REDISTRIBUTION THROUGH FARM PROGRAMS: INSTRUMENT CHOICE & TRANSFER LEVELS

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Abstract

This paper synthesizes the political-economy literature on farm policy and it augments existing models by endogenizing instrument choice and by allowing for multiple interest groups. In addition, we test some of the key hypotheses underlying our public choice model applied to agricultural policy making. Our goal is to understand the relative importance of the various determinants of agricultural policy. We examine cross sectional and time series data for a number of key agricultural products in both developed and developing countries. Our empirical results show that transfer level and instrument choice depend on one another and in addition on both country and commodity characteristics such as: size and income of the country, proportion of population in agriculture, and whether the commodity is exported or imported.

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" Economists have been much more successful in measuring effects of policies than in explaining their adoption.." George Stigler, Nobel Lecture, Stockholm, December, 1982.

Positive theories of economic regulation were originally developed in classic pieces of work by Buchanan and Tullock; Stigler (1971); Peltzman; and Becker. Corden's conservative welfare function was also a pioneering contribution. Most of the applications of "public choice economics" to agriculture originated with Australians (where it is also said that all elasticities come from) with the work of Anderson; Sieper; and Freebairn and Rausser. Since then, additional attempts to explain agricultural policies in a political economy framework have been made by Sarris and Freebairn; Riethmuller and Roe; Paarlberg and Abbott; Balisacan and Roumasset; Gardner 1987; Lopez; Miller; Babcock, Carter and Schmitz; and Lindert. The state of the art today is probably best reflected in Gardner's 1987 paper.

This paper empirically investigates the international agricultural policy making process. We look across 13 commodities, 15 countries and over 5 years. Our main objective is to explain both the "causes" of agricultural policy and "choices" of policy instruments. Our theoretical framework is drawn from Becker, who posits the political process as a clearinghouse which trades off political pressures amongst interest groups. The Becker model

allows us to derive testable hypotheses. We extend earlier work (especially that of Gardner, and Balisacan and Roumasset) through an examination of agricultural policy instrument choice. We are interested in explaining phenomena such as the high levels of protection to U.S. and European grain farmers compared to much smaller levels in Canada and Australia. Alternatively, we are curious as to why American and European beef farmers are protected but they aren't in Australia and Canada. Or, why do U.S. sugar farmers receive support through import quotas and U.S. rice farmers receive direct government payments. A good theory of public choice ought to be able to rationalize all of these differences.

The paper contains three main sections: 1) a synthesis of pertinent previous work, 2) a brief outline of the Beckerian framework which serves as the basis for our conceptual model, and 3) an empirical examination of the causes of transfer levels and instrument choice.

Background and Motivation

Outside of this literature on the political economy of farm policy and as part of the free trade hysteria, international organizations such as GATT, the World Bank and OECD have spent considerable resources on measuring the inefficiencies of government distortions in agriculture. Simultaneously, they have been proposing schemes to dismantle farm programs. Governments in member countries have carried out similar analyses (e.g. USDA, ABARE, Agriculture Canada) and they have developed an equal number

of different ideas of how to get the government out of agriculture. Have these agencies overlooked the essence of what political economy studies have found? If these agencies don't fully appreciate how agricultural policy is put together, how can they begin to take it apart. Efficiency based theories do not guide agricultural policy so how can they be used to dismantle policy. Economists have approached the problem as if all they had to do was identify inefficiency in order to get rid of the policy. For example, the official USDA position on GATT is that every nation must remove all subsidies. According to the theory of public choice, this is a naive view of how the world works and we doubt if the USDA position would even be ratified by U.S. Congress! Perhaps part of the problem is that existing political economy explanations of farm policy are inconsistent and weak. This means that more work is needed on agricultural policies using the public choice paradigm and it provides a motivation for this paper.

Like many of the above mentioned papers, we believe most of the agricultural distortions were put in place around the globe in order to appease interest groups and that these interest groups are now more powerful than ever. Interest groups will bloc attempts to move toward free trade. In many industrial countries (e.g. United States, Japan, EC, and Canada) farmers and middlemen will lose under freer trade, so why should they support it? While compensation could be paid to farmers it is not likely to occur. Alternatively, those who lose from existing distortions (consumers, taxpayers, and foreign interests) are poorly organized, their per

capita losses from agricultural distortions are small and thus do not have the incentive to spend political effort towards ensuring a free trade outcome.

The Self-Willed and Clearinghouse Government Models

Most of the public choice literature on farm policy has followed two alternative lines of inquiry, the self-willed government (SWG) model and the Clearinghouse government (GHG) model[1]. The first line of inquiry assumes that the government is an autonomous unit which maximizes a social welfare function. Empirical studies which have used this approach have come up with very poor results. The second line of inquiry postulates that the government is more like a political arena where interest groups meet and policy is determined through interest-group interaction. We believe this is the more plausible description and it is the approach that we adopt in this paper.

Self-Willed Government Model

As the name implies, the SWG approach focuses on the "endogenous nature of policy formation" by incorporating government behavior into commodity models (Rausser and Freebairn, Sarris and Freebairn, Riethmuller and Roe, Lopez, and Paarlberg and Abbott). It typically specifies a government utility function whose arguments are the welfare of domestic interest groups. This approach assumes the government then chooses policy instruments in order to maximize its utility function. Endogenizing government

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[1] Bhagwati coined these two terms.

behavior becomes an end in itself with this approach and there is no theoretical explanation of how the weights evolved.

The SWG approach begins with a government criterion function such as equation (1):

$$U = U(CS, PS, GR; \theta) \qquad (1)$$

where U is assumed to be strictly concave, CS is consumer's surplus, PS is producer's surplus, GR is government revenue (positive or negative), and θ represents the parameters of the underlying commodity model. Expressions for consumer's surplus, producer's surplus, and government revenue are derived from the commodity model. The government chooses from j policy instruments I_j in order to maximize (1). The first order condition is:

$$\delta U/\delta I_j = w_1 \delta CS/\delta I_j + w_2 \delta PS/\delta I_j + w_3 \delta GR/\delta I_j = 0 \qquad (2)$$

where $w_1 = \delta U/\delta CS$, $w_2 = \delta U/\delta PS$, and $w_3 = \delta U/\delta GR$.

Optimal domestic farm (pricing) policies are then determined by assuming explicitly values for w_i (i=1,2,3); substituting expressions for CS, PS and GR into (1) and solving the welfare maximization problem. Alternatively, the w_i's can be implicitly solved for by inserting observed price policies into equation (1).

Clearinghouse Government Model

The CHG models (based on Peltzman and Becker) treat the political process as a clearinghouse, which trades off political pressures amongst interest groups (Balisacan and Roumasset, Gardner 1987, Miller). The Becker model explains policy as being the outcome of interest groups using the government (as a

clearinghouse) to either maximize net gains or minimize net losses resulting from income transfers. Government policies subsidize some groups and tax others in the redistribution process. This political "game" is zero-sum in influence and negative-sum in taxes and subsidies (due to deadweight costs of transfers and taxes). This model can be expressed as follows:

$$- I_{ti}(\Gamma) = n_i F_i(R_{ti}) = n_j G_j(R_{sj}) = I_{sj}(\Gamma) \qquad (3)$$

where i= 1, ..., q and j=1, ..., v-q. I_{ti} is the influence function of the ith taxed group and I_{sj} is the influence function of the jth subsidized group. R_{ti} is a vector of taxes paid by the n_i members (n_i is the size of the ith group) and F_i determines the deadweight losses associated with taxes. Similarly, R_{sj} is the vector of subsidies to the n_j members and G_j represents the deadweight loss of the subsidy.

Becker's comparative statics give the following results:

> "... pressure tends to be greater by more efficient groups, by subsidized groups with smaller deadweight costs, by taxed groups with larger deadweight costs, by groups with intrinsically more influence, and by subsidized groups whose benefits are financed by a small tax on many persons" (Becker, pp.390-391).

Applying the Becker framework to the redistribution of income through commodity markets sheds light on two questions, the choice of policy and the resulting level of protection. Both will be a function of commodity and country characteristics. If we consider just two interest groups (e.g. farmers who gain and consumers who lose) it can be shown (see Miller or Gardner) that there are two factors at work that make the farmer's net gain less than the total

consumer cost. These two factors are: a) deadweight costs associated with the price distortion (G_j in equation (3)), and b) the collection costs of taxes used to pay for the policy (F_i in equation (3)). Determinants of the levels of G_j and F_i include the type of policy selected, the amount of intervention and the elasticities of supply and demand.

With two interest groups, the choice of policy becomes quite straightforward. Farmers desire a higher price and their only concern is the ratio of net gains to total costs at the margin. As explained by Miller, they:

> "... will want the government to choose a policy that gives them a high level of net gains per dollar spent on political pressure, while minimizing the marginal costs of policy and therefore the incentive to spend on political pressure by the other group" (Miller, p.13).

Using this rule the choice of policy simply becomes a function of supply and demand elasticities. Gardner explains:

> "Thus, given that the choice of policy approach is open, the prospects for relatively efficient redistribution increase when either the supply or demand elasticity is nearer zero and, given this minimum, the further from zero is the other elasticity" (Gardner,1987,p.293).

Synthesis of the two Models

The essential difference between the SWG and CHG public choice models can be illustrated with the aid of Figure 1. Assume two interest groups, farmers and consumers, and a single policy variable which redistributes income from one group to another. In

Figure 1, the surplus transformation curve[2] (STC) traces out efficient combinations of producer surplus (PS) and consumer surplus (CS) which are attainable by changing the level of the policy variable. The shape of the STC depends on the underlying commodity characteristics, as well as the particular policy and other factors. According to the SWG paradigm, the optimal amount of government intervention is at point SW, where the social welfare function is tangent to the STC. Here, a familiar efficiency condition holds: $dPS/dCS=-w_1/w_2$, where PS and CS are producer and consumer surplus, respectively, and w_1 and w_2 are as defined in (2).

The CHG paradigm also posits efficient redistribution and it will therefore generate a similar STC as shown in Figure 1. Gardner (1983) worked out the relationship between the choice of policy instrument and the positioning and shape of the STC. CHG models are distinct from SWG models because they do not assume the existence of a social welfare function (SWF). Instead, in the CHG framework, the government's choice of where to locate on the STC is determined by the lobbying behavior of farmers relative to consumers. The outcome of the political bargaining process could lie anywhere on the STC, such as point CH. The slope of the STC at point CH (or any other point) is the marginal cost of redistribution.

To summarize, both the SWG and CHG models assume efficient redistribution, so that policy choices lie on the maximum

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[2] See Gardner(1983) for a derivation of the surplus transformation curve.

attainable STC. The difference between the two models then is, essentially, on the "demand side" interpretation of the slope of the trade-off. The SWG model interprets it as the ratio of welfare weights; the CHG model interprets is as relative influence at the margin. While the SWG model could call w_1/w_2 the relative influence ratio, this masks the distinction between the motivations for policy.

There are a number of aspects of the Becker model which have not been fully explored through applied work. An important extension would involve the analysis of more than two interest groups. With regard to farm policy in most developed countries, agribusiness is one of the most influential lobbying groups, probably more influential than farmers themselves. The analytics of the impact of farm policies on agribusiness have been worked out by [illegible], Carter and Wohlgenant. They set up a model of a [illegible]petitive agricultural commodity market which includes middlemen, who may either gain or lose from farm policies and they then consider alternative policy scenarios. It is shown that the middlemen's gain (or loss) critically depends on: a) the degree to which farm policies enhance or reduce farm output, and b) the degree to which marketing inputs and farm products are substitutes (or complements) in the production of a retail good. Alston et al. argue that, for most commodities, middlemen gain along with farmers, as a result of farm programs.

Choice of Policy Instrument

There is a limited amount of work on "instrument choice" in the trade literature that we believe has relevance for agricultural policy. This literature includes the work of Ray, Lloyd and Falvey, Cassing and Hillman, Godek, Rodrik, and Magee. This work on "instrument choice" literature has not been intertwined with the public choice literature described above. We attempt to unite these bodies of literature in our conceptual framework below.

Cassing and Hillman set up a government political support function which has price levels and industry profits as its arguments. They examine the choice between tariffs and quotas and thus rule out more efficient instruments such as production subsidies. Their support function is as follows:

$$M [P, \pi] \qquad (3)$$

where P and π represent, respectively, the increase in price and industry profits due to government distortions. Maximizing this support function leads the government to choose a tariff over a quota. It is interesting to note that the quota results in a smaller deadweight loss but it is not chosen. This contradicts the Becker result about efficiency. However, if the government is concerned about revenue (and it collect quota rents) then its objective function becomes:

$$V = V(M,R) \qquad (4)$$

where R is government revenue. In this case the choice of instruments becomes indeterminate.

Lloyd and Falvey focus on the impacts of uncertainty on the

choice between quotas and tariffs. They ignore other reasons (e.g. information asymmetry) for why one instrument would be chosen over another. In their model, the source of uncertainty is randomness in an exogenous world price, p^*. A protectionist policy transforms $h(p^*)$, the distribution of p^*, into a distribution $g(p)$. The nature of this transformation depends on the choice of instrument. Since a quota truncates the distribution $h(p^*)$ at some p^q, input quotas are preferred by producers.

Ray's work is empirical. He specified a political economy model of industry protection with tariff versus non-tariff barriers. He demonstrated that non-tariff barriers have substituted for tariff barriers because tariff barriers have been negotiated lower by GATT.

Godek empirically examines the use of tariffs versus quotas for a cross-section of U.S. manufacturing industries using 1970 data. He finds that high tariffs are correlated with quotas. Using logit and tobit analysis, Godek regresses quota dummies and tariff levels on a number of political influence variables. He finds that high geographic concentration and large industry size raise the probability of obtaining a quota. Tariffs are found to be related to industry concentration.

Rodrik models policy instrument choice and treats non-economic objectives as being endogenous. He then examines the welfare ranking of tariff versus subsidy schemes and shows that the conventional literature on distortions, welfare and trade policy may have misleading conclusions. Paradoxically, tariffs can receive

a higher welfare ranking than production subsidies in Rodrik's model. He finds that tariffs may be more efficient than subsidies because a tariff has attributes of a public good, it benefits all firms regardless of how much they lobby the government.

Conceptual Framework

As discussed above, the work by Gardner (1987), Miller, and Balisican and Roumasset on "agricultural protectionism" devoted itself towards an explanation of the level of protection. Their common approach was to determine the level of protection as a function of the ability of a commodity group to generate political influence. In this paper, we are also interested in the complementary question of whether or not commodity characteristics determine the type of instrument.

The Gardner model assumes just two interest groups and that the most efficient instrument is chosen (i.e. deadweight losses are minimized). As explained with the aid of Figure 1, the surplus transformation function is dependent on the choice of instrument. The steeper the slope of the surplus transformation curve the more efficient the instrument[3]. The conceptual framework we are using is that shown in Figure 1. However, we account for three interest groups (farmers, consumers/taxpayers, and middlemen) and we therefore interpret the surplus transformation curve in Figure 1 as representing the cost of redistribution from consumers/taxpayers

[3] Alston and Hurd have derived surplus transformation curves for a combination of instruments.

to farmers, holding transfers to middlemen constant. The restriction on transfers to middlemen will yield a STC different from a two group (i.e. farmers and consumers) STC.

Our conceptual framework is clearly Beckerian. We assume that the government plays a "passive" role in the political process. The choice of instrument and level of protection hinge on the political outcome of interest groups' interaction. Their interaction simultaneously determines instrument choice and level of redistribution. The position of the STC in Figure 1 depends on instrument choice and the level of transfers to middlemen (which is being held constant). The amount of redistribution depends on the relative influence the transferee exerts over the transferor, and this gives the equilibrium point on the STC.

Based on this framework, we offer the following taxonomy of variables that influence instrument choice:

1. Efficiency - This is Becker's assumption that transfers from taxpayers to farmers will take place in an efficient manner (i.e. deadweight losses will be minimized). The efficiency of a given transfer will primarily depend on market characteristics (i.e. supply and demand elasticities) and the choice of instrument. Generally speaking, the deadweight costs are the lowest when supply and demand are inelastic. Bruce Gardner has shown the important relationship between elasticities and the efficiency of redistribution.

2. Transparency (information asymmetry)- This argument says that some instruments are more transparent than others and if an

instrument can "hide" the true level of protection then it is desirable from the standpoint of those protected and from the standpoint of politicians. Information asymmetry exists because consumers and taxpayers are rationally ignorant when it comes to policies which are relatively unimportant to them. They have little incentive to educate themselves about farm policy. We believe this to be an important factor in agricultural policy, especially in large industrial countries where taxpayers and consumers are uninformed when it comes to agricultural policy (let alone economics).

In Becker's model, information asymmetry plays an important role. He assumed that the larger the number of taxpayers, the less their production of political pressure, because an increase in the number of taxpayers reduces any individual's tax burden. In a similar vein, Magee argues that instrument choice is governed by the law of "optimal obfuscation" which leads to a choice of less efficient instruments. Efficient instruments are usually more transparent and the theory predicts that they would be used in countries where taxpayers are more aware of agricultural policy. In small countries, where taxpayers and consumers are knowledgeable about the effects of agricultural policy, it is not only more difficult to transfer income to farmers but there is also less incentive to obfuscate transfers. Australia, Canada and New Zealand most likely fit this small country classification. The U.S. and the EC are large countries and taxpayers are more naive when it comes to agricultural policy.

3. Institutional Factors - Certain instruments are not permitted by domestic laws. In addition, GATT has difficulty enforcing certain non-tariff barriers, voluntary export restraints, and export subsidies on agricultural products. Under GATT, import controls are allowed on products that have either domestic price support or production control programs.

4. Property Rights to Rents & Revenues- Import quotas generate rents to the quota holder, and these rents could be viewed as a good way to transfer income. Alternatively, tariffs might be preferable in certain cases (especially in developing countries) as a source of government revenue.

5. Supply Security Argument- Certain instruments raise the domestic self-sufficiency ratio. We expect this to be an important factor for Japan, the EC and some developing countries.

6. Foreign Interest Argument - In addition to farmers and middlemen, foreign interests also play an important role in agricultural policy formation. For example, foreign countries collect handsome quotas rents as a result of U.S. import controls on sugar, cheese and beef. Another example is found in U.S. wheat and corn policy and the use of export subsidies. For the past four years the U.S. government has spent $1.5 to $2.0 billion per year on grain export subsidies and the largest benefactors of this program have been importing nations. Japan also accounts for foreign interests when it allocates import quotas for food.

To operationalize our version of the Beckerian model, the level of support function is given by:

$$s = f(i, e, PIF, PIC, PIM, DC/LDC) \quad (6)$$

where,

s = level of protection

i = vector of instruments

e = vector of elasticities

PIF = political influence of farmers

PIC = political influence of consumers

PIM = political influence of middlemen

DC/LDC = dummy variable set equal to 1 for developed countries and zero for less developed countries

Similarly, the instrument choice function is given by:

$$i = g(s, e, PIF, PIC, PIM, DC/LDC) \quad (7)$$

The three political influence functions (PIF, PIC and PIM) are endogenous and they have the reduced form structure shown in equations (8) - (10):

$$PIF = f(e, wp, X, M, L, AgPop) \quad (8)$$

where

wp = world price

X = proportion of production exported

M = proportion of production imported

L = lawyers per capita

AgPop = proportion of population in agriculture

$$PIC = g(e, Pop, DC/LDC, GNP) \quad (9)$$

where

Pop = total country's population

GNP = country's per capita GNP

$$PIM = h(X, M) \qquad (10)$$

where

M = marketing margin.

We estimate the above model with 5 regression equations[4]. The first one is an ordinary least squares regression with the level of support as the dependent variable:

$$s = f(i, \underset{-}{e_s}, \underset{-}{e_d}, \underset{+}{e_r}, \underset{-}{wp}, \underset{-}{X}, \underset{+}{M}, \underset{-}{AgPop}, \underset{+}{Pop}, \underset{+}{DC/LDC}, \underset{+}{GNP}) \qquad (11)$$

The expected signs are shown directly below the explanatory variables in equation (11). The choice of instrument is not signed **a priori** but we would expect the more efficient instruments (i.e. direct income transfers and input subsidies) to be associated with higher levels of protection. Either an inelastic supply (e_s) or inelastic demand (e_d) are expected to lead to higher levels of protection. Demand elasticity enters equation (11) in absolute value form. However, Gardner (1987) has shown that relative elasticities are also important[5].

To account for the importance of the size of one elasticity relative to another we introduced the following ratio into equation (11):

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[4] We have been unable to obtain data on lawyers per capita and marketing margins. Consequently L and M have been temporarily dropped from the regression equations.

[5] See the quote from Gardner on page 8 above.

$e_r = \max(e_s, e_d) / \min(e_s, e_d)$

e_r is always > or = 1.0 and we therefore expect a larger ratio to lead to a bigger transfer.

A higher world price (wp) will presumably decrease farmers' ability to generate pressure for protection and thus wp is expected to have a negative sign. We expect that the higher the proportion of production exported (X) the less protection received and the higher the proportion imported (M) the greater the amount of protection received. These signs should be the same for developing countries, who have a habit of taxing agriculture. The higher the level of exports the greater the tax (a negative sign on the coefficient) and the higher the level of imports the less the tax (a positive sign on the coefficient).

As the proportion of the population in agriculture (AgPop) increases the "group" becomes more disorganized and less efficient at producing pressure. We see the extreme case in many developing countries where the farm population acccunts for the majority of the population and thus they are taxed rather than subsidized. As Stigler (1988) observed:

> .." politically effective groups have used the state to foster their ends in all periods of history. In some periods there was little scope for political actions to benefit important groups. What could Iowa farmers do a hundred years ago to increase their profits ... Whom could they tax when they constituted almost the entire state population?" (p.xiv)

Therefore we expect a negative sign on the AgPop coefficient.

Total population (Pop) is a proxy for the large country/ small country variable and is included in order to measure the importance

of information asymmetry. In a large country we expect taxpayer naivety (i.e. rational ignorance) and this should lead to higher levels of support for farmers. The Pop coefficient is expected to have a positive sign in equation (11).

The dummy variable for developed/developing country (=1 for developed countries) is expected to be positive. Anderson and Hayami have argued that as countries develop they switch from taxing to subsidizing agriculture. This hypothesis can also be tested with the per capita GNP variable in equation (11). Another reason we include the GNP variable is that we estimate equation (11) for all countries and then separately for each of the two groups: developed and developing countries. The GNP variable allows us to test the Anderson and Hayami hypothesis within the group of developing countries.

After estimating equation (11) we estimate the logit regressions, one for each of our instrument choice categories:

$$i = g(s, X, M, e_s, e_d, e_r, DC/LDC, AgPop, Pop, GNP) \qquad (12)$$

Many of the same explanatory variables appear in these logit regressions as were used in equation (11). As explained above, the choice of instrument is hypothesized to be a function of: a) the efficiency of transfers (variables s, X, M, e_s, e_d, e_r, AgPop, and GNP); b) information asymmetry (the Pop variable); c) institutional factors (X, M, and DC/LDC); and d) supply security (X and M).

The data and its sources are listed in Table 1 and the regression results are reported in Tables 2 through 5. The four

instrument categories are border measures, direct income payments, input subsidies and supply controls. For each observation we accounted for only the most important instrument - the one which provided the largest transfer. For example, in 1986, for wheat in the United States the deficiency payment program was the largest wheat transfer and we used only data on the deficiency payments - other smaller transfers were not included in our data set. Given the small number of observations for the supply control instrument the results for this logit regression are not reported. Producer subsidy equivalents (PSEs) were used as proxies for the level of protection. The data covers the five year 1982 to 1986 time period. Refer to Table 1 for the commodity and country coverage.

Results

The regression results shown in Table 2 are those explaining the level of protection (equation (11)). We obtain a large number of correct signs and many of these coefficients are statistically significant. These results are very encouraging and they demonstrate the strength of the Clearinghouse government model. When these results are compared to those of earlier studies they support our **a priori** belief that the Clearinghouse government model has greater predictive ability than the self-willed government model. The results for equation (11) - for all countries- show that four key variables explain the level of protection: the instrument, the proportion of the population in agriculture, the GNP, and the supply and demand elasticities. Except for the GNP and the demand elasticity, the coefficients have the correct sign. As the

proportion of the population in agriculture increases the level of support declines because farmers are less able to produce pressure.

The logit results shown in Table 3 all fit the data rather well, with the percentage of right predictions ranging from 72% to 81%. The statistically significant variables in the border measure equation are the level of protection, the proportion exported, the proportion imported, total population, GNP, the demand elasticity, the elasticity ratio and the developed/developing dummy. The higher the level of protection the lower the probability of a border measure. This is to be expected because we hypothesized a correlation between level of protection and efficiency of the instrument. Border measures are relatively inefficient and therefore we find a lower probability of their use when transfers are high. We find a positive relationship between the percentage of a commodity exported and the use of border measures. The opposite holds for the percentage imported. The larger the country (measured by total population) the more likely border measures will be used. This result fits our information asymmetry argument- in large countries we would expect relatively more obfuscation. The higher the GNP the lower the probability that we observe border measures. The higher the demand elasticity the higher the probability that border measures will be used. Similarly, we find a positive relationship between the elasticity ratio and the incidence of border measures. The results also show that developed countries are more likely to use border measures compared to developing countries.

Turning to the second logit result for direct income, we find that its use is related to the level of protection, the percent imported and exported, total population, the GNP, the demand elasticity, the elasticity ratio, and the developed/developing dummy. The higher the level of protection the higher the probability of a direct income measure. This result agrees with our preconvictions that there is correlation between level of protection and efficiency of the instrument. Direct income measures are relatively efficient and therefore we find a higher probability of their use when transfers are high. We find a negative relationship between the percentage of a commodity exported and the use of direct income measures. The opposite holds for the percentage imported. The larger the country (measured by total population) the less likely direct income measures will be used. This result fits our information asymmetry theory because in a relatively small country a more efficient instrument is expected. The GNP coefficient is positive and this makes sense because poor countries cannot afford to make direct transfers to farmers from the government treasury. Developed countries are less likely to use direct income measures. The higher the demand elasticity the lower the probability of observing direct income payment. This same negative relationship holds for the elasticity ratio. Finally, developed countries are less likely to use direct income payments than are developing countries.

The third logit regression equation has input subsidies as the dependent variable. This instrument is related to the level of

protection, the developed/developing dummy, the proportion of the population in agriculture, the size of the total population, and the GNP. On the efficiency scale we normally think of input subsidies as falling between border measures (inefficient) and direct income payments (efficient). Therefore our priors on the sign of the independent variables are not as strong as they are for border measures and income payments. It is interesting to find that the higher the level of protection the lower the probability of using an input subsidy. Developed countries are less likely to use input subsidies. As the percent of the agricultural population rises the lower the likelihood of input subsidy use. Alternatively, the higher the GNP the greater the probability that input subsidies will be used.

Summary

This paper has taken as its framework the Becker model of competition amongst interest groups for political influence and applied it to agricultural policy making. We have interpreted the model to include multiple interest groups and we have focused on explaining both the level of protection and instrument choice. A number of testable hypotheses were developed and then tested using six years of data applied to sixteen countries, twelve commodities and four instrument groups. The level of transfer and instrument choice were regressed on commodity market characteristics, country characteristics and political influence variables.

The empirical results are rich in that the regression equations have relatively high explanatory power, especially the logit regressions where instrument choice is the dependent variable. We find that the level of transfer depends on the choice of instrument, country characteristics (i.e. percent of the population in agriculture, GNP per capita, and level of development), and commodity characteristics (i.e. supply and demand elasticities). The factors which explain instrument choice include the level of transfer, proportion of commodity exported or imported, size of the country, GNP per capita, supply and demand elasticities and level of development.

These results strongly suggest that agricultural policy is the outcome of political bargaining amongst pressure groups. Both commodity and country characteristics explain the level of transfers and the choice of instrument. In large countries like the United States and the EC it is rational for taxpayers to remain ignorant about farm policy. The implies that the prospects for meaningful policy reform are indeed dim.

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