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RISK ANALYSIS FOR AGRICULTURAL PRODUCTION FIRMS: CONCEPTS, INFORMATION REQUIREMENTS AND POLICY ISSUES

Proceedings of a Seminar Sponsored by
Southern Regional Project S-180
"An Economic Analysis of Risk Management
Strategies for Agricultural Production Firms"
New Orleans, Louisiana
March 25-28, 1984

Department of Agricultural Economics
Agricultural Experiment Station
College of Agriculture
University of Illinois at Urbana-Champaign

July, 1984

AE-4574

A CASE FOR FARM INCOME INSURANCE?

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Farm income insurance has gained attention as an alternative to traditional price-support programs. Both the Congressional Budget Office report on farm revenue insurance and the Department of Agriculture task force report on farm income insurance protection have been received with interest. No doubt this interest has been sparked by the dismal performance of current farm programs in the 1980s. However, despite the dissatisfaction with current policy, the Congress is unlikely to move rapidly to a new and different approach. History supports this assertion.

In this paper, I want to examine the case for farm income insurance. My conclusion is that there is a case for income insurance, but that there are many constraints to a workable program.

Fundamental Issues

It is useful to start with a look at two basic issues. The first issue is: why should society be concerned about how farmers adjust to risk? The conventional response is that farmers are risk-averse, preferring a lower, but more certain income, over a higher but more uncertain level of income. As a result, farmers will use fewer resources in agricultural activities than they would if the same expected returns were certain or if they were less risk-averse. Thus there may be efficiency gains to society if farmers face reduced risk. This resource allocation argument is difficult to convey, in part because of a lack of practical evidence. The validity of this efficiency argument is questionable in today's highly specialized commercial farming sector. Apart from the efficiency issue, income instability is an inherent problem of commercial farmers. The widely-held perception is that sharp year-to-year fluctuations in farm income are not only harmful to farmers, but also to rural communities and agribusinesses. Moreover, there is some evidence that farmers now face greater instability because the agriculture sector is integrated into the domestic and international economies.

If the public should care about risk and income instability in farming, a second policy issue is: what is the appropriate public

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role in helping farmers adjust to them? Public policy has long acknowledged the risk and uncertainty facing farmers, and many federal programs have been aimed at agriculture. In fact, by some measures federal support of agriculture is much larger relative to its economic importance than for any other sector (CBO, January 1984). Farm price-support programs have allowed certain farmers to transfer price risks to the public sector. And federal crop insurance has helped some farmers shift production risks to taxpayers. But price-support programs have several limitations, including their high costs (CBO, February 1984). Furthermore, expansion of federal crop insurance under the Federal Crop Insurance Act of 1980 is proving to be challenging and costly. Despite extensive government intervention, policy has not focused directly on income stabilization; attempts to stabilize incomes directly via price stabilization and supply management have proven to be costly.

While these longstanding public programs are being questioned as to their relevance to farmers and to society, there is growing interest in methods for farmers to transfer risks to those in the private sector rather than to taxpayers. For example, commodity futures options may offer farmers a more advantageous way to transfer price and income risks than is currently available. Farmer self-financing of price-support programs is also a way to shift farming risks away from taxpayers.

The basic point is that society's concern about farming risks and income instability and appropriate public policies needs to be reexamined. Such an evaluation could lead to the consideration of alternatives. One alternative is farm revenue insurance.

Farm Revenue Insurance

The idea to insure farmers' incomes is not new--a form of income insurance was written by a private insurer at the turn of the century. The recent studies (CBO, August 1983; USDA) focus attention on income insurance as a contemporary policy.

The CBO study looked at the concept of farm revenue insurance. Farm revenue insurance would aim directly at stabilizing farmers' incomes. It would do so by guaranteeing a farmer that revenue per acre of each crop would not fall below some proportion of normal or expected revenues. (Revenues, or gross income would be insured rather than net income.) For example, a corn farmer might insure 75 percent of average revenues per acre based upon recent experience. If revenue from the crop was less than the insured level--due to either low yields or low prices--the farmer would receive an indemnity equal to the difference. There would be no indemnity if revenue levels were inside the normal range of variation.

This approach to income insurance could build on the existing federal crop insurance program. Farm revenue insurance would protect farmers against sharp declines in gross incomes regardless whether price or production variability was the cause. In exchange for this protection, farmers would ideally pay a premium that reflected their individual risk. This would minimize the possibility that farm revenue insurance would encourage inefficiency. Under an ideal insurance scheme, long-run premiums would approximate a farmer's indemnity payments so that his average annual revenue would be the same as in the absence of insurance. But insurance would reduce year-to-year variability in revenues, increasing them through indemnities in poor years and reducing them through premium payments in all other years.

Farm revenue insurance would replace existing price-support programs, with the exception of a grain reserve to protect consumers. The taxpayer costs of farm revenue insurance would depend upon several factors. But it probably could be provided at a smaller cost than current price-support programs. Farmers would pay all or a portion of the costs through premiums.

Constraints on Revenue Insurance

Clearly, there are many constraints to farm revenue insurance. First, there is a set of insurance problems. From an insurance perspective, perhaps the main challenge to revenue insurance is the difficulty of measuring revenue risks and predicitng the probability of future losses. Establishing insurance premiums that reflect individual farm risks is necessary to minimize adverse selection. If, for example, premiums represented average risk levels, then high-risk farmers would be encouraged to participate and low-risk farmers would not. The program would be collecting premiums for average risks and paying out indemnities on high risks. This would be costly.

Production risks, which are half of the revenue equation, can be predicted with reasonable accuracy on the basis of existing farm or county yield data. Price risks are another matter, however. Using yield data, one can estimate average revenue per acre and year-to-year variability from state price data. But because of the number of variables affecting prices, not the least of which is government policy, such revenue data may generate inaccurate predictions about the probability of losses. To address this problem, revenue data based on recent history would have to be examined carefully in the initial states of implementation. As individual farm observations accumulated over time, this problem would be lessened.

A critical insurance problem lies in the fact that the incidence of price risks is not independently distributed among farmers. In

other words, prices received by one farmer are typically closely aligned with prices received by others: a decline in corn prices because of an unanticipated drop in exports is felt by all farmers selling corn. Such a decline could make all insured farmers eligible for indemnity payments. Since the objective of farm revenue insurance is to provide protection against such declines, the cyclical pattern in agriculture could mean that in some years the program would pay out to a great majority of insured farmers and in others to very few. This could lead to variable participation from year to year, since in years when the market outlook was negative farmers would have greater incentive to participate than in years when the outlook was positive. In order for the program to work, farmers would have to participate on a multiyear rather than a year-to-year basis. They could be encouraged to to so through incentives such as premium discounts for multiyear contracts.

There are also "moral hazards" stemming from the behavior of the insured. Under certain conditions a farmer might be able to reduce his yields in order to profit from the indemnity. Cases could exist where the economic optimum yield given production costs and expected prices would be smaller than the insured yield. This hazard could be minimized by basing expected revenues on average individual farm yields so as to penalize those who deliberately lowered their yields by reducing the level of insurance protection they would receive in future years.

Second, to make revenue insurance viable, a relatively large number of farmers would have to participate. This would require that farmers understand the advantages of the program and that they be able to pay the premiums. Farmers' perceptions of the necessity for revenue insurance would depend on their attitude toward risk, the alternatives available to them (such as forward pricing), and the economic characteristics of their businesses (extent of diversification, financial reserves, etc.). In general, those farmers who are most vulnerable to farm income variability would be most likely to want revenue insurance. These would include farmers dependent on the income from farming (such dependency increases with farm size); farmers with substantial debt-to-asset ratios; and new entrants. Clearly, not all farmers would have the desire to buy insurance; but not all would have to participate in order to have an acceptable pooling of risk.

Farmers would have to be able to pay the insurance premiums. This means that premiums should be as low as possible relative to the level of protection, and that long-term expected benefits should be attractive relative to costs. Most likely, premiums that reflect the full cost of providing farm revenue insurance would discourage many farmers from participating. This raises the issue of whether the public should subsidize farm revenue insurance. On the one hand, it

may be argued that the federal role should only be to create a market in which farmers can buy income protection, a market which is not provided by the private sector. This view suggests that farmers should pay the full cost of farm revenue insurance. On the other hand, it is also argued that there are benefits in the society that justify public subsidization of income insurance. Indeed, it seems likely, as evidenced by the subsidization of federal crop insurance, that premium subsidies would be necessary to encourage participation in revenue insurance. An argument against them is that if the subsidies became substantial the program would reward inefficiency and become an income transfer program rather than insurance against fluctiations. No doubt the level of subsidy would be intensely debated just as are the levels of price and income support under current policy.

There is yet another important constraint--the problem of making a transition from current policy to something new like farm revenue insurance. Policy change has occurred very slowly over the past 50 years. Moving from current policy to a new approach is more than just a political question. There are a series of issues dealing with program design and implementation. For example, farm revenue insurance as outlined here would build upon federal crop insurance. Yet federal crop insurance is burdened with many problems. Participation has declined after an initial surge following the Federal Crop Insurance Act of 1980. A number of reasons explain why: too-high premiums relative to coverage; farmer anticipation of other federal disaster assistance; losses in excess of premium income because of inadequate rates, and insurance of high-risk acreage; and adverse risk selection because of the use of county average yields. Dissatisfaction with current federal crop insurance weakens it as a vehicle for farm revenue insurance.

There is a more fundamental barrier to farm revenue insurance. The underlying premise of insurance is that it would reduce year-to-year fluctuations in farmers' incomes, collecting premiums in all years and paying out indemnities in low-income years. This implies random variation about an acceptable average level of income. Thus, the Congress would have to accept the mean level of farm income over time and adhere to the income stabilization objective of farm revenue insurance. Whether the Congress would do this is very uncertain. Much of the dissatisfaction with current policy arises from the confusion about farm policy objectives. It is clear that income enhancement, not income stabilization, has been the dominant objective in the 1980s.

Alternative Income Insurance

Obviously, there are several problems with actuarial-type income insurance programs. There are, however, other ways to address

income instability that may be less complex. One example is Canada's Western Grain Stabilization Program. Its objective is to stabilize farmers' annual cash flow--the difference between cash receipts and cash production expenses. Basically the program operates around a stabilization fund to which farmers and the government contribute. From a practical viewpoint, this approach could have more appeal.

Concluding Comment

Farm income insurance deserves consideration as a new policy approach. There is a case for insurance to help farmers adjust to risk and income instability. But there are many questions to be answered--obviously, there are many difficulties in making a significant policy shift. A pilot experimental insurance program would provide a better understanding of its possibilities.

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