DETERMINANTS OF GROWTH IN THE EU MEMBER STATES OF CENTRAL AND EASTERN EUROPE[1]

After the recession following the collapse of the centrally planned economies at the beginning of the 1990s, the countries in central and eastern Europe embarked on a path of economic transformation and rapid growth. The buoyant expansion was underpinned by structural and institutional reforms, macroeconomic stabilisation, the prospect of EU membership and actual accession to the EU in May 2004 and January 2007. These developments give rise to many important questions regarding current economic conditions in the central and eastern European (CEE) countries and the ensuing growth prospects. The purpose of this article is to review the main drivers of growth in the CEE countries, i.e. the EU Member States of that region, and to assess the key challenges faced by these countries in making progress with convergence in the years ahead.

The article finds that, in order to ensure sustainable economic growth in the CEE countries, it is crucial for these economies to take appropriate policy action in several areas. In particular, sound macroeconomic policies, including a credible monetary policy and an adequate fiscal policy, are essential to ensure appropriate fundamentals for further sustainable growth and convergence. In addition, there appears to be a need for them to address their structural labour market problems. In this context, enhancing labour participation and reducing regional and skill mismatches are of particular importance. Finally, further efforts to improve the attractiveness of the business environment and investment in human capital appear to be crucial for any faster catching-up.

1 INTRODUCTION

At the beginning of the 1990s, most CEE countries entered a new political and economic era. Since the beginning of this transformation process, they have sought to become members of the EU. The Czech Republic, Estonia, Latvia, Lithuania, Hungary, Poland, Slovenia and Slovakia achieved this goal in May 2004, followed by Bulgaria and Romania in January 2007.[2] Since then, several of these CEE countries have joined the exchange rate mechanism II (ERM II), namely Estonia, Lithuania, Latvia, Slovenia and Slovakia, with Slovenia adopting the euro on 1 January 2007.

There is no doubt that the CEE countries involved have come a long way since the late 1980s, but this is by no means the end of their process of "transition." Many challenges still lie ahead and the real convergence process, defined here as the convergence of the level of per capita income in these CEE countries to the euro area average, is far from complete.[3] Although living standards in the CEE countries have improved considerably since the beginning of the transition period, the gap between their per capita income and the euro area average still remains significant.

A natural framework for many long-term analyses of economic growth is the traditional production function approach that links output to the accumulation of labour and capital, and to technological progress. This approach, which also forms the analytical basis for the article, helps to distinguish the main components of growth. Against this background, the article focuses on aspects related to labour market performance, capital investment and human capital.

With regard to other important determinants of growth, cross-country studies suggest that stable macroeconomic fundamentals and financial sector development have a positive influence on long-term growth. It has been found that overly large governments, often

1 The article is based on O. Arratibel, F. Heinz, R. Martin, M. Przybyla, L. Rawdanowicz, R. Serafini and T. Zumer, "Determinants of growth in the central and eastern European EU Member States – a production function approach", ECB Occasional Paper No 61, April 2007.

2 Cyprus and Malta are not covered in this article since they did not undergo a transition process, which makes them less comparable with the CEE countries.

3 There are also other possible definitions of real convergence, such as the convergence of the sectoral structure of different economies or the international convergence of institutions and legal framework conditions. However, the convergence of per capita income levels is the most frequently used definition of the term "real convergence" in economic literature.

represented by sizable total expenditure-to-GDP ratios, may have a negative impact on output growth by distorting the efficiency of resource allocation. In this context, it is important to note that the total expenditure ratios are above 40% in a number of the CEE countries involved (e.g. the Czech Republic, Latvia, Hungary, Poland and Slovenia), which is relatively high in relation to countries at comparable levels of development. In addition, four of these CEE countries (the Czech Republic, Hungary, Poland and Slovakia) are still in excessive deficit. Where the development of the financial sector is concerned, a broad consensus in the literature suggests that a deepening of the financial market is linked to growth through the promotion of capital accumulation and through a positive impact on the pace of productivity growth.

The remainder of the article is organised as follows. Section 2 gives a short overview of the output growth and real convergence experienced by the EU Member States of central and eastern Europe since the mid-1990s and looks at the contributions of labour, capital and total factor productivity to the growth in income per capita. This provides a general background for the more detailed analyses of recent labour market and investment developments in Sections 3 and 4. Section 5 summarises the main findings and identifies key challenges for the CEE countries with regard to their further real convergence process.

2 PROGRESS WITH REAL CONVERGENCE

Following the abrupt end of the centrally planned systems in central and eastern Europe in the late 1980s, output collapsed in most CEE countries. Although data for the first half of the 1990s are mostly unreliable and should be treated with great caution, Table 1 indicates that output losses in these countries between 1991 and 1995 differed significantly and were largest in the Baltic States (Estonia, Latvia and Lithuania).

Since 1996 real GDP growth has resumed in almost all countries, reflecting progress in macroeconomic stabilisation and the implementation of a wide range of structural and institutional reforms.[4] Bulgaria and Romania are notable exceptions, due to the fact

4 The high growth rates also reflect a "base effect" caused by the large initial drop in output.

Table 1 Real GDP growth rates

(annual average percentages)

	1991-1995	1996-2000	2001-2005
Bulgaria	-2.6	-0.8	5.0
Czech Republik	-1.0	1.5	3.3
Estonia	-6.2	5.6	7.3
Latvia	-11.8	5.4	7.8
Lithuania	-10.0	4.2	7.7
Hungary	-2.4	4.0	4.1
Poland	2.2	5.1	2.9
Romania	-2.1	-1.3	5.9
Slovenia	-0.6	4.4	3.4
Slovakia	-1.7	3.7	4.8
CEE countries	-1.0	3.5	3.9
Euro area	1.5	2.8	1.5

Source: ECB staff calculations based on the Total Economy Database of the Groningen Growth and Development Centre (GGDC), May 2006.

Table 2 GDP per capita in terms of purchasing power parity

(euro area = 100)

	1995	2000	2005	2005-1995[1)]
Bulgaria	27.8	24.8	31.3	3.5
Czech Republic	63.6	60.6	67.3	3.7
Estonia	29.8	35.9	49.7	19.9
Latvia	25.7	30.8	43.8	18.1
Lithuania	30.4	33.3	46.1	15.7
Hungary	46.6	50.8	59.2	12.6
Poland	36.6	41.4	45.1	8.5
Romania	29.0	24.2	30.3	1.3
Slovenia	64.0	69.5	77.1	13.1
Slovakia	42.0	44.1	52.1	10.0
CEE countries	38.1	39.3	45.5	7.4

Source: ECB staff calculations based on the GGDC Total Economy Database, May 2006.
1) Change in percentage points.

that deep structural changes associated with the transition process occurred later than in the other CEE countries. In the period from 1996 to 2000, output growth was particularly strong in Estonia, Latvia, Lithuania, Poland and Slovenia, and slightly less strong in Hungary and Slovakia. The slowest pace of recovery was recorded in the Czech Republic, largely on account of the recession that followed the financial crisis of 1997. In the subsequent period from 2001 to 2005, real GDP growth accelerated further in all CEE countries, except Poland and Slovenia which, nonetheless, continued to register higher growth rates than the euro area.

The relatively strong growth performance in the CEE countries relative to the euro area also led to some progress in real convergence.

While the levels of per capita income in all CEE countries have increased relative to the euro area over the past decade, they were – on average in terms of purchasing power parity (PPP) – still below half the euro area level in 2005 (see Table 2), although there were some major differences from country to country. In that year, the level of income per capita in Slovenia was around 77% of the euro area average, while that in Bulgaria and Romania stood at around 30%. In addition, the pace of convergence in per capita income levels differs widely across countries. While the Baltic States have made remarkable progress regarding real convergence with the euro area in the past decade, per capita income levels in Romania in 2005 were only slightly higher than ten years ago. With the exception of Bulgaria and Romania, the countries with the lowest income levels in 1995 recorded the highest output growth rates in the following ten years (see Table 1).

ANALYSIS OF REAL CONVERGENCE PATTERNS

As pointed out above, the CEE countries are still characterised by quite large gaps vis-à-vis the euro area with respect to their GDP per capita levels. In order to gain a better insight into the nature of these gaps, this sub-section looks into differences between the CEE countries and the euro area in labour utilisation and productivity.[5]

As can be seen from Chart 1, all CEE countries improved their relative labour productivity vis-à-vis the euro area between 1995 and 2005, although the gap still remains quite significant.

Labour utilisation, defined as the proportion of the total population that is in employment, was significantly lower in Lithuania, Hungary, Poland, Romania and Slovakia in 2005 than in the euro area (see Chart 2). It is worth noting that, since 1995, overall labour utilisation has declined in most CEE countries except Bulgaria, Latvia, Hungary and Slovenia. But even in the latter countries, the increase in labour utilisation was very small, and labour utilisation in Hungary is still very low.

As regards average hours worked, people in employment in most CEE countries (especially in the Baltic States) appear to work far longer

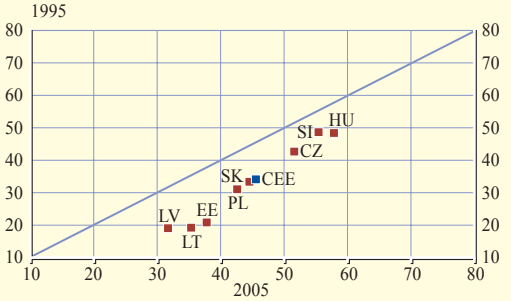
5 More specifically, GDP per capita is decomposed according to the following formula:

$$\frac{GDP}{POP} = \underbrace{\frac{EMP}{POP}}_{\substack{\text{labour}\\ \text{utilisation}}} * \underbrace{\frac{GDP}{EMP}}_{\substack{\text{labour}\\ \text{productivity}\\ \text{per worker}}} = \underbrace{\frac{EMP}{POP}}_{\substack{\text{labour}\\ \text{utilisation}\\ \text{(hours worked)}}} * \frac{THW}{EMP} * \underbrace{\frac{GDP}{THW}}_{\substack{\text{labour}\\ \text{productivity}\\ \text{per hour}}}$$

where *GDP* is the gross domestic product, *POP* the population, *EMP* total employment and *THW* total hours worked.

Chart 1 Relative labour productivity levels per hour worked

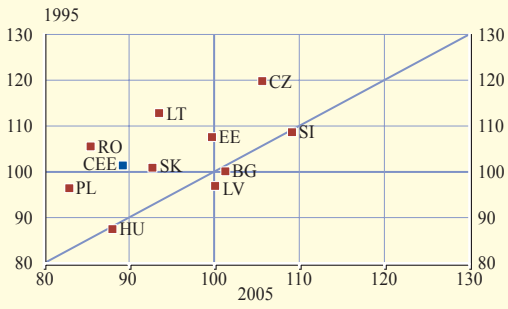
(euro area = 100)



Source: ECB staff calculations based on the GGDC Total Economy Database, May 2006.
Note: No data are available for Bulgaria and Romania.

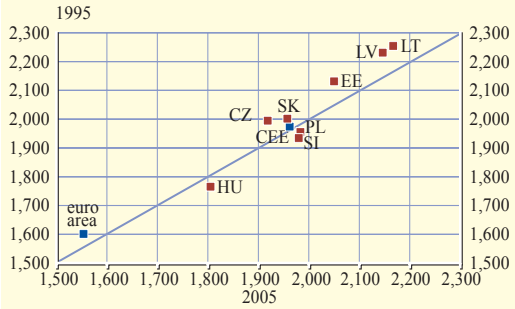
Chart 2 Labour utilisation

(euro area = 100)



Source: ECB staff calculations based on the GGDC Total Economy Database, May 2006.
Note: Labour utilisation is defined as the ratio of total employment to the total population.

Chart 3 Average annual hours worked per person employed



Source: ECB staff calculations based on the GGDC Total Economy Database, May 2006.
Note: The CEE aggregate does not include Bulgaria and Romania due to data limitations.

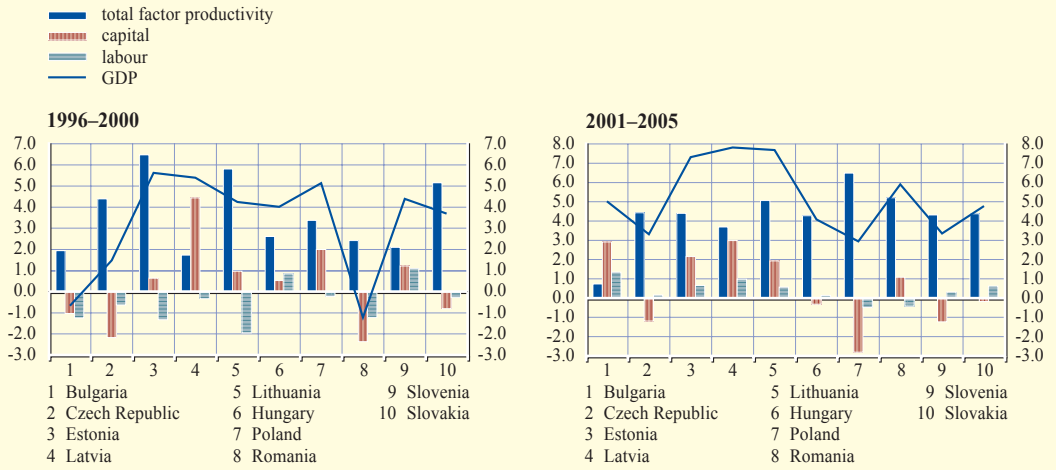
hours than those in the euro area (see Chart 3). This is likely to reflect differences in product and labour market regulations (for example, shops in the CEE countries are open longer than in the euro area; differences in the standard working week or relatively high non-wage labour costs in the CEE countries work in favour of having fewer employees who work longer hours), diverging preferences with respect to work and leisure, and a relatively smaller share of part-time arrangements in the CEE countries than in the euro area.

In addition to the analysis of the differences in the levels of GDP per capita in the CEE countries and in the euro area, it is useful to investigate the changes in GDP per capita. As population figures in most countries have been relatively stable over the past decade, changes in GDP per capita can be approximated by real GDP growth.[6]

6 Average growth in real GDP and real GDP per capita is almost identical for most of the CEE countries. The exceptions are Bulgaria, Estonia and Latvia, where due to a decline in the population, growth in real GDP per capita is significantly higher than growth in real GDP.

Chart 4 Contribution of total factor productivity, capital and labour to average GDP growth

(annual percentage changes; percentage points)



Source: ECB staff calculations based on the GGDC Total Economy Database, May 2006.
Note: Capital stock estimated using the perpetual inventory method (see O. Arratibel et al., "Determinants of growth in the central and eastern European EU Member States – a production function approach").

Between 1996 and 2005, rising total factor productivity (TFP) made a very significant contribution to GDP growth in all CEE countries, with the exception of Latvia in the period from 1996 to 2000 and Bulgaria in that from 2001 to 2005 (Chart 4).[7] However, the exact magnitude of the TFP contribution may be overestimated – to the extent that capital and labour are underestimated (for instance, due to the assumed high depreciation rate or unrecorded employment). The transition process – involving privatisation, restructuring, higher competition, deregulation in product and labour markets, opening-up markets to international trade, foreign direct investment (FDI) inflows, transfers of technology, etc. – necessitated a more efficient use of production inputs and better managerial practices, both of which are captured by TFP. At the same time, for most of the CEE countries, the contribution of labour to real GDP growth was very modest or even negative, which to some extent reflects the process of economic restructuring.[8]

3 LABOUR MARKET DEVELOPMENTS

This section first reviews labour market developments and then looks at the issue of skill mismatches in the CEE countries. Looking at the labour market performance over the period from 1997 to 2006, the picture is rather mixed. The employment rate declined in the Czech Republic, Poland, Romania and Slovakia (see Table 3). This decline was also associated with an increase in the unemployment rate and falling labour participation rates. Some other CEE countries such as Hungary, Slovenia and the Baltic States, by contrast, experienced a more encouraging labour market performance, with employment rates rising and unemployment rates declining continuously since 1997. Labour participation rates increased in Hungary and Slovenia, in particular. Focusing on more recent developments, most CEE countries experienced notable improvements in their labour markets. The employment rates increased in all CEE countries in 2006 and, with the exception of Hungary and Slovenia, all countries recorded decreases in the unemployment rates.

7 For the calculation of TFP, it is assumed that output is given by a Cobb-Douglas production function where K is the capital stock, EMP the labour supply and α and $(1-\alpha)$ the shares of capital and labour in GDP respectively. In line with the literature on growth, it is assumed that $\alpha=0.35$.
$GDP = TFP * K^{\alpha} * EMP^{1-\alpha}$

8 The above findings are broadly corroborated by other studies that have undertaken similar exercises for the CEE countries (P. Doyle et al., "Real convergence to EU income levels: Central Europe from 1990 to the long term", IMF Working Paper, WP/01/146, 2001; European Commission, "Catching up, growth and convergence of the new Member States", 2004; IMF, "Growth in the Central and Eastern European Countries of the European Union – a Regional Review", 2006).

Table 3 Selected labour market indicators

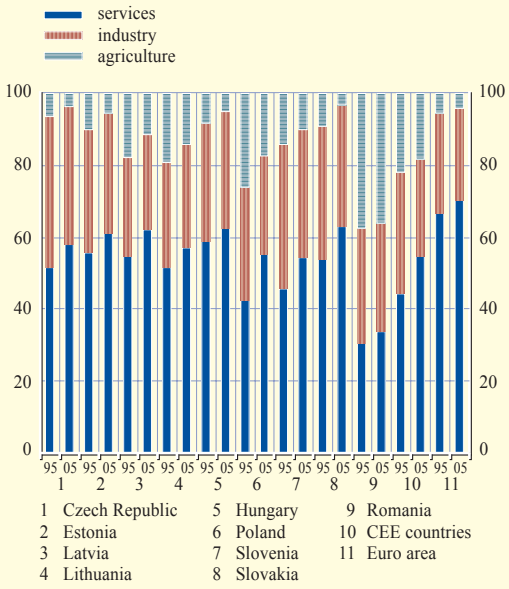
(percentages)

	Employment rate		Unemployment rate		Participation rate	
	1997 [1]	2006	1997 [1]	2006	1997 [1]	2006
Bulgaria	n.a.	58.3	n.a.	9.2	n.a.	64.2
Czech Republic	68.6	65.2	4.8	7.4	72.0	70.4
Estonia	65.3	68.0	10.5	6.2	73.0	72.5
Latvia	59.7	65.9	14.2	7.2	69.6	71.1
Lithuania	62.3	63.6	13.6	6.0	72.2	67.6
Hungary	52.0	57.2	9.0	7.5	57.1	61.8
Poland	58.8	54.1	11.2	14.6	66.2	63.3
Romania	67.2	59.3	6.0	7.6	71.5	64.1
Slovenia	62.8	66.8	6.8	6.2	67.4	71.2
Slovakia	60.6	59.2	12.6	13.8	69.3	68.7
CEE countries	n.a.	58.2	n.a.	10.5	n.a.	65.0
Euro area	58.2	64.1	11.8	8.8	65.9	70.3

Source: Eurostat.
1) For Latvia, Lithuania and Slovakia, the data refer to 1998.

Chart 5 Employment shares, broken down by broad economic sectors, 1995-2005

(percentages)



Source: Eurostat.
Notes: Data on the sectoral breakdown of employment are not available for Bulgaria, and the most recent year for which data are available for Romania is 2002. The CEE aggregate does not include Bulgaria and the aggregate for 2005 is based on 2002 data for Romania.

Overall, however, the indicators presented above point to a relatively weak performance of the CEE labour markets in comparison with the average for the euro area. In particular, the gap between the employment rate in most of the CEE countries and that in the euro area as a whole was negative in 2006. Only in three countries, namely Estonia, Latvia and Slovenia, did the rate of employment exceed the euro area level.

To some extent, the above-mentioned developments in the labour market reflect the process of economic restructuring faced by the CEE countries in the past decade. All CEE countries have seen the share of the services sector increasing, at the expense of the shares of the agricultural and industrial sectors. Compared with the euro area, however, agriculture and industry still provide a larger share of employment (see Chart 5); the percentage of people employed in agriculture in 2005 ranged from below 4% in the Czech Republic and Slovakia to above 36% in Romania. This was lower than ten years earlier, but was still significantly higher for a vast majority of the countries than the average of 4.3% recorded for the euro area in 2005. The share of employment in industry also remained higher than in the euro area in all CEE countries. The share of employment in the services sector in the CEE countries is still small in comparison with the euro area, but is gradually becoming more important.

LABOUR MARKET MISMATCHES

The structural change in the output and employment composition in the CEE countries brought about by the transition process is associated with a change in the composition of the workforce by qualification and skill level. This often implies an increased mismatch between a demand for more skilled workers and a lesser-skilled labour supply, which effectively reduces the overall labour supply and possibly creates growth bottlenecks. The high and, in some cases, increasing proportion of the total number of unemployed who have primary and secondary schooling in most CEE countries (see Table 4) also reflects the fact that the economic transition has led to a shedding of labour and job relocation, with jobs being destroyed in industries with low productivity and created in industries with higher productivity and in an underdeveloped service sector.[9]

More detailed information on educational mismatches in the CEE countries tends to be country-specific and is not available for all the countries concerned. In all CEE countries, however, a better labour market performance would require providing training opportunities for displaced workers and, more generally, improving the ability of education systems to respond – in both qualitative and quantitative terms – to an increasing demand for better qualifications.

9 For an empirical analysis of skill mismatches and cross-sectoral mobility, see A. Lamo, J. Messina and E. Wasmer, "Are specific skills an obstacle to labour market adjustment? Theory and an application to the EU enlargement", ECB Working Paper No 585, February 2006.

Table 4 Unemployment rates by level of education attained, 2006

(percentages; ages 15-64)

	Primary	Secondary	Tertiary
Bulgaria	20.5	7.7	3.8
Czech Republic	24.9	6.3	2.5
Estonia	13.3	6.2	4.1
Latvia	19.9	6.0	2.7
Lithuania	11.1	6.5	2.4
Hungary	16.2	6.6	2.6
Poland	24.9	15.2	5.5
Romania	9.0	7.7	3.1
Slovenia	8.5	6.5	3.0
Slovakia	47.9	12.1	3.0
Euro area	11.4	8.0	5.0

Source: Eurostat.

The existing skill mismatches may be affected by the increased migration of labour from the CEE countries to some of the other EU countries following the opening of their labour markets.[10] Given that young and qualified workers typically show the highest propensity to migrate, increased east-west migration within the EU, while generally beneficial and desirable in economic terms, may temporarily aggravate existing labour market bottlenecks in some sectors in the CEE countries. At the same time, the skills that these workers acquire abroad may support productivity growth in the long run, provided that the large share of current migration is temporary in character.

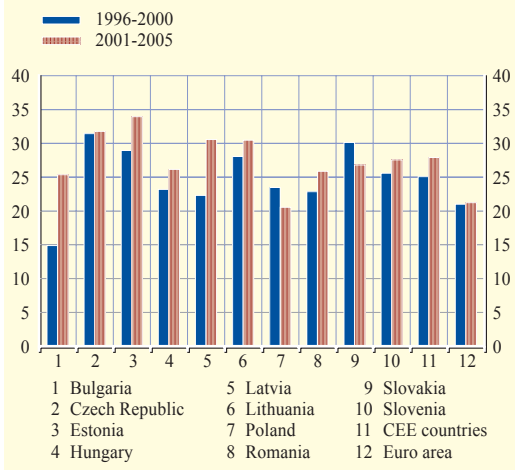
4 INVESTMENT DEVELOPMENTS

This section reviews recent trends in, and the main determinants of physical capital accumulation in the CEE countries. It then moves on to discuss issues related to human capital accumulation. Finally, it looks at the role of foreign direct investment in the catching-up process. Besides the performance of labour markets, investment growth is also likely to play a prominent role in the catching-up process of the CEE countries. It is expected to have a major impact on potential growth, not only by deepening the availability of capital, but also on account of its potential impact on productivity growth via the promotion of innovation and the enhancement of the international distribution of knowledge. From 1996 to 2005, the share of investment in GDP

10 See F. Heinz and M. Ward-Warmedinger, "Cross-border labour mobility within an enlarged EU", ECB Occasional Paper No 52, October 2006.

Chart 6 Ratio of gross fixed capital formation to GDP

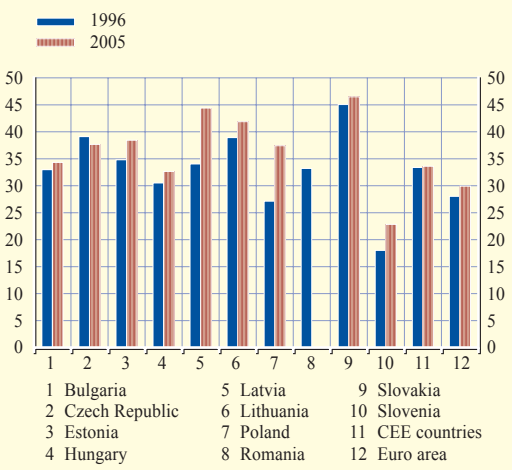
(percentages; annual averages)



Source: Eurostat.

Chart 7 Ratio of the gross operating surplus to GDP

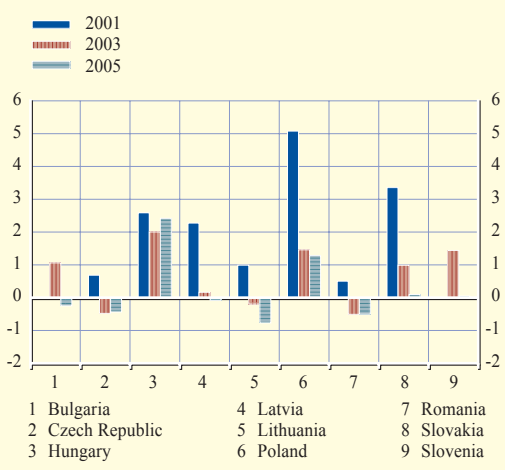
(percentages)



Source: ECB.
Note: The CEE average for 2005 does not include Romania.

Chart 8 The real cost of capital in the CEE countries – the gap vis-à-vis the euro area

(percentage points)



Sources: Eurostat, European Commission and ECB staff calculations.
Notes: No data for 2001 are available for Bulgaria and Slovenia. No real cost of capital was calculated for Estonia, due to the lack of data on comparable long term interest rates (see also footnotes 11 and 12 in the main text).

in most CEE countries was higher than in the euro area (see Chart 6). This can be explained by the relative scarcity of capital in the CEE in comparison with the euro area, which implies that high investment ratios might be necessary to catch up.

From 1996 to 2005 (see Chart 6), the development of the ratios of investment to GDP showed large country-specific differences. In Bulgaria, Estonia, Latvia, Lithuania, Hungary, Romania and Slovenia, the investment ratios increased markedly, reaching between 25% and 34%, on average, between 2001 and 2005. The investment ratio of the Czech Republic was stable at a fairly high level (33%), while that of Slovakia decreased from a correspondingly high level in the period from 1996 to 2000 to 26% in the period from 2001 to 2005. Finally, the investment ratio of Poland decreased further from already a relatively low level to 20% in the period from 2001 to 2005.

There are two main supply-side determinants of investment ratios: profitability and the cost of capital. With regard to profitability indicators, although the theory suggests that the expected future profitability is what really matters for investment decisions, current figures on profitability are often used as a proxy in empirical work. Based on national accounts data, the share of profits (the ratio of the operating surplus to GDP) was calculated for the CEE (see Chart 7).

The share of profits increased in most CEE countries in the period from 1996 to 2005 and ranged from 23% in Slovenia to 46% in Slovakia in 2005. The increasing profitability of investments in the CEE countries is likely to have supported the accumulation of capital.

Turning to the cost of capital, the simplest measure thereof contains three major elements: the financial costs arising from the ownership of the capital stock, the changes in the price of the capital stock and the losses due to the depreciation of the capital stock.[11]

Calculations for the period from 2001 to 2005 suggest that the gap between the cost of capital in CEE countries and that in the euro area initially decreased in all CEE countries, although it increased somewhat again in Hungary in 2005 (see Chart 8).[12] While the cost of capital declined in both the euro area and the CEE countries between 2001 and 2005, the decrease was larger in the latter countries.

The key reason for the overall drop in the cost of capital was the decrease in borrowing costs, for which the long-term interest rates are used as a proxy here. The decline in the spread of

11 The cost of capital for the CEE countries can then be approximated by using the formula $Ck = PI*(R-dlog(PIe)+\delta)/PGDP$ where Ck is the real cost of capital, R is the nominal long-term interest rate, PI is the investment price deflator, $dlog(PIe)$ is the expected change in the investment price deflator, δ is the physical depreciation rate of capital and $PGDP$ is the GDP deflator. The advantage of this formula is that it can be easily applied to macro data. Its shortcomings are that it does not take into account the cost of equity capital and tax changes.

12 On account of data limitations, the cost of capital was not calculated prior to 2001.

long-term interest rates with respect to the euro area rates, in turn, largely reflected the reduction in the country risk premia that was triggered by the decrease in macroeconomic uncertainty as a result of the nominal convergence process of the CEE countries with the euro area. In particular, the disinflation process in several CEE countries played a key role in the decrease in long-term interest rates. Moreover, the borrowing costs in the CEE countries were influenced by the development of competition and efficiency in the banking sector.[13] Overall, however, the decrease in the cost of capital in general, and the fall in borrowing costs in particular, are likely to have supported investment growth in the CEE countries.

Looking ahead, the high degree of convergence of the cost of capital in the CEE countries to the euro area level suggests that the further investment growth stimulus to be expected from a further decrease in the cost of capital will not be all that high. However, experience in some CEE countries has shown that this convergence process can be reversed if stability-oriented macroeconomic policies are not followed consistently. In particular, the still comparatively high cost of capital in some of the larger CEE countries (notably Hungary and Poland) can be linked, among other things, to market uncertainties that are related to fiscal imbalances.

INSTITUTIONAL ENVIRONMENT

In addition to the factors discussed above, institutional factors, such as product market regulations, might also have a strong impact on the pace of capital accumulation. A study by Alesina et al. provides robust empirical evidence suggesting that the decrease of entry barriers can lead to higher capital accumulation.[14]

Unfortunately, there is no standardised way of measuring the regulatory burden of a certain country, and all measures used to compare regulations in different countries should be considered with due caution. One way of doing so is to compare the administrative burden in the CEE countries and the euro area, based on indicators published by the Fraser Institute (see Table 5). The tentative conclusion that can be

13 See, for example, the article entitled "Financial development in central, eastern and south-eastern Europe" in the November 2006 issue of the Monthly Bulletin.

14 A. Alesina, S. Ardagna, G. Nicoletti and F. Schiantarelli, "Regulation and Investment", NBER Working Paper No 9560, National Bureau of Economic Research, 2003.

Table 5 Indicators of the Fraser Institute on the administrative burden in 2004

	Price controls	Burden of regulations	Time with government bureaucracy	Starting a new business	Irregular payments	Business regulations	Regulation
Bulgaria	3	2.9	3.7	4.7	7.2	4.3	6.2
Czech Republic	7.0	3.1	8.8	5.0	6.3	6.0	6.4
Estonia	6.0	5.2	7.3	7.1	7.8	6.7	7.3
Hungary	6.0	3.2	9.7	6.5	7.3	6.6	7.3
Latvia	6.0	3.8	6.9	6.8	5.8	5.9	6.7
Lithuania	6.0	3.1	6.3	5.8	6.9	5.6	6.4
Poland	3.0	2.8	7.0	5.4	5.5	4.8	5.9
Romania	1	3.3	10.0	6.5	5.0	5.2	5.9
Slovakia	6.0	2.9	7.4	6.8	6.3	5.9	6.8
Slovenia	4.0	2.9	6.3	4.9	7.8	5.2	6.3
CEE countries	4.8	3.3	7.3	5.9	6.6	5.6	6.5
Euro area	6.3	3.5	7.3	6.2	8.0	6.3	6.5

Source: Fraser Institute.
Notes: All indices are between 1 and 10, and higher indices mean better regulations. The shaded cells represent those parameters where a particular CEE country reaches or exceeds the euro area average.

drawn is that the business environment in the CEE countries has improved significantly over the past few years; on average, however, it has not reached the level of the euro area countries. This implies that new businesses in the CEE countries generally face higher administrative burdens than their counterparts in the euro area. However, there are significant country-specific differences. Estonia and Hungary, in particular, appear to be outliers. In both countries, four of seven indicators suggest an environment that is more friendly to businesses than that in the euro area.

HUMAN CAPITAL ENDOWMENT

While accumulating physical capital is a necessary condition for any catching-up by the CEE countries, it is at least as important to improve the efficiency of the use of capital (and labour). A higher degree of efficiency in the use of inputs can be achieved through investment in "knowledge", a common term for investment both in research and development (R&D) and in higher education.

The adoption of foreign technologies has played a key role in the development of the CEE economies. However, the diffusion of foreign technologies requires a well-educated labour force, a network of scientists who can apply and perfect them, as well as a business environment that is supportive of innovation. Moreover, investment in these non-tangible factors is also essential for the CEE countries to adjust their production structure by increasing the share of goods and services with higher added value.

Looking at the CEE countries' public spending on education, expressed as a percentage of GDP, suggests a fairly favourable picture, as this ratio is higher than the euro area average in all CEE countries except Bulgaria, the Czech Republic, Romania and Slovakia. Moreover, in some of the CEE countries (Bulgaria, Hungary and Poland), it has increased significantly over time (see Table 6).

Another indicator of human capital endowment in the CEE countries is the share of 20 to 24 year-olds in the population who have completed at least upper secondary education. In all CEE countries, this share is higher than the euro area average, and the CEE average in 2005 was more than 10 percentage points above the euro area level (see Chart 9). This relatively high share suggests that the CEE countries have a good potential as locations for skill-intensive economic activities. However, there is still

Table 6 Total public expenditure on education as a percentage of GDP

	1996	2003	2003-1996 [1]
Bulgaria	2.60	4.24	1.64
Czech Republic	4.68	4.51	-0.17
Estonia	6.05	5.43	-0.62
Latvia	5.14	5.32	0.18
Lithuania	5.18	5.18	0.00
Hungary	4.51	5.85	1.34
Poland	4.67	5.62	0.95
Romania	-	3.44	-
Slovenia	-	6.02	-
Slovakia	4.53	4.34	-0.19
CEE countries	4.67	5.00	0.33
Euro area	-	5.02	-

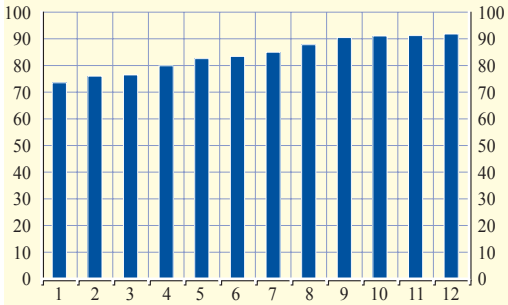
Source: Eurostat.
1) Change in percentage points.

Table 7 Gross expenditure on research and development as a percentage of GDP

	1996	2004	2004-1996 [1]
Bulgaria	0.52	0.51	-0.01
Czech Republic	0.97	1.26	0.29
Estonia	-	0.88	-
Latvia	0.42	0.42	0.00
Lithuania	0.50	0.76	0.26
Hungary	0.65	0.88	0.23
Poland	0.65	0.56	-0.09
Romania	-	0.39	-
Slovenia	1.35	1.45	0.10
Slovakia	0.92	0.51	-0.41
CEE countries	0.75	0.76	0.01
Euro area	1.90	1.89	-0.01

Source: Eurostat.
1) Change in percentage points.

Chart 9 The share of 20 to 24 year-olds in the population with at least a secondary level of education in 2005



Source: Eurostat.

scope for improving the responsiveness of education to market demand in the CEE countries.[15]

Turning to investment in R&D, gross expenditure on R&D (as percentage of GDP) in 2004 was, on average, less than half that in the euro area. In recent years, however, spending on R&D has increased substantially in a number of CEE countries (see Table 7).

The relatively low R&D spending in, and the small number of patents registered by, the CEE countries can partly be explained by looking at the sources of R&D financing in these countries. In 2000, industry already played a smaller role, on average, in the financing of R&D in the CEE countries (39% of total R&D spending) than in the euro area (around 57%). The share accounted for by industry in the CEE countries decreased to around 36% of total R&D financing in 2003, while it remained stable at around 56% in the euro area. The relatively small involvement of industry can be explained by the fact that the export-oriented sector in the CEE countries is dominated by foreign companies, which often prefer to carry out most of their R&D activities at their headquarters. At the same time, the domestic small and medium-sized enterprise (SME) sector often lacks the means to finance R&D activities. A greater involvement of the SME sector in R&D activities and better financing opportunities for these activities would thus appear to be beneficial for the long-term growth prospects of the CEE countries.

While government involvement can play an important role in supporting innovative SMEs, the solution to the apparent problem of financing R&D activities is more complex. Traditionally, a certain part of R&D financing is the responsibility of the government, in particular the financing of basic research with a highly unpredictable rate of return. In the case of applied research, however, government involvement often distorts economic incentives and the public sector lacks the knowledge to pick those projects that are commercially most viable. The key to success is thus not only to increase gross expenditure on R&D as a percentage of GDP, but also to ensure the most efficient allocation of recourses, which in turn requires well-functioning financial markets. Providing financial markets and, more generally, the business sector with the right incentives for involvement in R&D activities thus appears to be the key means of improving the innovation potential of CEE countries.

DEVELOPMENTS IN FOREIGN DIRECT INVESTMENT

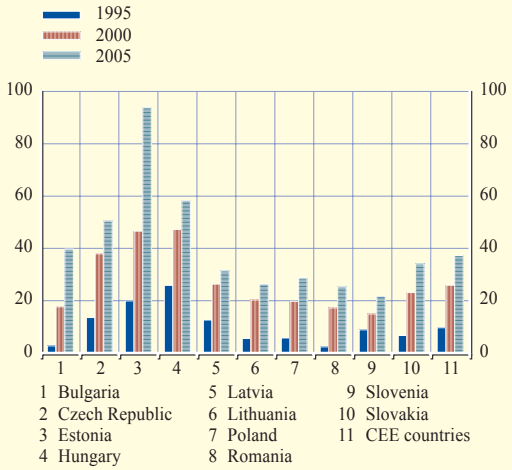
FDI plays an important role in the real convergence process of the CEE countries. On a theoretical basis, FDI can be viewed as supportive of investment and growth in primarily two ways. On the one hand, it acts as a catalyst for technological progress and boosts productivity via technology and knowledge spill-overs. On the other hand, it provides financial resources and thus facilitates the accumulation of capital.

The CEE countries have received substantial FDI inflows since the early stages of their transition. Annual FDI inflows averaged around 5% of GDP between 1995 and 2005, although

15 See, for example, H. Feldmann, "How flexible are labour markets in the EU accession countries Poland, Hungary and the Czech Republic?", *Comparative Economic Studies*, Vol. 46, No 2, 2004.

Chart 10 Stocks of inward foreign direct investment

(percentage of GDP)



Source: WIIW Database of the Vienna Institute for International Economic Studies.

the pattern varied strongly across countries. Overall, FDI inflows remained strong throughout the past decade. In 2005, FDI inflows in the CEE countries amounted to 4.8% of GDP (€26 billion).

In line with strong FDI inflows, inward FDI positions have been growing rapidly in most CEE countries (see Chart 10). The stock of inward FDI in the CEE countries rose to 37% of GDP (€211 billion) in 2005. Estonia recorded the highest accumulation of FDI (more than 90% of GDP), followed by Hungary and the Czech Republic. In Latvia, Lithuania, Poland, Slovenia and Slovakia, FDI has been more moderate, resulting in inward FDI positions below the CEE average, with the lowest position being registered for Slovenia (22% of GDP in 2005).

Various factors have shaped the accumulation of FDI in the CEE countries, with EU accession prospects and privatisation being counted among the main drivers. Privatisation was a major factor in the 1990s, in particular. Indeed, differences in the timing of privatisation and the degree of openness to foreign investment help to explain country-specific differences in the FDI positions. More recently, however, other determinants of FDI, such as cost factors, the size of the market and the location, overall political and macroeconomic stability and FDI policies have gained in importance, given that privatisation is generally playing a diminishing role as a source of FDI, while so-called greenfield FDI is gaining importance, both in relative and in absolute terms, with respect to the overall picture presented by FDI.

5 CONCLUSION

After the severe economic recession in the aftermath of the collapse of the centrally planned systems in the CEE countries at the beginning of the 1990s, these countries embarked on a path of rapid growth. As a result, all CEE countries have managed to converge in terms of their level of per capita income towards the euro area average, although the gaps remain quite large for many of them. The buoyant expansion was bolstered by structural and institutional reforms, macroeconomic stabilisation, the prospect of EU membership and actual accession to the EU in May 2004. Improvements in labour productivity were the main driver of the catching-up process, while labour utilisation declined in most of the countries involved.

The still ongoing process of sectoral transition from agriculture and industry to services is associated with the prevailing mismatch between the labour supply and job vacancies in the CEE countries. This has already created labour market bottlenecks in some countries and sectors and is likely, if not appropriately addressed, to lead to increasing wage pressure and ultimately lower growth and real convergence. With regard to capital, most CEE countries recorded rising investment ratios, driven by improved profitability and a reduction of the cost of capital, which, in turn, mainly reflected the effect of nominal convergence towards the euro area and increasing competition in the CEE countries' banking sectors. Looking at investment in human capital, the CEE

countries show a mixed picture. Some indicators of educational attainments show a favourable picture relative to the euro area. Figures on R&D spending, by contrast, suggest that the CEE countries lag substantially behind the euro area.

In order to ensure that fast economic growth in the CEE countries remains sustainable, it is crucial for these economies to take appropriate policy action in several areas. First, it is of key importance that the countries aim at improving their fiscal performance by implementing credible and sufficiently ambitious fiscal consolidation plans. Such measures, together with the conduct of a credible monetary policy, are essential to ensure appropriate conditions for further sustainable growth and convergence. Second, they need to address their structural labour market problems. In this context, raising labour participation and reducing regional and skill mismatches are of particular importance. Finally, in order to ensure that the capital accumulation process continues and that R&D investment increases, the countries need to make further efforts to improve the attractiveness of their business environment. Further investment in human capital also appears to be crucial for any faster catching-up. Many of the above-mentioned facets of growth-enhancing policies will also help to ensure a continued inflow of FDI, which is expected, in turn, to help accelerate the convergence process of the CEE countries. Also, measures to further enhance competition in product markets would be equally important for future growth performance.

Overall, real convergence cannot be taken for granted, as the experience of some other EU Member States has demonstrated. Real convergence requires continued efforts to improve the supply side of the economy, while at the same time providing an adequate macroeconomic environment.