ECONOMICS – WORKING PAPERS 2021/01

Towards a new growth model in CESEE:

Convergence and competitiveness through smart, green and inclusive investment

European Investment Bank
The EU bank

Towards a new growth model in CESEE:

Convergence and competitiveness through smart, green and inclusive investment

February 2021

European Investment Bank
The EU bank

Towards a new growth model in CESEE: convergence and competitiveness through smart, green and inclusive investment

EIB Working Paper 2021/01
February 2021

Authors
Áron Gereben (European Investment Bank)
Patricia Wruuck (European Investment Bank)

This is a publication of the EIB Economics Department

About the EIB Economics Department
The mission of the EIB Economics Department is to provide economic analyses and studies to support the Bank in its operations and in the definition of its positioning, strategy and policy. The department, a team of 40 economists, is headed by Director Debora Revoltella.

economics@eib.org
www.eib.org/economics

Disclaimer
The views expressed in this publication are those of the authors and do not necessarily reflect the position of the European Investment Bank.

EIB working papers are designed to facilitate the timely exchange of research findings. They are not subject to standard EIB copyediting or proofreading.

For further information on the EIB's activities, please consult our website, www.eib.org. You can also contact our InfoDesk, info@eib.org.

Published by the European Investment Bank.
Printed on FSC Paper.

pdf: QH-BK-21-001-EN-N ISBN 978-92-861-4936-8 ISSN 2599-736X DOI 10.2867/1421

Towards a new growth model in CESEE: convergence and competitiveness through smart, green and inclusive investment

Áron Gereben, Patricia Wruuck *

European Investment Bank

February 2021

Abstract

This paper focuses on the growth and convergence of Central, Eastern and South-Eastern European EU countries (CESEE). We argue that the factors behind the pre-crisis growth model of the region – skilled yet affordable labour force, foreign direct investment, imports of productivity-enhancing technology – are petering out, and are yet to be substituted. We propose a new growth model centred around a shift towards more home-grown innovation, digitalisation, climate change mitigation and a strong focus on skills, labour and social inclusion to leave the middle income trap behind for good and to boost economies' growth prospects in a post-COVID world. Based on analysis of firm-level data, we highlight the prerequisites of making this transition happen.

JEL classification: J24, O14, O33, O40, P27, P28

Keywords: climate change, convergence, economic policy, digitalisation, innovation, labour market, long-term growth, productivity, skills.

* *Authors' note: The opinions expressed are the authors' only. The paper should not be reported as representing the views of the European Investment Bank.*

The authors thank Rozalia Pál, Tinatin Akhvlediani, Filippo di Mauro and participants of the CompNet and National Bank of Slovakia Conference, 22-23 June 2020 for comments.

Executive summary

- To continue the process of economic convergence and to maintain competitiveness, CESEE countries need to revisit their growth models and move towards a more innovation and knowledge-based framework.
- A new growth model for the region needs to focus on
  1) home-grown innovation,
  2) digitalisation,
  3) strengthening the skill base and social inclusion, as well as
  4) fostering the transition towards a greener economy.
- The COVID-19 shock amplifies the structural challenges CESEE economies are facing. The experience of the lockdowns demonstrated the critical importance of digitalisation for competitiveness and economic resilience. While the pandemic shock offers a "make-or-break" moment for the climate transition, it could widen inequalities and societal fault lines in the region.
- Home-grown innovation needs to gradually take over the role of technology import in CESEE, yet most countries in the region are still regarded as modest or moderate innovators compared to their EU peers. Limited availability of finance and people with the right skillsets are holding back innovative firms. To overcome bottlenecks, it is necessary to nurture the available skilled labour force and to increase the access to finance, in particular risk capital and venture debt.
- Digitalisation is an opportunity for CESEE and its firms. Businesses can access distant markets easier, and benefit from cost reduction or product and process improvements through digital technologies. While most countries in the region still need to catch up with the rest of the continent on digitalisation, many firms in CESEE are on par with EU peers in adopting certain key digital technologies. Digitalisation , however, may lead to polarisation, could adversely impact the labour market and could deepen inequalities in the region through job automation. We argue that to leverage on digitalisation it is necessary to strengthen the skill base to advance the digitalisation transformation in the region, and to mitigate at the same time individuals' risks of being left behind.
- Despite progress in the area, the countries of the region continue to be more energy intensive than the rest of the EU. They could achieve further significant carbon reduction through lowering the energy use of the building stock, through renewable electricity generation and through the greening of transport systems. Strong policy action is necessary to drive the transition itself, but also to mitigate of the possible adverse social impacts of the low carbon transformation.
- Addressing skill shortages by investment in human capital is a key element of a successful transition to the new growth model. Skill shortages remain a major bottleneck

for long-term growth. Countries of the region need to step up efforts to boost adult learning. They also need to apply a wide range of active labour market policies to improve job matching and to bring parts of the inactive population to the labour market.

Introduction

Economies in Central Eastern and South Eastern Europe have come a long way on the convergence path despite some setbacks. Until the onset of the financial crisis in 2008, economies of Central, Eastern and South Eastern Europe (CESEE)[1] established a record of significant growth and economic progress. The process leading to the EU accession, and the accession itself, have unleashed the inherent potential of these economies. Previously state-owned industries were privatised and important reforms were implemented, which laid the foundations of market economy. This in turn attracted capital and foreign direct investment that drove productivity improvements and GDP growth. In many instances, however, unsustainable levels of consumption and borrowing propelled to some extent the pre-crisis growth, thus exacerbating the recession following the 2008 crisis.

To continue the process of economic convergence and maintain competitiveness, CESEE countries need to revisit their economic models and move towards a more innovation and knowledge-based convergence framework. The "old CESEE growth model" underpinning post-accession convergence has been based on the combination of low labour costs, the role of exports, and the capital inflows intermediated through foreign direct investments. While the regions' economies recovered successfully from the downturn following the financial crisis, we argue that the growth model has reached its limits, which has manifested in the slowdown of productivity growth, increased labour costs, and significantly lower capital inflows. As the old model appears to be less and less capable to propel the engine of economic convergence, it raises the question of what mechanism could replace it as a driver of the catching-up process. While the need for a new growth model clearly predates the most recent pandemic shock, we contend that the impact of COVID-19 reinforces the case for this transition.[2]

To avoid getting stuck in the middle income trap and achieve sustainable growth in the years to come countries in the region need to focus on i) innovation ii) digital technologies, iii) climate change mitigation and iv) skills, labour and social inclusion. Together, these four areas form the

[1] In the context of this paper, CESEE refers to the eleven EU member States in Central Eastern and Southeastern Europe (Hungary, Poland, Slovakia, Czechia, Estonia, Lithuania, Croatia, Latvia, Romania, Slovenia, and Bulgaria), i.e. we consider the three waves of enlargement (2004: Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovakia and Slovenia, 2007: Bulgaria and Romania and 2013: Croatia).The only exception is aggregate data from the EIB CESEE Bank Lending Survey, which uses a somewhat different definition (see EIB 2018a).

[2] We use the term "growth model" in this report in a practical sense to describe the way a given economy and its economic policy rely on the economies' resources and factors of production – capital, labour, technological progress – to achieve economic growth, as opposed to describe a theoretical economic model seeking to identify the drivers of long-term economic growth.

basis for sustainable growth looking ahead. However, the region still faces substantial catch-up needs in each of the four areas.

In the coming years, home-grown innovation needs to gradually take over the role of technology import in CESEE. So far, technology importation has not been substituted with home-grown innovation. Most countries in the CESEE region are still regarded as modest or moderate innovators compared to their EU peers. The transformation of innovation investment into scientific and technological outputs has improved, but some important bottlenecks – e.g. availability of staff with the right skill set – remain. Firm-level data points towards strong discrepancies within the CESEE region, but also shows some encouraging signs, such as a growing share of corporate investment being dedicated to innovation. To strengthen innovative firms in the region, it is necessary to increase the availability and access to finance, such as risk capital and venture debt products.

Digitalisation presents an opportunity for the region. In general, most countries in the region still need to catch up to leading EU peers on digitalisation. While digitalisation has different dimensions, including the availability of digital infrastructure, skillsets and the adoption of technologies by households, the public sector and corporates, firm-level data from the EIB Investment Survey (EIBIS) shows that on the last point, i.e. the adoption of several key digital technologies[3], corporates in the region are on par with EU peers. Some countries have even become leaders in some of the other dimensions, e.g. digitalisation of public administration, or developed successful digital hubs. However, challenges related to digitalisation pertain to risks for polarisation, a potential adverse impact on labour markets and a deepening of inequalities in the region. We present new evidence showing that risks of job automation are particularly high in CESEE regions compared to other parts of the EU. Moreover, firm-level data suggests that the limited availability of skilled labour risks propelling labour saving rather than labour augmenting digitalisation investment. We argue that skill shortages in the region also reflect structural reasons and hence need to be addressed with a long-term perspective, looking beyond cyclical fluctuations in labour demand. Hence, a key area for action to fully leverage digitalisation are measures to strengthen the skill base, helping to advance the digital transformation in the region and maximising its benefits while mitigating potential negative effects.

Addressing skill shortages through investment in human capital is a key element of CESEE economies' successful transition to the new growth model. Evidence shows that many CESEE firms have been facing difficulties in finding personnel over the last years, with innovative companies and those catching up to the productivity frontier being particularly affected. At the same time, CESEE labour markets face relatively high risks related to automation and job cuts liked to the reduction of carbon-intensive economic activities. Countries of the region need to

[3] Key digital technologies refer to 3-D printing, advanced robotics, Internet of Things, Cognitive Technologies, Augmented Reality or VR, drones and platforms.

step up efforts to boost adult learning, and apply a wide range of active labour market policies to address the additional strains put on the labour market and facilitate job transitions for workers. Prompt action is needed to support reskilling and upskilling activities to avoid outcomes where significant parts of the populations become excluded from the gains of the progress.

Europe is in the process of taking a bold action in terms of global leadership in the fight for climate change and the CESEE region can make a significant contribution boosting prospects for success. The economic transformation of the CESEE region was accompanied by large-scale gains in energy efficiency over the past three decades but the countries of the region continue to be more energy intensive than the rest of the EU. Key areas where significant progress can still be achieved include the energy use of the building stock, renewable electricity generation and the greening of transport systems.

The COVID-19 pandemic is amplifying the structural challenges that the CESEE economies are facing. For instance, it clearly demonstrated the critical importance of digitalisation for competitiveness and highlighted the risks of lagging behind. As to the labour market and skills, COVID further widened the gap between the "old" and the "new" world of work, emphasising the already existing regional and societal fault lines of inequality. When it comes to climate change mitigation, the pandemic offers a "make-or-break" moment for the fight climate change. If CESEE countries miss that, they risk fully reverting to the pre-pandemic standards and locking them in for longer. Following on swift policy responses, forward-looking strategies for recovery are needed. Recovery strategies should focus on the four elements of the new growth model – innovation, digitalisation, the green transition and a focus on human capital - to support a forceful and sustainable economic rebound.

In the followings, we outline the key parts of a new growth model for the region and connect them in a coherent framework. Using firm-level data from EIBIS, complemented with aggregate statistics, we assess countries' positioning concerning the key pillars of the new growth model. We discuss the challenges and opportunities for transitioning towards the new growth model against the background of the most recent developments and the impact of the global COVID-19 pandemic on the region. The final section concludes, and highlights the priorities for public policy.

The old growth model has been petering out

Exports, propelled by low wages, capital inflows and technology import, were major growth drivers in CESEE before 2008. Integration through trade well preceded the actual EU accession. Geographical proximity, reforms and competitiveness helped to integrate quickly into the EU supply chains (particularly into the one of the German automotive manufacturing sector), granting indirect access to global markets (see Hagemejer and Muck, 2019). This ushered in an era of export-driven growth, particularly of machinery and transport equipment manufacturing. Over time, the CESEE countries have moved up somewhat the production value chain, with more and more complex technological processes adopted by the local subsidiaries of the multinational companies (Roaf et al, 2014).

The combination of low wages and a skilled labour force were catalysed by the EU membership, which contributed significantly to the export-led growth. At the same time, EU membership brought down the legal barriers and other cross-border frictions, giving CESEE a strong advantage over other geographical regions with similar characteristics. Together with the availability of specific skillsets in the region, including command of Western European foreign languages, and geographic proximity, CESEE countries became a particularly attractive nearshoring destination.[4]

Private investment - to a large extent in the form of foreign direct investment - flourished in most CESEE countries, also supporting productivity. Economic and political transition, privatisation, the prospect of EU accession, and financial deepening fuelled investment. Large-scale private greenfield investments helped build up and modernise the capital stock in the countries of the region, and facilitated rapid export growth. Foreign direct investment had a beneficial impact on capital deepening. Moreover, it enabled transfer of technology and know-how, thereby supporting the rapid increase of total factor productivity (Damijan et al., 2013).

The pre-crisis growth model came hand-in-hand with imbalances. In some of the countries, these manifested in increased external deficits and international indebtedness.[5] Initially capital inflows took the form of foreign direct investment (FDI). These inflows typically financed productive assets, and reflected long-term commitments from the investors' side. However, growth was largely driven by external borrowing for consumption and real estate, and became increasingly unsustainable in the years before the financial crisis.

---

[4] Campos et al (2014) provide an estimate on the positive effects of EU membership on aggregate income levels.

[5] Current account deficits to GDP ratios reached double-digit GDP levels in Bulgaria, the Baltic States and Romania in the years before the crisis, and elevated to high single digit levels in other countries of the CESEE region, with the exception of the Czech Republic.

The financial crisis prompted a protracted reversal of the strong capital inflows leading to a recession in the region. The lack of new funding triggered declines in credit and domestic demand. The output slowdown in the euro area, and deleveraging by Western European parent banks exacerbated and prolonged the sudden stop, and weighed heavily on macroeconomic and financial developments (Gattini et al, 2019).

Despite a robust recovery in CESEE, potential growth slowed down significantly during the financial crisis and its aftermath. Furthermore, the slowdown of potential growth was not particular to a single factor of production. While the decline of total factor productivity (TFP) was the largest, other factors – capital and labour also contribute negatively to the post-2009 decline in potential growth. While the latest estimates of potential growth approached the pre-crisis levels by 2019 (see Székely and Buti, 2019), the upside is more limited by factor constraints than 15 years ago.

While European structural and investment funds (ESIF) have played a crucial role supporting public investment, private investment remained subdued. EU funds helped maintaining a healthy level of public sector capital formation during the post-crisis downturn. Private investment, however, declined sharply and still has not fully recovered to the level experienced in the early 2000s. Low private investment is partially related to the slowdown of capital inflows. With the advent of the financial crisis, capital flows to the region, both gross and net, collapsed and have remained at a low level. The largest decline came from inward FDI, which dropped to a third by the 2012-2014 period relative to 2005-2007 (EIB, 2016). This decline contributed significantly to lower corporate investment, both directly and indirectly via the catalytic effect of FDI on domestic investment that weakened with this decline.

The pace of technological change has also slowed down with the moderation of inward FDI, reflected in lower total factor productivity growth. Lower TFP growth is partially due to the fact that it has become more difficult to find those 'low hanging fruits', where the replacement of old, outdated technology to modern production facilities led to large-one off productivity improvements. The extra productivity gains for any additional FDI are lower now than they used to be around the time of the enlargement. In addition, exogenous factors, such as the crisis and the related shift in risk perceptions, contributed to the slowdown of FDI and lower TFP growth as a result.

The labour force has become a key constraint to investment and growth over the last years. Hitherto an untapped potential, labour markets in CESEE countries have increasingly tightened, to the extent that labour shortage became a drag on investment and competitiveness. The post financial-crisis rise in unemployment reversed, and countries of the region have come close to full employment. Wage growth has surpassed productivity increases in some countries of the region (EIB 2018, 2019). Skill shortages have been particularly pronounced and persistent compared to other regions of the EU, posing issues for many firms in the region (see EIB 2018,

2019). Compared to the rest of the EU, more CESEE firms posted open positions with vacancies for higher-skilled occupations often hard to fill (EIB 2018).[6]

Financing constitutes another challenge, particularly for innovative firms. In the region, innovative companies appear particularly prone to being financially constrained (Correia et al, 2018, Pál and Wruuck, 2019). CESEE firms' financing remains largely bank centric. Funding for venture and growth capital is coming mainly from outside CESEE, and from public sources. Venture capital volumes in the CESEE have been stagnating in the last few years. Venture capital accounts only for 6% of total private equity volume, with 70% of the recipients being start-ups. The ICT sector accounts for almost half of the venture capital volume in the CESEE.[7] The VC market in the region is characterised by the prevalence of public resources.

The petering out of the old growth model may cast the shadow of the middle-income trap over the countries of the region in a worst-case scenario. Despite the cyclical upturn over the last years, growth has still lagged behind the levels seen in those countries that successfully graduated from middle income to high income. Furthermore, many of the other conditions of a successful continuation of the convergence towards the most developed economies of Europe – for instance, high levels of private investment – are not present either.

The problem of reaching and maintaining a level of economic development that corresponds to high income is not unique to CESEE. The Spence report (Commission on Growth and Development, 2008) presents a broad set of empirically established conditions that can be considered as prerequisites of successfully graduating from the middle-income trap.[8] They derive these from the experience of 13 countries, mostly from the Far East. He highlights the role of high investment levels, in particular to infrastructure, human capital development, early childhood and higher education and healthcare, among others.[9] Eichengreen et al (2014) point out that convergence slowdowns are more likely to occur in middle income economies characterised by high old age dependency, excessive investments into projects with low future returns, and undervalued exchange rates that remove the incentives to innovate. In contrast, countries investing into high quality human capital and shifting their exports towards higher tech products are better positioned to avoid the middle-income trap.

---

[6] See EIB 2018 for further discussion.

[7] However, there are some recent signs that the VC market situation in the region is improving. The recent investment and divestment activity confirms the positive trends of the previous years, despite the significant influence of a limited number of large transactions.

[8] We refer to the 'middle income trap' as a slow-down in growth when a country approaches upper/middle income levels.

[9] The EU membership have been helping the countries of CESEE towards meeting these conditions, both directly through providing access to various forms of investment support (ESIF, EIB, EFSI), and indirectly through the four freedoms provided by the single market.

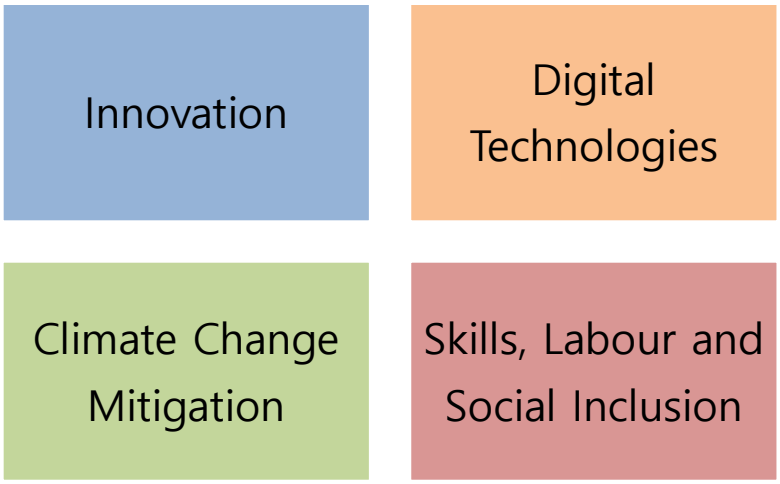
There is extensive evidence about the presence of various symptoms of the middle income trap in the CESEE context. For instance, EBRD (2017) demonstrate growth underperformance relative to other emerging regions, slowdown of productivity growth, gaps in the capital stock in the EBRD region, including CESEE. When it comes to investment, Bubbico et al (2017) show that levels of investment, by the private sector in particular, appear to be below the level necessary for economic convergence towards the core of the EU and current investment levels are not even sufficient to maintain the size of the capital stock relative to GDP under reasonable growth assumptions.

What could be the characteristics of a new growth model?

CESEE countries need a new growth model to propel growth and convergence looking ahead. In the light of the constellation, risks of being stuck in the middle income trap and the constraints described above, what could drive growth in the region?[10] We propose the following themes as key integral parts of a new growth model for the countries of the region:

1. Domestic innovation as a key driver of productivity growth,
2. Investment in digitalisation,
3. Sustainable development towards a carbon-neutral economy.
4. Preservation and improvement of skills and human capital.

Figure 1: Elements of a new growth model for CESEE



Source: EIB Economics Department

We revisit the state of play of the foundations of these four pillars in CESEE, focusing mainly on the private sector. Using firm-level data from EIBIS, we assess countries' positioning about the key pillars of the new growth model. We discuss the challenges and opportunities for transitioning towards the new growth model against the background of the most recent developments and the impact of the global COVID-19 pandemic on the region.

[10] For further discussion in the literature about the need for a new growth model and its possible elements also see Piatkowski (2014), IMF(2016), Bubbico et al., (2017), Grela et al (2017), EBRD, (2017) and Gattini et al, (2019b).

Innovation

Sustainable long-term convergence needs to be based on innovation. Countries that are far behind the technological frontier are often able to show rapid progress based solely on capital accumulation, labour force growth and technology import for a while. However, after a certain level of technological sophistication sustainable long-term convergence can only be achieved by becoming innovative and creating, rather than importing, technology. Countries that are unable to go through this transformation risk being stuck in the middle-income trap.

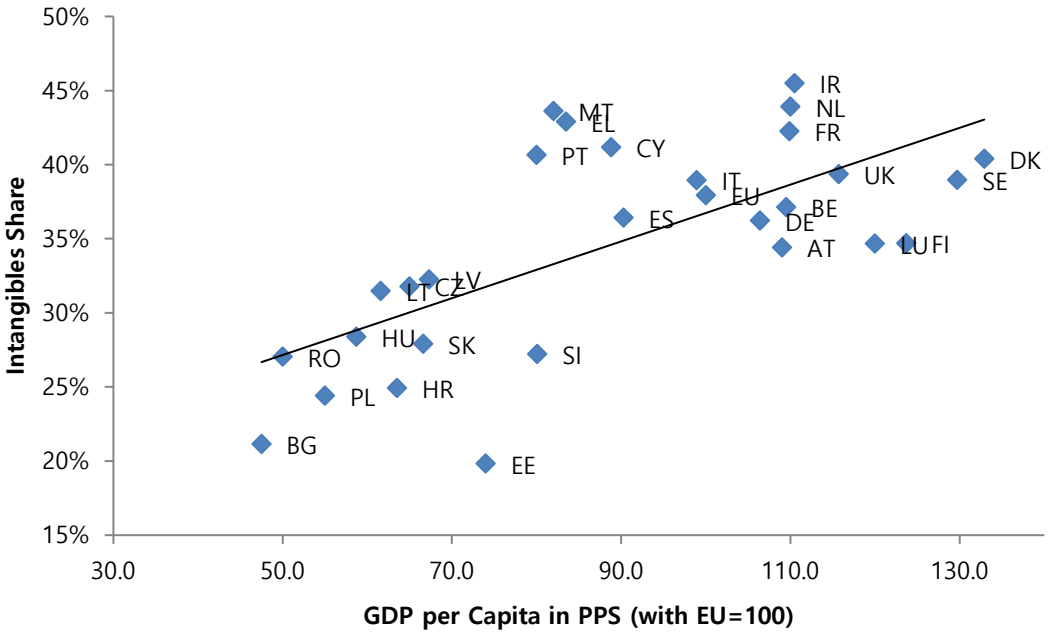
Home-grown innovation needs to gradually take over the role of technology import in CESEE. It is clear that in many countries of the region there are still opportunities to move upstream in the functional specialisation in manufacturing (Stöllinger, 2019), and these economies – especially Bulgaria, Romania and Croatia – technology adoption will remain an important source of productivity growth. Nevertheless, CESEE economies have reached a level of development where more domestic innovation is increasingly needed to maintain the momentum of economic growth.[11]

So far, technology importation has not been fully substituted with home-grown innovation in CESEE. Figure 2 illustrates the strong association between investment in knowledge and innovation – in the form of intangible assets, such as research, development, software, data, training or business process improvements – and the level of economic development. It also reveals that CESEE economies as a group are lagging behind the rest of the EU. Nevertheless, substantial heterogeneity exist in the evolution of innovation performance across the CESEE region. Some countries – such as Lithuania, Slovakia and Latvia – have increased their innovation capacities, while in others – including Slovenia, Croatia and Bulgaria – innovation performance has stagnated. [12]

11 See Acemoglu et al (2006) on the changing trade-off between imitation and innovation-based productivity growth relative to the distance to the global technological frontier, and its impact on on-term growth and convergence.

12 The crucial role of innovation in the future convergence of CESEE countries is discussed in detail by Correia et al (2018).

Figure 2: Correlation between GDP per capita and share (%) of intangible investment in total corporate investment, 2017



Source: EIB Investment Survey, Eurostat

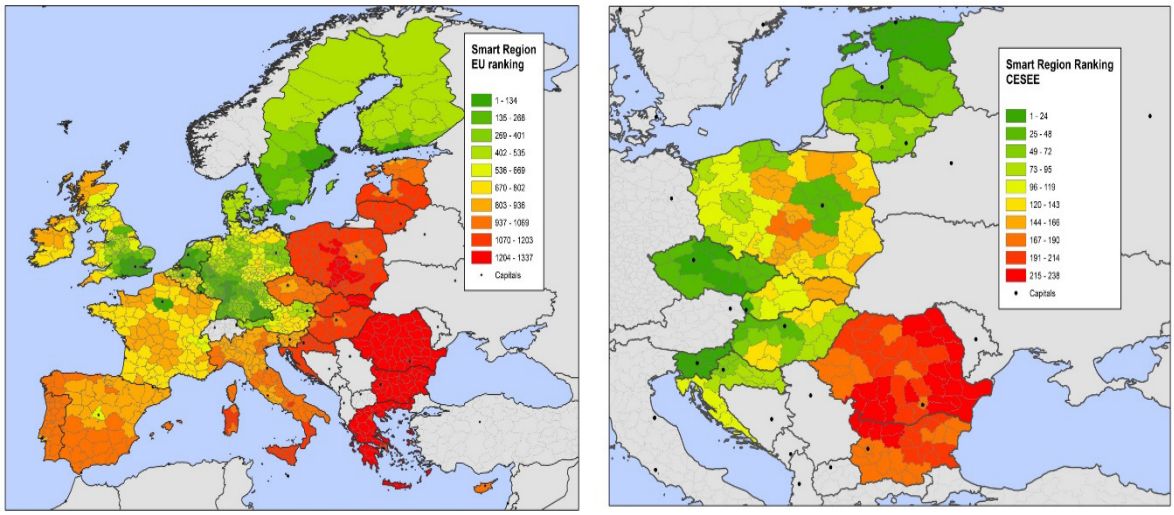
Currently, most countries in the CESEE region are still regarded as modest or moderate innovators. The European Innovation Scoreboard (EIS) summarises innovation performance across EU Member States and ranks them once per year.[13] Most of the CESEE countries fall under the categories of "Moderate innovators" (Czechia, Estonia, Lithuania, Slovakia, Slovenia, Hungary, Latvia, Poland, Croatia), or "Modest innovators" (Bulgaria and Romania).[14] The gap between the most and the least advanced innovators does not seem to be closing, with regional innovation performance in Bulgaria and Romania increasing more slowly than for all EU regions.[15] At the regional level, the innovation gap is also significant. Based on the Smart Regions Index (Kollár, Bubbico, and Arsalides, 2018), the CESEE regions and cities lag behind their EU peers (see Figure 4). Manufacturing firms and large companies primarily drive innovation activity in CESEE countries. Looking at firms with active R&D spending, i.e. leading, incremental and developing innovators), about 64% of active innovators are large firms, almost 18% are medium-size firms and less than 14% are among small firms (Figure 4 and Figure 5).

[13] See http://ec.europa.eu/growth/industry/innovation/facts-figures/scoreboards_en

[14] See European Innovation Scoreboard 2020 (https://ec.europa.eu/commission/presscorner/detail/en/QANDA_20_1150)

[15] See Regional Innovation Scoreboard (2019).

Figure 3: Smart regions (EU rankings and within CESEE rankings, NUTS 3 regions)



Source: Kollár, Bubbico, Arsalides (2018)

Figure 4: CESEE - Active innovators by firm size, 2020

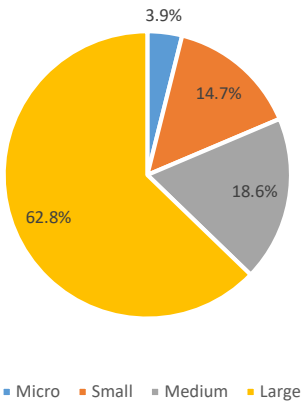
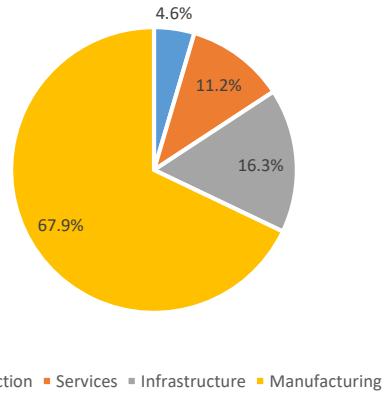


Figure 5: CESEE - Active innovators by sector, 2020



Source: EIB Investment Survey, 2020

Note: Active innovators refer to those that spend actively on R&D and fall into the categories of leading innovators, incremental innovators or developers.

The transformation of innovation investment into scientific and technological outputs has improved, but some bottlenecks remain. Part of the challenge of further improving firms' innovation performance in the region is to achieve broad-based improvements in innovation systems. Moreover, constraints imposed by the labour market situation pose a particular bottleneck as firms' readiness to innovate is closely linked to the availability of staff with the right skillsets.

Evidence points towards strong discrepancies within the CESEE region but also shows some encouraging signs. The EIBIS data from the 2020 survey indicates strong differences for

innovation activity within the region. While nearly two in five firms (39%) report having introduced some new products or services, this share varies between almost half of firms reporting some innovation activity in Poland and Lithuania (47%, and 44% respectively) to a low of some 32% in Romania, 30% in Estonia and 28% in Bulgaria. However, survey results continue to suggest that most innovation activity still pertains to adoption. Analysing developments over a five year period (2016-2020) indicates that an increasing share of corporate investment has been dedicated to innovation in CESEE and a larger share of firms prioritises the development of new products and services as with regards to their future investment (around 25% for 2016-2018 and up to 30% in 2020). Overall, firms in the region attach even slightly greater importance to innovation than EU peers (28% on average). Hence, survey results point to persistent (perceived) 'catch-up' needs but also a shift in firms' mind-sets attaching greater priority to innovation. Similarly, analysis of intra-European knowledge flows using citations data over a longer time period indicates that while Western and Europe has remained the leading region in terms of citation linkages within the EU, integration of Central and Eastern Europe into knowledge flows have increased compared to 2001. However, collaboration intensity[16] with other EU countries, a factor correlated with the share of productivity leaders in an economy, still remains low across CESEE economies (EIB 2019).

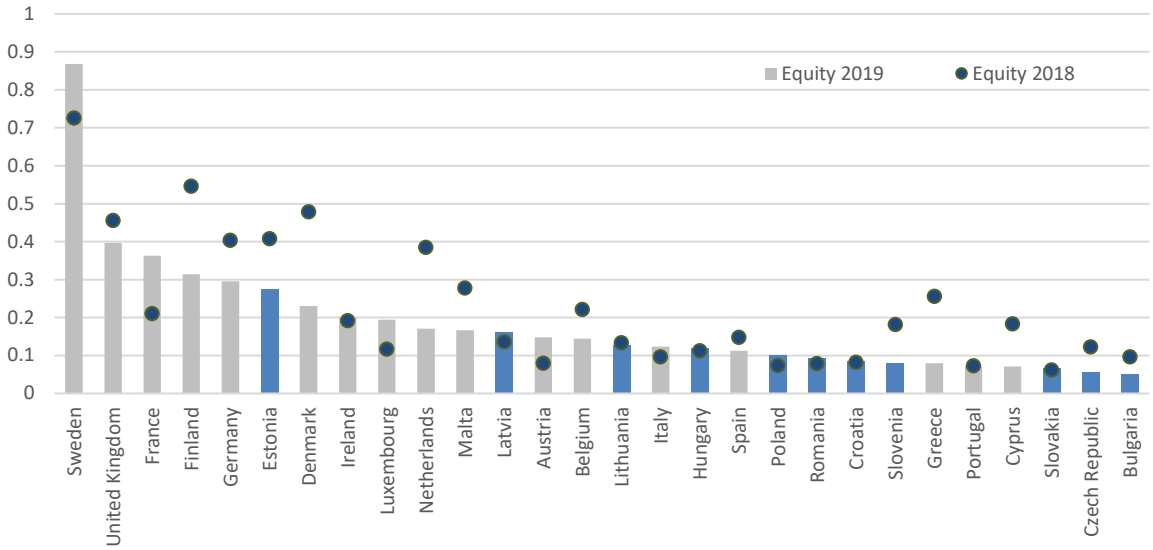
CESEE economies need to continue strengthening different types of innovation activities for convergence. The key challenge remains to reduce the share of firms neither actively advancing nor adopting innovation. This supports rising productivity on average as well as mitigating gaps across firms. Innovative firms in Central and Eastern Europe tend to experience a number of obstacles in their operating environment, such as business regulation, skill shortages and access to finance. Here, tackling obstacles in the business environment also serves to support innovation as the ability to use and create knowledge and new technologies is shaped by the functioning of product, labour and financial markets and the human capital. Dedicated innovation policies and instrument mixes need to be tailored to specific country circumstances, given strengths and weaknesses and differences in current innovation performance. However, two areas policy across the region need to focus on to advance the transition towards a knowledge economy are strengthening of the skill base through investment in education systems and life-long learning opportunities and supporting access to finance. Furthermore, beyond a focus on mitigating current deficits in innovation systems, a forward-looking focus on strengthening digital innovation presents an opportunity for CESEE economies, as legacy technology issues can be less pronounced and some have quite high quality digital infrastructure (see Table 1).

Part of the innovation gap is related to finance, or the lack of it. The heavily bank-based system of financial intermediation of the CESEE economies is not conducive of financing innovative

[16] Collaboration intensity is measured by the number of collaborative patents between country I and the rest of the EU.

activities (EBCI 2020). The presence of a diverse set of capital providers that are able to finance and support innovative firms and their activities with relevant financial instruments across the lifecycle is of key to support the innovation process. To strengthen innovative firms in the region, and prevent them to relocate after the seed stage, it is necessary to increase the availability and access to growth risk capital, particularly at mid-stage (Figure 6). Further development of capital markets and alternative funding sources for innovative companies are also of key importance, as well as the introduction of new venture debt products targeting later-stage innovative companies.

Figure 6: ESAF equity sub-index by countries



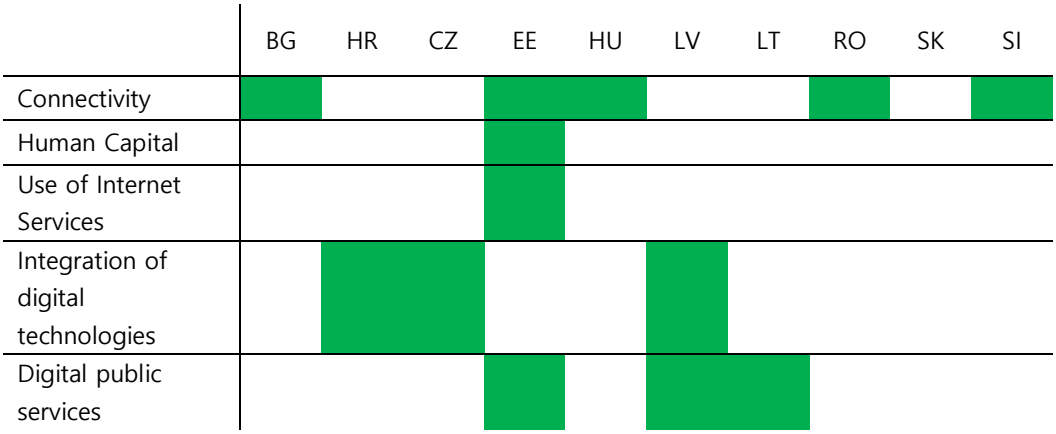
Source: The EIF SME Access to Finance (ESAF) Index, June 2019 update.

Digital technologies are increasingly becoming innovation drivers. The dynamics and impacts of innovation are changing with the rise of digital technologies and their increasing convergence with the physical world. Despite cross-country disparities, the CESEE region has made some progress towards increasing digital capacity and performance (European Commission 2019, EIB 2020). Also, in a number of countries, successful technology driven start-ups have started to emerge. Twelve "unicorns" with a combined value of EUR 30 bn have been founded across the region and several cities across the region are forming start up ecosystems (EIB 2019, Pison 2020). However, the adoption of digital technologies needs to broaden across firms in order to realize productivity gains on a substantial scale and avoid an increasing polarisation among corporates in CESEE.

Digitalisation

Most countries in the region still need to catch up to EU peers on digitalisation. Digitalisation has multiple dimensions including availability of adequate network infrastructure, digital skills and use of technologies by corporates and households. On overall digital competitiveness, most countries in the region lag behind the EU average with the exception of Estonia and Lithuania (see DESI scoreboard 2020). Out of the five dimensions in the Digital Economy and Society Index, several CESEE countries in fact score above the European average on connectivity infrastructure (see Table 1). However, with the exception of Estonia, all other countries in the region lag when it comes to the use of internet services and the development of human capital to support digitalisation processes (and arguably the use of Internet services a broad scale).

Table 1: Digitalisation in CESEE



Source: European Commission, DESI (2020), EIB ECON.

Note: Fields marked in green indicate that the country scores above the EU average in the respective dimension.

EIBIS data provides new insights to digitalisation at the firm level and shows some encouraging developments. EIBIS provides more detailed information on corporates' adoption of key recent digital technologies (EIB 2020a, EIB2020b). In this respect, the CESEE firms are very similar to the EU averages.[17] About half of the firms have partially implemented digital technologies and 12% have organised their business around it. On average, firms in the CESEE region are on par and in some countries – Czechia and Slovakia – they are even among the leaders when it comes to the adoption of some key digital technologies. At the same time, CESEE also features the countries with the lowest share of adopters across the EU (Bulgaria, Poland and Romania). This suggests that for some countries such as Romania for instance, where a high share of firms

[17] The digital technologies considered are 3-D printing, automation via advanced robotics, drones, platform technologies, augmented or virtual reality, cognitive technologies and Internet of things. For further information see EIB (2019).

shows very low productivity in EU comparison, many corporates still miss out on the potential productivity gains and risk falling further behind.

Small firms are slower to adopt key digital technologies. The analysis of firm-level data from EIBIS shows discrepancies among corporates across CESEE: About two thirds of large firms in CESEE (69%) have at least partially implemented digital technologies compared with some 50% of SMEs. Digital adoption gaps between large and small firms are not limited to the region but small firms in CESEE arguably face some further challenges for digital adoption. These pertain to financing as small firms in the region are not only more often subject to finance constraints but operate in an environment with less developed capital markets as well as limited availability to attract skilled staff to push ahead with digitalisation processes. In turn, difficulties to attract enough specialised talent can slow technology diffusion and development.

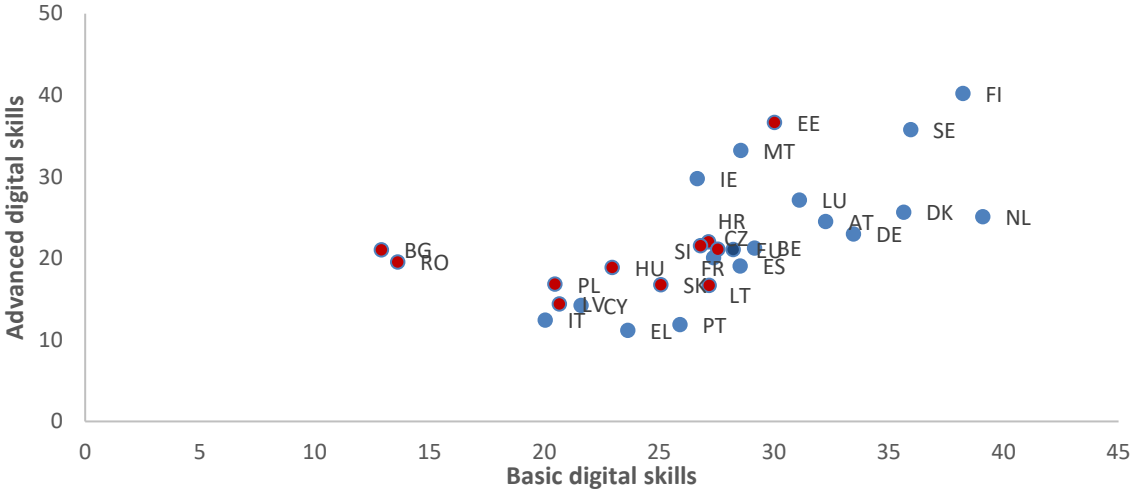
Adoption varies across technology type, with the use of robots having become more widespread. Finally, a look at the adoption of specific digital technologies across sectors suggests that while the use of IoT and advanced robotics is relatively widespread, CESEE firms lag behind EU peers when it comes to the use of cognitive technologies, even though in this area the EU has been relatively slow compared to the United States. The widespread use of advanced robotics to some extent reflects the industrial specialisation of some countries in the region and the use of robots in car manufacturing in particular. At the same time, it also suggests that digital technologies in the region are often adopted for labour saving purposes.

The combination of a favourable business environment and availability of digital talent is the basis to broaden adoption and foster digital innovation in the region. The availability of skillsets to develop and deploy digital technologies is a key factor that influences firms' decisions to invest in new technologies in general but also affects the purpose, notably whether digital technology investment is more labour saving versus more labour augmenting. Here, skill constraints also interact with other limiting factors in firms' operating environment.

Digitalisation adds to labour market challenges in CESEE as some jobs are being lost and new skills need to be learned. Digital technologies set to substantially affect labour markets in the region, making some parts of the workforce potentially redundant. CESEE countries have relatively high shares of jobs at risk in European comparison given concentrated sectoral exposure, tasks and work organisation (Nedelkoska/Quintini 2018; Pouliakas 2018). Our analysis of automation risks at regional level corroborates this picture (EIB 2019). The estimates suggest that high-risk regions – defined as the 20 % of all EU regions with the highest share of jobs at risk of being automated during the next decade – are heavily concentrated in Central and Eastern Europe, with seven of the ten most exposed areas are located in Romania. Moreover, digitalisation changes skill demand, thereby contributing to shortages firms' experience. These can be particularly pronounced for specialised high-level talent, as there is strong demand for these skills globally, and firms in the CESEE region need to compete for skillsets. Indeed, results from the EIB special survey on skills and digitalisation found the highest share of long-term vacancies for high-level talent in the region.

CESEE countries need to strengthen the human capital to support the digital transformation. Most CESEE countries lack EU peers with respect to basic internet user skills and advanced digital skillsets. Only Estonia exceeds the EU average in both areas. While Croatia, Slovenia and Czechia are still relatively close to EU average levels, gaps are larger for Latvia and Poland in both areas. Basic user skillsets appear least developed in Romania and Bulgaria. At the same time, both countries compare more favourably on advanced digital skillsets, which includes the availability of specialist IT talent. Looking at dynamics over the last five years, most CESEE countries, show limited improvements on the human capital dimension, again with the notable exception of Estonia.

Figure 7: Basic versus advanced digital skills in EU countries



Source: European Commission, Digital economy and society index.

Note: The human capital dimension measures 'basic' Internet user skills (users with at least basic digital skills, above basic skills and basic software skills) and advanced digital skills and development (availability of ICT specialists and ICT graduates). The use of Internet services scores are calculated as weighted averages of Internet use, online activities and online transactions. For further information on the composition and measurement of the index see www.digital –agenda-data.eu/datasets/desi/indicators#desi-dimensions.

Basic digital skills are crucial in determining the overall labour market impact of digitalisation. While broader availability of advanced digital talent in some CESEE countries can facilitate the development of new digital businesses locally and the growth of digital hubs, the limited development of more basic user skills can still hamper these new businesses to thrive in the local market (Figure 7). Moreover, the local business environment needs to be receptive and favourable to new digital entrepreneurs.

Constraints in digital skills can skew firms' investment in digital technologies towards the labour saving type. This pattern, with firms more inclined to invest in digital technologies for automation purposes rather than to develop new products or services, particularly shows in the manufacturing sector (EIB 2020). Facing skill constraints, firms can choose between seeking skills on the market, i.e. rely on hiring, or develop skill sets in house through training. In the CESEE

region, firms over the last years have shown stronger reliance on the recruitment channel compared to EU peers and less emphasis on training (Figure 8 and Figure 9). Firm size is one of the factors affecting training investment. For large firms, EIBIS data shows that, the share of corporates in CESEE not investing in training is about the same as in Western Europe (some 23%). However, small firms are relatively less inclined to invest in training (43% not investing in training in CESEE compared to 36% in Western Europe, based on EIBIS 2016-2019). Lower training activity together with limited availability to pay competitive wages to attract staff with the right skillsets hence remains a factor potentially limiting the spread of digital technologies in CESEE and could widen polarisation among firms.

Figure 8: Strategies to cope with skill gaps in current workforce

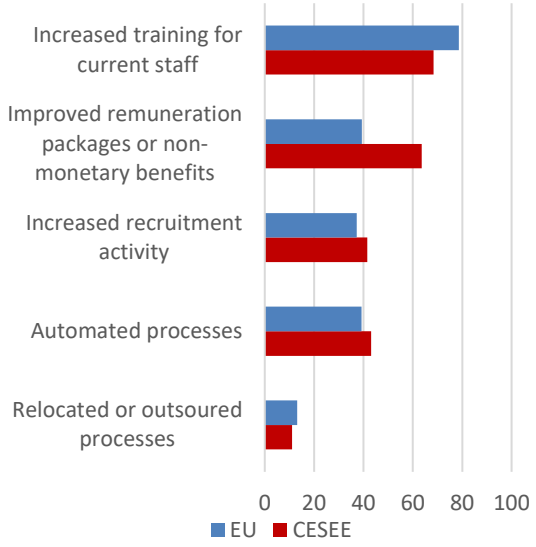
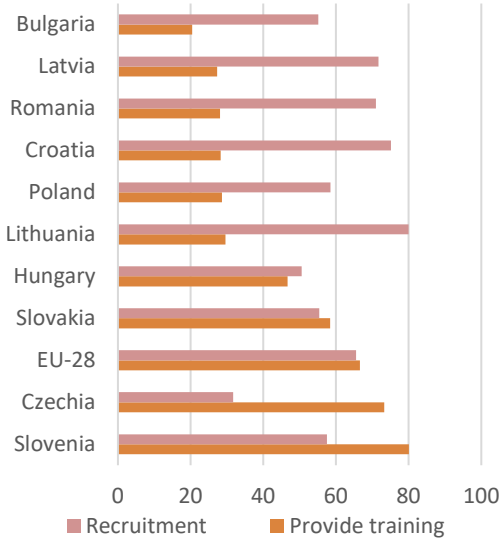


Figure 9: Usual reaction to future skill needs



Source: EIBIS digitalisation and skills survey (2018), CVTS (2015).

Note: % of all enterprises. Left: Share of firms stating to have taken each measures as a response to skill gaps in their current workforce. Right: Share of firms stating to react to future skill needs via recruitment and/or training.

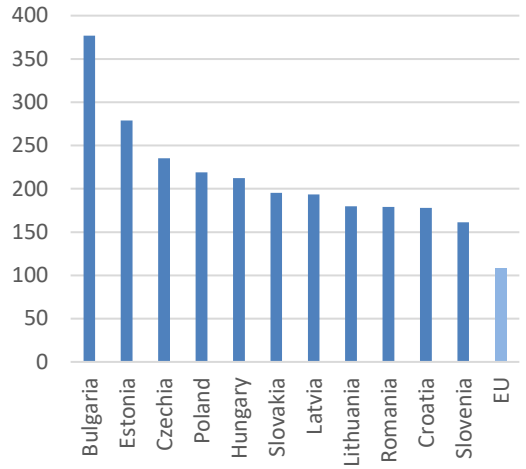
Policy support for digitalisation in CESEE needs to come with a strong focus on human capital. Both broadening basic digital skills as well as expert technology skillsets are needed. The emphasis on digital skills helps to advance digital innovation while at the same time helping to mitigate risks for people being excluded from a changing labour market. To support the availability of digital skills, both education and life-long learning systems in CESEE need to be strengthened. The focus on digital skills needs to become "engrained" and the acquisition of human-centric skills complementary to technologies (for example creativity, communication) needs to be fostered. Increasing the use of digital tools for educational purposes, e.g. in schools but also through e-learning opportunities, can be an instrument to broaden the availability of digital skillsets. Policies focused on businesses should foster access to early stage funding and the creation of accelerators and incubators. Governments also need to work with local stakeholders to ensure that the right incentives and supporting tools are available to strengthen digital ecosystems.

Towards a carbon-neutral economy

The shift towards a carbon-neutral economy comes with challenges, but also with opportunities for the CESEE region. Europe is in the process of taking a bold action in terms of global leadership in the fight for climate change. To achieve a net zero-carbon economy by 2050, the EU must substantially raise its investment in energy systems and related infrastructure. Supported by investments in green technologies, sustainable solutions and new businesses, the European Green Deal can be a new growth strategy for the EU as a whole. Beyond the objective of restoring the health of the planet, it is a push to improve the quality of life of European citizens, and a way to unlock a range of new economic and business opportunities for all. Involvement and commitment of all EU member states is crucial to its success. It should also be understood that the path towards carbon neutrality needs to be based on solidarity between the countries and regions of the EU, and this solidarity has to ensure that there will be no one left behind.

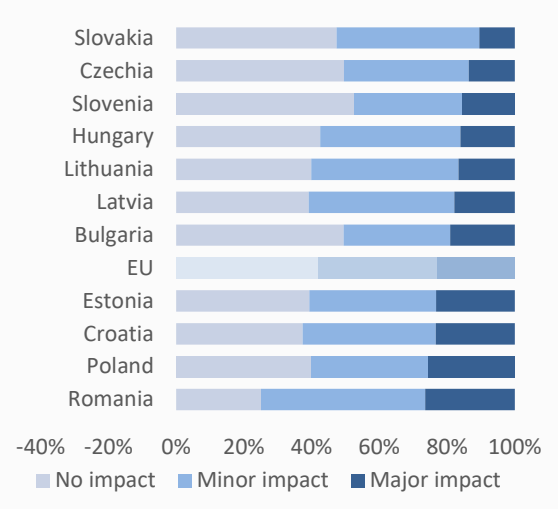
While the CESEE countries have improved their carbon footprint over the last decades, there is still a lot of room for improvement. The economic transformation of the region was accompanied by large-scale gains in energy efficiency over the past three decades but CESEE countries are still more energy intensive than the rest of the EU (Figure 10). On average, it takes about two times more energy to produce one unit of GDP in the CESEE, with severe implications not only on the carbon footprint, but also on air quality and health. At the same time, the still high levels of energy intensity suggest that large-scale industrial transformation will be required over the coming years.

Figure 10: Energy intensity measured as total energy consumption relative to GDP (kgoe per EUR 1 000, 2018)



Source: Eurostat

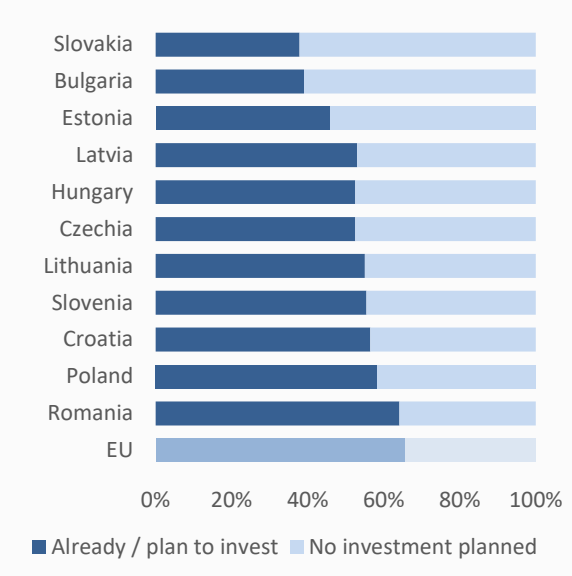
Figure 11: Perceived impact of climate change and related weather patterns on firms' business



Source: EIBIS 2020

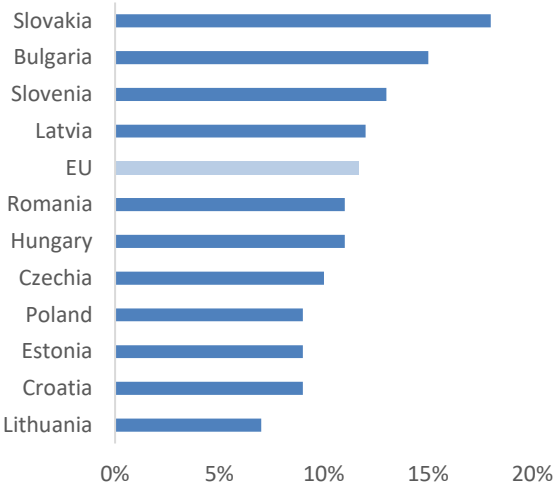
Climate change is becoming a focal issue at corporate level. According to the 2020 wave of the EIBIS survey, one-fifth of firms in the region report that climate change and the related changes in weather patterns has had a major impact on their business, which is slightly below the EU average of 23% (Figure 11). A further 38% of companies report minor impact. The share of concerned firms is the highest in the construction and infrastructure sectors. The countries with the highest share of firms reporting a major impact on their businesses, as a result of climate change, are Romania (26%), Poland (25%), Croatia (23%) and Estonia (23%).

Figure 12: Share of firms with investment plans to tackle climate change impact



Source: EIBIS 2020

Figure 13: Share of investment dedicated to energy efficiency improvements at firm level



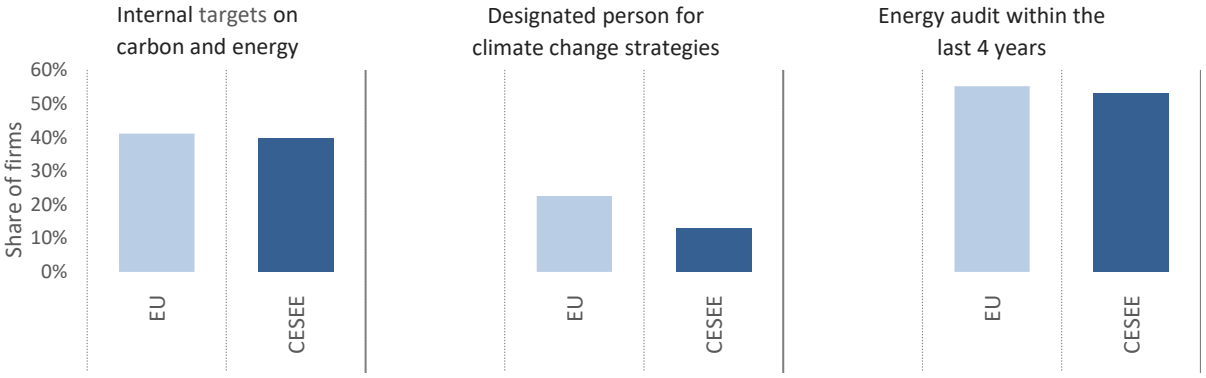
Source: EIBIS 2020

Over half of firms in CESEE countries - 56% - have already invested or plan to invest in the next three years in measures to tackle the impact of weather events and reduction in carbon emissions. This is somewhat lower than the EU average of 67% (Figure 12). About 41% of CESEE firms did already invest into energy efficiency in the past, and they dedicated about 10 % of their total investment to such purposes in the last financial year (Figure 13). EIBIS data shows that while the share of firms that actually invested into greening is lower than the EU average (47%), the share of investment to improve energy efficiency in CESEE is in line with the EU (also around 10 %). However, there are some differences within the region with firms in Bulgaria and Slovakia dedicating more than 15% to energy efficiency improvements compared to less than 10% in Estonia, Lithuania and Poland (see figure 9). The companies in the region find that the most important barriers to investment into tackling climate change are the uncertainty about the regulatory and tax environment, and the cost of green investment activities.

Beyond investment, firms can also tackle the climate challenge through setting up internal procedures. According to the EIBIS, companies in CESEE countries are as likely as EU firms to have set internal targets on carbon and energy (40% and 41% respectively), but are less likely to have designated a person to develop their climate change strategies, 13% and 23%

respectively (Figure 14). More than half of all firms across the CESEE region (53%) have had an energy audit in the past four years, similar to the EU average (55%).

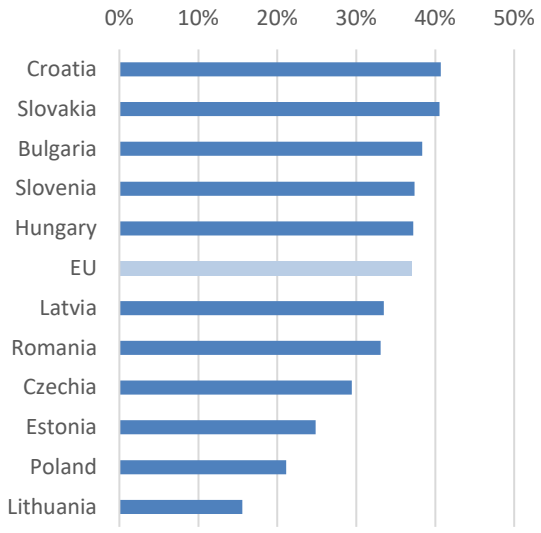
Figure 14: Share of firms with energy targets, designated climate manager and energy audit



Source: EIBIS 2020

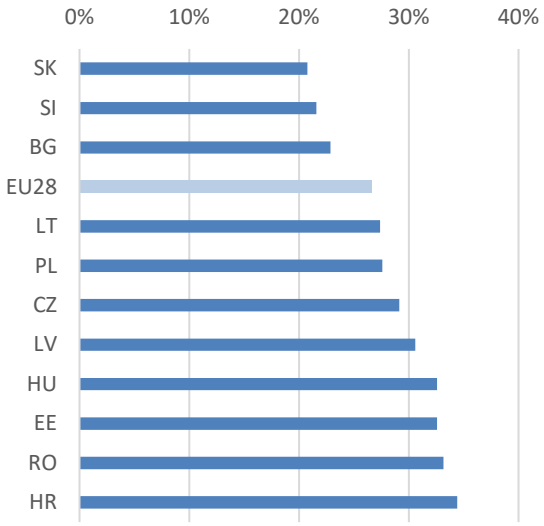
One particular area with sizable yet still untapped opportunities for large-scale energy efficiency improvement in the CESEE region is the energy use of the building stock.[18] On the corporate side, this is corroborated by EIBIS data, as the share of firms stating that their building stock meets high energy efficiency standards remains below the EU average (29 % in CESEE compared to 37 % for the EU, EIBIS 2019). This indicates some room for improvement as well as corporate investment needs in this field (see Figure 15).

Figure 15: Average share of building stock meeting high energy efficiency standards



Source: EIBIS 2019

Figure 16: The share of households in final energy consumption in CESEE (2018)



Source: Eurostat

[18] For further discussion on financing energy efficiency and renovation in the region also see European Commission (2018). A detailed analysis and a set of policy proposals has been put forward in a report by the Prince of Wales Corporate Leaders Group (2019).

Refurbishing buildings could reduce carbon emissions and improve the quality of life for citizens at the same time. Looking beyond firms, households account for 25-35 % of final energy use in the CESEE (Figure 16), and almost three-quarter of that energy is used for heating. At the same time, many households in the region are not able to adequately heat their homes at affordable prices, thus low-cost energy efficiency measures provide an opportunity to assist vulnerable households beyond the reduction in carbon impact. A large portion of the housing stock in CESEE is poorly insulated. However, given that the high share of the building stock was built using industrial prefabricated technology, in many cases standardised solutions could be rolled out at relative low costs.

More financing, and more innovative financing support, is crucial to tap the large potential energy saving in the CESEE residential sector. While subsidised financing for energy efficiency improvements have been available in the past years from both EU and domestic sources, renovation rates remain below the EU average. This is partly due to structural factors – high individual ownership, low number of social rental housing, abundance of multi-unit residential buildings – that hinders decision-making on energy efficiency investments. The financial solutions offered need to be tailor-made to address these challenges. For instance, on-bill financing – where the repayments of loans for energy-efficient renovations are carried out through the utility bills – has large untapped potentials in CESEE, and could allow those households that otherwise have limited affiliation to the banking system to use external financing to improve their carbon footprint and comfort (Mundaca and Kloke, 2018).

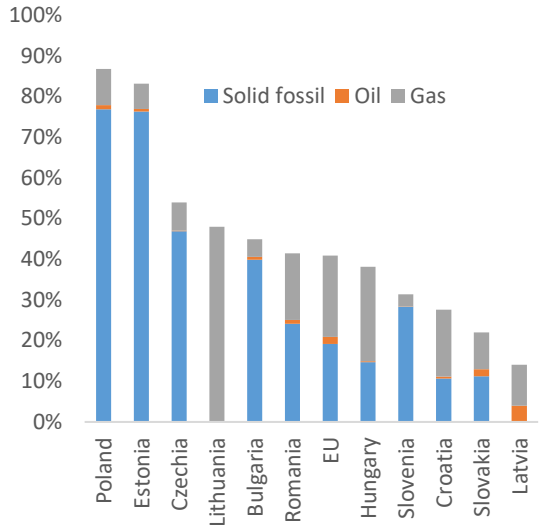
Electricity generation is another area where the carbon footprint can be reduced significantly. Many countries in the CESEE region continue to rely heavily on fossil fuels – coal in particular – to produce electricity (Figure 17). Significant new renewable capacity will need to be installed in all CESEE countries in order to meet the EU target of at least 32 per cent of renewable energy by 2030.

CESEE countries have opportunities for renewable generation but differentiated strategies are needed. The rapid development of the technology and market for renewable energy generation – both globally and at the EU level – in the last 10 years provide practical and economical options to the CESEE region to revamp their models of electricity production. There is substantial heterogeneity in the viable opportunities for renewable energy generation across countries, depending on the geographical conditions. For Bulgaria, Hungary and Romania, the yearly potential sum of electricity generation from a 1 kW photovoltaic solar configuration is approximately 1.5 times greater than that of Western Europe due to the higher amount of sunlight. In Poland and the Czech Republic, wind power potential is significant, as well as in highland areas in Romania and Bulgaria, which is far from being fully exploited. Geothermal energy production has significant potentials in some of the CESEE countries, in Hungary for instance.

To unlock the potentials of renewable energy generation in CESEE, remaining obstacles need to be addressed. First, significant parts of the existing electricity networks need to be upgraded

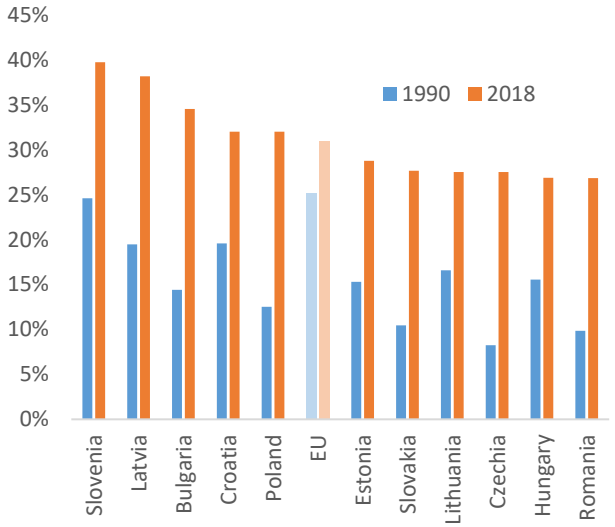
to make them capable to accommodate the intermittent nature of renewable energy generation. Second, uncertainties of the policy frameworks governing renewable energy production and the related support schemes should be tackled. Finally, the labour market implications stemming from the energy transition – severe job losses in the mining industry in particular – should be handled through active policy measures such as dedicated retraining strategies. This can be facilitated for example by identifying local jobs similar in task content, offering suitable retraining options to acquire "bridging" skills and foster cooperation among stakeholders including employers, public authorities and educational institutions.

Figure 17: Share of fossil fuel in electricity generation in CEESE countries (% of total electricity, 2018)



Source: Eurostat

Figure 18: The share of transport in final energy consumption in CEE in 1990 and in 2018 (%)



Source: Eurostat

Transportation is another high impact area CESEE countries can effectively address with integrated planning strategies. Transport uses about one-third of final energy consumption in the CESEE. Moreover, its share within energy use has grown significantly over the last decades (see Figure 18). Countries in the region have efficient and extensive public transportation systems relative to the rest of the EU as a legacy from the pre-1990 era. This pre-existing network, and the tradition of using public transport could form a solid basis for innovative mobility services in the future. Improving mass transit through efficient investments into the infrastructure and combining it with innovative services that incorporate shared solutions and smart mobility could provide a viable alternative to private car ownership. Moreover, improvements in transportation systems as part of integrated urban planning strategies can make a contribution to climate impact and improve citizens' lives in the region.

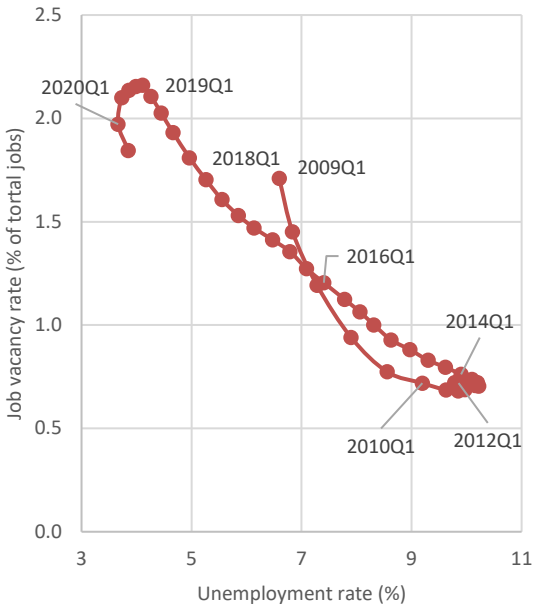
Electrification of the individual transport fleet together with the upscaling of community transport systems should be prioritised. Regulatory frameworks, subsidy schemes and innovative financing solutions need to be designed to support the uptake of electric vehicles,

which are restricted by lower purchasing power in CESEE countries. In the absence of such measures, there is an increased risk that demand for mobility in the region will be satisfied through import of used vehicles with high carbon footprint from other EU countries.

Skills and human capital

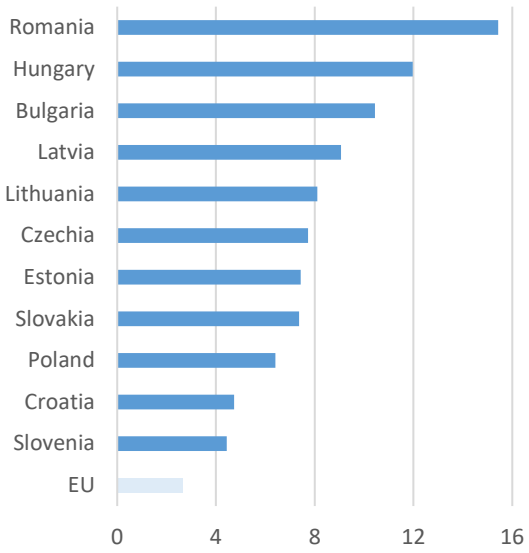
The labour force has become a key constraint to investment and growth in CESEE in recent years. Labour markets have increasingly tightened, reflected in low unemployment and high job vacancy rates (Figure 19). This has resulted in wage increases well above the EU average (Figure 20): wage growth developments have outpaced productivity growth in a number of most countries, potentially lowering competitiveness (EIB 2018, European Commission 2019).[19]

Figure 19: The Beveridge curve for the CEE



Source: Eurostat

Figure 20: Average annual growth (in %) in labour costs (2017-2019).



Source: Eurostat

Note: The labour cost index (LCI) shows the short-term development of the labour cost, the total cost on an hourly basis of employing labour.

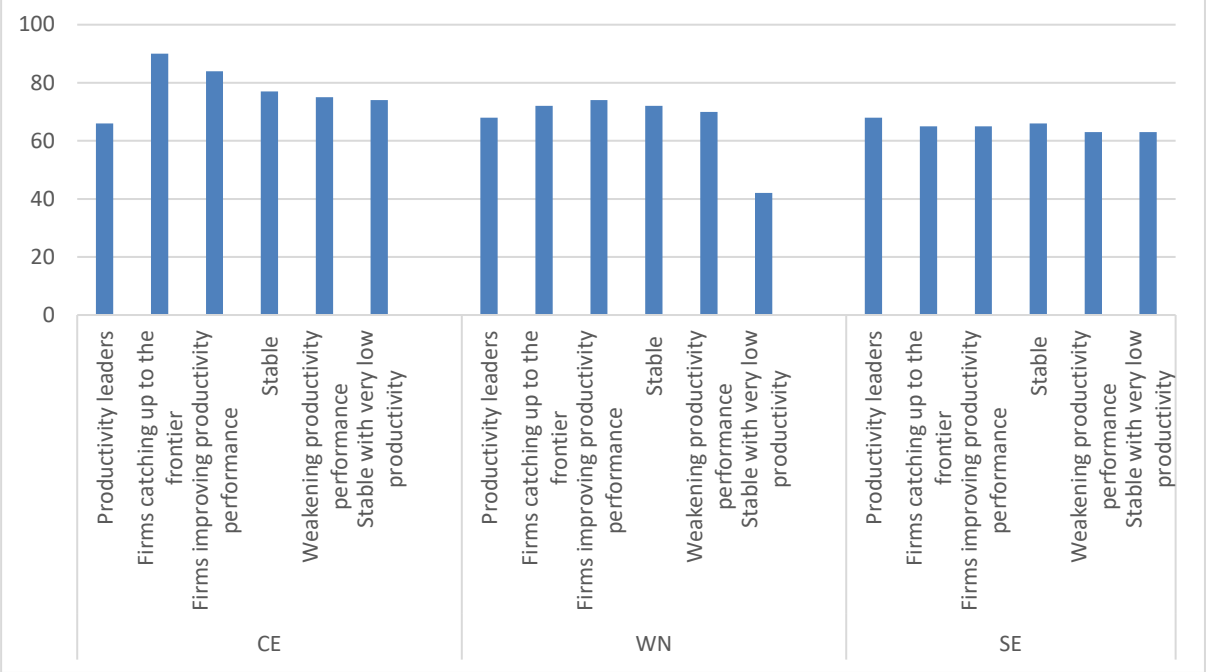
Firms have been facing increasing difficulties in finding personnel, with innovative companies and those catching up to the productivity frontier often particularly affected. Labour shortages in the region are broad-based across different skill levels with wage increases similar or sometimes even higher in some low-skilled occupations.[20] At the start of 2020, aggregate vacancies were higher and unemployment lower than before the financial crisis. Lack of staff with the right skills has posed a persistent impediment to investment for firms in the region

[19] Real wage growth exceeded productivity growth 2016-2018 particularly in Romania (almost 6pps on average) followed by Bulgaria, Czechia, Hungary, Latvia, Lithuania, Poland and Slovakia (about 2pps or more). See European Commission (2019) for further discussion.

[20] In some cases, these also reflect changes in the minimum wage.

throughout the last four years as indicated by EIBIS and remains a key concern for firms in the region with 76% reporting it as a barrier in 2020 (EU: 73%, EIB 2020). Firms have reported difficulties to fill open positions at higher-level occupations, for which 16% of firms report having long-term vacancies (see EIB 2018 for discussion). Beyond limiting production on the short run, these shortages can also add to difficulties to adopt new technologies and push technology investment to be more labour-saving than labour-augmenting (see section on digitalisation). Hence, the shortages can have negative implications for inclusiveness and potentially curb longer-term growth prospects.

Figure 21: Share of firms reporting skill constraints (%), by productivity performance and country group



Source: EIBIS 2016-2018, Orbis.

Note: Categories refer to the dynamics in firms' productivity performance for three country groups in the EU (CE=Central and Eastern Europe, WN=Western and North Western Europe, SE=Southern Europe). They dynamics are attributed to firms based on total factor productivity data available from 2011 to 2016. Productivity leaders are in the top quintiles of productivity levels by year in all observations. Firms catching up to the frontier started elsewhere in the distribution but arrived at the productivity frontier. Firms in the third category improved their ranking during the period of observation. Firms in the fourth category are stable (i.e. their last ranking is equal to the first). The firms in the fifth category worsened their position and those in the last position are stable at the bottom over the observation period.

Reasons behind the skill shortages in CESEE are both cyclical and structural.[21] Structurally, emigration and aging have exacerbated gaps (Batsaikhan et al., 2018, Atoyan et al., 2016). Analyses have pointed out the persistently higher levels of emigration over the last decades, particularly of the higher skilled and accelerating after EU accession. We found reporting of skill shortages by firms more pronounced in the countries more strongly affected by brain drain (EIB

[21] See EIB (2018b) for further discussion.

2018). Cyclically, the fast and strong rebound after the financial crisis increased labour demand. At the same time, sectoral shifts within CESEE economies - higher job creation in high technology intensive activities and job losses in some traditional activities such as agriculture, mining etc. – contributed to shortages as required skillsets are less readily available.

Altogether, the labour market situation contrasts with the period from the mid-1990's to the early 2000. In the past, an abundant labour force with relatively high education levels and good potential for requalification rendered CESEE countries attractive for near-shoring activities, supported integration into global value chains and economic growth. Over recent years, skill shortages have more become more prevalent often limiting firms'. Analysis of EIBIS data suggests that innovative firms in the region appear particularly subject to skill constraints. This can negatively affect the potential of CESEE firms when it comes to boosting their innovation activity. Moreover, firms striving to catch up to the productivity frontier are more likely to report gaps (see Figure 21).

Unused or underused reserves of labour still exist in most CESEE countries but require support for activation. Policy actions would be necessary to access these reserves. For instance, unemployment and inactivity have remained high in many rural regions over the last years, but the large mismatch in skills often prevent the affected population from engaging in the labour market. Previously relocated low-value added FDI, such as white products assembly, could give way to higher value added facilities by leaving and freeing up labour. Furthermore, the public sector employs a significant part of the highly skilled labour force, therefore improving the efficiency of the state could also help alleviating labour shortage in the private sector. Moreover, a better alignment of education systems with labour market needs can help to mitigate skill shortages and prevent inactivity.

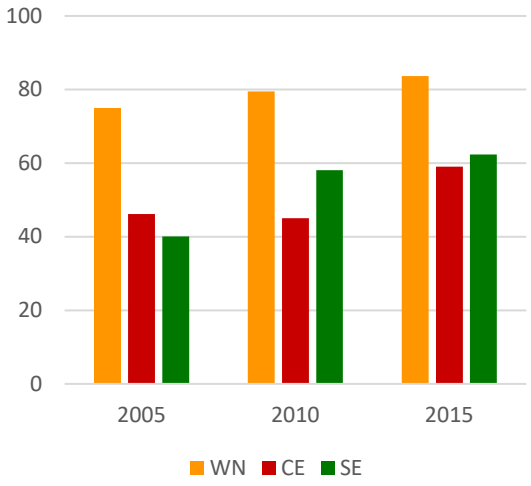
Investment in human capital is needed to prepare the workforce for changes and avoid deepening of socio-economic divergences. Job automation risks in CESEE economies tend to be higher than across Western Europe. At the same time, lifelong learning participation of the workforce lags. As for firm training, EIBIS data shows that in CESEE, it is particularly in regions where a relatively high share of jobs are at risk that fewer firms invest in training of their workforce (EIB 2020). Notably, CESEE contrasts with other parts of Europe where firms' propensity of investing in training either does not differ by automation risks – the case in North and Western Europe – or relatively more firms invest in training where risks of job losses linked to automation are elevated (Southern Europe). In contrast, the pattern for CESEE points to potential difficulties in managing the digital transition in an inclusive manner, as possibilities for training and retraining are essential for the workforce to obtain and remain in quality employment as digitalisation advances.

Increasing access to training and learning opportunities remains key for the region to support further convergence. An innovation-based and sustainable growth model can only be implemented successfully if the structures that develop and nurture the necessary skills of employees are in place. Skills are the basis underpinning development of innovation in the

region, in turn helping to advance digitalisation and the transition towards a greener economy. At the same time, the skill base and continuous investment in upgrading it mitigates risks of large-scale job losses due to digitalisation and facilitates adaptation processes related to the transition towards a carbon-neutral economy.

Skills are key to support firms' competitiveness and to strengthen inclusiveness in the region. Over the last 15 years, some positive developments are visible, as more firms have been investing in the training of their workforce (Figure 22). However, given the substantial transformative potential of digital technologies for labour markets together with industrial transformation linked to greening of the economy, more activity will be needed looking ahead. While analyses project a neutral or even positive impact on employment for the green transition, some job losses will be locally concentrated and hence require targeted efforts to support job transitions and develop new skillsets.

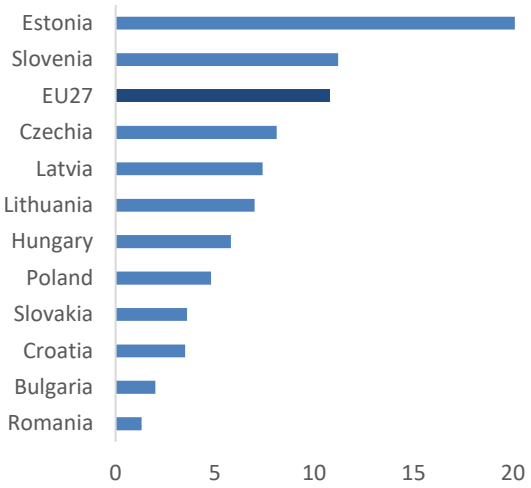
Figure 22: Share of firms providing training (in % of all enterprises), by EU country groups



Source: Eurostat, CVTS.

Note: Group averages exclude Croatia and Ireland due to missing data for 2005-2010.

Figure 23: Share of the adult population participating in lifelong learning in 2019



Source: Eurostat.

Note: Participation rate in education and training (last 4 weeks), from 25 to 64 years.

CESEE countries need to step up efforts to boost adult learning. Nurturing skills and knowledge in CESEE requires comprehensive strategies, including enhanced possibilities for upskilling and reskilling during working lives. Currently, most CESEE countries lag behind the EU average on the share of people participating in life-long learning (Figure 23). Moreover, some countries show strong urban-rural disparities. For example, participation in lifelong learning remains below one percent in some more rural regions of Romania.

CESEE is exposed to a double transition. The digital transformation, together with the decarbonisation are likely to put additional strains on the labour market. These risks are clearly present, as high automation risk is concentrated in the CESEE. When it comes to

decarbonisation, the key risk stems from the fact that significant proportions of the population are employed by the coal industry in some CESEE countries, such as in Poland, Czechia, Romania and Bulgaria. These transition risks need to be addressed promptly to avoid outcomes where significant parts of the populations become excluded from the gains of the progress. Policies need to be put in place to avoid high rates of technological unemployment, and prevent further polarisation on EU labour markets. Currently, spending on active labour market policies in most countries in the region is low in comparison (EIB 2018). Retraining and support will be required to ensure new economic opportunities for the workers who will lose their jobs. Public policies focused on skills are central to provide the workforce with the right skills to complement new technologies and thus mitigate labour market polarisation. However, providing skills through re-training is only one side of the coin: financial support also needs to support job creation in the affected regions, and pathways should be created to match the demand with supply.

Stepping up adult learning needs to be combined with efforts to strengthen quality and inclusiveness in education. Locally concentrated job losses, e.g. due to mining or plant closures call for local retraining efforts and strategies to boost adult learning. Moreover, education systems are central to equip people with the skillsets to adapt successfully to changing job requirements throughout their working lives. Performance of education systems vary across the region but several countries compare favourably in standardised student performance measurement particularly for mathematics and sciences (OECD PISA 2018 results, OECD education at a glance).[22] Also, the gap to EU digitalisation frontrunners in the availability of ICT specialists seems to narrow for the younger population, suggesting that graduates increasingly pick up much needed skillsets (Novak et al 2018). However, curricula and teaching methods need to be progressively adapted to ensure the development of skills complementary to new digital technologies. Beyond technical skillsets such as programming, this also means strengthening the focus on communication, creativity, critical thinking and leadership skills in education. Also, policies that foster inclusiveness in education are needed to mitigate risks of long-lasting detachment from the labour market early on.

Digital technologies need to be leveraged better to boost learning in the region. A changing labour market will require more flexibility from education systems. This requires constant review of curricula and studies and collaboration between educational institutions and firms to improve labour market relevance of offers. In some cases, this can mean shorter periods of study, potentially combined with work, or new degrees offered by educational institutions. In addition, digital technology could be leveraged for education, with online tools having the potential to boost learning on a broader scale.

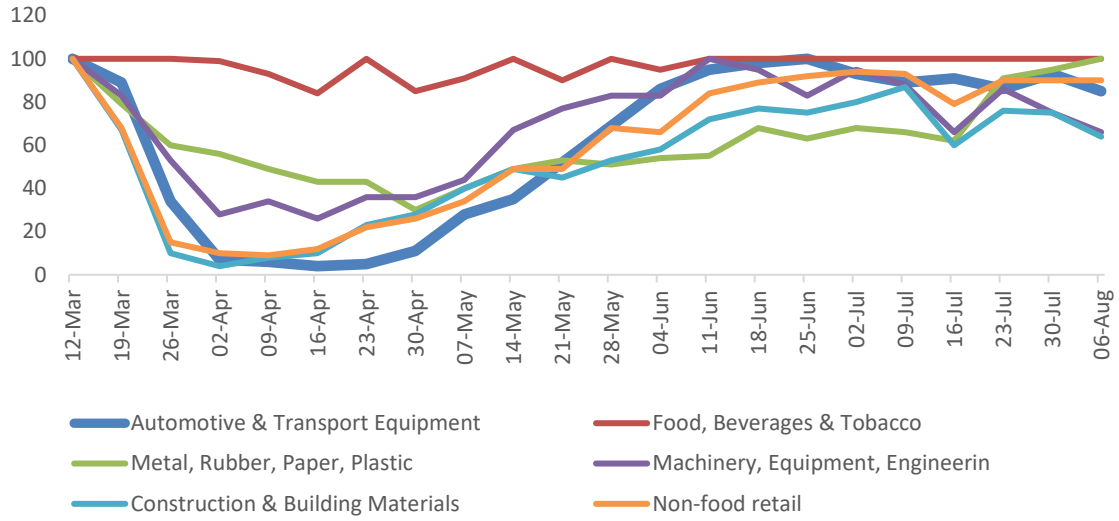
[22] Based on 2018 PISA results for pupils' performance in mathematics, science and reading, Estonia ranks best among EU peers and compares favorably globally. For mathematics and sciences, Poland, Slovenia and Czechia score above OECD average.

The COVID-19 shock: What implications for moving towards a new growth model in CESEE?

The COVID-19 shock reinforces the need for a new growth model. The need for a new growth model in CESEE is primarily driven by structural trends (including technological change, demographics) rather than cyclical fluctuations. Nevertheless, the global pandemic shock induced by COVID-19 also affects the CESEE countries significantly. We assess the short-to medium impact of the COVID-19 pandemic on the region and discuss implications for transitioning towards a new growth model.

The COVID-19 pandemic constitutes an unprecedented economic shock for the CESEE region and ends the upswing abruptly. Countries in the region have enacted early and strict lockdown measures in European comparison, which helped to contain the spread of the virus and mitigate costs to human lives. Nevertheless, most countries in CESEE are now facing the strongest economic contraction since the 1990s.

Figure 24: Operations of European supply chains relative to full capacity (%)



Source: Shippeo.

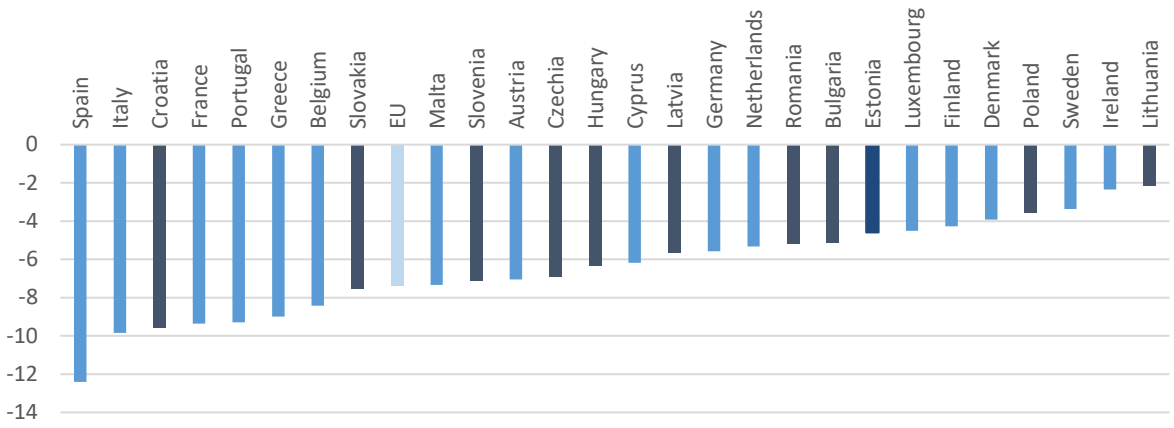
Note: Index based on live operation status data for more than 3000 plants and warehouses in Europe and thousands of associated transportation flows.

The pandemic is also amplifying some of the structural challenges that the CESEE economies are facing. For instance, it clearly demonstrated the critical importance of digitalisation for competitiveness, and highlighted the risks of lagging behind in these areas. The experience of the lockdown gave further impetus to the adoption of new digital and green technologies, in contrast to traditional industries such as manufacturing where the firms involved in EU supply chains have stronger competitive positions. Digital firms also showed that they are much more

resilient to lockdown of physical borders than traditional industries and services. As to the labour market and skills, COVID further widened the gap between the "old" and the "new" world of work. This risks a widening of the already existing regional and societal fault lines.[23]

The impact of the pandemic shock on CESEE economies is heterogeneous, depending on structural features. Dependencies on sectors particularly sensitive to lockdown measures and external linkages mean higher risks and negative implications for countries' growth outlook 2020. When asked about the long-term impact of COVID-19 as part of the EIBIS, firms in the CESEE region highlight more – relative to the EU average - the impact on their supply chains (42% versus 36%). Integration into global value chains is a key channel with particularly strong impacts in the Czech Republic, Slovakia and Hungary, which are strongly exposed to the German automotive supply chain, which suffered a particularly harsh disruption due to the first-wave lockdown measures in spring (Figure 24). Other countries, such as Croatia and Slovenia have a particularly strong role of tourism in the economy. As such, Croatia, with the highest share of tourism in GDP (23%) in the region, is also among the hardest hit. Poland stands to be relatively less affected given stronger domestic orientation of the economy (Figure 25).

Figure 25: Predicted changes in GDP across EU member states for 2020



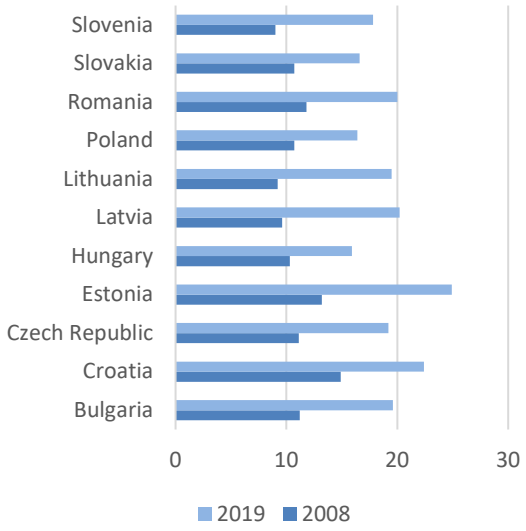
Source: EU Commission/AMECO, Autumn 2020 forecast.

One shared feature across the region is a relatively high vulnerability to capital outflows experience. This channel amplified the effects of the 2008 crisis significantly in the region. However, most CESEE economies are better positioned now to weather external shocks than they used to be in 2008. This is reflected in lower levels of public debt, lesser reliance on short-term capital flows and more balanced loan to deposit ratios on the banks' side. As a result, while portfolio outflows from CESEE countries were significant at the start of the outbreak, they have rapidly stabilised, and the impact on exchange rates was significant, yet containable so far.

[23] Darvas (2020) points out that within the EU, about 8% of employees with basic secondary education or lower lost their jobs during the first half of 2020. At the same time, jobs requiring university degrees increased by 3%.

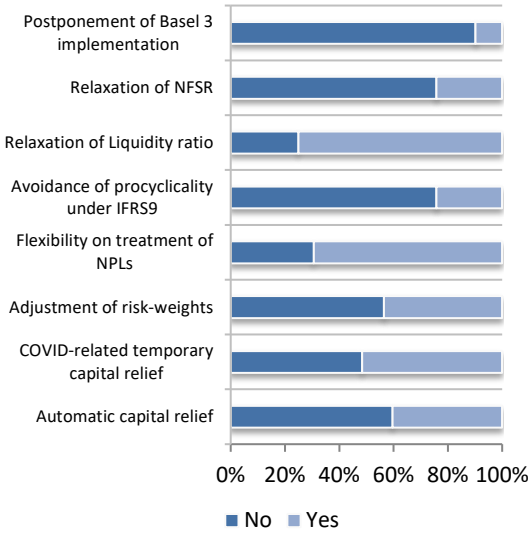
The banking sector entered this crisis more solidly. Most recent survey evidence suggest that the banking sector is facing one of the worst years since the financial crisis (EIB 2020a). NPLs have started increasing again, albeit less rapidly than expected at the onset of the pandemic. On the upside though, the banking sector is in a stronger position than before the financial crisis. NPLs have come down over the last years and banks' capitalization has been shored up (Figure 26). In addition, regulatory and policy measures have helped to support lending mitigate the immediate impact of the pandemic on the banking sector (see Figure 27).

Figure 26: CESEE banks core tier 1 ratio, per cent risk weighted assets



Source: IMF

Figure 27: CESEE banks' view on the usefulness of various regulatory measures



Source: EIB CESEE Bank Lending Survey

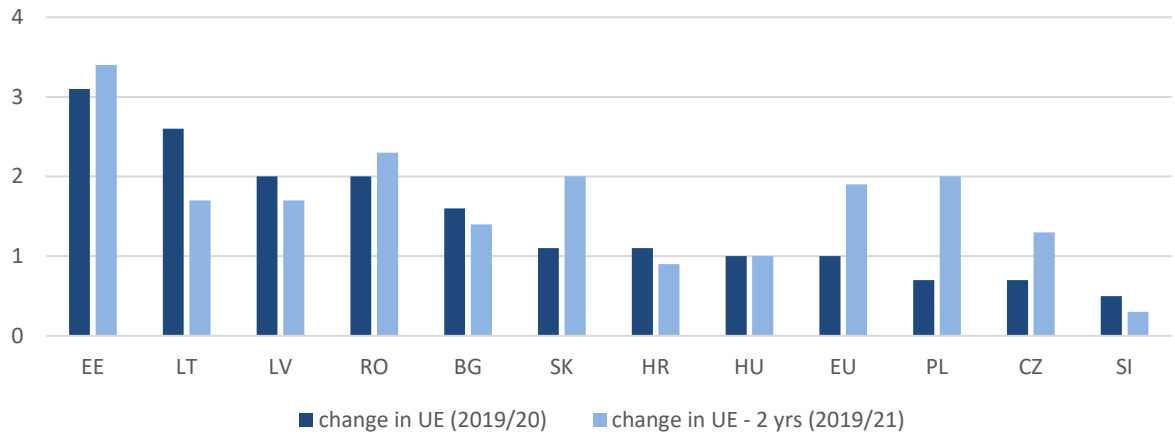
Note: Survey question: "Did the following regulatory and policy measures help to support/maintain lending to the economy?"

CESEE countries' labour markets short-term and structural challenges linked to COVID-19. Increases in unemployment are projected above EU averages in most CESEE countries (see Figure 28). This reflects structural and institutional features of labour markets including higher shares of self-employed and temporary contracts, employment protection legislation and limited employee bargaining power. While CESEE countries have a less strong tradition of short-time work schemes compared to other continental labour markets such as Germany or Austria, the use of furlough or short has broadened across the region and helped to mitigate the immediate rise in unemployment. At the same time, unemployment is projected to further increase in 2021 in most countries. Moreover, recent results of EIBIS indicate that 19% of firms in the region expect COVID 19 to lead to permanent reductions in employment. While unemployment benefit schemes vary within the CESEE with respect to duration and replacement rates, duration tends to be more limited in most (typically not exceeding 12 months; Astrov,

Holzner et al, 2019). Also, benefits tend to be more favourably to older employees while younger workers typically face a higher risk of unemployment as a result of the shock i.a. due to contract situations and employment in sectors particularly hard hit. In addition, a number of CESEE countries have relatively high shares of self-employed (Poland, Romania, Czechia), typically with little protection if their businesses falter as a result of shocks. Hence, a swift restart of the economy is paramount to limit the social impact from economic contraction induced by the pandemic in CESEE.

When it comes to climate change mitigation, the COVID-19 pandemic opened a window of opportunity to break with old bad habits. The lockdowns implemented across the world have led to sharp drops in carbon emissions in the short run. Although this is likely to have only negligible impact on climate change in the long run, the experience has pointed the way towards changes that could reduce emissions in the longer-term. For instance, we have now a new baseline of what can be achieved digitally: remote work, education, shopping. The pandemic therefore offers a "make-or-break" moment for the fight climate change. If CESEE countries miss that, they risk fully reverting to the pre-pandemic standards and locking them in for longer.

Figure 28: Predicted changes in unemployment across CESEE and EU 2020/21

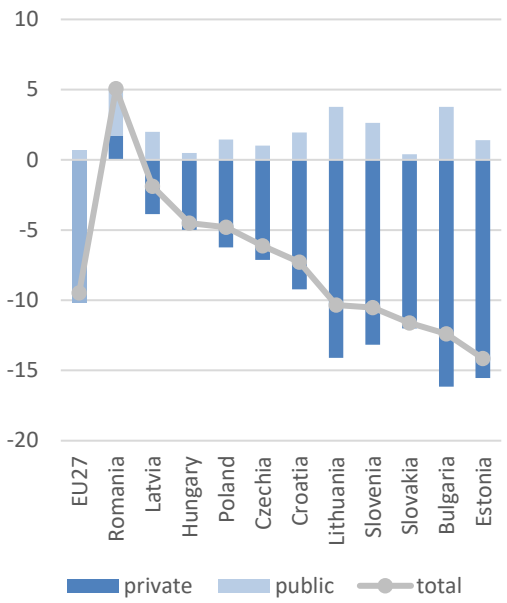


Source: EU Commission (Autumn forecast).

A strong impact on in investment is expected. The effect of the pandemic on private investment in the CESEE region stands to be pronounced, with drops ranging above 10 percent (see Figure 29). Romania, where investment activity had been volatile over the last years, is the only EU country in the EU where still an increase investment is expected, supported by construction. The drop in private capital formation is only marginally compensated by government investment. At the same time, the global pandemic adds to already high levels of uncertainty that have prevailed in the region and posed limits to corporate investments (EIBIS 2019, 2020 and forthcoming). On the corporate side, the heightened uncertainty leads firms to postpone and/or rescale their plans. This effect tends to be stronger during recessions as lower cash flows strengthen the negative impact of uncertainty. At the same time, large firms and intangible

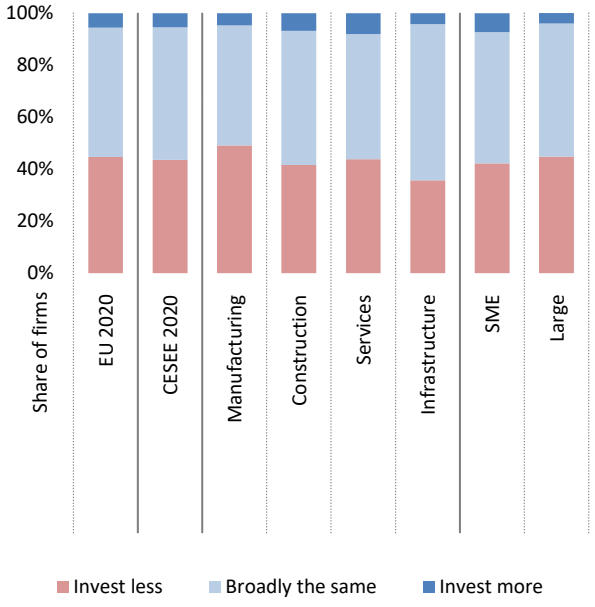
intensive firms tend to react less negatively to uncertainty. For CESEE, new data from EIBIS shows that about 44% of CESEE firms say they expect to invest less in 2020 due to the pandemic. Among firms with investment plans, three in ten report to delay or abandon (part of) these (see Figure 29). Around one quarter (24%) expects to continue investment plans with a reduced scale. While CESEE firms' investment reaction are about in line with other EU peers, the planned reduction coincide with persistently higher shares of firms having reported investment gaps over the last years and still continue doing so (21% in CESEE compared to 15% in the EU). In particular, firms in Romania (33%) and Lithuania (31%) are most likely to think they had invested too little. Against this background, the COVID-related cuts could further delay catching up processes and improvements in the capital stock. Similarly, recent analysis finds that CESEE continues to have massive gaps in infrastructure investment compared to Western Europe (IMF 2020). Overall, the decline in aggregate investment is expected to be substantial, and risks delaying convergence.

Figure 29: Forecasted change in public and private investment, volume (percentage change on preceding year)



Source: European Commission (AMECO), Autumn forecast.

Figure 30: Impact of COVID-19 on firms' investment plans (Have your company's overall investment expectations for 2020 changed due to coronavirus?)



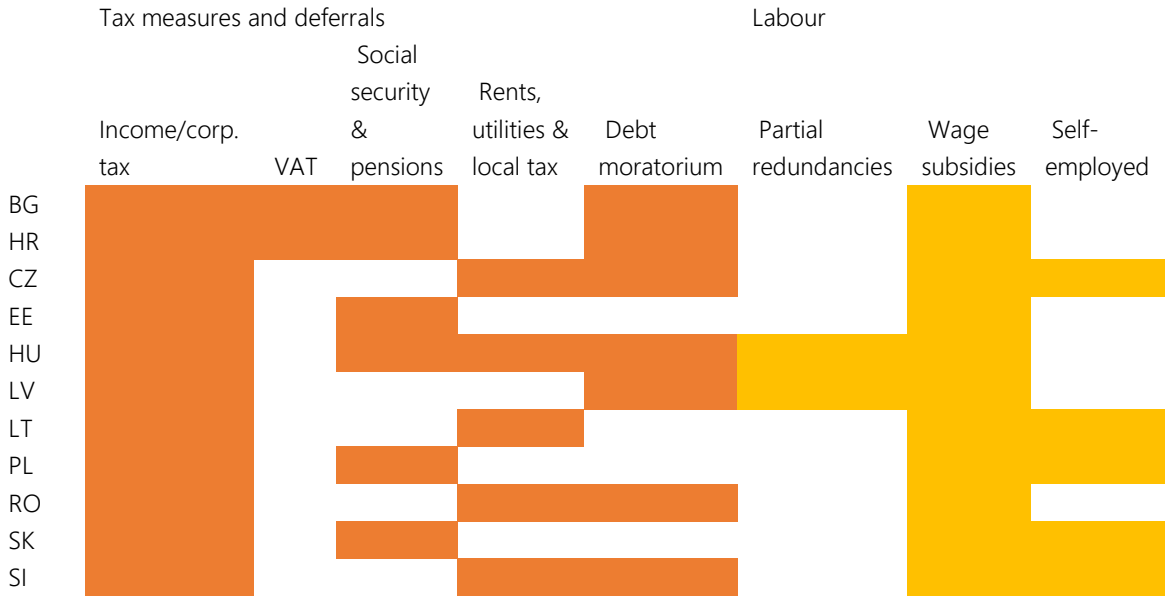
Source: EIBIS 2020

The crisis prompted swift and strong policy responses to support firms and households helped to mitigate negative effects. Immediate economic policy responses in the region to the COVID shock have relied on a mix of monetary and fiscal policy measures to provide support for firms and households (see table 2 for an overview for measures during the first wave). Policymakers have acted, pledging support and stepping up measures to support corporates as developments unfolded. Policy responses by national governments including fiscal stimulus and

liquidity support such as guarantees. Boosting access to (emergency) loans is clearly among the most popular responses to mitigate the impact of the COVID shock on corporates and the wider economy in CESEE and across the EU. Furthermore, all countries have implemented some form of tax forbearance as part of their policy response measures.[24] The use of debt moratoria in some form has been relatively common across the region. While the uptake somewhat varies across countries in the region, some 25-30% of banks report that moratoria have equaled 10-20% of their outstanding portfolios for household and corporate loans (see EIB 2020a for further discussion). Similarly, the large majority of governments have implemented some form of wage subsidies, for instance using some form of short-time work or furlough schemes to maintain employment and support corporate liquidity.

The national policy measures are being complemented through EU support. Notably this includes two new dedicated instruments, i.e. the SURE scheme (European Instrument for temporary Support to mitigate Unemployment risks in an Emergence) to provide financial assistance in the form of loans to member states to support short-term work and similar measures and the new pan-European guarantee fund to support corporates. The pan-European guarantee fund also helps to preserve a level playing field in the single market, given that member states responses have differed in size of stimulus and implementation speed. Under SURE, ten CESEE countries have received financial support amounting to EUR 21.7 bn.[25]

Table 2: Short-term COVID policy responses with a focus on corporates and households – 1st wave



Source: OECD, IMF, EIB ECON. As of June 2020.

[24] Based on IHS, IMF and OECD policy response information.

[25] The countries are Bulgaria, Czechia, Hungary, Croatia, Latvia, Lithuania, Poland Romania, Slovakia and Slovenia. See European Commission, Dec. 2020.

Following on swift policy responses, forward-looking strategies for recovery are needed. Policy support to firms and households has been crucial amidst the onset of the pandemic in spring to address urgent liquidity needs, enforce health sector capacity and to mitigate immediate social hardships. Similarly, it will be key for the recovery phase. Recovery strategies should focus on the four elements of the new growth model – innovation, digitalisation, the green transition and a focus on human capital to support a forceful and sustainable economic rebound. Not addressing those, raises risks to longer-term competitiveness and inclusiveness of CESEE economies. The preparation of national recovery plans to set out key public investment projects and reforms aims to reinforce efforts to develop growth strategies to support sustainable and inclusive growth looking ahead.

The common European framework and support for recovery can benefit countries' strategies. When formulating policy options for the building blocks of the new engine for the region, it is useful to consider the broader – in this case European – context. The EU at large is facing its structural challenges: the urging necessity of the transition towards a carbon-neutral economy, the need to embrace digitalisation and the fourth industrial revolution, and the call for more inclusive growth. The EU agenda that addresses these challenges provides an opportunity for CESEE countries to fit their economic transformation into the broader EU-level policy framework, exploiting synergies, funding opportunities and more. The recovery support from the European side, also envisages improved support possibilities as part of the next generation EU package, such as a reinforcement of the Just transition fund instrument and enhanced financing support for green and digital projects, which provide support for CESEE economies' to transition successfully towards a new growth model.[26] Action would focus on unlocking the job creation potential of the digital and green transition, for instance through investment in clean technologies and increasing energy efficiency of buildings, but also support foster reskilling and upskilling activities to better equip the workforce with the skills needed in a changing labour market.

[26] On the next generation EU package also see European Commission (27 May 2020) https://ec.europa.eu/commission/presscorner/detail/en/ip_20_940

Conclusions and policy recommendations

Countries in the CESEE region need to revisit their economic models to continue the process of economic convergence. The conditions on which the pre-crisis dynamics of these economies was founded have changed, and they need a "new growth model" to drive economic convergence looking ahead. This new growth model should focus on home-grown innovation, knowledge and skills-based growth, and sustainability, leveraging the opportunities of digital technologies.

The COVID-19 shock amplifies the structural challenges CESEE economies are facing. The experience of the lockdown demonstrated the critical importance of digitalisation for competitiveness and economic resilience and highlighted the costs of lagging behind in this area. Moreover, it showed that different, more sustainable ways of production and work are possible. At the same time, the pandemic shock risks a widening of inequalities and societal fault lines in the region, if the economic impact of the pandemic are not adequately addressed and countries in the region are too slow to adapt swiftly to the structural transformation processes the shock emphasized.

Jointly strengthening the four elements of the new growth model brings benefits for economies and citizens of CESEE. Domestic innovation, digitalisation, sustainable development and strengthening skills are closely intertwined. While innovation is increasingly digital, the technologies (to be) developed power a successful green transition. Skills form the basis to drive these processes and enable individuals to seize the opportunities of economic transformation.

Comprehensive efforts are needed to boost home-grown innovation across the region. As a group, CESEE economies are still lagging behind the rest of the EU and currently, innovation is happening mostly in large, foreign-owned manufacturing firms.

- To translate research into tangible innovation, a broader set of private firms need to invest into intangible assets, particularly into R&D. The key challenge remains to reduce the share of firms neither actively advancing nor adopting innovation. This supports rising productivity on average as well as mitigating gaps across firms.
- Part of the innovation gap is related to finance, or the lack of it. As a consequence, fostering capital market development and increasing the set of capital providers that are able to finance and support innovative companies through their activities and suitable financial products is key to support the innovation process. This includes better access to growth and risk capital, new venture debt products and alternative funding sources.
- Furthermore, a key obstacle innovative firms, new digital entrepreneurs and start-ups are facing is related to skill bottlenecks. Strengthening of the skill base through investment in education systems and life-long learning opportunities is therefore also necessary to advance the transition towards a knowledge economy.

Digitalisation also calls for investment into skills and human capital across the region. Digitalisation can alleviate labour shortages and contribute to innovation as an enabling factor. However, if not matched with the necessary policy measures, it can add to the strains of the labour market by increasing skill mismatches, substituting human workplaces by technology and adding to social polarisation. The combination of a favourable business environment and availability of digital talent is the basis to broaden adoption and foster digital innovation in the region.

- Policy support for digitalisation in CESEE needs to come with a strong focus on human capital. To support the availability of digital skills, both education and life-long learning systems in CESEE need to be strengthened. The focus on digital skills needs to become "engrained" and the acquisition of human-centric skills complementary to technologies.
- The development of basic digital skills are particularly important in determining the overall labour market impact of digitalisation as constraints in basic digital skills can skew firms' investment in digital technologies towards the labour saving type.
- Policies focused on businesses should foster access to early stage funding and the creation of accelerators and incubators. Governments also need to work with local stakeholders to ensure that the right incentives and supporting tools are available to strengthen digital ecosystems.

The transition towards carbon-neutrality brings new opportunities to the economies of the region. As part of the EU agenda to achieve a net zero-carbon economy by 2050, the CESEE region is also in the process of shifting its energy systems and related infrastructure towards sustainability. Given the high energy intensity of the CESEE economies, the path ahead is not going to be without challenges. The transformation towards carbon neutrality is bound to unlock a range of new economic and business opportunities, for example for the production of renewable energies. Given the legacy of the region, strong policy action is necessary to drive the transition itself, but also to mitigate of the possible adverse social impacts of the low carbon transformation to ensure that there will be no one left behind. However, there are also 'low hanging fruits'.

- Refurbishing buildings (both residential and non-residential) could reduce carbon emissions and improve the quality of life for citizens at the same time. More financing, and more innovative financing support, is crucial to tap the large potential energy saving in the CESEE residential sector.
- Tapping the region's unlocked opportunities in renewable electricity generation is another area where the carbon footprint can be reduced significantly. Differentiated strategies are needed to reflect the country-specific and regional geographical conditions.
- Transportation is another high impact area CESEE countries could effectively address with integrated planning strategies, by upgrading the quality of the pre-existing

extensive public transportation systems, and supporting the accelerated electrification of the individual transport fleet.

Labour markets risk remaining a major bottleneck for long-term growth if challenges remain unaddressed. Active labour market policies can help ease labour market shortages by improving job matching and bringing parts of the inactive population in the labour market. Moreover, they can help to build increase the availability of much-needed skillsets through support for re- and upskilling. While labour market shortages may temporarily ease due to the impact of the COVID shock, structural drivers such as adverse demographics and pressure from emigration suggest that they are likely to return sooner rather than later. Policies focusing on skills of the workforce promise the benefits of easing adaptation to changing skills requirements and improving longer-term competitiveness. To that extent, skill policies are also going to influence CESEE countries positioning in (re)structured value chains in a post-COVID world.

- CESEE countries need to step up efforts to boost adult learning to deal with the strains digitalisation and decarbonisation are putting on the labour market.
- In addition, financial support also needs to support job creation in the regions that are affected negatively by the green and digital transitions, and pathways should be created to match the demand with supply.
- Stepping up adult learning needs to be combined with efforts to strengthen quality and inclusiveness in education. Beyond technical skillsets, strengthening the focus on communication, creativity, critical thinking and leadership skills should be prioritised, together with policies that foster inclusiveness to mitigate risks of early detachment from the labour market.

References

Acemoglu, D., Aghion, P. and Zilibotti, F (2006) "Distance to Frontier, Selection, and Economic Growth", Journal of the European Economic Association, Vol. 4, pp. 37-74.

Astrov, V., Holzner, M., Leitner, S., Mara, I., Podkaminer, L. and Rezai, A. (2019). "Wage Developments in the Central and Eastern European EU Member States", Wiiw Research report 443, The Vienna Institute for International Economic Studies, Vienna.

Atoyan, R., Christiansen, L., Dizioli, A., Ebeke, C., Ilahi, N., Ilyina, A., Mehrez, G., Qu, H., Raei, F., Rhee, A. and Zakharova, D. (2016). "Emigration and its economic impact on Eastern Europe", IMF Discussion Note. International Monetary Fund, Washington, D.C.

Bartelsman, E. (2019). "From new technology to productivity," European Economy discussion paper 113, European Commission, Brussels.

Batsaikhan, U., Darvas, Z. and Raposo, I. (2018). "People on the Move: Migration and Mobility in the European Union," Bruegel, Brussels.

Bubbico, R. L. et al. (2017). "Wind of change: Investment in Central, Eastern and South Eastern Europe." Regional Studies and Roundtables, European Investment Bank (EIB), Luxembourg

Campos, N., Coricelli, F. and Moretti, L. (2014), "Economic Growth and Political Integration: Estimating the Benefits from Membership in the European Union", CEPR Discussion Paper No.9968.

Commission on Growth and Development (2008), "The Growth Report : Strategies for Sustained Growth and Inclusive Development." Washington, DC : World Bank.

Correia, A., Bilbao-Osorio, B., Kollár, M., Gereben, Á and Weiss, C. (2018). "Innovation investment in Central, Eastern and South-Eastern Europe: building future prosperity and setting the ground for sustainable upward convergence", EIB Regional Study, December.

Damijan, Joze, Rojec, Matija, Majcen, Boris and Knell, Mark, (2013). "Impact of firm heterogeneity on direct and spillover effects of FDI: Micro-evidence from ten transition countries." Journal of Comparative Economics, 41, issue 3, p. 895-922.

Darvas, Zs. (2020) 'COVID-19 has widened the income gap in Europe', Bruegel Blog, 3 DecemberEBCI (2020), "State of innovation finance in CESEE." European Bank Coordination ("Vienna") Initiative, Working Group on Financing Innovation, report.

EBRD (2017)."Transition Report 2017-18. Sustaining growth." EBRD, London.

EIB (2016). "Investment and Investment Finance in Europe", European Investment Bank.

EIB (2018), "EIB Investment Report 2018/2019: Retooling Europe's economy", European Investment Bank.

EIB (2019), "CESEE bank lending survey H1 2020", European Investment Bank.

EIB (2020), "Investment Report 2019/2020: Accelerating Europe's Transformation", European Investment Bank.

EIB (2020a), "CESEE Bank Lending Survey – Autumn 2020". European Investment Bank, Luxembourg.

EIB (forthcoming), "Investment Report 2020/21". European Investment Bank.

Eichengreen, B., Park, D. and Shin, K. (2014) "Growth Slowdowns Redux: New Evidence on the Middle-Income Trap", Japan and the World Economy, Vol. 32, pp. 65-84.

EIF (2018) EIF VC Survey (2018), Fund managers' market sentiment and views on public intervention, EIF R&MA Working Paper 2018/48, European Investment Fund.

European Commission (2018), "Financing Energy Efficiency in Central and South Eastern Europe. Conference proceedings Sofia, available at https://ec.europa.eu/info/files/proceedings-sofia-public-conference_en

European Commission (2019), "Labour Market and Wage Developments in Europe. Annual Review 2019." European Commission, DG Employment, Brussels.

Gattini, L., Gereben, Á., Revoltella, D. (2019a), 'Cross-border banking in CESEE – through the lens of the EIB Bank Lending Survey', in: Mark Allen (ed), Ten years of the Vienna Initiative: 20019-2019, European Investment Bank.

Grela, M., Majchrowska, A., Michałek, T., Mućk, J., Stążka-Gawrysiak, A., Tchorek, G. and Wagner, M. (2017) "Is Central and Eastern Europe converging towards the EU-15?", National Bank of Poland Working Paper No. 264.

Hagemejer, J and Muck, J (2019), Export-led growth and its determinants: Evidence from Central and Eastern European countries, The World Economy, Wiley Blackwell, vol. 42(7), pages 1994-2025, July.Kollár, M., Bubbico, R. L., Arsalides, N., (2018), Smart Cities, Smart Investment in Central, Eastern and South-Eastern Europe, EIB Thematic Study, European Investment Bank.

Roaf, J., Atoyan, R., Joshi, B., Krogulski, K., IMF staff team (2014). 25 Years of Transition: Post-Communist Europe and the IMF, International Monetary Fund, Washington, D.C.

IMF (2016), Central, Eastern, and Southeastern Europe: How to Get Back on the Fast Track, Regional Economic Issues, May 2016, International Monetary Fund.

IMF (2020), Infrastructure in Central, Eastern and Southeastern Europe: Benchmarking, Macroeconomic Impact, and Policy Issues. Departamental paper, No.20/11, IMF Washington.

Nedelkoska, L. and Quintini, G. (2018). "Automation, skills use and training". OECD Social, Employment and Migration Working Paper No. 202. OECD Publishing, Paris.

Novak, J., Purta, M., Marciniak, T., Ignatowicz, K., Rozenbaum, K. and K. Yearwood (2018). "The Rise of Digital Challengers. How digitization can become the next growth engine for Central and Eastern Europe." Digital McKinsey Papers

Pál, R. and Wruuck, P. (2019). "Investment: What holds Romanian firms back? EIB working paper 2019/08, EIB Luxembourg.

Piatkowski, M. (2014) "The Warsaw Consensus" – The New European Growth Model. TIGER Working Paper Series 131.

Pison, Z. (2020), 'The Future of Tech Startups in Central & Eastern Europe'. GLOBSEC.

Pouliakas, K. and Sekmokas, M. (2018). "Automation, skills demand and adult learning". In: Investing in Europe's future: the role of education and skills. Luxembourg: European Investment Bank.

Stöllinger, R. (2019), "Functional Specialisation in Global Value Chains and the Middle-Income Trap,"wiiw Research Reports 441, The Vienna Institute for International Economic Studies, wiiw.

Székely, I. and Buti, M. (2019). "Trade shocks, growth, and resilience: Eastern Europe's adjustment tale", VoxEU, CEPR, 28 June.

ECONOMICS – WORKING PAPERS 2021/01

Towards a new growth model in CESEE:

Convergence and competitiveness through smart, green and inclusive investment

Economics Department
economics@eib.org
www.eib.org/economics

European Investment Bank
98 -100, boulevard Konrad Adenauer
L-2950 Luxembourg
+352 4379-22000
www.eib.org – **info@eib.org**

PDF: ISBN 978-92-861-4936-8