THE OPPORTUNITY COST OF PROTECTING CROPPING HISTORY

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Farmers are continually faced with the necessity to make farm management decisions which have economic consequences. Often the situation occurs wherein the farmer has little information upon which to base a decision. The situation may be forced on the farmer so that a no action decision also has economic importance. Also, as is the case in a dynamic society, a decision made now can have repercussions in years to come.

For many years, some type of government farm program has been in effect for many farm commodities. Most of these programs have been designed so that a farmer's decision to participate could be made on a year to year basis. Production decisions could be made independently with a decision not to participate in a given year having no effect on the choice or level of participation available in subsequent years.

THE AGRICULTURAL ACT OF 1970

In 1970, a new Agricultural Act became law. This legislation allows the individual producer much more flexibility in his production decisions. Previous programs had utilized some type of allotment or marketing quota to limit production. These had generally been translated into limits on planted acreage for a given farm. The new program has no provision for limiting planted acreage of most crops. The allotments are used to determine the amount of set-aside required and the level of payment to the producer. To participate in the wheat and feed grain program, the farmer is required to set aside from crop production a percentage of his farm's allotment for that crop. If the set-aside requirement is met, the farmer will receive payments based on the payment rate and his allotment. He does not have to plant any

of the specified crop. He is free to plant the remainder of his cropland, other than the set-aside and conserving base acreage, to any crop he desires not controlled by allotment. (A few crops such as tobacco, peanuts, rice, long-staple cotton and sugar beets are still under allotment.) The same rules apply for cotton as for wheat and feed grains except that cotton acreage must be planted in order to receive the payment.

REQUIREMENTS TO PROTECT

CROPPING HISTORY

The Agricultural Act of 1970 contains provisions which made farmer decisions about participation much more dynamic. One such provision is the requirement that if crops for which payments are received are not planted, the allotment base for payment may be reduced for the following year. If no acreage of the crop is planted for three consecutive years, then the total allotment base, for payment purposes, could be lost to the farm. Thus, if this provision is totally operative, decisions about this year's operation could materially affect the operation and organization in future years.

The Act does allow for the possibility that planting of one crop may substitute for another crop in preserving cropping history. For instance, the Secretary of Agriculture can specify that feed grains and wheat may substitute for each other or that soybeans can substitute for other crops in preserving their history. Such a substitution provision is a year to year decision which the Secretary can make. Substitution of feed grains for other crops was permitted in 1971, and it has been announced that substitution of soybeans will also be permitted in 1972.

The major provisions of the 1970 Act are conducive to permitting the producer more flexibility in making production decisions. However, the need to protect the cropping history of previously allotted crops may reduce some of this freedom. In order to decide whether or not to protect the history, the farmer will need to consider several points.

1. How will current profit be affected by planting the crop to protect history? Obviously, if it is his most profitable crop he will likely plant more than sufficient acreage to protect the history. If the crop is inferior profit-wise, then profit will be foregone if history is to be protected.
2. How will profit be influenced in subsequent years when the allotment base for the nonprotected crop is reduced and ultimately is lost altogether?
3. What is the likelihood that allotments or bases will be reinstated in farm programs of the future? Will the loss of a present base have economic consequences in this event?

The first two of these questions can be evaluated with some success using the assumptions and payment rates of the present program. The third question is a completely subjective evaluation for the individual operator. Many studies have been concerned with the value of an acre of allotment to an individual producer [1, 3]. A number of these studies have concluded that to a large extent, the value of allotments have been capitalized into land values. Thus, if the allotment is lost, the market value of the land may be diminished. For this reason, some people have held to historical allotments even though they did not represent the most profitable enterprises. If the producer feels that whatever the program of the future, the relative profit from the crop will not be changed, then he will be much less concerned about losing the allotment.

PURPOSE AND PROCEDURE

The purpose of this paper is to present an economic evaluation of both the current and long run opportunity costs (questions 1 and 2 above) for a typical farm in Southwestern Oklahoma. A linear programming procedure was used to determine the optimum farm organization when alternative protection attitudes were assumed. Short run opportunity costs are represented by foregone profit from the current year's operations. To obtain an estimate of this foregone profit, the net farm income for alternative optimum organizations was compared. The alternatives considered were:

1. A program whereby the farmer meets the

set-aside provision to become eligible for all government payments but plants the most profitable alternatives.
2. A program whereby the farmer again meets the set-aside provisions and also plants enough of each allotted crop to preserve that crop's history.
3. A no program alternative whereby the farm organization is determined without consideration of government payments or set-aside requirements.

Estimations of opportunity costs for the longer run were obtained by programming alternative 2 recursively. That is, the allotment base and corresponding payment were reduced for successive solutions in accordance with the "loss of allotment" provisions of the Farm Act. The fourth solution reflected complete loss of allotment and was therefore the long run optimum solution for this alternative. This is not to be taken as a realistic sequence of events but it does get at the opportunity costs involved. In reality, reduction of allotment is caused by not planting the allotted crop. Thus, if a realistic sequence was presented, where in the allotment was reduced in successive years, it would not be possible to allow any production of the crop during such period.

THE MODEL

A linear programming matrix was developed for a typical farm in Southwestern Oklahoma [2]. The farm contains 360 acres of cropland, of which 32 acres are classified as loam soils, 116 acres as clay and 212 acres as sandy loam. Crop history includes 50 acres of feed grains, 66 acres of wheat, 62 acres of cotton, and 38 acres of conserving base. The farm also has been producing oats and alfalfa hay. In all the programming, an upper limit of 80 acres of alfalfa was imposed. All labor was purchased at $1.75 per hour and operating capital was charged at 7.5 percent for 6 months. The cost figures for the different enterprises considered only variable costs; consequently, the optimal returns value represents payment to all fixed factors of production.

All of the basic assumptions of the Agricultural Act of 1970 as it was applied to the 1971 production year were incorporated into the model. This included the 20 percent set-aside for cotton and feed grains, the 75 percent set-aside for wheat and the basic price support levels specified.

SHORT-RUN COSTS OF PROTECTING HISTORY

Three basic optimum plans were calculated using the linear programming model. The first plan required the farmer to meet all the set-aside and conserving

base requirements in order to receive all payments but the most profitable crops were planted. The exception was cotton which had to be planted in order to receive the payment. The second plan required the farmer to meet all the requirements to receive payments and also to plant enough acreage of each crop to protect that crop's history (no substitutions were allowed).. The third alternative represented a nonparticipating farm whereby there was no conserving base or set-aside requirement, the farmer received no payments and the entire cropland acreage was devoted to the most profitable crops.

The significant features of the three optimal farm solutions are presented in Table 1. The following points bear emphasis:

1. The short run opportunity cost for protecting history of all three crops on this particular farm is only $200 annually.
2. If the enterprise budgets are truly average, grain sorghum and oats are more profitable than cotton or wheat, when only market prices are considered.
3. Nearly half of the returns above variable costs from crop production in Southwestern Oklahoma is derived from the payments received for participation in the government commodity programs.
4. So long as farm program payments are not disturbed, changes in organization among major crops do not severely affect farm returns in Southwestern Oklahoma.

Table 1

OPTIMUM FARM ORGANIZATION FOR 360 ACRE CROPLAND TYPICAL SOUTHWESTERN OKLAHOMA FARM FOR THREE GOVERNMENT PROGRAM ALTERNATIVES

Item	Unit	Alternative 1 Participate but not protect history	Alternative 2 Participate and protect history	Alternative 3 Do not participate
Cotton:				
Planted	Acre	55.8	55.8	
Set aside	Acre	12.4	12.4	
Wheat:				
Planted	Acre	0	60.0	
Set aside	Acre	50.0	50.0	
Grain sorghum:				
Planted	Acre	108.2	91.8	164.0
Set aisde	Acre	10.0	10.0	
Alfalfa	Acre	80.0	80.0	80.0
Oats	Acre	43.6	—	116.0
Conserving base	Acre	38.0	38.0	
Returns over variable cost	Dol.	4,477.00	4,277.00	5,034.00
Government payments:				
Cotton	Dol.	3,022.00	3,022.00	0
Wheat	Dol.	2,429.00	2,429.00	0
Feed grain	Dol.	260.00	260.00	0
Net returns	Dol.	10,188.00	9,988.00	5,034.00

EFFECTS OVER TIME OF FAILURE

TO PROTECT HISTORY

The 1970 Act provides that if cropping history is not protected by either planting the crop or planting a permitted substitute, the allotment will be reduced 20 percent the first year, 20 percent the second year and totally removed the third year. Thus, in an area like Southwestern Oklahoma where much of the income is dependent on government payments, not protecting history can mean a sizable reduction in income as the allotment and payment are phased out.

Figure 1 graphically portrays the effect on returns over variable costs as each of the basic allotments was independently phased out according to the provisions of the Act. Solution 1 shows the income with the full allotment and full payment receipts, while solution 2 shows the returns after the allotment for the unprotected crop has been reduced 20 percent. The set-aside requirement has also been reduced proportionally and the payment rate remains the same. The model has forced participation in the other two crops to protect history. Solution 3 represents a 40 percent reduction in allotment and set-aside requirements and solution 4 pictures farm returns after the allotment and government payments have been completely lost.

Since the feed grain base for a typical farm in the area provides for a small government payment ($260) for this crop, there was very little effect of phasing out this program. The loss of the $260 government payment was partially offset by the profit derived from a crop which was planted on the feed grain set-aside acreage so that the net reduction in returns over variable cost was only $136. The government payment for cotton and wheat were much larger; however, and the effect of phasing out either of these programs was more dramatic. Loss of the wheat program benefits reduced returns by $1,862. The comparable figure for the cotton program was $2,843.

In general, changes in income over time as the result of a phasing out of an allotment or base appear to be the function of three variables. First, the level of associated farm program payments is important because it represents a supplement to the income obtained from the sale of farm produce. Second, the size of the allotment or base regulates the cropland set aside from production. The third variable is the profitability of alternative cropping activities. In the example, although feed grains were more profitable at market prices than wheat or cotton, their degree of
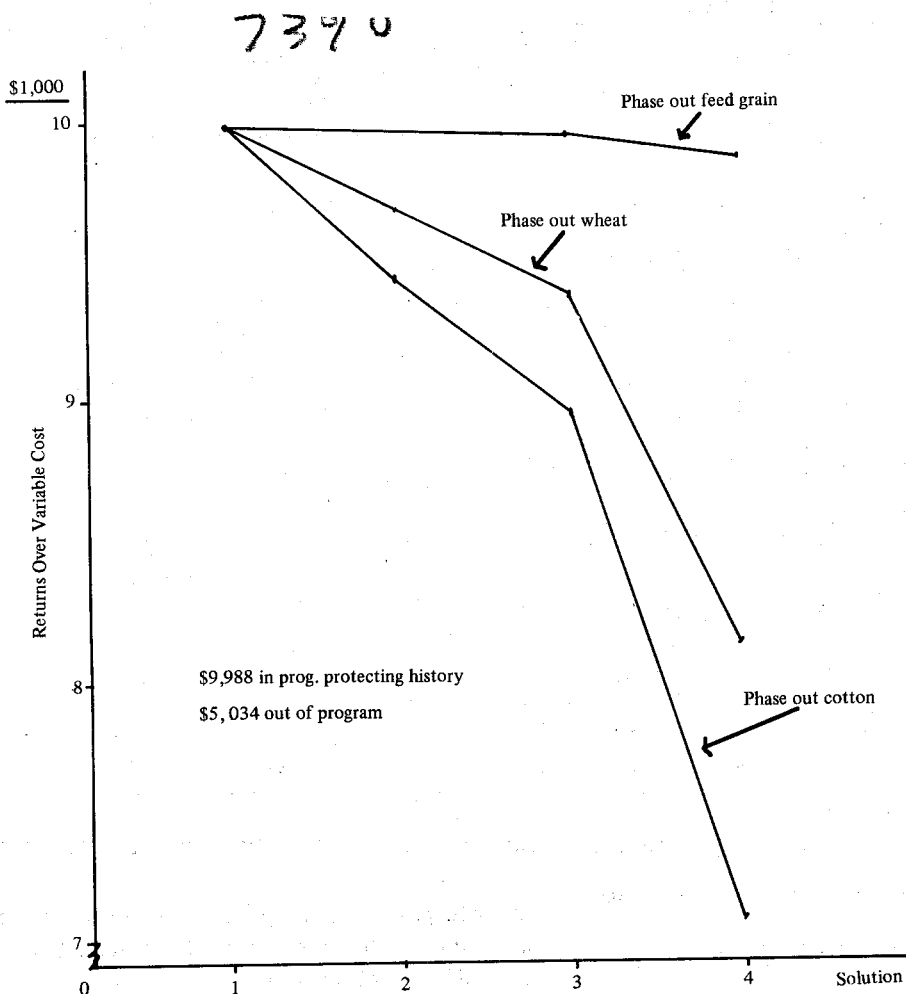

FIGURE 1. SUBSEQUENT EFFECT UPON RETURNS FROM PHASING OUT OF ALTERNATIVE CROPPING HISTORIES UNDER ACT OF 1970 FOR A SOUTHWESTERN OKLAHOMA FARM

profitability was not enough to even remotely offset the loss of cotton or wheat payment.

LIMITATIONS

The analyses presented are limited because of the short time duration of the Agricultural Act of 1970 (3 years) and because of the substitution provisions contained within it. For both 1971 and 1972 the substitution of wheat and feed grains to protect history has been permitted and soybean substitution will be permitted in 1972. Thus, the farmer may be able to protect history in several ways.

The short period of the present act has made long run decisions based on its provisions difficult. The farmer is uncertain whether allotments and cropping history will be important in subsequent legislation. Thus, he may be reluctant to take chances on losing the allotment.

SUMMARY AND IMPLICATIONS

The Agricultural Act of 1970 was designed to give farmers more flexibility in making production decisions. One feature which tends to reduce this flexibility provides that unless cropping history is protected either by planting the crop or a permitted substitute, the allotment base for that crop may be reduced and completely removed after a three year period. A linear programming model was designed to test the effect of various cropping history decisions for a typical Southwestern Oklahoma farm with a wheat, cotton and grain sorghum production history.

The short run opportunity cost associated with protecting cropping history is positively correlated with the profit advantage held by alternative crops, government payments being excluded from the comparison. Results from the illustrated farm indicate that cropping history in much of Southwestern Oklahoma can be protected with a

negligible sacrifice in returns. The decision to fully patricipate in the programs but not to protect history was only $200 more profitable in the short run than the decision to participate and protect all history. On the other hand, if there were competing crops which held a decided profit advantage in the market place, substantial one-year costs might be obscured by the concern for the allotment of the less profitable crops. Of course, if the supported crop itself is the more profitable, there is no opportunity cost and protection is automatic.

Protecting cropping history in the long run generally bears negative costs; that is, there is cost associated with *not* protecting history. The extent of this cost is the summation over time of the annual government payments foregone less the short run costs discussed above. In the model, since the payment from the feed grain program was small, the phasing out of this program had little effect upon farm income. Much larger payments were associated with the wheat and cotton programs; consequently, phasing out of these allotments through failure to protect history had a substantial effect.

Negative long run opportunity costs do not hold when a competing crop commands a profit advantage over the supported crop, considering both returns from the market and from government payments. In such event, there is no incentive to plant the supported crop, nor, for that matter, to preserve history, save for a possible effect on the future value of the land. Projections of land prices based on future allotment values is highly subjective.

Thus, the opportunity cost of protecting cropping history would seem to depend on three factors, (1) the level of associated farm program payments, (2) the size of the allotment or base, and (3) the relative profitability of alternative competing crops. The level of payments is normally the most significant long run factor, while the competition furnished by competing crops is usually most important in the near term.

REFERENCES

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