

LOBBYING AND AGRICULTURAL PROTECTION IN THE UNITED STATES: IMPLICATIONS FOR INTERNATIONAL COOPERATION

Abstract

Abstract: This paper studies whether political campaign contributions influence agricultural protection in the United States in the manner suggested by the political economy model of Grossman and Helpman (1994). This is the first attempt to test this model using agricultural data. The intent of the paper is broader. It seeks to use the findings as a basis for informing the Doha round of negotiations on the subject of agricultural protection. Viewing the development of institutions through the lens of a political economy model requires rigor in both testing the model and using it as a basis for policy. We do this in three steps. First, based on the history of U.S. farm policies we argue that a focus on border protection, as opposed to other forms of support to farmers, is most appropriate for understanding the prospects for disciplining agricultural protection through international negotiations. Existing evidence strongly indicates that border barriers impose the greatest negative externalities on other countries. Second, we test the model using a detailed data set of agricultural protection and agricultural PAC contributions over five congressional election cycles between 1991 and 2000. The model is qualitatively affirmed by the data. Third, we make a novel attempt to solve a puzzle about the model's quantitative implications, also found in recent studies. This solution makes the simple model consistent with the complicated decision-making process in real world government. Taken seriously, the results imply the underpinnings of a political economy equilibrium that will be hard to dislodge. In particular, efforts to liberalize trade in agriculture will require significant support from export-oriented or other interest groups, more than has been generated to date. As these potential countervailing forces do not have much to interest them in the current Doha round of WTO negotiations, greater incremental progress in disciplining agricultural trade policies should probably be obtained via bilateral and regional agreements.

1. Introduction

Despite the fact that agriculture accounts for less than 5% of GDP and employment in developed countries, farm policies held up the Uruguay round of negotiations and are proving contentious in the ongoing Doha round of WTO trade negotiations. By design, agricultural protection was virtually ignored in the first six GATT rounds due to the sector's political sensitivity. The power of agricultural lobbies is also visible in regional trade agreements, which have routinely excluded agricultural products (Schiff and Winters, 2003). The task of achieving multilateral discipline in the Doha round is therefore a challenging one.

Many would argue that progress on this front is a necessary condition for the Round's success. It is well known that agricultural policies transfer significant amounts of resources to farmers and agricultural landowners in OECD countries. Total support to agriculture in the OECD has remained steady at some US\$300 billion per year. Two-thirds of this amount is generated by instruments that support domestic prices, especially border protection, and one-third by direct fiscal subsidies. The incidence of the former is mostly borne by domestic consumers, while the costs of the latter are incurred by taxpayers. Tariffs in agriculture are many times those applied to manufactures. The use of non-ad valorem tariffs such as specific taxes (levied on the basis of quantities), tariff rate quotas (where once a quota is exceeded, near-prohibitive tariffs kick in), regular quotas, seasonal restrictions, and health and safety standards is becoming widespread.

Understanding the political economy of agricultural support policies in OECD countries is important for those who foot the bill. Adoption of more efficient policy instruments to achieve agricultural objectives requires a good understanding of who is gaining from the status quo. It is also important to affected countries in the rest of the world. Negotiations pit OECD countries against countries that are affected by OECD country policies. But really, both sets of countries can gain in long run efficiency through trade liberalization. In this sense they are allies, at least in principle. But the reason they are pitted against each other is the influence of those who stand to lose from liberalization, primarily OECD farmers. In order to effectively negotiate in a multilateral forum, therefore, both sets of countries will need to identify policy packages that will help mobilize *domestic* political support for reforms. This of course is the premise underlying the logic of Putnam's (1988)

concept of two-level games, and reflected in the long-standing recognition in the literature that trade negotiations may be able to harness the power of issue linkage (Putnam 1988; Sebenius 1984; and Tollison and Willett 1979) to move overall policies in a welfare-improving direction.

In their survey of the literature, de Gorter and Swinnen (2002, p. 1903) motivate the study of the political economy of agricultural policy as: “Understanding why governments do as they do allows one to analyze the policy formation process and alter incentive constraints through institutional reform in order to achieve desired policy outcomes.” To this end, with the objective of informing the design of implementable agreements, this paper investigates the political economy of U.S. agricultural protection.

Governments serve their constituencies first. To the extent that lobbies significantly influence agricultural policy, implementing freer trade in agriculture requires designing incentive schemes that take into account the status quo political-economic equilibrium. Effective bargaining between governments must be performed over policy options that are politically viable domestically. Hence, multilateral negotiations seeking to implement freer trade in agriculture must recognize the political-economic nexus that has resulted in continuous subsidization and protection of agriculture in developed countries since the 1930s.

While previous empirical studies surveyed here and in de Gorter and Swinnen (2002) have investigated and affirmed the validity of the role of politics in agricultural protection, few if any have done so with the discipline of a theoretical model underlying their analysis. A primary objective of this paper is to undertake a theoretically motivated empirical analysis of agricultural protection. We employ the political economy model developed by Grossman and Helpman (1994) to investigate whether agricultural protection is a consequence of political campaign contributions. This model has come into prominence with the advent of empirical work endorsing its predictions (Eicher and Osang 2002, Goldberg and Maggi 1999, Mitra, Thomakos, and Ulubasoglu 2002, and McCalman 2004), at least qualitatively. The model predicts protection to be a simple function of the existence of lobbying organization, the inverse import penetration ratio and the import demand elasticity. The tightness of its theoretical predictions make the model amenable to testing using cross-sectional data. We apply the Grossman-Helpman model to the case of US agricultural trade policy, using data on agricultural PAC contributions and agricultural protection for a cross section of agricultural

commodities over the 1991-2000 period. To our knowledge this is the first study to use agricultural data to test the Grossman-Helpman model.

An attractive feature is that one can use the estimates to back out a key parameter of the theoretical model, namely the weight that government places on consumer welfare relative to campaign contributions. We would expect a government that is influenced by contributions to trade off consumer welfare loss for contribution dollars on an about equal basis. Surprisingly, previous studies indicate that the US government is actually a welfare lover and places an almost negligible weight on contributions. This paper suggests a novel resolution for that puzzle. We show that it is the consequence of taking a feature of the theory too literally. Making the model more real-worldly and yet retaining its simplicity, not only rids the paradox, but we feel it embodies the model with the stuff on which to base policy. Xxx write it better.

The paper proceeds as follows. Section 2 surveys the literature to put interest-based models of agricultural policy in context and to provide a flavor of the econometric models and data used in this literature. In Section 3 the Grossman-Helpman model is introduced and its main predictions stated and described. The data are described in Section 4. In Section 5 the model's prediction is tested, the results analyzed, and some puzzles resolved. Section 6 discusses implications for international negotiations and institutional design. Section 7 concludes.

2. Traditional Political Economy Models in Agriculture: A Survey

A small set of papers that encapsulates the main issues debated and methods used in the literature on the political economy of agricultural protection is surveyed here. It complements the sweeping study by de Gorter and Swinn (2002), which is the best analytical survey on this subject to date.

We begin with Anderson's (1992) partial equilibrium framework, which neatly explains the developed versus developing country issues that lie at the heart of the present day stalemate. The need to explain two stylized facts about agricultural protection motivate Anderson's model: first, special interests matter, and second, while both developed and

developing countries protect their agriculture, trade barriers are much higher in developed countries. Figure 1 depicts Anderson's model. The price in this political market is political support for the government, for example campaign contributions, and the quantity is agricultural protection.² The negatively sloped demand curve represents the marginal willingness of farmers to pay for increased assistance. The willingness to pay declines as the amount of assistance increases because more assistance encourages entry of new firms, spreads the benefits over more firms, and worsens the free-rider problem of collective lobbying action by the group. The positively sloped supply curve represents the marginal political cost to the government of providing assistance. This cost increases with the amount of support as greater intervention causes greater welfare losses, thus weakening electoral support from adversely affected consumers.

Suppose the quantity of assistance is measured as the effective protection coefficient (the percentage by which policy has raised value-added) for this sector relative to the average effective protection coefficient for other sectors of the economy. Equilibrium in developed countries (dc) occurs at a quantity greater than one, indicating that agriculture receives greater protection than other sectors on average. Equilibrium in developing countries (udc) occurs at a quantity less than one, indicating that agriculture is discouraged relative to other sectors.

This policy disparity between developed and developing countries has been well documented in the literature. According to Anderson this disparity is due to dissimilar distributional effects of policy intervention in these two types of economies, as well as differences in the relative costs of collective action by interest groups. The result is a pro-agriculture policy bias in rich countries and an anti-agriculture bias in poor ones. If capital and land are sector-specific but labor is mobile across sectors, the distributional effects of a policy that alters farm prices is determined by (i) its impact on wage costs, and (ii) the share of the expenditure on food. In a poor agrarian economy raising the relative price of agricultural products can substantially raise wage rates by increasing labor demand in the labor-intensive agricultural sector. This substantially lowers the income of owners of land and

² Protection or promotion may be measured variously by the nominal protection coefficient (NPC) which measures the difference between world and domestic prices as a result of the protection or price support, the effective protection coefficient (EPC) which measures the amount by which the policy raises value added, or producer/ consumer subsidy equivalent (PSE, CSE) which measures the monetary benefit to producers/consumers as a result of the policy as a percentage of production value in the absence of the price support.

industrial capital. Together with the high costs of lobbying organization (farms are small and farmers numerous, so the free rider problem is usually insurmountable) this makes for weak demand for farm price support policies relative to demand for policies that support the industrial sector. The demand and supply curves in political markets in developing countries therefore intersect towards the lower left in Figure 1.

Conversely, in rich industrial economies farmers are a small proportion of the labor force. Raising the relative price of farm products has little impact on the demand for labor and consequently wages. Thus, consumers rarely organize to counter lobby. Further, since people spend a small part of their income on farm products they are less sensitive to an increase in farm price. As a result, the supply curve in industrial economies is far to the right of that in developing countries in Figure 1. The demand curve lies to the right as well. Farms are larger on average, and more capital-intensive—fixed costs are higher. Thus, the stakes from price support policies are high. Institutionally, commercialization of agriculture has given rise to cooperatives, which has also reduced the free-rider problem of political organization in this sector. In practice, most of the support goes to the largest and richest farmers, who therefore have a large incentive to become and stay organized.

Other authors have advanced extensions of the pressure group model building on a combination of Olson (1965), Stigler (1971), Downs (1957) and de Gorter and Tsur (1991). Swinnen's (1994) propositions summarize their main conclusions: Politicians increase agricultural support as real agricultural income falls; demand elasticities influence the support level for large importers and exporters; the equilibrium level of support (per unit of output) increases as (i) the share of agriculture in total output decreases; (ii) capital intensity increases, and (iii) elasticity of supply increases.

Empirical evidence concerning the determinants of the structure of agricultural protection is plentiful. Two studies represent the empirical literature well. Olper (1998) employs a reduced form econometric model to explain the structure of Common Agricultural Policy (CAP) transfers in eight countries in the European Union. He considers effective and nominal protection rates in these eight countries annually over 1975-1989. The explanatory variables are (loosely) motivated by the Olson-Stigler model, extensions of the Downsian model by de Gorter and Tsur (1991) and Swinnen (1994), and the model of altruism due to Bullock (1994). The three main findings from Olper's panel regression estimates are, first,

that protection increases under adverse market conditions for the farming industry (supporting the counter-cyclical hypotheses of Bullock), second, that countries with a comparative disadvantage in agriculture enjoy greater protection in agriculture (supporting the view that Stolper-Samuelson effects motivate losers to organize politically to oppose liberalization), and third, that a high budget share for food consumption reduces protection (perhaps indicating government's concern for welfare losses from protection). In sum, both, special interests as well as government concern for welfare determine the structure of CAP transfers.

Honma (1993) uses the Anderson-Hayami (1986) framework of endogenous protection to investigate the determinants of the nominal protection coefficient (NPC) measured as (log of) the ratio of the value of agricultural output in domestic prices to its value in border prices. Honma's panel of 14 industrial countries between 1955-1987 yields three main findings. First, NPC declines with higher productivity (relative to industry) in agriculture. Second, there exists an inverted-U shaped relationship between the NPC and the share of agriculture with a peak at to 4.5%. Third, NPC increases as the terms of trade (ratio of world export price of agricultural products to the export price of manufactured goods) decline in agriculture. Honma concludes that as economies reach advanced stages of development the political environment favors protection in the agricultural sector for two reasons. The relative contraction of agriculture in the total economy reduces the consumers' resistance to agricultural protection, and contraction of agriculture leads to greater concentration and therefore encourages political lobbying by farmers.

A valuable message that this "first generation" of empirical studies has succeeded in spreading is that textbook depictions of the optimality of free trade are simplistic depictions of the real world. Bringing about free trade would require reconsidering the system of incentives that makes the presence of special interests and the existence of protection long-lived. But the goal of using the lessons from political economy models to bring about institutional changes raises the ante for the political economy models. This is where the first generation of studies falls short. Empirical specifications employed there are ad hoc and have only tenuous links to underlying theory. The specifications used are reduced form econometric models that could have emerged from a variety of competing theories. While the results may indicate strong associations between some variables and agricultural price distortions, the ad hoc specifications that are applied cannot distinguish between competing theories. What theory

are the results informing? Which theory should serve as the lens for best viewing the world of agricultural protection? These questions are important because the same lens should be used to understand and assess institutional changes. Thus, the design of appropriate institutions necessarily requires an accepted structural model. Once a model emerges as the dominant paradigm, the work of designing institutions can begin, and often suggests itself.

This paper is motivated by the need in the literature to begin second-generation work that is more theory-based and less ad hoc than the studies that led the way. The Grossman-Helpman (1994) model has become the dominant theoretical paradigm in the international economics literature as it offers a consistent and rigorous framework that integrates a number of the economic and political variables that motivated the first generation political economy models (and rejects others). Since this model is inspired by the political system prevalent in the United States, it is particularly well suited to be applied to U.S. agricultural protection.

3. The Grossman-Helpman Model

Grossman and Helpman (1994) advance a general equilibrium theory of how trade policy responds to lobbying contributions, delivering a precise prediction about the cross-sectional structure of tariffs. In their model, money causes votes and is the source of electoral strength. A fact that supports this view is that lobbying contributions account for a significant share, up to 80%, of the total campaign expenditures of the majority of congresspersons.³

A unitary government is assumed to maximize a weighted sum of welfare (W) and lobbying contributions (C):

$$G = aW + C, \tag{1}$$

³ Authors own observations from perusing a number of congressional profiles between 1980 and 2000 comprehensively summarized by Congressional Quarterly in their "Politics in America" volumes.

where a is the weight the government puts on a dollar of welfare relative to a dollar of contributions.⁴ Free trade would be the efficient outcome if the government maximized welfare alone. Here government trades off welfare loss imposed on consumers by protection for campaign contributions by those who stand to gain from protection. The parameter a determines the terms of this tradeoff.

An ad valorem import tariff t_i on good i raises its price p_i above the world market price π_i . Revenues from the tariff are redistributed on a lump-sum basis to individuals in the economy. These individuals differ only in their ownership of sector-specific factors. Each individual owns capital that is specific to the production of one good. The supply of any sector-specific capital is limited, hence the rewards to specific capital used to produce good i increase with p_i . This provides owners of sector-specific capital in any import-competing sector an incentive to politically organize and lobby the government for a tariff.⁵

Lobby i presents government a menu that indicates the price (i.e. contribution) it is willing pay for each and every possible tariff t_i . The menu may obviously offer zero contributions for some values of the tariff. In deciding their menus, every lobby takes into consideration that government maximizes (1), specifically that government takes consumers' welfare into account. Take an extreme example with just one lobby, say, in sector 1, whose membership is almost negligible relative to the population. Lobby 1 wishes to induce the government to protect it with a tariff t_1 . The lobby submits a menu of offers given by the contribution schedule $C_1(t_1)$.⁶ The government can choose to either set p_1 at a level above the

⁴ While the political science literature has debated and gone beyond unitary government theories, formally complete models with more sophisticated forms of government are rare. Perhaps, the unitary government construct is at the heart of why quantitative implications of empirical studies, including this one, are at odds with the Grossman-Helpman model. We return to this issue in the discussion of the empirical results, and offer a resolution that features congressional decision-making.

⁵ Cross-commodity linkages are absent from the model, so that organized producers lobby only for protection to their good, not against protection on other goods. Consumers are the only group hurt by the tariffs. The relatively small input-output coefficients among the set of agricultural goods indicates that this assumption is well worth making for agricultural goods, and simplifies the model considerably. Cross-commodity linkages can be theoretically accommodated but introducing competition among lobbies makes the predictions less simple. Lopez (2001) studies cross-commodity linkages in the case of US agriculture.

⁶ This menu is, in turn, determined by the maximization by the individual members of the sum of their welfare functions, $\sum_{i \in L} W_i(p_i)$, where L denoted the set of individuals comprising the lobby. The individual welfare functions are the sum of three components: producer profits, consumer surplus, and tariff revenue. Since individuals maximize quasi-linear utility functions with desirable properties, the expression for consumer surplus is simple. See Grossman and Helpman (1994) eq. (4).

world price and collect the contribution associated with that level, or ignore the lobby and collect nothing from it. Let G_0 denote the value of the political welfare function in (1) with a zero tariff on good 1. In order to obtain a more favorable policy, lobby 1 must ensure the government a political welfare of at least G_0 . That is, it must compensate the government to the extent of the welfare loss from protecting sector 1.⁷

The Grossman-Helpman model yields a precise testable implication about the cross-sector pattern of protection, given by the following equation:

$$\frac{t_i}{1+t_i} = \left(\frac{-\alpha}{a+\alpha} \right) \times \frac{z_i}{e_i} + \left(\frac{1}{a+\alpha} \right) \times \left(I_i \times \frac{z_i}{e_i} \right). \quad (2)$$

In (2) t_i is the ad valorem tariff for good i in political equilibrium. I_i is an indicator variable that equals one if sector i is organized into a lobby. The parameter $\alpha \leq 1$ is the fraction of the population organized into lobbies. $a > 0$ is the government preference parameter. $z_i = x_i/m_i$ is the equilibrium ratio of domestic output to imports and e_i is the absolute value of the elasticity of import demand.⁸ If sector i is an importer then it is protected ($t_i > 0$) depending on whether it is organized ($I_i > 0$) or not ($I_i < 0$).

The second component on the right hand side of (2) indicates that protection to *organized* sectors is given according to their z/e ratios. Since deadweight loss from protection is higher in industries with high import demand elasticities the government is averse to protecting these industries, all else equal. The numerator of z (output) formalizes the notion of the stakes from protection, so high output sectors make the largest lobbying contributions. The lower the import volume, the lower the social cost imposed on individuals, thus diluting their opposition to protection of that sector.

⁷ In this example, the single lobby gets to keep any and all surplus (the aggregate change in the welfare of each member net of contributions). With more than one lobby, due to lobbying competition, lobbies may collectively contribute beyond the welfare loss to the government, and the government extracts some of that surplus.

⁸ Thus, the logic of Ramsey pricing applies. If the demand for a good is uniformly less elastic than that for another good, the optimal tax rate is higher for the first good due to the lower deadweight loss from taxing it rather than the second good. If the first good is totally inelastic there is no deadweight loss from taxing it, and the first best can be reached by taxing just this good.

The first component on the right hand side of (2) indicates that negative protection to *unorganized* industries is given according to their z/e ratios. α measures the extent of opposition to protection. As organized consumers, members of lobbies oppose protection outside their sector. If only a negligible fraction were organized into lobbies ($\alpha=0$) then there would be no organized opposition to protecting any sector, only organized support for protecting a lobby's own sector. If everyone were organized, $\alpha=1$, then organized lobbying for protection in any sector would be balanced out by organized opposition to that protection, and tariffs would be zero.

The tightness of the theoretical prediction allows testing the model. Specifically, there are three testable predictions. First, the coefficient on z_i/e_i is negative, second, the coefficient on $I_i \times z_i/e_i$ is positive, and third, since $\alpha < 1$ the sum of their coefficients must be positive. In addition to those qualitative predictions, the coefficients on z_i/e_i and $I_i \times z_i/e_i$ can be used to back out a quantitative estimate of the preference parameter a (and also of α).

Goldberg and Maggi (1999) have empirically investigated these predictions using U.S. manufacturing industry data from the early 1980s. They use nontariff barrier (NTB) data since U.S tariff reductions were the subject of the multilateral reductions in the Kennedy and Tokyo rounds, while the Grossman-Helpman model is one of unilateral tariffs. NTBs are measured as coverage ratios, that is, the percentage of imports covered by such barriers. Evidence from their sample of 3-digit SIC industries affirms the main predictions of the Grossman-Helpman model. Goldberg and Maggi find that protection increases with the inverse import-to-output ratio when an industry is politically organized (PAC contributions are used to assess whether industries are politically organized), and protection is decreasing in the inverse import-to-output ratio when industries are unorganized.⁹

⁹ Gardner's (1987) study is prescient about the Grossman-Helpman model's key features. In Gardner's model government maximizes the weighted sum of buyer's surplus (B) and producer's rents (R), $B + \theta R$. In turn, B and R are functions of farm output quantities. Efficient redistribution using production controls in this framework requires choosing quantities of farm products to maximize W. Unlike Grossman and Helpman, who adopt a formal model of the lobbying process and, as a result, are able to provide micro-foundations for their objective function, Gardner does not provide micro-foundations for W. He employs Peltzman's (1976) "majority generating function" as the argument for using this type of objective function. He attributes the same forces that determine lobbying effectiveness as determining the value of the parameter θ . Gardner measures these forces for seventeen farm commodity by the number of producers, their geographical dispersion, the stakes from redistribution (output per farm), and the stability of the industry (variability of production patterns). He also estimates (long-run) demand and supply elasticities for those commodities. Pooling data across the seventeen commodities over the period 1912-80 yields a sample of 1124 observations for Gardner's empirical analysis. The dependent variables are variants of the nominal protection coefficient. Gardner finds that the lower (greater)

This study, as well as Mitra et al (2002) and McCalman (2002), all find an implausibly high implied value of the government preference parameter a . They find that government attaches over 50 times as much weight on aggregate welfare as on contributions, and that over 80% of the population is politically organized. This is inconsistent with their qualitatively strong evidence in favor of the Grossman-Helpman predictions. It appears that lobbying is either grossly understated, or that the losses from protection are not as large as specific case studies of protection (Hufbauer, et al., 1986; de Melo and Tarr, 1990) would have us believe.

We estimate an econometric model based on a stochastic version of equation (2) using panel data for 44 commodities over 1985-2001:

$$\frac{t_{it}}{1+t_{it}} = \beta_1 \frac{z_{it}}{e_{it}} + \beta_2 \left(I_{it} \times \frac{z_{it}}{e_{it}} \right) + \beta_0 + \varepsilon_{it}, \quad (3)$$

where ε_{it} is an identically independently distributed normal homoskedastic error term (independence and homoskedasticity are presumed across both the cross-section and time-series observations), and a constant term β_0 is added. The empirical analysis is the basis for testing the Grosman-Helpman model using agricultural protection data. If the model explains agricultural protection in the U.S. then it provides a useful lens through which to view obstacles to trade liberalization in agriculture. The next two sections are devoted to the task of testing the model and resolving previously found puzzles pertaining to the model.

4. Data

Lobbying

Agricultural PAC spending data for the five congressional election cycles between 1991-2000 (103rd through 106th Congress) were downloaded from the Federal Election Commission

the (inverse) demand elasticity, the greater the level of intervention, that is, the higher the price relative to it's non-distorted price. This is a confirmation of the Grossman-Helpman intuition that it is most efficient to tax commodities with the lowest price elasticities of demand, and is the basis for Gardner's conclusion that interventions in U.S. agriculture have been efficient.

(FEC) website (www.fec.org).¹⁰ It is useful and relevant to understand whether PAC spending in agriculture is in line with the Grossman-Helpman idea of money buying influence (as different from money buying mere access to policymakers). Farm PACs contributed between \$5.5 million and \$7 million during each of the five election cycles. Among farm products, the most politically active were sugar PACs, dairy PACs and ranch PACs. Together these three PACS accounted for about 75% of total farm PAC contributions.¹¹ Over 200 PACs were politically active during this period. Cotton, dairy and wheat had the highest degree of PAC concentration, and represented by the equivalent of three or four equal sized PACs. Ranch, sugar, and fruits and vegetables were represented by the equivalent of eight to ten equal-sized PACs.¹²

PAC money is clearly influential in agriculture. A study of the 1985 and 1990 voting during sugar legislations by Brooks, Cameron and Carter (1998) finds that in the House and Senate both votes were responsive to sugar PAC contributions. Further, the value of sugar production in their constituency also determined how congresspersons voted. Sugar lobbies also targeted candidates that were likely to advance pro-sugar policies. Lopez (2001) finds that PAC contributions actually influenced agricultural policies.

Two-thirds of agricultural PAC money went to House candidates and one-third to Senate candidates. Figure 2.1 indicates the top twenty recipients in the House of agriculture PAC contributions during the 1991-92 election cycle.¹³ During this cycle, 15 of the top 20 House recipients of agricultural PAC money fifteen were members of the influential House

¹⁰ For the graphs below, mapping PACs into SIC-based agriculture-related sectors was done via a concordance constructed by Beaulieu and Magee (2002). In most cases many PACs mapped into one SIC code, so SIC level contributions are simply the aggregate of the mapped PACs. For one-to-many maps, political contributions from each PAC were fractionally assigned equally to each SIC code into which the PAC mapped. To check for consistency we compared our data with the data on the opensecrets.com website. For the few sectors in which opensecrets.com reports such information our data closely matched theirs.

¹¹ Food manufacturing PACs, forestry and nursery PACs, agriculture service PACs and agriculture distribution PACs contributed more than did farm PACs.

¹² Based on Herfindahl indices computed by the author.

¹³ The PAC data are in three relational data files: candidate information files (CN), PAC committee information files (CM), and files containing transactions between PACs and candidates (PAS). For each election cycle, aggregate contributions by each PAC to every candidate were computed from the PAS files, and then merged with the relevant cycle's CN files. Agriculture committee and sub-committee assignments for each Congress were obtained from Congressional Quarterly (1991-1999).

Agricultural committee (Figure 2.1). They included the committee chair (de la Garza) and three subcommittee chairs (Huckaby, Stenholm, Rose). Figure 2.2 bears out much the same story for the 1999-2000 election cycle, the last period in our sample. The pattern of giving in these figures clearly indicates that agricultural PACs targeted politicians with influence over agriculture policy. The amounts are not inconsequential. Agricultural PACs delivered between 8% (Fazio) and 60% (de la Garza) of the total PAC money received by candidates in the “ag PAC top 20”.¹⁴

Rather than being driven by party or ideology, agricultural PAC money sought influence. A natural experiment that the five cycles provide is the switch from Democratic to Republican majority in 1995 and thereafter. Whereas, the top-twenty recipients who were agriculture committee members comprised largely Democrats during the 1991-92 and 1993-94 congresses, they were mainly Republicans in the three later congresses.

Figures 3.1 and 3.2 display the top twenty Senate recipients of Ag PAC money for the first and last cycles in the 1990’s. Contributions to Senate candidates were similar in magnitude to contributions to House candidates. Since a Senate election cost approximately ten times as much as a House election on average, receipts as a percentage of their total PAC receipts do not exceed 25% and are generally lower than 10% even for the largest agricultural PAC recipients.¹⁵

Trade, Output and Protection

The USDA’s Production, Supply and Distribution database PSD Online (at http://www.fas.usda.gov/psd/complete_files/default.asp) was the source for trade and production data used to construct the inverse import-to-output ratios (z). Time series data

¹⁴ Top 20 list-makers who were not on the Agricultural committee represented districts with influential agricultural constituents (CA, OK, VA, MI). For example, Fazio’s district (CA, district 3) was among the 30 leading districts by market value of agricultural products (1997 Census of Agriculture).

¹⁵ In 1992 the average winning Senate candidate spent \$3.9 mn. while the average House winning candidate spent \$0.5 mn., approximately an 8:1 ratio,. The average Senate loser spent \$2.0 mn. While the average House loser spent \$0.2 mn., a 10:1 ratio. In other election cycles the ratios were similar. Further, total PAC receipts as a proportion of total campaign spending averaged approximately 20% for winning Senate candidates while they averaged approximately 50% for winning House candidates. These figures are computed from information on the [opensecrets.org](http://www.opensecrets.org) (opensecrets 2002) web site.

over 1985-2001 for farm products at the 4- and 5-digit Harmonized System (HS) level are available at the site.¹⁶

The main use to which the PAC spending data is put is measuring lobbying organization, which is central to the empirical analysis of the Grossman-Helpman model. Whether a good i has political representation ($I_i=1$) or not ($I_i=0$) is determined on the basis of the value of the ratio of PAC spending-to-production.¹⁷ Goods are ordered by the PAC spending-to-production ratio and sets of I are defined, each set corresponding to a particular cutoff value of the ratio. Model (3) is estimated using all these alternative I -sets in order to gauge the robustness of the results to measures of political organization.

As discussed in Section 1, agricultural protection relies heavily on non-tariff barrier (NTB)-based instruments. Given that tariffs were the primary focus of discussions in the Uruguay round, they are not appropriate for testing models of unilateral protection like the Grossman-Helpman model. Indeed, it is often argued that NTBs have emerged precisely because being party to multilateral tariff agreements forces governments to forgo unilateral control over their tariffs. NTBs are more amenable to unilateral actions. Measures of agricultural NTBs used in this paper are based on the NTB indicators in the UNCTAD TRAINS database for the years 1993, 1996, and 1999.¹⁸ There are over 150 types of NTBs documented by UNCTAD, and the measure used here is simply the coverage ratio of the union of all NTBs, or the proportion of imports covered by the NTBs. This measure has been prominent in studies of trade protection (Trefler, 1993; Goldberg and Maggi, 1999) thus facilitating comparison of our results with those obtained previously.

Estimation of the Grossman-Helpman model is based on an (unbalanced) panel over the 1985-2001 period, since we have the production and trade data for that period. However, the TRAINS database go back only to 1993. Faced with the choice of whether to drop observations corresponding to earlier years and conduct the analysis on a small sample, or

¹⁶ The USDA system matches the HS 4- or 5-digits descriptions almost perfectly.

¹⁷ Production value is not immediately available, since the PSD database keeps data in quantities, not values, and units of measurement are disparate across goods. But once the output-to-imports ratios are constructed, they are multiplied by imports (from UNCTAD, see below) in order to recover value of production. Where imports are zero this method does not allow measurement of production, and those observations have to be dropped. Fortunately, imports are strictly zero for only few goods.

¹⁸ From the raw data on the UNCTAD TRAINS database, Robert Haveman has constructed binary indicators of NTBs at the 6 digit HS level. These are used in the present analysis.

proceed on the assumption that the stickiness in protection justified applying the existing data to fill in the gaps, we chose the latter. Thus the 1993 UNCTAD NTB coverage ratios were applied for 1993 and preceding years, the 1996 coverages were applied for 1994 through 1996, and the 1999 coverages were applied for 1997 and subsequent years. The gain in the sample size is significant.

At this stage it is useful to consider whether exclusive focus on border protection while neglecting production subsidies and other mechanisms of price support is appropriate. The main justification for our focus on protection is that the quantitative literature assessing the impact of farm policies on world prices -- the variable that matters most to foreign countries whether or not they are agricultural producers -- concludes that border barriers are the most important determinant of international spillovers (World Bank, 2003). That is, the trade-distorting effects of policy are principally due to border protection. Further, as Sumner (2002) and others have argued, there is little scope for reopening the various provisions (concerning subsidies and other price support mechanisms) that are embodied in the US Farm Bill. While there has always been talk of reducing subsidies, in practice the trend is towards decoupling subsidies from production rather than reducing subsidies. The farm bills of rich countries make reform of subsidies a difficult task. However, since the Farm Bill does not address trade policy, border protection is more amenable to international negotiation. That is the reason for focusing on border protection and not other forms of price support.

The import elasticity (e) data kindly provided by Marcelo Olarreaga (World Bank). Estimation of the Grossman-Helpman model requires complete data on z , e , and protection. Whenever any of these is missing the observation is dropped. The sample coverage is quite adequate. For example, for 1998 the sample accounts for 45% of agricultural output.

5. Empirical Analysis

Results

Tables 1 and 2 contain estimates of the parameters in model (3). Table 1 reports estimates from fixed-effects (FE) models and Table 2 from random effects (RE) models. Either it is case that the included variables capture the main sources of heterogeneity across commodities

(FE), or that the unobserved sources of heterogeneity are orthogonal to the issue variables (RE).¹⁹ Despite the widely varying assumptions behind the two types of models, both models yield estimates and inferences that are strikingly alike. Without loss of generality, the discussion focuses on the FE model results in Table 1.

The ten models reported in Table 1 use different definitions of political organization. Their purpose is two-fold. First, contributions do not necessarily imply that a particular commodity is politically represented in the *trade* arena, the relevant policy domain for the Grossman-Helpman model. Agricultural producers have historically benefited from a basket of instruments such as production subsidies, acreage controls, and various types of price support measures, in addition to trade protection (see e.g. Goldstein, 1996 for an illuminating account of the evolution of agricultural institutions). It is not clear a priori which commodities are lobbying specifically for continued trade protection. Second, in order to service a readership with a broad set of beliefs, the ten models convey the robustness of the results to different measures of political organization.

In the first model in Table 1, 95% of the sample is organized. The variable I_{ij} equals 1 if the PAC spending-to-output ratio for the corresponding observation is ranked above the bottom fifth percentile of the sample. Absolute t -values appear below the estimates of β_0 , β_1 , β_2 . Shaded t -values denote statistical significance for 1-tailed test at 10% (bold), 5% (bold, underline), and 1% (bold, double underline). The fraction of population that is organized, α , is estimated as $-\beta_1/\beta_2$ if this value is less than unity, otherwise α assumes the corner solution value of 1. In Table 1 interior values of α are shaded and appear in bold (there are no implausible negative estimates). The preference parameter a is estimated as $1/\beta_2 - \alpha$ (again, there are no implausible negative estimate in any of the models).

The signs and statistical significance on the estimates of the parameters β_1 and β_2 affirm the Grossman-Helpman predictions in all the models, even in models with few

¹⁹ The RE econometric model presumes that the unobserved heterogeneity across commodities, that is, the heterogeneity not captured by the included explanatory variables, is uncorrelated with the included explanatory variables. Further, the RE model presumes an error-component structure in which a time-series variance component is added to a cross-sectional variance component (see e.g. Woolridge, 2003). Since this results in heteroskedasticity (unequal variances) estimation is by generalized least squares. The FE model, on the other hand, does not presume the absence of correlation between the unobserved heterogeneity in the commodities with the included explanatory variables. Heterogeneity is controlled via as many dummies as there are commodities.

politically organized sectors. Estimates of β_1 are negative and statistically significant in all models, indicating that organized consumers lobby against protection of agricultural commodities that are not politically well represented. Estimates of β_2 are positive and usually statistically significant using a right-tailed test. Political organization thus increases agricultural NTB protection according to the z/e ratio. For commodities represented by lobbies, the greater the stakes from protection (high output) and the lower the deadweight loss from protection (low imports, low e), the greater is the level of NTB protection afforded.

A change in z/e in an unorganized industry thus changes the level of NTB coverage by $\beta_1 < 0$, and in an organized industry by $\beta_1 + \beta_2$. The theoretical prediction that $\beta_1 + \beta_2 > 0$ is borne out in models with I -cutoffs above 30%, 35%, 50%, 75% and 80% (in which estimates of α lie between 0 and 1).²⁰ Since it is likely that between 30% and 80% of the commodities (more precisely, observations in the panel) *are* organized, those models capture reality. Political organization thus results in the *additional* gain in protection equal to β_2 , for every unit change in z/e . For example, if one believes that 50% of the sample has political organization, an increase in the output-to-import ratio by 100 would increase NTB coverage in politically organized sectors by 0.20, or 20%. In the cross section, there are wide disparities in the output-to-import ratios, and differences of that magnitude are not uncommon.

Quantitatively, the results echo a puzzling finding from previous examinations of the Grossman-Helpman model from manufacturing data. The implied estimates of the government preference parameter are highly skewed towards welfare. The estimates of a , inferred from the fixed effects estimates of Table 1, are between 399 and 692 (using only estimates from models that satisfy $\beta_1 + \beta_2 > 0$, that is, where α is estimated to be positive and less than 1). They show that government places far greater weight on a dollar of welfare, at least 400 times as much, as on a dollar contributed politically. The implication is that the observed values of z/e and their interactions with I can only lead to the observed levels of NTB protection if government puts a very high weight on welfare. That is, *if lobbying expenditures are made according to the profit gains (to producers) and deadweight losses (to consumers) implied by z/e* , then observed agricultural protection can only be justified by

²⁰ However, formal hypothesis tests indicate that $\beta_1 + \beta_2$ is not statistically significantly different from zero. In other words, on the margin, political organization is able to eliminate the negative protection that would result were there no political organization, but not buy any more than that on average.

government's maximization of an objective function that heavily weights welfare. If government placed less weight on welfare then we should observe far higher levels of NTB protection.

Removing the conditioning information (in italics) in the previous paragraph leads to the conclusion that government maximizes welfare. That is, the unconditional implication of high values for a is simply that the Grossman-Helpman model mistakenly assumes that government's objective is something other than welfare maximization. But welfare maximization would lead to free trade, and trade in agriculture is by no means free. The deadweight losses from protection are considerable. Table 2 compiled from Hufbauer, Elliott, and Schott (1986), indicates the extent of those losses from protection in U.S. agricultural products. They estimate the annual deadweight losses from protection due to sugar quotas during 1977-84 to be \$540 mn., due to Section 22 protection of dairy products in 1983 to be \$1.6 bn., due to peanut quotas in 1983 to be \$14 mn., due to voluntary export restraints of meat in 1983 to be \$280 mn., and due to a policy to extend the fish conservation zone further out to sea to be \$185 mn..

Our own data used to estimate the models in Tables 1 and 2 indicate that over the period of the sample NTBs covered 45% of agricultural imports (25% of imports were covered by measures such as monitoring and threats of antidumping investigations, and 20% were covered by price-type measures such as antidumping and countervailing duties). This expanded in 1996 upon conclusion of the Uruguay round to around 90% of agricultural imports (the use of "surveillance" and tariff quotas greatly increases while harder price-based measures declined). In sum, protection of agriculture is substantial. To conclude that the large values of a inferred from estimates of the Grossman-Helpman model require us to reject the role of politics in agricultural trade policy would be a simplistic at best and a misrepresentation of the results at worst.

How is one to resolve this paradox? A natural starting point is the idea that the large estimates of a are a consequence of the model's assumption that *contributions are far larger in magnitude than they actually are*. Ceteris paribus, the higher is output (numerator of z) the greater is the gain to producers from protection, while the lower is imports (denominator of z) and the import elasticity the smaller is the deadweight losses to consumers from protection. Thus producers make lobbying expenditures in accordance with the ratio z/e . In the common

agency model of Bernheim and Whinston (1986), which is the framework that Grossman and Helpman adopt, contributions are locally truthful, that is, around the equilibrium tariff policy vector each lobby's contribution schedule is such that the lobby contributes whatever it gains (gross of contributions) *at the margin*. Thus, in order to induce government to implement a policy, the change in contributions from any lobby due to a small change in policy must, at the margin, compensate the government an amount equal to (i) a times the loss in consumer welfare plus (ii) the net loss in contributions from all other lobbies due to that policy change²¹

To simplify the exposition without losing generality, consider the case where a single lobby represents each sector, and whose membership comprises a negligible fraction of the population. Then the actions of any lobby do not affect other lobbies (Grossman and Helpman, 1994, Section 4 Example 3). Then the common agency relationship simplifies into a set of independent principal-agent relationships. Each lobby compensates according to a times deadweight loss and obtains the corresponding amount of protection. Scenarios with lobbying competition entail greater contributions.²² If deadweight losses are as large as the estimates in Table xxx3 indicate, then according to the lobbying side of the Grossman-Helpman model the estimates of a imply that we should observe lobbying spending in the billions of dollars! The first puzzle, then, is the case of the missing contributions.

Alternative Theories

It is relevant at this stage to consider whether competing views about lobbying might not be more relevant than the Grossman-Helpman view of lobbying as exchange. An alternate view is one where lobbying spending provides access to politicians. This opens the door for lobbies to provide politicians with information that benefits them and simultaneously implies policies that benefit the lobbyist.²³ Hansen (1991) discusses milestones in agricultural policymaking during the twentieth century that resulted from of such informational lobbying.²⁴ Might not informational lobbying be a worthy alternative to the quid-pro-quo lobbying of the Grossman-Helpman model?

²¹ Mathematically this is immediate from differentiating (1) with respect to the vector of prices p .

²² Section 4 of Grossman and Helpman (1994) provides examples with lobbying competition.

²³ This theory was originally developed in Bauer, Pool and Dexter (1963) and Millbraith (1960).

Evidence on the effectiveness of informational lobbying in agriculture is weak at best, and absent at worst. Wright (1991) finds only very weak evidence of informational lobbying of the House Agriculture committee, the most influential policymaking committee in agriculture. He attributes the weak finding to the fact that the Agriculture committee deals with a narrow and well defined set of issues on a periodic basis (as different from Ways and Means which attacks a range of diverse issues, often on an ad hoc basis). Both, leaders and rank and file members of the Agriculture committee, have ample opportunity to regularly interact with lobbies. The preferences of agricultural lobbies have been fairly constant over time, and so those preferences are well known to Agriculture committee members (in contrast to the Ways and Means Committee whose members encounter a wide range of lobbyists, many on an issue-by-issue basis, so that informational lobbying can be influential on the margin). Hence, informational lobbying of Agriculture committee members is *not* influential on the margin in the formation of coalitions. This view of Agriculture committee members possessing a strong continuing link with PACs whose preferences have been stable over time is endorsed in Parker and Parker (1998). Agriculture is distinguished among committees for the stability of their coalitions as issues move from committee to the floor. Parker and Parker take this to imply that the influence of special interests on forming preferences of committee members on these committees is strong. In contrast, member of other committees often change their votes on the floor indicating that their preferences on committee were weak to begin with.

Therefore, we do not see a role for informational lobbying in agriculture, at least over the short duration of a decade. Our experiment is different from Hansen's (1991), who considers a longer period in history during which there were points in time when Congress sought new information from lobbies. At those threshold points, informational lobbying may

²⁴ Specifically, in the 1950s and 60s, farm policy makers dropped the American Farm Bureau Federation (AFBF) from its dominant position in agricultural politics. AFBF had been agriculture's leviathan for a generation. In the 60s and the 70s commodity organizations replaced the position previously occupied by the AFBF. Also, in the 60s and the 70s farm policy makers paid less and less attention to the advice of farm lobbies. In the 70s and 80s, this was reversed, and they scarcely paid attention to the advice of consumer lobby. In sum, during those 40 years, congress reallocated access within the farm lobby, congress restricted access for the farm lobby but congress denied access to the consumer lobby. Hansen's theory of these changes in access is developed around (i) competitive advantage in a lobby's ability to deliver better information to politicians than their rival groups, and (ii) recurrence of issues around which a lobby makes its case to the politicians. Hence, politicians grant access to lobbies on the basis of their *informational advantage* over other lobbies, and also the *permanence* of the issues and positions conveyed by the lobbies.

have led to marked shifts in how Congress began to view agricultural policy. On a continuing basis over the 1991-2000 period we see little role for new information. Our view is thus that agricultural PACs contributions are more in the spirit of exchange or payments in political markets for protection, as Grossman and Helpman posit.

Rejecting the informational lobbying paradigm, however, still leaves unresolved the puzzle the results pose. Having argued against the alternative model of informational lobbying, we bear the burden of reconciling our results with the maintained Grossman-Helpman model.

Reconciling the results: Probabilistic protection

There are actually two resolutions we present, both of which bring the model closer to legislative reality. The first way of reconciling the results with the model is by modifying the prediction that contributions equal a times deadweight loss (DWL) by introducing uncertainty about whether protection will in fact be delivered. The Grossman-Helpman model presumes government to be a singular entity with the power to supply protection with certainty. In reality the legislative process leading to protection is uncertain.²⁵ For example, if contributors viewed the probability of continuing protection to be 1%, then contributions in the same model would equal a times *expected* deadweight loss, or $a \times 0.01 \times \text{DWL}$. More generally, suppose this probability is γ . Then the estimated coefficient on the term $I \times z/e$ in equation (3) is actually $\gamma \times \beta_2$ (and not β_2 as in the original model). If we believe γ to be 0.01, then a coefficient on $I \times z/e$ of 0.005 actually implies that β_2 equals 0.5. a now equals 2, which is very much in line with the amount of contributions and deadweight losses that agricultural protection actually imposes.

Intuitively, just as the variable z/e mapped DWL (see fn. below) into contributions in the original Grossman-Helpman model, with uncertainty about protection the relevant variable now becomes $(\gamma \times z/e)$.²⁶ If this variable is used in place of z/e in model (3), the

²⁵ Technically this implies that in Grossman and Helpman, 1994, Figure 1, the GG curve as viewed by contributors is probabilistic, possibly leading to lower contributions.

²⁶ Consider the expression for an approximation of DWL in any industry (and dropping subscript i): $\text{DWL}/x \approx 0.5 \times [t/(1+t)]^2 \times e/z$, where x is output (see fn. 27). Substituting for $t/(1+t)$ from (2), but presuming $\alpha = \beta_1 = 0$ in keeping with our single lobby scenario, yields $\text{DWL}/x \approx 0.5 \times [\beta_2 \times z/e]^2 \times e/z = 0.5 \times 1/a^2 \times z/e$, or $a \times \text{DWL}/x \approx 0.5 \times 1/a \times z/e$. (Since the numerator on the left hand side is PAC spending according to the Grossman-

estimates of the preference parameter a in Tables 1 and 2 would have to be scaled down by $1/\gamma$ (for example, 100), yielding sensible values for a .

Can a low probability such as 1% be justified? As Table 3 indicates, protection of sugar, dairy, peanuts and meat has been in existence for decades. Lobbies must like their chances of continued protection! Consider a very different calculation on their part, one that is consistent with the pattern of their giving, which achieves similar results to the low probability case. Lobbies calculate that if they are able to influence a handful of politicians, such as ranking members of the House and Senate agriculture committees, then it is likely that protection will be continued. By targeting only a handful of members, lobbies lower the probability of success.

The second way of reconciling the results with the model is therefore to view the *probability* of getting government to implement protectionist policy to be the (endogenously determined) target of lobbies. It may be in the interest of lobbies to target low probabilities because, by the expected deadweight loss logic, higher probabilities entail higher spending. Due to free riding and other organizational problems, sectors may not be able to get all producers to contribute to the cause. Thus, lobbies select whom to lobby in order to achieve a targeted probability of success (in turn, determined according to how much they can spend). Another benefit is that the political burden of the deadweight loss falls equally on all 525 representatives and senators, but the lobbies need target, say, 15 influential members. Hence, lobbies contribute $15/525$ of $a \times E(DWL)$, or approximately $0.03 \times a \times E(DWL)$. The result is approximately similar to the 1% probability calculus previously described, even if the probability of obtaining protection is high, around 50% (that is, $E(DWL) = 0.5 \times DWL$).

From the congressperson's point of view, each bears a small share of the DWL. Congresspersons on the agricultural committee are more than willing to bear their share of DWL. As described graphically in Section 4, representatives of agricultural constituencies vie for membership on agricultural committees so that not only are they able to influence policy to suit their constituencies but they are able to be lobbied as well. Hence, formal extensions

Helpman model, $PAC/x \approx 0.5 \times 1/a \times z/e$, and PAC spending by the industry's lobby as a fraction of industry output is proportional to z/e , the factor of proportionality being approximately $0.5/a$. This mapping from DWL into z/e is modified as DWL becomes probabilistic. Thus, if $E(DWL) = 0.01 \times DWL$, then $a \times E(DWL)/x \approx 0.5 \times 1/a \times (0.01 \times z/e)$. That is, the lobby contributes according to the transformed variable $(0.01 \times z/e)$.

of the Grossman-Helpman theory in this direction should recognize the paramount importance of committees in legislative decisions as emphasized in Fenno (1973), Grier and Munger (1991), and Weingast and Marshall (1988).

Once the issue leaves the committee for the floor, why should other congresspersons that bear the DWL but are not compensated by lobbies, care to vote for the distortionary policy? A plausible reason is the possibility to trade votes. Agriculture committee members are supported in exchange for their support on issues on which the agriculture committee members bear their portion of DWL without being compensated. Proof of vote trading in the U.S. congress and its quantitative importance is demonstrated in Stratmann (1992, 1995). Stratmann (1995) finds that vote trading among farm interests is widespread, and that such logrolling coalitions exhibited a strong degree of stability. Stratmann's (1992) analysis of logrolling during voting on the 1985 Farm Bill shows strong evidence that legislators traded votes. Moreover, legislators with intense preferences, such as members of the House agriculture committee, were the most likely to trade votes.

The puzzle thus stands resolved. The implication that the Grossman-Helpman model is qualitatively and quantitatively validated arms us with a political economic theoretical lens with which to view agricultural protection. The view should jolt us into reality. The equilibrium we observe is one that has strong political underpinnings. Is it an equilibrium that is easily dislodged? We think not.

6. Design of Institutions: Implications for International Cooperation

What do our results imply for institutional design? Let us view Putnam's (1988) domestic or Level II interactions in agriculture through the Grossman-Helpman lens. We see a government receptive to exchanging agricultural protection for campaign contributions from interest groups. Agricultural policy is therefore an equilibrium price at which the government delivers the demand for protection. The empirical results not only validate the existence of such linkage between the government and interest groups, but also indicate, based on our resolution of the "paradox of missing contributions", that government may place as much weight on a dollar of campaign contributions as a dollar of welfare loss for consumers.

To place the results of this paper in the international institutional context, consider the Doha round currently underway. The deadlock over agriculture in Cancún put the Doha round in the same position as the Uruguay Round after the 1990 Brussels stalemate over agriculture. Presciently, Paarlberg (1997, p. 414) questioned the wisdom of linking the fate of the Doha round to significant liberalization of agriculture, based in part on the experience with prioritizing agricultural liberalization in the Uruguay round. The specific question is whether to rely on *domestic* efforts to reduce agricultural protection, bringing these to the WTO only once they have been agreed domestically, or whether to rely on internationalizing the domestic reform agenda. Putnam's (1988) two-level games highlight linkages of one policy with another, suggesting that an internationalizing strategy might effectively link negotiations over agriculture to other areas such as intellectual property rights. Simultaneous liberalization might stand a better chance of success than a strategy of liberalizing issues individually.

In the specific case of agriculture, Paarlberg (1997) argues against such issue linkages, and recommends domestic liberalization before internationalization. His argument is that the Uruguay round neither facilitated nor motivated agricultural liberalization beyond the domestic EU MacSharry reforms of 1992 and the domestic US reforms of 1990 and 1995-96.²⁷ Many observers have concluded that the Uruguay round did not lead to effective reductions in support to agriculture, and where it did it was largely unilateral. It can be hypothesized that one explanation for this is that the focus of negotiators was to a large extent on domestic subsidy programs, as reflected in the development of disciplines relating to the classification of trade-distorting subsidies (into the well known "green, amber and blue" categories) and reduction commitments for different categories of support. However, very little reform of border protection really occurred (Anderson, 2004).

It is clearly possible, in principle, to link agricultural liberalization to commitments in other areas that export interests and those seeking multilateral disciplines for non-economic reasons care about. The problem is that in the Uruguay round there was far more scope to

²⁷ Patterson's (1997) account of the MacSharry reforms highlights two intra-EU factors. First, German integration created a multitude of interest groups thus lowering the relative influence of agricultural interest groups which had historically wielded influence at the poll. Second, the enormous pressure on Germany's budget due to integration was exacerbated by its contribution towards sustaining the CAP in its existing form. This created a schism between French and German positions towards CAP reform, and broke the alliance that had previously dominated CAP policymaking. Paarlberg also notes that the EU reforms were motivated by bilateral US threats (for which Germany did not have the stomach). On the US side, reforms were due to a change in party control in the Congress plus exogenous changes in grain prices.

seek to employ such cross-issue linkages than there is today. In the Uruguay Round new policy areas such as intellectual property rights and services were opened up to negotiations. Developing countries saw the benefits of introducing reforms in those areas in return for ending the Multifibre Agreement and limiting the use of agricultural subsidies by developed countries. In the current Doha round there are no new issues on the table and the scope for cross-issue trades is greatly reduced. There is still potential for trading across issues such as services commitments by developing countries. But even here, the design of the relevant multilateral instrument, the General Agreement on Trade in Services (GATS), is such that services industries do not see the potential for overcoming the insurmountable constraints they face in contesting and operating in foreign markets (Mattoo, 2003). In manufacturing, many countries have already accomplished open market access to trade and direct investments. Without new developments, the incentive for export interests to engage in the trade negotiation game is muted. There are only few options remaining. Either other interest groups must see it worth their while to seek to use the WTO to pursue their objectives, for example development or environmental NGOs or Church groups, or the remaining “hard nuts” of protection will have to be addressed through predominantly domestic political interactions.

The design of international institutions is the endogenous result of strategic interactions among countries based on rational calculations (Bagwell and Staiger 2003). Rosendorff and Milner (2001) argue that international institutions that include an escape clause make it (i) easier for countries to reach an initial agreement to liberalize, and (ii) lead to more long-lived cooperation among countries. The greater the uncertainty about future domestic demand for trade intervention, the less likely it is that governments will agree to liberalize trade without the “insurance” that an escape clause provides. Escape clauses will be a precondition for agricultural agreements to liberalize trade. Even were such clauses possible, they are unlikely to make agreements easier to reach unless countervailing forces that are willing to take on agricultural protection in domestic political contexts exist.

Institutional solutions, including international agreements, while carved by designers, evolve endogenously in response to demand for change and the supply of institutional innovations. Before the end of the Uruguay round, Runge and von Witzke (1990) predicted that EU expansion to include Eastern European countries would be the source of demand for

liberalizing the CAP. In the event, budgetary pressures, as well as linkages with issues such as the environment and the increased emergence of interest groups centered around these issues, did force the rethinking of institutions such as unanimity in voting for policy changes (that existed before the 1992 reforms). The CAP was reformed in anticipation (in part) of the accession of the 10 additional countries that joined the EU in 2004. Thus, in the case of the EU and the CAP, the pressure for reform has been influenced by a regional expansion strategy. Can a shift to more regional strategy may have greater prospects of imposing disciplines on border protection in agriculture?.

The Cancún deadlock led to an increase in interest by countries to seek bilateral agreements.²⁸ The US indicated it would vigorously pursue free trade agreements, in part to gain export market access for agricultural products in which it has a comparative advantage. A noteworthy feature of the agreements that were negotiated after Cancun by the US is that they include agriculture, something that the EU has studiously avoided in its RTAs, though integration of the agricultural market is an objective of the CAP for EU members.

Why might bilateralism appear attractive to the US? Martin's (1992) analysis of collaboration games suggests that since multilateral norms (e.g. reciprocity and nondiscrimination) are problematic to enforce, a response to collaboration problems is for smaller groups to reach bilateral agreements and then apply the norm of nondiscrimination to extend these agreements to other countries. Yarbrough and Yarbrough (1992) suggest that stable cooperative outcomes in international trade settings are more possible on a regional or bilateral basis. Regionalism is not necessarily a negative development for agriculture for two reasons. First, bilateral agreements will lead to the removal of protective barriers in at least some sectors. Richardson's (1993) also suggests one way in which a regional process

²⁸ Why might governments prefer free trade agreements at all? Maggi and Rodriguez-Clare (1998) provide an answer. They model plausible scenarios in which lobbies do not compensate the government adequately for all the distortions from protection. When government weighs both welfare loss and contributions significantly (as our empirical results indicate to be the case with agriculture), the loss in welfare provides the impetus to push its policies in the direction of free trade. So even though issue linkages might stymie multilateral negotiations, the Maggi-Rodriguez-Clare mechanism still induces governments to seek free trade via bilateral trade agreements. This might provide the foundations behind Goldstein's (1996) analysis that since executives elected by national constituencies are welfare-minded they have the greatest incentives to turn to international institutions. Handing over policymaking authority to international institutions gives a more equitable representation to export interests and the public than the government might domestically be able to provide. Martin and Simmons (1998) also point out the role of time-inconsistent preferences as incentives for governments to transfer policymaking to international levels, because the long-term gains from doing so outweigh the short-term losses.

encourages wider liberalization of those sectors: the political weakening of these sectors decreases their ability and incentive to lobby for protection. As a result the government's incentive to protect them also diminishes, opening the path to multilaterally liberalizing those sectors.

Second, bilateral agreements may be accompanied by deeper integration that allows for investment and thus joint ownership of farms by agriculturists from partner countries. This may allow small farmers on both sides of the border to cooperate in joint ventures, enhancing their ability to compete with big producers in their own countries. In the North American context, the same farmers cooperatives that historically resisted free trade, now champion it in specialty crops such as avocados, tangerines, as well as in commodity products such as milk and cheese. For example, Calavo Growers Inc., a California cooperative specializing in avocados, was originally a strong opponent of NAFTA. But it transformed itself within a decade into a trader of avocados, purchasing the bulk of its products from Mexico, Chile, and New Zealand. Sunkist Growers Inc., an orange and lemon cooperative in California, has agreements with Chilean and South African growers to sell their products under the Sunkist brand to markets as far as Hong Kong and Japan.²⁹ Thus, institutional development arising in a trade agreement context can erode trade barriers and potentially aid future multilateral liberalization of agriculture.

Runge and von Witzke's argument, carried over to agricultural protection, would be to delay the liberalization of agriculture until a time when the processes outlined above erode the political power of agricultural lobbies. Rather than attempt to force countries to negotiate down barriers at a time when domestic interest groups with deep pockets rule, it may be best to let other institutions develop that erode those links. The potential for the emergence of such institutions is good. RTAs provide the scope for such a dynamic to develop. The recent inclusion into the EU of a number of countries that are relatively poor and agriculture intensive has begun the process of decreasing agricultural prices within the EU and reducing the need for high border protection. EU expansion thus illustrates the potential for regional integration process to drive the adoption of more efficient policies. But it also illustrates that the process may take a long time, imposing costs on the rest of the world in the interim.

²⁹ "Farm Alliances Erode Trade Barriers" Wall Street Journal, 9/15/2003. Dairy cooperatives from Ireland, New Zealand, and Denmark are already old hands at this internationalization game.

Another institutional response to offset the strength of the agricultural lobby is to increase the perceived *domestic* cost of maintaining the status quo. This can be achieved through actions aimed at encouraging greater participation of potentially countervailing lobbies. By providing more information on the negative spillovers of agricultural protectionism, for example, its impact on the environment, on poverty and income distribution at home, on developing countries and poverty alleviation prospects there, and on the link to security, countervailing forces can be unleashed. Absent such engagement our results suggest little prospect for reform. There is of course a link between such a strategy and the trade negotiations context, as the latter can provide a focal point for such groups. However, and this is a lesson of the Uruguay round, it is important that the focus not be predominantly on actions that are sought on the part of developing countries, but that the focus be on actions that are needed at home.

Realism suggests, however, that expectations regarding the results of a domestic information generation strategy should be limited. It is not a panacea, as illustrated by the results of campaigns by NGO groups to “name and shame” recipients of aid in the US, or to highlight the environmental spillovers of regressive distributional effects of current policies. Exogenous factors such as the ballooning U.S. fiscal deficit in the, the prospect of further accessions in the EU, and perceptions that redirecting funding to higher value added activities such as R&D may well play important roles. Insofar as domestic action will be key, such exogenous changes could be critical in changing the existing political equilibrium. The best documented case in this regard is the reversal of U.S. protectionist policies in the early 1930s through the adoption of the Reciprocal Trade Agreements Act (Hiscox, 1999).

7. Conclusion

This paper investigates the determinants of US agricultural protection, from the theoretical lens of the Grossman-Helpman (1994) model. This theoretically well founded model delivers clear empirical predictions about the structure of protection. Thus, empirical estimation of the determinants of protection are tightly linked to theory and not ad hoc as in previous empirical work on the subject of the political economy of protection. This is the first attempt at

applying this model to study agricultural protection. Estimates from the model strongly affirm the qualitative implications of the Grossman-Helpman model. They clearly establish that interest-group money holds influence over agricultural protection in the U.S. We also attempt to resolve puzzles about the quantitative implications of the results. We show that the puzzle arises due to the unrealistic implication of model (in turn, due to the model's assumption of a unitary government that can deliver protection with certainty) that lobbying spending is many times more than what it actually is. We show that the puzzle is resolved by extending the model to allow uncertainty about the ability of politicians to deliver policy.

The results of the empirical estimation clearly reveal the government-business political nexus that underlies the equilibrium with agricultural protection. Multilateral trade negotiations have been a major focal point for international efforts to change the domestic political equilibrium supporting protection of agriculture. But the experience suggests that at the end of the day reciprocity is of limited use in the case of agriculture. Little has been achieved in terms of effective multilateral disciplines and distortionary policies supporting agriculture remain high. Although there has been a move towards less distorting forms of income support, there is little reform of the rates of border protection.

From a global welfare perspective the biggest gains will be due to reductions in market access barriers (Anderson, 2004). Although the GATT/WTO is designed to pursue such an agenda, after forty years we remain in a situation with high agricultural barriers. We make the case that the potential to use the institutional mechanism of reciprocal liberalization and cross-issue linkage has declined relative to what was feasible ten or twenty years ago when barriers to manufactures were higher. Given the increasing controversy over whether expanding the WTO to include new issues will yield significant net benefits, and the fact that the kinds of new issues slated for inclusion in the WTO are anyway unlikely to mobilize countervailing domestic political forces strong enough to take on the agricultural lobby, other strategies will likely be needed. One avenue for domestic change is the shifts in interest group constellations due to exogenous factors. These might take a long time. We suggest that bilateral and regional trade integration, as opposed to multilateral efforts, may speed the process of change.

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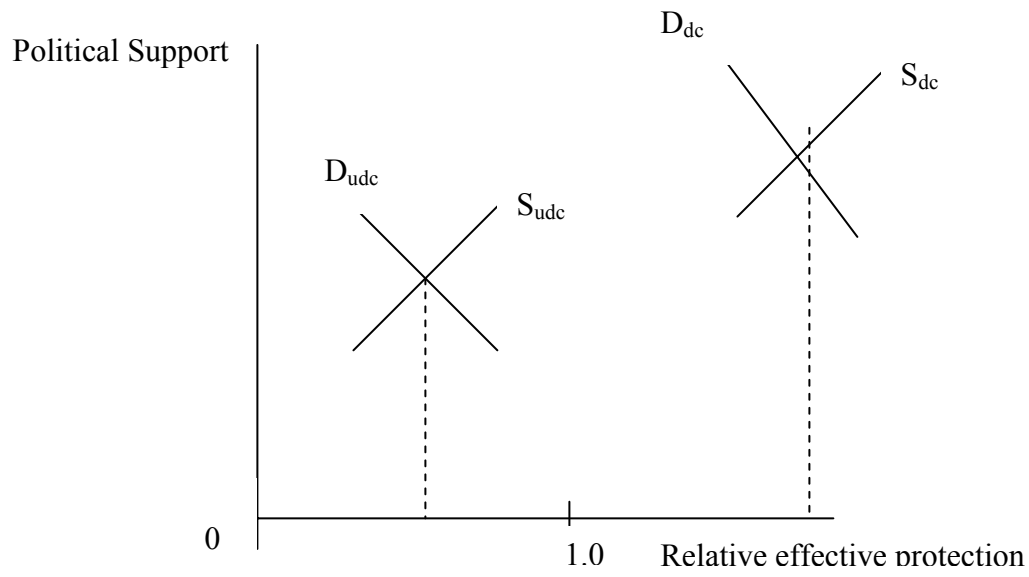


Figure 1: The political market for government assistance to agriculture

Figure 2.1: Top 20 H0USE Recipients of AG PAC money: 1991-92 Election Cycle

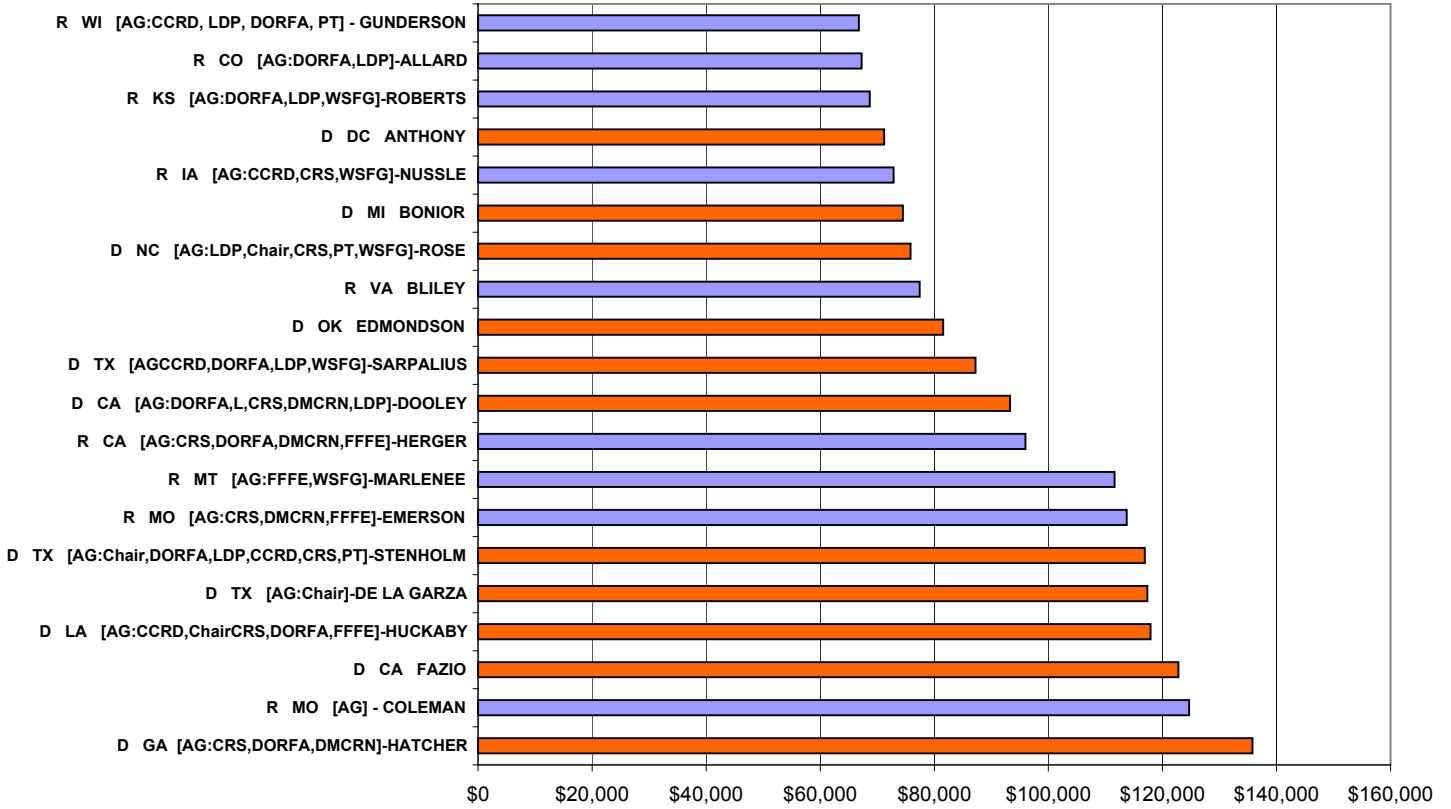


Figure 2.2: Top 20 H0USE Recipients of AG PAC money: 1990-00 Election Cycle

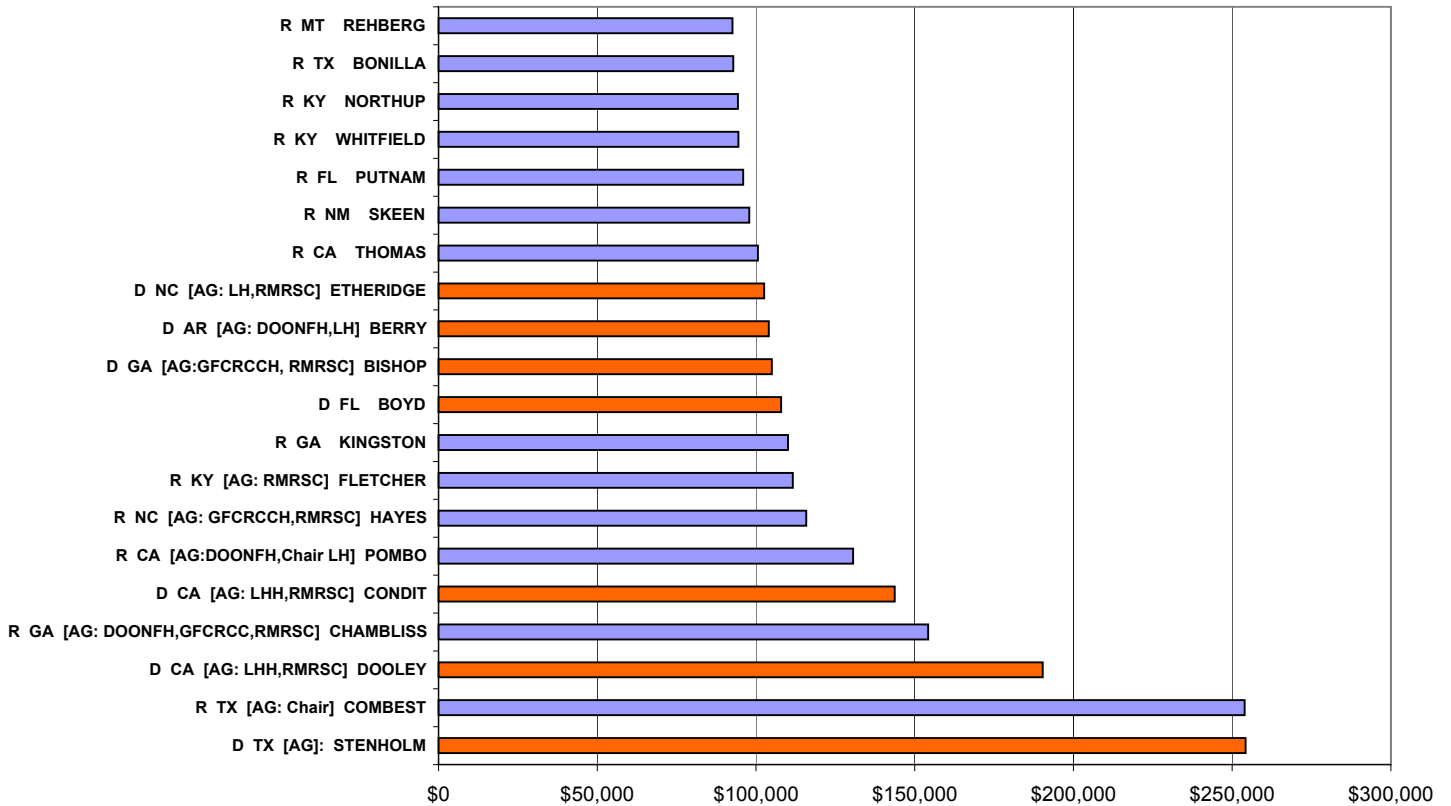


Figure 3.1: Top 20 SENATE Recipients of AG PAC Money. 1991-92 Election Cycle.

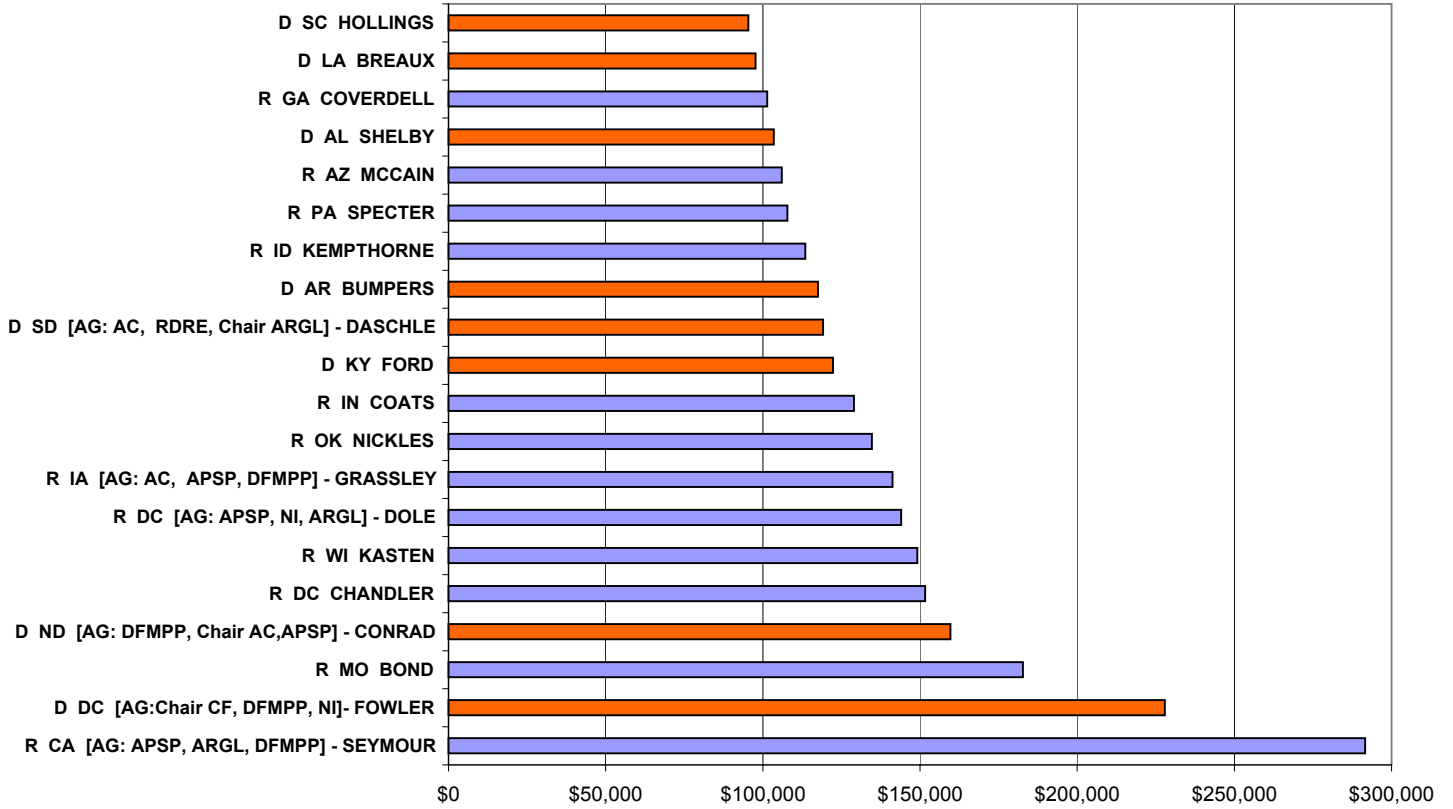
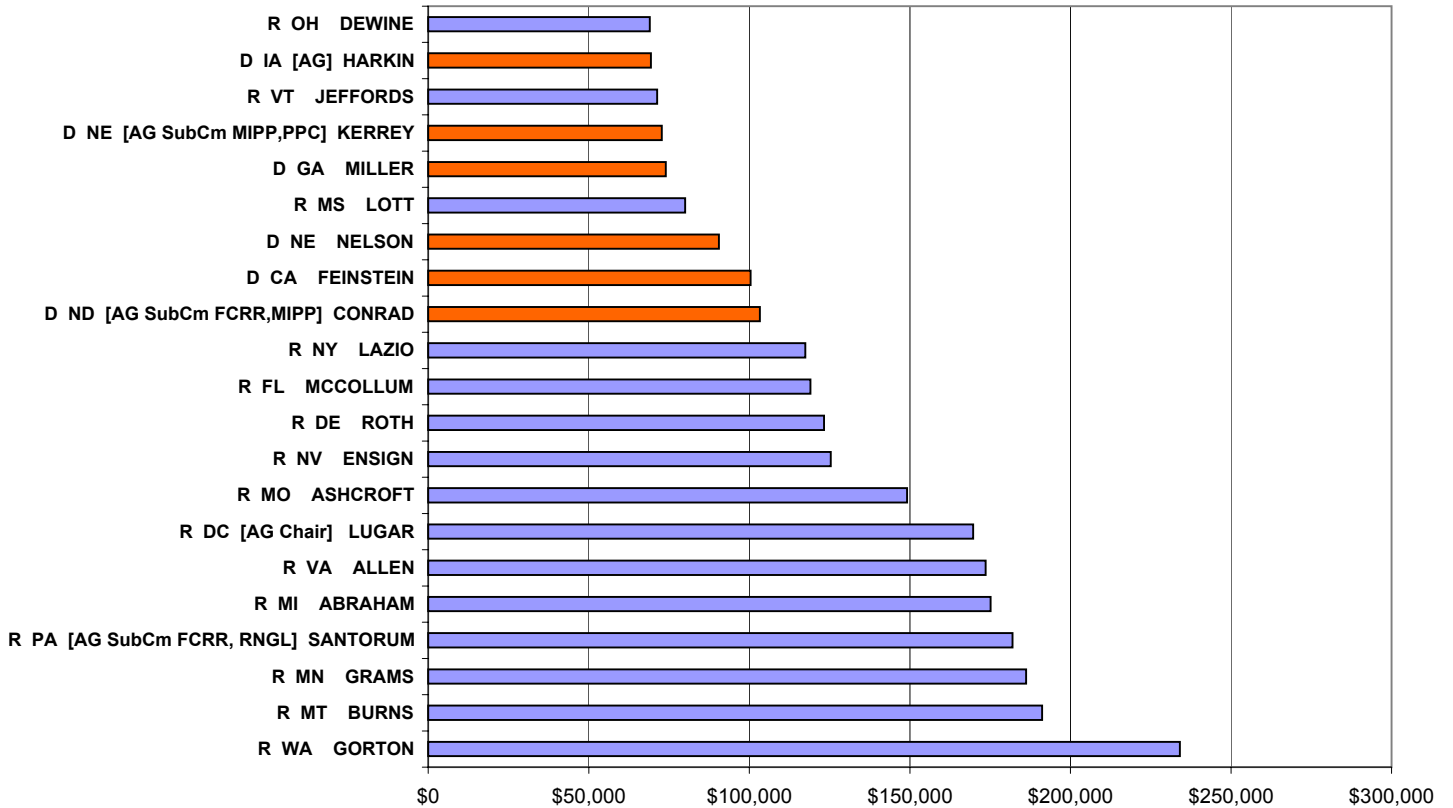


Figure 3.2: Top 20 SENATE Recipients of AG PAC Money. 1999-00 Election Cycle.



**Table 1.1: Fixed Effects Estimation of the Grossman-Helpman Model
44 commodities, unbalanced panel over 1985-2001**

$$\frac{NTB_{it}}{1+NTB_{it}} = \beta_1 \frac{z_{it}}{e_{it}} + \beta_2 \left(I_{it} \times \frac{z_{it}}{e_{it}} \right) + \lambda_i + \varepsilon_{it}, \text{ where } \lambda_i \text{ are fixed effects.}$$

$I_{it}=1$ if (PAC $_{it}$ /Output $_{it}$) is ranked above bottom:	β_1	β_2	N	R^2	\hat{a}	$\hat{\alpha}$
5%	-0.002084 <u>3.10</u>	0.001540 <u>2.03</u>	497	.466	648	1
10%	-0.001424 <u>2.92</u>	0.000958 <u>1.61</u>	497	.463	1043	1
20%	-0.001173 <u>2.30</u>	0.000367 0.56	497	.461	2726	1
25%	-0.001339 <u>2.77</u>	0.000857 1.32	497	.461	1166	1
30%	-0.001860 <u>3.66</u>	0.002008 <u>2.85</u>	497	.463	497	0.93
35%	-0.001771 <u>3.47</u>	0.001828 <u>2.53</u>	497	.470	546	0.97
50%	-0.001765 <u>3.62</u>	0.002042 <u>2.88</u>	497	.471	489	0.86
60%	-0.001218 <u>2.83</u>	0.001050 <u>1.69</u>	497	.464	951	1
75%	-0.001400 <u>3.28</u>	0.002502 <u>3.19</u>	497	.473	399	0.56
80%	-0.001133 <u>2.71</u>	0.001443 <u>1.76</u>	497	.465	692	0.78

Notes:

1. Absolute t -values below estimates of β_0 , β_1 , β_2 . Shaded t -values denote statistical significance for 1-tailed test at 10% (bold), 5% (bold, underline), 1% (bold, double underline).
2. Dependent variable is measured as NTB coverage ratios. On the rhs, individual variables are defined as: the output-to-imports ratio (z), the absolute price elasticity of import demand (e), and the binary variable indicating political organization (I).
3. The eleven models differ in their definitions of Political organization: $I=1$ if the (PAC/Output) percentile is above the cutoff level in first column.
4. α is % of population that is organized (shaded, bold if positive and less than 1. In the estimation α is not constrained to be positive and less than 1. It is estimated here as $\alpha = \text{Min}(-\beta_1/\beta_2, 1)$.
5. a is the preference parameter. a estimated as $a = 1/\beta_2 - \alpha$, where α is estimated as described above.

**Table 1.2: Random Effects Estimation of the Grossman-Helpman Model
44 commodities, unbalanced panel over 1985-2001**

$$\frac{NTB_{it}}{1+NTB_{it}} = \beta_1 \frac{z_{it}}{e_{it}} + \beta_2 \left(I_{it} \times \frac{z_{it}}{e_{it}} \right) + \beta_0 + u_i + \varepsilon_{it},$$

where u_i are random effects (uncorrelated with regressors) terms.

$I_{it}=1$ if (PAC $_{it}$ /Output $_{it}$) is ranked above bottom:	β_1	β_2	β_0	N	R^2	\hat{a}	$\hat{\alpha}$
5%	-0.002061 3.11	0.001638 2.24	0.551371 9.96	497	.020	610	1
10%	-0.001339 2.88	0.001010 1.80	0.551012 9.89	497	.016	989	1
20%	-0.001062 2.22	0.000470 0.79	0.562439 10.12	497	.011	2129	1
25%	-0.001259 2.78	0.000972 1.66	0.555973 10.09	497	.015	1028	1
30%	-0.001693 3.65	0.001875 3.05	0.552671 10.14	497	.028	533	0.90
35%	-0.001637 3.53	0.001777 2.84	0.556588 10.29	497	.026	562	0.92
50%	-0.001519 3.47	0.001789 2.87	0.566482 10.39	497	.026	558	0.85
60%	-0.001001 2.58	0.000842 1.42	0.566759 10.22	497	.014	1187	1
75%	-0.001144 2.98	0.002091 2.77	0.573224 10.16	497	.025	478	0.55
80%	-0.000932 2.49	0.001151 1.45	0.568653 10.22	497	.014	868	0.81

Notes: See Notes to Table 2.1, plus:

1. The Hausman test for random effects (that the individual effects are uncorrelated with the other regressors) cannot be rejected at 5% for any model except the last one, where the I -cutoff is above 90th percentile.
2. In all models, the variance component for the random effects (i.e. σ_u^2) is approximately 0.10, and the variance component for the total error (i.e. σ_ε^2) is approximately 0.14. Hence, there is variance in the time series data for specific commodities, as well as in the cross-section across commodities.

**Table 2: Welfare Costs of Protection: Selected Products
(Compiled from Hufbauer, Berliner, and Elliott, 1986)**

Sugar	1934- 41	Jones-Costigan Act established quota framework for production and imports. Consumption allocated to domestic and foreign sugar producers. Additionally, tax on domestic and imported sugar used to pay domestic producers to limit their production.
	1948-74	The 1948 Sugar Act assigned fixed quotas to domestic producers and Philippines. Cuba received 98.64 of residual consumption. Amended in 1956 to assign 55% of increase in consumption to domestic producers, 30% to Cuba and the rest to other countries. Allowed to expire in 1974 due to booming sugar prices.
	1976-Present	The Target Price Era: Falling sugar prices led various administrations to impose quotas, tariffs, fees and price support programs.
	Welfare cost	\$ 57 mn. [Crandell, 1978] \$975 mn. in 1983. [Dardis, 1985] \$960 mn. in 1983. [Tarr, et al 1985] \$540 mn. average 1977- 84. [Hufbauer et al, 1986]
Dairy Products	1953 - Present	Imports regulated under the Agricultural Adjustment Act of 1933. Section 22 authorizes president to impose fees or apply quotas if imports threaten domestic prices. Section 22 widely used. Induced increase in price of imports estimated to be 80%
	Welfare cost	\$1,600 mn. in 1983. [Hufbauer et al, 1986]
Peanuts	1953 - Present	Peanuts came under the Agricultural Adjustment Act of 1933 after being designated a "basic crop", in 1934. In the 1930s, farmers also received payments for taking land out of peanut production. 1941 amendment to the act established market quotas and price support. The two-tier quota system was introduced in 1977. There is also strict import quota in existence, since 1953.
	Welfare cost	\$14 mn. in 1983 [Hufbauer et al, 1986]
Meat	1965 - Present	Meat Import Act of 1964 limited imports of meat. The president is required to proclaim quota if the imports are likely to exceed adjusted base quantities. To avoid quotas, the administrations have negotiated voluntary restraints with importers.
	Welfare cost	\$12.5 mn. in 1971. [Magee, 1972] \$5-\$19 mn. in 1977. [Crandall 1978] \$280 mn. in 1983. [Hufbauer et al, 1986]
Fish	1977 - Present	US Fishing industry received protection as early as Washington's presidency. Fish caught by foreign vessels within the US 200 mile conservation zone cannot land in the US. Over the years, domestic industry has unsuccessfully appealed for more protection, but the US International Trade Commission (USITC) has found no injury. However, 1976, Congress responded by extending the FCZ (fishery conservation zone) to 200 nautical miles and extended the benefits to domestic processors too.
	Welfare cost	\$185 mn. in 1983 [Hufbauer et al, 1986]