Determinants of Farm Size and Structure

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THE EFFECT OF GOVERNMENT POLICY ON FARM SIZE AND STRUCTURE

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The structure of production agriculture can be described by farm size measured in a number of ways, by pattern of commodity production involving diversification and specialization, off-farm employment and tenure as reflected by farmland ownership and operation. There appears to be a strong need to believe that the policy actions of the Federal government have had a significant influence on the structure of agriculture and especially farm size. The reason I say that there seems to be a need to believe in the influence of policy is due to the national willingness to believe in the "family farm" as something worthy of preserving and to buy policies sold on the strength of that quality.

Currently, more than 50 years since the New Deal began what has been a more or less continuous governmental presence in agriculture, there are still family farms, but there are fewer of them and a small number of large farms produce an amount of produce far out of proportion to their numbers. In spite of all of the debate and resources given to farm policy, with the exceptions of the Homestead Act and the Reclamation Act of 1902, there has never been a stated national goal of policy to produce a given distribution of farm sizes all of which are economically efficient and yet amenable to management by families. Still there is the need to feel that policy has influenced the structure of farming in a significant way.

This paper will examine first, the forces that lead to larger, more specialized highly capitalized farms. Second, it will attempt to evaluate various government policies such as farm price and income policy, tax policy, and monetary policy to see if the policy instruments and the forces that lead to structural change are related.

Structural Change Forces

Any business, including farming, is the way it is because of several factors. As a business develops, it is influenced by financial incentives as well as factors related to the preferences of the manager that do not necessarily lead to maximization of expected profits.

Production economists have tried to explain firm growth in farming by use of economic theory showing the presence of economies or diseconomies of scale or size. The research that guides this inquiry focuses on estimation of cost functions for types of farms generally on a total farm basis. The results usually reveal an approximation of a long-run average cost function and previous work has predominantly presented an L-shaped curve suggesting substantial unit cost reductions up to some scale and level unit costs beyond (Hall and LeVeen, 1978, p. 596). The implications for farm size and, therefore, the number of farms are obvious. There is overhead to be spread, but not much empirical evidence has appeared to show that unit costs increase due to exceeding the capacity of certain elements in the business.

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There are some problems with these research results as an explanation for the size and number of farms. The approach probably works best when off-farm opportunities are poor or absent. In that case, the assumption that most, if not all, of the available labor time of the family can be charged to the farm is valid. It is not altogether clear that there are many economies of size to be realized on smaller farms where there are opportunities for family members to work off the farm and where often older, but serviceable, smaller machinery exists. Labor is no longer an overhead cost in this situation, but can be charged at the opportunity cost per unit of time used. Some of the lumpiness disappears.

As Young shows elsewhere in these proceedings, the results interpreted as economies or diseconomies of size or scale can vary depending on the measure of size or scale adopted. This is especially meaningful when multiproduct farms are being examined and if the farms are not highly homogeneous with respect to technology and quality of resources.

An additional problem with cost research as an explanation of forces behind firm growth, or lack thereof, is the usual assumption of perfect certainty and the assumed risk neutrality of the farm manager. The presence of the principle of increasing risk has been ignored in these studies. Earl Heady, in his 35-year old book, continues to speak cogently about the role of uncertainty and the relation of uncertainty and equity in limiting the resulting size of firm (Heady, 1952, p. 545).

Heady, in a paper presented at an NCR-113 workshop in 1984 (Heady, 1984, p. 26), suggested that it may be more important to study the economics of farm size than the economies of farm size. This led Heady to argue that prediction of farm size for an individual firm amounts to predicting the demand for and use of capital by the firm. The supply will be controlled partly by the firm's ability and willingness to finance out of equity and by the ability and willingness of institutions to loan to the firm. The farmer's demand for capital will be, only in part, a function of the marginal value productivity of capital. Certainly, the perfect certainty demand for capital will be adjusted for the farmer's attitudes toward risk.

In addition to the forces already mentioned, there are other reasons why firms exist and grow as they do. Motivations for enlargement of farm size or land ownership often arise from a personal or family goal to control certain real estate or to mimic the admired behavior of another person. Another motivation which could not be predicted by cost research is the speculative motive based on expectations about inflation and/or future farm policy directions. Certainly the events of the decade of 1975-85 provide evidence of this kind of behavior.

In summary, then, the forces that shape the structure of farming are represented by a complex set of financial variables related to the behavior of costs, farmer perception of and response to uncertainty, the behavior of lending institutions, and various personal motivations based on non-financial goals and speculation.

Government Policy

Even though the stated justification for farm policies is and has been to promote and protect "family farms," with the implication that an agriculture with small to moderate sized firms would result, the instruments have been indirect (price subsidies, low interest rates, and cost sharing) and there has been no clear structural goal (Spitze, Ray, Walter, and West, 1980, p. 6.). The exceptions to this are the Homestead Act and the Reclamation Act of 1902. Each of these actions had, as a goal, farms of 160 acres.

There are examples of policies in other countries where the explicit goal was to change the structure of agriculture. Sweden is an example with its "Rationalization" Policy designed to make farms larger and more economically viable. In 1967, the Swedish Parliament put a policy in place designed to reduce the arable land in farms by one-third, the number of holdings by one-half, and remove as much as 70 percent of the labor resource from farming. This policy was accompanied by instruments of community development, land control, financial help to farmers to modernize and get larger, advice, crop insurance, and labor market funds to rehabilitate redundant labor (Linden and Swedborg, 1969). To a large extent, they have achieved their goals. The goals of policies applied to U.S. agriculture have not been as well articulated or designed.

Farm Structure and Government Commodity Programs

There are now about 2.4 million farms in the U.S. by census definition. In 1965, there were about 3.4 million (USDA, 1983). Evidence from the Census of Agriculture as presented by Sumner (1985, p. 294) is that middle-sized farms, those producing from $40,000-$200,000 in 1978 dollars, received 50 percent of direct government payments in 1978 compared to 40 percent in 1969; yet their share of output stayed at about 40 percent.

Data also show that direct government payments are disproportionate to the share of cash receipts. For example, in 1982, farms with sales less than $10,000 generated 3.2 percent of the cash receipts and received 7.2 percent of the payments. Farms with sales over $500,000 accounted for 30 percent of the cash receipts and 7 percent of the payments. For farms in the $100,000-$199,000 category, the ratio was roughly one.

The results are not surprising. Price supports, deficiency payments, or disaster payments are tied to output and, therefore, higher production of supported commodities results in proportionately more payments. The very large farms as a group don't receive payments in proportion to their sales because many do not produce commodities that benefit from the programs. California lettuce farms, for example, are not a part of the commodity programs although they benefit from subsidized irrigation water. In spite of publicity about large payments to industrial farms, there is no evidence that the level of payments received has led to increases in farm size ceteris paribus.

Commodity Programs and Risk

It would seem that the presence of price supports would tend to reduce price and income uncertainty. The principle of increasing risk asserts that large, specialized farms with high debt-equity ratios face more risk associated with price variability than do smaller, more diversified farms that have little debt. Cash flow is not as crucial.

Harrington et al. (1983) concluded that price and income programs (1) stimulated growth by allowing farmers to borrow more at lower interest rates, because of less risk; (2) made it possible for farms to stay in business by truncating the price distribution and; (3) caused increases in land prices and other farm assets.

Sumner (1985, p. 289) argued, and I agree, that the structure of farming is more influenced by risks associated with long-term expectations over periods longer than the life of most farm bills. The decisions that involve major land purchases or irrigation development, for example, will not be encouraged or discouraged by PIK programs or the Food Security Act of 1985. Certainly, whatever

stabilization from year to year that price and income policies can bring about for the affected commodities can easily be negated by other policy decisions to change eligibility or take positions to alter export demand. We are now witnessing shrinking from former positions by changing rules such as cross-compliance, lowering milk price supports, and serious discussion of eliminating commodity programs. One hopes that farmers were smart enough not to make investment decisions based on the 1985 Farm Bill. Policy changes can destroy as well as create wealth.

Credit Policy

The major source of extra capital for farmers is and has been debt financing. To make this work, policies have made credit available at cheap interest rates. The Farmer's Home Administration and the Farm Credit System have been the two vehicles providing governmental involvement in lending capital to farming. The Farm Credit Act of 1971, which loosened the reins on loan policy throughout the Farm Credit System, must have aided the expansion in farm size. Mortgage maxima that could be granted without Farm Credit Board approval were increased from $100,000 to $400,000 and the use of open-end mortgages which could be increased based on increases in net worth could not have been a deterent to firm growth.

Tweeten (1984, p. 36) shows that Farmer's Home Administration lending appears to have deviated from its original charge to serve limited-resource farmers. That is, in 1979, farms with over $200,000 sales comprised 7 percent of the farms, but received 23 percent of all Farmer's Home Administration lending. This was apparently due to the economic emergency loan program. On a share of lending compared to shares of sales, it appears that the lending share exceeds the sales share on all but the largest farms. Based on this, Tweeten concludes that Farmer's Home Administration cannot be found culpable of aiding the trend to larger farms.

Tax Policy and Farm Structure

There is considerable opinion that tax policy, especially Federal income tax policy, has been an aid to increasing farm size. In a recent issue of Choices, Nixon and Richardson (1987, p. 12) counsel that the 1986 Tax Reform Act tells farmers to "get larger or get out." This, it is argued, is due to the lowering of upper income rates and elimination of investment tax credit and the change in depreciation rules. On the same page, Stinson and Boehlje (1987) suggest that the 1986 tax reform will make farming riskier and more labor intensive due to fewer and lower marginal brackets and reduced deductions associated with capital investments. Both of these reports demonstrate the possible influence of tax policy on farm structure.

Income tax rules have favored agriculture. The provisions that are generally agreed to be advantageous to agriculture are: (1) cash accounting as contrasted to accrual accounting, (2) expensing costs of developing capital assets, and (3) favored capital gains treatment of income sale of livestock such as dairy or breeding animals. There are other favorable provisions that are not restricted to agriculture. Examples of these are investment tax credits and accelerated depreciation.

Breimyer (1987, p. 36) indicates the difficulty of determining whether the 1986 Tax Reform Act is more or less progressive. Since the current and earlier laws differ in what can be used to reduce taxable income as well as changing rates, it is not clear whether large, high income farmers will benefit from the change more than smaller farmers. If wealthy farmers were heavily invested in tax shelters, the 1986 law could have a progressive effect on these businesses.

There is no doubt that farming has had favored tax treatment. Cash accounting has allowed the placement of costs of a project in one tax year and the benefits in another to manage the year-to-year tax bill. In addition, sales of assets produced with deductible costs have been taxed at capital gain rates. What resulted was different rates of return depending on the marginal tax rate and this return could be used for firm growth.

Cash accounting made possible tax sheltering when there were differential capital gains rates. Tax credits and deductions are usually more favorable for high income people compared to low income people.

There is no question that investment tax credits and accelerated depreciation have encouraged capital-labor substitution and, therefore, have aided farm expansion. The surge in demand for large machines by farmers in the mid-1970s when increases in farm income were huge, provides evidence that farmers' biggest problem then was tax management. The income sheltered by tax credits and deductions appears to have been placed in the land market and led to farm expansion. While, as mentioned earlier, economies of size and expected prices are important determinants in decisions about expansion, a farmer who has large new machinery financed in part by tax credits and can see the need for more if expansion takes place has completed the set of necessary and sufficient conditions for expansion.

Sisson (1982, p. 95) observes that tax preferences appeared to widen with increasing income. He concludes from his research that the net effect of Federal tax structure is to provide an incentive for farms to increase in size. Other analysts have not been as certain. Davenport, Boehlje, and Martin (1982, pp. 30, 31) were relatively noncommital concerning the net effect of tax policy on firm growth. They argued that incentives for expansion were present, but could not verify the effect of the incentives.

There is good reason to believe that credits and deductions encourage capital-labor substitution and thereby encourage expansion linked to technology. On the other hand, as Tweeten (1984, p. 82) points out, this may be balanced by progressive tax rates. The effect of credits and deductions is to shift the demand schedule for capital (technology) to the right, while the effect of progressive rates is to shift the demand schedule to the left. The net effect of these shifts is an empirical matter requiring estimation.

Monetary and Fiscal Policy

The effects of monetary and fiscal policy are likely to be indirect for the most part. It isn't difficult to develop scenarios of the resultant effect of tight or loose money on interest rates and conclude that investment in farm assets would be discouraged or encouraged, respectively. I argue, then, that tight money favors farms with high equity which may include well-established family farms of moderate to large size. Conversely, loose money will favor the entering young farmer and the expanding highly leveraged farmer who is moving up. This reasoning is similar to that of Tweeten (1983, pp. 61-67).

In addition to the effects that monetary policy has on the cost and ability to finance agriculture, there are the effects on the general price level that impact agriculture. The net effect has to be determined by the relative effects of inflation on costs (input prices) compared to product prices. My understanding is that this issue (a) has not been settled for the recent past and (b) may have no general answer.

There is general agreement that low interest rates helped fuel the expansion in farm size during the 1970s and the conventional wisdom is that the high interest rates of the early 1980s halted the bull market in farm land and other farm assets. But these events are confounded by a drop in export demand which was not totally independent of the value of the dollar. If we can't, as Sumner (1985, p. 241) asserts, find data from conclusive natural experiments that contain variation in structural variables and variations in farm programs, ceteris paribus, it doesn't seem that we are soon to find similar data to demonstrate conclusive direct relations between monetary-fiscal policy and farm size and structure.

Certainly a booming economy doesn't discourage introduction and adoption of technology. However, we must remember that hybrid corn, along with tractors, came into being and was largely adopted during the great depression. So the lesson seems to be one that tells of how niggardly nature is in revealing these relationships to the social scientist.

Summary and Conclusions

This review has shown that the explanation for changes in farm size and structure is found in a complex of forces and relationships. It seems that cost functions representing constant technology and perfect certainty are not enough. It appears that non-financial motivations, reaction to risk, technology, tax policy, monetary-fiscal policy, and credit all can influence farm size and structure.

Examination of price and income policies presents no convincing evidence that these policies have been non-neutral with respect to size. There is some logical basis for arguing that the policies may have retarded farm size expansion. As yet, we have not discovered ways to make the data tell the truth about the relation of price and income policies and trends in farm size. The existence of large farms that produce commodities not covered by commodity policy shows that there have been other strong forces influencing farm size.

There are compelling logical arguments that technological change, tax policy, and monetary policy are the important forces shaping the size, number, and control of American farms. There is also a strong argument to be made that if there are national goals with respect to farm size and structure, the policy should have instruments designed to directly influence size and ownership, for example. If we are correct that price and income policies are size and structure neutral while claiming to protect family farms, the policy can't have been successful.

Questions that require research are: (1) What is the net effect of tax policy?; Will special credits and deductions be offset by progressive rates?; (2) What is the nature of distribution of farms by size?; Is it becoming bimodal or is it unimodal, but skewed as Sumner (1985, p. 295) suggests?; (3) What can we learn about firm growth and farm structure by examining demand functions for capital for various sizes and kinds of farms?

There is considerable yet to learn that could be useful to individual farmers and policy makers. This could be interesting because of the split personality of Americans who, while admiring family farmers, also admire those that devour their neighbors and become wealthy. Such is the tension that surrounds this issue.

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