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Assessing the Implications of EU Enlargement for CEEC Agri-food Trade Specialisation

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**„What was expected, what we observed,
the lessons learned.“**

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ABSTRACT

The goal of the paper is to analyse agri-food trade specialisation in seven Central and Eastern European Countries (CEECs) with their trade groupings over the period 2000-2005, prior to and after their accession to the EU. For these CEECs, we found high agri-food trade specialisation in a relatively small number of commodities. The most competitive commodities in trade with all trade groupings other than the EU-15 were marked by a fairly high level of processing. Over the analysed period the CEE countries did not maintain positions of the most competitive commodities, but at the same time they improved positions of a number of previously uncompetitive commodities. The competitiveness of CEEC agri-food trade commodities declined over the period analysed.

Key words: agri-food trade; specialisation; Lafay index; Markov matrices; new EU Member States

1 INTRODUCTION

Changes in trade specialisation can occur as a consequence of deep structural changes in the economic system of a country. Given the considerable economic and political changes in Central and Eastern European Countries (CEECs), in the European and global environment context, attendant shifts in the structure and dynamics of trade specialisation patterns are assumed.

Existing studies focusing on the analysis of revealed comparative advantages and trade specialisation patterns of transitional economies differ in various aspects. The number and structure of commodities under scrutiny are determined by the level of aggregation and the classification system in which the trade flow data are reported. The length of the period analysed also alters. HINLOOPEN AND MARREWIK (2004) analysed the dynamics of Chinese comparative advantages over the period 1970-1997; ZAGHINI (2005) examined the evolution of trade patterns in the new EU-10 Member States (2004 enlargement) between the years 1993 and 2001; and trade specialisation in the EU and CEECs in 1995 – 2002 was investigated by FERTÖ AND SOÓS (2006),

FERTÖ AND HUBBARD (2003) concluded that the extent of specialisation of the CEECs agri-food exports to the EU exhibited a downward trend. Furthermore, they found that the specialisation indices of individual CEECs have converged rather than polarised over the period analysed. WÖRZ (2005) analysed the dynamics of trade specialisation in six geographical regions — OECD North, OECD South, East Asia, South Asia, Latin America, and CEECs - and found a global tendency towards a decrease in the intensity of specialisation, together with regional convergence. ZAGHINI (2005), however, found an increase in trade specialisation of EU-10 Member States.

The paper analyses the structure and dynamics of agri-food trade flows of individual CEECs that became new EU Member States in 2004 and 2007 (the Czech Republic, Latvia, Lithuania, Slovakia, Slovenia, Bulgaria and Romania) and their trade groupings over the period 2000-2005. Over this period the most important factors influencing CEEC agricultural trade were accession to EU; gradual agri-food trade liberalisation; changes in WTO commitments (as non-EU and EU members); and reform of the Common Agricultural Policy.

We examined the magnitude of the dynamics of agri-food trade specialisation of these countries using the Lafay index and the degree of change in agri-food trade specialisation using various approaches. The paper does not, however, address the changes in absolute values of trade flows; nor does it deal with the evolution of the quality of internationally traded goods.

The paper is organised as follows. The following section is devoted to the methodology applied and data used. The third section presents the results, while the last section draws conclusions.

2 METHODOLOGY AND DATA

To assess the possible implications of CEEC accession to the EU for their agri-food trade structure and trade flows in the period 2000-2005, the following issues were analysed: (1) changes in CEEC trade structure; (2) the most competitive commodities and their level of processing by individual CEECs; and (3) the dynamics of agri-food trade specialisation with their trade groupings.

Identification of the most competitive commodities and an analysis of the evolution of agri-food trade specialisation were based on calculation of the Lafay index (LFI) (LAFAY, 1992) of trade specialisation. This was adjusted, for the reasons explained below, as follows:

$$LFI_j^i = \begin{cases} 0; & \text{if } x_j^i = 0 \wedge m_j^i = 0 \\ 100 \left[\frac{x_j^i - m_j^i}{x_j^i + m_j^i} - \frac{\sum_{l=1}^N (x_l^i - m_l^i)}{\sum_{l=1}^N (x_l^i + m_l^i)} \right] \frac{x_j^i + m_j^i}{\sum_{l=1}^N (x_l^i + m_l^i)}; & l = \overline{1; k}; \text{ otherwise} \end{cases} \quad (1)$$

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.

The sum of LFI values for all commodities is zero. A value for a commodity can therefore be either positive or negative, meaning either comparative advantage or disadvantage.

The LFI is used in this study rather than the BALASSA (1965) RCA index because of the nature of the data, which show the presence of intra-industry trade. This choice is also underpinned by recent studies by FIDRMUC AND DJABLÍK (2003) or CATEANO AND GALEGO (2006), which produced evidence that the role of intra-industry trade in CEEC - EU-15 relations has increased. FONTAGNÉ AND FREUDENBERG (1997) argue that a significant proportion of intra-industry trade may appear due to insufficient sectoral disaggregation. However, this is unlikely to be the case with our data because of the HS 6 code we used. A major advantage of the LFI is also its ability to eliminate the influence of cyclical factors on trade specialisation (ZAGHINI, 2005).

We identified the most competitive commodities of the seven countries by three conditions that had to be met simultaneously. First, ten commodities with the highest LFI values were selected. The number of items is arbitrary but it reflects the fact that LFI values fell significantly by order of commodity. The second condition came from the assumption that a commodity reveals comparative advantage if a country trade also specialises in it over a fairly long period of time (in our case at least for four out of the six years examined). The third condition considered an item's share of exports to a selected trade grouping out of total exports to that grouping. BERGSCHMIDT AND HARTMANN (1998) approach was applied for classification of commodities by level of processing. A higher level of processing is assumed to mean higher value added.

Trade flows at the beginning of the period analysed (before enlargement) and at the end (after enlargement) were compared. To eliminate extreme fluctuations in trade flows, we averaged the respective trade flows of 2000 and 2001 and 2004 and 2005.

To analyse a change in trade specialisation, we used the Galtonian regression:

$$LFI_{ij}^{T_2} = \alpha_i + \beta_i LFI_{ij}^{T_1} + u_{ij} \quad (3)$$

where

T_1 – beginning of the period analysed;

T_2 – end of the period analysed;

α_i , β_i – regression coefficients;

u_{ij} – disturbance term;

i – country pair (e.g. Slovak trade with Hungary)

j – commodity.

By definition, β_i can take the following values:

- a) $\beta_i < 0$ means a complete reversal of trade specialisation,
- b) $\beta_i \in (0;1)$ denotes that on average the specialisation pattern remained the same but previously uncompetitive commodities improved their positions and *vice versa*,
- c) $\beta_i = 1$ indicates structural stability,
- d) $\beta_i > 1$ shows that a country became more specialised in commodities in which it had already been specialised.

Analysis of the regression coefficient itself is not sufficient to draw conclusions about the relation between comparative advantages/disadvantages and the degree of specialisation. Thus, adopting the approach of ZAGHINI (2003) and HINLOOPEN AND VAN MARREWIK (2004), we computed the ratio

$$\frac{\sigma_{iT_2}^2}{\sigma_{iT_1}^2} = \frac{\beta_i^2}{R_i^2} \quad (4)$$

where

R_i^2 – coefficient of determination of the stochastic equation (3),

$\sigma_{iT_1}^2$ and $\sigma_{iT_2}^2$ – variances of regressor and regressant from (3), respectively.

Equation (4) shows that no intra-distribution dynamics occurred if $\beta_i = R_i$; a country's agri-food trade specialisation increased if $\beta_i > R_i$; and it fell if $\beta_i < R_i$.

Trade specialisation development

The development of agri-food trade specialisation over time was investigated by Markov transition matrices. We used the approach of QUAH (1993), PROUDMAN AND REDDING (2000) and REDDING (2002). The elements of transition probability matrices are probabilities of transition from one stage (of trade specialisation) in time τ to another stage in time $\tau + n$. The transition probabilities were calculated by counting the number of transitions out of and into each stage. The sum of elements in a row of transition probability matrix is equal to unity.

The construction of probability matrices first needed a decision as to how many intervals to divide the group of LFI values into. The trade specialisation literature does not take a unified approach to this. 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 agri-food trade specialisation was investigated over a short time span (between successive years) and over the whole period (2000-2005). In the first case, we computed five one-year matrices for each reporter-partner pair. Next, we averaged those five matrices to find out how agri-food trade specialisation developed from a short time perspective. In the second case, we analysed the development of agri-food trade specialisation over a longer period of time by calculating transition matrices between 2000 and 2005. Comparison of the two results shows the development of agri-food trade specialisation.

Data

In this study individual CEECs trade flow data from the period 2000 – 2005 were analysed using the six-digit code of the Harmonised System (HS), which presents 729 commodities each year and country. We considered the following trade groupings/partners of individual CEECs: old EU Member States (EU-15); eight new EU Member States (NMS);¹ Acceding countries² (ACC) - Bulgaria and Romania; the Commonwealth of Independent States (CIS); the United States (USA); the Rest of the World (ROW); and total agri-food trade. Data expressed in euro are from the National Statistical Offices and were collected under the TRADEAG³ FP6 project.

3 RESULTS

3.1 CEEC agri-food trade in 2000 - 2005

The composition of individual CEEC agri-food trade by trade grouping shows that, for all the CEECs considered except Bulgaria and Slovenia, the EU-15 and NMS were the most important trading partners (Table 1). Slovenia had very intensive trade relations with the ROW, which may be attributed mainly to substantial trade with the countries of former Yugoslavia. Lower trade shares with the ROW for all countries except Latvia in 2005 than in 2000 point to a possible trade diversion effect of the 2004 EU enlargement.

The most intensive agri-food trade with the NMS was observed in the case of Slovakia. Trade with the ACC, CIS and the USA appeared to be of minimum importance for the majority of CEECs.

Table 1: Composition of individual CEEC agri-food exports/imports by trade groupings in %

		Trading partners/groupings											
		EU-15		NMS		ACC		CIS		USA		ROW	
Country		Ex.	Im.	Ex.	Im.	Ex.	Im.	Ex.	Im.	Ex.	Im.	Ex.	Im.
2000	BG	33	38	6	7	2	2	4	1	5	3	50	49

¹ The Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, the Slovak Republic, Slovenia.

² As of 2005

³ TRADEAG (“Agricultural Trade Agreements”) is 6FP project No 513666, financed by the European Commission.

2005		40	45	4	7	6	1	2	1	3	1	45	44
2000		38	50	41	22	1	0	8	0	1	4	11	24
2005	CZ	43	63	42	27	1	0	4	0	1	1	10	9
2000		35	28	22	15	0	1	26	9	11	2	6	15
2005	LT	47	45	26	33	0	0	22	7	1	3	5	12
2000		25	47	38	35	0	1	27	4	6	3	3	10
2005	LV	27	42	37	44	0	0	22	5	5	1	9	7
2000		46	32	14	22	2	1	4	3	1	4	33	39
2005	RO	55	38	9	15	5	1	4	2	1	9	26	35
2000		22	39	63	44	2	0	7	1	0	1	6	15
2005	SK	31	40	59	50	2	1	3	1	0	1	5	10
2000		21	54	5	35	1	1	2	0	3	1	71	27
2005	SI	43	58	1	4	0	1	4	0	1	1	48	24

Source: own calculations based on the TRADEAG CEEC database

Note: BG – Bulgaria, CZ – the Czech Republic, LT – Lithuania, LV – Latvia, RO – Romania, SK – the Slovak Republic, SI – Slovenia

Ex. – export; Im.-import

Agri-food trade of all CEECs by trade groupings was specialised in a relatively small number of commodities (Table 2). This is particularly evident in trade with the ACC, CIS, ROW and the USA, i.e. countries that were not the main trading partners of the countries analysed. Specialisation in exported commodities was generally higher than in imported ones. The results presented in Table 2 also point to the legitimacy of a detailed analysis of trade flows.

The most competitive commodities do not show clear trends in respect of the level of processing. However, the results presented in Table 3 indicate that Bulgarian and Romanian processed agri-food commodities were not competitive on the EU-15 market. Insufficient compliance with food quality and safety requirements on those markets may be a possible explanation. Both countries exported mainly live animals, carcasses, cereals and oilseeds to the EU-15.

Table 2: Share of the ten most important commodities in exports/imports by value to/from trade grouping in 2000 – 2005 (%)

Reporter	Partner	Export		Import		Reporter	Partner	Export		Import	
		min.	max.	min.	max.			min.	max.	min.	max.
Bulgaria	EU-15	55.7	67.2	32.3	38.9	Romania	EU-15	58.8	68.5	38.0	50.2
BG	NMS	75.5	84.9	44.1	60.8	RO	NMS	66.7	80.8	45.1	58.5
	CIS	68.8	86.3	79.2	97.1		CIS	57.5	68.2	74.1	94.1
	ACC	82.0	94.7	79.7	93.5		ACC	79.9	87.0	69.5	88.8
	ROW	53.9	60.8	53.0	72.6		ROW	81.0	87.6	58.4	72.4
	USA	82.5	95.5	69.3	85.2		USA	87.8	98.0	90.0	93.2
	Total	47.3	55.6	33.0	42.3		Total	54.7	64.5	39.8	46.2
Czech Republic	EU-15	45.4	54.0	28.9	33.3	Slovakia	EU-15	40.6	64.8	28.9	38.7
CZ	NMS	30.7	41.1	28.5	32.7	SK	NMS	30.3	38.5	32.2	37.5
	CIS	58.5	80.4	59.2	76.3		CIS	76.4	85.1	80.4	95.3
	ACC	53.5	77.6	58.0	82.8		ACC	81.3	90.2	76.1	89.3
	ROW	63.3	70.9	44.9	57.1		ROW	58.2	80.3	41.5	57.7
	USA	88.1	93.2	81.6	88.6		USA	91.3	99.8	72.6	80.2
	Total	36.4	41.7	24.8	28.1		Total	30.3	39.3	26.1	30.5
Latvia	EU-15	76.4	85.2	29.9	35.4	Slovenia	EU-15	56.3	63.4	25.2	29.4
LV	NMS	37.7	46.8	32.3	42.0	SI	NMS	54.1	79.0	45.1	76.4
	CIS	67.0	87.2	48.0	70.5		CIS	91.8	97.6	84.7	98.0
	ACC	97.6	100.0	95.9	100.0		ACC	80.4	94.8	86.4	95.4
	ROW	79.6	90.8	41.5	48.9		ROW	47.0	57.9	41.4	52.1
	USA	91.9	98.1	71.5	80.0		USA	89.9	95.2	69.3	75.5
	Total	47.8	64.1	25.3	30.5		Total	41.5	52.2	23.9	27.7
Lithuania	EU-15	66.6	85.3	31.0	39.7						
LT	NMS	34.9	58.4	28.8	36.4						
	CIS	60.5	83.5	52.1	75.2						
	ACC	93.3	100.0	99.1	99.7						
	ROW	74.7	95.5	48.3	55.8						
	USA	84.9	97.4	88.0	98.3						
	Total	49.9	68.6	23.1	31.8						

Source: own calculations

Unlike Bulgaria and Romania, agri-food exports from the Czech Republic and Slovenia to the EU-15 specialised in highly processed commodities, which indicates their better ability to penetrate the EU-15 market.

Contrary to CEEC agri-food exports to the EU-15, intra-NMS agri-food exports showed a stronger tendency towards highly or semi-processed commodities. NMS exports to ACC were heterogenous in the level of processing. Semi and highly processed commodities prevailed in CEEC exports to the Commonwealth of Independent States. NMS (with the exception of Bulgaria and Romania) agri-food exports to the ROW was dominated by commodities with a higher level of value added.

Table 3: Level of processing of the most competitive export commodities by trade groupings

Trade grouping	Exporting country							
	BG	CZ	LV	LT	PL	RO	SK	SI
EU	M	H	S	S	S	R	Inc	M, H
NMS	H	S, H	M, H	H	H	S, H	S, H	S, H
ACC	R	Inc	H	S, H	H	M, S	Inc	M, H
CIS	H	S, H	S, H	S, H	H	S, H	Inc	S, H
USA	H	S, H	H	H	H	H	R, H	H
ROW	Inc	S, H	H	S	S, H	R, M	S, H	H
Total	Inc	S, H	H	S, H	S, H	R, M	S, H	S, H

Source: own calculations

Note: R – raw commodities, M – minimally processed, S – semi-processed; H – highly processed, Inc – inconclusive decision

3.2 Structural stability and intra-distribution dynamics of agri-food trade specialisation

Agri-food trade of individual Central and Eastern European Countries with the ACC, CIS and the USA revealed a rather high degree of specialisation in both periods examined - 2000-2001 and 2004-2005. Trade with the other groupings was specialised to a lesser extent and in some cases specialisation even decreased.

The degree of revealed comparative advantage increased in particular in trade with the ACC. Latvian and Romanian agri-food commodities witnessed an increase in revealed comparative advantages in relation to the majority of trade groupings, which was not the case of the other countries.

For the majority of CEECs, the specialisation pattern in respect of their trading partners as a whole did not change, but the degree of specialisation decreased. In other words, commodities revealing significant comparative advantage saw their positions worsen due to the decline in competitiveness, while commodities in a very weak position at the beginning of the period of observation saw their positions improve in terms of comparative advantage. There were, however, several exceptions to the overall decrease in specialisation. In trade with the ACC, CEECs deepened their comparative disadvantages in commodities (mainly primary ones) that performed badly at the beginning of the period analysed. After the 2004 EU enlargement import of those commodities from Bulgaria and Romania to NMS increased.

The year-by-year development of specialisation patterns was analysed using Markov transition probability matrices. We found rather significant rigidity, expressed by high diagonal probabilities, of commodities in trade with the EU-15, NMS, ROW and total agri-food trade. This was especially true of items that, each year, showed either significantly comparative disadvantage or, on the contrary, revealed high comparative advantage. On the other hand, there was much higher probability of agri-food competitiveness changes in CEEC trade with the ACC, CIS and the USA, which means higher dynamics in that trade.

Over a one-year span, it was rather difficult for CEECs to improve the position of comparatively disadvantageous commodities with regard to individual trade groupings. On the other hand, it is also true that, once obtained, a comparative advantage, the countries were able to maintain this commodity position over the period analysed.

NMS trade with the ACC, CIS and the USA showed a high share of the same non-traded commodities over a one-year span. This situation may be due to high transaction costs. Moreover, in NMS trade with those three groupings over a one-year span there was a rather stable structure and high specialisation of traded commodities. An exception was Czech trade with ACC, where a significant shift in agri-food commodity trade position was observed.

Five-year transition matrices revealed significant dynamics of agri-food trade specialisation of individual CEECs according to trade groupings. We observed a gradual expansion in the number of mutually traded commodities in CEEC trade with the EU-15, NMS, ROW and in CEEC total agri-food trade, which, however, made the level of trade specialisation decrease over the period analysed.

Furthermore, the magnitude of the five-year diagonal probabilities leads to the conclusion that over the period analysed, CEECs were more likely to see their trade positions in comparatively advantageous commodities worsen than their positions in comparatively disadvantageous ones improve.

To summarise, over the five-year period noticeable structural changes were observed in the agri-food trade patterns of NMS countries with Bulgaria, Romania, the CIS, USA and ROW. Taking into account the 2007 EU enlargement, the CIS, USA and ROW are third countries for the EU. Changes in the structure and dynamics of agri-food trade could be explained by the implementation of EU policies in the new Member States. Gradual agri-food trade liberalisation with the EU-15 before accession, mutual CEEC trade liberalisation after accession and insufficient flexibility to a changing environment affected the pattern of agri-food trade specialisation. Changes in commitments in relation to the WTO (as non-EU and EU members) and reform of the Common Agricultural Policy (CAP) of the EU also contributed to the structural changes.

4 DISCUSSION AND CONCLUSIONS

Over the period analysed, CEECs intensified trade with the old EU Member States, while their share of agri-food trade with the rest of the world declined; this is possibly a trade diversion effect of enlargement.

A noticeable feature of individual CEEC agri-food trade is their high level of specialisation in a relatively small number of commodities (by value). In most cases the ten most exported commodities by value were well in excess of 30 per cent of total agricultural export.

The most competitive CEEC commodities in trade with the EU-15 in 2000 -2005 do not show a clear tendency as regards their level of processing. Country specifics, however, imply that the Czech Republic and Slovenia succeeded in exporting highly processed commodities to the

EU-15, while Bulgaria and Romania exported predominantly commodities with low value added. Semi and highly processed commodities, i.e. with higher value added, were predominant in CEEC exports to trade groupings other than the EU-15. Dairy products were generally the most competitive CEEC commodities on all the markets considered.

Individual NMS agri-food trade with the ACC, CIS and the USA revealed a rather high degree of specialisation. Trade with the other groupings was specialised to a lesser extent and in some cases specialisation even decreased. A drop in revealed comparative advantages of the majority of the most successful commodities over the period analysed was detected. CEECs did not maintain positions of their comparatively advantageous commodities, but at the same time the positions of a number of previously uncompetitive commodities improved.

CEEC accession to the EU, mutual trade liberalisation, gradual agri-food trade liberalisation, changes in WTO commitments (as non-EU and EU members) and reform of the CAP may be considered to be the prime factors influencing the comparative advantages, composition and dynamics of CEEC agri-food trade.

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