FTA Trade Policy in the Presence of Foreign Lobbying

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March 2007

Abstract

This paper studies the effect of foreign lobbies on trade policy of a country which is a member of a Free Trade Agreement (FTA). It uses a monopolistically competitive political economy model where external tariffs are endogenously determined by the government. The effect of foreign lobbying under the FTA is examined empirically using Canadian industry-level trade data that allows differentiating lobby groups by the country of origin. The analysis suggests that the presence of foreign lobbying has a significant effect on the domestic trade policy. The heterogeneity of foreign lobbies is also important: the presence of an organized lobbying group in an FTA partner country tends to raise trade barriers, while an organized lobbying group of exporters from outside of the FTA is associated with less protection.

1 Introduction

In the political economy literature a growing number of studies view trade policy as an endogenous outcome of lobbying activity by special interest groups. Several authors (Goldberg and Maggi, 1999, Gawande and Bandyopadhyay, 2000) have confirmed that lobbying intensity by domestic firms is one of the main determinants of the cross-industry pattern of protection. More recently, Gawande, Krishna, and Robbins (2006) also find that lobbying by foreign firms for trade barriers reduction has a significant effect on the structure of tariffs across industries. However, if a country is a member of a regional trade agreement and foreign firms can affect the government’s decision regarding trade policy, it becomes necessary to distinguish foreign lobbying from within and outside of the free trade area. Organized foreign interests with preferential market access will lobby for more protection against other foreign firms, and the trade agreement may become more protectionist with strong lobby group in a prospective FTA partner country. Active foreign lobbying under the preferential trade agreement not only may lead to an increase in trade protection but it can also make welfare-reducing trade agreements politically feasible.
In this paper I analyze the effect of foreign lobbying on domestic trade policy when the country is a member of a preferential trade agreement using Canadian post-NAFTA trade data. Given the relative size of the US and Canadian economies, the effect of US lobbying in Canada will be considerably larger than the effect of Canadian lobbying in the US. Therefore, focusing on Canadian data is particularly advantageous. The empirical analysis of this paper reveals two main results. First, the activity of foreign lobbyists in Canada is a significant determinant of the Canadian trade policy, and sectors where foreign firms without preferential market access are politically organized tend to receive less protection. This result supports the previous finding by Gawande, Krishna, and Robbins (2006) for the US. Second, NAFTA has an important effect on the structure of foreign lobbies. The data confirms that foreign firms with preferential market access lobby for more protection. This result implies that an FTA with an active foreign lobby may become more protectionist and, under certain conditions, lead to a welfare reduction.

This paper is the first one that analyzes from theoretical and empirical points of view the effect of foreign lobbying on domestic trade policy in the presence of an FTA. The political economy model presented in this paper incorporates a monopolistically competitive market structure into a Grossman and Helpman (1994) ‘protection for sale’ setup (henceforth GH) to analyze the role of foreign lobbying on national trade policy. The framework is further extended by allowing for two types of foreign interest groups, namely, lobbying groups formed by firms from an FTA partner country and by firms from countries outside of the FTA, aggregated into the rest of the world (ROW). This differentiation of foreign lobbies by market access is important in the presence of an FTA. When two countries join a regional trade agreement, granting zero import tariffs to each other, the Most Favored Nation (MFN) provision is violated, and firms from countries with preferential market access will lobby for more protection under the FTA to lock it from competition from the ROW firms, while firms from outside of the FTA will continue to lobby for trade liberalization.\footnote{Two considerations should be taken into account when partner country lobbying for more protection is considered. First, the WTO tariff binding constraints the lobbying opportunities by the partner country firms, however, they may still play an important role in future and impede multilateral trade liberalization in those sectors. Second, the WTO precludes countries from raising their tariffs once the FTA is signed. Yet foreign lobbies may oppose further tariff reduction as described above and use antidumping and countervailing measures to gain protection.} This intuition implies that in a world where almost every country is a part of at least one FTA, a complete theory of the effect of foreign lobbying on the national trade system should take into account its possible heterogeneity.

In this paper I take a closer look at the effect of foreign lobbying on a country’s trade policy when it decides to form an FTA. A particularly important question is whether the FTA may induce the government to raise import tariffs against non-member countries when foreign lobbying...
is allowed. In this case, lobbying activity by firms from a partner country will slow down the trade liberalization process and represents an extra argument in support of restrictions on deleterious interference of foreign interests into trade policy negotiations.

The model of foreign lobbying in the presence of the FTA is tested in this paper using Canadian post-NAFTA trade data. The empirical analysis suggests a strong and statistically significant effect of domestic and foreign lobbying on Canadian trade policy, and points at the importance of distinguishing partner country lobbying from ROW lobbying. Using data on lobbying intensity by sector and by country of origin, this paper verifies that the main predictions of the model are consistent with the data.

First, the empirical evidence shows that even politically unorganized sectors receive positive level of protection from the government of 2-4 percentage points of the ad-valorem tariff for the average industry. This is in contrast with the standard GH formulation, where unorganized sectors are subject to import subsidies. Second, the importance of both partner country and ROW foreign lobbying under the FTA finds strong support in the Canadian data: while the presence of the organized domestic lobbying group raises import tariff in that industry by 3-5% relative to the unorganized industry, organized partner country would raise it by 1-2%, and foreign lobbying from the ROW would lower it by 2-3%. These results are economically meaningful and confirm the main prediction of the model that foreign firms with preferential market access behave just as domestic firms do, which introduces an additional distortion in the policy making process. Finally, an important contribution of this work to the political economy literature of trade is its determination of more plausible values for the government’s valuation of political contributions. In this paper, the government is estimated to value political contributions more than national welfare, which is in sharp contrast with previous tests of the benchmark GH specification where governments have stronger preferences for welfare. This result is significant and robust to changes in estimation specification. It is also very intuitive because it explains why relatively small political contributions have strong policy effects.

Most of the literature on endogenous trade policy concludes that a country is more likely to reduce its external tariff when it enters an FTA. Richardson (1993), Bagwell and Staiger (1997), Bohara, Gawande, and Sanguinetti (2004), Bond, Riezman, and Syropoulos (2004) show that a welfare-maximizing government will lower external import tariffs once an FTA is formed. By doing this, the government restores part of the tariff revenue lost due to the shift in import demand from the ROW to the partner country firms.

Ornelas (2005a,b) examined the political economy of an FTA without foreign lobbying using oligopolistic market structure in the GH model. He shows that the FTA formation weakens the
lobbying power of domestic firms because elimination of tariffs between FTA member countries shifts part of a tariff rent from domestic firms towards firms from a partner country. Therefore, political economy factors lower the potential benefit from protection for home country firms, thus reinforcing the welfare maximization considerations identified by Bagwell and Staiger (1997) and reducing the government’s incentives for protection. The model in this paper allows for cross-border lobbying activity, which lessens the effect introduced by Ornelas (2005a,b): a reduction in political activity by domestic firms is coupled with an increase in contributions for protection by the FTA partner country firms, provided the sector in the partner country is politically organized. The fact that the US firms lobby for higher Canadian tariffs finds a strong support in the post-NAFTA data and implies that the presence of a foreign lobby may in fact raise external tariffs when a country enters the FTA.

A growing attention in the political economy literature has been paid to political donations by foreign interest groups. In general, contributions from foreign agents are considered to be harmful and a threat to national independence, and during the last two decades many countries have introduced legislation that restricts foreign intervention into the political process. This tendency reflects increased concerns about political activity of foreign lobbies and its possible negative effects. The regulations on contributions by foreign corporations aim to limit the effect of foreign agents on the national policy, and the growing empirical evidence suggests a significant effect of foreign interests on domestic policy making, including the effect on trade policy.

Many scholars have evaluated the intensity of foreign lobbying in the US and argue that it has high potential for policy influence. Mitchell (1995) found that foreign affiliates in the US contributed 5.6% of total corporate political contributions in 1987-88, and 42% of them hired professional lobbyists to promote their interests in Washington. Hansen and Mitchell (2000) claim that, although foreign corporations make lower political contributions than domestic ones due to the existing legal restrictions, they are just as intensive as domestic corporations with respect to lobbying activity and lobbying expenditures. Choate (1991) presents a list of over 200 former US officials (including members of president’s administration) who lobbied interests of foreign corporations, along with the list of foreign clients they represent and the amounts paid.

Among them are Canada (The Canada Elections Act, s.217, 1993), UK (The Political Parties, Elections and Referendums Act, 2000), Singapore (The Political Donations Act, 2001), Russian Federation (Federal Law No175, 2002), India (The Foreign Contribution (Management and Control) Bill, 2005), France (Code electoral, Article L52-8, 2005). Some countries, like Germany (The Law on Political Parties (Party Law), 2002) and Spain (Ley organica, de regimen electoral general, 2003), prohibit non-EU political contributions. In April 2003, the Committee of Ministers of the Council of Europe adopted Recommendation that “states should specifically limit, prohibit or otherwise regulate donations from foreign donors”. 
While it has been argued that foreign corporations are quite influential in US politics, very little research has been done on their effect on trade policy outcomes. In their pioneering work, Gawande, Krishna, and Robbins (2006) demonstrate that foreign agents spent more on lobbying in the US than domestic corporations contributed to political parties, and the effect of foreign lobbying on the US trade policy is about as strong as the effect of domestic organized interest groups. This paper was the first to show that foreign lobbying is an important factor in the formation of national trade policy. Using the same data, Kee, Olarreaga, and Silva (2003) show that the lobbying expenditure by Latin American countries is a significant determinant of preferential treatment that these countries get from the US.

Gawande, Krishna, and Robbins (2006) argue that foreign lobbying may be beneficial to the country’s trade policy as counter-pressure to domestic interests and may help to reduce distortional trade barriers. In contrast, the current paper suggests that the above argument is invalid in the presence of preferential trade agreements, when firms from a partner country prefer to maintain high discriminatory tariffs for third-country imports. Since most of the countries are members of at least one preferential trade agreement, cross-border lobbying may stimulate more protectionist trade policies in FTAs and disrupt multilateral trade liberalization.

In this work I show that the variation in the objectives of foreign lobbies in the presence of an FTA plays an important role, and the Canadian post-NAFTA data strongly confirms this fact. Canada represents a useful testing ground for the effect of foreign lobbying in the presence of an FTA because US multinationals are particularly active in lobbying for their interests abroad. The result that the formation of the FTA in the presence of foreign lobbying may lead to an increase in the external import tariff suggests a potential welfare reduction under the FTA and should be taken into account in the welfare analysis.

The rest of the paper is organized as follows. Section 2 provides some evidence on the lobbying activities of foreign firms in Canada. Section 3 introduces the modified GH version of the model that allows imperfectly competitive market structure and two groups of foreign lobbies, and motivates the empirical methodology. Section 4 describes the data and Section 5 explains the estimation procedure. Results are presented in Section 6 and Section 7 concludes.

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3 According to the Transparency International Bribe Index report (2002), US multinationals use illegal contributions most frequently in gaining a competitive advantage in international trade. One of the most striking examples was in 2005 when US lobbyist Jim Giffen was accused of offering $84 million of illegal contributions during 90s to Kazakh officials, including the president of the state, in order to secure market access for Chevron, Mobil Oil and other US multinationals.
The role of foreign lobbies in Canada

To motivate the presence of foreign lobbying in the theoretical model and empirical specification, we need to discuss the main channels of foreign lobbying activity in Canada and its relative strength as compared to domestic lobbying.

Concerns about foreign influence on Canadian policy and the necessity for special regulation emerged after WWII. The main law that regulates the activity of domestic and foreign lobbyists in Canada is the Canada Elections Act introduced in 1960. This law regulates the amount of political contributions by Canadian nationals to political parties that could be used for political advertisement campaigns. It also explicitly bans the use of political contributions from foreigners (s.217): “No person or party shall accept or use contributions from a person who is not a Canadian citizen . . . , corporation or association that does not carry on business in Canada, foreign political party, or foreign government”.

However, this law suffered from a lack of transparency in the lobbying process. On September 9, 1985 Canadian Prime Minister Mulroney announced his intention to introduce a legislation to ensure that “persons, who are approached by lobbyists for Canadian corporations, associations and unions, and by agents on behalf of foreign governments and other foreign interests, would be clearly aware of who is behind the representations”. As a result, a Lobbying Registration Act (LRA) came into force on September 30, 1989. This piece of legislation introduced a definition of a lobbyist and a requirement for lobbyists to register at the Lobbyists Registrar. But more importantly, it requires lobbyists to provide information about the name and business address of the organization “that has a direct interest in the outcome of the lobbyists activities on behalf of the client”, all of its subsidiaries and headquarter corporation, if there is one. Amendment to the LRA introduced in 1996 made this information publicly available. Besides, it introduced a strict disclosure of funds policy applied to political parties. Together with the Canada Elections Act, LRA made it difficult for foreign firm to lobby their interests in Canada directly.

Nevertheless, there are some loopholes in the legal restrictions, and politically active foreign firms can still influence trade policy outcomes in at least two ways. First, they can hire Canadian agents and consultants to lobby the executive branch on their behalf and affect policy outcomes in a way that suits the interests of foreign firms. Second, subsidiaries of foreign enterprises can make legal political contributions with their own funds. Since there are no restrictions on the share of foreign capital in the assets of a company that makes political contributions, any local subsidiary of a foreign corporation can make political donations from its own funds if “it carries business in Canada”. Moreover, almost any big foreign company that exports to Canada has an independent local sales department, which is legally allowed to lobby for a lowering of import tariffs on the parent
company’s products imported into Canada. Lobbying efforts of such subsidiaries will be opposite to the efforts of domestic firms and, therefore, pooling all Canadian firms together regardless of ownership may lead to misleading results and estimation problems.

In the trade policy literature corporate political activity is typically measured with financial contributions to candidates and political parties, while very little attention has been paid to other means of affecting policy outcomes such as direct lobbying. However, earlier research on the effect of foreign companies on national policy (Hansen and Mitchell, 2000) suggests that foreign corporations prefer direct lobbying to political contributions not only because of legal restrictions on contributions, but also because of informal legitimacy questions for politicians with respect to accepting money from corporate sources with foreign ownership. Hansen and Mitchell found that because lobbying is less visible than contributions, foreigners use it equally intensive (and effective) as domestic firms do. Gawande, Krishna, and Robbins (2006) established a similar pattern: in the 1978 US election cycle, foreign corporations spent approximately 40% more on lobbying than their US counterparts contributed to political parties. For these reasons, lobbying expenditures seem to be a better measure of foreign political involvement, especially in countries with legal restrictions on political contributions by foreigners.

Unfortunately, data on lobbying expenditures by domestic and foreign corporations in unavailable for Canada. To measure the foreign lobby intensity in Canada I collected the information on the number of lobbyists officially registered with the Office of the Registrar of Lobbyists, as it is required by the LRA. The Act defines a lobbyist as “an individual who, for payment, undertakes to lobby on behalf of a client” and represents organization in arranging meetings with public office holders, or “communicate with a public office holder in an attempt to influence the development of any legislative proposal, ... the making or amendment of any regulation, ... the development or amendment of any program or policy”. Intuitively, the number of lobbyists hired by a company or industry should be highly correlated with the lobbying expenditure and hence can serve as a proxy for political activity. The lobbyists registration data is publicly available and is discussed in more detail in Section 4.2, but the following figures illustrate the relative importance of foreign lobbying in Canada. In 1996-97, there were 1032 officially registered lobbyists representing interests of manufacturing firms regarding Canadian trade policy, with 47%, 26% and 27% of them acting on behalf of Canadian, US and ROW firms, respectively. These numbers support previous findings by Gawande, Krishna, and Robbins (2006) and demonstrate that foreign agents have actively attempted to influence formation of domestic trade policy. The objective of the remaining part of the paper is to estimate the effectiveness of lobbying by two interest groups (in the partner country and in the ROW) and compare it to the effect of domestic lobbyists on Canadian trade policy.
3 The model

The theoretical model is based on the Grossman and Helpman (1994) political economy model and presents several modifications that allow for the presence of foreign lobbying and facilitate econometric estimation. In their original formulation, Grossman and Helpman considered a small open economy, which leaves no room for foreign companies to lobby because pre-tariff prices are fixed. In this work I develop and build into the GH setup a model of monopolistic competition with differentiated goods to allow foreign firms to gain or lose from import tariffs.

There are \( N \) products (industries) in the model and three countries: Canada (Home country), the US (FTA Partner country) and the ROW, denoted by \( H, P \) and \( ROW \), respectively. Industries are denoted by index \( i \in \{1, \ldots, N\} \) and countries by \( j \in \{ H, P, ROW \} \). There are \( n_j^i \) firms in country \( j \) and industry \( i \). These firms are assumed to be symmetric within the same country and industry, i.e. they share the same cost structure and hence face the same demand functions and charge the same prices. In total, there are \( n_H^i + n_P^i + n_{ROW}^i \) different varieties of each product \( i \).

A representative consumer maximizes a quasilinear utility function with a constant elasticity of substitution index nested into a Cobb-Douglas function:

\[
U = X_0 + \sum_{i=1}^{N} \omega_i \ln X_i
\]

\[
X_i = \left(n_H^i d_H^i \frac{1}{x_i} x_i^H \frac{\sigma_i - 1}{\sigma_i} + n_P^i d_P^i \frac{1}{x_i} x_i^P \frac{\sigma_i - 1}{\sigma_i} + n_{ROW}^i d_{ROW}^i \frac{1}{x_i} x_i^{ROW} \frac{\sigma_i - 1}{\sigma_i}\right)^{\frac{1}{\sigma_i - 1}} \tag{1}
\]

where \( X_i \) is an aggregate consumption index for product \( i \), \( \omega_i \) is the share of product \( i \) in the total consumer’s expenditure, \( x_i^j \) is the demand for product \( i \) produced in country \( j \), \( \sigma_i > 1 \) is the elasticity of substitution between varieties of product \( i \), and \( d_i^j \) is a country-wide taste (or quality) parameter for product \( i \) imported from country \( j \). Maximizing (1) subject to the standard budget constraint, we obtain the demand functions and an aggregate price index for product \( i \):

\[
X_i = \omega_i (P_i)^{-1}, \quad i \geq 1 \tag{2}
\]

\[
x_j^i = \frac{\omega_i d_i^j}{p_i^j} \left(p_i^j \right)^{1-\sigma_i} \tag{3}
\]

\[
P_i = (n_H^i d_H^i (p_H^i)^{1-\sigma_i} + n_P^i d_P^i (p_P^i)^{1-\sigma_i} + n_{ROW}^i d_{ROW}^i (p_{ROW}^i)^{1-\sigma_i})^{\frac{1}{1-\sigma_i}} \tag{4}
\]

Firms within one country and sector are assumed to have the same constant marginal cost. This allows to consider Canadian market independently from other markets, i.e. prices on the Canadian market are set independently of other markets. The substitution elasticity between industries is assumed to be equal to unity. 

\footnote{Substitution elasticity between industries is assumed to be equal to unity.}
market depend only on the demand elasticity, the (fixed) number of firms and the fixed marginal
cost structure. Denoting a specific import tariff set by the home country government on imports of
product $i$ from country $j$ as $\tau^j_i$, we can write the profit of a country $j$ firm that produces product
$i$ as:

$$\pi^j_i = (p^j_i - c^j_i - \tau^j_i)q^j_i$$

(5)

where $q^j_i$ is the quantity supplied and $c^j_i$ is the marginal costs. I assume that the number of firms
is large enough to ignore the effect of their individual pricing decisions on the industry price index
$P_i$, i.e. each firm takes the price index as given. Knowing product demand functions (3), each firm
sets the profit-maximizing price as a markup over its marginal costs:

$$p^H_i = \left(\frac{\sigma_i}{\sigma_i - 1}\right)c^H_i$$,  
$$p^P_i = \left(\frac{\sigma_i}{\sigma_i - 1}\right)(c^P_i + \tau^P_i)$$,  
$$p^\text{ROW}_i = \left(\frac{\sigma_i}{\sigma_i - 1}\right)(c^\text{ROW}_i + \tau^\text{ROW}_i)$$

(6)

For convenience, isolate costs from (6) and write down equilibrium profits (5) as:

$$\pi^j_i = \sigma_i^{-1}p^j_iq^j_i$$,  \forall j

(7)

The government chooses import tariffs to maximize a weighted sum of national welfare $W$ and
political contributions $C$:

$$G(\tau^j, C^j) = \sum_i C^H_i + aW + b\sum_i C^P_i + c\sum_i C^\text{ROW}_i$$

(8)

where $C^H_i$, $C^P_i$ and $C^\text{ROW}_i$ are industry-wide political contributions from each country. Coefficient
$a$ is a weight that the government assigns to national welfare relative to political contributions.
Coefficients $b$ and $c$ reflect the government’s preferences for the US and ROW contributions over
the contributions by domestic firms. As long as accepting contributions from foreign firms involves
risk of reputation loss or law infraction, politicians may prefer domestic contributions to overseas
donations thus both coefficients are presumably less than one.

Firms in industry $i$ can organize themselves and form a group to lobby the local government for
a change in trade policy.\footnote{With the number of firms in the sector being limited by the endowment of sector-specific capital, firms in each
industry have an incentive to form a lobby group and seek for protection from foreign competition. Here I ignore the
free-riding problem within each sector. See Bombardini (2005) for an extensive discussion of firm-level contribution
decision.} Firms within the FTA pay no import tariffs and hence lobby for more
protection, while firms from other countries lobby for lower tariffs for the opposite reason. The lobby
representing industry $i$ of country $j$ maximizes its welfare from obtaining protection net of political
contribution: $(W^j_i - C^j_i)$. As in Grossman and Helpman (1994), the equilibrium trade policy is a
solution to a two-stage game. In the first stage, knowing the government’s objective function, each
organized lobbying group provides the government with a schedule of political contributions as a function of import tariff. In the second stage, observing contribution schedules, the government sets trade policy that maximizes its objective function (8). Grossman and Helpman (1994) show that for truthful contribution schedules the optimal trade policy is the one that maximizes joint surplus of the government and organized lobbying groups. Let \( \alpha_i \) denote the share of the home country population entitled to the domestic industry \( i \) profits, and \( I_i^j \) denote an index variable that takes the value of one when industry \( i \) in country \( j \) is politically organized and zero otherwise. The joint welfare function then takes the form:

\[
\Omega = \sum_{i=1}^{N} I_i^H W_i^H + aW + b \sum_{i=1}^{N} I_i^P W_i^P + c \sum_{i=1}^{N} I_i^{ROW} W_i^{ROW} \tag{9}
\]

where \( W_i^H = n_i^H \pi_i^H + \alpha_i (TR + CS) \) is welfare of the domestic industry \( i \) gross of political contributions, \( TR \) and \( CS \) are total tariff revenue and consumer surplus, respectively, \( W_i^j = n_i^j \pi_i^j, j \in \{P, ROW\} \) is gross welfare of foreign industries \( i \) from exports to the home country market, and \( W = \sum_{i} (n_i^H \pi_i^H) + TR + CS \) is national welfare. Denote the share of country \( j \) on the Canadian market for product \( i \) as \( s_i^j \). Taking the first order condition of the joint welfare function with respect to the ROW import tariff rate and rearranging it, one obtains the expression for the equilibrium trade policy:

\[
\varepsilon_i \frac{\tau_i^{ROW}}{p_i^{ROW}} = -\frac{1}{\sigma_i} + (\sigma_i - 1) \frac{p_i^{P}}{\sigma_i} s_i^P + \frac{I_i^H}{a + \alpha \sigma_i} s_i^H + \frac{b I_i^P}{a + \alpha \sigma_i} s_i^P + \frac{c I_i^{ROW}}{a + \alpha \sigma_i} s_i^{ROW} - 1 \tag{10}
\]

Overall, predictions of the monopolistically competitive version of the GH model with foreign lobbying correspond to those of the benchmark setup with perfect competition. On the left-hand side \( \left( \tau_i^{ROW}/p_i^{ROW} \right) \) is the ad-valorem tariff on the ROW imports, which is multiplied by the price elasticity of demand for the ROW imports \( \varepsilon_i \). Therefore, as in the benchmark GH model, trade protection is inversely related to the import demand elasticity.

The second element on the right-hand side shows the positive relation between the FTA external and internal tariffs and reflects a tariff complementarity effect: if the tariff rate for the partner country is high, it is optimal for the government to raise the external tariff as well.\(^8\) Intuitively, an increase in the within-FTA tariff rate causes an increase in imports from the ROW, and the positive effect on the tariff revenue is proportional to the market share of the partner country firms \( s_i^P \). Furthermore, the tariff revenue effect is stronger if the partner country and ROW exports are

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\(^6\) Contribution is defined as truthful if it reflects the true preferences of lobbying group for any possible policy outcome.

\(^7\) Details on derivation of equation (10) are provided in Appendix.

\(^8\) This result is consistent with other studies, e.g. Bagwell and Staiger (1997), Ornelas (2005a,b).
close substitutes.\(^9\)

The third term is similar to the benchmark GH model: a politically organized domestic industry receives more protection from the government. Moreover, the level of protection is higher if domestic and imported varieties are close substitutes and if the domestic sector is relatively large, as the domestic lobby has more to gain from protection in this case. In contrast to the benchmark case, even for unorganized industries protection may still be positive due to the imperfectly competitive market structure, since the coefficient \(\frac{\alpha}{\alpha+\sigma}\) is positive.

The fourth term reflects the effect of political activity by partner country firms on the national trade policy. \(I_p\) enters the equation positively, making protection more likely in those sectors where partner country exporters are organized into lobbying groups and where product varieties are closer substitutes. Similarly to the domestic lobby, the effect of partner country firms lobbying on the import tariff is proportional to their market share.

The last term is negative and reflects the effect of lobbying efforts by the ROW firms to reduce protection. As before, the scaling factor \(\frac{\sigma_i-1}{\sigma_i}\) reflects higher motivation by the ROW firms to lobby for trade liberalization when the degree of substitution between varieties within a given industry is high, but unlike domestic and partner country lobbying, the ROW lobbying intensity declines with the market share. The intuition behind this result is an increased damage from protection for small ROW industries, and as a consequence these industries will resist tariff increase more intensively.\(^{10}\)

As in the GH model, domestic and partner country’s lobbying results in overprotection and welfare reduction relative to the first-best outcome. The presence of an organized foreign lobby from the ROW may help to (partially) restore the optimal level of import tariffs and raise national welfare. However, the presence of the ROW lobbying alone causes underprotection and is thus welfare-reducing. Therefore, the overall net effect from the presence of the partner country lobbying is likely to lead to welfare reduction, whereas the overall welfare effect of the ROW lobbying activity is unambiguous: the effect is positive if ROW firms counter-lobby against the effort of domestic and partner country firms to raise protection and negative if ROW firms form a single organized lobbying group in the sector.

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\(^9\)It should be noted that without the MFN rule, a set of equilibrium tariffs for all importers would be determined by a system of simultaneous equations with the number of equations being equal to the number of importing countries. With the MFN and the FTA, the number of equations goes down to two. However, under complete trade liberalization agreement, a within-FTA tariff is exogenously set to zero and the second term on the right-hand side of (10) vanishes.\(^{10}\)This result follows from the Cobb-Douglas utility function. Fixed product expenditure shares imply that the import tariff imposed on one variety will raise consumer’s expenditure on all varieties through aggregate price index proportionally to their market shares. Therefore, the higher is the ROW market share (and the lower is the share of other varieties), the less harmful is the import tariff for the ROW exporters.
4 The data

The empirical section of this paper estimates the effects of domestic, partner country and ROW lobbying activity on the Canadian post-NAFTA trade policy. Primarily, trade barriers are measured with import tariffs and the share of imports that is subject to trade restrictions; the US were treated as an FTA partner country, while all other countries that have no preferential trade agreements with Canada were aggregated into ROW. The estimation of equation (10) requires the following data: the measure for trade protection, imports by the country of origin and by sector, domestic output by sectors, substitution and price elasticities, political organization dummies and three sets of instruments for market shares. This study is conducted for 249 Canadian 6-digit NAICS manufacturing sectors (NAICS 31-33) for the period 1996-97.

4.1 Protection measures and market shares

Domestic manufacturing shipments data for 249 NAICS-6 industries is provided by Industry Canada. The values of Canadian imports, as well as customs duties collected, were obtained from Statistics Canada at the HTS-10 level and aggregated to NAICS-6 using the concordances tables from the International Trade division of Statistics Canada.

In the original formulation, the GH model was meant to analyze the political economy of import tariff formation. However, tariff rates are often argued to be an imperfect measure of trade protection for the analysis of endogenous trade policy formation in the presence of WTO tariff regulation. With limitations on the magnitude of tariffs imposed by the WTO, organized interests would seek non-tariff protection from import competition. The advantage of nontariff barriers (NTBs) as a measure of trade distortion is their unilateral adoption by different countries, as opposed to tariffs that are set cooperatively in WTO negotiations. Unless organized industries can protect their interests during WTO negotiations, NTBs are a preferred measure for trade protection. However, measurement difficulties and the qualitative nature of NTBs are important issues, which can be a serious problem in a small sample estimation.

In light of this, I used tariff, NTBs and protection coverage share as a measure of protection. Ad-valorem tariff rates were obtained as the ratio of aggregated duty collected by customs over the value of imports.\(^{11}\) NTBs for Canadian imports were obtained from the TRAINS database maintained by UNCTAD, which shows the proportion of imports that is covered by one or more qualitative restrictions. This data is available at the HS-6 level and was aggregated into NAICS-6 groups. In addition, the protection share variable was constructed as the share of Canadian imports

\(^{11}\)Therefore, tariff measure takes into account antidumping and countervailing duties.
that is either subject to positive import tariff or covered by NTBs.

Descriptive statistics for protection measures and market shares are presented in Table 1. In 1997 the average tariff rate, NTBs and protection coverage ratios for the ROW imports were 4.8%, 18.2% and 77.5%, respectively. Tariffs and NTBs are highly correlated both within and outside of the FTA, which implies that different measures of protection are still highly complementary.

### 4.2 Political organization dummies

Previous studies that have tested the GH model empirically used firm-level political contributions to assign the value for the political organization dummy variable.\(^\text{12}\) Although these data are available for Canada for 1997 and afterwards, this paper uses a different approach. As was previously mentioned, foreign corporations prefer direct lobbying to political contributions because transparency of political contributions may raise concerns about foreign interference into the political process. Furthermore, since different means of political involvement are highly correlated (Hansen and Mitchell, 2000), direct lobbying seems to be an appropriate measure for domestic political activity as well.

In this work the degree of political activity in an industry is measured by the number of lobbyists representing the corporate interests of that industry. The *Lobbyists Registration Act* (LRA) requires every individual to register at the Lobby Registrar Canada if the person seeks for a meeting or a phone call to any public office holder regarding the development, modification or cancellation of legislative proposals, regulations, public policies and programs. The assumption that political contributions will be ineffective for the determination of trade policy without such contact seems to be reasonable and, therefore, political contributions should be followed up by a personal contact with a policymaker. For this reason, the number of registered lobbyists is used to measure firm-level lobbying intensity within an industry.

The main advantage of this data set is the large amount of detailed information lobbyists are required to submit. This includes information on the business address of a corporation that benefits from lobbying, its subsidiary and headquarter, and the objective of the meeting with a public office holder. This information is very helpful in determining the “nationality” and industrial affiliation of lobbyists representing interests of multiproduct multinational corporations. Another advantage of this data set is that it gives a very narrow definition of a lobbyist. Any person representing his or her own interests, and who is not being paid for arranging the meeting with the public office holder, is not obliged to register. This removes information on the very small firms. Large firms, which have high lobbying power and can effectively influence the decisions of policymakers, typically use

\(^{12}\) e.g. Goldberg and Maggi (1999), Gawande and Bandyopadhyay (2000), Bombardini (2005), Gawande, Krishna, and Robbins (2006).
the service of professional consultants or corporate lobbyists, who are required to register.

Firms were assigned a NAICS-6 industry code using the Canadian Company Capability database maintained by Industry Canada. Assigning an industry code to multiproduct firms involves some degree of discretion. For example, some firms in the automobile sector operate in more than ten NAICS-6 industries. Since the number of such firms is relatively small, I assigned primary, secondary and tertiary NAICS codes to such firms using different information sources: the Canadian Company Capability database, the Federal Corporations Registry and the North America Compustat database. The databases listed above allow assigning industry codes to US and ROW firms. The LRA also requires lobbyists to declare a “subject-matter in respect to which an individual undertakes to communicate with a public office holder”. In many cases, information on the purpose of lobbying activity reported in the lobbyist registration form allowed to attribute a firm to a single (or a small number of) primary NAICS code.

National affiliation of each firm that a particular lobbyist is representing was determined from two sources. First, the lobbyist registration form requires to provide “the name and business address of the parent corporation and those subsidiaries which directly benefit from the lobbying”. Sometimes lobbyists provide incomplete information and in this case it was complemented with the information from other data bases mentioned previously. Again, quite often the “nationality” of the firm was determined from the “objective” section of the lobbyist registration form.\(^\text{13}\)

There are two more advantages of using lobbyists’ registry data over using political contribution data. First, the necessity to report the objective of the contact with the public office holders allows to isolate effectively those firms that lobby particularly for a change in trade policy. This is especially a problem for domestic lobbyists: on average, only one out of eight lobbyists, representing the domestic manufacturing sector, is concerned with trade policy. Therefore, pooling political contributions by all domestic firms may cause serious measurement problems for the political organization variable.

Second, the main channel used by foreign firms to lobby their interest in Canada is through local subsidiaries, which distribute the imported goods within Canada. Formally, these firms should be assigned to a trade sector code (NAICS 41-45) and dropped from the sample but this would substantially underestimate lobbying efforts by foreign firms. For each trade firm concerned with international trade policy issues I used the company profile and lobbying objectives information to assign an appropriate manufacturing industry code and country.

\(^{13}\text{For instance, a lobbyist of a Japanese Automobile Manufacturers Association of Canada registered in Ontario, Canada was attributed to the ROW on the basis of the meeting purpose to “secure international trade for electric equipment”}\).
The amendment to the LRA announced in 1995 introduced several important refinements that made it more desirable to use post-1995 lobbying data. First, for the purpose of transparency, the lobbyists’ connections to the public office holders were opened to public scrutiny, and the lobbyists’ registry database became available for research purposes. Second, this amendment extended the amount of information that must be reported. But most importantly, it made disclosed information more complete and reliable. For the first time lobbyists were obliged to provide all the information, and effective enforcement devices were introduced to encourage better compliance. It extended the power of the Lobbyists Registrar, who was authorized to seek for clarification of information submitted. The registrar was allowed to conduct an audit of provided information and, when necessary, investigate the provided information. Sanctions for violating the LRA were also increased: “every individual who contravenes any part of the Act . . . is liable to a fine not exceeding twenty-five thousand dollars. On proceedings by way of indictment, an individual is liable to a fine of up to one hundred thousand dollars or to imprisonment for a term not exceeding two years, or to both” (LRA, Section 14).

For these reasons, the data for political activity by firms was collected for the 1997 election cycle and complemented with the 1996 lobbying data to take into account possible small lag in trade policy response to lobbying efforts. Similar to other studies, several thresholds for the number of lobbyists in an industry will be set to determine the values of political organization dummies.

As a final note on the lobbyists’ registry data, I will briefly discuss the reliability of this database. In 2001 an independent study of compliance to the LRA was conducted by KPMG Consulting Inc. (2001). The already registered lobbyists were asked if they were aware of any non-compliance behavior. Reported results indicate that 50% of consultant lobbyists and 15% of corporate lobbyists were aware of non-registered lobbying, while they evaluated the aggregate compliance rate at 70% and 100%, respectively. In general, compliance was perceived to be high, although non-compliance behavior is still an important issue.

Descriptive statistics for the number of lobbyists is provided in Table 2 and the distribution of lobbyists across sectors is shown in Figure 1.

4.3 The elasticity of substitution

To my knowledge, there are no studies to date that estimate substitution elasticities for Canadian NAICS-6 industries, especially within a framework of monopolistic competition. In this study substitution elasticities were estimated using the approach by Feenstra (1994), recently applied by Broda and Weinstein (2006) to a large set of US imported commodities. This approach identifies supply and demand elasticities using no instrumental variables, and relies only on the assumption
of independent supply and demand disturbances. The complete derivation of the estimator is presented in Appendix C. It also includes a discussion of a possible estimation bias due to a small sample size and a proposed solution to that problem.

The summary statistics and a histogram of the elasticity estimates are presented in Table 3 and Figures 2 and 3. Price elasticities of the ROW import demand were calculated using (9a). As a robustness check, I estimated the substitution elasticities for NAICS industries at various level of aggregation and verified that more aggregated commodities are more differentiated: the average value of $\sigma$ decreased from 5.85 to 5.34 and 4.56 while moving respectively from six to five and four digits NAICS. As another robustness check, I estimated US elasticity of substitution using the same procedure for the same year and industry classification. Presumably, Canada and the US should have similar tastes, and varieties that are close substitutes in Canada should be close substitutes in the US as well. This suggestion is supported by Figure 4, which compares the percentage deviation from the mean for Canadian and US estimates and shows a very close relationship in the perception of product characteristics in Canada and US.

4.4 Instrumental variables

In equation (10) market shares are likely to be determined simultaneously with the tariff rates and should be properly instrumented. Trefler (1993) proposed to instrument the import penetration ratio with industry factor endowments as the measure of comparative advantage independent of the level of protection. Following this approach, a list of instruments for the Canadian market share includes: the share of productive to non-productive workers, the capital stock in machinery and construction, inventories, and the consumption of fuel and electricity. All of these data is provided by Statistics Canada. The same list of instruments was constructed for the US market share in Canada using the US Census data.

To instrument the ROW share in the Canadian market, two “gravity” variables were built. The first one is the distance between Canada and the average exporter. For every product, the pair-wise log-distance between Canada and the exporting country was weighted by the share of this country in the global export of the product.\footnote{Since the exporter’s share on Canadian market is endogenous, I use the share on global market, assuming it is unaffected by Canadian tariff rate.} The total exports by country and by sector were constructed using the UNCTAD database. For the geographic distance two measures were used: a simple geographic distance between two capital cities, and a distance weighted by population density and economic activity within each country. These data were taken from the Centre d’Etudes Prospectives et d’Informations Internationales. The rationale for using this “distance” variable is
the following: if main producers of a particular good are located far from Canada, the ROW share in the Canadian market is likely to be small.

The second “gravity” variable is a log of worldwide exports of a product by all countries exporting to Canada. The intuition for including this variable as an instrument is the same as for using GDP in the bilateral trade gravity model: the more the ROW countries produce (and export) worldwide, the more they will export to Canada in particular, and the larger the ROW share in the Canadian market should be.

In previous tests of the GH model political organization dummies were derived from political contributions and treated as endogenous, because contributions are directly related to tariffs. In the data set used in this paper there is no direct link between the import tariff rate and the number of lobbyists. However, I will instrument the political organization variable as well for the reason of possible measurement error, such as assignment to the wrong industry or missing information on the number of lobbyists. To instrument the US and Canadian political organization dummies, I use the information on the total number of firms in an industry, shares of big and medium firms, and the CR-4 concentration ratio. It is not possible to construct similar measures for the ROW and we can only rely on the US and Canadian industry characteristics as proxies for concentration in other countries.

5 Estimation procedure

Equation (10) motivates the following form of the estimation equation:

$$Y_i = \beta_0 + \beta_1 s_i^h + \beta_2 I_i^b s_i^h + \beta_3 I_i^p s_i^p + \beta_4 I_i^f [1 - s_i^f]$$

$$Y_i = \left( \frac{\sigma_i}{\sigma_i - 1} \right) \left( \frac{\tau_i}{p_i^f} + \frac{1}{\sigma_i} \right)$$

$$\beta_1 = \frac{a}{a + \alpha}, \quad \beta_2 = \frac{1}{a + \alpha}, \quad \beta_3 = \frac{b}{a + \alpha}, \quad \beta_4 = \frac{c}{a + \alpha}$$

In equation (10) the inverse elasticity was taken on the left-hand side and both sides were multiplied by $\frac{\sigma_i}{\sigma_i - 1}$ because substitution elasticity is likely to be measured with error. Using (12), the four coefficient estimates of the reduced form (11) can be used to derive four structural parameters of the model.

There are several issues regarding the estimation of (11) that should be addressed. First, the right-hand side variables of (11) include non-linear combinations of endogenous variables. To deal with this problem the set of instrumental variables includes the ones described in the Section 4.4 above, their square terms and interactions.\(^{15}\)

\(^{15}\)This IV estimator was proposed by Kelejian (1971).
Second, using many instruments relative to the sample size and to the number of instrumented variables leads to a bias of 2SLS towards OLS results (Hansen, Hausman and Newey, 2006). The third problem with a small ratio of endogenous variables to the number of instruments is a problem of weak instruments. When the correlation between the endogenous variable and most of the instruments is weak, conventional asymptotics may provide poor approximations for the reduced form estimates and test statistics, and inferences on the significance of coefficients may be very misleading. Finally, Goldberg and Maggi (1999) point at the problem of heteroskedasticity of the error term in (11), which may be correlated with the imperfectly measured elasticity of substitution.

Therefore, equation (11) requires an estimator that will be robust to the problems of many instruments, many weak instruments and heteroskedasticity. Several estimation procedures that address these problems were proposed recently in the econometrics literature. I used LIML with Bekker (1994) standard error correction. Hansen, Hausman, and Newey (2006) demonstrated that this approach has better small sample properties than 2SLS and is asymptotically correct in the presence of many instruments and many weak instruments. It results in tests with the correct size and the tests can be made robust to heteroskedasticity through the use of conventional robust covariance matrix estimators.

6 Results

6.1 Test of a benchmark GH model

As a starting point, I will present the results on a GH version of the model with homogeneous goods to test how well the new data on Canada can fit the benchmark model and compare its performance with the results of previous empirical studies. Since in the benchmark model markets are perfectly competitive and import supply is infinite elastic, there is no reason for foreign firms to participate in lobbying, and in the benchmark case I will consider only the effect of domestic lobby groups on the home country trade policy.

Following Grossman and Helpman (1994), the optimal import tariff for a small open economy with politically organized sector-specific factors of production takes the following form:

\[
\frac{c_i^* f_i^*}{p_i^*} = -\frac{\alpha}{a + \alpha} \frac{X_i^h}{M_i} + \frac{1}{a + \alpha} \frac{X_i^h}{M_i} I_i
\]

where \(X_i^h\) is a domestic value of shipments and \(M_i\) is a total value of imports. Table 4 represents

\[16\] Stock, Wright, and Yogo (2002) and Andrews and Stock (2005) provide an excellent survey of this literature.

\[17\] I also tried a correction of standard errors proposed by Kleibergen (2002) but results differ only marginally and I do not report them here.
estimation results for equation (13) using tariffs, NTBs and protection share data as a measure of Canadian trade barriers.

Following Goldberg and Maggi (1999), several thresholds were used for the number of lobbyists in the construction of political organization dummies to verify that the results are not driven by the way these dummies are assigned. In the first column of Table 4 an industry is considered to be politically organized if it is represented by at least one lobbyist. For the second and third columns the threshold is two and three lobbyists, respectively.

First, consider the estimation with tariffs as a protection measure. The estimates of the regression model (13) are of correct signs across all specifications: organized sectors receive more protection and protection in unorganized sectors is negative and increases with import penetration. The latter result is statistically significant at 5% confidence level. In organized sectors protection declines with the import penetration but this result is not statistically significant. The model estimates are very robust to the way political organization dummies are constructed. When trade barriers are measured with NTBs and protection share, results correspond closely to those obtained for the tariff equation: the parameter estimates preserve correct signs but are estimated with less precision when trade barriers are measured with protection share. Overall, the estimates of the structural model (13) using Canadian data are generally in line with the results of the studies by Goldberg and Maggi (1999) and Gawande and Bandyopadhyay (2000).

The estimates of the structural parameters of the model vary considerably across different measures of protection. However, the variances of these parameters are very high and one cannot reject hypotheses that both $\alpha$ and $a$ are the same across all specifications considered. The fraction of population represented by a lobby, is estimated around 0.6 for the specifications with tariffs, 0.2 for specifications with protection shares and greater than one for specifications with NTBs. In general, 95% confidence interval for $\alpha$ includes the whole $[0; 1]$ interval and the model does not allow to obtain a precise measure for $\alpha$. Nevertheless, the obtained results do not contradict the previous estimates of $\alpha$ by Goldberg and Maggi (1999) and Gawande and Bandyopadhyay (2000), who estimated the share of population represented by interest groups to be around 0.85 and unity, respectively.

The estimates of the government’s political bias vary from 10 in the specification in shares to 100 in specification in tariffs. The values of the parameter $a$ greater than ten imply approximately equal weights that the government assigns to political contributions and to national welfare net of political contributions, which supports the results of studies that use US data.\textsuperscript{18}

\textsuperscript{18} The government’s objective function $C + aW$ is equivalent to $a_1 C + a_2 (W - C)$, where $a = \frac{a_2}{a_1 - a_2}$, $a_1$ is the weight on political contributions and $a_2$ is the weight on welfare net of political contributions. Therefore when $a$ is
Overall, the results of the GH model with Canadian data are broadly consistent with those obtained by Goldberg and Maggi (1999) and Gawande and Bandyopadhyay (2000) and other studies for the US. These results will serve as a benchmark against which the results of monopolistic competition model with foreign lobbying and FTA participation will be compared in the next section.

6.2 Estimation results for monopolistic competition model with foreign lobby

In this section I present the estimation results for the political economy model of trade with monopolistic competition, FTA membership and two groups of foreign lobbies. The results from equation (11) appear in Table 5, where several measures are used to measure trade barriers. Columns with different numbers denote different threshold levels for construction of the political organization variable. Columns (1) and (2) report the results when an industry is assumed to be politically organized if there it at least one and three lobbyists, respectively. In column (3) a country’s \( j \) industry is organized if it is represented by at least three lobbyists and accounts for strictly more than one third of a total number of lobbyists in that industry. This measure was constructed to exclude sectors with positive but small number of lobbyists relative to the whole industry.

First note that for any measure of protection and political organization variables, the coefficient \( \beta_1 \) is positive and almost always statistically significant, implying that domestic industries receive a positive level of protection regardless of political economy factors. This is consistent with the prediction of the model that the welfare-maximizing government always finds it worthwhile to protect home country producers against competing importers when domestic and foreign products are close substitutes and markets are imperfectly competitive. The positive level of protection for unorganized sectors is in contrast to the benchmark GH model and finds strong support in the data. As the theory predicts, among politically unorganized sectors protection increases with the share of domestic firms on the market. When protection is measured with tariffs, the point estimate for \( \beta_1 \) in the most preferred specification in terms of the log-likelihood function (column (3)) is 0.21, which converts to the welfare-maximizing ad-valorem import tariff of 2.2% for an average Canadian industry, given the average Canadian market share, price and substitution elasticities of 0.66, 5.32 and 5.83, respectively. In terms of the optimal level of NTBs and protection share, the welfare-maximizing NTB coverage for the average industry is estimated to be 8.9% of total imports from outside of the FTA, while the welfare-maximizing share of imports subject to any trade restriction is 17.9%.

The effect of a politically organized domestic lobby (coefficient \( \beta_2 \)) is always estimated to be much greater than one, \( a_1 = \left( \frac{\alpha+1}{\alpha} \right) a_2 \approx a_2. \)
positive and very significant, independently of the construction of the political organization dummy and the measure of trade distortion. Everything else being equal, active domestic lobbying in the industry leads to a higher level of protection and this effect is significant and robust across all specifications. The presence of a politically organized domestic lobby tends to increase import tariffs by 5.4% for the average industry, the NTB coverage ratio by 29.7%, and the protection share by 31.7%.

The novel result of this section are the estimates of coefficients $\beta_3$ and $\beta_4$. The coefficient $\beta_3$ measures the effect of the FTA partner country’s lobby and is always estimated to be positive, although in specifications with tariffs it is only marginally significant. The effect of the ROW lobbying (coefficient $\beta_4$) is always negative and significant at 5% except for specifications with NTBs. According to these results, the presence of politically organized US industries in Canada leads to higher Canadian import barriers and the ROW lobbying effort is negatively correlated with the Canadian protection measures. Thus, it seems safe to conclude that, while our results do not allow to get a precise estimate of $\beta_3$, they strongly support the hypothesis of foreign lobby differentiation with respect to market access implied by the FTA and predicted by the theoretical model of Section 3. The point estimates of coefficient $\beta_3$ in specifications with the best data fit are 0.345 (column (3) for tariffs), 3.033 (column (3) for NTB) and 5.041 (columns (2) for protection share). These estimates imply that a politically organized industry in the FTA partner country tends to increase a country’s average import tariff by 1.2%, average NTB coverage by 10.5% and average protection coverage by 17.4%. Similarly, the presence of a politically organized group of exporters from outside of the FTA tends to decrease the average Canadian import tariff by 3.4%, the average NTB by 9.8% and the average protection share by 34.9%. These numbers are economically plausible and provide additional support to the estimates of the model.

Estimates of equation (11) allow to derive the values of the structural parameters of the model. As expected, absolute magnitudes of coefficients $\beta_4$ are always less than $\beta_2$, which implies that ROW contributions are relatively less important for Canadian policymakers than contributions from domestic firms ($c < 1$). This result is not surprising given the legislative restrictions on contributions by foreign firms in Canada. But in spite of that, policymakers’ valuation of contributions from abroad is still positive and significant. The estimates of the government’s preferences towards political contributions from the FTA partner country ($b$) depends on the protection measure that US firms are trying to affect. In lobbying for tariffs, partner country contributions are estimated to be 35-80% less effective than domestic contributions, while in lobbying for NTBs the effectiveness domestic and partner country lobbying is approximately equal. Finally, when trade distortions are measured by protection share, the government’s valuation of political contributions from the FTA
partner country relative to domestic ones rises to 1.63 but the hypothesis that \( b \leq 1 \) can never be rejected.

At the same time, US contributions seem to be more important than contributions from the ROW. Depending on the specification, the government’s valuation of US contributions is estimated to be around two times the valuation of contributions from other countries. Among possible reasons are greater proximity of the US and Canadian financial systems and a more sophisticated mixture of asset structure that makes it more difficult to distinguish between Canadian and US firms (relative to the distinction between Canadian and ROW firms).

The estimates of the population share organized into lobbying vary substantially across different specifications. In tariff equations, parameter \( \alpha \) is always greater than one but the standard error is very large and 95% confidence intervals almost always overlap with the \([0; 1]\) interval. In equations with NTBs and protection shares, point estimates for \( \alpha \) are also very imprecise and in all specifications one cannot rule out the possibility that \( \alpha \) is negative.\(^{19}\)

As for the relative importance of national welfare for the government, the parameter \( \alpha \) is estimated around 0.3-0.5 with reasonable degree of precision as compared to the benchmark GH model. It implies that when organized interests lobby for a change in tariff policy, the government’s valuation of political contributions is three to five times higher than the valuation of national welfare net of contribution. The result that policymakers are driven mostly by political contributions they receive from different lobby groups sharply contrasts with results obtained previously in a perfectly competitive setup: Gawande and Bandyopadhyay (2000) estimated \( \alpha \) to be over 3,000, in Goldberg and Maggi (1999) its value is around 70. My own estimates for Canada fall in the range 50-65 (see Section 6.1). However, Gawande and Bandyopadhyay (2000) recognized that high estimates of \( \alpha \) contradict the empirical evidence that welfare loss from protection are always greater than the amount of political contributions policymakers receive in exchange for protection. Intuitively, \( \alpha < 1 \) is what we should expect to get in the empirical model, because an increase in profit from a one percent increase in tariff (i.e., the maximum contribution that government could get for protection) is always lower than the corresponding decrease in welfare. Therefore, in order to observe any positive tariff above the welfare maximizing level in the equilibrium, the government should put a stronger emphasis on contributions relative to welfare and thus \( \alpha < 1 \) is a desirable feature of the empirical model.

Estimates of the reduced form (11) shown in Table 5 have a meaningful economic interpretation for an average Canadian industry. Given the average market shares of the three groups of firms,\(^{19}\) It should be pointed out that that measuring \( \alpha \) is a standard problem in the literature and its estimation proved to be difficult.
price and substitution elasticities, one can back out the welfare maximizing level of protection and
the average effect of each lobby group on Canadian trade policy. Table 6 presents the average
and marginal effect of each lobby group on different measures of protection. Marginal effects are
calculated as the effect of a particular lobbying group on an industry with average characteristics
and were discussed earlier in this section. Average effects are calculated as a simple average of the
fitted values of the dependent variable implied by the model estimates. As a result, the average
Canadian industry receives 1.33% import tariffs, 7.31% NTB coverage and 7.81% protection share
from lobbying by domestic firms; 0.21% tariffs, 1.87% NTBs and 4.26% protection share from
lobbying by partner country firms; -0.48% tariffs, -1.38% NTBs and -6.24% protection share from
lobbying by ROW firms. These results are economically reasonable and statistically significant.

6.3 Robustness

This section explores the robustness of the previous results to the treatment of foreign lobbies
operating in Canada. Table 7 represent a sensitivity analysis of the benchmark model results when
one cannot differentiate between domestic and foreign lobbying activity and attribute all or part of
politically active foreign firms to domestic industry lobbying. Table 7 only shows the estimates of the
equation in tariffs. The first three columns replicate the results for the benchmark GH model (with
a Canadian lobby only) from Table 4 to provide a standard for comparison. The next three columns
report specifications where US firms that are politically active in Canada are treated as Canadian.
Interestingly, the results remain qualitatively the same as in the benchmark case, with only a small
change in parameter estimates and small increase in the likelihood function. In the last three
columns of Table 7 all foreign firms that are politically active in Canada are treated as Canadian,
and they show that results are not robust to the treatment of the ROW lobbying. Coefficients on
\( \frac{X^h_i}{M_i} \) are biased towards zero and measured with larger error, reflecting the preferences of organized
foreign lobbies for protection removal. This result is preserved when other protection measures are
used and should not be surprising given conflicting interests of domestic and ROW lobbying groups.

Table 8 shows how robust are the results of the monopolistically competitive model to the
exclusion of one or two foreign lobby factors. As in the previous section, I only consider the tariff
equation here for two reasons. First, results are qualitatively the same when the NTB or protection
share are used to measure trade distortions. Second, equations in tariffs give higher precision and
fit the data better. The first three columns replicate the results from Table 6 for comparison. The
results of Table 8 suggest that including the effect of the US and ROW significantly improves the
fit of the model. However, to a large extent, this is due to the inclusion of the ROW lobby: the
likelihood ratio test always rejects the model without ROW lobbying. At the same time, omitting
the lobbying activity by US firms reduces the log-likelihood, but the likelihood ratio test fails to reject the model without US lobbying. Another important implication of Table 8 is that the estimates of \( \beta_1 \) and \( \beta_2 \) – and thus the structural estimates of the model – are not affected seriously when foreign lobbying is excluded.

The second set of robustness checks repeats the same thought experiment used in the previous section, by assuming that one cannot distinguish domestic from foreign lobbying activity. In columns A and B of Table 9 the US firms that are politically active in Canada are treated as Canadian. Furthermore, in column A the lobbying activity by the ROW firms is ignored. Finally, in column C all foreign firms that are politically active in Canada are assumed to be Canadian. Results of Table 9 suggest that inability to distinguish Canadian lobby from US does not affect the estimates of the model unless the effect of the ROW lobby is excluded. However, the estimates of Table 8 are not robust to the treatment of the ROW lobbying intensity: not only the variance of estimators increase but also the estimates of \( \beta_2 \) are biased downwards. This result is not particularly surprising given the fact lobbying objectives of ROW are opposite to those of home country firms. Therefore, the concern raised in the beginning of this paper that inability to separate out the effect of foreign lobby from domestic lobby may lead to misleading results even when a proper set of instruments is used get a strong support in the data.

6.4 The comparison of the benchmark with monopolistic competition GH models

To test two competing versions of the GH model estimated by instrumental variables, I used a J-Test for non-nested hypothesis testing (Davidson and MacKinnon (1993), p. 388). The testing procedure requires the same dependent variable, so for the purpose of this section both sides of (11) were multiplied by \( \frac{\sigma_i}{\sigma_i - 1} \), and \( \frac{1}{\sigma_i} \) was moved to the right-hand side. The alternative benchmark specification (13) remains unchanged.

As in Davidson and MacKinnon (1993), let \( f(s_i, I_i^g, \sigma_i) \) to be a LIML regression model for the monopolistic competition specification (11), and \( g(s_i^h, I_i^h) \) to be a LIML regression model for the benchmark specification (13). The validity of the benchmark GH model can be tested using augmented LIML regression \( \tilde{g} = g(s_i^h, I_i^h) + \lambda_1 \tilde{f} \), where \( \tilde{f} \) is constructed as fitted values from the LIML estimation of (11). The benchmark GH model is rejected in favor of the monopolistic competition model if the test for \( \lambda_1 = 0 \) is rejected. In a similar way, the monopolistic competition model is rejected in favor of the benchmark GH if in the regression model \( \tilde{f} = f(s_i, I_i^g, \sigma_i) + \lambda_2 \tilde{g} \) the hypothesis \( \lambda_2 = 0 \) is rejected. The J-test results for three measures of protection are presented in Table 10.
The results of J-test suggest that neither model can be rejected as a correct one when protection is measured with tariffs. However, the benchmark GH model is always weakly rejected in favor of the model with monopolistic competition as the monopolistically competitive specification of the model adds more explanatory power. The second part of the table displays J-test results for the benchmark model and monopolistic competition with only domestic lobbying and uses the same set of instruments. Again, neither model can be rejected as a correct one, but these results suggest that simply taking into account the imperfectly competitive structure of the market improves the explanatory power of the “Protection for sale” model.

When protection is measured with NTBs, J-test results indicate that the benchmark model is rejected in favour of monopolistic competition model with foreign lobby and weakly rejected in favor of the model without foreign lobbying, while the monopolistic competition version is never rejected as a correct model specification. This suggests that some information of the monopolistically competitive model is not explained by the model with perfect competition.

7 Conclusion

The main objective of this paper is to study the effect of foreign lobbies and FTA formation on a country’s trade policy. This paper accomplishes this goal by modifying the original GH model through the introduction of monopolistically competitive market structure to allow for the presence of foreign lobbies. The paper shows that signing a free trade agreement with a big country leads to a welfare-reducing increase in import tariffs in the presence of foreign lobbying, in particular lobbying by an FTA partner country.

The empirical results suggest that the GH model with monopolistic competition has more explanatory power than a benchmark version. For Canada, the effect of foreign lobbying is statistically significant and is in the line with theoretical predictions of the model: a presence of an organized lobbying group in the FTA partner country tends to raise import tariff, while an organized lobbying group of exporters from other countries is associated with a lower Canadian import tariff. A major benefit of the approach to the political economy factors in international trade policy, used in this paper, is a more plausible values obtained for the government valuation of political contributions. Contrary to previous studies, the result that the government values political contributions more than the national welfare is very persistent and explains why relatively small political contributions may have strong lobbying power.
Appendix B: Derivation of the Equilibrium Trade Policy

The equilibrium trade policy is derived by maximizing the sum of the government and lobbying groups’ welfare functions (9):

\[
\Omega = \sum_{i=1}^{N} I_i^H W_i^H + aW + \sum_{i=1}^{N} I_i^P W_i^P + \sum_{i=1}^{N} I_i^{ROW} W_i^{ROW}
\]

\[
W_i^H = n_i^H \pi_i^H + \alpha_i (TR + CS) - \text{welfare of the domestic industry } i
\]

\[
W_i^j = n_i^j \pi_i^j, \; j = \{P, ROW\} - \text{welfare of the partner country and ROW industry } i \text{ from trade}
\]

\[
W = \sum_i (n_i^H \pi_i^H) + TR + CS - \text{national welfare}
\]

Before deriving the optimal trade policy, calculate the responsiveness of equilibrium prices and quantities to the change in the ROW tariff. An increase in the ROW tariff will not affect equilibrium prices of domestic and partner country firms directly, but will increase equilibrium quantities \(q_j^i\) through an increase in the aggregate price index \(P_i\). Firms from the ROW will have a direct negative effect on equilibrium quantity through an increase in consumer price (6) and an indirect positive effect through an increase in the aggregate industry price index.

\[
\frac{\partial q_j^i}{\partial \tau_i^j} = \frac{\partial q_j^i}{\partial P_i} \frac{\partial P_i}{\partial \tau_i^j} = (\sigma_i - 1) \frac{q_j^i}{P_i} \frac{\partial P_i}{\partial \tau_i^j} \quad \text{for } j = H, P \tag{1a}
\]

\[
\frac{\partial q_i^{ROW}}{\partial \tau_i^{ROW}} = \frac{\partial q_i^{ROW}}{\partial P_i} \frac{\partial P_i}{\partial \tau_i^{ROW}} + \frac{\partial q_i^{ROW}}{\partial \tau_i^{ROW}} \frac{\partial P_i}{\partial \tau_i^{ROW}} = -\sigma_i \frac{\sigma_i}{\sigma_i - 1} p_i^{ROW} + (\sigma_i - 1) \frac{q_i^{ROW}}{P_i} \frac{\partial P_i}{\partial \tau_i^{ROW}} \tag{2a}
\]

For future convenience, define the share of country \(j\) firms on Canadian market for the product \(i\):

\[
s_j^i = \frac{n_i^j p_i^j x_j^i}{P_i X_i} = \frac{n_i^j p_i^j x_j^i}{\omega_i} = n_i^j d_j^i \left( \frac{p_i^j}{P_i} \right)^{1-\sigma_i} \tag{3a}
\]

The effect of the ROW tariff rate on industry price index can be expressed as:

\[
\frac{\partial P_i}{\partial \tau_i^{ROW}} = \frac{\partial P_i}{\partial p_i^{ROW}} \frac{\partial p_i^{ROW}}{\partial \tau_i^{ROW}} = n_i^{ROW} d_i^{ROW} \left( \frac{P_i}{p_i^{ROW}} \right)^{\sigma_i} \frac{\sigma_i}{\sigma_i - 1} \tag{4a}
\]

Now we can calculate the effect of the ROW tariff change on welfare terms in the objective function (9). The element

\[
X_i \frac{\partial P_i}{\partial \tau_i^j} = \frac{\sigma_i}{\sigma_i - 1} n_i^{ROW} x_i^{ROW}
\]

is a common factor that I want to isolate in every equation.

Tariff revenue:

\[
TR = \sum_i \left( n_i^P \tau_i^P x_i^P + n_i^{ROW} \tau_i^{ROW} x_i^{ROW} \right)
\]
\[
\frac{\partial TR}{\partial \tau_{ROW}} = n_i P_i \frac{\partial q_i^P}{\partial \tau_{ROW}} + n_i^{ROW} x_i^{ROW} + n_i^{ROW} \tau_i^{ROW} \frac{\partial q_i^{ROW}}{\partial \tau_{ROW}} = \\
= X_i \frac{\partial P_i}{\partial \tau_{ROW}} \left( \frac{n_i^p P_i}{P_i X_i} (\sigma_i - 1) \frac{q_i^P}{P_i} + \frac{\tau_i^{ROW}}{p_i^{ROW}} \left[ -\frac{\sigma_i}{s_i^{ROW}} + (\sigma_i - 1) \right] \right) = \\
= X_i \frac{\partial P_i}{\partial \tau_{ROW}} \left( (\sigma_i - 1) \frac{i}{P_i} s_i^P + \frac{\sigma_i - 1}{\sigma_i} + \frac{\tau_i^{ROW}}{p_i^{ROW}} \left[ (\sigma_i - 1) s_i^{ROW} - \sigma_i \right] \right)
\] 

(6a)

Consumer surplus:

\[ U \overset{1}{=} X_0 + \sum_i \omega_i \ln X_i \]

Indirect utility: \( V \overset{2}{=} Y - \sum_i \omega_i + \sum_i \omega_i \ln \left( \frac{\omega_i}{P_i} \right) = Y + \sum_i \omega_i (\ln \omega_i - 1) - \sum_i \omega_i \ln P_i \]

\[ CS = \sum_i \omega_i (\ln \omega_i - 1) - \sum_i \omega_i \ln P_i \]

\[ \frac{\partial CS}{\partial \tau_{ROW}} = -\omega_i \frac{\partial P_i}{P_i} - X_i \frac{\partial P_i}{\partial \tau_{ROW}} = -X_i \frac{\partial P_i}{\partial \tau_{ROW}} \] 

(7a)

Profit functions:

\[ n_j \frac{\partial \pi_j}{\partial \tau_{ROW}} \overset{(7.a)}{=} n_j \frac{\pi_j}{\sigma_j} P_j^{\sigma_j} \left( \sigma_i - 1 \right) \frac{q_i^j}{X_i} \frac{\partial P_j}{\partial \tau_{ROW}} = \frac{\sigma_j - 1}{\sigma_i} n_j \frac{q_i^j}{P_j X_i} X_i \frac{\partial P_j}{\partial \tau_{ROW}} = \\
= \frac{\sigma_j - 1}{\sigma_i} s_i^{ROW} X_i \frac{\partial P_j}{\partial \tau_{ROW}}, \text{ for } j = H, P \]

(8a)

Substituting (6a), (7a) and (8a) into the derivative of (9) with respect to the ROW tariff rate we obtain:

\[ \frac{\partial \Omega}{\partial \tau_{ROW}} = (a + \alpha) \left( (\sigma_i - 1) \frac{\tau_i^P}{p_i^{ROW}} s_i^P + \frac{\sigma_i - 1}{\sigma_i} \frac{\tau_i^{ROW}}{p_i^{ROW}} [(\sigma_i - 1) s_i^{ROW} - \sigma_i] \right) X_i \frac{\partial P_i}{\partial \tau_{ROW}} + \\
+ \left[ (H + a) \frac{\sigma_j - 1}{\sigma_i} s_i^H + b I_i^P \frac{\sigma_i - 1}{\sigma_i} s_i^P + c I_i^{ROW} \frac{\sigma_i - 1}{\sigma_i} (s_i^{ROW} - 1) \right] X_i \frac{\partial P_i}{\partial \tau_{ROW}} = 0 \]

Rearranging and isolating the ROW tariff rate on the left-hand side we we obtain optimal trade policy:

\[ \tau_{ROW}^* = (\sigma_i - 1) \frac{\tau_i^P}{p_i^{ROW}} s_i^P - \frac{1}{\sigma_i} \frac{H + a + \alpha}{\alpha} s_i^H + \frac{b I_i^P}{\alpha} s_i^P + \frac{c I_i^{ROW}}{\alpha} \frac{\sigma_i - 1}{\sigma_i} [s_i^{ROW} - 1] \]

(14)

Where \( \varepsilon_i \) is the price elasticity of demand for the ROW imports:

\[ \varepsilon_i = \frac{\partial q_i^{ROW}}{\partial P_i^{ROW}} \frac{P_i^{ROW}}{q_i^{ROW}} = \left( \frac{\partial q_i^{ROW}}{\partial P_i^{ROW}} + \frac{\partial q_i^{ROW}}{\partial P_i^{ROW}} \frac{P_i^{ROW}}{P_i} \right) \frac{P_i^{ROW}}{q_i^{ROW}} = (\sigma_i - (\sigma_i - 1) s_i^{ROW}) \]

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Appendix C: Estimation of the Elasticities of Substitution

In this section time index is omitted to simplify notation. We start with the description of supply-demand system.

From equation (3), total demand for the imports of product $i$ imported from country $j$ equals:

$$x^j_i = \frac{\omega^j_i d^j_i}{P^j_i} \left( \frac{P^j_i}{P_i} \right)^{1-\sigma_i}$$  \hspace{1cm} (3)

Since using expenditure shares instead of quantities reduces measurement error, the above equation is transformed into shares:

$$s^j_i = \frac{p^j_i x^j_i}{P^j_i X^j_i} = \frac{p^j_i x^j_i}{\omega_i} = \frac{d^j_i}{P^j_i} \left( \frac{P^j_i}{P_i} \right)^{1-\sigma_i}$$  \hspace{1cm} (1b)

Taking logs and time differencing, we obtain the new demand equation:

$$\Delta \ln s^j_i = (\sigma_i - 1) \Delta \ln P_i - (\sigma_i - 1) \Delta \ln p^j_i + \epsilon^j_i$$  \hspace{1cm} (2b)

The error term in (1b) is likely to be correlated with the market shares due to simultaneity in determination of market shares and product prices. To model this simultaneity, following Feenstra (1994) let the supply equation for variety $j$ of good $i$ to take the form:

$$p^j_i = \exp(v^j_i) (x^j_i)^{e_i}$$

where $e_i$ is the inverse supply elasticity and $v^j_i$ is a technology parameter. Taking logs and time differencing we obtain a modified supply equation:

$$\Delta \ln p^j_i = e_i \Delta \ln (x^j_i) + \Delta v^j_i$$  \hspace{1cm} (3b)

To derive the supply equation in the form of expenditure shares, substitute the expression for quantity supplied from (1b) into (3b):

$$\Delta \ln p^j_i = \frac{e_i}{e_i + 1} \Delta \ln (d^j_i) + \frac{e_i}{e_i + 1} \Delta \ln (x^j_i) + \Delta \delta^j_i, \hspace{0.5cm} \delta^j_i = \frac{1}{e_i + 1} v^j_i$$  \hspace{1cm} (4b)

To facilitate estimation it is convenient to eliminate product-specific fixed effects from supply and demand equations through taking the difference in (2b) and (4b) with respect to some reference country $k$:

$$\tilde{s}_{ij} = (\sigma_i - 1) \tilde{\nu}_{ij} + \tilde{\epsilon}_{ij}$$  
$$\tilde{p}_{ij} = \frac{e_i}{e_i + 1} \tilde{s}_{ij} + \tilde{\delta}_{ij}$$  \hspace{1cm} (5b)

Where $\tilde{\epsilon}_{ij} = (\Delta \ln x^j_i - \Delta \ln k^j_i)$ for any variable $x$. Although in the model I aggregated all non-NAFTA countries in the ROW, in this section I treat the output of each country as a separate
product and assumed that the number of varieties equals to one (Canadian product) plus the number of importing countries. With the assumption that ROW firm are symmetric, treating product of each country as a separate variety does not affect predictions of the model. Therefore, after differencing, the number of cross-sections in equation (5b) equals to the number of countries that imports product into Canada.

For consistent estimation of substitution elasticity parameters, the assumption of independent error terms in (5b) is critical, i.e. technological factor is assumed to be independent of the taste for variety parameter.

Assumption 1: \( \lim_{T \to \infty} \frac{1}{T} \sum_i \delta_{ij} \bar{e}_{ij} = 0 \) for ∀ product \( i \)

With this assumption, isolate error terms on the right-hand side of (5b) and multiply them through:

\[
\begin{align*}
Y_{ij} &= \theta_1 X_{ij}^1 + \theta_2 X_{ij}^2 + u_{ij} \\
Y_{ij} &= \bar{\nu}_{ij}^2 \\
X_{ij}^1 &= \bar{s}_{ij}^2 \\
X_{ij}^2 &= \bar{\nu}_{ij} \bar{s}_{ij} \\
u_{ij} &= (\sigma_i - 1)^{-1} \bar{e}_{ij} \bar{\delta}_{ij} \\
\theta_1 &= \frac{e_i}{(e_i + 1)(\sigma_i - 1)}, \quad \theta_2 = \frac{\sigma_i e_i - 1}{(e_i + 1)(\sigma_i - 1)}
\end{align*}
\]

Several authors\(^{20}\) showed that a consistent estimates of \( \theta_1 \) and \( \theta_2 \) can be obtained by the IV estimator, where instruments are country indicators. To demonstrate this result, append (6b) across varieties for each product:

\[
Y_i = \theta_1 X_i^1 + \theta_2 X_i^2 + u_i
\]

The total number of observations in (8b) is \( T \cdot C_i \), where \( T \) is the number of periods in the sample and \( C_i \) is the number of countries that import product \( i \) into Canada. Introduce \( TC_i \times C_i \) matrix of instrumental variables where each column \( j \) is an indicator variable for the importing country \( j \), such that vector \( e_j \) is a \( T \)-dimensional vector of 1's:

\[
Z_i = \left[ \begin{array}{cccc}
e_1 & 0 & \cdots & 0 \\
0 & e_2 & \cdots & 0 \\
\vdots & \vdots & \ddots & \vdots \\
0 & 0 & \cdots & e_{C_i} \\
\end{array} \right]
\]

Then, for the fixed number of importing countries, \( Z \) is a set of valid instruments for \( T \to \infty \). First, Assumption 1 guarantees that \( \lim_{T \to \infty} \frac{1}{T} \sum_t Z_i' u_i = 0 \) holds for any product \( i \). The product \( \frac{1}{T} Z_i' u_i \) is

the $C_i$-dimensional vector with elements $\frac{1}{T}\tilde{\delta}_{ij}\tilde{e}_{ij}$, each approaching zero under the Assumption 1. Independence of supply and demand error terms implies that instruments $Z$ are uncorrelated with the error in (8b). Feenstra (1994) also showed that $p\lim_{T \to \infty} \frac{1}{T} \sum_t Z'_t X_i$ has a full column rank under a technical restriction that the demand and supply curves should vary across countries, i.e. for each product there should be some variance either in taste or in productivity parameters across varieties. Therefore, the rank condition for identification is satisfied. Together with $p\lim_{T \to \infty} \frac{1}{T} \sum_t Z'_t u_i = 0$, this condition guarantees that the IV estimator with instrument matrix $Z$ is consistent.

To make the estimator identical to the one used in Feenstra (1994) and Broda and Weinstein (2006), pre-multiply equation (8b) with $Z(Z'Z)^{-1}Z'$ to obtain:

$$\bar{Y}_i = \theta_1 \bar{X}^1_i + \theta_2 \bar{X}^2_i + \bar{u}_i$$

(9b)

where upper bars denote time averages. The OLS estimator on (9b) is identical to the IV estimator on (8b), thus, a consistent estimator of the reduced form parameters $\theta_1$ and $\theta_2$ can be obtained by averaging equation (7b) over time and estimating it with the weighted OLS for each product $i$.

$$\theta_i = \left( \sum_{j=1}^{C_i} t_{ij} X'_{ij} X_{ij} \right)^{-1} \left( \sum_{j=1}^{C_i} t_{ij} X'_{ij} Y_{ij} \right)$$

(10b)

Weights $t_{ij}$, the number of years country $j$ was exporting product $i$ to Canada, are used to compensate for the different number of observations (number of years) for each importing country.

Even though estimator (10b) is consistent as $T$ goes to infinity, several authors point on its bad performance in small samples where Assumption 1 may not hold.\textsuperscript{21} The data set used in this work covers the period from 1988 to 2004, while the average number of importing countries per product equals to 80. The number of cross-sections is, probably, too large relative to the number of years to rely on the asymptotic theory. The problem of a small sample can be solved using a correction method similar to Deaton (1985) error-in-variables estimator.

Let $Y^*_i$ and $X^*_i$ to be the unobserved population means, and $\bar{Y}_i$ and $\bar{X}_i$ to be their sample estimates. Assume the following sample structure:

$$\begin{pmatrix} \bar{Y}_i \\ \bar{X}_i \end{pmatrix} \sim N \left( \begin{pmatrix} Y^*_i \\ X^*_i \end{pmatrix} ; \begin{pmatrix} \sigma_y & \sigma_{xy} \\ \sigma_{xy} & \Sigma \end{pmatrix} \right)$$

The normality assumption is not critical here. Let $\Omega^*$, $\Omega_{XX}$ and $\Omega_{XY}$ to be a moment matrix for $X^*_i$, sample moment matrix for $X_i$ and cross moment matrix for $\bar{Y}_i$ and $\bar{X}_i$, respectively. The following equalities must hold:

$$E(\Omega_{XX}) = \Omega^* + \Sigma$$

\textsuperscript{21}Staiger and Stock (1997) and Bound, Jaeger, and Baker (1995).
The OLS estimator for $\theta$ can be written as follows:

$$\hat{\theta}_i = (X'_i X_i)^{-1} (X'_i Y_i) = (\Omega_{XX} - \Sigma)(\Omega_{XX} - \sigma_{xy}) = (\hat{X}'_i \hat{X}_i - C_i \Sigma)^{-1}(\hat{X}'_i \hat{Y}_i - C_i \sigma_{xy}) \quad (11b)$$

The difference between this estimator and WLS estimator (10b) is that the sample counterparts for variances in $\sigma_{xy}$ and $\Sigma$ can be calculated using all $T \cdot C_i$ observations, and estimator (11b) is consistent for $C_i \to \infty$ holding $T$ fixed.

Finally, the estimator I used is the WLS estimator (10b) with the small sample correction (11b):

$$\hat{\theta}_i = \left( \sum_{j=1}^{c_i} t_{ij} \left(X'_{ij} X_{ij} - \hat{\Sigma}_{ij} \right) \right)^{-1} \left( \sum_{j=1}^{c_i} t_{ij} \left(X'_{ij} Y_{ij} - \hat{\sigma}_{xy} \right) \right) \quad (12b)$$

And $\hat{\sigma}_{xy}$ and $\hat{\Sigma}_{ij}$ are the sample counterparts for $\sigma_{xy}$ and $\Sigma$:

$$\hat{\Sigma}_{ij} = \frac{1}{t_{ij} - 1} \sum_{k=1}^{t_{ij}} \left(X_{ijk} - \bar{X}_{ij} \right)' \left(X_{ijk} - \bar{X}_{ij} \right)$$

$$\hat{\sigma}_{xy,ij} = \frac{1}{t_{ij} - 1} \sum_{k=1}^{t_{ij}} \left(X_{ijk} - \bar{X}_{ij} \right)' \left(Y_{ijk} - \bar{Y}_{ij} \right)$$

The matrix of covariates $X_i$ also includes a constant term to address the problem of measurement error in prices. On the left-hand side of (6b) we have second moment for prices, which equals to the variance of true prices plus the variance of the measurement error. Thus, the constant term will absorb the measurement error in prices. Since market shares are not correlated with unit values errors, explanatory variable will not be affected by the measurement error. Therefore, inclusion of a constant term in $X_i$ makes the estimator (12b) robust to the measurement error in prices.

Once we obtain the vector of estimates $\hat{\theta}_i$, we can derive the structural parameter of interest $\sigma_i$ from (7b):

$$\sigma_i = 1 + \frac{2}{-\theta_2 + \sqrt{\theta_2^2 + 4\theta_1}} \quad (13b)$$

To avoid the imaginary values, the condition $\theta_2^2 + 4\theta_1 \geq 0$ must hold. In fact, this condition was satisfied every single time when estimate for $\sigma_i$ was statistically significant.
References


Figure 1: Distribution of the number of lobbyists across sectors

Figure 2: Distribution of the number of lobbyists across sectors
Figure 3: Distribution of substitution elasticities

Figure 4: Comparison of Canadian and US estimates for the elasticity of substitution
Table 1. Descriptive statistics for protection measures and market shares, 1997.

<table>
<thead>
<tr>
<th></th>
<th>US tariff</th>
<th>ROW tariff</th>
<th>US NTB coverage</th>
<th>ROW NTB coverage</th>
<th>US protection share</th>
<th>ROW protection share</th>
<th>Canadian market share</th>
<th>US market share</th>
<th>ROW market share</th>
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<tbody>
<tr>
<td>Mean</td>
<td>0.013</td>
<td>0.048</td>
<td>0.172</td>
<td>0.182</td>
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<td>0.328</td>
<td>0.222</td>
<td>0.162</td>
<td>0.134</td>
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<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Maximum</td>
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<td>1</td>
<td>1</td>
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<td>1</td>
<td>0.70</td>
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<td>1</td>
<td>0.46</td>
<td>0.68</td>
<td>0.14</td>
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<td>Corr. with NTB</td>
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<td>0.68</td>
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<td>0.35</td>
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<td>Corr. with protection share</td>
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Table 2. Descriptive statistics for the number of lobbyists, 1996-97.

<table>
<thead>
<tr>
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<th>Canada</th>
<th>US</th>
<th>ROW</th>
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<td>Number of lobbyists per sector</td>
<td>1.94</td>
<td>1.08</td>
<td>1.15</td>
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<td>Median number of lobbyists</td>
<td>1</td>
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<td>0</td>
</tr>
<tr>
<td>Standard Deviation</td>
<td>3.30</td>
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</tr>
<tr>
<td>Minimum</td>
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<td>0</td>
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<tr>
<td>Maximum</td>
<td>18</td>
<td>12</td>
<td>14</td>
</tr>
<tr>
<td>Total number of lobbyists</td>
<td>481</td>
<td>267</td>
<td>284</td>
</tr>
<tr>
<td>% of sectors with at least one lobbyist</td>
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<td>0.32</td>
<td>0.35</td>
</tr>
<tr>
<td>% of sectors with at least two lobbyists</td>
<td>0.38</td>
<td>0.26</td>
<td>0.26</td>
</tr>
<tr>
<td>% of sectors with at least three lobbyists</td>
<td>0.23</td>
<td>0.19</td>
<td>0.15</td>
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Table 3. Descriptive statistics for the elasticity of substitution and price elasticity

<table>
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<th>Elasticity of substitution</th>
<th>Elasticity of import demand</th>
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<td>Minimum</td>
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<td>Maximum</td>
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<td>21.36</td>
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Table 4. Estimation results for the benchmark GH model with different protection measures

| Dependent variable: | | |
|---------------------|-------------------|-------------------|-------------------|
|                     | Tariffs (1)       | Tariffs (2)       | Tariffs (3)       |
|                     | NTBs (1)          | NTBs (2)          | NTBs (3)          |
|                     | Protection share (1) | Protection share (2) | Protection share (3) |
| $X^h_i$ / $M_i$     | -0.0059**         | -0.0057**         | -0.006**          |
|                     | (0.0024)          | (0.0024)          | (0.0024)          |
| $X^h_i I_i / M_i$   | 0.0097            | 0.0111            | 0.0102            |
|                     | (0.0081)          | (0.0087)          | (0.0088)          |
| Constant            | 0.2965**          | 0.2925**          | 0.2977**          |
|                     | (0.1437)          | (0.1286)          | (0.1419)          |

| Structural parameters: | |
|------------------------|-------------------|-------------------|
| $\alpha$               | 0.61              | 0.51              | 0.59              |
|                        | (1.279)           | (0.946)           | (1.221)           |
| $\alpha$               | 1.29              | 1.11              | 1.42              |
|                        | (3.708)           | (2.897)           | (4.629)           |
| $a$                    | 102.5             | 97.8              | 35.6              |
|                        | (168.7)           | (161.9)           | (95.05)           |
|                        | 30.9              | 38.8              | 11.9              |
|                        | (73.88)           | (119.4)           | (25.12)           |
|                        | 11.4              | 11.8              | 11.4              |
|                        | (23.00)           | (25.88)           | (25.88)           |

| Notes: 1). Standard errors in parenthesis 2). In columns (1), (2) and (3) industry is politically organized if it is represented by 1, 2 and 3 lobbyists, respectively 3). *, ** and *** denote statistical significance at 10%, 5% and 1%, respectively |
Table 5. Estimation results for the monopolistically competitive model (10) with foreign lobbying and different protection measures

<table>
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<td>-0.914**</td>
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Structural parameters:

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$N$ 248 248 248 248 248 248 248 248 248 248 248 248
Log-Likelihood -74.2 -70.1 -68.9 -550.7 -542.1 -522.1 -622.0 -625.7 -624.3
AIC 0.64 0.61 0.60 4.48 4.41 4.25 5.06 5.09 5.08

Notes: 1). Standard errors in parenthesis
2). In columns (1) and (2) an industry is politically organized if it is represented by 1 and 3 lobbyists, respectively. In column (3) an industry is politically organized if it is represented by at least 3 lobbyists and accounts for strictly more than one third of the total number of lobbyists in that industry.
3). *, ** and *** denote statistical significance at 10%, 5% and 1%, respectively
Table 6. Marginal and average effects of political economy factors on different measures of protection

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<td>Active domestic lobbying</td>
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<td>4.85 5.72 5.42</td>
<td>23.83 36.07 29.73</td>
<td>30.46 31.74 33.49</td>
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<tr>
<td>Active partner country lobbying</td>
<td>0.52 0.54 1.19</td>
<td>10.54 7.44 10.49</td>
<td>14.06 17.44 25.65</td>
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<td>Active ROW lobbying</td>
<td>-1.50 -3.62 -3.38</td>
<td>-0.68 -12.55 -9.81</td>
<td>-26.22 -34.90 -42.77</td>
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<tr>
<td>Average effect of domestic lobbying</td>
<td>2.65 1.41 1.33</td>
<td>13.04 8.88 7.31</td>
<td>16.67 7.81 7.80</td>
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<tr>
<td>Average effect of partner country lobbying</td>
<td>0.22 0.13 0.21</td>
<td>4.53 1.82 1.87</td>
<td>6.04 4.26 3.40</td>
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<td>Average effect of ROW lobbying</td>
<td>-0.06 -0.65 -0.48</td>
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<td>-10.51 -6.24 -4.81</td>
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Table 7. Estimation results for a benchmark GH model with import tariff and foreign lobbying being treated as domestic

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<th>Threshold number of lobbyists:</th>
<th>Only Canadian lobbyists</th>
<th>Canadian and US lobbyists</th>
<th>Canadian, US and ROW lobbyists</th>
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<td>3</td>
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<td>( \frac{X_i}{M_i} )</td>
<td>-0.0059**</td>
<td>-0.0057**</td>
<td>-0.006**</td>
</tr>
<tr>
<td></td>
<td>(0.0024)</td>
<td>(0.0024)</td>
<td>(0.0024)</td>
</tr>
<tr>
<td>( \frac{X_i}{M_i} \frac{I_i}{M_i} )</td>
<td>0.0097</td>
<td>0.0111</td>
<td>0.0102</td>
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<tr>
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<td>(0.0081)</td>
<td>(0.0087)</td>
<td>(0.0088)</td>
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<td>Constant</td>
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<td>0.2977**</td>
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<td>0.59</td>
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<td>( \alpha )</td>
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Notes: 1). Standard errors in parenthesis
2). *, ** and *** denote statistical significance at 10%, 5% and 1%, respectively
Table 8. Estimation results for the monopolistically competitive model (10) with import tariffs and different foreign lobbying structure

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<td>$S_i$</td>
<td>0.072</td>
<td>0.179**</td>
<td>0.210**</td>
<td>0.056</td>
<td>0.199**</td>
<td>0.195**</td>
<td>0.034</td>
<td>0.153*</td>
<td>0.162*</td>
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<td>(0.084)</td>
<td>(0.089)</td>
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<td>(0.083)</td>
<td>(0.093)</td>
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<td>(0.086)</td>
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<tr>
<td>$I_{i}^{h}S_i$</td>
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<td>0.557***</td>
<td>0.528***</td>
<td>0.480***</td>
<td>0.552***</td>
<td>0.566***</td>
<td>0.488***</td>
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<td>0.547***</td>
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<td>(0.072)</td>
<td>(0.070)</td>
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<td>$I_{i}^{p}S_i$</td>
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<td>0.345*</td>
<td>0.150</td>
<td>0.156</td>
<td>0.345*</td>
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<td>-0.264***</td>
<td>-0.246***</td>
<td>-0.115**</td>
<td>-0.264***</td>
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<td>-0.115**</td>
<td>-0.264***</td>
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Structural parameters:

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Notes: 1). Standard errors in parenthesis
2). In columns (1) and (2) an industry is politically organized if it is represented by 1 and 3 lobbyists respectively. In column (3) an industry is politically organized if it is represented by at least 3 lobbyists and accounts for strictly more than one third of the total number of lobbyists in that industry.
3). *, ** and *** denote statistical significance at 10%, 5% and 1%, respectively.
Table 9. Estimation results for the monopolistically competitive model (10) with import tariffs and foreign lobby being treated as domestic

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<thead>
<tr>
<th>Threshold number of lobbyists:</th>
<th>A</th>
<th>B</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>( s^h_i )</td>
<td>0.082</td>
<td>0.211*</td>
<td>0.218**</td>
</tr>
<tr>
<td></td>
<td>(0.088)</td>
<td>(0.084)</td>
<td>(0.082)</td>
</tr>
<tr>
<td>( I^h_i s^h_i )</td>
<td>0.497***</td>
<td>0.542***</td>
<td>0.629***</td>
</tr>
<tr>
<td></td>
<td>(0.058)</td>
<td>(0.063)</td>
<td>(0.070)</td>
</tr>
<tr>
<td>( I^p_i s^p_i )</td>
<td></td>
<td>-0.102**</td>
<td>-0.252***</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.050)</td>
<td>(0.065)</td>
</tr>
<tr>
<td>Constant</td>
<td>0.087*</td>
<td>0.067</td>
<td>0.085*</td>
</tr>
<tr>
<td></td>
<td>(0.049)</td>
<td>(0.049)</td>
<td>(0.048)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Structural parameters:</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>( \alpha )</td>
<td>1.85</td>
<td>1.46</td>
<td>1.24</td>
<td>1.87</td>
<td>1.50</td>
<td>1.30</td>
<td>2.44</td>
<td>2.14</td>
<td>1.61</td>
</tr>
<tr>
<td></td>
<td>(0.252)</td>
<td>(0.227)</td>
<td>(0.190)</td>
<td>(0.251)</td>
<td>(0.219)</td>
<td>(0.182)</td>
<td>(0.463)</td>
<td>(0.463)</td>
<td>(0.327)</td>
</tr>
<tr>
<td>( a )</td>
<td>0.17</td>
<td>0.39</td>
<td>0.35</td>
<td>0.13</td>
<td>0.30</td>
<td>0.23</td>
<td>0.36</td>
<td>0.71</td>
<td>0.61</td>
</tr>
<tr>
<td></td>
<td>(0.206)</td>
<td>(0.187)</td>
<td>(0.158)</td>
<td>(0.202)</td>
<td>(0.175)</td>
<td>(0.146)</td>
<td>(0.333)</td>
<td>(0.336)</td>
<td>(0.249)</td>
</tr>
<tr>
<td>( b )</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>( c )</td>
<td>0.20</td>
<td>0.45</td>
<td>0.56</td>
<td>(0.105)</td>
<td>(0.127)</td>
<td>(0.141)</td>
<td>(0.105)</td>
<td>(0.127)</td>
<td>(0.141)</td>
</tr>
<tr>
<td>( N )</td>
<td>248</td>
<td>248</td>
<td>248</td>
<td>248</td>
<td>248</td>
<td>248</td>
<td>248</td>
<td>248</td>
<td>248</td>
</tr>
<tr>
<td>( Log-Likelihood )</td>
<td>-75.3</td>
<td>-73.7</td>
<td>-70.5</td>
<td>-73.3</td>
<td>-66.5</td>
<td>-61.6</td>
<td>-92.6</td>
<td>-91.9</td>
<td>-87.2</td>
</tr>
<tr>
<td>( AIC )</td>
<td>0.63</td>
<td>0.62</td>
<td>0.59</td>
<td>0.62</td>
<td>0.57</td>
<td>0.53</td>
<td>0.77</td>
<td>0.77</td>
<td>0.73</td>
</tr>
</tbody>
</table>

Notes: 1) Standard errors in parenthesis
2) In columns 1, 3 and 5 an industry is politically organized if it is represented by 1, 3 and 5 lobbyists, respectively.
3) In columns A and B partner country lobbying is treated as domestic. In column C all foreign lobby is treated as domestic.
4) *, ** and *** denote statistical significance at 10%, 5% and 1%, respectively
Table 10. J-Test for the benchmark and monopolistically competitive GH models

### Dependent variable: Tariffs

<table>
<thead>
<tr>
<th>H0:</th>
<th>H1:</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>MC GH with foreign lobby is true</td>
<td>Benchmark GH is true</td>
<td>0.50</td>
</tr>
<tr>
<td>Benchmark GH is true</td>
<td>MC GH with foreign lobby is true</td>
<td>0.25</td>
</tr>
<tr>
<td>MC GH w/o foreign lobby is true</td>
<td>Benchmark GH is true</td>
<td>0.42</td>
</tr>
<tr>
<td>Benchmark GH is true</td>
<td>MC GH w/o foreign lobby is true</td>
<td>0.37</td>
</tr>
</tbody>
</table>

### Dependent variable: NTBs

<table>
<thead>
<tr>
<th>H0:</th>
<th>H1:</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>MC GH with foreign lobby is true</td>
<td>Benchmark GH is true</td>
<td>0.70</td>
</tr>
<tr>
<td>Benchmark GH is true</td>
<td>MC GH with foreign lobby is true</td>
<td>0.22</td>
</tr>
<tr>
<td>MC GH w/o foreign lobby is true</td>
<td>Benchmark GH is true</td>
<td>0.79</td>
</tr>
<tr>
<td>Benchmark GH is true</td>
<td>MC GH w/o foreign lobby is true</td>
<td>0.49</td>
</tr>
</tbody>
</table>

### Dependent variable: Protection share

<table>
<thead>
<tr>
<th>H0:</th>
<th>H1:</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>MC GH with foreign lobby is true</td>
<td>Benchmark GH is true</td>
<td>0.01</td>
</tr>
<tr>
<td>Benchmark GH is true</td>
<td>MC GH with foreign lobby is true</td>
<td>0.18</td>
</tr>
<tr>
<td>MC GH w/o foreign lobby is true</td>
<td>Benchmark GH is true</td>
<td>0.01</td>
</tr>
<tr>
<td>Benchmark GH is true</td>
<td>MC GH w/o foreign lobby is true</td>
<td>0.12</td>
</tr>
</tbody>
</table>

Notes:

- P-values denote the confidence level for rejecting H0.
- MC stays for "Monopolistic competition" version of GH model.
- In columns (1) and (2) an industry is politically organized if it is represented by 1 and 3 lobbyists, respectively. In column (3) an industry is politically organized if it is represented by at least 3 lobbyists and accounts for strictly more than one third of the total number of lobbyists in that industry.