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Research Report

Real convergence in central, eastern and south-eastern Europe

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Piotr Żuk, Li Savelin

Real convergence in central, eastern and south-eastern Europe

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Abstract

This paper analyses real income convergence in central, eastern and south-eastern Europe (CESEE) to the most advanced EU economies between 2000 and 2016. The relevance of this topic stems both from the far-reaching implications of real income convergence for economic welfare and the importance of convergence for economic and monetary integration with, and within the European Union. The paper establishes stylised facts of convergence, analyses the drivers of economic growth and identifies factors that might explain the differences between fast- and slow-converging economies in the region. The results show that the most successful CESEE economies in terms of the pace of convergence share common characteristics such as, inter alia, a strong improvement in institutional quality and human capital, more outward-oriented economic policies, favourable demographic developments and the quick reallocation of labour from agriculture into other sectors. Looking ahead, accelerating and sustaining convergence in the region will require further efforts to enhance institutional quality and innovation, reinvigorate investment, and address the adverse impact of population ageing.

JEL codes: E01, F15, O11, O43, O47, O52, O57.

Keywords: Real convergence, economic growth, middle-income trap, EU accession, central, eastern and south-eastern Europe, Western Balkans.

Executive summary

The paper analyses real income convergence in central, eastern and south-eastern Europe (CESEE) to the most advanced European Union (EU) economies between 2000 and 2016. The relevance of this topic stems not only from the far-reaching implications of real income convergence for economic welfare, but also from the importance of convergence for economic and monetary integration with, and within, the European Union. This concerns both CESEE countries that have already joined the European Union (including in particular those which subsequently entered the euro area) and CESEE countries that are currently EU candidates or potential candidates, and are thus expected to join the European Union at some point in the future.

The paper establishes the stylised facts of convergence and analyses the drivers of economic growth from the production function perspective, i.e. labour and capital accumulation and total factor productivity growth, as well as factors that might have had a particular impact on these variables. Based on qualitative and quantitative analysis, factors are identified that may explain differences between fast- and slow-converging economies in the region. The most successful CESEE economies in terms of the pace of convergence share common characteristics. These include, inter alia, improvements in institutional quality and human capital (and/or the high level of the latter) in more outward-oriented economic policies, reflected in growing trade openness and foreign direct investment (FDI) inflows, particularly if supported by progress in external competitiveness. Favourable demographic developments (and/or high labour participation rates) and the fast reallocation of labour from agriculture into other sectors were also typical for rapidly converging CESEE economies.

Looking ahead, accelerating and sustaining convergence in the region will require further efforts to enhance institutional quality and innovation, reinvigorate investment, and address the adverse impact of population ageing. For EU candidates and potential candidates, EU accession prospects might constitute a linchpin for reform momentum, in particular – but not exclusively – in the key area of enhancing institutional quality, and might thus support the long-term growth prospects and real convergence of these countries.[1]

[1] This occasional paper is an expanded version of the article, published with the same title in ECB Economic Bulletin, Issue 3, 2018 (ECB, 2018).

1 Introduction

Most CESEE economies embarked on a major economic transition from command to market economy in the 1990s, which in several of them also continued beyond 2000. The economic transition has largely shaped economic developments in these countries since 1990. Despite large transitional costs and overall mixed economic performance in the 1990s, most CESEE economies have experienced high economic growth since 2000, which has contributed to a catching-up towards the most advanced economies in the world. CESEE economies also have a few other characteristics in common, despite their diversity. First, most of them are small open economies with close proximity and strong economic ties to larger and more advanced EU economies. Second, most CESEE economies have either joined the European Union already or are EU candidates or potential candidates with prospects of joining the EU at some point in the future.

This paper analyses real income convergence of CESEE economies to the most advanced EU economies between 2000 and 2016. The analysis includes both: (i) the 11 economies that joined the EU in this period, 5 of which have since also adopted the euro; and (ii) 6 economies from the Western Balkans that are EU candidates or potential candidates[2]. Real convergence – understood to be a process in which economic growth in poorer countries is faster than in richer ones, and thus real income differences between the countries diminish over time – has far-reaching implications for economic welfare and well-being. Moreover, the attainment of sustainable convergence remains important for economic and monetary integration with, and within the EU. This stems from the fact that achieving sustainable convergence narrows real income disparities, supports social cohesion and thus facilitates the functioning of the Internal Market as well as Economic and Monetary Union (EMU).

Furthermore, there is a close link between convergence in real incomes and convergence in prices (nominal convergence). Faster-growing (converging) economies usually experience real exchange rate appreciation, which often materialises through higher inflation rates. After entering EMU, however, higher inflation may lead to lower real interest rates than in other member countries (ECB, 2015). Consequently, the likelihood of the faster-growing economies experiencing boom-bust cycles rises, particularly given the typically higher natural interest rates in such economies, unless fiscal or macroprudential policy instruments are properly applied in such economies to preserve macro-financial stability. Furthermore, the

[2] This paper focuses on the CESEE countries that are EU members (which are referred to as "new EU Member States" (NMS) and include Bulgaria, Croatia, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovenia and Slovakia) or EU candidates and potential candidates (which are referred to as the "Western Balkans" and include Albania, Bosnia and Herzegovina, the former Yugoslav Republic of Macedonia, Montenegro and Serbia). Kosovo is also included in the analysis where data are available (without prejudice to positions on status, in line with the United Nations Security Council Resolution 1244 and the International Court of Justice's opinion on Kosovo's declaration of independence). Although Turkey is an EU candidate country, it is not included in the analysis, since it does not share the background of an economic transition from a command economy to a market economy.

lack of income convergence is often coupled with poor institutional quality. The low institutional and governance standards may complicate the further integration and smooth functioning of the EU and the euro area as they make a country less resilient to shocks (Cœuré, 2017).

At the same time, the topic of convergence in CESEE is interesting in the context of the discussion on the "middle-income trap" that has been prominent in the literature in recent years, and which pointed to the fact that many middle-income countries fail to continue catching up and thus fully converge to rich economies. Against this background, the aim of the paper is to 1) establish stylised facts on convergence in CESEE countries; 2) analyse the sources of economic growth; 3) identify the challenges that CESEE economies are facing; and 4) compare the performance of the three groups of CESEE countries: EU Member States using the euro, EU Member States that have not joined the euro area yet, and EU candidates and potential candidates.

The paper consists of five main sections. In section two, the basic concepts of convergence and economic growth are introduced, both from a theoretical and an empirical perspective. The third section analyses stylised facts on economic convergence in CESEE economies. Section four begins with a growth accounting exercise, followed by a qualitative analysis of the drivers of economic growth, i.e. labour and capital accumulation and total factor productivity (TFP) growth. As regards the latter, selectively chosen factors that might affect TFP are analysed, such as economic structure, human capital, trade openness, innovation and, last but not least, institutional quality. The analysis is complemented with a panel regression (in section five), where the qualitative analysis is tested against econometric results. Finally, in section six, based on the overall findings, the paper attempts to show which general factors might explain the differences between fast- and slow-converging economies in CESEE.

Box 1
Background information on CESEE countries

CESEE economies share a few common characteristics. First, they have a joint legacy of being command economies that embarked on a transition process to market economies in the 1990s. Second, all of them are small open economies with close proximity to and strong economic ties with larger EU economies. Third, all of them have either joined the EU already or are EU candidates or potential candidates with the prospect of joining the EU at some point in the future. The table below presents basic country information for all of the economies analysed in this article. Overall, the country sample includes 17 CESEE countries, composed of 11 new EU Member States (NMS), which include 6 non-euro area EU Member States (non-euro area NMS in the charts) and 5 euro area NMS, and 6 EU candidates and potential candidates, which in this article are referred to collectively as the Western Balkans.

Table A

EU membership status, population and income levels

Country	Official status	Population (2016, millions)	Real GDP per capita (2016, PPP, international USD)	Real GDP per capita (2016, as a percentage of the EU28 average)
Euro area NMS				
Slovenia	Member since 2004; using the euro since 2007	2.1	29,930	82.3
Slovakia	Member since 2004; using the euro since 2009	5.4	29,212	80.3
Estonia	Member since 2004; using the euro since 2011	1.3	28,110	77.3
Latvia	Member since 2004; using the euro since 2014	2.0	23,743	65.3
Lithuania	Member since 2004; using the euro since 2015	2.9	28,034	77.1
Non-euro area NMS				
Czech Republic	Member since 2004	10.6	31,339	86.2
Hungary	Member since 2004	9.8	25,664	70.6
Poland	Member since 2004	38.4	26,036	71.6
Bulgaria	Member since 2007	7.1	17,795	48.9
Romania	Member since 2007	19.7	21,671	59.6
Croatia	Member since 2013	4.2	21,800	60.0
Western Balkans				
Albania	Candidate since June 2014 (accession negotiations have not yet been opened)	2.9	11,356	31.2
FYR Macedonia	Candidate since December 2005 (accession negotiations have not yet been opened)	2.1	13,121	36.1
Montenegro	Candidate since December 2010 (negotiations opened in June 2012)	0.6	15,737	43.3
Serbia	Candidate since March 2012 (negotiations opened in January 2014)	7.1	13,721	37.7
Bosnia and Herzegovina	Potential candidate (applied for EU membership in February 2016)	3.5	11,338	31.2
Kosovo	Potential candidate (has not applied for EU membership)	1.8	9,452	26.0

Sources: European Commission, Haver Analytics, World Bank and ECB calculations.

2 Convergence and economic growth

2.1 Basic concepts

Several different concepts of economic convergence have been developed and used in the literature (Islam, 2003)[3], but the β- and σ-convergence concepts have the most significant implications for welfare and thus are most frequently analysed. β-convergence implies that lower-income countries tend to grow more quickly than richer ones. β-convergence is a necessary but not sufficient condition for σ-convergence, which in turn implies that the dispersion in real incomes among countries tends to diminish over time. Thus, if β-convergence holds, this means that poorer countries grow more quickly than richer ones, although this may not be sufficient to equalise income levels across countries over time, so σ-convergence does not necessarily follow. The idea of β-convergence can be derived directly from the neoclassical growth framework and results from the assumption of decreasing returns on capital (Solow, 1956; Swan, 1956). In this framework, capital-scarce (low-income) economies exhibit higher returns on this factor of production than capital-abundant (high-income) ones, which promotes fast capital accumulation and economic growth in the former group of countries.

In addition, apart from the above concepts of convergence, the existence of "conditionality" is also often discussed in the literature. Conditional convergence takes into account the fact that the institutional set-up or policies may differ across countries. Thus, economies may converge towards different steady states and economic growth in poorer economies may not automatically be higher than in richer ones. In turn, unconditional (absolute) convergence suggests that poorer countries grow more quickly than richer ones irrespective of the institutional settings or policies pursued. In other words, while absolute convergence assumes that low-income economies exhibit faster per capita growth than high-income ones (without conditioning or any other characteristics of those economies), the main idea behind conditional convergence is that the more quickly economies grow, the lower the capital levels they have in comparison to their own steady state, which results in higher returns on capital (Barro and Sala-i-Martin, 2004). One implication of conditional convergence would be that economies with similar characteristics (such as OECD or central and eastern European economies) are likely to converge to the same steady state in the longer term. This concept is often described as "club convergence".

If convergence is not a process that happens automatically as the conditional convergence concept implies, determining the drivers of economic growth and

[3] In his review of the convergence literature, N. Islam enumerates seven concepts of convergence: 1) convergence within an economy vs. convergence across economies; 2) convergence in terms of growth rate vs. convergence in terms of income levels; 3) β-convergence vs. σ-convergence; 4) unconditional (absolute) convergence vs. conditional convergence; 5) global convergence vs. local or club convergence; 6) income convergence vs. total factor productivity convergence; 7) deterministic convergence vs. stochastic convergence.

the conditions that are supportive to growth appears crucial from a policy perspective. While the growth models of Solow (1956) and Swan (1956) focused on capital accumulation as the main driver of growth (and where technological progress is treated as exogenous), the next wave of the theoretical literature sought to endogenise technological change by including the accumulation of human capital, innovation, investment in research and development or learning by doing (Romer, 1986, 1987, 1990; Aghion and Howitt, 1992; Lucas, 1988). However, endogenous growth models have also been criticised for not explaining the fundamental determinants of growth (Acemoglu et al., 2005). For example, cross-country differences in allocating resources to innovation or human capital accumulation may explain differences in income levels but do not answer the question of why these policies differ across the countries.

Therefore, in the 1990s, the literature started to focus on institutions as the fundamental explanation of growth, income differences across countries and convergence. Institutions are understood to be "the rules of the game in a society" (North, 1990), which shape the incentives of economic actors in terms of investment in physical and human capital or developing new technologies (Acemoglu et al., 2005). Institutions may include a wide variety of the rules of the game, both formal and informal, such as property rights, contract enforcement, the effectiveness of the judiciary system, the control of corruption, the quality of regulation and governance, conflict management or political stability (see e.g. Rodrik, 2000).

More recently, linked to the focus on the role of sound institutions, there is also the new concept of sustainable economic convergence, which can be seen as the process whereby income per capita levels of lower-income economies catch up, on a sustainable basis, with those of the higher-income economies. For real convergence to be sustainable, the expansion of aggregate demand must be consistent with long-term potential output growth. Higher growth that results, for instance, from a financial boom may prove to be unsustainable if not matched by higher potential growth. To be sustainable, real convergence should be underpinned by sound policies and institutions. In this respect, it has recently been shown that institutional quality is an important explanatory variable for cross-country growth differentials across the EU and long-term growth in European economies (Masuch et al., 2016).

Another prominent concept in the literature focuses on geographical advantages and agglomeration effects. According to these concepts, geographical location may create advantageous conditions for growth and productivity due to possible complementarities and spillovers between firms in clusters, which might result in economies of scale in production and attract new companies. At the same time, the geographical location influences transportation costs, while climate might affect productivity directly (e.g. in agriculture) or indirectly through the health and human capital of the population. One important implication is that the agglomeration effects might be self-reinforcing, which might explain the persistency of income level dispersion across regions (see, among others, Krugman (1991), Fujita et al. (1999), Gallup et al. (1999)). The agglomeration effects also help

to explain why some geographical areas have been more economically successful than others, despite similar characteristics in terms of e.g. institutional quality.

2.2 Evidence of convergence

While conditional convergence appears very appealing from a theoretical perspective, it is absolute convergence that has particularly significant welfare implications, and this paper therefore focuses mainly on the latter concept. In other words, the paper seeks to answer the question of whether poorer European countries have managed to narrow the gap with richer ones in terms of GDP per capita (σ-convergence).[4] Analysing GDP per capita trends since the 1960s across economies points to only a few cases of sustainable convergence from low/middle income to high income (see Chart A). Countries that have managed to join the group of richest economies are, inter alia, Hong Kong, Ireland, Japan, South Korea, Singapore and Taiwan. However, many countries not only failed to converge, but have diverged from the group of richest countries as they became poor after being middle income. At the same time, many poor countries managed to reach middle income but failed to continue to converge to high income thereafter, which inspired a discussion on the "middle-income trap".

Box 2
The middle-income trap

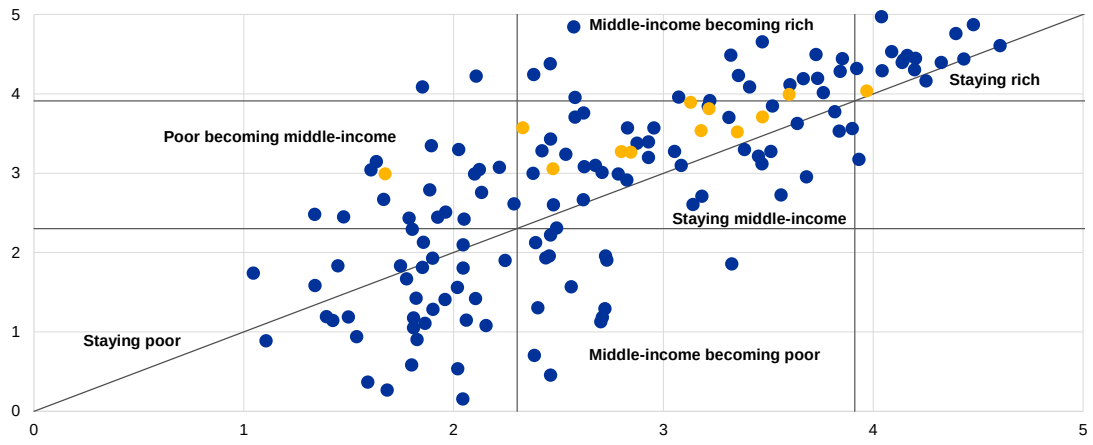
According to the middle-income trap hypothesis, after experiencing fast GDP growth and reaching middle-income status, economies follow a lower growth trajectory, which precludes them from achieving high-income levels (Eichengreen et al., 2011, 2013). These authors discovered that the slowdown in economic growth is often associated, inter alia, with unfavourable demographics and high investment ratios, with the latter suggesting an over-reliance of GDP growth on capital accumulation at the early stage of the catching-up period.

[4] While large country samples usually do not confirm the absolute β-convergence hypothesis, most studies find convincing evidence for conditional β-convergence. These include, among others: Islam (1995); Mankiw et al. (1992); Silvestriadou, Balasubramanyam (2000); Barro, Sala-i-Martin (2004); Mello, Perrelli (2003).

Chart A

GDP per capita in 1960 and 2016 in 147 economies

(x-axis: GDP per capita relative to the United States in 1960 (in log of %); y-axis: per capita relative to the United States in 2016 (in log of %))



Sources: Maddison Project Database (2018 version) and Bolt, J., Inklaar, R., de Jong, H. and van Zanden, J.L., "Rebasing 'Maddison': new income comparisons and the shape of long-run economic development", Maddison Project Working Paper No 10, 2018.
Notes: Middle income is defined arbitrarily as the income between 10% and 50% of the US GDP per capita. The yellow dots represent the CESEE economies for which data were available. A similar chart can be found in Agénor, P.R., et al. (2012).

The middle-income trap is usually explained by the observation that the initial advantages of a catching-up economy may disappear once a certain level of development is reached. More specifically, at the early stage of development, poor countries may relatively easily achieve high GDP growth due to low labour costs (therefore being highly competitive on global markets when producing labour-intensive goods), labour reallocation from lower to higher productivity sectors (e.g. from agriculture to manufacturing), and the import of advanced technologies. However, once wages increase to international levels and thus hamper external competitiveness and the sectoral reallocation of labour is largely completed, further productivity and economic growth require a shift from labour-intensive production towards more innovative and technologically advanced production. This shift remains challenging, and many countries fail to converge further, after reaching middle-income levels (Agénor et al., 2012). This observation is broadly confirmed by the studies of Eichengreen et al. (2011, 2013), which point out that slowdowns in economic growth are less likely in middle-income economies where human capital is higher and high-technology products account for a relatively large share of exports.

However, the evidence supporting the middle-income trap hypothesis obtained when analysing a large set of countries over a longer time perspective is mixed (see Chart A). Although only a small number of the middle-income countries have managed to join the high-income group since 1960, many of them have narrowed the distance from the most developed economies.

When narrowing the sample to European countries since 2000, some evidence of σ-convergence (and therefore also β-convergence) can be found.[5] Since 2000, all lower-income economies managed to increase their income levels more quickly than the richer ones (see Chart 1). In particular, countries in the southern Caucasus, which were the poorest in 2000, achieved high GDP growth rates and thus narrowed the gap in terms of their GDP to the United States, which might be

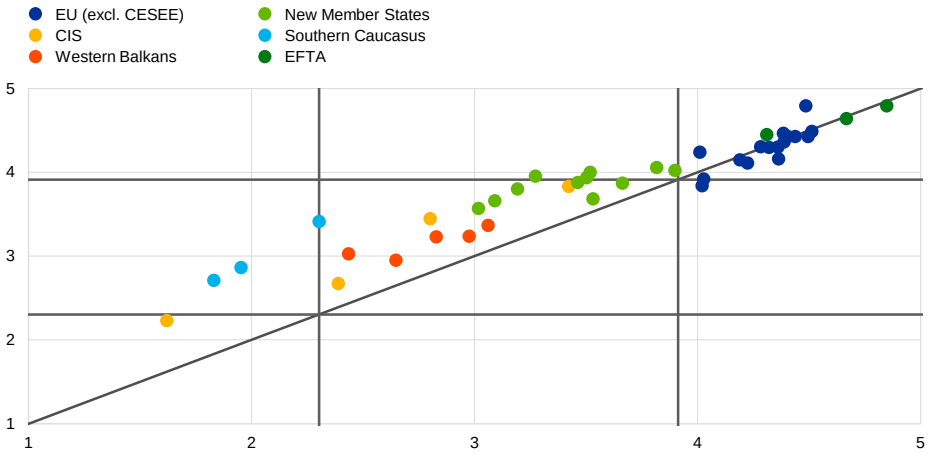
[5] According to World Bank data on real GDP per capita, based on purchasing power parity.

used as a proxy of the world income frontier. Also, all CESEE countries managed to reduce their distance from the United States.

Chart 1

Convergence in Europe between 2000 and 2016

(y-axis: GDP per capita in PPP relative to the United States in 2016 (in log of %); x-axis: GDP per capita relative to the United States in 2000 (in log of %))



Source: World Bank.
Note: Middle income is defined arbitrarily as the income between 10% and 50% of US GDP per capita.

On the other hand, since 2000, real per capita incomes in some western European countries have diverged from US levels. In this respect, Italy is the most striking example, as GDP per capita relative to the United States decreased from 79% in 2000 to 64% in 2016. Developments in some western European countries also show that, when analysed over longer time spans, convergence may be illusory and unsustainable. This relates to some euro area economies (particularly Greece and Spain) that experienced strong GDP growth before the crisis, driven to a large degree by a boom in domestic demand during a period of excessive credit dynamics, followed by a painful adjustment thereafter (del Hoyo et al., 2017). Therefore, notwithstanding the catching-up that took place between 2000 and 2007, those countries diverged from the world income frontier in the period of 2000 to 2016 as a whole.

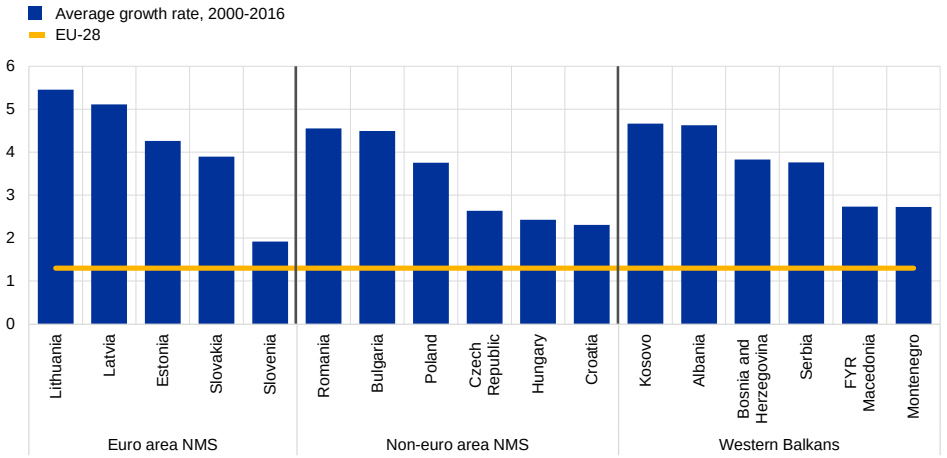
3 Convergence in CESEE economies: stylised facts

In all CESEE economies, both real GDP per capita in PPP[6] in absolute terms and measured as a proportion of the EU28 average improved over the period 2000-16. GDP growth was particularly strong in the run-up to the 2008-09 financial crisis, reaching close to or above 5% in some new EU Member States and in the poorest Western Balkans economies (see Chart 2).[7] Strong economic expansion contributed to accelerated catching-up with more advanced EU economies (see Chart 3). However, since 2009, economic growth has slowed down in all countries in the region. As a result, the pace of convergence to the EU28 average became slower than before the crisis, albeit some countries, such as the Baltics and Poland, managed to continue to catch up at a relatively fast pace after 2010 too.

Chart 2

Real GDP per capita in PPP 2000-16

(annual growth rate, period average, as a percentage)



Sources: Haver Analytics, World Bank and ECB staff calculations.

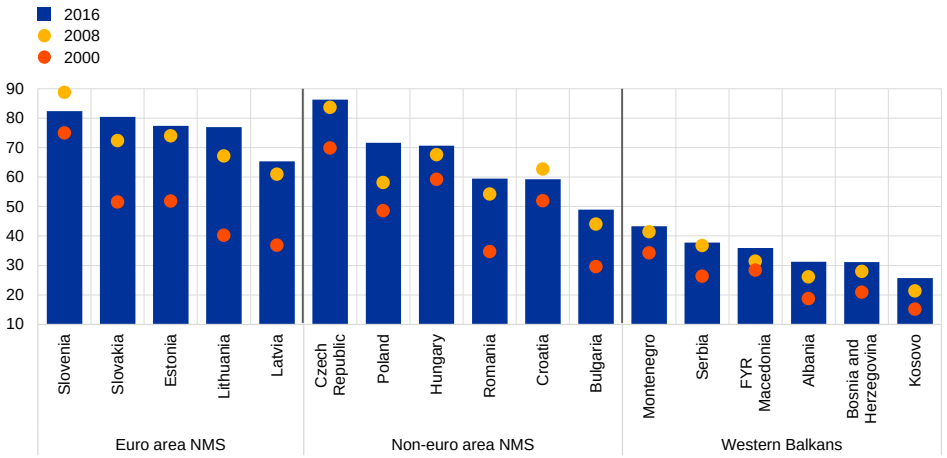
6 Using purchasing power parity (PPP) eliminates the effect of price level differences between countries and thus allows a more accurate measurement of welfare which is comparable across countries.

7 Owing to mass emigration in the period analysed (and the resulting high remittance inflows) as well as FDI (and the resulting outflow of incomes), GNI could also be considered as an economic welfare measure in analysing convergence. However, for all economies analysed, growth rates of GDP per capita and GNI per capita were broadly similar in the period analysed. Thus, the paper focuses on the GDP measure due to the higher availability of data and the fact that this measure is most frequently used in the literature.

Chart 3

Real GDP per capita in PPP in 2000, 2008 and 2016

(as a percentage of EU28 average)



Sources: Haver Analytics, World Bank and ECB staff calculations.

Notwithstanding these general traits, the relative increase in GDP per capita, as compared with the EU average, points to heterogeneous developments in the group of countries analysed. Most of all, despite high economic growth, the catching-up process in EU candidates and potential candidates was often slower than in new EU Member States. This however needs to take into account the Yugoslav wars in the 1990s, which had a destructive impact on economies in the region and put economic transition on hold in many of them until the following decade. The developments were also heterogeneous within CESEE countries that are EU Member States. Some of them (the Baltic States, Bulgaria, Poland, Romania and Slovakia) experienced particularly fast convergence in the period analysed. At the same time, other CESEE EU Member States found it hard to converge to EU28 beyond the levels already achieved by 2008. In fact, GDP per capita in Croatia and Slovenia diverged from the EU average after 2008, although this negative trend has been reversed in more recent years. Given these heterogeneous developments, it appears that while in some CESEE countries the middle-income trap hypothesis could be dismissed (at least given their experience so far), in others the signs of a slowdown in convergence after reaching a certain level of economic development are visible.[8]

As a result, some new EU Member States (such as the Czech Republic and Slovenia) reached GDP per capita levels above 80% of the EU28 average early on. In other new Member States, such as Poland, Slovakia, Lithuania or Estonia,

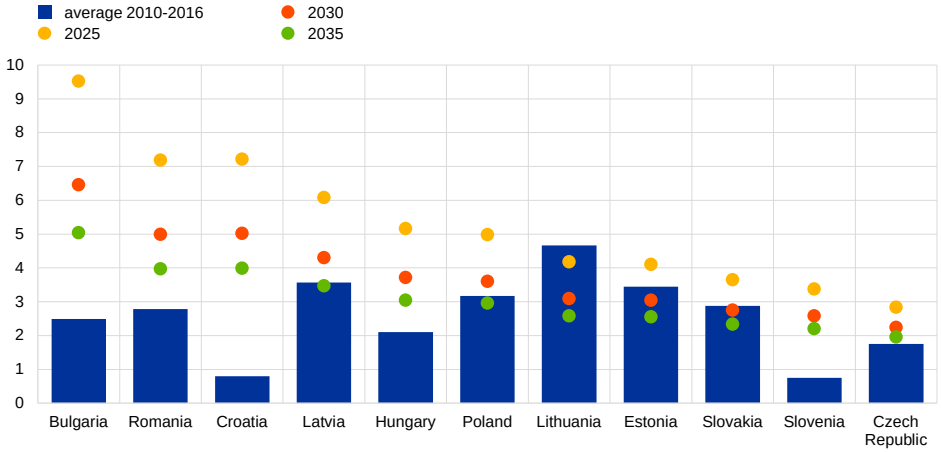
[8] Note that a slowdown may take place at different levels of development. CESEE countries that have experienced a slowdown in convergence (Slovenia, Hungary and Croatia) since 2005 are often already classified as high-income countries (according to the World Bank classification, Slovenia and Hungary have been high-income countries since 2016, while Croatia was an upper-middle-income country in 2016 (after being classified as a high-income country in 2015). However, factors which might be holding back further convergence might largely be the same for countries classified as middle-income and those that already belong to the high-income group, but still have ample room to catch up to the most advanced economies. Furthermore, all income classifications and the cut-off between them are, to a large degree, arbitrary.

despite fast growth and convergence over the 2000 to 2016 period, GDP per capita levels still remain around 20-30% lower than the EU28 average. However, if these countries were to sustain the GDP growth rates observed in recent years, they would relatively quickly (before 2030) converge to the EU28 average (see Chart 4). At the same time, for many other EU Member States from the region, convergence to the EU28 average in the next 15-20 years would be impossible without a marked acceleration in GDP growth going forward.[9]

Chart 4

Growth in GDP per capita among new Member States required to achieve 100% of the EU28 average by 2025, 2030 and 2035*

(per capita, in PPP as a percentage)



Sources: Haver Analytics, World Bank and ECB staff calculations.
* Assuming GDP growth in the EU28 (per capita, in PPP) at 1.2%, i.e. the growth rate observed between 2010-16 on average.

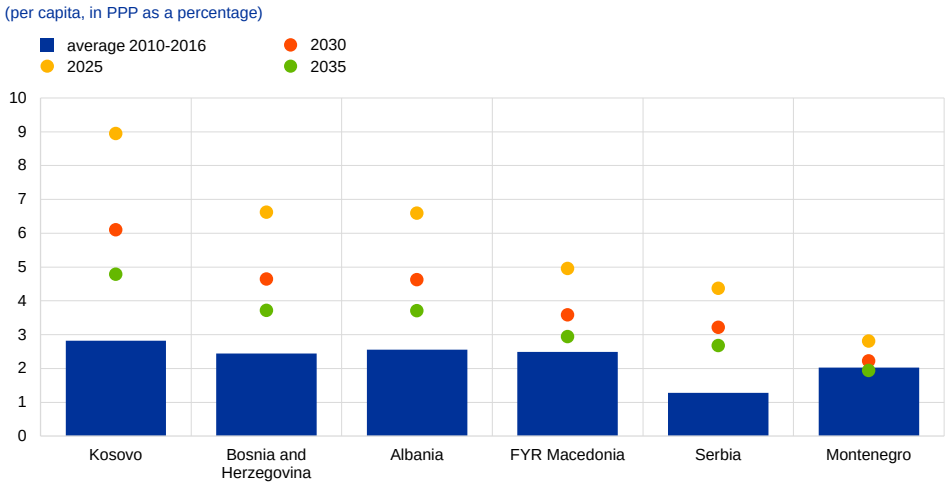
Turning to EU candidates and potential candidates, in 2016, all Western Balkan economies had income levels amounting to less than 50% of the EU28 average; with the lowest GDP per capita in PPP terms measured in Kosovo (26%) and the highest in Montenegro (43%). Overall, most EU candidates and potential candidates are still far from achieving the level of income convergence to the EU average typical at the time of accession for the EU countries in the sample analysed (which in most cases amounted to around 50-60% of average GDP per capita in the EU).[10] In order to achieve the level of 50% of average GDP per capita in the EU28 by 2030, most EU candidate countries and potential candidates would need to exhibit much higher GDP growth than in previous years (see Chart 5). Only in Montenegro does the challenge appear somewhat smaller, as GDP growth observed so far is already close to that which would allow for reaching such an income level by 2030.

9 These mechanical calculations assume that GDP growth in EU and CESEE countries remained at the average level from 2010 to 2016. In particular, the calculations do not take into account the likely slower economic growth once countries achieve a higher level of GDP per capita as well as other challenges to economic growth and convergence going forward, which are discussed in the subsequent sections, nor the impact of the United Kingdom leaving the EU, which will statistically reduce the EU average income level.

10 Among the CESEE countries that have joined the EU since 2004, the lowest GDP per capita (as a percentage of the EU28 average) at the time of accession was observed in Bulgaria (42.3%) and Romania (49.4%) in 2007, and in Latvia (48.3%) and Poland (51.2%) in 2004.

Chart 5

Growth in GDP per capita in the Western Balkan countries required to achieve 50% of the EU28 average by 2025, 2030 and 2035*



Sources: Haver Analytics, World Bank and ECB staff calculations.
*Assuming GDP growth in the EU28 (per capita, in PPP) at 1.2%, i.e. the growth rate observed between 2010-16 on average.

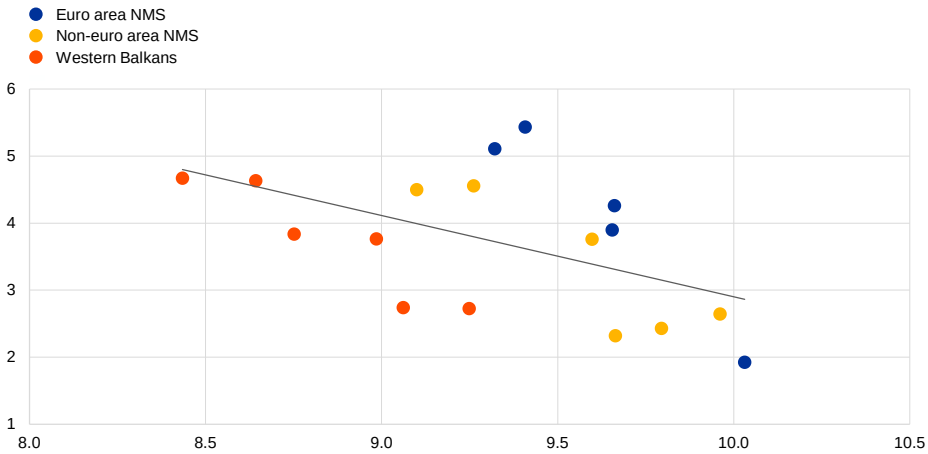
3.1 Initial income levels and growth

Poorer CESEE countries experienced stronger economic growth between 2000 and 2016, which is in line with the unconditional β convergence hypothesis. The correlation between initial income levels and average annual growth, however, appears stronger (and negative) in new EU Member States that joined the euro area than in the other two groups of countries (see Chart 6). Furthermore, an analysis of the Western Balkan countries and the non-euro area new EU Member States with similar income levels in 2000 reveals that the latter group has experienced a much higher average annual growth rate. These two observations might point to the positive role that EU accession has played in the convergence of CESEE economies. What is also striking is that while income dispersion within the group of new EU Member States and the group of Western Balkan economies has narrowed since 2000, these two groups have diverged from each other (see Chart 7). Such development supports the hypothesis of “club convergence” in the sample analysed and suggests that CESEE EU Member States have, so far, been converging to different steady states from those of EU candidates and potential candidates.

Chart 6

Initial income levels and average GDP growth between 2000 and 2016

(y-axis: average growth rate, real GDP per capita in PPP, 2000 16, as a percentage; x-axis: log of real GDP per capita at PPP, 2000)

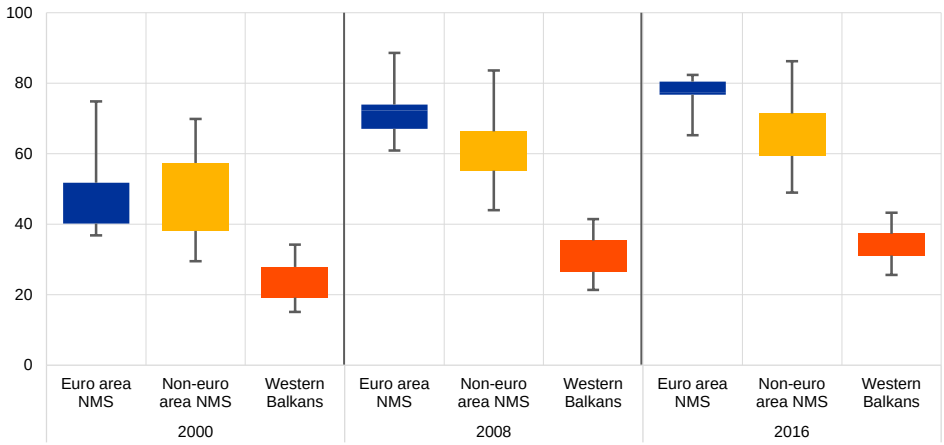


Sources: Haver Analytics, World Bank and ECB staff calculations.

Chart 7

Income dispersion vis-à-vis the EU28 in the period 2000-16

(real GDP per capita in PPP as a proportion of the EU28 average)



Sources: Haver Analytics, World Bank and ECB staff calculations.
Notes: The upper whisker denotes the maximum value in the sample and the lower whisker the minimum value. The boxes indicate the dispersion between the first and third quartiles.

3.2 Other aspects of convergence – human development indicators

When analysing income convergence, the limitations of GDP as a measure of well-being, which have been vastly debated in the literature (see e.g. UNDP, 1996; Stiglitz et al., 2008) need to be borne in mind. GDP is a measure of economic activity, while a country's development is also often seen as associated with reductions in income inequality, job creation, and improved access to healthcare and education. Thus, merely looking at GDP growth will not entirely capture this multidimensional

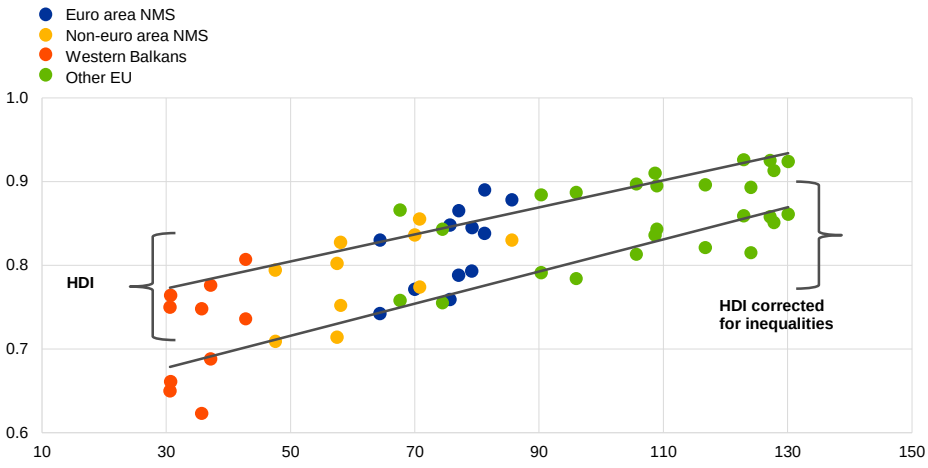
aspect. Furthermore, a number of papers that have explored the relationships between economic growth and human development found that human development is not only the end-product of the development process but also a means of generating future economic growth (see e.g. Ranis et al., 2000; Boozer et al., 2003; UNDP, 1990).

The positive relationship between per capita income levels and the Human Development Index (HDI) holds among CESEE countries.[11] In the period under review, income convergence of CESEE economies was accompanied by considerable progress in reducing poverty (EBRD, 2016), increasing access to education (see Section 3.4) or prolonging life expectancy. Consequently, most advanced CESEE EU Member States (see Chart 8) already score higher than some other EU Member States. Notwithstanding these positive traits, it appears that the intra-country income distribution has been – similar to the experience of many other economies in the world in recent decades – rather skewed in favour of higher percentiles. That said, inequality (measured by the Gini coefficient) does not appear to be higher than in other emerging markets. Overall, when adjusted for inequalities within the country (related to life expectancy, education and income), new EU Member States score higher than their income levels would imply, which is due to both relatively lower inequalities in the region and higher human capital (as proxied by the mean years of schooling). On the other hand, Western Balkan countries often display lower HDI indices than their income levels would suggest.

Chart 8

Human Development Index and GDP

(y-axis: Human Development Index in 2015, 1=highest); x-axis: real GDP per capita in PPP, as a percentage of EU28 average in 2015)



Sources: Haver Analytics, United Nations Development Programme, World Bank and ECB staff calculations.
Notes: Other EU depicts EU Member States that joined prior to 2004, except Luxembourg and Ireland. Under perfect equality, the Human Development Index (HDI) adjusted for inequalities is equal to the HDI, but it falls below the HDI when inequality rises.

[11] The HDI (developed by the United Nations) is composed of four components, namely (i) life expectancy at birth, (ii) expected years of schooling, (iii) mean years of schooling, and (iv) gross national income (in PPP USD, real terms). The HDI is the geometric mean of normalised indices for each of these dimensions. Although the methodology for calculating the HDI has faced criticism (notably over the choice of dimensions and aggregation methods, see e.g. Kovacevic (2011) for further details), arguing that one index cannot capture the character of a multitude of indicators, or that the HDI depicts an oversimplified view of human development by relying on only a few indicators, the HDI remains a useful indicator allowing for a broader focus than economic growth solely in the policy debate.

4 Drivers of economic convergence in CESEE countries between 2000 and 2016

4.1 Growth accounting

Growth accounting analysis[12] of CESEE economies shows that since 2000 economic growth has largely been based on rising total factor productivity and capital accumulation. On the other hand, CESEE countries have experienced mixed demographic developments, and as a result, labour contribution to growth has, on average, been close to zero. Therefore, this growth pattern was somewhat different from that of many other converging economies that have often been analysed in the literature, where growth was often mostly based on capital and labour accumulation.[13]

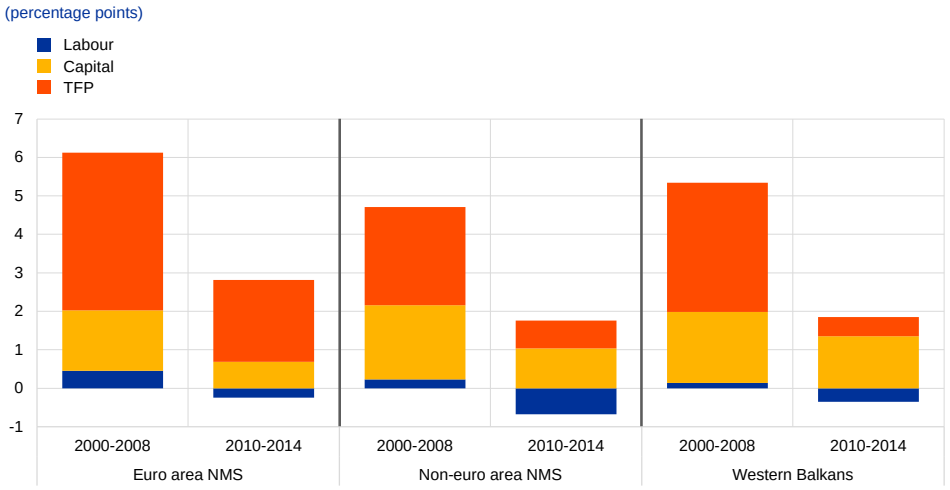
Nevertheless, the relative strength of the drivers of economic growth in CESEE was heterogeneous across both countries and periods of time. Before the crisis (i.e. between 2000 and 2008), the relative strength of the growth drivers was broadly similar throughout the region, with a particularly strong contribution from TFP growth and capital accumulation. While labour accumulation, on average, also supported economic growth, its contribution remained small in all groups of economies (see Chart 9). After the crisis, economic growth in CESEE countries slowed down, and was mostly associated with slower TFP growth. As a result, economic growth in the region became more reliant on capital accumulation. This was particularly visible in the Western Balkans, where capital accumulation became, in practice, the only driver of economic growth.

[12] Growth accounting allows for the quantification of contributions of capital and labour accumulation to total economic growth. The part of economic growth that cannot be explained by the accumulation of those factors of production is usually attributed to total factor productivity growth (however, the unexplained part could account for e.g. measurement error or human capital accumulation). Growth accounting calculations for the CESEE countries in this note are based on the Penn World Tables database (version 9.0).

[13] These economies include, for example, OECD countries between 1960 and 1995, Latin American countries between 1940 and 1990, and East Asian countries between 1966 and 1990. Among the OECD countries, capital accumulation accounted for around half of overall growth, and total factor productivity growth for around one-third of it between 1960 and 1995, while the remaining portion of growth could be attributed to labour accumulation. The growth pattern of Latin American countries between 1940 and 1990 and in East Asian countries between 1966 and 1990 also relied on capital and labour accumulation (accounting for around half and around one-third of total growth respectively); however, the total factor productivity contribution to overall growth was, on average, much lower (Barro and Sala-i-Martin, 2004). See also European Bank for Reconstruction and Development (2017).

Chart 9

Contributions to economic growth from labour, capital and total factor productivity in the periods 2000-08 and 2010-14



Sources: Penn World Table version 9.0 and ECB calculations.
Notes: The labour share in Albania and Montenegro is assumed to be equal to the average of FYR Macedonia, Bosnia and Herzegovina, Serbia and Croatia. Average hours worked in the Western Balkan countries are assumed to be equal to the average in the new Member States. The calculations assume a standard Cobb-Douglas production function. Data are available only up to 2014.

In the new EU Member States outside the euro area, the contribution from capital accumulation also became the main growth driver, although TFP growth also explained a significant part of total economic growth. By contrast, in the euro area countries in the region, TFP growth remained the main growth. At the same time, headwinds from a shrinking labour force became a drag on growth in all three groups of countries.[14] In the next section of the paper, the respective growth drivers are analysed in more detail.

4.2 Capital stock and its accumulation

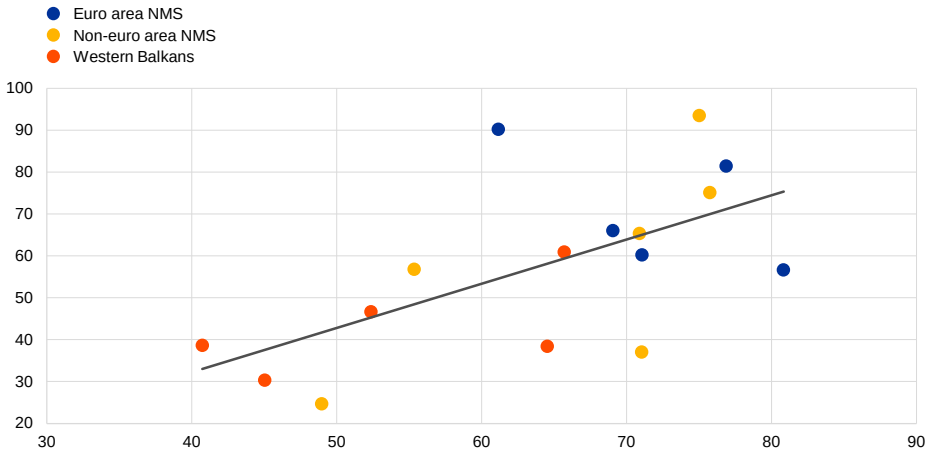
Despite the capital accumulation observed since 2000, capital stocks per person employed remain substantially below the EU28 average in almost all CESEE economies. The capital gaps with more advanced EU economies, which often accompany lower labour productivity (see Chart 10), are particularly high in south-eastern Europe, where in some countries, the capital stock accounts for only around one-third of that in the EU28. Given the low capital stock, on average, in CESEE economies, high investment ratios appear essential for fast capital accumulation and convergence to more advanced EU economies.

[14] While the Penn World Table database (version 9.0) used in this growth accounting exercise covers data only up to 2014, strong employment growth throughout the region after 2015 suggests that labour contribution to growth after 2010 might be higher than estimated for the period 2010-14.

Chart 10

Capital stock per person employed and labour productivity in CESEE countries in 2014

(y-axis: capital stock per person employed (index: EU28 = 100);x-axis: GDP per person employed (index: EU28 = 100))



Sources: Penn World Table version 9.0 and IMF (World Economic Outlook).
Notes: The blue dots depict new Member States that have adopted the euro, the yellow dots new Member States not part of the euro area, and the red dots the Western Balkan economies. Data are available only up to 2014.

Spence et al. (2008), after identifying economies growing rapidly for an extended period of time in the post-war period, pointed out that all of them exhibited investment-to-GDP ratios above 25% in the period of rapid convergence. Investment was booming in most CESEE economies before 2008, and in 12 of them, investment rates hovered above 25% of GDP. However, domestic saving rates were not enough to finance the investment boom and large savings gaps (i.e. the differences between investment and domestic savings ratios) constituted a common characteristic of CESEE countries. Those were particularly high in south-eastern Europe, including in current EU candidates and potential candidates, and in Baltic countries, where in some cases savings gaps reached double digits.

The investment boom before the crisis was supported by high demand growth and, given the limited domestic savings, was financed largely by capital inflows. These capital inflows included, in particular, bank loans and foreign direct investment (FDI, see Chart 11). In addition, FDI not only had a positive impact on capital accumulation, but also enabled technology and know-how transfer, thereby supporting TFP growth (Damijan et al., 2013; see also the panel regression results in Section 5). However, high investment ratios often also reflected high investment activity in the construction sector (see Chart 12), boosted to a certain extent by credit-driven housing booms in many CESEE countries before the crisis, which possibly had a limited impact on labour productivity and long-term growth prospects.[15] Furthermore, while increasing financial intermediation can, in principle,

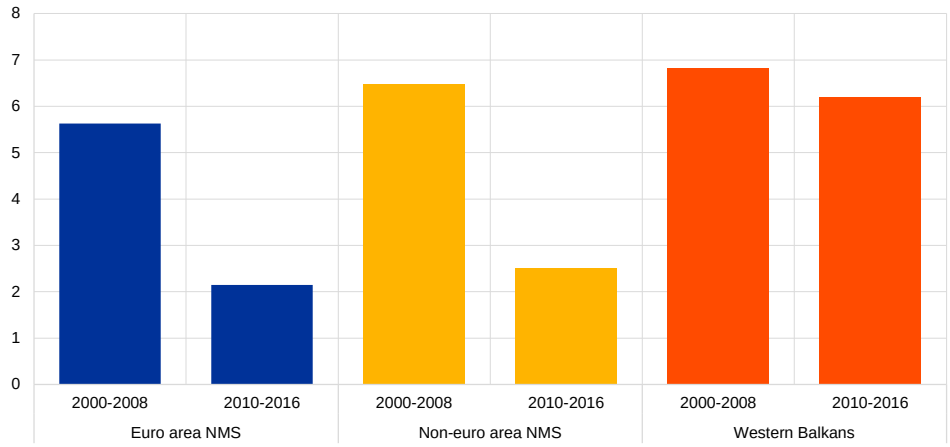
[15] For example, Sala-i Martin (1997) found that non-equipment investment has no impact on GDP growth if the level of total investment is controlled for. At the same time, the author found a strong link between equipment investment and growth, thus confirming previous results obtained by DeLong and Summers (1991).

support economic growth[16], particularly in countries where financial intermediation remains relatively low, a rapid build-up of debt before the crisis in some CESEE countries (notably in those that were using the euro, see Chart 13) was followed by private sector deleveraging, which in turn remained a drag on GDP growth after the crisis. Financial depth, however, remains low, on average, throughout the CESEE region (as proxied by domestic credit to the private sector as a percentage of GDP), as compared with the EU28 average.

Chart 11

Average foreign direct investment (FDI) inflows in the periods 2000-08 and 2010-16

(as a percentage of GDP)



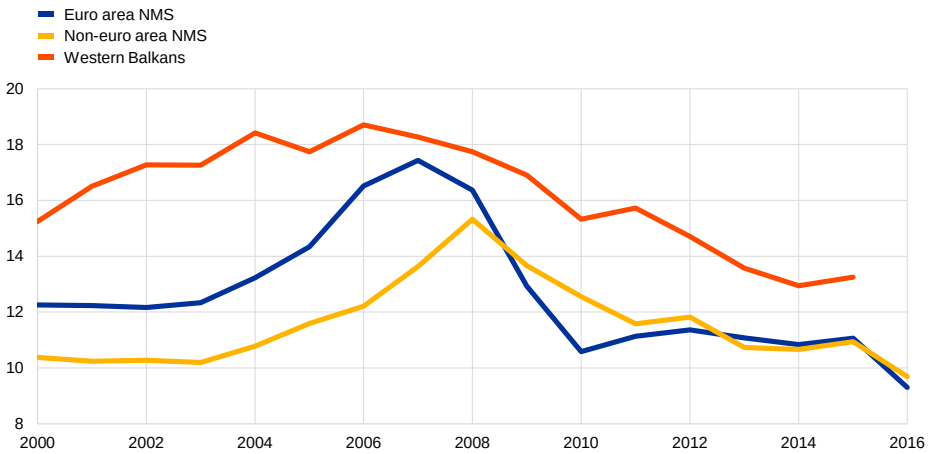
Sources: Wiiw (FDI database) and ECB calculations.
Notes: Data in gross terms. Simple averages of country-specific data for regional aggregates.

16 While the positive role of financial intermediation in supporting economic growth is generally confirmed in the literature (for an extensive review of theoretical and empirical studies on this topic see, for example, Levine (2005)), some papers also point out that excessively large financial sectors might result in financial fragility, while fast credit growth might be followed by financial crises (Arcand et al., 2012).

Chart 12

Average total construction value added in the period 2000-16

(as a percentage of GDP)

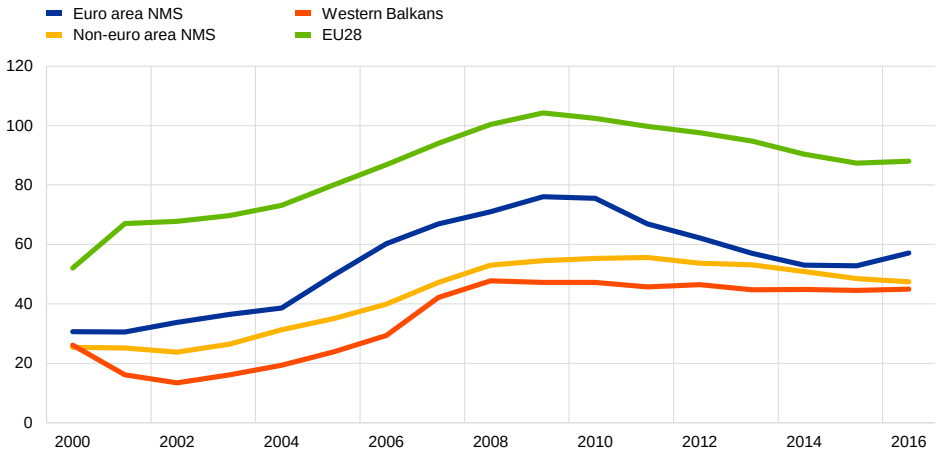


Sources: European Commission (AMECO database) and ECB calculations.
Notes: Averages calculated from all countries for which data are available. In the case of the Western Balkans, these include Albania (until 2015), FYR Macedonia Serbia. For non-euro area EU Member States, only Croatia has been excluded due to data availability issues. Simple averages of country-specific data for regional aggregates.

Chart 13

Domestic credit to private sector by banks

(as a percentage of GDP)



Sources: World Bank and ECB calculations.
Note: Simple averages of country-specific data for regional aggregates.

After the crisis, investment ratios declined substantially. This took place against a backdrop of slower GDP growth, lower capital inflows, a slowdown in construction activity and lower credit growth.[17] Overall, only five CESEE economies managed to keep them above 25% of GDP. At the same time, the larger the savings gaps were before the crisis, the larger the downward adjustments in investment ratios were afterwards, and as investment ratios fell, they became more closely aligned with

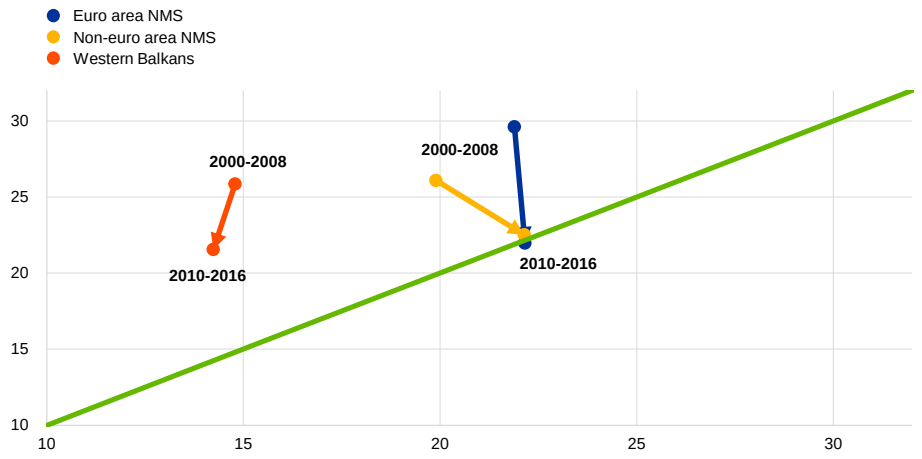
[17] The fall in investment after the crisis was a global phenomenon. Available studies usually explain the weak investment after the crisis as the result of lower (expected) GDP growth, higher uncertainty and indebtedness, and smaller FDI inflows in emerging economies (World Bank, 2017, BIS, 2015).

domestic savings rates (see Chart 14). The experience of fast-growing investment before the crisis followed by the substantial adjustment afterwards, points to the conclusion that while capital flows to converging and capital-scarce economies appear essential to foster economic growth and convergence, they might also exacerbate volatility in these economies, particularly if portfolio capital flows or flows to the banking sector dominate instead of more stable sources of finance such as FDI.

Chart 14

Average savings and investment rates in the periods 2000-08 and 2010-16

(y-axis: investment rate (as a percentage of GDP); x-axis: savings rate (as a percentage of GDP))



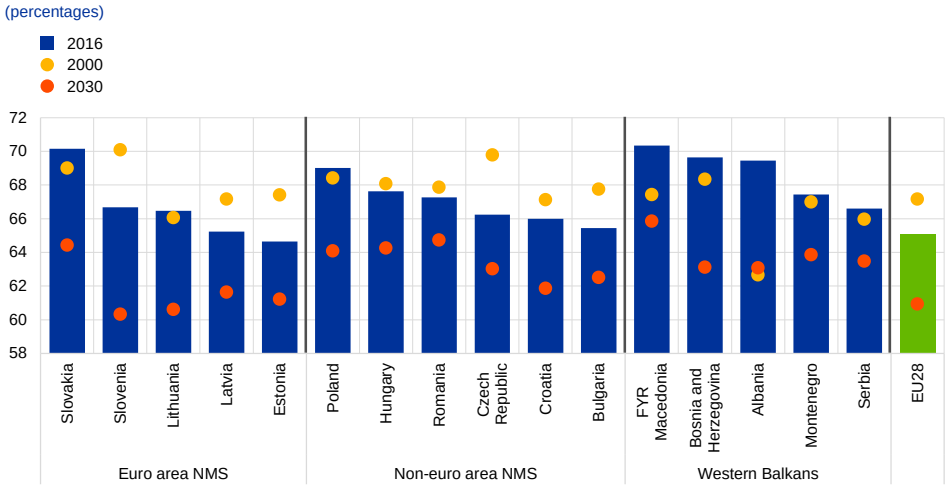
Sources: IMF (World Economic Outlook) and ECB calculations.
Notes: 45-degree line shown in grey. Simple averages of country-specific data for regional aggregates.

4.3 Labour

In the period under review, only some CESEE countries could reap a demographic dividend, i.e. a boost in economic growth potential related to the increase in the working age proportion of the total population. While this proportion increased most in EU candidates and potential candidates and in some new EU Member States (see Chart 15) in the period analysed, it declined in the Baltic countries, the Czech Republic and Slovenia. Against this background, the labour contribution to economic growth since 2000 has, on average, been low in CESEE economies, as compared with the example of other fast-growing emerging economies.

Chart 15

Population aged 15-64 as a proportion of total population in 2000, 2016 and 2030



Source: World Bank (WDI).
Note: Data for Serbia include Kosovo.

While the underlying demographic trends were heterogeneous overall, all CESEE countries experienced unfavourable migration developments. According to Atoyan et al. (2016), the outflow of the workforce was particularly high in south-eastern Europe, both in countries that had already joined the EU (around 11% of the population in 1990) and in countries outside the EU (close to 10%), but was slightly lower in central and eastern Europe and in the Baltic countries (around 5-6% of the population in 1990). The unfavourable migration trends accelerated after these countries joined the EU. Emigration concerned mostly the young and skilled workforce, which in turn adversely affected productivity and income convergence.

Looking ahead, the challenges related to the falling working age proportion of the population are expected to increase due to the acceleration in population ageing. The working age population is expected to plunge in all CESEE countries, with the highest drop in Baltic and south-eastern EU countries (see Chart 15). Such developments may have considerable implications for economic growth. Most of all, they will have a direct adverse impact on economic growth through lower labour input. At the same time, population ageing may also have indirect effects on economic growth through its impact on aggregate productivity, savings or the level and structure of public expenditure, although there is still no consensus in the literature on the exact mechanism via which population ageing can affect those variables. It should also be borne in mind that ageing is likely to trigger policy and behavioural responses that might have an unclear impact on economic activity

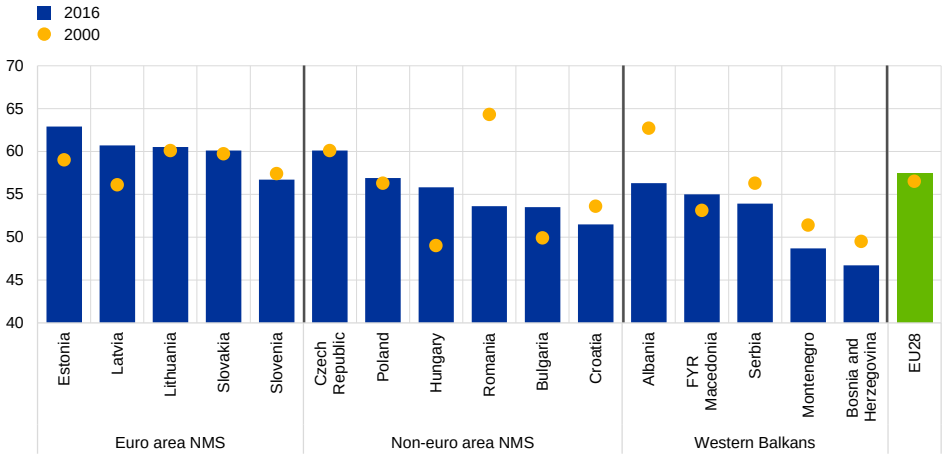
overall. These may include changes in the design of pension systems, labour market policies, savings patterns or investment in human or physical capital.[18]

The negative implications of the changing population structure on the labour market could be mitigated by increasing labour participation. Although labour participation rates in the Baltic or some central and eastern European countries are already at relatively high levels, there is still significant scope for higher activity in south-eastern Europe, particularly in the Western Balkans (see Chart 16). In these countries, participation rates are as much as 10 pp. lower than in the EU28, on average, and in many cases have declined since 2000.[19] At the same time, additional employment gains could result from a better alignment of labour supply and demand and thus lower unemployment rates, which in the Western Balkan countries are still high (often above 20%).

Chart 16

Labour participation rate in 2000 and 2016

(as a percentage of the total population aged 15 and above)



Sources: World Bank (WDI) data compiled by the International Labour Organisation.
Note: Statistical break in Romania in 2002.

18 For example, assuming productivity decreases in line with age, population ageing may reduce aggregate productivity. However, empirical studies on this mechanism are inconclusive (see for example Skirbekk (2004), van Ours and Stoeldraijer (2010); Bloom and Sousa-Poza (2013)). Some authors (Lee and Mason (2010)) indicate that growing longevity, together with low fertility, may increase investment in human capital and result in higher productivity and economic growth. Also Bloom et al. (2014) formulate a hypothesis that ageing may trigger behavioural responses, related to, for example, the growing labour participation by women or investment in labour-saving technologies. At the same time, while the falling share of the working age population, which typically exhibits higher savings rates, may lead to lower aggregate savings, increased life expectancy may have the reverse effect on this variable (Bloom et al., 2007).

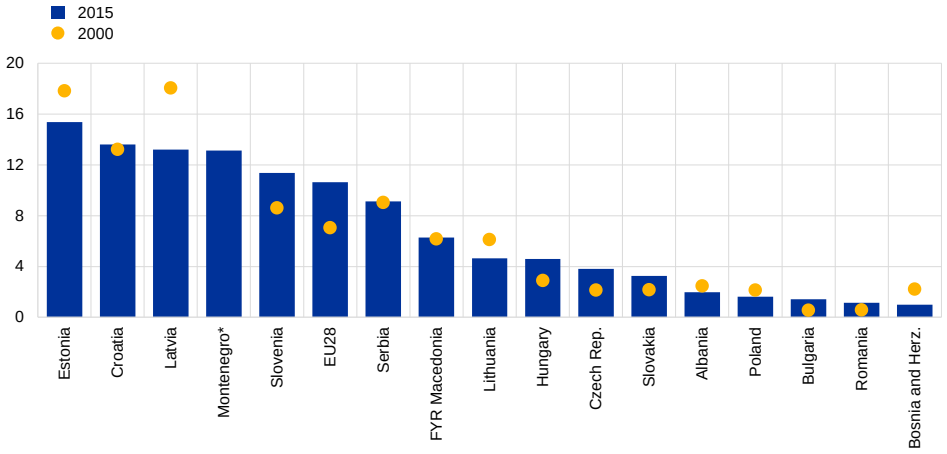
19 The scope for higher labour market participation is clearly visible when analysing the most vulnerable groups on the labour market. For example, in 2016, labour participation rates among the young (aged between 15 and 24) were below the EU average (42.2%) in all CESEE countries. It was particularly low (below 30%) in Bosnia and Herzegovina, Bulgaria, Hungary and Serbia. There is also sizable room for increasing female labour participation in most CESEE countries, particularly among EU candidates and potential candidates. In Bosnia and Herzegovina, only around one-third of women were active on the labour markets, as compared with the EU average of 51%. By contrast, female labour market activity is relatively high in the Baltic countries (also as compared with the EU average). Similar conclusions could be drawn when analysing labour market participation of more senior cohorts, which remains relatively low in most CESEE countries.

Another potential avenue for mitigating the negative impact of the falling proportion of the working age population on labour markets is immigration. Notwithstanding the large heterogeneity across the countries analysed, in most of them, the number of immigrants as a proportion of the population remains low (an average of 3.3%, compared with 10.6% in the EU28[20] in 2015; Chart 17). Although immigration has already increased in some CESEE economies in the period analysed, it was mostly driven by large immigration from other less developed CESEE countries, which also face demographic challenges ahead[21]. On the other hand, the number of immigrants in the Baltic States declined considerably in the period analysed, driven mostly by a fall in the number of Russian and Belarusian citizens. Overall, the potential for immigration to mitigate challenges related to the ageing population has, so far, only been exploited to a limited degree in the region. That said, due to the scale of expected demographic change, immigration should rather be considered as a policy that can mitigate, but not fully overcome, the negative consequences of ageing for labour markets in the region.[22] Furthermore, attracting immigrants requires the offer of economic opportunities in the labour market, which tend to be limited in countries that still suffer from relatively high unemployment, notably the Western Balkans.

Chart 17

Migrants stock to population in 2000 and 2015

(as a percentage)



Sources: United Nations and ECB staff calculations.
Note: Simple averages of country-specific data for regional aggregates.

20 Country averages weighted by population (United Nations data).

21 For example, the increase in the number of immigrants in Slovenia was largely driven by inflows of citizens of Bosnia and Herzegovina and the former Yugoslav Republic of Macedonia, while in Hungary, it was driven by inflows of citizens from Romania and Serbia.

22 For example, in 2016, Poland saw an unprecedented inflow of Ukrainian citizens, with more than 500,000 of them receiving a residence permit (according to Eurostat data). However, the working age population in Poland was expected to shrink by more than 3.1 million by 2030 and by 8.1 million by 2050 (as compared with 2015; the World Bank forecast).

4.4 Drivers of total factor productivity

In this section factors that might have had a tangible impact on total factor productivity in CESEE are analysed. Total factor productivity measures the efficiency with which labour and capital inputs are used in the production process and is a key driver of sustainable convergence. There are many factors that can influence this efficiency in the production process and this subsection will focus on the impact of the economic structure, the role of human capital, trade openness and external competitiveness, and innovation, and, finally, the more fundamental role played by institutional quality.

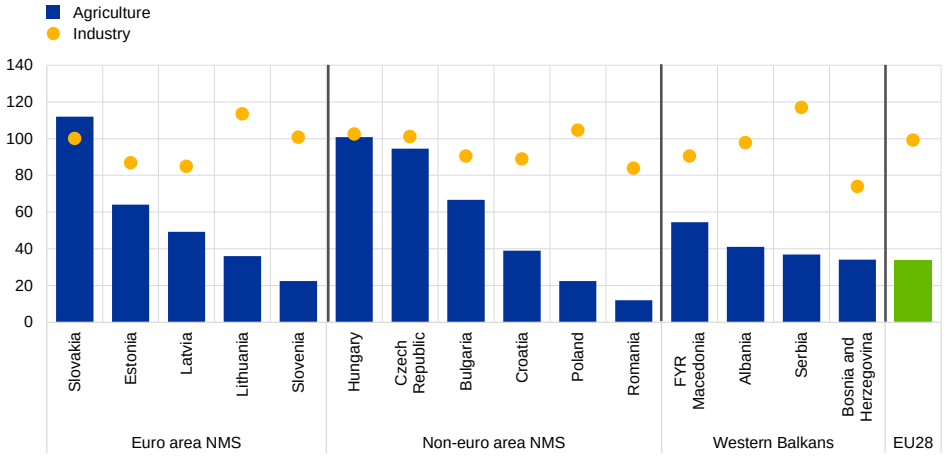
4.4.1 Economic structure

Owing to the differing productivity levels across economic sectors, the structure of the economy has a direct impact on aggregate productivity and economic growth. Most importantly, productivity in agriculture is usually lower than in services and industry (see Chart 18). Thus, the high proportion of total value added accounted for by agriculture may adversely affect productivity levels in the economy. At the same time, labour reallocation from agriculture to industry and services supports productivity and economic growth.

Chart 18

Labour productivity in industry and agriculture in 2016

(labour productivity in services = 100)



Sources: ECB staff calculations based on World Bank WDI.
Note: Labour productivity is defined as output per person employed.

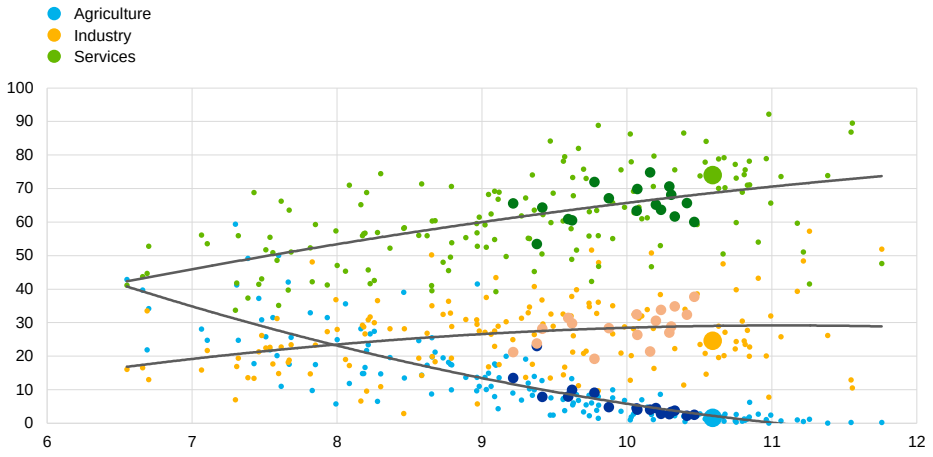
The stylised pattern is that as economic development progresses, the importance of services in the economy tends to increase, while the role of agriculture tends to diminish (see Chart 19). At the same time, the proportion of industry as a percentage of total value added tends to increase at the initial stages of economic development, but afterwards this may follow different patterns, as industry is frequently seen to constitute both high and low proportions of total value added in highly developed countries. Between 2000 and 2016, CESEE economies followed this stylised pattern. Consequently, the proportion of services as a percentage of

total value added increased and that of agriculture as a percentage of total value added fell. At the same time, the proportion of industry as a percentage of total value added remained broadly unchanged.

Chart 19

Proportion of agriculture, industry and services as a percentage of total value added in 170 economies in 2016

(y-axis: proportion of total value added as a percentage; x-axis: log of GDP per capita at PPP, current international dollars)



Sources: World Bank (WDI) and Organisation for Economic Co-operation and Development (OECD).
Notes: The darker colours denote CESEE countries, and the largest dots the EU28 average. Data refer to 2015 for 16 countries

However, some CESEE economies show a structure that deviates somewhat from the stylised patterns. Some CESEE countries are less industrialised than their GDP per capita levels might imply. This relates in particular to some Western Balkan countries where agriculture still plays a particularly important role. At the same time, most developed CESEE economies appear to be more industrialised than other economies at a similar stage of development. In these countries, the relative strength of the industrial sector may be explained by the reallocation of production from Western Europe, which was driven by high FDI inflows, increasing participation in global value chains, lower labour costs and proximity to more advanced EU economies.

Significant scope for further labour reallocation towards services and industry remains in many CESEE countries. While in some of these countries the proportion of employment in agriculture has already reached the low levels typical for advanced economies, in others it remains high, thus dragging down overall productivity. For example, the proportion of agriculture as a percentage of total employment in Albania is around 42%, while, as a proportion of total value added, it accounts for only 23%. In Romania, these numbers are 26% and 4%. Among more advanced economies, over-employment in agriculture appears to be particularly pronounced in Poland, where agriculture as a proportion of total employment accounts for 11%, while it is barely 2.7% as a proportion of total value added.[23]

[23] World Bank data for 2016.

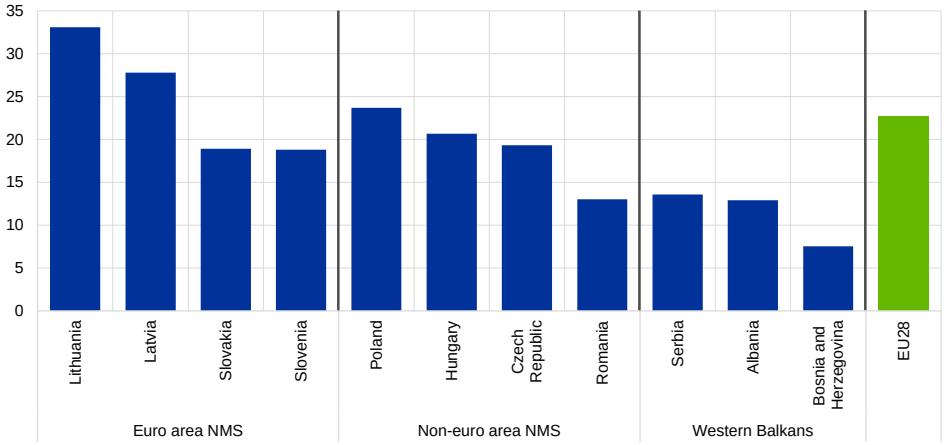
4.4.2 Human capital

Human capital levels in CESEE countries appear to be relatively high overall.[24] Although human capital is not directly observable, it can be approximated by variables such as the percentage of the workforce with higher education or education enrolment rates. In these metrics, most CESEE countries score relatively well compared with the EU average (see Chart 20). In particular, the proportion of the population with at least a bachelor's degree in the Baltic countries is higher than, and in central and eastern Europe similar to, the EU average. At the same time, significant gaps persist in the Western Balkans and in some new EU Member States, where the proportion of the population with at least a bachelor's degree remains very low.

Chart 20

Proportion of the population with at least a bachelor's (or equivalent) degree in 2015

(as a percentage of the population aged 25 or older)



Sources: World Bank (WDI) and ECB calculations.
Notes: Data are not available for all CESEE countries. Data refer to 2014 for Poland and Romania and to 2012 for Albania. The EU average is calculated from all countries for which data are available.

Enrolment in tertiary education has increased in all CESEE countries since 2000, pointing to growing human capital of younger generations, which is likely to boost productivity and economic growth going forward. In some countries the enrolment ratio increased substantially.[25] Overall, in 2015, in almost half of the CESEE countries, the ratio was above the EU average of 68%, and it exceeded 50% in almost all countries in the region.

Notwithstanding these positive traits, challenges related to education quality and the alignment of skills to labour market demand persist in many CESEE economies, particularly in the Western Balkans. In this context, PISA scores,

[24] Although labour input in the production function approach is often assumed to be homogenous, in reality, the quality of labour varies considerably across countries and time, which reflects differences in human capital. Thus, when using the production function approach, while assuming that the labour input is homogenous, any change in the quality of labour leads to a change in the unexplained component of economic growth, which is usually attributed to total factor productivity.

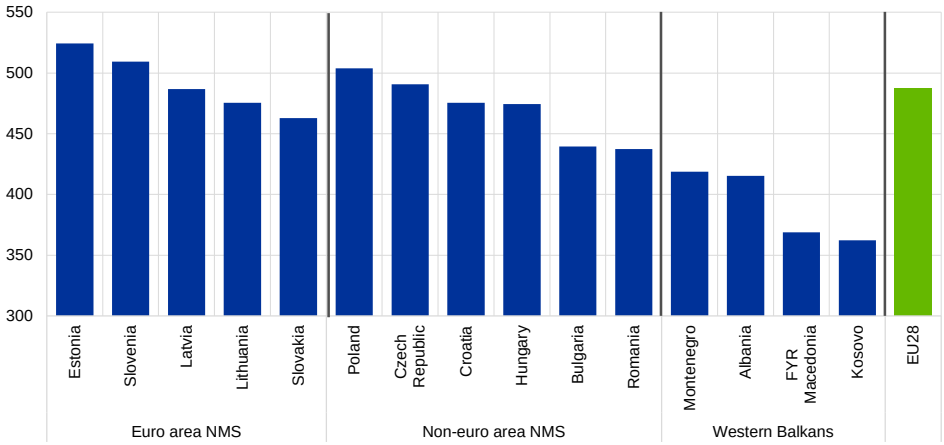
[25] Gross enrolment ratio is the ratio of total enrolment, regardless of age, to the population of the age group that officially corresponds to the level of education shown.

showing how 15-year-old students perform in terms of mathematics, reading and science skills, point to a very low quality of education in EU candidates and potential candidates, as well as among south-eastern European countries that have already joined the EU (see Chart 21). Conversely, students perform relatively well in Baltic and some central and eastern European countries, pointing to a higher quality of education. At the same time, the alignment of skills to labour market needs remains weak in most CESEE economies (IMF, 2016), which is contributing to a higher mismatch on the labour market and to higher unemployment, particularly in the Western Balkans.

Chart 21

PISA average score in mathematics, reading and science in 2015 (aged 15 years)

(higher score indicates better performance)



Sources: OECD and ECB staff calculations.

4.4.3 Trade and external competitiveness

More outward-oriented policies might support higher economic growth in the long run. According to the economic theory of comparative advantages and factor intensity, increased trade flows allow for a reorientation of resources within sectors and a specialisation between countries, thus raising efficiency and income levels. Furthermore, higher economic openness might create opportunities for small economies to access new markets and take advantage of economies of scale in production.[26]

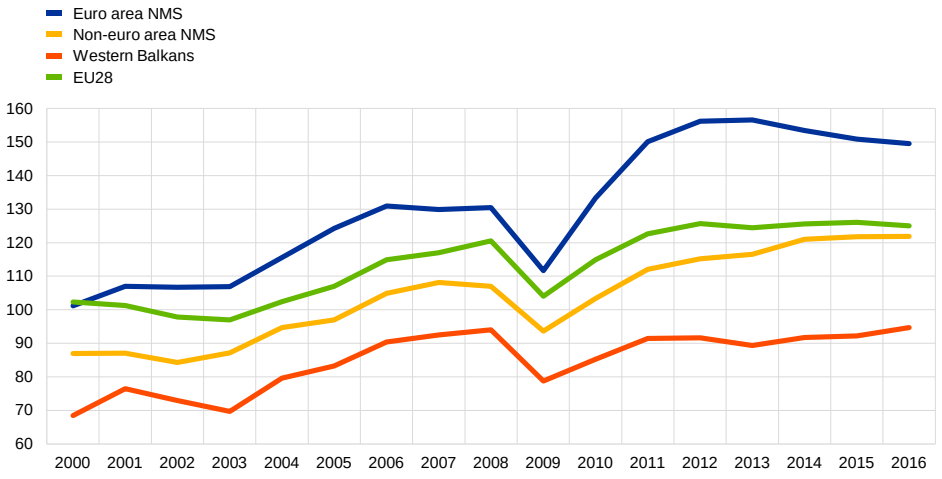
[26] That said, growing trade openness might also pose challenges related to e.g. labour reallocation from import-competing sectors or potentially increasing income inequalities. Also, despite initial gains related to higher trade, countries might become trapped in the production of goods and services in low-productivity growth sectors, in which they display comparative advantages (e.g. low skill and high labour-intensive products), potentially impeding convergence to the richest economies in the longer term. For a more extensive review of trade openness and its potential impact on the economy, see Dollar (1992), Sachs and Warner (1995), Ben-David (1993), Edwards (1998), Rodriquez and Rodrik (2001) or Rodriquez (2006).

Trade openness has increased in almost all countries in the CESEE region since 2000, creating favourable conditions for income convergence in these economies. The most developed or fast-converging CESEE economies (such as the Czech Republic, Estonia, Lithuania, Slovakia or Slovenia) also display high trade openness. However, a high degree of trade openness may not be sufficient to achieve a sustainable convergence process, particularly if it is not accompanied by improving competitiveness. CESEE countries that have joined the euro area have experienced the fastest growth in trade openness since 2000 (see Chart 22). At the same time, the increase in trade openness in EU Member States outside the euro area was more gradual, which, however, might also reflect the bigger size of those economies. By contrast, trade openness in the Western Balkans has grown only moderately and remains much lower than the EU average. Much faster growth in exports than in imports was a common characteristic in all countries from the region. Against this background, almost all new EU Member States managed to turn trade deficits in 2000 into trade surpluses by 2016. However, in the Western Balkans, although exports have generally been growing more quickly than imports since 2000, large external trade deficits still persist. While significant trade deficits are typical for catching-up economies, which also usually attract capital inflows, large trade imbalances in some Western Balkan countries may also be a sign of a narrow production base and the generally low competitiveness of the countries in the region.

Chart 22

Trade openness in the period 2000-16

(sum of exports and imports of goods and services as a percentage of GDP)



Sources: IMF (World Economic Outlook) and ECB staff calculations.
Notes: Data for Montenegro are available only from 2001 onwards. Simple averages of country-specific data for regional aggregates.

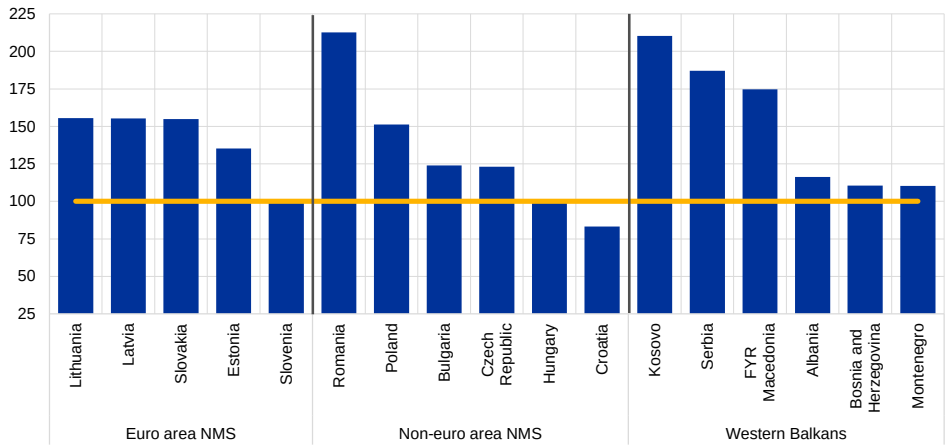
Changes in world export market shares – an indication of the ability to compete on global markets – remained heterogeneous in CESEE countries. For instance, Kosovo, the former Yugoslav Republic of Macedonia, Poland, Romania, Serbia and Slovakia managed to strongly increase their share of world merchandise exports, although several of them started from a relatively closed economy and low export levels (see Chart 23). The Baltics, on the other hand, experienced an impressive boost to exports in the years prior to the financial crisis in 2008, while the increase has since moderated. Hungary, which shows one of the

highest trade openness ratios, was not able to increase its share of global exports, suggesting little progress in competitiveness. The main export market of most CESEE economies has traditionally been the EU, accounting, on average, for 70% of merchandise exports. However, export destinations have become more diversified over the past decade, including an increase in intra-regional trade.

Chart 23

Change in world export market shares from 2004 to 2016

(index: 2004 = 100)



Sources: IMF (World Economic Outlook) and ECB staff calculations.
Note: The base year is 2004 due to the lack of data for some countries in the sample.

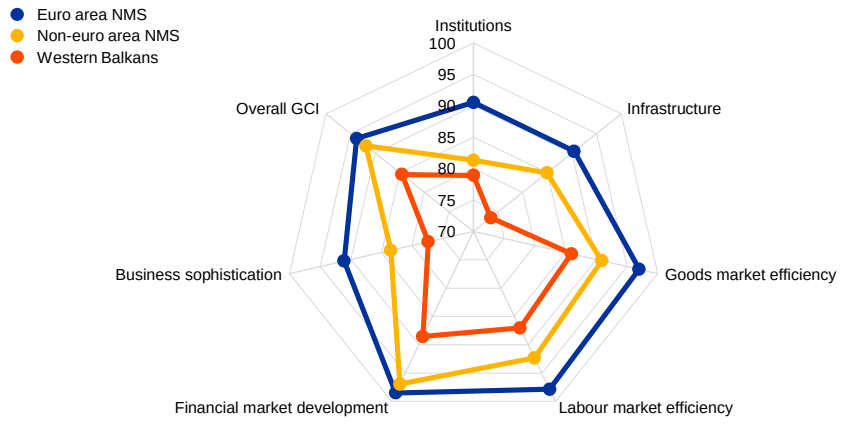
External competitiveness indices suggest that most of the CESEE economies analysed score worse than the EU average in all metrics, notwithstanding an improvement over the past decade (see Chart 24). The CESEE region appears to have particular weaknesses in institutions (see also Section 4.4.5), infrastructure quality (which poses a particular vulnerability in often landlocked EU candidates and potential candidates)[27], labour market and business sophistication. External competitiveness appears to be particularly low in the Western Balkans, where labour markets suffer from the difficulties in attracting and retaining talent, which is illustrated by the "brain drain" and the specific experience of emigration over the past decade (see also Section 4.3). Furthermore, the majority of Western Balkan countries have shallow value chains, in contrast to some of the new EU Member States, which have managed to become integrated into global value chains by being the destination of the production delocalisation of older EU Member States.

[27] Poor infrastructure quality in Western Balkan countries is also confirmed for example by the Logistics Performance Index as calculated by the World Bank.

Chart 24

Global Competitiveness Index 2017-18

(EU28 average = 100)



Sources: World Economic Forum (GCI) and ECB staff calculations.
Notes: The Global Competitiveness Index (GCI) is calculated on the basis of 12 sub-indicators, of which six are depicted here. The full index is depicted here in order to provide an overview of the global competitiveness in the region, which means that the full index also includes the six sub-indicators shown separately in the chart. A higher score indicates a better relative performance. Simple averages of country-specific data for regional aggregates.

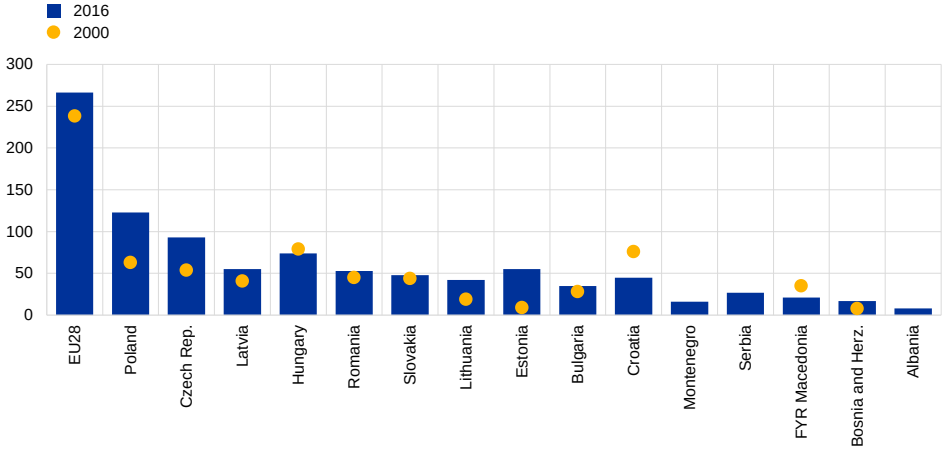
4.4.4 Innovation

A key driver of productivity and growth is innovation, which also appears fundamental to be able to compete on global markets with higher value added products. While low-income countries may be able to converge quickly due only to the accumulation of capital and labour and the import of technologies and know-how (through capital goods imports or FDI), achieving sustainable convergence may be inhibited by an inability to shift production from being labour-intensive to becoming more innovative and technologically advanced. Without such a structural shift, countries risk getting stuck in the “middle-income trap”. In the context of CESEE countries, both those which have already joined the EU and those which are currently EU candidates and potential candidates, enhancing innovation (and productivity) also appears fundamental in the context of European integration and the ability to compete in the single European market.

While in recent years some CESEE countries have managed to catch up gradually in terms of innovation relative to the EU, others have stalled or even backtracked to some extent. If the number of patent applications per million of population is used as a proxy for innovation, the latter has improved notably in Baltic countries, Poland and Slovenia since 2000 (see Chart 25). The heterogeneous evolution of innovation in CESEE countries points to the fact that innovation gains are not automatic and may require the pursuit of innovation-supportive policies.

Chart 25

Resident patent applications per million population in 2000 and 2016



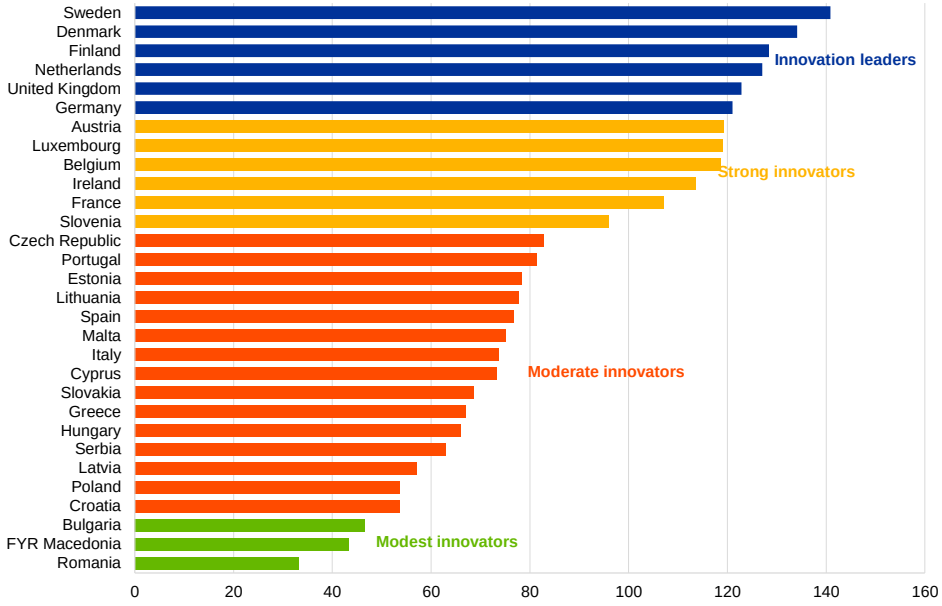
Source: World Intellectual Property Organization (WIPO) statistics database.
Notes: Simple average of country-specific data for EU28.
Data for 2000 and 2013 for FYR Macedonia. In the case of Montenegro, Serbia and Albania, data for 2000 are not available.

Significant scope for improvement remains among most CESEE countries, in particular in south-eastern Europe. According to the European Innovation Scoreboard, classifying economies according to their innovation performance based on a number of metrics[28], only Slovenia is ranked as a strong innovator, while most CESEE economies are classified as moderate innovators and some – usually those from south-eastern Europe – as only modest innovators (see Chart 26). The strengths of CESEE economies include human resources and an innovation-friendly environment overall (typically in central and eastern Europe and in Baltic countries), while countries are lagging behind in terms of research quality, small and medium-sized enterprise (SME) innovation (related to products, processes, marketing and organisation), links between innovative SMEs and research, links between private and public sector, and intellectual assets (measured by e.g. patent applications).

[28] These metrics cover inter alia the quality of human resources, quality of research, investment in research and development (R&D), level of intellectual assets, exports of medium- and high-tech products, employment in knowledge-intensive activities, etc.

Chart 26

European Innovation Scoreboard in 2016 for CESEE and other European economies (as a percentage of the EU28 average)



Source: European Commission (European Innovation Scoreboard).
Note: Data are available only for some CESEE economies.

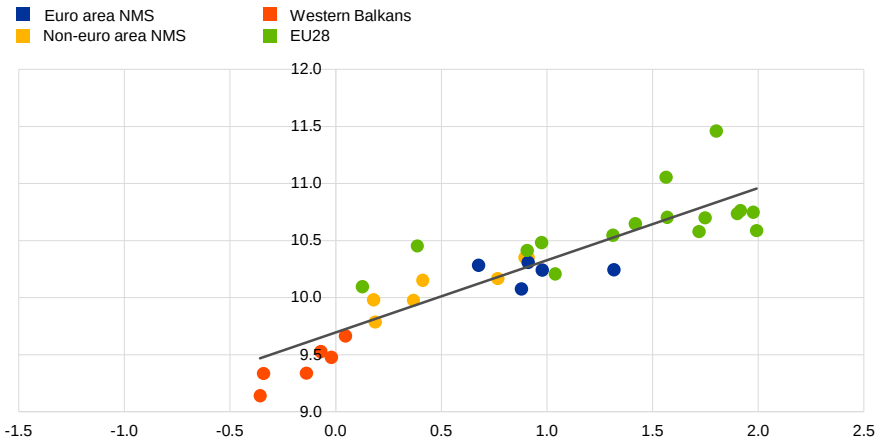
4.4.5 Institutional quality

The quality of institutions is often assumed to be a fundamental explanation of economic growth and differences in economic development between countries in the long run (see e.g. IMF, 2003; Acemoglu et al., 2005; Rodrik, 2008). Accordingly, a strong correlation can also be observed between the quality of institutions and GDP per capita (see Chart 27) in the group of CESEE countries. Although institutions are endogenous, meaning that they are determined by society and may be a function of its income, their improvement does not necessarily occur automatically as economic development progresses.

Chart 27

Income levels and institutional quality in 2016

(y-axis: log of real GDP per capita at PPP, 2011 international dollars; x-axis: World Bank Worldwide Governance Indicators average scores)



Sources: Haver Analytics, World Bank Worldwide Governance Indicators (WGI – see Kaufman et al. (2010) for methodology) and ECB staff calculations.
Notes: The WGI average score is a simple average of the regulatory quality, government effectiveness, control of corruption and rule of law sub-indicators. A higher index implies a better relative performance in institutional quality. Simple averages of country-specific data for regional aggregates.

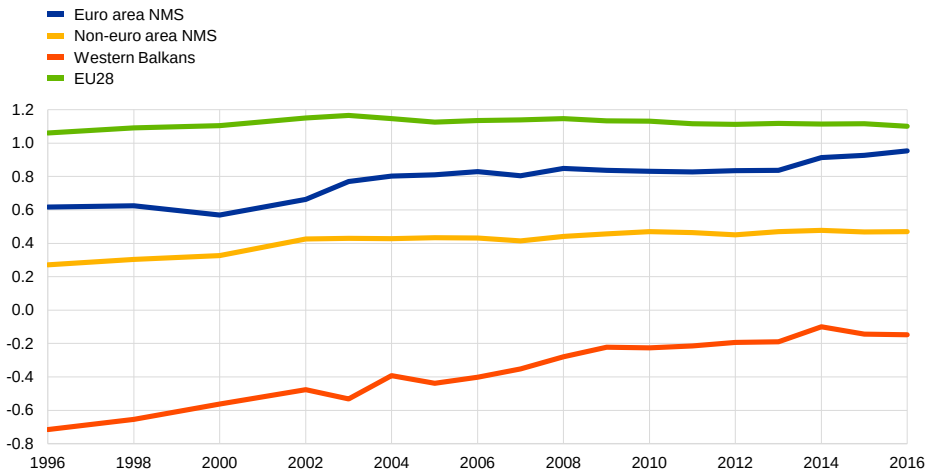
For example, Kaufmann and Kraay (2002) found a strong positive causal effect running from better governance to higher per capita income; however, a causal effect running in the opposite direction (from per capita income to governance) in their study was weak and even negative. Institutions (i.e. "the rules of the game in a society") in the CESEE region and their evolution in recent decades need to be analysed in the context of the transition of these countries from a command to a market economy since the 1990s. While the transition in CESEE EU Member States was rather fast and took place mostly at the beginning of the 1990s, the pace of the transition in the Western Balkans was much slower. This development largely stems from the 'lost decade' due to the post-Yugoslavian wars, which affected reforms.

Along with the transition to a market economy, institutions in CESEE countries became more supportive to growth. The fastest improvement took place in some Western Balkan economies, although from very low levels, and in countries that had already joined the euro area (see Chart 28). At the same time, institutional quality in some CESEE countries, after having improved initially, deteriorated thereafter. EU accession constituted another important anchor for institutional reforms. In new EU Member States, the most significant efforts in improving institutional quality took place in the years prior to EU accession, while progress has been limited thereafter (see Chart 29). This points to the importance of EU accession prospects for EU candidate countries and potential candidates in maintaining the reform momentum with the aim of enhancing institutional quality.

Chart 28

Worldwide Governance Indicators (delivery index)

(synthetic index based on the average score across four sub-indicators)

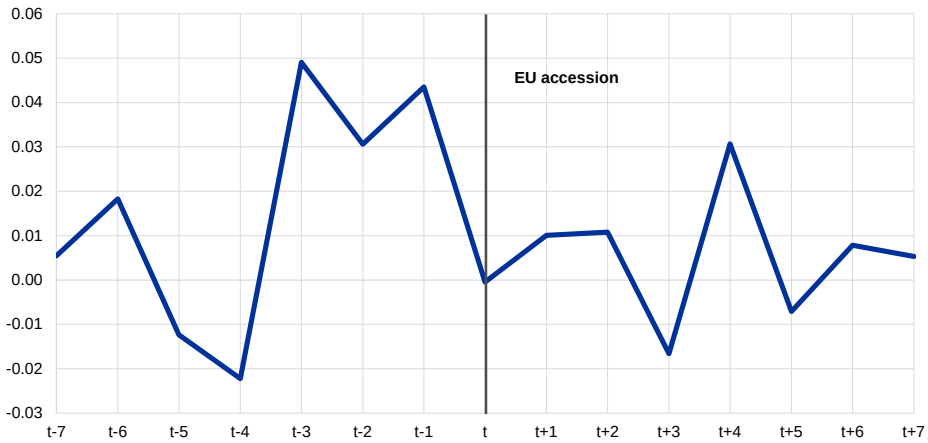


Sources: World Bank (Worldwide Governance Indicators – WGI) and ECB staff calculations.
Notes: The WGI delivery index is a simple average of the regulatory quality, government effectiveness, control of corruption and rule of law sub-indicators. A higher index implies a better relative performance in institutional quality. Simple averages of country-specific data for regional aggregates.

Chart 29

Average annual change in the Worldwide Governance Indicators (delivery index) in new EU Member States relative to the year of EU accession

(higher score indicates better performance)



Sources: World Bank (WGI), EBRD and ECB staff calculations.
Notes: Simple average of individual country performances. The WGI delivery index is a simple average of the regulatory quality, government effectiveness, control of corruption and rule of law sub-indicators. A higher index implies a better relative performance in institutional quality.

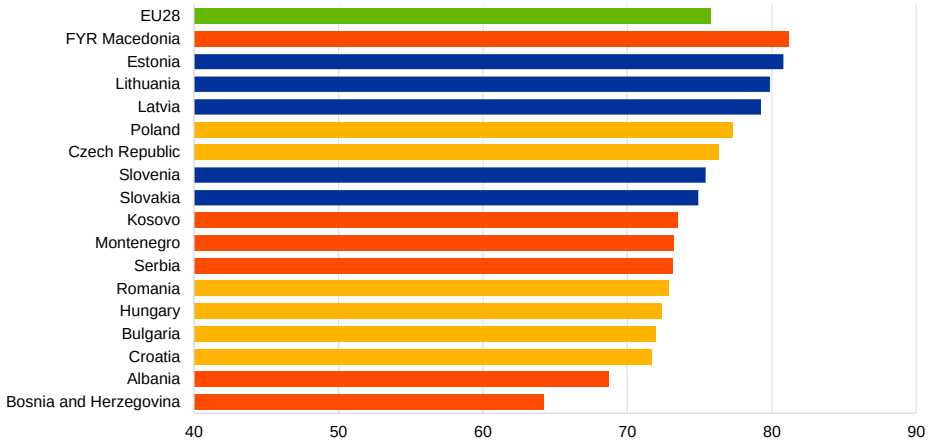
Despite overall improvements in institutional quality, progress remains heterogeneous across the region, and there is still considerable scope for further progress in many of them. Most CESEE countries lag behind the EU28 in institutional quality. This concerns, in particular, the Western Balkans, where institutional quality remains particularly low due to, inter alia, higher corruption, weaker rule of law and lower regulatory quality. In this group of countries, political instability and practices in the informal sector are other impediments cited by

businesses as being a drag on their activity and the business environment is also hampered, to a large extent, by factors such as weaknesses in contract enforcement, insolvency resolution and property registration, or the lack of a stable electricity supply, which are all reflected in the region's overall lower ease of doing business score (see Chart 30).

Chart 30

Ease of doing business, 2017-18

(distance from frontier, higher score indicates better performance)



Source: World Bank's Ease of Doing Business.
Notes: The distance from the frontier measures the distance of each economy from the 'frontier,' which represents the best performance observed across all economies in the Doing Business sample since 2005. An economy's distance from the frontier is reflected on a scale from 0 to 100, where 0 represents the lowest performance and 100 the frontier.

EU accession constitutes an important anchor for institutional reforms. As can be seen in Chart 29, the most significant efforts to improve institutional quality in new EU Member States took place in the years prior to EU accession, while progress has been limited thereafter in many of them, especially in countries that remained outside the euro area. However, CESEE countries that have joined the euro area have also maintained the positive reform momentum in recent years and, as a result, institutional quality in these countries has converged close to the EU average. This is a positive development, given the more favourable growth prospects associated with better institutional quality and the fact that strong institutions are crucial to ensure the sustainability of convergence.

Similarly, the institutional quality also remains a fundamental factor for the EU accession process in the Western Balkans. Further strengthening institutional quality in these countries remains essential not only for creating favourable conditions for economic growth, but also for complying with the Copenhagen criteria for EU accession. These include the stability of institutions, guaranteeing democracy and the rule of law, the existence of a functioning market economy, and the capacity to cope with competitive pressure and market forces within the EU. In turn, EU accession prospects might create an anchor for reform momentum in these countries conducive to enhancing institutional quality, as was the case for countries from the region that have already joined the EU.

5 Growth regression results

This section presents the results of estimations of a few simple panel models to complement the qualitative analysis conducted in the previous sections with more quantitative results. The models are based on a sample of all CESEE economies analysed between 2000 and 2016 (annual data), except Montenegro and Kosovo, which were excluded from the analysis due to low data availability. Growth in GDP per capita in PPP is chosen as the dependent variable. In some models, GDP growth is smoothed using the Hodrick-Prescott filter (with lambda 6.25) to eliminate GDP growth cyclicality.[29] Thus, the dependent variable in these models could be considered as potential GDP growth per capita.

The choice of predictors was based on the qualitative analysis conducted in the previous sections and the review of literature on economic growth (see e.g. Barro and Sala-i-Martin, 2004). Choosing independent variables in growth regressions poses a number of challenges. These include, inter alia, omitting variables that might have a significant impact on growth. By contrast, including all significant variables might not be possible due to the limited number of observations or a short time series or might lead to the collinearity of predictors. In order to address these challenges, two different groups of models were estimated. In the first approach, a number of predictors were included in the regressions simultaneously (the results are presented in Table 1). In the second approach, which was used as a robustness check, predictors were added to each model sequentially (the results are presented in Table 2 and Table 3).

Following the first approach, five different models were estimated. Four of them were fixed effects models and one model was estimated with the generalised method of moments (GMM) methodology. Fixed effects models seem to be a natural choice for a panel of countries. These models control for all time-invariant characteristics of a country (uncorrelated with individual characteristics of other countries) which might have an impact on both independent variables and predictors. The choice of fixed effects models (rather than random effects ones) is also supported by the results of the Hausman test conducted for all models described below. Accordingly, the first estimated model is a standard fixed effects model for the whole sample analysed, with HP-filtered GDP per capita growth as the regressed variable (model 1 in Table 1). Thereafter, the same model was estimated but with a narrower sample including only CESEE countries that have already joined the EU (model 2 in Table 1). The third model is estimated again for the whole sample of countries, but instead of HP-filtered GDP growth, actual GDP growth was used as the dependent variable (model 3 in Table 1). In the fourth model, potential year

[29] Another approach which would allow for controlling business cycle fluctuations is based on data averaging over a certain period (e.g. five years). However, owing to the relatively short time period analysed in this paper, applying this approach would considerably reduce the number of observations in the sample.

effects were controlled for by adding time fixed effects (model 4 in Table 1).[30] In order to minimise the potential endogeneity bias, the independent variables used were lagged (except for a few variables that were assumed to be strictly exogenous[31]). In the fifth model, the first-differenced GMM estimators were applied, as introduced by Arellano and Bond (1991), which are also very frequently applied in the growth regression analysis (model 5 in Table 1), since it provides consistent estimates, even if there are endogeneity and measurement errors.[32] In order to control for heteroscedasticity, all models were estimated with robust standard errors.

First, in order to confirm the convergence hypothesis, lagged GDP per capita was included in the model. If the hypothesis holds, the coefficient is negative, which implies slower GDP growth when GDP per capita was higher in the previous period. In order to control for external developments, GDP growth in the euro area is used. At the same time, the ratio of trade openness (defined as exports plus imports divided by GDP) is included to investigate the impact of trade on economic growth. In the list of domestic drivers of growth, the investment ratio is included, which is expected to have a positive impact on GDP growth (both through higher demand and positive supply effects).[33]

A variable measuring the number of patent applications per GDP is also added as a proxy for innovation and research and development outlays, and this variable is expected to have a positive impact on economic growth. The credit to GDP ratio is also included in the models to proxy the impact of financial sector development on economic growth in CESEE countries. The stock of credit in the economy may also have an unclear impact on GDP growth: while financial deepening might support growth, the high level of private sector indebtedness may negatively affect investment or consumption.

Furthermore, in order to capture the impact of demographic developments and changes in human capital levels, the working age proportion of the total population and the tertiary education enrolment ratio (total enrolment in tertiary education, regardless of age, expressed as a percentage of the population in the age group that officially corresponds to this level of education) are used as predictors. Positive coefficients of these two variables are expected, with the caveat that the education enrolment index measures only the human capital of the younger population (with part of it remaining outside the labour market), thus its potential effect on GDP growth might be small in the short term.

Last but not least, the World Bank delivery index (i.e. the average of four indicators: regulatory quality, government effectiveness, control of corruption and rule of law), is

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30 The Wald test was introduced, which shows that the hypothesis that the coefficients for all years are jointly equal to zero should be rejected.

31 These include GDP growth in the euro area and the working age proportion of the total population.

32 On the other hand, when applying the Arellano-Bond method, problems relating to weak instruments may arise when the time series are persistent and the time dimension is small. Thus, when applying this method, non-filtered GDP per capita growth data are used, which are less persistent than the HP-filtered time series.

33 It needs to be emphasised that lagging the investment-related variables most likely does not fully resolve the potential endogeneity bias (for example, investment may be higher when GDP growth is expected to accelerate in the period ahead).

used as a proxy for institutional quality. Positive values of the coefficient are expected, meaning that better control of corruption supports economic growth. At the same time, it needs to be emphasised that improvements in institutional quality might have more of an impact on economic growth in the longer term and sustainability of the improvement in institutional quality is key. Therefore, the instantaneous effects of changes in institutional quality on economic growth might be limited.

Table 1

Growth regression results for CESEE economies between 2000 and 2016

(regressed variable: GDP per capita in PPP, p-values are shown in brackets)

	(1) Fixed effects (GDP data filtered; whole sample)	(2) Fixed effects (GDP data filtered; EU11)	(3) Fixed effects (GDP data not filtered)	(4) Fixed effects (time fixed effects; GDP data not filtered)	(5) GMM (GDP data not filtered)**
GDP per capita	-6.573**	-6.136**	-15.81***	-20.77***	-6.753*
(log, lagged)	(0.012)	(0.018)	(0.003)	(0.000)	(0.059)
GDP growth in the euro area*	1.368***	1.687***	1.491***	–	0.964***
	(0.000)	(0.000)	(0.000)	–	(0.000)
Trade openness	0.039***	0.037***	0.108***	0.082**	0.088***
(exports plus imports to GDP ratio)	(0.002)	(0.004)	(0.000)	(0.024)	(0.007)
Investment	0.063**	0.037	0.102**	0.150**	0.349***
(to GDP ratio)	(0.015)	(0.103)	(0.04)	(0.039)	(0.001)
Credit	-0.052***	-0.045***	-0.0312	-0.022	-0.083***
(to GDP ratio)	(0.001)	(0.004)	(0.139)	(0.321)	(0.002)
Patent applications	0.010	0.009	0.003	0.0000	-0.004
(per million population)	(0.155)	(0.174)	(0.804)	(0.996)	(0.709)
Population (15-64)	0.774***	0.809***	0.932***	0.935**	0.544**
(proportion of total)	(0.002)	(0.004)	(0.006)	(0.029)	(0.018)
Tertiary education enrolment	0.0325*	0.0393*	0.0504	0.00146	0.0259
(% of a subpopulation)	(0.058)	(0.051)	(0.105)	(0.958)	(0.413)
Institutional quality	1.106	1.117	3.311*	2.855	2.701
(WDI delivery index)	(0.496)	(0.415)	(0.080)	(0.168)	(0.183)
GDP growth	–	–	–	–	0.059
(lagged)	–	–	–	–	(0.378)
R2 (overall)	0.821	0.855	0.692	0.758	
Number of observations	196	166	196	196	164

Source: ECB staff calculations.
Note: *** p<0.01, ** p<0.05, * p<0.1. The values of constants (and coefficients of each year in model 4) in the regressions are not shown in the table.
* For models where HP-filtered GDP growth is a regressed variable, HP-filtered GDP growth in the euro area is also used as a regressor. In model 4, which includes time fixed effects, GDP growth in the euro area is not included (GDP growth in the euro area already captures year-specific developments common for all countries in the sample). ** GMM estimation – one step Arellano-Bond estimation, with all variables treated as endogenous except for the proportion of the population aged 15-64 and GDP growth in the euro area. One lag of the dependent variable was included as a regressor.

Regression results show that most coefficients entered the equations with the expected signs and the estimation results are broadly similar across the models analysed. First of all, GDP growth was negatively associated with the lagged level of GDP per capita, which is consistent with the β-convergence hypothesis. In the case of regressions where potential GDP growth was used as an independent variable (model 1 and model 2), the estimated coefficient came to around 6, which means that a 10% higher GDP per capita level is accompanied by GDP growth that is lower by 0.6 percentage points. A similar value of the coefficient was obtained when general method of moments estimators were used (model 5). In

models with actual GDP growth (model 3 and model 4), the estimated coefficient is much higher, which might, however, reflect the fact that the variability of actual GDP growth is higher than that of potential GDP growth.

GDP growth in the euro area proved to strongly influence economic growth in CESEE countries, with a multiplier higher than 1 in most cases. It implies that 1 percentage point higher GDP growth in the euro area is accompanied by even faster GDP expansion in CESEE countries, which confirms the high importance of proximity to more advanced EU economies for economic growth in CESEE countries. At the same time, higher trade openness positively contributed to growth, according to the results from all estimated models.

Not surprisingly, GDP growth in CESEE countries was positively associated with investment ratios. At the same time, the relationship between GDP growth and the stock of credit was negative, presumably reflecting a build-up in private sector leverage in the run-up to the financial crisis, which later affected private sector activity. Innovation – proxied by the number of patents per million inhabitants – in most regressions appeared to support growth; however, the relationship was not statistically significant. The relationship between growth and the working age proportion of the total was strong and positive (with an elasticity from around 0.7 to 1.0), similar to the relationship between growth and human capital (as proxied by the tertiary education enrolment ratios). Furthermore, the improvement in institutional quality was associated with higher GDP growth, although the relationship was statistically significant only in one model, potentially reflecting the fact that the impact of institutional quality on growth is likely to be visible in the longer term.

Several additional fixed effects models were estimated as a robustness check. In these models, the number of regressors was reduced and the impact of each variable on economic growth was tested separately. In the first set of models (presented in Table 2), GDP data were filtered so as to control for business cycle developments (thus the methodology corresponds to that applied in the first model from Table 1). In the second set of models presented in Table 3, GDP data were not filtered, although GDP growth in the euro area was added as a regressor, which also helped to control for volatility relating to the business cycle in the period analysed (thus the methodology corresponds to that applied in the third model from Table 1). At the same time, several variables were added to the models to complement the results already achieved previously (FDI inflows, value added in the construction sector, credit growth and the control of corruption index).

The robustness check broadly confirmed the results. Most importantly, a strong negative relationship between GDP per capita level and GDP growth in subsequent periods was confirmed. Furthermore, the results showed that higher GDP growth rates were associated with higher FDI inflows and trade openness. However, the relation between GDP growth and activity in the construction sector proved to be negative (but not statistically significant), which likely reflected boom-bust cycles in construction in many CESEE economies in the period analysed. At the same time, while a higher stock of credit appeared to constitute a drag on GDP growth, the relationship between GDP growth and credit growth itself appeared to be positive. Similarly to the results obtained before, improvement in institutional quality (proxied

both by the delivery index and the control of corruption index separately) was associated with higher GDP growth, although the coefficients were only statistically insignificant in some cases. The positive relationship between education enrolment and GDP growth could not be confirmed (the coefficients of education enrolment were not statistically significant). Lastly, no statistically significant relationship was found between GDP growth and patent applications.

Table 2

Growth regression results for CESEE economies between 2000 and 2016: fixed effects model

(regressed variable: GDP per capita in PPP (filtered), p-values are shown in brackets)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
GDP per capita	-8.958***	-8.112***	-11.63***	-3.568***	-8.261***	-8.036***	-9.679***	-9.720***
(log, lagged)	(0.000)	(0.000)	(0.000)	(0.004)	(0.000)	(0.001)	(0.000)	(0.000)
Population (15-64)	0.136	0.020	0.315**	0.042	0.060	0.199	0.083	0.064
(proportion of total)	(0.242)	(0.899)	(0.018)	(0.726)	(0.781)	(0.201)	(0.413)	(0.517)
Investment*	0.090***	0.181***	0.084***	0.023	0.070**	0.077**	0.085***	0.074***
(to GDP ratio)	(0.003)	(0.005)	(0.004)	(0.204)	(0.025)	(0.017)	(0.000)	(0.002)
FDI	0.066**							
(to GDP ratio)	(0.040)							
Construction		-0.328						
(to GDP ratio)		(0.172)						
Trade openness			0.039**					
(exports plus imports to GDP ratio)			(0.015)					
Credit				-0.096***				
(to GDP ratio)				(0.000)				
Credit				0.043***				
(to GDP ratio; change)				(0.001)				
Patent applications					-0.017			
(per million population)					(0.202)			
Tertiary education enrolment						-0.0302		
(% of a subpopulation)						(0.248)		
WDI delivery index							1.383	
							(0.391)	
Control of Corruption index								2.172*
								(0.062)
R2 (overall)	0.560	0.603	0.600	0.772	0.549	0.573	0.564	0.578
Number of observations	240	208	240	221	213	220	240	240

Source: ECB staff calculations.
Note: *** p<0.01, ** p<0.05, * p<0.1. The values of constants in the regressions are not shown in the table.
* In model 1 and model 2 in the table above, FDI inflows and value added in construction were subtracted from the value of total investment.

Table 3

Growth regression results for CESEE economies between 2000 and 2016: fixed effects model

(regressed variable: GDP per capita in PPP (not filtered), p-values are shown in brackets)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
GDP per capita	-6.831***	-6.024***	-12.49***	-5.490***	-5.885***	-7.398***	-7.245***	-7.524***
(log, lagged)	(0.000)	(0.001)	(0.000)	(0.002)	(0.000)	(0.001)	(0.000)	(0.000)
Population (15-64)	0.297	0.199	0.741***	0.212	0.483	0.343	0.316*	0.294
(proportion of total)	(0.159)	(0.444)	(0.003)	(0.217)	(0.113)	(0.113)	(0.093)	(0.118)
Investment*	0.034	0.182**	0.052	0.010	0.033	0.051	0.048*	0.0403
(to GDP ratio)	(0.307)	(0.022)	(0.162)	(0.718)	(0.436)	(0.126)	(0.072)	(0.144)
GDP growth in the euro area	1.340***	1.323***	1.376***	1.287***	1.419***	1.367***	1.340***	1.320***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
FDI	0.076**							
(to GDP ratio)	(0.044)							
Construction		-0.563						
(to GDP ratio)		(0.211)						
Trade openness			0.081***					
(exports plus imports to GDP ratio)			(0.009)					
Credit				-0.051***				
(to GDP ratio)				(0.000)				
Credit				0.030				
(to GDP ratio; change)				(0.239)				
Patent applications					-0.011			
(per million population)					(0.405)			
Tertiary education enrolment						0.006		
(% of a subpopulation)						(0.856)		
WDI delivery index							0.550	
							(0.777)	
Control of Corruption index								1.423
								(0.298)
R2 (overall)	0.576	0.602	0.628	0.646	0.598	0.576	0.575	0.577
Number of observations	240	208	240	221	213	220	240	240

Source: ECB staff calculations.
Note: *** p<0.01, ** p<0.05, * p<0.1. The values of constants in the regressions are not shown in the table.
* In model 1 and model 2 in the table above, FDI inflows and value added in construction were subtracted from the value of total investment.

6 What explains the difference in the pace of convergence?

Based on the analysis conducted above, this section pins down factors which might explain why the pace of convergence was faster in some CESEE countries than in others during the period under review. All CESEE countries were ranked by their pace of convergence between 2000 and 2016 (i.e. an increase in GDP per capita in PPP relative to EU28 average, as a percentage). The variables are then chosen which may have had a particular impact on growth and the top- and bottom-performing economies are designated across these metrics. Top-performing countries are marked in green and bottom-performing economies in red. The results of the analysis are shown in Table 4.

Overall, the fastest-converging countries include Lithuania, Latvia, Albania and Romania. At the same time, convergence has been particularly slow in Slovenia, Croatia, Hungary and the Czech Republic. In the latter set of countries, the Czech Republic and Slovenia could constitute a separate group: despite the fact that convergence was rather slow, these two countries remain the most advanced CESEE economies in terms of income per capita, with levels close to the EU28 average.

The most successful CESEE economies in terms of pace of convergence share the following common characteristics. First, institutional quality improved considerably during the period analysed. Second, they experienced a very fast reallocation of labour from agriculture to other sectors with higher labour productivity. Third, they experienced improved external competitiveness (as proxied by the world export market share) and growing trade openness. Furthermore, most of them also experienced either relatively favourable demographic developments or managed to considerably increase labour market participation rates. The fastest-converging economies also exhibited a very significant improvement in human capital levels or the level of human capital was already one of the highest in the region. Finally, investment ratios also tended to be higher than those of their peers.

When analysing countries in terms of convergence, one striking characteristic is that the four countries with the slowest pace of convergence already had the highest level of income per capita in 2000 (the Czech Republic, Croatia, Hungary and Slovenia). At the same time, while demographic, labour market and human capital developments were mixed overall, progress in external competitiveness and innovation in many of those countries was slow compared with their peers. Most of them also experienced little improvement in institutional quality (although in some of them, in particular Slovenia, it was already relatively high in 2000). The slowest-converging economies suffered from relatively high indebtedness of the private sector.

Table 4

Dispersion of country-specific performance in selected metrics between 2000 and 2016

(Countries are ranked by the pace of convergence (i.e. change in GDP per capita relative to the EU28 average, as a percentage) during the period under review. Top-performing countries are marked in green (the greener the colour, the better performance), bottom-performing countries are in red (the redder the colour, the poorer performance); grey indicates that no data were available)

Countries (ranked by the pace of convergence)	GDP per capita in 2000 (inverse)	Investment ratio (average)	Working age population (change)	Participation rate (change)	Human capital (change)	Human capital average	Share of industry and services in employment (change)	Trade openness (change)	FDI inflows (average)	World export market share (change)	Innovation (patent application, change)	Delivery index (change)	Credit to GDP ratio (average, inverse)
Lithuania													
Latvia													
Albania													
Romania													
Kosovo													
Bulgaria													
Slovakia													
Bosnia and Herzegovina													
Estonia													
Poland													
Serbia													
Montenegro													
FYR Macedonia													
Czech Republic													
Hungary													
Croatia													
Slovenia													

Sources: ECB staff calculations based on IMF (World Economic Outlook), World Bank, Haver Analytics, World Intellectual Property Organization (WIPO) statistics and Vienna Institute for International Economic Studies (wiiw) data.
Note: In some cases, averages (or changes) reflect a slightly shorter period than 2000-16 due to data availability issues.

7 Conclusions

This paper analyses real convergence and its drivers in CESEE. On the basis of the qualitative and quantitative analysis conducted in the paper, the following conclusions can be drawn.

Between 2000 and 2016 all CESEE economies analysed managed to narrow their gap to the EU28 average in terms of GDP per capita. The pace of convergence was, however, heterogeneous across countries and periods. Most CESEE countries that had already joined the EU were converging relatively quickly and some of them had already reached GDP per capita levels close to the EU28 average. On the other hand, despite high economic growth, the pace of convergence of EU candidates and potential candidates to the EU28 was, on average, slower and their distance from more advanced European economies remained substantial. In most CESEE countries, most of the catching-up took place before the crisis, after which, in most countries both GDP growth and convergence to more advanced EU countries slowed down. The pace of convergence declined in particular in most of the advanced CESEE economies and the poorer ones (especially those in the Western Balkans), although the Baltics and Poland continued to catch up relatively quickly after 2010 as well.

Since 2000, economic growth in CESEE countries has been based mostly on total factor productivity growth and capital accumulation, while the labour contribution to growth was, on average, close to zero. Growth accounting analysis shows that the post-crisis GDP growth slowdown was mostly a consequence of slower total factor productivity growth and capital accumulation. At the same time, growth patterns in new EU Member States and in EU candidates and potential candidates, while broadly similar before the crisis, deviated thereafter, mostly due to a particularly strong slowdown in total factor productivity growth in the latter group of countries.

Despite capital accumulation since 2000, in most CESEE economies capital stocks remain substantially lower than in the EU28 on average. While the investment ratios were relatively high before the crisis, driven to a large degree by the construction boom and FDI inflows during a period of limited domestic savings, they declined thereafter. As a consequence, only a few CESEE countries have managed to sustain high investment in recent years. The investment slowdown in CESEE appears to be a consequence of slower potential GDP growth, lower FDI inflows and construction activity, and private sector deleveraging after a build-up of private debt before the crisis.

When analysing labour input to growth, only some CESEE countries were able to reap a demographic dividend between 2000 and 2016. While the underlying demographic trends were heterogeneous, all CESEE countries experienced emigration. Looking ahead, challenges related to the falling working age proportion of the population are expected to increase due to accelerated population ageing. The negative implications of the changing population structure for the labour market

might be mitigated by increasing labour participation, which remains low in many countries, in particular among the young, females and seniors, or by fostering immigration.

Proxies for human capital indicate that it remains relatively high in CESEE countries and improved considerably in the period under review, thus supporting economic growth. However, significant gaps persist, in particular in the Western Balkans. Also challenges related to the quality of education and the alignment of skills to labour market demand persist in many CESEE economies, in particular in EU candidates and potential candidates.

Gaps in productivity levels (as compared with more advanced EU countries) are also related to the structure of the economy, with low productivity agriculture representing a sizeable proportion of total value added and of employment. Between 2000 and 2016, the economic structure of CESEE countries converged to that observed in the EU, with the proportion of services increasing and the proportion of agriculture falling, thus supporting productivity growth. At the same time, industry as a proportion of GDP, while remaining broadly unchanged, on average, in CESEE economies, mostly stayed above the EU28 average, supported by the reallocation of production from Western Europe due to the lower labour costs and the proximity to more advanced EU economies.

Economic growth and convergence in CESEE economies appeared to be supported by the growing openness to international trade. Many CESEE economies managed to increase their competitiveness on global markets, as indicated by their growing shares of global exports. However, in some economies these shares increased only moderately and high current account deficits persisted, which signals challenges related to external competitiveness. In the countries with lower external competitiveness, the catching-up was slower as well.

Innovation in most CESEE countries remained moderate or low, and while some CESEE countries managed to catch up gradually in terms of innovation, others stalled or even experienced a fall in their innovativeness relative to EU countries on average. Thus, transformation towards more innovative and technologically advanced economies will remain one of the greatest challenges, in order to achieve sustainable convergence and to avoid the “middle-income trap” in the future.

The institutional quality in CESEE countries remains heterogeneous. While in the EU Member States that use the euro it remains broadly similar to the EU28 on average, it lags behind in CESEE countries that are not yet in the euro area, in particular in EU candidates and potential candidates. In this context, EU accession constituted an important anchor for institutional reforms and CESEE countries that have joined the euro area have also maintained the positive reform momentum in recent years. Owing to the fundamental role of institutional quality in economic development, its improvement will pose a key challenge for these economies going forward.

Overall, based on the analysis conducted in this paper, one can point to a couple of characteristics common to most successful CESEE economies in terms of the pace of convergence. These include strong improvement in institutional quality, human capital (and/or a high level of the latter), favourable demographic developments and/or high participation rates in labour markets, fast reallocation of labour from agriculture to industry/services, relatively high investment ratios, improving external competitiveness in tandem with growing trade openness and strong FDI inflows. While some of these characteristics are more difficult to influence than others through dedicated policies, they point to areas which policymakers should pay attention to in their endeavour to continue with, and possibly accelerate the process to catch up with EU's most advanced economies.

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