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**WHO DETERMINES FARM PROGRAMS?  
AGRIBUSINESS AND THE MAKING OF FARM POLICY**

by

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## WHO DETERMINES FARM PROGRAMS? AGRIBUSINESS AND THE MAKING OF FARM POLICY

### ABSTRACT

Political-economic analyses of the causes and consequences of agricultural commodity policies typically emphasize farmer and consumer (taxpayer) interests and underplay the role of agribusiness. A more complete understanding of agricultural policy requires paying attention to the important role of agribusiness interests. Policies that benefit farmers (e.g., price supports, supply controls, deficiency payments) may either enhance or reduce agribusiness profits. The type of policy instrument preferred by agribusiness varies among commodities, depending on the technology of the marketing processes beyond the farm gate and the elasticity of final demand. This paper emphasizes the idea that instruments of farm policy are chosen in response to pressures from both agribusiness and farmers at the expense of taxpayers and final consumers.

### Key Words

farm programs, farm policy, agribusiness, political economy.

## I. INTRODUCTION

*Agribusiness firms have the largest number of food and agricultural lobbyists in Washington. They are also among the most powerful. Their political clout results from a combination of their knowledge of Capitol Hill, their finesse in working with members of Congress and their staffs, their knowledge of how decisions are made in the executive branch, their attention to detail, their knowledge of the facts, and their campaign support, including political contributions through both PACs and as individuals. Complementing and enhancing their effectiveness is the fact that they do their job with little public attention. (R.D. Knutson, J.B. Penn and W.T. Boehm, p. 74)*

The U.S. Food Security Act of 1985 (i.e. the "Farm Bill") outlined farm policy for four consecutive years, and it provided for record income transfers to American farmers. For example, in 1986 alone government payments for corn, wheat, and rice accounted for 57 percent of crop value (Council of Economic Advisers). Net farm income reached all-time highs in 1986 and 1987, largely because of handsome government payments through commodity programs.

Under the 1985 Farm Bill, five basic types of policies are used to raise farm incomes through commodity markets. These include (i) explicit government subsidies on production of a commodity (including target price-deficiency payments schemes) or on inputs used in its production; (ii) supply controls that restrict output of a commodity or inputs used in its production; (iii) price support programs where the government purchases farm products to support the market price; (iv) export subsidies; and (v) trade barriers on importables (tariffs, import quotas, or voluntary import restraints). Many commodity programs involve a combination of two or more of these policy instruments, as can be seen in Table 1. Estimates of the annual gains and losses associated with commodity programs are shown in Table 2. Total annual farm gains were approximately \$17 billion in 1987. Five commodities (corn, wheat, sugar, milk, and cotton) received the lion's share of the income transfers.

An important distinguishing feature among the individual policies lies in their differential effects on the quantity purchased and prices paid by buyers of the farm commodity. In particular, output subsidies reduce the price to buyers of farm commodities, while supply controls, price supports, and import barriers have the opposite effect. Further differences are the effects on government costs and revenues. Output subsidies and support prices involve government spending; supply controls do not, and import barriers (tariffs or quotas) may raise government revenues. Alternative programs, therefore, imply differences in the final incidence of benefits and costs.

Previous analyses have considered the impact of farm programs on three broad groups—farmers, taxpayers and consumers. Often, taxpayers have been aggregated with consumers (e.g. Gardner 1983, 1987a). Clearly, there are other interests. For instance, agribusiness interest groups are politically powerful and active in the policy-making processes in which farm programs are decided, possibly more so than farmers. The overall objective of this paper is to build upon the work of Gardner (1983, 1987abc) and specifically introduce the important role of agribusiness in the political-economic policy-making process.<sup>1</sup>

The paper proceeds as follows. In the next section (Section II) we discuss the political economy of farm programs. We suggest that a coalition of farmer and agribusiness interests is likely to be formed given the nature of these groups. Policies that benefit both farmers and agribusiness are unlikely to minimize costs of transferring income to farmers. In Section III we develop a simple model of surplus distribution through farm programs and derive and illustrate the conditions under which both agribusiness and farmers will benefit from alternative policies. We show that different policies will meet this criterion (of benefitting farmers and agribusiness) for different commodities, depending upon the nature of final demand and the characteristics of industry technology. Combining these two parts,

we predict that policy choices will differ systematically among commodities to meet the political economy constraint that agribusiness gains along with farmers depending on market and industry parameters. In Section IV we evaluate the evidence from the 1985 Farm Bill consider whether middlemen and farm input suppliers gain from current U.S. farm programs and whether their interests can account for the choices made in the 1985 Farm Bill.

## II. POLITICAL ECONOMY OF FARM PROGRAMS

Becker has investigated conditions under which pressure groups might successfully obtain income transfers through government programs, and he hypothesizes that the government will redistribute income efficiently. This line of inquiry was extended by Gardner (1987a) who empirically tested Becker's proposition by measuring factors that cause government support levels in agriculture. Gardner's model begins with a given income transfer and predicts that the government will choose the policy that minimizes deadweight loss per dollar transferred to farmers. Alternatively, we postulate in this paper that governments will not efficiently redistribute between just two groups when influential "third party" lobby groups prefer policies that do not minimize deadweight loss per dollar of farmer gain. With more than two groups the government may still redistribute efficiently but it faces a different constraint if it chooses to transfer income to more than just farmers. As a consequence, the policy choice may differ from the case with only two groups.

Consider Figure 1, which illustrates two alternative farm policy options. The first raises prices to  $P_2$  through a production control scheme that limits production to  $q_2$ . The net social cost associated with this program is shown by the area  $abc$ .<sup>2</sup> A second policy option sets a target price at a level equal to  $P_1$  and allows the consumer price to fall to  $P_3$ . The net social cost of this program is equal to the area  $ced$  in Figure 1, which is greater than area  $abc$ . Farmers are indifferent between the two commodity programs since the income transfers are equal in both cases. (i.e., area  $P_2afP_0 - fbc$  is equal to the area  $P_1ecP_0$ ).

Considering only the interests of farmers and taxpayers (consumers), the efficient policy choice would be the production control. Now consider the impact of the third party. Let us assume the agribusiness lobby prefers the target price program over the supply control program. Even though the deadweight loss with the target

price program is greater than with the supply control program, a strong agribusiness lobby would convince the government to choose the former program.

In Gardner's model, the two groups are somewhat arbitrary and restrictive. "Farmers" implicitly include farmers and the suppliers of farm-purchased inputs. "Consumers" implicitly include final consumers, taxpayers, processors, exporters, retailers, and other middlemen. It may be inappropriate to aggregate consumers of a farm commodity with taxpayers at large.<sup>3</sup> This will be so, in particular, when the consumers of the farm commodity are other farmers (as in the case of feedgrains) or foreigners (as in the case of export goods) rather than final domestic consumers. Even in cases when it seems appropriate to aggregate final consumers with taxpayers, it may not be appropriate to aggregate final consumers (and taxpayers at large) with all processors and other middlemen involved in agricultural markets beyond the farm gate. Similarly, in many situations it will be inappropriate to aggregate farmers with the suppliers of inputs they purchase.

It may be possible to account more completely for current programs by redefining the interest groups into more natural aggregates in the sense that the parties within an aggregate have common interests and work as a coalition in the policy process. Natural candidates for distinct interest groups include input suppliers, farmers, middlemen, consumers, and taxpayers. Three of these groups—consumers, taxpayers, and farmers (for most commodities)—have in common the problem of a large membership. This makes it difficult and expensive for them to organize and lobby effectively on their own behalf. Free riders also present a problem for them. On the other hand, middlemen and farm input suppliers are few, and it is relatively inexpensive for them collectively to organize and lobby. Individually and collectively, farmers have a great vested interest in farm programs; the individual and collective interests of farm input suppliers and middlemen are even greater.



While consumers and taxpayers have the greatest collective interest in farm programs, their individual interests in specific programs are very small.

Against this background, it should not be surprising to find that agribusiness and farmers act in concert to pursue farm programs. Agribusiness can lobby effectively at relatively low cost. For their part, farmers supply the voting constituency both directly and by generating sympathy among the urban electorates. Consumers and taxpayers have little individual interest in generating effective political opposition, and they are ill-placed to do so. The most likely outcome is a scheme of farm programs that serves the interests of both farmers and agribusiness.

### III. DETERMINANTS OF PROGRAM BENEFITS

In this section, we develop a simple model of a competitive agricultural commodity market to derive and illustrate the conditions under which middlemen or farm input suppliers may gain or lose from farm policies. All of the farm policies being considered benefit farmers. We use the model to analyze the effects on demand for inputs supplied by agribusiness either (i) to farmers (farm input supply) or (ii) to be used beyond the farm gate (middleman). We do not formally consider the interests of consumers or taxpayers in this analysis.

In our model, middlemen are assumed to produce a retail (or export) product using three factors: a farm product, other purchased inputs (e.g., other raw materials and labor), and a composite of inputs supplied by middlemen themselves. Farm programs are incorporated via shifts in the supply of the farm product through either (i) supply-reducing (price-increasing) policies (restrictions on some farm input(s) or farm output, import controls, or government purchases with price supports) or (ii) supply-increasing (price-reducing) policies (subsidies on some farm input(s) or the farm output).

Market middlemen will benefit from a farm program when it leads to an increase in the derived demand for the inputs they supply. Thus, market middlemen will benefit from a reduction (and lose from an increase) in the supply of the farm product when marketing inputs and the farm product are gross substitutes (i.e., when the "substitution effect" that increases demand for marketing inputs outweighs the "scale effect" that reduces demand for all inputs in response to the increased price of the final product arising from the increased price of the farm product). On the other hand, when the two inputs are gross complements (i.e., when the "scale effect" outweighs the "substitution effect") middlemen will gain from an increase (and lose from a reduction) in the supply of the farm product. The relative sizes of these scale and substitution effects vary among commodities

according to differences in both technology of the marketing processes beyond the farm gate and final demand conditions. Thus, in some commodities, middlemen would prefer higher prices of farm products; in others, they would prefer lower prices of farm products.

We also present a two-factor model of farm production. One of the factors is purchased farming inputs supplied by agribusiness. We use this model to analyze the effects of output subsidies and acreage controls on demand for purchased farming inputs. Farm input suppliers will benefit from farm programs that lead to an increase in U.S. farm output and thus to an increase in the derived demand for (normal) inputs purchased by farmers. They will also benefit from acreage restrictions that lead to substitution in favor of purchased inputs.

### A Three-Input Model of Agricultural Marketing

Let the quantities of three inputs used to produce a final agricultural product be denoted as follows:  $a$  - marketing inputs supplied by middlemen;  $b$  - raw farm product; and  $c$  - purchased marketing inputs (e.g., other raw materials). Let  $P_a$ ,  $P_b$ , and  $P_c$  denote their respective prices. It is assumed that the industry production function,  $Q = f(a, b, c)$  exhibits constant returns to scale. Therefore, industry factor demand equations (as functions of  $P_a$ ,  $P_b$ , and  $P_c$ ) can be characterized as:<sup>4</sup>

$$(1) \quad E_a = \eta_{aa} EP_a + \eta_{ab} EP_b + \eta_{ac} EP_c$$

$$(2) \quad E_b = \eta_{ba} EP_a + \eta_{bb} EP_b + \eta_{bc} EP_c$$

$$(3) \quad E_c = \eta_{ca} EP_a + \eta_{cb} EP_b + \eta_{cc} EP_c$$

where the operator  $E$  denotes relative changes so that  $E_a = d \ln a$ , etc., and the uncompensated elasticities of demand for factor  $i$  with respect to the price of factor  $j$  are defined as  $\eta_{ij} = k_j (\sigma_{ij} + \mu)$  for all  $i, j \in S = \{a, b, c\}$ ; the  $k_i$ 's are cost shares of total

revenue ( $k_a + k_b + k_c = 1$ ); the  $\sigma_{ij}$ 's are Allen partial elasticities of substitution that satisfy the constraints  $\sigma_{ij} = \sigma_{ji}$  and  $\sum_j k_j \sigma_{ij} = 0$  for all  $i, j \in S$ ;  $\mu$  is the elasticity of product demand. The factor supply equations (assuming nonjointness in production) can be characterized as:

$$(4) \quad E_a = \varepsilon_a [EP_a + \alpha_1] - \alpha_2$$

$$(5) \quad E_b = \varepsilon_b [EP_b + \beta_1] - \beta_2$$

$$(6) \quad E_c = \varepsilon_c [EP_c + \gamma_1] - \gamma_2$$

where the  $\varepsilon_i$ 's ( $i \in S$ ) are elasticities of input supplies.

Exogenous policy changes are represented by the  $\alpha$ 's,  $\beta$ 's, and  $\gamma$ 's:  $\alpha_1$ ,  $\beta_1$ , and  $\gamma_1$  are proportional increases in supply prices for factors a, b, and c respectively, corresponding to subsidies on marketing inputs, the farm product, or other inputs purchased by middlemen;  $\alpha_2$ ,  $\beta_2$ , and  $\gamma_2$  are proportional reductions in quantities of the three factors (a, b, and c respectively) and represent the effects of supply controls on the three factors when combined with corresponding supply elasticities of zero. For example, to model the effect of a 10 percent subsidy on the farm product, set  $\beta_1 = 0.1$ ; to model the effect of a farm production quota that reduces output by 10 percent set  $\beta_2 = 0.1$  and  $\varepsilon_b = 0$ . The combined effects of these two policies can be modeled by setting  $\beta_1 = 0.1$ ,  $\beta_2 = 0.1$ , and  $\varepsilon_b = 0$ .<sup>5</sup> We can use this model to analyze the effects of import tariffs by treating imports as a factor purchased by middlemen.<sup>6</sup>

#### Effects of Farm Policies on Demand for Agribusiness Inputs

This system of six equations can be solved for changes in the six endogenous prices and quantities in response to alternative policy combinations. Initially, we are interested only in the sign of the expression for the relative change in price of the marketing inputs that indicate whether middlemen gain (positive sign) or lose

(negative sign) from policies. Later we analyze effects on demand for inputs purchased by farmers to determine whether farm input suppliers gain.

(i) Subsidies or Quotas on Farm Output

Substituting (1)-(3) into (4)-(6), setting  $\alpha$ 's and  $\gamma$ 's = 0, and using the restrictions implied by the zero homogeneity property ( $\eta_{aa} = \mu - \eta_{ab} - \eta_{ac}$ , etc.) yields the following equation for the relative change in the price of marketing inputs in response to output subsidies or output controls on farm products:

$$(7) \quad EP_a = \{[\beta_2 - \varepsilon_b \beta_1] \cdot [\eta_{ab} (\varepsilon_c + \eta_{ca} + \eta_{cb} - \mu) + \eta_{ac} \eta_{cb}]\} / D$$

or

$$(7') \quad EP_a = \{[\beta_2 - \varepsilon_b \beta_1] \cdot [\eta_{ab} (\varepsilon_c + \eta_{cc}) + \eta_{ac} \eta_{cb}]\} / D$$

where D is the determinant of the matrix of demand and supply parameters and under reasonable assumptions ( $\mu < 0$ ;  $\varepsilon_i > 0$  for all i),  $D > 0$ .<sup>7</sup> Thus, whether middlemen gain ( $EP_a > 0$ ) or lose ( $EP_a < 0$ ) depends on the sign of the numerator { } in (7). Middlemen will gain (lose) from output subsidies ( $\beta_1 > 0$ ), and they would lose (gain) from supply restrictions ( $\beta_2 > 0$ ) when:

$$(8) \quad k_b (\sigma_{ab} + \mu) \varepsilon_c - k_c \mu + k_a \sigma_{ac} + k_b \sigma_{bc} + k_a k_c (\sigma_{ac} + \mu) (\sigma_{bc} + \mu) > 0.$$

or

$$(8') \quad \eta_{ab}(\varepsilon_c - \eta_{cc}) + \eta_{ac} \eta_{cb} > 0.$$

Middlemen clearly will gain from output subsidies (and lose from output controls) when substitution effects among factors are small relative to scale effects (e.g., when  $0 < \sigma_{ij} < -\mu$  for all  $i \neq j$  so that all uncompensated cross-elasticities of factor demand are negative, i.e., all inputs are gross complements). On the other

hand, when substitution effects are large relative to scale effects (e.g., when  $\sigma_{ij} > -\mu$  for all  $i \neq j$  so that all uncompensated cross-elasticities of input demand are positive; i.e., all inputs are gross substitutes), middlemen gain from output controls and lose from output subsidies on the farm product.

A simpler expression results when it is assumed that the supply of the third factor ( $c$  – purchased marketing inputs) is perfectly elastic ( $\epsilon_c = \infty$ ). Then we have:

$$(9) \quad EP_a = [\beta_2 - \epsilon_b \beta_1] \eta_{ab} / D' = [\beta_2 - \epsilon_b \beta_1] k_b [\sigma_{ab} + \mu] / D'$$

$$\begin{aligned} \text{where } D' &= [\epsilon_a + \eta_{ab} + \eta_{ac} - \mu] [\epsilon_b + \eta_{ba} + \eta_{bc} - \mu] - \eta_{ab}\eta_{ba} \\ &= [\epsilon_a - \eta_{aa}] [\epsilon_b - \eta_{bb}] - \eta_{ab}\eta_{ba} > 0. \end{aligned}$$

Thus, middlemen will gain from an output subsidy (lose from production controls) in agriculture when the uncompensated cross-price elasticity of demand for the marketing input ( $a$ ) with respect to the price of the farm product ( $b$ ) is negative (i.e., they are gross complements), which will occur when the elasticity of substitution between these two inputs is less than the magnitude of the elasticity of demand for the product ( $\sigma_{ab} < -\mu$ ).

The question of whether farm input supply industries benefit is relatively straightforward. Farm input supply industries will benefit (lose) from policies that act directly to increase (reduce) farm output so long as the inputs they supply are normal factors of production.

#### (ii) Acreage Controls Combined with Output Subsidies

In many cases, however, farm output is controlled indirectly through the use of acreage controls, and sometimes output is subsidized indirectly through the use of input subsidies (e.g., subsidized irrigation water). From the point of view of

middlemen, the pertinent question is whether the net effect of farm input and output policies is to enhance or reduce the supply of the farm product they face. The question of whether farm input supply industries benefit is slightly more complicated in this case. These questions are easily addressed using a two-factor model in which two inputs ( $f = \text{land}$ ,  $g = \text{purchased inputs}$ ) are used to produce the farm product ( $b$ ).<sup>8</sup> An acreage control that reduces the quantity of land by a proportion  $E_f$  will reduce supply of the farm product (holding its price constant) according to:<sup>9</sup>

$$(10) \quad E_b = \beta_2 = E_f k_f (\sigma_{fg} + \varepsilon_g) / D^*$$

where  $D^* = \sigma_{fg} + k_f \varepsilon_g > 0$ ;  $\sigma_{fg}$  = the elasticity of substitution between land and purchased inputs,  $k_g$  = the cost share of purchased inputs in the farm product,  $\varepsilon_g$  = the elasticity of supply of purchased inputs,  $k_f$  = the cost share of land ( $= 1 - k_g$ ), and  $\varepsilon_f$  = the unregulated elasticity of supply of land. The effects of this acreage control combined with a proportional output subsidy on supply of the farm product (holding its price constant) are given by:

$$(11) \quad E_b = \beta_1 \varepsilon_b' - \beta_2 = \{\beta_f \sigma_{fg} k_g \varepsilon_g - E_f k_f (\sigma_{fg} + \varepsilon_g)\} / D^*$$

Equation (11) shows whether the combined policy increases or decreases supply of the farm product and thus (in conjunction with equation (8)) whether middlemen gain or lose. The conditions under which farm input suppliers gain or lose from this combined policy are less restrictive. The relative change in the price of

purchased inputs ( $EP_g$ ), arising from an output subsidy combined with an acreage restriction, is:

$$(12) \quad EP_g = \eta_{ab} \sigma_{fg} \beta_1 + k_f (\sigma_{fg} + \eta_{bb}) \beta_2$$

Thus, farm input supply industries will benefit (lose) from acreage controls alone when the elasticity of substitution between land and the farm input(s) they supply is greater (less) than the absolute value of the elasticity of demand for the farm product (i.e., when land and purchased farm inputs are gross substitutes:  $\sigma_{fg} > -\eta_{bb}$ ). Even when input suppliers lose from the acreage controls (i.e., when  $\sigma_{fg} < -\eta_{bb}$ ), their gains from output subsidies may more than offset those losses.

In a case where marketing inputs and the farm product are gross complements, middlemen and input supply industries will both gain from policies that increase supply of the farm product. The input supplier gains will be even greater when acreage controls are used as part of the program if the inputs they supply are gross substitutes for land. When marketing inputs are gross substitutes for the farm product, middlemen will prefer policies that reduce the supply of the farm product. Farm input suppliers may also gain if acreage restrictions are used rather than direct output controls.

### (iii) Price Supports

Price supports with government purchases raise commodity prices paid by middlemen and received by farmers. In equation (7), this policy may be represented by combining an increase in the farm product price ( $\beta_1 > 0$ ) with a perfectly elastic



supply facing middlemen ( $\epsilon_b = \infty$ ).

$$(13) \quad EP_a = \beta_1 \eta_{ab} [(\epsilon_c - \eta_{cc}) + \eta_{ac} \eta_{cb}] / D''$$

$$\text{where } D'' = [\epsilon_a - \eta_{aa}] [\epsilon_c - \eta_{cc}] - \eta_{ac} \eta_{ca} > 0.$$

Thus, middlemen will benefit from farm price supports when technology and final demand conditions are such that they would gain from output controls (i.e., when the substitution effect outweighs the scale effect of increasing the farm product price so that  $\eta_{ab} > 0$ ). Farm input suppliers will benefit either way.

#### (iv) Import Controls or Tariffs

A number of U.S. programs support domestic producer prices indirectly through the use of tariffs or controls on imports of substitutes for unprocessed U.S. farm products (e.g., sugar, wool, and beef) or substitutes for processed agricultural products (e.g., dairy products). The latter type of policy protects both the processor and the farmer from foreign competition, while protection against imported raw materials protects the farmer but increases the middleman's cost of both domestic and imported raw materials. We can analyze trade barriers on raw materials using our model by defining input  $c$  as the imported substitute for domestic farm products (import controls with  $\gamma_2 < 0$ ; import tariffs with  $\gamma_1 < 0$ ). To simplify, let us assume that the unregulated supply of imports to the United States is perfectly elastic ( $\epsilon_c = \infty$ ). Then (corresponding to equation (9)) the effects of an import tariff (or equivalent import quota) on middlemen are represented by:

$$(14) \quad EP_a = \gamma_1 \eta_{ac} / D' = \gamma_1 k_c [\sigma_{ac} + \mu] / D'; D' > 0 \text{ as in (9).}$$

Thus, middlemen will gain from an import tariff when the elasticity of substitution between marketing inputs and imported raw materials is greater than the absolute value of the demand elasticity, i.e., when marketing inputs and imported raw materials are gross substitutes. They will lose from such a policy when marketing inputs and imports are gross complements.

#### IV. WHO GAINS FROM U.S. FARM PROGRAMS

In this section, we assess whether agribusiness benefits from U.S. farm programs for the major agricultural commodities. First, we provide a relatively detailed analysis of an example of each major type of policy: the tobacco program (output controls), the wheat program (output subsidies combined with acreage controls), the dairy program (price supports inter alia), and the sugar program (import controls). Then we consider a broader range of commodities but in less detail. In making these assessments, we compare current programs to (i) a base of no programs, (ii) major alternatives that were considered in the preparation of the 1985 Farm Bill, and (iii) alternatives that the 1985 provisions replaced. The specific effects of some programs vary from year-to-year, depending on the settings of policy instruments (e.g., deficiency payments relative to acreage diversions for corn). Unless we state otherwise, in the analysis that follows we have in mind a "typical" recent year from an ex ante perspective.

To evaluate the full effects of a particular commodity program on agribusiness interests would require comprehensive data on all of the market and policy parameters in the model. However, for most programs, the qualitative effects depend primarily on only a few key parameters. Whether middlemen benefit depends on (i) the net effect of the program on the supply functions of the domestic farm product (and imported substitutes) that they face, and (ii) whether the inputs supplied by middlemen are gross substitutes or complements for the domestic farm product (or imported substitutes). Whether farm input supply industries benefit depends on whether domestic farm output is increased or reduced and, when it is reduced, on whether the substitution effect of acreage controls more than compensates for the effect of other policies.<sup>10</sup>

## (a) Tobacco (Output Quotas)

The tobacco program has been studied intensively, and relatively good data are available on elasticities of supply and demand and substitution possibilities.<sup>11</sup> Here we ask whether U.S. cigarette manufacturers benefit from the tobacco program, which controls U.S. production through national poundage quotas. In terms of our model, let us define the inputs used by U.S. cigarette manufacturers as: marketing inputs— $a$ ; domestic tobacco— $b$ ; and imported tobacco— $c$ . Further, let us assume that the United States faces a perfectly elastic supply of tobacco imports. Then, we can use equation (9) to determine whether cigarette manufacturers gain from production controls on U.S. tobacco.

The compensated cross-elasticity of demand between U.S. tobacco and marketing inputs (domestic/other) for 1982 was estimated by Sumner and Alston as  $1.69 = \eta_{ba}$ . Using cost shares of marketing inputs of  $k_a = 0.85$ , this implies  $\sigma_{ba} = 2.0$  which is greater than the absolute value of the elasticity of demand for U.S. cigarettes ( $0.4 = -\mu$ ). That is, in the U.S. cigarette industry, the substitution effect dominates the scale effect of U. S. tobacco price changes. U. S. tobacco and manufacturing inputs are gross substitutes so that the demand for manufacturing inputs increases, and cigarette manufacturers gain, as a consequence of the tobacco program. Cigarette manufacturers would lose if tobacco supply controls were eliminated; they would be further disadvantaged if supply controls were replaced with output subsidies. This is an instance where middlemen and farmers (who own quota) both benefit from the farm program but farm input suppliers most likely lose. It is also a case where the national deadweight costs of using output controls are much less (in fact, Alston and Sumner show they are negative) than those of using an output subsidy to assist farmers.

In recent years the tobacco program has been under considerable scrutiny. As with most programs, there was concern about the costs to taxpayers, and in 1982 and

1983, the "no-net-cost" tobacco program was implemented, requiring the major costs of price supports and surplus disposal to be borne by growers. Instead of reducing support prices to clear the market, they were frozen in nominal terms and quotas were reduced. The choice to reduce quotas and not to reduce support prices was of benefit to both quota owners and cigarette manufacturers but not to farmers without quota or to farm input suppliers.

(b) Wheat (Output Subsidies)

In the wheat industry, primary "middlemen" are grain merchants who supply export markets and the domestic flour milling and baking industry (secondary "middlemen"). We have no formal evidence on opportunities for substitution between wheat and inputs supplied by grain merchants. However, we conjecture that they are very limited, and because much of the U.S. wheat output is exported, the overall demand for the grain merchants' product (wheat at wholesale) is relatively elastic. Thus, it seems likely that grain merchants, along with wheat growers, benefit from output subsidies (and would lose from supply controls) on farm production of wheat.

The current wheat program has been analyzed recently by Babcock, Carter, and Schmitz. They concluded that the net effect of acreage diversions and output subsidies was to increase the supply of wheat in 1986 to the benefit of both middlemen and farm input suppliers, as well as farmers.<sup>12</sup> Since 1986 the levels of target prices, loan rates, export subsidies, and total acreage diverted have varied considerably, year-to-year. For much of the latter 1980s the net effect of the wheat program may have been to reduce U.S. production. At the same time, it is possible, that U.S. sales may have been greater than with no programs as a result of policies to run down Commodity Credit Corporation (CCC) stocks. With the current policy settings, in particular the Export Enhancement Program, it seems likely that total

throughput will be greater (and the buyers' price will be lower ) than if there were no wheat program at all in 1989. Similar conclusions may be drawn concerning U.S. farm programs for other grains (e.g., corn and other feedgrains). They have much in common with the wheat program in that they involve output subsidies and acreage controls and are likely to result in a net increase in output and a lower price to domestic buyers compared to a situation of no programs for grains.

While the effects of the current wheat program (relative to no program) are not clear cut, the effects of recent policy choices underlying the program are relatively clear. For grains, the previous (1981) programs involved a combination of target prices, deficiency payments, support prices, and acreage controls. The main alternatives discussed in 1985 were (i) mandatory supply controls set to achieve the same farmer benefit or (ii) some modification of the details of the existing mix of policies. The eventual outcome was to reduce the support prices (loan rates) and use greater expenditure on output subsidies instead of government purchases to support farm prices. The clear losers from the decision not to use mandatory supply controls were taxpayers (and grain exporters in other countries). Farmers neither lost nor gained. The clear winners from the decision not to use supply controls were grain merchants and the suppliers of inputs used in grain production. The grain merchants also gained from the decision to lower the loan rates, which lowered their cost of procuring grain.

### (c) Dairy (Price Supports)

Dairy policy in the United States is very complicated (e.g. see LaFrance and de Gorter; Ippolito and Masson). Here we consider the essentials of federal programs, ignoring the important role of marketing orders. Fundamental support for both dairy farmers and processors is provided by barriers to imports. In addition,

farm prices for milk are supported indirectly through government purchases of processed dairy products at prices based on the milk content of the products.

Wohlgenant reports estimates of the elasticity of retail demand for dairy products ( $\mu = -0.21$ ) and the elasticity of substitution between raw milk at the farm and marketing inputs ( $\sigma_{ab} = 0.96$ ), which indicates that raw milk and marketing inputs are gross substitutes in dairy processing and marketing. Thus, dairy processors would gain from price supports applied directly at the farm level, raising their costs of raw materials. They surely gain from price supports applied to processed dairy products under an umbrella of barriers to international trade. In addition, milk output is greater than it would be without the dairy program, and farm input suppliers gain as well.

In the dairy industry, the major change in the 1985 Farm Bill was the introduction of the whole herd buy-out program. The direct purpose of this provision was to reduce the accumulation of CCC stocks arising from the support prices being set above market clearing levels. Farmers were assessed a levy (initially 40 cents/cwt, 3.5 percent of the support price) to finance the herd buy-out program. This program change has no direct implications for middlemen who continue to face the support prices; all of the costs were borne by farmers. Alternative means of reducing dairy surpluses—further reductions in support prices or direct output controls—might have been better for farmers but worse for dairy processors. However, in the case of the dairy industry where much of the processing is done by farmer-owned cooperatives, the distinction between farmers and middlemen is blurred. Recently, on the extraordinary grounds of drought relief, the dairy industry succeeded in deferring a planned phased reduction in milk support prices. This policy decision, too, is entirely consistent with the interest of dairy processors in maintaining a high price for their purchased raw materials.

(d) Sugar (Import Controls)

The U.S. sugar cane and sugar beet growing industry is protected by a combination of price supports and import quotas. The import quotas are adjusted with the objective of avoiding any federal budget costs (i.e., to leave the market price greater than the loan rate). Thus, the program effectively operates as an import quota alone that increases the price of both domestic sugar cane-sugar beet and imported raw sugar.

Clearly, U.S. manufacturers of sugar substitutes (such as high fructose corn syrup and corn starch) benefit from the sugar program (Schmitz et. al.; and Leu, Schmitz and Knutson). U.S. sugar refiners also benefit because the import quotas protect them from competition from raw sugar imports. The refiners' benefits will be greater, the greater are the possibilities for substituting processing inputs for raw farm products in production of sugar, but substitution is not necessary for the processors to benefit in this instance. It is also possible that other manufacturers gain from substituting marketing inputs for sugar in the production of confectionery and beverages, for example. Farm input suppliers also gain from the increase in domestic production of sugar (and associated increase in input use) arising from the sugar program. The only clear-cut losers from the sugar policy are final consumers of sugar and products that incorporate sugar.

(e) Overview of U.S. Farm Programs

With regard to other agricultural commodities, some empirical evidence exists to indicate whether marketing inputs and farm products are substitutes or complements. Wohlgenant (forthcoming) estimated elasticities of substitution between marketing inputs and farm products for a variety of commodities. Based on the relationship between elasticities of substitution and final product demand elasticities, complementary input demand relationships are indicated for beef and



veal, pork, and poultry while substitution relationships are found for dairy products, eggs, and fresh vegetables.

Gardner (1975, p. 405) shows that in the case of a two-factor model, derived demand for the farm product will be more elastic than retail demand if and only if the elasticity of substitution exceeds the absolute value of the retail demand elasticity. Using this result, information on input relationships can also be derived for cotton, sugar, and rice from other published studies. For cotton, Wohlgenant (1986) estimates the domestic derived demand elasticity to be -0.3, which is less than the retail demand elasticity of -0.5 estimated by Blanciforti and Green. In the case of sugar, the estimated demand function for sugar by Leu, Schmitz, and Knutson implies a derived demand elasticity of -0.15, which is larger in absolute value than the final retail demand elasticity of -0.05 estimated by Huang. Finally, Scobie and Posada T. estimated the elasticity of substitution between marketing inputs and farm product for rice to be 0.5, which is less than the absolute value of the final retail demand elasticity of 0.15 estimated by Huang.

As discussed above, Table 1 summarizes the major elements of farm programs for a range of U.S. commodities. In every case shown in Table 1, it is possible (and in most cases it seems likely) that middlemen gain, along with farmers, as a result of the farm programs. The answers are equivocal because we are uncertain of either (i) the effects of a program on the supply of farm product facing middlemen or (ii) whether marketing inputs and farm products are gross substitutes or gross complements. Many farm commodities are most likely gross complements with marketing inputs (wheat and feedgrains, beef and veal, pork and poultry), and middlemen in these industries will benefit from a net increase in grain supply either directly or through increases in farm supply of livestock products. Whether current provisions lead to a net increase in grain production or throughput by middlemen is not clear, however. In several import-competing agricultural

industries (dairy, beef, sugar, and rice), domestic farm prices and farm output are supported indirectly by trade barriers against either competing farm products or processed products and directly by price supports. In these industries, middlemen are likely to benefit from trade barriers and price supports on both the raw materials and the processed products because the imported raw materials tend to be gross substitutes for marketing inputs. In the case of tobacco, U.S. cigarette manufacturers gain from direct controls on U.S. production because the farm product and marketing inputs are gross substitutes. Also, in most cases, we suspect that farm input suppliers gain. Farm programs generally enhance domestic output of farm commodities (tobacco and peanuts are exceptions). This output effect increases the demand for normal inputs used by farmers. Augmenting this is the substitution effect that favors greater use of other inputs arising from acreage controls for many commodities.

The implications of recent policy choices are less equivocal. The 1985 Farm Bill involved some significant changes in major U.S. farm programs, all of which seem to have favored agribusiness interests. Ostensibly, at least, the major imperative of the 1985 Farm Bill (indeed for U.S. farm policy throughout the 1980s) was to reduce federal budget costs of the programs while maintaining support for farmers. However, program changes in 1985 and subsequent changes have offered little relief for taxpayers or the consuming public. Federal budget costs of farm programs continue to run between \$10 billion and \$20 billion a year (Congressional Budget Office).

A major aspect of the 1985 Farm Bill was that it was commodity oriented, which means that clear benefits accrued to specific commodity producers (Guither). Pressure groups could clearly identify the payoffs from lobbying efforts. The major beneficiaries of the key provisions of the 1985 Farm Bill were U.S. farmers and agribusiness concerns. Taxpayers were the major losers from the 1985 Farm Bill

since this group did not exert much pressure on policy makers. This is understandable and predictable from the theories of pressure group formulation. Taxpayers form a group that is large, diverse, and not well organized. Pressure group models like the one developed by Stigler explain competition between pressure groups for the benefits from government intervention, and they demonstrate that groups can more readily obtain subsidies when they represent a relatively small number of individuals. Taxpayers came out losers because they are a large and disorganized group.

Agribusiness groups were strongly opposed to production controls, and farmers were content without production controls as long as the target price remained high. A poll taken in 1986 by the U.S. Department of Agriculture indicated farmers were split almost evenly on the question of production controls versus a continuation of the present policy. Taxpayers stood to gain most from mandatory production controls, but due to their inherent difficulty in forming a coalition, they lost out to agribusiness interests. In passing the 1985 Farm Bill, Congress rejected the option of eliminating (or at least substantially reducing) taxpayer costs by replacing deficiency payments schemes with direct supply controls. For grains, the deficiency payments component has, instead, been increased as a consequence of reducing the support prices (loan rates). The main gainers here were middlemen and farm input suppliers who both benefit from lower unit costs and greater throughput of grain. For milk and tobacco, on the other hand, where middlemen are likely to prefer higher unit costs of their raw materials, the reductions in support prices have been retarded.

## V. Conclusion

This paper suggests that instruments of U.S. farm policy are chosen in response to pressures from agribusiness and farmers, at the expense of consumers and taxpayers. Depending on market parameters, alternative policy instruments that favor farmers may either benefit or harm farm input suppliers and middlemen. For the most part, U.S. farm programs have used policy instruments that are likely to favor agribusiness as well as farmers. Often these choices increase the cost of transferring income to farmers in order to satisfy agribusiness interests. As a result, farm programs will not always minimize the cost of transferring income to farmers. This result is consistent with a political economy model in which agribusiness and farmers act as a coalition--farmers supplying votes and agribusiness supplying lobbying effort--to pursue their common interests because neither group could be as effective in isolation.

Our conclusions about particular program choices are clouded by our general uncertainty about the price and quantity effects of programs. Still, none of our evidence is inconsistent with a model in which agribusiness interests play an important role in farm programs. Therefore we suggest that a more complete understanding of the genesis of farm programs will require paying greater explicit attention to the role of agribusiness.

## FOOTNOTES

<sup>1</sup>A few previous studies have mentioned the impact of farm programs on agribusiness (e.g., Carman and Youde; Council for Agricultural Science and Technology; Gardner 1987b) but there has not been a systematic evaluation of either the effects of policy on agribusiness or on the role of agribusiness in policy determination.

<sup>2</sup>In essence, this model is used by Gardner (1987a). In his earlier piece on efficiency of redistribution through farm programs Gardner (1983) provides a more detailed analysis of this problem.

<sup>3</sup>Some models have treated consumers and taxpayers (i.e., government revenue) as distinct groups (for instance, see Sarris and Freebairn). This modification seems prudent when it is considered that taxation measures elsewhere in the economy, to finance government spending on commodity programs, are likely to involve an excess burden (e.g., see Gardner 1983, 1987b).

<sup>4</sup>For this form of derived demand, see Allen, p. 508.

<sup>5</sup>In his excellent text on the economics of agricultural policies, Gardner (1987b) develops formulas for effects of a range of policies on welfare of various groups including middlemen. His three-factor model is similar to the one used here except that he imposes an additional assumption of weak separability of agricultural production. However, he uses this model only to describe and measure effects—not to analyze causes—of policies.

<sup>6</sup>However, we cannot explicitly model export subsidies without disaggregating the demand into domestic and export components. For most cases the results for output subsidies will indicate the directions of the effects of the export subsidies (under the Export Enhancement Program) on demand for agribusiness inputs.

<sup>7</sup>The determinant is  $D = D_1 - D_2$ , where  $D_1 = (\epsilon_a - \eta_{aa})(\epsilon_b - \eta_{bb})(\epsilon_c - \eta_{cc})$ , and  $D_2 = \eta_{ab} \eta_{bc} \eta_{ca} + \eta_{ac} \eta_{ba} \eta_{cb} + \eta_{bc} \eta_{cb} (\epsilon_a - \eta_{aa}) + \eta_{ac} \eta_{ca} (\epsilon_b - \eta_{bb}) + \eta_{ab} \eta_{ba} (\epsilon_c - \eta_{cc})$ . For normal parameter values (i.e., negative final demand elasticity, positive input supply elasticities, and negative semi-definite matrix of Allen partial elasticities of substitution),  $D_1 > D_2$  and  $D > 0$ . For details, see Wohlgenant (1982, p.8).

<sup>8</sup>For complete details on the underlying model, see Muth or Gardner (1985, 1987b).

<sup>9</sup>At the same time, as a result of the acreage control, the elasticity of supply of the farm product will be reduced from  $\epsilon_b = \{ \sigma_{fg} (k_g \epsilon_g + k_f \epsilon_f) + \epsilon_f \epsilon_g \} / \{ D^* + k_g \epsilon_f \}$  to  $\epsilon_b' = \sigma_{fg} k_g \epsilon_g / D^*$ .

<sup>10</sup>When a farm program involves a combination of several policy instruments, it may increase or reduce both output of the farm product and the price paid by middlemen. In some instances (notably wheat and feed grains), the answer to this question is controversial. Uncontroversial estimates are available on the elasticities of final demand ( $\mu$ ) for most important agricultural commodities. Data are also available on the cost shares of farm products and other inputs in the marketing chain. However, there is comparatively little empirical evidence available about the substitution possibilities in agricultural marketing industries (i.e., the  $\sigma_{ij}$ 's) upon which the results hinge crucially.

<sup>11</sup>See Sumner and Alston (1987), Sumner and Wohlgenant, and Alston and Sumner.

<sup>12</sup>See Babcock, Carter, and Schmitz for a description of the effects of the current wheat program and some analysis of the alternatives that were discussed in determining the 1985 Farm Bill.

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Table 1. Major U.S. Farm Commodity Programs

Commodity	Value of U.S. Farm Output 1986 (\$billion)	Major Program Elements
Cattle	20.92	Input Subsidy <sup>a</sup> Import Quota
Dairy	18.15	Price Supports Import Barriers Marketing Orders
Feedgrains	15.08	Output Subsidy <sup>b</sup> Acreage Control
Poultry & Eggs	10.42	Input Subsidy <sup>a</sup>
Hogs	9.53	Input Subsidy <sup>a</sup>
Soybeans	9.33	Support Price
Wheat	4.86	Output Subsidy <sup>b</sup> Acreage Control Export Subsidy
Cotton	2.44	Output Subsidy <sup>b</sup> Acreage Controls Price Supports Export Subsidy
Tobacco	1.78	Output Quota Price Supports
Sugar	1.51	Price Supports Import Quotas
Rice	.53	Output Subsidy <sup>b</sup> Acreage control Price Supports Import Barriers

<sup>a</sup>There are no explicit programs for hogs or poultry & eggs, but feedgrain programs effectively subsidize output of all meat products.

<sup>b</sup>The output subsidies are provided in the form of target price/deficiency payment schemes.

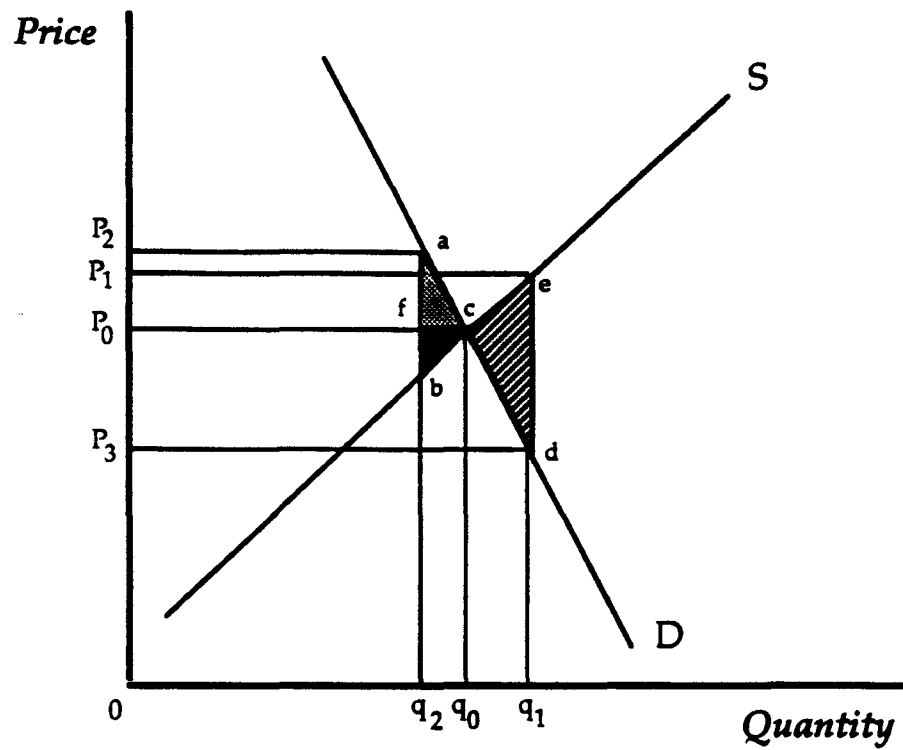
Table 2

*Gains of producers, consumers and taxpayers from 1987  
commodity program  
(Billions of dollars)*

Commodity	Producers	Consumers	Taxpayers
Feed grains	8.9	0	-10.3
Wheat	2.4	0	-3.7
Rice	0.5	0	-0.6
Cotton	0.9	0	-1.5
Sugar	1.7	-3.1	0
Milk	1.3	-1.2	-1.4
Tobacco, peanuts and wool	0.8	-0.5	-0.2
Sum	16.5	-4.8	-17.7

Source: Gardner (1987c, p.55).

Figure 1 - Efficient Redistribution with Two Political Groups:  
The Gardner Model



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