Convergence of household expenditures of the EU-member and acceding countries in the years 1995–2002

Konvergence výdajů domácností zemí EU a nově vstupujících zemí v letech 1995–2002

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Abstract: The convergence in household consumption expenditure contributes to the aims defined in the Treaty of the European Union. Consumption expenditure convergence also restricts the impacts of asymmetric shocks under the bounded inner market mobility of goods, services and sources. The paper concentrates on convergence level and dynamics of consumption expenditures between the EU member and acceding countries in years 1995–2002. There are significant differences in absolute values of convergence expenditures, in prices levels of consumption goods and consumption structures among the groups of countries in year 1995. During the eight years the gap became smaller measured by the structure and absolute level of expenditures recalculated on purchasing power parity. Panel data analysis of food share in consumption disclosed the influence of total consumption expenditures while the impact of relative price of commodity is ambiguous.

Key words: consumption expenditures, convergence process, EU-enlargement, panel data analysis

Abstrakt: Konvergence spotřebních výdajů domácností je jednou z podmínek dosažení cílů definovaných ve Smlouvě o Evropské unii. Dostatečná konvergence spotřebních výdajů dokáže rovněž omezit dopady asymetrických šoků na spotřebitele v podmínkách nedokonalé vnitřní mobility zboží, služeb a zdrojů. Příspěvek se zabývá zhodnocením míry konvergence spotřebních výdajů stávajících a nově vstupujících zemí a jejím vývojem v období 1995–2002. V roce 1995 lze pozorovat značné rozdíly absolutní výše spotřebních výdajů, cen nakupovaného zboží a struktury spotřebních výdajů mezi oběma skupinami zemí. V průběhu sledovaných osmi let došlo k výraznému sblížení struktur spotřeby a výše spotřeby přepočtené na srovnatelnou kupní sílu. Analýza panelu dat prokázala, že hlavní příčinou konvergence podílu potravin na celkové spotřebě jsou změny v celkových spotřebních výdajích. Vliv relativní ceny na podíl potravin se ukázal jako neprůkazný.

Klíčová slova: spotřební výdaje, konvergenční proces, rozšíření EU, analýza panelu dat

INTRODUCTION

The EU members and the acceding countries are subjects of a lot of comparative studies from the very beginning of association and then acceding process. The comparisons try to catch the short-run and long run progresses in mutual convergence. The countries are mainly assessed from the economy development level characteristics or Maastricht's criteria point of view.

Each enlargement of the EU increased the divergence of member countries, the following convergence processes were very slow and expensive. The set of countries joining the EU in 2004 is rather remote from the EU members and moreover, it is very heterogeneous at the same time. The 2004 enlargement is the largest in the EU history measured by population. Not only from the above mentioned reasons it is supposed that the convergence results of the newly entering countries will depend highly on their present situation and their own abilities.

Concern of the EU in economic and social progress and cohesion of all members is defined in the EU-treaty. The cohesion is significantly influenced by political and social attitudes of the EU-citizens to the other EU citizens. The cohesion is further supported by common history, culture etc. We should add the similar consumer possibilities to these factors. The extend and the structure of consumer expenditures are the basis for mutual comparison of consumer possibilities. The disparities in expenditure structure can also result in the different development of consumer possibilities caused by asym-

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metrical shock. The strong convergence in consumer expenditures in conjunction with price equalisation and well-established common market could minimise these risks.

The jeopardy of asymmetric shocks is discussed in literature in detail. Shifts in the aggregate demand or supply can have different consequences in economics. McKinnon (1961) analysed impacts of these shocks on the prices of traded and non-traded goods. The later Mundel model of optimum currency areas (Mundel 1973) incorporates his arguments and shows the way to mitigate the negative outcomes of shocks. Mundel demonstrates that the portfolio diversification and reserve pooling lead to sharing of losses and also profits. These procedures warrant more similar and moderate development under fixed exchange rates than under the flexible exchange rate in the situation of limited mobility of factors in the areas with common currency (Lafrance, St-Amant 1999).

The second way to minimise the impact differences of shocks was presented by Kenen (1969) that focused on diversification and structure of economies. Further analysis of this approach concluded in need for high level of convergence of monetary union candidates. Firstly, the nominal convergence and nominal stability were studied. In the last years, the growing attention is paid to real convergence. This change in analysis was strengthening in context of the prepared 2004 EU enlargement. The newly entering countries declared their will to join the Monetary Union as early as possible. Some of them can easily accomplish the nominal convergence criteria proving the large gap in real convergence at the same time (PricewaterhouseCoopers 2002). This significant real divergence could destabilise the whole Monetary Union due dissimilar responses of national economies to changes in economic, political, social, etc. environment under bounded internal mobility (Sinn 2002).

The real convergence analyses need more detailed and comparable data for all EU members. The data for household analyses are collected from survey carried out by national statistical offices. Through the last years their scope expanded so the Eurostat issued in 1993 and 1997 manuals of Household Budget Survey in the EU – Methodology and Recommendations for Harmonisation to Reduce the Diversity of National Surveys. This manual defined the common harmonised nomenclature of consumption expenditure (COICOP-HBS) and harmonised indexes of consumer's prices (HICP) that are also used in this paper (European Communities 2003).

The paper concentrates on appraisal of the last development of household expenditures and its mutual comparison among the EU members and acceding countries. The level and dynamics of convergence of household expenditure is measured by Finger-Kreinin indices. Finally the regress and panel data analyses are used to identify the main sources of convergence dynamics. The attention is laid on impact of household expenditures per capita and price of appropriate commodity group relative to price level of the whole consumer basket.

DATA AND METHODS

The price indexes in HICP nomenclatures are available at the OECD electronic database accessible at http:\\195.145.59.167\ISAPI\. The consumer expenditure classified according the COICOP-HBS is taken from the Eurostat electronic database including the data for acceding countries. The price indexes are based to year 1996. The relative price indexes of commodity groups were computed as a ratio of commodity group price index and the whole consumer basket price index in the same year and country. This relative price index measures the expensiveness of commodity from the consumer point of view (PricewaterhouseCoopers 2004). The analysed period was specified according the availability of comparable data set. The consumer expenditures are available with some exception for all countries under research for years 1995–2002, while the price indexes for the acceding countries only for period 1999–2002.

After the basic statistic data description, the modified Finger-Kreinin measure of similarity of international trade structure was used to quantify the level of convergence. The Finger-Kreinin index summarised the absolute deviation of shares of each country from some other structure expressed in shares. In this paper, the Finger-Kreinin index is centred to consumer expenditure structure of the EU-15. The European structure was computed as the weighted average of member states using their population as weights. The expenditure convergence and similarity are show also by cluster analysis dendrogram that presents suchlike results in graphical way. The squared Euclidean distance metric was used, the clustering methods of furthest neighbour, centroid, median and group average and Ward's finished in same cluster distinguishing only by absolute value of distance.

The final part of the paper relays on regress analysis. The standard Ordinary Least Square method in combination with panel analysis was applied to find the main sources for further consumer expenditure convergence. The fixed effect, between effect and random effect approaches are utilised to estimate regress coefficients. The efficiency of each approach is evaluated by set of R-squared statistics. The standard Hausman test is evaluated to judge the suitability of each approach. The used methods and characteristics are described in detail for example in Verbeek (2002) or Green (2003).

RESULTS AND DISCUSSION

The expenditures varies highly not only among the EU-members, but also among the acceding countries. In year 2002, they fluctuated between 21.6 thousand EUR for Luxembourg and 7.6 thousand of EUR for Portugal. The absolute difference for acceding countries is lower, the expenditure moves from 2 400 EUR for Latvia to 10 600 EUR in case of Cyprus. Cyprus is really an outstanding economy among the acceding countries, its results reach almost the average of the EU-members. Omitting Cyprus

Table 1. Consumption expenditures per capita and comparative price level in 1996–2002

	Consumption expenditures p. cap. (current prices in thousands of EUR)		Comparative consumption expenditures price level (EU =100)		Consumption expenditures p. cap. (PPS prices of 1995 in thousands of EUR)	
	1995	2002	1995	2002	1995	2002
Belgium	11.3	13.7	109.5	98.7	11.1	13.9
Denmark	13.3	16.1	133.7	130.7	10.4	12.3
Germany	13.1	15.0	114.0	104	12.0	14.4
Greece	6.2	8.6	79.9	79.7	8.0	10.8
Spain	6.8	9.9	84.1	82.4	9.8	12.0
France	11.4	14.0	113.7	99.7	11.2	14.1
Ireland	7.7	14.9	94.8	118.3	12.7	12.6
Italy	8.6	13.3	82.4	94.5	13.6	14.1
Luxembourg	16.3	21.6	110.7	99.7	17.2	21.7
Netherlands	10.1	13.8	105.8	101.8	10.9	13.5
Austria	12.7	15.4	112.8	101.5	12.3	15.2
Portugal	5.2	7.6	71.7	73.5	8.7	10.4
Finland	10.0	13.7	129.4	122.7	9.3	11.2
Sweden	10.5	14.0	120.2	117.3	10.5	11.9
U. Kingdom	9.5	18.6	85.3	107.5	19.6	17.3
Czech Republic	2.0	4.0	45.2	53.1	6.1	7.5
Estonia	1.1	2.9	38.3	56.1	4.5	5.2
Cyprus	6.8	10.6	79.2	83.1	11.0	12.7
Latvia	0.9	2.4	33.5	50.4	5.1	4.7
Lithuania	0.9	2.7	27.9	51.1	6.5	5.2
Hungary	1.8	3.6	42.1	54.9	3.7	6.6
Malta	–	6.7	–	71.9	–	9.3
Poland	1.7	3.5	40.4	57.4	4.5	6.1
Slovenia	4.5	6.4	72.8	72.6	5.1	8.8
Slovakia	1.4	2.8	38.1	43.5	4.5	6.4

Source: Eurostat, OECD and author computation

from group of acceding countries, we obtain more homogeneous results for this group.

The consumption expenditures at current prices are influenced by different price levels and purchasing parity of national currency. The figures in fourth and fifth column in Table 1 measure the comparative price level of consumption expenditure relatively to level of the European Union. The value above 100 indicates appropriately higher consumption prices than the EU average.

The consumption price levels in most of the EU-members converge in some cases rapidly (Belgium, Germany, France, Italy and Austria), in the others very slowly (Denmark, Finland, Sweden). The least developed EU-countries held their price level almost stabile about 20 per cent points below the average. The substantial rise of consumption price mainly due appreciation of their national currencies came about in Ireland and the United Kingdom. The comparative consumption price level in typical acceding country reached in 2002 about one half of EU average. The increase of prices is caused mainly by domestic inflation in some cases strengthen by appreciation of national currency relatively to EUR (the Czech Republic, Hungary, Slovenia, …) or weaken by depreciation (Latvia, Lithuania, Slovakia, …).

Finally the last two columns present the consumption expenditure recalculated to Purchasing Power Standard (PPS). These figures indicate the consumer possibilities expressed in common monetary units, of which every unit can buy the same amount of goods across the countries. Expenditure expressed in PPS is not so variable over countries and over time. Both groups of countries increased per capita consumption for about 1 700 EUR in average. This increase is equal to 17.6% growth in case of the EU-members and to 32.7% in case of acceding countries. From this point of view we conclude that the gap in consumption expenditure is getting to close. Due to a lower price level the expenditure of acceding countries met slightly more than 53% of the EU-members expenditure in year 2002, while in 1995 they did not overcome 49% level. Going on with the same growth rates, the acceding countries reached the level of the EU-members average not earlier than after following 45 years.

Table 2. Consumption expenditure shares in 2002, changes in 1995–2002 (in %) and values of Finger-Kreinin index

	Food		Alcohol and tobacco		Housing		Transport		Recreation and culture		Finger-Kreinin index	
	share	change	share	change	share	change	share	change	share	change	1995	2002
EU-15	13.13	–1.39	3.61	0.01	20.83	0.15	13.61	0.25	9.32	0.22	–	–
Acceding	21.29	–5.19	7.28	–0.93	22.99	5.02	12.78	2.43	7.43	1.00	16.57	14.64
Czech Rep.	19.25	–5.77	9.49	–0.33	21.57	4.91	10.58	–0.80	10.08	0.55	17.92	13.68
Estonia	22.87	–11.25	8.70	1.26	20.99	–0.26	11.27	3.32	7.53	2.55	24.02	15.79
Cyprus	19.47	–0.68	4.80	0.01	7.85	0.00	13.26	–1.35	7.68	0.53	15.52	15.77
Latvia	24.36	–15.91	8.73	0.15	15.29	2.75	9.63	1.88	7.02	2.96	31.41	24.03
Lithuania	30.74	–11.12	7.32	–3.14	13.86	–0.12	15.16	6.95	7.16	4.25	34.20	23.80
Hungary	19.06	–5.13	8.46	0.22	18.17	–0.93	15.41	2.85	7.83	–0.16	14.86	15.30
Malta	20.39	–	6.00	–	5.91	–	13.22	–	7.79	–	–	18.10
Poland	21.11	–8.05	6.69	–2.26	26.54	6.98	12.84	1.78	6.63	0.09	20.01	18.57
Slovenia	17.08	–3.85	4.81	–1.18	20.53	3.50	15.32	–1.56	9.62	0.85	12.77	7.20
Slovakia	24.64	–	5.45	–	23.24	–	10.71	–	6.83	–	–	16.22

Source: Eurostat, author computation

The structure of consumption expenditures plays the relevant role in convergence process. The shares of selected important commodity groups in 2002 and their changes over the period of eight year are given in Table 2. The table contains commodity group with the highest shares. The structures of consumption expenditures for fifteen EU-members and ten acceding countries were computed as weighted averages according to the population.

It is evident that there are no substantive changes in commodity structure of consumption of the EU-members. Their shares are stable only with exception of food expenditures that demonstrated decrease of 1.4 per cent point over last eight years. The opposite is true for acceding countries, their structures are quit dynamic. Noticeable are decreases in shares of food, mainly in Baltic countries. Shares of expenditures on food converge fairy quickly, under the same rates the acceding countries catch the level of the EU-members in circa fifteen years. The expenditures on alcohol and tobacco in acceding economies doubled in comparison with EU-members. This is probably caused by higher level of consumption and lower total expenditures. The impact of prices is ambiguous.

Noteworthy is the development of housing expenditures. In the last year they grew in acceding countries heavily above all in Poland, the Czech Republic and Slovenia. The growth was so strong to overcome the share in the EU-members during last eight years.

Expenditures on transport need not converge too much, in year 2002 the acceding countries showed almost same shares as in EU-members. Transport expenditures are significantly affected by rail fares and price of fuel. These are not usually created purely at the markets, they are strongly influenced by economic policy through price regulation and consumption taxes. So the level of convergence in each country in this commodity group depend highly on government attitude towards this issues.

Share of recreation and culture group can indicate the possibility of non-necessary expenditures. Shares of all acceding countries are only slightly below the EU-average with exception of the Czech Republic and Slovenia that have the higher shares. Dynamics of shares proved increasing tendency in all countries only without Hungary.

The integrated view on state and changes in converge offer Finger-Kreinin index computed relatively to the EU-members average form all types of consumption expenditures. The lower the index value is the closer the two structures are. The absolute values of index have no specific meaning, they are useful only in cross or time comparison. The convergence tendency is obvious for all countries except Hungary. The most similar consumption structure with great margin proved Slovenia, followed by the Czech Republic and by group of three economies – Estonia, Cyprus and Hungary. The biggest shift did Baltic countries, although two of them – Latvia and Lithuania – staid a bit apart.

Similar results give dendrograms at Figure 1 and 2. From the first one describing the situation in 1995, it is apparent considerable distance of Baltic countries form the others. Further we can identify cluster of the other acceding countries formed together with Portugal. Separate is the whole cluster of the EU-members that has no coherent structure.

Eight year later the situation is significantly different. The Baltic economies are not so remote, especially Estonia. New cluster is formed more according geographical location than according the membership status or degree of development. Specific cluster comprises of Greece, Spain, Portugal, Cyprus and Malta. The second one is created by the rest of acceding countries exclusive Slo-

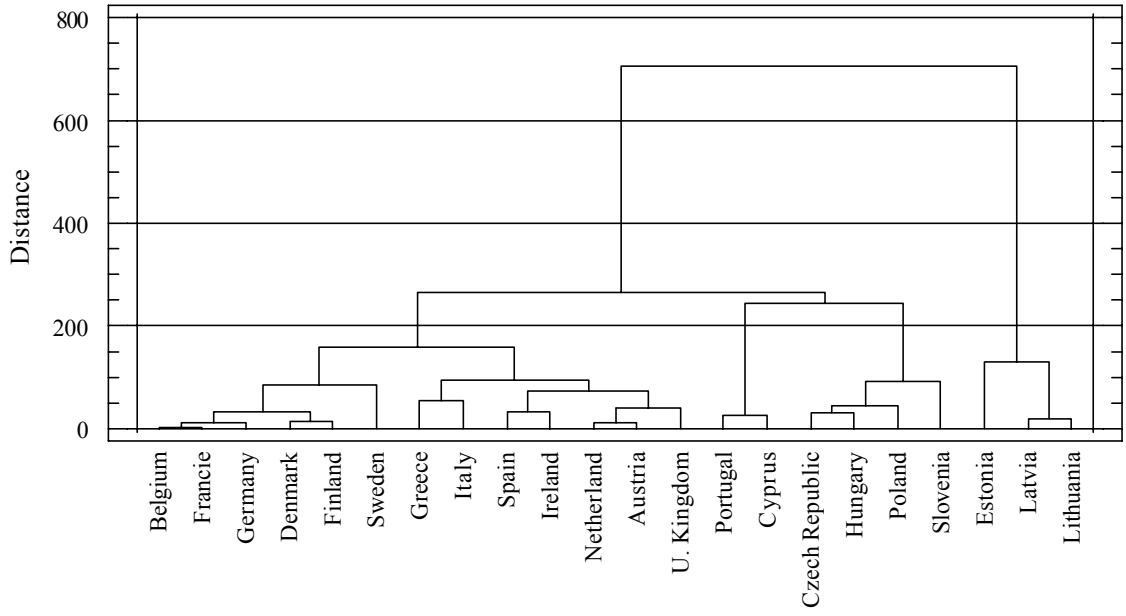

Figure 1. Dendrogram of consumption expenditures in 1995

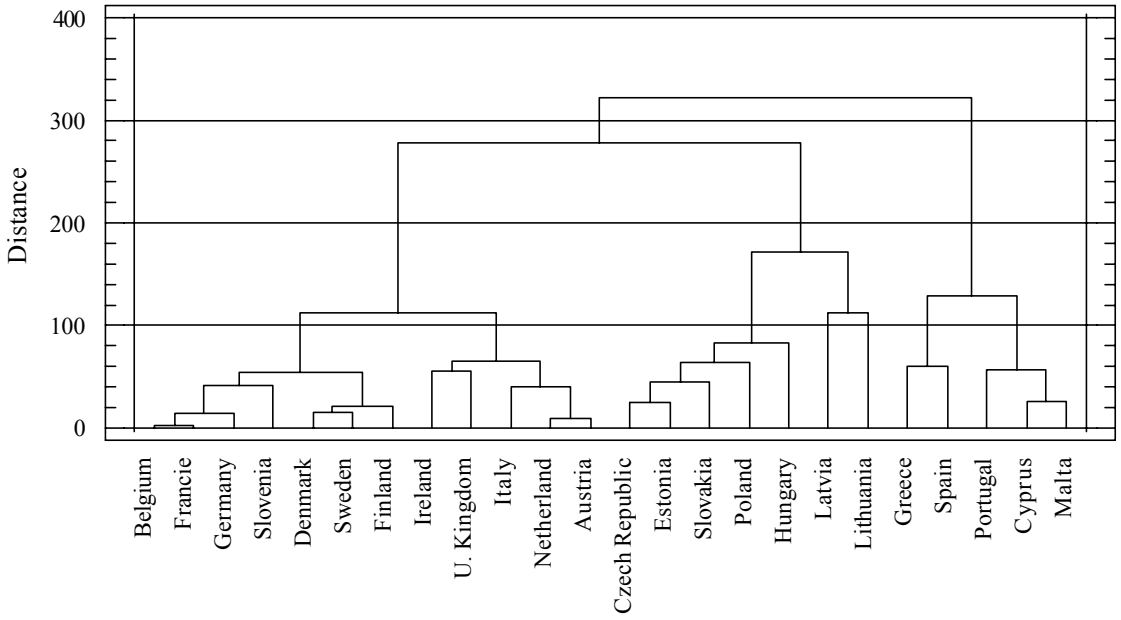

Figure 2. Dendrogram of consumption expenditures in 2002

venia that closely incorporated into the EU-members economies. Among the others we can find the cluster of Denmark, Finland, Sweden or United Kingdom and Ireland, etc. At the same time, all Euclidean distances between partial structures became shorter.

As shown above, the convergence in consumption structure is quite fast. The question to answer now is to find the sources of this convergence. Let us focus on food expenditures, where the highest changes occurred. It is figured out from the theory of consumer that its demand for specific good depends at first place on relative price of these goods in comparison to others and on total sum of money spent on all goods. The influence of these two factors was analysed by means of panel data analyses. The result of three possible panel analysis view and standard ordinary least square method are presented in Table 3. The analysis was separately executed for the set of the acceding and acceding plus the EU-member countries.

The statistical procedures resulted in similar estimates of b coefficients although each method tries to maximise different statistics. The impact of total consumption expenditure is negative, the rise of one thousand EUR is connected with drop of the share of food commodity

Table 3. Panel analysis results (significance levels in parentheses below estimates)

	EU-member and acceding countries				Acceding countries only			
	OLS	Fixed	Between	Random	OLS	Fixed	Between	Random
Constant	6.9500	–	0.0282	1.7874	11.9011	–	–0.1200	0.0112
	(0.0133)	–	(0.9548)	(0.0000)	(0.1669)	–	(0.9225)	(0.9927)
Expenditure	–0.7211	–0.4845	–0.7659	–0.5435	–0.9034	–0.6042	–0.8832	–0.7197
	(0.0000)	(0.0000)	(0.0002)	(0.0000)	(0.0005)	(0.1277)	(0.1333)	(0.0270)
Price	15.3450	1.9384	15.1115	5.9203	12.2668	25.5115	13.5030	21.5950
	(0.0000)	(0.4575)	(0.0391)	(0.0124)	(0.0818)	(0.0099)	(0.3872)	(0.0102)
F-statistics	371.8954	93.1326	52.8560	108.8846	11.5228	19.5820	2.4336	15.8351
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0001)	(0.0000)	(0.1576)	(0.0000)
Overall R^2	0.8142	0.6975	0.8147	0.8095	0.6356	0.5824	0.6351	0.6208
Within R^2	0.7112	0.7487	0.7172	0.7422	0.5850	0.7316	0.6437	0.7275
Between R^2	0.7133	0.7019	0.8433	0.8105	0.6399	0.5957	0.6904	0.6102
Hausman ξ	94.6575	–	33.6978	25.7127	44.0933	–	86.3847	75.2530

group in extent of 0.54 till 0.77 per cent point in case of all researched countries. For only the acceding countries, the estimated drop is 0.60 till 0.90 per cent point, but the lower bound is significant at 13% level. The sign of this estimate is consistent with the theory.

The impact of relative price is not so ambiguous. At first the estimates have higher variability, secondly the significant levels are in some cases very low. In spite of it, its signs are consistent with theory, the relatively higher price leads to increase in share because low demand elasticity is usually assumed for food. The estimates should be interpreted in the following way (for example OLS for acceding countries only): the unit rise in relative price index is connect with 12.26 rise in share or one per cent point change in relative price should result in 0.1226 rise in consumption share. The estimates for intercepts are fully unreliable or in case of all countries vary heavily.

Each approach to panel data analysis tries to maximise diverse statistic. The OLS concentrates on the overall correlation, the Fixed effect on within a Between effect naturally on between correlation, while the random tries to find the best combination according partial effects variation. So the goodness-of-fit characteristics are not directly comparable to evaluate the appropriateness of the specific approach.

The Hausman tests for estimate sameness proved important differences. Values of Hausman test statistic overcame manifold the critical value for 5% significance that amounts to 7.814. The source of these differences cannot be definitely traced, it may be the correlation among the individuals intercepts and explanatory variable or among explanatory variable itself, etc.

CONCLUSION

The EU-enlargement in 2004 can be characterised as an attempt to integrate group of countries very heterogeneous relatively to the current EU-members. During the association and acceding process, the countries converged with high dynamics in almost all fields. The same results can be seen in consumption expenditure that were analysed in this paper.

Concentrating on absolute value of expenditures and their structure, the paper proved the significant changes toward the results of the EU-members. The greatest progress was done by Baltic countries, while the closest to the EU are Slovenia and the Czech Republic, followed by Hungary, Estonia a Cyprus. The application of panel data analysis on food expenditures share in total consumption finished in derivation appropriated regress coefficients coherent with economic theory.

There is still a considerable gap between acceding and the EU-member economies that mirrors also in consumer expenditure. As in case of expenditures on food, the general consumer behaviour is strongly dependent on the total consumption that is highly influenced by degree of economic development. We can assume that the convergence of consumption expenditures will continue in connection with economic growth.

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