ACREAGE RESPONSE TO THE TARGET PRICE AND SET-ASIDE PROVISIONS OF THE FOOD AND AGRICULTURE ACT OF 1977

By Sam Evans*

The Food and Agriculture Act of 1977 increased the influence of target prices on acreage allocation decisions. Differences between target and market prices were highly correlated with rates of participation in recent grain set-aside programs. But, target prices also encourage set-aside participants to increase acreage of the set-aside crop. The net effect of a set-aside on acreage of a specific crop may, thus, be positive or negative. Deficiencies in the target price formula magnify the potential for target prices to disrupt the allocative function of market prices.

Keywords

Food and Agriculture Act of 1977
Target prices
Set-aside
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Acreage response

The Food and Agriculture Act of 1977 continued the target price/deficiency payment mechanism for supporting farm income and authorized set-aside and paid-diversion programs to influence production of wheat, feed grains, rice, and cotton during the 1978/79-1981/82 crop years. An important difference between the 1977 act and its predecessor—the Agriculture and Consumer Protection Act of 1973—is that, except for rice, deficiency payments and set-aside and diversion requirements are now based on current plantings rather than on historical acreage allotments. The "current plantings" feature of the 1977 act affects both the distribution of commodity program benefits and also crop acreage response to policy variables such as target prices, set-aside requirements, and diversion programs.[1]

In this article, I examine, from a theoretical perspective, farmers' responses to target prices with and without set-aside controls. I also consider methodological problems from the perspective of an economist who must predict aggregate acreage response to alternative levels of policy variables. Finally, I evaluate the target price adjustment formula in the 1977 act, especially the influence that short-term changes in average yields have on target price determinations.

TARGET PRICES

The Agriculture and Consumer Protection Act of 1973 established target prices for wheat, feed grains, and cotton beginning with the 1974 crop year.[2] Target prices are used to calculate deficiency payments to producers. Deficiency payments are made to eligible wheat and feed grain producers if the national weighted average farm price during the first 5 months of the marketing year is less than the target price. Cotton payments are determined from a comparison of the calendar year average farm price with the target price.

The record does not indicate why cotton is treated differently. As deficiency payments (D) are made on new crop production, comparing the target price (P^t) with a calendar year average farm price (P^f)—a mixture of old (Po^f) and new crop (Pn^f) prices—affects the role the target price plays in cotton producers' planting decisions.

By definition, $D = P^t - P^f$, where P^f is the weighted average of old crop (January-July) and new crop (August-December) prices, that is, $P^f = WoP^f_o + WnP^f_n$. Sales in the first and fourth quarters usually account for the bulk of Wo and Wn, the old and new crop weights, respectively.

When the formula for deficiency payments is rewritten as

$$D = P^t - WoPo^f - WnPn^f,$$

we see that the average price for new crop production needed to eliminate deficiency payments (D = o) is

$$P^f_n = \frac{P^t - Wo\ Po^f}{Wn}$$

The value of Pn^f which assures that deficiency payments will not be made may be considered the "effective" target price for the new crop.

If farm prices during the first quarter average below the announced target price ($Po^f < P^t$), the effective target price is greater than

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[1] For an analysis of the distributional impacts of the 1977 act, see (*12*). Italicized numbers in parentheses refer to items in References at the end of this article.

[2] See (*5*) for detailed provisions of the commodity programs under the 1977 act.

P^t. For example, if P^t and Po^f are 60 and 55 cents a pound, respectively, and Wo and Wn are 0.4 and 0.6, respectively, the effective target price for new crop production is (60-0.4(55))/0.6 or 63.3 cents a pound. Producers who recognize this have an incentive to increase their cotton acreage. If, of course, $Po^f > P^t$, the effective target price is less than P^t, making market prices more important in planting decisions.

Under the 1973 act, acreage allotments were used to determine the production eligible for deficiency payments. The legislation permitted feed grain and wheat producers to collect deficiency payments on "normal" production from their allotment whether or not the crop acreage exceeded the allotment. Cotton producers, however, had to plant at least 90 percent of their allotment to earn the full deficiency payment.[3]

The 1977 act, by basing deficiency payments on current rather than historical acreage, may make producers (especially of wheat and feed grains) more responsive to target prices than formerly. One can see this greater role of the target price by examining total and marginal revenue functions for program crops under the 1973 and 1977 acts.

Total revenue was $P^fQ + Dq$ under provisions of the 1973 act and is $(P^f + kD)Q$ under provisions of the 1977 act, where P^f is the expected market price, Q is total production, D is the expected deficiency payment, q is normal production from the allotment, and k is the allocation factor or percentage of production eligible for target price coverage.[4]

Marginal revenue for wheat and feed grain production under provisions of the 1973 act was simply the market price, P^f, as the revenue of Dq was forthcoming regardless of the quantity produced. On the other hand, marginal revenue under provisions of the 1977 act may be higher than the target price. It is $P^f + kD$. Marginal revenue and thus acreage response are influenced by expected deficiency payments.

As producers had to plant cotton to earn any deficiency payment on that crop, marginal revenue under the 1973 act was $P^f + D$ on production from the allotment. But it was only P^f on acreage in excess of the allotment. Thus, a cotton target price greater than the expected market price could have induced producers who would plant less than their allotments on the basis of market price to increase acreage (*2, 6*). In 1977/78—the last year in which a crop was covered under the 1973 act—cotton acreage in the Southeast was about 50 percent of the region's total allotment, whereas that in the lower cost regions of the Southwest and West exceeded allotments by 37 and 120 percent, respectively. Compared with the allotment system, the 1977 act, by basing total deficiency payments on current acreage, increased target price coverage for low-cost cotton producers and increased the potential for target prices to influence their planting decisions.

Acreage Response to Target Price: No Acreage Controls

Figure 1 illustrates how, under provisions of the 1977 act, target prices may influence the acreage allocated to a particular crop. The shortrun acreage response function is AA, the target price is P^t, and the expected farm price is P^f. Expected marginal revenue from the combination of P^t and P^f is labeled P^D where $P^D = P^f + kD$, and $k < 1.0$.

If there were no target price or if P^f exceeded the target price, planted acreage would be F when P^f is the expected farm price. However, with target price P^t and allocation factor k, acreage would increase to D as expected marginal revenue increases to P^D. The target price, therefore, generates a new acreage response function for expected farm prices below the target price. In this example, the new curve passes through the point (P^f, D) rather than the original point (P^f, F). Both curves pass through (P^t, T) as for a farm price of P^t, expected deficiency payments are zero. The resulting "kinked" acreage response curve is labeled B*t*A (fig. 1). The function B*t*A shows acreage response to expected farm price when the target price and allocation factor

[3] See (*8*).

[4] The allocation factor is the ratio of national program acreage—estimated acreage needed for domestic, export and stock needs—to actual harvested acreage. The factor must be 0.8 to 1.0 for wheat and feed grains, the minimum cotton national program acreage is 10 million—no minimum allocation factor is specified for cotton. Producers who voluntarily reduce plantings of a crop by a percentage specified by the Secretary of Agriculture are guaranteed target price coverage on their entire acreage of that crop.

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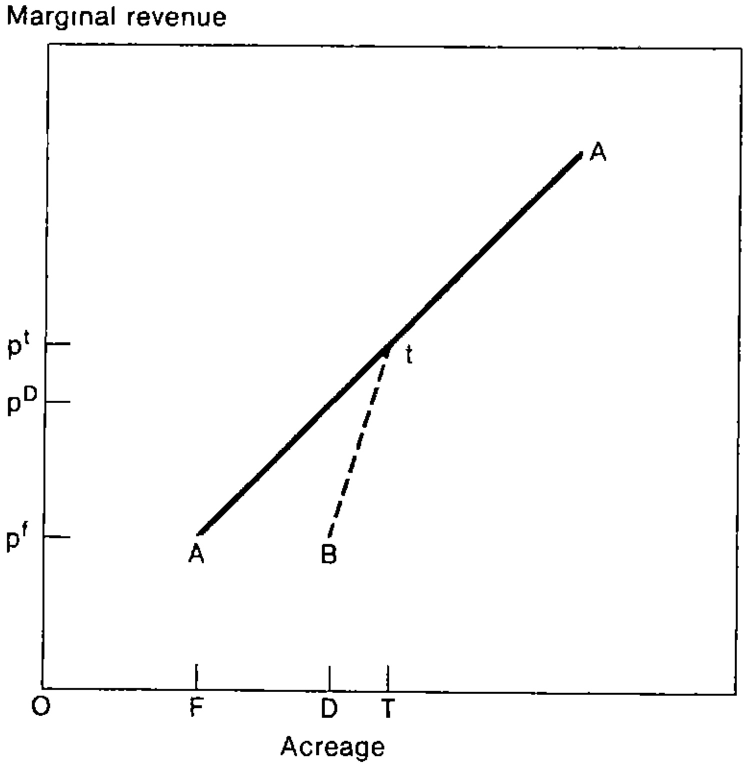
Figure 1
Acreage Response to Target Price



are given The horizontal differences between B*t*A and AA are increases in acreage due to the effects of the target price and allocation factor on marginal revenue These differences equal $(a)k$D, where a is the acreage change per unit of price change along AA

As indicated in figure 1, acreage is less responsive to price changes when market prices below the target price are expected In this example, the acreage change per unit of price change is $a(1 - k)$ [5] If the allocation factor were 1 0, marginal revenue would be P^t, and B*t* would be a vertical line For a smaller allocation factor, B*t* will shift toward AA, and the target price will have less impact on acreage response

FARMER-OWNED RESERVE PROGRAM

Another major provision of the wheat and feed grain program is the farmer-owned reserve Under this program, farmers contract to store grain for a specific period of time (currently 3 years) or at least until the market price exceeds the loan rate by a specified percentage This level of market price is termed the "release" price In return for holding grain off the market until the release price is reached or the contract expires, producers receive an annual storage subsidy (see (*5*) for further details of the program)

Here I do not consider the release price as the primary supply inducing price even if it exceeds the larger of the target price or the expected market price No doubt, the farmer-owned reserve increases price expectations of producers both in and out of the program However, the release price is not a guarantee The contract may expire without the release price being reached Instead, the release price sets an approximate upper bound on the final selling price (*7*) Moreover, a specified release price larger than the target price does not rule out deficiency payments which influence farmers' acreage decisions under provisions of the 1977 act

Farmers must ultimately form subjective expectations not only of the selling price under the reserve program but also of the time path of price movements The time dimension suggests that the expected selling price must be discounted That is, the present value of the expected selling price (including the net storage subsidy) compared with alternative price

[5] One could argue that the target price, by reducing income uncertainty, will dampen the response to market prices even if they exceed the target price This argument is considered in (*3*)

expectations, such as the target price or current market price, is what may be relevant to producers' acreage allocation decisions

SET-ASIDE PROGRAMS

The 1977 act maintains the Secretary of Agriculture's authority to implement a set-aside program when excessive supplies of cotton, wheat, rice, or feed grains are projected Unlike previous legislation which expressed the set-aside requirement as a percentage of an allotment based on historical acreage, the 1977 act expressed the set-aside requirements as a percentage of current plantings For example, a corn set-aside of 10 percent requires participating producers to set aside an acre of cropland for every 10 acres of corn planted This does not necessarily mean that corn acreage will be less Rather, it means that, for each acre set aside, a corresponding reduction must be made in the acreage of crops "normally" planted on the farm [6]

The 1977 act gave the Secretary authority to institute cross-compliance requirements when a set-aside for one or more crops is in effect For example, if there is a set-aside for corn, a producer growing corn must comply with this requirement to be eligible for benefits from any farm program Compared with no provision for cross-compliance, the 1977 act may increase producer participation in set-aside programs, especially when market prices are weak

Factors Affecting Participation in Set-Aside Programs

The decision to participate in a set-aside program is complex It requires farmers to weigh potential benefits from the farm programs against the net revenue they can expect to lose by taking land out of production Many benefits gained through participation cannot be quantified For example, what is the value of the economic security provided by the complete farm program for a commodity? How does one measure the value of being eligible for disaster payments and for the loan and farmer-owned reserve programs?[7] The cross-compliance requirement also complicates the process of estimating benefits of participation as it requires the farmer to estimate the value of benefits from all program commodities produced on the farm

The most measurable incentive for participation in a set-aside program is probably the difference between the target price and the expected market price of a commodity As will be shown later, changes in the expected deficiency payment (combined in some cases with a diversion payment) agreed closely with changes in the rates of participation in the 1978 and 1979 wheat and feed grain programs

If there were a set-aside requirement for corn, for example, expected returns per acre of corn harvested by participants would be

$$(P^f_c - C_c + k_c D_c)\, Y^p_c,$$

where P^f_c, C_c, k_c, D_c, and Y^p_c are, respectively, expected market price, per bushel production costs, the allocation factor, the expected deficiency payment, and the "payment" yield for corn [8]

[6] The 1977 act provided for establishing a normal crop acreage (NCA) based primarily on 1977 plantings for each farm When a set-aside is in effect, a participant's planted acreage of the normal crops plus the acreage designated as set-aside cannot exceed the NCA This change was made to reduce "slippage," the tendency for the acreage put into conserving uses to exceed the reduction in planted acreage of the controlled crops (*1*)

[7] Problems of measuring the present value of the release price specified in the farmer-owned reserve were discussed earlier As the reserve program raises price expectations for all producers, the release price itself may not be the important factor affecting participation decisions The level of storage subsidy paid to participants may well be the key variable

[8] The "payment" yield—the yield used by the U S Department of Agriculture to calculate total deficiency payments—is loosely based on yields for the previous 3 years If, for some reason, expected yields were less than the payment yield, the target price would figure more prominently in planting decisions Pawson (*6*) indicated, for example, that cotton payment yields in 1972 in some regions were 55 percent higher than normal yields From data in (*10*), I found that cotton payment yields for the 1978 paid-diversion program averaged 663 pounds per planted acre For the three seasons prior to 1978/79, cotton yields per planted acre averaged about 462 pounds, a near normal yield Moreover, nearly 40 percent of the diverted acreage was in Texas where yields are usually well below the national average, only 5 percent was in California and Arizona where yields are well above the national average

For all three crops, participation in the set-aside program declined in 1979/80 as farm prices increased relative to target prices, thereby reducing the participation incentive

By participating in the set-aside program, a producer increases net returns from an acre of corn by $k_c D_c Y_c^p$ and reduces total variable costs by the proportion of acreage idled There is, however, an opportunity cost associated with participation as income is foregone from the acreage set aside This loss may be offset partially by returns from permitted uses of the conserving acreage The net opportunity cost per acre planted is, therefore, S_c (RF − RP), where S_c is the set-aside percentage, RF is the foregone net revenue per set-aside acre, and RP is per acre net revenue from the best permitted use of the set-aside acre

A profit-maximizing producer will participate in a set aside program if

$$k_c D_c > S_c \frac{(RF - RP)}{Y_c^p}, \quad (1)$$

where the term on the left is the gain per bushel produced, while that on the right is foregone net revenue per bushel The difference, $k_c D_c - S_c (RF - RP)/Y_c^p$, is a measure of the incentive to participate in a set-aside program

The foregone net revenue (RF) may represent a reduction in corn acreage, in which case RF = $(P_c^f - C_c) Y_c^w$, where Y_c^w is the average yield per acre withheld from production The foregone yield (Y_c^w) is likely to be less than the average yield on planted acres as farmers tend to idle their least productive land[9] The foregone net revenue may also result from a reduction in acreage of other crops in the NCA A farmer growing corn and soybeans could meet corn set-aside requirements by reducing either soybean or corn acreage, or both

Combined Set-Aside and Diversion Programs

Under the 1978/79 and 1979/80 feed grain programs, producers who complied with set-aside requirements could also voluntarily divert to conserving uses additional acreage equal to 10 percent of current plantings Participants in this voluntary program received a diversion payment on normal production from their planted acreage of the particular crop

[9] The opportunity to set aside less productive land, a factor in the set-aside decision, varies widely across the United States and may be related to farm size Data show that, of the farms participating in the 1978/79 wheat and feed grain programs, those largest in terms of NCA had the smallest foregone net income per set aside acre, and the rate of participation in the set-aside programs was also positively related to farm size (*12*, pp 28, 38) To the extent that land of below-average productivity is set aside, the ability of the program to control production is reduced And, as the distribution of commodity program benefits among farm-size groupings depends on both current plantings and participation rates, the presumed opportunity for larger farms to set aside relatively unproductive land increases the tendency for program benefits to be skewed toward larger farms

Equation (1) may be expanded to include the option of diverting acreage for payment A profit-maximizing producer will participate in both the set-aside and diversion program if,

$$k_c D_c + R_c > (S_c + Z_c) \frac{(RF - RP)}{Y_c^p}, \quad (2)$$

where R_c and Z_c are, respectively, the per bushel diversion payment and the diversion percentage applied to current plantings If $R_c > Z_c (RF - RP)/Y_c^p$, a diversion program will strengthen the incentive to set aside

Sample Calculations of Participation Incentives

I calculated a measure of the incentives to participate in the recent wheat and feed grain programs with the simplifying assumptions that $k = 1\ 0$, RF = $(P^f - C)$, and RP = 0 The table presents the results along with "actual" participation rates

Although the calculations only crudely approximate aggregate participation incentives, they provide some valuable insights Moreover, changes in the estimated incentives agree closely with changes in actual participation rates The reason for greater participation in the wheat programs was a wider difference between the target price and expected (previous season) farm price of wheat For all three crops, participation in the set-aside programs declined in 1979/80 as farm prices increased relative to target prices, thereby

Calculation of set-aside and diversion incentives

Year	Crop	Requirement per planted acre		Price			Expected deficiency payment[4]	Diversion payment	Average variable cost[5]	Program participation incentives		Acreage[8]			Estimated participation	
		Set-aside S	Diversion Z	Farm[1] P^f	Loan[2] P^l	Target[3] P^t	D	R	C	Set-aside[6]	Diversion[7]	Planted	Set-aside	Diverted	Set aside[9]	Diversion[10]
		Acres		Dollars per bushel								Million acres			Percent	
1978/79	Wheat	0 2	0	2 33	2 35	3 00	0 65	—	1 23	0 43	—	66 3	9 6	—	72	—
1979/80	Wheat	2	0	2 98	2 35	3 40	42	—	1 29	08	—	71 6	8 2	—	57	—
1978/79	Corn	1	1	2 02	2 00	2 10	08	0 20	1 11	– 01	0 11	80 1	3 2	2 9	40	90
1979/80	Corn	1	1	2 25	2 00	2 20	0	10	1 10	– 11	– 02	80 0	1 7	1 1	21	65
1978/79	Sorghum	1	1	1 82	1 90	2 28	38	12	1 13	31	05	16 5	1 1	3	67	27
1979/80	Sorghum	1	1	2 02	1 90	2 34	32	10	1 14	23	01	15 4	8	3	52	38

[1] Average for previous season
[2] In January 1980, loan rates for 1979/80 were increased to $2 50 for wheat, $2 10 for corn, and $2 00 for sorghum
[3] In May 1978 (after 1978/79 planting season), the wheat target price was raised to $3 40
[4] Difference between P^t and larger of P^f and P^l
[5] Calculated from (*13*) Average yields of previous three seasons were used
[6] Incentive is $D - S(P^f - C)$, assuming allocation factor of 1 0
[7] Given set aside participation, incentive is $R - Z(P^f - C)$
[8] See (*15, 16*)
[9] Percentage is $\frac{\text{acres set aside}}{(\text{acres planted})\ (S)}$ (100)
[10] Percentage is $\frac{\text{acres diverted}}{\text{acres set aside}}$ (100)

— = Not applicable

It should now be clear that target prices under the 1977 act have a greater potential to interfere with the allocative function of market prices than under the 1973 act

reducing the participation incentive Furthermore, the feed grain diversion payments were lower in 1979/80

The corn diversion payment provided most of the incentive for producers to comply with its set-aside requirements (see table) In 1978/79, 90 percent of the eligible acreage was enrolled in the diversion program That is, nearly everyone who set aside acreage also found it profitable to divert additional acreage for the 20-cents-per bushel payment This is not surprising as the diversion payment was double the maximum possible deficiency payment

In contrast with corn, wide differences between the target price and the farm prices or loan rates for grain sorghum in 1978/79 and 1979/80 resulted in relatively high rates of participation in grain sorghum set-aside programs In fact, the data suggest that a set-aside program alone, particularly in 1978/79, may have achieved results in grain sorghum markets not significantly different from those achieved by the set-aside/diversion program

Acreage Response to Set-Aside Incentives

When a set-aside is in effect under provisions of the 1977 act, a target price greater than the expected market price influences acreage response in two ways First, the target price provides a measurable incentive to reduce acreage by participating in the set-aside program, second, it provides an incentive to increase production of the controlled crop as deficiency payments increase marginal revenue for participants From the first effect, we can visualize a leftward (negative) shift of the acreage response curve for set-aside participants, reflecting the increased opportunity costs of producing the set-aside crop From the second effect, we can visualize the response to the target price as an upward movement along the acreage response curve for participants, reflecting a positive influence on acreage Whether acreage of the controlled crop increases or decreases under a set-aside program depends, therefore, on the relative strengths of these opposing effects

A simple model was formulated to illustrate the acreage response to set-aside incentives The model is for a farm which grows two crops (X and Y) and on which there is a set-aside requirement for X Profit (π) functions are

$$\pi_0 = Px\, fx\,(Ax) + Py\, fy\,(At - Ax) - (C^k + C^v)\, At \quad (3)$$

for the nonparticipant and

$$\pi_1 = (Px + Dx)\, fx\,(Ax) + Py\, fy\,(At - (1 + Sx)Ax) - C^k\, At - C^v\,(At - SxAx) \quad (4)$$

for the set-aside participant, where Px and Py are expected market prices of X and Y, respectively, Ax and $At - Ax$ are planted acreages of X and Y, and At is total acreage available, C^k and C^v are fixed and variable production costs per acre, assumed to be equal for producing either X or Y, Dx is the expected deficiency payment per bushel of X produced, Sx is the set aside rate, and fx and fy are the respective production functions

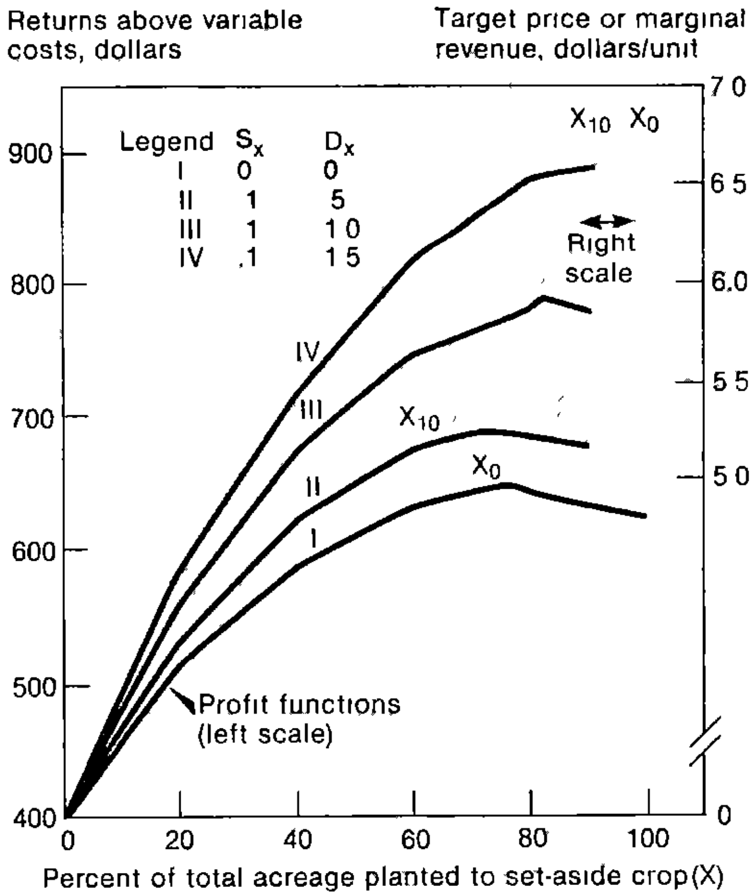
Furthermore, let Px = \$5 per bushel, Py = \$6 per bushel, At = 5 (units of land), $C^v = C^k$ = \$100 per acre, and production functions of X and Y be $Qx = 50\,Ax - Ax^2$ and $Qy = 40\,Ay - 2\,Ay^2$ Alternatively, $Qy = 40\,(At - Ax) - 2\,(At - Ax)^2$

Figure 2 shows profit functions for the situations labeled I-IV They differ as follows Situation I assumes no farm program and also represents the profit curve for nonparticipants given the above assumptions, situations II – IV assume a 10-percent set-aside requirement for X (Sx = 0 1), with successively higher target prices of \$5 50, \$6, and \$6 50 per bushel of X (Dx = \$0 50, \$1, and \$1 50, respectively, given Px = \$5)

Assuming no set-aside restrictions, I solved the model to derive the acreage response of X to marginal revenue (right scale, fig 2) The resulting function is labeled *XoXo* When a set-aside is in effect, two questions are relevant Will the farmer participate in the program, and how will acreage be allocated between crops X and Y? Those questions may be answered after an examination of the profit functions As the profit functions for situations II—IV lie above that for the nonparticipant, participating in any of the alternative set aside programs is the more profitable action The optimum planted acreages of X under the set-aside programs correspond to the maximum values of the profit functions One can derive

Figure 2

Derivation of Acreage Response to Target Prices Under a Set-Aside Program



the acreage response curve of X to target prices given a 10-percent set-aside rate by plotting these optimum acreages (percentages of total acreage) against the righthand scale in figure 2 The resulting curve is labeled $X_{10}X_{10}$

The curve $X_{10}X_{10}$ lies to the left of X_0 X_0 due to the higher opportunity costs of producing X However, as the target price of X increases, acreage of X increases and acreage of Y decreases For target prices greater than about $5 75/bu , acreage of X exceeds the acreage that would be planted under the no set-aside alternative Eventually, for a target price of about $6 50 per bushel, the acreage of X reaches its maximum under the set-aside rules ($A_x^{max} = At/1\ 1$) and the acreage of Y = 0[10]

Aggregate Response

Analyzing aggregate acreage response to set-aside incentives is infinitely more complex than the simple model suggests Such analysis requires identifying the acreage response curve(s) of set aside participants as well as estimating the response by nonparticipants As most crops are grown over a wide geographical area and under a variety of economic and technical conditions, participation rates and participant responses to target prices will vary greatly from region to region Program benefits depending on cross-compliance requirements may also differ significantly

[10] On May 15, 1978, President Carter signed the Emergency Agricultural Act of 1978 This legislation gives the Secretary of Agriculture discretionary authority to raise target prices for wheat, feed grains, and cotton whenever a set aside is in effect for one or more of these crops (*9*, p 11) As this article indicates, participation in a set-aside program would be greater for a higher target price However, the higher target price may cause farmers who would set aside for a smaller incentive to increase acreage of the set-aside crop It should be recognized that a potential result of increasing the target price to compensate set-aside participants is that acreage of the set-aside crop could be little changed (or even greater), but deficiency payments could be higher

If a satisfactory formula is not developed, target price adjustments are likely to become increasingly discretionary and, thus, increasingly subject to political pressures

from region to region, thereby causing differing participation rates For example, cotton program benefits may be an important factor in a Texas producer's decision to participate in a feed grain set-aside, but those benefits are not a factor in an Iowa producer's decision Such considerations suggest that predicting the total impact of set-aside programs on crop acreages and production requires a highly disaggregated analysis

THE TARGET PRICE FORMULA

It should now be clear that target prices under the 1977 act have a greater potential to interfere with the allocative function of market prices than under the 1973 act This potential is magnified by the formula for target price adjustments The formula is

$$P^t_{n+1} = P^t_n + \left(\frac{C_n}{Y_n} - \frac{C_{n-2}}{Y_{n-2}}\right)(0.5) \quad (5)$$

where P^t is the target price, n is the current crop year, C is the sum of variable, machinery, and overhead costs per planted acre for the specific crop, and Y is yield per planted acre (*7*)

As per unit costs in only 2 years influence the adjustments, yield variations are potentially a major source of target price adjustments For example, high yields in "n" relative to "$n - 2$" could cause a downward adjustment in the target price even though per acre costs may be increasing rapidly The formula may result in target price adjustments that are out of phase with changes in average costs based on normal or expected yields, and, consequently, the substitution of one crop for another Inflated corn or cotton target prices resulting from a particular pattern of yields could cause these crops to substitute for soybeans

A second characteristic of the adjustment formula that may cause target prices to misrepresent current costs relates to the cumulative nature of the adjustments From equation (5), it can be shown that the target price in any one year during 1979-81 is linked to 1978 (base year) target price as follows

$$P^t_{78+n} = P^t_{78} + \frac{C^u_{78+n-1} + C^u_{78+n-2} - C^u_{77} - C^u_{76}}{2} \quad (6)$$

where $n = 1, 2,$ or 3 and $C^u = C/Y$, or average costs

Equation (*6*) indicates that abnormally high yields in either 1976 and 1977, or both, would have tended to bias the target price upward, abnormally low yields would give a downward bias Distortions in relative target prices could persist throughout the period if yields of one crop had been high in 1976 or 1977 and those for another crop had been low

The problems with the target price formula specified by the 1977 act are well recognized, particularly those caused by random yield variations These problems have contributed to the passage of legislation increasing the degree of discretionary authority given to the Secretary of Agriculture with respect to establishing target price levels As noted earlier, in 1978 the Secretary was authorized to raise target prices above formula levels for set aside participants, and on March 18, 1980, President Carter signed the Agricultural Adjustment Act of 1980 (H R 3398) This legislation permits the Secretary to raise feed grain and wheat target prices for the 1980 and 1981 crops above formula levels To qualify for the higher targets, producers must plant within their normal crop acreage Speaking on behalf of H R 3398, Howard Hjort commented

> If we could be assured that yields per planted acre would again increase in 1980 we would not need to be concerned over the formula target prices And while no one knows what yields will be in 1980, the odds clearly are in favor of national average yields below the exceptional ones observed in 1979 If this happens, it is clear that the 1980 target prices will be well below the level that would permit most producers to cover the costs they cannot postpone (*4*)

It is clear that the current formula must be revised to give more weight to changes in per acre production costs and less to random yield variations If a satisfactory formula is not developed, target price adjustments are likely to become increasingly discretionary and, thus, increasingly subject to political pressures

CONCLUSIONS

The Food and Agriculture Act of 1977 increased the influence of target prices on resource allocation decisions both by requiring wheat and feed grain producers to plant those crops to qualify for deficiency payments and also by basing the amount of payments on current, rather than historical, acreages of program crops These provisions make expected marginal revenue from program crops depend on deficiency payments

When there are no set aside restrictions, the target price causes producers to be less responsive to changes in market prices if market prices are below the target price When set-aside restrictions are in effect, target prices play a dual role The difference between the target price and the expected market price gives producers a measurable incentive to participate in the set-aside program which has a negative influence on acreage of the controlled crop For example, analysis of the 1978 and 1979 wheat and feed grain set-aside programs showed a close agreement between participation rates and expected deficiency payments Target prices increase the marginal revenue of the controlled crop for set-aside participants, which has a positive influence on acreage Thus, it is virtually impossible to generalize about the net effects of a set-aside program on acreage and on production of a specific crop This suggests that establishing values for policy variables such as the set-aside rate and the target price is a delicate matter, requiring a thorough analysis of the impacts on crop acreage

The greater role of the target price under provisions of the 1977 act has focused attention on the target price adjustment formula Deficiencies in the formula, particularly those related to short-term yield changes, may cause target prices to be out of phase with changes in current production costs, thereby magnifying the potential for target prices to influence resource allocation decisions

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