

# **Influence of Tariffs and Non-Tariff Barriers on Ukraine's Imports: Would the WTO Membership Make Change?**

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The paper estimates the effect of tariffs and non-tariff measures on imports in Ukraine, aiming to determine the sectors sensitive to trade control measures. This sensitivity is then used as a measure of potential responsiveness of sectors towards Ukraine's membership in the WTO. Results of the panel data analysis show that trade control measures have quite limited impact on imports, while major determinants are production in exporting country and transportation costs, implying that the WTO membership is rather unlikely to provoke significant inflow of goods in the country. The growth in imports due to the WTO membership only is likely in two sectors – leather footwear, and paper and paper products.

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## **Introduction**

Recently the role of the WTO in general, as well as trade control measures in particular has once again appeared under debate. Andrew Rose (2004) published one of the most striking results. He found little evidence that the WTO/GATT actually promote international trade, although showed that the Generalized System of Preferences nearly doubles it. An importance of national trade control measures was part of the discussion concerning border effects on trade initiated by McCallum (1995) publication. In particular, Natalie Chen (2004) has found that technical barriers to trade have an important impact on the border effect, thus trade. Elaborated studies of effects of trade control measures, including non-tariffs measures (NTM), were carried by, e.g., Leamer (1990), Harrigan (1993), and Lee & Swagel (1997). Studying developed countries' trade control measures that Latin America countries faced, Leamer (1990) found that both tariffs and the NTM have a significant import-reducing effect. While Harrigan (1993) did not completely support Leamer's findings exploring the bilateral OECD trade in 1983, he showed that tariffs, as well as quantity barriers<sup>2</sup> have significant negative impact on bilateral trade. On the contrary to Harrigan's study based on industrial breakdown, Lee and Swagel (1997) pooled across industries, studying average effects of trade barriers on imports. Although they conclude that trade control measures are important for hindering import, no conclusive evidences about their relative importance were found.

This paper presents a case study of the importance of trade control measures on the basis a unique database of tariffs and NTM applied in Ukraine in the second half of the 90s. The main question raised in this paper is how sensitive are Ukraine's imports to trade control measures? The answer will not only add to the pool of evidences regarding effects of tariffs and NTM, but could also shed light upon potential consequences of Ukraine's membership in the WTO. It is expected that the WTO-induced reduction of trade control measures, not important in explaining trade flows, is likely to have minor impact on imports in particular industry, and vice versa. Moreover, taking into account tariff and hard-core NTM focus in reduction of trade control measures under the WTO, it is anticipated that the accession to the WTO might still have minor effect on imports of goods, dependent on other types of NTM.

The rest of the paper is built as follows. Section 2 briefly outlines monopolistic competition model of trade used as a theoretical background of the paper. Next, detailed reviews of tariff, NTM, and transportation costs estimates are provided in Section 3. Section 4 contains the

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<sup>2</sup> Rather broad category, according to Harrigan (1993) classification that includes both quotas, prohibition, and quality control measures

discussion of empirical results, Section 5 considers the potential effect of the WTO membership, and Section 6 concludes the paper.

### **Monopolistic competition model of trade**

Following papers by Lee & Swagel (1997) and Harrigan (1993), for a determination of import flows the study is relied on the monopolistic competition model of trade developed by Helpman and Krugman (1985). Assuming identical homogeneous preferences of consumers and differentiated, imperfectly substitutable production in different countries, the model-predicted trade flow is as follows:

$$m_{ijk} = s_j y_{ik}, \quad s_j = \frac{\Pi_j}{\Pi}, \quad \text{thus} \quad \frac{m_{ijk}}{\Pi_j} = \frac{y_{ik}}{\Pi} \quad (1)$$

where

- $m_{ijk}$  = imports of industry  $i$  output by country  $j$  from country  $k$ ,
- $\Pi_j$  = country  $j$ 's aggregate spending,
- $s_j$  = country  $j$ 's share in total world spending,
- $y_{ik}$  = output of industry  $i$  in country  $k$ , and
- $\Pi$  = total world spending.

In other words, imports of output of industry  $i$  by country  $j$  are proportional to the output of industry  $i$  from country  $k$ , while the coefficient of proportionality is the share of country  $j$  in total world spending. However, as noted Harrigan (1993), the direct proportionality statement is too strong, and not supported by real-world observations. Thus, he suggested somewhat weaker hypothesis:

$$m_{ijk} = \alpha_i y_{ik}, \quad \text{and} \quad \alpha_i \leq s_j, \quad (2)$$

where

- $\alpha_i$  = a factor of proportionality that captures a bias towards domestically produced varieties.

In this case, imports by country  $j$  and output in country  $k$  are still in direct proportion to each other, but the factor of proportionality may differ from  $s_j$  depending on the degree of bias that consumers exhibit towards domestically produced varieties for output in different industries.

The monopolistic competition model is based on assumption of the absence of trade control measures. The next step is to extend the model incorporating the effects of various barriers. Although the effect of trade policies is quite sensitive to the economy's structure (Flam & Helpman, 1987), in the simple case it is expected that both tariffs and NTM will have trade-reducing effect (Lee & Swagel, 1997; Harrigan, 1993).

Adopting log-form and including transportation costs alongside with tariffs and NTM, the equation for estimation looks as follows:

$$\log\left(\frac{m_{ijk}}{\Pi_j}\right) = \beta_{1i} + \beta_{2i} \log\left(\frac{y_{ij}}{y_i}\right) + \beta_{3i} \log(1 + \tau_{ijk}) + \beta_{4i} \log(1 + \kappa_{ijk}) + \beta_{5i} \log(1 + NTM_{ijk}) + \varepsilon_{ijk} \quad (3)$$

where

- $\tau_{ijk}$  = average tariff on industry  $i$  output by country  $j$  from country  $k$ ,
- $\kappa_{ijk}$  = transportation costs to deliver industry  $i$  output by country  $j$  to country  $k$ ,
- $NTM_{ijk}$  = NTM index on industry  $i$  output by country  $j$  from country  $k$ .

The proposed equation follows ones by Lee & Swagel (1997) and Harrigan (1993). However, unlike Harrigan (1993), since Ukraine is small country in economic terms and its demand is unlikely to influence a production in other countries, it is presumed no simultaneity determination between imports and output in exporting country. Thus, no instrument variables are used.

## Data

The study covers the period from 1996 to 2000<sup>3</sup>. Trade data come from the UN Commodity Trade (COMTRADE) database, while the industrial output is based on the OECD Industrial Survey (Vol. 2003, release 2). Data are aggregated to four-digit ISIC industries (Rev. 2), and the analysis is done for two- and three-digit codes. As a result, panels for different codes include different number of observation.

## Tariffs

Tariff information is obtained from the Law on Customs Tariff in Ukraine adopted in 1993 with all subsequent amendments. There are three types of imports tariff rates applied in

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<sup>3</sup> The choice of time interval was determined by availability of information both on trade flows and industrial production. On the one hand, detailed information on trade flows in Ukraine is on hand only since 1996 when the methodology of trade statistics was settled in Ukraine (Michaely, 1998). On the other, detailed information on industrial output was available only up to the year 2000.

Ukraine<sup>4</sup>: *ad valorem* rates, specific rates, and so called mixed (or combined) rates that have both *ad valorem* and specific part<sup>5</sup>. Here, import tariffs are provided as *ad valorem* rates whenever possible. Otherwise, *ad valorem* equivalents are estimated for specific or mixed rates (See Appendix for estimation of *ad valorem* equivalents). The shares of mixed and specific rates in import tariff schedule differ among years. These rates were introduced in 1996, and initially possessed less than 1% of total number of tariff lines; however, by 1998 their share reached 22% of tariff lines. Non-*ad-valorem* rates are applied mostly to agricultural products.

To match the aggregation level of production and trade, tariffs were aggregated to the four-digit level of the ISIC classification. The question was the weighting scheme to choose. Traditional weighting schemes include simple arithmetic average, import structure of home country-importer, domestic production, or import structure of the ‘third party’ (see Daly & Kuwahara, 1999; Lee & Swagel, 1997; Nogues, Olechowski, & Winters, 1986; Leamer, 1990). Each of these weighting schemes suffers from important drawbacks<sup>6</sup>, with import structure of the ‘third party’ seems as the most attractive option, since it should not cause either upward- or downward biases. Still, the problem is to ensure that ‘third party’ imports structure is similar to home country imports structure; otherwise, the diversion may once again cause biases. As the ‘third party’ Nogues, Olechowski, & Winters (1986) proposed world trade, while Daly & Kuwahara (1999) suggested the OECD trade.

Here it is suggested the alternative ‘third party’ weighting scheme. The weight is constructed on the basis of a structure of exports of the each country, from which home country imports. The underlying assumption is that exports structure of each country is quite similar for all destinations. It might be not perfect assumption, but usage of the structure of exports to specific country might once again cause downward bias, since highly protected imports will cause lower exports, as in the case with home import structure. If export-structure scheme is applied, tariff structure of importing country is matched with export structure of the country

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<sup>4</sup> Ukraine has different trade regimes. Most of its trade is conducted either under free trade or the MFN regimes. Free trade agreements are signed with all countries of the former Soviet Union and with Macedonia, although by now they are terminated with the Baltic countries due to their accession to the EU. The most of other partners including the EU trade are under the MFN regime. This study covers only countries that trade under the MFN rate.

<sup>5</sup> For example, 30%, but not less than 0,3 euro per 1 kilogram

<sup>6</sup> Simple average is likely not to take into account the relative importance of various products. Home imports is likely to be downward biased if protection is effective, since in this case imports of highly-protected goods is lower than its ‘free-trade’ level. Alternatively, a use of domestic production is likely to produce upward bias in the case of effective protection due to over-representation of highly protected products (Daly & Kuwahara, 1999, Lee & Swagel, 1997).

of origin, allowing assigning weights in line with potential importance of trade barriers for each particular country.

Table 1 provides simple average tariffs rates for ISIC sectors. The highest levels of nominal tariffs in Ukraine are registered for beverage industries, exceeding 100% tariff rate for almost all years under review. Other food products, tobacco, clothing and footwear follow this sector. Wood products, non-ferrous metals, and petroleum refineries are the industries, least protected by tariffs.

### *Non-tariff measures*

Ukraine's NTM included in the study are grouped into three categories: 'hard', 'health', and 'custom'. The first includes so-called hard-core barriers, usually imposed with the specific intent of modifying or restricting trade flows (Laird & Yeats, 1990). In this study, the 'hard' NTM encompasses quota, licensing<sup>7</sup>, minimum custom value regulation, weapon control, antidumping and safeguard investigations. The second category – 'health' NTM – includes all types of control that at least officially aimed at ensuring health and safety of humans, plants, animals, and environment. Here, the 'health' NTM covers mandatory certification, including the metrological and energy-saving controls, ecological control, sanitary, phyto-sanitary, and veterinary controls, as well as registration of medicaments and medical equipment. Finally, the 'custom' NTM comprises customs inspection itself, provision of inquiry about custom value, as well as requirement for preliminary payments of all imports duties and taxes in advance alongside with provision of preliminary custom declaration.

Due to the lack of reliable and detailed price information necessary for construction of tariff equivalents, inventory approach was chosen as a method of the NTM quantification. In particular, it was constructed an NTM intensity (NTMI) index that shows the percentage of cases when the pre-selected NTM are actually applied to the given number of tariff lines, weighted on countries' exports structure as with tariffs (see Appendix for estimation details).

Tables 2-4 demonstrate non-weighted NTMI indices for each sector and for each of three groups of the NTM. As shown, hard-core barriers were quite rarely applied in Ukraine during the period under review. So, in 1996 only four sectors were subject to the 'hard' NTM,

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<sup>7</sup> In general case, only non-automatic licensing is considered as the hard-core barrier. However, it is quite difficult to distinguish automatic and non-automatic licensing procedures for Ukraine, thus all licensing is included in the index.

although later the protectionism has increased. The peak of application of the ‘hard-core’ barriers was in 1998-1999 due to introduction of minimum custom value requirements, abolished in 2000. Beverage industries, miscellaneous chemical products, industrial chemicals, cameras, clocks and measuring equipment, tobacco, machinery, and transport equipment are among the sectors where hard-core barriers were applied. Unlike ‘hard’ NTM, the ‘health’ NTM has been widely applied throughout the entire period between 1996 and 2000. Tobacco products have been the most controlled sector, and furniture and printing/publishing sector the least controlled. In 1996 the ‘custom’ NTMI was the same, since include only custom inspections. Introduction of preliminary customs declaration in 1997 and custom value inquiry in 1999 caused some variation in the index, mostly in 1999-2000. Here, furniture, beverages, and tobacco sectors faced the most severe control. Thus, although different NTM applied to different sectors, the ‘favourites’ seems to be beverages and tobacco sectors, for which all three groups of the NTM are among the highest.

#### *Transportation costs*

There are several proxies of transport costs in economic literature. The most traditional proxy is a distance between principal cities of trading partners (Rose, 2004; Rauch, 1999) or some estimation based on the distance. For instance, Nitsch (2000) used an idea of relative distance, according to which countries are expected to trade more with each other if other trading partners are far away.

Except for distance, another important aspect of transportation costs is the weight of commodities that are to be transported. It is rational to expect that transportation of heavier goods is in most cases more costly. To capture the idea, Chen (2004) used an industry-specific weight-to-value ratio. Here, it is proposed to use a compound measure of transportation costs that includes both the distance and the weight. It is constructed by multiplying the distance between capitals of trading partner on the weight-to-value ratio:

$$\tau_{ijk} = \frac{\sum_j W_{ijk}}{\sum_j m_{ijk}} \times Dist_{jk}, \quad (5)$$

where

$\tau_{ijk}$  = a proxy for transportation costs;

$W_{ijk}$  = a weight of imports of countries  $j$  from  $k$  ;

$m_{ijk}$  = a value of respective imports;

$Dist_{jk}$  = a distance between capitals of countries  $j$  and  $k$ .

The rationale is rather straightforward: heavier the goods and larger the distance, the less trade will occur. Chen (2004) showed that this ratio is negatively correlated with the bilateral trade flows. It is expected that the compound measures also enters the equation with a negative sign.

## **Empirical results**

It is expected the imports of industry  $i$  output by country  $j$  from country  $k$  is positively related to output in country  $k$ , while the rest of variables – tariffs, the NTM, and transportation costs – have the import-reducing effect, thus negatively related to the imports. To test this relation, panel equation (3) was estimated for 9 sectors at two-digit level of aggregation and for 29 sectors at the three-digit level of aggregation. The panel included imports from 19 countries between 1996 and 2000, and used the GLS. To capture the fixed effects associated with specific features of each year, dummy variables for years 1997-2000 were introduced in the model. The reason for expecting differences among years rested in transitional nature of Ukraine's economy with quite frequent changes of 'rules of the game'.

### *Two-digit sectors*

As shown in Table 5, imports and industrial output were statistically significantly and positively related in all cases but one (paper and paper products). Transportation costs proxy also revealed an expected negative sign, and was statistically significant for seven out of nine sectors, excluding food, beverages, and tobacco, and wood and wood products. However, results for trade barrier variables are far less conclusive. In the most cases the coefficients for trade control measures did not significantly differ from zero. The negative and significant effect of tariffs was received only for three sectors: paper and paper products, machinery and equipment, and other manufactured goods. Surprisingly, imports of food-industry products that faced the highest nominal tariff rates appeared to be unresponsive to them. Although the sign was negative, it was not significantly different from zero.

The 'hard' NTM had statistically significant negative impact on imports of two sectors: textile, clothing, and leather industries, and other manufactured products. The 'health' NTM could be considered as statistically significant barrier for food, beverages, and tobacco, and

non-metallic mineral product industries. Contrary to expected, for chemical and petroleum product industries the sign was statistically significant and positive. Possible explanation could be a 'responsive' behaviour of the government that reacted on the growth of imports via imposing higher NTM. The 'custom' NTM appeared to be the most important import barrier. The statistically significant negative sign was received for food, beverage, and tobacco industries, textile, clothing, and leather industries, wood and wood products, and machinery and equipment.

### *Three-digit sectors*

Regressions for higher level of disaggregation – three-digit sectors – showed quite a similar picture (Table 6). While both output of exporting country and transportation costs are significant for explaining imports, importance of various trade control measures is far from evidential. Tariff appeared to be significant barrier to import for textile, clothing, leather footwear, paper and paper products, petroleum refineries, cameras, clocks, measuring equipment, and other manufactured goods. The 'hard' NTM has significant negative effect on food products not elsewhere specified, leather footwear, glass and glass products, and other manufactured goods. The 'health' NTM negatively affected food products not elsewhere specified, and tobacco. The 'custom' NTM created a barrier for food products, clothing, industrial chemicals, petroleum refineries, and fabricated metal products.

To summarize, empirical results doesn't support the hypothesis about high importance of trade control measures, including non-tariff ones, for imports in Ukraine. Although some of trade control measures have statistically significant negative effect on imports by sectors, much more important factors that determine trade are output of exporting country and transportation costs.

### **Would the WTO membership make change?**

That question was posed in the title of the paper. It was expected that high importance of tariffs and hard-core NTM could indicated that these sectors are more sensitive to growth in imports after Ukraine become a member of the WTO. On the other hand, high importance of the 'health' and 'custom' measures may be a signal that imports' increase after the WTO membership will not be so noteworthy, since these NTM are likely to remain in place or experience only slight modification due to the WTO membership.

At the two-digit level of aggregation (Table 7), imports in four out of nine sectors are likely to be non-sensitive to the WTO membership. For basic metal industries it was found no statistically significant relations between imports and any of trade control measures. Other three sectors – food, beverages, and tobacco, wood and wood products, and non-metallic mineral products – are sensitive to either ‘health’ or ‘custom’ NTM, thus also less likely to respond to Ukraine’s accession to the WTO. The only sector that shows the statistically significant negative link with tariffs only is paper and paper products. Here, the reduction of tariff in this sector is likely to promote imports.

At the three-digit level of aggregation (Table 8) the situation is quite similar. The only sectors that are likely to be affected to the WTO membership are leather footwear and paper and paper products. No statistically significant relationship was found between imports and trade control measures in such sectors as beverages, leather products, furniture, printing and publishing, miscellaneous chemical products, rubber products, miscellaneous plastic products, pottery, china, and earthenware, non-ferrous metals, non-electrical and electrical machinery. Thus, for these sectors’ imports it is expected that the WTO membership will less likely to make changes. Among sectors that might be not affected by Ukraine’s accession to the WTO, since they are sensitive only to the ‘health’ and ‘custom’ measures, are food products, tobacco, wood products, except furniture, and fabricated metal products.

To sum up, an estimation of the WTO membership consequences based on sensitivity of different sectors towards trade control measures showed that most of the sectors seem non-sensitive either due to general non-responsiveness to trade control measures or due to link only with ‘health’ and ‘custom’ NTM. The only two industries, in which growth of imports is likely to be provoked by the WTO membership, are leather footwear and paper and paper products.

## **Conclusions**

The first objective of the paper was to identify the links between trade control measures and imports Ukraine controlling for output and transportation costs. One of the challenges was to quantify NTM. It was proposed a NTM intensity index that elaborates traditional frequency index, but allows incorporation several overlapping NTM in one measure. Results of the panel

analysis showed that Ukraine's imports were strongly related to output in the exporting country and to transportation costs, but not so strongly to various trade control measures.

The second objective of the paper was to make inferences about potential effect of Ukraine's accession to the WTO on the basis of established links between trade control measures and imports. On the basis of identified relations it seems rather unlikely that the change in trade control measures provoked by the WTO membership will significantly affect imports. The only sectors dependent on tariffs and/or hard NTM and, thus, potentially sensitive to changes in trade regime are leather footwear and paper and paper products. On the other hand, twelve out of twenty-nine three-digit sectors have no statistically significant relations with any of trade control measures. These sectors are likely to be non-sensitive to the changes in trade regime in the country.

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## **Appendix**

### ***Estimation of ad valorem tariff equivalents***

For estimation of *ad valorem* equivalents, average unit values for total imports of respective commodity categories were received. Estimations were conducted at the six-digit level of the harmonized system, the most disaggregated level for which both value and quantity data for imports are available. For specific rates, *ad valorem* equivalents are estimated directly by dividing the rate on unit value, while for mixed rates the maximum of the estimated *ad valorem* equivalent and given *ad valorem* part of the mixed rate is chosen.

### ***Quantification of non-tariff measures***

One of the most challenging tasks for any trade control measures study is to quantify NTM. The first best option is the construction of the tariff equivalents for the NTM that allows both comparing the NTM with tariffs and making reasonable conclusions about welfare implications of the NTM. In theory, an effect of any NTM could be captured if prices before and after the NTM are compared. However, a major difficulty is to make sure that the change in price occurred exactly because of the change in the NTM. The situation is complicated if the study focuses not on several specific products, but on trade flows in aggregate. In this case, it becomes fairly impossible to identify price changes and, thus, to construct tariff equivalents.

Yet other option adopted by such international institutions as the UNCTAD and the WTO is so called inventory approach to the NTM quantification, showing whether the NTM or several NTM are applied or not to the specific product. The most conventional is a frequency index that shows a number of tariff lines covered by the some pre-selected group of the NTM. The key element of the index is a dummy variable that takes a value of unity if one or more NTM is applied to the item. The natural extension of the frequency index is import coverage index that weights the existing NTM structure on either home county imports or world imports. The detailed discussion of this and other approached could be found in Laird and Yeats (1990), and Deardorff and Stern (1997). Application of the inventory approach itself could be found in studies by, e.g., Walter (1972), Nogues, Olechowski, and Winters (1986), Amjadi and Yeats (1995), Harrigan (1993), Lee and Swagel (1997), Daly and Kuwahara (1999), as well as the numerous WTO and UNCTAD reports. The UNCTAD supports TRAINS database that alongside with tariffs provides the NTM frequency indices.

One of the drawbacks of the frequency index is that it doesn't take into account the number of the NTM applied to each specific product. It is not a problem as soon as only one NTM is considered. However, if the group of the NTM is studied, information is missed. Therefore, it is proposed an augmented measure – the NTM intensity index (NTMI) – that captures information both about number of and to which products the NTM are applied. Formally, the NTMI shows the percentage of cases when the pre-selected NTMs are actually applied to the given number of tariff lines:

$$NTMI = \left( \frac{\sum_{n=1}^N \sum_{l=1}^L NTM_{nl}}{L \cdot N} \right) \cdot 100, \quad (4)$$

where

$NTM_{nl}$  = a dummy variable that takes a value of unity if the  $n$  type of the NTM is applied to the tariff line  $l$  and zero otherwise;

$N$  = a total number of considered tariff lines,  $n = 1, \dots, N$  ;

$L$  = a total numbers of considered types of the NTMs,  $l = 1, \dots, L$  .

Thus, the NTMI shows the share of the entire non-tariff protection capacity used by the country.<sup>8</sup> As in the case with the frequency index, it is possible to add weights to the NTMI. Here, it is used the 'third-party' export-structure weighting scheme, which was already discussed for tariff weighting.

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<sup>8</sup> By construction, the NTMI is very sensitive to the number of the NTM involved in the study. Therefore, for meaningful international comparisons it is necessary to ensure that similar sets of the NTM are involved in the comparisons.

**Table 1**

Import tariff rates, simple average, ISIC Rev. 2

		1996	1997	1998	1999	2000
311	Food products	14,2	30,8	42,1	40,8	44,9
312	Food products not elsewhere classified, animal feeds	8,6	50,4	38,8	21,8	26,5
313	Beverages	159,5	74,8	103,4	147,7	107,0
314	Tobacco	31,9	31,1	25,0	41,6	54,1
321	Textile	4,4	6,7	9,1	12,4	10,4
322	Clothing	25,8	26,4	26,3	28,2	27,2
323	Leather products	9,4	11,5	11,5	14,5	14,5
324	Leather footwear	15,0	30,0	30,0	30,0	25,0
331	Wood products, except furniture	1,3	1,6	1,6	1,6	1,6
332	Furniture	16,9	16,3	18,6	21,5	18,2
341	Paper and paper products	2,1	2,9	5,8	5,5	5,8
342	Printing, publishing	5,7	5,3	10,1	15,3	17,2
351	Industrial chemicals	5,7	5,2	5,0	7,4	6,1
352	Misc. chemical products	6,0	9,5	9,8	8,0	9,3
353	Petroleum refineries	2,1	2,0	2,0	2,2	2,9
354	Misc products of petroleum and coal	6,5	6,1	6,8	8,0	8,0
355	Rubber products	6,3	6,2	7,1	7,9	6,7
356	Misc plastic products	7,3	7,2	7,1	8,1	9,1
361	Pottery, china and earthenware	7,7	7,5	8,5	9,6	11,1
362	Glass and glass products	6,2	6,1	10,5	13,7	13,3
369	Other non-metallic mineral products	6,9	6,9	9,9	10,6	10,4
371	Iron and steel	5,5	5,4	5,3	5,3	5,3
372	Non-ferrous metal	1,1	1,1	1,2	1,6	2,6
381	Fabricated metal products	4,9	7,1	7,3	7,9	7,8
382	Non-electrical machinery	1,9	2,0	2,1	4,7	4,7
383	Electrical machinery	3,5	4,0	4,3	8,1	8,0
384	Transport equipment	4,7	4,5	4,4	6,4	6,4
385	Cameras, clocks, and measuring equipment	4,9	5,0	5,3	8,7	8,3
390	Other manufactured goods	10,6	10,9	11,3	13,4	12,9

Sources: COMTRADE, Ukraine's legislation, own calculations

**Table 2**  
 'Hard' NTM by sectors, 1996-2000

		1996	1997	1998	1999	2000
311	Food products	0,0	0,0	2,6	2,6	0,2
312	Food products not elsewhere classified, animal feeds	0,0	0,0	5,1	5,1	0,0
313	Beverages	5,3	5,3	9,5	9,5	10,4
314	Tobacco	0,0	8,3	8,3	8,3	8,3
321	Textile	0,0	0,0	0,5	0,9	0,4
322	Clothing	0,0	0,0	3,4	4,3	0,1
323	Leather products	0,0	0,0	0,0	0,0	0,0
324	Leather footwear	0,0	0,0	14,3	14,3	0,0
331	Wood products, except furniture	0,0	0,0	0,0	0,0	0,0
332	Furniture	0,0	0,0	0,0	0,0	0,0
341	Paper and paper products	0,0	0,0	0,0	0,0	0,0
342	Printing, publishing	0,0	0,0	0,0	1,2	1,2
351	Industrial chemicals	0,1	0,3	1,7	6,4	6,5
352	Misc. chemical products	4,5	4,4	5,9	9,2	10,1
353	Petroleum refineries	0,0	0,0	2,9	2,9	2,9
354	Misc products of petroleum and coal	0,0	0,0	0,0	0,0	0,0
355	Rubber products	0,0	0,3	0,3	0,3	0,3
356	Misc plastic products	0,0	0,0	5,9	0,0	0,0
361	Pottery, china and earthenware	0,0	0,0	0,0	0,0	0,0
362	Glass and glass products	0,0	0,3	0,3	0,0	0,3
369	Other non-metallic mineral products	0,0	0,0	0,0	0,0	0,2
371	Iron and steel	0,0	0,0	0,0	0,0	0,0
372	Non-ferrous metal	0,0	0,2	0,2	0,2	0,2
381	Fabricated metal products	0,0	0,1	0,1	0,1	0,1
382	Non-electrical machinery	0,0	0,3	1,3	0,5	0,8
383	Electrical machinery	0,0	0,2	0,7	0,6	1,7
384	Transport equipment	0,0	0,9	0,9	1,9	0,9
385	Cameras, clocks, and measuring equipment	0,2	0,4	0,4	0,2	0,2
390	Other manufactured goods	0,0	1,0	1,6	2,7	2,7

*Sources: COMTRADE, Ukraine's legislation, own calculations*

**Table 3**  
 'Health' NTM by sectors, 1996-2000

		1996	1997	1998	1999	2000
311	Food products	33,7	33,6	35,3	33,8	37,9
312	Food products not elsewhere classified, animal feeds	29,9	29,9	32,9	32,9	35,5
313	Beverages	27,3	26,5	29,5	29,5	31,8
314	Tobacco	25,0	41,7	41,7	41,7	41,7
321	Textile	5,0	5,0	5,2	5,2	5,3
322	Clothing	5,3	5,3	5,3	5,3	5,6
323	Leather products	16,3	16,3	16,3	16,3	16,7
324	Leather footwear	1,1	1,1	1,1	1,1	3,2
331	Wood products, except furniture	17,3	17,3	17,7	17,7	17,7
332	Furniture	0,0	0,0	0,0	0,0	0,0
341	Paper and paper products	5,1	5,1	5,0	5,0	5,0
342	Printing, publishing	0,0	0,0	0,0	0,0	0,0
351	Industrial chemicals	26,3	26,2	26,0	26,0	26,6
352	Misc. chemical products	12,0	12,1	12,5	12,5	13,9
353	Petroleum refineries	17,4	18,1	18,1	18,1	18,1
354	Misc products of petroleum and coal	12,5	12,5	12,5	12,5	12,5
355	Rubber products	2,0	2,0	2,1	2,1	2,1
356	Misc plastic products	10,5	10,5	10,9	10,9	12,3
361	Pottery, china and earthenware	4,4	3,3	3,3	3,3	3,3
362	Glass and glass products	1,0	1,2	3,5	3,5	3,7
369	Other non-metallic mineral products	4,3	4,3	7,0	7,0	7,1
371	Iron and steel	0,4	0,4	0,4	0,6	0,7
372	Non-ferrous metal	3,8	3,8	3,9	3,9	4,1
381	Fabricated metal products	2,7	2,1	2,5	2,6	2,6
382	Non-electrical machinery	2,9	3,8	4,1	4,1	4,7
383	Electrical machinery	7,0	5,2	4,8	4,8	4,8
384	Transport equipment	4,0	3,3	3,9	3,9	3,9
385	Cameras, clocks, and measuring equipment	4,9	3,5	3,6	3,6	5,9
390	Other manufactured goods	1,9	1,9	1,9	1,9	1,9

*Sources: COMTRADE, Ukraine's legislation, own calculations*

**Table 4**  
 'Custom' NTM by sectors, 1996-2000

		1996	1997	1998	1999	2000
311	Food products	33,3	33,3	33,8	49,1	49,1
312	Food products not elsewhere classified, animal feeds	33,3	33,3	35,9	41,9	41,9
313	Beverages	33,3	54,1	55,6	84,4	84,4
314	Tobacco	33,3	44,4	55,6	88,9	88,9
321	Textile	33,3	33,3	33,3	34,7	34,7
322	Clothing	33,3	33,5	33,5	40,3	40,3
323	Leather products	33,3	33,3	33,3	34,8	34,8
324	Leather footwear	33,3	33,3	33,3	53,3	53,3
331	Wood products, except furniture	33,3	33,3	33,3	33,3	33,3
332	Furniture	33,3	48,8	48,8	91,8	91,8
341	Paper and paper products	33,3	33,3	33,3	37,1	33,6
342	Printing, publishing	33,3	33,3	33,3	33,3	37,0
351	Industrial chemicals	33,3	33,4	33,4	33,7	33,7
352	Misc. chemical products	33,3	33,3	33,3	36,0	36,0
353	Petroleum refineries	33,3	33,3	33,5	39,3	39,3
354	Misc products of petroleum and coal	33,3	33,3	33,3	33,3	33,3
355	Rubber products	33,3	33,3	33,9	41,4	41,4
356	Misc plastic products	33,3	33,3	33,3	41,2	36,6
361	Pottery, china and earthenware	33,3	33,3	33,3	48,9	48,9
362	Glass and glass products	33,3	33,3	33,3	33,8	33,8
369	Other non-metallic mineral products	33,3	33,3	33,3	34,2	34,2
371	Iron and steel	33,3	33,3	33,3	33,3	33,3
372	Non-ferrous metal	33,3	33,3	33,3	37,1	37,1
381	Fabricated metal products	33,3	33,5	33,7	34,7	34,7
382	Non-electrical machinery	33,3	33,5	33,5	35,1	35,1
383	Electrical machinery	33,3	34,3	34,3	43,2	43,2
384	Transport equipment	33,3	33,3	36,3	49,9	49,9
385	Cameras, clocks, and measuring equipment	33,3	33,3	33,3	33,7	33,7
390	Other manufactured goods	33,3	34,5	37,7	45,1	45,1

*Sources: COMTRADE, Ukraine's legislation, own calculations*

**Table 5**

Results of regressions for two-digit ISIC Rev. 2

		c	output	wtv	tariff	hard	health	custom	d1997	d1998	d1999	d2000	No of obs	R <sup>2</sup>
31	Food, beverages and tobacco	-12,3***	0,3***	-0,1	-0,1	2,6	-3,3*	-2,0**	-0,4**	-0,2	-0,3	0,1	669	0,73
32	Textile, clothing, and leather industries	-13,3***	0,6***	-0,5***	-1,3	-4,1**	3,7	-1,9*	0,1	0,6***	0,7***	0,6***	647	0,84
33	Wood and wood products	-12,6***	0,4***	-0,4	6,8	-	2,9	-2,6**	0,1	0,4**	0,2	0,5*	282	0,82
34	Paper and paper products	-5,1**	0,3	-1,2***	-7,5***	5,1	3,9	-1,3	0,5***	1,3***	1,3***	1,4***	251	0,90
35	Chemical and petroleum products	-12,4***	0,5***	-0,5***	-1,1	0,8	5,3***	0,2	0,1	0,6***	0,6***	0,5***	649	0,89
36	Non-metallic mineral products	-10,0***	0,3**	-0,6***	-0,2	7,6	-7,2***	1,3	0,4**	0,9***	0,8***	0,7***	287	0,87
37	Basic metal industries	-2,4	0,5***	-1,7***	0,4	-421,8	-17,8	-4,4	-0,4	0,8***	0,6*	1,3***	94	0,83
38	Machinery and equipment	-13,9***	0,7***	-0,5***	-3,2*	2,6	-0,8	-1,6***	0,3***	0,9***	0,9***	0,9***	1240	0,83
39	Other manufactured products	-14,5***	0,8***	-1,1***	-6,7*	-29,5*	-9,1	12,7*	-0,1	0,8***	0,6**	0,6*	152	0,85

Note: \*\*\* means 1%, \*\* means 5%, and \* means 10%

**Table 6**  
Results of regressions for three-digit ISIC Rev. 2

	c	output	wtv	tariff	hard	health	custom	d1997	d1998	d1999	d2000	No of obs	R <sup>2</sup>
311 Food products	-7,9***	0,7***	-1,0***	0,0	-1,8	-3,7	-4,7***	-0,3	-0,4	-0,1	0,0	417	0,73
312 Food products not elsewhere classified, animal feeds	0,1	0,3	-1,2***	-0,4	-22,3***	-14,3**	-2,9	-0,1	1,4**	0,7	0,72	83	0,79
313 Beverages	-9,2***	0,1	-0,4	0,0	2,1	-0,8	1,6	-1,0	-0,3	-1,1	-2,1	131	0,61
314 Tobacco	-12,1	1,0**	-0,6	17,1	-1,2	-30,6*	5,5	2,6	3,1	1,1	-	38	0,94
321 Textile	-12,6***	0,7***	-0,9***	-3,5*	-1,1	24,2***	0,1	0,3	1,1***	1,3***	1,3***	338	0,87
322 Clothing	15,9*	1,0***	-2,6***	-28,2***	-11,2	-2,0	-39,8*	0,8**	2,1**	-0,23	-	73	0,85
323 Leather products	-12,5***	0,3**	-0,5**	-3,7	-	-4,2	6,6	-0,2	0,1	0,2	-0,2	163	0,77
324 Leather footwear	-3,0	0,7*	-2,1***	-8,0**	-7,6**	26,3	-0,8	-	-	-	-	73	0,81
331 Wood products, except furniture	-17,5***	0,3**	-0,3	61,5	-	17,2**	-	0,0	0,4	0,1	0,3	205	0,78
332 Furniture	-1,9	0,8***	-2,5***	-5,2	-	-	3,2	-	0,2	-0,5	-0,8	77	0,89
341 Paper and paper products	-2,6	0,4*	-1,7***	-10,5***	-	2,5	-0,3	0,7***	1,6***	1,6***	1,9***	208	0,89
342 Printing, publishing	-5,4	1,1**	-2,9**	13,1	6,5	-	5,6	-	0,9	1,2	0,1	43	0,93
351 Industrial chemicals	210,0**	0,6***	-0,8***	16,1	10,8**	4,8	-766,6**	-0,1	-0,1	0,3	0,6**	111	0,85
352 Misc. chemical products	-10,6***	0,5***	-0,8***	1,7	1,3	2,6	-0,1	0,3*	0,7***	0,6***	0,4**	318	0,91
353 Petroleum refineries	15,9	0,4	-1,8**	-301,4*	157,7***	16,2	-33,8*	-2,6	-2,4	-0,8	-	51	0,82
354 Misc products of petroleum and coal	-	-	-	-	-	-	-	-	-	-	-	-	-
355 Rubber products	-15,0***	0,9***	-0,8	3,1	-5,7	-0,6	2,4	-0,5	0,2	0,5	0,4	102	0,87
356 Misc plastic products	5,6	0,8*	-3,5**	-2,3	1,4	-19,9	7,2	-	1,2	0,8	1,5	49	0,97
361 Pottery, china and earthenware	-6,3	0,5	-1,3	2,6	-	5,8	0,2	-0,6	0,0	-0,1	-	66	0,82
362 Glass and glass products	-17,7***	0,6***	-1,3**	19,3**	-27,3*	-9,0	29,1***	0,7*	1,3***	-0,4	-	72	0,86
369 Other non-metallic mineral products	-21,2	0,2	-1,4***	-4,1	60,0***	-3,4	70,9	0,4*	0,7**	0,9***	0,2	149	0,89
371 Iron and steel	3,53	0,8***	-2,6***	-36,4	-	111,1**	-	-1,7***	-0,2	-1,4***	-	44	0,75
372 Non-ferrous metal	0,4	0,8**	-3,2***	0,7	11,5	25,2	8,8	-0,4	0,7**	0,2	-	50	0,92
381 Fabricated metal products	-8,3***	0,9***	-1,8***	-2,7	-6,7	4,4	-2,3***	0,4**	1,0***	1,2***	1,4***	253	0,86
382 Non-electrical machinery	-14,5***	0,8***	-0,5***	1,7	-2,5	2,2	-4,3	0,2	0,9***	0,9***	0,7**	376	0,84
383 Electrical machinery	-10,4***	0,7***	-1,1***	-1,6	0,1	2,0	-0,6	0,2	0,7***	0,7**	0,9***	280	0,81
384 Transport equipment	-14,1***	0,4**	-0,2	1,6	11,6**	4,4	-3,2	0,4	1,2***	0,7	1,2**	202	0,73
385 Cameras, clocks, and measuring equipment	-41,4***	1,2***	-1,0***	-29,7**	-3,0	1,0	83,8*	0,4	1,3***	1,6***	1,1***	129	0,91
390 Other manufactured goods	-14,5***	0,8***	-1,1***	-6,7*	-29,5*	-9,1	12,7*	-0,1	0,8***	0,6**	0,6*	152	0,85

Note: \*\*\* means 1%, \*\* means 5%, and \* means 10%

**Table 7**

Would the WTO membership make change? (two-digit classification)

		Tariff	Hard	Health	Custom	Would the WTO membership make change?
31	Food, beverages and tobacco	NS	NS	Negative	Negative	Not likely
32	Textile, clothing, and leather industries	NS	Negative	NS	Negative	Ambiguous
33	Wood and wood products	NS		NS	Negative	Not likely
34	Paper and paper products	Negative	NS	NS	NS	Likely
35	Chemical and petroleum products	NS	NS	Positive	NS	Ambiguous
36	Non-metallic mineral products	NS	NS	Negative	NS	Not likely
37	Basic metal industries	NS	NS	NS	NS	Not likely
38	Machinery and equipment	Negative	NS	NS	Negative	Ambiguous
39	Other manufactured products	Negative	Negative	NS	Positive	Ambiguous

*NS = no statistically significant relation***Table 8**

Would the WTO membership make change? (three-digit classification)

		Tariff	Hard	Health	Custom	Would the WTO membership make change?
311	Food products	NS	NS	NS	Negative	Not likely
312	Food products not elsewhere classified, animal feeds	NS	Negative	Negative	NS	Ambiguous
313	Beverages	NS	NS	NS	NS	Not likely
314	Tobacco	NS	NS	Negative	NS	Not likely
321	Textile	Negative	NS	Positive	NS	Ambiguous
322	Clothing	Negative	NS	NS	Negative	Ambiguous
323	Leather products	NS		NS	NS	Not likely
324	Leather footwear	Negative	Negative	NS	NS	Likely
331	Wood products, except furniture	NS		Positive		Ambiguous
332	Furniture	NS			NS	Not likely
341	Paper and paper products	Negative		NS	NS	Likely
342	Printing, publishing	NS	NS		NS	Not likely
351	Industrial chemicals	NS	Positive	NS	Negative	Ambiguous
352	Misc. chemical products	NS	NS	NS	NS	Not likely
353	Petroleum refineries	Negative	Positive	NS	Negative	Ambiguous
355	Rubber products	NS	NS	NS	NS	Not likely
356	Misc plastic products	NS	NS	NS	NS	Not likely
361	Pottery, china and earthenware	NS		NS	NS	Not likely
362	Glass and glass products	Positive	Negative	NS	Positive	Ambiguous
369	Other non-metallic mineral products	NS	Positive	NS	NS	Ambiguous
371	Iron and steel	NS		Positive	-	Ambiguous
372	Non-ferrous metal	NS	NS	NS	NS	Not likely
381	Fabricated metal products	NS	NS	NS	Negative	Not likely
382	Non-electrical machinery	NS	NS	NS	NS	Not likely
383	Electrical machinery	NS	NS	NS	NS	Not likely
384	Transport equipment	NS	Positive	NS	NS	Ambiguous
385	Cameras, clocks, and measuring equipment	Negative	NS	NS	Positive	Ambiguous
390	Other manufactured goods	Negative	Positive	NS	Positive	Ambiguous

*NS = no statistically significant relation*