Vested Interests and the Political Economy of Import Tariff Setting in Brazil

By

Monica Arruda de Almeida

Department of Political Science
University of California, Los Angeles

marruda@ucla.edu
http://www.bol.ucla.edu/~marruda

This paper is the first version of one of my dissertation's chapters. Thus your comments and suggestions will be particularly appreciated. For the same reason, though, I would ask your discretion when citing this study, which is still a work in progress. Also, I would like to thank my advisor, professor Michael Lofchie, for his always-helpful comments and unceasing support. I am no less grateful to professors Kathy Bawn and Barbara Geddes for their valuable guidance throughout this study. My special thanks go to professor Marc-Andreas Muendler for unselfishly sharing his conversion systems of the Brazilian industrial classifications and other economic indicators.

Prepared for delivery at the sixth annual Society for Comparative Research Graduate Student Retreat at the University of California, San Diego, May 14 – 15, 2004.

Abstract

This study identifies and measures how industrial sectors have influenced trade policy in Brazil's recent democratic phase. More specifically, I examine whether industrial sectoral strength functions as a predictor of import tariff rates. I use a version of the Grossman-Helpman's (1994) "Protection for Sale" trade model in which industrial strength is proxied by a set of factors, including those originally specified by the G-H model – such as import-penetration and import-demand elasticities ratios – plus buyers concentration ratio. The G-H model has been widely acknowledged for its high explanatory power to a country's trade policy. My findings indicate that the pattern of import tariffs in Brazil still reflect the government's trade protectionist practices during the country's import-substitution era. This is despite the fact that Brazilian import tariffs were greatly reduced across industrial sectors in the 1990s. In addition, I find that the model explains, on average, only 34% of the variance in Brazil's import tariff rates. This result thus further corroborates the evidence that economic traits of individual industrial sectors have limited capability of explaining the political economy of import tariff setting in Brazil in recent years.

Introduction

The early success of the Brazilian economic reforms during the 1990s, when the country was able to end years of hyperinflation and to launch its first significant trade liberalization program, has led many observers to believe that the Brazilian government has finally given up its state-interventionist policies for a pragmatic market based economic program. However, as one looks at Brazil's import tariff rates, it becomes clear that, although the government has reduced import tariffs across industries, it has kept a pattern of protectionism that resembles that of during the country's I.S.I. (Import-Substitution-Industrialization) program.

The goal of this study is to estimate how much of Brazil's import tariff setting practices during the country's recent democratic phase can be explained by market forces, that is, by the relative strength and traits of its industrial sectors. This is an important question to address given Brazil's historical pattern of political insulation from private pressures. To accomplish this task, I use a slightly different version of the Grossman-Helpman (G-H) 1994 trade model, which has been commonly praised for its explanatory power (e.g., Goldberg and Maggi 1999, Gawande and Bandyopadhyay 2000). In this study, industrial strength is proxied by three factors, including those originally specified by the G-H model – such as import-penetration and import-demand elasticities ratios – plus buyers concentration ratio. As mentioned earlier, import tariff is my dependent variable. Economic figures represent 48 industrial sectors that are aggregated according to Brazil's *Niv. 80* classification system (please see Table A1 in the appendix). My analysis reveals that the variables I test in the model not only have high significance, but they also all support the argument that the Brazilian government has still employed a great deal of discretion when setting import tariffs. Such discretion is exercised in a way that is not aimed at collecting tax revenues but rather at promoting import protection. This is despite the Brazilian

government considerably lowered import tariffs rates across industrial sectors in the 1990s. This finding is further corroborated by the fact that the economic variables I use in the model are able to explain only 34% of the variance in import tariffs in Brazil between 1986 and 1999. Therefore, the evidence points to the possibility that there are other political-institutional factors in play, which are still significantly influencing trade policies in Brazil even after the country's latest trade liberalization efforts.

This paper is divided in six sections, including introduction. In section 2, I describe the G-H model in detail, give an example of how it has been used in the trade literature, and contrast the G-H model's assumptions, which derived from the economic-institutional environment in developed countries, to the "relaxed" assumptions that I make in my model so that I can properly interpret this study's results in light of Brazil's economic-institutional context. I present then my quantitative results in section 3, and lastly I summarize the main conclusions of this study and anticipate how other chapters of my dissertation will address some of the political-institutional problems not answered by this paper.

The Grossman-Helpman model

The reason why the G-H model has been so well received in the literature on the political economy of trade is because of its parsimony. That is, these scholars were able to pinpoint three variables that have had consistently very high explanatory power when it comes to explaining a country's trade protectionist policy. This section explains *conceptually* the structure and assumptions of the G-H model.[1]

[1] My hope is that this approach will be more instructive to social scientists who are not comfortable with formal presentations of econometric studies. For those who wish to examine the formal specification of the Grossman-Helpman's model, please refer to their 1994 "Protection for Sale" article. For a formal presentation of an example of the empirical use of their model, see Goldberg & Maggi (1999).

In a nutshell, Grossman and Helpman attempt to explain deviations from free trade, which they recognize as the optimum welfare policy, by identifying economic groups that are successful in influencing trade policies to their private benefit, but in detriment to the economic interests of the rest of society. Their model does so by taking into account the cross-sectional differences in strength and traits of industrial sectors. Explicit in this assumption of interest group activity is the authors' view of politicians as agents who are in pursuit of their selfish interests rather than seeking to maximize aggregate welfare. A conceptual "twist" that they introduce in their model is the stress on the idea that incumbent politicians are also interested in maintaining political support rather than being only concerned with electoral outcomes. Hence, private interests may or may not "buy" political support through campaign contributions. Or if contributions are granted, they are so because special interests act with a view towards influencing policy regardless of who wins the elections.[2]

The G-H model asserts that differences in levels of trade protection among individual industries reflect the equilibrium of the following factors: (1) level of political organization; (2) ratio of domestic output in the industry to net trade; and (3) elasticity of import demand or export supply. Notice that a protectionist policy (the dependent variable) can be represented by a vector of import and export taxes as well as subsidies. The fundamental attribute of such policy is that it entails some form of redistribution of the country's resources to private groups.

Goldberg and Maggi (1999) uses the G-H model to assess how well it fits the U.S. data. They find that, in the few sectors where protectionism exists in the American market, the pattern of import protection is consistent with the predictions of the model.[3] Their data set is based on

[2] This assumption in fact carries a lot of empirical evidence even in the context of an electoral season for it is common to observe the same economic group contributing to the campaigns of rival candidates.

[3] In other equations, they added few commonly used variables in the literature to assess whether they would improve the explanatory power of the G-H model. They were: employment size; sectoral unemployment rate, measures of

the 1983 figures where industries are aggregated at the 3-digit SIC (Standard Industrial Classification) level. Coverage ratios for nontariff barriers (NTB's) are their choice for the dependent variable. Thus their model attempts to predict levels of import protectionism in the U.S. Following is a discussion of the relevant explanatory variables that Goldberg and Maggi use in their study. I will also contrast the empirical assumptions that their model makes to the ones that I adopt in my model.

A. Import elasticity

In both Grossman and Helpman (1994) and Goldberg and Maggi (1999) articles, import demand of price elasticity is expected to be negatively related with measures of import protection (import tariffs or NTB's). Therefore they expect imported goods that have high elasticity demand, that is, that are of relatively easy domestic substitution, to be proportionally less taxed by the government. Implied in this assumption, is the idea of import tariffs being a policy tool for state revenue collection. Hence the importance of taxing goods whose domestic demand is less likely to suffer significant changes even after the tariff overcharge. This is arguably a plausible theory to defend in the context of a fairly free trade economy.[4]

In my model, however, I start with the opposite expectation to that of the above authors. I assume that import elasticity has a positive relationship with levels of import protection. As a former I.S.I. country, and by all means, still a fairly protectionist economy, Brazil has both promoted import protection of consumer and other finished goods, and eased the importation of

---

unionization; changes in import penetration, and buyer and seller concentration rates. Surprisingly, they find that practically none of the added variables improves the explanatory power of the G-H model, with the exception of employment size and unemployment rate. However, the likelihood ratio test does not reject the reduced version of their equation in favor of the extended one.

[4] Such policy would then be inspired by Ramsey's studies on the theory of taxation (see Ramsey, F.P. 1927. "A Contribution to the Theory of Taxation." In *Economic Journal* 37:47-61).

raw and basic materials to boost domestic industrial production. These are two crucial policies to the success of an I.S.I. program. For this reason, I expect import tariffs in Brazil to reflect the government's support for import protectionism during the period I study.

B. Political organization

To proxy levels of political organization, Goldberg and Maggi use data on political action committee (PAC) campaign contributions between 1981 and 1982. They aggregate firm-specific contribution figures to the 3-digit SIC industry level, and then use what they call a "natural" break in the data to set up a dummy variable for political organization. They specify that industries that contribute less than US$ 100 million a year are politically demobilized, whereas those that contribute above that threshold are considered organized.[5] These scholars acknowledge that there is "noise" on the data because political contributions are given to influence all sorts of policies that go beyond trade matters. However, they believe that on average different levels of contributions by industries will closely reflect a sector's political muscle to influence trade policy outcomes. Overall, the industries that they find to be politically organized are machinery, chemicals and allied products, and transportation equipment.

In my study, the most recent and reliable figure I find to proxy industrial-political strength in Brazil is buyer concentration, which I measure as the proportion of an industry's national total imports to the country's GDP.[6] I expect a negative relationship between import tariffs and buyers concentration ratio because the industries with high demand for imported products (which we can assume that consist mostly of intermediary goods in the Brazilian case)

[5] Their contention of a natural break in the data set is based on the fact that for some reason there are very few sectors that contribute between 90 and 130 million dollars.
[6] In a later chapter of my dissertation, where I focus on Brazil's labor market, I use a buyer concentration variable that is disaggregated at the states' level.

are those that lobby the government for lower tariffs.[7] Similar to Goldberg and Maggi, I find that sectors with more political clout are electrical products, transport equipment, machinery, chemicals, and motor gas. However, it is important to clarify that industries with high concentration ratios are likely to overlap across industrial countries because high concentration is an economic trait of specific industrial sectors, as Frieden (1991) explains:

> "It is important to note that concentration ratios are primarily a function of characteristics of the industries themselves, and not of political, cultural, or other unique national features. Buarque de Hollanda Fillho (…), for example, shows that highly concentrated industries in Brazil are also highly concentrated in the United States, West Germany, France, and Italy. The ultimate cause of the outcomes here is thus to be searched for in industrial organization rather than other noneconomic factors." (p.139, ft. 4)

Even after taking the above statement into consideration, I argue that there is still a broader incentive for social scientists to estimate levels of industrial concentration. For although the *cause* of concentration might be of economic nature, it is hard to conceive that such concentration will not have any political ramification. Thus if one can successfully identify industries that are truly concentrated, given the differences in composition within industrial parks across countries or at subnational regions, it will be a step in the right direction when it comes to estimating different levels of industrial political clout.

However, despite the similarity in the make up of our political variables, the way Goldberg and Maggi (1999) and I operationalize them is quite distinct, as I explain later.

C. Import penetration

There used to be two empirical facts that have puzzled trade economists for quite sometime in the past. One has to do with the general small effect that a country's trade liberalization

[7] In fact, Grossman and Helpman (1994) also considers the possibility of adapting their model's assumptions once imported intermediary goods are included in the data set.

policies have on its import flows. The other one is that historically import penetration ratios are found to be positively correlated with levels of import protection. It was only from the late 1970s on that trade theorists realized that trade protection should be understood as an endogenous policy (e.g., Brock and Magee 1978). This new interpretation of trade policy contends that the impact of trade liberalization tended to be underestimated by the import penetration variable because as import flows start rising domestic import competing interests are likely to mobilize and lobby for higher protection (Trefler 1993). Therefore, import penetration ratio should be interpreted as a "backlash" variable.[8]

In order to address this problem and come up with more accurate coefficient estimates in their trade equations, some studies have run simultaneous equations for import flows and protection levels. In the case of Goldberg and Maggi (1999), import protection is also treated endogenously. They first estimate a reduced form equation for import penetration, in which they use 21 explanatory variables that might have some impact on import penetration ratios. Following Trefler (1993) exercise, those variables attempt to take into account differences in factor endowments across industries, such as shares of capital, land, and human capital.

However, the innovative approach that Goldberg and Maggi introduce in their work is that they estimate import penetration interactively with a dummy variable of political organization.[9] They argue that the relationship between import penetration and protection rates depends on whether the industry is organized. In industries that are politically organized, they expect a negative relationship between import protection and import penetration. Whereas in industries

[8] After estimating protection levels endogenously, Trefler finds that the model's restrictive impact on imports is actually 10 times higher than had it treated protection exogenously. His findings are based on 1983 U.S. trade data.
[9] Goldberg and Maggi treat their political organization variable both exogenously and endogenously. In the latter case, they run a separate reduced equation because they assume industrial contribution levels to be endogenous to industry's size. However, when comparing the results between the two econometric analyses, they do not find any "appreciable difference, either for point estimates or the standard errors" (1999: 1143).

that lack political clout, one should observe a positive association between import penetration and import protection. In fact, they do find statistical support for their latter argument but not for the former. However, when they test the import penetration variable alone, they also find it to be positively associated with import protection. Thus, despite their efforts, the results of their analyses are not necessarily instructive.

In this study, I treat import penetration both exogenously and endogenously. But differently from previous works, I test whether a "lag" of import-penetration variable yields any revealing outcome.[10] Before moving on to the next section where I show my quantitative results, I present Table 1 where I summarize the main assumptions of my trade model.

Table 1. Summary of Brazil's trade model

Dependent variable: Import tariff rates

Explanatory variables	Sign	Reason
Import elasticity	+	Trade policy still reflects import substitution pattern
Buyers concentration	-	Pressure for access to cheaper imported inputs
Import penetration	+	Backlash variable against trade liberalization

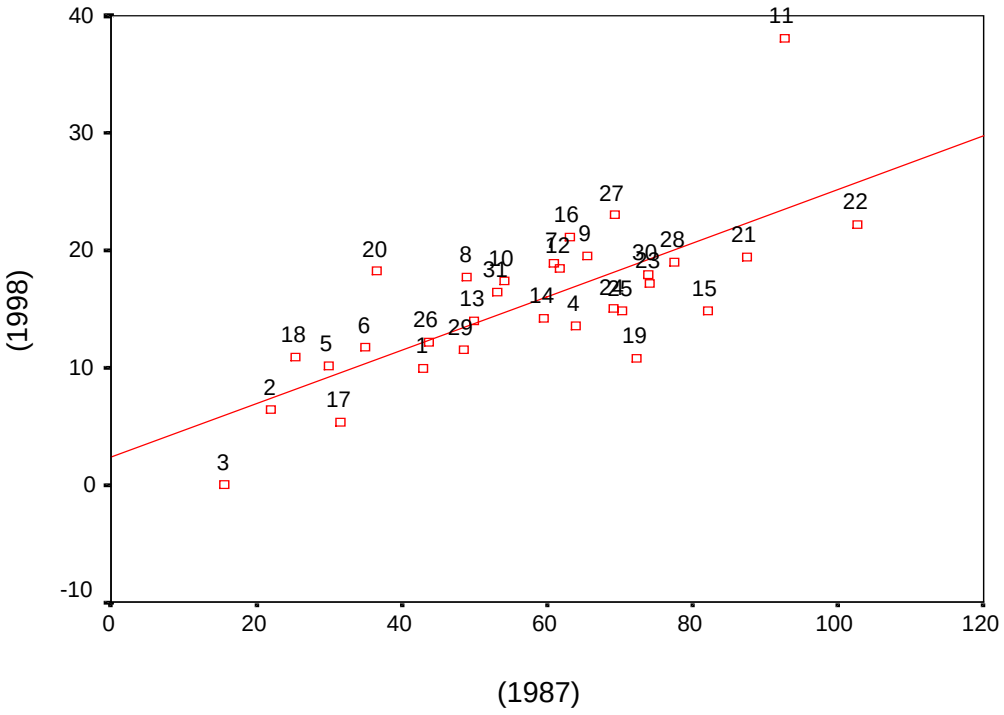
Testing the G-H model on the Brazilian case

Perhaps it is important to highlight again that the main inspiration for this study was the fact that Brazil's import tariff rates in the late 1990s, that is, after the country's trade liberalization reform, still reflected the pattern of import protectionism characteristic of the Brazilian I.S.I. program. For example, Figure 1 shows the high correlation between nominal tariff rates between 1987 and 1998 (r = .74). Even after the overall rate of tariff reduction, one can, with reasonable accuracy, predict a tariff level for an industrial sector in 1998 based on its

[10] Please refer to the appendix for information on the formula of the import penetration variable used in this study.

tariff rate more than 10 years earlier.[11] The exception is the automobile industry (no. 11), which has a proportionally higher rate of nominal protection than in the past.

Figure 1. - Patterns of Nominal Tariff Setting: 1987 vs. 1998



r = .74

Source: Based on Kume, Guida and Souza's (2001).

[11] The "official" beginning of Brazil's trade liberalization program took place at end of the José Sarney administration, in 1988, when the government issued a six-year schedule for import tariff reductions and the elimination of NTB's.

Industry Codes

1 - Animal or Vegetable products
2 - Mineral oils
3 - Crude petroleum & coal
4 – Nonmetallic mineral products
5 - Steel products
6 - Metal products (except ore)
7 - Metal working
8 – Machinery
9 - Electric machinery
10 - Electronic equipment
11- Transport & motor vehicle
12 - Auto parts & other vehicles
13 - Wood and furniture
14 - Cellulose, paper & printed material
15 – Rubber
16 - Chemical products
17 - Petrochemicals
18 - Other chemical products
19 - Pharmaceutical products & cosmetics
20 - Plastic products
21 - Textile
22 - Clothing
23 - Footwear
24 - Coffee industry
25 - Groceries
26 - Live animals
27 - Dairy products
28 - Sugar
29 - Vegetable oils
30 - Other food products
31 - Miscellaneous

When looking at the above graph, one wonders how seriously committed was the Brazilian government to the country's trade reform, at least during the period that this study examines. My main purpose for testing the G-H trade model on the Brazilian case is to assess the impact that differences in levels of industrial sectoral strength have on import tariffs. Notice that my assumption is that variations in political clout amongst industrial sectors are a natural outcome of each industry's economic traits. Hence the logic presented here is similar to the one used during the explanation of the "industrial concentration" variable. But differently from my earlier description, I extend the view to all the variables in my model that certain economic strength and traits of selected industries are likely to produce a finite number, as well as an identifiable pattern, of government responses to their economic pleas. Hence the goal of this paper: to identify a number of industrial characteristics that have been in "harmony" with the government's current trade policy. Or to put it more bluntly, this study seeks to identify which

industrial sectors in Brazil have been the "winners," on the basis of their economic characteristics, during the country's recent program of trade liberalization.

A. Results

First, I would like to clarify why I use import tariff rates as the dependent variable when NTB's have been the preferred choice of measurement of import protection in the literature. The years that this study covers coincide with a period in which the Brazilian government practically eliminated most of the countries NTB's. The government was mostly manipulating import tariff values and exchange rates to set the pace of Brazil's trade reform program. Therefore, values of import tariffs have been considered an efficient proxy to measure changes in trade liberalization levels during the 1990s (Hay 1997; Ferreira and Rossi 1999). Again, economic figures represent 48 industrial sectors that are aggregated according to Brazil's *Niv. 80* classification.

We shall move now to the results. The first question that I address is whether there is evidence of endogeneity in Brazil's import-penetration rates.[12] The correlation coefficient between import tariffs and import-penetration rates is -.24. The fact that the correlation between the two variables is not only small but also negative is really puzzlingly. Looking again at Figure 1, it seems that the import tariff structure in Brazil is more rigid than one might initially expect. That is, changes in tariff rates have occurred but at a much lower pace and in a way that do not alter the overall structure of the country's import protection. This leads us to the possibility that the negative relationship that we find between those two indicators reflects already a period of "pos-backlash," in which tariffs rates have risen in such level that practically restricted the entrance of new imports into the domestic market. Incidentally, this is the evidence that Goldberg and Maggi (1999) were looking for in their study on the U.S. data. Recall that they

[12] Please refer to this paper's "data sources" section for information on the variables I use in this study.

argue that a positive correlation between import tariffs and import penetration rates occurs only within non-organized sectors. They further contend that within sectors that are politically organized, the correct expectation is to notice a negative relationship between those two variables, which they find in their study but not at a statistical level of significance.

My next step then is to identify how many years back on Brazil's trade figures import penetration rates have the highest positive correlation with import tariffs.[13] I find that this is so when I lag the import penetration variable in five years (when r = .39). Thus I assume that this is the time when import flows are at their highest level relative to import tariffs, which also implies that at that time industries have yet to react against import flows. This is one way that we can think of dealing with the problem of endogeneity in protection levels. I run a *Generalized Least Square* (GLS) regression model in Stata, to take into account potential problems with panel data, and reach the following results:

[13] Perhaps crucial to this question is to understand why we can even expect a negative correlation between import tariffs and import penetration rates. It seems that signs of a stronger negative correlation between these two indicators are more likely to occur in protectionist countries. Because even if one notices a "backlash" against liberalization from selected sectors in an open economy, there is so much that the affected industries can influence trade policies. In other words, of course that the affected sectors can temporarily increase protection but it is very unlikely that they will be able to pursue it to the point that import tariffs become prohibitive. Whereas in protectionist countries, this is a more feasible scenario.

Table 2. Full model (1st version)

Random-effects GLS regression — Number of obs = 300
Group variable (i) : niv80 — Number of groups = 43

R-sq: within = 0.4052 — Obs per group: min = 6
between = 0.2431 — avg = 7.0
overall = 0.3438 — max = 7

Random effects u_i ~ Gaussian — Wald chi2(3) = 182.46
corr(u_i, X) = 0 (assumed) — Prob > chi2 = 0.0000

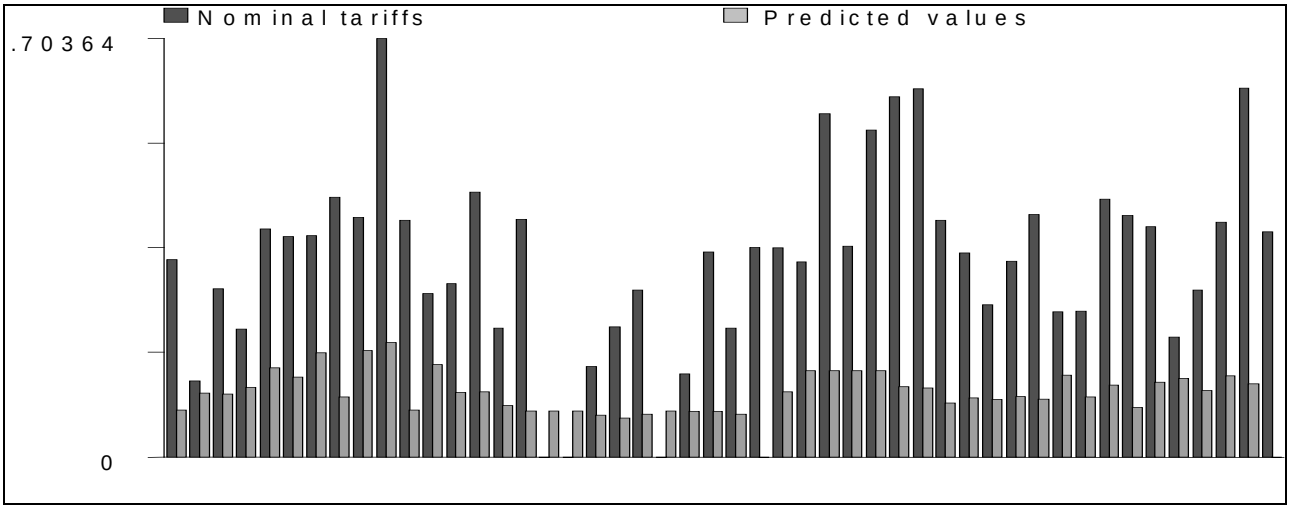
tariff	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
importel	.0254684	.0080939	3.147	0.002	.0096046	.0413322
l5_imp_pen	.9643716	.0772274	12.487	0.000	.8130087	1.115734
impgdpbr	-9.49e-09	1.93e-09	-4.907	0.000	-1.33e-08	-5.70e-09
_cons	.0879291	.0204707	4.295	0.000	.0478073	.128051
sigma_u	.0514144					
sigma_e	.08595897					
rho	.2634907	(fraction of variance due to u_i)				

Note:
Importel = import elasticity rates
l5_imp_pen = Five-year lag variable for import penetration rates
impgdpbr = buyer concentration at the national level

As we can see the three variables I test present high levels of significance. The interpretation of the size of the coefficients may be hard due to the differences in measurements between the economic indicators. However, if we standardize the coefficients' results we can roughly state that one standard deviation increase in import penetration is associated with .55 standard deviation increase in import tariffs, followed in strength by buyer concentration (beta = - .27), and import elasticity (beta = .24). As I mentioned in the beginning of this paper, the result of this model seems to support the message that Figure 1 informs us, namely, that import tariff rates in Brazil still reflect in great deal the country's past I.S.I. program. The fact that the overall model has an R^2 of .34 implies that are still other noneconomic factors that are not being

captured by the model, and that are influencing the government's high level of policy discretion when it comes to the setting of Brazil's import tariff rates. Figure 2 compares the actual values of tariffs rates to those predicted by my analysis per industrial sector, and confirm that the G-H model in fact underestimates the level of import tariffs in Brazil from 1986 to 1999.

Figure 2.



These are the main results I obtain when I use the five-year lag variable of import penetration. However, the story that comes up when I introduce the reduced form equation for the import penetration variable is slightly different from the one narrated above.

Differently from selecting explanatory variables that reflect distinctions in factor endowments across industries, as Trefler (1993) and Goldgerg and Maggi (1999) do, I choose variables that reflect changes in Brazil's macroeconomy to set up the reduced equation. My option for this approach is due to the realization that changes in levels of import flows in Brazil have been historically linked to changes in the country's current accounts. The variables I initially use to predict import penetration rates are: trade balance, terms of trade, foreign reserves, real exchange rates, and foreign debt. But as one can expect, I find that some of these

variables show multicollinearity. They are "balance of trade" and "terms of trade," which I later withdraw from the reduced model. The result of the regression on the reduced equation for the import penetration variable is shown in Table A1 in the appendix. The important information to keep in mind now is that the correlation coefficient between the predicted values of the reduced equation and the actual import penetration rates is .50. This explains why I get a negative sign when I plug into the general model the predicted values of the import penetration variable from the reduced form equation, as the Stata output shows:[14]

Table 3. Full model (2nd version)

Random-effects GLS regression — Number of obs = 430
Group variable (i) : niv80 — Number of groups = 43

R-sq: within = 0.4075 — Obs per group: min = 10
between = 0.1129 — avg = 10.0
overall = 0.2784 — max = 10

Random effects u_i ~ Gaussian — Wald chi2(3) = 265.54
corr(u_i, X) = 0 (assumed) — Prob > chi2 = 0.0000

tariff	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
importel	.0195628	.0109332	1.789	0.074	-.0018659	.040991
mpent_hat	-1.415548	.0993319	-14.251	0.000	-1.610234	-1.220861
impgdpbr	-1.06e-08	2.56e-09	-4.136	0.000	-1.56e-08	-5.58e-09
_cons	.3716057	.0263397	14.108	0.000	.3199807	.4232306
sigma_u	.07718968					
sigma_e	.08747398					
rho	.43778624	(fraction of variance due to u_i)				

Note:
importel = import elasticity rates
mpent_hat = predicted values for import penetration rates
impgdpbr = buyer concentration at the national level

[14] Recall that the original correlation between Brazil's import tariffs and import penetration rates is -.24 (see p. 13).

Aside from the difference in signs in the coefficients of the import penetration variables between the models, the overall result of the two versions of the full model is similar. The coefficient for import elasticity loses a bit of weight and significance (from less than 5 to less than 10% level) in the second version, whereas the coefficient for the buyers concentration variable has the same negative sign, gains a little more strength (Δ = -1.11 E-7), and remains significant at less than 1% level. The overall R^2 of the second version of the full model is slightly smaller (.28).

It seems then that the major challenge that is presented by this exercise is to properly interpret the problem of endogeneity in import protection policies as well as the role that changes in import penetration rates have on a country's trade policy. This is a problem that is also apparent in Goldberg and Maggi's (1999) article.[15] The difference here is that I try to understand the problem of endogeneity in the context of a relatively closed economy. In this respect, I lack literary reference, including empirical studies that could shed some light on better ways of operationalizing the G-H model in the context of a developing economy.

Conclusion

Despite the somewhat publicity by the Brazilian government of its trade liberalization reform in the 1990s, there has been evidence that the government comes short of fulfilling its promises to open the domestic market to foreign goods. The goal of this paper was to estimate the extent to which Brazil's manufacturing industry operated under a free market economy in the period covered by this study. My findings point to the conclusion that protectionist practices are still pretty much present in Brazil's trade policies. Although there are some inconclusive results

[15] Gawande and Bandyopadhyay (2000) comment that although it is commonly acknowledged the positive association between import flows and import protection rates, the explanation for such events still lacks theoretical foundation (p. 149).

about the impact that import flows has on the country's import tariff rates, the other parameters of the G-H model indicate that Brazil's economy still operates as if the country were under I.S.I. Import tariffs rates have been proportionally higher on final goods, which means that the domestic industry are being considerably shield from foreign competition – despite the government's noticeable cuts on tariff rates. In addition, this result indicates that industries that depend on the importation of intermediary goods and raw materials have been able to keep tariff rates low. This is especially among industrial sectors with relatively high demand of imports.

The question that arises then is why the government has kept tariffs low on products with low import demand elasticity, particularly in the context of revenue crisis in the federal accounts.[16] One might speculate about two possible explanations for the government's choice to keep this policy, which are in no means exclusionary. First it might be that the government wanted to prevent further political costs associated with the reforms within the country's industrial sector. Between 1985 and 1999, jobs lost in Brazil's manufacturing sector amounted to about 20%. In the "electric machinery & communications apparatus" industries, for example, this number rises to 49%. Many industries that suffered the most with reforms are characterized for its proportionally high regional concentration and union densities. These are like industrial hives that the government might prefer to avoid whenever possible.

Another possibility for the Brazilian government to impose proportionally low taxes on goods with low import demand elasticity – contrary to what is preached in most industrial countries – may have to do with the country's institutional rigidity. Although Brazil's top economic leadership might favor a nondiscriminatory tariff policy (perhaps closer to a flat tariff system), there may have been resistance for such policy from officials from the second and third

[16] Recall that Brazil, among other developing countries, has been pressured by international financial agencies (most notably the IMF) to keep primary surpluses in its national accounts.

tears of the state machine. Certainly, Brazil's financial representatives would appreciate using import tariffs for revenue collection. But considering the history of Brazilian institutions, this is not a far stretched hypothesis.

All things considered, the conclusion is that economic traits of individual industrial sectors have limited capability of explaining the political economy of import tariff setting in Brazil during recent years. The G-H model does underestimate import tariff levels in Brazil. The job now is to identify, and hopefully estimate the impact of, other noneconomic factors that have influenced Brazil's trade policy during its recent democratic phase. This is a task that two other chapters of my dissertation pursue. In my following studies, I focus on the impact of the reforms on Brazil's labor in the manufacturing sector, and later on the role that Brazil's clientelistic political style has had on trade policy's outcomes.

APPENDIX

Table A1. Classification at *Niv. 80* (total of 48 industrial sectors)

Code	Description
401	Non-metallic mineral products
501	Basic metallic products
502	Rolled steel
601	Non-ferrous metallic products
701	Other metallic products
801	Manuf & maint machinery & equip
802	Tractors & embankment machinery
1001	Electrical equipment
1101	Electronic equipment
1201	Automobiles, trucks, & buses
1301	Other vehicles & parts
1401	Wood & furniture
1501	Paper, pulp, & cardboard
1601	Rubber products
1701	Non-petrochemical chemical elements
1702	Alcohol
1801	Motor gasoline
1802	Fuel oil
1803	Other refinery products
1804	Basic petrochemical products
1805	Resins & fibers
1806	Alcoholic fuel
1901	Chemical fertilizers
1902	Paints, varnishes, & lacquers
1903	Other chemical products
2001	Pharmaceutical & perfumery products
2101	Plastics
2201	Natural textile fibers
2202	Natural textiles
2203	Artificial textile fibers
2204	Artifical textiles
2205	Other textile products
2301	Apparel
2401	Leather products & footwear
2501	Coffee products
2601	Processed rice
2602	Wheat flour
2603	Other processed edible products
2701	Meat
2702	Poultry
2801	Processed milk
2802	Other dairy products
2901	Sugar
3001	Raw vegetable oil
3002	Processed vegetable oil
3101	Animal food & other food products
3102	Beverages
3201	Miscellaneous

Table A2. Reduced equation (Dep. Variable: import penetration ratio)

Random-effects GLS regression — Number of obs = 470
Group variable (i) : niv80 — Number of groups = 47

R-sq: within = 0.5839 — Obs per group: min = 10
between = 0.0000 — avg = 10.0
overall = 0.2517 — max = 10

Random effects u_i ~ Gaussian — Wald chi2(3) = 590.68
corr(u_i, X) = 0 (assumed) — Prob > chi2 = 0.0000

meffpen	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
realxrat	-.1740219	.0158302	-10.993	0.000	-.2050486	-.1429952
foreserv	.0011281	.0008843	1.276	0.202	-.000605	.0028613
fordebt	4.54e-07	4.11e-08	11.040	0.000	3.74e-07	5.35e-07
_cons	.2131774	.020578	10.360	0.000	.1728454	.2535095
sigma_u	.06633368					
sigma_e	.03921632					
rho	.74100712	(fraction of variance due to u_i)				

Note:
meffpen = import penetration ratio
realxrat = real exchange rates
foreserv = foreign reserves
fordebt = foreign debt

Formula for the import penetration variable (from Muendler's data file)

In this study, import penetration rates are defined as the fraction of imports to domestic absorption in a given sector, as follows:

$$\frac{IM_i}{A_i} = \frac{1}{\frac{Y_i - (EX_i - IM_i)}{IM_i}}$$

Where Y_i is the sector's gross output, and EX_i and IM_i represent that sector's exported and imported goods, respectively. The domestic consumption of these goods (by households or government) and the use of these goods for capital formation (by households or government) are often written as $C_i + I_i + G_i \equiv A_i$, and this total is called domestic absorption.

DATA SOURCES

I obtained the following figures and their descriptions from professor Marc-Andreas Muendler's archives. These data sets can be easily accessed at his web site: http://econ.ucsd.edu/muendler/.

Nominal import tariffs –

Annual data on nominal *ad-valorem* tariffs are based on Kume, Piani, and Souza (2001) report sector. They weigh product-specific ad-valorem tariffs with the value added in each narrowly defined product group and arrive at sector classification (Brazil's *Level 80*). Tariff figures are from January 1986 to December 1999.

Import penetration ratios –

Mesquita Moreira and Correa's (1997) import penetration series draws on various sources, among them national accounts data and export and import series from the department of the treasury and the secretary of commerce (SECEX). Data are extracted from the tables and data appendices in Mesquita Moreira and Correa (1997) and Mesquita Moreira (2000). Data points are all years from 1989 through 1998.

Real exchange rates –

Real exchange rate series are from 1986 and 1998. The series applied is a mid-month U.S. dollar exchange rate *vis-à- vis* the respective Brazilian currency at the time.

Other economic indicators used in this study are obtained from a variety of sources, as follows:

Import elasticity rates are built by Tourinho et al. (2003) and they are from 1986 to 2002.Yearly figures on Brazil's trade flows - defined by quantity, time, and currency values (US$) - can be

accessed at the Ministry of Development, Industry, and Trade's web site: http://aliceweb.desenvolvimento.gov.br. Data on the Brazilian GDP are also obtained at the Ministry of Development's site. Figures on Brazil's foreign reserves, foreign debt, balance of payments, and terms of trade are from 1989 to 1999 and are organized by the Brazilian Institute of Geography and Statistic (IBGE), whose online address is at: http://www.ibge.gov.br.

Reference

Brock, William A., and Stephen P. Magge. 1978. “The Economics of Special Interest Politics: The Case of the Tariff.”*A.E.R. Papers and Proc.* 68 (May): 246-50.

Ferreira, Pedro Cavalcanti and José Luís Rossi. 1999. "Trade Barriers and Productivity Growth: Cross-Industry Evidence." Unpublished paper. Rio de Janeiro: Fundação Getúlio Vargas/IPEA.

Frieden, Jeffrey A.. 1991a. “Invested Interests: The Politics of National Economic Policies in a World of Global Finance.” In *International Organization* no. 45 (Autumn): 425-51.

Gawande, Kishore and Usree Bandyopadhyay. 2000. “Is Protection for Sale? Evidence on the Grossman-Helpman Theory of Endogenous Protection.” In *The Review of Economics and Statistics*, V.82(1): 139 – 152.

Goldberg, K Pinelopi and Giovanni Maggi. 1999. “Protection for Sale: An Empirical Investigation.” In American Economic Review, V. 89 (December): 1135 – 1155.

Grossman, Gene M. and Elhanam Helpman. 1994. “Protection for Sale.” In *The American Economic Review*, V. 84 (4): 833 – 850.

Hay, Donald A. 1997. "The Post 1990 Brazilian Trade Liberalization and the Performance of Large Manufacturing Firms: Productivity, Market Share and Profits." Discussion Paper nº 523. Rio de Janeiro: IPEA.

Kume, Honório, Guida Piani, and Carlos F. Bráz de Souza. 2001.“A Política de Importação no Períod 1987 – 1998: Descrição e Avaliação”. Manuscript, Rio de Janeiro: IPEA.

Mesquita Moreira, Maurício. 2000. “Indústria e Comércio Exterior.” In Conjuntura Econômica, 54 (7): 25 – 34.

_____ and Paulo Guilherme Correa. 1997. “Abertura Comercial e Indústria: O que se Pode Esperar e o que se Vem Obtendo.” In *Revista da Economia Política*, 17 (2): 61 – 91.

_____. 1998. “A First Look at the Impacts of Trade Liberalization on Brazilian Manufacturing Industry.” In *World Development*, 26 (10): 1859 – 1874.

Tourinho, Octávio A. F., Honório Kume, and Ana Cristina S. Pedroso. 2003. “Elasticidades de Armington para o Brasil – 1986 – 2002: Novas Estimativas.” Texto para Discussão n. 974. IPEA: Rio de Janeiro.

Trefler, Daniel. 1993. “Trade Liberalization and the Theory of Endogenous Protection: An Econometric Study of U.S. Import Policy.” In *The Journal of Political Economy*, V. 101 (1): 138-160.