COOPERATIVES' SHARES IN FARM INDUSTRIES:

ORGANIZATIONAL AND POLICY FACTORS

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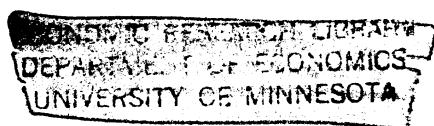# COOPERATIVES' SHARES IN FARM INDUSTRIES:
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This paper draws together evidence on the factors that explain the differing shares that cooperatives hold in the various farm marketing and farm supply industries. Paradoxically, the field of industrial organization rarely addresses the question of why industries are organized the way they are. One of the important and underattended issues is why we observe markets shared between conventional investor-owned enterprises and competing sellers (buyers) taking other institutional forms—cooperatives, state-owned enterprises, multinational firms, etc. Why is any given market not dominated by the one form best suited, as economic theory disposes us to expect? If in equilibrium a market is shared between different types of organizations, what factors explain these shares?

To determine why cooperatives command the shares that they do, we must explore three diverse areas of economic analysis—the property-rights theory of tied-equity firms, the analysis of tax effects in the theory of finance, and antitrust rules and the theory of cooperatives' behavior in noncompetitive market structures. These pieces are assembled in the first three sections of the paper, along with brief references to supporting empirical evidence. At each stage we derive hypotheses about how cooperatives' shares should differ among markets. We also seek to determine whether any given advantage of cooperatives can explain trends of their market shares — a question raised by the secular upward drift in these shares. In the fourth section we relate

these findings to the evidence on cooperatives' shares.

I. Organizational Traits

A. Theory of cooperative organizations

We examine the organizational properties of cooperatives in order to predict how they will behave as economic actors--in particular, how successfully they should compete with investor-owned enterprises (IOFs) in various market environments. Cooperatives are now recognized as one subspecies of what we may call "tied-equity firms." Their central feature is that residual claims on the enterprise's income stream are contractually tied to flows of transactions between the cooperative and the members. As a result, trade in the equities of the cooperative organization must be at least somewhat restricted: they are essentially nonmarketed if the cooperative's membership is closed or regulated, and least somewhat restricted if the equity claim and current transactions with the cooperative enterprise are marketed only as tied goods.

The principal theoretical predictions about the cooperative's behavior as a organization flow from this property-rights constraint of tied equity. Although a cooperative should behave like an IOF when both are embedded in static and perfectly competitive economies, their expected behavior patterns diverge under all other conditions.[1] In particular, the absence of traded equity distorts investment incentives for the organization. Because the member cannot adjust his current equity holdings in the organization except through his flow of current transactions, his preference regarding any investment decision is confounded with the conditions governing his preferred level of current transactions. And the time horizon over which returns to an

investment are discounted varies from member to member, because the member cannot dependably sell out and capitalize future quasi-rents.[2] The specific biases in investment and other allocative decisions made by the cooperative then come to depend on the constitutional rules that govern voting rights and on the political processes that operate within the organization.[3] More specific predictions necessarily depend on the detailed organizational traits that we assign to the cooperative organization.

B. Organizational features of farmer cooperatives

The assumptions behind these propositions match up well to the property-rights structures of agricultural cooperatives and to the organizational patterns that they exhibit. The following attributes are founded in various legal and traditional definitions of cooperative status (Abrahamsen, 1976; Neely, 1976): Members are customers or suppliers of the cooperative, and they deal with it at "cost," meaning that they share in the profits ("net savings") of the cooperative in proportion to their current transactions with it. Equity held (whether by direct purchase or as retentions from net savings) earns the holder either no direct dividend or one unrelated to the cooperative's net savings. Voting on policy decisions is usually unrelated to the value of equity held (it may or may not be related to the member's volume of current transactions with the cooperative). The cooperative may be either open or closed to new members.[4]

These features indicate that actual cooperatives match up to the key theoretical traits of the tied-equity firm. In a static context, the motives of an agricultural cooperative can be plausibly described as maximizing the sale revenue from the farm produce that they market or minimizing the net cost

of goods and services that they purchase (Helmberger and Hoos, 1962). Where
investment decisions are involved, however, the cooperative's preferred poli-
cies will depend on the time horizons and voting rights of its members, so
that no well-defined capital cost is available to guide a cooperative's
investment decisions.[5] The theory of cooperative enterprise shows that other-
wise identical industries consisting of cooperatives and competitive IOEs
allocate resources identically on condition of free entry of new cooperatives
and a free flow of members between cooperative organizations. However, loca-
tional constraints and organizational rules and customs tend to undermine
those assumptions.

We reviewed the extensive descriptive literature on farm cooperatives in
order to document and extend these and other propositions about the behavior
of cooperative organizations. We first consider the relationship between the
cooperative's managers and its members, and the extent and nature of members'
control over the cooperative's allocative decisions. In the IOE whose shares
are held by widely dispersed shareholders, the "market for corporate control"
provides the link that is supposed to keep managers' decisions aligned to the
owners' goal of maximizing their wealth. Neither in theory (Grossman and
Hart, 1980) nor practice (Smiley, 1976) does the market for corporate control
entirely constrain managerial decisions, but it is clearly an influence. In
agricultural cooperatives, by contrast, the owner-members' influence on
managerial decisions depends on their direct political participation. If the
members enjoy sufficiently low costs of political participation, they may
actively press their individual preferences upon the management.[6] In local
(centralized) cooperatives, where these costs are low, active political super-
visions by members is expected; in very large or federated cooperatives, how-

ever, managerial decisions may be substantially independent of effective review by members.[7] The orientation of cooperatives' directors toward the entrepreneurial problems of a typical-scale farm operation makes their supervision of cooperatives' managers both too intrusive in matters of detail and insufficiently sensitive to the need for skilled management. The salaries of cooperative managers have been low relative to comparable IOEs, although the gap has diminished in large, federated cooperatives. Incentive plans have seen less use than in IOEs, and of course they cannot be tied to the economic value of the cooperative enterprise because of the lack of a market in cooperative equities. Surveys seem frequently to attribute cooperatives' successes and failures to managerial quality rather than such obvious factors as the extent of competition. In the case of large, federated cooperatives, the casual evidence seems strongly consistent with a substantial degree of managerial independence. Elected directors of large cooperatives voice the feeling that they have relatively modest influence over the organization's policies (Biggs, 1978).

The theory of cooperative organizations points to the investment decision as a critical test of the effect of its members' distinctive property rights in the organization. It generally predicts underinvestment in the cooperative enterprise, relative to an IOE engaged in identical activities. This is both because the members' time horizons for participating are relevant, and because their access to the benefits from cooperative investments is limited by risk due to random disturbances to their own stream of transactions with the cooperative. However, the descriptive evidence on centralized cooperatives strongly suggests the contrary hypothesis that members gain utility from seeing their cooperative have a "first class" plant, more capital-intensive or

durable than optimal investment criteria might suggest. If this gain in util-
ity is uncorrelated with the amount of business that a member does with the
cooperative, and business volumes are unevenly distributed among member units,
a democratic voting procedure governing cooperatives' investment decisions
will give rise to overinvestment. A good deal of casual evidence supports the
overinvestment hypothesis, but any final prediction of under- or overinvest-
ment of course depends on cooperatives' profitability and access to capital
markets, discussed below.

One distinctive class of investment decisions is those that diversify the
cooperative's activities. The organizational model suggests a disposition of
cooperatives to diversify. The cooperative's orientation toward service to its
members, and its inability to make ready use of rate-of-return criteria
discourage a relentless application of profit-center tests to diversifying
activities and imply their proliferation in response to internal political
pressures. This behavioral difference, however, does not automatically imply a
poor normative evaluation. The cooperative may take on auxiliary activities
that the IOM in the same situation would inefficiently forego: activities sub-
ject to increasing returns, the costs of which can be covered by a two-part
tariff imposed on a club of users but not through a single price per unit.
(See Sandler and Tschirhart (1980) on the theory of clubs.) The statistical
evidence on diversification by cooperatives does not support a judgment on the
normative issue, but it does reveal some interesting behavioral patterns.
Marketing cooperatives have shown no overall increase in their diversification
among crops marketed, although they have diversified into farm supplies
(Abrahamsen, 1972, pp. 23-4, Table 17). Diversifications by the federated
regional marketing and farm-supply cooperatives do not differ obviously in

extent or justification from diversifications by comparable IOEs; spreading risks and utilizing fixed capacities are motives that affect both groups. Also, diversification seems to improve the ability of each type of enterprise to borrow working capital externally. The one conspicuous difference is the obligation felt by cooperatives to expand their activities around service to a fixed base of customers. The IOE diversifies in this way to spread overhead costs in its distribution system, but the cooperative seems to proceed further.

C. Implications for market shares

These hypotheses and the supporting evidence on cooperative organization suggest some propositions for examination below on differences in cooperatives' shares of various farm marketing and supply activities.

1. The weak relationship between the individual member's inputs to and returns from the cooperative's activities implies a free-rider problem in organizing the cooperative. This problem should be overcome most easily, and cooperatives' shares should hence be larger, where farm activities are most homogeneous and farmers' perceived interests most similar.

2. Cooperative organizations are ill-suited to complex entrepreneurial tasks and to those that demand activities far removed from the direct interests and experience of the cooperatives' members.

3. As a corollary of the preceding hypotheses, cooperatives' shares should be larger in activities involving immediate service to farmer-members than in those farther removed in the chains of marketing or supply.

4. Cooperatives should appear where they can fulfill the role of a club to provide decreasing-cost activities on small scales.

II. Tax Treatment, Cost of Capital, and Competitive Advantage

It is well known that corporation income is subject to double taxation. Income is taxed once at the corporate level (presently at a rate of 46 percent on incomes over $100,000) and a second time at the personal level. The effective personal tax rate depends on the individual's marginal tax rate, of course, but also on whether income is retained or distributed as a dividend. Dividends are taxed at the individual's marginal tax rate, while capital gains are taxed at a lower level -- currently at a statutory rate of 40 percent of the dividend tax rate, and then only upon realization. The result is an extremely favorable tax treatment of retained earnings.

Exempt cooperatives have a tax structure known as "fully integrated."[8] Income (either dividends or "savings" on transactions) is taxed once and only once at the personal level, with no distinction made between retained earnings and dividends. Non-exempt cooperatives have a tax structure containing features of both the corporate and the fully integrated systems. "Savings" earned by non-exempts allocated to patrons are subject only to the personal income tax. However, unallocated savings along with dividend payments on capital stock are taxed at the enterprise level.

In one sense both exempt and non-exempt cooperatives (for certain types of income) have a tax advantage, because they are not subject to the corporate income tax. However, what is often ignored or misunderstood[9] is that cooperatives face a disadvantage in the personal tax, because retentions are taxed at

the same rate as dividends.

A. Tax savings from cooperative organization

A useful way to think about the possible tax advantage of cooperatives is to pose the following question" Can a group of farmers (investors) establish a cooperative that replicates a corporation's activities, but enjoys a lower cost because of favorable tax treatment? That is, can a cooperative raise capital from farmers and pay them a return greater than their opportunity cost of capital?

Although the tax treatments of exempts and non-exempts are not identical, a single analysis can suffice if certain distinctions are noted. An exempt cooperative can pay a return on capital either in the form of a per-share dividend or through "savings" on transactions with no difference in tax treatment. For non-exempts, dividends paid on capital are subject to the corporate as well as the personal income tax. However, "savings" on transactions paid to members are subject only to the personal income tax. As long as farmers supply capital to the cooperative in proportion to their transactions, their returns are equivalent to a per-share dividend, only with a tax advantage.

There is a straightforward approach, first used in the finance literature for determining debt's tax advantage or disadvantage vis-a-vis equity,[10] that serves to answer the question posed above. Let I be the before-tax income generated by either a corporation or a cooperative. Let T_c be the effective corporation income tax, T_d the tax on dividends, and T_g the effective tax on capital gains. The after-tax income available to corporate investors is $I(1 - T_c)(1 - T_g)$ if income is retained. The after-tax income available to members of a cooperative is $I(1 - T_d)$ regardless of whether income is retained

or paid as dividends. Therefore, tax savings can be achieved by the cooperative form of organization if:

$$(1 - T_d) > (1 - T_c) (1 - T_g).[11]$$

This result is identical to the condition for debt to dominate retained earnings as a source of finance within the corporate sector. We expect this result because the tax treatments of cooperative income and debt finance are identical. Whether

$$(1 - T_d) \gtrless (1 - T_c) (1 - T_g)$$

depends on the magnitudes of T_d, T_c and T_g. The effective rate of capital gains tax is usually taken to be very low.[12] The effective corporate income tax is estimated to be approximately 0.4. As a result, a cooperative enjoys tax savings if $T_d \leq 0.4$ or slightly more, depending on the magnitude of T_g. Since tax rates on unearned income have been as high as $T_d = 0.7$, farmers in high tax brackets may actually be better off dealing with a corporation, other things equal, than with a cooperative. That is, some farmers may actually pay higher personal income taxes through cooperative membership than the total tax burden associated with retained earnings, the predominant source of corporate finance. Diverse personal tax rates are one reason why cooperatives and corporations may both persist in long-run equilibrium, with their market shares depending on the income distribution of farmers.

B. Retained earnings in corporations and cooperatives

Retained earnings are the major source of finance for both corporations and cooperatives. (Debt is also significant, but corporations are usually thought to be constrained in its use by some maximum debt-equity ratio; and, because of tax integration, cooperatives gain no tax advantage from debt

finance.) Corporations and cooperatives differ in their theoretical advantages of using retentions rather than acquiring new equity. However, as we shall see, organizational characteristics of cooperatives offset the corporation's apparent tax disadvantage in securing new equity and consequent reliance on retentions.

The most obvious reason why new share issues constitute a very minor source of additional equity for ongoing corporations is the non-neutral tax treatment of dividends and capital gains. Miller and Modigliani (1961) established conditions under which the value of the corporation is independent of its dividend policy, but they no longer hold once the favorable tax treatment of capital gains is admitted. Retained earnings have a tax advantage over new share issues, because the opportunity cost of retentions includes the dividend tax avoided for a lower tax on capital gains.[13]

For cooperatives the situation is quite different because of their fully integrated tax treatment. Retained earnings have no tax advantage over new share issues. The results in the preceding section are the same regardless of whether a cooperative finances its capital expenditures with retentions or new share issues. (Of course, a new cooperative has no choice but to issue shares.) Nevertheless, cooperatives like corporations rely predominantly on retentions as a source of finance.

One explanation for cooperatives' reliance on retentions is their tied-equity feature: the investor's return depends upon his volume of transactions rather than his equity holdings. (Recall that per-share dividends paid by non-exempt cooperatives are subject to double taxation.) Members of a cooperative, then, have an incentive to free-ride by supplying as little capi-

tal as possible. At the time of formation, members presumably supply capital in proportion to their expected use of the cooperative's plant. (This would correspond to the classic Lindahl solution for the provision of public goods.) However, once the cooperative is established, the member has no individual incentive to keep his invested capital aligned with his volume of transactions. Also, new members will wish to join the cooperative, once it is established, and be free-riders. The cooperative's services are a collective good (subject to congestion) for which excludability holds. However, setting an appropriate entrance fee requires truthful estimates from new members about their expected future transactions. Knowing that they will be required to supply capital in proportion to their stated expected future transactions, new members rationally understate them.[14]

One obvious way to align the capital supplied by a member to his transactions is to retain new capital from current "savings" on transactions and retire past equity contributions with some lag. This is exactly how most large non-exempt cooperatives work, with equity redeemed after eight or nine years.[15] Although a member's transactions and capital supplied are probably never exactly in line, equity rotation must bring the match very close. The practice may well represent the best possible compromise between enduring distortions due to free-riding and forsaking the cooperative's tax advantage.

C. Growth rates of corporations and cooperatives

Because retained earnings are the predominant source of finance for expansion in both corporations and cooperatives, it is useful to show how the growth rate of each institution depends on the retention ratio. A comparison of these relationships provides insights into the dynamics of a market con-

taining both corporations and cooperatives. The growth rates of corporations and cooperatives with identical retention ratios differ because: (1) corporations are subject to the corporation income tax; and (2) cooperatives retire retained earnings with a lag of approximately a decade.

Suppose that a corporation and a cooperative can earn the same pre-tax rates of return on capital of $r/(1 - T_c)$. If the corporation's income tax is T_c, then its after tax return is simply r. If the corporation retains R percent of all earnings, and its capital stock does not depreciate, it will grow at a rate of Rr. Ignore for the moment the fact that cooperatives retire retentions with some lag. If the cooperative also retains R percent of earnings, its growth rate is $Rr/(1-T_c)$. With an effective corporate tax rate of $T_c = 0.4$, the cooperative will grow at a rate two-thirds faster than the corporation.

The fact that the cooperative retires retained earnings with some lag complicates the calculation of its growth rate. The size of the cooperative in period t, S_t, can be modeled by the difference equation:

$$S_t = (1 + i)S_{t-1} - i \cdot S_{t-L-1} \tag{1}$$

where $i = Rr/(1-T_c)$ and L is the equity retirement lag. The second term simply states that retentions from period t-L-1 are paid back in period t. The growth rate of the cooperative in any period t+1, g_{t+1}, can be expressed as:

$$g_{t+1} = \frac{S_{t+1}}{S_t} - 1 = \frac{(1 + i) S_t - i \cdot S_{t-L}}{(1 + i) S_{t-1} - i \cdot S_{t-L-1}} - 1 \tag{2}$$

It can be proven that the growth rate given in equation (2) declines monotonically with time after an initial period of length L. How quickly it declines

depends on i and L. The convergence process is illustrated in Figures IA, IB, and IC, where the cooperative's growth rate is plotted as a function of time for different values of L and i. L is set equal to 5 in IA, 10 in IB, and 15 in IC. In each panel i is allowed to take on three values: $.06\overline{6}$, .100, and $.13\overline{3}$. These values can be generated by setting $r = 0.10$, $T_c = 0.4$, and R equal to alternatively 0.4, 0.6, and 0.8. Recall that $i = Rr/(1-T_c)$. These values of R cover the range of retention ratios exhibited by most cooperatives.

Examining any one panel, we observe that growth rates decline more rapidly, the smaller is i. Looking across the panels and holding i constant, we see that growth rates decline more rapidly, the smaller is L. If $L = 10$ and $i = 0.1$ are selected as representative values, the growth rate equals 0.0552 for $t = 15$ and 0.0302 for $t = 30$. These values are obviously much smaller than $i = Rr/(1-T_c)$. For small values of i and L, g_t converges to zero.

Figures IA-IC illustrate that the growth process is quite unusual for the cooperative that rotates equity with a lag. The newly formed cooperative may initially experience rapid growth, but it is not sustainable. A cooperative that increases a financial parameter such as R will experience a jump in its growth rate for a time period of length L, followed by much lower growth rates. The same phenomenon should occur for cooperatives in the aggregate during and after a period of favorable economic conditions (high values of r), such as they experienced for part of the 1970's.

D. Profits, growth, and supply of capital

The organizational and tax factors discussed so far cast up a series of advantages and disadvantages for cooperatives in securing and accumulating
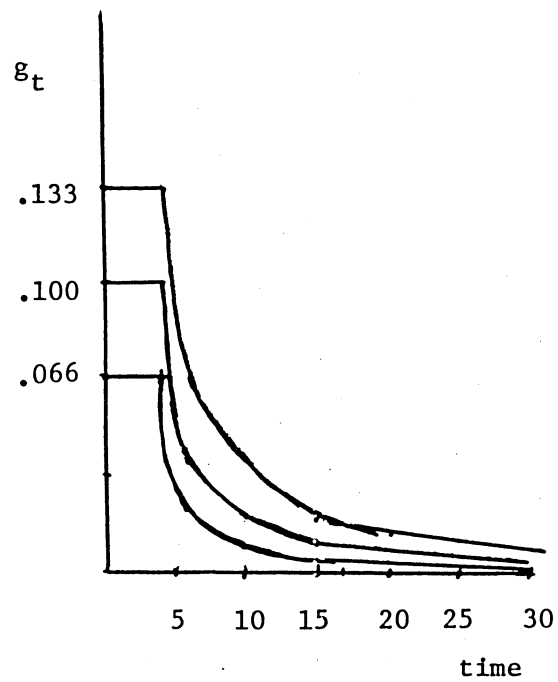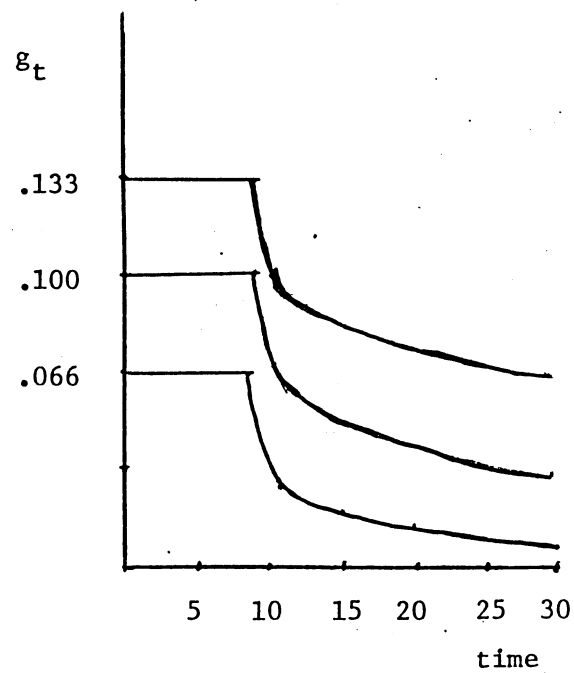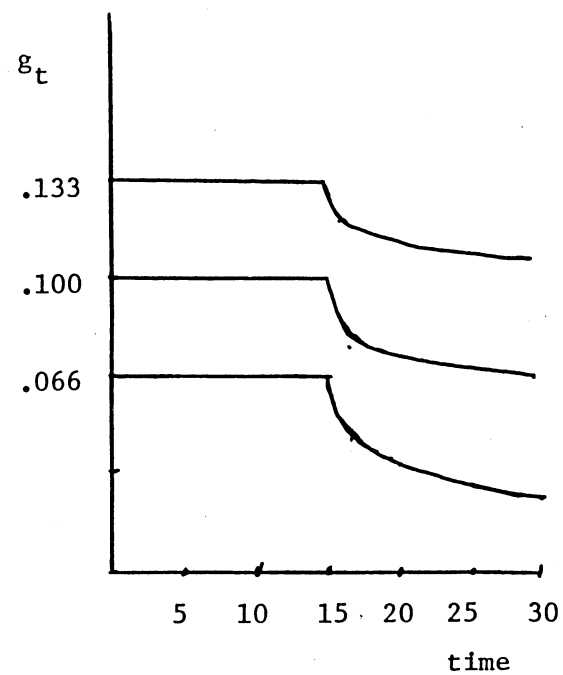
FIGURE IA

L=5

FIGURE IB

L=10

FIGURE IC

L=15

capital. We present here some empirical evidence on the profitability, tax payments, sources of capital, and growth rates of cooperatives. We first examine the financial data for a small sample of large, federated cooperatives. The sample is sharply constrained both by the lack of publicly available data and the paucity of marketing cooperatives that pay an arm's-length price for their members' produce.[16] We then examine some aggregate data on agricultural cooperatives published by the U.S. Department of Agriculture.

The financial data for Farmland, Gold Kist, and Land O'Lakes for the past two decades are summarized in Table 1. The first three lines report their before-tax (BTROE) and after-tax (ATROE) rates of return on equity as well as the ratio of income-tax payments to before-tax income (T). The difference between BTROE and ATROE is equal to (T)BTROE. These differences in Table 1 are quite small (zero in one case), because T is small compared to effective tax rates for corporations. The reason T is usually positive is because tax integration is not complete for non-exempt cooperatives. Except for Farmland in the 1970's, the BTROE values are typical of those earned in the corporate sector in the last two decades. However, because of tax integration, ATROE values for the sample are all high when compared to those in the corporate sector.

Lines 4 through 6 give the sources of finance for each cooperative. Line 4 is the fraction of earnings retained (R), line 5 is the ratio of retirements to retentions (RET), and line 6 is the change in the ratio of debt to debt plus equity, $\Delta(D/(D+E))$. R is large in all cases and exceeds 0.7 in three instances. Combined with high ATROE values (and with other factors held constant), this produces rapid growth. However, cooperatives' lagged retirement of retentions is a counteracting force. In two instances RET is below 0.25,

Table 1

Profitability, Financial Structure, and Growth

for Three Large Cooperatives

	Farmland		Gold Kist	Land O'Lakes	
	1960s	1970s	1970s	1960s	1970s
1. BTROE	.1958	.2961	.1754	.1622	.1824
2. ATROE	.1775	.2728	.1664	.1622	.1725
3. T	.0935	.0787	.0527	.0	.0541
4. R	.6154	.5348	.7535	.8335	.7062
5. RET	.2177	.2313	.9700	.5278	.3724
6. $\triangle \frac{D}{D+E}$	.1558	.0830	.1493	.0483	.1417
7. GROWTH	.0971	.1450	.1001	.0765	.1221

Source: annual reports.

meaning that over $4 of earnings were retained for every $1 of past retentions being retired. However, in one case the ratio is almost one, and in another it is over one-half. D/(D+E) was not in steady state for our sample of cooperatives over the 1960's and the 1970's (line 6). Cooperatives in recent decades have greatly increased their use of debt finance, starting from low levels of D/(D+E).

The last line gives the compound growth rates (GROWTH) of plant and equipment in nominal dollars. The growth rates are generally very high. The high growth rate for Farmland can be explained by its high ATROE, especially in the 1970's, a low RET, and increased reliance on debt finance. Gold-Kist has a surprisingly high growth rate, given that its RET is close to one. The explanation is the fifteen-point increase in D/(D+E), as well as new equity finance from sources other than retentions. Land O'Lakes had a more moderate growth rate in the 1960's, because its RET was over 0.50. A decline in this ratio and an increase in leverage resulted in a double-digit rate of growth in the 1970's.

We do not believe the rapid rates of growth exhibited in Table 1 are sustainable for even a few more years. BTROE value were unusually large because of favorable economic conditions during the 1970's. Combined with high R values, these produced low values of RET and resulted in rapid accumulation of equity capital. Rotation of retentions from the 1970's should greatly increase the retirement/retention ratio in the current decade, and curtail cooperatives' growth rate. Furthermore, upper limits to D/(D+E) probably preclude a recurrence of large increases in this ratio.

A second source of quantitative evidence is the aggregated data on agri-

cultural cooperatives published occasionally by USDA (Griffin, 1972, 1980). Information for the fiscal years 1970 and 1976 suggests rates of growth, profit, and retention in line with those of the largest cooperatives reported in Table 1. We can observe average ATROE values and retention rates for the fiscal years 1970 and 1976, and the data also distinguish between the 100 largest cooperatives and all others. Once again, high values of ATROE and R combined to support high annual rates of growth of nominal assets. In each major category (marketing, farm supply, and those performing both functions), the 100 largest cooperatives were somewhat more profitable than the smaller cooperatives, but the small ones displayed substantially higher rates of retention. Accordingly, all reported high rates of growth of nominal assets.

A limited cross-section statistical analysis of the USDA financial data suggests a pattern for the bulk of smaller cooperatives that differs in some ways from that of the leading regional cooperatives, analyzed above.[17] Profit rates on equity show a significant positive correlation with the percentage of net savings paid out in cash, and annual growth rates of assets are largely uncorrelated with profit rates. Thus, while the large regionals appeared to be earning high profits and plowing them back to exploit further profit opportunities, most of the smaller cooperatives seem more mature financially, with high profits (where they occur) not associated with strong incentives to expand. This pattern is consistent with the organizational traits discussed in Section I: The local cooperative services a fixed membership base. It does not compete with neighboring cooperatives, so that horizontal expansion is precluded except by merger. Its diversification possibilities are limited, and vertical expansion takes the form of investment in federated cooperatives.

The overall financial advantage or disadvantage of cooperatives depends both on tax treatment and on the ultimate supply price or cost of capital. Although evidence cited above on retentions and growth bears on the cost of capital, it is not a direct measurement. We first take the easier part -- the cost of debt capital. Cooperatives appear to enjoy some advantage in the interest rates that they pay on debt, principally through borrowing from the Banks for Cooperatives, themselves cooperative organizations with access to capital on favorable terms that reflect their quasi-governmental status.[18] The interest-cost advantage from access to the Banks for Cooperatives may have been as much as 25 percent in some periods, and in 1976 they accounted for 62 percent of the cooperatives' total debt. Another advantage utilized by some of the larger cooperatives is borrowing by means of tax-exempt industrial development bonds issued on their behalf by local governments. Davidson (1980) shows that during 1975-79 the median issue on behalf of local coopera-tives carried a 7 percent interest rate, that for regionals 6.2 percent. Besides low interest rates, these bonds offer the advantage of longer maturi-ties than loans from Banks for Cooperatives. Thus, at least some cooperatives enjoy access to important sources of low-cost debt.

Alas, the absence of traded equities in cooperatives leaves us with no basis for inferring the cost of equity capital for them directly. On the lim-ited evidence at hand, we suggest the data available on the rates of return on book value for local cooperatives suggest that they are not particularly high, as they would be if cooperatives were severely restricted in their access to capital. A few direct investigations have concluded that farmers earn rela-tively low returns on their investments in cooperative equities.[19] The interest and dividends paid on cooperatives' liabilities to their members have

generally yielded below-market rates of return, and a large minority of cooperatives still operate without any fixed period of equity rotation, leaving the refunding of equities for political determination (hence, uncertain). The high rates of retention coupled with evidence of modest rates or return suggest that farmers typically assign a low opportunity cost to capital invested in cooperatives -- at least up to a point. There is also ample evidence of their resistance to large up-front equity investments (e.g., French, 1980, p. 104), suggesting the hypothesis that the shadow price of equity to the typical cooperative may be low initially, but rises sharply with its rate of retention or rate of acquisition of new equity from a fixed base of clients.

B. Implications for market shares

Overall, the evidence on taxation and cost of capital suggest the following hypotheses about the incidence of cooperatives:

1. The traditional prediction is that cooperatives enjoy a favorable tax treatment that results in an effective cost of capital lower than for similar IOEs. We show that prediction to be correct if $(1 - T_d) > (1 - T_c)(1 - T_g)$. Therefore, we expect that cooperatives enjoy an advantage in capital-intensive activities except for serving farmers with high personal incomes.

2. The evidence on the opportunity cost of capital to cooperatives generally points in the same direction as the evidence on taxation, but it imposes the qualification that cooperatives' proclivities toward capital-intensive activities are limited where the capital commitment per farm enterprise becomes large.

3. The preceding section offers important implications for the growth rates of cooperative enterprises and thus the changes over time in their market shares. Profitable cooperatives can expand rapidly for a period of time, but the equity rotation cycle eventually imposes a tight constraint on growth. This pattern may also hold some implications for sectoral differences in cooperatives' shares: Large-scale activities entailing large investments are within their reach if the plant can be put in place before the rotation cycle comes around, or if it can be done through a federated structure so that the individual farmer-member's implicit contribution is small. The latter process predicts tapered vertical integration narrowing as it proceeds away from purchases or sales at the farm level.

III. Antitrust Exemption and Other Competitive Factors

A. Opportunities for market power

Cooperatives' presence can be explained either by seizing the opportunity to exploit monopoly/monopsony power or organizing to countervail it. The importance of the former motive stems from the provision of the Capper-Volstead Act that authorizes the voluntary association of independent agricultural producers to process, handle, or market their products collectively. Agricultural cooperatives are allowed to maintain joint marketing agencies and to exchange information with one another. In this section we briefly consider how the kinds of noncompetitive behavior permitted to cooperatives but denied to IOEs can influence cooperatives' presence in various markets.[20]

Clearly a cooperative may obtain a monopoly of an agricultural market by including all producers among its members, and it is probably allowed to accomplish the same goal by merging with other cooperatives. Certain other

methods may not be used to obtain a monopoly. It may not acquire IOEs for this purpose. It may not engage in predatory practices against market competitors. And it may not employ coercion to induce agricultural producers to join. Cooperatives may form collusive agreements with other cooperatives,[21] although not with IOEs.

Section 2 of the Capper-Volstead Act provides a procedure for the Secretary of Agriculture to investigate and enjoin any cooperative from monopolizing or restraining trade so that the price of any agricultural product is unduly enhanced. The absence of any enforcement activity under this provision suggests that it does not impair the value of a cooperative's market power. The secretary's jurisdiction is apparently exclusive, in the absence of illegal activities that would bring the antitrust agencies onto the scene.

If a cooperative is legally free to set a monopoly price, its effect on resource allocation then turns on its ability to restrict output or otherwise make profitable use of a monopoly position. Output restriction lacks explicit authorization in the Capper-Volstead Act, but it has not been found illegal. To make full use of any potential monopoly power, a marketing cooperative must either control all sources of supply of a commodity or control buyers' access to supply through an exclusive dealing arrangement. If a cooperative can limit supply by its own members, it also has an incentive to induce or compel membership. On the other hand, if it can control buyers' access to supplies, its incentive is to restrict membership. Youde and Helmberger (1966) found a positive correlation between potential market power in cooperatives and restriction of membership, so that the latter case appears to be the more prevalent one.[22]

A cooperative's gain from monopolistic action, however, does not depend on output restriction, and its members can benefit even if its success in raising the selling price of a farm product causes them to expand the amount they supply. Their gains then depend on the cooperative's ability to segment the market for its output into a high-value use with an inelastic demand and a low-value use with a more elastic demand. Price discrimination generates some monopoly gains for agricultural producers even though the affected farm product's output exceeds what would result under competitive conditions. It may pay the cooperative simply to destroy some output and divide among members the proceeds from selling the rest.[23]

B. Resistance to market power

Historically, much of the zeal that prompted the founding of cooperatives obviously came not from a quest for monopoly/monopsony gains but rather from the desire to countervail what was perceived as monopsony/monopoly on the other side of the market (Heflebower, 1980, chaps. 3-5). A bargaining cooperative can serve as a pure form of countervailing power. However, the more common case is the operating cooperative that actually enters the sector suspected of market power. The theory of entry barriers proves helpful in predicting the incidence of this motive. Long-run monopolistic distortions depend on entry barriers. The victims of the distortions can improve their lot by entering the monopolized activity only if they are among the best favored of potential entrants to the sector. As a vertical entrant into a distorted sector, a cooperative may stand at the head of the queue of potential entrants for several reasons. If the entry barrier lies in the size of the capital investment needed to enter, the cooperative's apparently low opportunity cost of capital favors it.[24] The cooperative also enjoys an

advantage as a vertical entrant where vertical integration confers an advantage in avoiding risks associated with fluctuations of the price in the intervening market. A margarine monopolist might have no incentive to integrate backward into raising soybeans (because agriculture is a competitive industry), but the hedge against fluctuations in the price of soybeans could make the difference needed to warrant entry by soybean marketing cooperatives into margarine production.

Another reason why the cooperative may prove a preferred (that is, least impeded) entrant is the very fact that its competitive aggressiveness in the entered market is subject to certain built-in curbs. Serving a fixed-base membership, it does not come with unlimited market-share objectives. And its aggressiveness in pricing is limited by the fact that low prices erode the net saving that almost alone signals the manager's performance to members, and the utility-maximizing manager avoids generating a negative signal.[25] If IOEs competing with a cooperative entrant recognize these limitations, they are more likely to "make room" for the cooperative than for a similar IOE entrant. This argument does not apply, however, if the cooperative is in a position not only to enter but also to earn excess profits thereafter. The average-cost pricing procedure of the cooperative then promotes the involuntary undercutting of competitors' prices, resulting in an expansion of market share to the extent that membership policies permit.[26] It also fails to apply where a marketing cooperative obligated to take its members' supplies then dumps the processed output at whatever price it brings, spoiling the recognition of mutual pricing dependence in the market.[27]

Market distortions can encourage the growth of cooperatives in order to evade short-run hold-ups and small-numbers bargaining situations as well as

conventional long-run market power on the other side of the market.[28] Even if buyers at the first stage of off-farm marketing or processing lack long-run monopsony power, a short-term bargaining advantage may be available to them. At harvest time a buyer must be found promptly for a perishable crop, and the sunk component of the farmer's costs deeply depresses his reservation price. Hold-ups may occur in markets so localized that securing a competing bid from the next nearest buyer is itself costly for the farmer. In short, limited but appreciable short-run disadvantages in small-numbers bargaining can arise in a variety of situations. Even where these squeezes cannot be sustained in the long run, it may pay farmers who are potential victims to invest in insuring that they will not be caught out. Protection can take various forms that include entering into forward contracts as well as coalescing into coopera- tives or utilizing other collective-bargaining agents.

These motives of exploiting and/or evading monopoly power point to vari- ous structural features of markets that may induce the development of coopera- tives. Consider first the structural requisites for monopolizing, in which the ever-present free-rider problems of cooperative organization become all the more important. A favorable feature is the concentration of production in a compact growing region--one state or area if the product is marketed nation- ally, a local cluster if it is regional. Defections from the cooperative coalition become easier to avert. There should also be few close substitutes and potential entrants into production, especially other agricultural areas that can readily switch to the crop in question. And the existence of secon- dary or low-value uses for the product is an important factor if the coopera- tive cannot restrict output.

Other structural traits indicate markets in which cooperatives should arise to avert monopoly power. For long-run monopoly power, what matters is the existence of entry barriers that cooperatives are well-suited to overcome, primarily those resting on capital costs. The potential for short-run hold-ups is indicated by pre-commitment of most farm costs, perishability or low portability of the output, and localized markets. Analogous conditions for farm-supply cooperatives will be mentioned below.

IV. Evidence on Market Shares

Accurate measurement of cooperatives' shares of various farm-related markets encounters a number of problems of concept and empirical data that defy clean solution. In practice nothing more than a rough approximation can be expected. Heflebower (1980, pp. 34, 57) assembled and adjusted data on cooperatives' shares of crops marketed using information from USDA and National Commission on Food Marketing. These appear in Table 2 along with shares of farm supplies purchased, estimated by the USDA. One important shortcoming of these data, especially the shares of the individual fruits and vegetables, is that the activities of bargaining cooperatives are not reflected, only those that undertake the actual marketing function.

A. Patterns in Horizontal Market Shares

A number of patterns in these shares seem to conform to the hypotheses discussed above.

1. Marketing cooperatives seem more prevalent where production of a crop is geographically concentrated and its producers are highly specialized (sugar, rice, various fruits). These traits respond to predictions based on

Table 2. Cooperatives' estimated shares of farm marketing and farm
supply activities

Commodity group	Share	Commodity	Share
Share of farm value marketed, 1975-6		**Share of farm marketings, 1964**	
Sugar products	71%	Cranberries	85%
Dairy products	69	Dried prunes	63
Rice	54	Pears	59
Nuts	43	Dried figs	58
Grains, soybeans	40	Oranges	56
Edible beans, peas	28	Almonds	55
Fruits, vegetables	27	Walnuts	55
Cotton products	26	Grapefruit	34
Tobacco	13	Dried raisins	34
Livestock products	9	Pecans	25
Eggs, poultry	8	Apples	21
		Cherries	19
		Potatoes	10
		Peaches	7
Share of farm supplies bought, 1979			
Petroleum	38		
Fertilizer, lime	41		
Farm chemicals	31		
Feed	22		
Seed	13		

Source: Heflebower (1980, pp. 34, 57) (data originally U.S. Department
of Agriculture, Farmer Cooperative Service, and National Commission on Food
Marketing); Farmer Cooperatives 43 (February 1977): 4; Farmer Cooperatives 48
(April 1982): 4-5. Shares in 1979 are available for some marketing activi-
ties: dairy products, 68%; grains, soybeans, 41%; fruits and vegetables, 25%;
cotton products and, 28%; livestock and products, 11%; and poultry products,
9%.

the organizational properties of cooperatives.[29]

2. High market shares seem to occur where structural conditions bestow monopoly power on cooperatives: low elasticity of demand for the product (lack of good substitutes in use), freedom from threats of entry (because efficient producing areas are few, or the market is highly localized), and opportunities to discriminate between high-value and low-value markets. Fluid milk and specialized fruit crops[30] supply the obvious examples. The balancing of milk supplies by the cooperatives, however, responds partly to an inability of competitive markets to clear in response to sharp shifts in short-run demand and supply, and is not entirely explained by the discriminating-monopoly model.[31]

3. The countervailing of monopsony or monopoly clearly has some explanatory power. In our judgment (and contrary to much rhetoric), the threat of short-term holdups has been more important for promoting cooperatives than long-run monopoly on the other sides of farm markets. The high incidence of perishables in dairy products and tree crops seems consistent with this hypothesis. The low incidence of cooperatives in vegetables seemingly a puzzle, can be explained by dispersed production and short growing cycles. This interpretation stressing short-run hold-ups implies that bargaining cooperatives will appear in markets in which neither side possesses any long-run market power, and the evidence is consistent with that implication.[32] The same pattern appears in farm-supply sectors. Cooperatives account for large shares of seed and fertilizer, which are required by the user at precise times but costly for him to hold in storage (Vogelsang, 1979).[33] Cooperative membership allows farmers to share the fixed cost of providing "excess" storage capacity needed to guarantee availability of these inputs at times of peak demand and insure against shortages and monopolistic bargaining advantages (Fite, 1978,

pp. 338-9).

4. Closely related to the preceding point, cooperatives seem more pre-valent in products priced locally and lacking well-developed national market prices. Clear examples appear in the growth of cooperatives for marketing livestock and potatoes for processing in a time when their markets are becom-ing more localized or shifting from spot pricing to term contracts (USDA, Farmer Cooperative Service, 1977; Holder and Hepps, 1978).

5. Cooperatives seem more prevalent in activities that involve personal-ized services to members that are not readily priced on an incremental-cost basis. The cooperative then becomes a club that can potentially cover the average costs of a range of services heterogeneous, incidental services and an agreed goal of "service to members" may make the club's formation possible. Apparent /are the prevalence of cooperatives in the custom mixing and delivery
        examples
of feed and the application of fertilizer (Mather, 1973, pp. 4-5).

6. Efficient scales of plant exert a complex influence. Cooperatives do not appear where the individual farm can itself efficiently carry out the dis-tribution and marketing function, as in poultry and eggs. Nor do cooperatives appear where scale economies are substantial, as with farm machinery. Dairy cooperatives show the positive influence of moderate scale economies. The evidence is found both in the scale of processing plants and in the historical correlation of their rise with the introduction of farm tanks and the appear-ance of scale economies in farm-to-plant hauling (O'Day, 1978, pp. 22-24; Tucker, Roof, and Monroe, 1979, pp. 31-3).

7. Cooperatives are expected to flourish in capital-intensive activi-ties. That prediction runs counter to their disabilities for complex

organizations and extensive scale economies, because of the collinearity of these traits among manufacturing sectors. Nonetheless, cooperatives are prevalent in several farm-supply industries that are capital-intensive, although not organizationally complex when local cooperatives provide a distribution network. These include petroleum, fertilizer, and farm chemicals.

D. Vertical Integration and Diversification

We can also examine cooperatives' shares in the vertical sequences of transactions moving outward from initial off-farm sales of output and purchases of farm inputs. The exact forms of these vertical relationships are diverse. Local cooperatives hold memberships in federated regional cooperatives, but decide independently on their volumes of purchase and/or sale transactions with the regionals. Some regionals are vertically integrated into local operations.[34] And some regionals are partly federated but also include individual growers as direct members. Despite this diversity, we can broadly identify which farm marketing and supply sectors entail the most vertical integration.

Before addressing these patterns directly, we refer briefly to some problems of cooperative organization as it affects vertical relationships. The regional and local cooperatives seem to encounter the same difficulties in their relationships as do the locals and their primary members.[35] The locals' postures on policies for the federated regional cooperatives aim at maximizing perceived benefits to each local's own members and not maximizing any overall market value of the regional firm. The regionals' policies are affected, and coordinated use of common facilities (such as leased railcars) has its problems and limitations. Regional cooperatives are tied to the locals for their

business (by legal requirements for the minimum proportion of business done with members) but cannot depend on the locals' patronage.

Analysis of the grain trade shows that this last feature is more limiting than it might first appear. Research on the bases for success in the large IOEs in the grain trade has suggested the following interpretation: They owe their effectiveness as large-scale organizations to a combination of market conditions around the world, physical scale economies in long-distance grain shipments and in storage and transshipment facilities, and economies in pooling risks that cannot be hedged directly in the futures market. In order to exploit the advantage created by these intersecting scale factors they must maintain a continuous trading presence, be ready to buy and sell at a wide variety of locations, and plan their physical investments on the basis of a comprehensive analysis of prospective long-run changes in the market (Caves, 1977-78). The cooperative tied to selling the grain made available by a fixed base of grower-members faces disadvantages in attaining these economies of scale and utilization, especially if supplies from the fixed base are uncertain. Diversified primary farm producers' interests diverge from the requisites of supporting a vertically integrated and specialized marketing system (French, 1980, pp. 99-100). Cooperatives have pursued types of export transactions that do not require them to establish extensive information networks or capabilities to arrange transportation (Hirsch, 1979).

The disabilities of vertical integration from a fixed membership base probably also affect lines of farm marketing that lead to differentiated products requiring high-level marketing skills. One mentions this disadvantage with some deference, because a number of cooperatives in fact have successfully established brand names. Where product differentiation gives rise to an

entry barrier, it stems mainly from large capital costs of initial sales pro-
motion and distribution facilities, along with any scale economies inherent in
these. The capital costs place the cooperatives at no great disadvantage
against other going-firm entrants. However, a regional marketing cooperative's
tie to a fixed base of primary raw material limits its abilities to attain
distributional scale economies, and scale economies in sales promotion deter
all but the largest cooperatives. In several lines of processed foods,
cooperatives tend to supply an undifferentiated segment of the market, leaving
differentiation to the IOEs.[36] Or they enter into joint ventures or contract
arrangements with IOEs, whereby the IOE retains the marketing function while
the cooperative owns the processing facilities.

The empirical evidence permits only a casual test. Cooperatives' integra-
tion forward from marketing into processing (dairy, fruits and vegetables)
seems to occur mainly where their control of produce at the farm level is
quite complete and where processing facilities support price discrimination or
insure against short-term hold-ups in the disposal of seasonal produce. Vert-
ical integration from local marketing into national and international distri-
bution is only partial in grain, where the logistical disadvantages of
cooperatives are relatively great. Cooperatives' shares of produce exported
in primary form seem high only where their control of off-farm sales is quite
complete, or where foreign buying is done by centralized agencies willing to
take on some transaction costs and risks that the cooperatives tend to avoid
(Thurston et al, 1976; Bradford and Berberich, 1973).

Integration backward into manufacturing by farm-supply cooperatives seems
to occur mainly in fertilizer, petroleum products, feed, and seed. All are
products for which farmers (and thus farm-supply cooperatives) are either the

dominant customers or use aggregate quantities that exceed the outputs of single efficient-scale manufacturing facilities. All represent mature technologies, often capital-intensive. Problems of opportunism arise in arm's-length transactions: quality is difficult for the buyer to determine, or demand and use are highly seasonal, and storage is expensive. Thus, vertical integration in farm supplies seems to be explained by about the same factors that explain cooperatives' roles as retailers of supplies to farmers, with the additional factor of cooperatives' advantages in some capital-intensive stages of production.[37]

Diversification is a final aspect of multimarket activities of cooperatives. In local marketing cooperatives it reflects simple technical features of the joint use of facilities and the mixture of crops produced in the area (Abrahamsen, 1972, Table 17). For cooperatives already engaged in food processing or manufacturing farm supplies, diversification seems to stem from the same motives that affect IOEs: to utilize by-products, intangible skills, or distribution channels with excess capacity.[38] Brand names, once established, can be transferred to closely related products. Thus, diversification in cooperatives involves no particularly distinctive forces, and diversification and vertical integration both seem to flow from the factors that explain cooperatives' primary shares of marketing and farm-supply sectors.

FOOTNOTES

1. Carson (1977) derived optimal behavioral patterns for a cooperative that is assumed to maximize some private social welfare function defined over the utility levels of its members. It will buy inputs from them at prices equated to the input's marginal value to the cooperative and sell them outputs at marginal cost. Transactions with nonmembers will be priced to maximize profits, and the resulting net revenue of the cooperative distributed to members according to the social welfare function. For references to earlier literature on the theory of cooperatives, see Carson (1977) and Vitaliano in Marion (1978, pp. 21-42); for a synthesis of the broader literature on tied-equity firms, see Jensen and Meckling (1979). Useful empirical surveys include McGregor (1977) and Jones (1980).

2. Jensen and Meckling (1979) emphasized these problems of efficient investment in tied-equity firms. They also stressed the peculiar comparative statics of these firms (see also Meade, 1972), which makes their consistency with a Pareto-optimal prefectly competitive equilibrium a proposition of dubious relevance.

3. See Furubotn's discussion (1976) in the context of labor-managed firms. Susman (1982) derived constitutional rules for a cooperative that would lead its members to bargain--or vote--themselves into a Pareto-optimal bargain. However, there is no mechanism to assure that the constitutional rules actually chosen have this property.

4. These traits seem to fit reasonably well not only the centralized cooperative owned directly by its member-patrons, but also the federated cooperative in which the immediate members are other cooperatives. See Mather

(1971).

5. There of course may be reasonable ways to infer a cost of capital indirectly. See American Cooperation, 1977-78, p. 251-3, and Holmstrom (1980).

6. Because the members' individual time preferences may differ, and because the cooperative's allocation decisions may affect their utility levels in other ways (mentioned below), there is no reason to suppose that members will automatically express identical preferences even if their individual farm activities are quite similar.

7. To keep the text of manageable length, we report the discursive empirical evidence in appendices and only summarize the results (and mention the key sources) in the text. Details pertaining to this section appear in Appendix A.

8. For a discussion of tax integration, see Musgrave and Musgrave (1976, pp. 298-299).

9. Confusion existed until recently in the literature of finance and public finance over the tax advantage or disadvantage of debt compared to equity finance. The tax treatment of interest income is exactly the same as income earned by cooperatives' members. For an early discussion of the tax advantages and disadvantages of debt finance, see Stiglitz (1973).

10. See for example Haley and Schall (1979, pp. 390-398).

11. This result can be found in Haley and Schall (1979, p. 396), who examine the tax advantage (disadvantage) of debt compared to retained earnings.

12. An important reason is that capital gains are taxed at realization, not upon accrual. The effective tax on capital gains is usually estimated to be under ten percent.

13. Both Mervyn King and Alan Auerbach derived estimates of the cost of retained earnings and new share issues based on the U.S. tax system. See for example King (1974, pp. 21-35).

14. Of course the same demand-revelation problem exists for the original members attempting to establish a cooperative. However, there is one important difference. If the original members fail to solve the free-rider problem, the cooperative is not established.

   See Knoeber and Baumer (1983).

15. /Brown and Volkin (1977) show that the majority of cooperatives have some program of equity redemption, although the majority of local (centralized) cooperatives redeem only in special circumstances. The bulk of systematic redemption programs are simply revolving funds that pay off the earliest contributors first, with the average rotation period being 8.5 years for federated and 9.1 years for local cooperatives. Another device used by some cooperatives is capital retentions proportional to gross transactions rather than savings. This device seems a less optimal one than retentions from savings, and it may stem mainly from tax considerations [Farmer Cooperatives 48 (May 1981): 4-7].

16. When pooling is employed, the profits of the cooperative are indistinguishable, and a meaningful profit figure could be calculated only for the cooperative and member farm enterprises taken together.

17. This statistical analysis is reported in Appendix B. Knoeber and Baumer (1983) develop some evidence relating retention rates to cooperatives' rates of return and risk levels and to returns and risks in alternative investments in farm assets.

18. Evidence on various behavioral aspects of capital cost discussed in this section is summarized in Appendix C. Our cross-section analysis of USDA financial data sheds some light on the characteristics of cooperatives enjoying access to financing from the Banks for Cooperatives. The Cooperatives' rates of profit show no regular relationship to the extent of their borrowing from the Banks for Cooperatives. Dependence on these banks for borrowed funds is positively related to the proportion of net saving that cooperatives pay out in cash, and it shows weak negative relationships to their leverage values and to tax payments as a proportion of pre-tax net savings. Each of these correlations suggests that the Banks for Cooperatives offer proportionally more financial support to the needier and less aggressive cooperatives (see French, 1980, p. 200).

19. Studies of optimal cooperative financing, for example, typically point toward less use of revolving-fund equity and more use of debt. See Snider and Kohler (1979); Dahl and Dobson (1976).

20. Neely (1976, pp. 265-321) provides extensive legal background.

21. Including cooperatives that function solely as bargaining agents.

22. Also see Youde in Marion (1978, pp. 219-25).

23. See Masson and Eisenstat in Marion (1978, pp. 51-68). Helmberger and Hoos (1965, pp. 53-6) worked out the elasticity conditions for a gain from monopolization when fringe producers are present.

24. Bain (1956) associated capital-cost entry barriers simply with a high absolute cost for a plant large enough to attain minimum efficient scale. However, an entry barrier due to product differentiation may in effect by

a capital-cost barrier, insofar as it requires the entrant to make a large and risky investment in sales promotion or other activities to establish its good will asset.

25. See Walsh in Marion (1978, pp. 43-50, esp. p. 46). His impression (p. 47) confirms Dahl's finding (in Marion, 1978, pp. 293-9) that local farm-supply cooperatives show no obvious aversion to taking part in local price-fixing activities.

26. See Eisenstat and Masson in Marion (1978, pp. 281-91).

27. For an example see Fischbein (1978, chap. 4).

28. Klein, Crawford, and Alchian (1978) have written about these phenomena as a shortcoming of long-term contractual relations, leading to vertical integration, but they can explain other market institutions as well.

29. Heflebower (1980, pp. 52-3) argued that the same pattern appears in the differences among sections of the country in cooperatives' shares of grain marketing.

30. Some studies indicate that bargaining cooperatives in these crops have significantly raised prices to growers. See Garoyen and Thor in Marion (1978, pp. 135-48); but also Helmberger and Hoos (1965, pp. 171-5, 186-95). Knutson (1971, pp. 17-20) discussed dairy cooperatives' bargaining successes.

31. See Tucker, Roof, and Monroe (1979, pp. 22-4).

32. See Helmberger and Hoos (1965, pp. 176-9); U.S. Department of Agriculture (1977); American Cooperation, 1977-78, pp. 86-115; and Long in Marion

(1978, pp. 118-34).

33. It is also difficult for the farmer to determine the quality of the product prior to its purchase and use, a fact historically important in explaining the rise of supply cooperatives (Knapp, 1973, chap. 9).

34. The primary regional grain cooperatives control country elevator capacity that amounts to 23 percent of their capacity in terminal and subterminal elevators (U.S. Department of Agriculture, 1976, Table 1).

35. Additional details appear in Appendix B.

36. On cheese, see Farmer Cooperatives 48 (April 1981): 16-17.

37. See Mather and Bailey (1971); Mather (1973); U.S. Department of Agriculture (1978).

38. For a descriptive study of this diversification see Schmelzer and Campbell in Marion (1978, pp. 71-104).

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Appendix A. Evidence on Organizational Traits of Cooperatives

Because of the ultimately political control over cooperatives' allocative decisions, the structures of voting rights for their members are important. The pattern of one-member, one-vote predominates, with 92 percent of a sample of local cooperatives employing this method, 4 percent voting in proportion to patronage, 3 percent in proportion to equity capital, and the remainder other methods. Among large and predominantly federated cooperatives, the one-member, one-vote rule prevails for 71 percent, patronage 13 percent, and equity 7 percent.[1] We expect one-member, one-vote to prevail among relatively homogeneous and geographically centralized cooperatives, activity-weighted voting where members are more disparate economically, far-flung geographically, or enjoy better alternatives to the cooperative organization in question. These predictions are based on the expectation that members doing more business with the cooperative face absolutely larger (opportunity) losses when decisions are made contrary to their interest, but that lobbying and/or (implicit) side-payments to internalize such externalities are easier when members enjoy extensive interpersonal contact within a local community. The (modest) difference in voting systems between large and small cooperatives supports these conjectures. Also, when patterns are analyzed by crop handled by the smaller marketing cooperatives, the incidence of one-member, one-vote appears least for those crops in which the variance of members' operating scales is probably largest, and their access to alternatives to cooperative marketing is easiest: fruits and vegetables, livestock, and poultry.

The theory of cooperative organization makes it clear that the mobility

of members into and out of cooperatives is important for their predicted allocative consequences (Meade, 1972; Jensen and Meckling, 1979). Most of the systematic evidence on this point bears on cooperatives' financial arrangements and on mergers among them, and therefore is discussed below. Where the mobility of members is not impaired by geography and by cooperatives' regulations, significant movement of members seems to occur. A survey of Northeastern dairy farmers taken in 1980 indicated that 19 percent had dropped or shifted cooperative memberships since 1975.[2]

Directors' intrusive interest in operating questions, their belief in the primacy of providing services demanded by members, and their view that profit maximization should not be a primary responsibility are documented in a useful survey by Biggs.[3] Because directors' own current incomes are usually not particularly high, they have been disinclined to authorize the salaries necessary to attract high-quality managerial personnel, and managers in turn may be valued more for diligence and fealty to members than for managerial expertise. The problem is probably worse among the smaller cooperatives, but survey evidence shows that it is present although receding among the large federated ones. In an unspecified population of cooperatives (mostly large, it appears), the incomes of the cooperative chief executive in 1975 was found to be 70 percent of that of counterparts in IOEs, up from 66 percent a few years earlier.[4] But it is important to recognize that federated regional cooperatives utilize more sophisticated directors, avow greater interest in maximum profits, and employ longer planning periods.[5] A good deal of casual evidence suggests that the large regionals have recruited effective managerial talent out of the investor-owned sector and have developed high levels of skill in such functions as advertising and marketing, far removed from the direct

experience and concern of their farmer constituents.[6]

Cooperatives have come late to the use of formal planning as a business tool, and those attempting it have often found their information and accounting systems weak for the task.[7]

Because managerial quality may influence the success of IOEs just as much as cooperatives, the evidence on cooperatives' management must be evaluated with care, but it nonetheless holds some interest. One survey of 350 cooperatives in the 1960's found managerial factors by far the most important correlates of success and failure. Among 150 farm supply cooperatives in the Pacific Northwest, success was related to managerial and motivational factors, but not at all to the pressure of competition from rival organizations.[8]

The degree to which managers act in owners' interests is never a simple thing to establish, and the only evidence here is circumstantial. The views expressed by directors of large cooperatives do suggest that they feel they have limited control over the activities carried on by managers. Eleven percent of directors of large cooperatives feel they have little or no influence on decisions ratified by the board, and only 21 percent feel they have a considerable influence; for smaller cooperatives these proportions are more favorable to directorial control, though not a lot more. Directors of large cooperatives receive more information before meetings than do directors of smaller cooperatives, but the margin between what they get and what they feel they need is larger. They generally agree that local cooperatives are more under control of their members and serve them better than do federated cooperatives.[9] Recent difficulties of one federated cooperative, Farmers Export Co., suggest both some scope for the pursuit of managerial utility and

also the adverse consequences of clashing interests among the dozen member cooperatives.[10] If large, federated cooperatives seem to offer some scope for managerial behavior, that charge hardly applies to local cooperatives. There is neither demand nor scope for sophisticated entrepreneurial talents, and one wonders whether the dominant managerial goal may not be service to members in a short-run and political sense. Happily a recent survey found the best return on investments as the highest-ranked objective, followed by that of a satisfactory rate of net saving each year.[11]

Behavioral evidence on the diversification of cooperatives' activities' -- relevant to their role as clubs -- is abundant but not easy to interpret. Their legal and organizational structures clearly dictate a mission of providing service to a predetermined group of customers or suppliers,[12] and that disposes them against diversification into activities not related to this membership base (as well as against horizontal expansion into the territories of other cooperatives). But excess diversification occurs in the small, in order to provide services requested by the fixed member base. Cooperatives are concerned about averaging margins over activities that differ in profitability, because of the perceived importance of fair treatment of their various members. However, the record-keeping costs of setting and rebating different margins on different types of business discourage imposing a tough profit-center test. Some cooperatives make the effort, but others do not.[13] A study of machinery leasing by cooperatives seems to confirm the tension between the goal of service to members and the need to maintain some profit-center standing for leasing activities. For example, cooperatives were found to maintain flat charge schedules for equipment use that fail to reflect substantial fixed transportation and transaction costs associated with completing the

lease transaction and delivering the equipment. But cooperatives' leasing activities also display some aspects of an efficient club: cooperatives' managers of equipment leasing make allowances in their charges for personal knowledge about how well the individual customer maintains his equipment, while a competing IOE that was studied does not.[14]

FOOTNOTES

1. Clement E. Ward, Vernon E. Schneider, and Roman Lopez, _Voting Systems in Agricultural Cooperatives_, USDA, Economics, Statistics, and Cooperatives Service, Cooperative Research Report No. 2 (1979).

2. _Farmer Cooperatives_, April 1982, pp. 6-7.

3. See Gilbert W. Biggs, _Farmer Cooperative Directors: Characteristics, Attitudes_, USDA, Farmer Cooperative Service, FCS Report No. 44 (1978), Tables 2, 4, 18, Appendix Tables 24, 26. Also see D. B. DeLoach, "Growth of Farmer Cooperatives--Obstacles and Opportunities," _J. Farm Econ_. 44 (1962): 489-500 (esp. p. 496). Similar patterns have been observed in worker-owned plywood companies; see K. V. Berman, _Worker-Owned Plywood Companies_ (Pullman, WA: Washington State University Press, 1967), pp. 157-64.

4. Richard Larson, "Executive Compensation: How Cooperatives Compare," _Farmer Cooperatives_, April 1976, p. 11; Biggs, Table 12.

5. Biggs, Tables 2, 3, 12, 18, 20, Appendix Table 24. Data in the source are tabulated for "small," "medium," and "large" cooperatives, not local vs. federated; however, the two classifications are highly correlated (see

Appendix Table 5).

6. For example, J. David Morrissey, Riceland Foods: Innovative Cooperative in the International Market, USDA, Farmer Cooperative Service, FCS Information No. 101 (1975), chap. 5; "The Billion-Dollar Farm Co-ops Nobody Knows," Business Week, February 7, 1977, pp. 54-64; Fite (1978).

7. Russell C. Engberg, Financing Farmer Cooperatives: Needs, Sources, Policies Procedures and Problems (N.P.: Bank for Cooperatives, 1965), pp. 49, 52-55, 57-8; Harold Wayne Lough, "The Relationship Between Farm Supply Cooperatives' Economic Performance and Their Organizational Power Centers' Levels of Motivation to Achieve Objectives," Ph.D. Dissertation, Oregon State University, 1971.

8. Charles A. Kraenzle, et al., Agricultural Cooperatives: Challenges and Strategies, USDA, Economics, Statistics, and Cooperatives Service, Cooperative Research Report No. 9 (1979), pp. 45-6.

9. Biggs, Tables 21, 25, Appendix Table 25. It should also be noted that directors of large cooperatives spend more time on the job and there seems to be rather little turnover of directors on cooperatives' boards (Tables, 15, 17).

10. Roy Rowan, "A Farm Co-op in the Hands of High Rollers," Fortune 103 (April 20, 1981): 149-60.

11. American Cooperation, 1975-76, pp. 92-8.

12. See, for example, Engberg (1965, pp. 48-9).

13. Donald T. Davidson, Methods and Policies Used in Making Patronage Refunds by Selected Farmer Cooperatives, USDA, Farmer Cooperative Service, General Report No. 137 (1966).

14. Lloyd C. Biser, Machinery Leasing and Custom Services by Cooperatives and Other Dealers, USDA, Economics, Statistics, and Cooperatives Service, Farmer Cooperative Research Report No. 14 (1979).

Appendix B. Cross-Section Data on Financial Structures of Cooperatives

We analyzed data contained in two surveys by the USDA of the financial characteristics of farmer cooperatives.[1] These surveys rest on a complete census of the 100 largest cooperatives plus a sample of the smaller ones, with the sample data blown up to the size of the national population. We cannot calculate average profits and related data for the population except in these census years. With this limitation recognized, Table B-1 presents information on the profit and retention rates for the cooperative population averaged for 1970 and 1976 and the annual growth rates of (nominal) assets between 1970 and 1976. These data support the conclusion that high profit and retention rates were permissive of high rates of growth, with the larger cooperatives appearing somewhat more profitable but the others retaining more of their net savings.

We also calculated a series of correlations from the data given in these reports. Two cross-sections are available, neither very satisfactory. Marketing cooperatives are subdivided functionally into ten groups (nine for 1970), and farm-supply cooperatives can be disaggregated into top-100 members and others; these twelve (eleven in 1970) functional categories provide one cross-section. The other cross-section comes from the subdivision of the cooperatives among the twelve districts of the Banks for Cooperatives. Obviously the functional subdivision stakes more claim to providing homogeneous subclasses than do the geographic regions, but the limited degrees of freedom available prompted us to use the geographic breakdown as a test of the robustness of any conclusions reached from the functional breakdown. Table B-2

Table B-1. Rates of net saving, retention, and growth, large and small coopera-
tives, 1970 and 1976

Type of cooperative	Net saving after taxes % of equity, average of 1970, 1976	Retentions % of net saving, average of 1970, 1976	Average annual compound growth rate, total assets, 1970 to 1976
Marketing:			
top 100	17.2%	20.4%	12.5%
other	14.3	47.0	13.7
Farm supplies:			
top 100	22.8	40.4	19.7
other	15.8	49.0	13.8
Marketing and supplies:			
top 100	17.6	43.4	16.3
other	16.0	60.7	10.7

Source: calculated from Griffin (1980).

Table B-2 . Correlation matrix, cross-section analysis of financial aspects of cooperatives, 1970 and 1976

	% net saving paid in cash	Retentions % of equity	Borrowed capital % of equity	% borrowed capital Banks for Coops.	Fixed assets % total assets	Taxes % net pre-tax saving	Asset growth rate 1970-6
Net saving % equity	.894* .543	.754* .117	-.169 .233	.525 -.084	-- .457	-.141 -.240	-.005 .397
	-- .627*	-- -.189	-- .601*	-- -.178	-- .360	-- .040	-- .545
% net saving paid in cash		-.868* -.809*	-.010 .369	.626* .606*	-- .569	-.275 -.644*	-.151 .351
		-- -.768*	-- .552	-- .282	-- .344	-- -.362	-- .107
Retentions % of equity			.412 -.364	.661* -.691*	-- -.196	-.527 .489	-.066 -.044
			-- -.550	-- -.240	-- .066	-- .059	-- -.327
Borrowed capital % equity				-.028 -.223	-- .499	.337 .056	.178 .130
				-.598* -.453	-- .209	.. .466	-- .203
% borrowed capital Banks for Cooperatives					-- -.097	-.561 -.555	.297 .019
					-- .137	-- -.667*	-- -.111
Fixed assets % total assets						-- -.384	-- .687*
						-- -.326	-- .455
Taxes % net pre-tax saving							.185 -.097
							-- -.327

Note: Each cell in this correlation matrix contains four correlation coefficients. The left-hand pair pertains to fiscal 1970, the right-hand pair to fiscal 1976. The upper pair reflects variance among farm-supply and farm-marketing activities (11 or 12 observations). The lower pair reflects variance among Banks for Cooperatives districts (12 observations). Coefficients marked (*) are statistically significant at the 5 percent confidence level. Data are unavailable for cells marked (--). Source: Griffin (1972, 1980).

presents the results of this correlation analysis. Each cell contains up to

four correlation coefficients, representing the years 1970 and 1976 and the

functional and geographic breakdowns of cooperatives (see note to the table).

Some observations are missing because some data were collected for 1976 but

not 1970. The variables covered in the correlation matrix are:

1. Net saving before taxes as a fraction of total equity.

2. Percentage of pre-tax net saving paid to members in cash.

3. Net savings retained by the cooperative (whether allocated
   or unallocated) as a fraction of total equity.

4. Borrowed capital as a fraction of total equity.

5. Fraction of borrowed capital secured from Banks for
   Cooperatives.

6. Fixed assets as a fraction of total assets (available
   for 1976 only).

7. Federal and state income taxes as a fraction of before-tax
   net savings.

8. Compound annual growth rate of nominal assets between
   1970 and 1976.

Regarding the last variable, it should be noted that the populations covered

in the two years are not identical, and so growth rates can be affected by the

formation of cooperatives, acquisition of cooperatives by others, or reclas-

sification of cooperatives from one category to another.

Perhaps because of the small samples, rather few of the correlations are

statistically significant. The conclusions supported most strongly pertain to

the positive relationship between net saving on equity and the payment of cash

dividends, and the partly definitional negative relationship between net sav-

ing paid in cash and retentions as a percentage of capital borrowed from the

Banks for Cooperatives. These correlations probably indicate both something

about the policies of the Banks and about the access of the larger coopera-
tives to sources of debt capital other than the Banks.

FOOTNOTES

15. Nelda Griffin, A Financial Profile of Farmer Cooperatives in the United
    States, USDA, Farmer Cooperative Service, FCS Research Report No. 23
    (1972); Nelda Griffin et al., The Changing Financial Structure of Farmer
    Cooperatives, USDA, Economics, Statistics, and Cooperatives Service,
    Farmer Cooperative Research Report No. 17 (1980).

Appendix C. Behavioral Evidence on Capital Supplies of Cooperatives

This appendix reports evidence from miscellaneous sources on coopera-
tives' supplies of capital. The Banks for Cooperatives long enjoyed the use
of a large revolving fund of U.S. government money that entailed no interest
payments. That has now been replaced, but the evidence continues to suggest
that the Banks, as part of the farm credit system, can borrow at interest
rates that reflect their quasi-governmental status.[1] Careful comparative stu-
dies of the interest advantage of borrowing from the Banks for Cooperatives
are rare, but a good deal of casual comment takes this advantage for granted.[2]
From the 1979 annual report of the Banks for Cooperatives we can compute
interest income from loans as a percentage of the average of beginning and
ending gross loans outstanding, 10.9 percent; commercial banks' average prime
rate for the year was 12.7 percent. Data for 1960-75 tabulated by Baker[3] from
USDA sources tend to confirm this margin of advantage. He provides the fol-
lowing comparison between interest rates charged by Banks for Cooperatives and
by commercial banks in retail loans to farm borrowers:

	1960-67 average	1968-75 average
Banks for Cooperatives	5.03%	7.47%
Commercial banks	6.84%	8.13%

These data suggest a margin of advantage of roughly 10 to 25 percent for loans
from the Banks for Cooperatives. As with all cooperatives' prices, these are
subject to questions of interpretation. Cooperatives had to make capital
inputs into the Banks for Cooperatives to draw loans--a cost; but they also
received some (small) rebate of net savings from the system--a benefit. Thus,

these data do not necessarily provide an accurate estimate of the margin of advantage of borrowing from Banks for Cooperatives, but they are probably correct in suggesting a small but significant advantage.

Through much of its history, cooperatives have not been rationed in their borrowings from the Banks for Cooperatives (Engberg, p. 52), but limits on the amount of funds provided to a single borrower have recently become binding for the larger cooperatives.

Data also document the interest-rate advantage that cooperatives enjoy from access to industrial development bonds. As of June 1979 they had been used by 52 large cooperatives which account for 31 percent of all cooperatives sales. The use of these bonds is still proliferating; in 1979 four states accounted for 58 percent of all projects financed by these bonds, but they were then authorized in 40 states and coming into use in new ones. Although cooperatives using them complain of the red tape involved in securing approval, outright issue costs (median 3.1 percent of the capital acquired) seem in line for bond issues of this size. The range of interest rates carried by industrial development bonds issued during 1975-79 was between 5.5% and 8.5% for local cooperatives, 1.8% and 8.4% for regionals, and 4.5% and 8.25% for interregionals.[4] As a source of debt capital at advantageous interest rates, industrial development bonds in the aggregate are much less important for the cooperatives than are the Banks for Cooperatives. The total bonds outstanding in mid-1979 were only 4.3 percent of cooperatives' borrowed capital as of 1976.

Access to low-cost debt capital plus the organizational difficulties of securing equity capital might induce cooperatives to employ higher leverage

than comparable IOEs, even if they traditionally relied largely on equity.
Some studies suggest that their leverage is higher than comparable IOEs in the
food-processing sector, or that it has grown faster.[5] Evidence of this sort
disposes us to think that the recent increase in cooperatives' leverage should
not be extrapolated into the future.

Cooperatives' liabilities to their members include not only retained
earnings but also various types of debentures, preferred, and common stock.
All of these carry fixed interest payments or dividends, generally set by pol-
icy or statutory constraint at levels that would not make them competitive on
the open market.[6] Data in Griffin (1972) show the maximum interest rates that
cooperatives of various types could be paying on purchased equity-type instru-
ments; for at least half the functional classes, they appear to be below
market rates of return.

Some evidence on the rotation of equity can be added to that set forth in
the text. Sources disagree somewhat on the trend in rotation periods for
cooperatives' equity. A study of Pacific Northwest cooperatives shows no
change over an extended period. One of regional dairy cooperatives illus-
trates the use of per-unit capital retentions to shorten the rotation period.[7]
Some differences among cooperatives in equity rotation practices confirm the
organizational problems stressed in the text. Local cooperatives with many
inactive members are likely to have redemption programs, and more likely if
they hold unallocated reserves stemming from tax-paid profit-making activities
(Brown and Volkin, 1977, pp. 13-25). Those activities create rents for
members that could be disseminated in various ways; accelerated rotation of
equity has the obvious advantage of paying off what is usually an interest-
free loan from the member. Inflation has amplified cooperatives' financing

problems, as with IOEs. It has raised the cost of new real investments. It has raised members' marginal tax rates, and hence the percentage of net savings that need to be paid in cash to cover their tax bills. Both of these developments compete with the use of retentions to rotate old equity.[8]

A number of sources confirm that the one unscalable barrier for cooperatives is securing an up-front equity investment from their members. This has constrained the entry of cooperatives into activities that require not necessarily a high capital-output ratio but a large fixed capital investment per member.[9] There is also some evidence that members of ongoing cooperatives resist capital assessments that might be made to expand the cooperative's plant at a rate faster than permitted by retained net savings. A survey of Northeastern dairy farmers indicated the occurrence of such assessments as by far the most common reason given for dropping or changing cooperative membership.[10]

FOOTNOTES

1. Russell C. Engberg, Financing Farmer Cooperatives: Needs Sources, Policies, Procedures, and Problems (N.P.: Bank for Cooperatives, 1965), chap. 2, pp. 113-5; Gerald W. Emmer, "Hard Look at Financing Needed for Future Good," American Cooperation, 1977-78, p. 264.

2. One study of local cooperatives in Oregon in 1963 indicated about a 15 percent differential on both short-term and long-term borrowings. See Oregon State University, Agricultural Experiment Station, The Role of Borrowed Funds in Oregon Cooperatives, Circular of Information No. 622 (1965). For a typical casual evaluation, see American Cooperation,

1978-79, p. 334.

3. C. B. Baker, "Instability in the Capital Markets of U.S. Agriculture,"
   Amer. J. Agr. Econ. 59 (February 1977): 170-7 (data from Table 2).

4. Davidson (1980); Farmer Cooperatives 47 (June 1980): 10-13 and 45 (June
   1978): 4-9.

5. See Emmer, pp. 254-66; Gail N. Brown, "Financial Analysis Shows Problems
   and Possible Ways Cooperatives Can Improve," American Cooperation, 1978-
   79, pp. 324-32.

6. See Farmer Cooperatives 43 (April 1976): 4-8 ff.

7. Farmer Cooperatives 48 (April 1981): 9-11; Knutson (1971, p. 14).

8. Farmer Cooperatives 47 (October 1980): 8-10.

9. See American Cooperation, 1978-79, pp. 232-8; American Cooperation, 1977-
   78, pp. 85-6; Tucker, Roof, and Monroe (1979, pp. 25-6, 29-30). For a
   case study that illustrates farmers' differing attitudes toward capital
   contributions and retentions, see William Chazanof, Welch's Grape Juice:
   From Corporation to Cooperative (Syracuse: Syracuse University Press,
   1977), chaps. 10-11.

10. Farmer Cooperatives 49 (April 1982): 6-7.

Appendix D. Evidence on Vertical Integration and Diversification

This appendix summarizes diverse empirical evidence bearing on coopera-
tives' vertical integration and diversified activities. As is mentioned in
the text, measurement of vertical integration is difficult, because it can
take several independent forms. Local (centralized) cooperatives hold shares
in federated cooperatives, and independently transact a certain flow of busi-
ness with them. Federated cooperatives may admit growers as direct members or
be integrated backward to operate local cooperatives in essence as subsidi-
aries. Therefore no single indicator of the extent of vertical integration is
available. Table D-1 presents the two most relevant sets of data. One meas-
ures the extent of investments in other cooperatives as a percentage of total
assets. Since these intercooperative holdings almost always represent verti-
cal relationships, the data give an accurate impression of vertical ownership
links. The second set of data indicates the percentage of gross cooperative
business handled by regionals; this can indicate vertical chains of transac-
tions emanating from local cooperatives, but in some cases it mainly reflects
the extent of grower membership in the regionals (sugar, tobacco). Putting
these data together, we find that the formal chains of vertical transactions
appear mainly in cotton and grain marketing and in farm supplies, whereas
backward-integrated regionals are important in nuts, fruits and vegetables,
sugar, and several other product groups.

Additional data appear in Table D-2, which contains specific figures on
the degree of vertical integration in regional and international grain tran-
sactions. Table D-2 confirms our expectation that cooperatives' shares will

Table D-1. Indicators of extent of vertical integration in agricultural
            cooperatives

Functional group and commodity marketed	Investments in other cooperatives % of total assets, 1976 (1)	Percent of gross cooperative business handled by regional cooperatives, 1969-70 (2)
Marketing cooperatives	3.4%[a/]	70%
beans & peas (dry edible)	n.a.	71
cotton, cotton products	8.2	76
dairy products	4.0	75
fruits & vegetables	3.2	69
grain, soybeans	11.8	45
livestock & products	3.7[b/]	88
nuts	n.a.	96
poultry products	3.0	73
rice	2.7	74
sugar products	0.1	100
tobacco	n.a.	100
wool & mohair	b/	76
Farm supply cooperatives	13.7[a/]	49
building materials	n.a.	49
containers, packaging	n.a.	80
farm machinery	n.a.	56
feed	n.a.	49
fertilizer	n.a.	58
meats & groceries	n.a.	45
petroleum products	n.a.	54
seed	n.a.	45
sprays and dusts	n.a.	54

[a/] These figures pertain to cooperatives principally engaged in farm
marketing and farm supply, not to the total markets in these products. For
cooperatives engaged in both marketing and farm supply, the figure is 10.0%.

[b/] Wool is included in livestock.

Source: col. (1) - Griffin (1980, p. 22); col. (2) - Abrahamsen
(1972, Table 18).

Table D-2.   Vertical integration in grain marketing, 1977

Kind of grain	Proportion of farm grain sales handled by 14 primary regional cooperatives	Proportion of regionals' port shipments moving to cooperative elevators
Wheat	26.0%	61.4%
Corn	16.8	47.7
Sorghum	23.8	78.4
Soybeans	27.1	64.5
Other grains	18.0	96.9

Source: USDA, Economics, Statistics, and Cooperatives Service, Regional Grain Cooperatives, 1975 and 1977, Farmer Cooperative Service Research Report No. 6 (1980), Tables 7, 8, Appendix Table 6.

decline as transactions proceed from the local (where cooperatives' shares are around 40 percent) to regional and interregional transactions.

Data are available from other sources on vertical relations among supply cooperatives. Farm-supply cooperatives secure 67 percent of their fertilizer (on a tonnage basis) from cooperative manufacturing organizations.[1] Cooperatives distributing liquid fuels at retail got 94 percent of their supplies through cooperative channels in 1969.[2] A survey of 100 mid-size farm supply cooperatives (1970 sales $1 to $5 million) determined that 92 percent were affiliated with a regional supply cooperative from which most of their supplies were purchased.[3]

All cooperatives tend to face a common operating difficulty: They function to serve a given set of customers or suppliers and are discouraged from directing their facilities away from this membership base, but neither are they guaranteed a current flow of transactions from the base. This problem particularly affects the federated cooperatives, which complain that directors pursue the interests of their own parent cooperatives, and those parents place their business with the federated cooperative only when it serves their short-term advantage.[4] Regional cooperatives have tried to combat the difficulty by means of pooling arrangements: Farmers commit some proportion of their crops before harvest to be delivered into a pool, so that the regional can depend on a committed quantity in undertaking its marketing.[5] The vigorous efforts make to promote pools hold interest, because IOEs in the grain trade undertake the same operation without the assurance of pre-commitment, depending on market prices and certain types of grower contracts with special risk-sharing properties. This same relationship between vertical integration and uncertainty is apparent in the markets for pulses, where in the IOE sector

vertical integration has been tending to link the dealer/processor functions and the packing function. In the process, the spot market linking them tends to become thinned, and the cooperatives (which traditionally have operated as brokers) are under more pressure to operate pools to economize on marketing information (Smith, 1980). In backward-integrated farm supply cooperatives, tapered integration and long-term supply contracts between cooperatives seem to keep the uncertainty level acceptably low.[6]

The differences among crops in cooperatives' shares of U.S. agricultural exports shed light on both vertical integration and the relative disadvantages of cooperative organizations for dealing in these markets. Table D-3 presents data on cooperatives' shares of exports in two recent years. High shares are limited to fruits, nuts, and cotton, and they clearly reflect two influences: high cooperative shares at the initial marketing level, and international marketing channels that do not demand sophisticated logistical and marketing capacities of the exporters. An investigation by Hirsch (1979) shows that cooperatives have predominantly utilized foreign sales representatives in the export trade rather than establishing their own sales offices or information networks. In 1976 41 percent of all export grain transactions of cooperatives (42 percent of cooperatives' transactions in all agricultural commodities) were through foreign sales representatives.[7] Grain cooperatives have concentrated their export sales in the f.o.b. tender market, declining to take the risks and incur the transaction costs associated with chartering ocean vessels. The IOE exporters sell an estimated 40 to 45 precent of their exports on a c.i.f. or a c&f basis, the cooperatives only about 1 percent. Hence their business has been confined to certain classes of customers, and their export sales are more concentrated among regions than those of the

Table D-3. Shares of U.S. agricultural exports accounted for by cooperatives,
1976 and 1980

Product	1976	1980
Animals, animal products	1.4%	2.9%
Grains and preparations	8.0	7.0
Oilseeds, oilnuts, and preparations	8.4	6.6
Fruits and preparations	38.0	30.6
Vegetables and preparations	2.7	2.2
Nuts and preparation	40.1	35.1
Cotton (raw)	22.1	17.9
ALL	9.2	7.8

Source: _Farmer Cooperatives_, June 1982, pp. 4-5

IOEs.[8]

The declared motives for diversifying by large federated cooperatives include spreading risks and exploiting technical complementarities in manufacturing operations.[9] Among diversified midsize supply cooperatives, 88 percent are reported to borrow working capital, compared to 62 percent of specialized ones, a difference likely to reflect successful risk-spreading.[10] Marketing cooperatives that successfully establish skills in selling and distributing differentiated products find these skills transferable to other products. Thus, Land O'Lakes expands into frozen turkeys and margarine, Ocean Spray into bottled juices squeezed from fruits other than cranberries.[11]

FOOTNOTES

1. Mather (1973, p. 22).

2. Mather and Bailey (1971, p. v).

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5. Pooling predominates in the fruit, vegetable, and nut marketing cooperatives -- notably the sectors in which economies from sales promotion (a collective good) point toward some form of integration or contractual relationship between producers and marketers. The establishment of these collective goodwill assets was an important motive for forming cooperatives in this sector. See USDA, Economics, Statistics, and Cooperatives

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