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Regional Integration and Development Asymmetries

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Regional Integration and Development Asymmetries

1. Introduction

The aim of the present contribution is two-fold. First, we are going to briefly overview the theoretical arguments suggesting that regional economic integration may enhance the process of real economic convergence or catching up by less-advanced members of integration arrangements towards the development levels prevailing in more advanced member countries. Second, as an empirical test of the foregoing theoretical claims, we will embark on an analysis of actual economic growth paths of the present member countries of the enlarged European Union – both the ‘old’ (i.e. EU-15) and ‘new’ ones that is ten transition economies from East-Central Europe who joined the EU in 2004 or 2007, respectively (CEE-10 or EU-10). In particular, we will try to show that the process of regional integration in Europe tended as a rule to enhance the real economic convergence of income levels both within the EU-15 group as well as between the new (EU-10) and the old (EU-15) member countries.

The layout of the present chapter has been designed accordingly. The second section deals with major theoretical interrelationships between regional integration and economic growth. In particular, we will focus on main drivers of real convergence resulting from the process of regional integration. In the third section, we will attempt to shed some new empirical light on actual growth patterns prevailing in one particular regional integration endeavour, i.e. the enlarged European Union.

2. Regional integration and economic growth – a theoretical framework

One of the most important conclusions stemming from neoclassical models of economic growth (Solow, 1956; Mankiw et al., 1992) is the feasibility of income-level convergence between countries (or more precisely, conditional β -convergence). This implies that a less developed economy (with a lower GDP per capita) tends to grow faster than a more developed one. The convergence is conditional since it takes place when both economies strive to reach the same steady-state. If a less developed economy always grew faster, we would deal with the absolute convergence.

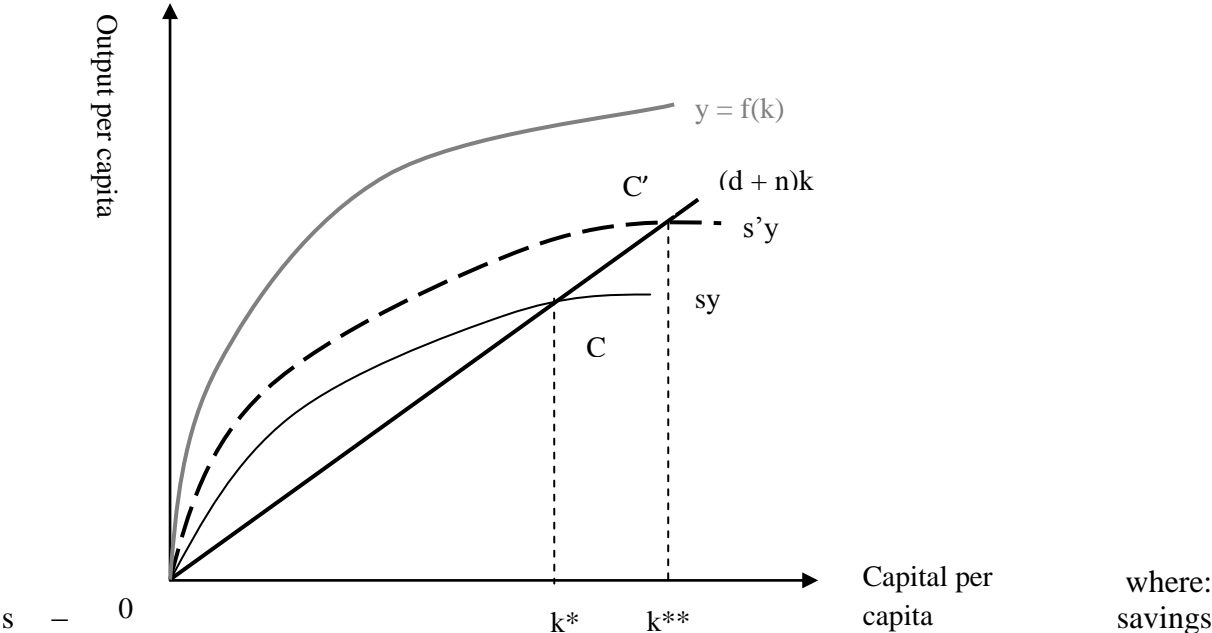
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Another possible gauge of diminishing development asymmetries is σ -convergence. It occurs if income differentials between the economies concerned decrease over time. Income differentiation can be measured by the variance or standard deviation of GDP per capita. Sigma convergence is a necessary but not sufficient condition for the beta convergence. The dispersion of income per capita levels between countries can increase while at the same time less developed countries may exhibit faster growth rates (Barro and Sala-i-Martin, 1992).

The main argument behind the convergence hypothesis is that, given the same exogenous technology, countries with lower per capita income and lower capital per worker (or capital-labour ratio) would offer higher returns to capital. This would attract more foreign investment, ensuring a higher capital formation rate and faster economic growth.

According to the neoclassical model, the inflow of foreign savings contributes to a rise in the saving rate and triggers a temporary acceleration in the rate of growth of income and capital accumulation in per capita terms. At the same time, higher saving rate is conducive to a permanent rise in the level of capital per worker or capital-labour ratio (during the adjustment period the stock of capital tends to grow in a faster pace than the stock of labour, the latter being determined by demographic growth). Once the adjustment is complete and the economy is on its new steady-state growth path, the rate of growth of income per capita converges again with the rate of demographic growth. The same rate applies to the stock of capital. Hence, a permanent rise in the savings rate leads to a temporary acceleration of economic growth while permanently increasing the level of income per capita and the level of capital per person. Chart 1 illustrates.

Chart 1. Increase in the saving rate and economic growth



rate, n – demographic growth, k – capital per person,
 d – depreciation rate, y – growth rate of income (output) per capita,
 s_y – savings per person required for each level of capital-labour ratio,
 $(d+n)k$ – investment needed to make capital per person constant.

This finding has often been referred to as *conditional convergence* (Barro, 1991). It implies that if less developed countries (such as e.g. transition economies in Central and Eastern Europe) aim to at least temporarily accelerate their economic growth and by the same token – to catch up with development levels prevailing in more advanced countries, they should permanently increase their propensity to save and augment their saving rates accordingly.

Seen from this perspective, one of the major and most effective vehicles for real economic convergence or diminishing development asymmetries among countries is believed to be a regional integration. It has been argued that the latter may give rise to increased capital flows between member countries, and in particular – from those better off to less developed ones. The inflow of foreign investment to poorer members allows a recipient country to raise its overall saving rate, which allows financing extra investment above the domestic saving level and thus contributing to an accelerated economic growth. Moreover, foreign direct investment is likely to simultaneously embody technical progress and hence result in substantial gains for the host country in terms of rising total factor productivity (or TFP). This in turn will accelerate the growth of potential output. The synergistic growth effects just outlined may be further compounded by an induced inflow of foreign direct investment from outside the integration grouping, attracted by rising actual and expected returns to capital.

In some integration undertakings (such as e.g. the European Union) the inflow of private (profit-oriented) funds may be paralleled by a scheme of official government aid or a system of budgetary transfers between member countries. Such a system may be frequently combined with a regional or structural policy pursued at the supra-national level and aimed at equalization of existing development asymmetries between member countries through redistribution of funds and development opportunities in favour of lagging-behind member states.

The third potential driver of real convergence within the framework of regional integration may stem from the economies of scale and scope. These are likely to be unleashed as a result of creating a free trade area or a customs union, which in turn enhances the development of a single market and entails a sharp increase of its size. Given a bigger

common market, firms from member countries are able to embark on mass-scale production projects and introduce cost-saving techniques thus capitalizing on their scale economies. Simultaneously, through inter- and intra-industry trade, new windows of opportunities are open to exploit the economies of scope due to specialization and diversification of product lines. The major gainers in these developments are smaller (and often, poorer) countries who are in a position to appropriate more fully the benefits due to scale economies. As a derivative, these countries may boost their economic growth and speed up the catching up process towards the development levels in richer member states.

Fourth, regional integration may be conducive to the real economic convergence among member countries via opening up domestic markets to foreign competition, as a result of dismantling bureaucratic and strategic barriers to entry and removing existing constraints to free movement of capital, labour, and other resources. Liberalization of trade and increased factor mobility between member countries would contribute to breaking existing local monopolies and bringing the hitherto imperfectly competitive market structures closer to a perfectly competitive ideal. Markets that are more competitive in turn are likely to provide efficiency gains in terms of improved resource allocation, lower production costs, as well as increased and more diversified output. As these gains are supposed to accrue more than proportionately to smaller and/or less developed participants of regional integration ventures, the latter's chances for an accelerated catching up are enhanced.

As a wrap up of the discussion in this section, it should be noted, however, that both the theory of international trade and economic growth theory are not unambiguous as regards the positive effect of regional integration on the real convergence process. While the traditional trade theory (Viner, 1950) implied that regional economic integration would lead to more convergence, some newer theories of international trade (Krugman, 1991) warned that integration might also result in rising income disparities. The same result has been suggested by new theories of economic growth, in particular those focusing on R&D efforts and brain drain as growth factors. New models of endogenous growth (Romer, 1986, 1990; Lucas, 1988) do not explicitly confirm the convergence hypothesis either. One of the most comprehensive empirical studies (Ben-David, 2000) concluded that per capita income levels throughout the world between 1960 and 1985 tended to diverge rather than converge. It is also worth highlighting within this context that the findings of new empirical studies indicate that the trend towards income-level convergence is more likely to develop within homogeneous groups of countries, while groups that are more heterogeneous would exhibit diverging tendencies in their growth trajectories.

3. Economic growth patterns in the European Union, 1980-2007

3.1. Economic convergence in the EU-15

Between the early 1970s and mid-1990s the European Union (originally known as the European Economic Community and later renamed to the European Community) witnessed several waves of enlargement which made it eventually grow from six to fifteen member countries. Among the chief objectives of this new phase of regional integration, one was of particular interest for our discussion. It boiled down to diminish the existing disparities in GDP per capita levels between the less-advanced and more developed members of the enlarged European Union, i.e. to ensuring the real convergence of development levels in poorer countries towards those prevailing in richer EU members. With a view to achieve this goal, a special system of financial transfers from the latter group to the former, including structural and cohesion funds, was designed.

Table 1. Relative development levels in EU-15 countries*, 1980-2007 (based on GDP per capita in PPP in constant 2000 prices, EU-15 = 100)

Country	1980	1985	1990	1995	2000	2005	2006	2007
Austria	112	113	112	114	116	114	114	115
Belgium	109	105	106	106	110	108	107	108
Denmark	122	125	114	117	115	113	112	112
Finland	103	108	107	95	102	102	104	107
France	110	109	108	105	101	99	99	99
Germany	104	104	104	106	103	102	102	103
Greece	80	74	66	65	73	85	87	89
Ireland	66	68	74	86	114	128	130	131
Italy	105	106	105	105	102	93	92	91
Netherlands	111	107	106	107	117	117	117	118
Portugal	60	58	66	67	68	67	66	66
Spain	76	74	79	79	85	91	94	94
Sweden	114	117	111	105	110	110	111	111
United Kingdom	97	100	101	102	102	106	105	106

* excluding Luxembourg.

Source: Author's calculations based on Eurostat (www.epp.eurostat.ec.europa.eu) and OECD data (www.oecd.org).

As data in Tables 1 and 2 demonstrates, between 1980 and 2007 the economic growth trajectories within the EU-15 group seem to be to a substantial degree consistent with the β -

convergence hypothesis. The latter implies that countries with lower initial GDP per capita levels should display higher growth rates than more developed ones. Table 2 partly confirms this pattern; it shows that the poorer EU members, such as Ireland, Spain, Greece (especially after 1995) and Portugal (until 2000) tended to grow in a faster pace compared to the EU-15 average while some of the richer economies (notably Denmark, France and Italy) exhibited slower GDP growth. However, the overall growth record in the EU-15 has been to some extent ambiguous as some more developed countries – in particular the Netherlands, Finland and the UK – displayed GDP growth rates above the average, particularly after 1995.

Table 2. Real GDP growth in EU-15 countries*, 1981-2007 (average annual growth rates, %)

Country	1981-1990	1991-2000	2001-2007	1981-2007
Austria	2,1	2,5	2,0	2,2
Belgium	2,0	2,3	1,8	2,1
Denmark	2,1	2,6	1,7	2,2
Finland	3,0	1,9	3,1	2,6
France	2,4	2,0	1,7	2,0
Germany	2,3	2,0	1,1	1,9
Greece	0,7	2,3	4,2	2,2
Ireland	2,8	6,8	5,2	4,9
Italy	2,4	1,6	1,0	1,7
Netherlands	2,2	3,0	1,7	2,4
Portugal	3,7	2,9	1,0	2,7
Spain	2,9	2,9	3,4	3,0
Sweden	2,2	1,9	2,8	2,2
United Kingdom	2,8	2,4	2,6	2,6
EU-15 average	2,3	2,5	1,9	2,3

* excluding Luxembourg

Source: Author's calculations based on IMF data (*World Economic Outlook*, October 2007).

As a result, by 2007 the relative development levels of most EU-15 member countries significantly changed compared to the pattern prevailing in 1980. Table 1 sheds some light on the picture of major gainers and losers. The group of gainers includes in the first place poorer countries that succeeded in catching up or narrowing their development gap vis-à-vis the richer EU members (Spain, Greece and – until 2000 – Portugal). The second category within

this group comprises more advanced EU economies that further improved their comparative position (the Netherlands, Finland and the UK). A special case represents Ireland who – due to its development policy and effective absorption of the dynamic effects of regional integration - by 2007 not only closed the historical development gap but by far outpaced the remaining EU-15 countries (Luxembourg apart) in terms of GDP per capita.

The group of losers includes mainly Italy and France, i.e. countries that over the whole 1980-2007 period suffered the largest deterioration in their relative development position or a real economic divergence (14 and 11 percentage points, respectively). By 2007, their GDP per capita levels were below the EU-15 average. In Italy, the divergence trend occurred mostly after 2000 whereas in France it started as early as in the 1980. The group in question also comprises Denmark, who in the 1980s ranked among the richest economies in Western Europe, and whose comparative development position within the EU-15 deteriorated by 2007. On the other hand, Portugal – the poorest EU-15 member – should also be ranked among losers as its economic growth performance, especially after 2000, cannot be deemed a success story.¹

The growth record in the EU-15 countries after 1980 seems to confirm partly the σ -convergence hypothesis, too. To see this, we can resort to the simplest proxy of income disparities, i.e the ratio of GDP per capita in the richest and the poorest member country. While in 1985 the ratio in question amounted to 2.15 (Denmark vs. Portugal) by 2007 it declined to 1.98 (Ireland vs. Portugal). Similar outcomes can be derived from the regression analysis conducted for the purpose of the present study. Based on its results (see Table 3 and Figures 1 and 1a) it was found out that the initial dispersion in the prevailing income levels in particular member countries tended to diminish throughout the whole period being studied, i.e. 1980-2007. This process took the fastest pace in the early periods of the EU enlargement that is in 1980-1989. However, the σ -convergence could not be traced in the subsequent stages of enlargement, that is after 1989.

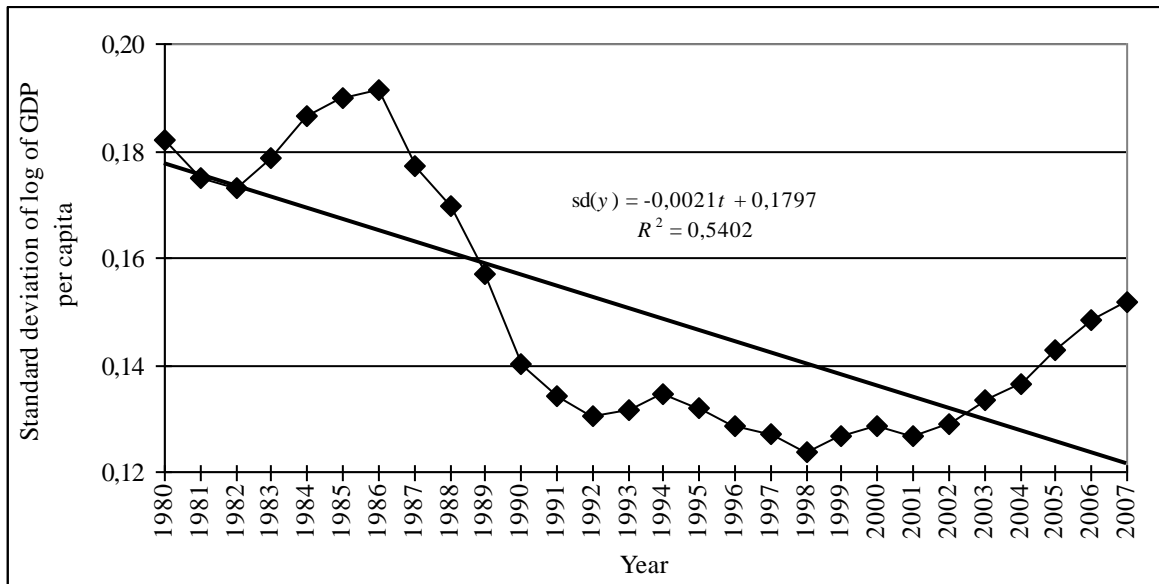
Table 3. Regression results for σ -convergence (EU-14)

Period	α_0	α_1	<i>t</i> -stat. (α_0)	<i>t</i> -stat. (α_1)	<i>p</i> -value (α_0)	<i>p</i> -value (α_1)	R^2	σ - convergence
1980-2007	0.1797	-0.0021	28.76	-5.53	0.000	0.000	0.5402	yes
1989-2007	0.1334	0.0001	29.61	0.38	0.000	0.711	0.0083	no

¹ According to a prevailing view, the disenchanting growth performance in Portugal was mainly a derivative of country's overvalued currency and excessive inflation at the date of joining the EMU.

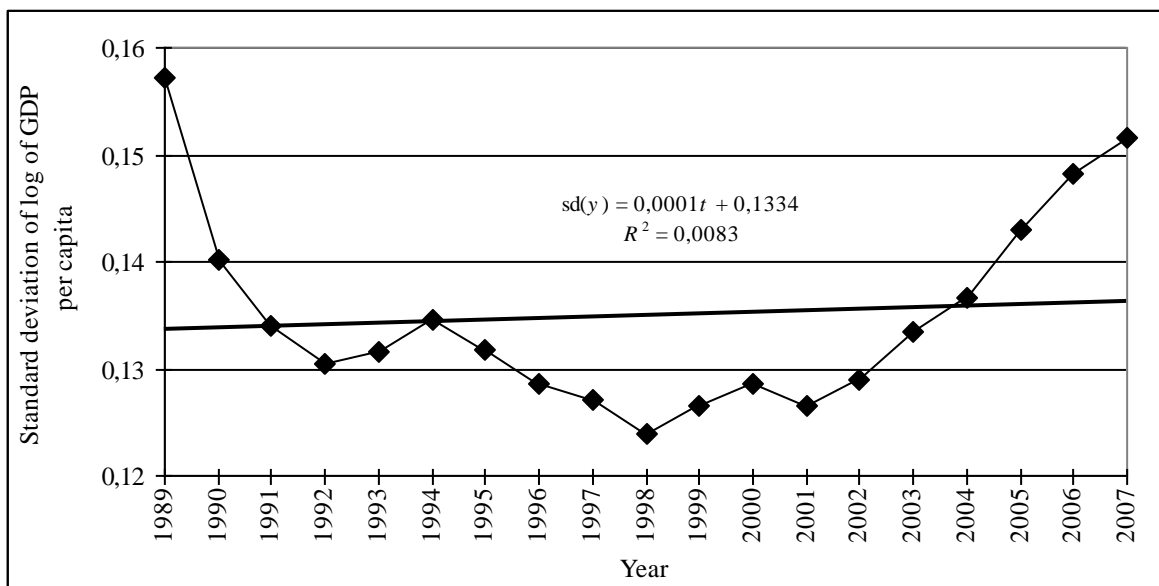
Source: Author's calculations.

Figure 1
Standard deviation of GDP per capita, 1980-2007 (EU-14)



Source: Author's calculations.

Figure 1a. Standard deviation of GDP per capita, 1989-2007 (EU-14)



Source: Author's calculations.

3.2. Real convergence between the new EU members and the EU-15

In 2004, the European Union decided to embark on its largest enlargement project ever – it accepted ten new members including eight former socialist countries or transition

economies from Central and Eastern Europe (CEE)² plus two small island Mediterranean countries, Cyprus and Malta. By 2007, two more transition economies, Bulgaria and Romania, joined the organization thus making it grow from the original size of EU-6 in 1957 to its present status of EU-27. In the ensuing text, we will focus on the former socialist economies exclusively and refer to them as CEE-10 or EU-10 countries.

Only a dozen of years earlier, i.e. in 1990, the CEE countries decided to depart from their command economy system and entered the road from central planning to the market. They embarked on systemic transformation as less developed economies lagging much behind Western Europe including the EU-15 countries. At the outset of systemic transformation the development asymmetries between the CEE-10 and the EU-15 were enormous – the GDP per capita in purchasing power parity (PPP) in the poorest country in the former group, Romania, represented only 34% of the EU-15 average. Table 4 provides a more detailed picture of the existing income disparities.

Table 4. New EU members – the development gap towards the UE-15, 1989-2007 (GDP per capita in PPP, UE-15 = 100)

Country	1989	1997	2003	2007
Czech Republic	75	63	65	73
Estonia	54	36	48	65
Hungary	56	45	56	57
Latvia	52	30	38	51
Lithuania	52	33	43	54
Poland	38	41	43	49
Slovakia	59	45	49	61
Slovenia	74	67	71	82
Bulgaria	46	23	29	34
Romania	34	23 ¹	28	36

1 - 1999

Source: own calculations based on IMF and Eurostat data.

The early years of systemic transformation witnessed a further widening of the pertinent development gaps, due to the so called ‘transformation recession’ suffered by all transition economies. As a matter of example, in 1992 (i.e. after overcoming the output contraction) the

² Czech Republic, Estonia, Latvia, Lithuania, Hungary, Poland, Slovakia and Slovenia.

GDP per capita in Poland represented only 32% of the UE-15 average. The scale of real divergence in a number of other CEE countries (e.g. Bulgaria, Estonia, Latvia and Lithuania) was even greater. By 1993, the average GDP per capita level in the CEE-10 area (US\$6,797) was slightly more than one-third of the average for the EU-15 (US\$18,965).

Since the mid-1990s most of the transition economies involved entered a real economic convergence path, i.e. they started to narrow the respective development gaps towards the EU-15. Tables 4 and 5 give a more detailed account of this process. One of the key drivers of this trend was the so-called ‘external anchor’ that is the prospect of EU membership. As shown, *inter alia*, in annual EBRD assessments, countries invited to join the EU initiated their structural and institutional reforms earlier, implemented them much more effectively and with greater commitment, and today are much more advanced in the reform process than the remaining transition economies. Moreover, as indicated in an IMF study, the quality of institutions in the new EU member states is currently higher on average than in other countries at a similar level of development.³ Based on other empirical studies it may be claimed that the fast progress in institutional reforms in CEE countries in turn translated into an accelerated economic growth.⁴

Table 5. GDP growth in transition economies and the EU-15, 1990-2007

Country	Real GDP growth rate				Real GDP index in 2007	
	Average annual % growth	Annual % growth				
	1990-2007	2005	2006	2007	1989=100	2000=100
Czech Republic	1.7	6.4	6.4	5.8	135	133
Estonia	2.1	10.2	11.2	7.8	144	172
Hungary	1.5	4.1	3.9	1.4	132	129
Lithuania	0.6	7.9	7.7	8.5	112	168
Latvia	1.2	10.6	11.9	10.5	124	181
Poland	2.9	3.6	6.2	6.5	167	130
Slovakia	2.3	6.6	8.5	8.7	151	149
Slovenia	2.1	4.1	5.7	6.0	146	131
Bulgaria	0.3	6.2	6.1	6.3	106	145
Romania	0.9	4.2	7.9	6.0	118	151

³ See IMF, *World Economic Outlook 2002*, Washington D.C. 2002, p. 102.

⁴ See R. Rapacki, *Structural Reforms*, chapter 3.4, p. 88-89 in: D. Rosati (ed.), „New Europe. Report on Transformation“, Krynica-Zdrój, September 5-8, 2007.

EU15	2.2	1.7	2.8	2.6	147	114
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Sources: *World Development Indicators 2007*, The World Bank, Washington 2007; *Transition Report Update*, EBRD, London, May 2007; Eurostat database; UN Economic Commission for Europe, *Economic Survey for Europe*, 2005 No. 2, Geneva 2005; VIIW Research Report No. 325, *Special Issue on Economic Prospects of Central, East and Southeast Europe*, Vienna, February 2006; own calculations.

Notwithstanding the fast economic growth since the early- or mid-1990s⁵, in all but one new EU member countries (Poland) the existing disparities in GDP per capita levels vis-à-vis the EU-15 were bigger at the date of their EU accession than in 1989 (Table 4). Seen from this angle, the scale of development asymmetries between the new accession countries and the old EU members was historically unprecedented and hence posed a serious challenge to the European Union.⁶ On the brighter side of the picture, however, one can notice a further acceleration of the real convergence process or catching up in the new EU countries (in particular, the EU-8, i.e. excluding Bulgaria and Romania) after 2000 and even more so since their EU accession in 2004. Data in Tables 4 and 5 appear to support quite unequivocally this assertion. As a result, income inequalities between the EU-10 and the EU-15 started to decrease. By 2007, the average GDP per capita in the former group equaled US\$16,846, which represented almost 50% of the average for the EU-15 area (US\$33,842).

Beta convergence

Similar to the EU-15 group alone in the preceding section, we conducted the regression analysis aimed to test the convergence hypothesis both for the enlarged European Union (EU-25 excluding Cyprus and Malta) and for two sub-groups, i.e. CEE-10 and EU-15. Our analysis confirms the β -convergence between the CEE-10 countries and the EU-15. This kind of economic convergence has been detected for 25 individual countries as well as for two sub-groups (the average for the 15 old EU members and the average for ten new EU entrants). The results are shown in Table 6 and Figure 2.

Table 6. Regression results for β -convergence (EU-10 & EU-15)

Period	α_0	α_1	t -stat. (α_0)	t -stat. (α_1)	p -value (α_0)	p -value (α_1)	R^2	β - convergence	β
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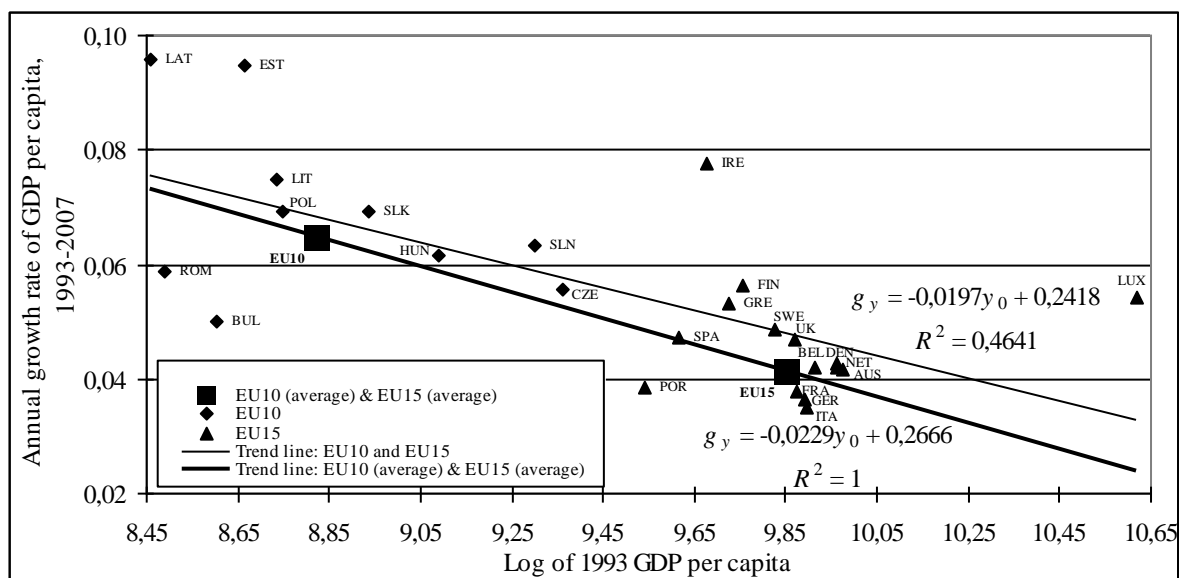
⁵ For example, the average annual growth rate of real GDP in Poland between 1992 and 2000 amounted to 5 per cent.

⁶ As we may remember from Table 1, the largest development gap recorded in the previous enlargements was that experienced by Portugal in 1985 – on the eve of country's EU accession its GDP per capita in PPP represented 58 per cent of the EU-15 average.

25 countries of the enlarged EU									
1993-2007	0.2418	-0.0197	5.79	-4.46	0.000	0.000	0.4641	yes	0.0230
1993-2000	0.0844	-0.0035	1.51	-0.60	0.145	0.554	0.0154	yes	0.0036
2000-2007	0.3917	-0.0337	7.13	-6.04	0.000	0.000	0.6133	yes	0.0385
2 regions (EU-10 and EU-15)									
1993-2007	0.2666	-0.0229	.	.	.	.	1.0000	yes	0.0276
1993-2000	0.1608	-0.0120	.	.	.	.	1.0000	yes	0.0125
2000-2007	0.4140	-0.0368	.	.	.	.	1.0000	yes	0.0426

Source: M. Próchniak, *Real Economic Convergence between Central and Eastern Europe and the European Union*, paper presented at the international conference organized by Chinese Economic Association, Cambridge, 1-3 April 2008.

Figure 2. Growth rate of GDP per capita over the period 1993-2007 and the initial GDP per capita level (EU-10 & EU-15)



Source: As in Table 6.

Table 6 shows that all the member countries of the enlarged EU (excluding Malta and Cyprus) have developed in line with the convergence hypothesis. Less-developed countries in this group tended to exhibit higher economic growth rates than those prevailing in more-developed EU members.

In 1993, all CEE-10 countries featured lower development levels than the EU-15 economies. The GDP per capita (in PPP) in the Czech Republic and Slovenia, the richest

CEE-10 economies, amounted then to US\$11,640 and US\$10,960 respectively, which was less than in Portugal (US\$13,927), the poorest EU-15 country. Between 1993 and 2007, the CEE-10 countries grew faster in average than the old EU members but this was not always the rule. The most atypical cases included Ireland, and Luxembourg, on the one hand, and Romania and Bulgaria, on the other. Ireland and Luxembourg displayed extraordinarily high growth rates (7.8% and 5.4% respectively) bearing in mind their initial income levels. On the other extreme, Romania and Bulgaria, i.e. the poorest CEE-10 economies in terms of their 1993 income levels, experienced relatively slow economic growth, comparable to that recorded in the wealthier EU-15 countries.

The catching-up process accelerated in the second part of the period as EU enlargement approached. The β coefficient for 25 countries rose from 0.36% to 3.85% between the sub-periods: 1993-2000 and 2000-2007 while the β coefficient for the two regions increased from 1.25% to 4.26%. The acceleration of the convergence process was partly driven by further trade liberalization, including significant tariff cuts. CEE-10 countries also adjusted better to EU technical standards, which was conducive to the development of international trade. Moreover, the FDI inflows to these countries peaked during this period.

Figure 6 shows that the average annual economic growth rate of the 25 current EU members during 1993-2007 was inversely related to their initial GDP per capita level. In the Figure, the position of individual countries is marked by dark rhombuses (CEE-10) and triangles (EU-15). The estimated trend line for the 25 countries has a slope -0.0197 , which implies that the β coefficient amounts to 2.30%. The value of R^2 is deteriorated mainly due to the fact that several countries (Ireland, Luxembourg, Romania, and Bulgaria as well as Latvia and Estonia) deviate considerably from the common trajectory.

The β convergence can also be traced at a more aggregated level. The big squares in Figure 6 represent the initial average GDP per capita and the average GDP growth rate in the CEE-10 and the EU-15 area. The average growth rate in the CEE-10 group as a whole was higher than in the EU-15 while the initial GDP per capita was lower. The trend line for these two regions has a slope -0.0229 with the β coefficient equals 2.76%.

The foregoing analysis may suggest a relatively slow income-level convergence between the new EU entrants and the old EU members. Hence, we should not expect a rapid equalization of income levels between the CEE-10 and EU-15. The beta coefficient amounting to 2.30-2.76% indicates that, if the average economic growth patterns prevailing between 1993 and 2007 are sustained, the new member countries of the enlarged EU would need 25-30 years to decrease by half the distance to their common hypothetical steady state.

Sigma convergence

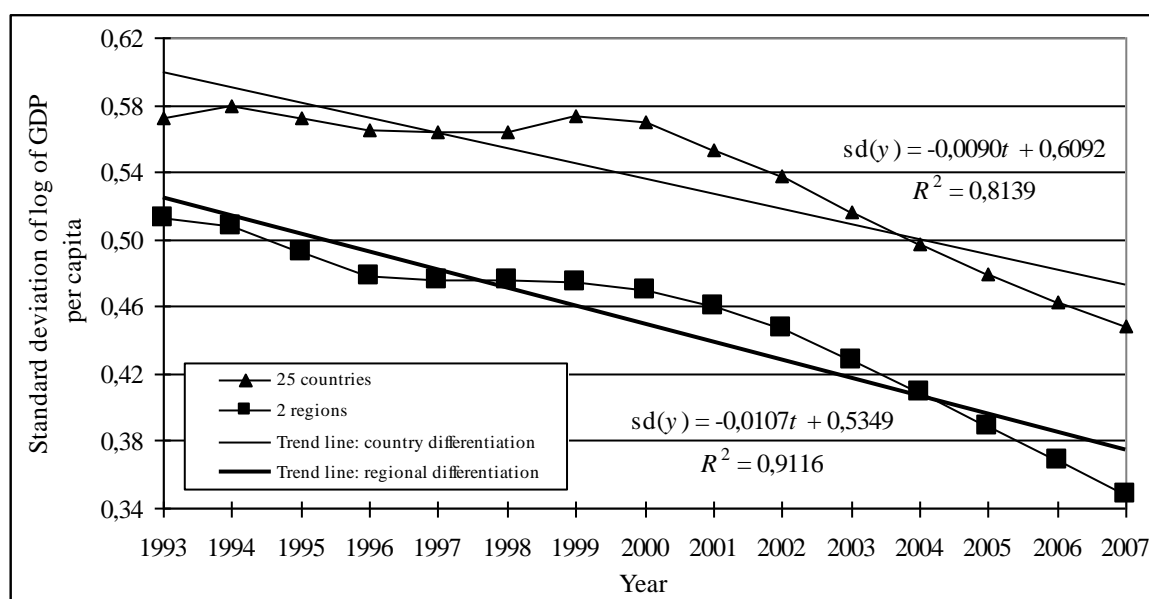
The CEE-10 countries also reveal a σ -convergence towards the EU-15, both if a country-by-country approach is applied and if two sub-groups or regions (CEE-10 and EU-15) are examined . The results of our regression analysis are provided in Table 7 and Figure 3.

Table 7. Regression results for σ -convergence (EU-10 & EU-15)

Period	α_0	α_1	t -stat. (α_0)	t -stat. (α_1)	p -value (α_0)	p -value (α_1)	R^2	σ -convergence
25 countries of the enlarged EU								
1993-2007	0.6092	-0.0090	56.04	-7.54	0.000	0.000	0.8139	yes
1993-2000	0.5742	-0.0009	138.64	-1.11	0.000	0.310	0.1703	yes
2000-2007	0.5882	-0.0178	408.52	-62.46	0.000	0.000	0.9985	yes
2 regions (EU-10 and EU-15)								
1993-2007	0.5349	-0.0107	63.67	-11.58	0.000	0.000	0.9116	yes
1993-2000	0.5142	-0.0063	92.62	-5.69	0.000	0.001	0.8436	yes
2000-2007	0.4958	-0.0179	133.78	-24.37	0.000	0.000	0.9900	yes

Source: As in Table 5.

Figure 3. Standard deviation of GDP per capita, 1993-2007 (CEE-10 & EU-15)



Source: As in Table 5.

Table 7 shows that income differentials tended to diminish over time both among the 25 current EU members and between the CEE-10 and the EU-15 sub-groups in the whole period of 1993-2007. For this period, the slope of estimated regression equations is negative (-0.0090 for the 25 countries and -0.0107 for two regions).

Figure 3 depicts the tendency of the standard deviation of log GDP per capita levels. As we can see, income dispersion between the CEE-10 countries and the old EU members revealed generally a downward trend. The most evident and systematic fall in income differentials took place in the second half of the period under review, i.e. between 2000 and 2007.

The standard deviation of log GDP per capita levels decreased from 0.57 in 1993 to 0.45 in 2007 among the 25 countries and from 0.51 to 0.35 between the two regions. However, income differences persisting between CEE-10 and EU-15 are still very large.

3.3. Prospects of economic convergence between the CEE-10 countries and the EU-15

As a wrap of the discussion carried out in the previous section, it is worth embarking on a tentative projection of possible scenarios of a complete catching up or closing the development gap between the new (EU-10) and old European Union member countries (EU-15).

Table 8. Possible scenarios of closing the development gap between the EU-10 and the EU-15 countries (number of years)

Country	Average annual growth rate of real GDP per capita (1996-2007)	Existing development gap (% of EU-15 average by 2007)	Expected time to catch up by a EU-10 country with the EU-15 average development level (GDP per capita in PPS)
Bulgaria	3,4	34	73
Czech Republic	3,1	73	28
Estonia	8,3	65	7
Hungary	4,2	57	26
Latvia	8,3	51	11
Lithuania	6,9	54	13
Poland	4,6	49	27
Romania	3,5	36	65
Slovak Republic	4,8	61	18
Slovenia	4,1	82	10

EU-15	1,9	100	-
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Source: Table 4, Eurostat database and author's calculations.

Table 8 compiles the input data necessary for carrying out the pertinent projections. The latter are based on a simple extrapolation of the economic growth paths (real GDP per capita) of individual CEE-10 countries between 1996 and 2007, assuming that the hitherto average growth trend over the same period in the EU-15 sub-group will continue. Under these assumptions, it may take between 7 and 73 years for individual CEE-10 economies - as data in the last column of Table 8 indicate - to completely close the development gaps towards the EU-15 average existing in 2007. The first transition economy that is likely to fully catch up is Estonia (by 2014), followed by Slovenia (2017), Latvia (2018) and Lithuania (2020). On the other end of the spectrum are Bulgaria and Romania whose real convergence process may take until 2072 and 2080 respectively. According to this basic scenario, the remaining new EU members ought to close their income gaps between 2025 (Slovakia) and 2035 (Czech Republic).

Obviously, the scenario outlined above is subject to many uncertainties and contingent upon a number of key factors that may hinder the real convergence process and make it much slower than foreseen in our projections. Below we point out to three most important such factors.

First of all, it should be stressed that the EU accession does not automatically entail the end to the process of structural reform and institutional adjustment in ten new member countries from Central and Eastern Europe. On the contrary, they will have to intensify their structural reforms, so as to be able to fully capitalize the benefits of membership and make sustainable the path of fast real convergence of their economies to the level of the "old" EU.⁷ A particularly significant challenge for the new member states in this regard is broadening the scope of financial intermediation and deepening their financial markets, restructuring of strategic sectors such as energy, heavy industry and agriculture, as well as the reform of public administration (including the justice system), particularly at the regional and local level. Weaknesses present in these areas can be seen, *inter alia*, as factors adversely affecting their capability to efficiently absorb the EU funds and make the best use of them.

Second, the new EU members are also expected to join in the future the European Monetary Union and to adopt the common currency, euro. To this end, they will have to fulfil

⁷ See: *Economic Survey of Europe*, UN Economic Commission for Europe, 2004 No. 1, Geneva, p. 15.

the nominal convergence criteria established in the Maastricht Treaty and in the Growth and Stability Pact. Table 9 below gives account of the readiness of individual transition economies for the EMU membership, as of end-2005.

Table 9. Criteria for nominal convergence in new EU member states (data as of end-2005)

Country	Inflation	General government balance	Public debt	Interest rates	Exchange rate
Reference value	2.5	- 3.0	60.0	5.3	+/- 15%
Czech Rep.	1.9	- 3.2	25.8	3.6	10.8
Estonia	4.1	1.5	5.1	6.3	0.0
Hungary	3.6	- 6.1	58.9	7.0	8.3
Lithuania	2.7	- 2.0	17.5	4.7	0.0
Latvia	6.7	- 1.2	12.6	5.9	6.7
Poland	2.1	- 4.7	47.4	4.9	19.0
Slovakia	2.5	- 3.0	45.2	3.6	7.3
Slovenia	2.5	- 1.9	30.0	3.8	1.2

Source: EBRD, Transition Report Update 2006.

The only countries that fulfilled all the criteria in 2005 were Slovenia⁸ and Slovakia. The Baltic states experienced problems with taming their inflation, while the Czech Republic, Poland and Hungary were grappling with public finance imbalances. Meanwhile, Hungary was the farthest away from the euro zone, failing to fulfil four of the five criteria for EMU membership.

It has been often argued that there might be a trade off embedded in simultaneous pursuits by new EU member countries to achieve two goals, i.e. both nominal and real convergence. This view was based on a belief that attempts by a CEE-10 country aimed to slice its budget deficit and/or public debt or to tighten its fiscal policy, may adversely affect this country's economic growth prospects and by the same token – decelerate the pace of its real convergence towards the EU-15.

However, this needs not to be the case provided the so-called golden rule of public finance is applied, which makes it possible to largely reconcile the contradicting objectives of nominal and real convergence in the new member states.

⁸ In 2007, Slovenia joined the Euroland.

The essence of the “golden rule” boils down to the proposal for the excess of public expenditure over revenue (the fiscal deficit, or more precisely, the part of it that reflects the borrowing requirement of the government) to be used for the financing of public investment. Thanks to such investment, especially in infrastructure, positive externalities for the private sector arise and it is possible to sustain or even speed up the rate of economic growth (real convergence), despite fiscal tightening and the reduction of the deficit (nominal convergence). Table 10 below contains data on the current and anticipated size of structural deficits and public investment in the new EU member countries in Central and Eastern Europe.

Table 10. Selected fiscal indicators in the new EU member states, 1998-2007 (% of GDP)

	Structural deficit 2003	Structural deficit 2007 (forecast)	Public investment (average for 1998- 2003)
Czech Republic	5.2	3.6	3.6
Estonia	- 2.6	- 0.1	4.2
Lithuania	1.8	1.8	2.6
Latvia	1.4	2.0	1.4
Poland	5.0	3.7	3.4
Slovakia	3.7	3.1	2.9
Slovenia	1.5	0.7	2.2
Hungary	6.2	2.7 ^a	3.7
UE-15	1.6	..	2.3

a – 2008.

Source: *Economic Survey of Europe 2004*, op. cit, p. 36.

The third factor that – at least in some CEE-10 countries – may constrain the pace of their catching up process is due to possible failures in completing privatization of state-owned enterprises (SOEs). This threat seems particularly serious in Bulgaria, Latvia, Poland, Romania and Slovenia where privatization significantly slowed in the last several years and where the challenges ahead in terms of restructuring and divesting the outstanding stock of state-owned assets or firms in sun set industries and problem sectors are particularly acute.⁹

⁹ According to annual EBRD assessments of the progress of systemic transformation or market reforms, by 2006 Poland and Slovenia were the least advanced among the CEE-10 countries in large-scale privatization. At the same time, Bulgaria, Latvia, Romania and Slovenia made the smallest progress in enterprise restructuring and corporate governance. See, EBRD, *Transition Report 2006*. London 2006.

Bearing in mind the foregoing (and other possible) threats to a smooth real convergence between the CEE-10 and the EU-15 countries it is reasonable to expect that this process might become more difficult in the future and take a more tortuous course.

This view has received some credit in a number of recent theoretical studies on economic convergence published at the time of the EU enlargement. For example, Kejak et al. (2004) extended the two-sector Uzawa-Lucas endogenous growth model to explain the growth path of new EU countries. They used this model to estimate the speed of income convergence between Poland, Czech Republic, and Hungary, and the EU-15. Under the optimistic scenario assuming the growth rate of 4%, Poland would achieve the current GDP per capita average level of EU-15 in 35 years, Czech Republic – in 23 years, and Hungary – in 30 years.

The EEAG report (EEAG, 2004) provides some estimates of the speed of catching-up process by CEE countries. The most optimistic scenario suggests that Slovenia would reach the income level equal to 90% of the future average for the euro area in 30 years. Over the same time, the Czech Republic, Hungary and the Slovakia would achieve 75-80% of the EU-12 average, whereas Poland and the Baltic states 65-70%.

Summing up it should be stressed that the EU membership does not offer an automatic mechanism or a guarantee for the real income convergence of the new member countries towards the development levels in the old EU-15 economies. As evidenced by the experience of Greece (until 1995) and Portugal, regional integration may at times co-exist with real divergence trends. The real challenge for the new members from Central and Eastern Europe therefore is to follow the patterns established by Ireland and Spain rather than those of Greece and Portugal.

REFERENCES

- Barro, R. [1991], *Economic Growth in a Cross Section of Countries*, “Quarterly Journal of Economics”, May.
- Barro, R.J. and Sala-i-Martin, X. [1992], *Convergence*, “Journal of Political Economy”, 100, pp.223-251.
- Ben-David, D. [2000], *Trade, Growth and Disparity Among Nations*, in: “Trade and Poverty”, WTO, Geneva.
- EBRD [2006], *Transition Report 2006*. London.
- EBRD [2007], *Transition Report Update*, London, May.
- EEAG [2004], *Report on the European Economy 2004*, CESifo, Munich.
- Eurostat, www.epp.eurostat.ec.europa.eu.
- IMF [2002], *World Economic Outlook 2002*, Washington D.C.
- IMF [2007], *World Economic Outlook*, October, Washington D.C.
- Kejak, M., Seiter, S. and Vávra, D. [2004], *Accession Trajectories and Convergence: Endogenous Growth Perspective*, “Structural Change and Economic Dynamics”, 15, pp.13-46.
- Krugman, P. [1991] *Geography and Trade*, MIT Press, Cambridge, Mass.
- Lucas, R.E. (1988) ‘On the Mechanics of Economic Development’, *Journal of Monetary Economics*, 22, pp.3-42.
- Mankiw, N.G., Romer, D. and Weil, D.N. [1992], *A Contribution to the Empirics of Economic Growth*, “Quarterly Journal of Economics”, 107, pp.407-437.
- OECD, www.oecd.org
- Próchniak [2008], M., *Real Economic Convergence between Central and Eastern Europe and the European Union*, paper presented at the international conference organized by Chinese Economic Association, Cambridge, 1-3 April.
- Rapacki, R. [2007], *Structural Reforms*, in: D. Rosati (ed.), „New Europe. Report on Transformation“, Krynica-Zdrój, September 5-8.
- Romer, P.M. [1986], *Increasing Returns and Long-Run Growth*, “Journal of Political Economy”, 94, pp.1002-1037.
- Romer, P.M. [1990], *Endogenous Technological Change*, “Journal of Political Economy”, 98, pp.S71-S102.
- Solow, R.M. [1956], *A Contribution to the Theory of Economic Growth*, “Quarterly Journal of Economics”, 70, pp.65-94.
- The World Bank [2007], *World Development Indicators 2007*, Washington D.C.
- UN Economic Commission for Europe [2004], *Economic Survey of Europe*, No. 1, Geneva.
- UN Economic Commission for Europe [2005], *Economic Survey for Europe*, No. 2, Geneva.
- VIIW Research Report No. 325 [2006], *Special Issue on Economic Prospects of Central, East and Southeast Europe*, Vienna, February.
- Viner, J. (1950) *The Custom Union Issue*, Carnegie Endowment for International Peace, New York.