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**OCCASIONAL PAPER SERIES**

**NO 86 / JUNE 2008**

**REAL CONVERGENCE AND  
THE DETERMINANTS OF GROWTH  
IN EU CANDIDATE AND  
POTENTIAL CANDIDATE  
COUNTRIES**

**A PANEL DATA APPROACH**

by Magdalena Morgese Borys,  
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## A PANEL DATA APPROACH<sup>1</sup>

by Magdalena Morgese Borys,<sup>2</sup>

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and Andrei Zlate<sup>4</sup>



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## LIST OF ABBREVIATIONS

### COUNTRY CODES (ISO CODES)

AL	Albania	MK	the former Yugoslav Republic (FYR) of Macedonia
BA	Bosnia and Herzegovina		
BG	Bulgaria	ME	Montenegro
HR	Croatia	PL	Poland
CZ	Czech Republic	RO	Romania
EE	Estonia	RS	Serbia
HU	Hungary	SK	Slovakia
LV	Latvia	SI	Slovenia
LT	Lithuania	SM	Serbia and Montenegro

### COUNTRY-GROUP ABBREVIATIONS

C/PC	Candidate countries, i.e. Croatia, the former Yugoslav Republic of Macedonia and Turkey, and potential candidate countries, i.e. Albania, Bosnia and Herzegovina, Serbia and Montenegro (six or seven countries, depending on whether data are available for Serbia and Montenegro as separate entities)
C/PC5 (C/PC6)	The C/PC countries excluding Turkey (the Western Balkans)
EU10	Countries that have become EU members since 1 May 2004, with the exception of Cyprus and Malta (i.e. Bulgaria, the Czech Republic, Estonia, Latvia, Lithuania, Hungary, Poland, Romania, Slovakia and Slovenia)
EU15	Belgium, Denmark, Germany, Ireland, Greece, Spain, France, Italy, Luxembourg, the Netherlands, Austria, Portugal, Finland, Sweden and the United Kingdom
EU25	The EU Member States as of 1 May 2004 (i.e. Belgium, the Czech Republic, Denmark, Germany, Estonia, Ireland, Greece, Spain, France, Italy, Cyprus, Latvia, Lithuania, Luxembourg, Hungary, Malta, the Netherlands, Austria, Poland, Portugal, Slovenia, Slovakia, Finland, Sweden and the United Kingdom)
CEE/SEE	All transition countries under review, i.e. C/PC5 (C/PC6) and EU10

### INSTITUTION ABBREVIATIONS

BIS	Bank for International Settlements
EBRD	European Bank for Reconstruction and Development
GGDC	Groningen Growth and Development Centre
IFS	International Financial Statistics
ILO	International Labour Organization
IMF	International Monetary Fund
OECD	Organisation for Economic Co-operation and Development
UNCTAD	United Nations Conference on Trade and Development
WB	World Bank
WIIW	The Vienna Institute for International Economic Studies

### OTHER ABBREVIATIONS

FDI	Foreign direct investment
GDP	Gross domestic product
GFCF	Gross fixed capital formation
PPP(s)	Purchasing power parity(ies)
TFP	Total factor productivity
WDI	WB's world development indicators database

**ABSTRACT**

The EU candidate and potential candidate countries have made considerable progress in economic transition and integration into the world economy within less than two decades. Nevertheless, gaps in terms of income per capita relative to the euro area remain large. This suggests that the challenges of real convergence will remain relevant for the region even in the medium and long term. This paper therefore focuses on real convergence and its determinants in the candidate and potential candidate countries. The analysis reveals that total factor productivity growth has been the main driver of convergence, followed by capital deepening, whereas labour has contributed only marginally to economic growth. There is evidence of conditional convergence in the transition countries of central, eastern and south-eastern Europe. More specifically, controlling for the quality of institutions, the extent of market reforms and macroeconomic policies, there is a significant and negative link between the initial level of GDP and subsequent growth. Labour productivity has improved in most countries, while employment and participation rates have been falling. Structural changes have resulted in, at least temporarily, increasing labour market mismatches. Investment rates have been rising rapidly in recent years, and foreign direct investment has been found to have a positive impact on total investment. Investment in human capital is still at a relatively low level compared with the euro area average. Thus, in order to sustain the positive developments observed in the past, further improvements are needed in terms of labour productivity and utilisation, as well as in terms of physical and human capital accumulation.

*JEL classification:* F15, F43, O16, O43, O47, O52

*Keywords:* real convergence, conditional convergence, determinants of growth, total factor productivity, labour markets, capital accumulation, EU candidate and potential candidate countries

## EXECUTIVE SUMMARY

*Within less than two decades, the EU candidate and potential candidate countries in south-eastern Europe have made considerable progress in economic transition and integration into the world economy.* Given closer economic integration through trade and financial flows, particularly with the EU, and the prospects for EU membership, this paper focuses on real convergence – defined as the convergence of per capita income levels towards those of the euro area – and its determinants in the candidate and potential candidate countries. It aims at providing an overview of key facts and figures on real convergence, in part using the benchmark of the EU10 average, i.e. the average performance of the central, eastern and south-eastern European countries that have joined the EU since 1 May 2004 (excluding Cyprus and Malta).

*The analysis described in this paper reveals that despite notable improvements, gaps in terms of income per capita relative to the euro area remain large in the countries under review.* This suggests that the challenges of real convergence will remain relevant for the region even in the medium and long term. Moreover, country-specific factors have affected the timing, speed and extent of the improvements. While a general pattern in line with developments in the EU10 economies holds true for Albania, Bosnia and Herzegovina and Croatia, recovery started about a decade later in the former Yugoslav Republic of Macedonia, Montenegro and Serbia. In addition, Turkey is clearly an exception, since it is the only non-transition economy, and its developments have therefore followed a different pattern. Accordingly, only Albania and Croatia (but all EU10 countries) had by 2006 managed to surpass their 1989 levels of total income in real terms.

*Total factor productivity (TFP) growth has been the main driver of convergence in the candidate and potential candidate countries, followed by capital deepening, whereas labour has contributed only marginally to economic*

*growth.* In addition, the contribution of TFP to growth has increased over time. In the EU10, by contrast, although TFP has been the main driver of growth, its contribution has declined notably over the last decade. This is in line with expectations that after the elimination of inefficiencies linked to a former central planning regime, sustained TFP growth may be more difficult to achieve. Thus further improvements in capital accumulation and capital efficiency are needed in the candidate and potential candidate countries to help sustain convergence in the future.

*There is evidence of conditional convergence in the transition countries of central, eastern and south-eastern Europe for the whole period under review.* More specifically, there is a significant and negative link, controlling for the quality of institutions, the extent of market reforms and macroeconomic policies, between the initial level of GDP and subsequent growth. However, while this result is generally robust across different specifications, it is not supported by all methods used. The quality of institutions seems to play an important role in growth, but in an indirect way. While variables capturing progress in institution building and structural reforms are not found to be directly linked with growth, controlling for institutional quality strengthens the growth-enhancing effects of traditional explanatory variables such as macroeconomic stabilisation and financial intermediation.

*Labour productivity has improved in most countries, as the share of more productive sectors in total output has risen and overall employment has declined.* However, south-eastern European countries have experienced adverse developments in their labour markets, namely falling employment and participation rates, caused initially by severe output losses and later by shifting production patterns. These negative trends have been gradually reversing, although at different speeds depending on each country's overall economic recovery and the effectiveness of the reforms it has introduced. While employment rates have been slowly increasing, on average they are still at

significantly lower levels than in the EU10 or in the euro area. Similarly, unemployment rates are much higher on average than in the EU10 and the euro area countries.

*Structural changes have resulted in, at least temporarily, increasing labour market mismatches.* In most countries there has been a noticeable shift of employment from agriculture and industry to the services sector, a trend which has been much more pronounced in the EU10. While this shift signals that the countries under review have been converging to the economic structure observed in mature economies, the strong and increasing demand for skilled labour is only partly matched by supply. Therefore, unemployment is lowest among workers with the highest education levels. Higher unemployment rates among the youth as well as high long-term unemployment rates provide additional evidence of labour market mismatches and a still high degree of labour market inflexibility.

*Investment rates have been rising rapidly in recent years and foreign direct investment (FDI) has been found to have a positive impact on total investment.* Again, in the EU10 similar developments started earlier, and investment growth has consolidated in the more recent period. More specifically, countries that have received more FDI relative to total investment also have reported a larger level of investment relative to GDP. Therefore, FDI flows continue to provide a good basis for further investment growth, leading to improvements in capital accumulation and its efficiency. The services sector has received the majority of the inward FDI stock, followed by industry. These shares are comparable to those of the EU10, but given the need to broaden the export base in most candidate and potential candidate countries, more foreign investment in export-oriented industries seems to be necessary in the future.

*Investment in human capital, proxied by the share of expenditure on education in total GDP, is still at a relatively low level compared with the EU10 or the euro area average.* By contrast, spending on research and development (R&D)

constitutes only a small share of GDP not only in candidate and potential candidate countries but also in most EU10 countries. Given the need for strong economic growth that would allow real convergence towards the euro area, higher human capital investment seems to be needed, even though most countries are characterised by a relatively high percentage of 20-24 year-olds with at least secondary education.

*In conclusion, EU candidate and potential candidate countries have been experiencing strong economic growth, labour market improvements and buoyant investment, including strong increases in FDI inflows.* In order to sustain these positive developments in the medium to long term and experience continued real convergence with the euro area, further improvements are needed in terms of labour productivity and utilisation, as well as in terms of capital accumulation. To the extent that recent overall growth has been mainly driven by TFP and not by capital accumulation and labour, it is important to emphasise the need for further reforms and economic restructuring aimed at improving labour markets and facilitating strong investment growth.

## I INTRODUCTION

Within less than two decades, the EU candidate and potential candidate countries in south-eastern Europe have made considerable progress in economic transition and integration into the world economy. Given closer economic integration through trade and financial flows, particularly with the EU, and the prospects for EU membership, this paper focuses on real convergence – defined as the convergence of per capita income levels towards those of the euro area – and its determinants in the candidate and potential candidate countries (C/PC) since 1989.<sup>1</sup> It aims at providing an overview of key facts and figures on real convergence in these countries, in part by using the benchmark of the EU10 average, i.e. the average performance of the central, eastern and south-eastern European countries that have joined the EU since 1 May 2004 (excluding Cyprus and Malta).<sup>2</sup>

The analysis described in the paper reveals that despite notable improvements, gaps in terms of income per capita relative to the euro area remain large in the countries under review. This suggests that the challenges of real convergence will remain relevant for the region even in the medium and long term. Moreover, there are relevant cross-country differences. For instance, Turkey has not undergone an economic transition. Hence, when appropriate, the analysis distinguishes between Turkey and the remaining candidate and potential candidate countries (C/PC5). In addition, the countries under review are heterogeneous in terms of size, the speed of economic reforms and demographic change. They have also been differently affected by financial and exchange rate crises as well as civil unrest and wars. While these factors have arguably had an impact on the speed and timing of convergence in each country, the horizontal nature of the paper often prevents a deeper analysis of all country specifics.

The paper is organised as follows. Chapter 2 analyses real convergence patterns, focusing on growth rates and the relative levels of real output across countries. It also discusses the

determinants of growth using a production function approach. In the next two chapters, two different paths are followed in order to gain a more detailed picture of the growth process and its determinants in the region. Given the notable gaps in income per capita and growth rates, Chapter 3 includes an econometric exercise investigating conditional convergence among the C/PC5 and the EU10. Chapter 4, following up on the growth accounting exercise presented in Chapter 2, provides an in-depth analysis of labour markets, recent patterns of gross fixed capital formation (GFCF) and foreign direct investment (FDI), i.e. the determinants of growth in candidate and potential candidate countries. Furthermore, as real convergence in the European context has been increasingly defined more broadly than as a convergence of per capita income levels, the chapter also includes a review of indicators of “structural convergence” (Padoa-Schioppa, 2002), i.e. institutional development and structural reforms.

<sup>1</sup> See the list of abbreviations on page 4.

<sup>2</sup> The paper was inspired by Arratibel et al. (2007), and follows the methodology and the structure of that paper to some extent. The analysis presented here differs from Arratibel et al. mainly in that it focuses on the EU candidate and potential candidate countries and includes an econometric analysis of conditional convergence in the C/PC5 and the EU10 countries.

## 2 PATTERNS OF REAL CONVERGENCE IN SOUTH-EASTERN EUROPE

This chapter provides an overview of economic growth patterns in the countries under review. It reveals important differences within the group, which make it useful to distinguish between three sub-groups in most of the analysis. The first sub-group comprises Albania, Bosnia and Herzegovina and Croatia, which – despite differences related for example to the wars of Yugoslav secession – followed a pattern of development similar to that of the transition countries of the EU10. The second one is composed of the former Yugoslav Republic of Macedonia, Montenegro and Serbia, where economic recovery started notably later, basically only in the current decade. Lastly, Turkey stands alone, being the only non-transition economy among the C/PC countries.

We can see that all economies in the C/PC5 group experienced notable output losses in the early 1990s, while output growth in Turkey was interrupted by multiple recessions. Although the economic decline in the former Yugoslav Republic of Macedonia as well as in Serbia and Montenegro continued until the late 1990s, in general 1993 can be seen as the start of the convergence process for the transition

countries. In contrast to the EU10 countries, which had surpassed their 1989 levels of total income in real terms by 2006, in the C/PC group only the fastest growing transition countries – Albania and Croatia – achieved a similar performance.

Total factor productivity (TFP) growth has been the main driver of economic growth in the region, followed by capital accumulation. Given that a significant part of TFP growth has been largely the result of the elimination of inefficiencies of the former central planning regimes, a decline to levels seen in mature economies can be expected for the future. Therefore, countries face the challenge of improving labour utilisation and fostering capital accumulation to ensure the sustainability of the real convergence process.<sup>3</sup>

### 2.1 REAL OUTPUT GROWTH

Following the collapse of the centrally planned systems and the outbreak of hostilities in the Western Balkans, all countries – with the

3 The example of emerging Asia suggests that strong capital accumulation is needed for a sustained catching-up with advanced economies (IMF, 2006c), given that TFP growth rates can be assumed to be similar in advanced and emerging economies in a non-transition context.

Table 1 Real GDP growth rates

	1990-1993	1994-1997	1998-2001	2002-2005
Albania	-5.7	5.1	9.3	5.0
Bosnia and Herzegovina	-19.6	24.9	9.0	4.0
Croatia	-12.0	6.4	2.2	4.7
FYR Macedonia	-7.6	-0.1	1.9	2.6
Serbia and Montenegro	-19.6	5.5	-1.2	5.0
<i>Serbia</i>	-	9.0	-1.5	5.6
<i>Montenegro</i>	-	9.1	0.0	2.8
<i>Kosovo</i>	-	-	-	2.5
Turkey	6.0	4.1	-0.4	7.5
<b>Weighted averages</b>				
C/PC	1.9	4.6	0.2	7.0
C/PC5	-11.7	7.8	3.1	4.5
C/PC4 (without BA, TK)	-15.0	5.2	1.6	4.7
EU10	-5.4	3.9	3.2	4.4
EU15	1.2	2.5	3.0	1.5

Sources: ECB calculations based on data from the GGDC Total Economy Database, January 2007, using total GDP in 1990 US dollars. EBRD data used for Serbia and Montenegro as separate entities (covering 1996-2005); Eurostat data used for Kosovo (covering 2002-2004). Note: The growth rates for Bosnia and Herzegovina and Serbia and Montenegro are assumed to be equal for the period between 1990 and 1993.

exception of Turkey – experienced notable recessions during 1990-93 (Table 1).<sup>4</sup> Seriously affected by the wars of Yugoslav secession, the countries in the Western Balkans recorded notably larger output losses than the EU10 countries in this period.

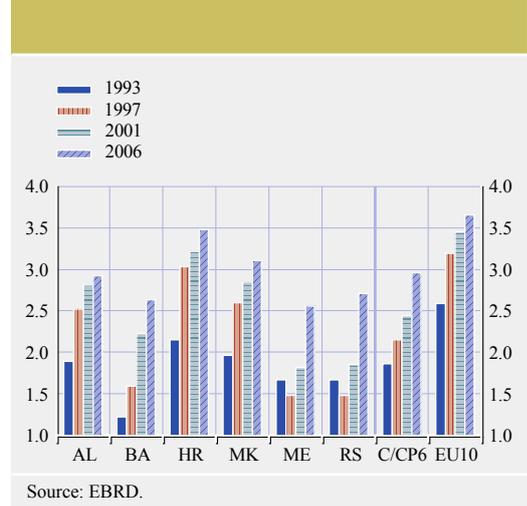
The economic decline in the C/PC countries reversed in the mid-1990s as hostilities ended, macroeconomic stabilisation took hold and structural reforms advanced. However, as indicated by the EBRD transition indicators<sup>5</sup> (Chart 1), the transition in the C/PC countries was generally slower than in the EU10. Croatia has traditionally been the most advanced of the C/PC5 group, maintaining a transition pace comparable to that of most EU10 countries, whereas Bosnia and Herzegovina as well as Serbia and Montenegro have lagged behind.

The speed of recovery differed significantly across countries after 1993. It was particularly uneven in the period between 1994 and 2001, which was characterised by prolonged recessions, due to differing progress with reforms and the varying impact of the war in the Western Balkans. While Albania and Croatia achieved growth rates comparable to those in the EU10 countries, Bosnia and Herzegovina recorded exceptionally high

growth rates as it recovered from the output losses during the war. By contrast, growth in the former Yugoslav Republic of Macedonia as well as in Serbia and Montenegro, affected by ethnic and political turmoil until the early 2000s, remained subdued. The growth process in Turkey, the only non-transition economy in the sample, was interrupted by three sharp recessions, in 1994, 1999 and 2001, following financial and exchange rate crises and natural disasters.

The years between 2002 and 2005 saw signs of consolidation and stronger growth in the Western Balkans. Growth accelerated in Croatia and the former Yugoslav Republic of Macedonia, while Serbia and Montenegro recovered from slow growth and the recession linked to slow reforms and the Kosovo war. As a result, by 2006 the fastest-growing economies among the C/PC5 countries – Albania and Croatia – had managed to surpass their pre-transition level of per capita income.<sup>6</sup> By contrast, all EU10 countries had surpassed their 1989 level of output in real terms by 2006, to an extent ranging from 159% (Poland) to 101% (Bulgaria).

Chart 1 Average EBRD transition scores



4 Regional averages are GDP-weighted. Calculating unweighted averages yields similar results for the EU10, while for the C/PC group differences are sometimes significant, given the large weight of Turkey, a non-transition economy. This is taken into account by focusing on the C/PC5 and Turkey separately throughout the analysis when appropriate.

5 The EBRD transition indicators summarise progress in structural reforms that are usually carried out at an early stage of the transition process – i.e. small-scale privatisation, price liberalisation, and trade and foreign exchange liberalisation – and structural reforms of a more long-term nature, such as large-scale privatisation, governance and enterprise restructuring, competition policy reforms, development of the banking sector, security markets and non-banking financial institutions, and infrastructure reform. The EBRD assigns numerical scores to sub-indicators corresponding to these reform areas. The scores range from 1 (little or no change from a planned economy) to 4.3 (the standard for an advanced market economy).

6 Calculations are based on the GGDC data-based levels of total output relative to 1989, which are generally in line with those reported in EBRD (2006), with two notable exceptions. The relative level of income per capita in Bosnia and Herzegovina is much higher in the GGDC data-based calculations (2005: 153% versus only 70% reported by the EBRD). To a smaller extent, the same is true for Albania (164% versus 137%). For the remaining countries the difference in GGDC and EBRD 2005 per capita income levels does not exceed 5 percentage points.

Box 1

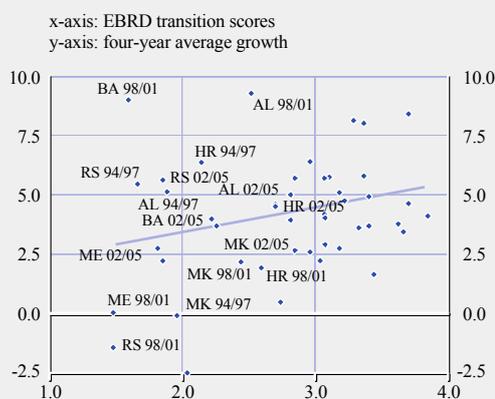
TRANSITION AND GROWTH

Correlation analysis suggests that, in general, the speed of economic recovery in the countries under review has been positively related to the pace of transition. Advanced reformers in 1993, 1997, 2001 achieved higher annual growth rates in the subsequent periods than slow reformers.

The chart plots the EBRD transition scores (see Footnote 5) for the years 1993, 1997 and 2001 (on the horizontal axis) against the average annual growth of total GDP over the subsequent four-year time intervals (1994-97, 1998-2001 and 2002-05, on the vertical axis) for the CP/C5 and the EU10. Simple regression analysis yields a coefficient estimate for the EBRD transition indicator that is positive (4.58) and statistically significant (i.e. the standard error is 0.91).

The chart reflects the delay in the transition reforms in the C/PC5 countries relative to the EU10 group, as well as large differences in economic growth among the C/PC5 countries themselves. (Note the concentration of C/PC5 observations on the left side of the chart, and their considerable variation above and below the trend line.) Although low transition scores are generally associated with relatively slow growth in subsequent years, notable exceptions from the trend occurred due to the post-war recoveries in Bosnia and Herzegovina (1998-2001) and Serbia (2002-05). Several success stories emerged, as Albania (1998-2001) and Croatia (2002-05) experienced relatively faster growth after the implementation of reforms.

Structural reforms and economic growth, 1993-2005



Sources: EBRD transition indicators, May 2007 (for reform scores), and GGDC (for growth rates).  
Note: Bosnia and Herzegovina in 1994-97 represents an outlier (with 25% average annual growth of total GDP, due to the recovery of unusually large output losses during the war), and was omitted from the chart. Unlabelled data points refer to figures for the EU10 countries.

2.2 INCOME PER CAPITA LEVELS

In most of the C/PC countries, output per capita declined sharply relative to the EU15 average after 1989, reaching all-time lows in the period between 1992 and 1994, followed by a steady recovery thereafter. However, in Serbia and Montenegro and the former Yugoslav Republic of Macedonia income per capita – relative to the EU15 average – reached its lowest point in 1999 (the year of the Kosovo conflict) and 2002 (the year after the security crisis), respectively (Table 2<sup>7</sup>; caveats on the potential bias in cross-country comparisons are described in

Box 2). Turkey is again an exception in this respect, as it was not a transition economy and so did not experience any economic collapse after 1989 and fast recovery afterwards. Given that it is at the same time by far the largest economy among the candidate and potential candidate countries, the C/PC average is to a large extent influenced by developments in Turkey. For this reason, it is useful to focus on the performance of the C/PC5 separately. In particular, while the

7 Table 2 provides data for 1989, 1993, 1997, 2001 and 2005 only. References in the text to intermediate years are based on the GGDC dataset.

**Table 2 Real convergence, GDP per capita (GGDC)**

(EU15 = 100; GGDC dataset, GDP per capita in GK\* PPPs, 1990 USD)

	1989	1993	1997	2001	2005
Albania	15.8	11.0	11.9	15.0	17.0
Bosnia and Herzegovina	26.0	11.5	26.5	29.4	30.3
Croatia	50.7	29.5	35.0	34.4	38.8
FYR Macedonia	28.3	19.4	17.2	16.3	17.0
Serbia and Montenegro	36.0	13.3	14.5	12.4	14.3
Turkey	32.5	37.1	37.3	31.0	37.6
<b>Weighted averages</b>					
C/PC	31.4	31.0	32.4	28.0	33.5
C/PC5	28.8	16.2	19.8	19.8	22.1
EU10	40.5	31.6	34.1	35.0	39.9
EU25	90.7	89.2	90.0	90.4	91.3
<b>Standard deviations</b>					
C/PC	11.6	10.8	10.8	9.5	11.1
C/PC5	13.0	7.8	9.5	9.7	10.6
EU10	16.5	12.0	14.2	15.8	20.1

Source: ECB calculations based on data from the GGDC Total Economy Database, January 2007, using total GDP in 1990 US dollars (converted at GK\* PPP). \* Geary-Khamis method, see Box 2.

Note: In cross-country comparisons, the GGDC dataset may suffer from a bias, described in detail in Box 2. For example, the relative level of GDP per capita in 2005 is probably overestimated for Bosnia and Herzegovina and Turkey, and underestimated for the former Yugoslav Republic of Macedonia as well as for Serbia and Montenegro.

C/PC had roughly the same level of average GDP per capita as the EU10 in 1993, per capita income was significantly lower in the C/PC5.

Between 1993 and 2005, average income per capita in the C/PC5 increased relative to the EU15 average, although by less than in the EU10. By 2005 the C/PC5 level of income per capita had risen on average by 6 percentage points relative to the EU15, i.e. from 16% in 1993 to

22% in 2005. By contrast, the EU10 average reached almost 40% of the EU15 average in PPP terms, up from 32% in 1993. The performance differed notably among the C/PC5 countries. Whereas Albania, Bosnia and Herzegovina and Croatia improved significantly in terms of real per capita income between 1993 and 2005, real GDP per capita increased only slightly in Serbia and Montenegro and even declined in the former Yugoslav Republic of Macedonia.

**Box 2****ACCOUNTING FOR THE BIAS IN CROSS-COUNTRY COMPARISONS OF INCOME PER CAPITA**

Cross-country comparisons of per capita income must be treated with caution, as relative levels might vary depending on the methodology used to express real income in PPP terms.

The GGDC Total Economy Database provides income per capita for the EU10 and the C/PC countries in PPP terms following the Geary-Khamis (GK) method. This method may produce biased results because the aggregation method uses reference price or reference volume structures that do not properly reflect countries' consumption patterns. For instance, the method does not take account of consumers switching their expenditure towards products that become relatively cheaper during the reference period (OECD, 2007; Rao, 2001; Rao and Timmer, 2000). While this bias is not relevant when assessing countries' performance over time relative to their respective initial levels of wealth (to the extent that the country-specific bias stays constant over

time), the impact on cross-country comparisons may be significant. For example, in Table 1 the relative level of GDP per capita in 2005 is probably overestimated for Bosnia and Herzegovina and Turkey, and underestimated for the former Yugoslav Republic of Macedonia as well as for Serbia and Montenegro.

The dataset provided by the WIIW avoids this bias by applying the Elteto-Koves-Szule (EKS) method, also used by the OECD-Eurostat PPP Programme. It uses neither a reference price structure nor a volume price structure when estimating real expenditures (OECD, 2007). It thus allows a more reliable comparison of the countries' levels of income per capita relative to each other in a given year (see Table below).

The data show that 2005 per capita GDP relative to the EU15 average was significantly lower in the C/PC than in the EU10 (i.e. 26% versus 46%). As of 2005, a two-tier hierarchy existed among the C/PC countries. Croatia's per capita income stood at about 44% of the EU15 average, almost reaching the average level of the EU10, while the remaining countries had levels that ranged between one-fifth and one-quarter of the EU15 average.

The key disadvantage of the WIIW dataset is that it covers a much shorter time period, especially for Bosnia and Herzegovina and Serbia and Montenegro, than the GGDC dataset. This constrains significantly the analysis of developments within the group of candidate and potential candidate countries. For this reason the analysis in this section, focusing on developments in countries over time, is largely based on the GGDC dataset. By contrast, when explicitly focusing on a cross-country perspective, the analysis relies on the WIIW dataset.

### Real convergence, GDP per capita (WIIW)

(EU15 = 100; WIIW dataset, GDP per capita in EKS PPPs)

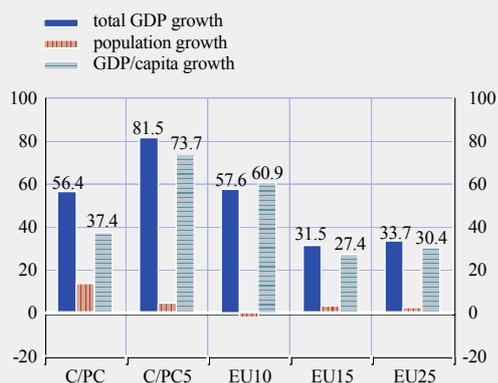
	1990	1993	1997	2001	2005
Albania	9.5	11.4	14.4	16.8	18.7
Bosnia and Herzegovina	-	-	-	22.4	23.2
Croatia	37.1	29.3	37.2	37.7	44.4
Macedonia	27.1	23.1	23.2	21.9	23.3
Serbia and Montenegro	-	-	-	-	-
<i>Serbia</i>	-	-	-	19.9	24.7
<i>Montenegro</i>	-	-	-	20.6	21.8
Turkey	26.3	29.1	29.1	24.1	25.9
<b>Weighted averages</b>					
C/PC (*)	-	-	-	24.0	26.3
C/PC 5 (*)	-	-	-	23.8	27.6
C/PC 4 (**)	26.3	28.1	28.8	24.5	26.6
C/PC 3 (***)	26.1	22.4	27.0	27.6	31.6
EU10	34.6	33.3	38.4	39.8	45.4
EU25	-	-	86.4	86.9	88.0
<b>Standard deviations</b>					
C/PC (*)	-	-	-	7.3	9.0
C/PC 5 (*)	-	-	-	8.1	10.1
EU10	12.0	12.4	14.3	14.0	13.9

Sources: WIIW Handbook of Statistics, 2006, with the exception of total GDP for Turkey (Eurostat) and population and employment for the EU 15, Cyprus, Malta and Turkey (GGDC).

Note : (\*) C/PC 5 and C/PC include RS rather than SM, (\*\*) C/PC 3 comprises Albania, Croatia and the former Yugoslav Republic of Macedonia, (\*\*\*) C/PC 4 comprises the C/PC 3 and Turkey.

**Chart 2 Total output, population and income per capita growth, 1993-2005**

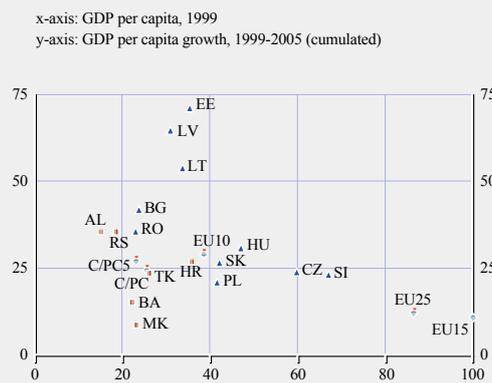
(GGDC dataset; GDP per capita in GK PPPs, 1990 USD)



Source: ECB calculations based on data from the GGDC Total Economy Database, January 2007, using total GDP in 1990 US dollars (converted at GK PPP).

**Chart 3 Absolute convergence**

(EU15 = 100; WIW dataset, GDP per capita in EKS PPPs)



Sources: WIW, Handbook of Statistics, 2006; Eurostat for total GDP in EKS PPPs (EUR millions, current prices) and population of Turkey; GGDC for real growth of GDP per capita.

On average, total output growth was roughly similar in the C/PC and the EU10 countries between 1993 and 2005 (56% versus 58% cumulated growth; Chart 2), while income per capita growth was slower in the C/PC (37% versus 61%). This is due to positive population growth in the C/PC (+13.8%, mainly driven by Turkey), compared with -0.2% in the EU10. Excluding Turkey, both total output and per capita income increased more rapidly in the C/PC5 than in the EU10.<sup>8</sup>

### 2.3 INITIAL PER CAPITA INCOME AND GROWTH

Countries with a lower level of income are expected to grow faster than richer countries (*absolute convergence*), provided that the steady state level of income is the same for all countries. This assumption is a strong one, as the investment rate, the institutional set-up, and macroeconomic and financial variables vary across countries, implying that the steady state level will be different. Against this background, *conditional convergence*, accounting for these differences, has become the most tested proposition of growth theory. However, given the similar post-transition experience and the current status of the EU membership prospects of the countries under review, it may be justified to assume a sufficient degree of homogeneity,

providing the basis for an analysis of absolute convergence, at least as a first approximation.<sup>9</sup>

The results suggest that for the group of C/PC countries, a rough pattern of absolute convergence can be observed for the interval between 1999 and 2005 (Chart 3), but not for the period expanded to 1993. For the EU10, by contrast, absolute convergence is generally observable for the entire period between 1993 and 2005, except for in Bulgaria and Romania.

Albania and Bosnia and Herzegovina were among the C/PC countries with the lowest levels of income per capita relative to the EU15 in 1993, and recorded the highest rates of economic growth relative to the C/PC average during the catching-up phase between 1993 and 2005. The former Yugoslav Republic of Macedonia and Serbia and Montenegro were

8 Given a lower level of initial income per capita in the C/PC countries, this is in line with what theory predicts. However, it should be noted that the post-1993 growth of income per capita in the C/PC5 also reflects the sizeable post-war recovery in Bosnia and Herzegovina during the late 1990s.

9 Previous studies have also investigated and validated empirically the concept of absolute convergence across entities linked by various degrees of political and economic integration, such as the US states (Barro and Sala-i-Martin, 2004), Japanese prefectures (Barro and Sala-i-Martin, 1992), regions within EU countries (Barro and Sala-i-Martin, 1991), Indian states (Cashin and Sahay, 1995), and South Pacific countries (Cashin and Loayza, 1995).

also below the average level of C/PC income per capita in 1993; however, due to political turmoil and the slow pace of reforms, they had sluggish rates of growth during subsequent years. Absolute convergence became more visible among the C/PC countries after 1999, although the pattern is not entirely clear (Chart 3). In particular, Albania and Serbia – the countries with the lowest income per capita level in the C/PC group in 1999 – achieved the highest average growth of per capita income during 1999-2005. However, the position of Croatia – which started the period with the highest GDP per capita in the group and achieved higher than average growth – weakens the pattern of absolute convergence. These results suggest that differences in macroeconomic policy and institutional reforms must be taken into account when analysing the convergence of the countries under review, as we do in the next chapter.

#### 2.4 CONTRIBUTIONS OF TOTAL FACTOR PRODUCTIVITY, LABOUR AND CAPITAL TO GROWTH

In order to assess future prospects for growth, it is useful to disentangle the driving forces of growth. To this end, we compute the contributions of TFP, labour and capital to growth in the C/PC5 and the EU10 countries. As TFP cannot be directly measured, its growth rate is calculated as a residual, assuming a classic Cobb-Douglas production function. In particular, we use the following calculation:

$$TFP_t / TFP_{t-1} = \frac{GDP_t / GDP_{t-1}}{(K_t / K_{t-1})^\alpha (L_t / L_{t-1})^{1-\alpha}},$$

where K and L represent the capital stock and employment, and  $\alpha$  and  $(1-\alpha)$  are the corresponding shares of capital and labour in GDP.

In the absence of reliable and comparable data on capital stocks in the countries reviewed, we approximate the series of real capital stock levels from real GDP and GFCF data, starting in 1991. We use the perpetual inventory method, i.e.  $K_t = K_{t-1}(1-\delta) + I_t$ , where  $I_t$  is the real GFCF in year  $t$ , and  $\delta$  is the annual rate of depreciation of the

capital stock, assumed to be  $\delta = 0.07$  following Arratibel et al. (2007). We approximate the initial capital stock levels in 1991 using the ratios of capital stock to GDP provided by Doyle et al. (2001) for the Czech Republic (2.8), Hungary (1.9), Poland (1.7), Slovakia (2.6) and Slovenia (2.1). We also use the average ratio of the five countries above (2.2) to approximate the initial capital stock levels in 1991 for Albania, Croatia, the former Yugoslav Republic of Macedonia, Bulgaria and Romania, in 1992 for Estonia and Lithuania, in 1993 for Latvia, in 1997 for Bosnia and Herzegovina and in 1998 for Serbia and Montenegro.<sup>10</sup> Finally, in line with the literature, we assume  $\alpha = 0.35$  (i.e. the share of capital in GDP).<sup>11</sup>

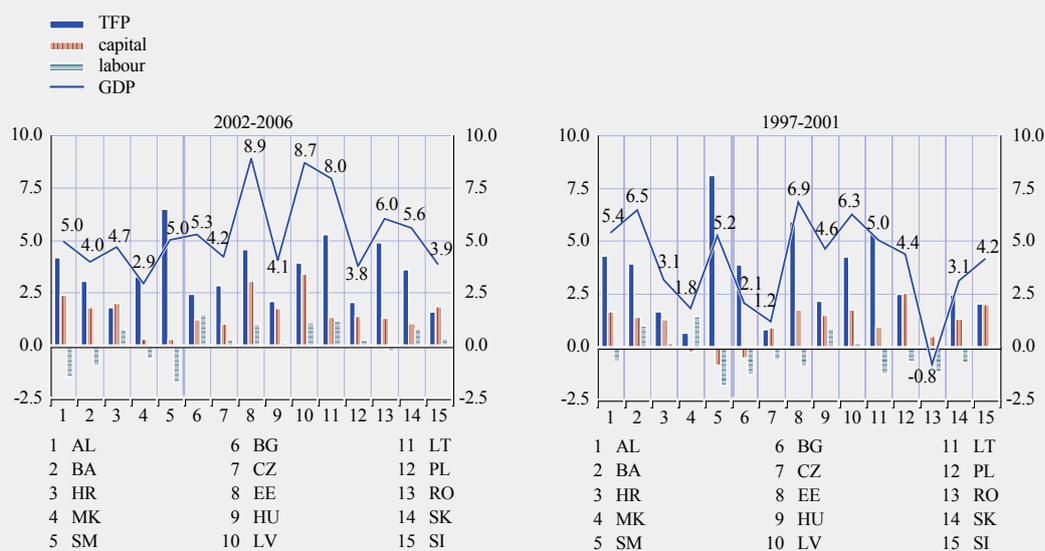
Based on these calculations, TFP growth was the main contributor to economic growth in the C/PC5 countries between 1997 and 2006, followed by capital accumulation. A similar pattern was observed for the EU10. By contrast, labour made only a marginal or – in particular for the C/PC5 countries – even negative contribution (Chart 4).<sup>12</sup> The contribution of labour was negative particularly in countries where employment may be underreported owing to the large share of the informal sector in the economy, such as in Albania (35% of GDP), Bosnia and Herzegovina (37%)

10 We were not able to use 1991 as the initial year when building the capital stock series for the Baltic countries, Bosnia and Herzegovina and Serbia and Montenegro due to missing observations for the early years in the GFCF data. However, we do not expect this drawback to alter our results, as using later-starting series for Bosnia and Herzegovina and Serbia and Montenegro is consistent with the assumption that these countries were less capital-intensive than the rest of the group.

11 To check the robustness of our results, we have used two alternative methods to estimate the capital stock. (1) Under the first method, we have assumed that the capital stock was zero at the beginning of transition (end-1989) and used the law of motion of capital with investment data (GFCF) starting in 1990 (available for all transition countries but the Baltic states, Bosnia and Herzegovina, Serbia and Montenegro and Turkey) to build the capital stock. The key disadvantage of this method is that the growth of the capital stock is probably overstated, owing to the low levels in the early years. Using this approach, we find that the contribution of capital accumulation to economic growth was at least as large as that of TFP growth, even during 2002-06. (2) Under the second method, we have followed the approach of Arratibel et al. (2007), which uses the growth of GFCF as a proxy for the growth of the capital stock. The results are broadly similar to those reported here.

12 Similar results have been found by Doyle et al., 2001; European Commission, 2004; IMF, 2006a; and Arratibel et al., 2007.

Chart 4 Contributions of TFP, capital and labour to GDP growth



Sources: GGDC (for real GDP and employment growth); IMF World Economic Outlook for data on real GDP and GFCF (constant prices, national currencies, billions).  
 Note: For reasons of data availability, the averages for Bosnia and Herzegovina cover the intervals 1999-2001 and 2002-05, and for Serbia and Montenegro 2000-01 and 2002-05 only.

and Serbia and Montenegro (39%) (Schneider, 2004). Among the C/PC5, the contribution of labour was only positive in Croatia, which is the most developed country within the group. Therefore, one caveat is that our findings may underreport the contribution of labour to growth in countries where a large informal sector is responsible for employment that is not reflected in the official figures.

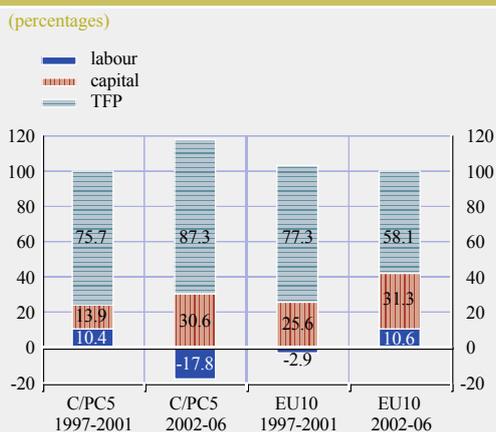
Besides TFP, capital accumulation has also been an important driver of growth in several countries. Our calculations suggest that investment accounted for more than one-third of the cumulated effect of TFP, labour and capital on growth in Croatia throughout the entire decade, and in Albania and Bosnia and Herzegovina during the most recent years (2002-06). In Croatia, the contribution of capital exceeded slightly that of the TFP in the second period. However, in the former Yugoslav Republic of Macedonia and Serbia and Montenegro the contribution of capital was negative in 1997-2001 and comparatively low in 2002-06, as recovery started relatively late,

and owing to ethnic or political turmoil, capital inflows and investment were still subdued.

Given their status as transition economies, the countries under review had been expected to show TFP growth – in the form of a more efficient use of inputs in production and better management – contributing considerably to output growth. Structural reforms, such as privatisation, deregulation of product and labour markets, openness to trade and FDI and technology transfers were deemed likely to drive TFP growth (Arratibel et al., 2007). However, it is thought that TFP growth might decline once the inefficiencies of central planning are completely eliminated (Iradian, 2007).

Chart 5 shows that as transition started late and gained speed only in the second half of the 1990s or early 2000s in the region, the contribution of TFP to economic growth has increased over time for the C/PC5 countries, whereas it has declined notably for the EU10 countries over the last decade. The role of capital accumulation has increased for both country groups during

Chart 5 Average contributions of TFP, capital and labour to GDP growth



Sources: ECB calculations using data from the GGDC Total Economy Database (for real GDP and employment growth) and the IMF World Economic Outlook (for real GDP and GFCF at constant prices and in national currencies, billions).

the same period but has remained significantly below that of TFP. The average contribution of labour to growth has become negative in the C/PC5 countries, whereas it has become positive in the EU10 group. The results reflect the less advanced capacity of the C/PC relative to the EU10 countries to deal with unemployment and labour market mismatches (which will be analysed in more detail in Chapter 4), as well as the relatively larger share of the informal sector in the C/PC economies.

### 3 CONDITIONAL CONVERGENCE IN EMERGING EUROPE

In Chapters 3 and 4 we follow two different avenues to gain more insight into the driving forces of growth. First, we conduct an econometric exercise to investigate whether there is evidence for conditional convergence of the transition economies of central, eastern and south-eastern Europe. In Chapter 4, labour markets and capital accumulation are analysed in more detail, since these may be key for ensuring further strong growth in the countries concerned.

#### 3.1 INTRODUCTION: ABSOLUTE VERSUS CONDITIONAL CONVERGENCE

This chapter provides a rigorous analysis of whether the relatively poor countries in the region have grown faster than the richer countries. To this end, the sample is broadened to all transition economies in central, eastern and south-eastern Europe in order to generate more reliable results on the basis of a larger number of observations.<sup>13</sup> In particular, we study the effects on growth of GDP per capita (as a determinant of growth according to neoclassical theory) and macroeconomic policies and institutional quality.

As discussed in Section 2.3, plotting the levels of initial GDP per capita against subsequent growth shows a rough pattern of absolute convergence for the C/PC countries in the period between 1999 and 2005, but not in 1993-2005. Furthermore, the cross-country regression of GDP per capita growth (averaged for 1994-2005) on the initial log level of GDP per capita in 1993 (as the sole explanatory variable) shows no significant correlation between the two series, irrespective of whether all countries in central, eastern and south-eastern Europe are taken together or the C/PC5 and EU10 are considered separately.<sup>14</sup> The same holds for panel regressions, showing no significant relationship between the annual growth of GDP per capita averaged for 1994-97, 1998-2001 and 2002-05 (as the dependent variable) and the corresponding log

levels of initial GDP per capita in 1993, 1997 and 2001 (as the explanatory variable). Thus, the absolute convergence hypothesis can be rejected for the C/PC5 and EU10 countries, taken either together or separately.<sup>15</sup>

The finding of no absolute convergence suggests that, apart from the initial GDP per capita level, differences in macroeconomic policies and the stage of economic reforms have also had an impact on the relative growth performance in the region. Therefore, in the remainder of this chapter we examine conditional convergence for the expanded sample of countries in the period between 1993 and 2005, in order to investigate the importance of per capita income, macroeconomic policies and the quality of institutions as determinants of growth in the countries under review.

#### 3.2 LITERATURE

The conditional convergence hypothesis has been confirmed by a large body of research (see e.g. Barro and Sala-i-Martin, 2004 and Bloom, Canning and Sevilla, 2002) using various datasets and econometric techniques. Traditional control variables that seem to be robustly significant across specifications include initial GDP, measures of macroeconomic stability, educational attainment and trade openness. Furthermore, there is growing evidence on the importance of institutions for growth. In their pioneering empirical work, Barro and

13 Given the focus on the transition economies in the region, we use the EU10 and the C/PC5 country groups, excluding Turkey – the only non-transition economy in the sample.

14 We do not present the detailed results here. In the cross-sectional regression of average growth on initial GDP the coefficient estimate is negative but not significant for all countries (-0.020, s.e. = 0.018), as well as for the C/PC5 (-0.067, s.e. = 0.052) and the EU10 countries (-0.001, s.e. = 0.019).

15 The panel regression generates coefficient estimates that either have the “wrong” sign or are not significant (or both), whether for all countries (0.011, s.e. = 0.010), or separately for the C/PC5 (-0.006, s.e. = 0.015) and the EU10 (0.014, s.e. = 0.012). Moreover, the fixed effects model does not receive support when we test the link between growth and initial GDP per capita without control variables, whether for all countries (under the null hypothesis that intercepts are the same, the p-value is 0.13) or for the C/PC5 (p-value = 0.17) and the EU10 (p-value = 0.101) taken separately.

Sala-i-Martin (1994) find that political instability has a statistically negative impact on growth. In a study more directly focused on institutions, Kaufmann et al. (1999a) provide evidence of a strong relationship between the quality of governance and per capita GDP. There is also a substantial body of research on the importance of the financial system for economic growth. The econometric framework is provided by King and Levine (1993a, 1993b), in which growth is regressed on control variables and quantitative indicators measuring the depth and the size of the financial system. The financial system has a positive effect on growth to the degree that it supports capital accumulation and productivity.

The evidence for conditional convergence is much weaker for transition economies, though. Studies of the earlier stages of transition often found that none of the variables suggested by classical growth theory (initial per capita income, secondary school enrolment and the investment rate) were significant (e.g. Campos, 2001). The degree of initial distortions and the speed of liberalisation seem to have dominated the early stages of transition, and economic reforms only affect productivity with a lag (Polanec, 2004). For this reason, the focus of the literature on growth in transition has shifted somewhat towards analysing the importance of structural factors and policies in determining growth. For example, Fisher, Sahay and Vegh (1996a, 1996b) find a positive and statistically significant relationship between growth and fiscal surpluses, foreign aid and liberalisation, as well as a negative and significant link between growth, inflation and initial income.

Moreover, a number of studies find that institutions are relevant in explaining differences in the growth performance of transition countries. Indicators measuring institutional quality were first found to matter in transition countries by Brunetti et al. (1997). Havrylyshyn and van Rooden (2000) and Grogan and Moers (2001) confirm the importance of the institutional framework for growth while stressing the key role of macroeconomic stabilisation reforms.

According to the theoretical literature, FDI also contributes significantly to stimulating economic growth in emerging market economies by improving technology and productivity (Borensztein et al., 1998). However, the empirical evidence on the importance of FDI for growth is somewhat mixed. The majority of studies using large samples of developing and emerging market economies find that FDI matters only when other factors are present. For example, Borensztein et al. (1998) argue that the effect of FDI on growth depends on the level of human capital. Alfaro et al. (2003) find that FDI positively impacts on economic growth in countries with sufficiently developed financial markets. By contrast, focusing on transition economies, Campos and Kinoshita (2002) suggest that FDI is an important factor in explaining economic growth irrespective of the level of human capital. The authors consider this result as complementing that of Borensztein et al. (1998), and attribute it to the fact that most transition economies lie above the threshold level of human capital.

The empirical evidence is similarly mixed with regard to the relationship between the financial system and growth. On the one hand, Aziz and Duenwald (2002) and Fink et al. (2005) do not find evidence for a positive link. On the other hand, Mehl, Vespro and Winkler (2006) argue that the quality of finance does indeed matter for growth, while pointing to some limitations of previous studies (i.e. not controlling explicitly for growth dynamics, omitted variables and endogeneity).

### 3.3 ECONOMETRIC FRAMEWORK

We use panel econometric analysis to test for conditional convergence between 1993 and 2005<sup>16</sup> on a sample of 15 transition economies (i.e. the C/PC5 countries in the Western Balkans and the EU10 countries).

<sup>16</sup> We deliberately exclude the period between 1990 and 1993 in order to abstract from the early transition years characterised by the economic collapse after the fall of the centrally planned systems.

The empirical growth literature generally employs two econometric methods to account for the determinants of growth. In the cross-sectional approach growth rates averaged over the entire time period represent the dependent variable, while the initial level of income per capita and contemporaneous averages of control variables serve as explanatory variables (Mankiw, Romer and Weil, 1992; King and Levine, 1993a). The panel approach takes both the cross-sectional and the time series components of the dataset into account, either by using annual observations or by taking averages of the dependent and explanatory variables over non-overlapping intervals, as well as the initial level of GDP per capita for each interval as one of the regressors (Barro and Sala-i-Martin, 2004; Beck, Levine, Loayza, 2000).

We use panel regressions, as the panel approach accounts not only for the variation across countries but also for the time series dimension of the data. It can explain whether changes in GDP per capita, macroeconomic policies and the speed of transition reforms over time affect economic growth. Thus, the variation of explanatory variables over time (such as the level of GDP per capita at the beginning of each interval) provides additional explanatory power and degrees of freedom for the regression analysis. Moreover, the cross-sectional regression would fail to take into account time periods in which there was an unusual growth performance, such as the severe recessions associated with financial crises and ethnic turmoil during the 1990s, events which we capture by using dummy variables in the panel regression. The cross-sectional approach may also generate biased estimates due to the omission of country-specific effects (i.e. those generated by idiosyncrasies such as geographic location), a problem which we avoid by using fixed effects to control for the unobserved heterogeneity in the ordinary least squares (OLS) and two-stage least squares (2SLS) regressions. Similarly, in order to avoid the bias caused by unobserved country-specific effects, we difference the regression equation with annual data using the general method of moments (GMM) difference

and system estimators developed by Arellano and Bond (1991) and Arellano and Bover (1995). Nonetheless, the cross-sectional regression does not take into account the endogeneity of explanatory variables (e.g. investment), a problem which we address with the 2SLS and GMM techniques, with both interval and annual panel data, by using lagged values of the corresponding variables as instruments under the assumption of weak exogeneity (i.e. explanatory variables can be affected by the current and past, but not by the future realisation of the growth rate). Finally, the panel approach allows us to report cluster standard errors that are robust to both arbitrary heteroskedasticity and arbitrary intra-group correlation within countries.

The analysis is performed with datasets of different frequencies.

(1) *Panel approach with four-year interval averages.* Using OLS and 2SLS regressions, we take the dependent variable (growth of GDP per capita) and several explanatory variables (investment, government balance and inflation) averaged over non-overlapping periods (1994-97, 1998-2001 and 2002-05). As in Barro and Sala-i-Martin (2004), the set of explanatory variables also includes the corresponding initial levels of GDP per capita in the years before the start of each interval (1993, 1997 and 2001). Nevertheless, when comparing simple OLS with the fixed effects model, we reject the null hypothesis that intercepts are the same for all countries, a finding which supports the fixed effects model.<sup>17</sup> The main advantage of the dataset with averages over time intervals is that the results are not influenced by idiosyncratic economic dynamics at business cycle frequency. However, one notable disadvantage is the reduction of the number of observations, i.e. with 15 countries and three time intervals, the dataset allows for a maximum of 45 observations.

17 The F-statistic is computed by comparing the restricted OLS model (in which all intercepts are the same) with the unrestricted model (with dummy variables for all countries), using  $F(2, n) = [(SSE_r - SSE_u)/2] / [(SSE_u/n)]$ .

(2) *Panel approach with annual data.* In the second approach, we use the dataset with annual observations without averaging over time periods, thus gaining a more comfortable number of observations (15 countries, 12 years). As the dependent variable in the growth regression we use the annual growth rates of GDP per capita. As the core explanatory variable we use the levels of GDP per capita (in natural logarithms) in the year prior to that for which growth is measured. In addition, we use contemporaneous annual values for inflation, government balance and the exchange rate regime indicators, lagged values for the FDI stock and values for the institutional indicators in available years as explanatory variables. One disadvantage of the panel approach with annual data is its vulnerability to cyclical demand-related factors, which introduces extra “noise” into the regression. However, in order to prevent the temporary fluctuations of GDP per capita from affecting the results, we use the predicted values for GDP per capita levels (in natural logarithms) obtained from their regression on a linear annual trend for each country. Another disadvantage is that the level of GDP per capita lagged by one year might be too recent to explain the real convergence process.<sup>18</sup>

We test several explanatory variables for endogeneity, which allows us to choose between OLS and 2SLS.<sup>19</sup> We thus find proof of endogeneity for investment and use its one-period-lagged values as an instrumental variable.<sup>20</sup> We report the results of fixed effects 2SLS, with the standard errors clustered by countries.

We also use dynamic panel techniques with the annual dataset, such as the two-step difference and system GMM estimators described in detail by Arellano and Bond (1991) and Arellano and Bover (1995), the methodology of which is described in detail in Box 3.

18 We chose not to use the initial levels of GDP per capita in 1993 as the core explanatory variable with data at annual frequency. Since the GDP per capita in 1993 is country-specific but constant over time, the method would be equivalent to estimating country-specific fixed effects while assuming them to be proportional to the GDP per capita in 1993 for each country, an assumption which is highly implausible.

19 We use the endogeneity test for explanatory variables (*endog*) implemented by the Stata command *xtivreg2*.

20 Under the null hypothesis of exogeneity, the chi-squared p-value for investment was 0.0404 in the model with fixed effects. Exogeneity can therefore be rejected at the 5% level.

### Box 3

#### TWO-STEP DIFFERENCE AND SYSTEM GMM ESTIMATORS

Our econometric specification is given by the model:

$$y_{it} = \alpha' X_{it} + \beta' W_{it} + v_i + \varepsilon_{it} \quad ,$$

where  $y_{it}$  is the annual growth rate for country  $i$  and year  $t$ ;  $X_{it}$  is a vector of strictly exogenous covariates, dependent on neither the current nor the past error  $\varepsilon_{it}$  (such as the exogenous war or crisis dummy variables);  $W_{it}$  is a vector of potentially endogenous variables that may be correlated with current or past errors  $\varepsilon_{it}$  (i.e. investment, inflation and government spending); finally,  $v_i$  is the unobserved, time-invariant country-specific effect. The equation has the following properties:

$$E(v_i) = E(\varepsilon_{it}) = E(v_i \varepsilon_{it}) = 0 \quad \text{and} \quad E(\varepsilon_{it} \varepsilon_{js}) = 0 \quad \text{for } i \neq j \text{ and } s \neq t .$$

The method involves several steps: (1) first-differencing the regression equation to eliminate the country-specific effect  $v_i$ , and thus avoid omitted variable bias:

$$y_{it} - y_{it-1} = \alpha' (X_{it} - X_{it-1}) + \beta' (W_{it} - W_{it-1}) + \varepsilon_{it} - \varepsilon_{it-1},$$

then (2) using values of  $W_{it-s}$  in levels ( $s \geq 2$ , i.e.  $W_{it}$  is lagged by at least two periods) as instruments for the term  $W_{it} - W_{it-1}$  that is probably correlated with the differenced error term  $\varepsilon_{it} - \varepsilon_{it-1}$ . Key necessary assumptions are: (a) the explanatory variables  $W_{it}$  are weakly exogenous, i.e. instruments  $W_{it-s}$ ,  $s \geq 2$ , are not correlated with current or past errors, and therefore not correlated with  $\varepsilon_{it} - \varepsilon_{it-1}$ ,<sup>1</sup> and (b) there is no serial correlation in the error term. In this context, we obtain the Arellano and Bond (1991) two-step “GMM difference” estimator from the following moment conditions:

$$E[W_{it-s}(\varepsilon_{it} - \varepsilon_{it-1})] = 0 \text{ for } s \geq 2 \text{ and } t = 3, \dots, T.$$

Finally, we obtain the GMM “system estimates” by adding the original equation in levels to the equation in differences, a method which generates more efficient estimates due to the use of additional instruments, i.e. variables in levels  $W_{it}$  are instrumented by their own first differences  $W_{it-1} - W_{it-2}$ , under the assumption that these differences are uncorrelated with the unobserved country effects (Arellano and Bover, 1995). For both sets of GMM estimates, we use the finite-sample Windmeijer correction in order to avoid the downward bias in the standard errors.

1 Endogeneity tests show that investment is endogenous in the dataset with annual frequency. Therefore, we use the second and third lags of investment as instruments in the difference and system GMM estimations, under the assumption of weak endogeneity.

### 3.4 DATA

The variables used are described in Table 3.<sup>21</sup> The sample consists of the 15 transition economies under review, i.e. the C/PC5 and EU10 countries. Moreover, for the sake of robustness we drop outliers. For instance, Bosnia and Herzegovina recorded 58% and 37% annual growth during the post-war recovery years 1996 and 1997 respectively, whereas annual growth did not exceed 15% in any other country. In Bulgaria annual inflation reached 1,061% in 1997 owing to the unusually severe economic crisis, whereas none of the other countries had inflation rates exceeding 200% during the review period. Therefore, we exclude the observations on these countries for the corresponding periods from the analysis. We also construct dummy variables to account for episodes of political and financial turmoil (*war* and *crisis*), which we assume to be exogenous as described in Table 3.

According to convergence theory, poorer countries are expected to record higher economic growth. We test this hypothesis using

the growth rate of GDP per capita (the variable *growth*) as the dependent variable and the lagged values of income per capita in natural logarithms (*lngdp*) as the core explanatory variable across all specifications (i.e. the natural logarithm of GDP per capita in the year before the start of each interval with averaged data and the fitted values of the natural logarithm of GDP per capita lagged by one year with annual data). The coefficient on *lngdp* is expected to be negative for the conditional convergence hypothesis to hold in our sample, i.e. when differences in macroeconomic policies and other key characteristics across countries and time are controlled for, low values of income per capita would be associated with higher growth rates in subsequent years.

21 One additional variable that according to theory may be important for growth is the human capital stock. We have used educational attainment of the labour force measured in average years as a proxy. However, this variable was not statistically significant in any of the specifications, which may be due to the fact that we had very few observations (data was available only until 2000 and for a limited number of countries). On the other hand, countries in our sample are relatively homogeneous with respect to educational attainment and hence it is plausible that there was not enough variability in the data to make it statistically significant.

Table 3 Data sources and the construction of variables

Variables	Panel with interval averages	Panel with annual data	Source
growth	Simple averages of GDP per capita growth rates for the periods 1994-97, 1998-2001 and 2002-05	Annual growth rates	GGDC
lngdp	Natural logarithm (ln) of GDP per capita in 1993, 1997 and 2001	Fitted values of the natural logarithm of GDP per capita lagged by one year, computed from the regression of the log of GDP per capita on a linear annual trend for 1993-2005 by country	GGDC
govbal	Simple averages of government balance as a percentage of GDP for 1994-97, 1998-2001 and 2002-05	Contemporaneous annual values	IFS
inflation	Simple averages of inflation for the periods 1994-97, 1998-2001 and 2002-05	Contemporaneous annual values	IFS
gfcf	Simple averages of GFCF as a percentage of GDP for the periods 1994-97, 1998-2001 and 2002-05	Contemporaneous annual values	UNCTAD World Investment Report
fdi	Initial values for the FDI stock in 1993, 1997 and 2001	Lagged values of the FDI stock	UNCTAD World Investment Report
open	Simple averages of trade openness (exports plus imports as a percentage of GDP) for the periods 1994-97, 1998-2001 and 2002-05	Contemporaneous annual values	Penn World Tables
tot	Simple averages of the terms of trade for the periods 1994-97, 1998-2001 and 2002-05	Contemporaneous annual values	IMF World Economic Outlook
heritage	Overall index of economic freedom for the years 1995, 1998 and 2002	Overall index of economic freedom for the years 1995, 1998 and 2002	Heritage Foundation index of economic freedom
ebrd	Overall transition indicator for the years 1989, 1993, 1997 and 2001	Overall transition indicator for the years 1989, 1993, 1997 and 2001	EBRD transition indicators
claims	Simple averages of annual data on claims on the private sector as a percentage of GDP for the periods 1994-97, 1998-2001 and 2002-05	Contemporaneous annual values	IFS
xrate	Simple averages of quarterly IMF exchange rate regime classifications for the periods 1994-97, 1998-2001 and 2002-05	Contemporaneous annual averages of quarterly data on IMF exchange rate classifications	IMF, Annual report on exchange arrangements and exchange restrictions
war	Dummy variable that takes the value 1 for Bosnia and Herzegovina (1992-95), Croatia (1991-95), FYR Macedonia (2001-02) and Serbia and Montenegro (1991-2001), for individual years or for the corresponding time intervals.		
crisis	Dummy variable that takes the value 1 for Bulgaria (1996-97), the Czech Republic (1997), Estonia (1999), Latvia (1995, 1999), Lithuania (1999), Romania (1997-99), Albania (1997) and Croatia (1999), for individual years or for the corresponding time intervals.		

We control for the impact of macroeconomic stabilisation policies using inflation (*inflation*) and fiscal balance as a percentage of GDP (*govbal*). We expect higher inflation to have a negative impact on income growth (negative coefficient). Growth is likely to be negatively affected by large fiscal deficits, as they may reflect unsustainable public expenditure positions.<sup>22</sup> Therefore, we expect a relatively small government deficit to have a positive impact on economic growth (positive coefficient).

The impact of investment on economic growth is captured by two variables: gross fixed capital formation as a percentage of GDP (*gfcf*), measuring the overall level of investment in the country, and FDI as a percentage of investments

22 At the same time, the structure of government spending may matter. Gupta et al. (2004) show that a higher proportion of spending on education and health benefits has a positive impact on potential growth as long as macroeconomic policies are sound.

(*fdi*).<sup>23</sup> The classical growth literature attaches substantial weight to the importance of investment for potential growth in the medium to long term, as it reflects higher capital accumulation which may directly lead to higher output.<sup>24</sup> FDI is believed to contribute to economic growth and real convergence in at least two ways. First, technological and know-how spillovers may boost technological progress, thereby contributing to an increase in labour productivity. Second, it provides financial resources, which in turn increase capital accumulation.<sup>25</sup>

The relative importance of trade for conditional convergence is measured by two variables: trade openness (*open*) and the terms of trade (*tot*). Trade openness is measured as the ratio of exports plus imports to GDP, whereas the terms of trade correspond to the ratio of the price of export commodities to the price of import commodities. Trade openness is closely related to country size, i.e. bigger countries tend to be less open and rely more heavily on domestic trade. Therefore, in order to eliminate this effect, we first regress trade openness on the population and the geographical size of the country, and then use the fitted values in the growth regressions.<sup>26</sup> A positive coefficient on openness would indicate a positive impact of trade and tariff policies on growth. On the other hand, the terms of trade – defined as the price of exports in terms of imports – reflect the income position of domestic residents. An appreciation of the terms of trade (i.e. imports become relatively cheaper) reflects an improved income position, which can be translated into higher domestic investment and higher output growth.

Many empirical studies provide evidence that institutions matter for long-term economic growth.<sup>27</sup> In our specification we use data from the Heritage Foundation and the EBRD to measure the quality of institutions and the extent of market reforms across time. First, we construct a simple average of the ten indices of economic freedom (*heritage*), using the corresponding scores provided by the Heritage Foundation.<sup>28</sup> Second, we construct a measure of progress in transition (*ebrd*), as a simple average of the nine main EBRD transition indicators.<sup>29</sup> When

the quality of institutions and market reforms do indeed matter for income growth, we expect positive coefficients on these variables.

Another factor that has been found important for growth in many empirical studies is the financial system. One of the quantitative indicators that can be used to measure the development of the financial system is the financial intermediation ratio, defined as the ratio of credit to the private sector to GDP. Following this definition and using data from the International Financial Statistics (IFS) database we construct the variable *claims*, which measures the flow of financial resources to households and firms. The impact of financial intermediation on growth is found in the literature to be positive and significant (Levine, 1998; and Levine, Loayza and Beck, 2000). This finding has been also confirmed for transition economies (Mehl, Vespro and Winkler, 2006).

Finally, we use an IMF classification of exchange rate regimes for the countries under review (*xrate*). These scores are calculated at quarterly frequency and range from 1 to 8, where higher scores show greater flexibility of the exchange rate regime.<sup>30</sup> Ghosh et al. (1996) explain that the exchange rate regime can influence economic

23 Data constraints restrict us to using aggregate investment rather than a more detailed breakdown by sectors and uses (infrastructure, education, health, etc.). We expect this limitation to affect the significance of the link between aggregate investment and growth.

24 As explained in Chapter 2, growth in the C/PC countries has been driven mainly by TFP rather than by capital and labour.

25 The empirical evidence on the impact of FDI on growth is somewhat mixed. While some authors find a strong positive relationship between FDI and growth, Carkovic and Levine (2002) find that after controlling for endogeneity and other determinants of growth, FDI is not significant. Mileva (2007) finds that for some transition countries, FDI flows crowded in domestic investment and thus contributed to capital accumulation, which is an important driver of growth. However, countries at a later stage of their transition relied more on foreign loans to raise domestic capital formation.

26 See e.g. Barro and Sala-i-Martin (2004).

27 See e.g. IMF (2003) and Alesina et al. (2003). A different opinion is provided by Glaeser et al. (2004).

28 These ten indices are measures of economic freedom in the following areas: business regulation, trade, fiscal, government, monetary, investment, financial, property rights, corruption and labour regulation. The index has values between 0 and 100; the higher the number, the higher the score of economic freedom.

29 See Footnote 5 on the details of these nine indices.

30 The data are published annually in the Annual report on exchange arrangements and exchange restrictions; updates are published semi-annually at <http://www.imf.org/external/np/mfd/er/index.asp>.

growth through either investment or increased productivity. They find that countries with fixed regimes have higher investment, while countries with flexible regimes have faster productivity growth. In their study, per capita GDP growth was slightly faster under flexible regimes. On the other hand, there is a large body of literature suggesting that corner solutions (i.e. either fixed or flexible exchange rate regimes) may be preferable to other exchange rate arrangements (i.e. soft pegs). Fischer (2001) argues that the reason why countries with open capital accounts prefer corner solutions for their exchange rate regimes is that soft pegs are crisis-prone and not viable over long periods. Therefore, one could expect a link between corner solution exchange rate arrangements and economic growth.

### 3.5 RESULTS

The results are summarised in Tables 4 and 5. Table 4 shows the estimates of the fixed effects OLS (columns 1-5) and fixed effects 2SLS (columns 6-8) regressions using panel data with time intervals. Table 5 shows the results of the fixed effects 2SLS (columns 1-4) and GMM estimation methods (columns 5-6) using panel data at annual frequency. The results can be summarised as follows:

1. Conditional convergence receives strong support in the fixed effects OLS and 2SLS regressions when using interval data. With annual data, this holds only when accounting for the quality of institutions and political stability; controlling for quantitative macroeconomic indicators alone is not enough to generate this result. Table 4 shows the results of fixed effects regressions with different specifications used. The estimated coefficients on the initial level of GDP per capita are negative and highly significant, a pattern which is consistent with conditional convergence for the transition economies under review. Similarly, in models with annual data (Table 5, columns 2-4), the estimate on lagged GDP per capita is negative and significant, but only when institutional quality (*heritage*) is controlled for.<sup>31</sup> The finding shows that

when (a) the quality of institutions, describing factors such as the extent of deregulation, property rights and corruption and (b) quantitative indicators, describing the extent of macroeconomic stabilisation (i.e. inflation and government balance) and the level of investment i.e. GFCF and the FDI stock) are controlled for, a lower level of initial GDP per capita is indeed associated with higher economic growth during the subsequent years. However, while the finding of conditional convergence is robust across the fixed effects OLS and 2SLS models used, it is not supported by the GMM estimates.

2. In fixed effects regressions the quality of institutions, while not significant itself, is needed as a control variable to confirm conditional convergence with annual data. The estimated coefficients on the institutional quality variable (*heritage*) are not statistically significant in most cases (Table 4, columns 2-5 and Table 5, columns 2-6). However, when the endogeneity of market reforms (*ebrd*) is controlled for in 2SLS models with fixed effects (Table 4, columns 6-8), we still find a positive and significant effect of market reforms with a negative and significant coefficient on GDP per capita at the same time.<sup>32</sup> Generally, it is plausible that institutional quality becomes statistically insignificant in models with fixed effects, as the cross-country differences in institutional quality may be captured by the country-specific intercepts.
3. Controlling for the quality of institutions augments the explanatory power of macroeconomic policy variables such as investment, FDI stock, inflation and

<sup>31</sup> It is also worth noting that the result is validated only with the qualitative measure of government institutions provided by the Heritage Foundation; we do not obtain similar results when using either the World Bank's Doing Business Report or the EBRD transition scores.

<sup>32</sup> When testing for endogenous regressors in fixed effects models with interval data, we find evidence that the stage of market reforms (*ebrd*) is endogenous, and therefore we use its four-year lagged values as instruments. The results are consistent with the existing literature, suggesting that the scores of market reform might be output-oriented rather than measuring inputs (Iradian, 2007).

**Table 4 Growth regression results, four-year interval averages**

Dependent variable: average growth of GDP per capita	(1) OLS, FE	(2) OLS, FE	(3) OLS, FE	(4) OLS, FE	(5) OLS, FE	(6) 2SLS, FE	(7) 2SLS, FE	(8) 2SLS, FE
Initial GDP per capita in logs	-0.10532*** (0.02703)	-0.10003*** (0.02735)	-0.09159*** (.02150)	-0.09687*** (0.03176)	-0.08312*** (0.01895)	-0.18604** (0.07377)	-0.22116*** (0.05721)	-0.22126*** (0.03785)
Investment	0.00128 (0.00089)	0.00210* (0.00119)	0.00225* (0.00126)	0.00200* (0.00124)	0.00234* (0.00131)	0.00140 (0.00156)	0.00369** (0.00188)	-0.00078 (0.00143)
Initial FDI stock	0.00140*** (0.00028)	0.00156*** (0.00033)	0.00111*** (0.00036)	0.00158*** (0.00031)	0.00116*** (0.00026)	0.00023 (0.00082)	0.00014 (0.00052)	0.00057 (0.00051)
Inflation	-0.00043 (0.00031)	-0.00003 (0.00009)	-0.00000 (0.00009)	-0.00002 (0.00009)	0.00112*** (0.00029)	-0.00007 (0.00066)	-0.00006 (0.00075)	0.00013 (0.00052)
Government balance	0.00591*** (0.00169)	0.00490*** (0.00159)	0.00197 (0.00225)	0.00484*** (0.00158)	0.00327** (0.00134)	0.00251 (0.00258)	0.00175 (0.00222)	0.00760*** (0.00186)
Heritage economic freedom index	-0.00019 (0.00079)		0.00024 (0.00086)	-0.00030 (0.00085)	0.00074 (0.00062)		0.00211* (0.00112)	
Crisis dummy			-0.01452* (0.00771)					
Exchange rate regime				-0.00120 (0.00238)				
Trade openness, filtered for country size					0.09428 (0.06296)			
Terms of trade					0.23729*** (0.06884)			
EBRD transition indicator						0.15037* (0.08979)	0.17276** (0.07304)	0.10497* (0.05560)
Claims								-0.00376*** (0.0010)
Claims x EBRD market reforms								0.00137*** (0.00032)
Number of observations	42	33	33	33	33	26	22	26
R <sup>2</sup> (centred)	0.61	0.64	0.70	0.65	0.80	0.74	0.78	0.87

Notes: Symbols denote: \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%. In brackets we report cluster standard errors that are robust to both arbitrary heteroskedasticity and arbitrary intra-group correlation. In the 2SLS regressions in columns (6), (7) and (8), we instrument the EBRD transition indicator (i.e. *ebrd*) – which fails our endogeneity test for regressors – with its four-year lagged values. FE indicates that the fixed effects approach has been used.

government balance as drivers of economic growth. The result is robust with OLS and 2SLS models, with both interval averages and annual data (Table 4 and Table 5).<sup>33</sup> We also find a positive and significant link between the terms of trade – but not trade openness – and growth in fixed effects OLS with interval data (Table 4, column 5). When the quality of institutions is controlled for, GMM also shows a significant link between growth and the sustainability of macroeconomic policies, i.e. inflation and government spending (Table 5, columns 5-6).<sup>34</sup>

4. The evidence on the impact of political and ethnic turmoil as well as financial crises on

growth is mixed. Whereas *war* dummies are not significant, *crisis* dummies do have at least weak significance in some cases (Table 4, column 3 and Table 5, columns 3 and 5-6). However, controlling for financial crises (*crisis*) decreases the significance of *govbal* (Table 4, column 3 and Table 5, column 3), a result which indicates that the

33 However, with annual data, the coefficients on inflation and government balance are significant and have the expected sign even without controlling for the quality of institutions (Table 5, column 1).

34 As already discussed, our tests show that investment is possibly endogenous in fixed effects models with annual data. In GMM, we have used lagged values of investment as instruments. The Hansen test of over-identifying restrictions shows that the null hypothesis (i.e. instruments are appropriate) cannot be rejected at the 1% level.

Table 5 Growth regression results, annual data

Dependent variable: annual growth of GDP per capita	(1) 2SLS, FE	(2) 2SLS, FE	(3) 2SLS, FE	(4) 2SLS, FE	(5) GMM, difference	(6) GMM, system
GDP per capita (lagged)	-0.06594 (0.04841)	-0.10567** (0.05202)	-0.09725** (0.03979)	-0.10605* (0.05473)	0.16985 (0.21782)	-0.04723 (0.04758)
Investment	-0.00042 (0.00175)	-0.00088 (0.00168)	0.00148 (0.00153)	-0.00089 (0.00170)	-0.00345 (0.00420)	0.00054 (.)
FDI stock	0.00103*** (0.00038)	0.00141*** (0.00038)	0.00099*** (0.00031)	0.00141*** (0.00036)	-0.00197 (0.00290)	0.00044 (0.00074)
Inflation	-0.00052*** (0.00017)	-0.00046*** (0.00011)	-0.00026*** (0.00007)	-0.00046*** (0.00011)	-0.00085* (0.00049)	-0.00123 (0.00096)
Government balance	0.00642*** (0.00131)	0.00660*** (0.00186)	0.00294** (0.00122)	0.00664*** (0.00219)	0.01559** (0.00648)	0.01254*** (0.00338)
Heritage economic freedom index		-0.00033 (0.00118)	0.00045 (0.00089)	-0.00031 (0.00124)	0.00394 (0.00626)	0.00128 (0.00114)
War dummy					0.13775 (0.11543)	0.14255 (0.08436)
Crisis dummy			-0.06302*** (0.01521)		-0.03157* (0.01531)	-0.02596* (0.01298)
Exchange rate regime				0.00019 (0.00383)		
Constant						0.41327 (0.41172)
Number of observations	170	143	143	43	127	143
R <sup>2</sup> (centred)	0.29	0.35	0.61	0.35		
Hansen test (p-values)					0.96	0.99

Notes: Symbols denote: \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%. In brackets we report cluster standard errors that are robust to both arbitrary heteroskedasticity and arbitrary intra-group correlation. FE indicates that the fixed effects approach has been used.

effects of financial crises are already captured by the government spending variable.

- Evidence is also mixed on the finance-growth nexus. The variable *claims* is negative and significant (Table 4, column 8), suggesting the counterintuitive relationship of a negative impact of financial development on growth. However, introducing an interaction between *claims* and the EBRD transition score (*ebrd*) provides the result that stronger progress in transition, i.e. a higher EBRD indicator, goes hand in hand with a positive effect of financial intermediation on growth. Indeed, for countries with a transition indicator of at least 2.8, the net average effect of *claims* on growth is not negative, but positive. Given that the EBRD indicator includes measures of the development of the banking sector, security markets, non-banking financial institutions, etc., this result suggests that in countries with more developed financial sectors there is a stronger link between credit and growth.

This is in line with previous findings of the literature, which stress the importance of the quality of the financial sector for the growth-promoting effects of financial intermediation in a transition economy context (see Mehl, Vespro and Winkler, 2006).

- We also find that exchange rate regimes have not been significantly related to growth performance (Table 4, column 4 and Table 5, column 4). While previous literature suggests a negative coefficient, i.e. fixed regimes associated with faster growth (McKinnon and Schnabl, 2003 and 2004; McKinnon, 1973; Schnabl, 2007), we find no significant evidence that either fixed or flexible exchange rate regimes would be associated with faster growth.

To sum up, there is evidence of conditional convergence in the countries under review: taking into account the quality of institutions (including deregulation, property rights and corruption),

the extent of market reforms (including the development of the banking sector, security markets and non-banking financial institutions), macroeconomic policy and investment, countries with a lower initial level of GDP tend to grow faster. However, while this finding is generally robust across different specifications, it is not supported by all methods used. Institutions play an important role, but in an indirect way, i.e. better institutions seem to support the growth-enhancing effects of traditional explanatory variables such as macroeconomic stabilisation and financial intermediation rather than directly influence the growth performance of the economies under review.

When interpreting these results, the following considerations should be made. First, the sensitivity to the methodology used may be attributed to the short sample, the relatively low number of observations and usual data limitations in the transition economy context. Second, we do find significant evidence of conditional convergence using the standard least squares regressions with fixed effects. This is a relevant finding, given the weak evidence for conditional convergence of transition economies in the literature. Third, our results do not confirm the significance of institutional variables in explaining growth, but they point to a more indirect impact of institutional quality on economic development. In particular, controlling for institutional quality and market reforms can augment the explanatory power of macroeconomic policy variables. More importantly, the effect of financial intermediation on growth seems to depend on the overall progress in transition in the countries under review.

#### 4 DETERMINANTS OF GROWTH IN THE SOUTH-EASTERN EUROPEAN COUNTRIES

Economic growth can be decomposed to show the relative contributions of labour and capital, as done in Section 2.4. According to this analysis, economic growth has been driven mainly by the growth of TFP in the C/PC countries, as is often the case in the early stages of economic transition. If these countries are to maintain high rates of growth and continue with the catching-up process, however, labour and capital will have to become increasingly important as determinants of economic growth. This chapter therefore provides an overview of the main developments in labour markets, investment and human capital in the C/PC countries since the beginning of transition. Despite some positive developments, there are still several obstacles remaining in all these areas, which may hamper growth if not properly addressed.

##### 4.1 LABOUR

Labour market performance directly affects the degree of labour utilisation, with important consequences for economic growth and per capita income levels. High employment and participation rates, a skilled workforce and the efficient allocation of labour are crucial ingredients in economic growth and real convergence for countries in the region. Against this background, this section first provides an analysis of labour productivity and labour utilisation in the C/PC countries. Given the still large gaps in labour productivity and utilisation between the countries under review and the EU15 countries, it is important to understand the changes that took place in the C/PC country labour markets in the last decade. The main findings of this section can be summarised as follows:

1. Labour productivity has improved in all countries relative to the EU15, mainly due to the expanding shares of more productive sectors in total output and due to the decline in overall employment.

2. However, labour utilisation has declined, reflecting labour market mismatches and the presence of a large shadow economy, which presumably understates employment relative to GDP.
3. Labour markets in the region are characterised by higher unemployment and lower employment and participation rates than in the euro area. However, these negative trends have been reversing in all countries in the last few years.
4. The ongoing process of economic restructuring is reflected in the changes in employment shares, i.e. the share of services has been steadily increasing, while the shares of industry and especially agriculture have been decreasing.
5. The process of economic restructuring has resulted in increased labour market mismatches, leading to high unemployment rates among workers with low levels of education as well as negative trends in long-term and youth unemployment.

##### 4.1.1 LABOUR PRODUCTIVITY AND LABOUR UTILISATION

Large gaps in income per capita still exist between the C/PC and the EU15 countries. To analyse the nature of these gaps, the following decomposition of income per capita can be used:

$$\frac{GDP}{Population} = \frac{GDP}{Employment} \frac{Employment}{Population},$$

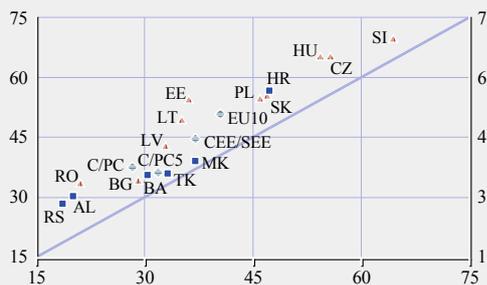
where the ratio of GDP to employment serves as a measure of labour productivity, and the ratio of employment to population measures the degree of labour utilisation (Arratibel et al., 2007).<sup>35</sup>

<sup>35</sup> It would be desirable to study labour productivity in terms of output per hour worked, since it captures the differences in working times across countries. However, due to the unavailability of data for the C/PC countries, the analysis is performed on the basis of the number of employed people. It covers the period 1998-2005 in order to avoid incongruous results, such as the low labour utilisation and the artificially high labour productivity in Bosnia and Herzegovina in the mid-1990s due to the war.

**Chart 6 Labour productivity relative to the EU15 countries**

(EU15 = 100; WIIW dataset, GDP per capita in EKS PPPs, 1990 USD)

x-axis: labour productivity, 1999  
y-axis: labour productivity, 2005

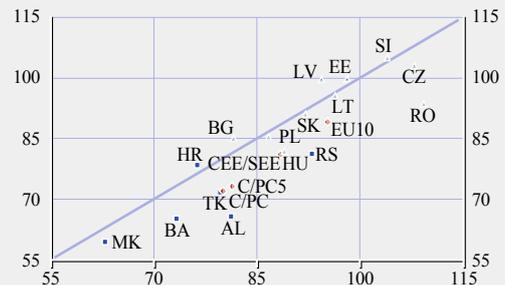


Sources: WIIW Handbook of Statistics, with the exception of total GDP in EKS PPPs (EUR millions, current prices) for Turkey (Eurostat), and population and employment for the EU15 and Turkey (GGDC).

**Chart 7 Labour utilisation relative to the EU15 countries**

(EU15 = 100; WIIW dataset)

x-axis: labour utilisation, 1998  
y-axis: labour utilisation, 2005



Sources: WIIW Handbook of Statistics, with the exception of population and employment for the EU15 and Turkey (GGDC).

Between 1999 and 2005, labour productivity – measured as real output per worker – improved in all countries relative to the EU15, although notable gaps remained. The pattern reflects not only the expanding shares of more productive sectors in total output (services in particular<sup>36</sup>), but also the decline in overall employment as a result of emerging mismatches in labour markets – namely between the increasing demand and the short supply of skilled workers – trends which are inherent in the process of economic restructuring in transition economies.<sup>37</sup>

Chart 6 plots labour productivity in the C/PC5 and the EU10 countries in 1999 (horizontal axis) and 2005 (vertical axis), expressed in percentage terms relative to the corresponding EU15 averages. This method illustrates graphically the process of real convergence in terms of labour productivity, with plots above the diagonal showing an improvement in labour productivity relative to the EU15 average between 1999 and 2005. Despite the improvement in labour productivity in the C/PC countries relative to the EU15 level, significant gaps continue to persist. This generally holds for the EU10 as well, although the gaps are in most cases smaller. By 2005, C/PC5 average productivity had reached roughly one-third of the EU15 average (37%), whereas in the EU10 it was about half. Of the

C/PC countries, Croatia stands out as having the highest level of labour productivity. However, this result may be partly driven by the low level of labour utilisation in Croatia relative to the EU15 countries (Chart 7).

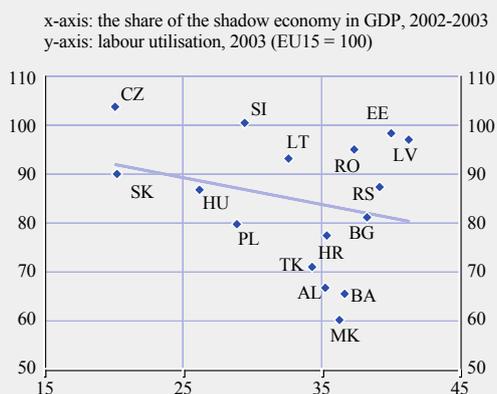
Labour utilisation – measured as total employment over population<sup>38</sup> – declined significantly between 1999 and 2005 in almost all countries under review relative to the EU15 (Chart 7). The decline probably reflects growing sectoral and regional mismatches in the labour market, stemming from, for example, an increase in demand for skilled labour and the geographical reallocation of economic activity within the countries. Labour utilisation in the C/PC countries reached only 72% of the EU15 average in 2005, with Albania, Bosnia and Herzegovina and the former Yugoslav Republic of Macedonia

36 Labour productivity is highest in the services sector in almost all countries under review, with agriculture the least productive sector in most cases. For example, in the C/PC5 productivity in services exceeded the level of overall productivity in the economy by about 30% on average in 2005 (based on EBRD and WIIW data).

37 See for example Commander and Kollo (2004).

38 The definition of labour utilisation is distinctly different from that of participation in the labour market. In principle, labour utilisation should always be lower than the participation rate, as it does not take into account the unemployed in the numerator, while having the total population, and not only the working age population (15-64 year-olds), as the denominator (see Footnote 39 in Section 4.1.2 for the definition of the labour market indicators).

**Chart 8 The size of the shadow economy versus labour utilisation**



Sources: Schneider (2004) and WIIW Handbook of Statistics, 2006.  
Note: The share of the shadow economy for Serbia and Montenegro is compared with labour utilisation in Serbia expressed relative to the EU15 level.

recording the lowest rates of close to or even below 65% of the EU15 level. We find a broadly similar picture for the EU10, although some countries recorded a slight improvement during the period, and on average labour utilisation stood closer to the EU15 average (at 89%) in 2005.

In addition to labour market frictions, the large size of the informal sector may explain the low levels of official labour utilisation in the C/PC countries, as a large shadow economy may imply an understatement of employment relative to GDP. In 2003 the size of the shadow economy in the C/PC countries was estimated in a range between 34% of GDP in Turkey and 39% in Serbia and Montenegro, significantly exceeding the corresponding estimates for the majority of the EU10 countries. Chart 8 suggests a negative correlation between the share of the shadow economy in GDP and the ratio of employment to total population, indicating that the size of the informal sector may be among the factors responsible for pushing labour productivity to artificially high levels in some C/PC countries.

#### 4.1.2 MAIN LABOUR MARKET DEVELOPMENTS

Labour market performance directly affects the degree of labour utilisation, with important consequences for economic growth and per capita income levels. High employment and

participation rates, a skilled workforce and the efficient allocation of labour are crucial ingredients in economic growth and real convergence for countries of the region.

On average, labour markets in the region are characterised by higher unemployment and lower employment and participation rates than in the euro area (Table 6).<sup>39</sup>

Differences have become even more pronounced over time, as – comparing the averages for 1997 and 2006 – unemployment continued to rise in the C/PC countries but dropped in the euro area, while employment rates rose in the euro area and declined in the C/PC. The same holds for a comparison of the C/PC and the EU10 averages. Focusing on developments in recent years suggests, however, that strong growth has had a positive impact on labour market developments in all countries under review. In particular, unemployment rates have declined or at least stabilised. In several countries, participation rates have been increasing as well, including Bosnia and Herzegovina and Serbia and Montenegro.

The ongoing process of economic restructuring is reflected in the changes in employment shares. The share of services has been steadily increasing, while the shares of industry and especially agriculture have been decreasing (Table 7). This trend has been very pronounced in most EU10 countries but can also be observed in some of the C/PC economies. Exceptions include the former Yugoslav Republic of Macedonia – where the shares of services and industry have declined while the share of agriculture has increased – and Bosnia and Herzegovina, where a shift has taken place from industry to agriculture.

<sup>39</sup> *Employment rate* = employment/working age population; *unemployment rate* = unemployment/labour force; *participation rate* = labour force/working age population, where *labour force* = employed + unemployed and the working age population refers to the number of 15-64 year-olds in the overall population (unless otherwise indicated). *Euro area* means throughout the paper the euro area as of 1 January 2001 (with 12 members, not yet including Slovenia).

**Table 6 Selected labour market indicators**

(in percentages)

	Unemployment rate		Employment rate		Participation rate	
	1997	2006	1997	2006	1997	2006
Albania	14.9	14.0	59.0**	49.7*/**	71.1	65.1*
Bosnia and Herzegovina	40.9	41.0	n.a.	29.7**	72.2	74.4*
Croatia	9.9	12.0	57.1	55.0*	64.3	64.2*
FYR Macedonia	36.1	36.0	36.5	34.1*	60.7	60.6*
Serbia	13.3	21.6	57.8	51.0*	n.a.	63.6
Montenegro	21.8	30.3*	38.0**	34.8*/**	n.a.	49.9*/**
Serbia and Montenegro	13.8	20.8	57.0	n.a.	62.0	65.5*
<b>Simple averages</b>						
C/PC	20.5	23.5	50.0	42.9	77.2	61.4
EU10	10.1	8.2	60.0	61.9	68.3	67.8
Euro area	10.5	7.9	58.4	64.5	65.9	70.3

Sources: Eurostat, national statistical institutes, WDI.

Note: C/PC average is calculated on the basis of the data availability indicated in the table.

\* indicates 2005 data, \*\* indicates working age population defined as 15 year-olds and over.

Compared with the euro area, the share of agriculture in total employment is still high in some countries, especially Albania (59%) but also Bosnia and Herzegovina, the former Yugoslav Republic of Macedonia and Turkey (20%-26%). In addition, the share of industry in total employment is significantly higher and the share of the services sector lower than the euro area average. Regional disparities have also emerged, as big cities as well as areas located close to borders with the EU and other main trading partners have experienced economic booms. In other areas, previously active in agriculture or heavy industries, economic

activity has declined, leading to sizeable labour market mismatches.

The process of economic restructuring, leading to a shift from employment in agriculture and industry to services, has had important consequences for the labour market as a whole. Jobs have been created in more productive sectors of the economy, while the demand for labour has declined in less productive areas. This has resulted in a decrease in demand for lower-skilled workers, which in turn has led to high unemployment rates among people with only primary or secondary education.

**Table 7 Employment shares by broad economic sector**

	Services		Industry		Agriculture	
	1996	2005	1996	2005	1996	2005
Albania	20.2	28.0	9.6	13.5	70.3	58.5
Bosnia and Herzegovina	45.2	48.7	51.1	30.8	3.7	20.5
Croatia	50.9	63.0	29.1	31.2	19.9	5.9
FYR Macedonia	59.1	48.4	32.7	32.4	8.3	19.6
Serbia and Montenegro	45.1	55.5	49.6	40.3	5.3	4.3
Turkey	34.3	48.2	22.3	26.2	43.4	25.6
<b>Simple averages</b>						
C/PC	42.5	48.6	32.4	29.1	25.1	22.4
EU10	50.4	55.9	34.2	31.3	15.5	12.8
Euro area	66.4	70.4	28.1	25.2	5.5	4.3

Sources: Eurostat, with the exception of Serbia and Montenegro (WIIW; national statistical institute for 2004), Serbia (WIIW), Montenegro (WIIW) and Bosnia and Herzegovina for 2006 and 1991 (national statistical institute).

**Table 8 Unemployment rates by the level of education attained, 2006**

(percentage of working age population, 15-64 years)

	Primary	Secondary	Tertiary
Albania*	7.5	6.3	0.3
Bosnia and Herzegovina	7.9	21.8	1.4
Croatia*	13.0	15.0	6.2
FYR Macedonia	18.9	14.8	2.9
Montenegro*	5.8	25.8	3.3
Serbia	4.4	14.5	1.8
Turkey*	6.0	2.9	1.2
<b>Simple averages</b>			
C/PC	9.1	14.4	2.4
EU10	19.1	8.1	3.5
Euro area	11.5	8.1	5.1

Sources : Eurostat, with the exception of Albania and Turkey (the ILO's LABORSTA), and Bosnia and Herzegovina, the former Yugoslav Republic of Macedonia, Montenegro and Serbia (national statistical institutes).

Note: \* indicates 2005 data; for Albania, FYR Macedonia and Montenegro unemployment rates have been calculated relative to the overall labour force.

Table 8 provides evidence of existing skill mismatches, especially in the group of workers with secondary education. While in the euro area the share of unemployed people with secondary education amounts to 8% of the labour force, the figure in Montenegro is 26%, in Bosnia and Herzegovina 22% and in Croatia, the former Yugoslav Republic of Macedonia and Serbia close to 15%. However, probably because these economies are in transition, the unemployment rate for people with only primary education in the C/PC countries is below the levels of the euro area (other than in Croatia and the former Yugoslav Republic of Macedonia). This may reflect the fact that there is still a relatively large

share of employment in industry and agriculture, sectors that have traditionally demanded lower-skilled labour. This situation is likely to change though, as the experience of the EU10 countries suggests. In the EU10, particularly high unemployment figures are recorded among workers with only primary education, pointing to the existence of severe skill mismatches.

Additional evidence of skill mismatches in labour markets may be derived from an analysis of youth and long-term unemployment (Table 9). While the average long-term unemployment rate (unemployment lasting over 12 months) is 4% in the euro area, it is 18.5% in the C/PC

**Table 9 Unemployment rates by type of unemployment, 2005**

(percentage of labour force)

	Total	Youth	Long-term
Albania	14.5	26.8**	13.1
Bosnia and Herzegovina	42.0	8.8*	26.8
Croatia	12.7	32.0	7.4
FYR Macedonia	37.3	71.3	34.6
Montenegro	30.3	7.7	25.9
Serbia	21.8	47.7	17.0
Turkey	10.2	19.3	4.1
<b>Simple averages</b>			
C/PC	24.1	30.5	18.5
EU10	9.8	20.9	5.5
Euro area	8.3	17.7	3.8

Source: Eurostat.

Note: The youth unemployment rate refers to unemployed persons aged 15-24 as a percentage of the labour force; the long-term unemployment rate corresponds to the number of people in unemployment for 12 months or more as a percentage of the labour force.

\* indicates 2006 data; \*\* indicates 2002 data.

countries, pointing to a very low rate of exit from unemployment and signalling that some groups of unemployed have a minimal chance of finding employment.<sup>40</sup> However, particularly high rates may also reflect the extent of unregistered employment in the informal economy.

Another sign of significant labour market mismatches is the high degree of unemployment among 15-24 year-olds. While in relative terms youth unemployment rates are similar in the euro area (which has approximately 18% youth unemployment versus 8% overall) and most C/PC countries, in absolute terms there is a large difference, especially in the former Yugoslav Republic of Macedonia (71% versus 37%) but also in Albania, Croatia and Serbia (27-48% versus 13-22%). This may reflect an environment where seniority is important, particularly in large enterprises, creating entry barriers for the young.<sup>41</sup> However, particularly high unemployment rates in this group may also result from the prevalence of the informal economy.

## 4.2 CAPITAL

This section reviews the main determinants of, trends in and prospects for capital accumulation in the C/PC countries, both for physical and human capital. The main results can be summarised as follows:

1. Investment as a share of GDP has increased significantly in the C/PC5 countries, exceeding the euro area average. However, in contrast to other emerging markets in the EU10, there has as yet been no overall shift of investment away from industry and towards services in the C/PC countries.
2. The contribution of FDI to GFCF has significantly increased in the C/PC countries, indicating their growing attractiveness to foreign investors.
3. There is a need for improvement in the quality of human capital in the countries

under review in order to benefit from possible technology spillovers from FDI. However, public expenditure on education and R&D have remained low.

4. Significant progress has been made towards reducing the administrative burden and creating a more business-friendly environment. However, there are still areas in which the C/PC countries need further progress, especially business regulation, competition policy and corruption.

### 4.2.1 INVESTMENT

The economic literature has highlighted the positive link between investment rates and economic growth across countries (DeLong and Summers, 1991; Mankiw, 1995). Moreover, the speed of capital accumulation – and implicitly growth – is influenced by the quality of a large set of institutional factors related to, among other things, the rate of exit and entry of firms, the rate of introduction of new products, the registration of patents, tax credits and R&D grants (Nicoletti and Scarpetta, 2003; Alesina et al., 2003; Arratibel et al., 2007).

Investment rates have varied substantially across time and countries. In most C/PC countries, a substantial rise in investment occurred between 2001 and 2005, most notably in Albania, Bosnia and Herzegovina and Croatia, ranging between 21% and 27% per year on average (Chart 9).<sup>42</sup> Turkey represents an exception to trends observed in the C/PC countries, as its investment ratio declined from around 25% of GDP in the late 1990s to less than 20% in the early 2000s, following the economic downturns of 1999 and 2001. In the EU10, investment was already strong between 1996 and 2000, exceeding the euro area average and indicating these countries'

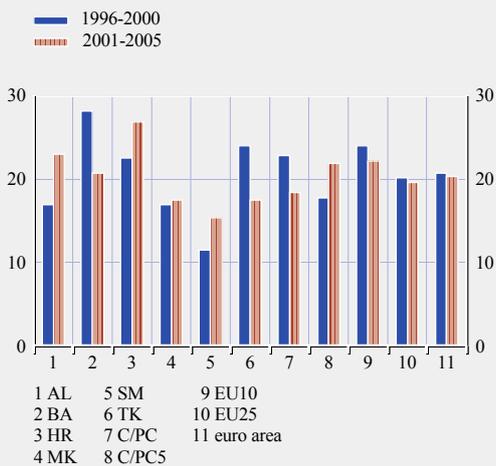
<sup>40</sup> In some countries, certain ethnic groups are characterised by higher unemployment. For example, unemployment rates in the former Yugoslav Republic of Macedonia vary significantly between various ethnic groups. While the unemployment rate in 1996-2001 was 28% for ethnic Macedonians, it was about 41% for Turks, 51% for Albanians and 72% for Roma (IMF, 2006b).

<sup>41</sup> See for example Nesporova (2002).

<sup>42</sup> However, it should be noted that compared with other emerging market economies, particularly those in Asia, investment rates are not extraordinarily high.

Chart 9 Ratios of investment to GDP

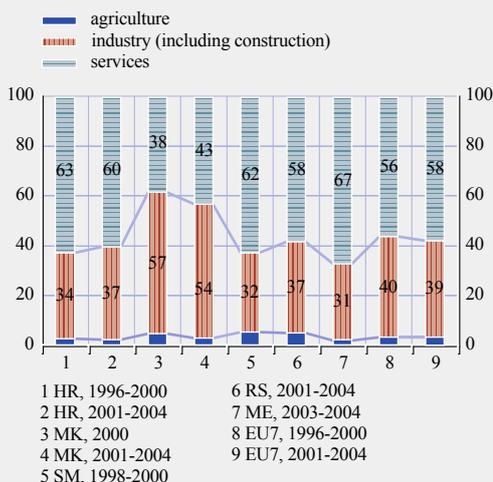
(in percentages)



Source: ECB calculations based on UNCTAD's World Investment Report.

Chart 10 Investment shares by sector

(percentages)



Source: ECB calculations based on WIIW data on investment by sector. Industry includes: mining; manufacturing; energy, gas and water supply; and construction. Note: EU7 corresponds to the EU10 excluding the Baltic countries (Estonia, Latvia and Lithuania).

advanced stage in the transition process. In 2001-05, investment growth consolidated on average in the EU10.

In terms of sectoral developments, the pattern of investment has shown a relatively high degree of heterogeneity in the C/PC5, whereas in most of the EU10 countries services have been attracting an increasingly large share of total investment.<sup>43</sup> Between the periods 1996-2000 and 2001-04, the share of services in total investment increased in the former Yugoslav Republic of Macedonia and Montenegro but declined in Croatia and Serbia, due to rising investment in industry, particularly in construction and manufacturing (Chart 10). Despite the mixed overall picture, some of the C/PC5 countries reported notably large shares of services in total investment – e.g. 60% in Croatia in 2001-04 and 67% in Montenegro during 2003-04 – in part highlighting the importance of the tourism sector in those countries.

#### 4.2.2 FOREIGN DIRECT INVESTMENT

Domestic capital accumulation can be financed via domestic or foreign savings, with the latter

taking the form of FDI, reinvested earnings or other capital flows.<sup>44</sup> Cross-border capital flows are expected to originate in countries where capital is abundant and head towards economies where capital is scarce, offering correspondingly higher rates of return. FDI is often mentioned as driving investment<sup>45</sup> and economic growth, in particular TFP growth, by fostering the internationalisation of production, increasing trade openness, stimulating the diffusion of foreign technology and encouraging effective corporate governance and enterprise restructuring (Arratibel et al., 2007).

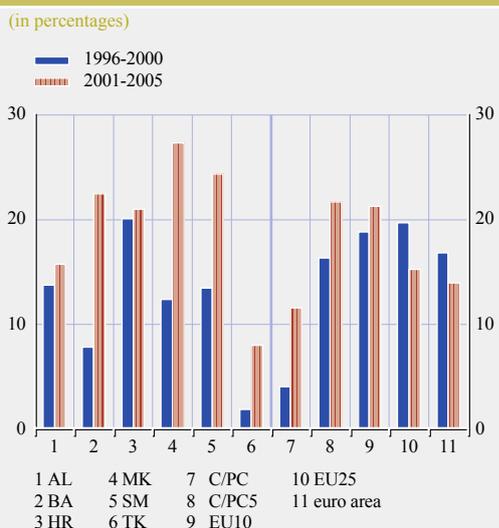
FDI inflows have become an increasingly important component of total investment in both

43 Data are available only for Croatia, the former Yugoslav Republic of Macedonia, Serbia and Montenegro.

44 Unlike catching-up processes in other parts of the world, the process of real convergence in central, eastern and south-eastern Europe has been accompanied by significant and in several countries widening current account deficits. According to Abiad, Leigh and Mody (2007), Europe has been different as it benefited from rapid financial integration, allowing a convergence process in line with the predictions of standard economic theory.

45 In terms of national accounts, not all FDI inflows are accounted for as investments. In particular, privatisation-related FDI inflows are usually not part of investment.

Chart 11 Ratios of FDI inflows to investment

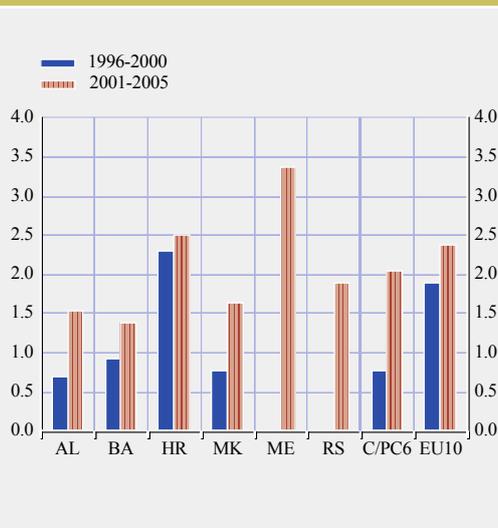


Source: UNCTAD's World Investment Report.

the C/PC and the EU10 countries. Between 1996 and 2005, the ratio of FDI to total investment rose from 4% to more than 11% in the C/PC countries (Chart 11). Despite a notable opening during 2001-05, FDI continued to make a relatively small contribution to total investment in Turkey in that period (less than 10%), while it accounted for more than 20% of investment in all the C/PC5 countries except Albania.

An increase in the net FDI flows – i.e. FDI inflows minus FDI outflows – in the C/PC countries can be observed starting in 1999-2000, whereas they have been steadily increasing in the EU10 since the early years of transition. Croatia, where FDI inflows have also been increasing since the early years of transition, is an exception to the C/PC group (Chart 12).<sup>46</sup> The relatively late inflow of FDI can be attributed to the fact that in the early to mid-1990s most C/PC countries were characterised by political instability and wars as well as a lack of reforms and macroeconomic stabilisation. In 2001-05, among the C/PC countries for which comparable data are available across time, a significant increase in net FDI flows as a percentage of GDP can be observed in Albania, Bosnia and Herzegovina and the former

Chart 12 Net FDI flows as a percentage of GDP



Source: ECB calculations based on Hunya (2006).  
 Note: The first column for Bosnia and Herzegovina is an average for 1999-2000.

Yugoslav Republic of Macedonia.<sup>47</sup> Overall, FDI flows are the highest in Montenegro (3.4% of GDP), followed by Croatia and Serbia (2.5% and 1.8%).

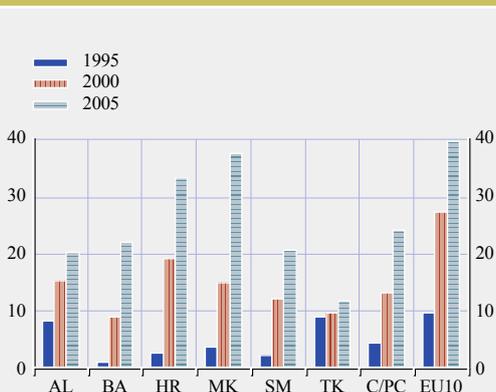
With the exception of Turkey, all countries under review have experienced a steady increase in FDI stocks as a percentage of GDP (Chart 13), the ratio averaging 24% in 2005 in the C/PC. The former Yugoslav Republic of Macedonia and Croatia stand out with an FDI stock of more than 30% of GDP, while the FDI stock in Turkey has remained broadly stable at around 10% of GDP.<sup>48</sup>

46 In the remainder of this chapter both net FDI flows and FDI stocks are analysed in relative terms as a percentage of GDP to avoid distortions due to differences in country sizes. Developments and rankings for net FDI flows and FDI stocks in per capita terms are broadly similar to those observed for FDI as a percentage of GDP.

47 FDI flows to the region have also been high compared with flows to other emerging markets. Expressed as a share of GDP, they have exceeded those to emerging markets in Asia, for example (Herrmann and Winkler, 2007). This is due to the increased attractiveness of the region given enhanced stability and progress in reforms (EBRD, 2004).

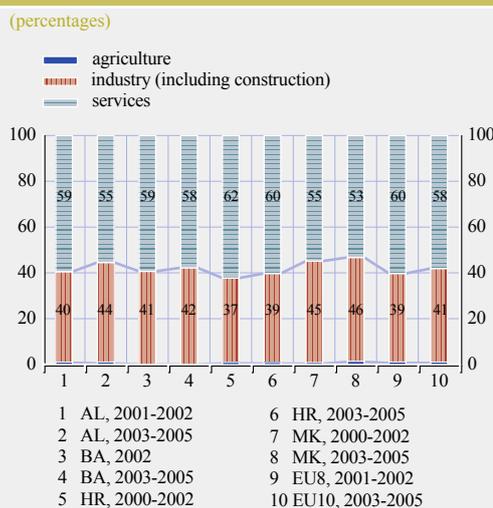
48 Indeed, in less than 20 years the countries under review have achieved – on average – a level of inward FDI stock in relation to GDP that is comparable to or even higher than in other emerging and developing countries.

Chart 13 Inward FDI stock as a percentage of GDP



Source: UNCTAD's World Investment Report.  
Note: The C/PC average is calculated including Serbia and Montenegro as one entity.

Chart 14 Inward FDI stock by sector



Source: ECB calculations based on data from the WIIW.  
Note: The EU8 equals the EU10 excluding Romania and Slovenia.

The services sector has received the bulk of the inward FDI stock in the four C/PC5 countries for which a sectoral breakdown is available. On average in 2003-05, services accounted for about 53-60% of inward FDI stocks, showing a slight decline compared with earlier years (Chart 14). Industry benefited from about 39-46% of FDI in 2003-05, its share increasing. These tendencies and shares are broadly comparable with those observed in the EU10; however, given the weak export base in most C/PC5 countries, further FDI flows to the tradable sector seem to be needed.

The literature has identified several key determinants of FDI inflows into emerging markets, including the transition economies, for example market size, agglomeration (clusters), openness, labour costs, business climate and more recently also the quality of institutions.<sup>49</sup> Campos and Kinoshita (2002) find that FDI into transition countries is driven mainly by agglomeration, large market size, low labour costs and abundant natural resources. Moreover, countries with greater trade openness, fewer

restrictions on FDI flows and good institutions are also likely to receive more FDI.<sup>50</sup>

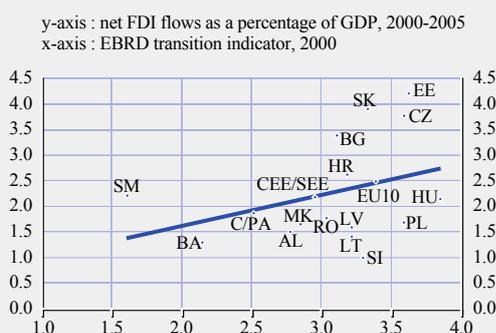
The importance of market reforms, proxied by the overall EBRD transition indicator, is confirmed also in our sample of countries. High scores in terms of the overall EBRD transition indicator in 2000 seem to have a positive impact on FDI developments in the following years (Chart 15).<sup>51</sup> More specifically, there seems to be a positive correlation between the quality of institutional reforms and the ability to attract FDI inflows. Croatia and Serbia and Montenegro have managed to attract a higher than average amount of FDI relative to their EBRD indicator scores.

49 The importance of institutions is noted for example by Mauro (1995) and La Porta et al. (1998).

50 In addition, Bevan and Estrin (2004) argue that EU announcements regarding accession prospects increase FDI inflows to countries that are given a positive evaluation.

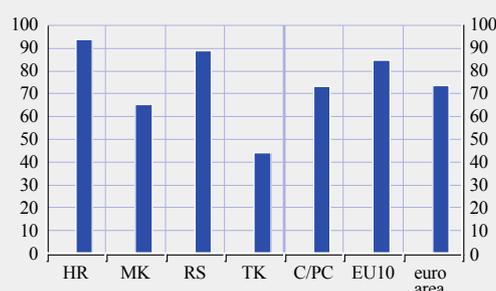
51 This indicator is calculated as a simple average of nine indicators developed by the EBRD to measure progress in transition. See Footnote 5 for more details on the indicators.

**Chart 15 EBRD transition indicators and net FDI flows as a percentage of GDP**



Sources: ECB calculations based on data from the WIW and EBRD.  
Note: For Serbia and Montenegro, the figure refers to FDI inflows as a percentage of GDP.

**Chart 16 Percentage of 20 to 24 year-olds with at least secondary education, 2005**



Source: Eurostat.  
Note: Data for the former Yugoslav Republic Macedonia are for 2002.

#### 4.2.3 HUMAN CAPITAL

Investment in “knowledge”, defined as investment in R&D and education, is a necessary condition for strong economic growth and real convergence.<sup>52</sup> A successful adoption of technologies depends crucially on infrastructure (capital that can facilitate and support the operational side of technological progress) and a labour force capable of adapting new technologies to the local environment.<sup>53</sup> Three indicators are commonly used to summarise investment in knowledge: total expenditure on education and total expenditure on R&D as a percentage of a country’s GDP, and the share of 20 to 24 year-olds that have completed at least secondary education.

In the C/PC countries, public expenditure on education as a percentage of GDP are still quite low and below the figures for the EU10 (Table 10). In 2004 only Croatia allocated more than 4% of GDP to education, as compared with an average of 5.1% for the EU25. Other countries under review spent only about 3.2-3.8% of their GDP on education in 2004.

<sup>52</sup> For an overview see Hanushek and Wößmann (2007).

<sup>53</sup> Van den Berg (2001) argues that human capital is essential for technological progress, including the adoption of foreign technologies. Analysing the potential for FDI spillovers, Blomström and Kokko (2003) stress that potential benefits of FDI are only realised if the initial level of education and human capital is sufficiently high. Borensztein et al. (1998) find that the impact of FDI on growth depends on the level of human capital in the host country. In particular, they show that there is a strong positive relationship between FDI and educational attainment.

**Table 10 Total Public Expenditure on Education**

(as a percentage of GDP)

	1997	2004	2004/1997**
Albania	3.3	3.2	-3.0
Croatia	n.a.	4.5	n.a.
FYR Macedonia	n.a.	3.4*	n.a.
Serbia	4.0	3.5	-12.5
Turkey	2.9	3.8	29.3
<b>Simple averages</b>			
C/PC	3.4	3.7	8.8
EU10	4.7	5.4	14.9
EU25	4.8	5.1	6.9

Source: Eurostat.

Note: \* indicates 2003 data and \*\* indicates the change in percentage points.

Table 11 R&amp;D expenditure

(percentage of GDP)	
	2002
Albania	n.a.
Bosnia	n.a.
Croatia	1.1
FYR Macedonia	0.3
Serbia and Montenegro	1.2
Turkey	0.7
<b>Simple averages</b>	
C/PC	0.6
EU10	0.8
Euro area	1.9

Sources: Eurostat and WDI.

A similar picture emerges when total expenditure on R&D is considered (Table 11). In 2002 this amounted to 1.9% of GDP on average in the euro area. In the region under review, it exceeded 1% of GDP only in Croatia and Serbia and Montenegro.

In terms of the share of 20 to 24 year-olds that have completed at least secondary education, Croatia and Serbia (and the EU10 countries) score better than the euro area average (Chart 16). This is in line with Landesmann et al. (2004). However, as argued by Feldmann (2004), there is a concern that the system of secondary education in transition countries is not able to prepare adequately to face the changing market conditions. This would suggest that the quantitative indicators of the level of education in the countries under review have to be interpreted with caution.

## 5 CONCLUSIONS

EU candidate and potential candidate countries have seen a strong recovery following the notable output losses recorded during the early 1990s. However, country-specific factors have affected the timing, speed and extent of this recovery. While a general pattern in line with developments in the EU10 economies holds true for Albania, Bosnia and Herzegovina and Croatia, recovery started about a decade later in the former Yugoslav Republic of Macedonia, Montenegro and Serbia. In addition, Turkey is clearly an exception, since it is the only non-transition economy, and developments there have therefore followed a different pattern. Accordingly, only Albania and Croatia had by 2006 managed to surpass their 1989 levels of total income in real terms. For the period 1993-2005, there is no evidence to support absolute convergence, as the Western Balkan countries experienced wars, severe political instabilities and a slow pace of reforms for most of the 1990s.

TFP growth has been the main driver of convergence, followed by capital deepening, whereas labour has contributed only marginally to growth. In addition, the contribution of TFP to growth has increased over time in the C/PC5 countries. In the EU10, by contrast, although TFP has been the main driver of growth, its contribution has declined notably over the last decade. This is in line with expectations that after the elimination of inefficiencies linked to a former central planning regime, sustained TFP growth may be more difficult to achieve. Thus, further improvements in capital accumulation and capital efficiency in the C/PC countries are needed to help sustain convergence in the future.

There is evidence of conditional convergence in the transition countries of central, eastern and south-eastern Europe for the whole period under review. More specifically, controlling for the quality of institutions, the extent of market reforms and macroeconomic policies, there is a significant and negative link between the initial level of GDP and subsequent growth. However,

while this result is generally robust across different specifications, it is not supported by all methods used. The quality of institutions seems to play an important role in growth, but in an indirect way. While variables capturing progress in institution building and structural reforms are not found to be directly linked with growth, controlling for institutional quality strengthens the growth-enhancing effects of traditional explanatory variables such as macroeconomic stabilisation and financial intermediation.

Labour productivity has improved in most countries under review, as the share of more productive sectors in total output has risen and overall employment has declined. However, south-eastern European countries have experienced adverse developments in their labour markets, namely falling employment and participation rates, caused initially by severe output losses and later by shifting production patterns. These negative trends have been gradually reversing, although at different speeds depending on each country's overall economic recovery and the effectiveness of reforms. While employment rates have been slowly increasing, on average they are still at significantly lower levels than in the EU10 or in the euro area. Similarly, unemployment rates are much higher on average than in the EU10 and the euro area countries.

Structural changes have resulted in, at least temporarily, increasing labour market mismatches. In most countries there has been a noticeable shift of employment from agriculture and industry to the services sector, a trend which has been much more pronounced in the EU10. While this shift signals that the countries under review have been converging to the economic structure observed in mature economies, strong and increasing demand for skilled labour is only partly matched by supply. Therefore, workers with the highest education levels have the lowest unemployment rates. Higher unemployment rates among the youth as well as high long-term unemployment rates provide additional evidence of labour market mismatches and a still high degree of labour market inflexibility.

Investment rates have been rising rapidly in recent years, and FDI has been found to have a positive impact on total investment. (Again, in the EU10 similar developments started earlier, and investment growth has consolidated in the more recent period.) More specifically, countries that have received more FDI relative to total investment have also reported a higher level of investment relative to GDP. Therefore, FDI flows continue to provide a good basis for further investment growth, leading to improvements in the accumulation of capital and its efficiency. The services sector has received the bulk of the inward FDI stock in the C/PC5 countries, followed by industry. These shares are comparable to those of the EU10, but given the need to broaden the export base in most C/PC5 countries, more foreign investment in export-oriented industries seems to be necessary in the future.

Investment in human capital, proxied by the share of expenditure on education in total GDP, is still at a relatively low level in the countries under review compared with the EU10 or the euro area average. By contrast, spending on R&D constitutes only a small share of GDP not only in the C/PC but also in most EU10 countries. Given the need for strong economic growth allowing real convergence towards the euro area, a rise in human capital investment seems to be needed, even though most countries are characterised by a relatively high percentage of 20-24 year-olds with at least secondary education.

In conclusion, EU candidate and potential candidate countries have been experiencing strong economic growth, improvements in labour markets and buoyant investment, including strong increases in FDI inflows. In order to sustain these positive developments in the medium to long term and experience continued real convergence with the euro area, further improvements are needed in terms of labour productivity and utilisation, as well as in terms of capital accumulation. To the extent that recent overall growth has been driven mainly by TFP and not by capital accumulation or labour,

it is important to emphasise the need for further reforms and economic restructuring aimed at improving labour markets and facilitating strong investment growth.

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