Agri-food Trade Specialisation Pattern in the New EU Member States

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Abstract— **The paper analyses development of agri-food trade specialisation pattern in eight EU Member States of the 2004 and 2007 enlargements (NMS) during the period 2000 – 2005. Over the period analysed, the NMS were not able to hold trade positions in the most competitive commodities, but on the other hand, positions of a number of previously uncompetitive commodities improved. We show convergence of dynamism of agri-food trade specialisation across NMS in trade with the partners/groupings investigated.**

Keywords— **agri-food trade, specialisation, EU Member States of 2004 and 2007 enlargements**

I. INTRODUCTION

New political and economical changes related to the EU enlargements in 2004 and 2007 (e.g. elimination of tariff and non-tariff barriers to trade within the enlarged European Union (EU)) led to new trade patterns that originated at the beginning of the nineties. Technological changes and a variety of supportive domestic and trade policies (e.g. Common Agricultural Policy (CAP), export subsidies) have a substantial effect on production and inter-country exchange of goods. Moreover, growth in the per capita income increases intra-industry trade among countries which can influence trade specialisation pattern of a country. In the paper we take a closer look at the dynamics of the development of agri-food trade specialisation pattern of eight EU new Member States of the 2004 and 2007 enlargements.

We assume that a commodity which shows specialisation position from a longer time perspective is also competitively advantageous.

The recent empirical literature on trade specialisation yields similar conclusions about the development of the trade specialisation patterns. It should be stressed, however, that the results are not directly comparable considering different time and country coverage as well as commodities/products analysed. [1] found that the extent of specialisation of agri-food exports of the Central and Eastern European Countries (CEEC) to the EU exhibited a declining trend. They also concluded that the pattern of specialisation indices of individual CEEC have converged rather than polarised over the analysed period. [2] observed a reduction in trade specialisation of six largest industrialised countries and eight East Asian countries. [3], by analysing dynamics of total trade specialisation in six geographical regions: OECD North, OECD South, East Asia, South Asia, Latin America, and the CEEC pointed to a global tendency in decreasing of trade specialisation. A recent study by [4] made a similar conclusion for specialisation of total trade of the enlarged European Union. However, [5] found an increase in trade specialisation of ten new EU Member States of the 2004 enlargement.

The goal of the paper is to analyse the dynamics of development of agri-food trade specialisation of eight new EU Member States of the 2004 and 2007 EU enlargements (Bulgaria, the Czech Republic, Latvia, Lithuania, Poland, Romania, the Slovak Republic, and Slovenia) with respect to their selected trade partners/groupings in the period 2000 - 2005.

Our paper contributes to the existing literature on trade specialisation development in several ways. First, it looks only at agri-food trade specialisation and thus can extend the insights into this area. Second, it provides a multi-country analysis based on very detailed trade flow data. Third, the paper analyses the changes in agri-food trade specialisation induced by the 2004 EU enlargement by using latest data available from national statistical offices of the countries.

II. DATA AND METHODOLOGY

A. Data

The data used in this study were collected under the TRADEAG FP6 project (TRADEAG CEEC data base) from the national statistical offices. Nominal yearly exports and imports of the NMS expressed in Euro and specified by the six-digit code of the Harmonised System (HS) (altogether 729 commodities for each year and country) were used. The period 2000 – 2005 is covered.

The following trade partners/groupings of the individual NMS were considered in our analysis: EU-15 (EU Member States before 2004 enlargement); new Member States of the 2004 EU enlargement (NMS04): the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovakia, and Slovenia. Agri-food trade with Bulgaria and Romania (NMS07) has also been investigated. The NMS agri-food trade with Commonwealth of Independent States (CIS) was of interest because of close trade relations in the past, while agri-food trade with the United States (USA) benefited from several bilateral agreements before 2004. All other countries were aggregated to the rest of the world grouping (ROW). Total agri-food trade served as a benchmark for comparison of agri-food trade development with individual trade groupings.

B. Static analysis of agri-food trade specialisation

The analysis of the evolution of agri-food trade specialisation follows computation of Lafay index (LFI) [6] of trade specialisation:

$$LFI_j^i = \begin{cases} 0, if\ x_j^i = m_j^i = 0 \\ \\ 100 \left(\dfrac{x_j^i - m_j^i}{x_j^i + m_j^i} - \dfrac{\displaystyle\sum_{j=1}^{N}(x_j^i - m_j^i)}{\displaystyle\sum_{j=1}^{N}(x_j^i + m_j^i)} \right) \dfrac{x_j^i + m_j^i}{\displaystyle\sum_{j=1}^{N}(x_j^i + m_j^i)}; \\ \\ i = \overline{1;k},\ otherwise \end{cases} \quad (1)$$

where

x_j^i - export of commodity j of country i to a selected trade grouping;

m_j^i - import of commodity j of country i from a selected trade grouping;

N - number of commodities for which the LFI is calculated;

k - number of countries/groupings.

We modified the part of the index expressing that LFI takes value zero if there is none trade with a trade grouping in a commodity and a given year.

The advantage of LFI over the classical RCA is that LFI takes into account intra-industry trade. To consider both exports and imports is important for assessment of specialisation in a commodity. Given the index structure, sum of LFI values over all commodities equals zero. The higher the index value, the higher the degree of specialisation. An important advantage of LFI lies also in its ability to eliminate the influence of cyclical factors on trade specialisation [5]

C. Dynamism of trade specialisation development

The development of agri-food trade specialisation over time was investigated by Markov transition matrices. We followed an approach of [7] and [8]. The idea of transition analysis lays in construction of transition probability matrices - square matrices consisting of probabilities of transition from one stage (of trade specialisation) in time τ to another point in time τ + n. The transition probabilities were computed by counting the number of transitions out of and into each stage. Sum of elements in a row of transition probability matrix is equal to unity (total probability).

In our study, the zero LFI values were controlled for by dividing the LFI group into five intervals of unequal size. The middle (third) interval included all values related to commodities with no mutual trade. The remaining edges of the LFI range were split into two equally sized intervals, according to the number of commodities.

Development of the NMS agri-food trade specialisation year by year and over a five-year period has been investigated to compare situation after the enlargement and before it. In the former case, five one-year matrices for each reporter-partner pair were computed. Next, those five matrices were averaged to find out how agri-food trade specialisation developed from a short time perspective. For the latter case,

transition matrices between 2000-2001 and 2004-2005 were calculated. Comparison of the two results reveals dynamics of the NMS agri-food trade specialisation.

An inter-trade grouping and a cross-country comparison of trade specialisation dynamics was carried out by two measures suggested by [9]:

$$M_1 = \frac{n - tr(M)}{n - 1}; \qquad M_2 = 1 - \left| \det(M) \right| \tag{2}$$

where

n – number of rows/columns of a transition matrix M

tr – trace of the transition matrix (sum of elements on the main diagonal)

det (M) – determinant of M.

For both indicators higher value suggests higher degree of mobility of commodities between levels (intervals) of trade specialisation. M1 uses information on the main diagonal, i.e. it measures explicitly the mobility (by means of transition probabilities) only of those commodities that were supposed not to change their specialisation level. M_2 is complex because via determinant it captures all changes in the matrix, i.e. in addition to M_1, it evaluates probabilities of any changes in specialisation level. Thus, M_1 and M_2 formally measure the degree of specialisation dynamics for a trade grouping and a country in a selected period.

To investigate how specialisation dynamics changed in the period analysed, differences of mobility indices pertaining to the five-year period and one-year period, respectively were calculated:

$$\Delta M_1 = M_{15} - M_{11} \qquad \Delta M_2 = M_{25} - M_{21} \tag{3}$$

where

M_{15} - M_1 pertaining to a five-year period;

M_{11} - M_1 pertaining to a one-year period,

M_{25} - M_2 pertaining to a five-year period;

M_{21} - M_2 pertaining to a one-year period.

III. RESULTS

The year-by-year development of specialisation patterns was analysed by Markov transition matrices. We found rather significant stiffness of commodities in trade with the EU-15, NMS04, ROW, and total agri-food trade. This holds true especially for the commodities that were each year either significantly uncompetitive or, on the contrary, highly competitive.

On the other hand, there was much higher probability of agri-food competitiveness changes in NMS trade with NMS07, CIS and the USA, which means higher dynamism in that trade.

Yearly, it was rather difficult for NMS to improve the position of competitively disadvantageous commodities with regard to individual trade groupings. But once obtained a competitive advantage, the countries were able to maintain this commodity position over the period analysed.

Five-year transition matrices revealed significant dynamics of agri-food trade specialisation of individual NMS according to trade groupings. We observed a gradual expansion in the number of mutually traded commodities in NMS trade with the EU-15, NMS04, ROW and in total agri-food trade, which, however, made the level of trade specialisation decrease over the period analysed. Moreover, the magnitude of the five-year diagonal probabilities suggests that during 2000 - 2005, NMS were more likely to see their trade positions in competitively advantageous commodities worsen than their positions in competitively disadvantageous ones improve.

The fact that there were changes in specialisation patterns of NMS agri-food trade with all analysed groupings does, however, not answer the question: with which trade grouping did agri-food trade specialisation see highest dynamism? In other words, is there some relation between trade groupings and the magnitude of the specialisation dynamism?

To investigate this issue, we have regressed values of M_1 (Figure 1) and M_2 on changes in values of the respective indices. The idea behind this regression is that if higher dynamism in agri-food trade specialisation is related to previously rigid trade specialisation pattern and, on the other hand, lower specialisation dynamisms corresponds to previously more dynamic trade, this leads to a sort of convergence in NMS agri-food trade with their partners.

Figure 1 and Figure 2 reveal that there is an indication of such convergence among individual trade groupings and all countries considered. In both cases, respective regression coefficients are highly significant and negative, confirming the hypothesis stated previously. Thus, during the EU enlargement agri-food trade of NMS saw higher dynamism in trade

of previously less dynamic partners, and on the other hand, a slow-down in agri-food specialisation dynamics was found for previously dynamic trade partners.
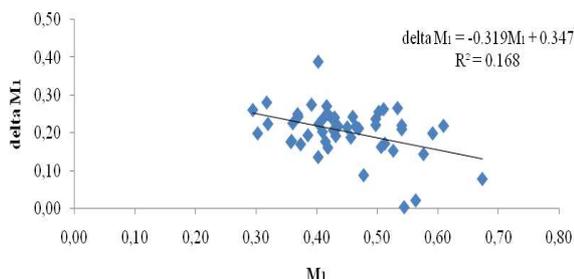

Fig. 1 Higher dynamics in agri-food trade specialisation relative to previously less dynamic trade groupings (according to M_1)
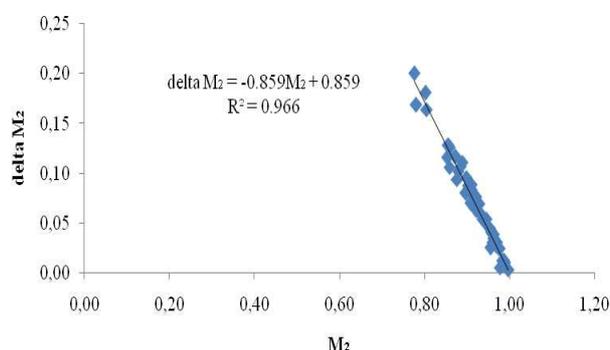

Fig. 2 Higher dynamics in agri-food trade specialisation relative to previously less dynamic trade groupings (according to M_2)

IV. CONCLUSIONS

This paper dealt with the development of agri-food trade specialisation dynamics of the EU new Member States of the 2004 and 2007 enlargements. A drop in revealed competitive advantages of the majority of the most successful commodities over the period analysed was detected. NMS did not maintain positions of their competitively advantageous commodities, but at the same time the positions of a number of previously uncompetitive commodities improved.

We found higher dynamics in agri-food trade specialisation relative to previously less dynamic trade groupings, and on the other hand, a slow-down in specialisation dynamics was found for trade with previously dynamic trade partners. This points to a convergence in agri-food trade of NMS and can be explained by the efforts of NMS to penetrate EU-15 markets, for which agri-food trade specialisation did not change much in the past.

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