PRODUCERS' POLITICAL INFLUENCE AND REDISTRIBUTION EFFICIENCY: AN APPLICATION TO THE U.S WHEAT PROGRAM

KIM YONG-TAEK *

I. Introduction

The process of formulating and evolving farm programs reflects the underlying economic and political structure concerning farm program issues. To understand the process of farm program formulation and to determine the values of endogenous economic variables as well as those of the policy instruments, a system of economic and political relations -- a political economy -- should be recognized.

Much of the theoretical and applied research on the political economy of farm programs has attempted to explain the process of farm policy formulation and the distributional effects of agricultural policies. "Public choice theory" has been applied to determine why inefficient redistribution policies and/or protectionism are implemented instead of efficient transfer policies.

According to public choice theory, interest groups attempt to influence policymakers to adopt policies that will maximize the utility of the interest groups. Therefore, the essence of the political problem is the resolution of the conflict arising between various interest groups. The political-economic equilibrium is also the outcome of the corresponding bargaining problem whose solution is acceptable to the interest groups (Rausser and Freebain; Zusman and Amiad; Gallagher; Beghin).

The bargaining process and the resulting compromises between different political groups and the range of preferences of these groups result in construction of several criterion functions such as the

* Research Associate, Korea Rural Economic Institute, Seoul, Korea.

Political Preference Function (PPF, Rausser and Foster; 1990, Oehmke and Yao; 1990, Sarris and Freebairn; 1983, Paarlberg and Abott; 1986, Gallagher; 1988) and the Social Welfare Function (SWF) or result in the Game Theoretical Framework (Harsanyi; Zusman; Zusman and Amiad; Beghin and Karp; Beghin).

The PPF approach accepts the actual choices of governments as revealed by the SWF. The first order conditions generate weights for the interest groups that, in empirical works, can be assumed or estimated to reveal the policymaker's implicit weights(Oehmke and Yao; Sarris and Freebairn; Rausser and Foster; Zusman and Amiad; Gallagher). Consequently, the PPF approach treats the resulting set of preferences parameterically and provides decision-makers with rational policy outcomes based on the representation of policy preferences as revealed policy preferences. The revealed preference of the government to the public issues can be employed to determine weights associated with various objectives. A set of weights in the PPF model reflects the political power and strength of various interest groups(Rausser and Just; Gardner; Sarris and Freebairn).

Some studies focused on the social cost of government redistributive policies. Becker (1983) attempted to unify the view that governments correct market failures with the view that they favor the politically powerful by presenting a theory of competition among pressure groups for political influence. He addressed the following arguments: 1) the transformation of economic policies can be explained by competition among interest groups, 2) an efficient policy survives over alternative policies since a Pareto-superior policy would attract more political support, 3) political equilibrium depends on the efficiency of each group in producing pressure, the effect of additional pressure on their influence, the number of persons in different groups, and the deadweight cost of taxes and subsidies, and 4) since efficiency depends on the extent of deadweight losses associated with proposed policies, public policies with lower deadweight losses are, ceteris paribus, more likely to be adopted.

According to Gardner's efficient redistribution theory (1983), efficiency in redistribution measured in terms of deadweight loss generated per dollar of economic surplus transferred between consumers and producers of a commodity resulting from government intervention could explain policy variations over time and across commodities. By

considering the ability to redistribute efficiently as well as the effectiveness of political organization, Gardner indicated which farm commodities had received the most government support since 1930. Gardner also developed the Surplus Transformation Curve (STC) concept which demonstrated the welfare trade-offs inherent in income transfer programs. Another study(Babcock et al) also listed the efficiency of farm programs and the effectiveness of political organizations as important forces in determining redistribution policies. Many recent studies, which focus on the social cost of redistributive agricultural policies, show why it is important to estimate the distributional consequences and the efficiency effects of agricultural policies.

Most of those studies, however, have neglected to consider both the political influence of interest groups in the political market and the economic efficiency of transferring wealth from one group to other groups. Given the role of political markets in transferring wealth, it is of interest to investigate the distributional consequences, as well as the efficiency consequences, of government policy and to investigate and measure the distributional effects of wheat policies, focusing on the interconnections between the political influence of interest groups and the redistribution efficiencies under policy alternatives.

The objective of this study, therefore, is to investigate theoretically the relationship between the political influence of the producer group and the redistribution efficiency under policy alternatives. Specifically, this study will 1) estimate the changes in producer surplus (PS), consumer surplus (CS), taxpayer loss (TL) and total deadweight loss under various agricultural policies; 2) examine empirically the relationship between the political influence of the producer group and the welfare levels of the interest groups; and 3) compare various redistributional efficiency measures developed from previous studies.

II. Model

Assume for simplicity that supply and demand are linear functions of domestic price. Let D_1 represent the total demand curve, which is the horizontal summation of the commercial exports and domestic demand (D_0) for wheat. The supply curve S_0 is assumed to represent the no-program supply, while S_1 indicates the adjusted supply curve due to

provision of the acreage reduction program. Thus, the supply curve of U.S. wheat shifts from S_0 to S_1 as seen in Figure 1. The adjusted supply curve establishes S_1 at a smaller output than the no-program supply curve S_0.

The supply functions under the absence and provision of wheat programs are defined as follows:

$S_0 = a_0 + b_0 P_s$ (without farm program)
$S_1 = a_1 + b_1 P_s$ (with farm program)

The demand functions are also defined as

$D_0 = c_0 + d_0 P_d$ (domestic demand),
$D_1 = c_1 + d_1 P_d$ (total demand)

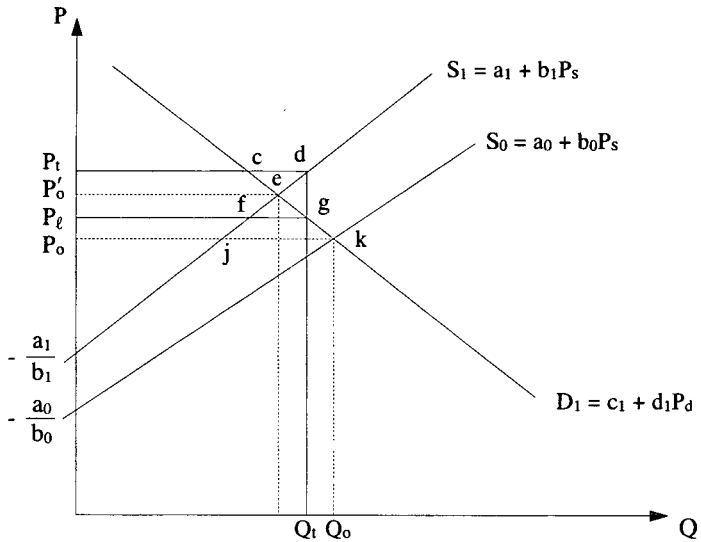
It is assumed that $c_1 > a_0 > a_1 > 0$, $b_1 > b_0 > 0$, $d_1 < 0$ as Figure 1 shows.

Assume that the following three policy instruments are available for domestic farm programs. Target price (P_t) / Deficiency payment, Loan rate(P_l), and Acreage reduction program(α). Because these policy instruments can be listed as main policy instruments, the vector of policy instruments is denoted by $Z_m = (P_t, P_l, \alpha)$.

It is assumed that the guaranteed target price is higher than the loan rate which is the floor price. Farmers respond to the target price by producing Q_t, and the loan rate is higher than the free market equilibrium price which is the price without government intervention in the wheat market. That is, $P_t > P_l > P_0$. Consumer surplus depends on whether the loan rate is set performance measures where the "change" is defined to be that increase or decrease resulting from government policies.

It is also assumed that regularity conditions are satisfied. Thus, V is twice differentiable and concave in (Z, w). To guarantee an interior maximum of the government objective function, it is required that the second order conditions are satisfied, i.e., $V_{zz} < 0$. This means that an increase in the level of policy instruments reduces the net marginal benefit of those policy instruments.

FIGURE 1. The Implementation of Target Price / Deficiency Payment and Loan Rate and Acreage Reduction Programs



III. The Changes in Gains and Losses from the Wheat Programs

The net social costs resulting from government intervention can be analyzed by comparing the gains and losses with the programs to a no-program situation. The overall distributional consequences, total deadweight loss (TDWL), are measured as the gains in producer surplus (PS) plus losses in consumer surplus(CS) and losses to the taxpayer (TL).

The changes in total producer surplus are the welfare gain to producers from having the option to sell much of the commodity at the target price in effect compared to the free market price. Thus, the gain in producer surplus is equal to the difference between area P_o P_t cd and area $-\frac{a_0}{b_0} - \frac{a_1}{b_1}$ jk in Figure 1. Thus, the gain in PS is

$$\triangle PS = \int_{-\frac{a_1}{b_1}}^{P_t} (a_1 + b_1 P)dP - \int_{-\frac{a_0}{b_0}}^{P_0} (a_0 + b_0 P)dP \quad (1)$$

$$\triangle PS = a_1 P_t + \frac{b_1}{2} P_t^2 - a_0 P_0 - \frac{b_0}{2} P_0^2 - \frac{a_0^2}{2b_0} + \frac{a_1^2}{2b_1} \quad (2)$$

The change in total consumer surplus is the welfare loss to buyers from having to purchase less of the commodity at the loan rate with the program in effect(P_l) compared to the free market price (P_0) in Figure 1. Therefore, the change in consumer surplus is the area behind the demand curve from P_0 to P_ℓ (area $P_0P_\ell gk$ in Figure 1. The gain in consumer surplus is measured as

$$\triangle CS = -\int_{P_0}^{P_1} D_1(P)dP \quad (3)$$

$$\triangle CS = -c_1(P_\ell - P_0) - \frac{d_1}{2}(P_\ell^2 - P_0^2) \quad (4)$$

The deficiency payment is equal to the difference between target price and the farm price if it is above the loan rate or the difference between the target price and the loan rate if the farm price is below the loan rate, multiplied by the proportion of the farm base that is allowable for planting and the program yield assigned to the farm. Thus, the taxpayers' losses are equal to area P_lP_tdg ($P_l > P_0$) or $P_t'P_dbi$ ($P_l < P_0$) in Figure 1. Therefore, the changes in taxpayer losses are measured as

$$\triangle TL = (P_t - P_\ell)Q_t = (P_t - P_\ell)(a_1 + b_1 P_t) = b_1 P_t^2 + (a_1 - b_1 P_\ell)P_t - a_1 P_\ell \quad (5)$$

IV. Derivation of Optimal Policies and Estimation of w

1. The optimal values of farm policy instruments

To determine the optimal choice of the policy control variables, P_t and P_l, taking the weight as given, the expected value of the PPF is maximized with respect to these control variables. After substituting the changes in producer and consumer surplus and taxpayer loss derived for the government objective function and maximizing the PPF(or V) with respect to two control variables, the optimal levels of farm policies are derived. The first order conditions (FOC) for the optimization of P_t and P_ℓ are

$$P_t : (a_l + b_l P_t)\, w - 2\, b_l P_t - (a_l - b_l P_\ell) = 0 \tag{6}$$

$$P_\ell : a_l - c_l + b_l P_t - d_l P_\ell = 0 \tag{7}$$

Solving the first order conditions equations Eq.(6) and (7), the optimal values of the government control parameters are

$$P_t^* = \frac{a_l d_l (1 - w) + b_l (c_l - a_l)}{b_l (b_l + d_l (w-2))} \tag{8}$$

$$P_\ell^* = \frac{c_l (2 - w) - a_l}{b_l + d_l (w-2)} \tag{9}$$

The optimal wheat policies derived indicate that the optimal levels and the signs of P_t and P_l depend on the parameters representing the economic condition as well as the distribution of political influence function of the producer group(w).

The second order condition (SOC) is

$b_l (w - 2) < 0$,
Because $b_l > 0$, $w < 2$

Assume that the political influence of the producer group is at least greater than zero($w > 0$). Then the second-order condition becomes $0 < w < 2$.

2. Estimation of w

Solving Eq.(8) for w , then w[1] is

$$w = \frac{-b_1^2 P_t + 2b_1 d_1 P_t + a_1 d_1 + b_1(c_1 - a_1)}{b_1 d_1 P_t + a_1 d_1} \tag{10}$$

The distribution of political influence of the producer group is not observable but the target price is observable. Consequently, the empirical observer can infer through Eq.(10) the value of w1 from observation of the target price, and the values of parameters of supply and demand equations. Thus, the distribution of political influence of the producer group varies and can be estimated from Eq.(10).

It is also an interesting fact that setting w = 1 in the government objective function corresponds to the situation of maximizing social surplus. Substituting w = 1 for Eq. (8), then where P_0' is the market price under the provision of wheat programs. Thus, under w = 1,

$$P_t = \frac{c_1 - a_1}{b_1 - d_1} = P_\ell = P_0' \tag{11}$$

the optimal level of the target price should be equal to loan rate and the market price; that is, a no-intervention policy is optimal. This is the traditional welfare economics result.

---

[1] Solving Eq.(9) for w, then $w(w_2)$ is

$$w_2 = \frac{(2d_1 - b_1)P_\ell + 2c_1 - a_1}{c_1 + d_1 P_\ell}$$

w derived from equation (8) reveals the political influence from the wheat program that implements a target price policy while maintaining status quo intervention. Similarly, w_2 derived from equation (9) shows the relationship between w_2 and the loan rate under changing the loan rates, holding all others unchanged at some levels. For simplicity, only w derived from equation (8) is considered as the revealed outcome of the producer group's political influence.

V. Relationship Between the Political Influence of the Producer Group and Redistribution Efficiency of Wheat Programs

The choices of policy instruments in farm programs result in trade-offs of the gains of producers and losses of consumers' surplus and taxpayers' losses. Gardner (1983) defined the combinations of PS and CS attainable by changing prices or quantities as Surplus Transformation Curves (STC) which is a concept similar to the utility possibility curves in the single-product framework. Since STCs were the government's income redistribution constraints, the optimal policy was the tangent point of the highest attainable STC and some social welfare indifference curve. Gardner argued that the slope of STC is an indicator in measuring redistribution efficiency.

The trade-offs are the changes in PS and the changes in CT (which is the sum of consumer surplus and the taxpayer loss) resulting from the farm programs. In order to derive the slope of STC, the changes in PS in the wheat program should be calculated. Eq.(2), Eq. (4) and Eq. (5) show the changes in PS and CT. Thus, the changes in PS and CT are

$$\triangle PS = a_1 P_t + \frac{b_1}{2} P_t^2 - a_0 P_0 - \frac{b_0}{2} P_0^2 - \frac{a_0^2}{2b_0} + \frac{a_1^2}{2b_1} \qquad (12)$$

$$\triangle CT = -c_1(P_\ell - P_0) - \frac{d_1}{2}(P_\ell^2 - P_0^2) - b_1 P_t^2 - (a_1 - b_1 P_\ell)P_t + a_1 P_\ell \qquad (13)$$

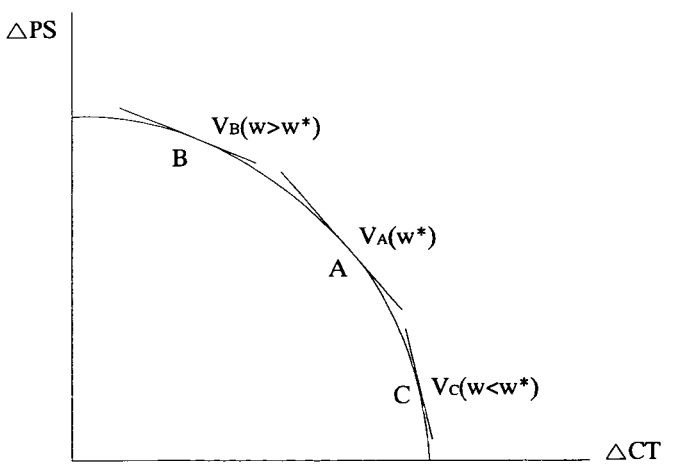
The surplus transformation curve is obtained by solving Eq. (13) for P_t and substituting in Eq. (14). Thus, the relationship between the changes in producer surplus and the changes in the sum of consumer surplus and the taxpayer loss can be shown. The curve of the STC is shown in Figure 2. The efficient redistribution tells how much the change in PS will increase for each dollar that the change in CT falls. This condition is expressed graphically by means of the line segment with slope STC passing through point A in Figure 2. Perfectly efficient redistribution is achieved at a point in which the slope of the STC is -1. Efficiency at the margin is measured by the slope of the STC. If the slope of STC is -1, then a dollar given up by consumers

and taxpayers yields a dollar gained by producers. The greater the slope's departure from -1, the less efficient the redistribution. As the slope increases, the optimal point moves from point A to point C; the changes in PS increase and the changes in CT decrease.

The STC developed by Gardner focused on investigating how the trade-offs between producer and consumers or taxpayers are changed if a single policy is changed while holding other policy instruments constant.

Since the PPF is defined as $V = w\triangle PS - \triangle CT$, the slope of STC under the current wheat programs is $\frac{d\triangle PS}{d\triangle CT} = -\frac{1}{w}$, where CT is the sum of CS and TL. Thus, as the political influence of the producer group increases, the slope of the STC declines. This relationship at the optimal point implies that if the linear PPF is defined, the political pressure of the producer group has an inverse relationship with redistributional efficiency. Thus, this inverse relationship between w and the slope of STC suggests that w can be a good measure of inferring redistributional efficiency. Once the linear PPF is defined and w is estimated, the transfer efficiency of the government's farm programs can be evaluated by simply looking at w instead of calculating the slope of the STC or deadweight losses.

FIGURE 2. The Surplus Transformation Curve.



A single policy scheme is the case in which only one policy instrument(the target price) is changed holding other policy instruments constant. Under a single policy scheme, more general results concerning the relationship between STC and w can be obtained by relaxing the assumption of linear demand and supply.

The effect of a marginal change in P_t (target price) on the change in PS are $\frac{d\triangle PS}{dP_t} = S_1(P_t)$. Similarly, the effect of a change in the target price P_t on the changes in CT is $\frac{d\triangle CT}{dP_t} = -[S_1(P_t) + P_tS_1'(P_t)]$. To get a unit free measure, the change in PS is normalized by dividing by P_tQ_t, where P_t is D(Q). The effect of a percentage change in P_t, $\frac{dP_t}{P_t}$ is obtained by dividing by D(Q):

$$\frac{d\triangle PS/P_tQ_t}{dP_t/P_t} = \frac{d\triangle PS}{dP_t} \cdot \frac{1}{Q_t} = \frac{S_1(P_t)}{Q_t} = 1 \tag{14}$$

$D(Q_t)$ is the target price on the demand function, and $S(Q_t)$ is the target price of the supply function at Q_t. Using the definition of elasticity of supply, when Pt is changed, the change in CT is

$$\frac{d\triangle CT/P_tQ_t}{dP_t/P_t} = \frac{d\triangle CT}{dP_t} \cdot \frac{1}{Q_t} = -\frac{S_1(P_t) + P_tS_1'(P_t)}{S_1(P_t)} = -(1+\varepsilon_s) \tag{15}$$

Thus, when the target price is changed, the slope of STC is found by dividing Eq. (14) by Eq.(15) :

$$\frac{d\triangle PS}{d\triangle CT} = -\frac{1}{1+\varepsilon_s} \tag{16}$$

Thus, when the target price is changed, the following relationship is established at the optimal point,

$$\frac{d\triangle PS}{d\triangle CT} = -\frac{1}{w} = -\frac{1}{1+\varepsilon_s} \tag{17}$$

Thus, w can be expressed by the following elasticity form,

$$w = 1 + \varepsilon_s. \tag{18}$$

The optimum is achieved at the point in which w is equal to the $1+\varepsilon_s$. In general, since the supply elasticity is greater than 0, w is greater than 1. It implies that the government's farm program leads to the generation of social deadweight losses. As a result, it is hard for w to be an optimum situation under the government farm program. If the supply elasticity gets close to 0, then w approaches 1 and the slope of the STC also approaches 1 from the above Eq. (17).

As a result, under a single policy scheme, the redistribution efficiency of the wheat program increases as the supply elasticity becomes inelastic.

VI. An application to the U.S. wheat program

Data for the empirical analysis were obtained from several sources. Based on annual data from 1960-90, the data used were mainly collected from the Economic Research Service(ERS), a branch of the United States Department of Agriculture (USDA). The sample used in this study to estimate the current U.S. domestic wheat program model, however, covered the period 1974-1991. This period was chosen because the target price policy enacted in 1973 Act began to be applied in 1974.

1. Estimation of the Political Influence of the Producer Group(w)

In order to estimate the political influence of the producer group, the supply and demand function parameters in the presence of wheat programs should be estimated. Program complexities, such as year-to-year changes in program mechanisms and the level at which policy instruments are set, challenge various econometric approaches in estimating commodity supply functions under program constraints (Cramer et al.). The simple replacement method is, therefore, used to substitute the values of prices, quantity, and elasticity data for the linear supply and demand equations. That is, the intercept and slope terms of the supply and demand curves are adjusted and expressed as linear functions of own-price and quantity by substituting each year's data for

TABLE 1. The Values of Parameters of Adjusted Demand and Supply During the Sample Period

Unit : a_0, a_1, c_1 = Mil, Bu, b_0, d_1 = Mil, Bu/($/Bu)

Year	a_0	a_1	b_0	b_1	c_1	d_1	Weight of Producers
1974	1,428.3	1,247.4	90.401	135.34	2,029.2	-85.620	0.65912
1975	1,701.4	1,488.9	104.00	156.01	2,280.0	-92.910	0.73930
1976	1,718.6	1,504.3	121.03	181.61	2,044.8	-96.000	1.0938
1977	1,638.2	1,432.2	150.01	224.84	2,380.8	-145.35	1.0927
1978	1,419.3	1,243.2	152.28	228.67	2,437.2	-174.33	1.0102
1979	1,710.0	1,493.8	143.94	215.56	2,589.6	-145.32	1.0874
1980	1,905.5	1,666.7	126.02	188.97	2,755.2	-121.48	1.0254
1981	2,224.6	1,949.5	142.24	213.68	3,141.6	-133.91	1.0764
1982	2,212.4	1,935.5	151.53	227.26	2,900.4	-132.44	1.2955
1983	1,935.3	1,694.0	136.29	204.51	3,048.0	-143.10	1.0781
1984	2,076.6	1,816.5	147.90	221.79	3,093.7	-146.90	1.1829
1985	1,941.0	1,696.8	143.14	214.51	2,353.2	-115.69	1.5555
1986	1,670.5	1,463.7	135.59	203.67	2,636.4	-142.66	1.2086
1987	1,687.2	1,475.6	174.29	261.32	3,220.8	-221.82	1.1668
1988	1,451.3	1,268.4	141.18	211.52	2,872.8	-186.30	1.0411
1989	1,626.9	1,425.9	109.33	164.27	2,670.0	-119.62	0.94759
1990	2,189.2	1,915.2	147.13	220.65	2,944.8	-131.94	1.2276
1991	1,583.0	1,386.7	151.63	227.70	3,171.4	-202.52	0.96876
Mean	1,784.3	1,561.4	137.1	205.66	2,698.3	-140.99	1.0809

wheat prices, quantities, and supply and demand elasticities for the linear supply and demand curves[2]. The acreage elasticity is assumed to be 0.3 and the elasticity for total demand is assumed to be -0.2 over the sample period. The supply price is the seasonal average price from a year ago (t-1) and is used as a proxy variable for the expected price of wheat. The demand price is the season average price received by farmers. The quantity of supply is the total amount of production produced from the harvested area. The quantity for total demand is total

[2] For more information about how the slope and intercept terms of the supply and demand curves are adjusted and derived, see the Gardner's method(B. Gardner, 1987. p 62-63).

utilization including the domestic utilization and the amount of export.

Equation (10) indicates that the political influence of a producer group is influenced by the parameters of economic and political markets which change over time. Thus, by substituting the values of a_1, b_1, c_1, and d_1 into Equation (10), the political influence of the producer group can be estimated. This method of estimating weights, w, is the concept of an ex-post measurement reflecting the final results of the decision-making process.

The yearly political influence of the producer group estimated from Eq. (10) is reported in Table 1. Table 1 indicates that the values of the estimated weights are between 0 and 2. The values of w are less than 1 in 1974, 1975, 1989, and 1991. The mean value of the political influence of the producer group was 1.08, which implies that the welfare of producers was weighted about 8 percent more than that of the public (consumers and taxpayers) during the period covered in this study.

The estimated values of political influence of the producer group confirm that the economic conditions are major determinants in changing the levels of farm policy instruments.

As a result, the trend of the changing political weights shows how the policy disequilibrium developed. Shocks to the economic environment led to changes in the levels of policy instruments in order to solve the policy crisis resulting from changes in the welfare distribution among interest groups.

2. Calculation of the Gains and Losses to Producers, Consumers, Taxpayers, and the Net Social Costs (TDWL)

The changes in producer surplus, consumer surplus, and taxpayer losses were calculated from Eq. (2), Eq. (4), and Eq. (5). The distribution and magnitude of the gains and losses to producers, consumers, taxpayers, and the net social costs (TDWL) in wheat programs are presented in Table 2.

Calculated changes in PS were related to the reductions in CS. The changes in PS were, in general, opposite to the changes in CS[3].

---

[3] The reason why the changes in PS and the changes in CS show the same direction for 7 years is that the changes in PS and CS are affected not only by the policy parameters, P_t and P_t, but also by the economic parameters, a_0, a_1, b_0, b_1.

TABLE 2. The Gains and Losses to Producers, Consumers, and Taxpayers, and Net Social Costs

Year	Producer Surplus	Consumer Surplus	Taxpayer Loss	Deadweight Loss	Weight
1974	-2,751.8	-965.4	1,036.9	-4,754.1	0.65912
1975	-2,554.4	-729.5	1,229.9	-4,513.8	0.73930
1976	341.02	-554.30	76.807	-290.08	1.0938
1977	417.55	461.9	1,354.7	-475.36	1.0927
1978	1,216.5	-246.33	1,254.0	-283.82	1.0102
1979	2,005.5	-442.01	2,004.0	-440.49	1.0874
1980	-154.2	-936.9	1,482.2	-2,573.3	1.0254
1981	480.42	-556.1	1,685.8	-1,761.5	1.0764
1982	4,524.0	-3,458.3	1,428.0	-362.21	1.2955
1983	6,799.9	-6,679.9	1,672.7	-1,552.7	1.0781
1984	6,124.0	-4,100.0	3,011.0	-987.03	1.1829
1985	8,680.4	-6,178.9	2,847.3	-345.78	1.5555
1986	5,505.6	-1,611.4	4,923.6	-1,029.3	1.2086
1987	5,505.8	-1,125.9	5,502.4	-1,122.4	1.1668
1988	3,748.2	-59.725	4,369.5	-680.97	1.0411
1989	1,216.4	-891.9	4,282.8	-3,958.3	0.94759
1990	4,296.9	-1,123.1	5,735.5	-2,561.6	1.2276
1991	2,137.4	-381.9	4,503.1	-2,747.6	0.96876

From 1974 to 1991 the changes in PS, CS, and TL averaged 2641.1, - 469.0, and 2688.9 million dollars respectively. Thus, the absolute deadweight loss for the wheat program averaged 516.8 million dollars per year and the value of PPF averaged 192.9 million dollars per year. The changes in TL steadily increased from 1974 to 1986, and the high taxpayer loss was not significantly changed during the period in which target prices held at the same levels. Loan rates became lower starting in 1986. The total deadweight loss has been substantial since the set-aside program began in 1982.

Consequently, wheat programs forced consumers and taxpayers to transfer income to producers during most of the sample period(before 1989). The deadweight losses arose from government intervention in the U.S. wheat market in order to protect domestic producers at the expense

of taxpayers and consumers. The recent wheat programs supported the producer group and improved the welfare of the consumer group at the expense of the taxpayer group. Recent high taxpayer losses resulting from the higher deficiency payment (the lower rates and maintained target prices) disclosed that the clear losers resulting from recent wheat programs were the taxpayers.

The estimates of the political influence of the producer group and the changes in PS, CS, TL are shown in Table 2. As the political influence of the producer group became stronger, the changes in PS rose, and the changes in CT (the sum of CS and TL) declined. The political influence of the producer group positively affected the changes in PS and negatively affected the changes in CT.

3. Relationship Between the Political Influence of the Producer Group and Redistribution Efficiency of Wheat Programs

The political influence of the producer group, total deadweight losses,

FIGURE 3. The Relationship Between the Political Influence of the Producer Group and Deadweight Loss

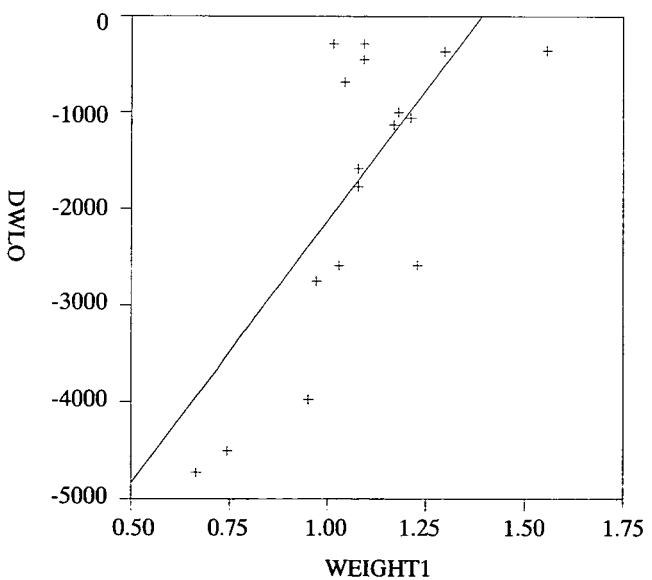


TABLE 3. The Political Influence of the Producer Group, Total Deadweight Losses, and the Slope of the STC as Efficiency Measures of Wheat Programs.

Year	Total Dead Weight Loss	Slope of STC	DWLPS	Weight
1974	-4,754.1	1.37	-0.047	0.65912
1975	-4,513.8	1.30	0.016	0.73930
1976	-290.08	-0.54	-0.851	1.0938
1977	-475.3	-0.47	-0.745	1.0927
1978	-283.82	-0.81	-0.233	1.0102
1979	-440.49	-0.82	-0.219	1.0874
1980	-2,573.3	0.06	2.905	1.0254
1981	-1,761.5	-0.21	-1.153	1.0764
1982	-362.21	-0.92	-0.080	1.2955
1983	-1,552.72	-0.81	-0.228	1.0781
1984	-987.03	-0.86	-0.161	1.1829
1985	-345.78	-0.96	-0.039	1.5555
1986	-1,029.37	-0.84	-0.187	1.2086
1987	-1,122.47	-0.83	-0.204	1.1668
1988	-680.97	-0.84	-0.181	1.0411
1989	-39,658.3	-0.23	-0.082	0.94759
1990	-2,561.6	-0.63	-0.190	1.2276
1991	-2,747.6	-0.43	-0.030	0.96876

* Slope of STC = (changes in producer surplus) / (changes in consumer surplus + changes in taxpayer loss)

the slope of the STC, and $\frac{TDWL}{\triangle PS}$ as efficiency measures of wheat programs are presented in Table 3. The DWLPS(= $\frac{TDWL}{\triangle PS}$) suggested by Cramer et al (1990) means each dollar of deadweight loss per dollar transferred to producers was associated with the commodity programs. The values of Table 3 and Figure 3 demonstrate that, by and large, the political influence of the producer group has an inverse relationship with the slope of the STC and a positive relationship with total deadweight loss. This result indicates that w can be an indicator for measuring redistribution efficiency as the theoretical model predicted.

VII. Summary and Concluding Remarks

When the public choice approach is applied to farm policies and programs, political decisions concerning farm programs are a reflection of selfish economic interests of several groups in farm policy matters. Therefore, the political decision as well as the policy selection and actual levels of various policy instruments chosen, is affected by the interaction between the government and the interest groups whose potential gains or losses can be substantial.

This study focuses mainly on the impact of the political process on farm program decision-making and its relationship to redistribution efficiency.

The following results were obtained from the theoretical and empirical analysis :

(1) The mean value of the political influence of the producer group was 1.08, which implies that the welfare of producers was weighted about 8 percent more than that of the public (consumers and taxpayers) during the period covered in this study (1974 -1991).

(2) From 1974 to 1991 the changes in PS, CS, and TL averaged 2641.1, - 469.0, and 2688.9 million dollars respectively. Thus, the absolute deadweight loss for the wheat program averaged 516.8 million dollars per year. The changes in PS were directly opposite of the changes in CS. The changes in TL steadily increased from 1974 to 1985. But the changes in TL did not change significantly over the period in which target prices were maintained at the same levels and loan rates became lower since 1986.

(3) The political influence of the producer group has an inverse relationship with the slope of the surplus transformation curve (STC) and a positive relationship with the total deadweight loss (TDWL). These results indicate that w can be an indicator for measuring redistribution efficiency as the theoretical model predicted. This inverse relationship between w and the slope of STC suggests that w can be a good measure for inferring redistributional efficiency. Once the linear PPF is defined and w is estimated, the transfer efficiency of the government's farm programs can be evaluated by simply looking at w instead of calculating the slope of the STC or deadweight losses.

REFERENCE

Becker, Gary S. "A Theory of Competition Among Pressure Groups for Political Influence." *Quarterly J. of Economics* 98: 371-400, 1983.

_____. "Public Policies, Pressure Groups, and Deadweight Costs." *J. of Public Economics* 28: 329-47, 1985.

Beghin, J. "A Game-Theoretic Model of Endogenous Public Policies." *Amer. J. Agr. Econ.* 72: 138-48, 1990.

_____, and L. Karp. "A Game-Theoretic Model of Agricultural and Food Price Policies in Senegal." Selected paper presented at AAEA annual meeting, Knoxville TN, 1988.

Gallagher, P. "The Grain Sector of the European Community: Policy Formation, Price Determination, and Implications for Trade." *Amer. J. Agr. Econ.* 72: 767-78, 1990.

Gardner, Bruce L. "Efficient Redistribution through Commodity Markets." *Amer. J. Agr. Econ.* 65: 225-234, 1983.

_____, "Cause of U.S. Farm commodity Programs." *J. Polit. Econ.* 95: 290-310, 1987.

_____, "Export Subsidies are Still Irrational." *Agr. Econ. Res.* 37: 17-19, 1985.

_____, "Economic Theory and Farm Politics." *Amer. J. Agr. Econ.* : 1165-1171, 1989.

_____, *The Economics of Agricultural Policies*, New York: Macmillan Publishing Company, 1987.

Harsanyi, J. C. "Cardinal Welfare, Individual Ethics, and Interpersonal Comparability of Utility," *J. of Polit. Econ.* 61: 309-21, 1955.

_____. "Measurement of Social Power, Opportunity Costs, and the Theory of the Two Person Bargaining Game," *Behavioral Science* 7: 67-80, 1962.

Oehmke, J. F. and X. Yao. "A Policy Preference Function for Government Intervention in the U.S. Wheat Market." *Amer. J. Agr. Econ.* 72 : 631-40, 1990.

Paarlberg, P. L. and Abott, P.C. "Oligopolistic Behavior by Pubic Agencies in International Trade: The Wheat Market." *Amer. J. Agr. Econ.* 68 : 528-42, 1986.

Rausser, G. C. and W. Foster. "Political Preference Functions and Public Policy Reform." *Amer. J. Agr. Econ.* 72 : 641-52, 1990.

Rausser, G. C. and R. E. Just. "Principles of Policy Modeling in Agriculture."

in G. C. Rausser (ed.) *New Directions in Econometric Modeling and Forecasting in U.S. Agriculture.* North-Holland, New York. 1982.

Sarris, A. H. and Freebairn "Endogenous Price Policies and International Wheat Prices." *Amer. J. Agr. Econ.* 65 : 214-24, 1983.

U.S. Dept. of Agriculture (USDA), Agricultural Stabilization and Conservation Service (ASCS), *Commodity Factsheets*, Various Issues.

_____, Economic Research Service, *Wheat Situation and Outlook Report*, Various Issues.

_____, Economic Research Service, *Economic Indicators of The Farm Sector*, Various Issues.

_____, Economic Research Service, *The 1990 Farm Act and the 1990 Budget Reconciliation Act: How U.S. Farm Policy Mechanisms Will Work Under the New Legislation*, 1990.

_____, Economic Research Service, *Provisions of the Food, Agriculture, Conservation, and Trade Act of 1990*, Agri. Information Bulletin Number 624. 1991.

Zusman, P. "The Incorporation and Measurement of Social Power in Economic Models." *Internat. Econ. Rev.* 17 : 447-62, 1976.

_____ and A. Amiad. "A Quantitative investigation of a Political Economy: The Israeli Dairy Program." *Amer. J. Arg. Econ.* 59 : 88-98, 1977.