Technical barriers to Trade in the European Union : Importance for the new EU members. An assessment for agricultural and food products.

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Paper prepared for presentation at the 11th congress of the EAAE
(European Association of Agricultural Economists),
The Future of Rural Europe in the Global Agri-Food System
Copenhagen, Denmark, August 24-27, 2005

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Abstract

This paper aims to assess the role of non-tariff barriers (NTBs) for new member states (NMSs) exports in the agri-food sector, in the period just before the EU accession actually stepped into force. The assessment is based on a detailed sectoral gravity model, which was enhanced with inclusion of different categories of NTBs: sanitary and phytosanitary measures (SPS), quality measures and import certificates. While the first two categories have implications primarily on production costs, the last category relates to transaction costs. SPS and quality measures do not so much act as barriers to trade for NMSs agro-food exports in the period immediately before joining the single market (year 2003), and their diminishing role, confirmed by the use of gravity modelling technique rather reflects the progress made in implementing the *acquis communautaire*. In contrast, import certificates still act as a barrier to trade, for reasons relating to the transaction costs involved. While developing the model on the product level, prices and two ratios of competitiveness (bilateral, global) were introduced, by which the multilateral resistance to trade is indicated.

Keywords: non-tariff barriers, Eastern European enlargement, *acquis communautaire*, gravity equation.

Acknowledgements:

This paper is based on the research results of cooperation project PAI Brancusi 2003-2004 (E.Chevassus-Lozza and V. Persillet from INRA Nantes, respectively M. Unguru and G. Turlea from IWE Romania) and it was further improved thanks to a two months research project sponsorship granted in 2005 by the French Embassy in Slovenia to D. Majkovič .

The authors wish to thank to Monique Harel (INRA Nantes) for her great support with the data.

I. Introduction

Why *acquis communautaire*, non-tariff barriers and agri-food sector? Since the single European market (SEM) was established, the free movement of goods has been facilitated not only by removing border formalities, but also by the technical harmonisation of national legislation in each member state. Particularly in the agri-food sector, it is further regulated by the European Food Safety and Consumer Information policy, in order to guarantee the safety and integrity of products, irrespective of the country of origin. This is why vis-à-vis third countries the existence of strict regulation, when their agro-food products enter the EU market, is implied.

In the case of EU enlargement, SEM accession is conditional upon the candidate countries' accepting the obligations of the internal market, and therefore accepting these principles of free trade. So before joining the single market, the candidate countries have on one hand to adopt the *acquis communautaire*, which refers in our case to technical harmonisation of production. On the other hand, implementation of the free movement of goods principle means in theory the abolition of all tariffs and non-tariff barriers (NTBs) for trade within the enlarged EU. Thus, it is very likely that after successfully fulfilling all the requirements, in addition to the elimination of physical borders new member states (NMSs) should benefit by abolishment of the tariff barriers and NTBs and likely reduction of transaction costs and delays.

Due to the recent EU enlargement one is not able to draw yet conclusions about the effect that the lifting of trade barriers actually has on trade flow between the EU and the Eastern European countries[1] (Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovak Republic and Slovenia). However, we might observe the NMSs trade performance just immediately before joining the EU. In this period, despite preferential trade agreements, the NMSs were essentially subject to the same access regulations to the EU market as any third country.

This paper aims to assess the role of NTBs for NMSs exports in the agri-food sector, in the period immediately leading up to accession. We assume that as soon as NMSs have fulfilled the production requirements, they overcome trade barriers. Avoiding the ongoing debate about justification of putting respective NTBs into force, we don't judge about the legitimacy of respective barrier. Instead we are assessing their impact on trade flow. More specifically, we are looking at the measures that determine the entry of products into the European market, whether technical measures (e.g. labelling standards, import certificates) or measures to protect the consumer (e.g. sanitary, phytosanitary).

Although there is a wealth of articles that evaluate the impact of enlargement on trade, few studies focus specifically on the tariff and non-tariff impact that enlargement of the single market can have on trade. We may mention few recent articles: (Manchin *et al*., 2003), (Nahuis, 2004) and (Maliszewska, 2003). Using either a CGE or a gravity model, they have tried to estimate the importance of border effects for the trade between NMSs and EU. The default hypothesis was that the potential trade gain is due partially to the lifting of the barriers at the EU border. Manchin *et al.* (2003), following Brenton *et al.* (2001), carry out their analysis on the basis of the typology of the technical regulations, and more precisely on the approach adopted by the EU to harmonize the regulations within the single market. Nahuis (2004) shows that the highest border effects exist and implicitly the highest trade gains are likely to occur in the agricultural and food sector. Chen (2004) takes into account tariffs and NTBs while explaining the persisting border effects among EU members both on country and industry level. She explains NTBs are not significant in the Single European market (also see Head and Mayer, 2000). The result about non-significance of NTBs in intra EU trade is somehow expected – they no more act significantly once the standards in SEM are met. In this study we use a gravity model, defined at a highly disaggregated level. In addition to the classical determinants and in conformation with the theoretical foundations explaining gravity equations (e.g. Anderson and van Wincoop, 2001 and 2004, Head and Mayer, 2000, Mayer and Zignago, 2005), our model includes specific variables to designate tariffs and NTBs. In this way, we propose an alternative for the well-known measurement problem of the complex NTBs system. Previous studies have tended to regard NTBs largely as the residuals of a gravity model, though there also statistical approaches exist which rely on data about the number of regulations, detentions at the border, or complaints received by international bodies. While evaluating the importance of trade barriers one usually makes use of the frequency of standards applied at the entrance to the markets. But the number of standards is

[1] In the rest of the paper we will refer to this group of countries as eight new member states (NMS)

a poor proxy for the trade restrictiveness of the whole regulatory set (Beghin and Bureau, 2001). Our analysis is based on customs legislation, which indicates general conditions for access to the SEM for respective product. For determination of the access conditions we introduce three dummy variables. These comprise *sanitary and phytosanitary measures* (*SPS*), *import certificates* (these certificates consist of validity of import permit, maximum trade volume, and for some products guarantee deposit) and *quality* measures (commercialisation regulations, including commercial characteristics such as freshness, standardization, conditioning and labelling), which represent level of NTBs in our empirical analysis. Quality and SPS measures demand the producers' adoption to the European technical standards, while import certificates represent pure transaction costs. In this context, our work is based on two assumptions:

- Import certificates, which generate transaction costs, become obsolete in the moment when enlargement steps into force. They should act as a trade barrier until the date of accession.
- The other two groups of measures do no longer represent trade barriers from the moment they are met by the producers. A comparison of the impact of these regulations has had on NMS exports between 1999 and 2003 indicates the progress in the implementation of the *acquis communautaire*.

In the paper we study role of NTBs in the case of agricultural and food sector of Eastern NMS. What can we learn from the progress of NTBs acting as trade barriers and their impact on trade flows, is further explained in the paper, which is structured as follows: (i) the theoretical derivation of the model is followed by the description of (ii) data sources, (iii) the application of model with the results derived, while with section (iv) we conclude.

II. The model

Gravity models are one of the most common options for a study of bilateral flows between countries. The debate about the theoretical foundations of the gravity equation has been widely spread among researchers who find groundings for the equation in the new international economics theory (see also Anderson and van Wincoop, 2001; Evenett and Keller, 2002; Head and Mayer, 2000; Mayer and Zignago, 2005). Such models have been used also as instruments to assess the importance of border effects, among which NTBs. Usually they are defined at a very aggregated level.

But the gravity-type model has been also employed for studies at industry-level (Head and Mayer, 2002), (Chen, 2004), (Nahuis, 2004), (Manchin et al.,2003).

Due to the importance of border effects (notably NTBs) for the agri-food products when entering SEM (Nahuis, 2004), we intend to look more closely to the role NTBs in the NMSs exports to the EU market. We have been interested to conduct a detailed analysis of the agri-food sector, not in comparison with other economic sectors, but to explain the role of tariffs and NTBs as impediments to trade in this specific sector. Furthermore, the meaning of these trade obstacles on time scale of NMSs accession period is illustrated by taking into account the two years: 1999 and 2003 as the last year before the EU entry for NMSs actually took place. Therefore a sectoral gravity model has been used. Below we present into details the specification of the model and the econometric method we have used for estimations.

1. The model specification

The model proposed hereafter is based on the new developments of gravity equation made notably by Anderson and van Wincoop (2001). The main contribution of their paper is the use of the CES expenditure system to derive an operational gravity model. A similar approach is proposed by Head and Mayer (2000) and Mayer and Zignago (2005), while determining the market access.

We assume that all goods are differentiated by place of origin, the supply of each being fixed and the consumer demand being defined by a CES utility function. In 1979 Anderson presented a theoretical foundation for the gravity model based on CES preferences and goods that are differentiated by region of origin. We assume also, in this paper, that the consumer follows a two-step budgetary procedure. In the first step, the importing country's consumers define the import demand, choosing between domestic and imported products, in order to satisfy the total demand. In the second step, the import demand is differentiated by country of origin. Because we analyse the access to the

European market, we only focus on this second step of the budgetary constraint, under the assumption that the first one is already done and thusly the total demand of import already defined. Thus, at the second step, the representative consumers from country *j* maximise a utility function of CES type for the product *k* with the geographical repartition of its imports from countries *i*:

$$U_{jk} = \left(\sum_i b_{ik}^{(1-\sigma)/\sigma} M_{ijk}^{(\sigma-1)/\sigma} \right)^{\sigma/(\sigma-1)} \quad (1)$$

Where: *j* denotes the importing country, *i* is its trading partner and *k* the product exchanged. M_{ijk} is the import quantity of product *k* originating from *i* consumed in country *j*. b_{ik}represents a parameter, which can be considered as the level of consumers' preference for imports of product *k* originating from *i*. σ is the elasticity of substitution of imports of *j*. This utility function is subject to the budget constraint:

$$m_{jk} = \sum_i P_{ijk} M_{ijk} \quad (2)$$

Where: m_{jk} is the total expenditure of *j* for the imported product *k* and was defined in the first step of budgetary procedure. P_{ijk} is the price of product *k* from region *i*, paid by consumer in *j*. Delivered price P_{ijk} differs from exporter's supply price P_{ik} due to trade costs, which are not directly observable. Trade costs are (Anderson and Wincoop, 2004) broadly defined to include all costs incurred in getting a good to a final user other than the production cost of the good itself. Then $P_{ijk} = P_{ik} T_{ijk}$ where T_{ijk} is the bilateral trade resistance (or in other words trade costs factor) for which the assumption was made that it encompasses tariffs, transport costs (proxied by distance), and non-tariff barriers. The nominal value of exports from *i* to *j* for product *k* is:

$$x_{ijk} = P_{ijk} M_{ijk} \quad (3)$$

Total value of exports of *i* is then on product level:

$$x_{ik} = \sum_j x_{ijk} \quad (4)$$

Solving the consumer utility function (1) given the budget constraint (2), we obtain the nominal demand of product *k,* originating from *i*, by the consumers in region *j*:

$$x_{ijk} = \left(\frac{b_{ik} P_{ik} T_{ijk}}{P_{jk}} \right)^{(1-\sigma)} m_{jk} \quad (5)$$

Where P_{jk} refers to country *j*'s CES index price for product *k*, related to *j*'s overall import price of product *k*. From [4] and [5] and with market clearance condition we derive to:

$$x_{ik} = \sum_j x_{ijk} = \sum_j \left(\frac{b_{ik} P_{ik} T_{ijk}}{P_{jk}} \right)^{1-\sigma} m_{jk} = (b_{ik} P_{ik})^{1-\sigma} \sum_j \left(\frac{T_{ijk}}{P_{jk}} \right)^{1-\sigma} m_{jk} \quad (6)$$

To derive the gravity equation, we follow Anderson approach by solving for the scale prices ($b_{ik} P_{ik}$) from the market clearing condition (6). Denoting by Y_{wk} the total world trade for product *k* (sum of total imports for product *k* of all countries *j*), $Y_{wk} = \sum_j m_{jk}$ and assuming size of respective *j* as $\theta_{jk} = \frac{m_{jk}}{Y_{wk}}$, we obtain the following equation of the bilateral trade:

$$x_{ijk} = \frac{x_{ik} m_{jk}}{Y_{wk}} \left(\frac{T_{ijk}}{\Pi_{ik} P_{jk}} \right)^{1-\sigma} \quad \text{with} \quad \Pi_{ik} \equiv \left(\sum_j \left(\frac{T_{ijk}}{P_{jk}} \right)^{1-\sigma} \theta_{jk} \right)^{1/(1-\sigma)} . \tag{7}$$

In (7), index Π_{ik} defined by Anderson and Wincoop is introduced:

$$\Pi_{ik} = \left(\sum_j \left(\frac{P_{ijk}}{P_{jk} P_{ik}} \right)^{1-\sigma} \theta_{jk} \right)^{1/(1-\sigma)} = \left(\frac{1}{P_{ik}} \right)^{1-\sigma} \left(\sum_j \left(\frac{P_{ijk}}{P_{jk}} \right)^{1-\sigma} \theta_{jk} \right)^{1/(1-\sigma)} . \tag{8}$$

The ratio $\Psi_{ijk} = \frac{P_{ijk}}{P_{jk}}$ may be interpreted as the price competitiveness of *i* on the market *j* for product *k*. From this we derive to ψ_{ik} index of global price competitiveness of *i* on all of its markets:

$$\left(\sum_j \left(\frac{P_{ijk}}{P_{jk}} \right)^{1-\sigma} \theta_{ik} \right)^{1/(1-\sigma)} = \left(\sum_j \left(\Psi_{ijk} \right)^{1-\sigma} \theta_{ik} \right)^{1/(1-\sigma)} = \Psi_{ik} . \tag{9}$$

Finally, if we define $\overline{\Psi}_{ijk} = \frac{P_{ik}}{P_{jk}}$ as cost-competitiveness of *i* on the market *j*, we may introduce in the gravity equation elements of competitiveness:

$$x_{ijk} = \frac{x_{ik} m_{jk}}{Y_{wk}} \left(T_{ijk} \frac{\overline{\Psi}_{ijk}}{\Psi_{ik}} \right)^{1-\sigma} . \tag{10}$$

The ratio $\frac{\overline{\Psi}_{ijk}}{\Psi_{ik}}$ compares the competitiveness of *i* on *j* to its global competitiveness. In other words, if *i* is more competitive on the market *j* than on all its other markets, this may stimulate its bilateral trade with *j*. Conversely, if *i* is less competitive on *j* than on its other markets, this will reduce its bilateral trade with its partner *j*. This finding is in conformation with Anderson and van Wincoop (2001), who argue that the key implication of the theoretical gravity equation is that trade between regions is determined by relative trade barriers. Trade between two regions depends on the bilateral barrier between them relative to the average trade barriers that both regions face with all their trading partners. Here we must stress out the term of multilateral resistance. The latter, as the composition of three components: (i) the bilateral trade barrier between regions *i* and *j*, (ii) *i*'s resistance to trade with all regions, and (iii) *j*'s resistance to trade with all regions, is founded by afore mentioned authors. Even though they have underlined, from a theoretical point of view, the importance of this multilateral resistance term, they have also pointed out its unobservability and while developing model further, they replaced it by dummies. Since we work at a very disaggregated product level, our development of Anderson and Wincoop's term allows us to measure multilateral trade resistance under certain necessary assumptions by this ratio of competitiveness. When deriving to the estimation equation, we say that $X_{ik} = x_{ik} / \widetilde{P}_{ik}$ is the total quantity of export of *i* for *k* with $\widetilde{P}_{ik}$ representing the price of total export of *i* on the product (*k)* level, $M_{jk} = m_{jk} / P_{jk}$, $X_{ijk} = x_{ijk} / P_{ijk}$ and $\frac{\widetilde{P}_{ik}}{P_{wk}} \cong \psi_{ik}$. So equation (10) becomes:

$$X_{ijk} = \frac{M_{jk} X_{ik}}{Y_{wk}} \left(\frac{T_{ijk} \overline{\psi}_{ijk}}{\psi_{ik}} \right)^{-\sigma} \tag{11}$$

In order to specify T_{ijk} - bilateral trade resistance – we follow Péridy (2005). We assume that it may be decomposed into different factors: the distance d_{ij} between *i* and *j* which is a proxy of transport costs, tariffs applied by *i* towards *j* (t_{ijk}) and non-tariff barriers (NTB_{ijk}) and other border variables (B_{ijk}), e.g. common border, common language. This latter effect captures any remaining unobserved trade resistance effect. Then $T_{ijk} = \left(d_{ij}^{\rho} t_{ijk}^{\theta} NTB_{ij}^{\psi} B_{ij}^{\zeta} \right)$ and the gravity equation expressed in quantity becomes:

$$\ln X_{ijk} = \alpha_0 + \alpha_1 \ln M_{jk} + \alpha_2 \ln X_{ik} + \alpha_3 \ln Y_{wk} + \alpha_4 \ln d_{ij} + \alpha_5 \ln t_{ijk} + \alpha_6 (\ln \overline{\psi}_{ijk} - \ln \psi_{ik}) + \alpha_7 \ln NTB_{ijk} + \alpha_8 \ln B_{ijk} + \varepsilon_{ijk} \tag{12}$$

Where: α_0 is a constant.

α_1 and α_2 should be equal to one. The theoretical gravity equation imposes unitary income elasticities.

$\alpha_3 = \rho(-\sigma) < 0$ with $\sigma > 1$ the CES elasticity: the larger the distance between *i* and *j*, the more important the transport cost and the lower the trade flow between the two countries.

$\alpha_4 = \theta(-\sigma) < 0$: the larger the tariff, the lower the export.

$\alpha_5 = (-\sigma) < 0$.

The sign of α_7 is not defined (see OECD 2002, Beghin and Bureau, 2001) and it depends on the nature of the regulation. This shows that it may act as a barrier in a first instance, when products do not meet certain standards while, as soon as the standards are met, it may facilitate the trade.

2. The econometric method

In most recent studies estimation of gravity equations in panel data is often used (see Péridy, 2005, Egger and Pfaffermayr 2003, Egger 2004). In this paper, we choose a cross-section analysis in order to compare the dynamics of the role of various trade barriers (1999 and 2003) and by this answer the questions from the beginning of the empirical research, about the changing role of NTBs over time.

Insofar as one of our objectives is to assess the impact of different trade barriers and more precisely to point out those which prohibit trade, we must take into account not only the actual bilateral trade but also "zero values" i.e. all the potential bilateral flows. Thus, possible econometric method for this purpose is Heckman procedure (Heckman, 1979). Due to the phenomena observed, the appropriate procedure in our case is to model the decisions that produce zero values (the decision to export or not), rather than to use the censored regression tobit model mechanically, where zero values are assumed to appear due to censoring (Maddala, 1992).

While checking for possible endogeinity of the total exports (supply of the NMS-8 respective country), we should use instrumented variables. Instead of this, we have moved the total exports to the left side of the equation, regressing by this way not the volume of the bilateral flow but the share of this flow in the total export of the country. This solution, used also by Anderson and Wincoop, (2001) or Head and Mayer (2000) eliminates the possible endogeneity and constraints the coefficient of the total export to be equal to 1.

III. The data

1. The sources

Several sources have been used:

- *Eurostat* for trade, data has been aggregated to 4 digits level (Combined Nomenclature), i.e about 155 products. This level of disaggregation is still consistent with the border regulations applied by the EU
- *The French customs* (http://www.douane.gouv.fr/) which hosts the electronic version of EU border regulations. This website contains notes at a more disaggregated level of the nomenclature (12 digits + a key letter), but they are in fact homogeneous at the 4 digits level. These notes mention the official sources where the regulations are available in details and provide support for successful implementation of the legislation (like list of documents needed for crossing the EU border).
- *TARIC Database* (DG XXI) for tariff applied by EU to NMS-8
- *CEPII* (http://www.cepii.fr) for distance between countries.

2. The variables

Besides the straightforward variables (on exports and imports), in our regression (equation (12)) some variables need further explanations. Thus, d_{ij} is the distance between the two capitals of *i* and *j*.

t_{ijk} denotes the tariff applied by the EU country *j* to the NMS *i*, for the product *k*. It is the same whatever the EU country, due to the common commercial policy. Then, it is rather t_{ik} , than t_{ijk} . Because we wanted to avoid the elimination from the estimations of the products with no tariffs ($\ln t_{ijk} = \infty$), we transformed the variable in the following way ($\ln t_{ijk} = \ln(t_{ijk} + 1)$).

$\overline{\Psi}_{ijk}$ the bilateral competitiveness is the ratio between the export price of *i* on the market *j* and the import price of *j* for the product *k*.

Ψ_{ik} is the index of global competitiveness of *i* on all its markets for the product *k.* It is the weighted average of the competitiveness of *i* on each market *j*, the weight being calculated as the share of market *j* in the total trade of *k*.

η_i is a country specific effect introduced to catch specificity of each NMS-8.

The sectoral specificity is captured by product dummies, aggregated into three sectors (μ_s): animals and animal products (CN chapters 1 to 5), vegetable products (CN chapters 6 to 14) and processed products (CN chapters 15 to 24).

NTB_{ijk} is a set of three dummy variables for non-tariff barriers: SPS, quality and import certificate.

$B_{ijk} = B_{ij}$ is a dummy variable equal to 1 if the two country partners share a common border, equal to 0 otherwise.

IV. Results and discussion

The increase of total exports of NMS-8' agri-food products over 1999-2003 period has been noticeable. But all NMSs except Hungary, are remaining net importers of agricultural and food products. In 2003 the EU market represented 42% of total agri-food exports of NMS-8. Conversely to what one could have been expected in the pre-accession period, the orientation of NMS-8 agri-food exports towards EU has hardly increased between 1999 and 2003 (Table 2, Appendix 1). Except for processed products, they have increased less than their total exports. At the same time, EU remains one of the strongest exporters to NMSs region. Only Poland, Hungary and Baltic states had boosted their trade relationships with EU partners. For some of NMS-8, especially for processed products, EU

destination stays on a marginal position in their total exports. For instance, in 2003 the share of EU in total Latvian exports of agri-food processed products was only 5.3%.

In the context of EU enlargement, the agreements for reduction EU tariff applied to candidate countries were expected to encourage the bilateral trade between the two regions, although, the tariff liberalization between EU and NMSs has been established to take place gradually, to a slower pace for agri-food products. As a result of these agreements, the tariff protection has been diminished, but one year before the recent enlargement, NMS-8 still had to face quite high tariff when entering the EU markets (overall products, 9,4%, as shown in Table 3, Appendix 1). The highest reduction took place for animals and animal products (from 24.7% to 7.7%). Despite the decrease in tariff protection, this group of products didn't gain market share on EU markets, most probably due to the strong sanitary regulations. Furthermore, as Hartmann and Schornberg (2004) report, in the meat processing industry there are still considerable variations among respective NMS about meeting the EU standards in the form of gaining the import sanitary certificate (in the Czech Republic and Hungary about 70% of meat production, in Slovenia around 80% for cattle and 95% for poultry production, while in Poland, Estonia and Lithuania only about 30% of meat production meet the standards).

Results for year 1999

From econometric point of view, the two steps in modelling (selection procedure through probit and regression on export volume) are not independent (value of the Chi2), which justifies the use of the Heckman procedure.

Our results for coefficients of 'classical' variables are in line with expectations from a gravity model. First, the volume of bilateral trade increases with *the size of the trading partners*. Second, the *distance* discourages the trade: more the countries are far away from each other, less the probability to trade between them. Third, the *common border* stimulates the trade; the probability for trade between the neighbouring countries is increased.

In the estimations, following our model, we have introduced two measures of competitiveness. The first, most common one, which catches the bilateral competitiveness, is significant and has the expected sign: the highest the price of the exporting country on the market, the lowest the volume of trade. The second one ladles the global competitiveness: less competitive is the exporting country on its other markets, more it will trade with a given bilateral partner. This result is in accordance with the Anderson and van Wincoop assumption about the impact of multilateral resistance on trade.

In 1999, the tariffs that the EU imposed on agri-food imports represented the greatest barrier for NMS-8 exports and inhibited trade flow, thus impeding their competitiveness. Despite the European agreements, the tariffs were high – 18.5% in average (see table 3, Appendix).

SPS, quality and import certificate act as import barriers (probit) and they also inhibit exchange volume.

a. The Sanitary and Phytosanitary regulations are measures aimed at guaranteeing sanitary standards, and are very strict. Above all, general procedure is that any exporting country trying to sell products on the European market has to be on the list of authorized countries, particularly if exporting animal products. In 1999, all NMS were on this list, and were therefore able to export to any European country. Once a country is on the list, all its exports are subject to numerous SPS varying from product to product e.g. type of disease, final use of the product. Products as such have to be accompanied by a certificate guaranteeing that they conform to European standards.

Our results show that in 1999 these SPS act as an entry barrier for imports originating from NMS-8. The *probit* coefficient (-0.3203) quantifies the importance of this barrier. These regulations also significantly limit the *volume* of NMS-8 imports to the EU. According to OECD (2002), this result is quite puzzling: one could assume that once a product has entered the European market, it conforms to the regulated standards, and that therefore the regulations would no longer act as barriers, but rather stimulate trade flow. There are several possible explanations.

The first one is due to the level of our observation; the analysis is performed at country - not company - level. However, once the country is on the list of the authorized exporting countries, the standard acts at the company level: the firm must fulfil the requirements of the standard to obtain the agreement to export to the EU market. Then the volume of trade will depend on the number of firms fulfilling the prerequisites. The results of the regression show that, after controlling for the size, the

distance and tariffs, the NMSs do not export at their potential due to the fact that some exporting firms did not fulfil the standard. A further reason could be that our results simply highlight the negative brand image of NMS products, in respect to sanitary and phytosanitary standards. In 1999, consumers still had limited confidence in NMS products, although these products fulfilled European requirements.

b. Quality. This variable comprises all the regulations for import quality control (particularly in the fruit and vegetables sector), commercialisation regulations, including commercial characteristics such as freshness, standardization, conditioning and labelling (e.g. for sea products, eggs) and origin (label, various compulsory information). The role of this variable as a barrier to entry is not negligible, though much less important that the sanitary and phytosanitary regulations. Nevertheless, these regulations limit the volume of trade.

c. *Import certificates* appear in both steps of estimation procedure, affecting not just the decision to export or not, but also the volume of actual export. These certificates are different from those required by the sanitary and phytosanitary regulations. They exist for certain products (certain meats, dairy products, fruit and vegetables, grain, sugar and wines) and they consist of validity of import permit, maximum trade volume, and for some products guarantee deposit. They increase the transaction costs and act as a technical barrier to trade.

Comparison between 1999 and 2003

The adoption of the *acquis communautaire* and the stage reached in the integration progress can be better understood by comparing the situation of 1999 with that of 2003. Regarding NTBs, one has to distinguish between "SPS" and "quality" on the one hand, and "import certificate" on the other. The first two require the exporting countries to realign themselves to European legislation. The results for 2003 reflect the process of adopting the European standards. Though the variable "quality" still appears in the *probit*, it no longer influences the volume of trade flow. We confirm that the adoption of the *acquis communautaire* in the field of the labelling was done before the enlargement as shown by Gasté (2003).

In the case of SPS, the lower value of the coefficient (compared to 1999) would indicate that the number of firms fulfilling the standards has increased, but SPS still acts as a trade barrier although in lesser extent than in 1999. This finding highlights the necessity for transitional periods for implementation of the *acquis communautaire* after the enlargement, for certain firms mostly in dairy and meat sectors. During this transitional period, these firms will have to meet the standards of the European production rules and meanwhile their products can only be sold within the country, but not on the wider European market. At the end of the transitional period in 2006, firms that will not meet these obligations will have to close.

The coefficients of the variable *import certificates* remain significant. This result is expected in the sense that these certificates represent transaction costs applied to all imports from all non-EU countries (NMS included). These costs can only be removed once the country becomes member of the SEM. Thus, with their accession to the EU, the lifting of this barrier should stimulate trade of NMS.

The lower tariffs (but still present in 2003: 9.4% in average) play a lesser role. The influence of other variables, such as distance and border, on the export volume is also decreasing. It is obvious that distance will always remain an obstacle to trade flow, but in 2003 it influences the volume of trade less than in 1999. Does this mean that the distance variable is not merely a proxy for transportations costs, but that it also contains costs related to market information, which are generally increasing with the distance between countries? In other words, would the reduced role of distance on volume trade reveal some improvement in NMS-8' knowledge of the EU market in the pre-accession period?

Table 1: The determinants of NMS-8 exports towards EU markets. Comparison between 1999 and 2003.

	YEAR 1999			YEAR 2003		
	Coef	Std.Err.		Coef	Std.Err.	
$\ln(X_{ijk} / X_{ik})$						
Total Imports M_{jk}	0,5243	0,0305	*	0,5684	0,0307	*
Bilateral competitiveness $\overline{\Psi}_{ijk}$	-0,5610	0,0446	*	-0,6493	0,0432	*
Global competitiveness Ψ_{ik}	0,2413	0,0536	*	0,3590	0,0548	*
Distance (d_{ij})	-2,0282	0,1134	*	-1,8651	0,0977	*
Applied tariff (t_{ijk})	-2,9194	0,4507	*	-1,8521	0,3961	*
SPS	-0,6322	0,1197	*	-0,2525	0,1074	*
Import certificate	-0,2809	0,1205	*	-0,5080	0,1053	*
Quality	-0,3118	0,1203	*	-0,0741	0,1067	NS
Common border	1,0015	0,2035	*	0,7943	0,1828	*
Animal products (reference)						
Plants, fruits and vegetables	-1,0654	0,1689	*	-0,5673	0,1425	*
Processed products	-1,3892	0,1598	*	-1,3901	0,1395	*
Poland (reference)						
Estonia	-1,3957	0,2099	*	-1,0235	0,1738	*
Latvia	-1,7053	0,3072	*	-1,7609	0,2551	*
Lithuania	-0,7545	0,2454	*	-0,8734	0,1893	*
Czech republic	-1,7992	0,1731	*	-1,7221	0,1587	*
Slovak republic	-2,3154	0,2431	*	-2,4801	0,2134	*
Hungary	0,1395	0,1457	NS	-0,0607	0,1392	NS
Slovenia	-1,0523	0,2172	*	-1,3514	0,2131	*
_cons	2,8864	0,7951	*	1,2815	0,6723	*
Select (Probit)						
Total Imports M_{jk}	0,1495	0,0082	*	0,1574	0,0085	*
Total exports X_{ik}	0,2086	0,0066	*	0,2114	0,0070	*
Distance (d_{ij})	-0,6588	0,0289	*	-0,6474	0,0281	*
Applied tariff (t_{ijk})	-0,2452	0,1280	*	-0,4370	0,1246	*
SPS	-0,3203	0,0344	*	-0,2726	0,0333	*
Import Certificates	-0,2169	0,0353	*	-0,2532	0,0332	*
Quality	-0,0848	0,0350	*	-0,0954	0,0339	*
Common border	0,3003	0,0683	*	0,3302	0,0692	*
Animal products (reference)						
Plants, fruits and vegetables	-0,3633	0,0489	*	-0,2997	0,0449	*
Processed products	-0,3149	0,0468	*	-0,3359	0,0442	*
Poland (reference)						
Estonia	-0,4570	0,0599	*	-0,1462	0,0575	*
Latvia	-1,0648	0,0731	*	-0,9060	0,0675	*
Lithuania	-0,9634	0,0591	*	-0,6968	0,0529	*
Czech republic	-0,8640	0,0473	*	-0,8309	0,0482	*
Slovak republic	-1,3441	0,0567	*	-1,2988	0,0565	*
Hungary	-0,3196	0,0452	*	-0,3165	0,0479	*
Slovenia	-0,7815	0,0582	*	-0,9179	0,0615	*
_cons	2,0262	0,2215	*	1,7764	0,2172	*
LR test of indep. eqns	chi2(1) = 420	Prob > chi2 = 0.0000		chi2(1) =360	Prob > chi2 = 0.0000	
Censored observations	8073			7743		
Uncensored observations	2954			3169		

V. Conclusion

The central issue of this paper is to examine the role of NTBs in the NMSs trade performance just before accessing SEM. What can we learn while observing the role of NTBs during the process of EU Eastern enlargement? For investigation on this topic, the gravity modelling technique has been used. By this we indeed do not observe the impact of NTBs on the overall welfare, but we might contribute to more precise comprehension of sometimes puzzling explanations of NTBs' true nature. For this reason, we have defined three dummy variables, which ladle NTBs in our model: SPS, quality and import certificates.

The analysis of the determinants of NMSs exports to the EU was performed by use of a model defined at a very disaggregated level. The model shows stable results for variables, which are considered to be "classical" in gravity models. More precisely, it shows that the volume of bilateral trade increases with the size of trading partners, and that distance discourages trade, while common borders increase the probability of trade between neighbours. Lowered tariffs in 2003, compared to 1999, play lesser role. In our model we have introduced prices and developed the term of multilateral resistance by introducing two ratios of competitiveness: bilateral and global. They result in conformation with theory: the higher the relative price of respective product on a given market, the lower the level of trade. And, from global perspective – less competitive the country on a global market, more it will trade with a given bilateral partner. The results of our model also reveal that in 1999, the three NTBs acted indeed as obstacles to trade. In the period immediately before joining the SEM, their role has diminished, but most notably for SPS and quality. The change of size of their coefficients between 1999 and 2003 can be interpreted as an indication of the progress made by NMSs in implementing the *acquis communautaire* in the pre-accession period. It is very likely that the restructuring and modernization in these countries as a request for EU accession brought progress in harmonization of production standards with those of EU. Therefore, some of NTBs do not represent any more as a real obstacle for them when entering the EU market.

References

Anderson, J.E.(1979). A Theoretical Foundation for the Gravity Equation. American Economic Review 69: 106-116.

Anderson, J. E. and van Wincoop, E. (2001). Gravity with gravitas: A solution to the border puzzle. Cambridge: MA.

Anderson, J.E., and van Wincoop, E. (2004). Trade costs. National Bureau of Economic Research Working Paper # 10480.

Brenton, P., Sheehy, J. and Vancauteren, M. (2001). Technical barriers to trade in the European Union: Importance for accession countries. Journal of Common Market Studies 39: 265-284.

Bureau, J.-C. and Beghin, J. C. (2001). Quantitative policy analysis of sanitary, phytosanitary and technical barriers to trade. Economie Internationale: 107-130.

Chen, N. (2004). Intra-national versus international trade in the european union: Why do national borders matter? Journal of International Economics 63: 93-118.

Egger, P. and Pfaffermayr, M. (2003). The proper panel econometric specification of the gravity equation : A three-way model with bilateral interaction effects. Empirical Economics 28: 571-580.

Egger, P. (2004). On the problem of endogenous unobserved effects in the estimation of gravity models. Journal of Economic Integration 19: 182-191.

Evenett, S.-J. and Keller, W. (2002). On theories explaining the success of the gravity equation, Journal of Political Economy 110(2): 281-316.

Gasté, A. G. (2003). L'adoption de l'acquis communautaire en matière de libre circulation des denrées alimentaires : L'exemple de la Pologne. Mémoire de DESS : Droit de l'agro-alimentaire, Nantes. Université de Nantes.

Hartmann, M. and Schornberg, S. (2004). Is Meat Processing in Central and Eastern European New Member States Competitive after EU Accession? EuroChoices (3)1: 26-30.

Head, K. and Mayer, T. (2000). Non-Europe: The Magnitude and Causes of Market Fragmentation in the EU.

Head, K. and Mayer, T. (2002). Effet frontière, intégration économique et "forteresse europe". Economie et Prévision: 71-92.

Heckman, J.-J. (1979). Sample selection bias as a specification error. Econometrica 47: 153-61.

Maddala, G. S., 1992. Introduction to Econometrics. 2nd edition. Prentice Hall International Editions.

Maliszewska, M. (2003). EU enlargement: Benefits of the single market expension for current and new member states. Center for Social and Economic Research, Warsaw.

Manchin, M. and Pinna, A. M. (2003). Border effects in the enlarged EU area. Evidence from imports to applicant countries. Center for European Policy Studies.

Mayer, T. and Zignago, S. (2005). Market Access in Global and Regional Trade. CEPII Working Paper 2: CEPII.

Ministère de l'agriculture (2002). Les mesures vétérinaires et phytosanitaires. Les dossiers de la PAC: 1-20.

Nahuis, R. (2004). One size fits all? Accession to the internal market; an industry-level assessment of EU enlargement. Journal of Policy Modelling 26: 571-586.

OECD (2002). Vue d'ensemble des obstacles non tarifaires : Résultats des enquêtes auprès des entreprises. OECD, Paris.

Peridy, N. (2005). Towards a new trade policy between the USA and Middle East countries: Estimating trade resistance and export potential, World Economy 28(4): 491-518.

Appendix 1

Table 2. The position of the EU in NMS foreign trade: Changes in the value of NMS-8' agri-food exports to the EU between 1999 and 2003

		Exports in 1999		**Exports in 2003**		**Changes 2003/1999**	
		Total (thou €)	*EU's share (%)*	Total (thou €)	*EU's share (%)*	Total exports *(%)*	Exports to EU *(%)*
Estonia	Animals and animal prod.	86888	*40.3*	147917	*50.5*	*70*	*113*
	Vegetable products	13781	*39.6*	20219	*63.6*	*47*	*136*
	Processed products	60567	*9.4*	123137	*12.5*	*103*	*169*
	Total	161236	*28.6*	291273	*35.3*	*81*	*123*
Latvia	Animals and animal prod.	24923	*59.2*	41077	*62.4*	*65*	*74*
	Vegetable products	8030	*15.8*	36106	*37.0*	*350*	*951*
	Processed products	44508	*7.6*	92017	*5.3*	*107*	*42*
	Total	77461	*25.1*	169200	*25.9*	*118*	*126*
Lithuania	Animals and animal prod.	125170	*26.0*	207423	*26.9*	*66*	*71*
	Vegetable products	56760	*22.1*	137873	*25.9*	*143*	*185*
	Processed products	91903	*29.2*	244061	*33.9*	*166*	*208*
	Total	273833	*26.3*	589357	*29.6*	*115*	*142*
Poland	Animals and animal prod.	623523	*52.3*	1060463	*55.1*	*70*	*79*
	Vegetable products	644695	*53.0*	839759	*52.0*	*30*	*28*
	Processed products	664161	*31.3*	982628	*40.5*	*48*	*91*
	Total	1932379	*45.3*	2882850	*49.2*	*49*	*62*
Czech Rep.	Animals and animal prod.	240886	*36.9*	336185	*37.3*	*40*	*41*
	Vegetable products	272794	*49.3*	287874	*42.5*	*6*	*-9*
	Processed products	353352	*28.8*	557421	*27.8*	*58*	*52*
	Total	867032	*37.5*	1181480	*34.0*	*36*	*24*
Slovak Rep.	Animals and animal prod.	66065	*35.7*	132939	*28.4*	*101*	*60*
	Vegetable products	130049	*25.3*	158783	*22.2*	*22*	*7*
	Processed products	149406	*8.0*	208735	*12.8*	*40*	*121*
	Total	345520	*19.8*	500457	*19.9*	*45*	*45*
Hungary	Animals and animal prod.	695532	*62.5*	838742	*59.3*	*21*	*14*
	Vegetable products	553251	*46.6*	743433	*47.6*	*34*	*37*
	Processed products	628772	*39.2*	901987	*41.5*	*43*	*52*
	Total	1877555	*50.0*	2484162	*49.3*	*32*	*30*
Slovenia	Animals and animal prod.	60949	*34.4*	77258	*35.2*	*27*	*30*
	Vegetable products	15359	*25.3*	22179	*24.1*	*44*	*38*
	Processed products	131740	*28.4*	137726	*12.6*	*5*	*-54*
	Total	208048	*29.9*	237163	*21.0*	*14*	*-20*
NMS-8	Animals and animal prod.	1923936	*50.8*	2842004	*50.2*	*48*	*46*
	Vegetable products	1694719	*46.6*	2246226	*45.2*	*33*	*29*
	Processed products	2124409	*30.2*	3247712	*33.0*	*53*	*67*
	Total	5743064	*41.9*	8335942	*42.2*	45,1	45,9

Source: aggregations based on COMEXT

Table 3. EU average tariffs* applied to agri-food products of NMS-8

Year	Animals and animal products	Vegetables products	Processed products	TOTAL
1999	24.7%	10.1%	20.3%	18.5%
2003	7.7%	5.5%	9.6%	9.4%

*) EU tariffs weighted by NMS-8 total exports for agri-food products, 4 digit level in order to take into account the productive structure of the countries. Source: own computations, using TARIC and COMEXT