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Modelling Government Processes and Policies in Agriculture: A Review

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In this paper, political preference functions and bargaining models based on game theory are examined for their relevance to government processes and policies in agriculture. While bargaining models show some refinements over preference models in explaining how interest group demands are met in a modern society, the results appear to still fall short of a well-documented understanding of the political economy and institutions involved in policy decisions. In practical terms, economic modelling is too time-consuming and elaborate to inform everyday decisions of government but an understanding of the principles involved and previous results of this kind of analysis can inform the work of both policy advisors and decision makers.

1. Introduction

There is considerable literature in agricultural economics concerned with the modelling of government decisions and policies. These models employ partial equilibrium frameworks in the main to examine the effects of policy changes on producer and consumer groups and taxpayers. This paper examines some of these collective decision making models and attempts to assess their usefulness and accuracy in explaining actual decisions taken. The review covers political preference functions, two-person bargaining games, and non-cooperative game applications.

The paper starts with a discussion of public choice and interest group theory as it affects public policy making and the role of constitutions and institutions in setting the working rules of government and commerce. Collective decision making refers to the political process and how it works. The essence of the analysis is to examine how policy instruments redistribute income in the economy and the degree to which identified groups benefit or lose from the change. The analysis is driven by a political economy view of the economy where parties act in their self-interest, whether they be entrepreneurs or politicians.

2. Background

It is important to clarify at the start that the models discussed in the literature are mostly based on the US

economy and constitution. The important point is that the constitution of a country sets the general rules for economic and political behaviour and it is not much use looking for inspiration when the some of the conventions are different in the first place. Following Quiggin, some deviations from the theory in applying it to the Westminster constitutional model and its modifications should be expected.

It is useful to distinguish between upper and lower (operational) constitutional rules (Johnson 1991, p.341). The upper constitutional rules refer to the major institutions of a society; the structure of government institutions and the system of law. These rules change very infrequently and require major upheavals or considerable consultation and politicising to make changes. Their importance is that they provide a long term frame of reference for political and economic decision making.

At the lower level, are the political and economic institutions which are changed or adjusted by the policy making process. These include provisions for administrative systems. These rules are of a more transitory nature, subject to political and pressure group influence, but nevertheless are the rules for the moment in making decisions.

The total area of political and economic decision making is referred to as the political market. In parallel with private markets, deals are made, trade-offs exist, costs and benefits have a place, and 'efficient' policy solutions can be identified. To simplify the complexities of such a market, the market analysis tends to focus on the role of interest groups and their behaviour. In this model, interest focuses on the role of government, the role of the bureaucracy, and the role of private interest groups. Self-interest is assumed to motivate all three groups and policy solutions tend to reflect the power base of each in the political process.

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The argument is that the state is not an organic body apart from the collection of individuals comprising it and that the central role of the economist is to analyse how efficiently government institutions enable individuals to express and realise their preferences about public goods, services and policies (Johnson, D.B., p.11). In this view, bureaucrats have their own preferences and goals which they can achieve by enlarging the size and budgets of their agencies. Politicians can achieve their goals by being elected to office and bestowing favours. Interest groups act on behalf of individuals in getting favourable policies passed in the legislature. Some interest groups may be more effective than others in their lobbying and fundraising activities.

On the other hand, it is reasonable to allow that such private interest concerns may not explain every policy decision taken by a governing body (Martin 1989, 1990). Many people believe there is something which can be called the public interest and that government decisions are made for the greatest good of the great number. Many political decision makers certainly believe this though their actions often belie their good intentions. One reason for the prevalence of this view is that decisions are often made in an information vacuum and some of the effects of policy changes are either unanalysed or unanticipated. The models discussed in this paper are highly relevant to this view of the political process as they seek to make clear what *the distributional effects* of such policy changes mean to society as a whole and to groups within it.

In seeking evidence of distributional effects of government policies, it is useful to identify broad areas where particular groups in society are advantaged by changes in government policy or actions of the different groups are relevant (Johnson 1994):

- where economic power is transferred to an interest group by a regulation or policy and/or creates new interest groups in the process;
- where transfers of wealth take place in response to a policy decision consistent with rent-seeking behaviour of a broadly defined interest group;
- where interest groups are involved in the policy process especially where potential conflict is likely;
- where the relevant strength of interest groups is relevant to the policy decision taken;

- where there are transfers of wealth on hardship or inequality grounds as in the case of drought relief;
- where there are transfers of wealth arising from the public provision of goods and services especially where private markets co-exist; and
- where transfers of wealth arise from imbalances in information control and supply as in advising Ministers or private commercial transactions.

These criteria provide a useful framework in assessing the models of government processes and policies in terms of public/private interest theories of government.

3. Political Preference Functions

In pursuing the private interest approach, several authors have endeavoured to quantify the observed bias in agricultural policies towards some groups in society by deriving a political preference or governing criteria function (PPF). This approach assumes that current policies reflect a political economic equilibrium summarising all the relevant forces. It acknowledges the influences of political agents and groups in the policy process by the assumption that an abstract policymaker maximises a weighted objective function subject to economic restraints. The weights or 'policy preferences' are seen as the outcome of the political decision making process (Swinnen and van der Zee).

In technical terms, PPF studies attempt to measure interest group 'success' by measuring marginal rates of transformation along a Pareto frontier. Transformation curves are theoretical constructs that show the trade-off between interest groups (in terms of producer and consumer welfare) when a political instrument is changed, all other instruments held constant (Bullock, p.352). It would be expected that the trade-off is one of diminishing returns and hence the curve would be concave to the origin. Tangency with a convex political preference function would identify a Pareto optimum. The implications of these constructs are discussed further below.

Another approach is to regard interest groups as parties to a two-person bargaining game (Zusman). The solution to the bargaining game can be regarded as the point in the bargaining set which maximises the product of the players' utility gains from cooperation. Recent work has focussed on prescriptive analyses of

the underlying choice rules and institutional design that structures the policy making process. These models represent politics as a process by which competing interest groups negotiate a compromise agreement that reflects their relative bargaining strengths (Rausser, Simon and van't Veld 1994). The implications of these are also discussed below.

In the following paragraphs I examine the Zusman, Bullock and Rausser *et al* positions in more detail and try and assess their relevance to Westminster type systems of government. As Swinnen and van der Zee point out (p.266), PPF analysis is not greatly different to the conventional benevolent, omniscient view of government. The difference is the recognition of differing interests in society that receive different rewards ('weights') in the political-economic decision making process. The abstract policy maker is an artificial concept to circumvent the modelling of the political market. Zusman attempts to overcome such criticism by modelling the bargaining process among pressure groups and the policy maker while Rausser *et al* develop a multilateral strategic bargaining model with constitutional implications. The work of Bullock is important as it demonstrates certain areas where the PPF assumptions are no longer valid.

4. The Basic PPF Model

It can be hypothesised that agricultural policy makers have a welfare function which includes social welfare weights for the three groups of people involved and can be written as,

$$W = w_p G_p + w_c G_c - w_t L_t$$

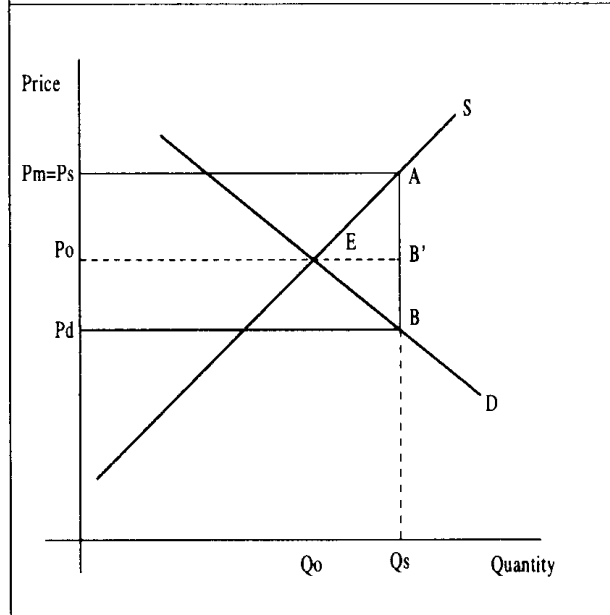
where w_p , w_c and w_t are the weights for producers, consumers and taxpayers respectively, and G_p , G_c and L_t are the respective welfare effects of the programme in terms of producer surplus, consumer surplus and loss to taxpayers. In the case of a support price policy, for example, the government or central decision maker makes a determination (from whatever point of view and with whatever information that is available) that involves an implicit weighting of welfare gains by producers and consumers and taxpayer loss. In Figure 1, the loss to taxpayers is equal to the sum of G_p and G_c plus the area ABE which is the dead-weight loss (DL_t). Thus the welfare function can be written in the following way,

$$W = (w_p - w_t)G_p + (w_c - w_t)G_c - w_t DL_t,$$

and the shares of the interest groups are represented in Figure 1 by,

$$\begin{aligned} P_o EAP_s &= G_p = \text{welfare gain for producers} \\ P_o EBP_d &= G_c = \text{welfare gain for consumers} \\ P_s ABP_d &= L_t = \text{welfare loss for taxpayers} \\ EAB &= DL_t = \text{dead-weight loss.} \end{aligned}$$

Figure 1: Standard Closed Economy Model for a Support Price



Estimates of the welfare weights are obtained by maximising W with respect to the policy variable. In this simple case, arbitrary values can be given to two of the weights and estimate the relative value of the third. Assuming government attaches equal importance to consumers and taxpayers, the welfare function simplifies to,

$$W = (w_p - 1)G_p - DL_t.$$

Assuming linear forms of the supply and demand equations, this function can be written as

$$W = (w_p - 1)(P_s - P_o)(Q_s - Q_o)/2 - (P_s - P_d)(Q_s - Q_o)/2$$

With further manipulation it can be shown that,

$$w_p = 1 + \frac{b(P_s - P_d)}{Q_s}$$

where b = slope of supply function

or

$$w_p = 1 + \frac{E(P_s - P_d)}{P_s}$$

where E = elasticity of supply.

The producer and consumer prices are observable and the elasticity of supply can be estimated. Therefore the implicit weight used by policy makers for producers relative to that of taxpayers can be estimated. If it is assumed that producers and consumers are of equal significance, w_p can be expressed in terms of the producer's price and the true market price,

$$w_p = 1 = \frac{E(P_s - P_0)}{P_s}$$

In both cases when producer and consumer prices are the same, as at the intersection of the supply and demand curves, w_p becomes equal to unity. Thus an absence of intervention can be interpreted as indicating that the government assigns equal significance to the three groups.

Figure 2: Surplus Transformation Curve Between Producers and Consumers

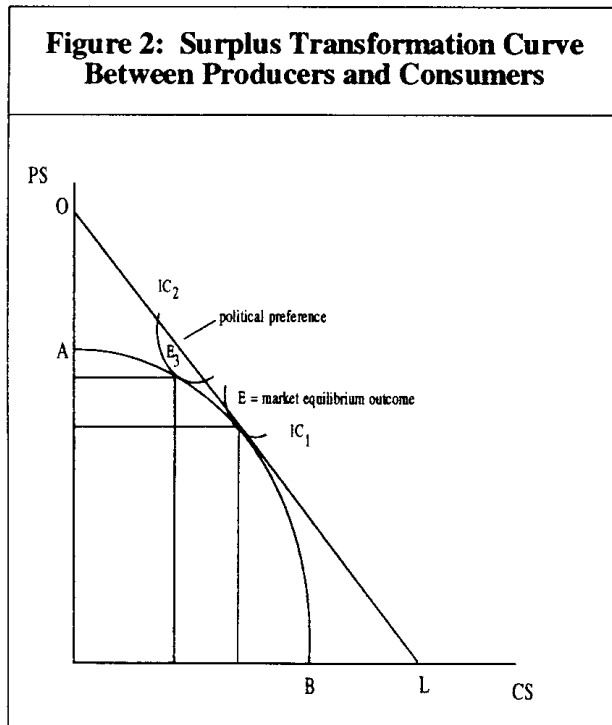
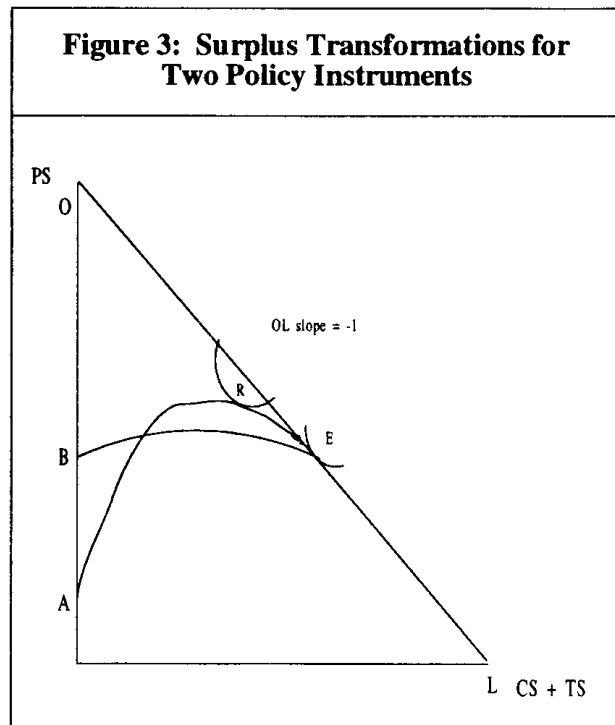


Figure 2 shows the assumed surplus transformation curve (STC), AB, between producers surplus and consumers surplus as government policy changes. OL is the price line of slope -1. IC₁ is the government's indifference curve at the market equilibrium outcome, E. The weights equal 1 at this point. The size of the producer surplus and the consumer surplus is the same as in the market solution in Figure

1. In the case of a support price, the government has moved on to indifference surface IC₂ with equilibrium at E₃. There is a gain for producers and a loss for consumers and taxpayers. The indifference curves represent the political preferences involved and the transformation curve represents the opportunities for trade-offs between consumers and producers welfare when intervention takes place. Only one policy instrument (a support price) is involved.¹

Figure 3 shows the case where two policy instruments (not mutually exclusive) are involved in finding the maximum welfare surplus (after Alston and Hurd). Curve AE shows the distribution of total surplus with a single instrument eg a production control alone. Curve BE shows the distribution for a second instrument eg an output subsidy. The concavity of the curves reflects the increasing deadweight loss relative to farmer benefits as transfers away from consumers/taxpayers increase. Point E shows the two curves meeting at a point where either policy gives the same distribution of welfare. This identifies the point of competitive equilibrium and equal weights.

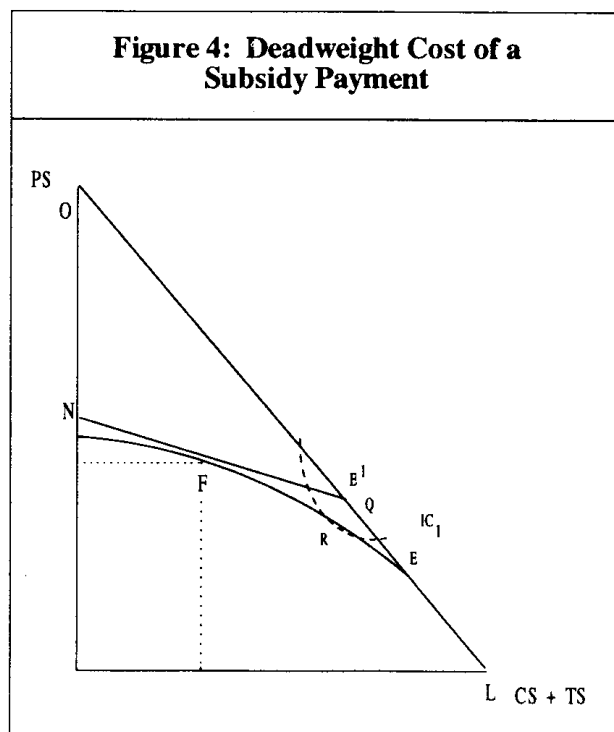
Figure 3: Surplus Transformations for Two Policy Instruments



¹ In discussion, Rodney Beard pointed out that political preference functions, such as represented by E_s, depend on the preferences of the median voter. The median voter theorem states that the preferences of the median voter are only valid in a uni-dimensional agenda. In the case of multiple political preferences there may be no unique optimal solutions.

The government's political preferences will be represented by an indifference curve between different producer and consumer surplus (plus taxpayer surplus) outcomes and could, say, be represented by point R, where the MRS equals the MRT (from IC_2). A production control alone is at a higher level of welfare than an output subsidy. Alston and Hurd show that a mix of policies may be most optimal if dead weight losses are taken into account. Figure 4 shows this result. The 45° line, OL, has slope of -1 and indicates that a dollar of subsidy costs a dollar of taxpayer's money. Now moving from point R to point E' could increase welfare by combining a subsidy with a production control. Any transfer along OL can be obtained without any distortion in resource use as the equivalent of a lumpsum transfer. OL is an efficient STC according to Alston and Hurd. Two instruments are better than one in defining an efficient solution.

The authors then introduce the impact of the dead-weight cost of the subsidy payments so that a dollar of subsidy costs $(1+d)$ dollars of taxpayer surplus. The slope of this line will be less than OL and is shown as NQ in Figure 4. With output fixed at the competitive quantity, NQ is the new STC. The best combination of the two instruments would be at point F. Only at point R would a production control alone be superior.



The importance of this analysis is that it moves beyond Gardner's (1987) construct where he only varied one instrument at a time (Bullock, p.352). The estimation of the Pareto frontier must allow for a multiplicity of instruments as actual experience would suggest.

5. Empirical PPF Studies

The model outlined above is directly utilised by Lianos and Rizopoulos (1988) in a study of Greek cotton. Due to relatively small local production Greece is a price taker. Since the market price is determined independently of the support price, no consumer gain is created by government intervention. In terms of Figure 1 the welfare gain for producers is $P_0 EAP_s$, for consumers is zero, and the loss for taxpayers is $P_s AB'P_0$, with a deadweight loss of EAB' . Utilising an estimate of the short-run elasticity of supply of 0.84 they calculate yearly estimates of w_p using yearly values of P_s , P_0 and Q_s . During a period of local intervention the average value of the distributional weight was 1.098 and during the period under the CAP, the average value was 1.202. These results are interpreted as a 9.8 per cent preference for farmers relative to taxpayers during the first period and a 20 per cent preference for farmers in the second period. In effect, the weight in this PPF study represents the percentage increase in the area of producers surplus following intervention.

Gardner uses the PPF framework to develop *a priori* theoretical expectations about the effects of changes in supply and demand elasticities on government intervention. He tests empirically whether actual intervention reacts to changes in supply and demand elasticities in a manner consistent with theoretical expectations. He considers two interest groups, producers and consumer-taxpayers, and two policy instruments, a target price and a production quota. In his comparative statics he allows government to use one instrument at a time, thus constraining his analysis to one or other of the two STCs involved rather than the Pareto frontier implied by simultaneous instrument use (Bullock, p.352).

An early study of PPF was that of Rausser and Freebairn (1974). They derived a PPF for US beef import quotas which gave the first estimates of the preference weights. These authors derive an econometric model to define the slope of the policy possibility frontier between their consumer welfare measure, aggregate consumer meat costs, and producer welfare, aggregate

beef producers' gross margin. Their results suggest that over the period 1959-1969 policy makers weighted a two dollar increase in beef producer returns as approximately equivalent in social value to a one dollar increase in consumer meat costs.

The US wheat sector was analysed by Oehmke and Yao who estimated a PPF with public research expenditure, target prices, and sales from government stocks as policy instruments in a dynamic setting. Given observations on actual values of target prices, government sales and research expenditures, their model can be viewed as a system of six equations with six unknowns, the unknowns being the relative weights the government places on each category of surplus included (p.635). The consumers' surplus weight was 0.46 for 1977 and the producers' surplus weight for 1977 was 1.43 relative to government expenditure. They found a considerable decline in weights for agricultural producers relative to consumers, comparing 1984 outcomes with those of 1977. These changes are consistent with claims that agricultural producer groups lost political power relative to consumer groups during the late 1970s and early 1980s (p.637). The results place an 80 per cent premium on wheat producers' surplus relative to wheat consumers' surplus and that government values consumers' surplus at approximately 50 per cent of the value of budget savings.

Oskam and von Witzke (1990) also examine the US wheat sector for the period 1981-1990 following an earlier study of Oskam (1988) of the EC dairy sector for the period 1984-1988. These authors model the problem with a cost minimisation objective function and solve it by ordinary LP methods. This procedure allows a greater range of policy changes to be investigated and surpluses identified before the average weights are estimated. For the EC dairy study, Oskam found weights for producers' income just below unity and weights for consumers' income below 0.5 relative to EC budget costs. For the US wheat sector, Oskam and von Witzke found the weight on producers' income to be 1.02 and that on consumers income 0.7 relative to budget expenditures.

The 1991 Industry Commission study of the Australian dairy industry provides comparable data to the above examples. Their analysis identified the increased costs paid by consumers due to the Kerin plan, the increase in producers returns and the deadweight costs of the policy. The transfer from consumers to producers amounted to \$108m in 1989-90, the dead-

weight loss of consumer surplus amounted to \$1.2m, the export subsidy on dairy products amounted to \$118m, and the deadweight loss of extra resources drawn into farming was \$11.8m. The overall effect was that the returns to farmers from manufacturing milk were increased from 21.4 to 24.4 cents per litre as a result of the market support payments in 1989-90. The latter is equivalent to a producer surplus 'weight' of 1.14.

According to Swinnen and van der Zee, PPF studies of industrial economies indicate that weights attached to agricultural producers exceed unity, while those for taxpayers are below zero. Producer weights are highest in W Europe and Japan, although traditional exporters also distort their domestic markets (Tyers, p.1411). The pattern of weights is similar in most industrial countries and in many developing countries although the variance of the weights differs greatly.

6. Assessment of PPF Models

Swinnen and van der Zee (following Rausser and Freebairn, p.439) point out that there are three possible approaches to obtaining the weights of a PPF; a direct approach by interviewing policy makers, an indirect approach from examination of the results of actual decisions ('revealed preference'), and an arbitrary approach, in which the researcher chooses weights according to his own beliefs. The indirect approach is used most often and infers weights using the PPF's first order conditions. Presumably political decision makers could be approached with some sort of structured questionnaire that revealed the general direction of their preferences. At the wider level, political commentators continuously analyse attitudes and decisions and forecast likely outcomes.

The approach still relies on the government as the final arbiter and decision maker. In this sense, the function does not 'explain' political decision making, it merely examines the end result. The estimation of producer and consumer surplus relies on the underlying model of the market to establish a first position or reference point.

The nature and number of arguments that can be included in a PPF is, in principle, unlimited. Usually the same interest groups as used in welfare economics is employed. In practice, PPF researchers must aggregate or omit some interest groups, ignore the availability of some policy instruments, and use simplified econometric models of markets (Bullock, p.349).

The above studies have the common characteristic that they start from a problem where the distortion in the economy is perceived to be large and analyse it to death. In each case, large transfers of taxpayers' and/or consumers' money are passed to producers for reasons of state security, political support or mistaken (uninformed?) objectives. They are useful in that they can quantify the largesse involved in the transfer. It has to be asked, however, if such data was considered at the time of the decision in the first place? It seems that this is seldom so possibly due to the complexity of the modelling involved and partly due to the fact that the modelling is never asked for in the first place. Each policy position would have to be studied in more detail to ascertain whether an interest group was particularly active, whether they were consulted in the policy forming process, and whether the public (particularly) were fully informed of the arguments involved and the consequences. Finally, it would be necessary to look at a range of policies, agricultural and otherwise, to see whether other interest groups were being advantaged by other policies and were being compensated in other ways when they were disadvantaged in the first place.

7. Bargaining Models

7.1 Zusman's Political Economy Model

Zusman particularly wants to take account of the interests and political power structure of participants in the policy process. He maintains that given the economic structure, interest groups' and policy makers' objectives and the political power structure, policy choices should be fully and uniquely determined. Inefficient existing policies could actually be improved within the existing power structure. Delays in policy updating will yield outdated and inefficient policies. Changes in the political power structure are likely. Policy changes which yield benefits whose distribution is consistent with the prevailing power structure have a better chance of being adopted. The task is to carry out a proper analysis of the political power structure in order to quantify the relative political power of all participants (Zusman 1994).

The values of endogenous policy variables are determined by the economic structure chosen. He assumes that there is a policy making centre that is constitutionally authorised to select the values of the policy instruments. The values of the endogenous variables affect all the participants in the political economy. In-

dividual participants having similar preferences over the set of feasible policy instruments are grouped into interest groups. Interest groups are assumed to have leadership capable of mobilizing the group's resources and coordinating the actions of group members. The groups' leaders can enter into binding agreements with other organised interest groups and policy making centers. The feasible set of policy instruments to be chosen will be constrained by certain conditions (prices must be non-negative, and unacceptable policy instruments are excluded). The exact choice of instruments is determined by a bargaining game involving the policy making center and the organised interest groups.

The objective function of the policy making center includes the center's perception of the power or strength of the organised interest groups on central policy makers, and the groups' evaluation of the costs of employing its means of power. The objective function of the interest groups reflects individual gains subject to the costs involved. The bargaining game determines the maximisation of the policy governance function with power coefficients showing the relative power of each interest group.

In discussing the power structure, Zusman reverts to a constitutional position. What is important are the shared values and beliefs concerning the laws controlling the functioning of the social and political environment. These allow power bases to be built and political commitment to be identified. Trends in ideology determine whether decision making is centralist or free market oriented. Groups will be affected by the distribution of wealth in a particular society. Producer groups are stronger than consumer groups. Successful groups will be well organised groups. Concentration of membership is better than dispersed membership and so on.

Zusman says that the power coefficients are crucial determinants of policy choices. It could be that the conditions determining the size of the power coefficients should be changed. Political institutions, including especially constitutional arrangements, written or tacit, determine the present distribution of power. Intervention at the institutional level may be more effective in changing welfare if previous bargaining has little result. This accords with the conventional view of upper and lower (operational) constitutional rules and their part in policy determination.

Rausser *et al* (1994) show the connection of this model to the Nash solution for a two-person bargaining game. There are two stages to the bargaining game. In the first stage, according to Rausser *et al*, players noncooperatively determine what actions they will threaten the other player with if no agreement is reached in the second bargaining stage. The exogenous disagreement point in Nash's original model thereby becomes an endogenous threat point where each of the players pursue threat strategies. This formulation was generalised by Harsanyi to the n -person bargaining game and was employed by Zusman to derive his governance function. This governance function represents a political-economic system as a weighted sum of a single policy makers and possible multiple interest groups' utilities, where the weights reflect the interest groups' relative power over the policy makers. The solution to the Zusman model is obtained by maximising the governance function.

Zusman and Amiad (1977) use the model to analyse the Israeli dairy program 1968-69. The conditions assuring the existence and uniqueness of a solution to the problem depend on the set of constraints in a programming problem. Endogenous variables are determined by structural equations. The policy instrument levels are determined by the observed political relations between groups in the system. These instrument levels and power weights are then derived from the programming solution. The authors stress their predictions of the policy instruments more than the derived power weights which tend to vary about unity. Additional constraints are modelled (raising the production quota) to improve the estimates of instrument levels. The latter adjustment raises the power coefficient for family farms ('moshav') compared to cooperative farms ('kibbutz'). Apparently, moshav farms were in favour of restrictions on imports and raising domestic production!

In Rausser's multilateral model, constitutional variables (the rules for making rules) must be specified as part of the description of the problem. Comparative statics can be applied to obtain insights in to the relative merits of alternative constitutional designs. In the Harsanyi-Zusman framework the key constitutional variables are embedded in the endogenously determined governance function weights and the effect on these weights of changing the constitutional rules cannot be directly tested (p.7).

In a recent survey, Sexton (p.195) distinguishes between the cooperative and non-cooperative game the-

ory models of bargaining. Zusman's model follows the cooperative game theory literature and specifies features that a solution should entail and then determines the types of solutions, if any, that satisfy predetermined outcomes or axioms (Rausser *et al*. 1994, p.1). Rausser's multilateral model derives from non-cooperative game theory and models constraints on the decision making process itself and predicts outcomes by determining the equilibrium non-cooperative strategies of decision makers facing those constraints.

Beghin's (1990) model utilises cooperative game theory as well as posing behavioural equations. This study stresses the interdependence between policies and player's bargaining strengths and derives their comparative statics with respect to a changing economic environment. From the possible cooperative game solution concepts, the reference point solution was chosen for the study. Reference points are payoffs players refer to when they evaluate payoff proposals. It is assumed that the payoff set and its frontier change with the economic environment. Players' payoffs, bargaining powers, and equilibrium strategies are changed by exogenous shocks. The power weights in the solution represent the bargaining-power coefficients of the players; and are equivalent to the weights of the objective function of revealed preference. In an example drawn from the economy of Senegal, the power weight for farmers was 0.59; that for urban consumers 0.13, and that for the marketing board/government was 0.27 (these are normalised coefficients summing to unity). Farmers are strong bargainers in setting local commodity prices as they have subsistence crops to fall back on. Consumers and government have more to lose in case of disagreement and hence fare less well than would be expected under price policies favouring urban consumers and the marketing board.

7.2 Rausser's Multilateral Model - a Strategic Approach

This model is applicable to a wide range of political-economic problems especially prescriptive analyses of the underlying collective choice rules (the constitutional space) and institutional design that structures the policy making process. The approach models constraints on the decision making process itself and predicts outcomes by determining the equilibrium non-cooperative strategies of decision makers facing those constraints. In this way crucial features of collective decision making are accommodated. Collec-

tive decision making is an inherently complex process that involves threats and counterthreats, compromises, coalition formation, multiple levels of disagreement and path dependencies (Rausser *et al* 1994).

The model represents politics as a process by which competing interest groups negotiate a compromise agreement that reflects their relative bargaining strengths. The bargaining game is generalised to a multidimensional issues space with multiple players. There is a fixed finite number of negotiating rounds. It includes a set of admissible proposals and a set of admissible coalitions. The set of admissible proposals might include an interval representing alternative settings of some policy variable or the admissible set could represent a package of policy instruments that are being negotiated simultaneously. The set of admissible coalitions includes any sub group of the players that together have the political power to implement a proposal (eg in a strict majority rule regime any group containing a strict majority of the players would be admissible). If one or more players have *de facto* veto power over the negotiations, then any admissible coalition would have to include those players.

In the first round of negotiations, each player submits a proposal from the set of admissible proposals and selects a target coalition from the set of admissible coalitions. One of these proposals is then selected at random according to an exogenously specified vector of access probabilities and put to the selected coalition for a vote (the higher a player's relative political power the greater will be that player's access probability). If all members of the coalition accept the tabled proposal then the game ends. If one or more parties rejects it then play proceeds to the next round. Equilibrium is where each party essentially tables the same proposal to their mutual satisfaction.

The constitutional variables are specified as part of the description of the problem and hence can be varied accordingly. In this way, a comparison can be made of simple majority rule versus a two-thirds majority. This in contrast to the Harsanyi-Zusman framework where the key constitutional variables are embedded in the endogenously determined governance function weights.

Rausser *et al* then discuss their Bulgarian case study as an example of their multilateral model. The groups represented are the former ruling elite, producers, and

'the center' which wishes to maximise social welfare. The elite have a rent in the old system which is diminished by the reform process. Producers expect to gain from economic reform while the centre wants the best from both worlds. The three interest groups negotiate with each other to determine the character of the transition. The outcome of their negotiations is reflected in a policy variable representing the deviation between consumer and producer prices in the market. The rent from such a distortion goes to the elite, reducing consumer and producer surplus and creating dead weight loss. In effect the distribution of this variable determines the distribution of political power in the post reform governance structure which in turn determines the level of distortion in the post-reform economy.

Bargaining reflects the relative political power of each group and the result could speed up or slow down the process of reform. The elite control the supply of human capital and too fast a reform lowers economic productivity. Each interest group has to negotiate a path of reform which will take it near the center position as neither extreme can be tolerated politically.

8. Conclusions

PPF and bargaining models seek to simulate the economic-political process and explain some of the factors which influence actual political policy decisions. PPF models examine the end results of the political process in terms of social welfare surpluses. They accept the central altruistic view of government maximising the national interest from its point of view and can provide estimates of how much an interest group may have benefitted from a given decision. Bargaining models go one step closer to the political process and examine the relative power of the groups involved in the decision making process. Recent bargaining models set out a wide range of constraints on, and opportunities for, bargaining between interest groups, which more narrowly define the political compromise which will satisfy the parties. These models have a particular advantage in simulating constitutional changes which will bring differing parties together.

PPF models derive weights which measure changes in welfare surpluses. Different models incorporate a wide range of policy instruments and their effects on welfare distribution. The estimation of weights is a relatively simple procedure, but the specification of the underlying model is complicated. Econometric

and LP methods are employed. The LP studies of Oskam show the incorporation of a detailed list of policy changes which econometric methods do not handle well. Weights can be derived for single years or for an average of years. All models rely on econometric estimation of a 'normal' reference point from which to calculate the social surpluses.

At the end of the day, PPF studies demonstrate to policy makers that the welfare surpluses have increased or decreased and by how much. It would appear that policy analysts could probably advise decision makers of the direction if not the arithmetic magnitude of the surpluses from standard welfare policy models. A well-organised economic secretariat could probably have in-house models in active preparation that could supply further details of direction and amount to decision makers.

PPF models do not seem constrained by any particular country orientation and have been published for a number of countries and products mostly in developed countries². They appear to be a feature of the agricultural economics literature in particular though no doubt their methodology applies to other industries and avenues of government expenditure wherever there are transfers from one group to another.

Bargaining models do start to examine the behaviour of the agents involved. Policies are the result of an optimisation game between rational actors who have all the information relevant for the game. This assumption may not be realistic. The relative power of the bargaining groups is crucial to the outcome. If agreement between agents can be reached then some kind of political efficiency is achieved by the process.

The cooperative game theory models of Zusman and Beghin are rich in detail even though they do not involve constitutional reform alternatives. Rausser's noncooperative game theory models include strategic bargaining and the relevant constitutional reforms. His model of Bulgarian bargaining is perceptive but not particularly instructive for an open primary trading country. The idea of bargaining between interest groups in stages is an appealing one and simulates actual policy making processes in many cases where discussion and re-negotiation are involved. A wide knowledge of the political process is required. Unilateral decision making (by cabinet committee for example) would not be well simulated by a bargaining game, though the decision itself would still reveal the

political preferences of the decision makers in some way.

Bargaining models assume a much greater and detailed knowledge of the political and economic framework surrounding a decision or set of decisions. In this sense, they resemble more and more a political science approach to decision making (and indeed could not do without it). This is well summarised by Beghin (p.147):

"The bargaining game framework incorporates agents' behaviour and reactions into the policy process. Estimated bargaining weights reveal the welfare trade-offs made by policy makers in their policy choices. Assumptions about players' behaviour, technology and preferences are necessary to quantify the game and the policy responses to shocks; adding more *a priori* structure could possibly bias the analysis. This approach also requires a well-documented understanding of the political economy and institutions involved in policy decisions."

In terms of the criteria suggested at the beginning of this paper, this review has shown that transfers of wealth can be amply demonstrated although largely after the event. The fairly simple structure of the models prevents clear identification of distribution impacts on a wider range of interest groups though it appears that modelling techniques could accommodate this. Richer distributional results could be obtained from computable general equilibrium models as suggested by Kym Anderson. Bargaining models do accommodate the relative strengths of interest groups and this initiative should be developed further. The analysis has not elucidated much on the effects of public provision of goods (which affects all departments of agriculture) nor on information imbalances

² Kym Anderson points out the limitations of the closed economy model utilised in the studies examined. A small open economy facing international prices at the border would be more appropriate as in the Australian case quoted. Partial equilibrium, single commodity models are less informative than other models hence there is a good case to employ computable general equilibrium models to demonstrate the distributional effects of government intervention (see Anderson 1995, p.402). The richness of the results is proportional to the effort put in, of course, and this may mitigate against more general use of these models in *policy preparation*.

(also part of the policy making process). Further descriptive and analytical work is clearly needed with regard to these latter aspects of the problem. Nor is the private/public interest debate resolved by these models. They tend to assume that the private interest model is the appropriate one to employ. Assessment of the private/public interest dichotomy needs to be based on a wider sample of processes and policies than these partial equilibrium models can encompass.

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