

Forthcoming: Handbook of International Trade

The Political Economy of Trade Policy: Empirical Approaches*

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I. Introduction

If, by an overwhelming consensus among economists, trade should be free, then why is it that nearly everywhere we look, and however far back, trade is in chains? Why do nearly all governments, unenlightened or enlightened, despotic or democratic, choose such apparently inefficient protectionist policies? In recent decades, an impressive theoretical and empirical literature on the “political economy of trade policy” has attempted to answer this question. The primary explanation offered in this literature is that sub-optimal policies are chosen because policies aren’t set by those who seek to maximize economic efficiency.¹ Rather, they are set in political contexts where the objectives of the policy-makers are different from that of aggregate welfare maximization. This study of “endogenous” trade policy determination, which takes into explicit account the political circumstances under which policy is set, forms the core of the literature on the political economy of trade policy whose empirical ambitions and accomplishments to date this paper attempts to survey.²

The main objective of this chapter, then, is to summarize and evaluate analytically the evidence in favor of endogenous protection. Conveniently for us, the literature has evolved in quite systematic ways. The early empirical work, until at least the late 1980s, mostly involved the examination of correlations between trade policies and various political economy factors that had been conjectured to be relevant in determining trade policy. While helping to loosely identify the relative importance of various political economy variables in determining policy, this literature has sometimes been criticized for employing econometric specifications whose links with the theories that motivated them were often only very tenuous. With the subsequent development of detailed theoretical platforms with strong econometric amenability, however, the recent empirical literature has moved in a somewhat “structural” direction establishing a much tighter link with the theory than has been tradi-

¹However, see Section IV for a discussion of contexts in which maximizing economic efficiency (theoretically speaking) entails departures from free trade.

²Earlier surveys of the theoretical issues and contributions in this area include Hillman (1989, 1991), Helpman (1997), and Rodrik (1995). Surveys of the empirical literature, with which this survey overlaps in its discussion of early econometric contributions in the area, include Baldwin (1985) and Magee (1994, 1997). A textbook treatment is provided by Vousden (1990).

tional in this field (and, for that matter, in many other branches of economics). We begin by describing the methods and results of the traditional literature. We then discuss the various theoretical frameworks that have been developed to describe endogenous trade policy determination and the empirical attempts to evaluate the predictions that emerge from these theories. As with any intellectual endeavor, every success and resolution has only served to raise additional questions and challenges. Indeed, there has been a healthy interaction between theory and empirical work in this area, with the new set of theoretical models generating challenges and opportunities for empirical work and with the new empirical analyses, in turn, posing challenges for future theoretical development. We discuss some puzzles that have emerged in the current literature and discuss possible avenues for future work that may help resolve them.

II. The Determinants of Trade Policy: Theoretical Conjectures

This section discusses the broad set of economic and political factors that were conjectured to be relevant for trade policy determination and that formed the basis for much of the early empirical work in this area. Several hypotheses (explicated at various degrees of theoretical rigor and often only informally) were offered in the literature to answer the central questions of why industries received trade protection and why some industries received more protection than others. Following Baldwin (1985), on whom the following discussion relies quite heavily, these could be classified as follows:

- The **Pressure Group** or **Interest Group** model: This framework emphasizes the incentives faced by capitalists to influence politicians to move policy in a direction that would favor them – for example, we would expect capitalists in import-competing sectors to lobby governments for barriers against imports. In important contributions, Olson (1965), Stigler (1971), Peltzman (1976,) and Pincus (1975) discuss the differing abilities of various industries to overcome free rider problems and get organized to lobby government effectively. Since a small number of firms in the industry and a high degree of geographic and seller concentration imply a greater likelihood of effective coordination, the theory suggests that the level of protection in an industry and (equivalently) the ability of industries to resist trade liberaliza-

tion should be positively linked with these variables. Olson (1983) also argues that economic groups may be more likely to organize in a context of a changing economic environment that threatens income and employment levels. This suggests further that industry protection be negatively related to industry *growth rates* in output and employment and positively related to increases in import penetration ratios. The theoretical demonstration by Mussa (1974) and Neary (1978) of the redistributive impact of tariffs in the presence of specific factors of production provided a foundation for understanding lobbying by specific factors such as industry specific capital or labor.

- The **Adding Machine** model, due to Caves (1976), emphasizes the voting strength of an industry in determining the extent of trade protection it receives. Since, according to this theory, elected officials tend to favor industries with the largest number of voters, the level of protection should be positively linked with the number of employees in the industry.
- The **Status Quo** model, due to Corden (1974) and Lavergne (1983), hypothesizes that government officials have “conservative respect” for the status quo, based either on regard for existing property rights (even in the form of rents generated by protection) or on a cautious response to the uncertainty associated with changes in policy, and further that governments wish to avoid large adjustment costs. Taken together, these dispositions imply that present protection should depend upon past levels of protection, a positive relationship between changes in tariff levels and changes in import penetration, and a positive relationship between changes in tariff levels and the variables used to measure the ability of workers in an industry to adjust to tariff reductions or changes in import penetration such as the proportion of old, unskilled and rural workers in a sector (whose ability to find new jobs is presumed to be lower).
- The **Social Change** model, due to Ball (1967), Constantopoulos (1974), and Fieleke (1976), emphasizes the motives of governments, on social justice grounds, to reduce the degree of income inequality in the economy by raising the living standards of the lowest income groups. This suggests that protection level will be high and tariff cuts will be low in sectors that employ low-income, unskilled workers.

- The **Comparative Cost** hypothesis suggests that industries in which the ratio of exports to production is high and the import penetration ratio is low will receive lower protection since they are not likely to be perceived as needing protection by either government officials or the management or labor force of the industry.
- The **Foreign Policy** model emphasizes the bargaining ability and possibilities of countries in their trade negotiations as important determinants of trade policy outcomes. Thus, for example, it is suggested that since developing countries had generally been exempt from the requirement of reciprocity in matching the tariff cuts offered by industrial countries in the early post war rounds of trade negotiations, duty levels in industrial countries will be higher on the exportables of developing countries relative to the exportables of other developed countries practicing reciprocity. As another example, it is suggested that a country would be more willing to lower its trade barriers against a partner country in which it has substantial direct investment (since the bargaining ability of the foreign country is improved by its ability to restrict the flow of earnings back to the investing country or otherwise lower the returns on the investments).

The theories listed above propose several variables as determinants of trade policy: Industry size, employment, concentration ratios, levels of imports, changes in the level of imports, and so on. A “first-generation” of the empirical literature attempted to explore the relevance of these variables using simple quantitative techniques and regression analysis. We describe these results in the following section.

III. First-Generation Empirical Evidence

A primary contribution of the “first generation” of empirical work on endogenous trade policy was its demonstration of associations between protection levels and a variety of political and economic variables.³ The robustness of these findings provided a quite convincing affirmation

³The list of contributors to this literature is a long and illustrious one. It includes, among others, the following studies by political economists and political scientists: Caves (1976), Baldwin (1985), Marvel and Ray (1983), Ray (1981), Brock and Magee (1978), Schattschneider (1936), Destler (1986), Keohane (1984), and Milner and Yoffie (1989).

of the endogeneity of trade protection. Researchers also attempted to make inferences about the relative validity of particular theories of endogenous policy – a less successful enterprise, as we will argue in some detail here.

A representative set of results are presented in Table 1. Columns 1 and 2 present Baldwin’s (1985) estimates of alternate regression models attempting to explain the cross-sectional variation of industry tariffs in the United States. The dependent variable in both columns is the average tariff level for the industry in 1976. The results indicate that industries with low wages and a high level of labor per unit of output tend to be highly protected. This gives some support to the social change model that we have described in the previous section: the government, acting on social justice grounds, provides the greatest protection to the low-income groups. They may also be interpreted as supporting, to some extent, the status quo model: protection levels are high because the government is unwilling to lower tariffs in industries with low-income (presumably unskilled and immobile) workers where the costs of adjustment to changes in the protection level would be the harshest. The adding machine model receives support as well: protection levels are positively related to industry employment levels. Finally, the number of firms in the industry (an inverse measure of firm concentration and the ability of industries to overcome the free rider problem in getting organized to lobby) is negatively related to the level of trade protection as predicted by pressure group theory. The comparative cost variables – the degree of import penetration and the degree of export orientation – do not show up as being significantly associated with the level of tariffs (although they are significant in other specifications not reported here). The foreign tax credits variable, representing the extent of investment abroad and thus the foreign policy model, does not appear as statistically significant in any of the specifications.⁴ The measures of fit seem relatively high: Up to half the interindustry variation in tariffs appears to be accounted for in some specifications.

⁴It must be noted that Helleiner’s (1977) theory suggests, however, that it will be *countries* in which there is extensive US investment that are able to bargain for lower tariffs. This does not necessarily imply that the industries in which there is higher US investment abroad will have lower tariffs on imports. Thus, a cross-industry study of type conducted by Baldwin (1985) isn’t perhaps the best context in which to test the foreign policy model.

Columns 3 and 4 in Table 1 presents estimates from Baldwin's (1985) regression model explaining tariff *cuts*. The dependent variable is the reduction in US tariffs in the Tokyo round of GATT negotiations (and is entered in the regressions with a *negative* sign). For the results presented in Column 4, only industries in which the initial tariff level was greater than five percent were included. The regression results again suggest that industries with lower tariff cuts were industries in which workers tended to be unskilled and low paid. These industries were also ones with large numbers of workers, high and rising import penetration ratios, and high initial levels of protection. Thus, the adding machine model and the status quo model both find some support in these results. As Baldwin (1985) notes, however, proponents of other models can claim some support from these results as well. While variables such as firm concentration ratios and the number of firms in the industry, which represent the pressure group model, are not significant, other variables, representing (possibly) an industry's incentive to organize, such as changes in import penetration ratios and changes in employment, are significant. Thus, the pressure group model finds weak support in these results as well.

The econometric methodology employed in estimating the models we have just described is susceptible to criticism along several dimensions, regressor endogeneity being perhaps the most obvious among them. And the general absence of rigorous sensitivity analyses makes it hard to attach a great deal of credibility to inferences about any particular variable. The first study to address the two problems of regressor endogeneity and sensitivity to specification is the study of nontariff barriers (NTBs) in the United States by Treffer (1993).⁵ The final column in Table 1 presents Treffer's estimates of the determinants-of-NTB equation, where the extent of NTB protection is measured by the NTB coverage ratio, that is, the fraction of commodities within any industry that is subject to any type of NTB. It indicates that comparative advantage factors (as measured by the change in the import penetration ratio, and the exports-to-value-added ratio) matter immensely to the determination of NTBs. A likelihood ratio test (not included in the table) indicates that comparative advantage factors (import penetration, changes in the import penetration ratio and exports) are at least five times as important as business interest factors (as measured by degree of concentration,

⁵It is additionally distinguished among empirical political economy studies of protection by its proper econometric treatment of endogeneity of imports in a model that *also* addresses censoring of the data.

scale, and capital measures). Additionally, the joint estimation of import penetration and NTB equations leads to a much higher estimate of the import restrictiveness of US NTBs than was in evidence in earlier studies of protection. These results illustrate the value of positive analysis in normative contexts:⁶ considerations according to Treffer's estimates, US NTBs as of 1983 succeeded in restricting imports by \$50 billion (that is, the import volume would be larger by \$50 billion in the absence of NTBs) – a much higher estimate than those provided by single equation estimates that ignore the endogeneity of tariffs. From this, Treffer calculates that the 1983 NTBs on imports of manufactures had an ad valorem tariff equivalent somewhere between twenty percent and forty percent. Lee and Swagel (1997) estimate a similar simultaneous equation system using a broader 1989 data set of pooled NTB data across industries and countries. They too find evidence consistent with a broad set of political economy theories of the determinants of protection and relatively high estimates of the impact of protection on trade flows.⁷

Overall, the results we have described above demonstrate the collective extent to which theories of endogenous protection explain inter-industry variation in trade barriers. They also illustrate the need to take explicit account of the positive aspects of trade policy determination in studying normative issues such as the impact of trade barriers on trade flows. The empirical results provide a measure of support to each of the theories that we have listed above.

Which theory has the greatest explanatory power? Gawande (1998a) attempts to formally compare (non-nested) models of endogenous trade protection using Bayesian methodology.⁸

⁶For a recent *theoretical* analysis that illustrates the value of taking account of political economy factors in determining optimal policy, see Krishna and Mitra's (2000) paper on "reciprocated unilateralism", where unilateral trade liberalization by one country is shown to bring to it the benefit of endogenous reciprocity by its partner due to the induced change in the political economy equilibrium in the partner country by the initial (unilateral) liberalization.

⁷Another interesting exercise on the restrictive impact of NTB protection was conducted by Harrigan (1993), who exploits the theoretical structure of the monopolistic competition model to derive expressions for bilateral trade flows, estimating them using data on bilateral trade flows and bilateral trade barriers. However, perhaps because he ignores the endogeneity problem, he finds NTBs to not be as restrictive. See also the cross-country study by Mansfield and Busch (1995).

⁸It is worth noting that Gawande (1998a) analyzes *separately* "Price NTBs" (such as antidumping duties and countervailing duties) and "quantity NTBs" (such as quotas and voluntary export restraints), thus

Roughly speaking, this proceeds as follows: First, in a nested comparison akin to the classic likelihood ratio test, the likelihood of a “full model” which uses a full set of explanatory variables relative to a model without variables representing a particular economic model (say the adding machine model) is computed. The likelihood of the full model relative to the full model minus variables representing a different theory (say, the interest group theory) is then computed. Dividing the first ratio by the second provides a non-nested comparison of the likelihood of the first model relative to the other (the adding machine model relative to the interest group model in the present example). The results using data on post-Tokyo Round ad valorem tariffs are presented in Table 2. Consider, for instance, the number 6.31×10^4 in the first column of Table 2. This indicates that the full model (F) is 6.31×10^4 times as likely with the variables representing the special interest model (IG) than without them. The number 39.47 below it indicates how likely the full model is relative to the full model minus the variables that represent the adding machine (AM) model. Dividing the first ratio by the second yields the non-nested comparison of the IG model versus the AM model, given in row 8 as 6.25×10^{-4} . This exercise yields some interesting results. As the results in Table 2 indicate, in the determination of US tariffs, the status quo (SQ) model performs exceedingly well. Taken together, the social change (SC) model and the status quo model dominate the interest group and the adding machine models – a conclusion that Baldwin (1985) reaches as well in the study of US tariffs that we have described above.⁹ With nontariff barriers, the dominance is reversed: the interest group and the adding machine models are prominent and, taken together, dominate the status quo and social change models overwhelmingly.¹⁰

allowing for these different types of instruments to have different effects (as predicted by a number of theories of trade under imperfect competition).

⁹Viewing the interest group and adding machine models as models emphasizing the short-run self-interest motivations of various groups (including the government) and the status quo and social change models as emphasizing social concerns, Baldwin (1985) has concluded that “models focusing exclusively on short-run and direct self-interest are insufficient for explaining the wide range of behavior patterns observable in the trade policy arena” and that “long-run self-interest” and “concern for welfare of other groups and the state” are also necessary to account for trade policy outcomes. However, the association of particular theories with short or long-run self-interest (in Baldwin’s terminology) is itself debatable. Thus, for example, a purely cynically motivated government with the short-run self-interest objective of winning re-election may be keen to do nothing to worsen the status-quo.

¹⁰The question of why models of NTB determination reach such different conclusions from theories of tariff protection regarding the merits of particular theories of endogenous protection is an interesting one. However, to our knowledge, it is a question that has not been pursued in the literature.

A major drawback in studies that attempt to discriminate between models, as recognized, for instance, by Gawande (1998a) and Baldwin (1985), is that they require a prior and, importantly, one-to-one determination of which variables represent particular theories. And, unfortunately, there are significant overlaps. Similar (or identical) variables are argued to be proxies for quite different behaviors in different models. Thus, for example, both the pressure group model and the status quo model suggest that the level of protection should be positively related to the import penetration ratio. In the former framework, increases in import penetration may increase the incentives for import-competing lobbies to be formed and to lobby for higher protection, and in the latter model the government itself responds to increased import competition by providing higher tariffs in order to maintain the income levels of individuals in the import-competing sector. Similarly, the proportion of unskilled workers is claimed as a relevant proxy for both the social change and the status quo models. In the former theory, industries with unskilled workers are granted higher protection on redistributive grounds. In the latter, protection is argued to be higher since unskilled workers are less mobile and would suffer disproportionately from any attempts to lower protection to their industries. This promiscuous relation between variables and theories and the inability of the literature to identify variables that would separate models more sharply has precluded the precise determination of the relative validity of the different models.

In partial response to these challenges, and aided by theoretical development of formal models of political economy with increasingly well specified micro-foundations, the literature has moved in a “structural” direction, linking empirical work and the underlying theory more tightly. In the following section, we discuss the evolution of the formal theories of trade policy determination, from the early work of Findlay and Wellisz (1982), Hillman (1982), Magee, Brock and Young (1989), and Mayer (1984) to the more recent models of Grossman and Helpman (1994, 1995a), and discuss alongside the growing body of empirical work that has attempted to test the predictions of these theories.

IV. The Determinants of Trade Policy: Theoretical Models

Where theoretical frameworks delivering specific and empirically testable predictions as to

trade policy outcomes are concerned, there are two main branches in the literature. The first branch represents the direct democracy or *median-voter* approach. The implicit assumption in this formulation is that trade policy is actually being directly voted upon or alternately that the government chooses policies in a manner that reflects majority opinion on the issue. The second and dominant branch represents the *interest group* theories that we have mentioned before: Trade policy is seen to be determined by the interaction between the government and organized lobby groups representing the economic interests of their members. We discuss both sets of models and the empirical attempts to test them.

IV. 1 Median-Voter Model

In a uni-dimensional policy context (i.e., with a single policy variable under discussion, say an import tariff on a particular good) where individual preferences over this policy are single-peaked,¹¹ it has been shown that the median voter's preferred policy choice (e.g., the level of the tariff) cannot be dominated in a majority voting context by any alternative. This is the well-known median-voter result of Black (1958). Mayer's (1984) model of endogenous protection derives the implications of this median-voter result for trade policy in the context of fully specified general equilibrium models of trade. In the two-sector, two-factor, Heckscher-Ohlin version of Mayer's model, equilibrium trade policies are predicted to be as follows: If the median voter's ownership of capital is lower than mean ownership (as is the case in about all countries), trade policy is biased in favor of labor (as opposed to capital).¹² This implies that equilibrium trade policies are predicted to be biased against trade in capital-rich countries and for trade in capital-poor countries (since, as implied by the Stolper-Samuelson theorem, trade restrictions increase returns to *scarce* factors in a Heckscher-Ohlin world). We should expect to see import barriers in capital-rich countries and import subsidies in capital poor countries. Since trade policies are almost everywhere biased against trade, this

¹¹The determinants of *individual* preferences over trade policy have been studied recently by Scheve and Slaughter (2001), who find, using survey data, that preferences over trade policy depend upon factor ownership (as postulated in median-voter models of trade policy) and asset holdings.

¹²This should be easy to understand intuitively: As stated by the Stolper-Samuelson theorem, in the two-sector Heckscher-Ohlin model, a change in the tariff on the importable raises the return to one factor and lowers that to the other. If the median capital-labor ratio in the economy is low, the median voter will vote for a tariff policy that favors labor over capital.

prediction of the Mayer model is almost directly refuted by the data – bad news for the median-voter model.

Dutt and Mitra (2001) have focused, however, on a related prediction of the Mayer model that relates not to the absolute level of the tariffs but to the variation in the level of tariffs (as related to the degree of income inequality) across countries: It is easily verified, using the same reasoning as above, that an increase in the gap between the median capital-labor ratio and the mean capital labor-ratio raises barriers in capital-abundant countries and lowers them in capital-scarce countries. To test this prediction, Dutt and Mitra (2001), using a variety of measures of trade restrictiveness and income inequality, estimate relationships of the following type:

$$TR_i = \alpha_0 + \alpha_1 * INEQ_i + \alpha_2 * INEQ_i * (K/L)_i + \alpha_3 * (K/L)_i + \epsilon_i \quad (1)$$

where i indexes countries, TR denotes trade restrictions, $INEQ_i$ denotes inequality in country i and $(K/L)_i$ denotes the capital-labor ratio in country i .

Note that,

$$\frac{\partial TR}{\partial INEQ_i} = \alpha_1 + \alpha_2 * (K/L)_i.$$

Given that an increase in inequality leads to more restrictive trade policies in capital-abundant countries and less restrictive trade policies in capital-scarce countries, the theoretical prediction is that $\alpha_1 < 0$ and $\alpha_2 > 0$. This is precisely what Dutt and Mitra (2001) find. Thus, their findings provide tentative support for the median-voter model of trade policy determination.

The Dutt-Mitra framework conducts its analysis at a high degree of aggregation – it does not address, to any extent, the cross-sectional variation in tariffs within a country. Theoretical predictions regarding the cross-sectional pattern of tariffs in a median-voter context have been obtained by Mayer (1984) and also by Helpman (1997) in an economic context (i.e., with demand and supply relationships) identical to that of Grossman and Helpman (1994)–

which we have described in greater detail in Section IV.2 below.¹³ Tariffs in this framework are predicted to be:

$$\frac{t_i}{1+t_i} = (1 - \gamma_i^m) \left(\frac{z_i}{e_i} \right), \quad i = 1, \dots, n. \quad (2)$$

where γ_i^m denotes the fraction of specific capital in sector i that is owned by the median voter (with the mean ownership normalized to one), z denotes the inverse of the import penetration ratio and e denotes the absolute import demand elasticity. It should be readily evident that testing this prediction requires information on the median voter's characteristics on a sectoral basis that would be hard, if not impossible, to obtain in most contexts. Consequently, there have been no attempts in the literature to test the cross-sectoral predictions of the median voter framework.

The multi-sector tariff predictions in the median-voter model described above have been derived under the assumption that ownership of specific factors is thinly dispersed in the population. Often, this is not the case: Ownership of production-specific production factors tends to be concentrated in the hands of relatively few agents. As Helpman (1997) points out, considering the extreme example of highly concentrated ownership, when all of the specific factor is owned entirely by a negligible fraction of the population, is instructive. In this case, members of the minority group that owns the factor in an import sector would vote for an import tax, whereas the rest would vote for an import subsidy (since they consume this good and would prefer to see its price lowered). The majority-voting outcome should therefore be an import subsidy. If anything, however, the opposite is generally true, i.e., import tariffs are seen instead – an observation that poses difficulties for median-voter theory.¹⁴ A

¹³It is perhaps worth noting that even in a multi-sector context, the voting process is still over a *single* variable – the tariff rate in any sector, i . The theoretical complexities inherent in multi-dimensional voting where various tariffs are voted upon simultaneously are well known and need not be repeated here. See for example, Shepsle (1990).

¹⁴See, however, Mayer (1984) for an explanation of the power of concentrated owners that relies upon voting costs. It is argued there that if voters face some positive costs of participating in the voting process, individuals with small stakes in the voting process may choose not to vote because their net return from voting is negative. This makes it more likely that the majority of those that remain will vote for a tariff.

possible resolution of this puzzle derives from the argument of Olson (1965) that it is sectors with concentrated ownership that manage to overcome the free-rider problem and effectively lobby government to protect their sector-specific incomes. This argument gains substantial expression in the pressure group or interest group theory of trade policy determination that we turn to next.

IV. 2 Interest Group Models

The interest group model that currently occupies center stage in the literature is the framework of Grossman and Helpman (1994), henceforth GH. GH models a small economy endowed with labor and n specific factors. These specific factors in combination with labor (which is mobile across sectors) produce n non-numeraire goods using CRS technology. In addition, a numeraire good (freely traded internationally) is produced using labor and Ricardian technology. Consumption preferences are identical across individuals within this economy and the representative agent’s utility function is assumed to take the following quasi-linear form:

$$U = c_0 + \sum_i u_i(c_i), \tag{3}$$

where c_0 denotes consumption of the numeraire good (good 0) and c_i denotes consumption of goods $i = 1 \dots n$.

In order to see the basis for the popularity of the GH model, at least from the standpoint of empirical application, it is perhaps instructive to see what is predicted as to tariff rates in economies of the type described above by the interest group models in the literature that preceded GH. We consider two well-known models, both important theoretical contributions in their own right: Findlay and Wellisz’s model (1982) using what has come to be called the “tariff formation function” and Hillman’s model (1982) postulating instead a “political support function”.¹⁵ Our discussion borrows liberally from Helpman’s (1997) survey of this literature.

¹⁵See also Bhagwati and Feenstra (1982).

Tariff Formation Function

Findlay and Wellisz's (1982) seminal model describes the tariff rate as the outcome of lobbying competition between opposing lobbies in a two-sector, specific factors, general equilibrium of trade. The government, which receives the lobbying funds, trades off lobbying spending by two self-interested lobbies, one for protection and one against, and is represented simply by a tariff formation function (which takes the lobbying expenditure levels by the two lobbies as its arguments). Using the same economic structure as in the GH model, as described above, with lobbies lobbying to raise the domestic price of goods they produce and to lower the domestic price of the other goods they consume, with lobbying expenditure levels determined as the noncooperative outcome of a game in which each side chooses its lobbying expenditure to maximize its net benefits, and with tariffs ultimately determined by a tariff formation function just as in Findlay and Wellisz (1982), Helpman (1997) derives the following prediction for trade policy:

$$\frac{t_i}{1 + t_i} = \frac{(1 - \alpha_i)(b_i - 1)}{\alpha_i b_i + (1 - \alpha_i)} \left(\frac{z_i}{e_i} \right), \quad i = 1, \dots, n. \quad (4)$$

In (4), α_i is the proportion of the population that owns sector-specific inputs in sector i , and b_i is the marginal rate of substitution in the government's tariff formation function between the level of protectionist lobbying spending and the level of anti-protectionist lobbying spending. While b_i is positive, only when it is greater than one does a marginal dollar of protectionist lobbying raise the tariff by more than it declines as a result of an extra anti-protectionist lobbying dollar. Hence the sector is protected only when $b_i > 1$. If the marginal lobbying dollars are equally effective ($b_i = 1$), there is free trade.

Political Support Function

Hillman (1982) views instead the choice of the tariff rate as the solution to an optimizing problem in which the government trades off political support from industry interests against

the dissatisfaction of consumers. Specifically, Hillman postulates a reduced form political support function for sector i with two arguments. The first argument is the gain in profits from a trade policy that raises the domestic price (p_i) over the free trade price (p), and the second argument is the loss in consumer welfare due to the price increase. Political support is increasing in the first argument but decreasing in the second. Using the same economic structure as in GH, Helpman (1997) derives the following prediction from the Hillman model:

$$\frac{t_i}{1+t_i} = \frac{1}{a_{pi}} \left(\frac{z_i}{e_i} \right), \quad i = 1, \dots, n. \quad (5)$$

In (5), a_{pi} is the marginal rate of substitution in the government’s political support function between aggregate welfare and profits of special interests in sector i , which varies across sectors. Sectors in which special interests are active (a_{pi} is finite) will receive positive protection.¹⁶

As can be seen from (4) and (5), the tariff predictions of Findlay-Wellisz and Hillman (1982) are not directly testable since they contain characteristics of the tariff formation function and the political support function – the relevant marginal rates of substitution – which vary across sectors and are not observable. These difficulties are theoretically “resolved” in the GH model, which postulates a *linear* government objective function that trades off lobbying contributions with overall welfare at a constant rate, and derives closed-form expressions for the cross-sectional pattern of tariffs that are directly empirically testable.¹⁷ It is to this framework that we turn next.

Political Contributions Approach

As we have described above, Grossman and Helpman (1994) consider a multi-sector specific

¹⁶Further, as in the GH model which we discuss shortly, protection is higher the larger the sector in terms of output-to-imports ratio, and the smaller the sector’s import demand elasticity.

¹⁷It should be readily evident that the *linear* form of the government objective function here pins down the relevant marginal rates of substitution and thus avoids the difficulties associated with the empirical testing of the Findlay-Wellisz and Hillman models that we have just described.

factor economy in which individuals have the quasi-linear preferences given by (3). Some of these sectors are politically organized. Others are not. The politically organized sectors influence politicians through campaign contributions. Politicians, in turn, maximize a linear objective function with two distinct components: political contributions by lobbies and aggregate social welfare. The interaction between the politicians and the lobbies is assumed to take the form of a menu auction (due to Bernheim and Whinston (1986)) where each organized lobby presents the government with a contribution schedule specifying the promised contribution level for each possible domestic price vector implemented by the government. In the first stage, lobbies present their contribution schedules, taking the contribution schedules of other lobbies as a given, and anticipating a second stage in which the government decides tariffs through an optimization process, taking all the lobby contribution schedules as a given. Protection across sectors is measured as a vector of import and export taxes and subsidies on the n goods. The GH framework makes the following prediction regarding the cross-industry pattern of protection:

$$\frac{t_i}{1+t_i} = \frac{I_i - \alpha_L}{a + \alpha_L} \left(\frac{z_i}{e_i} \right), \quad i = 1, \dots, n. \quad (6)$$

In (6), $t_i = (p_i - p)/p$ is the ad valorem tariff or subsidy on good i in equilibrium, where p_i is the domestic price of good i and p its world price. On the right-hand side of (6), I_i is an indicator variable that equals one if sector i is organized into a lobby and zero otherwise. The parameter α_L is the fraction of the population organized into lobbies. Since not all industries are necessarily organized, $\alpha_L \leq 1$. $a > 0$ is the constant weight that the government places on aggregate welfare relative to aggregate political contributions in its linear objective function. $z_i = y_i/m_i$ is the equilibrium ratio of domestic output to imports (exports if m_i is negative) and $e_i = -m'_i p_i/m_i$ is the elasticity of import demand (positive) or export supply (negative).

The influence exerted by organized interests in securing trade protection is easily seen in (6). If industry i is an import-competing producer and it is organized ($I_i > 0$), then it is able to

“buy” protection and obtains a protective import tax ($t_i > 0$). If it is an import-competing producer but it is not organized ($I_i < 0$), it receives a penalizing import subsidy ($t_i < 0$) instead. If industry i is an exporter and is organized, it is able to “buy” an export subsidy ($t_i > 0$), but if it is unorganized, then its exports are taxed. Three additional factors are emphasized: First, industry’s stakes from protection, as measured by the output-to-import ratio, z_i , determine the extent of protection the industry receives.¹⁸ Second, protection depends inversely upon the elasticity of import demand – this follows from the familiar Ramsey pricing scheme, that the best way to tax goods while minimizing welfare loss is to tax goods with low (absolute) demand elasticities at a higher rate than goods with high demand elasticities. Finally, the extent of lobbying competition manifests itself in the tariff expression. If all sectors were organized and in competition, they would cancel each other out: with the population entirely organized, we have $I_i = 1$ for all i , implying that $\alpha_L = 1$ and $t_i = 0$ for all i .

(6) may be written in an empirically testable form as:

$$\frac{t_i}{1 + t_i} = -\frac{\alpha_L}{a + \alpha_L} \left(\frac{z_i}{e_i} \right) + \frac{1}{a + \alpha_L} \left(I \times \frac{z_i}{e_i} \right), \quad i = 1, \dots, n. \quad (7)$$

Then the predictions are (i) the coefficient on z_i/e_i is negative, (ii) the coefficient on $I_i \times z_i/e_i$ is positive, (iii) and since $\alpha_L \leq 1$, the sum of the coefficients must be non-negative. In addition to those qualitative predictions, a quantitative implication of (7) is that the coefficients on z_i/e_i and $I_i \times z_i/e_i$ may be used to infer the size of a – the weight that government places on aggregate welfare relative to the weight on aggregate political contributions.

The predictions of the Grossman and Helpman model were first tested in two recent papers, Maggi and Goldberg (1999) and Gawande and Bandyopadhyay (2000).¹⁹ The protection

¹⁸A crude intuition may be provided as follows: The derivative of sector i ’s profit function with respect to own price is x_i , while the lower the imports, the lower the social cost protection imposes on the public. Hence the greatest protection is afforded to industries with the highest value of $z = x/m$.

¹⁹Recent work by Mitra, Thomakos and Ulubasoglu (2001) and McCalman (2001) have applied the GH

measure in both studies is the NTB coverage ratio in the US. Estimation of (7) requires data on two variables that are not directly measurable: import-demand elasticities and domestic political organization. For import-demand elasticities, both studies use estimates reported by Shiells, Deardorff and Stern (1986). Both also use data on corporate political contributions to assign the domestic political organization variable, I . The assignment of I itself is done differently in the two studies, however. Maggi and Goldberg (1999) use various threshold levels in campaign contributions to determine whether the domestic organization variable is to be assigned the value 1. On the other hand, noting that the data on campaign contributions are overall contributions and not just contributions for trade related matters, Gawande and Bandyopadhyay assign the domestic political organization variable in the following manner: They first examine, using simple OLS regressions, the correlations between campaign contributions and a number of right-hand-side variables including measures of imports. In the next step, the organization variable is assigned the value 1 for those industries for which the relationship between campaign spending and trade flows is positive. Gawande and Bandyopadhyay also explicitly account for intermediate goods. The main results from these two studies are presented in Table 3.

Table 3 shows that, despite the differing methodologies used in assigning the domestic contribution variable, both authors find support for the theory in the data. Political organization is found to influence the interindustry difference in trade protection in the manner predicted by the theory. All else held constant, tariffs are higher, on average, in industries represented by organized lobbies.

Two issues relating to the data used in the estimation of (7) are worth noting. First, consider the variable on the left hand side of (7), the ad valorem rate of protection t_i . In a world in which only tariff barriers are used, obtaining measures of t_i would be a relatively simple task. However, in practice, the trade barriers used are a complicated combination of tariff and nontariff barriers. Indeed, trade protection has been heavily dominated in recent decades by the use of nontariff barriers. The tests of GH we have discussed so far have

model to, respectively, Turkey and Australia.

both relied upon NTB data, using the NTB coverage ratio as a proxy for the protection rate. However, it is unlikely that NTB coverage ratios accurately represent the actual extent of protection. Thus, consider the extreme example of a sector in which most goods are protected, albeit by large nonbinding quotas. The coverage ratio measure would be very high. However, the fact that the quotas are nonbinding implies that, at least in a perfectly competitive context, the level of actual protection is zero. Thus, the coverage ratio greatly overstates the extent of protection in this case. Equally, in sectors in which only a small fraction of goods are protected, but with very restrictive quotas, we have the coverage ratio possibly under-representing the extent of protection. This points to a difficult and potentially unsurmountable issue with testing the model. Using data on tariffs alone in a world with significant NTB protection leads to inaccurate measures of the level of protection. Using NTB coverage data leads to a measurement error of a different sort. And constructing tariff equivalents of all NTBs with any acceptable degree of precision is an extremely challenging task.²⁰

A second and equally important data issue arises in the assignment of the political organization variable, I . As we have mentioned previously, existing studies have relied upon data on corporate campaign contributions to assign this variable, thereby raising (at least) two issues. First, the corporate campaign contributions data represent overall contributions by corporations, not merely contributions intended to sway trade policy. The only attempt to identify trade-related corporate contributions has been by Gawande and Bandyopadhyay (2000), who, as we have discussed previously, assign the organization variable on the basis of significant association of corporate contributions with trade flows. While this is a reasonable first step, it has the demerit of being altogether ad hoc. Clearly, an analytically sound approach is desired. Second, the focus on corporate contributions has resulted in the

²⁰Any attempt at measuring tariff equivalents is inhibited additionally by the non-equivalence between tariffs and non-tariff instruments in imperfectly competitive contexts (Bhagwati (1965)) and the problem that under different modes of imperfect competition, the same instrument may have quite different effects on the market outcome – as seen, for instance, by a comparison of the analysis of voluntary export restraints by Krishna (1989), who assumes Bertrand competition, with that of Harris (1985), who makes the Stackelberg assumption instead. Practitioners will nevertheless find useful suggestions regarding measurement methodology in Deardorff and Stern (1998a). See also Anderson (1998a, 1998b) and Anderson and Neary (1996) for analytical discussions of theoretically rigorous measures of protection.

exclusion of an equally important source of political contributions, labor unions. Although data on political contributions by labor unions is available, the problem has been that most of the labor lobby groups are aggregate lobbies combining workers from several different industries. The estimation of the GH model with US data has industries disaggregated at the 3- or 4-digit SIC level instead. It would be useful to use data on union membership to disentangle the 4-digit composition of unions, a task that Gawande and Krishna (2001a) have recently undertaken.

What else do we learn from the estimation of (7)? A distinguishing feature of the GH framework – in contrast with most empirical work conducted in economics – is the very close match between the economic model and the equation actually estimated. This match enables inference on values of the structural parameters of the model – in this case, the values of the parameter a which measures the preference of the government for welfare relative to campaign contributions. Clearly, for the model to have significance, the weight that government places on campaign contributions ($\frac{1}{a}$) must be relatively high. The more the government veers towards welfare maximization (i.e., the higher is a), the less appealing is the entire political economy enterprise. The Maggi-Goldberg and Gawande-Bandyopadhyay results suggest, however, that the estimates of a are really rather large: ranging from 100 to 3000. Although such a magnitude does not compel rejection of the model, which does not specify any priors on the value of a , it is enough to cast doubt on the value of viewing trade policy determination through this political economy lens.

Equally troubling is the magnitude of the political contributions in relation to the level of the trade barriers. Thus, for instance, in the period studied by Maggi-Goldberg and Gawande-Bandyopadhyay, overall political contributions (again, not just trade related) were in the range of \$30 million. This is quite a small number compared to the efficiency losses in trade distortions alone, not to speak of the increase in producer surplus from the tariffs – the relevant consideration for corporate contributors.²¹ Political contributors seem to be getting a much larger payoff in terms of trade protection than is suggested by the theory. The

²¹That the welfare losses from protection are large is demonstrated in studies of Hufbauer, Berliner and Elliott (1986), and Tarr and Morkre (1984).

extent of the departures of the theoretically predicted contribution levels from the actual contribution levels given the amount of protection that is actually observed is investigated in Gawande and Krishna (2001b).

Finally, a direct implication of (6), as we have noted above, is that industries with higher levels of output relative to their trade volumes, but with the same trade elasticities, are predicted to get greater amounts of protection. As Rodrik (1995) has pointed out, this serves to illustrate the basic puzzle in the literature of why trade policies are biased against trade rather than being in favor of it. If the idea of comparative advantage carries any force, specialization in exportables will imply that the exportable sector will be larger than the importable sector. (6) implies, in turn, that, *ceteris paribus*, we should observe a bias towards export subsidies rather than import tariffs.²² That we observe, in general, a bias in policy against trade rather than for it is, as Rodrik (1995) has forcefully argued, a problematic issue. While a few theoretical attempts have been made to resolve this, we know of no empirical papers on this topic in the literature to date.

Do variables omitted from the empirical specification (7) matter? Both Gawande and Bandyopadhyay (2000) and Maggi and Goldberg (1999) have estimated extended models by including on the right-hand side of (7) a large number of additional regressors. Happily for the GH model, the coefficient on domestic organization survives (i.e., it remains positive and significant in most specifications). However, the estimates from the extended models raise other issues for the GH model. Thus, an extended specification estimated by Gawande and Bandyopadhyay, which includes the industry concentration ratio on the right-hand side

²²Rodrik argues this point in the context of a country with two non-numeraire sectors: a single import competing and a single exporting sector. He argues that, *under balanced trade*, the question of which industry gets more protection boils down to a question of which industry has the higher level of output. With comparative advantage, the exporting sector is argued to be larger and therefore larger export subsidies are predicted by (6). However, Rodrik's argument regarding balanced trade and its implications for sectoral size and therefore trade policy in GH is slightly incorrect since it ignores, among other things, the role of the freely traded (by assumption) numeraire good in GH. The presence of this good to settle the balance of payments implies that the non-numeraire import-competing and exporting sectors bear no relation to each other in size. Indeed, both sectors could, in principle, be import-competing (or exporting) sectors. This shouldn't take away from the significance or validity of the point that he forcefully makes as to the policy bias against trade, however.

in addition to the domestic organization variable, finds the coefficient on the concentration ratio to be significant. Equally, Gawande, Krishna, and Robbins (2001), whose work we discuss in greater detail below, also find that concentration ratios matter for trade policy, *even after* domestic organization is included in the right-hand side in the estimation of (7). Since a primary contribution of the GH model is its detailed articulation of the interaction between organized domestic interests and the government and the implications of this for trade policy, the finding that the determinants of political organization (e.g., concentration ratios, as Olson (1965) has argued and as we have discussed above) have bearing on trade policy in a manner that is beyond that predicted by GH suggests that the role of political organization in determining trade policy has not been fully accounted for by the theory.

An important aspect of trade policy determination that is altogether excluded from GH and from the empirical exercises is the role played by international trade negotiations: GH treats trade policy as if it were determined entirely by domestic political pressures. A theoretical extension of GH, based on the idea of Putnam (1988), that allows for international negotiations has, however, been provided by Grossman and Helpman (1995a).²³ In their “trade talks” equilibrium, the world trade policy vector is determined by cooperative bargaining between two governments.²⁴ Organized lobbies in both countries anticipate this in making their political contributions to their governments. The model provides the following (potentially) testable implications regarding trade policy:

$$\tau^h - \tau^f = \left(-\frac{I_i^h - \alpha^h}{a^h + \alpha^h} \frac{X_i^h}{\pi_i M_i^{h^f}} \right) - \left(-\frac{I_i^f - \alpha^f}{a^f + \alpha^f} \frac{X_i^f}{\pi_i M_i^{f^f}} \right) \quad (8)$$

where, π_i denotes the world price of good i , τ_i^h denotes the domestic price of good i in the home country, τ_i^f denotes the domestic price of good i in the foreign country, X_i denotes out-

²³It should be immediately obvious that allowing a role for international negotiations necessitates the abandonment of the “small country” assumption that underlies GH. A “small country’s” trade policy doesn’t impact world prices and there isn’t any direct motivation for other countries to negotiate with it.

²⁴Non co-operative interactions between countries, have been the subject of the theoretical and empirical studies of Johnson (1953), Tower (1975), Bayard and Elliott (1994), Chan (1988), Copeland (1990), Conybeare (1987), Gawande (1995), Milner and Yoffie (1989), and Riezman (1982) among others.

put and M_i denotes volume of imports (or exports) of good i . Intuitively, with international negotiations over trade policies, special interests in the two countries in any given industry take opposing sides. Each would like the trade policy vector to be bent in a direction that favors it at the expense of the other. Thus, if industry i is organized in country X, but not in country Y, this industry is predicted to obtain positive protection in X and negative protection in Y. Empirical tests of this prediction obviously require data on cross-sectional variance in political influences abroad. Unfortunately, actual implementation of such tests has been inhibited, to date, by the apparent absence of any data sets on political contributions by organized interests in other countries.

Foreign lobbies operating in the US and their influence on US trade policy are investigated in a recent paper by Gawande, Krishna, and Robbins (2001). They observe first that the domestic presence of foreign lobbies could be welfare improving since foreign lobbies would lobby to lower tariffs, and proceed to investigate this idea empirically. The theoretical platform supporting their empirical exercise is an oligopolistic extension (with linear demand and constant marginal costs) of GH. Equilibrium domestic tariffs are predicted to be (approximately):

$$\frac{\tau_i}{P_i} = \left[\frac{2I_i^h}{(a + \alpha)} + \left(\frac{2a}{a + \alpha} \right) \right] \left(\frac{z_i}{e_i} \right) - \left[\frac{2I_i^f}{(a + \alpha)} \right] \cdot \left(\frac{z_i}{e_i} \right), \quad (9)$$

where X_i denotes aggregate production of i in the home economy, m_i denotes imports, and ϵ_i denotes import elasticity. As before, the constant a reflects the government's preference for welfare relative to campaign contributions, α is the fraction of the home population that is organized into any domestic lobby and I and I^* are dummy variables denoting domestic and foreign organization. The model therefore implies that sectors politically represented by organized domestic lobbies are, *ceteris paribus*, likely to receive more protection and that sectors in which there is foreign political presence are likely to receive less protection. Finally, sectors in which there is neither domestic political representation nor foreign political presence are predicted to receive positive protection (which should not be surprising given

the imperfectly competitive nature of the product market). The predictions are tested by estimating the following equation:

$$\frac{t_i}{1+t_i} = \beta_1 \left[\frac{z_i}{e_i} \right] + \beta_2 \left[I_i^h \cdot \frac{z_i}{e_i} \right] + \beta_3 \left[I_i^f \cdot \frac{z_i}{e_i} \right], \quad (10)$$

where t_i denotes the (effective) ad-valorem import tax (i.e., $\frac{\tau_i}{P_i - \tau_i}$) and where $\beta_1 = \left[\frac{2a}{a+\alpha} \right]$, $\beta_2 = \frac{2}{a+\alpha}$ and $\beta_3 = -\frac{2}{a+\alpha}$ (where, clearly, β_1 and β_2 are greater than zero and β_3 is less than zero).

Gawande, Krishna, and Robbins (2001) estimate (9), using a recently compiled data set on foreign lobbying presence in the United States and find broad support for the theory. Domestic organization and foreign organization are found to influence tariffs in a manner predicted by the theory. Specifically, industries with organized foreign lobbies have lower trade protection on average than industries without such lobbies.

One of the primary contributions of GH is that it provides the theory of government-lobby interactions with strong micro-foundations. Nevertheless, GH takes the presence of some organized lobbies to be given, paying little attention to the motivations of lobbies to get organized in the first place. From the standpoint of estimating the impact of lobbying on trade policies (the estimation of GH's basic equation (6), for instance), this is not a major problem since all the right-hand-side variables, including the organization dummies I and I^* , are treated as being endogenous in the empirical implementation. However, without a theory of lobby formation and estimates of the relative importance of the factors that determine lobby formation we cannot answer interesting comparative statics questions such as what happens to tariffs as the parameter a changes in (6), or what happens to tariffs if foreign political influence is somehow legally eliminated in (8).²⁵

²⁵An interesting theoretical contribution has been made by Mitra (1999), who endogenizes lobby formation in the GH framework. The decision to organize and form lobbies here is assumed to take place in a first stage, with the rest of the GH analytics following. Owners of specific factors in the various industries match the benefits from lobby formation to the total costs of being organized (which include any fixed costs of lobby formation itself and the contributions that the lobby ends up making to politicians), and get organized if the former dominate the latter in magnitude. This framework yields some interesting theoretical results relating to the impact on tariffs of changes in ownership distributions and changes in the government's preference for welfare relative to campaign contributions. The role played by the fixed costs of lobby formation is key,

Given the prominence of interest group theories of protection in the literature, surprisingly little empirical work on the actual mechanics for lobbying for protection has been done.²⁶ While there has been indirect evidence on pro- and anti-protectionist preferences of firms (see, for example, Magee (1980), and Pugel and Walter (1985)), there is little direct analysis of their trade-directed lobbying efforts. The difficulty here is that lobbying spending is directed at a variety of redistributive instruments, of which trade protection is but one. Lobbying data thus comes as a bundle, and it is difficult to disentangle the purely trade-related component of lobbying data. This problem may be alleviated by considering a set of industries whose primary lobbying concern is trade protection, as do Lopez and Pagoulatos (1996) for the food processing and tobacco industries. But to do a full cross-sectional study for all of manufacturing requires more care, both in the measurement of lobbying as well as its econometric treatment.

Some progress on investigating the incentives for lobby formation and lobby behavior in the context of trade policy determination is made in a study by Gawande (1998b), who examines the theoretical predictions of the Magee, Brock, and Young (1987) model of lobby organization.²⁷ Magee, Brock, and Young (1989) formalize Olson's (1965) intuition about how the free-rider problem makes lobby organization more difficult and arrive at predictions regarding the relationship between industry lobby spending and industry benefits from protection and the relationship between contributions per firm and the extent of the free-rider problem within the industry. Using cross-industry data on political contributions by corporate lobbies, Gawande finds evidence in support of these hypotheses. Gawande and Bandyopadhyay (2000) also investigate the lobbying side of the GH (1994) model. The evidence affirms the main GH prediction that lobby spending varies according to the deadweight loss from pro-

however, and being generally unobservable, makes empirical implementation rather difficult.

²⁶This is not a comment on the state of the art on the literature on lobbying at large, which is copious. Rather this is a comment on cross-industry studies of lobbying. To get a flavor for the issues and methods in the lobbying literature, see, for example, the surveys in Potters and Sloof (1996) and Morton and Cameron (1992), and studies on (i) Political Action Committee (PAC) money and election outcomes by Magee (2001b), Levitt (1994), and Stratmann (1992), and (ii) PAC money and Congressional voting by Bronars and Lott (1997), Baldwin and Magee (2000), Stratmann (1998), and Snyder (1992). Deardorff and Stern (1998b) provides studies on trade related lobbying.

²⁷In this context see also the empirical study by Magee (2001a) of the free rider problem in lobby formation motivated by the model of Pecorino (1998) and the study by Gawande (1997).

tection. A second hypothesis on the lobbying side of the model is that competition among lobbies induces them to spend according to the political strength of their rivals, where rivalry is measured in terms of lobbying competition from downstream lobbies. Gawande and Bandyopadhyay (2000) find that PAC spending rises with the share of an industry's output used by downstream industries as intermediate inputs and with the concentration of downstream users.

Thus far, our discussion has mostly focused on the extent to which we can explain departures from free trade by appealing to the conjecture that policy makers in making their decisions regarding trade policy place an additional value on particular groups in society (be they immobile low income workers or corporate interests). Somewhat implicit in this argument then, is the idea that free trade is the optimal (i.e., aggregate welfare maximizing) policy choice for governments and the policy that would be chosen had not governments such skewed preferences. As a caveat, it is therefore worth noting that the theoretical proposition that aggregate welfare is maximized by free trade only holds under the assumptions of a small, decentralized, competitive economy. As is well known, the *theoretical* literature on trade policy has demonstrated that with any departure from these assumptions, trade restrictions may improve upon the country's free trade level of welfare – even if *trade* restrictions are nearly always dominated in this regard by alternative policy instruments, as Bhagwati (1971) has shown.²⁸ Thus, in a wide variety of contexts, such as when a country is “large” in the production or consumption of its tradables (and therefore has monopoly power in trade) or in the presence of market failures, such as externalities in production or consumption, imperfectly competitive product or factor markets or in environments involving uncertainty, trade interventions have been shown theoretically to improve national welfare.²⁹ The literature has also argued that the practical value of such arguments for trade policy intervention may be limited due to the presence of rent-seeking (as in Krueger (1974))

²⁸A rich theoretical literature has developed on the issue of which policy instruments will actually be chosen in the context of particular institutional or political realities. See, for example, Rodrik (1986), Feenstra and Lewis (1991), Mayer and Riezman (1990), Riezman and Wilson (1997) and Rosendorff (1997).

²⁹See Bhagwati, Panagariya, and Srinivasan (1998), Helpman and Krugman (1990) and Brander (1995) for comprehensive treatments of optimal trade policy in the presence of market failures and imperfect competition. See Eaton and Grossman (1985), Falvey and Lloyd (1991), Young and Anderson, and Rodrik (1998) for discussions of trade policy in the presence of uncertainty.

or directly unproductive profit seeking (DUP) activity (to use Bhagwati's (1982) terminology) that dissipates any gains or due to informational constraints that limit the government's ability to recognize the appropriate contexts for trade interventions when (and if) they exist. Nevertheless, it can at least be argued that, in principle, observed interventions in trade may be (partially) explained by governments acting in cognizance (or perception) of such factors as externalities or imperfectly competitive product markets as we have listed above.³⁰ With the exception of some case studies,³¹ the *empirical* literature has, however, not examined these as explanatory factors, or attempted to separate their explanatory power from that of political economy factors in any *systematic* fashion. They remain essential topics for future research.

V. Topics

Our discussion so far has focused on cross-sectional studies of the determinants of trade barriers. While this has certainly dominated the research interests of scholars working in the field, the literature has also examined a number of other topics. These include historical analyses of the enactments of major trade laws, attempts to discriminate between canonical trade models such as the Heckscher-Ohlin model and the specific factors model on the basis of observations of sectoral and class cleavages in attitudes towards trade policy, time-series analyses of the aggregate patterns of tariffs, case studies of various forms of administered protection, and the political economy of preferential trade agreements. This is an enormous literature whose detailed description here is precluded on account of space limitations. We limit ourselves to presenting some highlights from recent work.

V.1 Historical Studies of Major Trade Policy Measures

Irwin and Kroszner (1996) study voting patterns in the US Senate over tariffs on specific goods in order to understand the factors influencing the passage of the infamous Smoot-

³⁰Thus, for example, it is quite well recognized that the infant-industry argument for protection (whose logic usually relies upon a combination of dynamic learning-by-doing externalities in production and credit constraints) was commonly used in developing countries to provide protective tariffs for their manufacturing sectors.

³¹See, for instance, Baron (1997) and Busch (1999).

Hawley Tariff Act of 1930. Contrary to some other studies which emphasize the partisan nature of voting over Smoot-Hawley, they identify the significant influence of economic interests in Senators' constituencies on the voting pattern.

Irwin and Kroszner (1999) study the Reciprocal Trade Agreements Act (RTAA) of 1934 through which Congress delegated its authority over tariff making to the President, giving him the authority to undertake reciprocal tariff reduction agreements with foreign countries without congressional approval. As an example of institutional change, the enactment of the RTAA is most interesting since it was passed just four years after the US Congress passed the Smoot-Hawley tariff, and it marked the beginning of a trend towards trade liberalization. The RTAA was enacted in the context of substantial differences in opinion across parties on the matter of tariffs. It was only firmly established after Republicans, long-time supporters of high tariffs who originally vowed to repeal the RTAA, began to support this Democratic initiative. Was this an ideological shift? Or was this prompted by shifting economic interests? Irwin and Kroszner use a detailed examination of the congressional voting record on the RTAA to argue that it was increased sensitivity to exporter interests (which the institutional structure of the RTAA, by providing greater incentives for exporters to develop as an organized lobby group, itself may have had stimulated) rather than ideological shifts that was responsible for the Republican conversion.³²

V.2 Sectoral and Class Cleavages in Attitudes Towards Trade Policy

The question of whether trade-related political behavior takes place mostly along sectoral (industry) lines or along class (factor-ownership) lines has attracted the attention of numerous economists and political scientists. Two canonical models of international trade—the two-sector, two-factor Heckscher-Ohlin model and the Ricardo-Viner or specific factors model—provide divergent predictions. The former, where full mobility of factors across sectors is assumed, predicts that the country's relatively abundant factor of production gains with trade liberalization and that the less abundant factor loses, thus implying that there will be a split along class lines on the issue of trade liberalization. The latter, where factors

³²See Hisox (1999) for another study of the RTAA.

of production are assumed to be specific to sector, predicts that economic interests will be organized along sectoral lines instead.

An early empirical analysis to discriminate between these competing hypotheses was conducted by Magee (1980), who examines testimony before the House Ways and Means Committee on the Trade Reform Act of 1973 and finds substantial support for the specific factors model, that in the vast majority of industries, factors of production are aligned along sectoral lines. Additional support for the specific factors model is provided by the more recent work of Irwin (1996), who examines voting patterns in the British general election of 1923, an election that hinged on the issue of free trade, and finds the occupational structure of the electorate to be far more significant in explaining the election outcome than was class structure. Magee and Baldwin (2000), in their examination of voting patterns by US Representatives on major trade bills (e.g., on the North American Free Trade Agreement), find stronger evidence supporting the class cleavage predictions of the Hecksher-Ohlin model than have previous voting studies: Factor status variables (such as the proportion of less educated workers in a representative's district) appear to have significant impacts on voting behavior. They find less support for the specific factors model: Few of the variables indicating occupational structure (e.g., the proportion of employment in particular industries) had large impacts on congressional voting. However, the prior policy views of legislators, as measured by their ratings by interest groups, were found to be important determinants of representatives' voting decisions. It should be readily evident, however, that to the extent that the policy positions taken by the representatives are likely to take into account the occupational/class structure of their constituents, it is difficult to infer the validity of particular theories from these estimates (for instance, because sectoral pressures may reflect themselves strongly through the policy position variable in ways that aren't fully captured by the variables representing the sectoral status of the district in the multivariate regressions).

V.3 Trends in Trade Policy and Time-Series Studies

The literature has discerned two distinct trends in trade policy over the past decades. First,

trade restrictions have been falling over time – in some cases (mostly developing countries) rather dramatically.³³ And second, countries have shifted away from tariffs to somewhat more complex forms of non-tariff protection (on which some more in section V.4 below).

Decreasing budgetary reliance on trade taxes (relative to income taxes) as countries grow richer and develop a broader income tax base over time and a general disillusionment with import-substitution and infant-industry arguments for protection (born of adverse experiences with these policies in many instances) have both been argued to explain the trend towards lower trade protection. These arguments do have merit. The proportion of tax revenue contributed by trade taxes is negatively correlated with national income levels (as Rodrik (1995) has shown). And the public expressions of unhappiness with the import-substitution and infant-industry arguments by policy makers in many countries that have embarked on major trade reforms have been quite well documented. We should note that neither of the explanations of trends in trade policy rely upon political economy arguments. To what extent ideological shifts regarding trade policy reflect underlying shifts in economic interests and to what extent they are exogenous is a question that hasn't received as much attention in the literature as it should.³⁴ If shifts in ideology are driven by factors outside of the domain of political economy and distributional conflict, they pose new problems of explanation.

The trend towards NTBs lacks a convincing explanation. Some analysts have argued that NTB protection allows governments some discretion in policy after their hands have been tied down by successive rounds of multilateral negotiation over tariffs. As Rodrik (1995) has noted, this nevertheless begs the question of why countries bother with trade negotiations when they are aware that the agreements will be flouted by the use of discretionary NTBs.

³³Thus, for example, in the 1980s and the early 1990s, Bolivia, Brazil, India, Mexico, Peru, and Turkey each implemented radical reforms of their trade policies, moving from highly protectionist environments to far more open ones.

³⁴Irwin and Kroszner's (1999) study of the RTAA, which we have discussed above, does illustrate the complex interaction between economic interests, institutions and ideology in shaping policy and provides a convincing candidate explanation for the downward movement in US tariffs. Nevertheless, to our knowledge, no similar shifts in institutional structure have been proposed to explain the dramatic changes in trade policy in the developing countries we have mentioned.

Very little systematic empirical work on the determinants of NTBs in preference to tariffs has been done to date.

While trade restrictions have trended downward overall, this has been argued to have been quite non-monotone in some instances. Thus, in the twentieth century, the US time series data on nominal tariff revenue as a proportion of import value, or the 'ad valorem tariff rate,' has been documented by Irwin (1998) to have taken the following pattern: From around .50 in 1900, it declined to .40 in 1910 and then .16 in 1920, in part due to the Underwood Tariff Act of 1913. With the Fordney-McCumber Tariff Act of 1922 it reversed direction and began to ascend, peaking at .60 with the Smoot-Hawley Tariff Act of 1930 (check this date). Reversing direction again, it declined sharply to .12 in 1950, and then dropped slowly to reach about .04 in 1980, after the implementation of the tariffs agreed to at the Tokyo Round of the GATT.

A number of analysts have attempted to explain this cyclical behavior of aggregate tariffs.³⁵ Magee and Young base their empirical investigation of the tariff data on the Brock, Magee, and Young (1989) general equilibrium model of endogenous protection. The familiar two-sector, two-factor Heckscher-Ohlin model with economy-wide mobility of factors of production and lobbying according to class (i.e., with labor's interests opposing that of the owners of capital) provides the foundations for the analysis. In an attempt to capture the political structure of the US, they develop an election model with electoral competition between two competing political parties,³⁶ Republicans and Democrats, to explain the supply of protection. The Republican Party is assumed to favor capitalists and the Democratic Party labor. The probability of Republicans winning the Presidency is related positively to lobbying by capitalists and negatively to lobbying by labor. Magee and Young's unit of observation is a Presidential term, yielding them twenty-one observations. Of the eight variables used in the analysis, of particular interest is the labor-capital ratio, which has direct links with the theory. The theory implies that as capital increases relative to labor, the

³⁵See O'Rourke and Williamson (1999) for a broad discussion of trade and immigration policy trends in the US in the twentieth century.

³⁶On the issue of electoral competition and special interest politics, see also Grossman and Helpman (1996).

election technology chooses a Republican administration, with the result that the tariff falls. Magee and Young find evidence in favor of this effect.³⁷

Lohmann and O'Halloran (1994) examine the impact of the power structure *within* the US government and the degree of conflict between different branches of power on trade policy (an approach that has its roots in Weingast and Moran (1983) and McCubbins and Schwartz (1984)), also finding aggregate tariffs to be linked to political economy variables. Using tariff rate data from 1949 to 1990, they model the change in tariffs in order to discriminate between three hypotheses: the pressure group hypothesis represented by economic variables, and two "power structure" hypotheses, namely, the presidential dominance hypothesis and the congressional dominance hypothesis. The latter hypotheses are represented by a variable that qualitatively measures three possibilities: divided government (when the administration and Congress are controlled by opposing parties), split partisan control (when the same party controls the administration and a single chamber of Congress), and unified partisan control (when one party controls the administration and both chambers of Congress). They find a statistically significant association between the tariff level and these variables. Among other interesting results, they find the President's trade policy-making authority to be far more constrained during a divided Congress than under a unified Congress, and US trade policy to be far more protectionist under a divided Congress than a unified Congress.

An alternative (and rather a-theoretical) approach is taken by Bohara and Kaempfer (1991), who run Granger tests in order to determine which factors cause variations in tariff data over time. They find that unemployment and inflation are responsible for movements in the tariff time series. Their study has also generated many similar analyses of European and Japanese data whose findings confirm the Bohara-Kaempfer results are quite robust. Indeed, Lohmann and O'Halloran (1994) also find that tariffs respond to the business cycle and that changes in tariffs are negatively associated with changes in inflation. No one has yet, however, followed up on these empirical findings by developing formal theories of endogenous protection which

³⁷Of course, since trade policy affects the incentives to accumulate capital, one expects the capital-labor ratio itself to be a function of trade policy in the long run, implying a more complex system than the one Magee and Young (1989) consider. This said, Magee and Young's work remains notable for its ambitious attempt to link theory to the data, as Leamer (1987) has noted.

feature unemployment or the business cycle. This remains a theoretical challenge for future research.

Irwin (1998) casts doubt on Bohara and Kaempfer's conclusions, showing that it is not shifts in any underlying political economy factors, but rather that most US import tariff rates have been specific, not ad valorem, that has made tariff rates appear to respond to inflation. The simple fact is that, all else being equal, if the average rate is computed as a percent of import value, it would decline when import prices rose and would rise when import prices increased. The US average tariff rate and average import price data (Irwin (1998), Figure 1) clearly shows this relationship over time. Irwin estimates that the elasticity of the average tariff rate with respect to average import price is of the order of $-.60$. Since import prices were increasing throughout the post-war period, Irwin's results imply that the multilateral cuts should not be unduly credited with reducing the average tariff rate — a large part of the decline is an artifact of the specific tariffs. Irwin's inquiry into the political economy of the average tariff after controlling for the import price effect takes the form of estimating the effect on the average tariff of each of eight tariff legislations from the Tariff Act of 1872 through the 1948 formation of the GATT. While each of these legislations are found to significantly affect the tariff, thereby directly confirming the presence of a political economy component to the average tariff, controlling for import prices makes their effects slighter.

V.4 Case Studies in Administered Protection

Administered protection generally refers to protection resulting as a *statutory* response to specified market circumstances or events, usually as determined by an administrative agency. Several such statutes are “permitted” by the GATT/WTO under specific circumstances, including anti-dumping (AD) duties and countervailing duties (CVDs).³⁸ As Blonigen and Prusa (2001) note, administered protection has emerged in recent years as the most widespread impediment to trade, and while most other instruments of trade protection have

³⁸More specifically, the GATT/WTO allows countries to levy ADs to protect their domestic industries against 'dumping' by foreign firms (i.e., when foreign firms sell their product at “less than fair value” in the domestic market) and to levy CVDs if the exports of foreign firms are subsidized by their governments.

been brought under greater GATT/WTO discipline, administered protection actions (ADs in particular) have flourished.

In the United States, the International Trade Commission (ITC) is charged with making AD and CVD determinations. Several recent studies have examined various aspects of ADs, CVDs, and the ITC process. Thus, for instance, Blonigen, Gallaway, and Flynn (1999) have studied the welfare costs of ADs and CVDs, Staiger and Wolak (1994) have studied the protective impact of the ITC procedure (finding significant costs even when ADs are ultimately not granted), and Finger, Hall, and Nelson (1982) and Hansen and Prusa (1997) have investigated the susceptibility of the ITC to being captured by special interests. The findings of these latter authors as to the extent of the influence of special interests on ITC decisions is interesting since the ITC process is supposed to be a purely statutory one, i.e., one reflecting merely market circumstances. These and other contributions are discussed in greater detail in the chapter by the Blonigen and Prusa (2001) in this Handbook.³⁹

While the ITC makes determinations in AD and CVD cases, almost all other cases (particularly, those falling under Section 301 of the 1974 Trade Act regarding unfair foreign trade practices or Special 301 cases on intellectual property rights), whether multilateral, bilateral or regional, come under the purview of the office of the US Trade Representative. USTR cases may be unilaterally initiated against a country by the US or, as is more likely, brought to the USTR by private parties to achieve redress. Noland (1997), in his examination of the political economy of USTR attentions and actions, finds that during the 1984-95 period USTR attention was related to the size of the partner country, and that the existence of bilateral trade imbalances suggests that more went into the formation of trade policy than merely responding to interest group pressure.

V.5 Trade and Foreign Direct Investment

Branstetter and Feenstra (1999) jointly examine trade and Foreign Direct Investment (FDI) in China, drawing on GH and Grossman and Helpman (1995a) to model the political process,

³⁹See also Krueger (1996) for a number of interesting case studies on particular industries.

where, they assume, the social benefits from trade and FDI liberalization are being traded off against the losses incurred by state-owned enterprises from such reforms.⁴⁰ They use province-level data on trade and FDI flows at the four-digit level to estimate the parameters of the government's objective function (similar to the one in GH) and find that the government places only half the weight on consumer welfare that it does on the welfare of state-owned enterprises.

Bhagwati's (1985) theory of quid pro quo FDI argues that FDI may be undertaken by foreign firms that export into the domestic market with the motive of creating jobs there and lowering the threat that their exports will be restricted by local politicians seeking to protect their constituents from foreign competition. A simple interpretation of this theory suggests that politicians should cast votes for free trade in exchange for greater FDI in their state or district. Blonigen and Figlio (1998) examine the effect of state-level FDI using data on Senate votes on trade issues from 1985 to 1994 and also study the effect of district-level changes in FDI on House trade protection votes in two high profile industries: automobiles and textiles/apparel. Their findings are somewhat ambiguous: They find that legislators are influenced by FDI, but in a dichotomous fashion: FDI makes protectionist lawmakers even more likely to vote for protection in the future, while it leads politicians that generally vote for free trade to be even less likely to vote for protection. These results are robust across both House and Senate votes.

V.6 Preferential Trade Agreements

Various aspects of the political economy of preferential trade agreements between countries (which often take the form of either free trade areas (FTAs), in which the parties to the agreement maintain independent trade policies against outside countries, or Custom Unions (CUs), in which parties to the agreement maintain a common trade policy against the outsiders) have been studied recently. Grossman and Helpman (1995b), Krishna (1998), Levy (1997), and Panagariya and Findlay (1996) have each analyzed theoretically the political

⁴⁰For an alternate theoretical analysis of endogenous trade policy with FDI, see Konishi, Saggi and Weber (1999).

and economic conditions under which such agreements are entered into by countries and the implications of such agreements for the conduct of their trade policy with countries outside the agreement.⁴¹

Empirical work testing the predictions of these models has, however, been quite limited.⁴² A recent exception is the work of Gawande, Sanguinetti, and Bohara (2001), which examines the particular predictions of the Grossman and Helpman (1995b) framework regarding “industry exclusions” in preferential trade agreements.⁴³ Industry exclusions in Grossman and Helpman (1995b) are determined in a bargaining game between the member countries in which each country brings to the bargaining table a list of industries that it wants excluded. At the top of the lists are the most politically sensitive industries. If industry i is an import-competing producer then it will prefer to be excluded from the agreement (or to maintain the status quo), while if it is an exporter then it will want to be included due to the extra profits in the partner country that await it in the FTA. Industries high on the lists are likely to be excluded from the FTA, but which country gets the greater number of exclusions depends on their relative bargaining strengths. Gawande, Sanguinetti and Bohara (2001) and Olarreaga and Soloaga (1998) using data from the MERCOSUR trade agreement between Brazil, Argentina, Paraguay, and Uruguay, finds evidence consistent with the predictions of the Grossman and Helpman (1995b) theory.

VI. Conclusions

That politics plays an important role in shaping economic outcomes is an immemorial insight. We have intuited for perhaps just as long that a proper understanding of political

⁴¹See also Cadot, de Melo, and Olarreaga (1999) and Richardson (1993) and the empirical study by Bohara, Gawande and Sanguinetti (2001). Bhagwati (1993) and Panagariya (2000) provide excellent surveys. Bhagwati, Krishna, and Panagariya (1999) provides a comprehensive collection of papers on the topic.

⁴²There is a sizeable empirical literature estimating the economic impact of preferential trade agreements (including the recent work of Frankel, Stein and Wei (1997) and Krishna (2001)), but this literature has ignored the issue of endogeneity of trade policy altogether.

⁴³Despite the fact that Article XXIV of the GATT mandates that trade be fully liberalized between signatories to a PTA, PTAs have almost always been accompanied by exclusions of some industries from the agreement. This was the case for the North American Free Trade Agreement (NAFTA) as well as for the European Union (EU). See Ozden and Parodi (2001) for a discussion of special industry clauses in MERCOSUR.

influences in economic systems is crucial for estimating the impact of our policy choices and for the design of our institutions. In this survey our attention was narrowly focused on empirical approaches in the study of the political economy of policy interventions in trade. Specifically, the task that we set ourselves was to chart the progress made in the literature in identifying and quantifying the role played by various political factors in shaping trade policy. Researchers, combining a variety of data sources and methods, have provided a convincing confirmation of the presence and significance of political-economic influences. However, where distinguishing among several alternative theoretical conjectures of the determinants of trade policy is concerned, the literature has been less successful. Inference has generally been confounded by the insufficiently precise and often promiscuous link between the theoretical conjectures and the political-economic variables that have served as their proxies in empirical exercises. The recent development of formal theories of endogenous protection which are characterized by the unusual merit of directly testable predictions has prompted a shift of the literature to a more “structural” direction – where the empirical specifications have tight links with the underlying theory. As it stands, these theories themselves are narrowly focused on a singular (albeit apparently important) determinant of policy: lobbying by organized interest groups. While the empirical analysis has provided a degree of evidentiary support for the theories, it has also served to highlight a number of internal inconsistencies and puzzles. As we have discussed, many important issues remain unresolved. It is hoped that future theoretical development will, while maintaining its econometric amenability, incorporate the insights of the both the theoretical and the earlier empirical literature regarding the broader set of influences on protection, political-economic or otherwise, and that future empirical analysis will provide a more comprehensive and unified account of the complex set of interactions that determine trade policy.

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Table I: Cross Sectional Studies of the Determinants of Trade Protection *

Variables	Tariffs		Tariff Cuts		NTBs
	Baldwin (85) (1)	Baldwin (85) (2)	Baldwin (85) (3)	Baldwin (85) (4)	Trefler (93) (5)
CONCENTRATION					
Seller Concentration	0.0002		-0.65(-3)		.53**
Seller Number of Firms	-.46(-5)**	-.32(-5)**		-.14(-4)	-.22*
Scale (Output/firm)					-1.83**
Buyer Concentration					1.13**
Buyer Number of Firms					-.06**
Geog. Concentration					0.11
TRADE					
Import Penetration Ratio		-0.02			0.17
Change in Import Penetration Ratio			0.26	0.03**	3.31**
ln (Import Penetration Ratio)			0.54(-2)	-0.03**	
Exports/ Value Added					-1.82**
exports/ shipments	0.34(-1)				
CAPITAL					
Capital Stock			.62(-5)		-.27**
LABOR					
Wage	-0.16(-1)**			-0.13***	
Unskilled Payroll/ Total Payroll		.14*	.97***		
Prodn.Workers/ Value Added		.03**			
Unionization					0.1
Employment	.94(-4)*			0.51(-3)***	0.08
Tenure					-0.01
%change in employment	0.84(-2)			-0.11*	
% Eng. And Scientists					1.63*
%White Collar					0.4
% Skilled					-0.31
%Semi skilled					0.15
% Unskilled					0.9
%Unemployed					1.22**
Labor Intensity	0.19(-1)				
OTHER VARIABLES					
Industry Growth					0.03
Foreign Tax Credit/Assets		1.1	9.90**		
Change in [(VA-Wages)/ K-Stock]			-0.02		
VA/Shipments		0.05		-0.14	
Tariff level			-0.13		
NTB indicator	0.46(-2)**	.61(-2)*	.03*		
Constant	0.26	0.15(-1)	-0.81	-0.11	
Adjusted R2	0.39	0.51	0.1	0.18	
N	292	292	292	292	322

*The dependent variable in Columns 1 and 2 of the results is the tariff level prior to the Tokyo Round of the GATT. In Columns 3 and 4, the dependent variable is the average rate of tariff reduction in the Tokyo Round and is entered into the equations as a *negative* number. In Column 5, the dependent variable is the NTB coverage ratio in 1983. All scaling is based on units of measurement in the original papers. See Baldwin (1985) and Trefler (1993) for detailed variable definition. * denotes significance at the 10 percent level, ** denotes significance at the 5 percent level and *** denotes significance at the 1 percent level. The number in parentheses indicates the direction and number of digits the decimal point should be removed.

Table II: Comparisons of Political Economy Models[†]

Models Compared	Ad Valorem Tariffs		Bilateral Price-NTBs		Bilateral Quant-NTBs	
	US-Japan	US-EC	US-Japan	US-EC	US-Japan	US-EC
1. F : F - IG	$6.3 * 10^4$	$2.31 * 10^{25}$	366	4880	1540	245.3
2. F : F - AM	39.47	—	14.52	3520	99.14	581.4
3. F : F - SQ	$3.98 * 10^8$	$2.98 * 10^{42}$	9.12	131.6	21.12	—
4. F : F - SC	2.03	2.14	1.38	33.2	—	—
5. F : F - CC	111.3	$7.03 * 10^5$	918.4	384.7	1780	$2.86 * 10^8$
6. F : F - (IG & AM)	$7.89 * 10^5$	Same as 1	63.15	$1.35 * 10^6$	$2.35 * 10^4$	$1.25 * 10^6$
7. F : F - (SC & SJ)	$5.43 * 10^7$	$4.91 * 10^{42}$	15.18	1050	Same as 3	—
8. F -SI : F -AM	$6.25 * 10^{-4}$	—	0.04	0.71	0.06	2.37
9. F - SQ : F -SJ	$5.11 * 10^{-8}$	$1.12 * 10^{-43}$	0.15	0.25	—	—

[†]Reproduced from Gawande (1998), Tables 5a and 5b. F denotes Full Model, IG = the Interest Group model: (PAC/VA, Output per firm, Seller Concentration); AM=Adding Machine Model: (Number Employed, %Unionized, Number of States with production, Seller Concentration); SQ=Status Quo model: (Import Penetration, Earnings, Post-Tokyo Round Tariff); SC=Social Choice model: (Payroll/Value-Added, Industry Employment growth, %Unskilled); CC=Comparative Cost model: (Bilateral Import Penetration, Bilateral Exports/Value Added, %Scientists, %Managers). EC denotes Grance, Germany, Italy and the U.K. Blank cells indicate that the models are not comparable since at least two representative variables have the wrong sign. See original paper for details.

Table III: Grossman and Helpman (1994) Model Estimation Results[‡]

Variable	Gawande and Bandyopadhyay (2000)	Maggi and Goldberg (1999)
$\frac{z}{\epsilon}$	3.08** (2.02)	-.009** (2.33)
$I \frac{z}{\epsilon}$	3.14** (2.00)	.011** (2.00)
N	242	107
R^2	0.23	—

[‡]See original papers for details on estimation procedure and variable definition. Additionally, only an abridged version of Gawande and Bandyopadhyay's specification is presented here. See the original paper for the full specification.