Political economy of tariff unification
The case of Russia

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ABSTRACT

The paper addresses political economy determinants of the import tariff reform in Russia during 2000–2001. For this purpose, Grossman–Helpman (1994) framework of endogenous trade policy analysis is developed to take into account government efforts to minimize losses in tariff revenues caused by misclassification of goods by importers. It was found that these revenues were in fact the leading priority in import regulation policy, followed by citizen welfare and contributions from business lobbies. This motivation ranking induced Russian government to apply lower tariff rates for goods which were likely to be misclassified more intensively, and higher tariff rates for goods which would have otherwise served for ‘hiding’ highly-taxed goods from import duties. However, there is still a substantial room for further liberalizing tariff unification, which can be a promising strategy to follow during the adjustment period after the WTO accession.

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Key words: political economy, endogenous protection theory, tariff regulation, policy formation in transition economy, trade policy in Russia.
NON-TECHNICAL SUMMARY

In 2000–2001, Russia experienced the major import tariff reform since trade liberalization of 1992. Its main characteristics were lowering the maximum tariff rate from 30 per cent to 20 per cent and unification of tariff rates within broad commodity classification groups. The result was a limited liberalizing tariff unification (i.e., simplification of tariff structure associated with a general decrease in tariff rates). Results of the tariff reform were built into the new Customs Tariff of 2002.

One of the key declared purposes of the reform was to generate additional budget revenues by limiting misclassification of higher-taxed imported goods for lower-taxed ones. In Russia, this problem appeared to be quite acute in the late 1990s, when both economic analysts and public officials complained of substantial losses in tariff revenues due to misclassification. International policy experience suggests three general receipts to fight import misclassification. These are complete tariff unification, limited tariff unification and administrative controls. Administrative controls, though necessary, can not solve the problem themselves, as tariff misclassification usually proliferates in corrupt administrative environment, and additional controls are likely to invite additional corruption. The most efficient policy option is complete tariff unification, as it eliminates any opportunity to make profits on misclassification. Such an option, however, is not common in the world practice (the most important exception being that of Chile). The reason is that complete tariff unification requires strong consensus among economic agents on tariff issues and/or government independence from private sector lobbying, which is rarely the case in the real world.

In this sense, limited tariff unification is a much more plausible option, as it allows balancing interests of industrial lobbyists, general population, and the government itself. Broadly speaking, there are three political economy motives influencing government decisions on tariff reform:

- political support and resource transfers from lobbying groups;
- general public welfare which affects electoral chances of the incumbent government;
- tariff revenues generated by tariff reform.

These motives can contradict each other. In particular, government efforts to maximize budget revenues and lobbying for sectoral protection can be detrimental to public welfare.

This paper assesses the impact of all three motives listed above on Russian import tariff structure established by Customs Tariff of 2002. Empirical study is based on Grossman–Helpman (1994) framework of endogenous trade policy analysis, which is further developed to take into account government efforts to minimize losses in tariff revenues caused by misclassification of goods by importers. It was found that these revenues were in fact the leading priority in import regulation policy, followed by citizen welfare and contributions from business lobbies. Concern about tariff revenues appears to be a rather important feature of Russian trade policy reform, in sharp contrast with the experience of transition countries of Central and Eastern Europe.
This motivation ranking induced Russian government to apply lower tariff rates to goods which were likely to be misclassified more intensively, and higher tariff rates for goods which would have otherwise served for ‘hiding’ highly-taxed goods from import duties. There are, however, important cases where government still applies too high tariff rates to intensively misclassified goods, especially in specific subsectors of chemical industry, machine-building, and food industry. This finding points to the significant room for further liberalizing tariff unification.

Good news for the consequences of this potential unification is that citizen welfare is ranked in government preference schedule higher than lobbying resources. This means that lobbying activities are not likely to dominate tariff policy, and thus it is likely to be welfare-improving. One can thus recommend further liberalizing tariff unification as a promising strategy to follow during the adjustment period after the WTO accession.
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POLITICAL ECONOMY OF TARIFF UNIFICATION:
THE CASE OF RUSSIA

1. THE PROBLEM

Trade policy plays two major roles in economic system. First, it protects national producers facing intensive foreign competition, and second, it provides government with financial resources to supplement ordinary fiscal revenues. Thus, when formulating strategy of trade policy reform, government of a transition country faces the problem of finding balance between two priorities, i.e., minimizing distortions induced by trade taxes, on the one hand, and minimizing losses in trade tax revenues, on the other. In particular, an important aspect of efficient trade policy reform has to do with creating incentives for importers to abandon different methods of trade tax evasion, including those of misclassifying trade articles subjected to higher tariffs for low–tariff ones.

In Russia, misclassification problem appeared to be quite acute in the late 1990s, when both economic analysts and officials of the State Customs Committee complained of substantial losses in tariff revenues due to misclassification. Among the most commonly cited examples were, e.g., misclassifying chicken (25 per cent \textit{ad valorem} tariff rate) for turkey (15 per cent rate), TV-sets (compound tariff rate with 30 per cent \textit{ad valorem} component) for consumer electrical machines (20 per cent \textit{ad valorem} tariff rate), flowers (25 per cent rate) for greenery (5 per cent rate). Given the fact that import tariff revenues constituted 9 to 11 per cent of total federal tax revenues in 1998–1999, widespread misclassification was generally considered to become rather dangerous for revenue-constrained government.\textsuperscript{1} To cope with this problem, it undertook a profound import policy reform in 2000–2001.

In September, 2000 Russian government approved the new Concept of customs and tariff policy. This Concept suggested (1) lowering the maximum tariff rate from 30 per cent to 20 per cent, (2) unification of tariff rates within broad classification groups, and (3) a set of administrative measures intended to fight illegal importation schemes. In November, 2000 the government revised the Customs Tariff in lines with this concept.\textsuperscript{2} The principal innovations in the tariff structure were as follows:

- abolition of the seven-grade system of \textit{ad valorem} import duties (0, 5, 10, 15, 20, 25, 30 per cent) in favor of four-grade one (5, 10, 15, 20); other \textit{ad valorem} rates and \textit{ad valorem} components of compound tariff rates can be applied only in exceptional cases\textsuperscript{3};
- large-scale unification of tariff rates within commodity groups with close consumer characteristics.

\textsuperscript{1} In fact, misclassification affects not only tariff revenues but also revenues from the VAT and excises on imported goods. Total revenues from these three import taxes equaled 24–25 per cent of federal tax revenues in 1998–1999 (External Sector of the Russian Economy..., 2000, p.91).

\textsuperscript{2} Government resolution no.886 approved on November 27, 2000.

\textsuperscript{3} Exceptions were still quite numerous. These were, e.g., some medications and special types of capital equipment (zero tariffs), chicken and cars (25 per cent rate), tobacco products (30 per cent rate), white sugar (40 per cent rate), etc.
The reform of 2000 profoundly affected ad valorem tariff rates for goods belonging to practically all two-digit commodity groups. In 2001, further steps in this direction followed. Import duties on 610 commodity groups were changed from October 1, 2001 and on 140 more commodity groups from January 1, 2002, with some 80 and 90 per cent of changes, respectively, being of liberalizing nature. The results of the tariff reform were built into the new Customs Tariff of 2002.4

The declared purpose of tariff reform was ‘to generate additional budget revenues without causing harm to domestic producers’5. The consequence was a limited liberalizing tariff unification (i.e., simplification of tariff structure associated with a unification of tariff rates within broad commodity classification groups as well as a general decrease in tariff rates). Three motives for import tariff unification are suggested in literature:

1. reduction of economic distortions resulting from high and differentiated tariff rates;
2. prevention of tariff revenue losses due to misclassification of goods by importers;
3. elimination of incentives for interest groups to lobby for protection.

The most remarkable tariff unification exercise of the last decades, that of Chile, is usually assumed to address motives (1) and (3).6 Official motivation for tariff reform in Russia seems to suggest motives (1) and (2). But can we rely on this statement in understanding the actual logic of tariff formation mechanisms in Russia? This question is rather important, as these mechanisms are likely to shape the structure of import tariff regulation during and after the WTO accession period.

To answer this question, we need a unified theoretical framework, which takes into account welfare consequences of trade policy, lobbying activities, and incentives to misclassify imports. Such a framework is put forward in section 2. It is based on Grossman–Helpman (1994) model of trade policy formation (henceforth G–H model), which is known to be the principal analytically rigorous framework for explaining political economy determinants of trade regulation structure. Earlier political economy models provided only a sort of a guide to political economy variables to be used for testing alternative hypotheses.7 By contrast, G–H model provides unambiguous predictions concerning the impact of particular variables on trade policy decisions.

The original G–H model, however, takes into account only the behavior of (1) lobbies interested in maximizing their welfare and (2) government interested in maximizing a weighted function of political contributions from lobbies and aggregate welfare of citizens. In this model,

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4 Newly established tariff structure contains 10666 10-digit tariff lines, with different goods being levied with ad valorem (in per cent of declared value), specific (in euros per physical unit) and compound (with both ad valorem and specific components) tariffs.
5 External Sector of the Russian Economy..., 2000, p.75–76.
7 In our previous works we relied on this less formalized framework of empirical analysis; see Afontsev, 2000; Afontsev, 2002. For an overview of ‘pre-Grossman–Helpman’ works on political economy of tariff protection, see Magee et al., 1989; Rodrik, 1995; on socioeconomic determinants of protectionism, see Mayda and Rodrik, 2001.
the government is able to get perfect information on import volumes and extracts tariff revenues equal to the actual value of imports multiplied by respective tariff rates. To address the phenomenon of misclassification, we need to introduce an additional group of agents, i.e., importers who can cheat the government by misclassifying goods they are trading in. This can result in actual tariff revenues falling short of tariff revenues due to a given tariff structure and actual import volumes. Incorporation of the tariff evasion argument into G–H model allows us to address all three motives for liberalizing tariff unification and develop an empirical model to analyze determinants of Russian tariff structure established by the reform of 2000–2001.

2. THEORETICAL FRAMEWORK

All individuals in an economy have identical preferences, identical labor endowments but different specific factor endowments. Individuals maximize utility function

\[ U = c_0 + \sum u_i(c_i), \]

where \( c_0 \) denotes consumption of exportable numeraire good, \( c_i \) denotes consumption of importable differentiated good \( i \), with \( u_i \) being differentiable, increasing, strictly concave function. The price of the numeraire good equals 1, and domestic price of differentiated good equals \( p_i \). Demand for each differentiated good \( d(p_i) \) implied by (1) is given by the inverse of \( u_i'(c_i) \). An individual with income \( y^k \) consumes \( c_i^k = d(p_i) \) of good \( i \), and the consumption of the numeraire good is given by \( c_0^k = y^k - \sum p_i d_i(p_i) \). Indirect utility function of an individual is thus

\[ V^k = y^k + \sum s_i^k(p_i), \]

where \( s_i^k(p_i) \) is the individual consumer surplus derived from differentiated goods, \( s_i^k(p_i) = u_i(d_i(p_i)) - p_i d_i(p_i) \).

Economy is populated with two types of agents, producers and importers. In a small open economy domestic price of differentiated good equals \( p_i = p_i^* + \tau_i \), where \( p_i^* \) is an exogenous world price of good \( i \), and \( \tau_i \) is a specific import tariff (\( \tau_i > 0 \)) or subsidy (\( \tau_i < 0 \)).

Production side. The numeraire good is produced using labor only with constant returns to scale and with input-output coefficient equal to one; thus, wages also equal one. Differentiated good is produced with labor and one sector-specific input, also with constant returns to scale. As wages equal one, returns on sector-specific factor used in production of good \( i \) depend on price of this good only: \( \pi_i = \pi_i(p_i) \). Domestic output of differentiated good is thus \( X_i = \pi_i'(p_i) \). Producers of each differentiated good and producers of the numeraire good represent fractions \( a_i \) and \( a_n \) of the total population, respectively. Their gross welfare is given by

\[ W_i = \pi_i + a_i [L + \sum s_i(p_i)], \]

\[ W_n = a_n [L + \sum s_i(p_i)] \]
where $L$ is total labor income (given that the total labor supply in the economy equals $L$ and wage rate equals 1), and $\Sigma s_i(p_i)$ is the aggregate consumer surplus.

If producers in a subset of differentiated good industries are politically organized, they can influence $r_i'$ by providing the government with political support measured by financial contributions $C_i$. Their behavioral strategy is thus to maximize net welfare $W_i - C_i$.

**Importers’ side.** Import operations are conducted using labor only, with wages being determined in the numeraire sector. Thus, legal income of importers equals

$$W_i^{\text{legal}} = a_m[L + \Sigma s_i(p_i)],$$

where $a_m$ is a share of importers in the total population.

Importers can also make illegal profits on misclassifying higher-taxed (lower-subsidized) articles for lower-taxed (higher-subsidized) ones. We assume that importers misreport only type of goods traded, not their value. Actual imports $M_i$ of each differentiated good equal difference between domestic consumption $d_i(p_i)$ and domestic production $X_i$:

$$M_i = d_i(p_i) - X_i.$$  

Denote the probability of audit over import operations in good $i$ by $\rho_i$ and the probability of revealing misclassification with audit by $\lambda_i$. When misclassification is revealed, importers are demanded to pay tariffs on actual imports and compensate audit costs $\Theta_i$; if audit reveals no misclassification, audit costs are born by the government. For a given specific tariff rate $r_i'$ importers choose the proportion $\xi_{ij}$ of each good $i$ misclassified for good $j$, so as the declared volume of imports $M_i'$ is

$$M_i' = M_i - \Sigma_j \xi_{ij}M_i + \Sigma_j \xi_{ji}M_j$$

and the taxed volume of imports is

$$M_i = M_i - \Sigma_j \xi_{ij}(1-\rho_i\lambda_i)M_i + \Sigma_j \xi_{ji}(1-\rho_j\lambda_j)M_j.$$  

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8 In a more sophisticated framework, this subset of industries can be modeled as a result of an endogenous selection process among lobbies willing to participate in bargaining over policy issues (on endogenous lobby formation, see Mitra, 1999; Felli and Merlo, 2002). In this paper we assume that such a subset had been already in place at the time of the tariff reform.

9 This is the major novelty of our approach. As far as we know, no attempt was made before to study the impact of importers’ opportunistic behavior on predictions of G–H model (though there are works taking into account importers’ lobbying behavior; see, e.g., Maggi and Rodriguez-Clare, 2002). To model tariff evasion, we relied on basic approaches of the tax compliance literature; for an overview, see Andreoni at al., 1998.
With imperfect monitoring over import operations \((\rho_i<1, \lambda_i<1)\), importers maximize their illegal income

\[
W_m^{\text{illegal}} = \Sigma \ell_i (M_i - M_l) - \Sigma \rho_i \lambda_i \Theta_i, \quad (9)
\]

the FOC’s with respect to \(\ell_i\) being

\[
\ell_i M_i' + M_i = \ell_i M_i' + M_i, \quad (10)
\]

where \(M_i'=\frac{dM_i}{d\ell_i}=\frac{dM_i}{dp_i}, M_i'=\frac{dM_i}{d\ell_i}=\frac{dM_i}{dp_i}\). Given that changes in \(M_i\) are in fact induced by changes in the appropriate \(\xi_{ij}\)’s, expression (10) is an aggregated presentation of conditions for individual welfare maximization.

Total welfare of importers \(W_m\) is the sum of its legal and illegal components. If importers are politically organized, they can attempt to influence tariffs by financial contributions \(C_{m1}\) and probability of audit by \(C_{m2}\) to maximize their net welfare \(W_m-C_{m1}-C_{m2}\).\(^{10}\)

**Government policy.** The government cares about welfare of citizens \((W)\), budget revenues \((R)\), and lobbying contributions:

\[
G = \alpha W + \beta \Sigma R + \Sigma C_i + C_{m1} + C_{m2}, \quad (11)
\]

where \(\alpha\) and \(\beta\) are relative weights attached by the government to citizen welfare and budget revenues (the respective weight of lobbying contributions equals one). Given (3)–(5) and (9),

\[
W = \Sigma \pi_i + L + \Sigma s_i(p_i) + \Sigma \ell_i (M_i - M_l) - \Sigma \rho_i \lambda_i \Theta_i. \quad (12)
\]

In turn, budget revenues equal tariff receipts minus net audit costs (i.e., total audit costs net of compensation paid by importers ‘caught in action’):

\[
R = \Sigma \ell_i M_i + \Sigma \rho_i \Theta_i (\lambda_i-1). \quad (13)
\]

We prefer to use not the menu auction political interaction model presented in the original Grossman–Helpman paper but the simplified Nash bargaining model proposed by Goldberg and Maggi, 1999, which generates just the same trade policy results. In this model, a Nash bargaining solution guarantees that equilibrium import policies maximize the joint surplus all parties involved. This means maximizing

\[
J = \alpha W + (1-\alpha)\Sigma (W_{i\in O}) + (1-\alpha)W_m + \beta \Sigma R, \quad (14)
\]

\(^{10}\) Note that in our model the only loser from misclassification is the government. Thus, producers have no incentive to influence probability of audit by lobbying.
where $O$ is a subset of organized industries. This gives us

$$
J = (\alpha + (1-\alpha)(a_O+a_m))L + [\alpha + (1-\alpha)I_i]S(p_i) + (\alpha+(1-\alpha)(a_O+a_m))S_r(p_i) + \\
+ \sum t^t_i M_i + (\beta-1)\sum t^t_i M_i + \sum \Theta_i \rho_i (\beta(\lambda_i-1)-\lambda_i),
$$

(15)

where $a_O$ is the share of population endowed with sector-specific factors represented by organized industrial lobbies and $I_i$ is a dummy variable which equals 1 if producers in the respective sector are organized and 0 otherwise.

The FOCs for maximizing (15) with respect to $t^t_i$ (or, which is the same, with respect to $p_i$) and $\rho_i$ are given by

$$
\frac{\partial J}{\partial t^t_i} = [\alpha + (1-\alpha)I_i]X_i + [\alpha+(1-\alpha)(a_O+a_m)](-d(p_i)) + \\
+ M_i + t^t_i M_i' + (\beta-1)M_i + (\beta-1)t^t_i M_i' = 0.
$$

(16)

$$
\frac{\partial J}{\partial \rho_i} = \beta(\lambda_i-1)-\lambda_i.
$$

(17)

As can be seen, both $t^t_i$ and $\rho_i$ are endogenous, i.e., they are determined by the interaction among government, producer lobbies, and importers maximizing their own objective functions. Expression (17) gives us the simple audit rule: $\rho_i=0$ for all $\lambda_i \leq \beta/(\beta-1)$ and $\rho_i=1$ for all $\lambda_i > \beta/(\beta-1)$. In its turn, (16) can be rewritten using (6) and (10) as

$$
(1-\alpha)(I_i-a_O-a_m)X_i + [\alpha+(1-\alpha)(a_O+a_m)]M_i + \beta t^t_i M_i' + \beta M_i = 0.
$$

(18)

Let

$$
m_i = M_i - M_i
$$

(19)

measure deviation of taxed from actual imports (quite naturally, $m_i$ is expected to be negative for higher-taxed goods, as importers are prone to underreport their imports, and positive for lower-taxed ones). Then

$$
-\beta t^t_i M_i = (1-\alpha)(I_i-a_O-a_m)X_i + [\beta-\alpha-(1-\alpha)(a_O+a_m)]M_i + \\
+ [\alpha+(1-\alpha)(a_O+a_m)]m_i.
$$

(20)
This yields

\[ t_i^* = \frac{(1-\alpha)(I_i-\alpha_s-a_m)}{\beta} \times \frac{X_i}{-M'_i} + \frac{\beta - \alpha - (1-\alpha)(\alpha_s-a_m)}{\beta} \times \frac{M_i}{-M'_i} + \frac{\alpha + (1-\alpha)(\alpha_s-a_m)}{\beta} \times \frac{m_i}{-M'_i}. \tag{21} \]

Divide both sides of (21) by \( p_i \). Using expressions for price elasticity of observed imports

\[ e_i = -M'_i \frac{p_i}{M_i}, \]

inverse observed import penetration \( z_i = \frac{X_i}{M_i} \), and the ratio of misclassified to actual imports \( \mu = \frac{m_i}{M_i} \), and noting that \( t_i' = t_i/(1+t_i) \) (where \( t_i \) is ad valorem equivalent of specific tariff rate \( t_i' \)), we have

\[ \frac{t_i}{1+t_i} = \frac{(1-\alpha)(I_i-\alpha_s-a_m)}{\beta} \times z_i + \frac{\beta - \alpha - (1-\alpha)(\alpha_s-a_m)}{\beta} \times \frac{1}{e_i} + \frac{\alpha + (1-\alpha)(\alpha_s-a_m)}{\beta} \times \frac{1}{\left( \frac{1}{\mu} + 1 \right) e_i}. \tag{22} \]

Expression (22) can be compared with the standard G–H formula:

\[ \frac{t_i}{1+t_i} = \frac{I_i}{1-\alpha} + \frac{\alpha S}{E_i} \tag{22'} \]

where \( Z_i = \frac{X_i}{M_i} \) is actual (rather than observed) inverse import penetration ratio, and \( E_i \) is price elasticity of actual imports: \( E_i = -M'_i \frac{p_i}{M_i} \).

The original G–H formulation (22') has the following implications for trade policy, given that \( \alpha<1 \):

(1) as the first term in the right-hand side expression in (22') is positive for \( I_i=1 \), tariff rates in organized sectors increase with inverse import penetration \( X_i/M_i \); that is, the larger the volume of domestic production, the more specific-factor owners have to gain from a given increase in prices, whereas the lower the volume of imports, the less the economy has to lose from protection;

(2) on the contrary, in unorganized industries protection rises with the level of import penetration, as the first term in the right-hand side expression is negative for \( I_i=0 \);

(3) higher protection level corresponds to lower import elasticity in a sector, as the latter means lower deadweight losses, and thus the government is more willing to grant protection to this sector.

\[ ^{11} \text{Note that } \mu \geq -1, \text{ as importers can not hide more goods than they actually import.} \]
In (22), we shift from actual to observed measures of inverse import penetration and price elasticities of imports, as well as introduce the additional variable capturing the effect of misclassification. If we are to produce predictions in lines with those of G–H model with $\alpha<1$, they are as follows:

1*) tariff rates in organized sectors increase with observed inverse import penetration $X_i/M_i$;

2*) in unorganized industries, protection decreases with the level of observed inverse import penetration;

3*) higher protection level corresponds to lower observed import elasticity;

4*) if deviation of observed imports from their actual level ($m_i$) is positive (i.e., other goods are misclassified for good $i$), higher absolute value of $m_i/M_i$ invites government to apply higher tariffs, while if $m_i$ is negative (i.e., imports of good $i$ are misclassified for imports of other goods), higher absolute value of $m_i/M_i$ corresponds to lower tariffs.

In fact, (4*) provides the political economy explanation of the endogenous tariff unification:

*Given imperfect monitoring over import operations and government concern over budget revenues, equilibrium import tariff structure will be more uniform to limit tariff evasion.*

In the next section we test propositions (1*)–(4*) using Russian tariff structure established by the reform of 2000–2001 as a touchstone.

2. EMPIRICAL EXERCISE

2.1. Model and Data

To test formulation (22) and its implications, we estimated the following econometric model:

$$
\frac{t_i}{1+t_i} = A_1 I_i \frac{z_i}{e_i} + A_2 \frac{z_i}{e_i} + A_3 \frac{1}{e_i} + A_4 \frac{1}{(\frac{1}{\mu}+1)e_i} + \epsilon_i, \quad (23)
$$

where $A_1=(1-\alpha)/\beta$, $A_2=(1-\alpha)(-a_0-a_m)/\beta$, $A_3=(\beta-\alpha-(1-\alpha)(a_0+a_m))/\beta$, and $A_4=(\alpha+(1-\alpha)(a_0+a_m))/\beta$ (note that $A_4=1-A_3$).

The focus of our study is on industries, not on commodity groups of the customs statistics, as only for industries we can find data on domestic output to calculate observed inverse import
penetration $z_t$. To obtain taxed import volumes for particular industries, we aggregated data on Russian imports (taken from the State Customs Committee database) for particular OKONKh industries.\footnote{OKONKh (the Unified Classificatory of Industries) was used to report production statistics up to 2002. The major data limitations we faced were as follows. First, Russian production statistics provide no information for some industries (the most important of them are industries producing electronic equipment and particular branches of non-ferrous metallurgy). Second, Russian trade statistics often combine items produced by different industries under the same commodity code, and sometimes we were unable to decompose them properly. To cope with the last problem, we aggregated some industries into groups for which total import flows can be calculated more accurately (there are 8 such groups in our database).}

The dependent variables used in (23) are *ad valorem* tariff rates and *ad valorem* equivalents of specific tariff rates in 2002, aggregated by industries using weights equal to shares of the respective commodity groups in industry imports.\footnote{In case of compound tariff rates we used the maximum of *ad valorem* component and *ad valorem* equivalent of specific component.}

Calculation of observed import demand elasticities presents a very complicated problem. The usual approach to get their values is based on the simultaneous dynamic estimation of supply and demand functions for imported and home-produced good varieties (see, e.g., Senhadji, 1998). This procedure can not be used in the Russian case due to the very short time period for which trade data are available (starting from 1994) as well as the lack of data needed for such an estimation at the level of disaggregated commodity groups. We can, however, estimate short-run elasticities using data on relative drop in imports, which resulted from the devaluation of 1998. As the scale of devaluation by far exceeded variation in other variables influencing import volumes, we can consider deviation of imports in Q2–Q4 1998 from the trend observed in Q2–Q4 1997 as induced mainly by exchange rate dynamics.\footnote{Of course, this is a rather strong assumption, but, if we take into account the degree of exchange rate variation, it seems to be quite reasonable for analyzing relative impact of price changes on import flows in the short run. We should note that the traditional method of estimating import elasticities also provides very rough results, with many elasticity coefficients turning out to be statistically insignificant or even having the wrong sign (Shiels, Stern and Deadorff, 1986). Despite this fact, they are widely used in research practice due to the lack of more reliable alternatives (see, e.g., Goldberg and Maggi, 1999).} These deviations can be calculated as

$$\Delta M_{i98Q4} = M_{i98Q4} - M_{i98Q2} \times \frac{M_{i97Q4}}{M_{i97Q2}}. \quad (24)$$

Then, using

$$e_i = -\frac{\Delta M_{i98Q4}}{\Delta r_{98Q2-Q4} \times M_{i98Q2}} \times r_{98Q2}, \quad (24)$$

we obtain an estimate of short-term import elasticities in respect of exchange rate, which can be interpreted as an approximation of short-term price elasticities of imports (in respect of exchange rate).\footnote{In fact, import elasticities in respect of exchange rate take into account both price and income effects of devaluation. To estimate (23) we need, however, only ordinal, not cardinal information on $\Delta z_t$.}

\footnote{\textsuperscript{12} OKONKh (the Unified Classificatory of Industries) was used to report production statistics up to 2002. The major data limitations we faced were as follows. First, Russian production statistics provide no information for some industries (the most important of them are industries producing electronic equipment and particular branches of non-ferrous metallurgy). Second, Russian trade statistics often combine items produced by different industries under the same commodity code, and sometimes we were unable to decompose them properly. To cope with the last problem, we aggregated some industries into groups for which total import flows can be calculated more accurately (there are 8 such groups in our database).

\textsuperscript{13} In case of compound tariff rates we used the maximum of *ad valorem* component and *ad valorem* equivalent of specific component.

\textsuperscript{14} Of course, this is a rather strong assumption, but, if we take into account the degree of exchange rate variation, it seems to be quite reasonable for analyzing relative impact of price changes on import flows in the short run. We should note that the traditional method of estimating import elasticities also provides very rough results, with many elasticity coefficients turning out to be statistically insignificant or even having the wrong sign (Shiels, Stern and Deadorff, 1986). Despite this fact, they are widely used in research practice due to the lack of more reliable alternatives (see, e.g., Goldberg and Maggi, 1999).

\textsuperscript{15} In fact, import elasticities in respect of exchange rate take into account both price and income effects of devaluation. To estimate (23) we need, however, only ordinal, not cardinal information on $\Delta z_t$.}
volume of imports of good $i$ in quarter $q$ of year $y$, $r_{98Q2}$ is the ruble-dollar exchange rate in Q2 1998 and $\Delta r_{98Q2-Q4}$ is the exchange rate change in Q2–Q4 1998). This procedure worked quite satisfactorily. Only eight elasticity estimates appeared to have the wrong sign, those being characteristic of either raw material or machine building industries (for the latter, the bulk of imported goods is known to be reported in Q4 of each year, irrespective of the time of signing contracts, and thus exchange rate fluctuations affect trade statistics only with a significant time lag). We dropped these industries from our sample, which finally included 150 non-agricultural industries (73.15 per cent of total imports in 199916).

To identify ‘organized’ industries, we used the standard assumption that the number of firms in an industry is positively correlated with the degree of free rider problem undermining cooperative outcomes,17 and experimented with different «threshold hypotheses» stating that industries are organized if the number of firms does not exceed certain level (for details, see Appendix 1). The most important question is related to the estimation of our measure of import misclassification variable $\mu$. In a two-country case, the most appropriate starting point would be to compare national import statistics with export statistics of a partner country (as was done, e.g., in Fishman and Wei, 2001, for trade between China and Hong Kong). As for trade between Russia and the ‘other world’, this option is clearly unavailable due to impossibility to get access to disaggregated trade statistics of all countries trading with Russia. Instead, we thus attempted to instrument inverse import penetration variable $z_i$ with the set of variables considered as major determinants of trade structure. Then, taking instrumented values for actual imports volumes, we used the appropriate formula for the misclassification variable $\mu$ (Appendix 2).

Such a procedure invites criticism for the following reasons. On the one hand, ‘missing trade’ (i.e., deviation of observed trade flows from predicted ones) can result not from misclassification of goods but from deficiencies of model used to predict trade (Trefler, 1995). On the other hand, our theoretical model presented in Section 2 rests on a rather strict assumption that importers misreport only type of goods, not their value, which is in fact equivalent to assuming that there is no smuggling. In the real world, however, significant part of Russian imports evades customs control at all, being either smuggled or transported by private individuals (so called ‘shuttle trade’ not registered by customs).

To cope with the first problem, we experimented with a number of model specifications, including those with variables of factor cost shares, factor productivity, import elasticities, and scale of production in various industries. Table A1 in Appendix 2 reports the best fit import elasticities, and the assumption that ordinal rankings of import elasticities in respect of exchange rate and prices are quite close in the short run seems to be realistic.

16 The choice of 1999 as a base year for calculating independent variables is quite natural given that it exactly preceded the tariff reform. Additional advantage of such a choice is that it precludes endogenous effects of tariff rates (taken from the Customs Tariff of 2002) on independent variables. Disaggregated data on production and production costs were taken from the following publications: Main Results of Industrial Production by Industries and Property Types. M.: Goskomstat, 2000; Costs of Production and Selling of Industrial Output in Q4 1999. M.: Goskomstat, 2000 (both are in Russian).

17 The classical formulation is of course Olson, 1965. Tough some recent developments raise doubts on this assumption (e.g., Pecorino, 1998), it is nevertheless widely used.
specification, which includes only factor cost shares and the scale of production. Two comments are necessary on this specification. First, statistical fit \( R^2 = 0.32 \) seems to be rather good for this class of dependent variables, which is known to be extremely ‘resistant’ to explanations and even approximations. Second, the fact that many coefficients are not statistically significant does not undermine the value of the model. As we are interested not in revealing particular determinants of trade structure, we did not approach an in-depth analysis of standard errors; for the purposes of our paper, approximation of trade flows is enough.\(^{18}\)

Even if we accept predicted values from the model presented in Appendix 2 as correct estimates of inverse import penetration, calculation of the import misclassification variable still suffers from the presence of smuggling and shuttle imports. As distinct from misclassification, these trade practices cause observed imports of higher-taxed goods to be lower than their actual imports without the corresponding increase in observed imports of lower-taxed goods over their actual volumes. In other words, almost all the difference between actual and observed imports for zero-taxed articles is due to misclassification, while the higher tariff rates, the higher share of this deviation is due to smuggling and shuttle imports. As in any case we are not able to differentiate statistically between misclassification of imports, on the one hand, and smuggling and shuttle imports, on the other, our procedure overestimates the misclassification variable \( \mu \) for higher-taxed goods. This is not to change our predictions concerning the impact of \( \mu \), however, as the government can be as much prone to reduce smuggling as it is to reduce misclassification. Having all this in mind, we can proceed with our econometric exercise.

### 2.2. Empirical Results

Table 1 presents comparative estimation results of our extended G–H model (23), standard-form G–H model with observed inverse import penetration, and no-threshold model denying the entire logic of G–H model. As can be seen, all variables of the extended G–H model have statistically significant signs. The striking finding is, however, that the only variable with the sign predicted by (1*)–(4*) is the inverse import elasticity.\(^{19}\)

For variables \( \frac{I_i}{\varepsilon_i} \) and \( \frac{z_i}{\varepsilon_i} \) to have ‘incorrect’ signs, the weight attached by the government to citizen welfare should exceed unity, i.e., it should be higher than the weight attached to lobbying contributions.\(^{20}\) On the contrary, the case of the variable \( \frac{1}{\left(1 + \frac{1}{\mu}\right)e_i} \) is completely counterintuitive, as its coefficient not only has the wrong sign but also contradicts the

---

\(^{18}\) Cf., e.g., Goldberg and Maggi, p.1152, Table A1 and especially Table A2, and comments on p.1145 concerning interpretation of coefficient signs.

\(^{19}\) The entire pattern breaks down for \( N=164 \). This can suggest that the ‘organizational threshold’ is likely to be somewhere between 129 and 164 firms per industry.

\(^{20}\) This result closely corresponds to conclusions of previous studies. E.g., Goldberg and Maggi, 1999, and Gawande and Bandyopadhyay, 2000 report that the weight attached to welfare of citizens is close to the weight of resource transfers from pressure groups (or even exceeds it).
logic of the model (this coefficient, denoted as $A_4$ in (23), had to equal unity minus coefficient on $\frac{1}{\epsilon_i}$, which is not the case).

### Table 1. Testing G–H Models of Tariff Formation

<table>
<thead>
<tr>
<th></th>
<th>Threshold 1 (N=70)</th>
<th>Threshold 2 (N=129)</th>
<th>No-threshold model</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Extended G–H</td>
<td>Standard G–H</td>
<td>Extended G–H</td>
</tr>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
</tr>
<tr>
<td>$I_{\frac{z_i}{\epsilon_i}}$</td>
<td>-0.000089</td>
<td>-0.000052</td>
<td>-0.000086</td>
</tr>
<tr>
<td></td>
<td>-5.666***</td>
<td>-4.666***</td>
<td>-5.789***</td>
</tr>
<tr>
<td>$\frac{z_i}{\epsilon_i}$</td>
<td>0.000047</td>
<td>0.000054</td>
<td>0.000045</td>
</tr>
<tr>
<td></td>
<td>4.639***</td>
<td>4.800***</td>
<td>4.820***</td>
</tr>
<tr>
<td>$\frac{1}{\epsilon_i}$</td>
<td>0.00056</td>
<td>0.00055</td>
<td>0.00055</td>
</tr>
<tr>
<td></td>
<td>3.038***</td>
<td>2.994***</td>
<td>2.994***</td>
</tr>
<tr>
<td>$\frac{1}{\mu}\frac{1}{\epsilon_i}$</td>
<td>-0.00051</td>
<td>-0.00049</td>
<td>-0.00049</td>
</tr>
<tr>
<td></td>
<td>-3.508***</td>
<td>-3.636***</td>
<td>-3.636***</td>
</tr>
<tr>
<td>$\chi^2$</td>
<td>77.44***</td>
<td>26.55***</td>
<td>101.69***</td>
</tr>
<tr>
<td>Log L</td>
<td>120.32</td>
<td>117.36</td>
<td>120.02</td>
</tr>
<tr>
<td></td>
<td>117.36</td>
<td>117.21</td>
<td>117.07</td>
</tr>
</tbody>
</table>

*Notes*. Maximum likelihood estimation with robust standard errors and suppressed constant term. Dependent variable: $t_i/(t_i+1)$, where $t_i$ is *ad valorem* tariff rate. $z$-statistics in parentheses. *** – 1 per cent confidence level, ** – 5 per cent confidence level, * – 10 per cent confidence level.

Given formulae for coefficient values presented in (23), and interpreting the misclassification term as a ‘violator’ of the model, we can solve for $\alpha$, $\beta$, and $(a_O+a_m)$. Using the best fit specification presented in column (3) of Table 1, we obtain

- $\alpha$ Relative weight attached to citizen welfare 1.000086
- $\beta$ Relative weight attached to budget revenues 1.000594
- $a_O+a_m$ Share of population represented by organized groups 52.2 per cent

Both $\alpha$ and $\beta$ are quite close to unity, suggesting that weights attached by the government to its political economy priorities are ‘almost’ the same. The leader is, however, budget revenues followed by citizen welfare, with lobbying contributions having the lowest rank in government preference schedule. Given the emphasis on budget revenues, counterintuitive sign on the misclassification term seems even more puzzling and invites further exploration. First of all, we can suspect that our empirical model (23) suffers from specification problems. As for only two observations in our industry database tariff rate was below 5 per cent, we used censored estimation technique to take into account (potentially) exogenous nature of this constraint (Table 2). Inverse import penetration variable for unorganized industries is no more statistically significant, but other effects are still present, including that of the misclassification variable.

### Table 2. Results of Censored Model Tests

<table>
<thead>
<tr>
<th></th>
<th>Threshold 1 (N=70)</th>
<th>Threshold 2 (N=129)</th>
<th>No-threshold model</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Extended G–H</td>
<td>Standard G–H</td>
<td>Extended G–H</td>
</tr>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
</tr>
<tr>
<td>$I_{\frac{z_i}{\epsilon_i}}$</td>
<td>-0.000089</td>
<td>-0.000052</td>
<td>-0.000086</td>
</tr>
<tr>
<td></td>
<td>-5.666***</td>
<td>-4.666***</td>
<td>-5.789***</td>
</tr>
<tr>
<td>$\frac{z_i}{\epsilon_i}$</td>
<td>0.000047</td>
<td>0.000054</td>
<td>0.000045</td>
</tr>
<tr>
<td></td>
<td>4.639***</td>
<td>4.800***</td>
<td>4.820***</td>
</tr>
<tr>
<td>$\frac{1}{\epsilon_i}$</td>
<td>0.00056</td>
<td>0.00055</td>
<td>0.00055</td>
</tr>
<tr>
<td></td>
<td>3.038***</td>
<td>2.994***</td>
<td>2.994***</td>
</tr>
<tr>
<td>$\frac{1}{\mu}\frac{1}{\epsilon_i}$</td>
<td>-0.00051</td>
<td>-0.00049</td>
<td>-0.00049</td>
</tr>
<tr>
<td></td>
<td>-3.508***</td>
<td>-3.636***</td>
<td>-3.636***</td>
</tr>
<tr>
<td>$\chi^2$</td>
<td>77.44***</td>
<td>26.55***</td>
<td>101.69***</td>
</tr>
<tr>
<td>Log L</td>
<td>120.32</td>
<td>117.36</td>
<td>120.02</td>
</tr>
<tr>
<td></td>
<td>117.36</td>
<td>117.21</td>
<td>117.07</td>
</tr>
</tbody>
</table>

*Notes*. Maximum likelihood estimation with robust standard errors and suppressed constant term. Dependent variable: $t_i/(t_i+1)$, where $t_i$ is *ad valorem* tariff rate. $z$-statistics in parentheses. *** – 1 per cent confidence level, ** – 5 per cent confidence level, * – 10 per cent confidence level.
<table>
<thead>
<tr>
<th></th>
<th>Threshold 1 (N=70)</th>
<th>Threshold 2 (N=129)</th>
<th>No threshold</th>
</tr>
</thead>
<tbody>
<tr>
<td>$I_{\frac{z_i}{e_i}}$</td>
<td>-0.000072</td>
<td>-0.000079</td>
<td>-0.000022</td>
</tr>
<tr>
<td></td>
<td>-2.339**</td>
<td>-2.234***</td>
<td></td>
</tr>
<tr>
<td>$\frac{z_i}{e_i}$</td>
<td>0.000023</td>
<td>0.000027</td>
<td>-0.000022</td>
</tr>
<tr>
<td></td>
<td>1.058</td>
<td>1.299</td>
<td>-0.959</td>
</tr>
<tr>
<td>$\frac{1}{e_i}$</td>
<td>0.00052</td>
<td>0.00054</td>
<td>0.00037</td>
</tr>
<tr>
<td></td>
<td>3.253***</td>
<td>2.872***</td>
<td>1.927*</td>
</tr>
<tr>
<td>$\frac{1}{(\frac{1}{\mu}+1)e}$</td>
<td>-0.00052</td>
<td>-0.00055</td>
<td>-0.00024</td>
</tr>
<tr>
<td></td>
<td>-2.752***</td>
<td>-2.245**</td>
<td>-0.924</td>
</tr>
<tr>
<td>$\chi^2$</td>
<td>75.11***</td>
<td>148.44***</td>
<td>4.62</td>
</tr>
<tr>
<td>Log L</td>
<td>53.38</td>
<td>53.60</td>
<td>52.01</td>
</tr>
</tbody>
</table>

Notes. Maximum likelihood estimation with robust standard errors and suppressed constant term. Dependent variable: $t_i/(t_i+1)$, where $t_i$ is *ad valorem* tariff rate. 109 uncensored observations, 41 left-censored observations (censoring level corresponds to 5 per cent tariff rate). $z$-statistics in parentheses. *** – 1 per cent confidence level, ** – 5 per cent confidence level, * – 10 per cent confidence level.

Literature suggests also that problems can be caused by the endogeneity of the elasticity variable and errors in its measurement, the proposed remedy being a ‘transfer’ of the elasticity term to the left-hand side of the equation (Goldberg and Maggi, 1999, p.1140). We followed this recommendation and tested models with rearranged elasticity term. The results are striking (Table 3). Our models almost boil down to the constant-only ones (log likelihood in constant-only models always exceeds 254), the threshold term as well as the misclassification term appear to be statistically insignificant, and the sign of the inverse import penetration turns to be negative and statistically significant, just as supposed by the ‘pre-Grossman–Helpman’ generation of *ad hoc* endogenous protection model. This invites us to experiment with these *ad hoc* specifications to compare their predictive value with that of our extended G–H model.
Table 3. Models with Rearranged Elasticity Term

<table>
<thead>
<tr>
<th></th>
<th>Threshold 1 (N=70)</th>
<th>Threshold 2 (N=129)</th>
<th>No threshold</th>
</tr>
</thead>
<tbody>
<tr>
<td>(I_{zi})</td>
<td>0.000016</td>
<td>7.21e-06</td>
<td>0.178</td>
</tr>
<tr>
<td></td>
<td>0.385</td>
<td>0.178</td>
<td></td>
</tr>
<tr>
<td>(z_i)</td>
<td>-0.000067</td>
<td>-2.780***</td>
<td>-0.000054</td>
</tr>
<tr>
<td></td>
<td>-2.780***</td>
<td>-2.452**</td>
<td>-1.392</td>
</tr>
<tr>
<td>(1 \left(\frac{1}{1+\mu}\right))</td>
<td>-0.0054</td>
<td>-0.0056</td>
<td>-0.0057</td>
</tr>
<tr>
<td></td>
<td>-1.067</td>
<td>-1.093</td>
<td>-1.258</td>
</tr>
<tr>
<td>Y-intercept</td>
<td>0.047</td>
<td>0.047</td>
<td>0.047</td>
</tr>
<tr>
<td></td>
<td>12.669***</td>
<td>12.694***</td>
<td>12.873***</td>
</tr>
<tr>
<td>(\chi^2)</td>
<td>29.18***</td>
<td>26.78***</td>
<td>23.42***</td>
</tr>
<tr>
<td>Log L</td>
<td>256.03</td>
<td>256.01</td>
<td>256.00</td>
</tr>
</tbody>
</table>

Notes. Maximum likelihood estimation with robust standard errors. Dependent variable: \(e_i/(t+1)\), where \(e_i\) is import elasticity and \(t\) is ad valorem tariff rate. Z-statistics in parentheses. *** – 1 per cent confidence level, ** – 5 per cent confidence level, * – 10 per cent confidence level.

For such an experiment, we used the following variables.\(^{21}\) First, we considered impacts of the inverse import penetration \(z_i\) and the organizational variable \(I_i\) (with threshold levels \(N=70\) and \(N=129\)) taken apart rather that together. According to the ‘pre-Grossman–Helpman’ logic, the impact of the former should be negative (industries with higher inverse import penetration need protection less and thus enjoy lower tariffs), while that of the latter should be positive (organized industries get higher tariffs). Second, we introduced our misclassification measure \(\mu\) directly rather than indirectly, as in (23), to test whether the government is in fact sensitive to the misclassification problem. Third, our \(ad hoc\) model includes several variables in lines with findings of the previous studies on endogenous tariff formation in Russia. Value of industry imports \(M_i\) controls for incentives to maximize tariff revenues by levying high tariffs on those items that account for the highest share of imports (in this case the government can receive the highest revenues from a given percentage increase in tariff rates, while at the same time abstain from increasing tariffs on other import articles and thus from inducing additional distortions in the economy). Number of companies (\(N_i\)) characterizes size and geographical dispersion of the industrial electorate, and at the same time provides an additional test for the traditional assumption that industries with more firms are less efficient in organizing pressure for higher tariffs. Finally, average output per firm (\(Avout\)) stands for average stakes of firms belonging to particular industries and their resources available for lobbying.

Table 4 presents results of estimating three variants of this \(ad hoc\) model. Only the misclassification variable \(\mu\) is statistically significant in all specifications; positive impact of the variable \(N_i\) corresponds to our previous findings (larger industrial electorate attracts higher protection), but it is not statistically significant in specifications with organizational variable \(I_i\). Coefficient on the inverse imports penetration variable is intuitive but not statistically

\(^{21}\) For a survey of general results of testing \(ad hoc\) political economy models, see Rodrik, 1995. For application of these models to trade policy in Russia, see Afontsev, 2000; Afontsev, 2002.
significant, while coefficient on the organizational variable is counterintuitive. Together with poor results of testing no-threshold specifications presented in the last columns of Tables 1–3, these findings strongly favor the G–H logic as compared with that of ad hoc model.\footnote{We also tested linear specifications of our ad hoc model using both OLS technique and two-stage SLS with inverse import penetration being instrumented with independent variables described in Appendix 2. The respective findings concerning the impact of individual variables on tariff rates correspond to those presented in Table 4.}

### Table 4. Ad Hoc Protection Model

<table>
<thead>
<tr>
<th></th>
<th>Variant 1</th>
<th>Variant 2</th>
<th>Variant 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>$z_i$</td>
<td>-3.22e-06</td>
<td>-1.57e-06</td>
<td>-2.33e-06</td>
</tr>
<tr>
<td></td>
<td>-1.626</td>
<td>-0.744</td>
<td>-1.169</td>
</tr>
<tr>
<td>$\mu$</td>
<td>1.271e-03</td>
<td>1.588e-03</td>
<td>1.474e-03</td>
</tr>
<tr>
<td></td>
<td>2.569***</td>
<td>3.297***</td>
<td>3.360***</td>
</tr>
<tr>
<td>$M_i$</td>
<td>1.25e-08</td>
<td>8.43e-10</td>
<td>5.72e-09</td>
</tr>
<tr>
<td></td>
<td>0.357</td>
<td>0.024</td>
<td>0.148</td>
</tr>
<tr>
<td>$N_i$</td>
<td>6.27e-06</td>
<td>4.62e-06</td>
<td>4.40e-06</td>
</tr>
<tr>
<td></td>
<td>1.950*</td>
<td>1.387</td>
<td>1.378</td>
</tr>
<tr>
<td>$I_i$ (N=70)</td>
<td></td>
<td>-0.023</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>-2.461**</td>
<td></td>
</tr>
<tr>
<td>$I_i$ (N=129)</td>
<td></td>
<td></td>
<td>-0.017</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>-1.560</td>
</tr>
<tr>
<td>$Av_{out}$</td>
<td>-3.48e-07</td>
<td>-1.74e-07</td>
<td>-2.36e-07</td>
</tr>
<tr>
<td></td>
<td>-1.425</td>
<td>-0.842</td>
<td>-1.107</td>
</tr>
<tr>
<td>$Y$-intercept</td>
<td>0.092</td>
<td>0.100</td>
<td>0.100</td>
</tr>
<tr>
<td></td>
<td>16.591***</td>
<td>15.209***</td>
<td>11.416***</td>
</tr>
<tr>
<td>$\chi^2$</td>
<td>21.97***</td>
<td>32.23***</td>
<td>32.29***</td>
</tr>
<tr>
<td>Log L</td>
<td>235.00</td>
<td>237.54</td>
<td>236.45</td>
</tr>
</tbody>
</table>

Notes. Maximum likelihood estimation with robust standard errors. Dependent variable: $t_i/(t_i+1)$, where $t_i$ is ad valorem tariff rate. $z$-statistics in parentheses. *** – 1 per cent confidence level, ** – 5 per cent confidence level, * – 10 per cent confidence level.

The major novelty of the ad hoc model is that import misclassification variable $\mu$ is statistically significant with a correct sign, testifying that the government does in fact pay attention to import misclassification and tries to limit it with more unified tariffs. With this result at hand, we can attempt to construct the ad hoc reformulation of the extended G–H model. As Table 5 shows, ad hoc introduction of the variable $\mu$ into the model supports the hypothesis that the government pays attention to the misclassification phenomenon in a more direct way than the extended G–H model predicts. The impact of this variable on tariff rates corresponds to our political economy argument for tariff unification and further stresses the fact that revenue considerations play the principal role in Russian import policy.

### Table 5. Ad Hoc Reformulations of the Extended G–H Model
<table>
<thead>
<tr>
<th></th>
<th>Threshold 1 (N=70)</th>
<th>Threshold 2 (N=129)</th>
</tr>
</thead>
<tbody>
<tr>
<td>$I_i \frac{z_i}{\epsilon_i}$</td>
<td>-0.000050</td>
<td>-0.000048</td>
</tr>
<tr>
<td></td>
<td>-4.346***</td>
<td>-4.646</td>
</tr>
<tr>
<td>$z_i$</td>
<td>0.000051</td>
<td>0.000049</td>
</tr>
<tr>
<td>$\epsilon_i$</td>
<td>4.476***</td>
<td>4.795***</td>
</tr>
<tr>
<td>$\frac{1}{\epsilon_i}$</td>
<td>0.00025</td>
<td>0.00025</td>
</tr>
<tr>
<td></td>
<td>1.664*</td>
<td>1.657*</td>
</tr>
<tr>
<td>$\mu$</td>
<td>0.0040</td>
<td>0.0040</td>
</tr>
<tr>
<td></td>
<td>3.079***</td>
<td>3.078***</td>
</tr>
<tr>
<td>$\chi^2$</td>
<td>38.49***</td>
<td>41.76***</td>
</tr>
<tr>
<td>Log L</td>
<td>124.93</td>
<td>124.77</td>
</tr>
</tbody>
</table>

Notes. Maximum likelihood estimation with robust standard errors and suppressed constant term. Dependent variable: $t_i/(t_i+1)$, where $t_i$ is ad valorem tariff rate. z-statistics in parentheses. *** – 1 per cent confidence level, ** – 5 per cent confidence level, * – 10 per cent confidence level.

3. CONCLUSIONS

Empirical study of import tariff structure established by Customs Tariff of 2002 showed that the leading priority in government tariff policy was budget revenues; they were followed by citizen welfare, with lobbying resources having the lowest rank in the government preference schedule. Concern about tariff revenues appears to be a rather important feature of Russian trade policy reform, in sharp contrast with the experience of transition countries of Central and Eastern Europe.

On the average, Russian government applies lower tariff rates for goods which are likely to be misclassified more intensively, and higher tariff rates for goods which would otherwise serve as ‘safe havens’ for hiding highly-taxed goods from import duties. There are, however, important cases where the government still applies too high tariff rates to intensively misclassified goods, especially in specific subsectors of chemical industry, machine-building, and food industry. This finding points to significant room for further liberalizing tariff unification.

Good news for the consequences of this potential unification is that citizen welfare is ranked higher in government preference schedule than lobbying resources. This means that lobbying activities are not likely to dominate tariff policy. One can thus recommend liberalizing tariff unification as a promising strategy to follow during the adjustment period after the WTO accession.

The principal question remains about the final destination of additional budget revenues made available by tariff reform. If they are used to produce valuable public goods, high weight placed by the government on budget revenues will be consistent with further raising citizen welfare. Otherwise, unproductive use of budget resources can make their increase less desirable. The most appropriate solution of this problem is to target expected revenue gains at the stage of planning tariff reform by stipulating particular budget lines whose financing will be raised with money made available by reform. In the real world, however, the practice of earmarking
revenues does not induce optimism, as it turns out much more a matter of promises than of actual policy. The second best option is thus to reduce burden of other distortive taxes by the sum of additional tariff revenues. This will reduce distortions generated by both trade and internal taxes, while keeping budget revenues constant, thus preventing additional distortive spending.

4. LITERATURE
Appendix 1. Threshold Hypotheses for Identifying Organized Industries

Figure A1 presents ranking of the first 100 industries in our database by the number of firms \( N \). We assume that industries with \( N \) below certain level are organized, while others are not. We used three such levels. The first and the second ones precede large increases in the number of firms at \( N=70 \) (47 ‘organized’ industries) and \( N=129 \) (61 industries). The third one corresponds to the ‘turning point’ at the diagram, after which the number of firms starts to rise sharply (\( N=164 \); 72 ‘organized’ industries).

Figure A1. Ranking of the First 100 Industries of the Database by Number of Firms
Appendix 2. Calculating the Import Misclassification Variable

To calculate our measure of import misclassification $\mu$, we need information on both observed and actual import volumes. The most obvious way to get actual import volumes (as they are unavailable from statistics) is to instrument the inverse import penetration variable $z_i \equiv X_i/M_i$ in 1999 with a standard set of variables used in trade structure analysis (see, e.g., Goldberg and Maggi, 1999). Using $\log(z_i)$ as a dependent variable, we obtained the following best-fit specification of the inverse import penetration model (Table A1).

### Table A1. Model for Inverse Import Penetration (linear regression with robust standard errors)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Description</th>
<th>Coefficient and t-statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Labor intensity</td>
<td>Share of wages in P&amp;SC</td>
<td>0.023 (1.422)</td>
</tr>
<tr>
<td>Capital intensity</td>
<td>Share of amortization payments in P&amp;SC</td>
<td>-0.056 (-1.089)</td>
</tr>
<tr>
<td>Fuel consumption</td>
<td>Share of fuels in P&amp;SC</td>
<td>0.016 (0.930)</td>
</tr>
<tr>
<td>Energy consumption</td>
<td>Share of energy in P&amp;SC</td>
<td>-0.047 (-3.199**)</td>
</tr>
<tr>
<td>Consumption of mineral resources</td>
<td>Payments for mineral resources as a share of P&amp;SC</td>
<td>0.089 (2.140**)</td>
</tr>
<tr>
<td>Land intensity</td>
<td>Payments for land re-cultivation as a share of P&amp;SC</td>
<td>-0.595 (-0.760)</td>
</tr>
<tr>
<td>Lumber consumption</td>
<td>Payments for lumber as a share of P&amp;SC</td>
<td>0.495 (4.318***)</td>
</tr>
<tr>
<td>Water consumption</td>
<td>Payments for water as a share of P&amp;SC</td>
<td>0.220 (1.458)</td>
</tr>
<tr>
<td>Scale of production (log)</td>
<td>Average output per enterprise, $$/th (log)</td>
<td>0.570 (4.791***)</td>
</tr>
<tr>
<td>Y-intercept</td>
<td></td>
<td>-1.144 (-2.569**)</td>
</tr>
<tr>
<td>$R^2$</td>
<td></td>
<td>0.320</td>
</tr>
<tr>
<td>F-statistics</td>
<td></td>
<td>10.09 (***</td>
</tr>
</tbody>
</table>

P&SC – production & selling costs.
*** – 1 per cent confidence level.

Fitted values from the estimated model (converted from logs) were taken as approximations of the actual inverse import penetration $Z_i \equiv X_i/M_i$. Then $\mu$ was calculated using the simple formula

$$\mu = \frac{m_i}{M_i} = \frac{Z_i}{z_i} - 1.$$