The Impact on Ukraine of Joining the WTO: Subsidies vs. Antidumping in Ferrous Metallurgy*

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Abstract

The goal of our research is to study Ukraine’s accession to the WTO referring to one particular sector discussed most hotly in this context: metallurgy. Ukrainian metallurgy has two remarkable features: from one side, steel producers receive substantial subsidies; from the other side, Ukrainian metallurgical exports have been permanently brought under antidumping investigations. The purpose of this research is to study effects of both cases and find impact on metallurgy and total welfare. The results of partial equilibrium model shows that on balance the total gains for the Ukrainian economy are calculated to be above USD 343 million, or 1.1% of GDP; hence, in the subsidies-antidumping duel there is no trade-off for Ukrainian economy.

Keywords: Ukraine, WTO, antidumping, subsidization, metallurgy

JEL Classification: F13, F14, L61, H21, H25

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**Contents**

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction</td>
<td>1</td>
</tr>
<tr>
<td>The problem</td>
<td>1</td>
</tr>
<tr>
<td>Research objectives</td>
<td>2</td>
</tr>
<tr>
<td>Importance of the study</td>
<td>2</td>
</tr>
<tr>
<td>Overview of Ukrainian metallurgical sector</td>
<td>4</td>
</tr>
<tr>
<td>Literature review</td>
<td>7</td>
</tr>
<tr>
<td>The model</td>
<td>9</td>
</tr>
<tr>
<td>Estimation of demand and supply elasticities</td>
<td>9</td>
</tr>
<tr>
<td>Welfare analysis</td>
<td>10</td>
</tr>
<tr>
<td>Effect of canceling subsidies</td>
<td>11</td>
</tr>
<tr>
<td>Effect of reducing antidumping</td>
<td>14</td>
</tr>
<tr>
<td>The data</td>
<td>16</td>
</tr>
<tr>
<td>Results</td>
<td>17</td>
</tr>
<tr>
<td>Conclusions and policy implications</td>
<td>25</td>
</tr>
<tr>
<td>Appendix</td>
<td>27</td>
</tr>
<tr>
<td>Bibliography</td>
<td>31</td>
</tr>
</tbody>
</table>
Introduction

The problem

Ukraine (as well as number of other post-soviet countries) is still en route of elaborating its foreign trade policy. Some options are highly desirable, but not realistic to achieve in the near decades (accession to the EU), other options are easier to implement, but will not bring much benefits (locking in trade with technologically outdated CIS countries). In such conditions, WTO membership is the most practical, essential and probably necessary requisite for integration with the world economy and realizing the benefits from it. Although the net effect is expected to be significantly positive, WTO membership brings some adjustment costs and path to become a member usually is quite complicated.

The process of Ukraine’s accession to WTO system started in 1993, when the official application was submitted; later in 1994 a Memorandum on the Foreign Trade Regime of Ukraine was send to WTO Secretariat. Since that time till the end of 2004 11 Working Party meetings were held. From 1997 till year 2000 the process was practically halted, while some positive changes were traced since 2001 and by the end of 2004 Ukraine signed 25 bilateral agreements with members of the WTO. The main barriers for entry are following: First of all, although there is a strong evidence of improved income after such trade reforms, policy makers are reluctant to changes. From one side, they may expect that benefits will appear after their political cycle, while costs will be experienced much earlier. Moreover, there is a great deal of uncertainty about the nature, magnitude and structure of changes in the economy and not much work was done to investigate this topic in Ukraine. Second barrier comes from the fact that although social effect from WTO membership will be positive, private costs in some spheres pushes leaders of powerful enterprises to lobby against reforms. As Stigler noted in his article on theory of economic regulation (Stigler, 1971), public is too diverse to organize and influence politicians, while industrialists can do it much easier.

The issue, discussed most hotly in connection with possible Ukraine’s membership in WTO, is metallurgical sector. Opinions differ diametrically opposite, from hopes that WTO will help Ukraine to develop the sector and obtain larger share of the world market to fears that metallurgy will not be able to compete equally and will cease. Such reaction is not surprising, taking into account the size and importance of the metallurgy for Ukrainian economy and world market. Ukraine is the 7th biggest steel producer in the world. The sector contributes 20% to Ukrainian GDP growth and employs more then 500 thousand workers; its share in total industrial production is around 28%, while share of metallurgy in Ukrainian exports is around 50%. Ukraine
is a large international player, being 4th biggest steel exporter in the world after Japan, Russia and Germany.

Ukrainian metallurgy has two remarkable features, which have conflicting impact and make this sector extremely interesting topic for economic research, from the both, theoretical and empirical sides of investigations. From one side, metallurgy receives substantial level of subsidization. Apart from implicit subsidies (debt write-offs, inter-enterprise soft budget constraints, cross-subsidization by lower prices for intermediate goods), selected metallurgical enterprises (especially large exporters) get ad-valorem subsidies. These subsidies take form of significant reduction of Enterprise Profit Tax (EPT), number of other taxes and obligations and amounted to around USD 500 m during last two years. From the other side, Ukrainian metallurgical exports have been permanently brought under antidumping investigations. Since 1993 till 2001 there were 43 cases of filing suits against Ukrainian metallurgical products. So far antidumping investigations have been or are being conducted in the USA, Canada, the EU, Venezuela, China, India, Mexico, Turkey, Thailand, Indonesia, etc. The major accusations are dumping and government subsidies.

**Research objectives**

If Ukraine is to join the WTO, it is stated there will be a trade-off: Ukraine will have to abandon subsidies (which are claimed to have substantial positive impact on industry growth), but at the same time will be able to fight against antidumping (“unfair” pricing) duties and especially against countervailing (“unfair” subsidies) duties. The purpose of this research is to study the effect of both cases and find impact on metallurgy and total welfare. Our hypothesis is that subsidization of metallurgy is not desirable for Ukraine. Moreover, we will argue that subsidies are not optimal even if we measure their consequences for metallurgical sector alone. Specifically for Ukraine, we will point that subsidies for steel producers anyway are partially shifted to foreign suppliers of intermediate good (imported energy resources from Russia). Indeed, optimal trade policy for Ukraine should be either small export tax or free trade, thus, there is no trade-off. Hypothesis will be checked with partial equilibrium model under assumptions of “small” and “big country”.

**Importance of the study**

Project has important policy implications. Ukraine’s accession to WTO is often blocked by leaders of powerful enterprises, including steel producers. Lobbying for subsidization is justified by claims that otherwise not only metallurgy, but the whole economy will be down. Results of the
research may show that such fears are unjustified, Ukraine and even steel producers taken alone, will win from changing trade policy. Canceling subsidies and more intensive WTO accession process should be the goals of the policy in Ukraine.
Overview of Ukrainian metallurgical sector

Industry overview

As was mentioned above, Ukraine is one of the largest steel producers in the world, it is ranked as 7th steel producers after China, Japan, USA, Russia, Germany and South Korea. During USSR times lion share of steel was supplied to former Soviet Republics. After obtaining independence, Ukraine was left with high-capacity metallurgical sector, well exceeding internal demand of the country. Such factors lead to the significant export orientation of the metallurgy: over 80 % of production is supplied to the foreign markets.

Totally, there are 14 major producers in the sector and several dozens of smaller enterprises in Ukraine. Although sector suffered from losses during 1998 crisis and output of steel decreased, financial performance, as well as output performance significantly improved during following years (see Graph 1).

Metallurgical sector of Ukraine uses mostly outdated technology of open hearth method, over 60% of steel is produced by this technique. Unsurprisingly that production is inefficient and very energy consuming. Energy expenses account for more than 40% of total production costs, comparing with 20% in Great Britain. Another consequence of open hearth production is low quality of steel.

Ukrainian metallurgical enterprises work well below their capacity level. Production of rolled metal and cast iron reaches only 50% of its potential level, while production of tubes - only 17%.

Industry employs over 500 thousand workers, but labor productivity is very low. Comparing with other countries, production of crude steel per worker per year equals to 590 tons in the EU, 430 tons in Brazil, 350 tons in South Africa and only 75 tons in Ukraine.
Metallurgical exports initially were oriented to CIS countries, but later on spread to new foreign markets. As of today, exports to CIS constitute only 4% of total exports, while major trade partners for Ukrainian ferrous metallurgy situated in Asia and Middle East (see Graph 2). Exports to advanced countries as a rule are restricted by protectionists’ policies, as we see, share of exports to the EU is only 6%, while share of exports to North America comes to modest 2% of total exports.

Subsidies

Ferrous metallurgy sector was traditionally considered to be strategically important for Ukraine and at all times received one or another form of support from the state. At the first half of 1990’s government granted to metallurgical enterprises various subsidies, tax exemptions and other privileges. In 1999 government of Ukraine adopted program of state support for metallurgy. This programs acts according to the Law “On Conducting an Economic Experiment at Ore-mining and Metallurgical Enterprises of Ukraine”. As was stated by Ukrainian officials, the aim of the program is to increase output and government revenues through granting tax privileges to the sector. Enterprises, wishing to participate in the “experiment” had to apply to the government; originally, 67 enterprises participated, represented virtually all sector.

The program foresees following privileges for metallurgical enterprises:

- Reduced enterprise profit tax (EPT). Tax rate for participating enterprises was set at the level of 30% of general tax rate. Thus, instead of existing EPT rate of 30% metallurgical enterprises enjoyed 9%. Later on EPT rate for metallurgical companies was set at the level of 15%. This tax exemption was conditional upon investing saved profit taxes to the working capital.
- Eliminated Roads Fund fee
- Reduced Innovation Fund fee (50% of general rate)1
- Reduced fee for environmental pollution
- Write-off of all fines for delay of tax payments prior to July 1999; after July 1999 reduced rate (50%) for fines apply.

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1 In 2000 Roads Fund fee and Innovation Fund fee were abolished for all enterprises.
Among all privileges, mentioned above, reduction of EPT was certainly the largest one. In 2002 Cabinet of Ministers worked-out project of the program of the metallurgical sector development till 2010. According to this program, the state will continue granting tax privileges to the metallurgical companies and even may grant direct transfers of public funds to the sector.

**Antidumping**

Existing program of state support contradicts GATT/WTO requirements, particularly Article I 1.1 a) (ii) – subsidies and compensation and Article III.2 – national regime of domestic taxation. Not surprisingly, Ukrainian ferrous metallurgy companies faced with increasing number of antidumping investigation, while government support was one of the major reasons for filing the suites. It is worth noting, that Ukraine does not has a status of market economy and antidumping duties are applied to the whole country, not certain enterprises.

Totally, between 1993 and 2001 there were initiated 43 cases of antidumping investigations against Ukrainian ferrous metallurgy. As can be seen from Graph 3, the major countries, which initiated investigations, were in Latin America and North America (15 and 11 cases correspondingly). Size of antidumping duty varied considerably from case to case: from 9% to 96%.

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**Graph 3**
**Number of Antidumping Investigations Against Ukrainian Metallurgy Exports, 1993-2001**
Literature review

In this part of the paper we would like to put case of Ukrainian metallurgy into the context of theoretical discussion of strategic trade policy and see what the theory suggests us.

By accepting subsidization, policy of Ukrainian government goes in line with the logic of well-known Brander-Spencer model (Brander and Spencer, 1985). In this paper authors argue that countries often perceive themselves as being in competition with each other for profitable international markets. In such conditions export subsidies can appear as attractive tool for improvement of relative position of a domestic firm. They model firm behavior as a Cournot duopoly with one domestic firm and one foreign firm, producing identical product. According to their findings, export subsidies will increase domestic exports and reduce output of foreign firm; lower the world price of the good and increase domestic profit and lower foreign profit. Dixit and Kyle (1985) applied this model to competition between Boeing and Airbus and concluded that for this case aggressive trade policy can help domestic producer. Their arguments were as follows: Suppose that if either Boeing or Airbus will produce a wide-bodied aircraft, the company will get profits, but if both of them will enter the market, they will lose due to the sunk cost. In this case, let’s say European government can promise to give subsidy to Airbus that will pre commit it to enter the market, while Boeing will stay away. As a result, Airbus will not only enjoy the subsidy, but will also capture larger market share; European income will increase at the expense of American one. Indeed, further research has showed that arguments for aggressive trade policy are probably too weak to go beyond Boeing-Airbus case.

Lets start from general issues. Brander and Spencer assume Cournot behaviors of firms, while Eaton and Grossman (1986) showed that if firms engage in Bertrand competition, the sign of the trade policy should be reversed from subsidy to export tax. Since type of competition can hardly be determined in our case, this finding seriously undermines arguments in favor of subsidy. Further, robustness of “subsidy advise” is weak if we depart from two firms assumption. Dixit (1984) argues “an export subsidy in a Cournot equilibrium is optimal so long as the number of firms is not too large”. Klette (1994) shows that if there is more than one domestic firm, subsidy is not desirable, while export tax can increase profits. In Ukraine there are 14 large metallurgical enterprises, plus a number of smaller specialized companies (Pikovskiy, 2000), that also decreases value of arguments for subsidization. Helpman and Krugman (1989) summarize these arguments, stating “When competition is Bertrand, an export tax is always optimal; even when competition is Cournot, a tax rather than a subsidy raises welfare, unless the domestic industry is highly concentrated.”
Specific features of Ukrainian metallurgy also do not support subsidization. First of all, one third of production costs is contributed by energy resources, imported from Russia (Mazur, Ivanov, 2001). As was stated by Chang and Chen (1994) and Ishikawa and Spencer (1996), if significant share of intermediate goods is imported, subsidy to a final good is shifted to foreign suppliers; as later noted, “export subsidy policy is never worthwhile from a domestic viewpoint”. Besides that, we should take into account that Ukraine produces steel products that are generally of low quality (Grischenko, 2000). Donnenfeld and Mayer (1997) argue that in this case voluntary export restraints may be socially desirable.

To sum up, we see that subsidization of steel producers is not optimal trade policy for Ukraine. Indeed, small export tax may increase social welfare. The logic for this argument is as follows. Under large country assumption, foreign export demand curve for Ukrainian steel is downward sloping. In order to maximize profits, it is necessary to lower price and increase demand for exports till the point where marginal cost equals marginal revenue rather than demand curve (point 2 instead of point 1, see graph below). Export tax allows to meet this optimal point. The rate of the tax is lower, the less effect Ukraine has on foreign market; free trade is optimal if country is “small” (Helpman and Krugman, 1989).

Graph 5. Optimal trade policy
The model

Two basic approaches, which can be used for empirical testing in the proposed research, are general equilibrium approach and partial equilibrium analysis.

Computable General Equilibrium (CGE) models rest on the general equilibrium economic theory, satisfying Walras law of global expenditures–income identity. Although CGE models are powerful method for policy shifts analyses, they also have several important drawbacks, which make them not very pertinent for proposed research. First of all, CGE models require intensive data inputs. This problem becomes even more severe in Ukrainian conditions where data is mostly not in electronic form and methodology of data collection is not transparent. Second, what is most important for us is that proposed research is sector-specific, while CGE models are not perfect tool for this type of analyses as industry specific information is often lost. Thus, it is advisable for this research to step away from general equilibrium and use partial equilibrium analyses.


Estimation of demand and supply elasticities

As a first step, it is needed to estimate demand and supply elasticities for metallurgical sector of Ukraine. There are two possibilities to get these estimates.

First, ad hoc estimates could be obtained by appealing to estimates of other authors who did work on the steel industry. Some results were fund in works by Grygorenko (2001), Hufbauer (2003), Irwin (2000), Reinert and D.W. Roland-Holst (2000).

Second method is much more rewarding and involves estimating elasticities through equilibrium model with simultaneous equation techniques. Estimation is similar to those, done by Irwin (2000) and Grygorenko (2001).

We advance estimations by obtaining data on largest steel plants of Ukraine and using panel data procedure.

Demand function. Demanded quantity depends on own price for steel products, price at the world market (US price is taken as a proxy\(^2\)), price for substitute (here we take price for non-

\(^2\) We do not consider steel price in US as a price for competing imports to Ukraine (there is virtually no US imports of steel to Ukraine), but rather as indicator of world price.
ferrous products) and level of economic activity in the international markets (can be approximated by EU or USA GDP growth). To take into account partial adjustment of demand for steel to endogenous shocks, we include lagged output. All data is monthly, series available from 1997.

\[
\log(Q_t) = \alpha_0 + \alpha_1 \log(p_{t}^{UA}) + \alpha_2 \log(p_{t}^{US}) + \alpha_3 \log(p_{t}^{NF}) \\
+ \alpha_4 \log(\Delta USAGDP_t) + \alpha_5 \log(Q_{t-1}) + \gamma_t
\]  

(1)

where

- \( Q \) - volume of Ukrainian ferrous metallurgy output
- \( p^{UA} \) - Ukrainian price for ferrous metallurgy products (weighted average)
- \( p^{US} \) - the US price for ferrous metallurgy products (weighted average)
- \( p^{NF} \) - the US price for non-ferrous products (weighted average)
- \( USAGDP \) - real GDP growth of United States

**Supply function.** Besides own price, supply of Ukrainian steel depends on cost components: prices for electricity, coal, gas and average wage in the industry. Again, for partial adjustment we take lagged output. All data is monthly, series available at least from 1997.

\[
\log(Q_t) = \beta_0 + \beta_1 \log(p_t) + \beta_2 \log(p_{t}^{Electr}) + \beta_3 \log(p_{t}^{Coal}) \\
+ \beta_4 \log(w_t) + \beta_5 \log(Q_{t-1}) + \gamma_t
\]  

(2)

where

- \( Q \) - volume of Ukrainian ferrous metallurgy output
- \( p \) - Ukrainian price for ferrous metallurgy products (weighted average)
- \( p^{Electr} \) - price for electricity
- \( p^{Coal} \) - price for coal
- \( w \) - average wage in the metallurgical industry

Equilibrium:

\[ Q_t^s = Q_t^D \]  

(3)

Equilibrium model can be solved with the help of 2SLS method.

**Welfare analysis**

Having estimations for demand and supply elasticities, it will be possible to proceed further and determine changes in prices and volume of output and then producer, consumer and total
surpluses. Doing so, we make assumptions of “small” and “big country” and separate analysis of subsidies and antidumping.

**Effect of canceling subsidies**

Let's start from *small country assumption*. Elimination of subsidy does not have effect on world price, as well as does not change domestic price and consumption. Supply function of metallurgical sector pivots leftward, while export supply shifts from $X_{Sub}^{UA}$ to $X^{UA}$ (see Graph 5). Domestic output will contract.

**Graph 5. Effect of cancelling subsidies, small country assumption**

Cancellation of subsidies will result in smaller output of domestic metallurgical enterprises and their surplus will contract.

\[ \Delta PS = -(a + b) \]  

(4)

Producer surplus can be quantified according to following equation:
\[ \Delta PS = -\left[ 1 - \frac{1}{\varepsilon + 1} \right] \left[ Q_{0\ Sub}^{S} P_{Sub}^{UA} - Q_{0}^{S} P_{W}^{W} \right] \]  

where \( Q_{0\ Sub}^{S} \) - supply of Ukrainian steel without subsidies, \( Q_{Sub}^{S} \) - supply with subsidies, \( P_{W}^{W} \) - world price, \( P_{Sub}^{UA} \) - domestic price, taking into account subsidy, \( \varepsilon \) is elasticity of supply.

Consumers are not affected, since neither price nor domestic consumption will change \(( \Delta CS = 0 )\), while government revenues will increase by the amount of subsidy, which now will be kept in the budget:

\[ \Delta GR = a + b + c = Q_{Sub}^{S} \left[ P_{Sub}^{UA} - P_{W}^{W} \right] \]  

Total surplus is positive and comes from removal of deadweight losses, that were result of inefficiency of resource allocation. The gain is equal to Harberger triangle.

\[ \Delta TS = c \]  

**Large country assumption** is more complicated. With elimination of subsidies the price will set at the world level; quantities supplied and demanded will adjust to it. Graphically, the process will start from upward pivot of Ukrainian total and export supply functions. Graph 5 shows these pivots as well as corresponding changes in prices, quantities supplied and demanded.

Let’s now turn to the calculus part. Subsidization of Ukrainian metallurgy affects first of all domestic prices and then, due to “big country” assumption prices at the world market. To incorporate this effect in our analysis, we have to know world elasticity of steel (available from International Institute for Steel and Iron) and proceed in three-stage way: 1) find out effect of canceling subsidies on Ukrainian steel price and quantity supplied; 2) using world elasticity for steel, estimate what effect it would have on the world market; 3) taking into account this information, specify estimates for Ukraine.

Subsidies can be incorporated into prices by finding value of subsidies per unit of output. The formula for relating changes in price and quantity supplied is as follows:

\[ \Delta Q^{S} = \left( \frac{\Delta P_{W}^{W}}{P_{0}^{W}} \right) \varepsilon Q_{0}^{S} \]  

here \( Q_{0}^{S} \) - supply of Ukrainian steel without subsidies, \( P_{0}^{W} \) - world price without subsidies, \( \varepsilon \) is elasticity of supply.

Knowing initial and final prices and quantities, as well as elasticity of supply and demand, it becomes possible to calculate alterations in producer and consumer surpluses according to following equations (the derivation is given in Appendix).
Where $Q^D_1$ is the volume of steel demanded by domestic consumers with subsidies.

$Q^S_1$ is the volume of steel supplied to domestic market at price $P^W_{Sub}$.

Without subsidies producers will have to compete at world prices, change in their surplus is:

$$
\Delta PS = -(a + b + c) 
$$

(9)

Producer surplus will change according to following formula:

$$
\Delta PS = -\left[1 - \frac{1}{\epsilon + 1}\right]\left[Q^S_{Sub} P^U_{Sub} - Q^S_0 P^W_0\right] 
$$

(10)

where, $Q^S_{Sub}$ - supply of Ukrainian steel with subsidization, $P^U_{Sub}$ - Ukrainian price with subsidies.

Consumers will face higher prices, as world and domestic prices will increase. Change in their surplus is equal to the sum of $e$, $f$ and $g$:

$$
\Delta CS = -(e + f + g) 
$$

(11)
Change on their surplus will be:

$$\Delta CS = \left[1 - \frac{1}{\gamma + 1}\right] \left[Q^D_0 P^W_{Sub} - Q^D_0 P^W_0\right]$$  \hspace{1cm} (12)

where $Q^D_0$ - quantity demanded without subsidization, $Q^D_1$ - volume of domestic demand with subsidies, $P^W_0$ - world price without subsidies, $P^W_{Sub}$ - world price with subsidies.

Change in the government revenue will be equal to the amount of subsidies

$$\Delta GR = a + b + c + d + e + f + g + h + i + j = Q^{Sub}_S \left[P^{UA}_{Sub} - P^W_{Sub}\right]$$  \hspace{1cm} (13)

Finally, change in total surplus is given as the sum of changes in surpluses above:

$$\Delta TS = EG + TOT = (k + l + d) + (h) + (j) + (i)$$  \hspace{1cm} (14)

Where $(k+l+d)$ is efficiency gain as a result of decrease in deadweight losses of producers; $h$ – is increase in demand efficiency coming from demand at world prices and reduction of excess domestic consumption; $j$ is increase in producers efficiency as a result of production at world prices and increase of output to optimal level; $i$ –is terms of trade gain.

**Effect of reducing antidumping**

In contrast to subsidies, which act from supply side, reduction in the countervailing duties will serve as a positive exogenous shock from demand side (upward shift of the world demand function as shown on Graph 7). Technically, we can consider it as increased demand for Ukrainian steel in international markets, and have to start not from price effect, but from quantity effect of increased demand. This idea is supported by the fact that almost all countervailing duties take form of quotas or prohibitive duties and losses from them in the Ukrainian statistics are reported in physical terms, i.e. millions of tons.

Estimation for final change in quantities and prices is similar to those, described in subsidies part. Equation for determining price change is given as:

$$\Delta P^W = \left(-\frac{Q^D_0}{\Delta Q^D_0}\right) \gamma P^W_0$$  \hspace{1cm} (15)

Using analogous technique, we derive following equations for estimation of changes in surpluses (detailed derivation is in Appendix).

Producers will be able to expand their output, corresponding gain in the producer surplus is equal to the sum of areas $a$, $b$ and $c$:

$$\Delta PS = a + b + c$$  \hspace{1cm} (16)
Producer surplus will change according to the next equation:

$$\Delta PS = \left[ 1 - \frac{1}{\varepsilon + 1} \right] \left[ Q^S_1 P^W_1 - Q^S_0 P^W_0 \right]$$  \hspace{1cm} (17)$$

Consumers will be negatively affected by higher prices, change in their surplus will be

$$\Delta CS = -[a + b]$$  \hspace{1cm} (18)$$

Change in consumer surplus:

$$\Delta CS = \left[ 1 + \frac{1}{\gamma + 1} \right] \left[ Q^D_0 P^W_0 - Q^D_1 P^W_1 \right]$$  \hspace{1cm} (19)$$

Change in total surplus is given by the sum of previous two values:

$$\Delta TS = \Delta PS + \Delta CS$$  \hspace{1cm} (20)$$

Graph 7. Effect of reducing antidumping
The data

First of all, we need data for estimation of supply and demand elasticities. For demand function we take monthly data for volume of Ukrainian ferrous metallurgy products and weighted average price for ferrous metallurgy products from State Statistical Office (Derzhkomstat). Reliable data exists from 1996 (previously there was change in methodology of classification). Data for largest steel enterprises is available from Information Agency “DerzhZovnInform” and Ministry of Economy. Monthly time series for the US price for ferrous and non-ferrous metallurgy products are available from www.economagic.com. Figures for real EU or USA growth (quarterly) can be taken from Eurostat or any other large statistical office. Estimating supply function, we will have to get data for prices of electricity, gas and average wage in the metallurgy, all from State Statistical Office, monthly.

Data for subsidies for metallurgical enterprises is available from State Tax Administration and State Statistical Office. Based on total amount of subsidies, it is possible to calculate subsidies per unit of production and incorporate it in prices. Ministry of Economy has at its disposal data on antidumping investigations against Ukraine. The data is organized in case-by-case way and covers country, which filed an investigation, subject of investigation, classification of product and size of quota or amount of duty. It is possible to get estimations of the lost exports for each case. Aggregating this data, we can get total amount of restricted exports per year.
Results

**Estimation of demand and supply elasticities**

Estimation of demand and supply elasticities was done according to the specifications, described in the previous section. We used monthly data for the period 1997-2001 and were able to disaggregate it by the largest steel producers in the country. There were 12 major enterprises and their share in total exports exceeded 80%, thus representing whole sector fairly good.

List of enterprises is as follows:

1. Krivorozhstal
2. Ilyich Metal Plant
3. Azovstal
4. Zaporozhstal
5. Alchevsk Metal Plant
6. Dzerzhinskogo Metal Plant
7. Petrovskogo Metal Plant
8. Yenakiyevskiy Metal Plant
9. Makeyevskiy Metal Plant
10. Donetskiy Metal Plant
11. Dneprspetsstal
12. Libknehta Metal Plant

Thus, we have panel data and use Two stage least squares method to estimate demand and supply functions. Here we present only main results. Please inquire for full estimation output.

Results for the **demand function** are consistent with what was expected prior to regressions: all coefficients have expected signs and statistically significant (see Table 1).

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<td>(4.118068)***</td>
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<td><strong>Price for ferrous metallurgy products</strong></td>
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<td>Lagged exports</td>
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<td>(0.026541)***</td>
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</table>

Note: standard errors are in parentheses; * - 10% significance level, ** - 5% significance level, *** - 1% significance level

Growth of world economy is a momentous factor of increasing demand for Ukrainian steel; as prices for steel substitutes grow, we observe increase of demand as well. What is most
important for us is elasticity of demand. Regression results show that 1% increase of price for ferrous metals leads to 0.77% decrease of its consumption. Here we should note that demand is surprisingly inelastic for Ukrainian products, a feature that we will discuss more in the next section.

Results for supply function are well acceptable as well. Price increase for major cost components of steel production (wages, electricity and coal) lead to contracted supply of ferrous metallurgy products. Average wage coefficient has comparatively less statistical significance (significant at 7% level), but this phenomenon can be easily understood since wages tended to be heavily misreported. Finally, coefficient for supply elasticity is equal to 0.5 and statistically significant at 1% level.

Table 2. Regression results, supply function

<table>
<thead>
<tr>
<th>Variables (all in log)</th>
<th>log($Q^s_t$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>16.07465 (1.615447)***</td>
</tr>
<tr>
<td>Price for ferrous metallurgy products</td>
<td>0.525137 (0.027179)***</td>
</tr>
<tr>
<td>Price for coal</td>
<td>-1.932558 (0.302111)***</td>
</tr>
<tr>
<td>Price for electricity</td>
<td>-1.039721 (0.113416)***</td>
</tr>
<tr>
<td>Average wage in metallurgy</td>
<td>-0.133724 (0.074085)*</td>
</tr>
<tr>
<td>Lagged exports</td>
<td>0.304140 (0.032768)***</td>
</tr>
</tbody>
</table>

Note: standard errors are in parentheses; * - 10% significance level, ** - 5% significance level, *** - 1% significance level

Welfare analysis

Before turning to the calculus part of the welfare analysis, big questions to answer are how reasonable “big country” assumption and optimal export tax hypothesis and whether we should accept it in our case.

Just looking at the global figures of the steel production in the world, Ukraine does not seem to be a significant player. Share of Ukraine’s production is 4% of total world steel production, while exports account for 8% of total world exports. Nevertheless, lets look behind these figures using Carlton and Perloff (1994) as guidance for defining degree of market power.

First of all, we should define what is the “steel market” we are looking at. As was pointed earlier, remarkable feature of Ukrainian metallurgy is open hearth production method and, as a
consequence, low quality of steel. Despite negative impression that “low quality steel” definition can bring, this characteristic of Ukrainian metallurgy has its positive sides: according to Pikovsky (2000), due to lower quality and, hence, lower price, Ukrainian producers were able to capture and secure sizable share of world market niche for such kind of products. Currently Ukraine is number seven as a steel producer in the world, giving way to China, Japan, USA, Russia, Germany and South Korea. Grischenko (2000) notes that out of these large competitors only China and Russia produce significant amount of steel for the same market segment. Other countries, although being large producers per se, operate at the market for higher quality and price steel.

Second, we should define the extent of the geographic market. It is true that EU or USA are huge markets for steel, while Ukrainian exports contribute only 1% to consumption of steel in the EU and 0.3% in North America. At the same time role of Ukraine at its major markets is quite significant: Ukrainian steel satisfies 31% of steel consumption in the Middle East region (it accounts for more then 50% of imported steel in these countries), 13% of consumption in Africa (22% of steel imports), 10% in Asia without China (14% of steel imports) and 10% in Central and Eastern Europe (17% of steel imports). Thus, although Ukraine surely should not be considered as a big player at the markets of advanced countries in Europe and North America, its sizable penetration on a number of other markets and quite large volume of these markets should be taken into account.

Last, but not the least, Carlton and Perloff (1994) advise to look at the indices of the market power. The most simple of them is Lerner Index, which in our case shows sizable market power of Ukrainian steel producers.

\[
\frac{P - MC}{P} = -\frac{1}{\gamma} = 1.3
\]  

(21)

Those facts do not allow us to define degree of market power precisely and another thoughtful analysis is needed here; but at least they advocate for not relaxing assumption of “big country” completely. We think that it is worth considering both cases and comparing the results.

The same relates to the optimal export tax. One more point to add here: our estimates show that Ukrainian producers operate at the inelastic part of the demand curve and elasticity of demand is equal to \(-0.77\). In such situation producers do not maximize their profits: it is better for them to increase price and decrease output (decreasing costs at the same time) until reaching elastic part of the demand curve. There is no evidence that Ukrainian producers follow such strategy and Carlton and Perloff (1994) give justification for this case: “If a monopoly takes advantage of an inelastic
portion of its short-run demand curve and raises its prices, its consumers are more likely to substitute away from its product in subsequent periods. Thus a monopoly may operate in the inelastic portion of its short-run demand curve to avoid making its long-run demand curve too elastic.” Ukrainian producers are likely to realize this and try to avoid raising prices and making their customers indifferent between buying Ukrainian steel and same-price but higher-quality steel from other producers. We cannot refrain from noting that small export tax theoretically should lead to more efficient situation.

To finalize, we believe that it is worth to keep large country assumption and compare it with small country case. Optimal export tax might also be studied, but more for theoretical sake. Apart from the fact that it should be rather small and not worth-while to introduce from the prospective of its implementation costs, we realize that mentioning it to policy makers will not be accepted and even can be quite dangerous, diverting them from the rest of our findings. Thus, keeping in mind its theoretical meaning, we will not refer to export tax in following empirical calculations.

**Effect of canceling subsidies**

Now we proceed to the calculations of the gains from canceling subsidies to the metallurgical sector of Ukraine and use our estimates of elasticities, as well as compare them with “ad hoc” estimates from other studies. We start from small country case. Producer surplus is shown to contract by USD 287 m, consumers are not affected in here, while government receives additional surplus of USD 578 m, which comes from re-channeled subsidy funds. Total surplus amounts to USD 291 m (see Table 3).

**Table 3. Effect of cancelling subsidies, small country assumption, USD m**

<table>
<thead>
<tr>
<th>γ</th>
<th>ΔPS</th>
<th>ΔCS</th>
<th>ΔGR</th>
<th>ΔTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.52</td>
<td>-287</td>
<td>0</td>
<td>578</td>
<td>291</td>
</tr>
<tr>
<td>“Ad hoc” estimates</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.13^t</td>
<td>-97</td>
<td>0</td>
<td>578</td>
<td>481</td>
</tr>
<tr>
<td>1.26^*</td>
<td>-471</td>
<td>0</td>
<td>578</td>
<td>107</td>
</tr>
</tbody>
</table>

Under large country assumption effect from canceling subsidies is smaller. In this case producers and government will face the same changes in their surpluses as under small country
assumption, but on top of it consumers will loose due to higher domestic prices and change in their surplus is estimated to be - USD 30 m. Correspondingly, total surplus comes to USD 261 m.

Table 4. Effect of cancelling subsidies, large country assumption, USD m

<table>
<thead>
<tr>
<th>$\varepsilon$</th>
<th>$\gamma$</th>
<th>$\Delta PS$</th>
<th>$\Delta CS$</th>
<th>$\Delta GR$</th>
<th>$\Delta TS$</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.52</td>
<td>-0.77</td>
<td>-287</td>
<td>-30</td>
<td>578</td>
<td>261</td>
</tr>
</tbody>
</table>

“Ad hoc” estimates

|  0.13$^\dagger$ | -2.00$^\dagger$ | -97         | -25         | 578         | 456         |
|  1.26$^*$        | -1.00$^*$    | -471        | -28         | 578         | 79          |

Effect of reducing antidumping

As was stated in the previous section, reduction in antidumping procedures should be considered as a positive shock from the demand side, which leads to the increased demand for Ukrainian steel. In order to estimate this positive shock we have to start from the opposite and assess what Ukrainian exports lose from antidumping now. This task is enormously difficult, taking into account all variety of factors that influence demand on international markets. In this study we decided to employ rather simple method, which is also used by Ministry of Economy of Ukraine and can give reasonably fair estimations. The main idea is to compare how the volume of certain export item has changed before and after applying antidumping duty. Data, which is needed for it consists of two parts: First of all it is the list of antidumping and countervailing measures with rather detailed pointing of affected trade items. We present reduced form of such list in Appendix; full form is available also. Second, it is the data on exports for several periods and with detailed disaggregation of trade items as well. Such data is available from the Ministry of Economy of Ukraine. Having estimated volume of exports with and without antidumping investigations (i.e. \( Q_0^D \) and \( Q_1^D \) in our narration) we will proceed with welfare analysis according to formulas, derived in previous section.

In the study we will compare exports for 2000 and 2001. In 2001 countries of North America, Russia, Columbia, Turkey and Egypt filed 15 antidumping suits against Ukrainian metallurgical exports, detailed list is given in Appendix A.5. As a result, exports of all types of steel products under investigations declined, comparing to 2000. Totally, exports of selected products were 2716 thousand metric tons in 2000, but only 1425 thousand metric tons in 2001, or 1291 thousand metric tons of decline. Now, having estimated volume of exports with and without antidumping investigations, we step to welfare calculations and present results in Table 5 below.

Table 5. Effect of reducing antidumping, USD m

<table>
<thead>
<tr>
<th>( \varepsilon )</th>
<th>( \gamma )</th>
<th>( \Delta PS )</th>
<th>( \Delta CS )</th>
<th>( \Delta GR )</th>
<th>( \Delta TS )</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.52</td>
<td>-0.77</td>
<td>92</td>
<td>-10</td>
<td>82</td>
<td></td>
</tr>
</tbody>
</table>

“Ad hoc” estimates

<table>
<thead>
<tr>
<th>( \varepsilon )</th>
<th>( \gamma )</th>
<th>( \Delta PS )</th>
<th>( \Delta CS )</th>
<th>( \Delta GR )</th>
<th>( \Delta TS )</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.13(^t)</td>
<td>-2.00(^t)</td>
<td>31</td>
<td>-8.9</td>
<td>22.1</td>
<td></td>
</tr>
<tr>
<td>1.26(^*)</td>
<td>-1.00(^*)</td>
<td>151</td>
<td>-10.1</td>
<td>140.9</td>
<td></td>
</tr>
</tbody>
</table>

Gains of producers constitute USD 92 m, consumers will be worse of by USD 10 m from increase of prices, and total welfare gains come to around USD 82.
Comparing both effects

Now we have all welfare calculations available and can compare both effects. Estimations are presented in Table 6.

Table 6. Cancelling subsidies and reducing antidumping, USD m

<table>
<thead>
<tr>
<th>ε</th>
<th>γ</th>
<th>Effect of canceling subsidies</th>
<th>Effect of reducing antidumping</th>
<th>Total effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.52</td>
<td>-0.77</td>
<td>-287</td>
<td>92</td>
<td>-195</td>
</tr>
<tr>
<td>Producers</td>
<td></td>
<td>-287</td>
<td>92</td>
<td>-195</td>
</tr>
<tr>
<td>Consumers</td>
<td>-30*</td>
<td>-30</td>
<td>-10</td>
<td>-40</td>
</tr>
<tr>
<td>Government</td>
<td>578</td>
<td>578</td>
<td>0</td>
<td>578</td>
</tr>
<tr>
<td>Total</td>
<td>261</td>
<td>82</td>
<td></td>
<td>343</td>
</tr>
</tbody>
</table>

0.13 | -2.00 |

| Producers | -97  | 31                            | -66                            |
| Consumers | -25* | -8.9                          | -33.9                          |
| Government | 578  | 0                             | 578                            |
| Total | 456  | 22.1                          | 478.1                          |

1.26 | -1.00 |

| Producers | -471 | 151                           | -320                           |
| Consumers | -28* | -10.1                         | -38.1                          |
| Government | 578  | 0                             | 578                            |
| Total | 79   | 140.9                         | 219.9                          |

* Large country assumption, zero otherwise.

As we can see, although cessation of subsidies will make producers worse off, they will benefit from reduction of antidumping investigations. Net effect is equal to –USD 195 m.

Indeed, estimated gains should be bigger since we employ partial equilibrium model and it does not take into account several factors. First, Ukrainian metallurgy makes intensive use of intermediate goods, first of all energy, imported from Russia (energy amounts to 30% of production costs). As was pointed by Ishikawa and Spencer, (1996) “... a foreign monopoly supplying the intermediate product would capture sufficient of the rents generated by an export subsidy that such policy is never worthwhile from a domestic viewpoint.” Hence, subsidies to Ukrainian steel producers anyway are partially shifted to foreign suppliers of intermediate good,
substantially decreasing incentive for subsidization. Second, WTO accession would mean lower import tariffs and lower prices for imports. Since metallurgy heavily depends on imported intermediate goods, cost of production will decrease, expanding export potential. Next, subsidization is not followed by immediate reaction of trading partners and antidumping suites may be filed not at the same time period, but with some lag, which is not taken into account here. Thus, we can expect that ultimate net effect on producers would be close to neutral. Finalizing, we should point that gains from subsidies in the long run are by far less sustainable than gains from competitive development of industry.

Consumers will loose due to higher prices, net effect is - USD 30 m. Government is calculated to win the most: stopping subsidization program will allow to save as much as USD 578 m. Total effect for Ukrainian economy sums up to rather significant amount: USD 343 m or 1.1% of GDP in corresponding period.
Conclusions and policy implications

The goal of our research was to study Ukraine’s accession to the WTO referring to one particular sector discussed most hotly in this context: metallurgy. Undivided attention to steel producers is not surprising, taking into account size and importance of the metallurgy for Ukrainian economy. Ukraine is the 7th biggest steel producer and 4th biggest steel exporter in the world. Its share in total industrial production in Ukraine is around 28%, while share in Ukrainian exports is around 50%; metallurgy employs more then 500 thousand workers.

Ukrainian metallurgy has two remarkable features: from one side, steel producers receive substantial subsidies; from the other side, Ukrainian metallurgical exports have been permanently brought under antidumping investigations. Thus, if Ukraine is to join the WTO, it is stated that there will be trade-off: Ukraine will have to abandon subsidies (which are claimed to have substantial positive impact on industry growth), but at the same time will be able to fight against antidumping duties and especially against countervailing duties. The fact of providing export subsidies differs Ukraine from Russia and has important implications for process of joining the WTO. In Russia producers do not receive export subsidies and hence, do not use this argument for lobbying against WTO membership. In Ukraine steel exporters would like to keep enjoying subsidization and joining the WTO is not in their interest.

The purpose of this research was to study effects of both, canceling subsidies and reducing antidumping measures and to find net impact on metallurgy and total welfare. Hypothesis is checked with partial equilibrium model under two assumptions: of “small country”, when Ukrainian steel export does not have effect on world prices and “big country”, when Ukrainian producers may influence prices in the world.

Our calculations confirm that steel producers will lose profits after the subsidies are cancelled; but Ukrainian steel exports will benefit from the reduction in antidumping investigations and lower antidumping duties against Ukrainian exports. Besides that, gains from subsidies in the long run are by far less sustainable than gains from the competitive development of an industry. Producers themselves are interested in competitive environment, since developing truly efficient production will give higher profits over the long run and allow to compete at international markets. Maintaining inefficient and maybe profit-making production by subsidies on opposite just waist money without making production any more competitive. Domestic consumers will experience small welfare losses as a result of higher prices for steel products. The biggest gains will accrue to the government budget, which will benefit from the reduction in
subsidies. On balance the total gains for the Ukrainian economy are calculated to be above USD 343 million, or 1.1 % of GDP.

To sum up, we see that in subsidies-antidumping duel there is no trade-off for the Ukrainian economy taken as a whole. It is widely recognized that by eliminating subsidies, Ukrainian steel exports will face fewer antidumping suits which will have a positive effect on Ukrainian exports and the price received by Ukrainian exporters of steel. Besides that, equal conditions will allow to promote development of competitive production. Further, elimination of subsidies is also beneficial for the whole Ukrainian economy. The Ukrainian government will save a substantial amount of money by canceling subsidization. It should be noted that it is very important to insure channeling those funds to more productive needs, such as investing in human and physical capital, developing infrastructure, etc, but not to enlarging bureaucratic apparatus or increasing military expenditures. Benefits from decreasing antidumping investigations, more competitive production and better use of budget funds exceed the losses of the producers and the small losses of consumers of steel. Thus, our study shows that Ukrainian economy will benefit from free trade and accession to the WTO should be set as the priority goal of the external policy. Ukrainian government will make a favor to everyone by changing hesitations to active policy of promoting WTO membership.
Appendix

A.1. Effect of canceling subsidies, small country assumption

\[
\Delta P S = \left[ Q^S_{\text{Sub}} p^U_{\text{Sub}} - Q^S_0 p^W_0 - A \int_{Q^S_0}^{Q^S_{\text{Sub}}} Q^S dQ^S \right] = \\
= - \left[ Q^S_{\text{Sub}} p^U_{\text{Sub}} - Q^S_0 p^W_0 - A \frac{Q^S_{\text{Sub}}}{\varepsilon + 1} \right] = - \left[ Q^S_{\text{Sub}} p^U_{\text{Sub}} - Q^S_0 p^W_0 - A \frac{Q^S_{\text{Sub}}}{\varepsilon + 1} + A \frac{Q^S_0}{\varepsilon + 1} \right] = \\
= - \left[ Q^S_{\text{Sub}} p^U_{\text{Sub}} - Q^S_0 p^W_0 - \frac{Q^S_{\text{Sub}} p^U_{\text{Sub}}}{\varepsilon + 1} + \frac{Q^S_0 p^W_0}{\varepsilon + 1} \right] = - \left[ Q^S_{\text{Sub}} p^U_{\text{Sub}} \left[ 1 - \frac{1}{\varepsilon + 1} \right] + Q^S_0 p^W_0 \left[ \frac{1}{\varepsilon + 1} - 1 \right] \right] = \\
= - \left[ 1 - \frac{1}{\varepsilon + 1} \right] \left[ Q^S_{\text{Sub}} p^U_{\text{Sub}} - Q^S_0 p^W_0 \right]
\]

A.2. Effect of canceling subsidies, large country assumption

\[
\Delta P S = \left[ Q^S_{\text{Sub}} p^U_{\text{Sub}} - Q^S_0 p^W_0 - A \int_{Q^S_0}^{Q^S_{\text{Sub}}} Q^S dQ^S \right] = \\
= - \left[ Q^S_{\text{Sub}} p^U_{\text{Sub}} - Q^S_0 p^W_0 - \frac{Q^S_{\text{Sub}}}{\varepsilon + 1} \right] = - \left[ Q^S_{\text{Sub}} p^U_{\text{Sub}} - Q^S_0 p^W_0 - A \frac{Q^S_{\text{Sub}}}{\varepsilon + 1} + A \frac{Q^S_0}{\varepsilon + 1} \right] = \\
= - \left[ Q^S_{\text{Sub}} p^U_{\text{Sub}} - Q^S_0 p^W_0 - \frac{Q^S_{\text{Sub}} p^U_{\text{Sub}}}{\varepsilon + 1} + \frac{Q^S_0 p^W_0}{\varepsilon + 1} \right] = - \left[ Q^S_{\text{Sub}} p^U_{\text{Sub}} \left[ 1 - \frac{1}{\varepsilon + 1} \right] + Q^S_0 p^W_0 \left[ \frac{1}{\varepsilon + 1} - 1 \right] \right] = \\
= - \left[ 1 - \frac{1}{\varepsilon + 1} \right] \left[ Q^S_{\text{Sub}} p^U_{\text{Sub}} - Q^S_0 p^W_0 \right]
\]
\[ \Delta CS = \left[ Q_0^D p_0^w - Q_1^D p_{Sub}^w + B \int_{Q_0^D}^{Q_1^D} Q^D y dQ^D \right] = \]
\[ = \left[ Q_0^D p_0^w - Q_1^D p_{Sub}^w + B \frac{Q^D y+1}{\gamma+1} \right] = \left[ Q_1^D p_{Sub}^w - Q_0^D p_{Sub}^w + B \frac{Q_1^D y+1}{\gamma+1} - B \frac{Q_0^D y+1}{\gamma+1} \right] = \]
\[ = \left[ Q_0^D p_0^w - Q_1^D p_{Sub}^w + \frac{Q_1^D p_{Sub}^w - \frac{Q_0^D p_0^w}{\gamma+1}}{\gamma+1} \right] = \left[ Q_1^D p_{Sub}^w \left[ 1 - \frac{1}{\gamma+1} \right] - Q_0^D p_0^w \left[ 1 - \frac{1}{\gamma+1} \right] \right] = \]
\[ = \left[ \frac{1}{\gamma+1} \right] \left[ Q_1^D p_{Sub}^w - Q_0^D p_0^w \right] \]

A.3. Effect of reducing antidumping

\[ \Delta PS = Q_1^S p_i^w - Q_0^S p_0^w - A \int_{Q_0^S}^{Q_1^S} Q^S \varepsilon dQ^S = \]
\[ = Q_1^S p_i^w - Q_0^S p_0^w - \frac{Q_1^S p_{Sub}^w - Q_0^S p_{Sub}^w}{\varepsilon+1} + \frac{Q_0^S p_0^w}{\varepsilon+1} = \]
\[ = Q_1^S p_i^w - Q_0^S p_0^w - \frac{Q_1^S p_{Sub}^w}{\varepsilon+1} + \frac{Q_0^S p_0^w}{\varepsilon+1} = Q_1^S p_i^w \left[ 1 - \frac{1}{\varepsilon+1} \right] - Q_0^S p_0^w \left[ 1 - \frac{1}{\varepsilon+1} \right] = \]
\[ = \left[ 1 - \frac{1}{\varepsilon+1} \right] \left[ Q_1^S p_i^w - Q_0^S p_0^w \right] \]

\[ \Delta CS = \left[ Q_1^D p_i^w - Q_0^D p_0^w - A \int_{Q_0^D}^{Q_1^D} Q^D \gamma dQ^D \right] = \]
\[ = \left[ Q_1^D p_i^w - Q_0^D p_0^w - B \frac{Q^D y+1}{\gamma+1} \right] = \left[ Q_1^D p_i^w - Q_0^D p_0^w - B \frac{Q_1^D y+1}{\gamma+1} \right] + B \frac{Q_0^D y+1}{\gamma+1} \]
\[ = \left[ Q_1^D p_i^w - Q_0^D p_0^w - \frac{Q_1^D p_{Sub}^w}{\gamma+1} + \frac{Q_0^D p_{Sub}^w}{\gamma+1} \right] = \left[ Q_1^D p_i^w \left[ 1 + \frac{1}{\gamma+1} \right] - Q_0^D p_0^w \left[ 1 + \frac{1}{\gamma+1} \right] \right] = \]
\[ = \left[ 1 + \frac{1}{\gamma+1} \right] \left[ Q_1^D p_{Sub}^w - Q_0^D p_0^w \right] \]
### A.4. Antidumping cases in 2000-2001

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
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<tbody>
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<td>USA</td>
<td>260.7313</td>
<td>41.27807</td>
<td>-219.453</td>
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<td>Rolled steel alloy</td>
<td>7225</td>
<td>USA</td>
<td>4.665845</td>
<td>3.915493</td>
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<td>Armature</td>
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<td>USA</td>
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<td>366.7464</td>
<td>-137.033</td>
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<td>Products</td>
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<td>Export Price</td>
<td>Trade Balance</td>
<td></td>
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<td>-------------------------------</td>
<td>--------------------------</td>
<td>--------------</td>
<td>--------------</td>
<td>---------------</td>
<td></td>
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<td>Semi-finished products</td>
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<td>Tube products</td>
<td>Russian Federation</td>
<td>81.8259</td>
<td>35.75819</td>
<td>-46.0678</td>
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<tr>
<td>Hot rolled steel</td>
<td>Columbia</td>
<td>20.03984</td>
<td>6.481283</td>
<td>-13.5586</td>
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<td>Tube products</td>
<td>EU</td>
<td>36.60189</td>
<td>25.28715</td>
<td>-11.3147</td>
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<tr>
<td>Armature</td>
<td>Mexico</td>
<td>35.40164</td>
<td>0</td>
<td>-35.4016</td>
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<td>Mexico</td>
<td>54.62246</td>
<td>0.105829</td>
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<td>Total</td>
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<td>2716.335</td>
<td>1425.077</td>
<td>-1291.26</td>
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