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Political economy of Poland's trade policy.
Empirical verification of Grossman-Helpman model

Abstract:

This paper analyses rent seeking behavior in trade policy and is based on the Grossman-Helpman (1994), "Protection for sale" framework. Our empirical implementation deals with Polish trade policy in the late 1990s. We use the instrumental variable approach to estimate the model, taking into account possible endogeneity of the regressors.

Our result suggest that lobbies were important in the process formation of Polish trade policy formation in the period under consideration. The degree of their influence is, however, significantly lower than in the case of the United States. The model seems to perform better for MFN than preferential tariffs. In the former case our estimates are in line with the original theory.

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Introduction

The Grossman and Helpman (1994) model (G-H) is probably the most advanced and well known model of political economy of trade policy. It is aimed at explaining the pattern of trade policy through operation of endogenous domestic lobbies.

In the early work of Findlay and Wellisz (1984) the interplay between domestic lobbies, representing capital and land owners, was represented by the "black box" tariff formation function. In the median voter model (Mayer, 1984), trade policy was determined by majority vote. In the G-H model the governmental policy is determined by elected politicians. The government, in its decisions, takes into account the welfare of the society and the contributions of lobbies, representing various sectors of the economy.

We present an empirical study of the endogenous tariff policy formation in Poland in mid 1990's. The selection of the period is not accidental. As we argue, trade policy was still autonomous in the early 1990s, but flexibility in tariff formation slowly decreased in the late 1990s, when Europe Agreement and WTO Uruguay Round duty reduction commitments were gradually implemented. We also believe that tariffs, similarly to the original G-H model, better reflect the pattern of protection, in comparison to non-tariff measures.

Our results are in line with the predictions of the Grossman-Helpman (G-H) model. Majority of our regressions support the theory and we find support for the significance of lobbies in formation of trade policy in Poland. The G-H model seems to work much better in the case of MFN than for preferential tariffs. There is some anecdotal evidence that lobbies managed to influence Polish trade policy several times, and this evidence is confirmed in our calculations. The importance of the lobbies is, however, significantly lower than in the case of the United States.

Some stylized facts on Polish trade policy

The opening up of the Polish economy was an important element in the process of economic transformation. Trade liberalization started in January 1990 when the zloty became convertible and almost all-domestic prices were released from administrative control. Majority of non-tariff measures were eliminated at that time. The new customs code, introduced in January of 1990, was compatible with international norms. The tariff description, the rules of customs' valuation, and the anti-dumping procedures were in line with the GATT articles. The average level of tariffs was 8.9 per cent *ad valorem* in the

beginning of 1990. But the tariff structure was not fully adapted to requirements of the market economy, and was somewhat arbitrary.

At that time Poland's tariffs were not subject to the discipline of the GATT and the government enjoyed a great deal of freedom when shaping the tariff structure. Poland had no legal constraint in the form of "bound" tariff schedule, although it was a GATT member since 1967. As a former communist country, it had a unique reciprocity formula in the Protocol of accession to GATT. In exchange for the MFN status among GATT members, Poland committed itself to increase the value of its imports from the members of GATT by at least seven percent annually. This commitment became impossible to fulfil by the mid 1970's. But formally nothing has been changed until the creation of the WTO in 1994. Therefore tariff changes were feasible in the beginning of 1990s.[1]

On August 1, 1991, the new tariff schedule came into force. The new schedule adopted the commodity nomenclature applied by the European Community (EC). Average nominal (unweighted) customs rates calculated on the basis of MFN were raised from 11.65 to 17.02.[2] Such changes was feasible since Polish tariffs were unbound in the GATT.

"The increase was motivated by the need to increase fiscal revenues, and by the desire to afford a degree of protection to Polish producers competing with imports."Sensitive" agricultural goods, such as butter and meat, automobiles and electronics." were among products that had been granted particularly high protection.[3] However, the notion of a sensitive product was not clearly defined at that time. The government administration had limited knowledge of what the reasonable tariff pattern should be[4]. On the other hand, the organized interest groups were either weak or nonexistent at that time. Therefore, in the early 1990s, the influence of domestic lobbies should not have been significant.

The preferential tariff liberalization started in 1994. In 1991, Poland signed the Europe Agreement (EA) with the EC.[5] The commercial part of the EA came into force by 1992. The EC and Poland started to create a free trade area (FTA) for non-agricultural products since March 1994 over a maximum period of ten years. The FTA did not apply to agricultural products. As far as the European Union's (EU) imports are concerned, the liberalization process has taken five years and was completed by the end of 1997. The timetable of tariff liberalization of Polish imports was more extended in time. Majority of reductions for other industrial products (43% of Polish imports in 1993) was implemented in equal steps from 1995 until 1999. The liberalization of tariffs on cars and other motor vehicles was postponed till 2002.

The EA contained some safeguard clauses. The most important is probably the so-called Restructuring Clause (art. 28 of EA) which could have been applied only by Polish side in the form of temporarily increased import duties. "These measures may only concern infant industries, or certain sectors undergoing restructuring or facing serious difficulties, particularly where these difficulties produce important social problems."

Poland signed a similar free trade agreement with EFTA countries (Austria, Finland, Island, Liechtenstein, Norway, Switzerland, Sweden). The agreement covered mainly trade in non-agricultural products. EFTA members eliminated most import duties in 1993. Poland gradually liberalized its tariffs and quantitative restrictions on EFTA imports by 1999 (except for steel, petroleum products, and automobiles).

Poland, along with the Czech Republic, Hungary and the Slovak Republic, established the CEFTA (Central European Free Trade Area) in 1992. Afterwards, Slovenia 1996, Romania and Bulgaria joined the CEFTA. The CEFTA Agreement established a free-trade area by 2001. CEFTA covered all goods, except for a few agricultural products. Thus, by the end of 1990s, almost all Polish duties on non-agricultural imports from majority of European countries have been eliminated. The share of these countries exceeded 65% of Poland's total imports.

The non-preferential (MFN, conventional) liberalization of Poland's trade policy towards non-European countries started in 1995. The country took part in the GATT Uruguay Round as the only state having the formal status of a developed country without any "bound" customs duties. After submitting its initial offer on tariff concessions, Poland took part in bilateral negotiations with several countries. The main Poland's commitments in the Uruguay Round concerning merchandise trade were to bind 94% of its duties and to reduce tariffs by 38% on industrial products and by 36% on agricultural goods over a period of six years.[6]. The simple average bound MFN Polish tariff rate for non-agricultural products was gradually reduced from 16.73 to 9.89 per cent. Thus, in 1995 Poland's special terms of accession to the GATT became irrelevant.

The tariff structure was determined, almost from scratch, in early 1990s by governmental decisions and it seems that the interest groups probably did not have very strong influence on the process. The organizations of producers (chambers) were just being established. However, the trade unions were quite powerful. Afterwards the level of import duties was gradually reduced over next years. The scope of reductions was quite impressive in

the case of preferential duties. Yet, it is possible to show some anecdotal evidence that the tariff changes were influenced by lobbies' pressure.

In January 1992, shortly after signing the Europe Agreement, Poland raised MFN customs duties for motor vehicles from 15 to 35 percent. At the same time the duty free quota (for 30000 vehicles) for automobile imports from the EU was granted. These trade policy changes were in coincidence with large FDI of the leading European motor car company in Poland[7]. India challenged these measures in GATT in November 1994 under Article I (MFN clause) and XXIV (formation of FTA). Consultations took place in order to find a solution satisfying both parties.[8] At the end Poland compromised, and agreed to open a temporary (two-year) tariff quota for small passenger cars originating in developing countries. Such a solution allowed for a formal settlement of the trade dispute on the WTO forum.

The other notable examples of changes in trade policy in the second half of 1990's involve the application of restructuring clauses by Poland.[9] In 1994, for the first time, the clause was applied to imported telecommunication equipment from the EU members. According to the government, the decision resulted from the necessity to restore the profitability of telecommunication equipment manufacturing in Poland that was heavily dependent on imported components. The restructuring clause was also used in 1996 to oil-refining products. Poland extended the period of reducing customs duties on oil-refining products until 2001 (according to the original timetable, customs duties were to be brought down to 0 at the beginning of 1999).[10] The restructuring clause, was applied for the third time, in 1997. Poland decided then to maintain tariffs at 9% in order to protect its restructuring of steel industry, despite the time-table of liberalization under Europe Agreement. One can reasonably argue that the application of restructuring clauses resulted from efficient lobbying, since this was almost explicitly foreseen by article 28 of the Europe Agreement.

The third and the most spectacular case involves the application of various import-reducing measures applied to imported gelatine. The main lobbyist was Mr. K. Grabek, the owner of three out of four factories producing gelatine in Poland and the sixth richest individual in Poland in 1999. He managed to get support from press and many influential politicians. Due to his lobbying, the sanitary norm for gelatine became more restrictive in 1993, the variables levies were introduced in 1995, and import duties were increased (from 15 to 56 per cent) in 1995. Finally, a total import ban on gelatine was imposed in 1998, under the claim that imported gelatine - if produced from bones of animals suffering from mad-cow disease - can be a public health hazard.[11]

What was therefore the role of lobbying in early 1990's? According to sociological questionnaire surveys made in 1993, the role of lobbies in Polish Parliament was quite important. The Members of the Parliament believed that the second task of the MP is to represent interest groups (11.1 percent of replies), and third to "organize the economy" (10.5 per cent of replies). On the other hand they believed that the organized interest groups did have important impact on political decisions taken by other MPs (13 percent of replies)[12]. The objective of this paper is to trace the impact of organized groups on Poland's government objectives using the methodology from Goldberg and Maggi study.

Review of empirical studies

Maggi and Goldberg (1994), in their seminal paper, present a modified version of the Grossman and Helpman model, that yields the same predictions but provides an estimable equation. In their model, the objective function of the tariff setting government is dependent on the welfare of the society (with weight β) and the contributions paid to the government (with weight 1-β). Maximization of the objective function yields the following equation:

$$\frac{t_i}{1+t_i} e_i = \frac{I_i - \alpha_L}{\frac{\beta}{1-\beta} + \alpha_L} \cdot \frac{x_i}{m_i} + \varepsilon_i = \gamma \frac{x_i}{m_i} + \delta I \frac{x_i}{m_i} + \varepsilon_i, \tag{1}$$

where t_i is the tariff level, e_i is the elasticity of demand, x_i/m_i is the import penetration ratio, I_i is a dummy variable that takes a value of one if an industry is organized and ε_i is an error term. This specification allows recovery of the structural parameters of the Grossman and Helpman model since $\gamma = \left[-\alpha_L / (\beta/1 - \beta) + \alpha_L \right]$ and $\delta = \left[1/(\beta/1 - \beta) + \alpha_L \right]$. The ($\alpha_L$) denotes a fraction of the population represented by a lobby, and(β) the weight of the society welfare in the government objective function; thus allowing to asses the impact of lobbies in the tariff setting process.

The construction of political organization dummy (I_i) in the Goldberg-Maggi paper is based on political action committee (PAC) campaign contributions for 1981-82 and 1983-84 congressional elections. A threshold level of $100 million was applied. The industries providing contributions above that level were treated as being organized.[13] The main problem with empirical verification involves the possible endogeneity of import penetration ratios. The other practical difficulty is the question of correct identification of organized sectors.

Therefore, Goldberg and Maggi (1994) use two auxiliary regressions to predict both import penetration ratios and political organization dummies. [14]

The results of empirical work by Goldberg and Maggi are encouraging. The basic specification estimated value of γ=-0.0093 and that of δ=0.0106 are broadly in line with predictions of G-H model. The implied values of β equals 0.986, which means that the consumer welfare is almost 100 times higher in the government's objective function than the political contributions. In the other specification β equals 0.981 (but is statistically smaller than one), which is only slightly less optimistic.

There are several other empirical studies based on the idea developed by Grossman-and Helpman. The study prepared by Grether, De Melo and Olarrega (2002) referred to political economy of trade policy in Mexico. Other work by Mitra, Thomkos, Ulubasoglu (2002) analyzed pattern of protection in Turkey and McCalman (2004) studied determinants of protection in Australia. Finally Tavares (2003a) analyzed the determinants of common external tariff in the European Union.

The major problem in most studies is the lack of data on political action committee campaign contributions, which could serve as the proxy for a sectoral political organization. This sort of data is unavailable in countries other than U.S. In some cases (e.g. McCalmam) the political organization variable was estimated using a probit model. In the same study a set of instruments were divided into two groups in each sector: those that affect the probability of being politically organized, and those that account for comparative advantage, having possible impact on import penetration.

Probably the most extensive list of industry-specific variables was compiled by Tavares (2003a), largely inspired by the work of Grether, De Melo and Olarreaga (2001). Tavares was aiming at explaining the pattern of tariff protection in the European Union. The other large set of variables was proposed by McCalman (2004).

The specification of variables used in empirical studies can be, somewhat arbitrary, grouped into two broad categories of industry characteristics, having impact on political organization and import penetration.

Generally the variables affecting the probability that the sector is **politically organized** that are used in the literature can be classified into two groups. The first group contains industry specific institutional variables. These include, first of all, political action committee campaign contributions made during congressional elections (higher contribution reflects better

organization of the lobby) used by Goldberg and Maggi (1999). Some authors instead used the degree of unionization variable, assuming that the higher level of workers' participation in trade unions (significant shares of employment) the more there will be protection (Mitra, Thomakos, Ulubasoglu (2002) and Grether, De Melo, Olarreaga (2001)). Alternatively, it is possible to use variables describing the institutional impact of region specific chambers and associations. Grether, De Melo, Olarreaga (2001), assume that if firms in a given industry are spread across the country, then their influence on the government's decision-making process is stronger as they exert their influence through different (more numerous) associations.

The second group of variables is related to the market structure that may affect the ability of a sector to organize itself. These include the number of firms in the industry (smaller number of firms alleviates the free rider problem in coordinating a lobby, thus increasing the level of protection, variable used by Tavares, 2003a and McCalman, 2004) and industry concentration (eg. Herfindahl index, used by Grether, De Melo, Olarreaga, 2001 and McCalman, 2004). Grether, De Melo, Olarreaga (2001) and McCalman (2004) employ also a measure of the employment share of a sector in a given country's total employment. They claim that the larger the industry seeking protection, the greater is the incentive to join in the tariff-setting process. Grether, De Melo, Olarreaga (2001) also claim that the tariff level may be higher in sectors with larges shares of FDI because owners of foreign capital may have access to a better lobbying technology. Probably multinational companies have a larger experience of lobbying in different countries which they can adapt to the host government. Also, governments may be more sensitive to FDI interests than to the interests of nationals. This can also result from the fact that foreign companies may be more credible in the lobbying game than domestic producers.

Moreover, some authors claim that declining industries (those with large increases in import penetration) tend to obtain more protection, to reduce adjustment costs (Grether, De Melo, Olarreaga, 2001, Hillman, 1982, or Brainard and Verdier, 1994). In a dynamic context, the compensation effect predicts that slow-growing industries will lobby more as the opportunity cost of lobbying will be lower.

To avoid the endogeneity of the inverse import penetration ratio, most authors have used instrumental variables. These include factor intensity characteristics, such as labour intensity (Grether, De Melo, Olarreaga, 2001), wage per worker (Trefler, 1993 and McCalman, 2004), capital-labour ratio (Grether, De Melo, Olarreaga, 2001 and McCalman, 2004) or human capital-labour ratio (McCalman, 2004).

The large number of variables used reflects difficulties in finding suitable measures and limited availability of some statistical data in analyzed countries. In our empirical part we will concentrate only on some of those variables, which are available for Poland.

Estimation technique and data

In our study we adopt a modified version of the empirical specification proposed by Goldberg and Maggi. In the original paper, the authors estimate equation (1) in a maximum likelihood framework. Since both variables, inverse import penetration and industry organisation dummy may be affected by the level of tariffs, there might be an endogeneity problem. This is resolved by using instruments for both variables in question.

The endogeneity problem is more severe in the case of inverse import penetration, which may be heavily affected by the tariff on the left hand-side of the equation (3). Also, what the Grossman and Helpman model cares about is trade flows that stem from the Heckscher-Ohlin type of comparative advantage. In the first stage model we construct the inverse import penetration ratio in the same fashion as Maggi and Goldberg (see equation 3 further below). In order to avoid the endogeneity problem, we regress the actual inverse import penetration ratio on capital share in output, investment share in output, labour share in output, employment level and investment level. In this way we project the theoretical inverse import penetration as a reflection of comparative advantage stemming from factor endowments. Following Maggi and Goldberg, we have also estimated an alternative version of the first stage model where we also included concentration indices and the share of subsidies in output.

In our case, the data on the industry contributions were unavailable, since in the 1990s there was no official way for the industry to contribute to political campaign. However, as the anecdotic evidence above shows, there were cases where trade policy was changed, obviously as a result of some interest groups pressure.

In the absence of direct measures of industry contributions, we have used similar variables to those used in literature, as a proxy for industry organization. These variables include: (i) Herfindahl concentration indices, (ii) capital-labour ratio (as we may expect that capital intensive industry may have more organised lobbies), (iii) export intensity (since export industries may receive special treatment by the government) and (iv) share of government subsides in the total value of sales.

The last variable requires some comments, since it has not been used in the other empirical studies. On one hand, subsidies could be treated as a variable equivalent to import duties, measuring the "remuneration" paid by the government to an industry in exchange for contributions. On the other hand, however, the receipt of subsidies by a given industry can reflect the level of political organization; organized sectors, where interest groups are stronger, can probably receive higher pecuniary benefits. In Poland, chambers of producers were not well organized, but trade unions were powerful, being able to influence governments' decisions. That is why we treat unit subsidies as a measure which can explain the level of industry organization.

We therefore construct four estimated versions of the variable I (one for each of the variables listed above) in the following way: it takes the value of 1 if the variable in question for a given industry is higher than the average for the given year and it takes the value of zero otherwise. Using the proxied variable is probably less prone to the endogeneity problem as using the contributions directly (also, Maggi and Goldberg in their sensitivity study, used non-instrumented I in the regression and obtained similar results).

Thus, the full model has the following form:

$$\frac{t_i}{1+t_i} e_i = \gamma \frac{x_i}{m_i} + \delta I \frac{x_i}{m_i} + \varepsilon_i \qquad (2)$$

$$\frac{x_i}{m_i} = \xi' Z_i + \mu_i \qquad , \qquad (3)$$

where t_i is the tariff, e_i is the elasticity of import demand, $\frac{x_i}{m_i}$ is the inverse penetration ratio, Z_i is the vector of instruments listed above, ε_i and μ_i are error terms. In the first stage we estimate equation (3) by OLS and in the second stage include the projected inverse import penetration ratio on the right hand-side of equation (2), which we estimate by OLS. We estimate two versions of the first stage model with concentration and subsidies excluded (model 1) and included (model 2). The results of first stage regressions are given in Table 1. Including concentration and subsidies does not add to the overall fit of the first stage model.

<<Place table 1 here>>

Data on both the conventional (MFN)[15] tariffs and preferential tariffs applied towards the EU countries[16] for Poland for most of the 1990s comes from the Foreign Trade Data

Center (CIHZ). These data were prepared in 8-digit Combined Nomenclature aggregation, which we aggregate into the 3-digit NACE using a Eurostat Concordance table. We use the Polish import data from Eurostat's Comext Database as weights. The output, export, import, subsidies, capital, labour, wage data comes from Polish Central Statistical Office (GUS). Data on Herfindahl indices were calculated using the micro-level GUS data in possession of National Bank of Poland. The data on import demand elasticities were unavailable for Poland. The study often used in the literature is the Shiells, Stern and Deardorff (1986). However, since not only it provides elasticities for a different economy and period but also uses SITC 3-digit classification, we have decided to set the elasticity of import demand for all sectors at -1. Our final dataset includes data for 87 NACE rev.1.1 3-digit sectors for the period of 1996-1999.

Estimation results

We have estimated the system of equations (2) and (3) using two alternative versions of equation (2). Since the variation of tariffs over time is rather low, we have decided not to use the fixed effects panel estimation. Instead we do a pooled OLS for all periods and for each period separately. The results of estimation in four different specifications (and model 1 as first stage regression) for MFN tariffs are presented in Table 2.

<< Place Table 2 here >>

Estimation of all four specifications of industry organization gives correct (i.e. in-line with the theory) parameter estimates in most of the periods. Herfindahl index of concentration, unit subsidy level and capital-labour (K/L) ratio seem to be the best proxies for the industry organization level. As stated before, the original Grossman-Helpman model requires the following to be true: $\gamma < 0$, $\delta > 0$ and $\gamma + \delta > 0$. In most cases, we find strong support for the first two hypotheses. However, it is true in all periods only for specifications using industry concentration indices as a proxy for industry organisation. In the case of specifications using capital-labour ratios and unit subsidies, we find only limited support for the second relation. In most cases we find only weak support for the third relation (the sum of two coefficients is not statistically greater than zero).

We can recover the structural parameters of the Grossman and Helpman model. As above: $\gamma = -\alpha_L/[(\beta/1-\beta) + \alpha_L]$ and $\delta = 1/[(\beta/1-\beta) + \alpha_L]$. After simple algebraic manipulation, we get: $\alpha_L = -\dfrac{\gamma}{\delta}$ and $\beta = \dfrac{1+\gamma}{1+\gamma+\delta}$. The calculated coefficients are listed in

last two columns of Table 1. We can see that both α_L and β are in most cases within the [0,1] range. The F-test statistic given in the one but last column corresponds to the test with the null hypothesis that $\beta=1$. This hypothesis is rejected in most cases at standard significance level (except the specification using export intensity).

<<Place Table 3 here>>

Results from estimations using model 2 as first stage regression are listed in Table 3 Similarly, models using concentration ratios and capital-labour ratios provide satisfactory results in terms of significance and signs of the explanatory variables. All three relations stemming from theory are satisfied (only weakly in the case of third relation), in most of the cases. However, the variabilities of calculated α_L and β values are visibly larger. In some cases, α_L takes values beyond the desired threshold (especially in the case of export intensity and unit subsidies proxies).

All above estimations were performed, as already indicated, using the conventional MFN tariff rate. We have also attempted to use the preferential rate applied to import from the EU as the explanatory variable. The respective regression results are presented in in tables 4 and 5. We can see that the Grossman and Helpman model finds very weak support using preferential data. Coefficients often have wrong signs and interpretation of the model is very limited. It may reflect the fact that the government's autonomy in preferential trade policy (and possible influence of lobbies) was much more limited in comparison to MFN duties. Surprisingly, contrary to the regressions using conventional tariffs, the most realistic results are obtained in the equation using unit subsidies as proxy for industry organization. It may thus be the case, that the industries that are the most active in influencing the government's pace of EU tariff reduction are also the ones that receive the largest unit subsidies.

<<Place table 4 here>>

What stems from the G-H model concerning determination of Polish trade policy? The estimated coefficients for the weight that the government attaches to social welfare (β) are close to 1 in all MFN cases under consideration. However, this estimate is statistically different from one (the test using Delta method rejects the hypothesis of equality to 1 at least 5% significance in most cases). This is a higher weight than in the original Maggi and Goldberg estimation (around 0.98). The parameter α_L suggests that a large fraction of the population (at least 50%) is represented by a lobby. What it suggests is that lobbies had a

smaller influence on trade policy than in the case of the United States, but this influence was still significant. Such low parameter estimates (while significant) stems from the fact, that overall tariff level is quite low (average tariff during the period under consideration is 12 percent for MFN duties and close to 2 percent for preferential tariffs).

<<Place Table 5 here>>

Conclusions

Our empirical implementation of the Grossman and Helpman model of endogenous trade policy determination deals with the problem of Polish trade policy in the late 1990s. We use the instrumental variable approach to estimate the model taking into account endogeneity of the regressors. Herfindahl index and unit subsidy level seem to be the best proxies for the industry organization level. The latter variable was used basing on the presumption that the sectors which are better organized can receive higher pecuniary benefits.

Our results are in line with the predictions of the theory. Most of our regressions support the theory and we find support for the significance of lobbies in formation of trade policy in Poland. The data seem to confirm findings from the Grossman-Helpman model much more in the case of conventional tariff than in the case of tariff on imports from the EU. There is some anecdotic evidence that lobbies had influenced Polish trade policy several times, and we believe that this evidence is confirmed in the calculations. The importance of lobbies is, however, significantly lower than in the case of the United States. The latter is in line with our expectations, given the limited period of functioning of market economy in Poland and smaller differences in ownership pattern.

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Footnotes

1. Position of Poland was different from that one of Hungary or Czechoslovakia. These two countries were also GATT members under communist regime, but had standard schedules of concessions. Their tariffs were "bound" at the beginning of economic transition.

2. When duty suspensions were also taken into consideration the average level was raised form 5.82 to 16.83 per cent Poland's Foreign Trade Policy 1993-1994 (1994), p. 63.

3. Kierzkowski, Okolski, Wellisz (1993), p. 56.

4. The opinion expressed by professor Stanislaw Wellisz, who acted, in the beginning of 1990's, as an economic adviser to Polish government.

5. Europe Agreement (1994).

6. Trade Policy Review Poland, Report by the Secretariat, 2000, p.24.

7. According to Grether, De Melo, Olarreaga (2001) FDI had an impact on the pattern of tariff structure in Mexico.

8. WTO Document: WT/DS/19/2, dated 11 September 1996.

9. Michalek (2005).

10. Poland's Foreign Trade Policy, 1995-1996, p.58-59.

11. Jasiecki, Moleda-Zdziech and Kurczewska (2000), p. 99-101.

12. Wesołowski ed. (1998), p. 140 and 182.

13. In fact, there was an additional equation in the model of Goldberg and Maggi (1999), related to the level of non- tariff protection.

14. Indeed, in the original model, an industry paying a contributions shall be treated as organized. It was impossible to apply this concept directly since all industries pay some contributions.

15. Conventional tariffs are "bound" duties applied to imports from all the WTO members.

16. Very similar tariffs were also applied to imports from EFTA and CEFTA members states.

Tables

Table 1 First stage estimation results of inverse of import penetration ratio

Variable	Model 1	Model 2
Capital share	-98.26	-304.00
	[1.09]	[2.62]***
Investment share	-2499.03	-2378.88
	[3.25]***	[3.08]***
Labour share	-2891.07	-3433.08
	[1.92]*	[2.00]**
Employment	0.01	0.01
	[1.84]*	[1.79]*
Investment	0.00	0.00
	[3.28]***	[3.35]***
Concentration		-217.58
		[1.43]
Subsidies		3533.68
		[2.66]***
Obs.	352	352
R-squared	0.19	0.19

Robust t statistics in brackets

* significant at 10%; ** significant at 5%; *** significant at 1%

Table 2 Estimation results using model 1 (employment excluded) as first stage

Periods	X/M		I*X/M(concentration)		Obs.	alpha_l	beta	Beta=1	p-val
All	-0.00008	[4.97]***	0.00012	[6.26]***	348	0.61	0.99988	39.24	0.00
1996	-0.00011	[3.23]***	0.00015	[3.73]***	87	0.70	0.99985	13.91	0.00
1997	-0.00009	[2.88]***	0.00015	[3.51]***	87	0.56	0.99985	12.29	0.00
1998	-0.00006	[2.29]**	0.00010	[3.10]***	87	0.63	0.99990	9.63	0.00
1999	-0.00005	[1.99]*	0.00010	[2.73]***	87	0.54	0.99990	7.48	0.01
	X/M		I*X/M(exp. intensity)		Obs.	alpha_l	beta	Beta=1	p-val
All	-0.00008	[3.85]***	0.00005	[2.34]**	348	1.41	0.99995	5.46	0.02
1996	-0.00010	[2.13]**	0.00004	[0.95]	87	2.23	0.99996	0.91	0.34
1997	-0.00008	[2.03]**	0.00006	[1.22]	87	1.37	0.99994	1.48	0.23
1998	-0.00007	[2.01]**	0.00006	[1.38]	87	1.26	0.99994	1.91	0.17
1999	-0.00006	[1.55]	0.00005	[1.21]	87	1.11	0.99995	1.47	0.23
	X/M		I*X/M(subsidies)		Obs.	alpha_l	beta	Beta=1	p-val
All	-0.00007	[4.28]***	0.00009	[2.75]***	348	0.72	0.99991	7.58	0.01
1996	-0.00009	[2.64]***	0.00012	[2.13]**	87	0.77	0.99988	4.52	0.04
1997	-0.00007	[2.56]**	0.00024	[2.90]***	87	0.31	0.99976	8.41	0.00
1998	-0.00006	[2.15]**	0.00010	[2.33]**	87	0.63	0.99990	5.42	0.02
1999	-0.00004	[1.48]	0.00004	[0.69]	87	1.12	0.99996	0.47	0.49
	X/M		I*X/M(K/L)		Obs.	alpha_l	beta	Beta=1	p-val
All	-0.00009	[6.01]***	0.00010	[4.95]***	348	0.87	0.99990	24.47	0.00
1996	-0.00010	[3.11]***	0.00007	[1.00]	87	1.48	0.99993	1.00	0.32
1997	-0.00010	[3.30]***	0.00013	[3.40]***	87	0.80	0.99987	11.56	0.00
1998	-0.00008	[3.07]***	0.00010	[3.29]***	87	0.81	0.99990	10.81	0.00
1999	-0.00007	[2.56]**	0.00010	[3.06]***	87	0.71	0.99990	9.33	0.00

Robust t statistics in brackets

* significant at 10%; ** significant at 5%; *** significant at 1%

Table 3 Estimation results using model 2 (employment included) as first stage

Periods	X/M		I*X/M(concentration)		Obs.	alpha_l	beta	Beta=1	p-val
All	-0.00008	[5.15]***	0.00011	[5.80]***	348	0.70	0.99989	33.70	0.00
1996	-0.00011	[3.31]***	0.00014	[3.72]***	87	0.78	0.99986	13.81	0.00
1997	-0.00009	[2.93]***	0.00012	[2.91]***	87	0.72	0.99988	8.48	0.00
1998	-0.00007	[2.51]**	0.00010	[3.15]***	87	0.67	0.99990	9.94	0.00
1999	-0.00005	[2.01]**	0.00010	[2.65]***	87	0.56	0.99990	7.00	0.01
Periods	X/M		I*X/M(exp. intensity)		Obs.	alpha_l	beta	Beta=1	p-val
All	-0.00008	[4.61]***	0.00006	[2.85]***	348	1.35	0.99994	8.10	0.00
1996	-0.00011	[2.56]**	0.00006	[1.33]	87	1.84	0.99994	1.76	0.19
1997	-0.00009	[2.70]***	0.00007	[1.59]	87	1.34	0.99993	2.52	0.12
1998	-0.00008	[2.33]**	0.00006	[1.59]	87	1.24	0.99994	2.53	0.12
1999	-0.00006	[1.75]*	0.00005	[1.37]	87	1.10	0.99995	1.87	0.17
Periods	X/M		I*X/M(subsidies)		Obs.	alpha_l	beta	Beta=1	p-val
All	-0.00007	[4.34]***	0.00006	[2.23]**	348	1.17	0.99994	4.95	0.03
1996	-0.00009	[2.70]***	0.00007	[1.70]*	87	1.39	0.99993	2.90	0.09
1997	-0.00007	[2.48]**	0.00008	[0.73]	87	0.90	0.99992	0.53	0.47
1998	-0.00006	[2.17]**	0.00007	[2.31]**	87	0.84	0.99993	5.36	0.02
1999	-0.00004	[1.52]	0.00003	[0.59]	87	1.39	0.99997	0.35	0.56
Periods	X/M		I*X/M(K/L)		Obs.	alpha_l	beta	Beta=1	p-val
All	-0.00009	[6.00]***	0.00009	[4.16]***	348	1.01	0.99991	17.30	0.00
1996	-0.00010	[3.14]***	0.00005	[0.70]	87	1.98	0.99995	0.49	0.49
1997	-0.00010	[3.41]***	0.00011	[3.07]***	87	0.97	0.99989	9.44	0.00
1998	-0.00008	[3.01]***	0.00009	[2.88]***	87	0.93	0.99991	8.31	0.00
1999	-0.00007	[2.47]**	0.00009	[2.84]***	87	0.77	0.99991	8.06	0.01

Robust t statistics in brackets

* significant at 10%; ** significant at 5%; *** significant at 1%

Table 4 Estimation results using model 1 as first stage (EU tariff)

Periods	X/M		I*X/M(concentration)		Obs.	alpha_l	beta	Beta=1	p-val
All	-0.00002	[2.78]***	-0.00001	[0.40]	349	-3.05	1.00001	0.16	0.69
1996	-0.00002	[1.67]*	-0.00004	[0.77]	88	-0.62	1.00004	0.60	0.44
1997	-0.00002	[1.11]	0.00002	[0.51]	88	1.04	0.99998	0.26	0.61
1998	-0.00002	[1.38]	0.00000	[0.06]	87	-14.00	1.00000	0.00	0.95
1999	-0.00002	[1.09]	0.00000	[0.24]	86	-3.45	1.00000	0.06	0.81

Periods	X/M		I*X/M(exp. intensity)		Obs.	alpha_l	beta	Beta=1	p-val
All	-0.00001	[1.23]	-0.00004	[2.70]***	349	-0.22	1.00004	7.29	0.01
1996	0.00000	[0.24]	-0.00007	[3.07]***	88	-0.05	1.00007	9.45	0.00
1997	0.00000	[0.07]	-0.00005	[1.67]*	88	0.02	1.00005	2.79	0.10
1998	-0.00001	[0.78]	-0.00003	[1.27]	87	-0.26	1.00003	1.61	0.21
1999	-0.00001	[0.82]	-0.00002	[0.96]	86	-0.31	1.00002	0.93	0.34

Periods	X/M		I*X/M(subsidies)		Obs.	alpha_l	beta	Beta=1	p-val
All	-0.00003	[3.64]***	0.00004	[2.87]***	349	0.69	0.99996	8.25	0.00
1996	-0.00003	[2.32]**	0.00007	[1.84]*	88	0.44	0.99993	3.37	0.07
1997	-0.00002	[1.39]	0.00011	[2.26]**	88	0.23	0.99989	5.11	0.03
1998	-0.00002	[1.76]*	0.00004	[2.25]**	87	0.64	0.99996	5.04	0.03
1999	-0.00003	[1.73]*	0.00003	[2.03]**	86	0.78	0.99997	4.13	0.05

Periods	X/M		I*X/M(K/L)		Obs.	alpha_l	beta	Beta=1	p-val
All	-0.00001	[1.37]	-0.00004	[2.98]***	349	-0.25	1.00004	8.85	0.00
1996	-0.00002	[1.65]	-0.00002	[0.48]	88	-1.47	1.00002	0.23	0.64
1997	0.00000	[0.04]	-0.00005	[1.52]	88	-0.01	1.00005	2.31	0.13
1998	0.00000	[0.65]	-0.00005	[2.12]**	87	-0.10	1.00005	4.50	0.04
1999	0.00000	[1.19]	-0.00005	[2.80]**	86	0.03	1.00005	7.85	0.01

Robust t statistics in brackets

* significant at 10%; ** significant at 5%; *** significant at 1%

Table 5 Estimation results using model 2 as first stage (EU tariff)

Periods	X/M		I*X/M(concentration)		Obs.	alpha_l	beta	Beta=1	p-val
All	-0.00003	[3.02]***	-0.00002	[0.87]	349	-1.56	1.00002	0.75	0.39
1996	-0.00002	[1.76]*	-0.00005	[1.08]	88	-0.47	1.00005	1.16	0.28
1997	-0.00002	[1.17]	0.00000	[0.03]	88	17.00	1.00000	0.00	0.97
1998	-0.00002	[1.51]	0.00000	[0.07]	87	12.59	1.00000	0.00	0.94
1999	-0.00002	[1.09]	-0.00001	[0.31]	86	-2.54	1.00001	0.10	0.76

Periods	X/M		I*X/M(exp. intensity)		Obs.	alpha_l	beta	Beta=1	p-val
All	-0.00001	[1.89]*	-0.00004	[2.56]**	349	-0.36	1.00004	6.53	0.01
1996	-0.00001	[0.76]	-0.00006	[2.74]**	88	-0.14	1.00006	7.48	0.01
1997	0.00000	[0.34]	-0.00005	[1.57]	88	-0.09	1.00005	2.48	0.12
1998	-0.00001	[1.02]	-0.00003	[1.23]	87	-0.34	1.00003	1.51	0.22
1999	-0.00001	[0.78]	-0.00002	[1.02]	86	-0.28	1.00002	1.04	0.31

Periods	X/M		I*X/M(subsidies)		Obs.	alpha_l	beta	Beta=1	p-val
All	-0.00003	[3.77]***	0.00003	[1.70]*	349	1.18	0.99997	2.89	0.09
1996	-0.00003	[2.25]**	0.00003	[0.98]	88	1.00	0.99997	0.97	0.33
1997	-0.00002	[1.36]	0.00004	[0.65]	88	0.55	0.99996	0.42	0.52
1998	-0.00002	[1.82]*	0.00003	[2.17]**	87	0.76	0.99997	4.70	0.03
1999	-0.00002	[1.73]*	0.00003	[2.07]*	86	0.73	0.99997	4.26	0.04

Periods	X/M		I*X/M(K/L)		Obs.	alpha_l	beta	Beta=1	p-val
All	-0.00001	[1.61]	-0.00005	[3.59]**	349	-0.24	1.00005	12.89	0.00
1996	-0.00002	[1.68]*	-0.00002	[0.77]	88	-0.92	1.00002	0.59	0.45
1997	0.00000	[0.11]	-0.00006	[2.04]*	88	-0.02	1.00006	4.17	0.04
1998	0.00000	[0.67]	-0.00005	[2.52]*	87	-0.09	1.00005	6.34	0.01
1999	0.00000	[0.96]	-0.00005	[2.91]**	86	0.02	1.00005	8.46	0.00

Robust t statistics in brackets

* significant at 10%; ** significant at 5%; *** significant at 1%