Bulgarian Journal of Agricultural Science, 21 (No 1) 2015, 1-15
Agricultural Academy

DOES ENLARGEMENT HAS CAUSED INTRA AND EXTRA EUROPEAN UNION AGRI-FOOD TRADE?

S. BOJNEC[1] and I. FERTO[2,3]
[1] *University of Primorska, Faculty of Management, Koper, Slovenia*
[2] *Corvinus University of Budapest, Budapest, Hungary*
[3] *Institute of Economics, Hungarian Academy of Sciences, Budapest, Hungary*

Abstract

BOJNEC, S. and I. FERTO, 2015. Does enlargement has caused intra and extra European Union agri-food trade? *Bulg. J. Agric. Sci*., 21: 1-15

The article investigates agri-food trade of the European Union (EU-27) countries in two market segments: intra-EU markets vs. total agri-food trade. The EU-27 agri-food exports have increased on both market segments. In a spite of fastest agri-food export growth by new member states (NMS), old member states (OMS) have dominant position in the EU-27 agri-food exports. Around 70% of the EU-27 agri-food exports are on the intra-EU-27 markets. The survival rates for agri-food exports are higher for the OMS than the NMS. The NMS have increased agri-food exports of new varieties/products. Specific results by country are found in evolution and structures of agri-food exports. Following the enlargement, the NMS have increased intra-EU exports, horizontal and high vertical intra-industry trade.

Key words: agri-food exports, intensive and extensive margin, duration analysis, intra-industry trade, European Union

JEL classifications: F14, F15, Q17, C24

Introduction

This paper aims to present evolutions in development of intra-European Union (EU) and extra-EU agri-food exports during the period 2001-2011 that includes the EU enlargements in 2004 and 2007. Agri-food exports in the enlarged intra-EU markets and on the extra-EU markets might be caused by the EU enlargements.

Land reforms, privatization and restructuring of state and collective farms in Central and Eastern European (CEE) countries have been largely investigated before the EU enlargements towards the East (e.g., Swinnen et al., 1997; Csáki and Lerman, 2000). Similarly, price and trade liberalization with Europe Agreements, which granted a freer access to EU markets and integration of the agri-food sector in the Common Agricultural Policy (CAP) of the EU have attracted research attention in the initial stage of transition during the pre-enlargement period (Bojnec, 1996; Bojnec and Swinnen, 1997), while recently for potentially new candidate countries (e.g. Bojnec et al., 2014). The focus has been also on agri-food competitiveness in transition countries using the policy analysis matrix, social profit rate and domestic resource cost approaches (Bojnec, 2001a, 2002).

In the enlarged EU and in the global economy, crucial is exports in intra-EU and extra-EU markets. The previous research has investigated different aspects of agri-food trade in CEE countries and in the EU member states focusing on trade specialisation (Bojnec, 2001c; Fertő and Hubbard, 2003; Bojnec and Fertő, 2007a, 2007b, 2008a, 2009a, 2009b, 2009c, 2010a, 2010b, 2012a, 2012c; Jámbor and Hubbard, 2013; Török and Jámbor, 2013), price and quality competitiveness (Bojnec and Fertő, 2005, 2008b, 2012b), duration of exports (Bojnec and Fertő 2012c), variety of exports (Bojnec and Fertő, 2012a), product value chains (Bojnec and Fertő 2014a, 2014b, 2014c) and intra-industry trade (Bojnec, 2001b; Fertő, 2005; Jámbor, 2014). However the scope of research is varied by periods, sample of countries and benchmarks of the analysis.

The aim of this paper is to provide a more comprehensive picture on agri-food trade performance of the EU-27 mem-

E-mails: stefan.bojnec@fm-kp.si, stefan.bojnec@siol.net; imre.ferto@uni-corvinus.hu, ferto.imre@krtk.mta.hu

ber states in both intra-EU markets and total agri-food global markets, including intra-EU markets between 2000 and 2011 using different empirical approaches. First, we provide an overview on how agri-food exports have developed during the analyzed period. Second, we focus on the duration of exports on both market segments: intra-EU markets and global markets. Third, we investigate the role of extensive versus intensive margin in the growth of agri-food exports, which complements the duration analysis. Finally, the paper pointed out the pattern of intra-industry trade (IIT) in both market segments with special emphasis on horizontal IIT, low and high vertical IIT.

The rest of the paper is structured as follows. In the next session we present the methodology for calculation of the export shares and the duration analysis. In addition, data used are presented. The third session provides main empirical results and their discussion. The session four derives main conclusions.

Methodology and Data

Constant market share

We employ a battery of empirical approaches to analyse various aspects of the EU-27 agri-food trade. The constant market share (CMS) model is one approach in identifying the causes of changes in exports (Ahmadi-Esfahani, 2006). The CMS model was first applied to trade in manufactured commodities by Tyszinski (1951), and then Rigaux (1971) gave an early example of applications for agricultural trade. It has again became popular for agri-food trade analysis in the last two decades (e.g. Ahmadi-Esfahani, 1995; Ahmadi-Esfahani and Jensen, 1994; Ongsritrakul and Hubbard, 1996; Chen and Duan, 2000; Fertő, 2004). The basis presumption underlying the CMS model is that the share of a country in a market should remain constant given the same level of competitiveness. Hence, any difference between the actual change in exports of the particular ('focus') country and the sum of the market competitors should be caused by a change in export composition or competitiveness (Chen and Duan, 2000). In the traditional CMS models, there are only two effects to explain the changes in export growth: the structural effect and the residual effect. The former describes the hypothetical change in expected exports, while the latter is the difference between the actual and the expected change. One can derive these effects more formally (Ahmadi-Esfahani, 1995). Market share can be defined as follows:

$$S=q/Q,$$

where S is the particular country's share of the reference market, q is the particular country's exports and Q is the exports of the reference. Manipulating equation (1) yields: $q=SQ$. Differentiating with respect to time one can obtain:

$$\Delta q=S\Delta Q+Q\Delta S,$$

where Δ is the change in the variable over time. The first expression on the right hand side is the structural effect and second is the residual effect. Equation (2) is valid only for an infinitely short time period. If the CMS model is applied at discrete intervals, the equation may be written in several ways utilising start and end of period variables. However, some applications (e.g. Ahmadi-Esfahani, 1995; Ahmadi-Esfahani and Jensen, 1994; Chen and Duan, 2000) are offered a following specification:

$$\Delta q= \underbrace{S0\Delta Q}_{\text{structural effect}} + \underbrace{\Delta SQ0}_{\text{residual}} + \underbrace{\Delta S\Delta Q}_{\text{second-order effect}}$$

The three structural components of the market share are calculated with this expression. First, the size of market or structural effect refers to the change in quantity of exports of the reference. If this grows (falls), then even with a constant market share S0, a given country's exports will increase (decrease) in quantity by $S0\Delta Q$. The other two components have different implications for the sources of export growth. The residual effect also can be called the competitive effect (Chen and Duan, 2000). It means that the change in exports occurs due to a change in the exporting country's competitiveness. The second-order effect can be interpreted as a change in exports due to the interaction of the change in exporting country's competitiveness and the change in the exports of the reference. The CMS models are applied to the change in EU-27 agri-food exports to the global market over the period 2000-2011.

Duration analysis

The next step we focus is on the duration of exports (Besedeš and Prusa, 2006a, 2006b; Nitsch, 2009; Fertő and Soós, 2009). Calculating the duration then appears to be straightforward: it is simply the time (measured in years) that a product has maintained exports without any interruption. Alternatively, applying statistical techniques from survival analysis, the duration can be modelled as a sequence of conditional probabilities that a product's exports continues after t periods given that it has already survived for t periods. Specifically, let T be a random variable that denotes the length of a spell. Then, in discrete time, the survival function, S(T), is defined as:

$S(T)=Pr(T\geq t)$. In empirical studies, the survival functions are estimated (in a non-parametric way) by computing the number of spells that survive (end) as a fraction of the total number of spells that are at risk after t periods. More specifically, we estimate duration of exports (exports >0) in EU-27 countries applying the nonparametric Kaplan-Meier product

limit estimator (Cleves et al., 2004). It is assumed that a sample contains n observations that are independent and denoted (ti; ci), where i = 1, 2,…, n, ti is the survival time, and ci is the censoring indicator variable C taking a value of 1 if failure occurred, and 0 otherwise of observation i.

It is also assumed that there are m < n recorded times of failure, when the exports switches from larger than 0 to lower than 0. The rank-ordered survival times are denoted as t(1) < t(2) < … < t(m), while nj denotes the number of subjects at risk of failing at t(j), and dj denotes the number of observed failures. The Kaplan-Meier estimator of the survival function is then:

$$\hat{S}(t) = \prod_{t(i)<t} \frac{n_j - d_j}{n_j},$$

with the convention that $\hat{S}(t) = 1$ if t < t(1). Given that many observations are censored, it is then noted that the Kaplan-Meier estimator is robust to censoring and uses information from both censored and non-censored observations. It is possible that in some cases exports were dissolved and later re-established during the sample period. The episodes of uninterrupted exports are the primary unit of analysis.

Intensive vs. extensive margin

In general, an increase in trade could be a result of three factors: intensive margin, where the same set of good is exported in larger volumes; extensive margin, where larger quantities of a larger set of goods are exported; and higher quality goods (Hummels and Klenow, 2002). The extensive and intensive margins can be decomposed further into following way (World Bank, 2013). First, intensive margin: (1) increase of existing products in established markets; (2) decrease in existing products in established markets; and (3) extinction of exports of products in established markets. Second, extensive margin: (1) introduction of new products in new markets; (2) introduction of new products in established markets; (3) introduction of existing products in new markets; and (4) product diversification in established markets. Existing products were exported to at least one partner in the previous year. Established markets are those to which the selected country exported at least one product in the previous year.

Intra-industry trade

We analyse the pattern of the IIT on the global and EU-27 markets. Greenaway et al. (GHM) (1994, 1995) express matched IIT as a share of gross bilateral trade:

$$GHM_k^p = \frac{\sum_j \left[\left(X_{j,k}^p + M_{j,k}^p\right) - \left|X_{j,k}^p - M_{j,k}^p\right|\right]}{\sum_j \left(X_{j,k} + M_{j,k}\right)}$$

where X and M are values of exports and imports, p is either horizontal or vertical IIT, j is the product category (j=1,…n) and k is a trading partner. The difference between export and import unit value is used to distinguish between the types of the matched two-way IIT between horizontal, low-quality and high-quality vertical IIT. The idea here is that if price differences are substantial, goods should be vertically differentiated, not only horizontally differentiated. Bilateral trade of a horizontally differentiated product, j, occurs when the unit values of exports (UV^x_j) and imports (UV^m_j), for a particular dispersion factor, α (e.g. 0.15), satisfies the following condition:

$$1\text{-}\alpha \leq \frac{UV^x_j}{UV^m_j} \leq 1\text{+}\alpha.$$

Similarly, bilateral trade of a vertically differentiated product is defined as being when

$$\frac{UV^x_j}{UV^m_j} < 1\text{-}\alpha, \quad \text{or} \quad \frac{UV^x_j}{UV^m_j} > 1\text{+}\alpha.$$

The vertical IIT represents specialization in varieties of different quality requiring different factor endowments. We distinguish between high and low quality vertical IIT. If the relative value of a product is 15% lower or higher than the limit of 0.85/1.15 (1-α/1+α), it is considered as low or high quality vertical IIT. The 15% range of relative unit value could be considered arbitrary (Fertő, 2005). Therefore we adopt the approach of a ±15% unit price threshold as a means of separating horizontally and vertically differentiated products. We compute measures of IIT to scale the IIT for horizontal (vertical) trade by the share of total horizontal (vertical) trade in total gross trade, such that the two measures sum up to the overall IIT.

Data used

The empirical analysis is conducted for the EU-27 countries using trade data at the six-digit World Customs Organization's Harmonized System (HS-6) level from the years 2000–2011. Agri-food export is defined by the WTO consisting 789 products. The UN Comtrade database (UNSD, 2013), with the World Integrated Trade Solution (WITS) software, is used in the calculations of agri-food exports. Intra-EU trade is included, and comparisons are made between results with intra-EU trade and total agri-food exports of the EU-27 member states.

Results

Evolution and structure of agri-food exports of the EU-27 member states

Most of agri-food exports of the EU-27 member states are on the intra-EU-27 markets (Figure 1). Following the

economic recession in 2008, agri-food exports of the EU-27 member states has experienced its fastest growth (in nominal US dollars terms) on the extra-EU-27 markets than on the intra-EU-27 markets.

Although the EU-27 member states are one of the larger players in the global agri-food markets – both on the export and import sides – their market shares decline. The EU-27 share in global agri-food exports declined from 47.2% in 2000 to 43.3% in 2011 (Figure 2). The EU-27 share in global agri-food imports declined from 46.5% in 2000 to 40.7% in 2011. Since 2010 the EU-27 switched to a net-exporter in global agri-food trade. The EU-27 member states, which

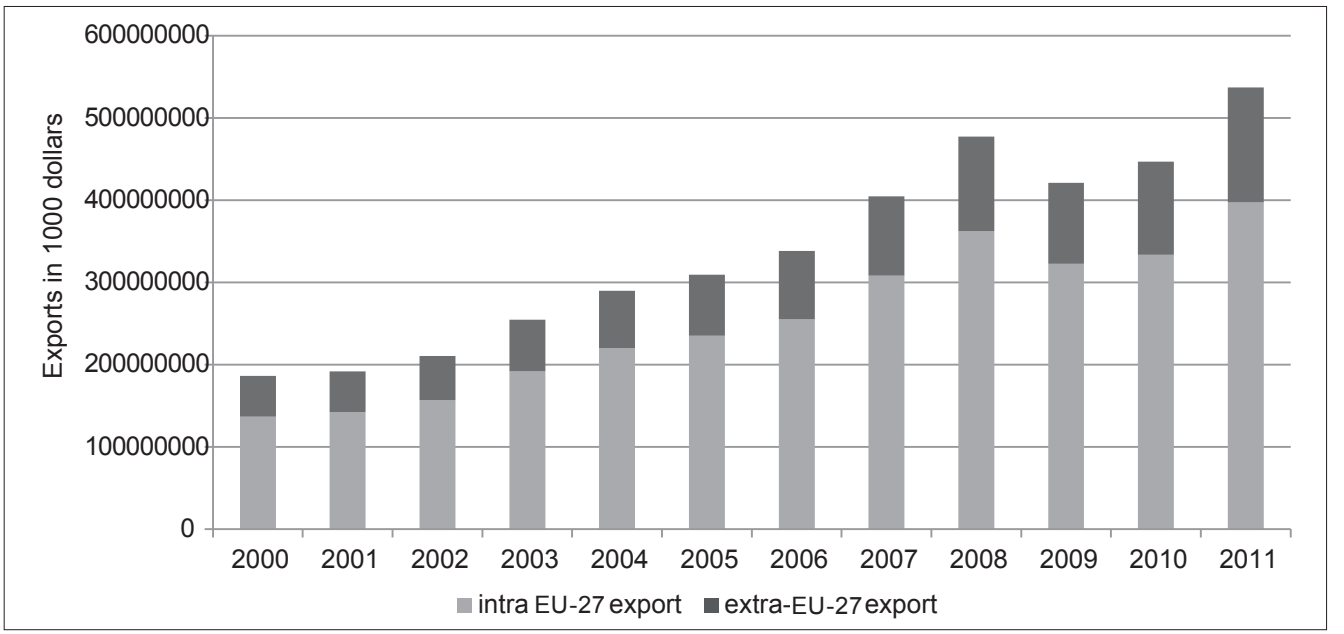

Fig. 1. The development of EU-27 agri-food exports, 2000-2011 (in thousand US dollars)
Source: Own calculations based on Comtrade database with WITS (World Trade Integration Solution) software

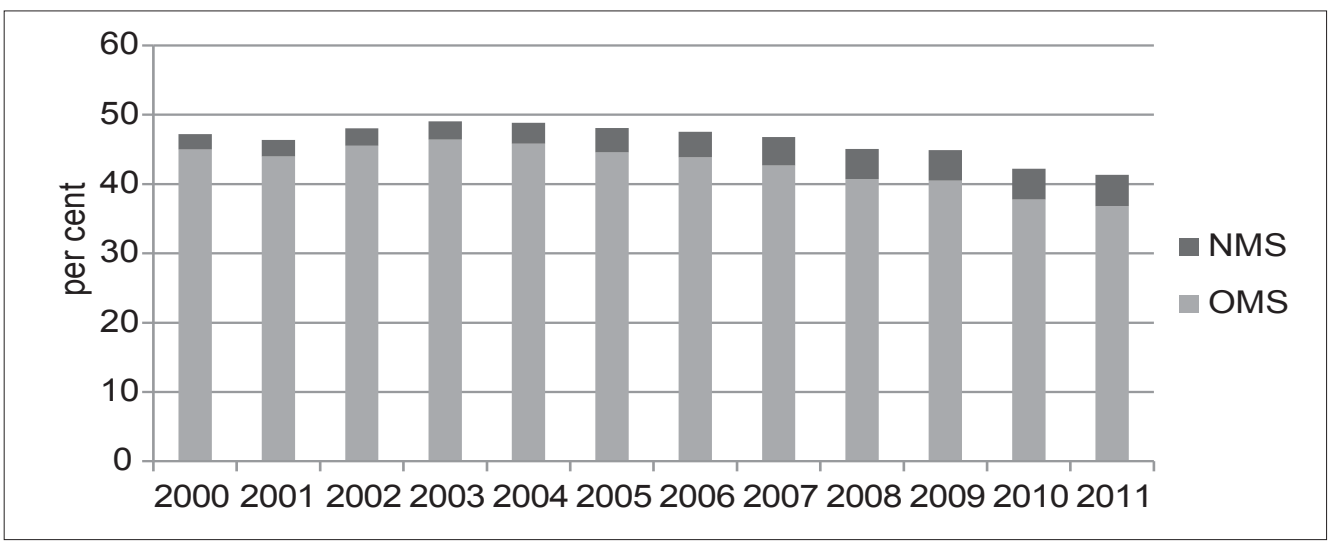

Fig. 2. The development of export share of EU-27 at the world market by OMS and NMS
Source: Own calculations based on Comtrade database with WITS (World Trade Integration Solution) software

have contributed to the agri-food trade surpluses, were: the Netherlands, France, Spain, Denmark, Ireland, and Belgium among the old EU-15 member states, and Hungary, Poland, Bulgaria, and Lithuania among the new EU-12 member states. So the EU is composed of heterogeneous groups of countries concerning their level of agri-food global competitiveness.

The agri-food export share of the EU-15 old member states (OMS) on the global markets has declined, but not for the EU-12 new member states (NMS). However, the share of the latter countries is much smaller.

Figure 3 presents the EU-27 member states agri-food export shares on the global markets. The importance of the EU-27 member states in global agri-food exports varies by countries and has changed over time indicating that some of the EU-27 member states have gained (lost) export shares in the global agri-food exports. The NMS, except for Cyprus, have mostly gained in the global agri-food export shares. Except for Austria, Germany, and Portugal, other OMS have lost export shares. The substantially lower export shares can be seen for France, Belgium, Denmark, the Netherlands, Ireland, Italy, Spain, and the United Kingdom (UK).

Similarly to the increases in the EU-27 member states agri-food exports to the global markets, there have been also increases in the EU-27 member states agri-food exports to the intra-EU-27 markets (Figure 4). During the 2009-2010 economic recession periods, the decline in the size of agri-food exports is seen for the OMS.

The intra-EU-27 markets are the most important for the EU-27 member states with around 70% of agri-food export share (Figure 5). The intra-EU-27 markets have remained important for the OMS or have declined a slightly. On the other hand, the catching up and convergence in the proportion of agri-food exports to the EU-27 markets can be seen for the NMS. In 2011, the EU-27 markets are a slightly relatively more important outlet for the NMS than for the OMS. This can be explained by innovation and development of new products/product varieties.

The results on the share of the EU-27 markets in total agri-food exports are mixed by the EU-27 member states (Figure 6). Except for Malta, the intra-EU markets are the most important. Greater differences can be seen between the years 2000 and 2011 for some countries. The strengthening of the EU-27 market share is seen particularly for most of the NMS such as for example for the Czech and Slovak Republics, Cyprus, Estonia, Hungary, Poland, Bulgaria, Romania, and Slovenia. The switches from the EU-27 markets to other global markets can be seen for example for Austria, Finland, Lithuania, Latvia, France, Portugal, and Spain. However, the intra EU-27 markets have remained the most important. For ex-

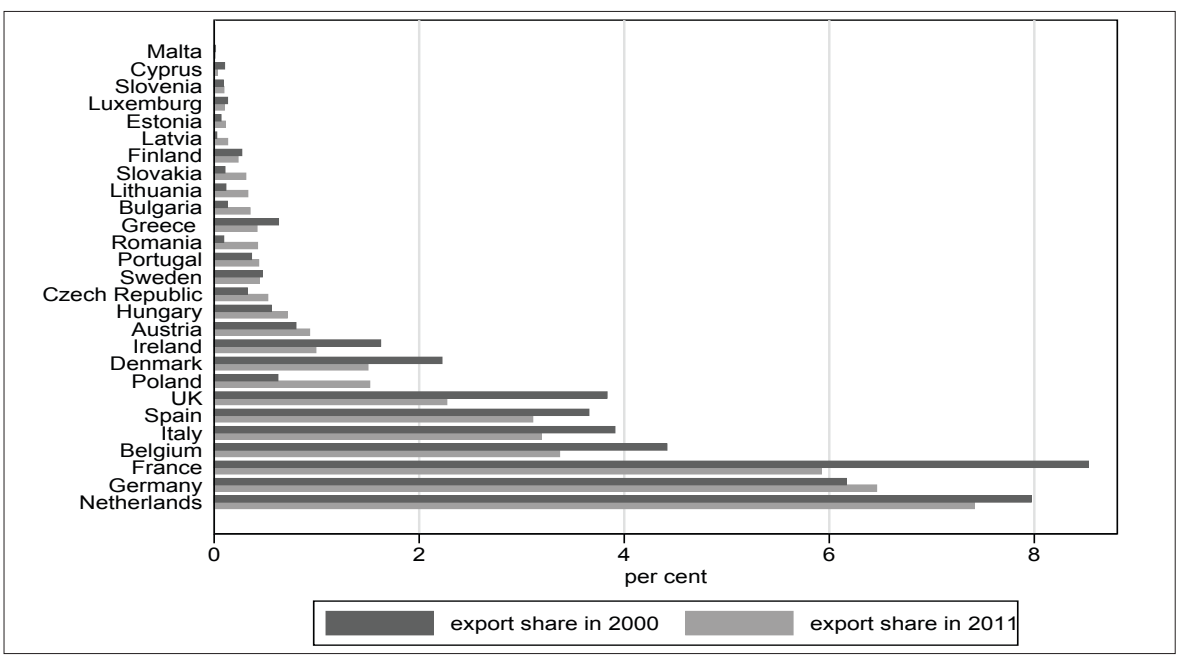

Fig. 3. The agri-food export shares on the global markets by countries in 2000 and 2011

Source: Own calculations based on Comtrade database with WITS (World Trade Integration Solution) software

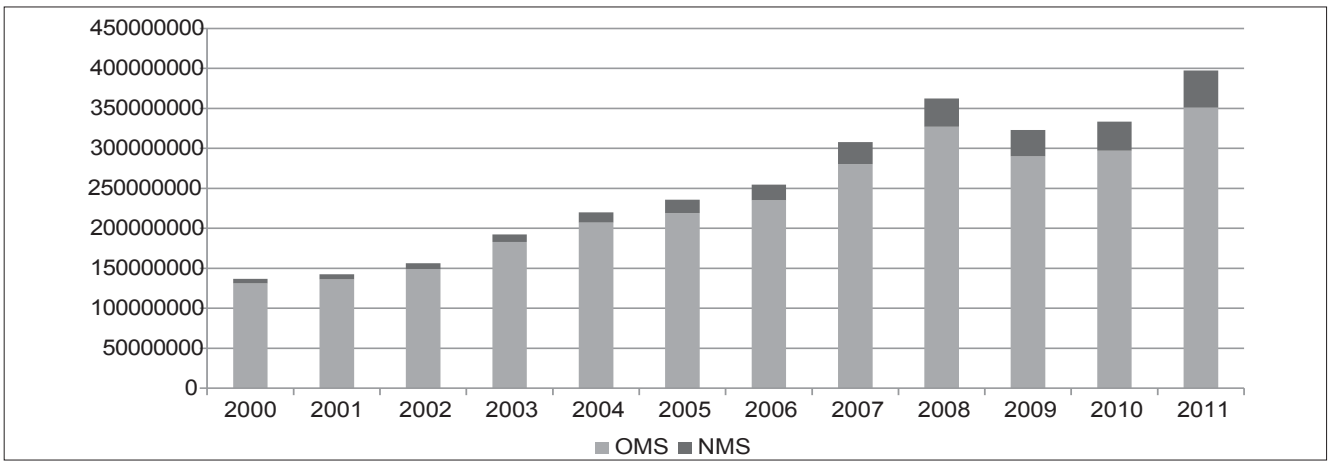

Fig. 4. The development of EU-27 agri-food exports to the EU-27 markets 2000-2011 (1000 dollars)
Source: Own calculations based on Comtrade database with WITS (World Trade Integration Solution) software

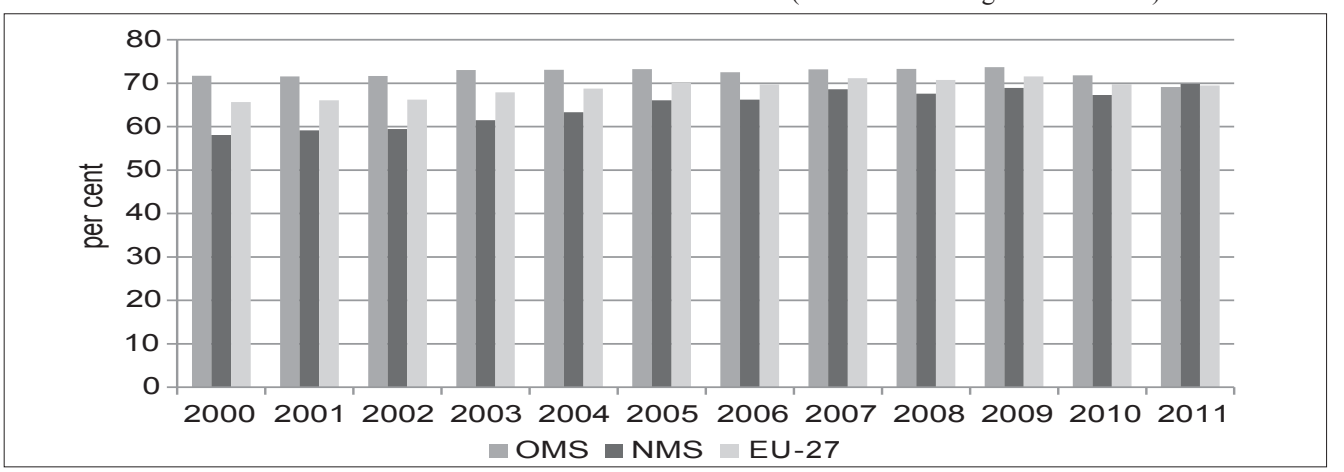

Fig. 5. The share of EU-27 markets in total agri-food trade by EU-27, NMS and OMS
Source: Own calculations based on Comtrade database with WITS (World Trade Integration Solution) software

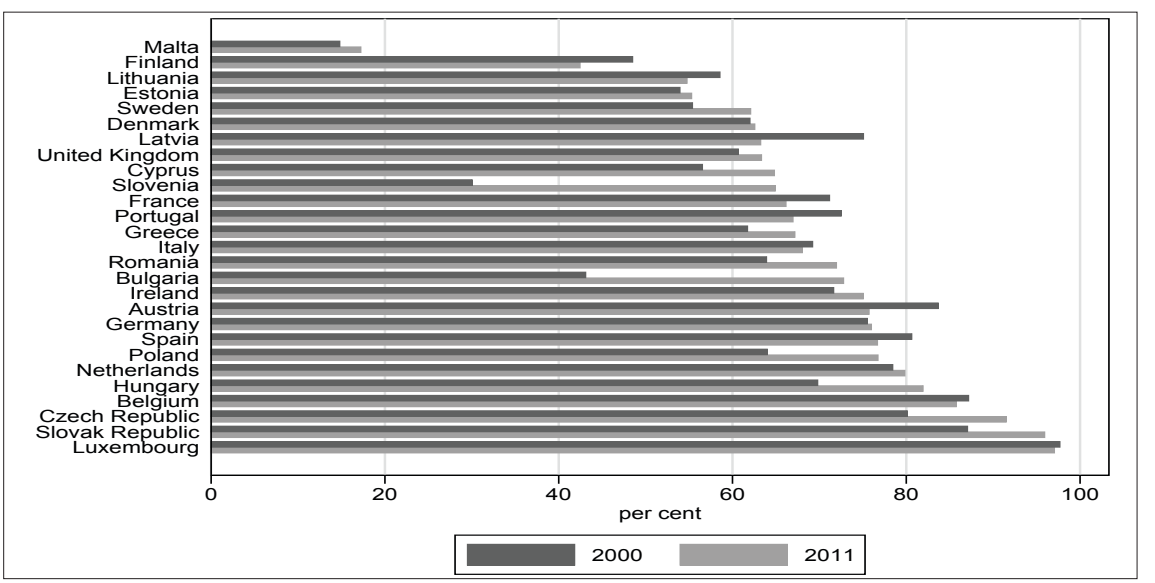

Fig. 6. The share of EU-27 markets in total agri-food trade in 2000 and 2011 by country
Source: Own calculations based on Comtrade database with WITS (World Trade Integration Solution) software

ample, almost all agri-food exports from Luxembourg are on the intra EU-27 markets.

Constant Market Share analysis

The OMS agri-food export performance can be explained mainly by the structural effects (Table 1). The growth of agri-food exports for the OMS is based on the increase in the global demand. Except for Austria, Germany, the Netherlands, Portugal, and Sweden, both residual and second order effects are negative implying a fall in competitiveness. Large structural effects can not compensate the impact of negative residual and second order effects resulting fall in market shares. The negative second order effects suggest that the influence of the interaction of the change in OMS's competitiveness and the change in the global's imports has been unfavourable.

Among the NMS, except for Cyprus and Malta, residual and second order effects are more important than structural effect on the intra-EU-27 markets. However, the impact of various components of the CMS estimations considerably differs by the NMS on the global markets. In addition to Malta, the structural effect dominates also for the Czech Republic, Estonia, and Hungary, whilst Cyprus has a negative structural effect. The structural effects are less than residual and second order effects for the other NMS (Bulgaria, Latvia, Lithuania, Poland, Romania, Slovakia, and Slovenia).

Duration of agri-food export

Figure 7 depicts the Kaplan-Meier survival rates for the duration analysis for the agri-food export of the EU-27 member states for intra-EU-27 and total global market segments

Table 1
The results of CMS models between 2011 and 2000 (in per cent)

	EU-27 markets			World markets		
	Structural	Residual	Second order	Structural	Residual	Second order
Austria	77	8	15	81	6	13
Belgium	133	-11	-22	152	-16	-36
Bulgaria	14	30	57	29	22	50
Cyprus	122	-7	-14	-4723	1462	3361
Czech Republic	38	21	41	53	14	33
Denmark	155	-19	-36	187	-26	-61
Estonia	43	20	38	52	14	33
Finland	128	-10	-19	124	-7	-17
France	170	-24	-46	178	-24	-54
Germany	78	8	15	94	2	4
Greece	138	-13	-25	192	-28	-64
Hungary	49	18	34	71	9	20
Ireland	173	-25	-48	226	-38	-88
Italy	116	-5	-11	136	-11	-25
Latvia	14	29	57	14	26	60
Lithuania	24	26	50	27	22	51
Luxemburg	129	-10	-19	151	-15	-35
Malta	80	7	13	169	-21	-48
Netherlands	91	3	6	111	-3	-8
Poland	22	27	51	33	20	47
Portugal	73	9	18	78	7	15
Romania	12	30	58	16	25	58
Slovakia	20	27	53	27	22	51
Slovenia	29	24	47	90	3	7
Spain	115	-5	-10	127	-8	-19
Sweden	78	8	15	110	-3	-7
UK	189	-31	-59	241	-43	-98

Source: Own calculations based on Comtrade database with WITS (World Trade Integration Solution) software

for the final (i.e. twelfth) analyzed year (2011) of the agri-food exports. The results show that the survival rates for agri-food exports are higher for the OMS in both intra-EU-27 agri-food exports and in total agri-food exports. For the NMS, the survival rate is a slightly higher in the intra-EU-27 agri-food exports than total agri-food exports, and vice versa for the OMS. However, this difference inside the OMS or inside the NMS is much smaller than between the OMS and the NMS.

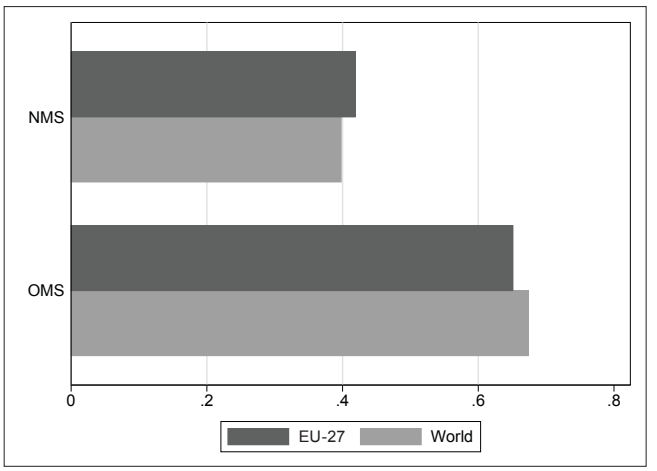

Fig. 7. The mean of Kaplan-Meier survival rates for the last year by the EU-27 and the world market

Source: Own calculations based on Comtrade database with WITS (World Trade Integration Solution) software

This suggests greater probability of survival for successful agri-food exports from the OMS than from the NMS. This greater survival rates for the successful OMS agri-food exports can be explained by supply-side factors related to stability in agri-food exports and demand-side factors related to incomes, tastes and preferences of consumer in importing countries.

As can be seen from Figure 8, there are substantial differences in survival rates between the EU-27 member states in both market segments. The survival rates are the smallest for the two NMS: Malta and Cyprus. The survival rates are the highest for a group of the nine OMS: Denmark, France, the Netherlands, Germany, Spain, Belgium, Italy, the UK, and Austria. Close to this group of the OMS is also the Czech Republic from the NMS. Except for Bulgaria, Malta, Romania, and Slovenia, the other eight NMS experienced higher survival rates in the intra-EU-27 agri-food exports than in total global agri-food exports. The results of the OMS are also mixed, but largely in opposite direction. Except for Finland, France, Greece, and Luxembourg, the other eleven OMS experienced greater survival rates in total agri-food exports than only in the intra-EU-27 agri-food exports.

Intensive vs. extensive margins

The distinguishes between intensive and extensive margins is based on sources in the growth of agri-food exports of the EU-27 member states. Traditional specialisation tends to be favourable for the expansion of existing products (the

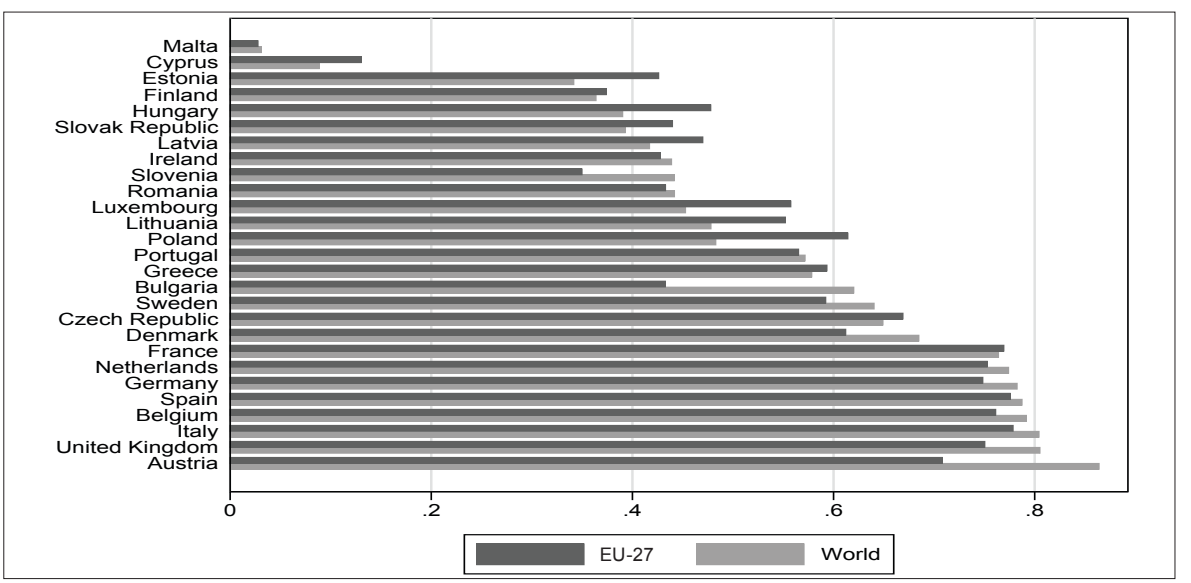

Fig. 8. Kaplan-Meier survival rates for the last year by country

Source: Own calculations based on Comtrade database with WITS (World Trade Integration Solution) software

intensive margin). Export-oriented growth across countries tends to combine the expansion of existing products (the intensive margin) with in particular an expansion of the rage of exports (the extensive margin) (Feenstra, 1994; Hummels and Klenow, 2005).

Decomposition of export growth confirmed the importance of the increase of existing products in established markets or intensive margin (Figure 9). Whilst the intensive margin with the increase of existing products for the OMS is profound on both the EU-27 markets and the global markets, this even more holds for the NMS, but only on the global markets. On the EU-27 markets, the share of extensive margin for the NMS is almost as high as the share of the intensive margin suggesting that the NMS are more innovative in gaining the EU-27 markets with new products/ varieties of the existing products. Different export performance between the NMS and OMS can be explained by increased export competitiveness in the NMS. Their export shares are still relatively low and possible improvements can be achieved in some niche products and products with comparative advantages.

Figure 10 reinforces different agri-food export performances between the OMS and most of the NMS. For the OMS, the intensive margin dominates in agri-food exports to both the EU-27 markets and to the global markets. The intensive margin dominates in agri-food exports to both market segments for the following four NMS: the Czech Republic, Cyprus, Estonia, and Hungary. For the other eight NMS (Bulgaria, Latvia, Lithuania, Malta, Poland, Romania, Slovakia, and Slovenia) the clear prevalence is on the extensive margin in agri-food exports to both market segments.

Figure 11 presents interesting insights and differences in decomposition of agri-food export growth along margins of

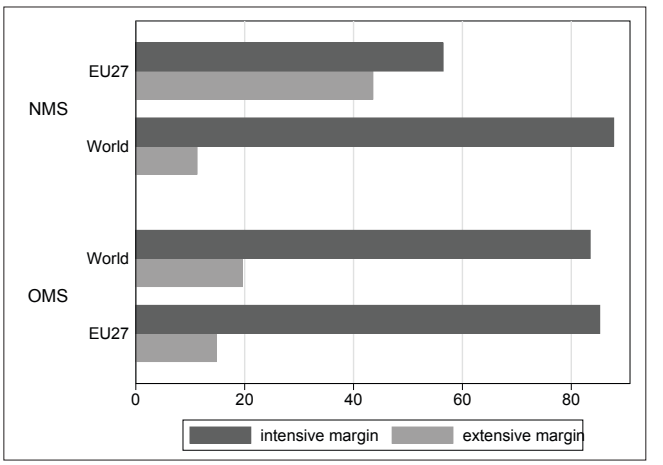

Fig. 9. Decomposition of agri-food export growth along margins of trade (%)

Source: Own calculations based on Comtrade database with WITS (World Trade Integration Solution) software

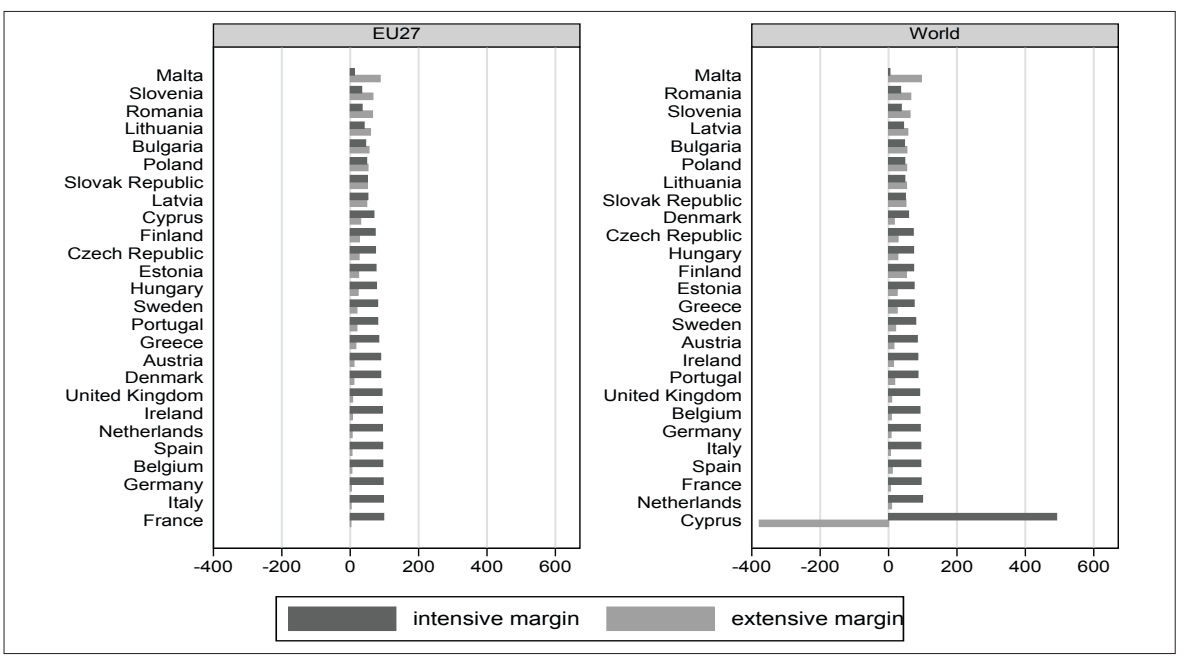

Fig. 10. Decomposition of export growth along margins of trade by country

Source: Own calculations based on Comtrade database with WITS (World Trade Integration Solution) software

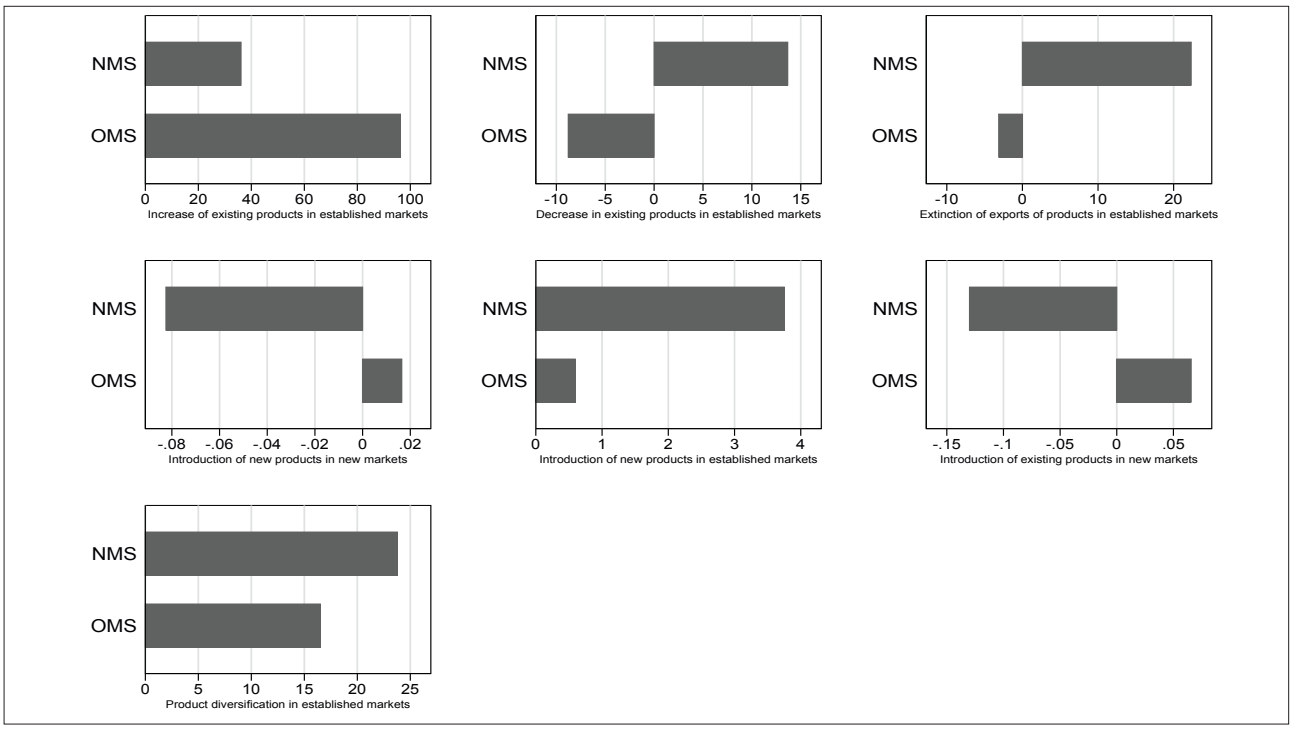

Fig. 11. Decomposition of export growth along margins of trade

Source: Own calculations based on Comtrade database with WITS (World Trade Integration Solution) software

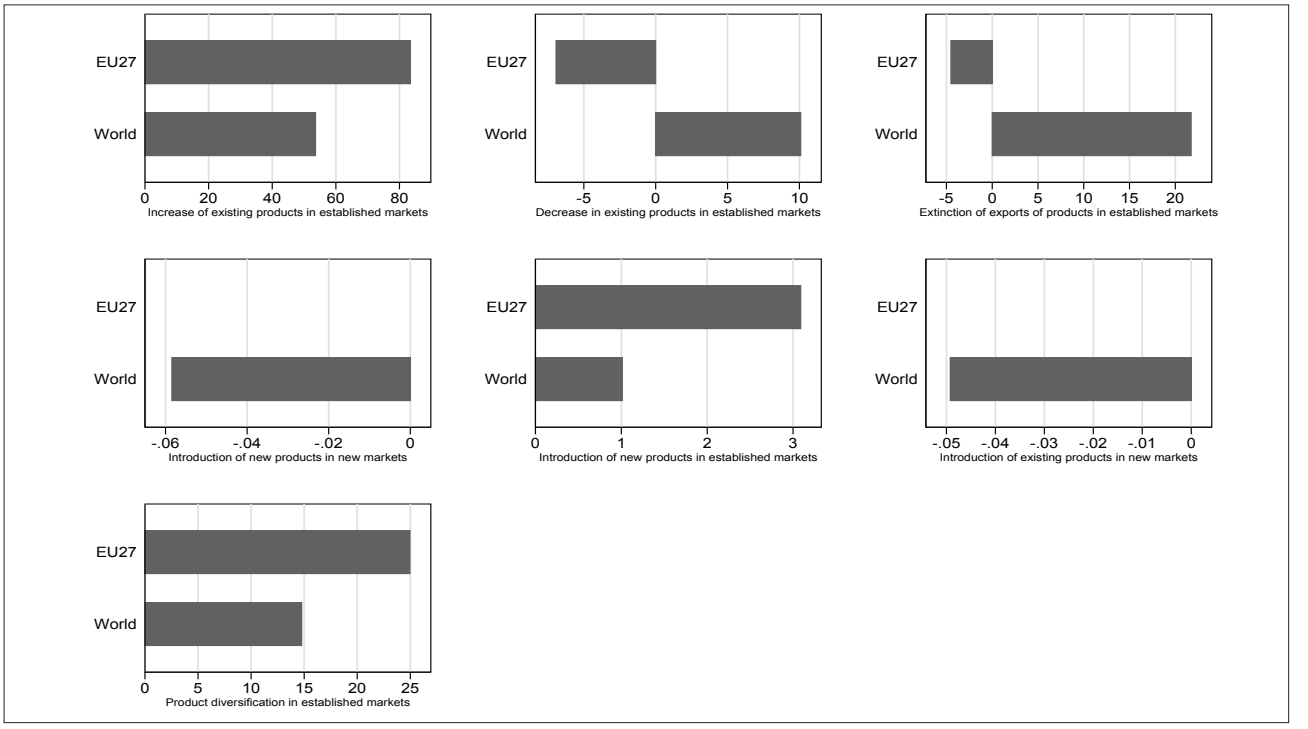

Fig. 12. Decomposition of export growth along margins of trade

Source: Own calculations based on Comtrade database with WITS (World Trade Integration Solution) software

trade between the OMS and NMS. For the OMS, the increase of existing products in established markets is far the most important, but less for the NMS. In addition, product diversification in established markets and introduction of new products in established markets for the OMS are less important than for the NMS. Introduction of existing products in new markets and introduction of new products in new markets are less important for both the OMS and for the NMS. The big difference between the OMS and the NMS is found for decrease in existing products in established markets and extinction of export of products in established markets with the positive sign for the NMS, and vice versa with the negative sign for the for the OMS.

On the EU-27 markets, the increase of existing products in established markets, product diversification in established markets, and to a lesser extent introduction of new products in established markets are the main positive components in agri-food export growth (Figure 12). The increase of existing products in established markets is the far the most important component in the decomposition of export growth along margins of trade, which can be related to population growth. On the other hand, other global markets are more dynamic. This can be seen also from sources of the EU-27 agri-food export growth on the global market, which are more dispersed by their sources of growth starting from increase of existing products in established markets, which is the most important single component, then extinction of exports of products in established markets, product diversification in established markets, decrease in existing products in established markets, and to a lesser extent introduction of new products in established markets. Introduction of new products in new markets and introduction of existing products in new markets are less important for the EU-27 markets and for other global markets.

Intra-industry trade

The share of IIT for the OMS on average was higher than for the NMS, but the agri-food IIT component for the NMS has been more dynamic with profound catching up in high IIT and particularly in high vertical IIT on both market segments on the EU-27 markets and global markets (Figure 13).

The share of IIT has increased over time. Unlikely to theoretical expectations, it is higher in total agri-food trade than on the intra-EU-27 markets. The share of horizontal IIT is more important than the share of high vertical IIT, which is more important than the share of low vertical IIIT. These are rather favourable results in terms of agri-food product quality.

As expected, the initial share of IIT for the OMS was greater than for the NMS, which has increased rapidly and almost catches up to the OMS. The NMS have increased particularly horizontal IIT and high vertical IIT. In 2011, the structure of high and low vertical IIT between the OMS and NMS has become more similar than before the EU enlargement in the initial analyzed year 2000.

On average, the shares of IIT are slightly higher on total global markets than on the intra-EU-27 markets (Figure 14). While this finding is a slightly surprising considering the 2004 and 2007 enlargements during the analyzed period, this can be explained by the economic slowdown in several of EU-27 member states. The decline real income declines has likely to caused reduction in demands for more expensive agri-food products and pushed agri-food businesses and international traders to reorient agri-food exports to the extra-EU-27 markets. In this trade seems to be greater similarities in the structures of agri-food exports and imports, thus contributing to higher share of IIT.

Cyprus and Malta are the NMS with the lowest share of IIT in both global and in the intra-EU-27 agri-food trade. Belgium and Germany are the OMS with the highest share of IIT also in both global and in the intra-EU-27 agri-food trade.

Finally, differences between the EU-27 member states are in the structure of IIT. For example, Belgium and Germany have relatively high share of horizontal IIT indicating greater similarities between export and import prices for similar agri-food products. The Netherlands and France have relatively high share of high vertical IIT indicating that export prices are much higher than import prices for similar agri-food products. Luxembourg has relatively high share of low vertical IIT indicating that export prices are much lower than import prices for similar agri-food products.

Conclusions

Different analysed aspects provide consistent results on the agri-food trade of the EU-27 countries and between the OMS and the NMS. The NMS have improved agri-food export and agri-food trade performances. There are possible differences between expectations and reality and particularly there are differences between the NMS.

Agro-food exports are growing from both the OMS and particularly the NMS. This agro-food export growth represents also a substantial part of the global agri-food export growth. Because EU-27 countries have lost agri-food export shares, this suggests that the global agri-food export growth has growing even faster, particularly in fast growing emerging market economies, such as for example the BRIC (Brazil, the Russian Federation, India, and China) countries (Bojnec et al., 2014). This global agri-food export growth can be explained by innovation and technological improvements on the supply-side, and by the increased food demand due to population and income growth.

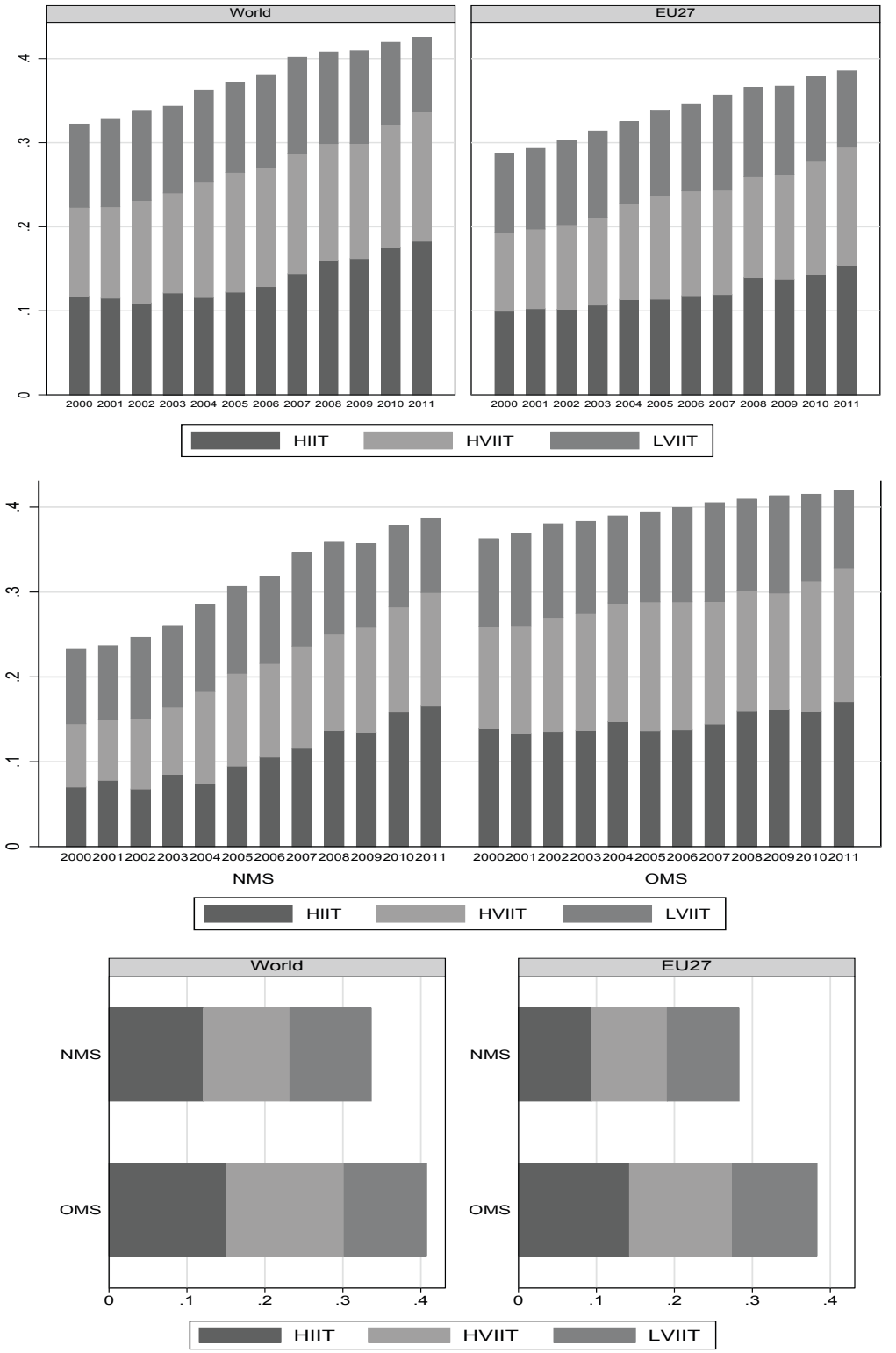

Fig. 13. The mean of intra-industry trade indices by markets and OMS vs. NMS

Source: Own calculations based on Comtrade database with WITS (World Trade Integration Solution) software

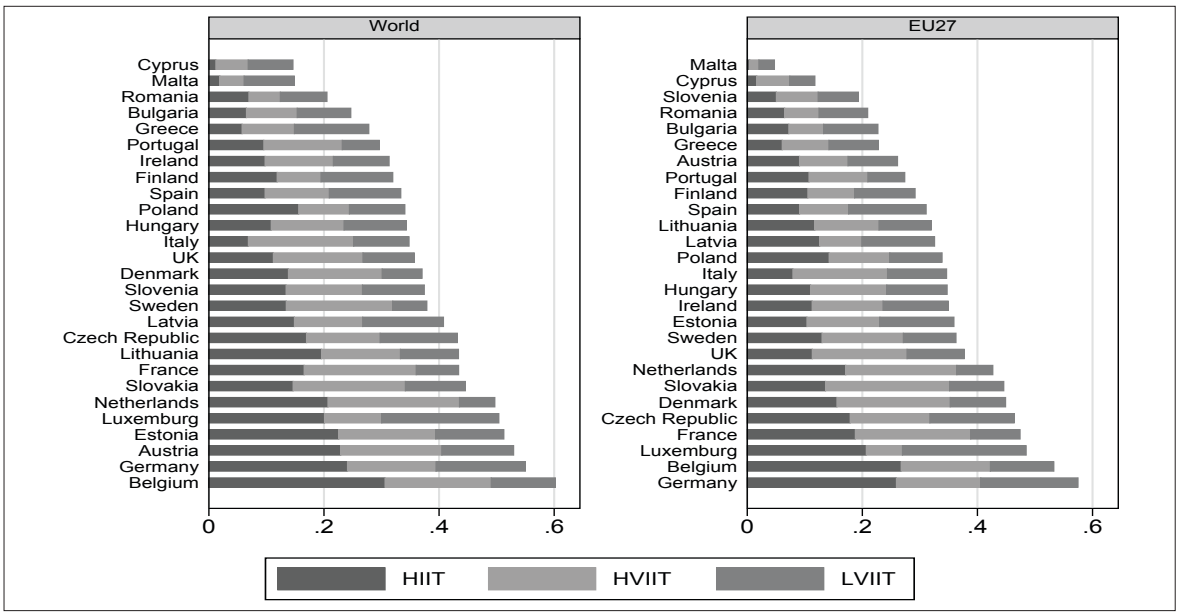

Fig. 14. The mean of intra-industry trade indices by markets and country

Source: Own calculations based on Comtrade database with WITS (World Trade Integration Solution) software

The CMS analysis by EU-27 member states suggests that the structural effects in the structure of agri-food exports are more important for the OMS, whilst residual and second order effects in the structure of agri-food exports for most of the NMS. While the structural effect is mostly positive for both the OMS and NMS, the residual and second order effects are more often positive for NMS.

The period following the EU enlargements in 2004 and 2007 has caused the increases of intra-EU-27 agri-food exports from the NMS. This can be partly explained by NMS trade diversion from traditional markets, but can be more likely due to structural changes in the agri-food sector with improvements in quality and development of new products/varieties. Namely, extensive margin in product diversification in established markets and introduction of new products in established markets are far the most important in agri-food export growth in the NMS than in the OMS.

However, the duration analysis for agri-food exports has confirmed longer duration of successful agri-food exports from the OMS than from the NMS. This suggests that the NMS agri-food exports are more dynamic, whilst for the OMS is more stable on long-term basis.

Following the enlargement, the NMS have increased intra-EU-27 agri-food exports, horizontal and high vertical IIT.

Among issues for future research are different and specific export performances between NMS and OMS by countries in evolution and structures of agri-food exports and their determinants.

Acknowledgements

This publication was generated as part of the COMPETE Project, Grant Agreement No. 312029 (http://www.competeproject.eu/), with the financial support from the European Community under the 7th Framework Programme. The previous version of this paper was presented as the keynote speech at the 142nd EAAE Seminar, Growing success? Agriculture and rural development in an enlarged EU, Budapest, May 29-30, 2014.

References

Ahmadi-Esfahani, F. Z., 1995. Wheat market shares in the presence of Japanese import quotas. *Journal of Policy Modelling*, **17**: 315–323.

Ahmadi-Esfahani, F. Z., 2006. Constant market shares analysis: uses, limitations and prospects. *Australian Journal of Agricultural and Resource Economics*, **50** (4): 510–526.

Ahmadi-Esfahani, F. Z. and P. H. Jensen, 1994. Impact of the US–EC price war on major wheat exporters' shares of the Chinese market. *Agricultural Economics*, **10**: 61–70.

Besedeš, T. and T. J. Prusa, 2006a. Ins, outs, and the duration of trade. *Canadian Journal of Economics*, **39** (1): 266–295.

Besedeš, T. and T.J. Prusa, 2006b. Product differentiation and duration of US import trade. *Journal of International Economics*, **70** (2): 339–358.

Bojnec, Š., 1996. Integration of Central Europe in the Common Agricultural Policy of the European Union. *The World Economy*, **19** (4): 447–463.

Bojnec, Š., 2001a. Agro-food competitiveness in Slovenia: The policy analysis matrix approach. *Bulgarian Journal of Agricultural Science*, **7** (4-5): 351–364.

Bojnec, Š., 2001b. Patterns of intra-industry trade in agricultural and food products during transition. *Eastern European Economics*, **39** (1): 61–89.

Bojnec, Š., 2001c. Trade and revealed comparative advantage measures: regional and Central and East European agricultural trade. *Eastern European Economics*, **39** (2): 72–98.

Bojnec, Š., 2002. Agricultural and food competitiveness in transition Central and Eastern European countries: social profit rate and domestic resource cost approaches. *Agricultural Economics Review*, **3** (2): 5–22.

Bojnec, Š. and I. Fertő, 2005. Classifying trade flow in agri-products between Hungary and Slovenia. *Studies in Agricultural Economics*, **103**: 17–35.

Bojnec, Š. and I. Fertő, 2007a. Hungarian and Slovenian agro-food trade with three main European Union partners. *Ekonomický časopis – Journal of Economics*, **55** (4): 345–358.

Bojnec, Š. and I. Fertő, 2007b. The catching-up process of European enlargement: Hungarian and Slovenian agricultural, food, and forestry trade. *Eastern European Economics*, **45** (5): 5–34.

Bojnec, Š. and I. Fertő, 2008a. European enlargement and agro-food trade. *Canadian Journal of Agricultural Economics*/Revue canadienne d'agroeconomie, **56** (4): 563–579.

Bojnec, Š. and I. Fertő, 2008b. Price competition vs. quality competition: the role of one-way trade. *Acta Oeconomica*, **58** (1): 61–89.

Bojnec, Š. and I. Fertő, 2009a. Agro-food trade competitiveness of Central European and Balkan countries. *Food Policy*, **34** (5): 417–425.

Bojnec, Š. and I. Fertő, 2009b. Determinants of agro-food trade competition of Central European countries with the European Union. *China Economic Review*, **20** (2): 327–337.

Bojnec, Š. and I. Fertő, 2009c. Former Central European free trade agreement countries' agri-food trade specialisation. *Agrawirtschaft*, **58** (8): 356–364.

Bojnec, Š. and I. Fertő, 2010a. Structure and convergence of agro-food trade of Central and Eastern European countries with the European Union during pre-accession. *Ekonomický časopis – Journal of Economics*, **58** (7): 677–689.

Bojnec, Š. and I. Fertő, 2010b. Quality differentiation in East-West European agro-food trade during the pre-accession. *Transformations in Business & Economics*, **9** (3,21): 36–51.

Bojnec, Š. and I. Fertő, 2012a. Agro-food exports variety from the Central and Eastern European countries. *Zemědělská ekonomika / Agricultural Economics – Czech*, **58** (1): 1–10.

Bojnec, Š. and I. Fertő, 2012b. Complementarities of trade advantage and trade competitiveness measures. *Applied Economics*, **44** (4): 399–408.

Bojnec, Š. and I. Fertő, 2012c. Does EU enlargement increase agro-food export duration? *The World Economy*, **35** (5): 609–631.

Bojnec, Š. and I. Fertő, 2014a. Export competitiveness of dairy products on global markets: The case of the European Union countries. *Journal of Dairy Science*, **97** (10): 6151–6163.

Bojnec, Š. and I. Fertő, 2014b. Forestry industry trade by degree of wood processing in the enlarged European Union countries. *Forest Policy and Economics*, **40**: 31–39.

Bojnec, Š. and I. Fertő, 2014c. Meat export competitiveness of European Union countries on global markets. *Agricultural and Food Science*, **23** (3): 194–206.

Bojnec, Š., I. Fertő and J. Fogarasi, 2014. Quality of institutions and the BRIC countries' agro-food exports. *China Agricultural Economics Review,* **6** (3): 379–394.

Bojnec, Š., S. Kvasha and O. Oliynyk, 2014. Agricultural financial systems in Slovenia and Ukraine. *Bulgarian Journal of Agricultural Science*, **20** (2): 458–468.

Bojnec, Š. and J. F. M. Swinnen, 1997. The pattern of agricultural price distortions in Central and Eastern Europe. *Food Policy*, **22** (4): 289–306.

Chen, K. Z. and Y. Duan, 2000. Competitiveness of Canadian agri-food exports against competitors in Asia: 1980–97. *Journal of International Food and Agribusiness Marketing*, **11** (4): 1–19.

Cleves, M. A., W. W. Gould and R. G. Gutierez, 2004. An Introduction to Survival Analysis Using STATA. Stata Press, College Station, Texas.

Csaki, C. and Z. Lerman, (eds.), 2000. Structural Change in the Farming Sectors in Central and Eastern Europe, World Bank Technical Paper No. 465. The World Bank, Washington DC.

Feenstra, R., 1994. New product varieties and the measurement of international prices. *American Economic Review,* **84** (1): 157–177.

Fertő, I., 2004. Agri-food trade between Hungary and the EU. Budapest: Századvég.

Fertő, I., 2005. Vertically differentiated trade and differences in factor endowment: The case of agri-food products between Hungary and the EU. *Journal of Agricultural Economics*, **56** (1): 117–34.

Fertö, I. and L. J. Hubbard, 2003. Revealed comparative advantage and competitiveness in Hungarian agri-food sectors,. *The World Economy*, **26** (2): 247–259.

Fertő, I. and K. A. Soós, 2009. Duration of trade of former communist countries in the EU market. *Post-Communist Economies*, **21** (1): 31–39.

Greenaway, D., R. C. Hine and C. R. Milner, 1994. Country-specific factors and the pattern of horizontal and vertical intra-industry trade in the UK. *Weltwirtschaftliches Archiv*, 130: 77–100.

Greenaway, D., R. C. Hine and C. R. Milner, 1995. Vertical and horizontal intra-industry trade: A cross-industry analysis for the United Kingdom. *Economic Journal*, **105**: 1505–1518.

Hummels, D. and P. J. Klenow, 2002. The variety and quality of a nation's trade. National Bureau of Economic Research Inc., NBER Working Papers: No. 8712.

Hummels, D. and P. J. Klenow, 2005. The variety and quality of a nation's exports. *American Economic Review*, **95** (3): 704–723.

Jámbor, A. and L. J. Hubbard, 2013. Changing product structure and comparative advantage: the case of Hungarian agri-food trade. *Ekonomický časopis – Journal of Economics*, 61 (8): 846–860.

Jámbor, A., 2014. Country-specific determinants of horizontal and vertical intra-industry agri-food trade: The case of the EU new member states. *Journal of Agricultural Economics*: forthcoming.

Nitsch, V., 2009. Die another day: Duration in German import trade. *Review of World Economics*, **145** (1): 133–154.

Ongsritrakul, S. and L. Hubbard, 1996. The export market for Thai frozen shrimps in the European Union. *British Food Journal*, **98** (8): 24–28.

Rigaux, L. R., 1971. Market share analysis applied to Canadian wheat exports. *Canadian Journal of Agricultural Economics/ Revue canadienne d'agroeconomie*, **19** (1): 22–34.

Swinnen, J. F. M., A. Buckwell and E. Mathijs, (eds.), 1997. *Land Reform, Agricultural Privatisation and Farm Restructuring in Central and Eastern Europe.* Ashgate: Aldershot.

The World Bank, 2013. World Integrated Trade Solution: Online Trade Outcomes Indicators – User's Manual – Version 1.0. Washington, DC: The World Bank.

Török, Á. and A. Jámbor, 2013. Agri-food trade of the new member states since the EU accession. *Agricultural Economics – Czech*, **59** (3): 101–112.

Tyszynski, H., 1951. World trade in manufactured commodities, 1899–1950. *The Manchester School of Economic Social Studies*, **19**: 272–304.

UNSD, 2013. Commodity Trade Database (COMTRADE). New York: United Nations Statistical Division. Available through World Bank's World Integrated Trade Solution (WITS): www.wits.worldbank.org.

Received February, 24, 2014; accepted for printing December, 2, 2014