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AN APPLICATION OF POLITICAL PREFERENCE FUNCTION APPROACH FOR THE KOREAN RICE SECTOR

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I. Introduction

Government interventions in the agricultural sector are widely practiced in both developed and developing countries. Although these interventions take different forms, many are believed to be highly inefficient. Economists traditionally point this out using the efficiency criterion, which implies an aggregate welfare function with equal weight to the economic gains and losses accruing to each interest group. According to the traditional welfare analysis that has ranked policies, pure transfers such as lump-sum subsidies or taxes have been suggested as the most efficient policy instruments for correcting any inequities among interest groups (Bhagwati 1971). Empirically, however, it has been observed that the policy instruments chosen by governments are often those that rank low in terms of the efficiency criteria. For example, income support policies for farmers are implemented through a variety of domestic and border price mechanisms rather than through a direct income subsidy that is not linked to production.

This raises the question as to why many governments have adopted welfare-distorting policies that contradict the advice of the economists which is to set the internal agricultural prices on the same level as the world market prices and transfer income to the farmers by lump sum transfers. Conventional policy analysis based on an

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efficiency criterion is unable to account for the pervasive nature of welfare-distorting agricultural policies adopted by many countries. As a result, the relevance of the traditional approach has been severely questioned (MacLaren 1992; Swinnen and Van der Zee 1993). Economists have responded to this challenge in a number of ways.[1] One strategy is to incorporate political considerations into an orthodox policy analysis using a political preference function approach. Under this approach, the government is assumed to select the level of policy instruments that maximize a weighted function of interest groups' welfare for the purpose of acquiring maximum political support. Also, the resulting policies are assumed to be a political economic equilibrium. With this framework, policies with high costs of distortion may be adopted for the benefit of a particular interest group. Therefore, the government may provide direct or indirect economic benefits to specific interest groups according to a decision maker's political preferences. This framework, known as the political preference function approach, has been useful for explaining the welfare-distorting agricultural policies adopted by many countries (Gardner 1987; Marchant and McCalla 1992; Bullock 1996). Although the model does not account for the underlying political process that determines the preference weights, the political preference approach can be useful for explaining policy selections, predicting future policy paths and evaluating alternative policy reforms.

II. Political Economic Approaches to Agricultural Policy

To understand why agricultural policies are inconsistent with traditional welfare analysis, an extensive literature has evolved in the past decades applying the economic theory of politics to agricultural policy. The origin of political economy can be traced back to the work of Downs (1957) on voter and politician behavior, the theory of Buchanan and Tullock (1962) on supply and demand of government

[1] Development in the field of public choice and political economic theory represent a response to the relative failure of the conventional efficiency criterion analysis (Swinnen and Van der Zee 1993; Brooks 1996).

policies, the theory of economic regulation (Stigler 1971; Pelztman 1976), and the theory of rent-seeking interest groups (Olson 1965; Krueger 1974; Zusman 1976). These earlier works in the public choice literature have provided the basis for the recent political economy analysis. The more recent political economy literature tries to formalize, combine, or apply one or more of these theories and to justify them empirically.

For agricultural policies, much of the literature focuses on the integration of political and economic markets and the endogenization of government policies (Zusman and Amiad 1977; Anderson and Hayami 1986). The political economy approach to agricultural policy has developed along two paths which depend on how the political process is viewed. These two approaches to modeling the political economy of farm programs are the political preference function (PPF) approach and the clearing-house government (CHG) model.[2]

The PPF approach assumes that policymakers maximize a political preference function in which different interest groups in a society have different weights in the function. The fundamental assumption of the PPF approach is that current policies reflect a political economic equilibrium summarizing all the relevant political power among interest groups. The PPF approach also assumes that policy-making can be described by a mathematical problem in which a rational government maximizes a function of interest groups' welfare. This approach allows economists to continue using the neoclassical tools such as optimization and marginal analysis. Also, because the PPF approach is more consistent with the traditional economic view of the government, it has been widely adopted for analyzing agricultural policies. The PPF approach has been used to derive political (or welfare) weights of different interest groups and to determine policy instrument levels for a given set of political weights. This type of model focuses on the endogenous nature of government behavior by incorporating policy decisions directly into commodity models.

The political preference function approach views policy decisions as the outcome of a political economic interacting process.

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[2] Some economists have termed the political preference function approach as the self-willed government model (Bhagwati 1989; Alston and Carter 1991).

It claims that an appropriate political preference function can reveal the role of interest groups in determining endogenous policies, which leads to the policymakers' political willingness to redistribute income through policy adjustments. In this political preference function, it is assumed that there exists a rice policymaker who acts to arbitrate the conflicting objectives of interest groups that seek to maximize their own benefits from the rice policy. As an arbitrator of competing interest groups, the policymaker selects the levels of a set of rice policy instruments so as to maximize his political preference function. With this assumption, the political preference function approach can measure the political willingness to redistribute income among interest groups in the course of setting the levels of rice policy instruments. This implies that the policy decision is determined endogenously according to the pattern of the implicit political weights given to the interest groups. The usefulness of this approach has been demonstrated by economists as a methodology for dealing with endogenous policy behavior (Sarris and Freebairn 1983; Paarlberg and Abbort 1986; Gardner 1987; Marchant and McCalla 1992; Bullock 1994; Alston 1998).

Empirical work began in this area with Rausser and Freebairn (1974) who estimated political preference weights under the U.S. beef import quota. Similar studies are Lianos and Rizopoulos (1988) for the Greek cotton sector, and Oehmke and Yao (1990) for the U.S. wheat sector. Multi-country and single-commodity political preference function studies are Sarris and Freebairn (1983) and Paarlberg and Abbott (1986) for the world wheat market. Tyers (1990) applies estimated political weights to the welfare incidence of EC agricultural policy reforms and evaluates their political feasibility. Recently, some theoretical assessments of the political preference function approach have been discussed in the literature (von Cramon 1992; Jeong and Bullock 1996; Bullock 1994, 1996, 1998); Bullock provides a theoretical explanation of the PPF methodology and assumptions. He argues that one can estimate political power with a PPF only if observed policies are Pareto-efficient, which may depend on the assumed number of interest groups and policy instruments. To ensure that observed policies are efficient, he shows that PPF studies must choose the number of policy instruments to be exactly one less than the number of interest groups.

In the clearinghouse government (CHG) model, the policy preference function is absent. This approach, which is based on Stigler (1971), Peltzman (1976) and Becker (1983), is also known as the Economic Theory of Regulation. The CHG model, unlike the PPF approach, does not assume that the government attaches preference weights to different interest groups but instead explains policy-making as the outcome of interest groups' using the government as a clearinghouse. The government responds to competing political pressures in such a way so as to maximize its probability of re-election. The equilibrium represents the outcome of interest groups' interaction and the response of the government thereto. Empirically, however, the CHG model has been used less than the PPF approach because of the lack of relevant and reliable political data. Studies applying the CHG model to specific policy interventions have so far been restricted mainly to the U.S. (Gardner 1987; Abler 1989, 1991). Gardner (1987) tried to explain differences in protection levels for 17 U.S. farm commodities since the 1910s. Abler (1989) found evidence of vote-trading between commodity interests on U.S. farm bill legislation. Pressure group models generally assume that the level of pressure depends not only on organization costs but also on the size of the benefits or losses.[3] The basic result of this assumption is that people who have more gains or losses from a certain policy will be more politically active and have a greater influence on the political outcome (Potters and Winden 1990).

The difference between the PPF and the CHG approaches can also be seen graphically. Figure 1 shows the welfare outcomes for two groups in society: producers and consumers. The surplus transformation curve (STC) traces out the efficient combination of producer surplus (PS) and consumer surplus (CS) attainable from varying government intervention.[4] In the absence of government

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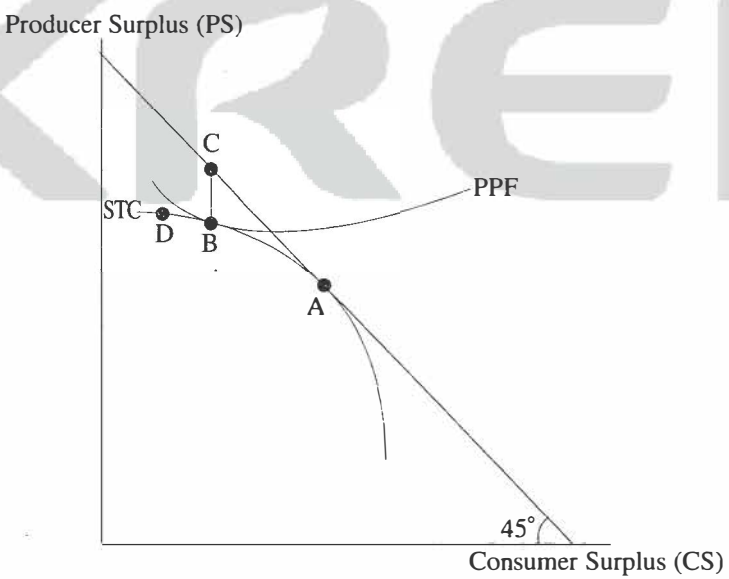
[3] Following Olson's (1965) theory of collective action, press group models generally emphasize the importance of organization costs and free-rider effects.

[4] The surplus transformation curve and the idea of efficient redistribution through commodity markets were developed by Gardner (1983, 1987). The surplus transformation curve framework has been used in several studies to analyze, both theoretically and empirically, the efficiency of agricultural policy (Alston and Hurd 1990; Bullock 1992; Salhofer 1996). As shown by Von Cramon (1992) and Bullock (1992, 1996), STCs also indirectly play an important role in political preference function studies.

intervention the market equilibrium is at point A where the slope of the surplus transformation curve is -1. Any point other than A would lead to one group losing more than the other group gains.

Because the deadweight loss is created by the policy intervention, the STC curve lies everywhere below the 45° line. The deadweight loss at the policy equilibrium is the distance BC. For the PPF approach, the equilibrium is at a point like B, where the government chooses a level of the policy instrument such that the surplus transformation function is tangent to the indifferent political preference function. At this point the marginal rate of transfer equals the ratio of the political (or welfare) weights attached to the two groups. Changes in the underlying market characteristics or in the political weights will alter this equilibrium.

Figure 1 Comparison between the PPF and CHG



By contrast, because the CHG model has no policy preference function, the political equilibrium could be located anywhere on the surplus transformation curve. The political equilibrium is determined only by the marginal influence of lobbying power of the two interest groups. For example, if the producer group is more successful in its

lobbying activities, the political equilibrium may be point D where no further increase in producer surplus can be obtained. The equilibrium point in the CHG model represents the outcome of interest group's interaction and the response of the government thereto.

While each model has strengths and weaknesses, no one model can explain the nature of government interventions for all countries and commodities. For example, whether U.S. farmers are favored because policymakers weigh their welfare more highly, or because they are more politically powerful is ambiguous. Even though it is possible to assign welfare weights that describe the outcome of observed policy in both models, it is impossible to prove whether these weights are determined by a self-willed government or determined endogenously as a response to pressures among interest groups.

III. Model Specification for the Korean Rice Sector

1. Conceptural Framework

The main purpose of this research is to better understand the political economy of the Korean rice sector. The Korean government behavior has historically been neither completely political as modeled in the public choice literature, nor totally economic as portrayed in the neo-classical social welfare literature. Thus, an appropriate analytical framework is required to explain and rationalize the Korean rice policy. Among the various approaches for analyzing agricultural policies, the political preference function approach is used to describe the political economy of the Korean rice sector. The political preference function approach is one example which explains government intervention in a competitive market without the classical justifications such as externalities or market failures. The fundamental advantage of this approach is that one is able to allow for different welfare weights throughout interest groups, in contrast to traditional models of agricultural policy where all interest groups are treated equally.

For the PPF model of the political economy of the Korean rice market, we must identify interest groups and policy instruments. This

study uses a group distinction employed in conventional welfare economics: producers, consumers and taxpayers, who have their own independent objective functions. Rice producers are assumed to maximize producers' surplus (*PS*), consumers maximize consumers' surplus (*CS*), and taxpayers minimize net government expenditures (*GS*) on the rice policy.

For policy instruments, a two-tier price policy is considered, which has been an integral part of the Korean rice policy and has undoubtedly created large welfare effects on interest groups. While the Korean government has employed various policy instruments for achieving the rice policy goals, its main policy for rice has been to set prices both for the rural producers and the urban consumers through the two-tier pricing system. Other types of government interventions such as input subsidy or lump-sum transfers for natural disasters that were infrequently used during the sample period are not considered. Rice is often sold to consumers at prices below purchase prices, although the consumer price is much higher than the international price. Actually, the two-tier pricing policy influences the private market through the operation of purchase and release price levels, and the amount associated with the government's stock and import management. In this study, the producer and consumer prices, which reflect the results of a combination of price and quantity operation, are regarded as the policy instruments.

The policymaker is assumed to set consumer and farm prices for rice in order to maximize a political preference function, which includes each interest group's welfare measure. It is consistent with the maximization of the following political preference function:

(1) $\underset{P}{Maximize}\ U = U(PS(P), CS(P), GS(P): \alpha)$,

where U represents the policymaker's policy preference based on producer surplus (*PS*), consumer surplus (*CS*), and government budget surplus (*GS*), where the latter represents taxpayers' welfare. $P = (P_s, P_d)$ is a vector of rice price levels, where P_s and P_d are producer and consumer prices, respectively. α denotes a vector of parameters representing the underlying commodity model.

Each group's welfare depends on the level of policy instru-

ments. Expressions for producer surplus, consumer surplus, and government surplus are derived from the commodity model. Based on this structure, the policymaker is assumed to choose the optimal producer and consumer prices so as to maximize equation (1). The optimal price policy can be obtained by differentiating the political preference function with respect to the producer price, P_S and the consumer price, P_d. The first order conditions are:

$$(2) \quad \frac{\partial U}{\partial P_S} = \lambda_P \frac{\partial PS}{\partial P_S} + \lambda_C \frac{\partial CS}{\partial P_S} + \lambda_G \frac{\partial GS}{\partial P_S} = 0,$$

$$(3) \quad \frac{\partial U}{\partial P_d} = \lambda_P \frac{\partial PS}{\partial P_d} + \lambda_C \frac{\partial CS}{\partial P_d} + \lambda_G \frac{\partial GS}{\partial P_d} = 0,$$

where $\lambda_P = \frac{\partial U}{\partial PS}$, $\lambda_C = \frac{\partial U}{\partial CS}$ and $\lambda_G = \frac{\partial U}{\partial GS}$.

Each λ_i ($i = P, C, G$) is a political or welfare weight that the government places on the interests of producers, consumers and government budget.[5] The political weights represent the results of competing policy influencing efforts of interest groups and measure the degree of policymaker's political willingness to favor a group.

The food and agricultural policy of a nation is largely determined by economic, social and political conditions in that country. The current economic and social situations, which are often associated with the macroeconomic environment, are a major determinant of agricultural policy. Agricultural policy is also affected by society's underlying values and objectives. These factors are regarded as important influences that induce the rice policy adjustments, and then lead to changes in the performance of the rice sector. Thus, a political preference function is adopted to represent the complicated political econmic black box accommodating economic, social and political conditions. The resultant indices of invisible

[5] The political weights have been interpreted in various ways: political bargaining power, political pressure, political influencing power, political preference rates, political willingness to redistribute income, marginal value on the welfare measure, and political attitudes toward interest groups.

policy influencing factors are expressed as the interest group's welfare or political weights.

2. Endogenous Policy Decision and Derivation of the Welfare Weights

It has been widely recognized that the political (or welfare) weights reflecting the bargaining power and policy-influencing efforts play an important role in determining government behavior in agricultural policy. There are three general approaches to obtaining the political (or welfare) weights in a model of political economic behavior:

1) the direct approach, consisting of interviews with policymakers to determine the political weights,
2) the indirect approach, also known as the revealed preference method, in which policy decisions are assumed to optimize the political preference function subject to appropriate constraints so the policy preference weights can be inferred, and
3) the arbitrary approach, in which the researcher simply chooses political weights according to his own beliefs.

It has been acknowledged that the usefulness of the direct and arbitrary approach for policy setting and evaluation is limited (Love, Rausser and Burton 1990). Along this line, the revealed preference approach has been developed to quantify the invisible policy influencing efforts of the interest groups. Within this structure, it is assumed that political weights of interest groups are inferred from past policy action. The basic assumption of the revealed preference method is that past levels of policy instrument are outcomes of optimizing the political preference function by the policymaker.

This section derives the political weights of interest groups in the Korean rice sector. To do so, it is assumed that there are three interest groups: producers, consumers and taxpayers. We are interested in the net effect on producers and consumers of the Korean price policy. Hence if P_S and P_d are the prices for producers and consumers, then the net producer benefit from having a price P_S instead of P_w, which is defined as the no intervention or border price, is measured by producer surplus:

$$\int_{P_w}^{P_S} S(P)dP.$$

Similarly, the net consumer welfare is measured by consumer surplus:

$$\int_{P_d}^{P_a} D(P)\, dP.$$

On the other hand, the taxpayers or government net expenditure is defined as: $GS = P_d^* Q_d - P_S^* Q_S - P_w^* M$ where Q_S, Q_d and M denote the levels of production, consumption, and net imports, respectively. The first term on the right hand side of the equation is the government revenue from selling to consumers, the second term is the cost of purchasing from producers, and the third term is the payment for imported rice.

Now suppose that the policy maker seeks to maximize a political preference function consisting of producer's surplus, consumer's surplus and taxpayer's expenditures by choosing the optimal domestic producer and consumer prices. The political preference function for the policymaker is:

$$(4)\quad \underset{P_S,\, P_d}{Maximize}\ PPF$$
$$= \lambda_P \int_{P_w}^{P_S} S(P)\, dP - \lambda_C \int_{P_c}^{P_a} D(P)\, dP$$
$$+ \lambda_G \{[P_d\, D(p_d) - P_S S(p_S)] - [P_w(D(p_d) - S(p_S))]\}.$$

For simplicity, it is assumed that there is no intertemporal storage activity. Assuming no stock changes, the net imported quantity is expressed as $D(P) - S(P)$. It is also assumed that the Korean government's choice of producer and consumer price levels of rice is the result of a trade-off between producer interests, consumer interests and the fiscal cost of the policy. In the two-tier pricing system, consumer and producer prices are the policy variables. Then, the optimal price policy can be obtained by differentiating the political preference function with respect to producer price, P_S and consumer price, P_d, respectively. To solve the optimization problem under a two-tier pricing policy, the government must choose the instruments P_S and P_d so as to satisfy the following necessary conditions:

$$(5)\quad \frac{\partial PPF}{\partial P_S} = S(p)(\lambda_P - \lambda_G) - S'(p)^* \lambda_G (P_S - P_w) = 0$$

$$(6) \quad \frac{\partial PPF}{\partial P_d} = D(p)(\lambda_G - \lambda_C) + D'(p)*\lambda_G(P_d - P_w) = 0$$

To be consistent with the maximization hypothesis, second-order conditions require that the Hessian matrix, which is constructed by taking the appropriate derivatives of first-order conditions, should be negative semi-definite at the optimal producer price (P_S) and consumer price (P_d), i.e.,

$$\frac{\partial^2 PPF}{\partial P_s^2} \leq 0 \text{ and } \frac{\partial^2 PPF}{\partial P_d^2} \leq 0.$$

When demand and supply are linear, the second-order conditions are satisfied by:

$$(7) \quad \lambda_G \geq \frac{\lambda_S}{2} \text{ and } \lambda_G \geq \frac{\lambda_C}{2}$$

Expression (7) is a restriction on the relative magnitude of welfare weights that is necessary to ensure the existence of a maximum. But, note that in the maximizing problem for the conventional utilitarian function in the absence of welfare preferences, the second-order conditions hold for any type of interventions.[6] Also, note that we have the additional normalization equation such that

$$(8) \quad \lambda_S + \lambda_C + \lambda_G = 3$$

Unlike other PPF research, this paper uses the above normalization rule in order to make an explicit comparison with the utilitarian social welfare function that has unit equal weight to each interest group ($\lambda_S = \lambda_C = \lambda_G = 1$).

Once we have established functional relations between the political weights and the levels of rice policies, we can derive the formulas for describing endogenous domestic prices for producers

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6 Baffes (1993) theoretically derives and evaluates the restrictions which have to be imposed on the welfare weights in order for a particular class of welfare functions to be consistent with the optimization hypothesis.

and consumers. Arranging the above first order conditions (5) and (6), we have the following equations for endogenous price determination:

$$(9) \quad P_s^* = P_W + \frac{\lambda_P - \lambda_G}{\lambda_G} * \frac{S(P)}{S'(P)}, \quad S'(P) > 0$$

$$(10) \quad P_d^* = P_W + \frac{\lambda_C - \lambda_G}{\lambda_G} * \frac{D(P)}{D'(P)}, \quad D'(P) < 0$$

From these equations, it is possible to evaluate how political and economic factors contribute to the establishment of endogenous price levels. First, the border price of rice impacts domestic pricing policies. Second, the domestic market situations in terms of the production and consumption functions also have impacts on the formation of producer and consumer prices. Third, the above equations imply that political weights of the producer, consumer and taxpayer are all involved in the process of rice price decisions. For example, a larger political weight for producers relative to taxpayers would increase the producer price.

Moreover, if we move the border price variable to the left-hand side of equation (9) and (10), we can see how political economic factors influence the difference between the domestic and border prices in (11) and (12):

$$(11) \quad P_s^* - P_W = \frac{\lambda_P - \lambda_G}{\lambda_G} * \frac{S(P)}{S'(P)}$$

$$(12) \quad P_d^* - P_W = \frac{\lambda_C - \lambda_G}{\lambda_G} * \frac{D(P)}{D'(P)}$$

These equations suggest the potential role of the political (or welfare) weights in evaluating the protection of the Korean rice sector. For example, if the producers' welfare is valued higher than the taxpayers' welfare, the domestic producer price would be above the international price, which is likely to lead to an increase in protection. Also, we know that if all political weights are the same, $\lambda_P = \lambda_C = \lambda_G$, then $P_d^* = P_S^* = P_W$. In other words, the optimal domestic prices for consumer and producer are equal to the world price. Thus, if there are

no special preferences among interests groups, free trade is the optimal policy. The difference between the domestic and world price only depends on the relative political weights. For example, if $\lambda_P > \lambda_G$ then it would imply that $P_s^* > P_W$, and $\lambda_C > \lambda_G$ implies that $P_W > P_d^*$.

The difference between producer and consumer prices is not affected by the world price in equation (13):

$$(13) \quad P_s^* - P_s^* = \frac{\lambda_P - \lambda_G}{\lambda_G} * \frac{S(P)}{S'(P)} - \frac{\lambda_C - \lambda_G}{\lambda_G} * \frac{D(P)}{D'(P)}.$$

The above equation implies that the price difference is purely determined by domestic supply and demand factors, and the political weights of producers and consumers relative to that of taxpayers. Particularly, assuming supply and demand elasticities are constant, the optimal price wedges are derived as follows:

$$(14) \quad \triangle 1 = \frac{P_S^* - P_W}{P_S^*} = \frac{\lambda_P - \lambda_G}{\lambda_G} * \frac{1}{\varepsilon} \quad (\varepsilon > 0), \text{ and}$$

$$(15) \quad \triangle 2 = \frac{P_d^* - P_W}{P^*_d} = \frac{\lambda_C - \lambda_G}{\lambda_G} * \frac{1}{\eta} \quad (\eta < 0).$$

where $\triangle 1$ and $\triangle 2$ denote the optimal producer and consumer price wedge, ε and η represent the demand and supply elasticity.

The optimal price wedges are simple forms of implicit political weights and elasticities of demand and supply. All of the elements of these optimal conditions, except the political weights, are typically observable either directly or from econometric estimates. Therefore, assuming that policymakers have chosen the optimal level of a given policy tool so as to maximize an implicit political preference function, one can determine the political weights used by policymakers. The above equations show that the optimal price wedges depend not only on the elasticity of supply and demand but also on the political weights. The more inelastic the supply (or demand) and the more deviation of the producer (or consumer) political weight from the taxpayer weight, the more the optimal price wedges tend to diverge. Assuming that the political weights are constant, it can be shown that

$(\partial \triangle 1/\partial \varepsilon) < 0$, and $(\partial \triangle 2/\partial \eta) < 0$. These implications are consistent with the observation in Gardner (1987) who finds that a low supply or demand elasticity is associated with more intervention. This implication is also the same as the findings in Rausser (1995). Through the decomposition of the government interventions into productive (PERT) and predatory (PEST) forms in both US and EC agricultural sector, he shows that the products with low demand elasticity receive a higher proportion of their public support in the form of predatory policies.[7]

Given the estimated elasticities of supply and demand from the domestic production and consumption functions, we can derive the political weights of the three major interest groups in the Korean rice economy. The estimated results from the Korean rice market model and data covering the 25 years are shown in Table 1. These estimates are the results of applying equation (14) and (15) with a normalization equation, (8). To generate these estimates, supply and demand elasticities were combined with annual producer and consumer prices, and world price (Hong Kong import price) data from 1970 to 1995. Long-run price elasticities of supply and demand from Im (1999), 0.86 and -0.30, are used here because we are interested in the expected political weights among interest groups in the Korean rice sector over the long time period (1970-95). In addition, these are close to those found by recent research.[8]

The estimated political weights as shown in Table 3.1 indicate that the Korean policies have favored rice producers more than the other interest groups. In the Korean rice sector, the political or welfare weights are particularly high for producers, low for taxpayers and

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[7] Rausser (1982, 1995) suggests a well developed model of Political Economic Resource Transaction (PERT), as the productive public intervention, which means lower transaction costs for efficiency, and Political Economic Seeking Transfer (PEST), which means wealth redistribution accompanied by efficiency losses, as the predatory interventions. The productive category includes all expenditures by the public sector that are expected to lower transaction costs and enhance the rate of economic growth; e.g., public-good expenditures, information and marketing service, grades and standards, inspections, crop insurance, public research, and extension, etc. For the predatory category, all redistributive transfers from other segments of the economy to agricultural producers are included; e.g., deficiency payments, price supports, trade barriers, and input subsidies, etc.

[8] In a recent study of the Korean Rural Economic Institute (1993), the elasticities of supply and demand are estimated 0.78 and -0.29, respectively.

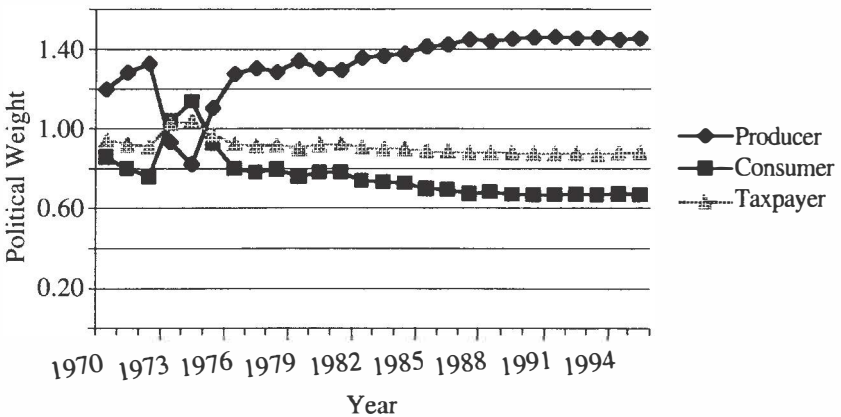
lowest for consumers. The average weights for producers exceed unity while those for taxpayers and consumers are less than unity.

Figure 2 illustrates the time trend in the political weights. A change in the political weight could be interpreted as policymakers' preferences changing over time. Revealed weights for producers have generally been higher than those for taxpayers and consumers. The pattern and trends of the political weights may seem stable. Figure 2

Table 1 Estimated Political Weights for the Korean Rice Sector, 1970-95

Year	Producer	Consumer	Taxpayer
1970	1.20	0.86	0.94
1971	1.28	0.80	0.92
1972	1.33	0.76	0.91
1973	0.93	1.04	1.03
1974	0.82	1.14	1.04
1975	1.11	0.92	0.97
1976	1.28	0.80	0.92
1977	1.31	0.78	0.91
1978	1.29	0.80	0.92
1979	1.34	0.76	0.90
1980	1.30	0.78	0.92
1981	1.30	0.78	0.92
1982	1.36	0.74	0.90
1983	1.37	0.73	0.90
1984	1.38	0.73	0.90
1985	1.41	0.70	0.89
1986	1.42	0.69	0.88
1987	1.45	0.67	0.88
1988	1.44	0.68	0.88
1989	1.45	0.67	0.88
1990	1.46	0.67	0.88
1991	1.46	0.67	0.87
1992	1.46	0.67	0.87
1993	1.46	0.67	0.87
1994	1.45	0.67	0.88
1995	1.46	0.67	0.88
Average	1.33	0.76	0.91

Figure 2 Revealed Political Weights for the Korean Rice Sector



also shows a political willingness to redistribute income in favor of rice producers at the expense of taxpayers and consumers. This implies that rice producers have generally been preferred to consumers and taxpayers. In other words, the Korean policymakers have placed more weights on the welfare of rice producers rather than those of consumers and taxpayers, except during 1973-74, which is the period of the first oil crisis.

When the oil crisis occurred in 1973, the import rice price sharply increased, almost triple the price in previous years before the crisis. Also, the oil crisis naturally increased domestic price levels and the government's burden because oil needs in Korea are supplied solely by imports. The crisis caused a significant increase in deficits in the Grain Management Fund, from 25 billion won in 1973 to 125 billion won in 1974. As a result of mounting government deficit and considering the important role of rice for consumers, domestic prices set by the government were maintained low during the crisis. Consequently, it is not surprising that the political (or welfare) weight of the taxpayers and consumers might be higher than that of producers during the oil crisis. This is consistent with the historical perspective of rice policy in Korea. These weights reflect the relative political concern the government puts on the welfare of producers, consumers and taxpayers. Even though this study does not analyze why the

government gives different weights to the welfare of producers, consumers and taxpayers, it may be because of interest group political power (Becker 1983), interaction among politicians and voters (Downs 1957) and a combination of other factors (Rausser 1992).

3. Test for Changes in Political Preferences

The purpose of this section is to investigate whether there are systematic changes in political preferences, which are attributed to the three interest groups. To do so, this section investigates whether the estimated political weights are significantly different among the interest groups. If the estimated weight patterns and trends are significantly different from the unit, then we can reject the null hypothesis that political (or welfare) weights among interest groups in the Korean rice sector are the same, and the policymakers' objective function is the same as the conventional welfare function. If there were different political attitudes toward the interest groups by the policymaker, political weights would be differentiated since the weights are designed to represent the political willingness to favor an interest group. The null hypotheses to be tested are as follows:

1) $\lambda_P = 1, \lambda_C = 1, \lambda_G = 1,$
2) $\lambda_P = \lambda_C, \lambda_P = \lambda_G, \lambda_C = \lambda_G,$ and
3) $E[\lambda_P] = E[\lambda_C] = E[\lambda_G].$

If we reject the null hypothesis, it can be said that the policymaker is responsive to the interest group's political power. Furthermore, if the estimated political weights are different pair-wise among the interest groups, we can reject the null hypothesis that policy preferences toward the interest groups are the same. The final hypothesis tested is that all groups have the same mean weight.

All the null hypotheses were rejected at the 1 percent significance level (see Table 2). The t-values for testing the hypothesis that the political weights are not different from the unit are 10.34 for producer weight (λ_P), -10.25 for consumer weight (λ_C), and -10.45 for taxpayer weight (λ_G). The t-values for testing pair-wise differences are 10.30 for producers and consumers, 10.36 for

Table 2 Test Statistics for Changes in Political Preferences

Variable or Hypothesis	Mean	Standard Error	t-value	F-value
λ_P	1.33	0.162	·	·
λ_C	0.76	0.118	·	·
λ_G	0.91	0.044	·	·
$\lambda_P = 1$	0.33	0.032	10.34	·
$\lambda_C = 1$	-0.23	0.023	-10.25	·
$\lambda_G = 1$	-0.09	0.009	-10.45	·
$\lambda_P = \lambda_C$	30.56	0.055	10.30	·
$\lambda_P = \lambda_G$	30.42	0.04	10.36	·
$\lambda_C = \lambda_G$	-0.15	0.015	10.05	·
$E[\lambda_P]=E[\lambda_C]=E[\lambda_G]$	·	·	·	159.54

producers and taxpayers, and 10.05 for taxpayers and consumers. Finally, the null hypothesis for the same mean weights among interest groups was rejected as the F-value is 159.54. These test statistics imply that the Korean rice sector has shown significantly different political or welfare weights on individual interest group. In other words, the relative political concern that government puts on the welfare of producer, consumer and taxpayer has not been the same as in the conventional policy analysis.

IV. Summary and Policy Implication

This study has presented a political preference function approach to explain the Korean rice policy. The political preference function approach has been employed to find the political (or welfare) weights of interest groups in redistributing income through government policy instruments. In this political preference function approach, the policymaker selects the levels of a set of rice policy instruments so as to maximize his policy objective function. Thus the policy decision is determined endogenously according to the patterns of the implicit

political weights given to the interest groups. Within the revealed preference structure, the implicit political weights of interest groups are derived from past policy action. The implicit political weights indicate that the Korean rice policymaker has shown a trend of favoring rice producers more than the other interest groups. In the Korean rice sector, the political or welfare weights are particularly high for producers, low for taxpayers and lowest for consumers. The welfare weight for producers exceeds unity while those for taxpayers and consumers are less than unity.

Actually, this study used a linear additive political preference function with unequal weights assigned to three interest groups: producers, consumers and taxpayers. However, in principle, the nature and the number of interest groups that can be included in a political preference function is unlimited. Thus, if possible, it is required to consider various functional forms and potential interest groups, which might be influenced by the policy.

The normative use of the PPF concept at given welfare weights may provide useful insights to policymakers and economists. Particularly, when the government attaches different weights to producers, consumers and taxpayers, the optimal choice among alternative policies depends on the particular political (or welafre) preferences and is an empirical question. Thus, future work will be in a model that applies the estimated weights to the analysis of alternative agricultural policy reform.

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