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DEVELOPMENT OF CONVERGENCE IN FOREIGN TRADE OF THE NEW EU-MEMBERS

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Abstract

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The importance of convergence in foreign trade is mentioned in the theory of optimum currency from the very beginning. Also the OCA index incorporates two basic aspect of foreign trade. The territorial reorientation is always characteristic for new EU-members and this process was already accomplished by most of the new EU-members. The more developed associated countries are already at the level of EU-members. The commodity orientation is connected highly with the competitiveness and level of development of the whole economy and the shares of sophisticated product in exports reflect it. Hence the evaluation was concerned on the manufactured goods, SITC group 7-Machinery and transport equipment and the high-technology intensive products. From viewpoint of commodity structure the countries joining EU in 1995 are the most successful. They are closely followed by the other EU-members. The new EU-members of 2004 are lagged, the lag is getting wider with the rise of technology intensity. Only the Czech Republic and Hungary are able to compete with the older EU-members. The commodity convergence of EU countries is runs very dynamically in new members, the shares of other EU countries are almost constant. The results of intra-industry trade also reflect the lag in competitiveness of economies under transition. The transition countries are very heterogeneous in the intra-industry trade as well. The internal structure of transition countries is similar to result obtained when assessing the commodity structure.

foreign trade, convergence, European Union, EU-enlargement

Most of the new EU-members declared their will to join European monetary union in the future. Although their preparatory and accession processes to European Union were long and difficult in some area, they strive to take part in further integration steps as soon as possible. During the accession process numerous measures and other changes were introduced not only in acceding countries but also in the EU-members. Significant part of these provisions was objected to increase similarity and compatibility of the EU-members and acceding economies to ensure the higher level of homogeneity.

The economic reforms accomplished in the new EU-members were different in each country but all of them involved a fundamental institutional reform. In the former centrally planned economies the institutional steps were essential condition for re-orientation of their foreign economic relationships from the former Soviet-type economies to the developed market economies. The economies in transition started to prefer co-operation with developed countries to mutual co-operation. This imperative territorial re-orientation finished up in effort to join the political and economic structure of developed countries as soon as possible (Holub, 1996).

The new EU-member countries succeeded in rising

the level of convergence during the last ten year. Desired deeper integration of new EU-members in framework of monetary union requires continuation of convergence processes. Moreover the convergence processes should accelerate to overcome lags in some variables that are still getting substantively larger and larger (investments in R&D or education, etc).

THEORY OF OPTIMAL CURRENCY AREA

The consequences of the low nominal and real convergence for prosperousness of an economic integration are discussed from late 1970s. The primary Mundel's approach (Mundel, 1961) was focused on the appropriateness of exchange rate regimes for the specific economic entities. Mundel analysed the behaviour under the asynchronous macroeconomic shocks. McKinnon (1963) analysed the suitability of fixed exchange rate regimes for small highly opened. The way of minimization of consequences of asymmetric macroeconomic shocks was suggested by Kenen (1969). He emphasized the benefits of diversification of foreign trade to prevent the negative impacts. The second Mundel's (1973) model of optimum currency area integrates the shortcomings of stationary expectations that were often castigated. Mundel showed the channels to minimize the negative impacts of asymmetric shocks in situations of uncertainty in exchange rate. The international portfolio diversification, reserve and budget pooling lead to sharing of losses and profits in Mundel's viewpoint. In this way the disturbances are spilled over among all participating economies according to the extent of their participation in an integration process. The traditional approach to optimum currency area resulted in the list of significant variables that the members should fulfil as precisely as possible.

In the second evolutionary phase of theory development the economists focused on evaluation of assets and costs following from membership in currency integration. The new attribute – the shock similarity was added to existing list of requirements for successful integration. The wage and price flexibility concept was slowly dismissed; it was replaced by the approach of real exchange rate variability (Ishyama, 1975). The importance of alternative equalising processes was stressed because an economy joining monetary union losses the sovereignty over its monetary policy. The extended list of criteria suffers from inconclusiveness of individual criteria.

The new approach to optimum currency areas emphasises credibility of countries in and out of a monetary union. The countries with higher credibility try to maintain their status, while the economies with lower creditability strive to participate in the reputation of an integration. (Barro and Gordon, 1983) The convergence obtained new purport. They test the economic preferences of potential members and check their prepareness to behave in the similar way as the current members (De Grauwe, 1996). The new concept also points out the possibly negative consequences of too strict or coute que coute meeting the criteria. Further it appeared the strong contradiction in the accurateness of completing the convergence criteria. Allowing the not exactly prepared countries to enter the monetary union could jeopardize the other members of a monetary union. On the other hand, letting them out may rise their preparatory cost and could lead to undesired two-speed European Union. (Frankel and Rose, 1997).

FOREIGN TRADE AND OPTIMUM CURRENCY AREA

No integration can be successful without reciprocal relationships among the members. This is true for every economic, especially monetary, integration that cannot be established without intensive mutual economic relations, foreign trade and international investment above all. The consequences of foreign trade on common monetary area were firstly discussed by Kenen (1969). He advocated the high degree of foreign trade diversification to minimize the negative impacts of potential macroeconomic shocks. These shocks could arise in a specific territory, industry or product and could spread through the foreign flows into the other economies. The necessity of wide diversification is in an exact contradiction with the trade specialisation on the basis of comparative advantages. The suggested diversification decreases the efficiency of an optimal sources allocation. The trade diversification invokes the widening of product and/or territory portfolio for the less effective items as well. This multiplies the decrease in profitability of foreign trade.

The diversification of foreign trade could not cause lowering of negative shocks impacts in the cases when industries or territories are positively correlated. Present-day economies are significantly interconnected not only at regional but also at global level. Their positive correlation is based on the substantive extent of outsourcing and international segmentation of production chains (Dicken, 2003). Under such circumstances the diversification discussed by Kenen is inefficient. It has to be assured at least the symmetric impacts on integrated economies. This can minimize the need for equalising process that are usually scarce or slow in monetary unions. The high degree of territorial and commodity homogeneity of foreign trade is a good prerequisite for such a development.

Krugman (1994) proved that deeper economic integration bolsters the specialisation of an economy under the assumption of relatively low transport cost, absence of trade barriers, resources availability, etc.

Thus according to Kenen the impacts of asymmetric shocks should be higher due to specialisation. Further specialisation also deepens the differences among economic regions in an individual national economy. These regions establish exclusively on economic principle regardless to artificially constructed national borders. This also leads to regional asymmetry than to national asymmetry in shocks (De Grauwe, 1997).

Controversial approach is presented by the European Commission. The intensification of mutual economic flows should synchronise the economic cycles and hence decrease the probability of asymmetric shock. Further the Commission states that most of European foreign trade is of an intra-industry type and that it is moreover generated mostly by non-perfect competitive industries and firms with monopoly power. Under such circumstances the monetary integration will not increase the trade and product specialisation. The conclusions of European Commission were tested by Frankel and Rose (1997). They found the positive correlation between the bilateral trade intensity and similarity of business cycles. They justified this relationship by the fact that countries usually peg its own national currency to the main trade partners to keep the exchange rate stable and thus follow the economic development of the main trade partners.

The similarity in commodity and territorial structures of foreign trade plays important role in OCA-index. These structures may be also used to assess the structure of national economies. Bayoumi and Eichengreen (1997) suggested a simple measure of commodity similarity of foreign trade. They divided the whole traded spectrum to three parts – manufactured, food and the remainder and summed up the difference in their shares in total trade. This measure is quite simple but not too precise. Other studies try to separate and evaluate the extent of intra-industry trade that signals the commodity similarity as well. (Boone and Maurel, 1998; Schweickert, 2001).

Typical source of shock impact asymmetry are differences in territorial structure of foreign trade. The differences in trade intensity with non-member economies could lead to fall in business cycle correlation. This risk arises with the differences and with the importance of trade in a national product. In OCA compound index Bayoumi and Eichengreen (1997) measured the similarity of territorial orientation by the average of shares of bilateral export to GDP. This indicator is also simple to compute, but could hide some differences that can be held as important. There is also no attention paid to potential internal shock uprising inside of a monetary integration and their impacts.

METHODS AND DATA

Foreign trade data are taken up from the COMTRADE database. The analysed data sets involve 25 reporter counties that equal to the 25 EU-members. The bilateral trade of reporters is followed to the 63 most important trade partners. These 63 trade partners represented more than 99.5% of total export of the then 15 EU-members in 1997–2001 in average. The data used for evaluation of commodity convergence were at three-digit level of SITC, rev. 3 classification. Each analysis is accomplished for the period 1993–2003 if not mention otherwise. Trade data are values of trade flows expressed in thousands of USD at current prices.

The territorial and commodity re-orientation of export is illustrated by per cent shares relatively to trade of all EU-members or some part of European integration. The selected years are used to express to typical trends and results during the last years. The attributes of EU-members and new EU-members are mutually compared to discover the state and dynamics of convergence processes in foreign trade. The trends in commodity convergence were analysed by cluster analysis. The results are illustrated by dendrograms presenting the cluster of similar economies. The Wards method with square Euclidean measure proved to be the most beneficial one.

Evaluation of intra-industry trade is connected with two issues that have to be decided before the measurements begin. Firstly it is needed to specify what is one industry from viewpoint of foreign trade. It is common to use the standard classifications like SITC, rev.3. The classification level of detail has to be specified at the same time. In this paper the classification to three digits code is used.

Secondly the appropriate coefficient has to be chosen to express the extent of intra industry trade. Usually the following Grubel-Lloyd index is preferred to the others due to its simplicity and ease of interpretation.

$$Bj = \frac{(Xj + Mj) - |Xj - Mj|}{Xj + Mj}$$

Xj value of export of a specified commodity
Mj value of import of a specified commodity.

If there is no intra-industry trade, the value of Gruber-Lloyd index is equal to a zero. If values of export and import exactly match, the index reaches unit value. The result of index can be interpreted as the share of balance in specific commodity relatively to the total extent of foreign trade in commodity.

TERRITORIAL REORIENTATION

The economies under transition that became the EU-members in 2004 exported mainly to East territories before year 1990. The reorientation of their fo-

reign trade was not finished till the year 1993 in that the analysis begins. The continuing reorientation during period 1993–2003 is obvious from Tab. I where the per cent shares of export into the 12 EU-members as in the year 1994 are presented. The shares of export into the 12 EU countries of the year 1994 afford us to mutually compare the share of new member of the year 1995 and 2004.

Share about 60% without any significant changes is characteristic for average of the 12 old EU-members in all yers. Countries that entered the European Union in 1995 slowly decrease their shares of export into the 12 old EU-members countries except for years 1998–1999 when a slight rise in share came about. The falls in trade with the 12 EU-members are substituted by rises in trade with countries that started their accession process. Territorial structures of Austria, Finland and Sweden were influenced significantly by the associated countries, the rest of EU remains almost unchanged.

Among the 10 new members of year 2004 we can also distinguish different patterns of dynamics during the last years. The Czech Republic, Hungary and Poland accomplished their reorientation circa in 1999, then they hold nearly constant share slightly above 60%. It is value reached only by Austria in the year of entrance to EU. Cyprus, Malta and Slovenia slowly decrease their share also in benefit of new EU members of the year 2004. The Baltic countries demonstrated only low share of foreign trade with the old EU-members. It is caused by their strong relations to Finland, Sweden and Russia.

Focusing on the convergence trends we can use the modified sigma approach that is based on coefficient of variation. Then we can state that the convergence increased during year 1997–2001 for which we have complete data. If we expressed the variability by relative coefficient of variation we can conclude that it fell from the value 3.41 to 3.17.

I: *Shares of exports in per cent to 12 EU-members of the year 1994 (in %)*

	1993	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**
CYP	55.9	51.6	55.2	52.3	44.9	47.1	47.2	44.7	45.8	49.1	-
CZE	42.6	45.8	53.2	50.7	52.2	57.9	61.1	60.8	61.7	60.8	62.0
EST	-	-	20.9	20.7	19.0	19.0	24.7	24.1	19.1	23.9	23.4
HUN	47.4	52.0	52.0	51.4	58.1	60.5	65.7	65.7	65.4	63.0	61.7
LTU	-	-	-	-	32.7	38.4	43.6	41.5	42.2	-	-
LVA	-	27.6	31.1	35.3	38.7	43.7	50.1	51.8	48.4	46.9	48.1
MLT	74.4	76.1	72.1	57.6	56.6	53.3	49.2	33.0	41.9	-	-
POL	-	-	-	-	58.3	62.5	65.2	64.0	63.7	63.7	62.5
SVK	-	29.9	32.3	35.8	38.9	47.0	50.0	52.2	53.3	51.6	51.8
SVN	57.2	59.1	59.6	57.0	55.8	57.6	57.9	55.3	53.6	51.1	49.9
AUT	63.6	62.9	61.5	62.1	60.6	62.4	62.6	61.2	60.5	60.0	57.1
FIN	45.6	45.0	44.6	41.3	40.8	43.5	44.4	43.4	42.3	42.5	40.7
SWE	53.3	49.8	52.2	50.0	48.4	51.2	50.1	47.3	47.1	47.0	47.2
EU-12	60.8	60.7	61.1	59.8	59.3	59.8	62.1	59.3	58.4	59.3	-

COMMODITY REORIENTATION

The territorial orientation of foreign trade is also evaluated in popular OCA index. The OCA index measures the share of manufactured commodities. Tab. II presents the shares of manufactured commodities, commodity group 7-Machinery and transport equipment and the group of sophisticated commodities that are intensive for high-technology. The list of these commodities is given in Annex I.

The manufactured commodities have the greatest share in export of all countries under analysis. There are significant differences among the individual countries not across the groups of countries according to the date of entrance into the EU. The best new EU-

-members of 2004 are better than most of EU-economies. The dynamics of this shares is quite low during 1994-2003 except significant rises in the case of Great Britain and Ireland. From the viewpoint of all manufactured commodities the high degree of convergence is obvious. The variance decreases from 199.1 to 119.3, the coefficient of variance fell also from 2.66 to 1.53.

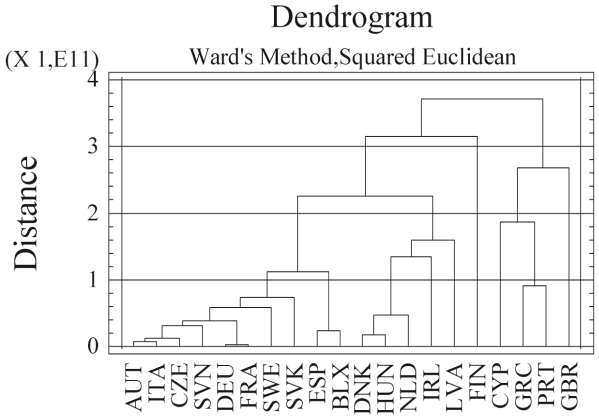
More significant differences are in commodity group 7-Machinery and transport equipment that is the most important export commodity group the most of countries. The new EU-member of year 2004 are not behind of other countries and the dynamics are also equal. The best ones are the three economies that jointed EU in 1995. They had more then 15% margin in 1994 that decreased to 6% margin in 2003. The change in modified sigma convergence is here also significant because the coefficient of variance dropped from 5.80 to 3.29.

Quite opposite is the situation in trade with high-technology commodities. The best results are reached by new EU-members of year 1995; they are closely followed by old EU-members. These two groups of countries converge. The loss of old EU-members decreased from 3% in average to 1% in average. On the other hand the new EU-members of 2004 diverge. The average loss rose from slightly less then 5% to more than 6% in year 2003. In general there is a high divergence at export of sophisticated commodities, the shares range from 2.5% for Cyprus to 33.6% in the case of Ireland.

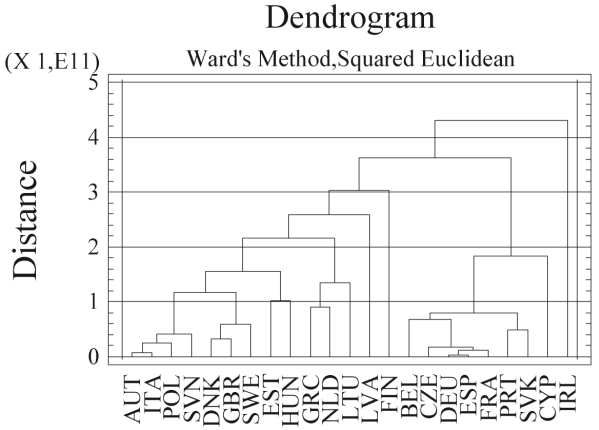
II: *Export shares of specific commodity groups (in %)*

	Manufactured		**Group 7**		**High-technology**	
	1994	**2003**	**1994**	**2003**	**1994**	**2003**
DEU	88.5	84.5	48.3	51.1	14.3	16.2
DNK	59.2	63.0	24.8	28.5	9.2	15.5
FRA	80.4	80.7	39.4	44.1	15.7	17.7
GBR	42.9	84.7	0.0	46.2	2.6	26.0
GRC	55.5	61.4	6.4	13.3	1.8	5.2
IRL	69.2	87.8	29.4	35.1	25.1	33.7
ITA	90.1	86.0	37.0	37.3	9.3	8.1
NLD	61.0	70.5	24.9	32.2	15.1	21.8
PRT	84.4	87.0	21.8	35.9	4.3	6.9
AUT	91.0	83.5	39.2	41.6	10.9	12.0
FIN	84.8	84.7	31.7	42.9	14.6	25.3
SWE	86.5	80.1	44.6	42.5	13.8	15.6
CYP	57.9	55.4	4.8	28.8	0.3	2.5
CZE	79.1	88.6	25.5	50.0	5.3	17.1
ESP	78.4	78.7	41.9	40.3	9.2	8.3
EST	-	71.5	-	28.6	-	16.9
HUN	66.8	86.8	23.3	60.3	8.5	28.1
LTU	-	59.6	-	26.4	-	6.7
LVA	65.5	58.7	20.4	8.7	6.8	3.6
POL	-	82.7	-	37.6	-	8.0
SVK	88.4	86.8	19.9	43.5	4.7	6.6
SVN	90.0	88.0	28.8	36.8	8.0	8.8

Analysing the commodity structure from the 3 digit classification SITC we can benefit from cluster analysis. The results of cluster analysis are illustrated by dendrograms in Fig 1 and Fig 2. Comparing the results of year 1993 and 2003 no significant convergence is present. Moreover the average distance is a bit higher. The clusters than could be identified in 1993 disappeared. The new EU-members of year 1995 and 2004 integrated among the other states not creating any cluster as before. The only relevant cluster is built up by Belgium, the Czech Republic, France, Germany, Portugal and Slovakia.



1: *Dendrogram of commodity structure in 1993*



2: *Dendrogram of commodity structure in 2003*

INTRA-INDUSTRY TRADE

As aforementioned the Commission argues that the deeper integration is without any rise of the risk of external macroeconomic shocks due to the high level of intra-industry trade. The intra-industry trade should moreover increases in process of integration. The intra-industry trade evaluated by Gruber-Lloyd index is presented in Tab. III. There are also expressed values separately for manufactured goods, commodity group Machinery and transport equipment and high-technology intensive product.

The 15 EU-members of 2003 reached very similar results in average. The average ranges from 0.53 to 0.67. There are significant differences for individual countries. Greece and Portugal demonstrates low level of intra-industry trade, they results are worse in all analysed groups of commodities.

The new EU-members of 2004 are unambiguously lagged; their Gruber-Lloyd coefficients are lower for 0.15–0.20 in average. Moreover this group of country is extremely heterogeneous. The lowest results of 0.10 till 0.18 are reached by Cyprus while the best one results are presented by the Czech Republic with values between 0.61 and 0.71.

Comparing results among the analysed group of commodities, no unambiguous relationship between the intra-industry trade and level of sophistication of a product was found. The slightly better results are characteristic for commodity group 7 as a whole, the results for manufactured goods and high-technology intensive products are nearly similar.

Although the intra-industry trade of all countries increased substantively during the analysed period, the convergence trend is not so obvious. The variance lowered only slowly and the modified sigma convergence indicator as well. No matter of this development the opinion of Commission proved to be valid from viewpoint of intra-industry trade.

III: *Values of Gruber-Lloyd index in 1994 and 2003*

	Manufactured		**Group 7**		**High-technology**	
	1994	**2003**	**1994**	**2003**	**1994**	**2003**
BEL	-	0.744	-	0.796	-	0.808
DEU	0.642	0.681	0.616	0.653	0.761	0.806
DNK	0.546	0.587	0.654	0.677	0.620	0.640
ESP	0.559	0.626	0.681	0.712	0.610	0.645
FRA	0.698	0.695	0.814	0.817	0.809	0.794
GRC	0.315	0.339	0.177	0.263	0.141	0.255
GBR	0.252	0.665	0.345	0.791	0.710	0.811
IRL	0.475	0.463	0.545	0.641	0.662	0.592
ITA	0.523	0.542	0.610	0.636	0.785	0.732
NLD	0.703	0.702	0.788	0.792	0.842	0.788
PRT	0.364	0.448	0.374	0.485	0.409	0.482
AUT	0.597	0.627	0.739	0.759	0.711	0.757
FIN	0.453	0.487	0.545	0.572	0.477	0.503
SWE	0.506	0.593	0.648	0.738	0.692	0.771
CYP	0.128	0.179	0.039	0.178	0.005	0.102
CZE	0.532	0.611	0.585	0.745	0.435	0.713
EST	-	0.458	-	0.461	-	0.525
HUN	0.460	0.530	0.541	0.633	0.432	0.611
LTU	-	0.404	-	0.427	-	0.405
LVA	-	0.321	-	0.313	-	0.388
POL	-	0.495	-	0.562	-	0.476
SVK	-	0.525	-	0.600	-	0.530
SVN	0.472	0.488	0.542	0.612	0.482	0.581

CONCLUSION

The EU-enlargement in 2004 could be characterised as a attempt to integrate group of countries very heterogeneous relatively to the current fifteen EU-members. During the whole association and acceding process most of the countries converged in almost all fields with high dynamics. The similar results can be seen in foreign trade patterns from the very beginning of 1990s. Two selected aspects of foreign trade convergence – similarity in commodity and territorial structure – were discussed in this paper.

Foreign trade plays an important role in theories of optimum currency area and attention is paid to issues of mutual trade of the currency union members. Measures of foreign trade similarities are also involved in famous OCA-index. The research results indicate high

degree of territorial structure compatibility; however the commodity compatibility is not so strong. There is substantial dynamics of convergence in territorial structures of all the EU-member countries.

There is still considerable gap between acceding and the EU-member economies that mirrors also in the foreign trade results. The territorial and/or mainly commodity structure corresponds to the situation of the whole economy. Under these assumptions the economic development will change structures in the direction towards to the more developed economies.

ANNEX 1

List of high-technology commodity groups SITC, rev. 3

code	name
524	Radioactive and associated materials
541	Medicinal and pharmaceutical products, other than medicament
712	Steam turbines and other vapor turbines, and parts thereof
716	Rotating electric plant, and parts thereof
718	Power-generating machinery, and parts thereof
751	Office machines
752	Automatic data-processing machines and units thereof
759	Parts and accessories to groups 751 and 752
761	Television receivers
764	Telecommunications equipment, parts and accessories
771	Electric power and parts thereof
774	Electro-diagnostic apparatus for medical, surgical, dental or veterinary purposes, and radiological apparatus
776	Cathode valves and diodes, transistors and similar semiconductor
778	Electrical machinery and apparatus
792	Aircraft and associated equipment; spacecraft
871	Optical instruments and apparatus
874	Measuring, checking, analyzing and controlling instruments and apparatus
881	Photographic apparatus and equipment

Source: UNCTAD Science&Technology for Development Network

SOUHRN

Vývoj konvergence zahraničního obchodu nových členů EU

Důležitost konvergence v oblasti zahraničního obchodu je zmiňována již od samého počátku teorie optimálních měnových oblastí. Často používaný OCA index zohledňuje ve svém výpočtu dvě základní charakteristiky zahraničního obchodu. Teritoriální přeorientace zahraničního obchodu vždy předchází členství v integračním seskupení, které je zakládáno právě za účelem intenzivnější spolupráce mezi členy navzájem. Rozbor zahraničního obchodu prokázal, že tato přeměna teritoriální struktury zahraničního obchodu byla u většiny nově začleněných zemí úspěšně dokončena. Rozvinutější ekonomiky z této skupiny vykazují dokonce silnější vazby na země Evropské unie než někteří stávající členové. Komoditní struktura obchodu je úzce spojena s celkovou efektivností ekonomiky. Vývoj podílů vývozu technologicky náročnějších komodit kopíruje tuto skutečnost. Nejefektivnější strukturu vývozu dosáhly země, které vstoupily do Evropské unie v roce 1995, následovány velice těsně ostatními členy evropské integrace. Země posledního rozšíření mají již významnou ztrátu, která se mírně zvětšuje. Výjimkou je Česká republika a Maďarsko, které jsou na úrovni vyspělých členů Evropské unie. Divergence komo-

ditních struktur probíhá spíše jako negativní catch-up proces, kdy výsledky zemí EU jsou téměř konstantní a změny jsou jen na straně zemí, jež vstoupily do EU v roce 2004. Vypočtené výsledky vnitroodvětvového obchodu odráží podobný vývoj. Země z posledního rozšíření dosahují velice heterogenních výsledků v závislosti na stupni jejich celkové rozvinutosti a tím i konkurenceschopnosti.

zahraniční obchod, konvergence, Evropská unie, rozšíření Evropské unie

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