Real convergence in the new Member States of the European Union (Shorter and longer term prospects)

Péter Halmai[1], Viktória Vásáry[2]

Abstract

The success of the integration process of the new EU Member States is reflected by their nominal and real convergence performance. These tendencies are of special importance considering further enlargement of the Eurozone. The financial and economic crisis of 2008 has resulted, however, in a fundamentally new situation as regards these issues.

The paper considers the experiences gained in real convergence, the catch-up processes and their future prospects. As for nominal convergence, only those factors were analysed which affect real convergence directly. In particular, the analysis focuses on the sustainability of the convergence processes.

The possible trends of longer term growth and convergence processes are presented based on a qualitative analysis representing the supply side approach.[3] The analysis is aimed at revealing potential – not insignificant – risks and threats.

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Keywords: European Union, real convergence, convergence crisis, potential growth, catch-up

1. Real and nominal convergence

1.1. New challenges of convergence during the crisis

The potential advantages of adopting the euro are of great importance for new Member States (NMSs). Euro adoption can contribute positively to long term growth and stability. It has an impact on economic performance through several macro- and microeconomic channels: the stability-oriented macroeconomic framework, access to liquid markets, more trade and foreign direct investment, lower transaction costs and increased competition.

Indeed, Eurozone membership has to be assessed in a broader context when considering it from the point of view of economic policy. The static view on the state of nominal convergence is not enough (Angeloni, Flad and Mongelli (2007)). In order to take full advantage of the single currency - taking into consideration the restrictions of the common monetary policy and irrevocably fixed exchange rate – the economic policy needs to ensure the proper functioning of the *internal adjustment mechanism safeguarding stability*. Adequate labour- and product market flexibility, as well as sufficient fiscal buffers were identified as the preconditions of successful euro adoption (Rybinski (2007), Darvas and Szapáry (2008)). Closer economic integration with the Eurozone might contribute to mitigating vulnerability against asymmetric shocks.

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[1]University of Pannonia, Hungary, Email: halmai.peter@gtk.szie.hu

[2] University of Pannonia, Hungary, Email: vasary.viktoria@gtk.szie.hu

[3]Analytically the projections are based on the statistical production function approach (Denis, McMorrow et al, 2006; Carone et al, 2006). In the Cobb-Douglas production function the potential GDP equals the product of the combination of the production factors and the total factor productivity.

Considering the special conditions of the NMSs, special attention needs to be paid to the *risks* related to convergence. Countries accumulating huge internal and external deficit are very vulnerable under the conditions of the present crisis. At the same time there has been a progressive price level convergence and real equilibrium appreciation as part of the process. On the other hand the catching up process of the NMSs is effected by globalization and financial integration. The NMSs are highly sensitive against shock impacts due to their relatively small size, high level of openness and greater need for external financing. These risks have become apparent during the current crisis. The retreat from risk and the search for liquidity by investors might contribute to heavy pressures on the financial markets of the NMSs.

1.2. Price level and real convergence

The majority of the NMSs achieved remarkable convergence (taking into account the advancement of macroeconomic stability and the supply side reforms related to EU-accession). Nevertheless, a broad difference among certain member states remained. The new MSs have to face a shortfall caused by the crisis and sharp decline in growth (often accompanied by a decrease in GDP). Certain countries, which had a significant catch-up growth during the past years (e.g. the Baltic States) entered into a recession. Growth in the region has slowed down permanently. Therefore real convergence – within and outside the Eurozone – remains a determinant factor shaping the economic policy strategy for most NMSs in the medium term.

The equilibrium real exchange rate appreciation (price level convergence) is considered a natural consequence of the economic catch-up (De Grauwe and Schnabl (2005)). Real exchange rate appreciation - depending on the monetary policy and exchange rate levels - might occur following two paths (or through the combination of the two): by nominal exchange rate appreciation and/or a higher internal (domestic) inflation. The pace and the channels of the equilibrium real appreciation are of great importance as regards the trajectory of nominal convergence. The fixed exchange rate system (which was introduced by the Baltic States) excludes the nominal exchange rate channel of the real appreciation. Therefore, higher trend inflation is evolving for converging economies than for the anchor area.

Beyond the Balassa-Samuelson effect further factors effect significantly the dynamism of real appreciation. The pace of the income convergence, the domestic demand growth exceeding GDP growth and the exchange rate regime are significant determinants of the price level convergence dynamics. (Darvas and Szapáry (2008)). In the short term certain factors (e.g. the nominal exchange rate movements, the effect of the changes in the global resource and food prices) might temporarily deflect the inflation rates from the trends supporting price level convergence. (Certain structural factors – e.g. trade liberalization, boosting competition on the product markets, etc. – might have similar effects.) At the same time *not all inflationary differences might be consistent with the need for ensuring competitiveness and external stability of the economy in the medium term.* In certain NMSs the unsustainable domestic demand growth caused the high inflation. This process was fuelled through too optimistic future expectations of the economic agents and/or insufficient economic policies.

Figure 1. Catch-up and price level convergence in the NMSs
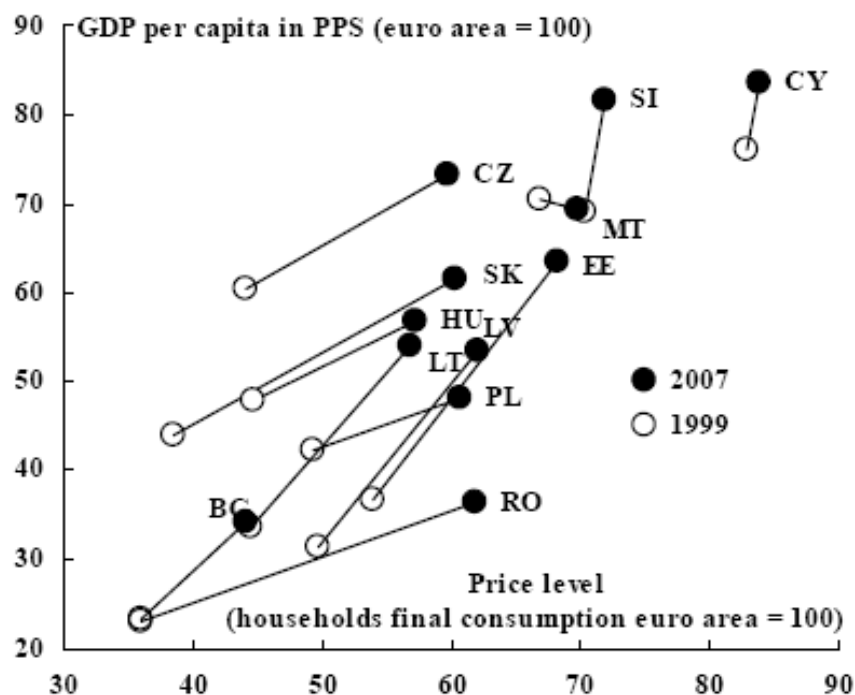
Source: European Commission, 2009c.

## 1.3. Financial integration and real convergence

The growth dynamism in the NMSs was generally accompanied – sometimes controlled – *by rapid financial deepening and credit expansion.* The financial integration of the NMSs has advanced. The NMSs were able to mobilize their external savings to a great extent due to ongoing convergence and the high returns on investment. The short-term and the long term interest rates have been converging to the Eurozone level. (see Figure 2)

This interest rate convergence mirrored the preceding favourable global environment. On the other hand it showed that EU-accession resulted in increasing confidence. EU-accession and the prospect of joining the single currency mitigated significantly the risk premia. It provided strategy focus and at the same time, a protective screen for trustworthy economic policies. (There were no such factors in the other developing market economies.) In the new MSs the sovereign risk ratings kept improving before and after accession. Following the financial turmoil the *risk perception increased* more generally.

There was higher capital inflow (including FDI) – expressed as a percentage of GDP - in MSs with tight pegs and currency boards (hereafter 'fixers') than in the floating currency countries. At the same time the fixed exchange rate regime resulted in a higher current account deficit. In the case of the 'fixers' the interest rate convergence was stronger. This process often led to negative real interest rates, especially in the case of strong inflation and rapid credit expansion. The 'fixers' started the real convergence process at a lower output level. Therefore the capital return was potentially higher that

in turn forced higher capital inflow during the earlier periods of catching up. (European Commission (2008a))

Figure 2. Real short-term interest rates in the new Member States
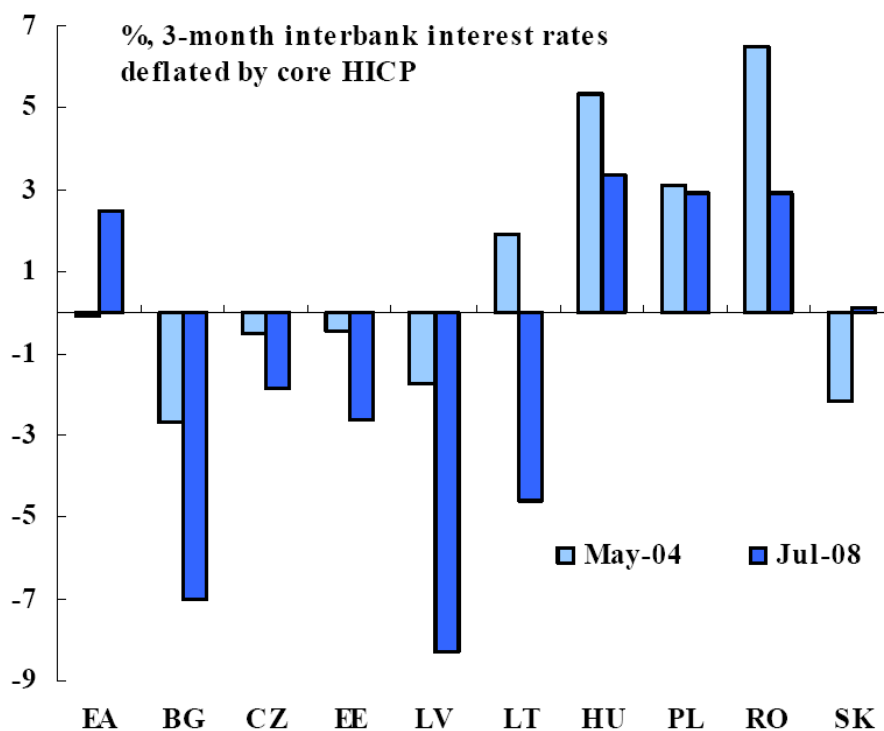
Source: European Commission, 2009c.

The rapid financial deepening and high capital inflow are considered a significant challenge to be faced during adaptation. (Darvas and Szapáry (2008)). The rapid credit expansion and the capital inflow in the non tradable sectors (especially housing) might change the composition of final demand. As a result a significant movement of the real exchange rate might come about. *The real appreciation and the external deficit might become excessive* due to unjustified optimistic expectations of the economic agents and insufficient economic policies.

An 'overshooting' of the real exchange rate may hinder the achievement of fast and sustainable nominal convergence. It might cause further difficulties on the road towards the Euro. In the coming years painful macroeconomic corrections could be required due to the increasing deficit. The credit growth has slowed down under the circumstances of the global crisis. Liquidity conditions have become tighter. The risk perception of credit providers and credit takers has intensified. The financing conditions have become worse in those countries where high external and internal deficit has developed and foreign currency lending was significant. (e.g. Baltic States, Bulgaria, Hungary, Romania.)

Following EU enlargement in 2004, four new countries fulfilled the criteria required for the adoption of the Euro. The other counties mostly made some steps as

regards the fulfilment of the nominal convergence criteria. Their economic structure got closer to that of the Eurozone, but there are significant differences among the MSs.

NMS countries prepare themselves for euro adoption under very different conditions. It is of great importance to outline adequate national strategies. As a fundamental factor of these strategies the *sustainability of the convergence* should be ensured. Nominal convergence needs to be achieved and sustained by taking into account globalization and financial integration which are peculiarities of the environment.

The main current challenge is the crisis management in countries with high domestic and external deficits. A well-balanced macroeconomic policy-mix and responsible wage policy is required to avoid painful macroeconomic corrections in the coming years. Strong financial supervision is needed and at the same time all counties should keep progressing towards convergence.

The proper functioning of internal adjustment mechanism of economic policies and the focus on prudent macroeconomic aspects could ensure that NMSs take better advantage of the single currency. Flexible domestic production factors and product markets favour smooth adjustment to economic and financial shocks. The future members of the Eurozone have to push on with adequate fiscal and structural policies according to the Stability and Growth Pact (SGP), the Lisbon Program and beyond.

2. Convergence and catching up

Convergence and catch-up cannot be considered as an automatic result of EU-accession. The catch-up processes of the MSs can be analysed methodologically by means of growth accounting, through a production function approach and the calculation and interpretation of the catch-up rate.

The pace of catching-up and convergence are not identical concepts. Both concepts may be interpreted in a negative light. However, their dynamics are not identical: *catching-up* is the distance to be travelled, while *convergence* expresses the measure of progress. Consequently, in the context of growth, the extent of the catch-up will be greater in the case of a narrower residual difference, while the measure of convergence shall accordingly be lower.

The convergence in the EU during the past decades showed a relatively steady pace. The inverse relationship between growth and the level of income is considered *β-convergence*. If this factor is present, poorer countries get closer to the richer ones. The β-convergence ratio depends on the economic policy and other country-specific factors. It indicates how long convergence will take place (see Barro and Sala-i Martin (1992)). The pace of *β-convergence* was 2,1-2,3% among countries over the period 1960-2003. The pace of β-convergence in the EU-27 during the half decade prior to accession (1999-2003) was annually 2,3% and increased to 3,4% between 2004 and 2008 (European Commission, (2009c)). The growth in the new Member States with lower income was faster than in the old Member States. The *catch-up process accelerated after the accession*. It is an essential question whether this accelerated process is sustainable or not (see below).

The convergence among regions seems to be faster. The caution is, however, justified: on the one hand the pace of convergence might be very different in certain countries and periods, on the other hand the method applied to quantify the above mentioned indicators could cause distortion.

The *economic integration favoured only a limited number of regions, especially at the outset.* Among these are the most dynamic and innovative regions of certain countries that could be mostly favoured through potential externalities produced in the entire EU-economy (Gianetti (2002)). As a result the convergence increases at country level, however that increase is driven only by a few regions. At the same time the level of GDP per capita might move further apart within countries. This conclusion is very important for the new Member States where the disparities of GDP per capita within countries are higher presently than the disparities in earlier periods of the development in the EU-15. *It is possible for internal disparities to grow – at least temporarily – as country level convergence progresses.*

2.1. Main trends in catching up in the new EU Member States

The pace of catching-up is expressed by *the catch-up rate,[4]* as follows:

$$Catch\text{-}up\ rate = 100 \cdot \frac{\Delta(y_{it} - y_t^*)}{(y_{it-1} - y_{t-1}^*)} \qquad (1)$$

where *y* is the level of GDP per capita at purchasing power standard for country *i* at time *t*; y_t^* is the average of $y_{t\ t}$ for the EU-25; Δ indicates the difference between *t* and *t-1*, where y_t^* is the weighted average of the EU-25.

In the case of negative catch-up rates the disparity between the country concerned and the EU average decreases, while the positive catch-up rate shows the increase of this difference.

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[4] The catch-up rate is calculated by means of the historical actual growth rate. It gives a framework for ex-post analysis of the catch-up dynamism. At the same time future projection shall be based on the potential growth rate. The authors shall render thanks to Hubert Gabrisch and the anonymous reviewer for their important methodological remarks which are considered to be relevant as regards the future research work.

Table 1. Average catch-up rates[2] - EU-10[1] (% per year)

	1991-1994	1995-1998	1999-2003	2004-2008	1991-2008
EU-10 average 3	0,43	-1,79	-1,66	-2,92	-1,56
Czech Republic	1,04	0,71	-1,89	-6,60	-1,69
Estonia	0,62	-2,44	-4,31	-4,53	-2,86
Hungary	0,88	-0,86	-4,54	0,60	-1,09
Lithuania	16,00	-2,56	-2,39	-4,47	1,08
Latvia	14,84	-1,21	-2,98	-4,42	0,97
Poland	-1,53	-2,55	-0,48	-2,19	-1,65
Slovakia	-2,33	-2,08	-1,41	-6,58	-3,20
Slovenia	0,36	-3,64	-4,23	-7,10	-3,88
Malta	-6,34	0,57	2,07	1,15	-0,39
Cyprus	-5,18	-3,36	-2,79	-1,20	-3,01

Source: calculated by authors based on Eurostat data.

1). EU-10: Countries which joined the EU in 2004.   2). The negative catch-up rate indicates the reduction in the GDP gap compared to average GDP per capita of the EU-25, and the positive catch-up rate shows the pace of growth of the rate.   3). Weighted against the population of the countries concerned.

The average catch-up rate in the EU-10 countries for the period of 1991-2008 was 1.56%. Above-average catch-up rates for the entire period were seen in Slovenia, Estonia, Slovakia and the Czech Republic. Poland's rate was average, while Latvia, Lithuania and Hungary came in below the average. (Table 1)

The effect of the transformation recession is striking, particularly in 1991-1994, and especially in Latvia and Lithuania. *After 1994, catch-up* (i.e. a negative catch-up rate) *is observed in the EU-8 countries.* (With the sole exception of the Czech Republic between 1995 and 1998.) The annual catch-up rate in the EU-10 was approximately 1,7% in 1999-2003. The best performance in this period was achieved by Hungary with a figure of 4,5%. A rate of above 4% was also attained by Estonia and almost by Slovenia too.

From the year of accession to 2008 and on average for the EU-10 – except for Hungary and Malta – all the countries experienced *significant growth in the catch-up rate*, with the average rate nearly doubled compared to the previous five years. Exceptional catch-up rates were displayed by Slovenia, the Baltic countries, the Czech Republic and Slovakia in the years studied.

Compared to the trends of previous years, one fundamental change was the *halt in the Hungarian catch-up process* from 2004. In Hungary's case, as a result of the macroeconomic (especially equilibrium) difficulties as well as the coerced stabilization program launched in the autumn of 2006, *there has essentially been no catch-up in GDP per capita since accession.* The trends of recent years have really put the brakes on the catch-up rate for the entire period under review. For Hungary the average annual catch-up rate

totalled 1,09% between 1991 and 2008. At the same time, within this period – between 1995 and 2003 – the catch-up rate approximated 3% per annum.

Against the methodological problems the σ-convergence[5] can be examined if the results are treated cautiously. According to the European Commission's examination the disparities are much larger if the new Member States are taken into account too (European Commission (2004)). The average annual fluctuation of the three convergence indicators shows that the disparities of the per capita GDP in the EU are narrowing. The pace of catch-up is enhancing compared to previous periods, especially at regional level, but the initial level of regional disparities is much higher.

The regional disparities decreased essentially due to the decrease in disparities among countries. The disparities within countries increased by 2,4-2,6% depending on the applied indicators. It strengthens the results for the EU-15: there is a certain degree of convergence to be observed at country and regional level in the whole EU-27, but the disparities within countries are increasing (or might increase).

The income dispersion in the enlarged EU remained largely the same during the period of 10 years between 1999 and 2008. This dispersion (Luxembourg is excluded) decreased (European Commission, (2009c)). The income equality was due to diminishing disparities among the new Member States. Therefore, two dimensions need to be highlighted. On the one hand, the new Member States were catching-up in *relative terms* during the half decade following the accession. On the other hand, *the absolute income inequalities decreased, too.*

The convergence over the past decade is depicted – as a simple regression - in Figure 3. (In Figure 3 data for the USA, Japan, Norway and Switzerland can also be seen.)

To benchmark the catch-up performances in a more sophisticated way the extended neoclassical growth theory needs to be applied. According to this framework, growth depends on the relationship between the initial output (y) of a country considered and its steady-state level (y*). The latter depends highly on savings, work supply (related to households' savings) government policies and institutional factors. As for certain determinants of y*, the growth rate changes inversely with y (conditional convergence), while in the case of a given y, growth varies directly with y*. Actually, the change in the steady-state income explains the acceleration of the catch-up process in certain countries and the slowdown in others. Government policies affecting growth include fiscal policies (tax mix, composition of public expenditures) and institutional choices. (Barro and Sala-i-Martin, (1992)(1995); Chalk and Tanzi, (2002)). Therefore growth might be relatively sluggish, even if the initial level of output is low and the steady-state output level is low, as well.

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[5]The development of the per capita GDP disparity - differences between absolute income - is to be measured as σ-convergence, i.e. through the change in the fluctuation around the average per capita GDP.

Figure 3. Convergence trend (1999-2008)
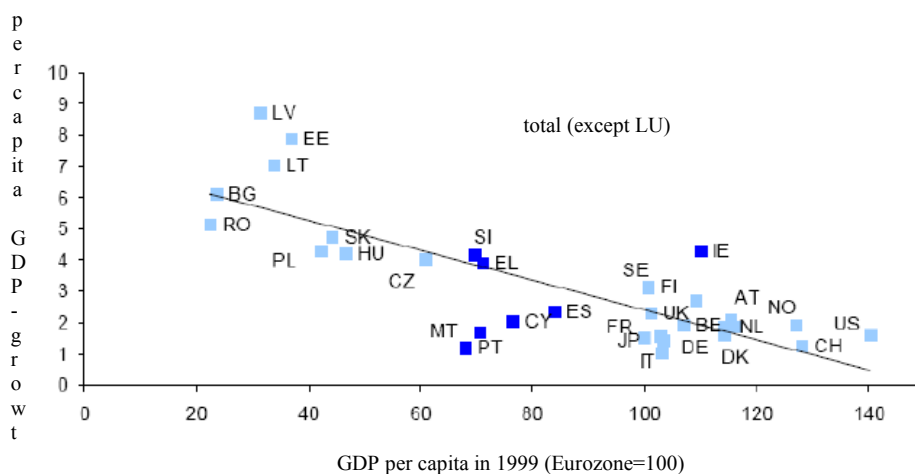
Source: European Commission, 2008a.

Figure 3 clearly emphasizes the disparities between the catch-up performances. Exceptional growth is recorded in the Baltic countries as well as in Ireland, and in the development of certain 'Nordic' Member States carrying out bold structural reforms (Sweden, Finland). Nonetheless, unfavourable dynamics are observed in Portugal, Malta and Cyprus, as well as in the larger continental Member States.

2.2. Quality of the catch-up and real convergence: sustainable convergence?

The faster growth in the NMSs after EU-accession was based mainly on *faster domestic demand growth*. (Table 2)

After the enlargement the dominant factors of the domestic demand growth were *private consumption* and the *gross fixed capital formation*. The government consumption growth was, however, somewhat more moderate. At the same time import usually grew to a greater extent than export in the NMSs.

The gross fixed capital formation increased also in the EU-15. As the dynamics of the private and public consumption growth mitigated in these counties the dominant demand-side factors of the economic growth were increasing investments and exports.

Among the NMSs the Baltic States had the highest economic growth in the half decade preceding the enlargement. In the years after enlargement (5 years) Slovakia became one of the countries with the most dynamic growth performance. The contribution of the domestic demand to the growth exceeded the annual average 6% in three countries (Bulgaria, Estonia, Latvia). In four other countries (Poland, Lithuania, Romania, Slovakia) the contribution of the domestic demand growth reached the indicated share after the accession. Before accession the net export contributed to the growth only in Cyprus, Poland and Slovenia, after accession the Czech Republic and Hungary could be added to the above mentioned group.

Table 2. GDP growth and its main demand factors

Annual average change as percentage (fixed prices)	New Member States		Old Member States	
	1999-2003	2004-2008	1999-2003	2004-2008
GDP	3,4	5,6	2,2	2,2
private consumption	4,0	5,5	2,5	1,7
public consumption	3,1	2,3	2,2	1,8
gross fixed capital formation	2,0	10,2	2,3	3,4
export	8,7	11,8	4,8	5,7
import	7,9	12,4	5,0	5,6
contribution to the GDP growth				
domestic demand	3,4	6,4	2,2	2,1
net export	0,0	-0,8	0,0	0,1

Source: European Commission, 2009a.

In the Baltic States and the new Balkan MSs the growth based on domestic demand was dominant. At the same time after accession in certain Central European Countries (Czech Republic, Hungary, Slovakia) the demand structure of growth was more rebalanced.

The output gap in the EU-27 in the period 2004-2008 reached 1,4% of the GDP. In the old MSs the positive output gap narrowed at the outset while the negative output gap in the new MSs switched to a great positive difference (over 3%)[6].

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[6]Own calculation, based on the database of the EPC Output Gap Working Group.

The catch-up process was partly based on exuberant demand. The process was financed through cheap credit. At the same time notable current account deficit arose in the countries concerned. The growth as a basis of catching up outpaced the supply potential of the economy.

This dynamics was not considered sustainable. In 2008 a strong growth correction was launched. The *real convergence prospects* have *deteriorated drastically* due to the global crisis and the accumulated macroeconomic equilibrium problems.

There has been a deep recession in the NMSs mostly as a consequence of the crisis. The national economic performances have declined significantly. In order to stimulate real convergence and the catch-up process' macroeconomic equilibrium, investments increasing the productivity and growth based on highly educated workforce are required. Precondition of the sustainable dynamism and the *sustainable convergence* is the simultaneous fulfilment of these criteria.

3. Longer term prospects of the real convergence. Divergence instead of convergence

Due to the severe structural productivity problems of the EU-15 and the insufficient adjustment to globalization a permanent and significant decline in the potential growth rate is to be expected (see European Commission (2006), Carone et al (2006) etc.). The unfavourable investment environment promotes a higher level of capital outflow and a notable increase in the share of imported products and services.

Applying the *production function* approach the longer-term simulations indicate that the potential growth rate both in the EU-15 and the EU-27 falls[7] (European Commission (2006), (2008b), (2009b)). This reduction will be continuous, moving from an annual 2,4% in 2004-2020 to an average 1,7% in 2021-2030 and then down to 1,3% in 2031-2060. *The decline in the potential rate of growth that is to be expected is far greater in the EU-10 and EU-12 countries than in the EU-15 states.* Output in the EU-12 between 2007 and 2030 will expand far more rapidly than in the EU-15 countries, i.e. the convergence process will continue. But as time passes the pace of convergence will slow down, and then stop after 2030. (Based on the simulations, annual GDP in the EU-10 will grow by only 0,6% in 2041-2060, compared to a figure of 1,5% for the EU-15 countries.[8] That is, there is a switch from convergence to divergence, see Table 3.)

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[7] In this section we used the quantitative analysis - based on the production functions - that was carried out for the European Commission. (See European Commission (2006), (2008b), (2009b); Carone et al (2006); Denis et al (2006).

[8] The average growth rate in the EU-12 is expected to be 2,6% in 2020, 1,8% in 2030, 1,2% in 2035, 0,8% in 2040, 0,6% in 2045 and 0,4% in 2050.

Table 3. Potential GDP growth rate (annual average as percentage)

	2007-2020	2021-2030	2031-2040	2041-2050	2051-2060	2007-2060
CZ	4,0	1,7	1,1	0,8	0,9	1,8
HU	2,9	2,1	1,5	0,9	0,9	1,7
PL	4,3	2,3	1,0	0,3	0,4	1,7
Sl	3,7	1,4	0,8	0,7	1,0	1,6
SK	5,3	2,3	0,9	0,3	0,4	2,0
RO	4,9	2,1	1,6	0,6	0,4	2,0
EU- 27	2,4	1,7	1,4	1,3	1,3	1,7
EU- 15	2,2	1,7	1,5	1,5	1,5	1,7
EU- 10	4,2	2,1	1,1	0,6	0,6	1,8

Source: Authors' compilation based on European Commission, 2008b.

In the EU-12 countries, *demographic developments*[9] are likely to be a particularly important factor in the decline of the potential growth rate. According to the forecasts the *labour input* might grow until 2010. Afterwards the working age population is expected to decline significantly, in the long run by about one third. In the EU-12 the working age population will decrease by 37% according to the forecast. It will be an important factor in the decrease of the potential growth rate.

The increases in productivity per worker are converging between the EU-15 and EU-10 countries. In the long run one is likely to see an average productivity growth rate of 1,7%, which - in the case of the EU-12 - constitutes a substantial slowdown of more than 50% over approximately three decades. (Table 4)

The majority of productivity growth per worker is attributable to total factor productivity (TFP). In the long run, the increase in TFP will be followed by capital deepening. According to an analysis of long-term development, total factor productivity growth may converge between the EU-15 and EU-12 countries at an annual rate of 1,1%. This enables a 1,7% increase in labour productivity per year, which in the long run will also converge between Member States (European Commission (2008b): 101).

In the EU-15 the contribution of *capital deepening* to the productivity growth will be average averagely 0,6% of the GDP in the long run. In the case of the EU-12 countries this contribution between 2004 and 2020 will be roughly 1,6% each year. This high rate is one of the indicators of convergence. Later on such contribution will gradually fall to 0,6%, the level of long-term growth in the EU-15. Based on these developments, productivity per worker in the countries of the EU-10 will rise to 83% of the level recorded in the EU-15 states by 2050.

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[9]These developments are discussed in detail by the „Ageing Report". European Commission, (2009b).

Table 4. Labour productivity (annual average growth rate as percentage)

	2007-2020	2021-2030	2031-2040	2041-2050	2051-2060	2007-2060
CZ	3,6	2,2	1,7	1,7	1,7	2,2
HU	2,8	2,6	2,3	1,9	1,7	2,3
PL	3,4	2,8	1,9	1,7	1,7	2,4
Sl	3,4	2,3	1,7	1,7	1,7	2,2
SK	4,5	2,9	1,9	1,7	1,7	2,6
RO	4,6	3,0	2,7	2,0	1,7	2,9
EU-27	1,9	2,0	1,8	1,7	1,7	1,8
EU-15	1,6	1,8	1,7	1,7	1,7	1,7
EU-10	3,4	2,7	1,9	1,7	1,7	2,4

Source: Authors' compilation based on European Commission, 2008b.

Note: labour productivity per hour.

Changes in total factor productivity are of crucial importance both in terms of long-term economic growth and convergence. In comparison to the annual average over several decades indicated above (1,1%) the growth of total factor productivity in most countries of the EU-15 has fallen since 1990 and grown by only 0,8% each year. *If we base our projections on this slower growth, then the long-term growth prospects are substantially worse than those presented in the baseline scenario.*

The decrease in the per capita GDP growth rate is more moderate than the decline in the dynamics of total output in the period studied, as the EU population is diminishing in the long term.

GDP per capita in the EU-10 and EU-12 countries compared to the EU-15 shall catch up significantly in the coming two decades. Later the convergence may come to a halt, and by the end of the period under review the GDP per capita in the EU-10 and EU-12 countries may fall somewhat compared to the EU-15. The estimated dynamics

of per capita GDP are based on the productivity growth of the country-group concerned.

Besides these tendencies the *growth rate might differ country by country*. It can be explained – especially in the first half of the period examined – through the different productivity dynamics of the countries. (A major factor of that is considered the catch-up potential of the countries.) In the second half of this period the development of demographic factors and labour input will be of great importance. (The projection assumes the convergence of the productivity dynamics in the longer run.)

Besides the declining potential of the GDP growth rate the growth sources are changing dynamically. The labour factor will contribute to the potential growth positively until 2020 afterwards this impact will become significantly negative. The productivity growth is determinant at the outset, later on it becomes, however, the exclusive source of growth.

According to the scenarios based on the production function, the *per capita GDP* calculated in PPS has been growing at the greatest pace in MSs with the lowest GDP (Bulgaria and Romania). (It is more than three and half times higher than it was in 2007.) The simulation shows a high dynamics also in the case of the Baltic States. Among the new MSs Estonia and Cyprus were expected to catch-up totally to the average per capita GDP (in PPS) of the EU-27. Slovenia and Slovakia are expected to exceed and the Czech Republic is expected to approach the EU-27 average. Later on, however, the indicator will drop below this average in all three MSs. By the end of the period examined it will reach only 92-94% of the EU average.

The per capita GDP of Latvia, Lithuania and Malta will reach 86-90% of the EU-27 average from 2030 onwards, but later on it will decline to 77-83% of the average. Hungary, Poland and Portugal – the latter not among those countries which have joined the EU in the recent accession rounds - are expected to be found at this level, in the 'convergence club'.

In the case of Hungary the per capita GDP will reach its relatively highest level in 2045 (79,6% of the EU-27 average), in the coming one and half decade this rate will decline by about 3%. In Poland the highest rate (74%) might be reached in 2035, and during the one and half decade afterwards it might drop to 66%.

At the end of the period examined Bulgaria and Romania will reach 59-62% of the EU-27 average even despite the significant catch up.

Consequently the full convergence of the income level calculated in PPS might be taken into account in only 2 smaller MSs also in the long run. The main scenario implies *persistent disparity in income*, the *potential development of the 'convergence clubs'* with 90%, 70-80%, 59-62% of the EU-27 average in the long run (Table 5 and Table 6).

Table 5. Per capita GDP in the cohesion countries in the long run (in PPS)

GDP in PPS 2007=100	2007	2015	2020	2030	2040	2050	2060
BG	100	144,4	168,7	217,5	272,8	312,9	358,0
CZ	100	133,6	152,8	182,6	208,3	233,0	266,9
EE	100	145,2	166,5	209,0	259,3	279,6	332,4
IE	100	113,1	124,2	146,7	171,1	191,2	218,1
EL	100	123,9	139,7	167,4	187,4	212,3	249,1
ES	100	113,6	128,3	158,4	178,3	195,5	229,5
CY	100	119,1	129,2	161,3	190,6	215,0	256,4
LV	100	151,3	170,7	227,1	265,2	284,5	317,5
LT	100	150,9	179,9	222,1	259,2	291,0	322,5
HU	100	127,7	146,3	183,7	219,6	248,9	285,2
MT	100	122,2	140,7	172,2	198,1	218,5	238,9
PL	100	139,0	159,2	205,7	239,1	261,6	290,1
PT	100	113,0	122,8	148,8	181,0	211,8	243,7
RO	100	150,7	179,4	229,3	281,2	316,0	353,8
Sl	100	126,5	145,0	175,5	189,3	214,6	249,1
SK	100	151,8	182,1	232,6	264,1	283,4	319,9
EU-27	100	117,7	129,3	152,0	174,9	201,2	234,3
EA-16	100	114,8	125,8	146,0	165,9	190,0	222,3

Note: own calculation based on the quantitative analysis of the Ageing Report.

Table 6. Development of the level of per capita GDP in the cohesion countries in the long run (in PPS)

GDP in PPS EU27=100	2007	2015	2020	2030	2040	2050	2060
BG	38,3	47,0	50,0	54,8	59,7	59,6	58,5
CZ	81,5	92,5	96,2	97,9	97,0	94,3	92,8
EE	72,2	89,0	92,9	99,3	107,0	100,3	102,4
IE	146,4	140,7	140,6	141,3	143,2	139,1	136,2
EL	98,0	103,2	105,8	107,9	104,9	103,4	104,2
ES	106,9	103,1	106,0	111,4	108,9	103,8	104,7
CY	92,7	93,8	92,7	98,4	101,0	99,1	101,5
LV	58,1	74,7	76,7	86,8	88,0	82,1	78,7
LT	60,5	77,5	84,1	88,4	89,6	87,5	83,3
HU	63,3	68,7	71,6	76,5	79,5	78,3	77,1
MT	77,0	80,0	83,8	87,3	87,2	83,7	78,5
PL	53,6	63,3	66,0	72,6	73,3	69,7	66,4
PT	74,6	71,6	70,8	73,1	77,2	78,5	77,6
RO	40,7	52,2	56,5	61,4	65,5	64,0	61,5
Sl	88,7	95,4	99,4	102,5	96,0	94,6	94,3
SK	68,5	88,4	96,5	104,9	103,5	96,6	93,6
EU-27	100,0	100,0	100,0	100,0	100,0	100,0	100,0
EA-16	110,1	107,4	107,0	105,8	104,4	104,0	104,4

Note: own calculation based on the quantitative analysis of the Ageing Report.

Summarizing: according to the simulations the annual potential growth rate of 2,4% in the EU-27 in 2007-2020 is expected to decrease to 1,3% after 2040. In the new MSs the potential growth rate will decline at a greater pace, thus the real convergence will stop from *2030 onwards and even a moderate divergence from the EU-15 might occur*. It can be explained by the following factors: on the one hand the productivity growth rate might be rebalanced by 2050, on the other hand the demographic forecast are significantly more unfavourable in the NMSs than in the old ones. Nota bene: labour productivity and employment depend on several factors and the simulation took the most likely scenario as a basis.

4. Crisis, potential growth, prospects

4.1 Growing risks, slowing growth, convergence-crisis

The financial and economic crisis started in 2008 caused an extraordinarily rapid decline in the economic performances. The slow-down has gradually become a global recession. This hit especially the USA and the EU. *New risks* have emerged, which will burden the economic activities in the future, too. The recovery of the economy is expected to be drawn out.

It is a real risk that *weak potential growth performance and slow recovery can be expected in that prolonged period*. The following main reasons explain that:

Fundamental lack of confidence which leads to the postponement of household consumption and effective entrepreneurial investments.

Real economy effects of balance sheet adjustment in the financial sector; downsizing of banks' assets including writing off 'impaired' or 'toxic' assets, *increases the cost of capital* also despite large recapitalisation packages;

Pervasive credit constraints and *higher borrowing costs* in the non-financial sector simultaneously with the restructuring of banks; (in the EU deleveraging needs for households are generally lower than in the US, but firms are more heavily indebted there. At the same time the persistent credit squeeze was one of the key factors of the relative Japanese slump recorded in the last two decades);

A persistent impact on the EU's growth potential might occur if *an attitude to risk and a higher cost of capital dominates*;

Slower growth in TFP in the short and medium terms, induced by the reduction in ICT and knowledge-based investment such as R&D. The postponement of key innovation-prone investments may have a lasting effect on productivity and growth;

Permanent destruction in human capital due to an increase in structural unemployment rate (NAIRU) induced by a protracted recession. (This permanent negative effect in terms of 'knowhow' or professional knowledge is often called 'hysteresis' effect (See Blanchard and Summers, 1989);

The collapse of world trade and the drastic fall in import demand pose risks for a *higher degree of protectionism*. (European Commission, 2009b)

Taking all these risks and threats into account *more negative growth prospects* can be observed than it was outlined previously (section 3).

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This is confirmed also by the mid-term simulations.[10] In 2009-2010 the potential growth rate will decrease to about half of the level which was reached during the previous years (to an annual 0,7-0,8%. From 2011 onwards it will increase again to an annual level of 1,5%. The countries which have joined the EU lately, however, have been facing a persistent and continuous decrease in potential growth. The impact of the crisis is shown through the development of capital accumulation and Total Factor Productivity. (Figure 4)

*Figure 4. Potential growth in the new MSs (annual change, %)*
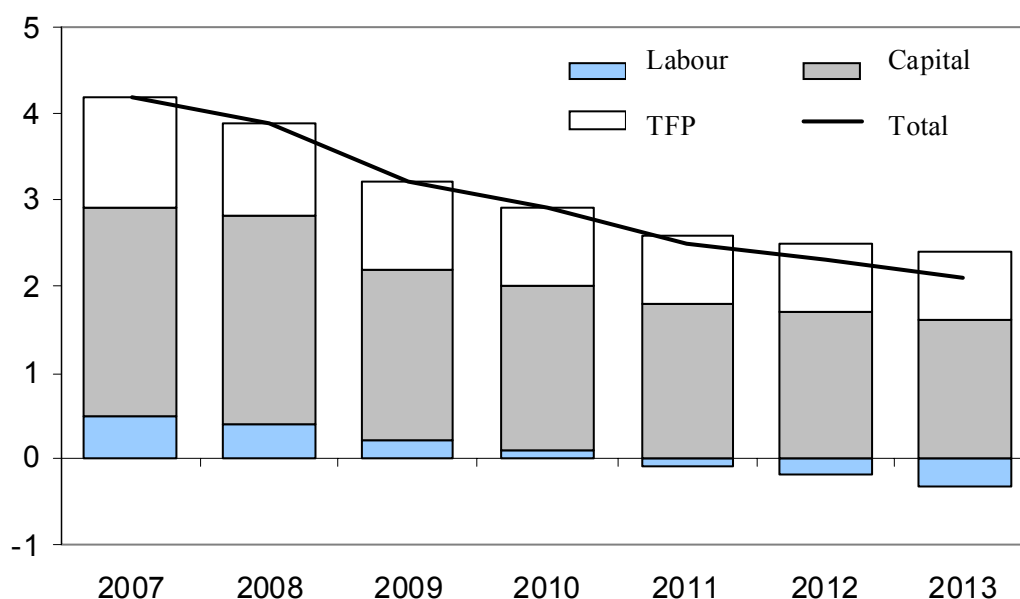
Source: based on the database of the EPC Output Gap Working Group.

The decrease in the dynamics of the potential output to be predicted for the coming years in certain EU-Member States is considered to be dramatic (See Figure 5). The potential output growth in the Baltic States will drop from an annual 5-6% to about 1-2%. In Hungary the annual dynamics of 3-4% might fall below 1% per year. In certain new MSs the real convergence might stop also in the short run and it might even come to a divergence compared to the more developed countries. This *convergence-crisis* might cause severe tensions both in the MSs affected and the EU as a whole during the indicated mid-term.

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[10]The analysis is based on the database calculated according to the production function methodology of the EPC Output Gap Working Group.

Figure 5. Potential growth in the EU Member States
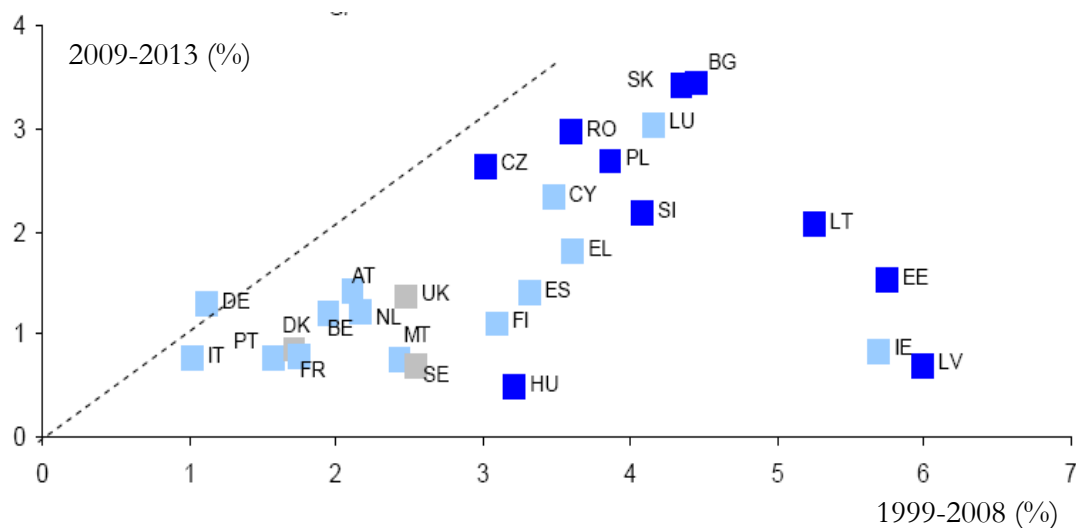
Source: based on the database of the EPC Output Gap Working Group and the AMECO database.

5. Financial crisis, potential growth, shock-scenarios

The financial crisis causes lower contribution of labour and capital formation to the growth and results in unfavourable TPF. *The longer-term* labour market trends (e.g. the unfavourable dynamics of the working age population) affect negatively the potential growth rate. The recession intensifies these negative impacts.

The mid-term simulations based on the production functions indicate the increase in structural unemployment. *According to the simulations 1% increase in the Non-Accelerating Inflation Rate of Unemployment (NAIRU) results in a decrease of 0,6% in the potential growth rate* (European Commission (2009a)).

Due to the financial disturbances the investment trends deteriorate severely. *A decline of 2-3% expressed as a percentage of the GDP decreases the potential growth rate by further 0,2-0,3% in the countries concerned.*

As a result of the unfavourable effects the contribution of the *TFP* to growth declines by about 0,1% a year. The TPF-assumptions are conservative: these assumptions don't take into account the one-off downward change to be expected in the TPF level and the development of the potential output related to the structural change in a sector. The performance of certain sectors e.g. financial services, car production etc. is likely to decline due to the crisis.

Empirically it is to be proved, that a *financial crisis might coexist with drawn-out or permanent output decline.* According to empirical researches a significant decrease in the potential growth rate was to be observed together with the extended bank and financial crisis (Cerra, Saxena et al. (2008), Haugh et al. (2009)). According to experiences gained in certain countries (Japan, Finland, Sweden) at the beginning of the 1990s, the financial shock causes a significant decline in the potential growth rate. This process is led by *permanent increase in unemployment and fall in the investment rate.*

Factors of downward pressure on investments:

- increase in risk premia calculated for entrepreneurial and household credits;

- correction towards the 'normal' rate of the investment level, which evolves following the excessive investment rate of the boom period (generated by the financial and housing bubbles).

Simulations carried out using the Quest model (see Ratto – Roeger – in't Veld (2008)) confirm the negative effects of the adjustment disturbances on the labour and product markets, the *nominal stiffness and the higher structural unemployment* on potential growth. The simulations show the function failure of the labour market, they show that there is no nominal wage adjustment after the crisis. This nominal stiffness might result in the decrease in employment and the increase in structural unemployment.

In order to calculate the impact of the current crisis, alternative scenarios need to be set up. In view of the large uncertainty regarding the length of the slump in economic activity the case of the temporary shock and the case of the permanent shock needs to be defined.

Two temporary shock scenarios can be described: a *'lost decade'* and a *'rebound'* *scenario*. These scenarios consider potential growth i.e. they are based on the supply-side factors. They do not take into account the actual growth, or those that are affected by business cycles.[11] Those figures are much lower than the baseline projection for the period until 2013. Therefore the annual potential GDP growth in the EU-27 included in the latest analysis carried out by the European Commission is lower by around -0,9% in both scenarios than in the baseline scenario.

The potential growth components will then converge to reach the growth rate projected in the baseline:

- in the *'lost decade'* scenario, labour productivity is assumed to reach the baseline growth rate in 2020. Labour input is assumed to reach the baseline growth rate in 2020, too.

- in the *'rebound'* scenario, labour productivity and labour input are expected to reach the baseline level in 2020.

Given the current economic crisis and a very considerable degree of uncertainty, the impact of a permanently worse situation of the growth potential can also be analysed. This is the *'permanent shock'* scenario.[12]

According to the permanent shock scenario from 2014 to 2020 the labour productivity growth and labour input growth will reach the baseline figures, but the unemployment rate will be permanently 1% higher than in the baseline from 2020

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[11]In the short term, the projections are based upon the Forecast carried out by the European Commission in January 2009 up to 2010, in the medium term the projections are extended until 2013 with the EPC Output Gap Working Group method that extrapolates the trends for the components of potential GDP.

[12]It requires sensitivity scenarios embedded in the long-term projection exercise.

onwards; and the labour productivity growth rate will be 0,25% lower than that from 2020 onwards.

The *'lost decade scenario'* causes a reduction in the per-capita GDP level by the end of the period examined compared with the baseline. It implies *a lower expected potential growth* up to 2020. This period is 'lost' in terms of accumulated wealth creation. The loss in GDP per capita in the EU-27 is around 8% in 2020. This scenario carries over the loss in the rest of the projection period. The growth projection remains broadly unchanged between 2020 and 2060. In the *'rebound' scenario*, the GDP per capita by 2060 is the same as in the baseline (the deterioration relative to the baseline up to 2014 is offset by the improvement between 2015 and 2020) (European Commission, 2009b).

A more marked reduction in the GDP per capita level occurs in the 'permanent shock' scenario. (The difference of this scenario from the baseline outlined in section 3 – expressed as annual average GDP growth rate – is indicated in table 7). In that case the GDP per capita is 10% lower than in the baseline in 2020, 14% lower in 2040 and 18% lower in 2060. It means that this scenario reflects significantly lower growth throughout the projection period than it was assumed before. (The growth path of the different variables is summarized in Figure 6.)

Table 7. Potential growth loss in the 'permanent shock' scenario - Annual average GDP growth rate, negative difference from the baseline

	2007-2010	2011-2020	2021-2040	2041-2060	2007-2060
BG	0,1	0,4	0,3	0,2	0,3
CZ	0,4	0,2	0,3	0,2	0,2
EE	2,4	1,5	0,3	0,2	0,6
LV	3,6	1,6	0,3	0,2	0,7
LT	2,3	1,8	0,3	0,2	0,7
HU	1,6	1,6	0,3	0,2	0,6
PL	0,9	1,0	0,2	0,2	0,4
RO	1,2	1,2	0,3	0,2	0,5
Sl	0,2	0,0	0,3	0,2	0,2
SK	0,6	0,1	0,3	0,2	0,2
EA	0,7	0,7	0,2	0,2	0,4
EU-27	0,8	0,7	0,2	0,2	0,4
EU-10	1,0	0,8	0,3	0,2	0,4
EU-25	0,7	0,7	0,2	0,2	0,4

Source: Authors' compilation based on the database of the Ageing Report, European Commission (2009b).

Note: Discussed in section 3.

Figure 6. Potential GDP growth under different shocks (annual growth rate)
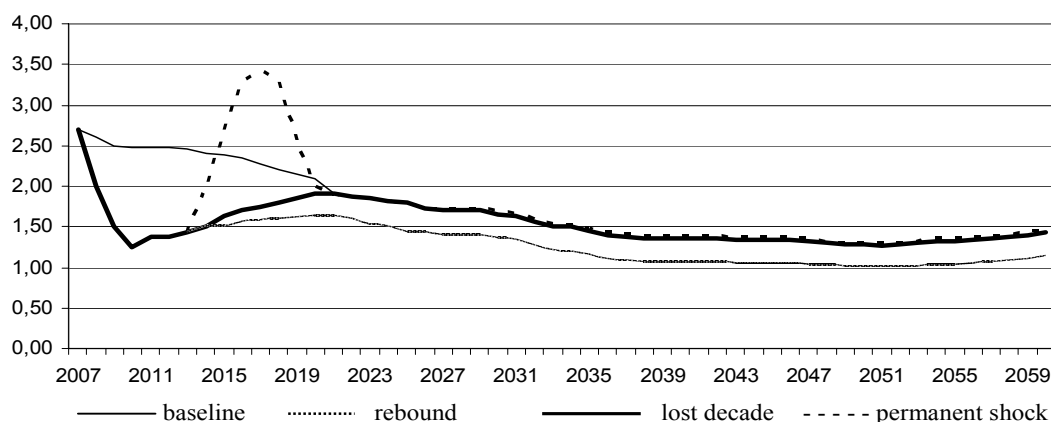
Source: European Commission, 2009b.

The permanent shocks would result in the complete collapse of the growth and catch-up models in Europe. In the long term one fifth of the GDP would fall out and the chances of real convergence would deteriorate dramatically, though differently country by country.

6. Some conclusions

1) An 'overshooting' of the real exchange rate may hinder the achievement of fast and sustainable nominal convergence. In the coming years painful macroeconomic corrections could be required due to increasing deficit. The credit growth has slowed down under the circumstances of the global crisis. The financing conditions have become worse in those countries where high external and internal deficit has developed and the foreign currency lending was significant. *The simultaneous sustainability of the nominal and real convergence is of great importance.* On the one hand a well-balanced macroeconomic policy-mix, responsible wage policy and strong financial supervision are required. On the other hand the flexible domestic production factors and product markets favour the smooth adjustment to economic and financial shocks. In the case of the lack of certain conditions (e.g. nominal stiffness) economic growth might stay for a longer period at a low level. Consequently real convergence might stop and even change direction.

2) The fulfilment of the nominal convergence criteria per se is not enough to ensure a robust long term economic performance in the monetary union. Therefore, the promotion of fiscal and structural policies is required also in the course of the euro-adoption. (Together with compliance with rules of the Stability and Growth Pact (SGP)). As basic condition for *real economic convergence* the structure of the economies has to become similar. This process might be promoted also by transfers of the cohesion policy. This way the risk of asymmetric shocks among certain economies might be mitigated, the synchronization of business cycles might be strengthened, and the Eurozone might get closer to the fulfilment of the criteria of the optimum currency area.

3)   *Catch-up and convergence is based on economic growth.* At the same time - in relation with challenges of globalisation and competitiveness problems of the European Union's economy - the current average annual rate of *potential growth in the European Union of 2,4% could fall to half this level on average in the coming decades.* The potential growth rate will be cut in half, despite the prognosis containing relatively benign development in labour productivity. This may also indicate adverse demographic changes. Since accession the new Member States have been following transition paths leading to substantial convergence. Yet *the pace of this catch up will dwindle over time and may eventually stop.* The growth in these countries might be more moderate in three decades than the average of the EU-15 at that time. It is possible that the convergence of the new Member States will reach around three-quarters of the per capita GDP level of the EU-15, i.e. after the rapid initial convergence *the EU-10 countries will increasingly constitute a stagnating 'convergence club'.*

4)   The present global crisis resulted in the deepest recession we have seen since WWII. New risks appeared. The new MSs have been experiencing a continuous fall in potential growth since 2008. The potential decrease in the dynamics of the potential growth in the medium term is of dramatic size in certain new MSs. In these countries *real convergence might stop in the short run and it might even come to a divergence.* We call it *'convergence crisis'.*

5)   The risk of shock repetition is high. These changes project *further erosion of the growth potential in Europe.* That is: due to the crisis and its potential long-term impacts there might be scenarios which are more unfavourable than those indicating decreasing potential growth in the previous point. *The trajectory of the permanent shocks threatens with the complete collapse of the European growth and catch-up model.*

6)   The above mentioned projections assume that there are no changes in the policies of the EU member states. Comprehensive, integrated structural reforms *(Lisbon-type reforms)* could provide an opportunity to overcome these adverse developments and achieve *higher growth than above and enlarge the Economic and Monetary Union.* Consistently implementing these reforms will facilitate a renewal of the European model and thus a better outcome to convergence processes. Fulfilment of the set goals depends to a not insignificant extent on convergence within Europe. The more developed EU Member States took the Lisbon process as their own from the very beginning. But the new EU members are very important factors in this framework. *The successful convergence of the new Member States which implies far-reaching reforms is a major prerequisite to the successful development of European integration.*

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