the greatest percentage growth within the dairy subsector. Seventy-seven percent of the milk at the first-handler level is marketed via cooperatives. During 1980, cooperatives produced 64 percent of U.S. butter, 47 percent of manufactured cheese, 16 percent of packaged fluid milk products, 22 percent of the cottage cheese, 10 percent of the ice cream, 17 percent of the frozen product mix, and 15 percent of the bulk condensed milk (Stafford and Roof, pp. IV-V).

TABLE 2. COOPERATIVE SHARE OF MARKETING ACTIVITY AT FIRST-HANDLER LEVEL^a

Commodity	1952	1983
 Percent	
Marketing Activity		
Milk	43	77
Grain and Soybeans	35	36
Fruits and Vegetables	15	19
Cotton	10	31
Livestock and Wool	14	11
Poultry	6	8
All Farm Products	20	30
Purchasing Activity		
Fertilizer	16	38
Farm Chemicals	13	35
Petroleum	22	38
Feed	19	19
Seed	16	14
All Above Farm Supplies	18	27

^a Source: Kraenzle, Street, and Richardson.

Beyond the first-handler level, cooperative market shares have declined for most commodities. The cooperative share of grain export markets has likewise declined.

CONSTRAINTS ON FARMER COOPERATIVE GROWTH: A REVIEW OF THEORY AND EMPIRICAL EVIDENCE

The organization of the U.S. food system has changed dramatically, and this changing system has implications for the growth of farmer cooperatives. A review of the agricultural economy over the past two decades illustrates this point. The 1970's decade is widely recognized as the golden decade for agriculture. During this decade, agricultural cooperatives grew fewer in number and larger in size; however, farmer cooperatives experienced more public scrutiny during this period than at any other time in their recent history. Less than favorable public opinion toward a few large regional and national cooperatives and legal cases involving cooperatives allegedly performing unfair trade practices have raised questions concerning the limited antitrust exemption given to farmer cooperatives (Johnson and Jesse, Mueller, 1979). In more recent years, the agricultural recession which started in 1981 has placed severe constraints on the growth of farmer cooperatives. This reduced level of growth has resulted in problems related to member loyalty, financial stress, and market access. Given this poor economic performance, this paper seeks to address theoretically and empirically the growth of farmer cooperatives.

Knutson correctly pointed out that the question of how large cooperatives should be allowed to get is "inherently a judgment question." A fundamental question in this public debate is: What is firm growth? Firm growth is an increment in firm size. Size is a static concept; growth, on the other hand, implies change in size. But size can be characterized by many aspects of the firm—sales, assets, employees, number of plants, etc. It is also widely recognized that firm growth may be internal or external. Internal growth includes adjustments of operations to help accomplish selected strategies by constructing new facilities, increasing membership or business volume, adding services, or developing markets. External growth, on the other hand, includes mergers, consolidations, acquisitions, and joint ventures.

A Review of the Economic Theory of Firm Growth

This review of firm growth theory is directed towards those economic theories that explain the growth of the firm from a micro view and the body of theory that explains the behavior of the firm as part of macro-economic theory (or as part of a study on structural change within an industry). Problems associated with size and change in size of firms have traditionally been treated by economists using the neo-classical average and marginal cost curves as the theoretical tool (Renborg). The shortcomings of this approach are numerous. First, the theory assumes that the goal of the firm is to maximize profits. Thus, the theory removes from any analysis the goal formulation process of management, and, to the extent the theory assumes a certain outcome, it does not account for risk associated with the growth process of the firm over time. Another critique of neo-classical theory is that it is insufficient as a planning instrument for the manager who wants to direct firm growth. The received theory is at a level of abstraction such that practical application of its use is unlikely. Lastly, the neo-classical theory is static: it describes efficient cost situations for a firm at a given state (size), as opposed to costs associated with a firm's growth (dynamic).

These and other limitations of neo-classical economic theory, as it relates to firm growth, have motivated economists to extend the neo-classical approach in the area of planning for growth. Baumol and Williamson developed optimal permanent growth rate models for an infinite planning period under certainty, and Richardson employed a model of optimal growth which determines the point where marginal profit from added investments in the firm equals marginal cost of financial capital. Although these theories are of the level of abstraction where their practical use to firm managers may be limited, these models do, however, incorporate a dynamic approach to the firm growth process.

Penrose developed a comprehensive theory of firm growth and evaluated several qualitative aspects of growth not only against the changes created by the firm's own activities, but also against the effect of changes external to the firm and beyond its control. Her model accounts for firm growth over time. She departs from the neo-classical theory of the firm by assuming that the amount of growth per unit of time, and the growth rate, is limited. Penrose rejects the existence of an "optimal" firm size. She argues

that inducements to growth stem from unused growth opportunities outside and inside the firm. Penrose assumes a growth cost function that is concave to the origin. Thus, the firm's rate of growth is hindered by growth costs, stemming from the difficulties management encounters in planning and organizing the growth process.

Industrial organization focuses primarily on market organization and economic performance (Bain, Scherer). The basic industrial organization paradigm holds that the structure of a market influences the conduct of firms which in turn influences the resulting market performance. Market performance is also interactive with the existing behavior and structure of the market. Much public debate and, thus, demand for economic information concerns identification of relationships between the structure of a market and its resulting economic performance. As a result, a great deal of economic research has dealt with firm size and resulting economic performance (growth). However, the evidence, largely coming from English economists, suggests that there is no relationship between the size of the firm and the mean growth rate of the firm (Kalecki, Hart, Simon and Bonini). This statistical relationship is known as the Gibrat's Law or the *law of proportionate effect* (Kalecki). Gibrat's Law states that the probability of a given firm's growing x percent is independent of the size of that firm. In other words, the probability of a large firm growing at a rate of 10 percent per year is no different from the probability of a small firm growing at the same rate per year. Koch notes that "Gibrat's Law also implies that the variances of the growth rates of various size classes of firms should be equal" (p. 162).

Hymer and Pashingian provide evidence from the American economy relative to firm size and firm growth rates. This study suggests that size of firm has no systematic effect on the firm's growth rate. However, contrary to Gibrat's Law, their evidence indicates that the variability of firm growth rates decreases as firm size increases.

Two basic relationships in industrial organization theory: (1) the mean firm profit rate is positively related to firm size and (2) the rate of firm growth is positively related to the rate of firm profitability, provide a logical contradiction to Gibrat's Law. If the above two statements are true, then it follows that larger firms should grow faster than smaller firms. Marcus provides an explanation as to why the empirical results support Gibrat's Law, but departs from the logical extension of

industrial organization theory. He asserts that the firm's growth rate is a joint function of the firm's rate of profit and the firm's market share. Marcus reasoned that a large market share will retard the firm's growth rate because as the market share of the firm increases, the distinction between firm and industry (monopoly) becomes indistinguishable, and the firm has a greater impact on market prices and terms of trade. Thus, the large firm may develop other objectives (i.e., maintenance of market share) rather than maximization of growth potential. Moreover, larger firms are more likely to consider antitrust in their firm's goal setting process. Marcus hypothesizes that the stimulant effects of higher firm profit rates upon firm growth are balanced by the depressant effects of possible antitrust action.

The Growth of Farmer Cooperatives: Empirical Studies

Research relevant to growth of agricultural cooperatives is limited. Mueller (1962) performed a comprehensive study of overall cooperative merger activity, its impact on cooperative growth, the general economic forces underlying it, and the unique problems cooperatives face when growth is by external means (mergers). He found that between 1945 and 1955 nearly one-half of the 102 large dairy cooperatives in his study grew primarily by merger and acquisition. Mueller concluded that cooperatives involved in merger activity grew at a faster rate during this time period than cooperatives which primarily depended on internal expansion. Mueller reasoned that if growth is a measure of a cooperative's success, then merging cooperatives are more successful than those which rely on internal growth exclusively. Garoyan and Cramer found that between 1940 and 1964 external growth accounted for only 13 percent of cooperative growth, increasing the average size of all cooperatives by approximately seven percent over the 25-year period. They concluded that cooperatives rely primarily on internal rather than external means of growth. The standard method of measuring the contribution of mergers to firm growth uses total assets as an indication of firm size. Total asset growth of acquiring firms during a given period is divided by estimated total assets of acquired firms to give a first approximation of the contribution of mergers to firm growth.

Industrial organization theory provides a framework for further examination of firm

growth. By distinguishing between structural elements and performance dimensions of firms, econometric models can be specified to: 1) identify factors associated with firm growth and 2) examine the relationship between firm size and firm growth. Babb measured growth of relatively small firms in the cheese, grain, and farm supply industries and the factors affecting their growth. Using ordinary least squares, Babb's model regressed the growth rates in total sales and assets of agribusiness firms and cooperatives as a function of time period (1950, 1960, 1970, 1980), the state in which the firm was located, business organization, and total sales or assets as a measure of firm size. These factors accounted for less than half (40%) of the variation in firm growth rates during 1950-1980. Chen, Babb, and Schrader compared the growth of large cooperatives to proprietary firms in the U.S. food industry by regressing firm growth (sales and assets) against selected independent variables such as profitability, diversification, mergers, advertising, and firm size. This study was completed during a time period (1975-1980) when the primary industry (agriculture) was experiencing growth in output. Christy examined the growth rates of cooperatives in three southern states during 1981-84. He examined the relationship between firm size, measured in terms of total assets and total sales, and the growth rates of agricultural cooperatives in the states of Alabama, Louisiana, and Mississippi. The coefficients for both total assets and total sales were not significant at the five percent level, thus making it possible to reject the hypothesis that larger cooperative firms grow at a faster rate than do smaller firms. Moreover, the coefficients carried negative signs which suggests that there is an inverse relationship between firm size and firm growth among agricultural cooperatives in the study area and during the time period of analysis. These results are consistent with Chen, Babb, and Schrader, suggesting that firm size has little effect on farmer cooperative growth rates during periods of increasing or decreasing economic activity within the agricultural sector. These empirical studies, although limited in scope, suggest that the growth rate of cooperatives corresponds to the *law of proportionate effect*.

THE ROLE(S) OF FARMER COOPERATIVES

The role(s) of farmer cooperatives in the U.S. food, fuel, and fiber systems is largely a

function of one's philosophical (ideological) position. The cooperative movement in the United States shares at least three rationales: (1) competitive yardstick, (2) supply management (coordination), and (3) social school of thought. Rather than suggest a prescribed role for farmer cooperatives, I would like to describe a set of problems cooperatives can potentially address given the three underlying rationales for cooperative existence. The emphasis is not on prescribing a set of solutions to problems, but rather on identifying characteristics of problems and exploring potential applications for farmer cooperatives given a changing agricultural economy.

The most common and widely accepted rationale for farmer cooperatives in the U.S. is the competitive yardstick school of thought. The competitive yardstick school views cooperatives as a method of addressing the problems associated with imperfectly competitive market structures. Thus, this school recognizes the existence of cooperatives only under conditions of market failure.

Two critical problems facing producers at the first-handler level that are related to market failure have implications for the role of cooperatives. The first problem deals with market power and the associated issues of buyer oligopoly and price discovery. Increased economic concentration is a trend occurring across most food markets, particularly at the producer and first-buyer level. This growth in buyer concentration is directly related to the price discovery and determination processes in agricultural markets. Clearly, the exchange between producer and buyer over time is being replaced by contractual arrangements as opposed to open market (price guided) transactions. If pricing efficiency in food markets is determined by how well prices function in these roles, then for agricultural markets, performance is lowered under conditions of contractual exchange. The concentration of these markets results in sub-optimal economic performance that results in market failure. What then is the role of farmer cooperatives, given this problem? The need for farmers to gain market power has been the major rationale for the existence and support of farmer cooperatives. This role for farmer cooperatives continues to receive widespread support except for the cases of illegal practices on the part of farmer cooperatives as set out in the Capper-Volstead Act. Within some commodity markets, cooperatives have received a major share of the volume marketed

(i.e., dairy). But does this growth in cooperative size and market share provide cooperatives with too much market power? Torgenson referred to Galbraith, who identified in cooperatives several structural deficiencies which limit their market power: (1) cooperatives are a loose association of individuals; (2) they rarely include all the producers of a product; (3) they cannot control the production of members; and (4) they have less than absolute control over the decision to sell. Therefore, it seems very unlikely that cooperatives can attain an excessive level of market power. They can make use of various practices which are available to private market firms in attaining market power, but since they cannot control individual members' production decisions, cooperatives do not possess the ability to enhance prices much differently from outcomes dictated by market fundamentals.

The second problem facing producers relates to the availability and quality of market information. Information exhibits a set of characteristics that invalidates the usefulness of its optimal allocation by markets. Information possesses the characteristics of a public good. The concentration of markets further contributes to the uncertainty of producers, and, as industrial concentration continues to occur in food markets, the issue of private ownership of information versus the public's right to know becomes more critical. The federal statistical budget was reduced by 20 percent in real terms between 1980 and 1983. The budget cuts in federal statistics altered the data production efforts of the United States Department of Agriculture, Statistical Reporting Service (SRS), in at least three ways: (1) approximately 27 agricultural-related and crop reports were eliminated, (2) some state level estimates were discontinued, and (3) data series were eliminated for several fruit and vegetable crops (Gardner). Thus, the public data and information output related to the producer and first-handler level in the market have been reduced. This situation presents a real opportunity for farmer cooperatives to develop a role in providing farmers with the access to market information and provision of management software and services.

The second major rationale for farmer cooperatives rests on the premise of improving the coordination of supply with demand for farm commodities to achieve prices more consistent with costs of production (Shaffer and Staatz). The problem of market surpluses and short-

ages and associated unstable prices are characteristic of market economies. Shaffer and Staatz argue that the coordination problem arises because:

... decisions to produce a flow of products and sources for future periods are made over time by many different actors, who are uncertain about the future demand and supply of these products and services. Although equating marginal costs with marginal revenue maximizes profit, equating marginal revenue when expectations are as uncertain as a random number table will produce a random distribution of profits and a random allocation of resources. (p. 53)

They point out that the coordination problem is most acute in food systems because of the added uncertainty in production due to weather and biological processes and because of the competitive structure of portions of the input, processing, and distribution segments of the system.

The role of farmer cooperatives in solving coordination problems in our food system can best be observed between individual firms (micro coordination) and between the total supply and total demand for commodities for industries at each step in the production-distribution process (macro coordination) (Shaffer and Staatz).

Cooperatives serving as institutions of market coordination are limited by several factors. First, the comprehensive theory of economic coordination is not developed. Second, the approach assumes market coordination is the major problem within the food system. How do we reconcile the benefits of improved market coordination against increased levels of market power and the potential unequitable distribution of property rights?

The third ideology which supports the cooperative movement within U.S. agriculture places equal, if not greater, emphasis on social aspects of development (human and community) as on the economic results. The changes in the agricultural sector have more tremendous impacts on rural communities. Segments of our rural communities are oftentimes bypassed by economic growth, rapid changes in technology, and public policies. These individuals are largely poor and powerless. Williams describes such individuals as likely members of Emerging Cooperatives:

Emerging Cooperatives are usually referred to as a group having a high percent of low-income members. These are the cooperatives organized and managed by individuals who are the residuals of an affluent society. The members are predominantly black, educationally disadvantaged, economically poor, and politically dispensable. (p. 913)

Low-income producer cooperatives differ from other cooperatives in several ways:

- (1) The major resource each member (or family) contributes is labor.
- (2) Membership consists largely of former sharecroppers and/or low-income limited resource farmers.
- (3) While the cooperative is organized for economic goals, most tend also to have social goals.

As an institution which stresses social change, cooperatives do have a role in helping members of rural communities to achieve the goals they desire. Cooperatives viewed in this context are inherently measured by performance criteria other than efficiency.

The use of the cooperative in community economic development is confronted by many constraints. Leadership and managerial abilities needed to operate these institutions are often lacking among the rural poor. Capital needed to operate these institutions is scarce. Lastly, the multiple objectives of these cooperatives makes it difficult to balance tradeoffs between competing members' interests.

CONCLUSIONS

Farmer cooperatives have legally operated within U.S. agricultural markets for over 50

years. The growth in cooperative numbers and members peaked during the 1960's; since that time their decline has paralleled the decline in the number of U.S. farms. Cooperatives tend not to be as prevalent within southern agriculture as within other regions of the country. Their shares of the input and product sides of the farm market have increased for most supplies and commodities marketed. The ability of cooperatives to penetrate the food distribution segment of the food system and international markets (grain) has been somewhat limited.

Empirical results suggest that cooperative growth is largely realized through the use of external methods. Further, cooperative growth rates across firm size appear to be consistent with the *law of proportionate effect* during periods of expansion and contraction in the agricultural economy. Certainly this hypothesis needs further testing with a broader cross section of cooperatives.

Three fundamental rationales for support of cooperatives were discussed. Each rationale links cooperatives to a critical problem within the U.S. food system. The competitive yardstick school of thought is most relevant to problems associated with market failure. The supply management school views vertical coordination as the primary problem with agricultural markets, and the social school advocates the application of cooperative business organization in solving social and human development problems in rural areas. The role(s) of farmer cooperatives, it was shown, has broader application than simply market failure considerations.

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