European Bank
for Reconstruction and Development

# TRANSITION REPORT 2018-19

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# WORK IN TRANSITION

# #workintransition

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# ABOUT THIS REPORT

The EBRD seeks to foster the transition to an open market-oriented economy and to promote entrepreneurship in the economies where it invests. To perform this task effectively, the Bank needs to analyse and understand the process of transition. The purpose of the *Transition Report* is to advance this understanding and to share our analysis with partners.

Responsibility for the content of the report is taken by the Office of the Chief Economist. The assessments and views expressed are not necessarily those of the EBRD. All assessments and data in the online country assessments are based on information as of late October 2018.

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# EXECUTIVE SUMMARY

This *Transition Report* focuses on the transformation of work. With profound changes being observed in three different areas that can be thought of as the "who", the "how" and the "where" of work, this report explores the issues of demographic change (the "who"), the automation of jobs (the "how") and the migration of workers across and within national borders (the "where"), looking at how the interplay between demographic shifts, technology and migration can help to shape economic growth and the future of work, both across the EBRD regions and around the world.

Rapid demographic change is being observed throughout the EBRD regions. In emerging Europe, ageing populations and shrinking workforces mean that countries need to help their citizens to extend their working lives. Meanwhile, in the young economies of Turkey, Azerbaijan, Central Asia and the southern and eastern Mediterranean, the main challenge is to create a continuous stream of high-quality jobs for the many new entrants to the labour market.

At the same time, technological change is transforming demand for skills and the nature of jobs. Many economies in the EBRD regions have experienced deindustrialisation (a decline in industrial employment) and job polarisation (a decline in medium-skilled occupations as a percentage of total jobs). While technological change is boosting demand for skilled labour, many countries face significant shortcomings when it comes to the quality of technology-related skills, especially among older workers.

Cross-border migration is also on the rise, with greater numbers of migrants leaving countries of the EBRD regions and greater numbers arriving in, or passing through, those countries. The analysis in this report shows that people who intend to emigrate often have higher-than-average skills, and emigration by skilled workers can, in the short term, have a negative impact on the productivity of firms in migrants' countries of origin. In the longer term, however, increases in knowledge flows between migrants' countries of destination and origin can help to turn a "brain drain" into "brain gains".

Meanwhile, within countries, people are increasingly gravitating towards more densely populated areas. These areas are projected to achieve the largest increases in productivity and well-being by 2040, provided that congestion can be kept in check. In places that have experienced depopulation, policy interventions need to foster productivity growth and support investment in infrastructure.

The analysis in this report is based on comprehensive individual-level and country-level data on adult skills, the use of industrial robots across sectors and countries, the characteristics of refugees and migrants travelling to Europe and people's intentions to migrate. As in previous years, this report also provides an overview of progress in the area of structural reform.

# 1 THE YOUNG AND THE OLD

Demographic change can occur fast. As countries develop, falling birth rates and rising life expectancy deliver demographic dividends in the form of a larger workforce relative to the size of the total population, an increase in savings and enhanced human capital. However, ageing populations and below-replacement birth rates can quickly turn such demographic dividends into demographic headwinds.

Turkey, Azerbaijan and the economies of Central Asia and the southern and eastern Mediterranean are currently at a relatively early stage of that demographic transformation process. These young economies face the challenge of creating large numbers of jobs every year for their new entrants to the labour market – a challenge that is shared by many other developing economies and emerging markets around the world. Priorities in such economies include boosting the level of physical capital per worker, improving human capital and raising labour force participation rates among women. Improvements to the business climate and stronger macroeconomic policy frameworks can help these economies to leverage the pool of global savings in order to fund investment in machinery and in education systems that provide the skills needed by the private sector.

In contrast, the economies of emerging Europe find themselves wrestling with population ageing. Ageing in emerging markets – a relatively new phenomenon – is partly a reflection of strong economic development that has brought about higher levels of income and improvements in healthcare for large sections of the population. However, it also represents a major challenge in the sense that demographics are no longer contributing positively to economic growth or income convergence.

As in advanced economies – where higher rates of immigration, greater reliance on automation and longer working lives have so far succeeded in mitigating the economic impact of ageing – the future of employment and growth in emerging markets will be shaped by the interplay between trends in demographics, migration and automation, as well as the way in which education and social safety nets respond to those trends.

In emerging Europe, labour force participation rates among older age groups have remained relatively low. Pension reforms raising statutory retirement ages and modifying provisions for early retirement can encourage older people to seek employment and incentivise firms to hire older workers, as can changes to tax systems. At the same time, improvements in healthcare, working conditions and life-long learning opportunities are also needed in order to help older employees to remain productive and retain or upgrade their skills.

**http://2018.tr-ebrd.com/theyoungandold**

# 2 SKILLS, EMPLOYMENT AND AUTOMATION

Over the last decade, many economies in the EBRD regions have experienced deindustrialisation and increased job polarisation. The employment shares of agriculture and manufacturing have declined substantially, with service-sector workers now accounting for larger percentages of the labour force. Medium-skilled occupations have declined as a percentage of total jobs, while numbers of low-skilled and high-skilled jobs have risen.

Across the EBRD regions, significant increases have been observed in the average number of years of education. However, the quality of that education and the extent to which it meets the needs of the market have not always risen in parallel. As a result, ICT skills tend to lag behind those observed in advanced economies, particularly among older workers. Closing this gap will help the EBRD regions to leverage the benefits of future technological advances while minimising the disruptive impact that digitalisation can have on the labour market.

The impact of profound technological change can also be seen in the rapidly rising numbers of industrial robots in parts of the EBRD regions. As elsewhere, automation has both destroyed and created jobs. The net impact that robotisation has had on employment in central and south-eastern Europe has been negative, but very small (accounting for 0.2 percentage points of the labour force, or 13 per cent of the total decline in the employment rate between 2010 and 2016). That negative impact has been strongest among workers who are only educated to primary level.

In many countries where the EBRD invests, skills shortages have been exacerbated by the emigration of skilled workers. The analysis in this chapter shows that the total factor productivity of firms whose workers have had increased opportunities to emigrate following their countries' accession to the EU has, on average, been significantly lower than it would have been in the absence of emigration. However, this does not appear to hold for foreign-owned and innovative firms, as they have been able to adjust to the changing environment by increasing wages. Policies that support training and the upgrading of local skills, such as subsidies for training newly hired workers, can help firms to deal with increased employee turnover and minimise the adverse effects of emigration.

In the longer term, innovative firms in migrants' countries of origin benefit from greater inflows of knowledge on the back of earlier emigration. Over time, those larger "knowledge remittances" are expected to help new EU member states to narrow the gap in relation to more advanced European economies in terms of the quantity and quality of patenting activity.

**http://2018.tr-ebrd.com/labourmarkets**

# 3 INTERNATIONAL MIGRATION

International migration is on the rise, both globally and in the EBRD regions. Indeed, emigration rates in the EBRD regions have risen since 1990, with almost 10 per cent of people born there now living outside their country of birth or citizenship.

The emigration of workers is a concern for many countries where the EBRD invests. The analysis in this chapter shows that people who express an intention to emigrate tend to be single, male and young and live in urban areas. They also tend to be better educated than the average person and are often less satisfied with the quality of local amenities (such as healthcare, education, air and water, housing and transport) than people who do not intend to emigrate. Satisfaction with the local education system appears to be of particular importance for the young and the highly educated when it comes to deciding whether to move abroad.

These findings suggest that improving the business environment and the quality of public services and other local amenities may significantly reduce people's desire to emigrate. Indeed, improving the quality of public goods can have a large impact on intentions to emigrate, comparable to the effect of raising wages by more than US$ 500 a month in a country such as Albania.

At the same time, many countries in the EBRD regions serve as transit and/or host countries for refugees and irregular migrants. According to survey data, the vast majority of those people (especially those coming from Syria, Afghanistan and Iraq) leave their country in order to escape conflict. However, there are also substantial numbers of irregular migrants (particularly those coming from countries such as Algeria, Morocco and Pakistan) who are driven mainly by a desire to seek out better economic opportunities. Further analysis shows that, like prospective economic migrants, refugees and irregular migrants also tend to be single, male, young and relatively well-educated.

It appears that refugees and irregular migrants often select their intended country of destination on the basis of their skills and the asylum procedures in the relevant country. In particular, better-educated people are more likely to head for countries where estimated returns to education are higher.

**http://2018.tr-ebrd.com/internationalmigration**

# 4 GEOGRAPHIC TRANSITION

When given a choice, people generally choose to live in places with good economic opportunities, and the places with the best opportunities tend to be large, densely populated cities. The numbers of people living in sparsely populated areas of the EBRD regions are declining, while cities with populations in excess of 500,000 people have either grown or experienced lower rates of population loss than smaller cities. As a city grows, local markets and pools of skilled workers expand in size, and the provision of public goods tends to become cheaper thanks to economies of scale. Indeed, analysis of the EBRD regions implies that workers in a city twice the size of a similar city nearby are, on average, 5 per cent more productive.

However, growing populations also result in increased congestion and pollution, which detract from people's quality of life. At some point, those factors will start to encourage people to relocate to more sparsely populated areas. Indeed, some large cities in the EBRD regions (such as Warsaw) have seen their populations disperse, with people moving away from densely populated urban areas in search of a less congested living environment.

This chapter uses a spatial model that balances those competing agglomeration and dispersion forces in order to shed light on the long-term economic implications of population shifts in countries where the EBRD invests. That analysis suggests that the EBRD regions' most densely populated areas can be expected to achieve the largest increases in well-being by 2040, but only if congestion can be kept in check. Investment in municipal infrastructure (such as public transport, water, waste water and recycling) can help in this regard.

The rapid process of urbanisation across the EBRD regions has been accompanied by the gradual emptying-out of large rural areas. In many economies, more than 50 per cent of people live in areas with declining population density. If productivity levels in those areas continue to fall, depopulation risks becoming self-reinforcing. Investment aimed at boosting economic efficiency (for instance, through improved irrigation in rural communities) can help to mitigate these changes to some extent.

The spatial model that is used in this chapter also shows that upgrades to infrastructure – such as roads and railways in the Western Balkans or transport links forming part of China's Belt and Road Initiative – deliver substantial economic gains to the communities that those new transport routes pass through. However, those effects become markedly weaker as distance from the upgraded infrastructure increases.

**http://2018.tr-ebrd.com/internalmigration**

# 5 MACROECONOMIC OVERVIEW

Following several years of relatively weak economic performance, growth in the EBRD regions averaged 3.8 per cent in 2017 – the second consecutive year of strengthening growth. That growth was broad-based, with support provided by stronger investment activity and increases in exports. External financing conditions have remained broadly favourable, encouraging firms to take on more debt (which is often denominated in foreign currencies).

In the longer term, the growth trajectories of countries in the EBRD regions are, to a large extent, shaped by those economies' demographic profiles. When analysing countries' economic performance, the concepts of GDP growth, per capita income growth and labour productivity growth are often used interchangeably. However, the large differences across economies in terms of their demographic profiles imply that the relationships between these three indicators are in fact complex and country-specific. Indeed, some EBRD regions (such as central Europe and the southern and eastern Mediterranean, for instance) have similar rates of real output growth, but differ considerably in terms of the speed of per capita income convergence and the underlying growth in output per worker.

**http://2018.tr-ebrd.com/overview**

# 6 STRUCTURAL REFORM

A number of countries have made progress in terms of the six key qualities of a sustainable market economy (as introduced in last year's *Transition Report*), with no significant declines being observed in the relevant scores. The business climate has improved further in several countries in eastern and south-eastern Europe and the Caucasus, leading to the upward revision of scores for competitiveness. Those same regions have also seen the upward revision of scores for integration, largely owing to improvements in the quality of logistics services and related infrastructure.

Many economies where the EBRD invests have made progress in the area of green transition by ratifying the Paris Agreement and making legislative commitments to reduce greenhouse gas emissions. Only very modest progress has been made in the area of financial resilience, but energy resilience appears to have improved across the EBRD regions. For example, Ukraine's energy resilience score has increased significantly, thanks to major improvements to the legal and regulatory framework governing the country's energy sector, a stronger role for Ukraine's independent energy regulator and further progress with tariff reforms.

Some progress appears to have been made with financial aspects of youth and gender inclusion, but progress in other areas of inclusion has been lacking. Only modest progress has been observed in the area of governance, with increases in scores generally concentrated in eastern Europe and the Caucasus.

On the negative side, the risk of inadequate compliance with frameworks aimed at combating anti-money laundering and the financing of terrorism (AML/CFT) has increased in a number of economies where the EBRD invests, particularly in the southern and eastern Mediterranean, Central Asia and south-eastern Europe. Moreover, in several countries, the perceived transparency of government policymaking has also declined. Meanwhile, non-performing loan ratios have increased further in Kazakhstan and Ukraine, and banking-sector liquidity has deteriorated in certain Central Asian countries, weighing on indicators of financial resilience. With few exceptions, net FDI and non-FDI capital inflows have remained unchanged or declined as a percentage of GDP.

**http://2018.tr-ebrd.com/reform**

# FOREWORD

This year's report is entitled "Work in Transition" not because (or not only because) it studies work in the EBRD's countries of operations that are in transition to sustainable market economies. "Work in Transition" is first and foremost about the transformation that is happening to work itself – both in advanced economies and emerging markets.

Work plays a key role in all of our lives. In 1930, John Maynard Keynes predicted that living standards would rise between four and eightfold by 2030, with the working week shrinking to just 15 hours. After all, why would you need to work more hours than that if part-time wages were sufficient to afford a decent standard of living? Today, income per capita in advanced economies is indeed five times the level seen in 1930, but we still work about 40 hours per week on average (slightly more in Asia; slightly less in Europe). Work still takes up the bulk of our time – second only to sleep, and way ahead of eating, studying and leisure activities.

We certainly seem to value work. Time and time again, studies of life satisfaction (including our own analysis in the *Transition Report 2016-17*) show that work's importance in terms of our happiness extends far beyond its role as a source of income. When people become unemployed, their life satisfaction declines much more than one would expect on the basis of the respective loss of income. Whether the unemployed worry about their future careers (which are, of course, at a disadvantage relative to those of their employed peers, who will continue learning on the job) or simply feel that they lack purpose, the fact remains that work is an essential element of life, in both developed and developing countries.

Consequently, understanding the ongoing transformation of work is crucial for the EBRD. Our objective is certainly not to create jobs. Although we are a public institution established and owned by national governments, we strongly believe that governments are not responsible for the direct creation of employment. However, our job is to support the development of sustainable market economies where the private sector is able to create good jobs. That is why we need to understand the factors that are driving changes in the quantity and the quality of work in today's – and, even more so, tomorrow's – economy.

Work is undergoing a profound transformation along three dimensions. First of all, major demographic shifts are affecting the supply of labour. The populations of advanced economies and the countries of emerging Europe are ageing rapidly, resulting in labour shortages and a need to improve the way in which older cohorts are integrated into the labour market. Meanwhile, the populations of Turkey, Azerbaijan and the countries of Central Asia and the southern and eastern Mediterranean are still very young, and those economies face the altogether different challenge of creating sufficient jobs for all the young people who are entering the labour market each year.

> **GIVEN THE SPEED OF TECHNOLOGICAL CHANGE, MODERN WORKERS WILL NEED TO KEEP UPGRADING THEIR SKILLS THROUGHOUT THEIR CAREERS.**

The second aspect of the transformation of work concerns skills. The "fourth industrial revolution" is resulting in job polarisation, reducing demand for medium-skilled workers and increasing demand for high and – for now – low-skilled workers. For the time being, low-skilled jobs can be done so cheaply that there is little risk of them being outsourced or automated. However, as technology progresses, they too will increasingly be at risk. Such changes are not restricted to advanced economies, either. Far from it. Indeed, they can also be seen in middle-income economies, including the EBRD's countries of operations.

In order to avoid being left behind, workers of today will need to upgrade their skills. Moreover, given the speed of technological change, modern workers will need to keep upgrading their skills throughout their careers. Unfortunately, in many parts of the EBRD regions, outdated education systems fail to equip workers with the right skill sets, resulting in a mismatch between the skills that are possessed by new entrants to the labour market and the skills that are required by the private sector.

The third aspect of the transformation of work concerns geographical shifts in the location of jobs and workers. This is resulting in high levels of cross-border migration, as well as significant intra-country labour mobility (which mostly involves workers gravitating from rural areas and small towns to larger cities).

Most of this year's *Transition Report* is devoted to analysing these three aspects of the transformation of work. The first chapter looks at demographic shifts in the economies of the EBRD regions. The second chapter explores the issue of technological change and automation, as well as the supply of and demand for skills. The third chapter looks at cross-border migration, examining the determinants and effects of both emigration and immigration. And the fourth chapter looks at internal migration and the impact of agglomeration. We examine the interplay between demographic change, technological advances, migration and urbanisation, showing that these result in both threats and opportunities.

This report will help us all to gain a better understanding of what the economies of the EBRD regions need to do in order to leverage those rapid changes in the nature of work and deliver for their citizens. The report finds that there is no one-size-fits-all solution. The challenge for ageing economies in emerging Europe will be to provide healthcare and training to older cohorts, and to invest in public goods in order to contain emigration. Those countries should also foster "knowledge remittances", benefiting from the knowledge and ideas of their diasporas abroad in order to boost productivity at home. Younger economies, in contrast, will need to reform their education systems and raise labour force participation rates among women. Advanced economies should invest in policies aimed at improving the integration of refugees, while less developed countries should prioritise sustainable infrastructure and reductions in the cost of trade and mobility. And all countries should promote smart and sustainable urbanisation.

While the transformation of work will pose major challenges for policymakers, our overall message is optimistic. Increases in life expectancy, technological progress and geographical shifts towards areas where workers can be more productive and lead more fulfilling lives can all result in tangible aggregate benefits. Moreover, a fair distribution of those benefits is eminently feasible. The future of work will itself entail plenty of work, but that future can and should be a bright one.

**Sergei Guriev**
Chief Economist
EBRD

# 1

# THE YOUNG AND THE OLD

Rapid demographic change is being observed across the EBRD regions. Turkey and the economies of the southern and eastern Mediterranean and Central Asia currently find themselves at an early stage of their demographic transition.

To create high-quality jobs for their many new entrants to the labour market, these economies need to boost levels of physical capital per worker and improve human capital. Meanwhile, in emerging Europe, populations are ageing fast.

In advanced economies, immigration, automation and longer working lives have so far mitigated the economic impact of ageing. In emerging Europe, pension reforms and adjustments to tax systems can help to encourage older people to seek employment, while improvements in healthcare and lifelong learning opportunities are important in order to help older employees to retain and upgrade their skills.

# Introduction

Thomas Malthus sounded the alarm about demographic pressures on economic well-being more than two centuries ago.[1] However, contrary to his prediction, the planet has not run out of the resources required to sustain population growth.[2] As population density has risen, improvements in technology and human capital have helped to boost productivity in agriculture, construction, public utilities and transport. Meanwhile, the focus of public debate has gradually shifted to the interplay between demography, technology, education and employment.

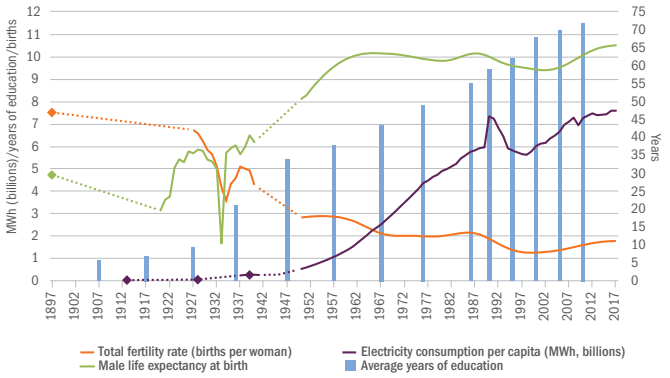
Demographic transformations can occur fast, with profound effects on the functioning of economies.[3] A century ago, life expectancy in the United States of America (USA) was around 40 years. Today, it is almost double that figure. In the Russian Empire on the eve of the 1917 revolution, life expectancy was around 31 years. By 1994, life expectancy in Russia was 66 years. And today, it is around 72. Russia's total fertility rate (the number of births per woman) is estimated to have fallen from around 7.5 a century ago to about 1.4 in the mid-1990s, before rising to around 1.8 today (see Chart 1.1).

Demographic shifts both reflect and catalyse changes in education and technology. As life expectancy in Russia has risen from 31 years to 72 years, people's ability to accumulate skills has changed dramatically, as have the prospects of achieving a financial return on those skills. Indeed, average years of education have risen rapidly as life expectancy has improved and the total fertility rate has declined. At the same time, technological change (such as the advent of electricity and computing; see Chart 1.1) has further increased demand for basic cognitive and computing skills, while also contributing to better standards of healthcare and further improvements in life expectancy.

The demographic changes that are being observed in emerging markets today are similarly fast-paced, as documented in the Macroeconomic Overview. Before the financial crisis of 2008-09, countries where labour force growth outpaced population growth accounted for 90 per cent of emerging market economies' contributions to GDP. By 2040, labour force growth is expected to exceed population growth in only 20 per cent of the world's emerging markets. This means that a given rate of productivity growth will translate into a lower rate of per capita income growth.

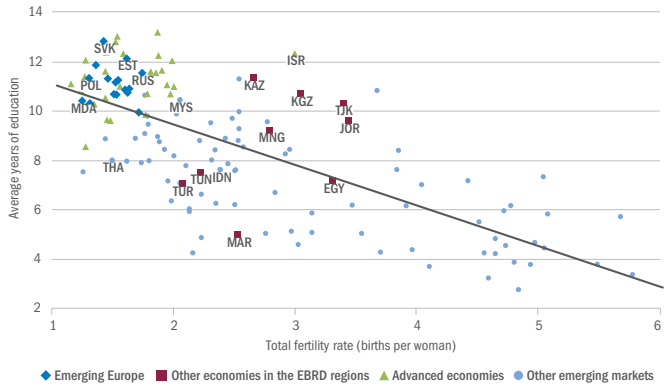
This chapter looks at how rapid demographic change influences countries' development paths, examining the impact of trends in demographics, technology, migration and the accumulation of skills. On the basis of that analysis, this chapter highlights policies that can help to deal with demographic challenges, looking at how countries in emerging Europe can improve labour force participation rates and enhance the productivity of older workers, and looking at how Turkey, Azerbaijan and the economies of Central Asia and the southern and eastern Mediterranean (SEMED) can create jobs for their young people.

**CHART 1.1.** Demographics, education and technology have evolved in tandem in Russia




**Source:** UN, Andreev et al. (1998), Kurkin (1938), Mironov (1991), Barro and Lee (2013), eeseaec.org and authors' calculations.

**CHART 1.2.** Average years of education increase as the total fertility rate declines




**Source:** Barro and Lee (2013), UN and authors' calculations.

[1] See Malthus (1798).
[2] See Lam (2011).
[3] See Lee (2003).

The chapter starts by looking at the demographic dividends that countries can secure as their birth rates fall and their life expectancy rises. These dividends manifest themselves in a higher ratio of workers to non-workers, higher levels of savings and greater investment in human capital. Over time, however, such dividends may be reversed and turn into demographic headwinds. The chapter then looks specifically at the economies in the EBRD regions that are in the early stages of that demographic transformation process – Turkey, Azerbaijan and the countries of Central Asia and the SEMED region – before turning its attention to the countries of emerging Europe, which are battling the headwinds of population ageing.

As we shall see, responses to population ageing may involve a combination of immigration, automation and longer working lives. This chapter looks at how countries can help people to stay productive for longer, exploring the ways in which pension and tax systems encourage people to remain in employment and assessing the factors that enable people to enjoy longer working lives (such as better health and lifelong learning). Chapter 2 then examines the subject of automation, and Chapters 3 and 4 look more closely at cross-border and internal migration.

**THE CEB REGION IS ONLY ABOUT**

**5 YEARS**

**BEHIND THE ADVANCED ECONOMIES OF THE EU IN TERMS OF POPULATION AGEING**

**THE WORKING-AGE POPULATION OF CENTRAL AND SOUTH-EASTERN EUROPE IS EXPECTED TO SHRINK BY**

**17%**

**BY 2040**

## Demographic dividends can turn into a demographic burden

### The first demographic dividend: a growing labour force and lower dependency ratios

As low-income countries develop, they have the opportunity to reap what is termed the "first demographic dividend".[4] As incomes rise, life expectancy improves and the birth rate tends to fall. In the early stages of economic development, this results in the working-age population growing much faster than the number of young and old people.

In addition, labour force participation among women tends to increase as the birth rate declines, although trends vary in accordance with prevailing social norms and skill requirements in the workforce.[5] Relatively strong labour force growth, in turn, raises the growth rate of per capita income (income convergence) for any given rate of output per worker, as discussed in the Macroeconomic Overview.

### The second demographic dividend: accumulation of savings and human capital

As improvements in the standard of living and healthcare gradually translate into rising life expectancy, individuals, firms and governments start to save more in anticipation of the need to finance future retirement. A higher savings rate enables an economy to sustain higher investment rates without exposure to risks associated with high and persistent current account deficits (the difference between domestic savings and investment). Higher levels of investment lead to increases in the stock of physical capital per worker, which in turn boost labour productivity and increase the speed at which per capita incomes converge with the income levels seen in advanced economies.[6]

In addition, increases in life expectancy raise lifelong returns to education, while lower fertility rates enable both parents and the state to commit more resources to each student. Thus, a decline in the number of children leads to an increase in quality.[7] As a result, the accumulation of human capital accelerates, providing a further boost to productivity growth. This is reflected in the strong relationship between higher average years of education and lower birth rates (see Chart 1.2). Increases in savings and spending on human capital in response to demographic change are referred to as the "second demographic dividend". The increased spending on human capital may be of particular importance as the empirical relationship between demographic variables and aggregate savings in the economy tends to be weaker.

### Demographic dividends reversed

As economies develop, demographic dividends can turn into a demographic burden. If life expectancy continues to rise, and the birth rate continues to fall, a country's population will age. Fewer workers will enter the labour force, while more workers will enter retirement. The ratio of the labour force to the total population will start to decline again, owing to a rising old-age dependency ratio (the number of people aged 65 or over as a percentage of the number of people aged between 15 and 64). Thus, the first demographic dividend will be reversed.

[4] The term "demographic dividend" was coined by Bloom et al. (2003) in a paper based on earlier work by Bloom and Williamson (1998) on the "demographic gift".
[5] See Mammen and Paxson (2000) and Goldin (2006).
[6] See, for instance, Young (1992) and EBRD (2017).
[7] See Becker and Lewis (1973).

A rise in accumulated pension obligations will necessitate increases in taxation and public debt. For instance, the labour tax wedge (the difference between gross salary and take-home pay) tends to rise as the old-age dependency ratio increases.[8] Pensioners may then start selling their assets (whether held privately or by pension funds on pensioners' behalf). If this happens on a significant scale, that dissaving can lead to a rise in long-term interest rates.[9]

In addition, as the age of the median worker rises, the total stock of human capital may start to depreciate, at least when it comes to basic cognitive skills or physical abilities that are harder to retain with age.[10] As a result, the second demographic dividend may also become a burden, typically after the first demographic dividend has been exhausted.

## Agenda for young economies

Most developing economies still have relatively young populations. In these economies, there is significant scope to benefit from the first and second demographic dividends in the coming years.[11] In the EBRD regions, Azerbaijan, Turkey and the economies of Central Asia and the SEMED region are all at this early stage of the demographic transformation process.

The large numbers of young people in the populations of such economies are sometimes referred to as the "youth bulge", owing to the shape of the resulting demographic "tree" (see Chart 1.3). The demographic trees of those economies contrast sharply with those of the rapidly ageing economies elsewhere in the EBRD regions (referred to hereinafter as "emerging Europe").

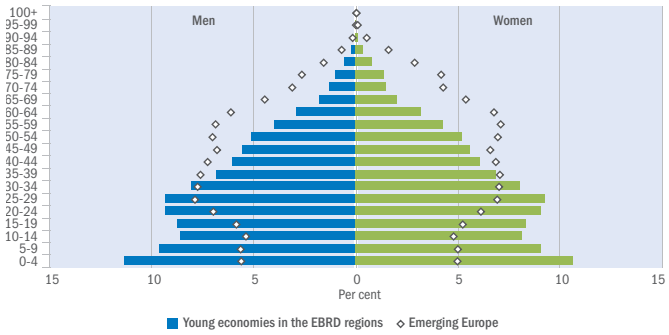
The demographic challenges faced by these economies are shared by many developing economies all over the world, from southern Asia to South Africa, that need to keep creating jobs for their many new entrants to the labour market. In Egypt, for instance, the number of jobs needs to grow by around 2 per cent every year (roughly 750,000 jobs), in order for the economy to be able to absorb all new labour market entrants.

### Boosting physical and human capital

As young economies are yet to reap the second demographic dividend, they tend to have lower levels of human capital (see Chart 1.2). Levels of physical capital per person of working age also tend to be lower in young economies (see Chart 1.4), although there is significant variation across countries (and it should be noted that country-wide levels of physical capital are measured much less precisely than labour force participation rates and years of education).

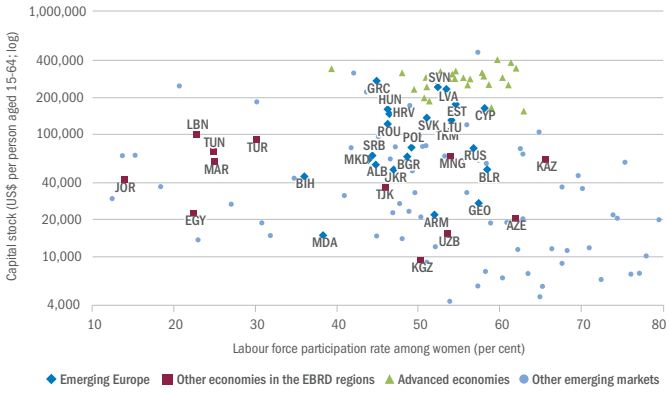
Labour force participation among women is particularly low in the SEMED region and Turkey (see Chart 1.4). Indeed, it averages 34 per cent across the SEMED region, Central Asia and Turkey, compared with 52 per cent in emerging Europe and 53 per cent in the G7 (which comprises Canada, France, Germany, Italy, Japan, the United Kingdom and the USA). Boosting investment, the quality of human capital and women's labour force participation can all help to strengthen per capita income growth in young economies.

**CHART 1.3.** The youth bulge: Azerbaijan, Turkey and the economies of Central Asia and the SEMED region have much younger populations than emerging Europe




**Source:** UN and authors' calculations.
**Note:** Based on data for 2017 or the latest year available.

**CHART 1.4.** Young economies tend to have lower levels of physical capital and lower labour force participation rates among women




**Source:** Penn World Tables, ILO, UN and authors' calculations.

**THE AVERAGE LABOUR FORCE PARTICIPATION RATE AMONG PEOPLE AGED 50-64 IS**

**60%**

**IN THE EBRD REGIONS, COMPARED WITH 74% IN THE G7**

[8] See World Bank (2014).
[9] See Goodhart and Pradhan (2017).
[10] See Desjardins and Warnke (2012).
[11] See World Bank (2015a).

## Leveraging global savings

In the past, the ability to raise levels of domestic investment in physical and human capital was largely dependent on the generation of domestic savings. Today, these young economies are better positioned to tap the increasingly global pool of savings (rather than relying solely on the increase in savings brought about by the second demographic dividend), with foreign savers playing an increasingly important role as investors in global equity, bond and property markets. The fact that savers around the world are searching for yield is reflected in the synchronisation of equity and debt performance across all markets. Indeed, the current rate of market synchronisation is the highest in 130 years, with levels of correlation ranging between 0.4 and 0.8, up from around 0.2 between the 1950s and the late 1990s.[12]

At the same time, a strong macroeconomic policy framework and a favourable and stable investment climate are required in order to leverage global savings and manage the current account imbalances that are associated with investment persistently exceeding domestic savings. Turkey is a good example of a young economy with persistent current account deficits.

Boosting investment and the quality of human capital also involves strengthening economic and political institutions and improving the business environment. Lowering barriers to the entry and exit of firms and improving the quality of management can help young economies to develop those export industries in which young and growing populations can provide a strong comparative advantage.

## Looking ahead

This chapter looks primarily at the new challenges being faced by the rapidly ageing countries in emerging Europe, but its findings apply more broadly. As indicated above, demographic changes can occur fast. Other countries in the EBRD regions (such as Turkey) may soon face the challenges posed by ageing populations and rising old-age dependency ratios. Indeed, Turkey's old-age dependency ratio is projected to rise from around 12 per cent today to 25 per cent in 2040.

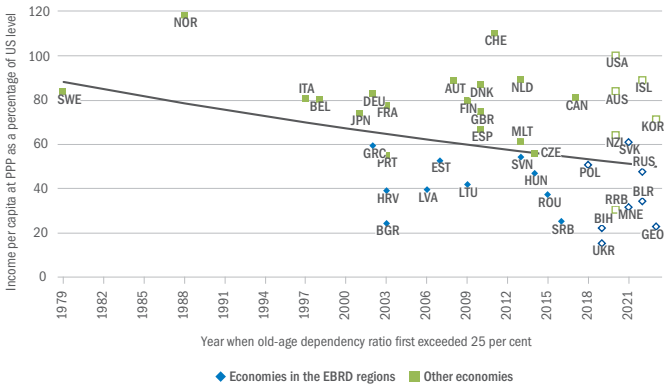
A striking example of the speed of demographic shifts can be found in China. In an attempt to control its rapid population growth, China introduced a one-child policy in 1979. In 2016, however, China's labour force started shrinking. The country's old-age dependency ratio remains below 15 per cent for the time being, but it is projected to rise fast, reaching 30 per cent by 2035 according to UN World Population Prospects estimates.

**BY 2040, EMERGING EUROPE WILL HAVE ONE RETIREMENT-AGE ADULT FOR EVERY**

**TWO**

**WORKING-AGE ADULTS**

**CHART 1.5.** Countries' old-age dependency ratios are reaching the 25 per cent mark with ever lower per capita income levels relative to the USA




**Source:** IMF, UN and authors' calculations.
**Note:** The old-age dependency ratio is the number of people aged 65 or over as a percentage of the number of people aged between 15 and 64.

# Emerging Europe: getting old before getting rich

## Countries encountering population ageing ever earlier

Until the early 2000s, rapid population ageing was, by and large, something that only affected a small group of advanced economies. Today, however, countries are tending to face such problems at earlier stages of economic development (see Chart 1.5). When in Sweden, Norway and Germany the old-age dependency ratio passed the 25 per cent mark between the late 1970s and the early 2000s, their per capita incomes were roughly equivalent to that of the USA. In central Europe and the Baltic states (CEB), the 25 per cent mark was passed in the mid-2000s with per capita incomes averaging around 45 per cent of the US equivalent. Romania and Serbia reached 25 per cent in 2015-16 with per capita incomes averaging around 30 per cent of the US level. And Ukraine is set to reach that threshold before 2020, with its per capita income projected to remain below 20 per cent of the US equivalent.

Thus, many middle-income economies are at risk of growing old before they can grow rich. The challenges that this poses extend well beyond "mechanical" demographic headwinds to per capita income growth. The necessary adaptation of the economy – in terms of facilitating longer working lives, leveraging technological progress, fine-tuning migration policies and redesigning social safety nets – may well be more challenging in countries with less developed economic and political institutions and less mature market structures. This may be a particular concern for economies in the EBRD regions where governance tends to be weaker than the levels that could be expected based on countries' per capita incomes.[13]

The demographic transformation process, which manifests itself in falling birth rates and ageing populations, is much more advanced in emerging Europe than it is in emerging Asia, Latin

[12] See Jordà et al. (2018).

[13] See IDB et al. (2018).

America, the Middle East or Africa. Many countries in emerging Europe reaped demographic dividends relatively early in the 20th century, similar to advanced economies. Following the start of the deregulation and liberalisation reforms in the early 1990s, the birth rates of post-communist countries fell further, from what were already relatively low levels, reflecting economic hardship and increased uncertainty. In some countries this effect was transitory, rather than permanent, with people delaying having children during the early years of the transition process.[14] While the availability of subsidised high-quality childcare can have a positive impact on both fertility rates and labour force participation among women,[15] it is unlikely to reverse the long-term decline in the number of births in higher-income economies, which reflects changes in the preferred number of children.[16]

In fact, the demographic profile in emerging Europe is similar to that seen in western Europe, with those countries' populations ageing at approximately the same rate as the populations of advanced European economies (see Chart 1.6) on account of modest birth rates and continued improvements in life expectancy.

### Ageing-wise, emerging Europe is only 5-10 years behind Europe's advanced economies

In terms of the level of old-age dependency, the CEB region is, on average, only about five years behind the advanced economies of the EU (and a quarter of a century ahead of China). Indeed, the region's old-age dependency ratio and the speed of its increase are actually higher than the US equivalents (albeit much lower than the figures for Japan). South-eastern Europe (SEE), in turn, is only around 10 years behind central Europe in terms of population ageing. In fact, Thailand is the only major emerging market where population ageing is as far advanced as it is in emerging Europe.

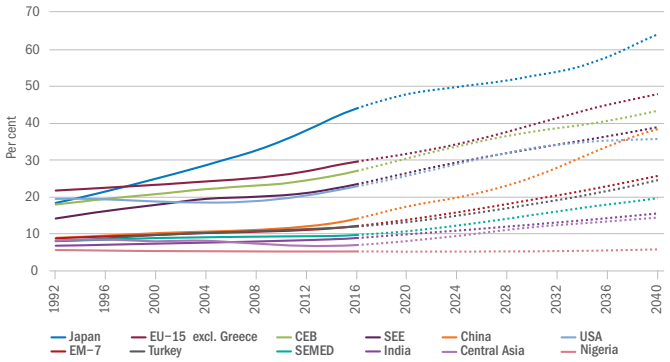
Moreover, on the basis of current trends, the working-age population of central and south-eastern Europe is expected to shrink by 17 per cent by 2040 (see Chart 1.7), with broadly similar developments forecast in eastern Europe. At the same time, however, those depopulation trends are expected to differ significantly from country to country, with implications for productivity and welfare, as discussed in Chapter 4.

## Response to ageing: migration, automation and longer working lives

### In many countries, migration has mitigated the impact of ageing

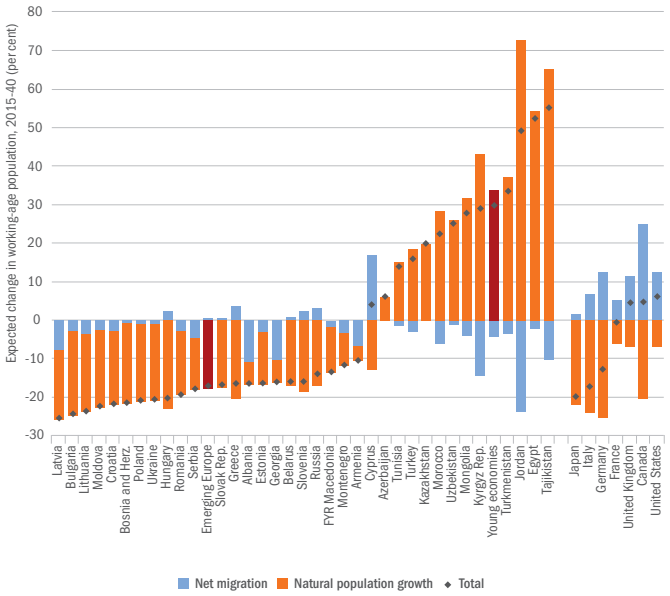
Historically, the link between demographic headwinds and growth in per capita incomes has been relatively weak – so much so that a recent World Bank report referred to Europe's past and potential future experience as "golden ageing" – although there are increasing concerns about the sustainability of generous pension systems in rapidly ageing economies.[17] In advanced economies, the economic impact of ageing has so far been partially mitigated by immigration, automation and longer working lives.

**CHART 1.6.** Old-age dependency ratios




**Source:** UN and authors' calculations.
**Note:** The old-age dependency ratio is the number of people aged 65 or over as a percentage of the number of people aged between 15 and 64. "EM-7" comprises Argentina, Brazil, Indonesia, Mexico, Saudi Arabia, South Africa and South Korea.

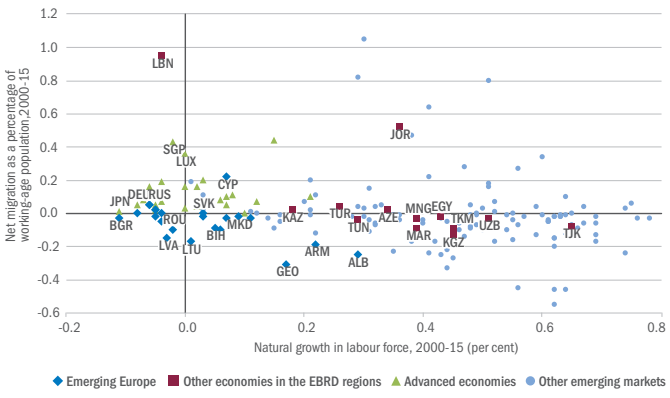
**CHART 1.7.** The working-age population of emerging Europe is expected to shrink by 17 per cent by 2040




**Source:** UN and authors' calculations.

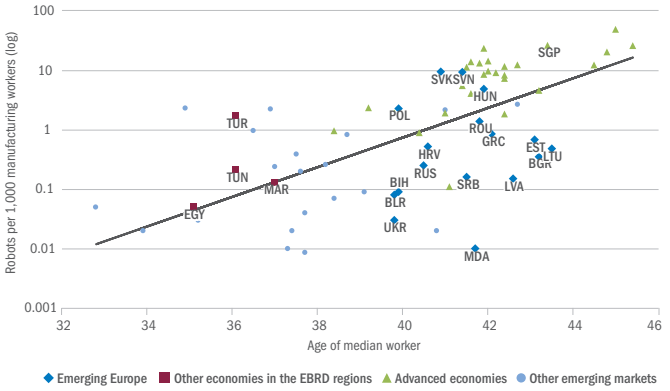
[14] See Billingsley and Duntava (2017).
[15] See Ostner and Schmitt (2008).
[16] See also Adserà (2004) for a discussion of determinants of fertility rates.
[17] World Bank (2015b) provides detailed analysis of the economic implications of ageing in Europe and Central Asia.

**CHART 1.8.** Changes in working-age population: natural growth versus net migration




**Source:** UN, World Bank and authors' calculations.
**Note:** Natural growth in the labour force reflects both demographic trends and changes in labour force participation rates.

**CHART 1.9.** Robots are used more widely in economies with older workforces




**Source:** International Federation of Robotics (IFR), ILO and authors' calculations.
**Note:** Based on data for 2017 or the latest year available.

**THE POPULATION-WEIGHTED AVERAGE STATUTORY RETIREMENT AGE IS LESS THAN 60 IN THE EBRD REGIONS, COMPARED WITH MORE THAN 65 IN THE G7**

Many advanced economies have experienced significant inflows of working-age migrants that have compensated for weak or negative growth in the native working-age population (see the upper-left quadrant of Chart 1.8). As a result, many high-income countries are continuing to enjoy the first demographic dividend (that is to say, their labour force is still growing faster than the total population). Indeed, the population of the USA remains younger than those of many economies in emerging Europe (see Chart 1.6).

Uniquely, emerging Europe has experienced the opposite, with migration generally exacerbating – rather than mitigating – demographic pressures (see the lower-left quadrant of Chart 1.8). Over the past two decades countries in emerging Europe have seen substantial net outward migration for both highly skilled and low-skilled labour, mostly to advanced EU economies.[18] At the same time, Turkey and Jordan, countries with higher natural growth rates, have experienced a significant influx of refugees.

Emigration does bring economic opportunities, however, if the skills and experiences of returning migrants and diasporas abroad can be harnessed and used to improve domestic productivity, boost innovation and broaden export markets. A section of Chapter 2 looks more closely at the economic impact of emigration in emerging Europe, and Chapters 3 and 4 examine migration patterns in the region in greater detail.

## Automation and technological change are stronger where labour is scarce

Advances in automation have enabled labour to be partially replaced with capital where workers are scarce. In Japan, for example, migration policies are restrictive and immigration is low, but there is a high degree of automation. More broadly, recent studies suggest that areas where labour has become more scarce have seen greater use of automation.[19]

With emerging Europe's labour force shrinking and its labour costs rising, incentives to automate jobs may be stronger than in other emerging markets. For instance, the penetration rates of robots in Hungary, Poland, Slovenia and the Slovak Republic are similar to those observed in advanced economies and well above the rates seen in Brazil, China, India and South Africa (see Chart 1.9).

On average, however, countries in the EBRD regions have been automating work processes more slowly than advanced economies with similar demographic profiles. This suggests that there is significant potential for rapid automation in the future, leveraging the regions' relatively high levels of human capital (as confirmed by the analysis in later sections of this chapter). At present, robots are primarily deployed in the automotive, electronics, appliances, chemicals, and machinery and equipment sectors, but they may be used more widely in other sectors in the future.

[18] See Atoyan et al. (2016) for a discussion of this issue and estimates of its economic impact.
[19] See Acemoğlu and Restrepo (2017a; 2018).

Leveraging technological advances may help to reduce upward pressure on wages and raise labour productivity, thereby strengthening economies' competitiveness in spite of demographic headwinds.[20] This may, however, entail greater polarisation of jobs – that is to say, rising numbers of low-skilled and high-skilled jobs, and declining numbers of medium-skilled jobs (see Chapter 2 for a discussion of this issue). Consequently, economic policy needs to respond to the combined impact that demographic shifts and technological change have on income distribution and the nature of jobs.

## Demographics, technological change and migration

Throughout history, education, demographic transformation and technological progress have been closely linked.[21] For example, the plague epidemics in Europe in the 14th century suddenly rendered labour much scarcer than land, which pushed up occupational wages. Over time, higher wages encouraged innovation and automation (such as the invention of the printing press in the 15th century). Higher wages also encouraged women to take up employment and led to a significant drop in fertility rates, thereby further reinforcing the relative scarcity of labour.[22]

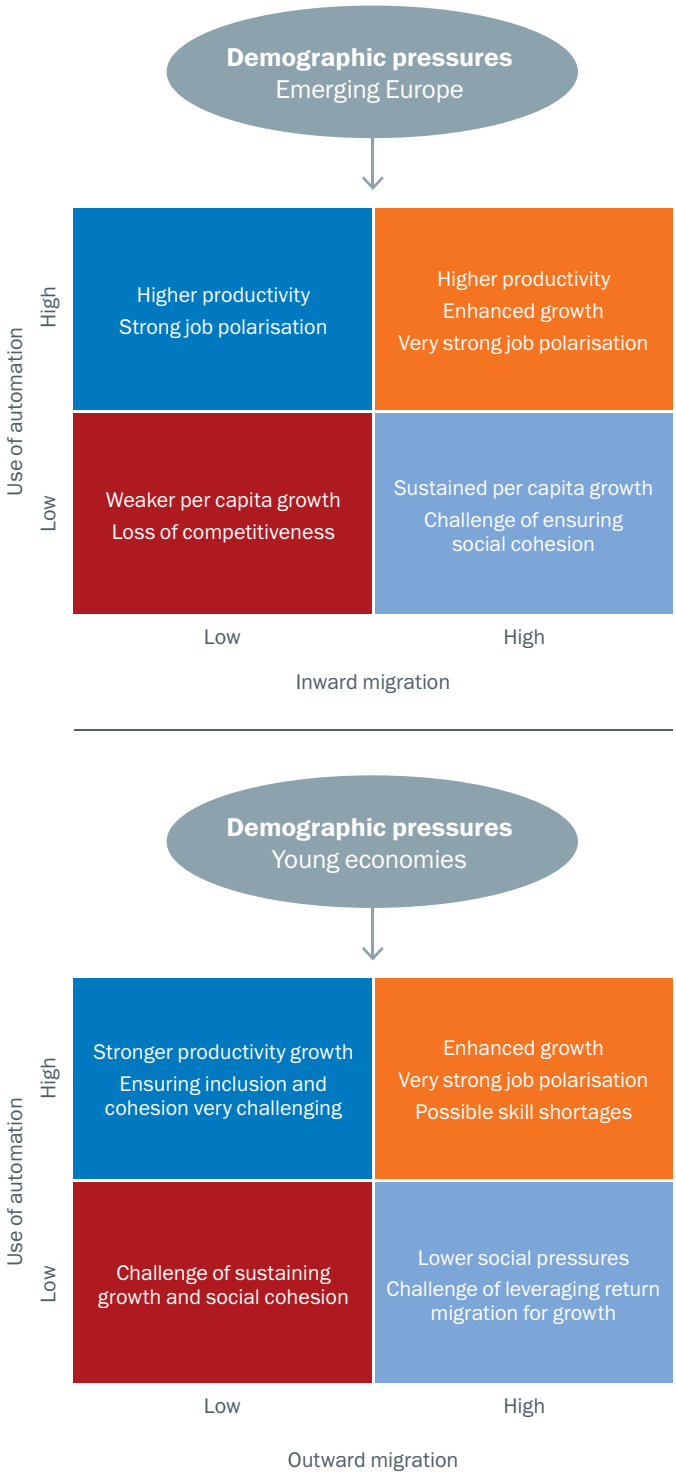
Thus, the economic impact of demographic pressures cannot be analysed in isolation. What matters for economic outcomes is the interplay between demographics and trends in technology and migration, as well as the way in which education and social safety nets respond to those trends. This is true both in rapidly ageing societies and in young economies (see the upper and lower panels of Chart 1.10 respectively). For instance, while an increase in immigration may support growth in an ageing economy, it will pose challenges in terms of inclusion and social cohesion. Increased use of automation can ease labour shortages that arise due to ageing and emigration but may further exacerbate inequality.

In young economies, meanwhile, it may be difficult to create jobs and boost labour productivity in the absence of increases in capital-to-worker ratios (automation) and significant outward migration. There, joblessness among young entrants to the labour market also has the potential to threaten social cohesion. These interactions are explored in greater detail in other parts of this report, with Chapter 2 looking at labour markets, Chapter 3 focusing on migration across borders and Chapter 4 looking at migration within countries. The remainder of this chapter focuses on the lengthening of working lives in ageing economies.

**19%**

**OF PIAAC SURVEY RESPONDENTS IN ECONOMIES WHERE THE EBRD INVESTS WERE RECENTLY GIVEN TRAINING BY THEIR EMPLOYER, COMPARED WITH 30% IN ADVANCED ECONOMIES**

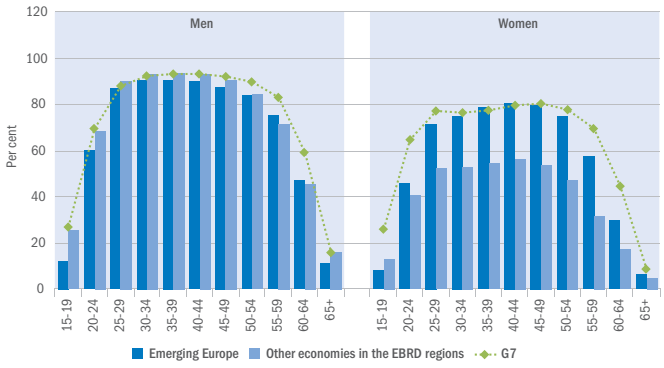
**CHART 1.10.** Interplay between demographic pressures, migration and automation




**Source:** EBRD

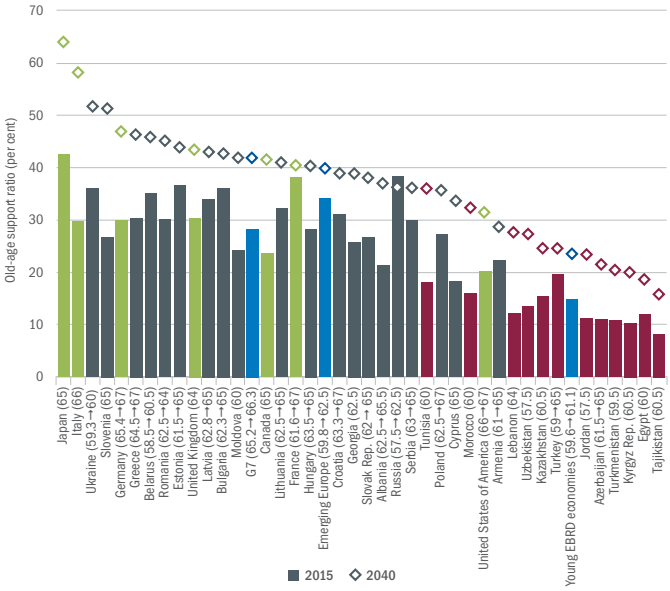
[20] See Acemoğlu and Restrepo (2017b) for empirical evidence.
[21] See Goldin and Katz (2009).
[22] See Voigtländer and Voth (2013).

**CHART 1.11.** Labour force participation rates decline faster with age in the EBRD regions than they do in G7 economies




**Source:** ILO and authors' calculations.
**Note:** Based on data for 2017 or the latest year available.

**CHART 1.12.** Old-age support ratios are projected to rise significantly between 2015 and 2040




**Source:** US Social Security Administration, UN and authors' calculations.
**Note:** The figures in brackets are simple averages of statutory pension ages for men and women, with arrows indicating changes over the period in question. The old-age support ratio is defined as the retirement-age population as a percentage of the working-age population on the basis of the country's statutory retirement age(s). Different colours denote emerging Europe, young economies in the EBRD regions, and the G7.

## Rising labour force participation among older people

As advanced economies have aged, labour force participation rates have risen among older people, although participation levels remain far lower than those observed among younger people.[23] Today, labour force participation rates for men in the G7 economies decline from around 90 per cent for men between the ages of 25 and 50 to around 60 per cent for men aged between 60 and 64, and less than 20 per cent for men aged 65 or over (see Chart 1.11).

In the G7 economies, the average labour force participation rate among people aged between 50 and 64 stood at 74 per cent in 2017, up from 68 per cent in 1997. The corresponding rate in the EBRD regions was lower at 60 per cent, although it too had increased since 1997, rising by 4 percentage points.

The EBRD regions and the G7 economies have similar labour force participation rates for prime-age men. However, participation rates for men start declining earlier in the EBRD regions, at around the age of 50, reflecting weaker health of workers and relatively early retirement ages in some countries. Meanwhile, in young economies where the EBRD invests, labour force participation rates among women are significantly lower (across all age groups) than those observed in the G7.

Labour force participation rates are also significantly lower among people below the age of 25 – both men and women – than they are in the G7 economies. In fact, concerns are sometimes raised that higher rates of employment among older people may entail lower employment rates among younger cohorts. The evidence, while inconclusive, tends to suggest the opposite – namely, that higher employment rates among older and younger workers tend to go hand in hand.[24]

The path that ageing economies need to take is clear: in the absence of a major demographic turnaround, older workers will need to work for longer. Policy responses in two areas can help to boost labour force participation among older people. First, pension and tax systems can be adjusted to encourage longer working lives. And second, improvements in healthcare and lifelong learning opportunities can help workers to remain productive and have longer careers. As discussed below, some encouraging developments can be observed in these areas.

## Adjusting pension systems in response to ageing populations

Pension systems in the EBRD regions tend to have generous parameters. For instance, the population-weighted average statutory retirement age is less than 60 in the EBRD regions, compared with more than 65 in the G7. What is more, in many cases the retirement age for women is as many as five years lower than that of men. In addition, many pension systems also include numerous options in terms of early retirement and disability pensions.[25]

Retirement ages in the EBRD regions are set to increase by an average of two years over the next two decades, on the basis of legislation that is already in force. However, old-age support ratios (defined as the retirement-age population as a percentage of the working-age population) will continue to rise. By 2040, the average old-age support ratio in emerging Europe is projected to be well above the G7 equivalent, with one retirement-age adult for every two working-age adults (see Chart 1.12).

In these circumstances, pension systems cannot deliver both broad coverage of the population and generous entitlements (high pension-to-wage ratios) while remaining fiscally sustainable. Different countries approach this trilemma in different ways.

[23] See, for instance, Maestas and Zissimopoulos (2010) for a discussion of the links between ageing populations and longer working lives.
[24] See Wise (2010).
[25] The discussion here is based largely on World Bank (2014).

In the EBRD regions, the fiscal burden of public pensions tends to be manageable, with social security systems focusing on providing basic benefits aimed at ensuring that pensioners remain above the poverty line.[26]

As a result, average retirement incomes in the EBRD regions tend to be less generous than those observed in advanced economies (relative to wages). A number of public pension systems include funded (defined contribution) pillars, but the coverage of those second-pillar components remains modest, with relatively low contribution rates. Private pension savings have also remained low as a percentage of countries' GDP, while real (inflation-adjusted) returns on pension assets held by public and private pension funds have been negative in many countries.[27]

Consequently, younger cohorts of workers need to be fully aware of the need to work longer and/or accumulate substantial savings in order to maintain higher levels of income in later life. At present, reforms that seek to improve the sustainability of public pension systems by reducing the generosity of pension entitlements are often strongly opposed by voters.

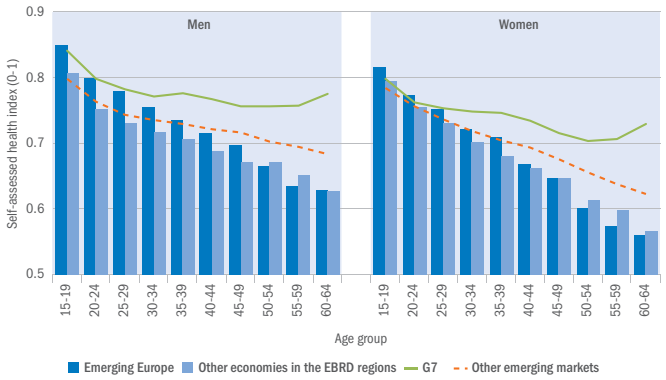
Reforms that raise the retirement age, if successfully implemented, are likely to provide stronger incentives to work longer. Evidence suggests that workers are much more likely to remain in the labour force if the benefits they are eligible to receive on exiting it are lower.[28] In Iceland, for instance, workers who choose to work on beyond the statutory retirement age of 67 (which will rise to 70 in the future) are eligible to receive a larger pension, with their pension entitlement rising by 0.5 percentage point per month for a maximum of five years. Large numbers of eligible workers have taken advantage of this opportunity.

## Using taxation to encourage labour force participation

It is often the case that tax and benefit systems strongly discourage older people from taking up employment, particularly when it comes to low-paid jobs, where the difference between take-home pay and any benefits available in the absence of employment may be small. Employer subsidies or individual tax credits for staff over the age of, say, 55 who are employed on certain types of contract could strengthen older workers' incentives to remain in the labour force. Such programmes are costly, but they may represent a fiscally viable alternative to unemployment benefits or early retirement payments.

Another challenge is to limit the impact that rising old-age support ratios have on labour taxes and incentives to substitute capital for labour. Traditionally, both funded pension schemes and unfunded pay-as-you-go schemes have been financed using social security contributions (a form of labour tax). As the labour force dwindles and numbers of retirees rise, ever higher levels of social security contributions may be required in order to fund pension obligations, making labour more expensive from an entrepreneur's perspective and strengthening incentives for automation, offshoring of jobs and tax avoidance.

**CHART 1.13.** Self-assessed health declines rapidly with age in the EBRD regions




**Source:** Gallup World Poll and authors' calculations.
**Note:** "Emerging markets" are defined here as economies with GDP per capita in excess of US$ 1,100 at market exchange rates that are not regarded as advanced economies on the basis of the IMF's definition.

Funding pensions out of consumption and wealth taxes may represent a more robust option, with a broader tax base and a smaller impact on the economy's competitiveness and incentives to substitute capital for labour. However, taxes on consumption tend to be more regressive than income taxes. Equity considerations relating to such reforms need to be addressed using appropriate expenditure policy measures.

## Good health and labour force participation

Incentives to seek employment are important, but people's ability to remain productive as they get older may be even more important. This is crucially dependent on two key factors: people's health[29] and their ability to retain and upgrade skills.[30] This section examines these factors in turn.

The role that good health plays in explaining the likelihood of a person being employed or seeking employment can be investigated using data from the Gallup World Poll – an annual household survey covering more than 160 territories around the world (including all economies in the EBRD regions). Each round of the survey involves at least 1,000 respondents in each country, with participants being asked several questions about their physical and mental health. Participants' responses can be aggregated to establish a rescaled composite index ranging from 0 (very poor health) to 1 (good health).

The self-assessed health of male respondents in emerging Europe declines sharply after the age of 50 (see Chart 1.13). This mirrors the decline in labour force participation rates among the same cohorts (see Chart 1.11). In contrast, self-assessed health

[26] See World Bank (2014). The fiscal implications of pension reform are beyond the scope of the analysis in this chapter of the *Transition Report 2018-19*.
[27] See World Bank (2014) for evidence.
[28] See Gruber and Wise (2002).
[29] See, for instance, Kulik et al. (2014).
[30] See Kotschy and Sunde (2018).

tends to decline later in life in other emerging markets and the G7. However, causality may run in both directions, with a number of studies finding that early retirement may lead to a less active lifestyle and a further deterioration in health.[31]

More broadly, deteriorating health is strongly linked to people's decisions not to seek employment.[32] Looking at Gallup World Poll data for all countries with GDP per capita in excess of US$ 1,100 at market exchange rates, around 22 per cent of respondents between the ages of 30 and 65 stay out of the labour force. The regression analysis reported in Table 1.1 looks at determinants of the likelihood of labour force participation across various countries, taking account of several different factors (such as gender, age, being in full-time education or training, and living in a particular country in a given year). Self-reported health is a major determinant of the decision not to seek employment, even when all of those other factors are taken into account. Health has a stronger impact on labour force participation among people between the ages of 50 and 65.

In emerging Europe, the impact of poor health is particularly strong among people over the age of 50 (see columns 1 and 3 of Table 1.1). If self-reported health improves from the 25th to the 75th percentile of the distribution of answers (corresponding to an increase of 0.4 on the 0-1 scale), that is associated with an increase of approximately 7 percentage points in the likelihood of seeking employment for respondents in emerging Europe between the ages of 50 and 65.[33]

A similar relationship can be observed in data collected by the Organisation for Economic Co-operation and Development (OECD) as part of its Programme for the International Assessment of Adult Competencies (PIAAC). Those PIAAC data, which are discussed in greater detail below and focus on skills and education, identify individuals who are in employment, education or training. Survey

**TABLE 1.1.** Good health is associated with an increased likelihood of labour force participation

| **Dependent variable** | **In the labour force/ in employment, education or training** | | | |
|---|---|---|---|---|
| **Interaction by region:** | | | | |
| **Regional grouping** | **All EBRD** | **Young economies** | **Emerging Europe** | |
| **Sample** | **Gallup** | **Gallup** | **Gallup** | **PIAAC** |
| | **(1)** | **(2)** | **(3)** | **(4)** |
| Health index (0-1) | 0.027*** | 0.038*** | 0.017*** | 0.210*** |
| | (0.003) | (0.003) | (0.003) | (-0.011) |
| Female | -0.230*** | -0.203*** | -0.263*** | -0.136*** |
| | (0.004) | (0.004) | (0.004) | (-0.012) |
| Age 50-65 | -0.060*** | -0.088*** | -0.073*** | -0.132*** |
| | (0.005) | (0.005) | (0.005) | (0.0139) |
| Health index * Female | -0.009* | -0.018*** | 0.003 | 0.053*** |
| | (0.005) | (0.005) | (0.005) | (-0.016) |
| Health index * Age 50-65 | 0.038*** | 0.064*** | 0.046*** | 0.217*** |
| | (0.007) | (0.005) | (0.006) | (0.0182) |
| Female * Age 50-65 | 0.009 | 0.010 | 0.019*** | 0.020 |
| | (0.007) | (0.006) | (0.006) | (-0.019) |
| Health index * Age 50-65 * Female | 0.022** | 0.016* | 0.021** | 0.026 |
| | (0.009) | (0.008) | (0.008) | (-0.026) |
| Health index * Region | 0.005 | -0.038*** | 0.070*** | 0.108*** |
| | (0.007) | (0.008) | (0.009) | (-0.029) |
| Female * Region | -0.0175* | -0.210*** | 0.178*** | 0.161*** |
| | (0.008) | (0.01) | (0.01) | (-0.03) |
| Health index * Female * Region | 0.009 | 0.03** | -0.056*** | -0.235*** |
| | (0.01) | (0.013) | (0.012) | (-0.04) |
| Age 50-65 * Region | -0.104*** | -0.048*** | -0.048*** | -0.166*** |
| | (0.009) | (0.013) | (0.012) | (-0.031) |
| Health index * Age 50-65 * Region | 0.075*** | 0.023 | 0.036** | 0.198*** |
| | (0.012) | (0.017) | (0.014) | (-0.046) |
| Female * Age 50-65 * Region | 0.042*** | 0.054** | -0.057*** | -0.033 |
| | (0.012) | (0.016) | (0.014) | (-0.042) |
| Health index * Female * Age 50 -65 * Region | -0.025 | -0.008 | 0.020 | -0.044 |
| | (0.016) | (0.023) | (0.019) | (-0.063) |
| Number of observations | 215,413 | 85,388 | 130,025 | 104,312 |
| $R^2$ | 0.163 | 0.166 | 0.165 | 0.199 |

**Source:** Gallup World Poll, PIAAC and authors' calculations.
**Note:** Estimated using a linear probability model controlling for country effects, year effects, respondent's year of birth, level of education, town size and other relevant characteristics. Probit estimations (not reported) yield similar results. The Gallup sample comprises individuals between the ages of 30 and 65 in economies with GDP per capita in excess of US$ 1,100 at market exchange rates. Robust standard errors are reported in parentheses, and *, ** and *** denote values that are statistically significant at the 10, 5 and 1 per cent levels respectively.

[31] See, for instance, Behncke (2012) and Mazzonna and Peracchi (2012).
[32] See Autor and Duggan (2003) for evidence from the USA.
[33] This figure, which is based on the results reported in Table 1.1, has been calculated by adding together the regression coefficients for (i) self-reported health, (ii) the interaction term between self-reported health and the dummy variable for the EBRD regions, (iii) the interaction term between self-reported health and the dummy variable for individuals aged 50 to 65, and (iv) the triple interaction term involving both dummy variables.

respondents are also asked to assess their health using a five-point scale. In the interests of comparability with Gallup data, those responses have been rescaled such that they range from 0 to 1. As with the Gallup data, good health is strongly associated with an increased likelihood of being in employment, education or training (see column 4 of Table 1.1).

The strong relationship between good health and an increased likelihood of labour force participation among people aged 50 or over calls for improvements in healthcare in the EBRD regions. It also highlights the need to make workplaces more suitable for ageing workers. Pilot projects at a BMW plant in Dingolfing (Germany) and a Renault plant in Novo Mesto (Slovenia) confirm that relatively inexpensive changes to equipment, uniforms and factory floors at manufacturing facilities (such as the introduction of softer floors, orthopaedic footwear, ergonomic chairs, vertically adjustable tables and magnifying lenses for work involving small parts)[34] can significantly improve workers' health and reduce sick leave among older employees. The potential to reduce rates of absenteeism and improve productivity among older workers mean that such investment is worthwhile for the companies in question.

## Retaining and updating skills in the face of ageing

### Lifelong learning can help to support longer working lives

Looking beyond the issue of health, low labour force participation rates among older age groups may also, to a large extent, reflect the difficulty of acquiring, retaining and updating skills. Older workers tend to find it harder to keep up with technological changes and generally have greater difficulty finding new employment.[35] In the past, workers could often rely on existing skills for the duration of their careers, but that is not necessarily the case these days, with working lives becoming longer and technology changing rapidly.

Studies suggest that learning new skills requires more effort the older you become, reflecting the declining adaptability of the brain. Consequently, it may be that acquiring new technical skills (such as the ability to speak a foreign language or develop software) ceases to be worthwhile once workers reach their early thirties[36] – well below the age of the median worker. What is more, by 2030 the median worker is projected to be in their early forties in the EBRD regions (and as old as 46 in Bulgaria).

The cost-benefit profile of acquiring new skills after the age of 40 can be improved if the cost of mid-career learning can be lowered. For example, changes could be made to basic educational qualifications (including university degrees) in order to help individuals to learn how to keep learning, rather than trying to provide students with specific skills that will remain relevant for decades. Indeed, research suggests that around half of all acquired skills now lose their relevance within five years in the absence of retraining.[37] Workplace practices and professional training may also have an important role to play when it comes to retaining and updating skills.

### PIAAC surveys: an indicator of adult skills

We can gain deeper insight into the skills of workers at different stages in their lives by looking at the results of the OECD's PIAAC surveys measuring the skills of adults aged 16 to 65. Those surveys were conducted between 2011 and 2014 in 31 countries, including nine economies in the EBRD regions: six post-communist countries (Estonia, Lithuania, Poland, Russia, the Slovak Republic and Slovenia), plus Cyprus, Greece and Turkey. The Czech Republic – another post-communist country – also participated in the surveys, which included questions about people's backgrounds, education, employment and well-being, as well as assessments of literacy, numeracy and problem-solving skills. Most participating countries outside the EBRD regions were high-income economies.

The average skill levels observed across all age groups in the PIAAC data are strongly correlated with the country-level measures of human capital (based on average years of education) that were used in growth accounting in earlier Transition Reports. At an individual level, a better performance in PIAAC tests is associated with better socio-economic outcomes: an increased likelihood of being employed, higher wages and greater job satisfaction. The analysis below looks at these links in more detail.

### Assessed skills decline after the age of 30: ageing and cohort effects

As Chart 1.14 indicates, countries in the EBRD regions tend, on average, to perform relatively well in PIAAC tests, particularly in relation to their levels of per capita income. In this analysis, literacy scores taken from PIAAC data have been complemented with comparable literacy scores derived from the World Bank's STEP skills measurement programme, which was carried out between 2012 and 2017 and covered a number of developing and emerging market economies.[38]

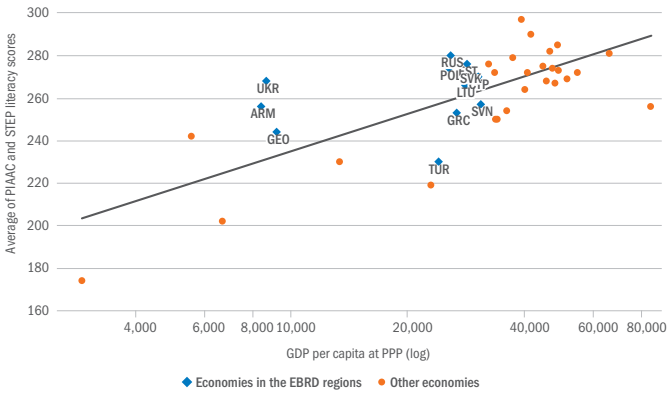
However, as in advanced economies, average performance in the EBRD regions tends to be weaker among older survey participants (see Chart 1.15). Across economies, scores initially improve as survey participants gain extra years of education and training, before declining from around the age of 30 onwards. This decline in performance among older workers is broadbased, with the dispersion of scores remaining broadly stable across the various age groups.

The downward trend seen after the age of 30 reflects a combination of two factors: first, the impact that the ageing process has on basic skills; and second, cohort effects (that is to say, the fact that older respondents were educated at an earlier point in time, when education enrolment rates may have been lower and different curricula were in place). In other words, older workers may need to update and broaden their skills – rather than simply retaining them – in line with changes in technology and working practices.

Studies suggest that such cohort effects may have a large impact.[39] Indeed, with younger people tending to be more familiar with computers and information technology (IT), it is noticeable that, across countries, average problem-solving scores (which involve a computer-administered test) decline faster with age

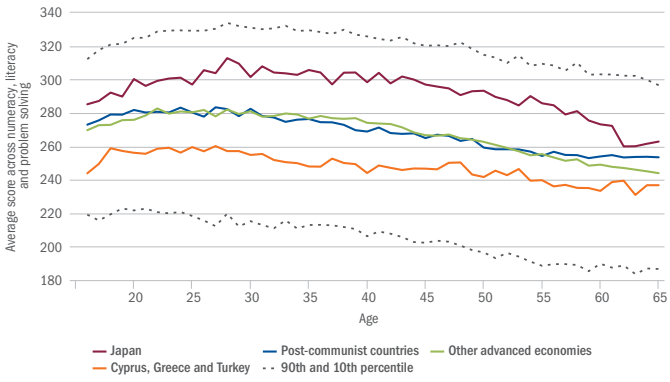
[34] See Loch et al. (2010).
[35] See Ahituv and Zeira (2011).
[36] See World Bank (2018).
[37] See Deloitte (2017).
[38] See Pierre et al. (2014) for a description of that programme.
[39] See Skirbekk et al. (2013).

**CHART 1.14.** Emerging Europe performs well in PIAAC and STEP tests relative to those countries' per capita income levels




**Source:** IMF, PIAAC, STEP and authors' calculations.
**Note:** PIAAC surveys were conducted between 2011 and 2014; STEP surveys were conducted between 2012 and 2017.

**CHART 1.15.** Average PIAAC scores decline with age, but trends differ across regions




**Source:** PIAAC and authors' calculations.

**IN THE EBRD REGIONS, BEING OVERQUALIFIED LOWERS JOB SATISFACTION BY AN AVERAGE OF AROUND 25% OF A STANDARD DEVIATION**

than literacy and numeracy scores (which are based on a pencil-and-paper assessment).

As the PIAAC surveys have only been conducted once, it is not possible to distinguish between the impact of ageing and cohort effects. Nonetheless, this analysis remains informative. Measures that enhance mid-career learning can help people not only to retain skills in the face of ageing, but also to update them (thereby reducing the differences between the various cohorts).

## Age-skill profiles differ across countries

Japan, the world's fastest-ageing economy (see Chart 1.6), also boasts the highest skill levels among older age groups, as reflected in average PIAAC scores (see Chart 1.15). However, even in Japan people aged 53 and over average weaker scores than 16-year-olds. This raises the question of how rapidly ageing economies in the EBRD regions and other parts of the world can increase the skill levels of older workers.

## Determinants of the skill levels of older employees

In order to shed light on this question, one can look at the determinants of skill levels across different age groups. The dependent variable in this analysis is the average test score across numeracy, literacy and problem solving. All specifications seeking to explain variation in test scores include interaction terms combining relevant factors (such as participation in training programmes) and the dummy variables for each 10-year age group. This results in separate estimates of the impact that, say, actively using skills at work has on people aged 16 to 24, people aged 25 to 34, and so on.

As one would expect, having a tertiary (university) degree is associated with higher average skills across all age groups when compared with respondents who have only completed secondary education (see Chart 1.16), which represent the baseline group in this analysis. Indeed, for 57 per cent of respondents in the EBRD regions, the completion of secondary education represents their highest academic qualification (with a similar percentage being observed in comparator countries), while one in five survey participants in the EBRD regions hold a tertiary degree. Having a research degree such as a PhD (held by 0.5 per cent of respondents in the EBRD regions) is associated with an additional increase in test scores.

A large positive effect in terms of the retention of skills appears to come from the frequent use of skills at work. Survey participants were asked how frequently they had to use problem-solving, numeracy and literacy skills in the workplace, with answers ranging from "never" to "every day". Those answers have been aggregated to form an index measuring the use of skills at work, which ranges from 0 (skills never used) to 19 (frequent use of all skills referred to in the survey). If the use of skills increases from the 25th to the 90th percentile of the distribution of this index, that is associated with an increase in test scores of up to half a standard deviation. The impact of this is particularly large for people aged 35 and over (see Chart 1.16).

Employee and employer training is also associated with higher levels of skill throughout a person's working life. A training index

constructed for the purposes of this analysis takes account of recent training organised by employers. Only 19 per cent of respondents in the EBRD regions reported having undertaken such training, compared with 30 per cent in other economies covered by the PIAAC tests. The index also covers private tuition (such as language classes) that has been undertaken by the respondent in the last 12 months – and again, the participation rate in the EBRD regions (14 per cent) is lower than that observed in comparator countries (18 per cent). The last component of the training index is the extent of the respondent's willingness to learn, as reported by respondents themselves using a four-point scale. The overall index ranges from 0 to 10, and an increase in a person's training score from the 25th to the 90th percentile of the distribution is associated with an increase in skill assessment scores of up to 17 per cent of a standard deviation.

Overall, these results reinforce the view that providing mid-career training can help employees to retain and upgrade their skills. Technological advances are opening up new avenues in terms of the provision of such training (as in the case of distance-learning programmes, for example). Government-backed loan initiatives with income-contingent repayment over the longer term can help to make degree courses and mid-career training programmes more affordable and attractive. And packages given to employees in the event of redundancy can include ring-fenced retraining allowances (as in the case of the restructuring of Slovak Telekom, for instance). Moreover, transparent evaluation and rating systems can help to improve the quality and relevance of training.

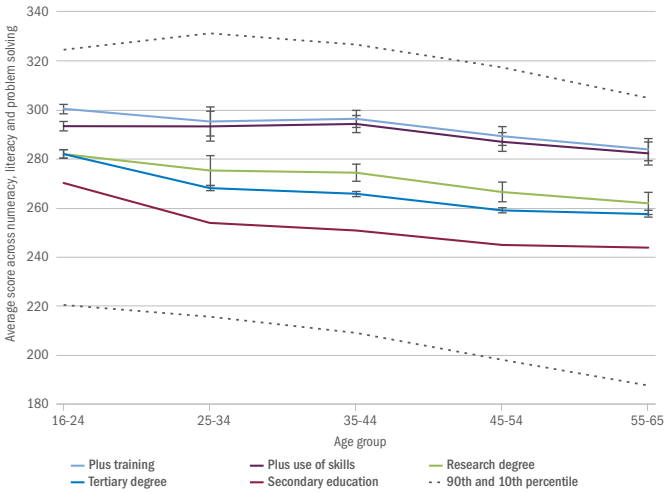
In addition, greater use of teams with a variety of different ages can facilitate on-the-job learning, as the skills and experiences of younger and older employees tend to be complementary.[40] Moreover, increased rotation across tasks can enable employees to use and upgrade their skills at work, while in some cases also reducing the physical and mental strain associated with repetitive actions.[41]

## Skills mismatches can lead to overqualification and low job satisfaction

When it comes to the impact that degrees have on skills, the quality of degrees – although not observed in the data – matters. Importantly, the above estimates of the relationship between degrees and skills represent an upper-bound estimate of the impact of those qualifications, as that analysis cannot meaningfully account for the fact that it tends to be students with stronger initial skills who are accepted into tertiary education (with the same being true of the use of skills at work and participation in training).

If degrees do not help to develop skills demanded by the market, a policy aimed at increasing the percentage of the population who have tertiary qualifications may lead to individuals becoming overqualified for the jobs they are doing. This, in turn, may have a strong negative impact on job satisfaction – and, ultimately, people's well-being.

**CHART 1.16.** Estimated skills by age group depending on education, on-the-job training and use of skills at work




**Source:** PIAAC and authors' calculations.
**Note:** These estimates are based on the regression of average skills on interaction terms between various factors and the five age groups. Specifications include country and industry effects, age (with a separate coefficient estimated for people over the age of 30), gender, immigration status, native language, type and size of employer, parents' education and other relevant characteristics. Ninety-five per cent confidence intervals are shown for the corresponding estimates of marginal effects.

**TABLE 1.2.** Overqualification is associated with lower job satisfaction

| Dependent variable | Job satisfaction | | |
|---|---|---|---|
| Method | (1) OLS | (2) IV | (3) IV |
| Overqualification | -0.164*** (0.006) | -0.160*** (0.007) | -0.144*** (0.007) |
| Average skill score | -0.0001 (0.004) | 0.046** (0.022) | 0.047* (0.022) |
| Education below secondary level | 0.001 (0.009) | 0.030* (0.016) | 0.031* (0.016) |
| Tertiary education | -0.003 (0.007) | -0.023* (0.012) | -0.022* (0.012) |
| Research degree | 0.125*** (0.026) | 0.093*** (0.030) | 0.094*** (0.030) |
| Overqualification * EBRD regions | | | -0.070*** (0.015) |
| Number of observations | 86,823 | 86,359 | 86,359 |
| $R^2$ | 0.087 | 0.085 | 0.085 |

**Source:** PIAAC and authors' calculations.
**Note:** Estimated using ordinary least squares (OLS) and instrumented variables (IV), controlling for country and industry effects, age (with separate coefficients estimated for people aged 16-30 and people aged 31-65), gender, immigration status, native language, type and size of employer, parents' education and other relevant characteristics. Average skills are instrumented with the number of books at home at the age of 16. Robust standard errors are reported in parentheses, and *, ** and *** denote values that are statistically significant at the 10, 5 and 1 per cent levels respectively.

[40] See, for instance, Gobel and Zwick (2012) and Naegele and Walker (2006).
[41] See Loch et al. (2010).

The PIAAC survey provides an opportunity to relate a measure of overqualification to job satisfaction. Each respondent was asked to name the qualification that a successful applicant for his/her job would be expected to hold at present. This qualification can be compared with the respondent's level of education, with survey participants who are educated to a higher standard than their job would normally require being deemed to be overqualified. Inevitably, this measure of overqualification involves a subjective element – the respondent's opinion about the qualification that is needed to do his/her own job.

Around a third of respondents in the EBRD regions were deemed to be overqualified (with the same percentage being observed in comparator countries). Younger people (those aged between 16 and 24) were more likely to be overqualified (with 42 per cent of them falling into that category). Incidence of overqualification was also above average among university graduates (37 per cent), rising to 51 per cent for holders of research degrees.

Participants also reported their level of job satisfaction on a five-point scale ranging from 0 (extremely dissatisfied) to 4 (extremely satisfied). Overall, 80 per cent of respondents in advanced economies were satisfied or extremely satisfied with their jobs, compared with 75 per cent in the EBRD regions.

Overqualification is one of the key causes of low job satisfaction, even after the level of education and performance in PIAAC tests have been taken into account alongside other factors such as the respondent's country, industry, gender, age and type of employment (see Table 1.2). The negative relationship between overqualification and job satisfaction is even stronger in the EBRD regions, where being overqualified lowers job satisfaction by about 25 per cent of a standard deviation (see column 3). In contrast, having a higher skill score and having a research degree are both associated with a higher level of job satisfaction.

The strongly negative relationship between overqualification and job satisfaction reinforces the need to focus on the quality of degrees. In this regard, greater private-sector participation in the design of educational and retraining programmes and the drawing-up of their curricula can help to reduce skills mismatches in the labour market.

## Reforms of the 1990s improved the retention of skills

However, the content of degrees is hard to observe, and country-wide changes in the quality (as opposed to the quantity) of education are notoriously difficult to measure. The transition from central planning to market-based systems in post-communist countries in the early 1990s offers a rare opportunity to look at the impact that market reforms have on the acquisition and retention of skills.

Educational reforms in these countries – which included changes to curricula, teacher training and student assessment – were phased in gradually over many years and at differing speeds. Certain changes were made quickly, including increases in foreign language tuition, the introduction of computers and the removal of ideological subjects. In addition, in many countries people graduating before those early transition reforms were assigned to their future employers by central authorities, whereas people graduating after those reforms had to look for a job themselves and were free to choose their employers.

Do the current skills of people educated before those early transition reforms systematically differ from the skills of people educated after the start of the transition process? PIAAC data can shed light on this question. For every individual, survey records include the total years of education and the year when the highest qualification was obtained. And for every country, the timing of early transition reforms can be determined on the basis of the year in which the prices of most goods and services were liberalised[42] – information that can be derived from the EBRD's transition indicators. So, for everyone in the seven post-communist countries covered by the PIAAC surveys, the average assessment score can be related both to the person's level of education and to the number of years of post-reform education. As before, this analysis also considers other relevant characteristics, including the respondent's gender, age and country of residence.

This analysis shows that people who undertook some or all of their years of education after the start of those transition reforms performed better in PIAAC tests (see Table 1.3). As expected, each extra year of post-reform education makes a positive and statistically significant contribution to the test score (of around 0.4 per cent of a standard deviation), adding up to a total increase of around 7 per cent of a standard deviation for a university graduate educated entirely after the reforms relative

**46**
**YEARS**
**PROJECTED AGE OF THE MEDIAN WORKER IN BULGARIA IN 2030**

**75%**
**OF PIAAC SURVEY RESPONDENTS IN THE EBRD REGIONS ARE SATISFIED WITH THEIR JOB**

[42] See Guriev and Zhuravskaya (2009) and Adserà et al. (2018).

to a university graduate educated entirely before the start of the reforms. Similar results can be observed if one looks at the number of years in education completed since the start of those reforms as a percentage of the total number of years of education.

This analysis is able to take account of participants' ages, as the total years of education vary across individuals, while the start dates of reforms vary across countries, implying that participants of the same age had varying exposure to post-reform education. However, most participants who undertook some or all of their years of education after the start of reforms are younger than those educated before the reforms, which gives rise to a concern that the results may primarily reflect cohort effects – that is to say, the continuous improvement in education enrolment rates and the quality of education in the 1990s and 2000s.

To alleviate such concerns, a placebo test repeated this exercise for the other countries in the PIAAC sample, which did not experience a transition from central planning to market-based systems. In this group of non-post-communist economies, start dates for fictitious price liberalisation reforms (ranging from 1990 to 1995) were assigned to countries on the basis of alphabetical order. Similar calculations were then used to determine the number of years of education that each individual had undertaken following those pseudo-reforms.

Reassuringly, the effect of those pseudo-reforms in non-post-communist countries is very small (and, if anything, negative), notwithstanding the fact that those countries are subject to the same potential cohort effects as post-communist countries.

**TABLE 1.3.** In post-communist countries, people who undertook some or all of their years of education after the start of transition reforms achieve higher scores in PIAAC tests

| Dependent variable | Average test score (z-score) | |
|---|---|---|
| Sample | (1) Post-communist countries | (2) Other countries placebo test |
| Years in education after the start of transition | 0.004*** (0.001) | |
| Years in education after the start of transition (placebo) | | -0.001 (0.001) |
| Age | -0.009*** (0.001) | -0.012*** (0.0002) |
| Female | -0.044*** (0.009) | -0.121*** (0.005) |
| Education below secondary level | -0.349*** (0.015) | -0.527*** (0.007) |
| Tertiary education | 0.311*** (0.012) | 0.390*** (0.006) |
| Research degree | 0.417*** (0.042) | 0.618*** (0.027) |
| Number of observations | 33,765 | 119,346 |
| $R^2$ | 0.287 | 0.458 |

**Source:** PIAAC and authors' calculations.
**Note:** Estimated using OLS, controlling for country and industry effects, immigration status, native language, type and size of employer, parents' education and other relevant characteristics. Robust standard errors are reported in parentheses, and *, ** and *** denote values that are statistically significant at the 10, 5 and 1 per cent levels respectively. In the placebo test, start dates for pseudo-transition reforms were assigned to non-post-communist countries on the basis of alphabetical order.

## Improvements in skills after Estonia's education reforms

Estonia's comprehensive education reforms provide an opportunity for a more precise estimation of the effect of such reforms on adult skills. Within the EBRD regions, Estonia is the top performer in international assessments of the performance of 16-year-old students (based on the OECD's Programme for International Student Assessment [PISA]) and one of the top performers in PIAAC assessments of adult skills.

In the early 1990s Estonia embarked on a comprehensive reform of its education system, moving towards the model employed in Finland. Those reforms, which spanned secondary and higher education and were rolled out over the period 1992-98, involved changes to curricula, student assessment and the retraining of teachers. Faster and more comprehensive reforms were carried out in Estonian-speaking schools, with a reform plan for Russian-speaking schools not being put forward until much later, in 1998. A plan to provide all education in Estonian was approved in late 2007.[43]

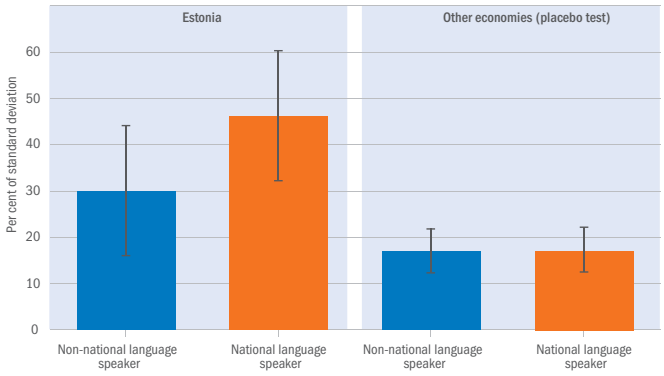
The situation in Estonia provides an opportunity not only to compare the performance of people who began studying after the implementation of those reforms with that of people who graduated before 1992, but also to look at differences between Estonian speakers (who were more exposed to reforms) and the Russian-speaking population in terms of improvements in test scores. Approximately 800 Estonians participated in the PIAAC assessment, 27 per cent of whom were Russian speakers. Of those educated after 1998, around 17 per cent identified themselves as Russian speakers. People who were partially educated during the reform period were excluded from this analysis.

Difference-in-difference regressions show that improvements in test scores following the implementation of reforms were indeed significantly larger among Estonian speakers, with the difference between Estonian speakers and non-Estonian speakers totalling 20 per cent of a standard deviation of test scores (see Chart 1.17). That difference is statistically significant at the 5 per cent level and can be attributed to the effect of Estonia's education reforms in the 1990s.

A concern remains, however, that these results may reflect national language speakers' inherently superior ability to improve their skills relative to speakers of other languages. For example, taking a PIAAC test in one's native language is associated with a statistically significant improvement in test scores. In order to see if this could be the key driver of improvements in test scores over time, this exercise has been repeated for other countries, comparing differences between the scores of national language speakers educated before 1992 and after 1998 with the corresponding differences for non-national language speakers. Unlike in Estonia, the differential for other countries is very small and not significantly different from zero in the statistical sense (see Chart 1.17).

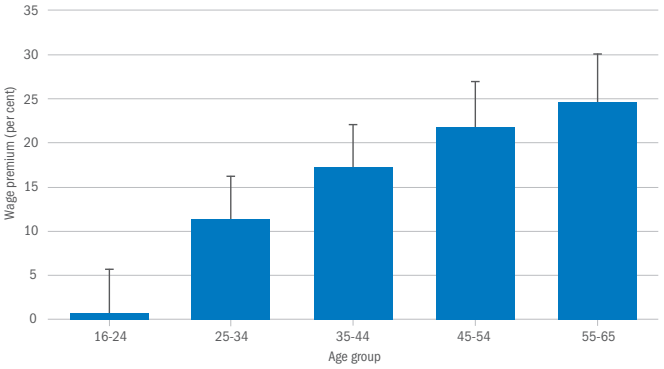
[43] See Lees (2016).

**CHART 1.17.** Improvement in test scores associated with being educated after – rather than before – education reforms




**Source:** PIAAC and authors' calculations.
**Note:** These estimates are based on difference-in-difference regressions of average skills on (i) a dummy variable for individuals educated after the reforms and (ii) an interaction term between that dummy variable and one for individuals speaking the national language. All specifications take account of gender, level of education, immigration status, native language, parents' education, the number of books at home at the age of 16 and other relevant characteristics. 95 per cent confidence intervals are shown for the estimates of marginal effects corresponding to the top portion of each bar.

**CHART 1.18.** The wage premium associated with a 1 standard deviation increase in average test scores is larger for older workers




**Source:** PIAAC and authors' calculations.
**Note:** These estimates are based on regressions of the log of monthly wages on interaction terms between average test scores and the five age groups. Specifications include country and industry effects, age, gender, level of education, immigration status, native language, type and size of employer, parents' education and other relevant characteristics. Average skills are instrumented with the number of books at home at the age of 16. 95 per cent confidence intervals are shown for the corresponding estimates of marginal effects.

## Returns to skills are higher among older workers

So far, this analysis has focused on the accumulation and retention of skills during a person's lifetime, as well as the links between education, skills and job satisfaction. But does investment in numeracy, literacy and problem-solving skills actually pay off? The data suggest that financial returns to improvements in skills are sizeable.

While skill scores are lower among older workers, the wage premium associated with improved skills increases with age. People's abilities tend to change in the course of their lifetime, with a shift from learning skills to utilising acquired knowledge in decision-making. Through on-the-job learning, people may acquire various "soft" skills (such as the ability to understand the emotions and motivations of others, negotiate, pitch a product or manage a team), as well as occupation-specific skills. These are distinct from the skills that are assessed in numeracy or literacy tests. And yet, test scores and broader skill sets are likely to exhibit a strongly positive statistical relationship, not least because basic skills such as literacy and numeracy help with the development of other role-specific skills.

In other words, the skills that are assessed in PIAAC tests may act as a useful – albeit imprecise – measure of the broader skill sets accumulated by adults. To account for this possibility in the regression analysis, the average PIAAC test score is instrumented with the number of books the respondent had at home at the age of 16. The number of books at home is a strong predictor of an individual's taste for learning and ability to acquire skills, but it should not directly influence an individual's wage or other labour market outcomes, nor can it be influenced by them. Within the EBRD regions, the percentage of respondents who had at least 100 books at home at the age of 16 ranges from 2 per cent in Turkey to 34 per cent in Estonia.

Regressing the log of monthly wages on test scores and several other explanatory variables suggests that the wage premium associated with higher levels of skill is larger for older employees. The difference in wages that is associated with a 1 standard deviation increase in test scores rises from a few per cent for people under the age of 25 to 25 per cent for people aged between 55 and 65 (see Chart 1.18). Returns to skills for that oldest age group are more than twice the size of those observed for people between the ages of 25 and 34, and that differential is statistically significant at the 5 per cent level. While it may be harder to retain and update skills later in life, the financial returns may well compensate for the effort.

The age profile of skill premia also highlights the way in which population ageing may exacerbate income and wealth inequality. People in occupations where lifelong learning and development are the norm benefit from increasing returns on acquired human capital, whereas people in basic occupations with few such opportunities (as is the case, for example, with many jobs in hospitality or construction) may see their incomes stagnate or decline. As working lives become longer, those pay differentials between occupations may increase accordingly.[44]

Consequently, improvements in lifelong learning opportunities may go a long way towards mitigating income inequality. However, if access to education and entry-level jobs is deeply unequal, such improvements may actually exacerbate inequality instead.[45]

[44] See Blundell (2014).
[45] See EBRD (2016).

## Conclusion

Demographic change can occur fast. As countries develop, declining birth rates and increases in life expectancy deliver demographic dividends in the form of a larger number of workers relative to the overall population size, higher levels of savings and enhanced human capital. However, ageing populations and below-replacement birth rates can quickly turn demographic dividends into headwinds. At this point, demographics start to have a negative impact on per capita income growth.

Azerbaijan, Turkey and the economies of the SEMED region and Central Asia are currently at a relatively early stage of that demographic transformation process. Those economies face the challenge of creating large numbers of jobs every year for their new entrants to the labour market, a challenge that is shared by many other developing economies and emerging markets around the world. Priorities in these "young" economies include boosting the amount of physical capital per worker, improving human capital and raising labour force participation among women. Improvements to the business climate and stronger macroeconomic policy frameworks can help these economies to leverage the pool of global savings in order to fund investment in machinery, equipment and education.

In contrast, the economies of emerging Europe find themselves wrestling with population ageing. Ageing in emerging markets – a relatively new phenomenon – is a reflection of economic development that has brought about higher levels of income and improvements in healthcare. But it also represents a major challenge in the sense that demographics are no longer contributing positively to economic growth or per capita income growth.

As in advanced economies – where higher rates of immigration, greater reliance on automation and longer working lives have so far succeeded in mitigating the economic impact of ageing – the future of employment and growth in emerging markets will be shaped by the interplay between trends in demographics, migration and automation, as well as the way in which education and social safety nets respond to those trends.

In emerging Europe, labour force participation rates among older age groups have remained relatively low. Pension reforms raising statutory retirement ages and modifying provisions for early retirement can encourage older people to seek employment and encourage firms to hire older workers, as can changes to tax systems. At the same time, improvements in healthcare, working conditions and lifelong learning opportunities are also needed in order to help older employees to remain productive and retain and upgrade their skills. Extending the country coverage of surveys such as the PIAAC and STEP can help governments to assess skill patterns across the population and design policies to address any gaps.

Chapters 2 and 3 look at the economic impact of automation and cross-border migration in the EBRD regions, while Chapter 4 takes a more detailed look at internal migration and the effect that demographic changes can have on countries' productivity and welfare.

# References

**D. Acemoğlu and P. Restrepo (2017a)**
"Secular Stagnation? The Effect of Aging on Economic Growth in the Age of Automation", *American Economic Review*, Vol. 107(5), pp. 174-179.

**D. Acemoğlu and P. Restrepo (2017b)**
"Robots and Jobs: Evidence from US Labor Markets", NBER Working Paper No. 23285.

**D. Acemoğlu and P. Restrepo (2018)**
"Demographics and Automation", NBER Working Paper No. 24421.

**A. Adserà (2004)**
"Changing fertility rates in developed countries. The impact of labor market institutions", *Journal of Population Economics*, Vol. 17, pp. 17-43.

**A. Adserà, F. Dalla Pozza, S. Guriev, L. Kleine-Rueschkamp and E. Nikolova (2018)**
"The impact of transition in eastern Europe on anthropometric measures and subjective well-being", EBRD working paper, forthcoming.

**A. Ahituv and J. Zeira (2011)**
"Technical Progress and Early Retirement", The *Economic Journal*, Vol. 121, pp. 171-193.

**E. Andreev, L. Darsky and T. Kharkova (1998)**
Demographic *History of Russia*: 1927-1959, Informatika (in Russian).

**R. Atoyan, L. Christiansen, A. Dizioli, C. Ebeke, N. Ilahi, A. Ilyina, G. Mehrez, H. Qu, F. Raei, A. Rhee and D. Zakharova (2016)**
"Emigration and its Economic Impact on Eastern Europe", IMF Staff Discussion Note No. 16/07.

**D. Autor and M. Duggan (2003)**
"The rise in the disability rolls and the decline in unemployment", *The Quarterly Journal of Economics*, Vol. 118, pp. 157-206.

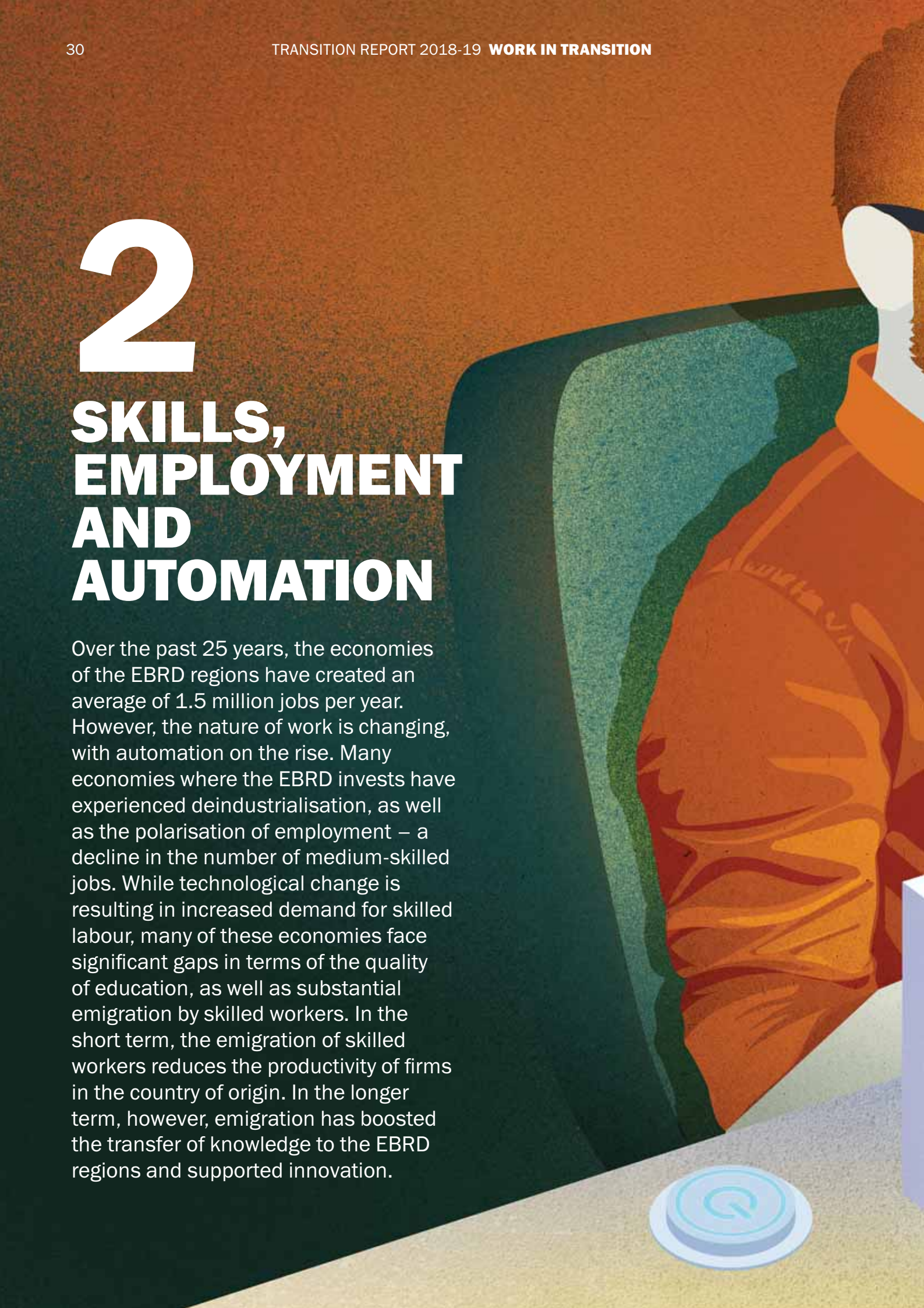
**R. Barro and J.-W. Lee (2013)**
"A new data set of educational attainment in the world, 1950-2010", *Journal of Development Economics*, Vol. 104, pp. 184-198.

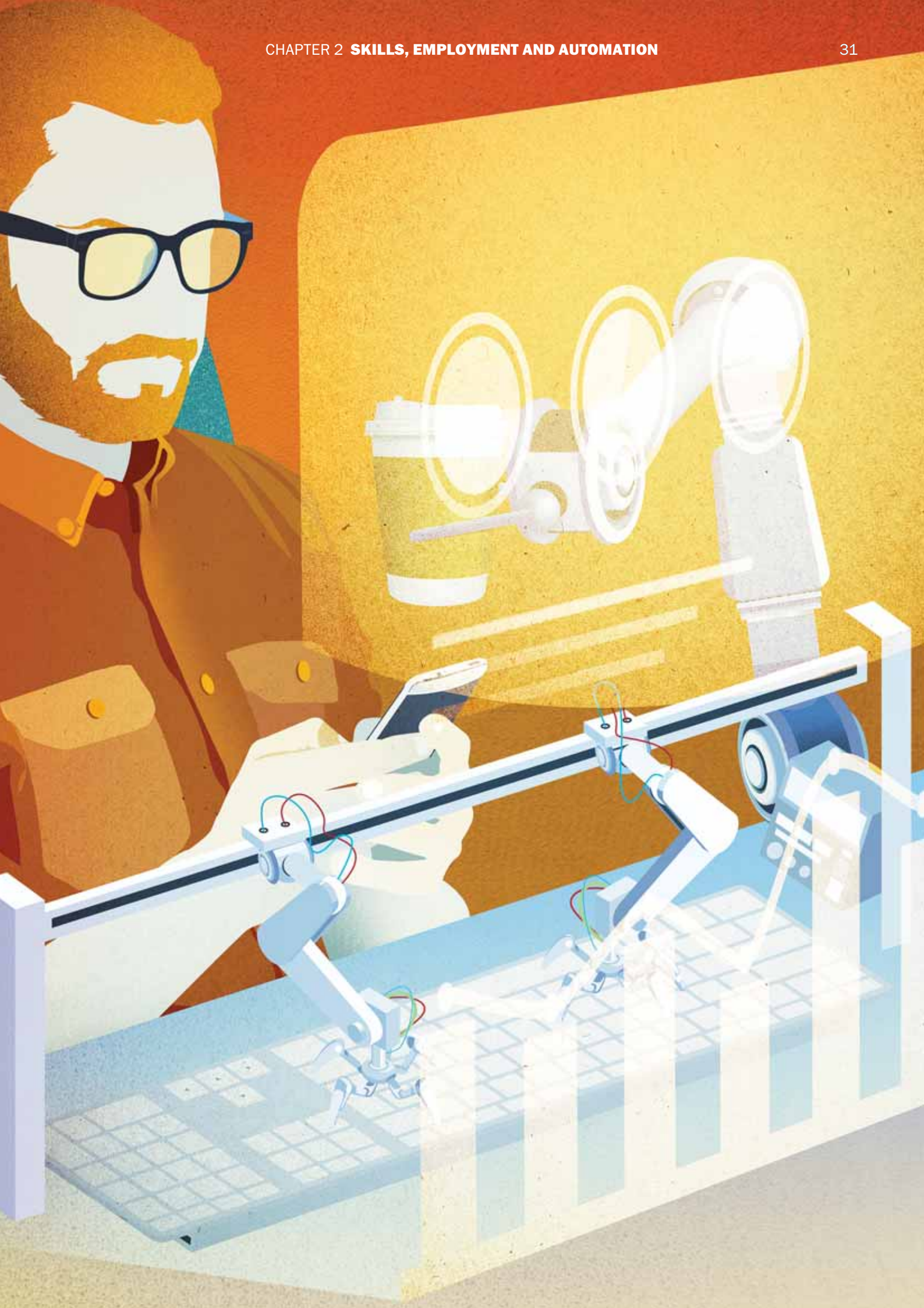
**G. Becker and H.G. Lewis (1973)**
"On the Interaction between the Quantity and Quality of Children", *Journal of Political Economy*, Vol. 81, pp. S279-S288.

**S. Behncke (2012)**
"Does retirement trigger ill health?", *Health Economics*, Vol. 21, pp. 282-300.
**S. Billingsley and A. Duntava (2017)**
"Putting the pieces together: 40 years of fertility trends across 19 post-socialist countries", *Post-Soviet Affairs*, Vol. 33, pp. 389-410.
**D. Bloom, D. Canning and J. Sevilla (2003)**
"The demographic dividend: A new perspective on the economic consequences of population change", RAND Monograph MR 1274.
**D. Bloom and J. Williamson (1998)**
"Demographic Transitions and Economic Miracles in Emerging Asia", *The World Bank Economic Review*, Vol. 12, pp. 419-456.
**R. Blundell (2014)**
"Income Dynamics and Life-Cycle Inequality: Mechanisms and Controversies", *The Economic Journal*, Vol. 124, pp. 289-318.
**Deloitte (2017)**
*Rewriting the rules for the digital age*, Global Human Capital Trends report.
**R. Desjardins and A. Warnke (2012)**
"Ageing and Skills: A Review and Analysis of Skill Gain and Skill Loss Over the Lifespan and Over Time", OECD Education Working Paper No. 72.
**EBRD (2013)**
*Transition Report 2013 – Stuck in Transition?*, London.
**EBRD (2016)**
*Transition Report 2016-17 – Transition for all: Equal opportunities in an unequal world*, London.
**EBRD (2017)**
*Transition Report 2017-18 – Sustaining Growth*, London.
**C. Göbel and T. Zwick (2012)**
"Age and productivity: Sector differences", *De Economist*, Vol. 160, pp. 35-57.
**C. Goldin (2006)**
"The quiet revolution that transformed women's employment, education, and family", *American Economic Review*, Vol. 96(2), pp. 1-21.
**C. Goldin and L. Katz (2009)**
*The race between education and technology*, Harvard University Press.
**C. Goodhart and M. Pradhan (2017)**
"Demographics will reverse three multi-decade global trends", BIS Working Paper No. 656.
**J. Gruber and D. Wise (2002)**
"Different Approaches to Pension Reform from an Economic Point of View", in M. Feldstein and H. Siebert (eds.), *Social Security Pension Reform in Europe*, University of Chicago Press, pp. 49-84.
**S. Guriev and E. Zhuravskaya (2009)**
"(Un)happiness in Transition", *Journal of Economic Perspectives*, Vol. 23(2), pp. 143-168.
**IDB, AfDB, ADB and EBRD (2018)**
*The Future of Work: Regional Perspectives*, Washington, DC.
**O. Jordà, M. Schularick, A. Taylor and F. Ward (2018)**
"Global Financial Cycles and Risk Premiums", NBER Working Paper No. 24677.
**R. Kotschy and U. Sunde (2018)**
"Can education compensate the effects of population aging on macroeconomic performance? Evidence from panel data", LMU working paper.
**C. Kulik, S. Ryan, S. Harper and G. George (2014)**
"Aging Populations and Management", *Academy of Management Journal*, Vol. 57, pp. 929-935.
**P. Kurkin (1938)**
*Birth rates and mortality in Europe's capitalist states*, Soyuzorguchiot (in Russian).
**D. Lam (2011)**
"How the world survived the population bomb: Lessons from 50 years of extraordinary demographic history", *Demography*, Vol. 48, pp. 1231-1262.
**R. Lee (2003)**
"The demographic transition: Three centuries of fundamental change", *Journal of Economic Perspectives*, Vol. 17(4), pp. 167-190.
**M. Lees (2016)**
"Estonian education system 1990-2016: Reforms and their impact", Estonian Ministry of Education.
**C. Loch, F. Sting, N. Bauer and H. Mauermann (2010)**
"How BMW is Defusing the Demographic Time Bomb", *Harvard Business Review*, Vol. 88, pp. 99-102.
**N. Maestas and J. Zissimopoulos (2010)**
"How longer work lives ease the crunch of population aging", *Journal of Economic Perspectives*, Vol. 24(1), pp. 139-160.
**T. Malthus (1798)**
*An Essay on the Principle of Population*, J. Johnson.
**K. Mammen and C. Paxson (2000)**
"Women's work and economic development", *Journal of Economic Perspectives*, Vol. 14(4), pp. 141 164.
**F. Mazzonna and F. Peracchi (2012)**
"Ageing, cognitive abilities and retirement", *European Economic Review*, Vol. 56, pp. 691-710.
**B. Mironov (1991)**
"The Development of Literacy in Russia and the USSR from the Tenth to the Twentieth Centuries", *History of Education Quarterly*, Vol. 31, pp. 229-252.
**G. Naegele and A. Walker (2006)**
"A guide to good practice in age management", European Foundation for the Improvement of Living and Working Conditions.
**I. Ostner and C. Schmitt (eds.) (2008)**
*Family Policies in the Context of Family Change*, Verlag für Sozialwissenschaften.
**G. Pierre, M. Sanchez Puerta, A. Valerio and T. Rajadel (2014)**
"STEP Skills Measurement Surveys: Innovative Tools for Assessing Skills", World Bank Social Protection & Labor Discussion Paper No. 1421.
**M. Skirbekk, M. Stonawski, E. Bonsang and U. Staudinger (2013)**
"The Flynn effect and population aging", *Intelligence*, Vol. 41, pp. 169-177
**N. Voigtländer and H. Voth (2013)**
"How the West 'Invented' Fertility Restriction", *American Economic Review*, Vol. 103, pp. 2227-2264.
**D. Wise (2010)**
"Facilitating longer working lives: International evidence on why and how", *Demography*, Vol. 47, pp. S131-S149.
**World Bank (2014)**
*The Inverting Pyramid: Pension Systems Facing Demographic Challenges in Europe and Central Asia*, Washington, DC.
**World Bank (2015a)**
*Global Monitoring Report 2015-16: Development Goals in an Era of Demographic Change*, Washington, DC.
**World Bank (2015b)**
*Golden Aging: Prospects for Healthy, Active and Prosperous Aging in Europe and Central Asia*, Washington, DC.
**World Bank (2018)**
*World Development Report 2019: The Changing Nature of Work*, Washington, DC.
**A. Young (1992)**
"A tale of two cities: factor accumulation and technical change in Hong Kong and Singapore", *NBER Macroeconomics Annual*, Vol. 7, pp. 13-54.

# 2 SKILLS, EMPLOYMENT AND AUTOMATION

Over the past 25 years, the economies of the EBRD regions have created an average of 1.5 million jobs per year. However, the nature of work is changing, with automation on the rise. Many economies where the EBRD invests have experienced deindustrialisation, as well as the polarisation of employment – a decline in the number of medium-skilled jobs. While technological change is resulting in increased demand for skilled labour, many of these economies face significant gaps in terms of the quality of education, as well as substantial emigration by skilled workers. In the short term, the emigration of skilled workers reduces the productivity of firms in the country of origin. In the longer term, however, emigration has boosted the transfer of knowledge to the EBRD regions and supported innovation.





# Introduction

Rapid technological change is having a profound impact on the nature of work and the types of skill that are in demand in the workplace.[1] One example of this is the advent of financial technology (fintech), which has brought about the rise of online banking and resulted in a reduction in the number of traditional high-street bank branches. In some cases, economic policy has struggled to keep pace with such developments (see, for instance, Annex 2.1 for a discussion of regulatory frameworks governing crowdfunding). The EBRD regions have not been immune to these trends. Indeed, the demographic pressures in emerging Europe have created particularly strong incentives for automation (as discussed in Chapter 1).

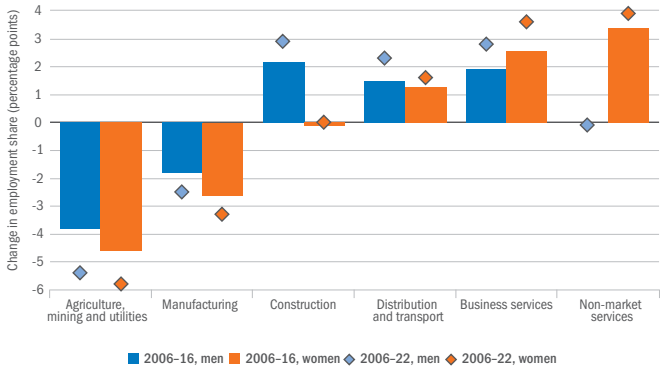
This chapter examines recent trends in labour markets across the EBRD regions, looking at the types of job that have been destroyed and created, future trends in job creation, the skills mix in the various economies and the economic impact of emigration by skilled workers. On the basis of the available evidence, it also discusses policies that can help to mitigate the disruptive effects of technological change and emigration by skilled workers.

The chapter starts by looking at skills from a supply and demand perspective. Like advanced economies, most countries in the EBRD regions have been experiencing deindustrialisation (a decline in industrial employment) and job polarisation (a decline in medium-skilled occupations as a percentage of total jobs). Educational attainment has improved, but mismatches between the supply of skills and the demands of employers persist.

The second section examines the ways in which automation alters demand for labour and skills. On average, workers in the EBRD regions face a significantly higher risk of job automation than their counterparts in advanced economies. For example, the mean probability of a job being automated in the foreseeable future is 57 per cent in the Slovak Republic and 55 per cent in Turkey, compared with around 40 per cent in the United States of America and the United Kingdom.[2]

The third section looks at the impact that the emigration of skilled workers has had on innovation and the productivity of firms in the EBRD regions. Following the accession to the EU of various countries in central and south-eastern Europe in 2004 and 2007, emigration from that region has increased considerably. Emigrants tend to be young and highly skilled, with Eurostat data indicating that more than 20 per cent have university degrees and another 40 per cent are educated to secondary level. The analysis in this section shows that although skilled emigration has been associated with a decline in firms' total factor productivity (TFP) – the efficiency with which capital, labour and material inputs are combined to produce final products – emigration has, in the medium term, boosted "knowledge remittances" to those migrants' countries of origin and contributed to higher rates of innovation.

**CHART 2.1.** Past and projected changes in employment shares of particular industries




**Source:** ILO and authors' calculations.
**Note:** Averages weighted by size of labour force. "Business services" comprise ISIC sectors I (accommodation and food services), K (financial and insurance activities), L, M and N (real estate, business and administrative activities). "Non-market services" comprise ISIC sectors O (public administration and defence), P (education), Q (healthcare and social work), R, S, T and U (other services).

## Demand for and supply of skills

### Deindustrialisation

It is difficult to assess demand for specific skills at a particular point in time. However, the employment shares of specific occupations can provide a useful approximation of such demand, as skills used at work tend to be specific to a particular industry or occupation.[3] Changes in employment shares over time provide important insights into the creation and disruption of jobs as a result of technological change.

The EBRD regions have been undergoing deindustrialisation. Indeed, the combined employment share of agriculture, mining and utilities declined by 4 percentage points between 2006 and 2016, while that of manufacturing declined by more than 2 percentage points over the same period (see Chart 2.1). These trends are projected to continue (see Box 2.2 for a discussion of expected changes in sectoral employment and working conditions). Male workers leaving the agriculture and manufacturing industries have typically found employment in construction, while women have mainly switched to non-market services such as public administration or education.

As a result, gender segregation in employment has increased further, with men accounting for 92 per cent of all employees in the construction industry in 2016 (up from 90 per cent in 2006) and women accounting for 59 per cent of all employees in non-market services (up from 57 per cent in 2006). See Box 2.1 for a discussion of gender imbalances in unpaid care work.

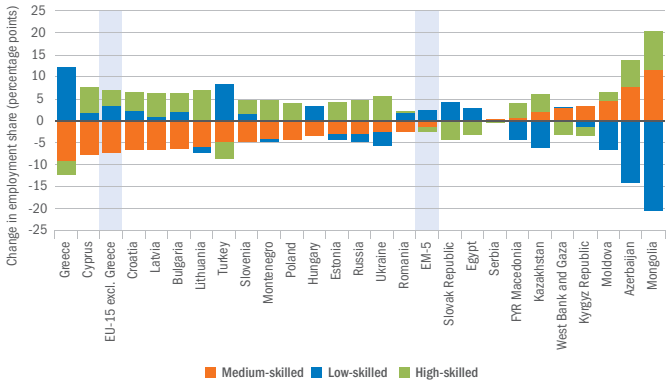
The speed of such structural shifts varies across economies. Indeed, additional analysis suggests that the economies of Central Asia and the southern and eastern Mediterranean (SEMED) region have tended to see the strongest declines in the

[1] See Acemoğlu and Restrepo (2017), Chiacchio et al. (2018), Dauth et al. (2017) and Graetz and Michaels (2018).
[2] See Nedelkoska and Quintini (2018).
[3] See Handel (2012), Parent (2000) and Gathmann and Schönberg (2010).

**CHART 2.2.** Changes in employment shares by occupation and gender, 2006-16


**Source:** ILO modelled estimates and authors' calculations.
**Note:** Weighted averages across 25 economies. Occupations are based on the International Standard Classification of Occupations' ISCO-08 classification and are ranked from left to right in declining order of skill-intensity. "Professionals" include engineering, healthcare, teaching, business and IT professionals. "Clerks" include keyboard clerks, service clerks and numerical or material recording clerks. "Craft workers" include construction workers, metal or machinery workers, handicraft or printing workers, electrical workers and food processing workers. "Service and sales workers" include personal services workers, sales workers, personal care workers and protective services workers. "Elementary occupations" include cleaners and helpers, agricultural labourers, food preparation assistants and refuse workers.

**CHART 2.3.** The employment share of medium-skilled occupations declined in most economies over the period 2006-16




**Source:** ILO modelled estimates and authors' calculations.
**Note:** Based on methodology in OECD (2017) and ISCO-88 classifications. "EM-5" comprises Argentina, Brazil, Malaysia, South Africa and Thailand. High-skilled occupations comprise legislators, senior officials and managers (group 1), professionals (group 2) and technicians and associate professionals (group 3). Medium-skilled occupations comprise clerks (group 4), craft workers and related tradespersons (group 7), and plant and machine operators and assemblers (group 8). Low-skilled occupations comprise service and sales workers (group 5) and elementary occupations (group 9). Data for Kazakhstan relate to the period 2006-15 and data for Montenegro relate to the period 2006-17.

**OVER THE LAST 25 YEARS, ECONOMIES WHERE THE EBRD INVESTS HAVE CREATED AN AVERAGE OF**

**1.5 MILLION**

**JOBS PER YEAR**

**THE COMBINED EMPLOYMENT SHARE OF AGRICULTURE, MINING AND UTILITIES FELL BY**

**4 PERCENTAGE POINTS**

**IN THE EBRD REGIONS BETWEEN 2006 AND 2016**

primary sector, while manufacturing has tended to decline most strongly in eastern Europe and the Caucasus (EEC) and Russia. Meanwhile, Turkey has seen a 6 percentage point increase in the employment share of business services.

In line with those sectoral shifts from agriculture and manufacturing to services, the employment shares of service-sector professionals and sales workers have risen by between 2 and 4 percentage points (see Chart 2.2). At the same time, the employment shares of elementary occupations (such as agricultural labourers), craft workers and technicians have fallen by between 0.8 and 2 percentage points. Occupational shifts have been more pronounced among women than among men.

## Job polarisation

Automation has reduced demand for certain routine cognitive tasks. Since the early 1990s, job creation has been concentrated mainly in low-skilled occupations (such as catering, construction and cleaning) that are harder to automate than computational tasks, as well as high-skilled occupations (such as professional services and research and development).[4] Highly paid skilled work, in turn, raises demand for relatively poorly paid personal services (such as cleaning or catering), reinforcing the polarisation of occupations into what Goos and Manning (2007) called "lovely" and "lousy" jobs.

In line with these global trends, the total employment share of medium-skilled occupations (such as clerks, craft workers, and plant and machine operators) has been declining in the EBRD regions (see Chart 2.3),[5] while those of high-skilled occupations and low-skilled occupations have both been rising. The extent of

[4] See Autor and Dorn (2013).
[5] See OECD (2017) for a classification of occupations.

such job polarisation has, on average, been greater in higher-income economies (see Annex 2.2). In Bulgaria, Croatia, Cyprus, Greece and Latvia, levels of job polarisation have been similar to those observed in advanced economies and higher than the levels seen in most emerging markets.

However, economies with large primary sectors have seen continued declines in the employment share of low-skilled occupations (with the largest declines being observed in agriculture) and increases in the shares of both medium-skilled and high-skilled jobs. This includes economies such as Azerbaijan, Moldova and Mongolia, where agriculture, mining and utilities still account for more than 35 per cent of total employment.

## Quantity of education versus quality of skills

The supply of skills has also been evolving. Indeed, the percentage of workers with university degrees has continued to rise across the EBRD regions, with the exception of Albania, Tajikistan and Turkey (see Chart 2.4). Levels of educational attainment in the EBRD regions are relatively high. In Russia, for example, 59 per cent of adults have university degrees, compared with an average of 28 per cent in advanced economies. In Ukraine, the figure is 40 per cent; and in Estonia, it is 30 per cent. The average number of years of education in the EBRD regions exceeds the equivalent figure for advanced economies.

However, a large quantity of education does not automatically translate into a high-quality education. The quality of education can be measured using the OECD's PISA study, which tests the numeracy, science skills and analytical reading of 15-year-old students in OECD member countries and a number of emerging markets. Economies in the EBRD regions tend to perform fairly poorly in PISA studies relative to their large numbers of years of education (see Chart 2.5). Indeed, the EBRD economies that participated in the 2015 PISA study achieved an average score of 440 across all subjects, compared with an average of 496 in advanced economies.

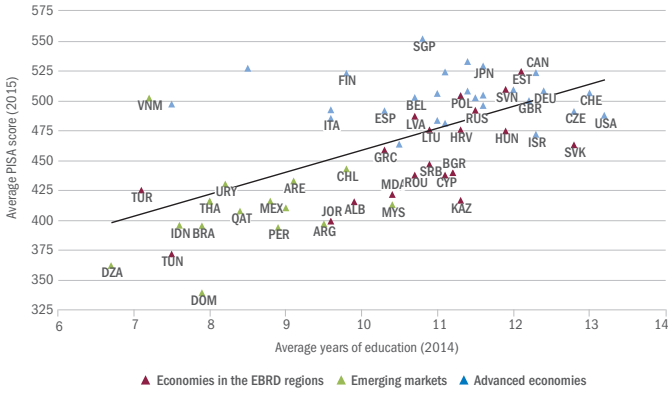
## Lack of ICT skills in the age of automation

This gap between the quantity and quality of education is even more apparent if we look at information and communication technology (ICT) skills, which are becoming increasingly important in light of technological change. While economies in the EBRD regions generally performed strongly in the OECD's PIAAC surveys in 2011-14, which looked at adult skills (see Chapter 1), their performance was weaker when it came to advanced ICT and cognitive skills that were needed to solve technical problems and accomplish complex tasks (see Chart 2.6). The percentage of the population who are considered to have good ICT skills ranges from 10 per cent in Turkey to 33 per cent in Estonia. Box 2.3 looks at skills mismatches in the SEMED region, which was not covered by those PIAAC surveys.

**CHART 2.4.** Degree holders increased as a percentage of the population between 1990 and 2016

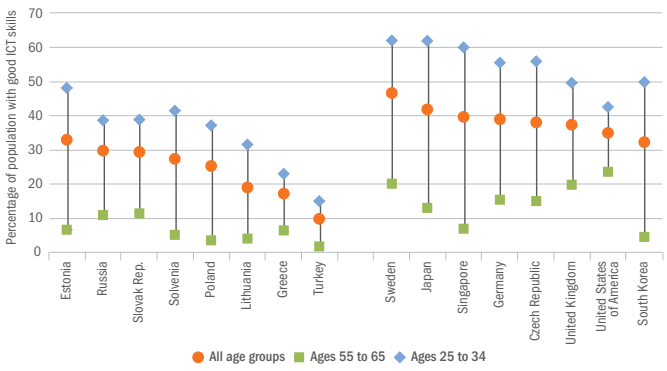

**Source:** Barro and Lee (2013) and authors' calculations.

**CHART 2.5.** The quantity and quality of education are correlated, but not very strongly



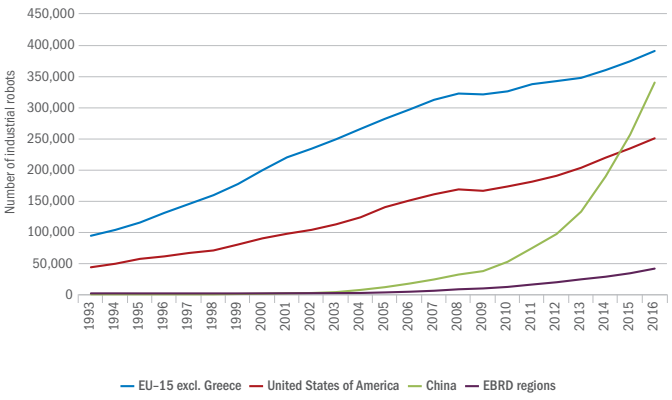

**Source:** OECD and Barro and Lee (2013).
**Note:** PISA scores for Argentina, Kazakhstan, Malaysia and Serbia relate to 2012.

**CHART 2.6.** Percentage of population with good ICT skills, by age group




**Source:** OECD and authors' calculations.
**Note:** "Good ICT skills" correspond to level 2 or 3 in the OECD's PIAAC tests.

**CHART 2.7.** The stock of industrial robots has been increasing around the world




**Source:** International Federation of Robotics (IFR) and authors' calculations.

## How automation is reshaping labour markets

Technological innovations are quickly shifting the balance between activities performed by humans and tasks performed by machines. Indeed, recent research suggests that nearly 50 per cent of all jobs in the United States of America face a high risk of being automated in the foreseeable future.[6] In developing countries, the risk of automation may be even higher, with up to 70 per cent of jobs at risk.[7] In manufacturing, the percentage of jobs that are at risk of automation may be particularly high.

While technological change inevitably gives rise to anxieties, history suggests that although some jobs will be destroyed, others will be created. Indeed, such innovations can help to shift labour from sectors with low levels of productivity (such as agriculture) to higher-productivity sectors (primarily manufacturing and services). This section revisits the subject of automation, looking at the impact that technological change has had on employment in the EBRD regions.

### Use of robots in the EBRD regions

A useful measure of the extent of automation is the total stock of operational industrial robots, which are defined by the International Organization for Standardization (ISO) as "automatically controlled, reprogrammable, multipurpose manipulators that are programmable in three or more axes".

The number of industrial robots is on the rise around the world (see Chart 2.7), both in absolute terms and as a percentage of the number of workers employed. Indeed, the total global stock of industrial robots is projected to increase by 14 per cent a year, reaching 3 million by 2020.[8] The number of industrial robots in use in the EBRD regions stood at 41,000 in 2016, up from 1,500 in 1993 (on the basis of available data for 22 EBRD countries). The vast majority of robots are deployed in manufacturing (particularly in the automotive sectors), although they have also begun to be used more widely in the production of plastic, chemicals and metals.

**THE EMPLOYMENT SHARE OF PROFESSIONALS INCREASED BY**

**4 PERCENTAGE POINTS**

**IN THE EBRD REGIONS BETWEEN 2006 AND 2016**

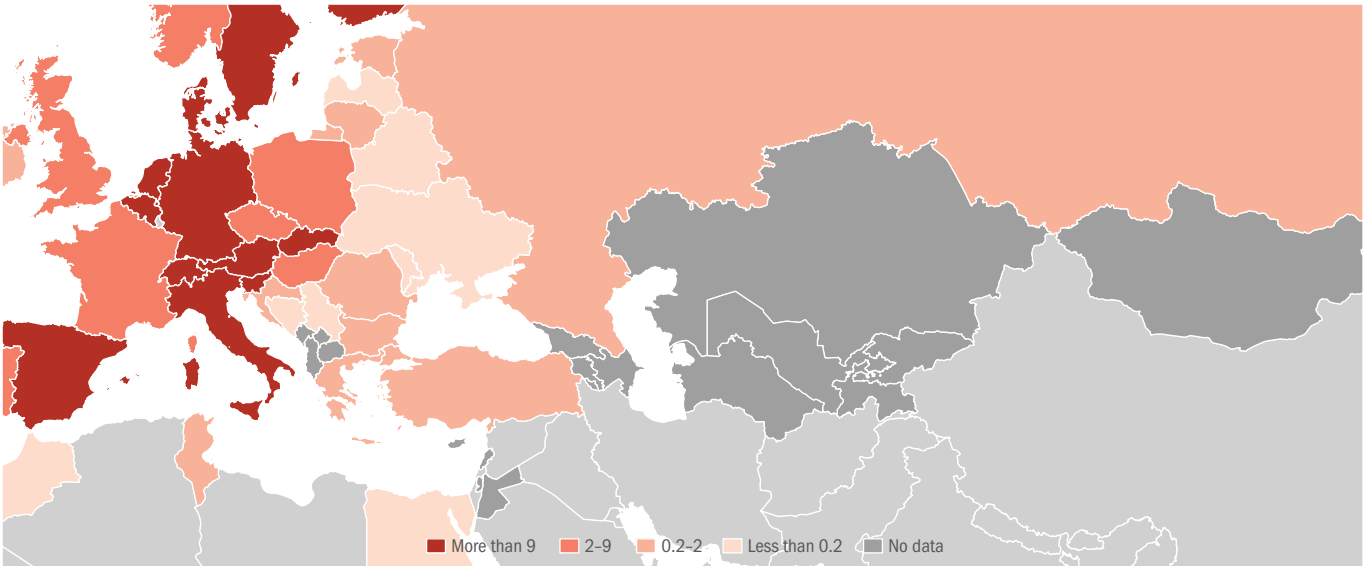
**THE EMPLOYMENT SHARE OF MANUFACTURING DECLINED BY MORE THAN**

**2 PERCENTAGE POINTS**

**IN THE EBRD REGIONS BETWEEN 2006 AND 2016**

[6] See Frey and Osborne (2017).
[7] See World Bank (2016), Nedelkoska and Quintini (2018), Chiacchio et al. (2018) and Manyika et al. (2017).
[8] See IFR (2017).

**CHART 2.8.** Number of robots per 1,000 manufacturing workers




**Source:** IFR, ILO and authors' calculations.
**Note:** Data relate to 2016.

The extent to which robots are used in manufacturing varies greatly from country to country (see Chart 2.8). The levels seen in the Slovak Republic and Slovenia (where there are more than 93 robots for every 10,000 manufacturing workers) are comparable to those observed in advanced economies and higher than those seen in Brazil, China, India and South Africa. Hungary, Poland, Turkey and Romania have also seen rapid increases in the ratio of robots to manufacturing workers (see Chart 2.9). In contrast, Moldova, Morocco and Serbia have fewer than 2 robots for every 10,000 workers.

Differences across countries and sectors in terms of the use of robots are strongly linked to differences in FDI. Indeed, regression analysis (available on request) suggests that a 1 per cent increase in FDI in a given sector of a given country is associated with a 12 per cent increase in the use of industrial robots.

**TABLE 2.1.** The impact of robotisation on employment

| Dependent variable | Change in employment rate, 2010-16 | | | |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| Increase in exposure to robots, 2010-16 | -0.0077** (0.0037) | -0.0079** (0.0036) | -0.0075** (0.0035) | -0.0072** (0.0035) |
| Increase in ICT-intensity, 2010-16 | | | | -0.1653*** (0.0542) |
| Country dummies | No | No | Yes | Yes |
| Country-level controls | No | Yes | No | No |
| Number of observations | 471 | 471 | 471 | 471 |

**Source:** Eurostat, IFR and authors' calculations.
**Note:** See Annex 2.4 for details of this instrumental variables (IV) estimation. Robust standard errors are reported in parentheses, and *, ** and *** denote values that are statistically significant at the 10, 5 and 1 per cent levels respectively.

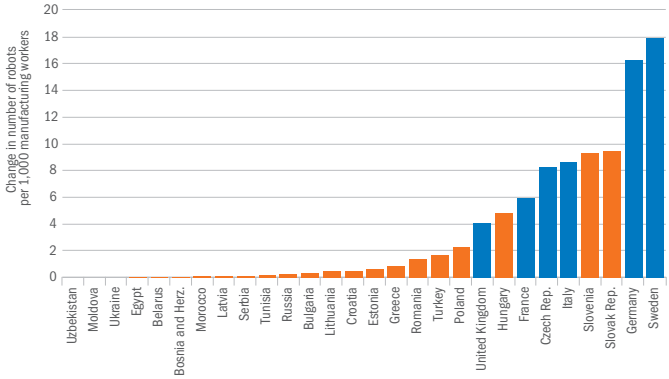
## Impact of robots on employment

Automation affects employment in two different ways. In some instances, robots may directly replace workers. However, firms that experience increases in productivity as a result of automation may also increase their demand for labour where it is complementary to the use of robots. In the 11 EBRD economies included in analysis of this issue (see Annex 2.3 for a description of the relevant data), the average employment rate (defined as the percentage of the labour force that is in employment) declined by 1.5 percentage points between 2010 and 2016, while the average number of robots increased by 0.3 per 1,000 workers over the same period.

In order to assess the extent to which the decline in employment can be attributed to the increase in robotisation, regression analysis can be used to explain the causal relationship between the employment rate and the level of robotisation (see Annex 2.4 for a description of the methodology used). That analysis points to a substantial displacement effect: every additional robot per 1,000 workers reduces the employment rate by 0.7 percentage point (see column 4 of Table 2.1).

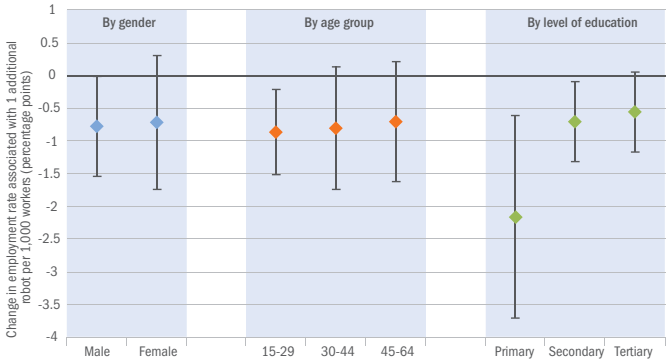
This suggests that robotisation can explain 13 per cent of the total decline that was seen in the employment rate between 2010 and 2016 in the 11 EBRD economies included in this analysis. Although it is not fully comparable owing to differences

**CHART 2.9.** Change in the number of robots per 1,000 manufacturing workers, 1993-2016




**Source:** IFR, ILO and authors' calculations.

**CHART 2.10.** Impact of robotisation by gender, age group and level of education




**Source:** Eurostat, IFR and authors' calculations.
**Note:** Based on regression analysis for individual demographic groups (see Annex 2.4 for details). Lines correspond to the 95 per cent confidence intervals associated with these estimates.

in the outcomes used and the time period covered, this estimated impact appears to be somewhat larger than the figures obtained for the United States of America and advanced European economies.[9] Increases in the ICT-intensity of production also have a statistically significant negative impact on the employment rate, but the effect of a 1 standard deviation increase in ICT-intensity is half the size of that of a 1 standard deviation increase in the use of robots.

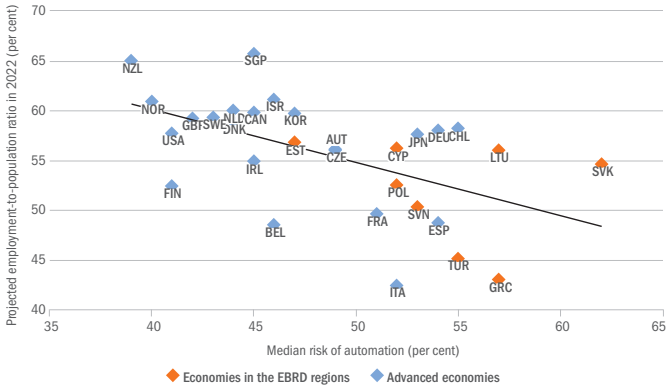
The effect of exposure to robots is strongest for people with low levels of education (see Chart 2.10). This may, however, change as technology evolves. There are no statistically significant differences between men and women or between younger and older workers in terms of the impact of robotisation.

## Probability of jobs being automated varies across economies

The probability of a typical (median) job being automated in the near future varies from country to country (see Chart 2.11). A job is considered to be at risk of being automated if most of the tasks involved could be performed by state-of-the-art computer-controlled equipment based on the availability of big data needed to complete such tasks.[10]

In nearly all of the EBRD economies included in Chart 2.11, the probability of the median job being automated is higher than the OECD average of 48 per cent, with Estonia being the only exception. In the Slovak Republic, the median probability of automation is as high as 62 per cent. Meanwhile, a higher probability of automation is associated with a lower projected employment-to-population ratio in 2022.[11]

**CHART 2.11.** Median risk of automation and expected employment-to-population ratio




**Source:** ILO and authors' calculations based on Nedelkoska and Quintini (2018).

**IN 2016, ABOUT**

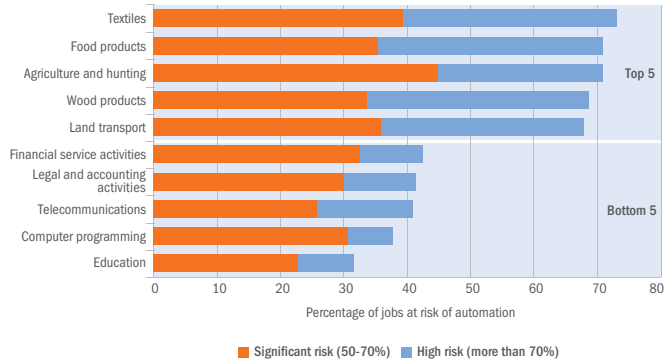
**41,000**

**INDUSTRIAL ROBOTS**

**WERE IN USE IN THE EBRD REGIONS – UP FROM 1,500 IN 1993**

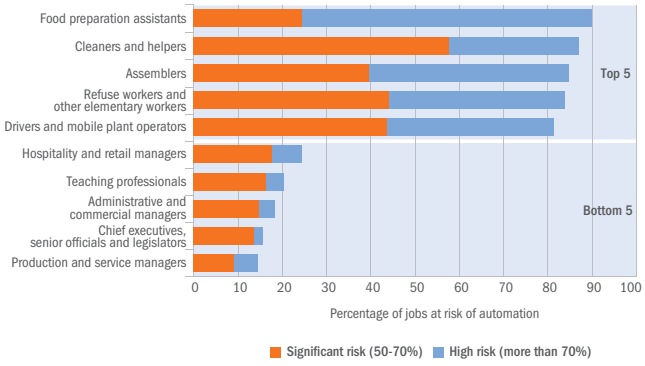
[9] See Acemoğlu and Restrepo (2017) and Chiacchio et al. (2018).
[10] See Frey and Osborne (2017).
[11] The employment-to-population ratio is defined as the percentage of a country's working-age population (rather than its labour force) that is in employment.

**CHART 2.12.** Industries expected to be most and least affected by automation in the EBRD regions




**Source:** Nedelkoska and Quintini (2018) and authors' calculations.
**Note:** Based on two-digit ISIC classification (rev. 4). Jobs are at high risk of automation if at least 70 per cent of the tasks involved are at risk of being automated. Jobs are at significant risk of automation if between 50 and 70 per cent of tasks are at risk of being automated. Estimates are simple averages across Cyprus, Estonia, Greece, Lithuania, Poland, the Slovak Republic, Slovenia and Turkey. Industries with fewer than 10 observations in four countries or more have been excluded.

**CHART 2.13.** Occupations expected to be most and least affected by automation in the EBRD regions




**Source:** Nedelkoska and Quintini (2018) and authors' calculations.
**Note:** Based on two-digit ISCO-08 classification. Jobs are at high risk of automation if at least 70 per cent of the tasks involved are at risk of being automated. Jobs are at significant risk of automation if between 50 and 70 per cent of tasks are at risk of being automated. Estimates are simple averages across Cyprus, Estonia, Greece, Lithuania, Poland, the Slovak Republic, Slovenia and Turkey. Occupations with fewer than 10 observations in four countries or more have been excluded.

## Probability of automation also varies across industries

In the EBRD regions, jobs in textile manufacturing, agriculture, food processing, the manufacturing of wood products and land transport are expected to be most affected by automation (see Chart 2.12). At the other end of the scale, fewer than 43 per cent of all jobs in financial, legal and accounting services, telecommunications, computer programming and education are expected to be significantly affected by automation. More generally, automation is expected to affect primary-sector jobs most and services least.

Repeating this analysis at the level of individual occupations shows that food preparation assistants, cleaners and helpers, assemblers, refuse workers, drivers and mobile plant operators face the highest risk of automation (see Chart 2.13). Occupations that require significant analytical skills and high levels of social interaction (such as managers, professionals and senior officials) are among those least likely to be automated.

## The impact of emigration on firms' performance and innovation

This section looks at the economic implications of the large-scale emigration that is being experienced by many economies where the EBRD invests. Its empirical analysis focuses on the experiences of EU member states in the EBRD regions, but its findings are applicable to other countries as well. For example, several economies in the EBRD regions are seeking EU membership, while others (such as Ukraine) are not involved in the accession process but are experiencing high rates of emigration among people of working age. For example, Poland issued nearly one million work permits to Ukrainian citizens between 2014 and 2017.

## Labour market access for new EU member states

When the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, the Slovak Republic and Slovenia joined the EU in 2004, followed by Bulgaria and Romania in 2007, those new EU member states experienced significant increases in the numbers of workers emigrating to the EU-15 and the four European Free Trade Association (EFTA) countries (namely, Iceland, Liechtenstein, Norway and Switzerland). By 2014, when all restrictions on migration from those new member states had been lifted, the number of migrants who had travelled to those 19 countries stood at four million, compared with 900,000 in 2003 (see Annex 2.5 for more details).

Eurostat data indicate that around 40 per cent of migrants leaving countries that joined the EU in 2004 had medium-skilled or high-skilled occupations in their countries of origin. In the case of Bulgaria and Romania, the corresponding figure was 35 per cent.[12] Emigration can raise wages in countries of origin, increase incentives for young people to invest in education, and foster cross-border flows of trade, capital and ideas.[13] However, concerns are often raised about "brain drain" and its adverse impact on economic development, and it is noticeable that

[12] For the purposes of this analysis, ISCO codes 11-35 are regarded as high-skilled occupations, and ISCO codes 41-83 are regarded as medium-skilled occupations.
[13] See Dustmann et al. (2015), Elsner (2013), Mayr and Peri (2009), Felbermayr and Jung (2009), Kerr (2008) and Choudhury (2016).

many of the migrants leaving those new EU member states are highly skilled.[14]

Firms often complain that they cannot find skilled labour to replace employees who have emigrated. Indeed, the percentage of firms reporting that a lack of skills was a major constraint on their business rose from 12 per cent in 2005 to almost 30 per cent in 2008-09 in the new EU member states, according to the representative Business Environment and Enterprise Performance Survey (BEEPS) conducted by the EBRD and the World Bank. Consequently, some scholars have argued that emigration has the potential to hinder the economic development of those countries, given the record-high labour shortages that they have experienced.

## The effects of emigration on firms' performance

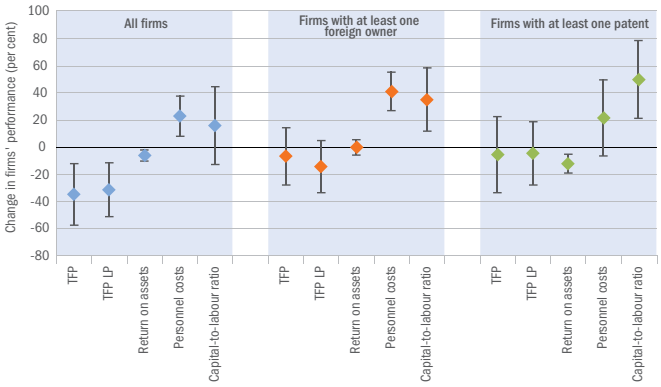
When emigration opportunities for economically active members of the population increase, firms in the countries of origin of potential migrants face more intense competition for labour. As a result, they may have to offer higher wages in order to retain or attract skilled employees. Alternatively, firms can make production more capital-intensive by replacing highly qualified labour with capital and less-skilled workers or choose a different product mix (see also Box 3.5 which discusses firms' responses to the opposite trend, namely an increase in low-skilled immigration). However, such adjustments are costly and may not be feasible for all firms. They may also have an impact on firms' TFP.

Emigration can affect firms' TFP via three main channels. First of all, firms that are unable to fill a vacancy promptly may be forced to leave capital equipment idle for extended periods of time. Second, a lack of skilled employees may reduce knowledge sharing, thereby slowing firms' accumulation of knowledge and hampering improvements in TFP. And third, when experienced employees leave a firm, specialist knowledge about production processes and relationships with suppliers and customers will be lost. Firms may also need to dedicate more resources to training newly hired employees. At the same time, higher rates of labour turnover may actually discourage firms from investing in training, further hampering productivity. On the other hand, an increase in labour market competition may incentivise firms to improve the quality of management and achieve higher levels of TFP.[15]

The emigration opportunities that were available to workers in those new EU member states post-accession varied by country of origin and sector, with the EU-15 and the four EFTA countries able to impose restrictions on such migrants for up to seven years. Those differences are captured by a labour mobility index ranging from 0 to 1, where higher values correspond to greater opportunities for emigration from a given country in a given year for workers in a specific sector (with 0 denoting a complete absence of freedom of movement for workers and 1 indicating full freedom of movement across the EU; see Annex 2.5 for details).

The regression analysis described in Annex 2.5 finds that increases in emigration opportunities had a negative impact on the TFP of firms in new member states (see Chart 2.14). Indeed, that analysis suggests that, on average, a maximum increase

**CHART 2.14.** The effect of increased emigration opportunities on the performance of firms in the new EU member states




**Source:** Amadeus and authors' calculations.
**Note:** See Annex 2.5 for details of this regression analysis. Lines show the 95 per cent confidence interval for each estimate. "TFP LP" is TFP as estimated in Levinsohn and Petrin (2003).

**AGRICULTURE, MINING AND UTILITIES STILL ACCOUNT FOR MORE THAN**

**35%**

**OF TOTAL EMPLOYMENT IN AZERBAIJAN, MOLDOVA AND MONGOLIA**

**THE GLOBAL STOCK OF OPERATIONAL INDUSTRIAL ROBOTS IS PROJECTED TO REACH**

**3 MILLION**

**BY 2020**

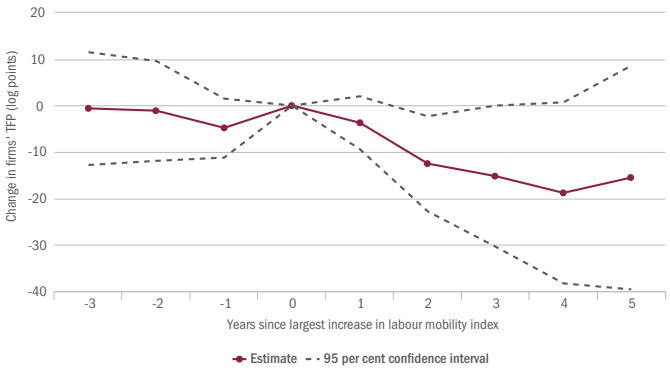
**IN RUSSIA,**

**59%**

**OF ADULTS HAVE UNIVERSITY DEGREES**

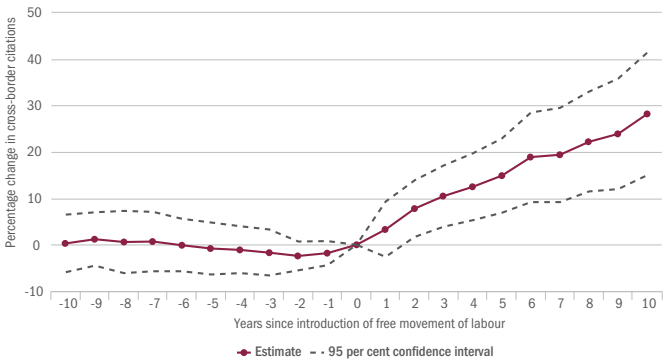
[14] See Batsaikhan et al. (2018).
[15] See, for instance, Bloom et al. (2015) for evidence of increases in TFP in response to more intense product market competition.

**CHART 2.15.** Evolution of the impact of increased emigration opportunities on the TFP of firms in the new EU member states




**Source:** Amadeus and authors' calculations.
**Note:** Estimated using the Levinsohn-Petrin procedure. See Annex 2.5 for details.

**CHART 2.16.** Increase in cross-border patent citations following the introduction of free movement of labour




**Source:** European Patent Office's Worldwide Patent Statistical Database (PATSTAT) and authors' calculations.
**Note:** See Annex 2.5 for details of this regression analysis.

in emigration opportunities for workers in a firm's country and sector (which corresponds, on average, to an increase of 0.25 in the labour mobility index) resulted in that firm's TFP one year later being around 7.5 percentage points lower than it would have been in the absence of emigration.[16]

The cumulative negative impact that emigration has on productivity increases for a number of years following the year with the largest increase in the labour mobility index (which is termed "year zero" in Chart 2.15). It is worth noting that, prior to year zero, firms subsequently exposed to increased emigration were no different from other firms in terms of their productivity trends.

Firms also adjust to increased emigration opportunities for current and potential future employees by increasing personnel costs (which include wages and other employee-related costs, such as hiring and training expenses). An annual increase of 0.25 in the labour mobility index will lead to a 5 per cent increase in personnel costs per employee (resulting in an average rise of €400 per worker per year; see Chart 2.14). The impact on the capital-to-labour ratio is also positive, but not statistically significant. These results are robust to the use of alternative measures of productivity, provided that the 1 per cent of firms that are most and least productive are excluded, firms established after 2002 are excluded and the sample is restricted to the period before the 2008-09 global financial crisis.

The impact on the TFP of firms with at least one foreign owner and firms with at least one patent is smaller and statistically insignificant (see Chart 2.14). This may be because these firms are able to spend significantly more on personnel. In addition, innovative firms (those holding patents) increase their capital-to-labour ratios to a significantly greater extent. Innovative firms may also be in a better position to offer their employees a stimulating working environment, as well as financial incentives conditional on innovations paying off. In the longer term, innovative firms may also benefit from inflows of knowledge facilitated by emigrants working abroad in advanced economies, as discussed in the next subsection.

## The impact that emigration has on innovation

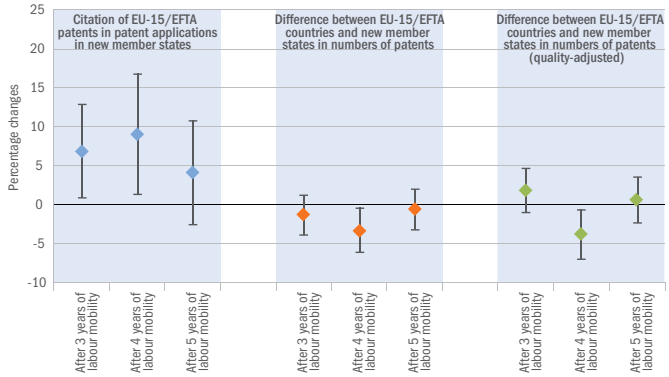
Emigration by skilled workers can potentially leave countries lacking the skills that are necessary to support innovation. However, emigrants often maintain close ties with their country of origin. Not only do they send remittances to family members, they also share acquired knowledge with former colleagues and employers, and the resulting cross-border knowledge flows have the potential to offset the negative impact on innovation.[17] In addition, migrants can also facilitate trade and FDI links. Moreover, migrants who return to their country of origin after a number of years abroad will bring with them any knowledge acquired abroad and may, in some cases, establish new firms. This may have a further indirect effect on innovation.[18]

In order to see which of those two opposing effects of emigration dominates, the analysis below looks at links between emigration and the frequency with which patents filed in migrants' countries of origin cite patents filed by inventors in migrants' destination countries, with such cross-

[16] This figure is obtained by multiplying the estimated coefficient (0.316) by the average maximum increase in the labour mobility index per year (0.25).

[17] See Kerr (2008) and Choudhury (2016) for a discussion of cross-country knowledge flows.
[18] See Felbermayr and Jung (2009), Bahar and Rapoport (2018), Javorcik et al. (2011) and Saxenian (2006).

**CHART 2.17.** Cross-border patent citations and patenting asymmetries between new EU member states and EU-15 and EFTA countries




**Source:** PATSTAT and authors' calculations.
**Note:** See Annex 2.5 for details of this regression analysis. Lines show the 95 per cent confidence interval for each estimate.

border patent citations representing a useful measure of knowledge flows between countries. In addition, that analysis also looks at rates of convergence in terms of the numbers of patents that are filed by inventors in countries of origin and destination countries.

It is noticeable, for example, that the number of cross-border citations in patent applications increased significantly following the introduction of free movement of labour between new EU member states and the EU-15 and the four EFTA countries (see Chart 2.16).

Furthermore, Chart 2.17 shows that the frequency with which patents filed in new EU member states cite patents filed in EU-15 and EFTA countries increases three to four years after the introduction of free movement of labour. At the same time, only a small part of that increase is driven by direct communication between migrant inventors and their former colleagues. If we exclude citations where an inventor cites a patent filed by someone with whom he or she has already filed one or more patents, the estimated impact declines slightly, but remains statistically significant, pointing to the importance of broader spillover effects within individual industries.

Importantly, migration from new EU member states to advanced European economies is also associated with a subsequent convergence in the numbers of patents filed by the two groups of countries. On average, firms in advanced European economies file more than three times the number of patents filed by firms operating in the same industries in new member states. Patents filed in advanced economies are also cited more in other patents and can therefore be regarded as being of higher quality. Migration has, on average, contributed to a narrowing of this gap, both in terms of the total number of patents filed and in terms of quality-adjusted measures of patenting (see Chart 2.17). This analysis suggests, therefore, that migration from new EU member states to advanced European economies has, on balance, resulted in a strengthening, rather than a weakening, of innovation in migrants' countries of origin.

**13%**

**OF THE DECLINE OBSERVED IN EMPLOYMENT IN 11 EBRD ECONOMIES IN CENTRAL AND SOUTH-EASTERN EUROPE BETWEEN 2010 AND 2016 CAN BE ATTRIBUTED TO ROBOTISATION.**

**ABOUT**

**40%**

**OF ALL MIGRANTS WHO HAVE LEFT COUNTRIES THAT JOINED THE EU IN 2004 HAD HIGH OR MEDIUM-SKILLED OCCUPATIONS IN THEIR HOME COUNTRIES**

## Conclusion

Over the last decade, many economies in the EBRD regions have experienced deindustrialisation and increased polarisation of jobs. The employment shares of the agriculture and manufacturing sectors have declined substantially, with professionals and service or sales workers now accounting for larger percentages of the labour force.

With a few exceptions, economies where the EBRD invests have tended to see improvements in educational attainment. At the same time, however, economies in the EBRD regions are lagging behind advanced comparators in terms of ICT-related skills, and the OECD's PISA tests point to wider challenges in terms of the quality – as opposed to the quantity – of education. Closing the gap in terms of ICT-related skills will help the regions' economies to leverage the benefits of future technological change while minimising the disruptive impact that digitalisation has on the labour market.[19] This may also help to leverage the full potential of online training courses and distance learning.

**THE PERCENTAGE OF FIRMS CITING A LACK OF SKILLS AS A MAJOR CONSTRAINT ON THEIR OPERATIONS WAS ALMOST**

**30%**

**IN 2008-09, UP FROM**

**12%**

**IN 2005**

**A MAXIMUM INCREASE IN EMIGRATION OPPORTUNITIES FOR A FIRM'S WORKFORCE WILL RESULT IN ITS TFP A YEAR LATER BEING ABOUT**

**7.5 PERCENTAGE POINTS**

**LOWER THAN IT WOULD HAVE BEEN IN THE ABSENCE OF EMIGRATION**

These economies have also seen profound technological change, as reflected in the rapidly rising numbers of industrial robots in operation. This increase in automation is estimated to account for 13 per cent of the total decline in employment in these economies. This effect is particularly pronounced among workers who are only educated to primary level. Policy responses to technological change need to do more to align the supply of skills with the demands of industry, as well as reducing barriers to education and increasing training opportunities for the most disadvantaged workers (as discussed in Chapter 1).

In many countries where the EBRD invests, skills shortages have been exacerbated by the emigration of skilled workers. The analysis in this chapter shows that the TFP of firms whose workers have had increased opportunities to emigrate following their countries' accession to the EU has been significantly lower than it would have been in the absence of emigration. On the other hand, foreign-owned and innovative firms have not experienced a negative impact on productivity, as they have been able to adjust to the changing environment by increasing personnel-related spending. Policies that support training and the upgrading of local skills, such as subsidies for training newly hired workers, can help firms to deal with increased employee turnover and minimise the adverse effects of emigration.

In the longer term, innovative firms in migrants' countries of origin benefit from larger inflows of knowledge on the back of higher levels of emigration. Indeed, an increase in knowledge transfers attributable to emigration has, over time, helped new EU member states to narrow the gap relative to advanced European economies in terms of numbers of patents and the quality of those patents. The positive impact that emigration has on innovation can be leveraged further by means of special programmes aimed at encouraging highly skilled emigrants to return to their country of origin. Conferences that put emigrants in contact with local inventors and firms can also help to increase cross-border knowledge flows.

[19] See OECD (2017).

## **BOX 2.1.** Enabling women to work more productively

The lack of availability or declining quality of public services is a major concern in many countries. In many post-communist countries, women bear the brunt of inadequate public services, as responsibility for caring for children, the elderly and the disabled has shifted back from the state to individuals.[20] In other regions (for instance, in some SEMED economies), such services were never really part of countries' social infrastructure in the first place.

Unpaid care work by women is often regarded as a cost-free alternative to the provision of care services by the state or the private sector. Care work is broadly defined as activities involved in meeting the physical, psychological and emotional needs of children, the elderly and the disabled.[21] Unpaid care and domestic work comprises basic household activities (such as cooking, fetching water and cleaning), plus unremunerated direct care for family and community members.

In the EBRD regions, women spend, on average, 3 hours more per day on unpaid work than men. In SEMED economies, women spend more than 5 hours per day on unpaid work (almost 5.5 hours in the case of Tunisia). Consequently, women's total working hours (including both paid and unpaid work) far exceed men's. Effectively, women have less time to dedicate to paid work.

When women do enter the labour market, it is rare for their care-related responsibilities to be sufficiently redistributed. As a means of reconciling unpaid care work and paid employment, women may accept part-time, informal, home-based work, which may be less well-paid. Women also tend to reduce their hours of paid work with each additional child, and mothers are overrepresented in part-time jobs. Data from the 2010 Labour Force Survey, which was conducted in 27 EU countries, indicate that 36 per cent of women with children work part-time, compared with 21 per cent of women without children.[22]

Part-time work can help women to combine paid work with care-related responsibilities, but this comes at a cost. Mothers who work part-time are much less likely to have managerial or professional occupations and more likely to have elementary occupations or be employed in the service industry. The fact that women are overrepresented in certain sectors and occupations contributes to gender wage gaps that undervalue women's labour and inflate the numbers of working poor.[23] Globally, the gender pay gap is estimated at around 20 per cent, and it is higher for workers with childcare responsibilities.[24]

Better public care services will allow more women to enter the labour force or increase the number of hours they work. This, in turn, will have a positive effect on economic growth through increased consumption in two-earner households, as well as through job creation in the care sector. Two studies in Australia have found that if the price of childcare is reduced by 50 per cent, labour supplied by young mothers rises by between 6.5 and 10 per cent.[25] Similarly, an increase in the subsidised provision of childcare, including public pre-primary school facilities, has been shown to have a positive and statistically significant impact on mothers' labour supply in Canada and Argentina.[26] In the same vein, a programme that increased free public childcare facilities in low-income neighbourhoods of Rio de Janeiro resulted in use of care increasing from 51 to 94 per cent, maternal employment rising from 36 to 46 per cent and employment rates almost doubling among mothers who did not work before giving birth.[27] Moreover, ILO analysis indicates that countries which invest more in care enjoy labour force participation rates of 70 per cent or more among women – significantly higher than the global average of 55 per cent.[28]

If women withdrew from unpaid care work, there would be a significant impact on both the labour market and GDP through the hiring of new care workers and through the new jobs performed by women (who had previously performed such tasks free of charge within their households). One way of estimating that impact is to calculate the number of hours that men and women in each age group spend on unpaid work each year and multiply that figure by an hourly wage rate that is assumed to be equal for men and women.

When estimated in this way, the size of the care economy ranges from 32 per cent of GDP in Bulgaria to 47 per cent of GDP in the Kyrgyz Republic. The care economy tends to be smaller where the labour force participation rate of women is higher, as women who stay at home tend to devote more time to care work. Thus, estimates of GDP would be substantially higher if the care economy was fully accounted for.

Recognising and valuing unpaid care work is central to addressing gender gaps in the labour market and closing the gender wage gap.

**IN THE EBRD REGIONS, WOMEN SPEND, ON AVERAGE,**

**3**

**HOURS MORE PER DAY ON UNPAID WORK THAN MEN**

**THE SIZE OF THE CARE ECONOMY RANGES FROM**

**32%**

**OF GDP IN BULGARIA TO**

**47%**

**OF GDP IN THE KYRGYZ REPUBLIC**

[20] See UNICEF (1999).
[21] See ILO (2018a).
[22] See Mills et al. (2014).
[23] See UN Women (2015) and ILO (2016).
[24] See Grimshaw and Rubery (2015), Flynn and Harris (2015) and Costa Dias et al. (2016).
[25] See Kalb (2009) and Gong et al. (2010).
[26] See Baker et al. (2008) and Berlinski and Galiani (2007).
[27] See Barros et al. (2011).
[28] See ILO (2018b).

## **BOX 2.2.** Projected labour market changes in the EBRD regions

There are many uncertainties in the world of work when it comes to the future of jobs and employment relationships. For example, there are concerns that employment conditions may deteriorate with the rise of the platform economy (economic activity that is made possible by new technological platforms). Similarly, the reallocation of labour across economic sectors – an intrinsic element of structural transformation – is also a cause of significant uncertainty.

This box analyses expected changes in employment relationships and working conditions across the EBRD regions over the period 2017-25, looking at aggregate sectors on the basis of the methodology developed in ILO (2018b).

Most economies in the EBRD regions are expected to experience substantial declines in the percentage of people working in the agricultural sector, with that sector's employment share falling by between 0.7 and 4 percentage points. That shift out of agriculture is expected to be somewhat less pronounced in central Europe and the Baltic states (CEB), as well as in Russia. In high-income comparator countries (the Czech Republic, France, Germany, Italy, Sweden and the United Kingdom), that shift is expected to be more limited (totalling 0.2 percentage points on average), reflecting the fact that advanced economies already have small agricultural sectors.

Unlike in the past, the structural shift away from agriculture is not expected to be accompanied by rising employment in manufacturing. Instead, employment in market services (such as wholesale and retail trade, transport and financial activities) is projected to increase further. Within market services, real estate and business and administration are projected to generate the most employment in the near future, followed by transport, storage and telecommunications, as well as restaurants and accommodation. The employment share of non-market services (such as public administration, education and healthcare) is also expected to rise, particularly in EU member states.

### Changes in working conditions owing to employment shifts across industries

Employment conditions can vary significantly across sectors and industries within a given country. ILO (2018b) presents a comprehensive analysis of the impact that employment shifts across sectors have on working conditions at the global level using a partial shift-share analysis. This methodology takes account of the impact that inter-sector changes have on working conditions, but takes no account of the impact of intra-sector changes.

At the level of the EBRD regions, a significant decline is expected in the incidence of vulnerable employment (defined as self-employment and contributing to domestic work), which will, among other things, reduce the probability of requiring social protection (see Chart 2.2.1). As such working conditions are prevalent in agriculture, the decline in that sector's employment share across the EBRD regions will translate into an overall reduction in the incidence of vulnerable employment. The total percentage of employment across these economies that is regarded as vulnerable is expected to fall by around 1 percentage point to stand at 19 per cent.

**CHART 2.2.1.** Impact of sectoral shifts on vulnerable employment, 2017-25


**Source:** ILO.
**Note:** These estimates are based on shift-share analysis, as described in ILO (2018b).

Structural shifts are expected to have a similar – albeit smaller – impact on the prevalence of part-time employment, temporary employment and time-related underemployment (where workers put in fewer hours than a specified threshold and would be willing to work additional hours). At the same time, the incidence of part-time employment and time-related underemployment could rise slightly in the CEB region, owing to the projected decline in the employment share of manufacturing – a sector typically characterised by full-time jobs with relatively stable hours – in those countries.

## **BOX 2.3.** Skills mismatches in the SEMED region

Skills mismatches – discrepancies between the supply of and demand for skills – remain an important bottleneck when it comes to economic development in the SEMED region, curtailing economic opportunities for employers and employees alike. Employers have to spend more on on-the-job training and endure lengthy recruitment campaigns, while workers have fewer employment opportunities. Many workers languish in jobs that they are overqualified for or take on duties that they are ill-prepared for, with negative implications for the aggregate productivity of the region's economies.

This problem is most acute among young people. Indeed, according to ILO data, more than a quarter of all people between the ages of 15 and 24 in the SEMED region are not in employment, education or training. Moreover, people educated to tertiary level account for 31 per cent of youth unemployment in Egypt and the West Bank and Gaza, and as much as 37 per cent in Tunisia, based on the latest available data from the ILO. Young women in SEMED economies tend to study for longer and gain higher qualifications than their male counterparts, but their employment outcomes tend to be much worse, especially when it comes to competing for private-sector jobs. Unsurprisingly, many young women end up leaving the labour market prematurely and forgoing further training.

The SEMED economies are among the most youthful in the EBRD regions, but they are also some of the economies that are struggling most to equip their populations with the right skills (as discussed in Chapter 1).

There are three different factors perpetuating skills mismatches in the SEMED region. First of all, shortcomings in primary and secondary education are ultimately resulting in demand for skills remaining unmet. Though levels of enrolment in compulsory education are high, approaching 100 per cent in some economies, teaching continues to rely excessively on passive engagement and rote learning. Outdated classroom resources are also obstacles to effective learning. Some pupils get by with the aid of costly after-school tuition, while others disengage altogether but remain technically enrolled on paper.

As a result, a considerable number of secondary school leavers fail to gain even a rudimentary understanding of key subject areas. Secondary school pupils in Jordan, Lebanon and Tunisia were among the worst performers in the OECD's 2015 PISA tests, which assessed the skills of 15-year-olds in 73 different economies. Across those three economies, between 60 and 75 per cent of pupils were classified as low achievers in mathematics; 46 to 72 per cent were regarded as low achievers in reading; and between 50 and 66 per cent of pupils were classed as low achievers in science. Furthermore, employers in Egypt, Morocco and Tunisia are among the least satisfied in the world with the quality of their countries' basic education, according to the World Economic Forum's Global Competitiveness Index 2017-2018.

Second, vocational education and training does not respond to employers' needs. In some cases, employers lack the initiative required to properly communicate their needs. And in other cases, providers of training may be too small to establish mutually beneficial partnerships with the business community. Whatever the cause, such dissonance is hindering improvements in the relevance and quality of training.

With EBRD support, sector skills councils (SSCs), such as the SSC for hospitality and tourism in Jordan, are now bringing together business leaders, education providers and policymakers. SSCs seek to improve vocational training at sector level by helping to establish feedback mechanisms between employers and training providers and ensuring that business needs are adequately reflected in sector-level qualifications frameworks.

More broadly, new opportunities for dual learning – whereby technical and vocational programmes combine traditional classroom-based learning with accredited experience in a business setting – represent promising developments. Dual learning enables businesses and education providers to work together to ensure that learning outcomes meet the industry's expectations. Such schemes enable learners to gain practical experience and develop business contacts.

Third, institutions such as national qualifications frameworks and labour market information systems are often underdeveloped or simply missing. Such institutions help to benchmark employers' needs against workers' skills and training outcomes. They also facilitate the forecasting of skill-related needs in the light of technological change. In the absence of such frameworks, potential labour market entrants lack clarity about demand for skills, which makes it harder to make informed decisions about education and training. The establishment of national qualifications frameworks and labour market information systems underpinned by coordinated private-sector involvement could go a long way towards addressing the issue of skills mismatches.

# Annex 2.1.
# Best practices for regulating crowdfunding

## Introduction

This section of the *Transition Report 2018-19* examines best practices for regulating investment-based and lending-based crowdfunding.

Lending-based crowdfunding is a form of crowdfunding whereby money is lent to individuals or businesses with a view to achieving a financial return in the form of interest payments and the repayment of capital over time.

In the case of investment-based crowdfunding, money is invested in unlisted shares or debt securities issued by businesses.

In 2018, the EBRD's Legal Transition team conducted a study analysing the regulatory frameworks governing lending-based and investment-based crowdfunding platforms in Austria, the Dubai International Financial Centre (DIFC), France, Germany, the United Kingdom and the United States of America.

That group of jurisdictions offers a considerable degree of variety in terms of geographical location, market maturity and the approach to regulating crowdfunding. The UK and the USA are world leaders in this area, with effective regulatory regimes underpinning highly developed markets, while Austria, France and Germany (as civil law jurisdictions) and the DIFC are, in the EBRD's experience, regarded as key points of reference for the EBRD regions and provide a different perspective on the various issues.

That EBRD study looked at (i) the types of authorisation that are required in order to operate crowdfunding platforms, (ii) capital and liquidity requirements, (iii) know-your-customer (KYC) and anti-money-laundering checks, (iv) restrictions on the size of loans and investable amounts, (v) consumer protection measures (including disclosures to investors), (vi) warnings regarding risks, and (vii) due diligence and pre-funding checks. The study culminated in a report published on 24 October 2018,[29] which made recommendations regarding best practices for the regulation of lending-based and investment-based crowdfunding platforms.

Several economies in the EU and in the EBRD regions have adopted (or are in the process of adopting) bespoke crowdfunding legislation, tailoring their regulatory frameworks to the needs of local markets. There is no consensus, however, as to what constitutes best practice in terms of the regulation of crowdfunding.

The EBRD's study helps to fill this gap, providing guidance on best practice in this area, and is applicable not only in the EBRD regions, but also in other countries around the world.

## Crowdfunding as a means of accessing finance

In the past few years, disruptive innovation has thrived and flourished in the financial services sector. Financial technology – "fintech" for short – is changing finance in many different ways. This disruption is posing a challenge to existing financial sector actors, but it is also creating opportunities – both for existing actors and for new entrants. By establishing an online market place where investors can be paired with investees, investment-based crowdfunding is increasing the level of competition in capital markets. Similarly, lending-based crowdfunding is boosting competition in respect of retail financial services by bringing lenders and borrowers together.

Besides providing an alternative source of financing, crowdfunding also offers a number of other benefits (see Table A.2.1.1 for an overview). It can, for example, help to attract other sources of funding, such as "business angels" or venture capital, with a recent study reporting that 45 per cent of angel investment in the UK takes place alongside crowdfunding investment.[30] Indeed, the presence of crowdfunding investment can help to validate the concept and finances of a novel project. It can also provide access to a large number of interested individuals, giving the entrepreneur valuable insights and information. And if a crowdfunding campaign is successful, it can act as a useful marketing tool. There is also evidence that crowdfunding may help women entrepreneurs to obtain investment funding from other women, in situations where women tend to find it difficult to secure financing for their entrepreneurial endeavours.[31]

## Risks associated with crowdfunding

As with all investment, crowdfunding entails a number of risks, including project and liquidity risks, the risk of cyberattacks and the risk of platform failures. The lack of experience and expertise among potential investors is a major concern, particularly given the limited mandatory screening of borrowers in some jurisdictions (including the USA).

Other concerns relate to the reliability of investment, the lack of regulation and the existence of differing regulatory regimes for retail investors and SMEs. At the same time, if appropriate safeguards are put in place in order to protect investors, crowdfunding has the potential to act as an important source of non-bank financing, helping to support job creation, economic growth and competitiveness.

## Findings of the EBRD's study

The question of what constitutes best practice as regards the regulatory framework governing crowdfunding platforms in a specific jurisdiction must necessarily take account of, and be informed by, the broader context in that particular jurisdiction. As a result, there is no one-size-fits-all approach when it comes to regulating platforms. That being said, the EBRD's study succeeded in identifying certain aspects of regulatory frameworks which appear to represent best practice and would probably prove beneficial in the vast majority of jurisdictions (as well as a number of optional additional measures, which could also be deployed depending on the context).

[29] See EBRD (2018).

[30] See Wright et al. (2015).
[31] See Greenberg and Mollick (2017).

**TABLE A.2.1.1.** Benefits of crowdfunding

| Benefits for those seeking capital | Benefits for those providing capital | Broader benefits for entrepreneurs | Benefits for the economy or society |
|---|---|---|---|
| • Ability to obtain capital in an accessible and competitive market place<br>• Ability, in most cases, to raise capital without giving up large amounts of equity in return<br>• Alternative to venture and seed capital (particularly where access to the latter is limited)<br>• Reduced cost of capital<br>• Quicker access to capital, with less friction | • Higher returns relative to other lending and investment opportunities<br>• Risk-spreading mechanisms (not only in terms of the impact of a single defaulting borrower or investee on multiple lenders or investors, but also in terms of lenders or investors having a range of potential borrowers or investees to fund)<br>• Investable asset class for alternative credit providers (such as funds and other investors) | • Alternative way of obtaining proof of concept and validation of ideas<br>• Diverse market for other sources of funding<br>• Access to broad range of insights and information<br>• Potential to use crowdfunding as a marketing tool | • Supports economic activity, particularly in relation to SMEs<br>• Resilient source of funding in a downturn, when access to conventional sources of finance is more limited[32]<br>• Greater competition in respect of retail financial services<br>• Possible social impact of increased female representation |

**Source:** EBRD.

The main conclusions of the EBRD's analysis were as follows:

- Where platforms' activities are aligned with other regulated activities, it may be possible to regulate crowdfunding by adapting an existing framework. However, a truly bespoke regime may be more appropriate.
- Imposing minimum capital requirements on platforms can help to ensure that operational and compliance costs continue to be covered in the event of financial distress. Capital requirements should be based on the nature and scale of the activities undertaken by the relevant platform and should be commensurate with the attendant risk.
- Platforms should be required to establish and maintain risk management systems and controls that can identify, track, report, manage and mitigate risks to their business (including operational risk, risks relating to cybersecurity and the protection of personal data, and the risk that the platform could be used to commit financial crimes).
- Platforms need to ensure that their senior management and employees are "fit and proper persons" to perform their roles. Platforms need to be able to assess this themselves.
- Platforms should have primary responsibility for identifying, reporting, managing and mitigating any conflicts of interest.
- The financial services regulator should, where appropriate, have the power to prevent platforms from investing in the projects they feature.
- Platforms should be subject to specific disclosure requirements, in order to ensure that investors and investees understand how platforms operate and earn revenue.
- Disclosures to investors and warnings regarding risks need to be tailored to the relevant product offered by the platform.
- There may be good reasons to differentiate between retail investors and institutional investors when it comes to providing information. Retail investors may benefit from receiving risk warnings and disclosures that are more explicit than those provided to institutional investors.
- A regime which differentiates between different types of investor is preferable to one that requires detailed suitability checks for all investors. Financial services regulators are best placed to decide on appropriate categories of investor.
- Platforms should be required to enter into agreements with their clients governing all key aspects of the client-platform relationship.
- Platforms should be permitted – but not necessarily obliged – to offer automated tools supporting the diversification of investors' portfolios.
- It is appropriate for lending-based platforms to provide information to investors on their post-investment arrangements and arrangement rights, whether that involves a trustee-type arrangement or a different type of enforcement mechanism.
- Platforms should be required to carry out KYC checks on their clients. The extent of those checks may vary on the basis of a risk assessment performed by the platform. Financial services regulators are best placed to provide platforms with guidance in this regard, which should be in keeping with the KYC requirements of the relevant jurisdiction. Such guidance should also be commensurate with the risk posed by clients.

The recommendations set out above cover just some of the best practices identified by the study, which the EBRD believes would be beneficial in the vast majority of jurisdictions. For a full list of those best practices, as well as details of the optional additional measures identified, see EBRD (2018).

## Conclusion

The EBRD hopes that these recommendations will help regulators in the EBRD regions to establish effective regulations governing crowdfunding platforms – which will, in turn, give greater legitimacy to those platforms, while ensuring that investors are adequately protected.

Indeed, the EBRD's Legal Transition team is already assisting the Capital Markets Board of Turkey and the Astana International Financial Centre in Kazakhstan with the establishment of new crowdfunding regulations, in line with the best practices identified by the study. With various other countries expressing an interest in fostering the development of crowdfunding (and fintech more broadly), similar work is expected to be carried out in other jurisdictions across the EBRD regions in due course.

[32] See Kirby and Worner (2014).

# Annex 2.2.
## Job polarisation and macroeconomic indicators

**TABLE A.2.2.1** Pair-wise correlations between job polarisation and macroeconomic indicators

| | Job polarisation | Log of increase in robot density (2006-16) | Trade openness (2014) | Employment share of primary sector (2016) | Human Capital Index (2014) | Log of GDP per capita (2016) |
|---|---|---|---|---|---|---|
| Job polarisation | 1 | | | | | |
| Log of increase in robot density (2006-16) | -0.41***<br>-0.34 | 1 | | | | |
| Trade openness (2014) | -0.28**<br>-0.15 | -0.32**<br>0.51** | 1 | | | |
| Employment share of primary sector (2016) | 0.58***<br>0.76*** | -0.46***<br>-0.66*** | -0.27***<br>-0.51*** | 1 | | |
| Human Capital Index (2014) | -0.20*<br>0.02 | 0.56***<br>0.41* | 0.25***<br>0.50*** | -0.75***<br>-0.39** | 1 | |
| Log of GDP per capita (2016) | -0.34***<br>-0.61** | 0.15<br>0.84*** | 0.45***<br>0.38** | -0.65***<br>-0.73*** | 0.58***<br>0.34* | 1 |

**Source:** ILO, IFR, Penn World Tables, IMF and authors' calculations.
**Note:** Based on 155 economies. *, ** and *** denote values that are statistically significant at the 10, 5 and 1 per cent levels respectively. "Job polarisation" is the change in the employment share of medium-skilled occupations over the period 2006-16 in percentage points. "Trade openness" is the sum of exports and imports as a percentage of GDP. In each case, the top value relates to the global sample and the bottom value relates to the economies of the EBRD regions.

# Annex 2.3.
## Data on the use of robots, employment and ICT

### Use of robots and employment

Data on the stock of industrial robots by industry, country and year come from the IFR and are based on annual surveys of robot suppliers. This dataset covers 22 economies in the EBRD regions and relates to the period 1993-2016. Dedicated industrial robots that are designed to perform a single task are not included in the dataset.

Data are also taken from the micro-level harmonised Labour Force Survey conducted by Eurostat, which covers 11 countries where the EBRD invests (Bulgaria, Croatia, Estonia, Greece, Hungary, Latvia, Lithuania, Poland, Romania, the Slovak Republic and Slovenia). Using those surveys, the outcome variable (the employment rate) can be constructed for specific demographic groups by aggregating individual responses by age, level of education, gender or industry (whereby socio-economic groups with fewer than five observations are disregarded).[33]

### ICT-intensity

In line with Marcolin et al. (2016), the ICT-intensity of an industry is defined as the percentage of employees in that industry who have ICT-related occupations, on the basis of the pan-EU Labour Force Survey. ICT-related occupations include computing professionals and associate professionals (for instance, computer system designers and industrial robot controllers), plus electrical and electronic equipment mechanics and fitters. Data on total populations and working-age populations are taken from the World Bank's World Development Indicators database. Exposure to Chinese imports is calculated as the change in Chinese imports between 2010 and 2016 using bilateral trade flow data from UN Comtrade.

### Firms' performance

Firm-level panel data for the period 2000-14 come from Bureau Van Dijk's Amadeus dataset. This annual dataset covers all industries and provides information on firms' size, sales, profits, employment costs, materials, assets, ownership structures and patents. These data are used to estimate TFP.

[33] See Chiacchio et al. (2018) for a similar approach.

WITH MORE THAN

**9.3**

**ROBOTS**

FOR EVERY 1,000 WORKERS, THE SLOVAK REPUBLIC AND SLOVENIA HAVE THE HIGHEST LEVELS OF ROBOT DENSITY IN THE EBRD REGIONS

EACH ADDITIONAL ROBOT PER 1,000 WORKERS REDUCES THE EMPLOYMENT RATE BY

**0.7**

**PERCENTAGE POINT**

## Innovation

Data on innovation come from the autumn 2014 edition of the European Patent Office's Worldwide Patent Statistical Database (PATSTAT) and cover 32 European countries. They include information on the location of the inventors and applicants for each patent. The number of patent applications in a given country serves as a measure of innovation, while the number of cross-border citations serves as a measure of knowledge flows.

The number of patent applications is aggregated by country, industry and year. The number of patent citations is aggregated by patenting country (the country of origin), cited country (the destination country), industry and year. If a patent has several international collaborators, it is assigned to the various countries in proportion to the number of inventors from each country. The sample covers the period 2000-14.

## Other variables

Data on industry-level output, investment and employment, as well as bilateral industry-specific FDI flows, come from Eurostat. Measures of countries' proximity to each other and data on bilateral trade flows are taken from the CEPII database. Country-level variables such as GDP and FDI come from the World Bank.

# Annex 2.4.
## Estimating the impact that robotisation has on employment

The following IV specification is estimated in order to establish the causal relationship between robotisation and the employment rate (defined as the percentage of the labour force that is in employment) across various industries and countries:

$$\Delta EmploymentRate_{cigae,2010-2016} = \beta_0 + \beta_1 \Delta IV(Exposure\ to\ Robots)_{ci,2010-2016} + \beta_2 \Delta ICT_{ci,2010-2016} + \gamma_c + \varepsilon_{ci}$$

The dependent variable is the change in the employment rate between 2010 and 2016, calculated separately for each gender *(g)*, age group *(a)* and level of educational attainment *(e)* in country *c* and industry *i*.

$\Delta(Exposure\ to\ Robots)_{ci,2010-2016}$

is the change in the number of robots deployed per 1,000 workers in country *c* and industry *i* between 2010 and 2016. Total employment in country *c* and industry *i* in 2009 is used as the denominator for robot density ratios to ensure that those ratios do not capture robot-induced changes in employment in the sample period.[34] Country dummies $\gamma_c$ control for all time-invariant country characteristics. $\Delta ICT_{ci,2010-2016}$ (the change in the percentage of employees with ICT-related occupations within each industry in a given country between 2010 and 2016) measures exposure to ICT.

The time period chosen, 2010-16, focuses the analysis on medium-term trends. Various fixed effects absorb trends that are common across particular countries, industries and demographic groups. Robust standard errors are two-way clustered at the country-industry level. All regressions are weighted by the baseline industry employment structure in each country to account for differences in the relative importance of industries.[35] Some specifications also include the total population, the share of the working-age population and exposure to Chinese imports.

There remains a concern that certain unobserved trends may affect both robotisation and employment in the absence of a causal relationship between the two. Causality could also run in the opposite direction, with changes in the employment rate affecting robotisation. In order to address such concerns, this analysis follows the example of Acemoğlu and Restrepo (2017) in using two-stage least squares (2SLS) with IV. The instrument,

$\Delta IV(Exposure\ to\ Robots)_{ci,2010-2016}$

captures changes in the use of robots across various sectors in 11 comparator economies outside the EBRD regions. Such changes capture trends in robotisation, but are not influenced by changes in employment in the EBRD regions.

[34] See Acemoğlu and Restrepo (2017) and Chiacchio et al. (2018).
[35] See Graetz and Michaels (2018).

# Annex 2.5.
## Estimating the impact that the emigration of skilled workers has on firms

This annex looks at the empirical strategy that is used to establish the causal impact which emigration has on firms' performance. Baseline estimations represent regressions of firm-level outcomes (TFP, personnel costs and capital-to-labour ratios) on the labour mobility index.

### Institutional background to labour mobility

A total of 10 countries (including eight in central Europe) joined the EU in 2004, and Bulgaria and Romania followed suit in 2007. The existing EU member states (the EU-15) and the four EFTA countries (Iceland, Liechtenstein, Norway and Switzerland) were able to restrict the free movement of labour from those new EU member states for up to seven years. Countries exercised this right to varying degrees. For example, the United Kingdom completely opened up its labour market to the 10 countries that acceded to the EU in 2004. In contrast, France kept transitional provisions in place until 2008, limiting free movement of labour to construction, tourism and catering. The United Kingdom then restricted migration from Bulgaria and Romania for the full seven years (that is to say, until 2014). At the other end of the spectrum, Germany restricted migration from all new EU member states for the full seven years.

### Indicator of labour mobility

The differences between new EU member states' access to the labour markets of advanced European economies are captured by a set of dummy variables $D_{odit}$, which are defined for each new member state *(o)*, industry *(i)*, potential destination country *(d)* and year *(t)*. The indicator takes a value of 1 if legislation in the destination country opened that specific industry up to migration from the new member state in question; otherwise, it has a value of 0.

Those legislation-based dummy variables are, in turn, multiplied by a measure of labour shortages in a given industry in a destination country. This measure captures the percentage of firms that are constrained by the unavailability of labour according to a European Commission business survey.

The resulting variable captures not only legislative barriers to migration, but also implicit industry-specific demand for migrants in destination countries. The weighted average of these variables can be used to measure exposure to emigration for each industry in a given country of origin. The weights applied to potential destination countries are based on the distance between the largest cities in the two countries in question. For instance, firms in Estonia are more likely to be exposed to emigration when Finland's labour market opens up, rather than when restrictions are lifted in Malta.

$$FL\,M_{cit} = \sum_{d=1}^{19} = w_{do} D_{odit}$$

In this instance, variation in the rules governing labour market access was driven mainly by the political landscapes in the various destination countries and is unlikely to have been related to the performance of firms in the countries of origin of potential migrants.[36] It can therefore be used to establish the causal impact that emigration had on firms' performance.

The resulting labour mobility index (FLM) is standardised such that it ranges from 0 to 1 and can be used as follows in reduced-form regressions capturing the intention-to-treat effect:

$$Y_{fict} = \beta_1 FLM_{ict-1} + \gamma_1 a_{ft} + \gamma_2 I_{ict-1} + \gamma_3 J_{it} + \gamma_4 C_{ct} + \tau_t + \nu_f + \epsilon_{ft}$$

Dependent variables are measures of firms' performance. Control variables include the age of the firm ($a_{ft}$), as well as industry-specific variables ($I_{ict-1}$) such as total investment and average mark-up (the ratio of revenues to costs) which reflect common trends in terms of competition or demand for labour that may affect firms' performance. $J_{it}$ are industry-specific controls measured at the aggregate EU level. These include total sales and labour shortages. Country-level controls $C_{ct}$ include an EU membership dummy, GDP and FDI inflows. Specifications include firm and time fixed effects. Standard errors are clustered at the country-industry level (two-digit NACE[37] level).

Firm-level TFP is calculated using a TFP index, as in Gorodnichenko and Schnitzer (2013), or using a semi-parametric approach in line with Levinsohn and Petrin (2003). The latter method accounts for the fact that unobserved productivity shocks may affect firms' inputs and performance at the same time. The return on assets (the ratio of earnings before interest and tax to total sales) is used as an alternative measure of productivity.

### Impact on knowledge flows

The following empirical model estimates the effect that emigration has on knowledge flows between destination country d and country of origin o in industry i in year t:

$$Y_{odit} = \beta_1 FLM_{odit-l} + \gamma_1 I_{odit-l} + \gamma_2 P_{oit} + \gamma_3 P_{dit-3} + \gamma_4 J_{it} + \gamma_5 C_{odt} + \tau_t + \nu_{odi} + \epsilon_{odit}$$

The outcome of interest is the log of the number of times that patents in destination countries are cited in patents filed by inventors from migrants' countries of origin (in this case, the 10 new EU member states in central and south-eastern Europe). For example, the number of Belgian patents that are cited in Polish patents filed in year *t* measures knowledge flows from Belgium to Poland.

The specifications include multiple lags aimed at capturing events several years after the introduction of free movement of

[36] See Constant (2011), Kahanec (2012) and Kahanec et al. (2014) for cross-country analysis of emigration from new member states following their accession to the EU.
[37] NACE refers to the industry standard classification system used in the European Union.

labour. In this case, the labour mobility index is a dummy variable indicating whether a specific industry in a destination country was open to migrants from a given country of origin in a given year. Specifications also control for (i) the total number of patent applications in a given industry in the country of origin, (ii) the lagged number of patent applications in a given industry in the destination country, (iii) bilateral industry-specific and country-wide FDI and trade flows (using the same lags as for the FLM index), (iv) the total number of patents in a given industry at the EU level, (v) a dummy variable indicating pairs of countries that are both EU members and (vi) time and origin-destination-industry fixed effects. Standard errors are clustered at the origin-destination-industry level (two-digit NACE level).

## Patenting asymmetries

A similar regression analysis is used to estimate the effect that emigration has on innovation. It uses the same set of explanatory variables, while the outcome variable is the difference between the log of the number of patent applications in migrants' countries of destination and the equivalent figure for their countries of origin, calculated for each industry and year. This measure captures convergence between new EU member states and advanced European economies in terms of industry-specific innovation. The coefficients for the various lags relative to the introduction of free movement of labour ($\beta_1$) indicate whether convergence in patenting within individual industries has become stronger following the introduction of free movement.

# References


**D. Acemoğlu and P. Restrepo (2017)**
"Robots and Jobs: Evidence from US Labor Markets", NBER Working Paper No. 23285.

**D.H. Autor and D. Dorn (2013)**
"The Growth of Low-Skill Service Jobs and the Polarization of the US Labor Market", *American Economic Review,* Vol. 103(5), pp. 1553-1597.

**D. Bahar and H. Rapoport (2018)**
"Migration, Knowledge Diffusion and the Comparative Advantage of Nations", *The Economic Journal,* Vol. 128, pp. F273-F305.

**M. Baker, J. Gruber and K. Milligan (2008)**
"Universal Child Care, Maternal Labor Supply, and Family Well-Being", *Journal of Political Economy,* Vol. 116, pp. 709-745.

**R. Barro and J.-W. Lee (2013)**
"A New Data Set of Educational Attainment in the World, 1950-2010", *Journal of Development Economics,* Vol. 104, pp. 184-198.

**R.P. de Barros, P. Olinto, T. Lunde and M. Carvalho (2011)**
"The Impact of Access to Free Childcare on Women's Labor Market Outcomes: Evidence from a Randomized Trial in Low-Income Neighborhoods of Rio de Janeiro", paper prepared for the 2011 World Bank Economists' Forum.

**U. Batsaikhan, Z. Darvas and I. Raposo (2018)**
"People on the Move: Migration and Mobility in the European Union", *Bruegel Blueprint Series,* Vol. 28.

**S. Berlinski and S. Galiani (2007)**
"The effect of a large expansion of pre-primary school facilities on preschool attendance and maternal employment", *Labour Economics,* Vol. 14, pp. 665-680.

**N. Bloom, C. Propper, S. Seiler and J. Van Reenen (2015)**
"The impact of competition on management quality: evidence from public hospitals", *The Review of Economic Studies,* Vol. 82, pp. 457-489.

**F. Chiacchio, G. Petropoulos and D. Pichler (2018)**
"The Impact of Industrial Robots on EU Employment and Wages: A Local Labour Market Approach", *Bruegel Working Papers,* Issue 2.

**P. Choudhury (2016)**
"Return migration and geography of innovation in MNEs: a natural experiment of knowledge production by local workers reporting to return migrants", *Journal of Economic Geography,* Vol. 16, pp. 585-610.

**A.F. Constant (2011)**
"Sizing It Up: Labor Migration Lessons of the EU Enlargement to 27", IZA Discussion Paper No. 6119.

**M. Costa Dias, W. Elming and R. Joyce (2016)**
"The gender wage gap", IFS Briefing Note No. BN186.

**W. Dauth, S. Findeisen, J. Südekum and N. Wößner (2017)**
"German Robots – The Impact of Industrial Robots on Workers", Institute for Employment Research Discussion Paper No. 30/2017.

**C. Dustmann, T. Frattini and A. Rosso (2015)**
"The Effect of Emigration from Poland on Polish Wages", *The Scandinavian Journal of Economics,* Vol. 117, pp. 522-564.

**EBRD (2018)**
"Innovative and alternative finance: best practices for the regulation of crowdfunding platforms".

**B. Elsner (2013)**
"Does emigration benefit the stayers? Evidence from EU enlargement", *Journal of Population Economics,* Vol. 26, pp. 531-553.

**G.J. Felbermayr and B. Jung (2009)**
"The pro-trade effect of the brain drain: Sorting out confounding factors", *Economics Letters,* Vol. 104, pp. 72-75.

**S. Flynn and M. Harris (2015)**
"Mothers in the New Zealand workforce", *Labour, Employment and Work in New Zealand,* Statistics New Zealand.

**C.B. Frey and M.A. Osborne (2017)**
"The future of employment: How susceptible are jobs to computerisation?", *Technological Forecasting and Social Change,* Vol. 114, pp. 254-280.

**C. Gathmann and U. Schönberg (2010)**
"How general is human capital? A task-based approach", *Journal of Labor Economics,* Vol. 28, pp. 1-49.

**X. Gong, R. Breunig and A. King (2010)**
"How Responsive is Female Labour Supply to Child Care Costs? New Australian Estimates", IZA Discussion Paper No. 5119.

**M. Goos and A. Manning (2007)**
"Lousy and lovely jobs: The rising polarization of work in Britain", *The Review of Economics and Statistics,* Vol. 89, pp. 118-133.

**Y. Gorodnichenko and M. Schnitzer (2013)**
"Financial constraints and innovation: Why poor countries don't catch up", *Journal of the European Economic Association,* Vol. 11, pp. 1115-1152.

**G. Graetz and G. Michaels (2018)**
"Robots at Work", LSE working paper.

**J. Greenberg and E. Mollick (2017)**
"Activist Choice Homophily and the Crowdfunding of Female Founders", *Administrative Science Quarterly,* Vol. 62, pp. 341-374.

**D. Grimshaw and J. Rubery (2015)**
"The motherhood pay gap: A review of the issues, theory and international evidence", ILO Conditions of Work and Employment Series, No. 57.

**M. Handel (2012)**
"Trends in Job Skill Demands in OECD Countries", OECD Social, Employment and Migration Working Paper No. 143.

**IFR (2017)**
"IFR forecast: 1.7 million new robots to transform the world's factories by 2020", IFR press release, 27 September, Frankfurt am Main, https://ifr.org/ifr-press-releases/news/ifr-forecast-1.7-million-new-robots-to-transform-the-worlds-factories-by-20 (last accessed 26 September 2018).

**ILO (2016)**
*Women at Work: Trends 2016,* Geneva.

**ILO (2018a)**
*Care work and care jobs for the future of decent work,* Geneva.

**ILO (2018b)**
*World Employment and Social Outlook: Trends 2018,* Geneva.

**B. Javorcik, C. Ozden, M. Spatareanu and C. Neagu (2011)**
"Migrant networks and foreign direct investment", *Journal of Development Economics,* Vol. 94, pp. 231-241.

**M. Kahanec (2012)**
"Labor Mobility in an Enlarged European Union", IZA Discussion Paper No. 6485.

**M. Kahanec, M. Pytlikova and K.F. Zimmermann (2014)**
"The Free Movement of Workers in an Enlarged European Union: Institutional Underpinnings of Economic Adjustment", IZA Discussion Paper No. 8456.
**G. Kalb (2009)**
"Children, Labour Supply and Child Care: Challenges for Empirical Analysis", *The Australian Economic Review,* Vol. 42, pp. 276-299.
**W.R. Kerr (2008)**
"Ethnic Scientific Communities and International Technology Diffusion", *The Review of Economics and Statistics,* Vol. 90, pp. 518-537.
**E. Kirby and S. Worner (2014)**
"Crowdfunding: An Infant Industry Growing Fast", IOSCO Research Department Staff Working Paper.
**J. Levinsohn and A. Petrin (2003)**
"Estimating Production Functions Using Inputs to Control for Unobservables", *The Review of Economic Studies,* Vol. 70, pp. 317-341.
**J. Manyika, M. Chui, M. Miremadi, J. Bughin, K. George, P. Willmott and M. Dewhurst (2017)**
"A Future that Works: Automation, Employment, and Productivity", McKinsey Global Institute, McKinsey & Company.
**L. Marcolin, S. Miroudot and M. Squicciarini (2016)**
"GVCs, Jobs And Routine Content Of Occupations", OECD Trade Policy Paper No. 187.
**K. Mayr and G. Peri (2009)**
"Brain Drain and Brain Return: Theory and Application to Eastern-Western Europe", *The B.E. Journal of Economic Analysis & Policy,* Vol. 9, pp. 1-52.
**M. Mills, F. Tsang, P. Präg, K. Ruggeri, C. Miani and S. Hoorens (2014)**
"Gender equality in the workforce. Reconciling work, private and family life in Europe", RAND Europe.
**L. Nedelkoska and G. Quintini (2018)**
"Automation, skills use and training", OECD Social, Employment and Migration Working Paper No. 202.
**OECD (2017)**
*OECD Employment Outlook 2017,* Paris.
**D. Parent (2000)**
"Industry-specific capital and the wage profile: Evidence from the national longitudinal survey of youth and the panel study of income dynamics", *Journal of Labor Economics,* Vol. 18, pp. 306-323.
**A. Saxenian (2006)**
*The New Argonauts,* Harvard University Press.
**UNICEF (1999)**
*Women in Transition,* International Child Development Centre Regional Monitoring Report No. 6, Florence.
**UN Women (2015)**
*Progress of the World's Women 2015-2016: Transforming Economies, Realizing Rights,* New York.
**World Bank (2016)**
*World Development Report 2016: Digital Dividends,* Washington, DC.
**M. Wright, M. Hart and K. Fu (2015)**
"A nation of angels: Assessing the impact of angel investing across the UK", Enterprise Research Centre report.

# 3 INTERNATIONAL MIGRATION

Emigration rates in the EBRD regions have been rising since 1990. Single, male, young and highly educated individuals from urban areas are more likely to migrate than their peers. Low satisfaction with the quality of local amenities (such as air and water, education, healthcare, housing, and roads and transport) is strongly associated with intentions to migrate. Many countries in these regions also serve as transit and/or host countries for refugees and irregular migrants from other parts of the world, who tend to be single, male, young and reasonably well educated (relative to the average level in their country of origin). Well educated refugees and irregular migrants often select their intended country of destination with a view to maximising the return on their skills, while those with lower levels of education are more likely to head for countries that have better integration policies and faster asylum processes.

# Introduction

The total number of international migrants around the world – a figure that includes both voluntary migration and forced displacement – has continued to grow rapidly. It reached 258 million in 2017, up from 153 million in 1990, according to figures compiled by the United Nations Department of Economic and Social Affairs (UN DESA).[1] People residing in a country where they were not born, or of which they do not hold citizenship, totalled 3.4 per cent of the world's population in 2017, up from 2.9 per cent in 1990. Most of those people are economic migrants – people who have travelled abroad voluntarily in search of economic opportunities. Such migration can be short-term, long-term or circular (see Box 3.1 for a discussion of circular migration).

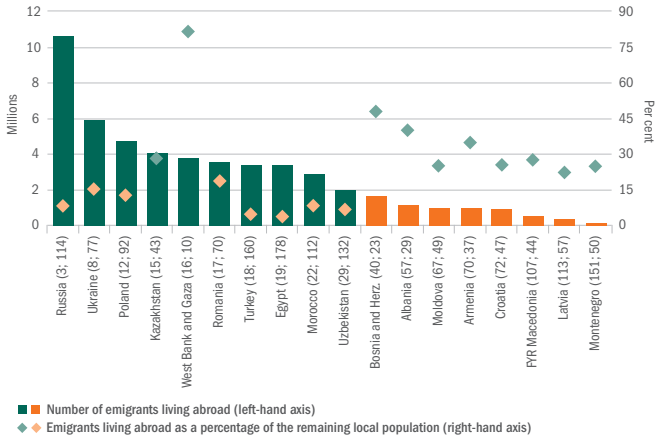
The total number of refugees – people who have been forcibly displaced as a result of natural disasters, political persecution or war – has also continued to rise, standing at 20 million in 2017, up from 17 million in 1990, according to the Office of the United Nations High Commissioner for Refugees (UNHCR). However, the number of refugees has fallen as a percentage of the world's population over that period, declining from 0.33 per cent to 0.26 per cent.

While almost two-thirds of all economic migrants reside in high-income countries, developing countries host nearly 80 per cent of the world's refugees and asylum seekers.[2] To be granted refugee status, an asylum seeker must face a well-founded fear of persecution on the grounds of race, religion, nationality or membership of a particular social group.

Emigration rates in the EBRD regions have consistently been higher than the global average. Indeed, in 2017, 9.7 per cent of all people who were born in the EBRD regions or held citizenship of a country in these regions lived outside their country of birth or citizenship, up from 8.1 per cent in 1990.

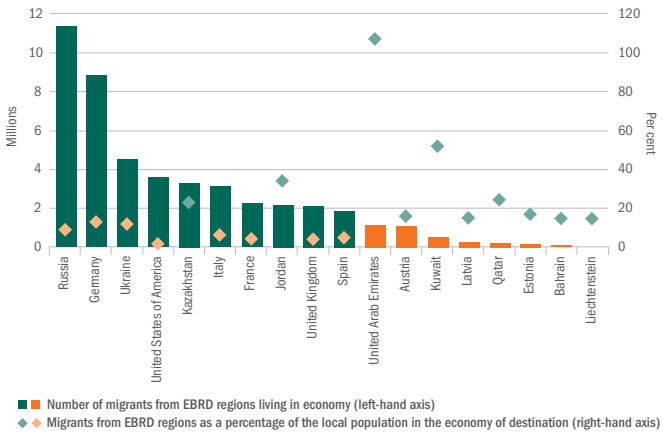
This chapter looks at the factors that are contributing to the large numbers of migrants leaving economies in the EBRD regions. The first section of the chapter provides a snapshot of current migration trends. The second section then looks at the profile of a potential economic migrant – an individual who is considering moving abroad – before investigating the factors that shape migration decisions and examining the ways in which these factors differ across specific groups of individuals. The last section looks at recent flows of refugees from conflict areas and examines the socio-demographic characteristics of migrants who have made their way to Europe.

**CHART 3.1.** Top 10 economies of origin in the EBRD regions in absolute and percentage terms




**Source:** UN DESA (2017a) and authors' calculations.
**Note:** Data relate to 2017. "Emigrants" are defined here as people who are no longer living in their economy of birth or citizenship. The numbers in parentheses indicate the position of each economy in the global rankings in terms of the absolute number of emigrants and emigrants as a percentage of the remaining local population respectively. The dark green bars and diamonds indicate the top 10 economies in absolute and percentage terms respectively.

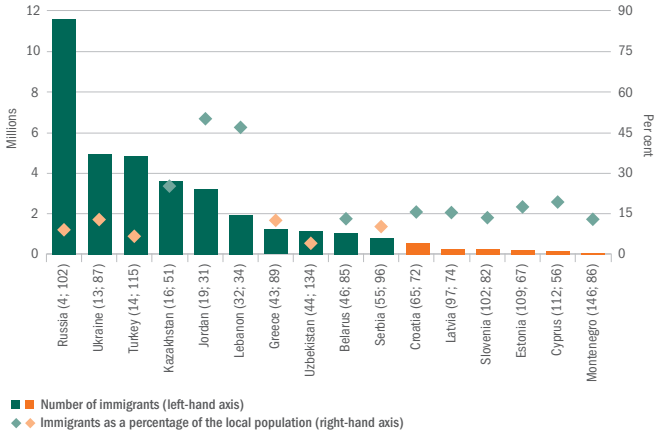
**CHART 3.2.** Top 10 destinations for migrants leaving economies in the EBRD regions in absolute and percentage terms




**Source:** UN DESA (2017a) and authors' calculations.
**Note:** Data relate to 2017. "Migrants" are defined here as people who are no longer living in their economy of birth or citizenship. The dark green bars and diamonds indicate the top 10 economies in absolute and percentage terms respectively.

[1] UN DESA does not not publish statistics for Kosovo separately, hence the country is excluded from all calculations and charts in this chapter that use UN DESA data.
[2] See UN DESA (2017b).

**CHART 3.3.** Top 10 destinations in the EBRD regions in absolute and percentage terms




**Source:** UN DESA (2017a) and authors' calculations.
**Note:** Data relate to 2017. "Immigrants" are defined here as people who are no longer living in their economy of birth or citizenship. The numbers in parentheses indicate the position of each economy in the global rankings in terms of the absolute number of immigrants and immigrants as a percentage of the local population respectively. The dark green bars and diamonds indicate the top 10 economies in absolute and percentage terms respectively.

**THE TOTAL NUMBER OF INTERNATIONAL MIGRANTS AROUND THE WORLD – WHICH INCLUDES BOTH VOLUNTARY MIGRATION AND FORCED DISPLACEMENT – REACHED**

**258 MILLION**

**IN 2017**

**THE TOTAL NUMBER OF REFUGEES WORLDWIDE STOOD AT**

**20 MILLION**

**IN 2017**

## Migration trends in the EBRD regions

### Emigration

What do we know about the geography of migration in the EBRD regions? Russia and Ukraine are both in the top 10 economies of origin worldwide in terms of absolute numbers of migrants (see Chart 3.1), with Russia ranked third, after India and Mexico. The West Bank and Gaza have the highest rate of emigration in the EBRD regions (and the 10th highest in the world) as a percentage of total population, with their 3.8 million emigrants equating to 82 per cent of the remaining local population.

The main destinations for migrants leaving economies in the EBRD regions are Russia, Germany, Ukraine, the United States of America (USA) and Kazakhstan (see Chart 3.2). Indeed, almost 98 per cent of migrants living in Russia come from within the EBRD regions, with more than 6 million coming from eastern Europe and the Caucasus (EEC) and almost 5 million coming from Central Asia. Conversely, more than 4 million people who were born in Russia or hold Russian citizenship are now living in the EEC region, while almost 4 million live in Central Asia.

Around 3 million people originating from the southern and eastern Mediterranean (SEMED) currently live in a different economy in the SEMED region. Another 9 million are living outside the EBRD regions, mainly in Europe and Gulf Cooperation Council (GCC) countries. European countries are also the main destination for the roughly 8.9, 10.4 and 3.4 million migrants originating from central Europe and the Baltic states (CEB), south-eastern Europe (SEE) and Turkey, respectively, playing host to 7.3 million migrants from CEB countries, 8 million from SEE countries and 2.8 million from Turkey.

These figures represent stocks of migrants, so they reflect past migration flows, but they can also help us to understand future migration patterns. Indeed, existing networks of migrants abroad may be an important pull factor for people who are considering migrating.[3] The presence of diasporas abroad and the extent to which migrants are concentrated in certain geographical areas may also have an impact on how much money migrants send home to their country of origin (see Box 3.2).

### Immigration

Russia is ranked fourth worldwide in terms of absolute numbers of immigrants, after the USA, Saudi Arabia and Germany (see Chart 3.3), with more than 11 million foreign-born individuals or foreign citizens living in the country. Jordan and Lebanon have the highest numbers of immigrants in the EBRD regions as a percentage of their local populations.

[3] See, for instance, Munshi (2003).

## Potential migrants: in search of more than just wages?

As regards the factors shaping migration decisions, previous studies have highlighted the roles played by (i) income differentials between countries of origin and destination, (ii) the corresponding differences in unemployment levels between countries of origin and destination, (iii) the cost of migration and (iv) the presence of migrant networks abroad.[4] Less attention, however, has been devoted to understanding how the quality of life and the quality of amenities in the home country may be linked to decisions to move abroad. This section looks at the profile of a typical migrant and compares monetary and non-monetary incentives to leave one's home country.

In general, individuals with higher levels of subjective well-being tend to report having less desire to emigrate.[5] Indeed, immigration rates in Russia are positively correlated with expected income differentials, but they are also lower where expectations regarding improvements in the quality of life at home are higher.[6] Similarly, a person's propensity to migrate to another area (including other areas of the same country) has been shown to be lower where satisfaction with the amenities in the current place of residence is higher.[7]

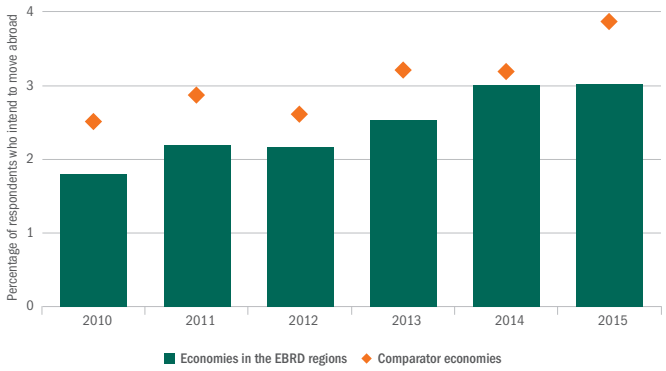
At the same time, however, other research suggests that quality of life – as captured by demographic and environmental indicators – had no impact on migration to high-income countries in the period 1991-2000.[8] Thus, evidence on the links between local amenities and international migration decisions is far from conclusive. The analysis presented in this section seeks to provide fresh insight into the impact that quality of life has on plans to move abroad.

## Data and methodology

The analysis in this section is based on data from the Gallup World Poll – a comprehensive annual survey completed by people living in more than 160 economies around the world (including all economies in the EBRD regions). The survey collects information on people's demographic and socio-economic characteristics, as well as their attitudes. Crucially, between 2010 and 2015 respondents were also asked about their satisfaction with a range of amenities – air and water, education, healthcare, housing, and roads and transport. They were also asked whether they would ideally like to move permanently to another country if they had the opportunity and whether they intended to migrate in the next 12 months. Other questions concerned people's preferred countries of destination and any social networks they had at home and abroad. Given that the survey mainly covers non-conflict areas, respondents can predominantly be thought of as potential economic migrants.[9]

Stated intentions to migrate have been found to be strongly associated with actual migration.[10] At the same time, intentions to migrate are also interesting in their own right as a reflection of people's desire to leave the country, irrespective of whether they do actually leave. The following analysis of people's intentions to migrate accounts for the cost of moving from the country of origin to the stated destination country on the basis of the geographical distance and language databases prepared by the Centre d'Études Prospectives et d'Informations Internationales (CEPII). Annex 3.1 describes the relevant regression analysis in greater detail.

**CHART 3.4.** Intentions to migrate are on the rise




**Source:** Gallup World Poll and authors' calculations.
**Note:** This chart reports the percentage of respondents who indicated that they wanted to move to another country on a permanent basis and were planning to do so within the next 12 months. The comparator economies used for this purpose are those with GDP per capita (at PPP) between the minimum and maximum values observed in the EBRD regions.

## Intentions to migrate on the rise

Intentions to migrate rose around the world between 2010 and 2015 (see Chart 3.4). In the EBRD regions, more than 3 per cent of respondents indicated an intention to migrate in 2015, compared with 1.8 per cent in 2010. A similar trend was observed in countries with comparable levels of income, with 3.9 per cent of respondents in those economies reporting an intention to migrate in 2015, up from 2.5 per cent in 2010. In absolute terms, those figures suggest that around 20 million people in the EBRD regions may have been considering a move abroad in 2015.

The five countries with the largest percentages of people reporting an intention to move abroad are all in sub-Saharan Africa, with Liberia topping the list at 14 per cent. Albania is ranked sixth in the world, with almost 10 per cent of respondents in that country indicating an intention to migrate within a year. Meanwhile, rates in excess of 5 per cent can be observed in Armenia, Kosovo and FYR Macedonia (see Chart 3.5). At the same time, these economies already have large numbers of

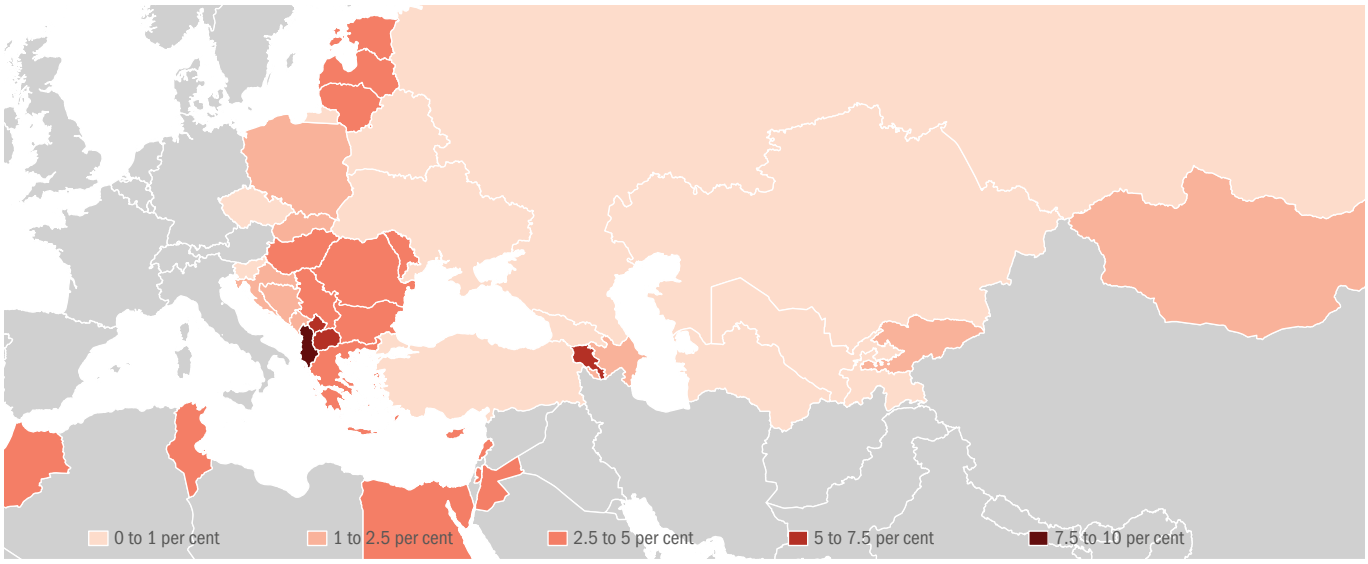
**FIGURES SUGGEST THAT AROUND**

**20 MILLION**

**RESIDENTS OF COUNTRIES IN THE EBRD REGIONS WERE CONTEMPLATING MOVING ABROAD PERMANENTLY IN 2015**

[4] See Borjas (1987), Mahajan and Yang (2017), Zoubanov (2004), Mayda (2005), Friebel et al. (2017), Munshi (2003) and Clark (2007).
[5] See Cai et al. (2014).
[6] See Mansoor and Quillin (2006).
[7] See Dustmann and Okatenko (2014), which is based on data for 2005.
[8] See Lewer et al. (2009).
[9] At the same time, the results for individuals living in areas experiencing major conflicts (defined using the Uppsala Conflict Data Program as areas where the number of conflict-related deaths totals 1,000 or more in a given year) are similar to those obtained for the rest of the sample.
[10] See Docquier et al. (2014).

**CHART 3.5.** Average percentage of respondents reporting an intention to migrate in economies where the EBRD invests, 2010-15




**Source:** Gallup World Poll and authors' calculations.
**Note:** This map reports the percentage of respondents who indicated that they wanted to move to another country on a permanent basis and were planning to do so within the next 12 months. Data represent six-year survey-weighted averages. The last four intervals in the legend are half-open: they include the upper endpoints but not the lower endpoints.

emigrants living abroad (see Chart 3.1). Between 2010 and 2015 the strongest increases in intentions to migrate were observed in the EEC region, the SEE region and Turkey, while Central Asia and Russia saw small declines in the percentage of respondents intending to leave their respective countries.

## The profile of potential migrants

Across the world, young men from urban areas are more likely to report an intention to migrate (see columns 1-3 of Table 3.1). These results also apply to potential migrants from the EBRD regions and comparator economies (see columns 4 and 5 of Table 3.1), and are confirmed when a similar analysis is undertaken on a subset of economies in central and south-eastern Europe using a different dataset (see Box 3.3). Married individuals are less likely to want to migrate, while having children has a positive effect on intentions to migrate but is only marginally statistically significant. People who have completed secondary education are more likely to migrate than their less-educated counterparts.

People in full-time employment and with a tertiary degree are around 1 percentage point less likely to report an intention to migrate. The effect of having a full-time job is stronger in the EBRD regions than in countries with comparable income levels (see columns 4 and 5 of Table 3.1).

At the same time, highly educated individuals in the EBRD regions are more likely to seek to emigrate than people who have only completed secondary education. This is true across all of those regions, with the exception of the CEB region. This may point to large skills mismatches in many EBRD economies, negatively affecting returns to skills (see also Box 3.4 for a discussion of the issue of "brain drain").

Unsurprisingly, intentions to migrate are also more likely to be reported where the wage differential between the country of destination and the country of origin is larger. They are also more likely where respondents have social networks abroad (that is to say, friends or relatives who are already living abroad who can be counted on in times of need). Conversely, the likelihood of migration is lower where individuals have strong social networks at home and where the distance between the country of destination and the country of origin is greater.

People who have greater confidence in their own personal safety and greater trust in the national government are less likely to report an intention to migrate, while perceptions of corruption in business are associated with an increase in the likelihood of intentions to migrate. When respondents' views on corruption and personal safety, social networks and other likely determinants of life satisfaction are all controlled for, life satisfaction itself does not have a statistically significant impact on intentions to migrate.

**BEING SATISFIED WITH THE QUALITY OF AMENITIES IN ONE'S COUNTRY OF ORIGIN REDUCES THE LIKELIHOOD OF SEEKING TO MIGRATE BY NEARLY**

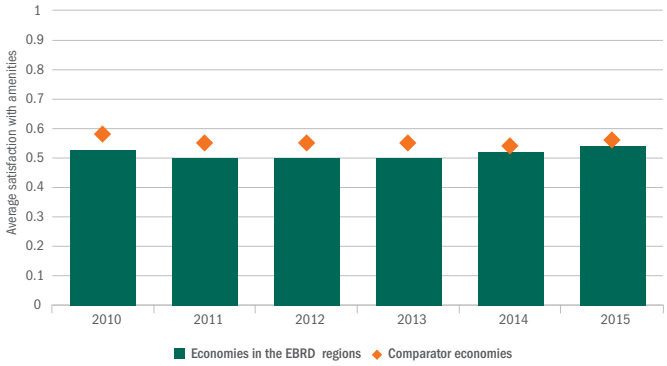
**1.6 PERCENTAGE POINTS**

**TABLE 3.1.** Characteristics of people intending to migrate abroad

| Dependent variable | | Intention to migrate (0/100) | | | | |
|---|---|---|---|---|---|---|
| | | Global sample | | | Economies in the EBRD regions | Comparator economies |
| | | (1) | (2) | (3) | (4) | (5) |
| Demographic characteristics | Male | 1.11*** (0.05) | 0.89*** (0.07) | 0.90*** (0.09) | 1.11*** (0.16) | 0.74*** (0.12) |
| | Aged 18-24 | 2.89*** (0.10) | 3.61*** (0.12) | 3.98*** (0.15) | 5.71*** (0.35) | 2.93*** (0.20) |
| | Aged 25-64 | 1.78*** (0.06) | 2.34*** (0.08) | 2.52*** (0.10) | 2.96*** (0.17) | 2.02*** (0.13) |
| | Married or in partnership | -1.55*** (0.06) | -1.60*** (0.08) | -1.64*** (0.10) | -1.88*** (0.18) | -1.30*** (0.13) |
| | Has children below age of 15 | 0.10* (0.06) | -0.02 (0.07) | 0.19** (0.09) | 0.44** (0.17) | 0.03 (0.12) |
| | Living in urban area | 1.06*** (0.06) | 1.20*** (0.08) | 1.15*** (0.10) | 1.02*** (0.18) | 1.06*** (0.13) |
| Education and labour market outcomes | No education or only primary education | -1.15*** (0.06) | -0.51*** (0.09) | -0.47*** (0.11) | 0.08 (0.23) | -0.54*** (0.13) |
| | Tertiary education | 1.06*** (0.12) | 0.34** (0.17) | 0.31 (0.21) | 0.84*** (0.31) | 0.33 (0.33) |
| | Full-time employment | -0.13* (0.07) | 0.05 (0.09) | -0.00 (0.12) | -0.51** (0.21) | 0.17 (0.15) |
| | Full-time employment and tertiary education | -0.75*** (0.16) | -0.94*** (0.24) | -0.95*** (0.29) | -0.81* (0.42) | -0.72 (0.47) |
| Wage differential and cost of migration from country of origin to country of destination | Wage differential (log) | | 1.26*** (0.06) | 1.28*** (0.07) | 0.76*** (0.11) | 1.05*** (0.10) |
| | Common border | | 2.04* (1.10) | 1.29 (1.41) | -6.10** (2.71) | 3.60 (2.19) |
| | Distance between most populous cities (log) | | -1.46*** (0.40) | -1.40*** (0.52) | -0.23 (0.75) | 0.07 (0.82) |
| | Once part of same country | | -1.39 (1.52) | -1.64 (1.86) | -2.90 (3.59) | -5.90** (2.57) |
| | Once in colonial relationship | | 1.74** (0.79) | 1.42 (1.12) | 15.94*** (2.54) | -0.37 (1.84) |
| | Linguistic proximity | | -0.60* (0.32) | -0.37 (0.43) | 0.74 (1.40) | -1.03** (0.52) |
| | Respondent has network abroad | | 3.71*** (0.08) | 4.07*** (0.10) | 4.15*** (0.18) | 3.81*** (0.14) |
| | Respondent has network at home | | -0.86*** (0.08) | -0.84*** (0.11) | -0.74*** (0.20) | -0.76*** (0.14) |
| Attitudes and perceptions | Personal safety | | | -0.84*** (0.09) | -0.60*** (0.17) | -0.72*** (0.12) |
| | Life satisfaction | | | -0.02 (0.02) | -0.23*** (0.05) | -0.00 (0.03) |
| | Trust in the national government | | | -1.17*** (0.09) | -1.20*** (0.17) | -1.10*** (0.12) |
| | Corruption widespread in business | | | 0.34*** (0.13) | 0.77*** (0.25) | 0.12 (0.17) |
| | Corruption widespread in government | | | 0.15 (0.13) | -0.00 (0.26) | -0.09 (0.17) |
| Number of observations | | 774,175 | 469,670 | 325,004 | 77,375 | 166,251 |
| $R^2$ | | 0.03 | 0.05 | 0.05 | 0.05 | 0.04 |

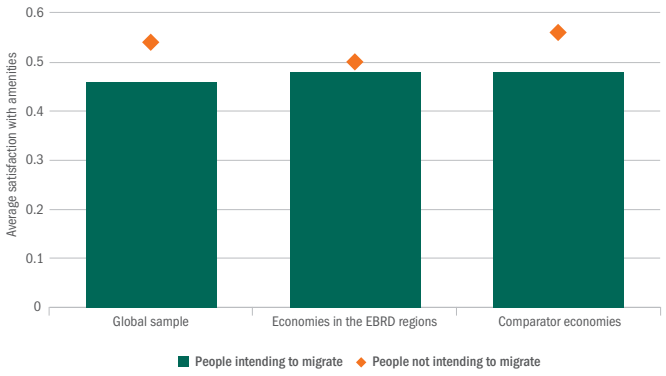
**Source:** Gallup World Poll, CEPII database and authors' calculations.
**Note:** Estimated using a linear probability model with survey-weighted observations. Robust standard errors are reported in parentheses, and *, ** and *** denote values that are statistically significant at the 10, 5 and 1 per cent levels respectively. Columns 1-3 report results for all economies included in the Gallup World Poll, while columns 4 and 5 show results for economies in the EBRD regions and for economies with comparable income levels only. All specifications take account of demographic characteristics, education and labour market outcomes, country of origin fixed effects and survey year fixed effects. Specifications in columns 2-5 also control for the wage differential and the cost of migration from the country of origin to the country of destination, whereas specifications in columns 3-5 include variables that capture the respondent's attitudes and perceptions. The results are robust to the inclusion of country of destination fixed effects. The comparator economies used for this purpose are those with GDP per capita (at PPP) between the minimum and maximum values observed in the EBRD regions.

**CHART 3.6.** Average satisfaction with amenities has remained broadly stable over time




**Source:** Gallup World Poll and authors' calculations.
**Note:** The comparator economies used for this purpose are those with GDP per capita (at PPP) between the minimum and maximum values observed in the EBRD regions.

**CHART 3.7.** People who intend to migrate tend to be less satisfied with local amenities




**Source:** Gallup World Poll and authors' calculations.
**Note:** Estimates calculated on the basis of regression analysis controlling for demographic characteristics, education and labour market outcomes, country of origin fixed effects and survey year fixed effects, using survey-weighted observations. The comparator economies used for this purpose are those with GDP per capita (at PPP) between the minimum and maximum values observed in the EBRD regions.

## People who intend to migrate report lower levels of satisfaction with amenities

On average, satisfaction with the quality of air and water, education, healthcare, housing, and roads and transport remained broadly stable in the EBRD regions over the period 2010-15, standing at around 0.54 on a scale of 0 to 1 in 2015 (see Chart 3.6). However, that average masks substantial variation across individual regions. In the SEMED region, for example, average satisfaction with amenities declined by 20 per cent between 2010 and 2015, while satisfaction levels in Turkey fell by 5 per cent. In Central Asia and the EEC region, by contrast, average satisfaction with amenities improved by around 9 per cent over that period.

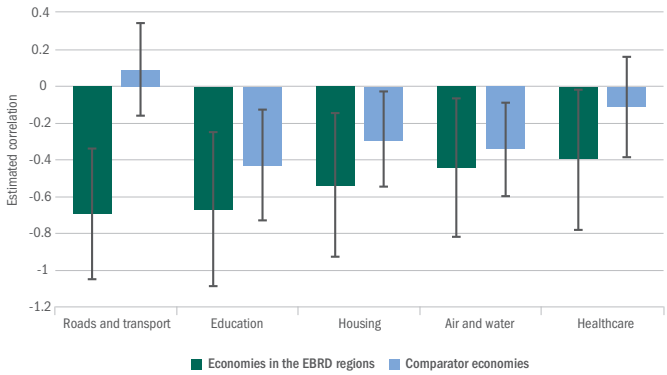
Across regions, people who intend to migrate tend to report lower levels of satisfaction with local amenities than people who intend to stay. Those differences are statistically significant at the 1 per cent level and continue to be observed after controlling for individual characteristics such as age, education and economy of residence (see Chart 3.7).

Results at the individual level confirm that lower levels of satisfaction are also associated with intentions to migrate (see Table 3.2). Indeed, being satisfied with the quality of local amenities reduces the likelihood of seeking to migrate by nearly 1.6 percentage points (see column 3). This is a sizeable effect, considering that the average likelihood of intending to move abroad is 3.5 per cent in the sample. In order to obtain a similar reduction in the likelihood of seeking to migrate, wages would need to rise in a way that reduced the wage differential between the countries of origin and destination by approximately 70 per cent. In a country such as Albania, this would correspond to a wage increase of roughly US$ 477 per month.

At the level of individual amenities, there is a particularly strong correlation between lower levels of satisfaction with air and water, education and housing and an increased likelihood of seeking to migrate. The link between satisfaction with healthcare and intentions to migrate is also statistically and economically significant. While the coefficient for satisfaction with roads and transport is not statistically significant, the effect appears to be driven by economies in the sample that are not part of the EBRD regions.

Satisfaction with individual amenities and intentions to migrate are negatively correlated in the EBRD regions (see Chart 3.8). Moreover, the link between satisfaction with roads and transport and decisions to migrate is stronger in the EBRD regions than in comparator economies, and the difference is statistically significant.

**CHART 3.8.** The correlation between satisfaction with roads and transport and intentions to migrate is stronger in the EBRD regions than it is in comparator economies




**Source:** Gallup World Poll, CEPII database and authors' calculations.
**Note:** These estimates of the impact that changes in satisfaction with amenities have on intentions to migrate have been obtained using a linear probability model. The specification controls for country of origin fixed effects and survey year fixed effects, demographic characteristics of the respondent, education and labour market outcomes, the wage differential and the cost of migration from the country of origin to the country of destination, as well as variables capturing the respondent's attitudes and perceptions. The regression also includes interaction terms between each of the amenity variables and a dummy variable identifying economies in the EBRD regions. Robust standard errors have been used to construct the 95 per cent confidence intervals shown.

Regression analysis (unreported) involving interaction between levels of satisfaction with amenities and a variable capturing the respondent's highest qualification shows that people who have been educated to tertiary level attribute greater importance to education, healthcare, and roads and transport than peers with no education or only primary education when thinking about emigrating. Similar analysis based on interaction between satisfaction with amenities and variables for different age groups indicates that satisfaction with education is more important to people aged between 18 and 24 than it is to people aged between 25 and 64.

## Refugees and irregular migrants from other parts of the world

At the end of 2017, there were 68.5 million forcibly displaced persons worldwide. The total number of people seeking sanctuary in a foreign country as a refugee stood at 20 million, with more than half of all refugees coming from Afghanistan, South Sudan and Syria.[11] The present refugee crisis differs from that of the 1990s in three crucial respects. First, it has had a much stronger impact on politics in Europe on the back of the rise of populist parties and the increase in economic hardship that was brought about by the financial crisis of 2008-09 and the subsequent eurozone debt crisis. Second, the current crisis involves multiple actors, over which Western nations have much less influence than they did in the 1990s. Third, the refugees arriving in Europe are regarded by many as being more culturally distant than those of the previous wave.[12]

**TOGETHER, SYRIA, AFGHANISTAN AND IRAQ ACCOUNT FOR**

**55%**

**OF ALL INTERVIEWED REFUGEES AND IRREGULAR MIGRANTS**

This makes it all the more important that we understand the socio-demographic characteristics of such refugees and irregular migrants, many of whom are likely to apply for asylum in their destination countries. Indeed, achieving a better understanding of those people's profiles will help with the development of more effective integration policies in transit and host countries, contributing to improved social cohesion and better economic outcomes. It may also help their economies of origin to develop policies that address the skills gaps left behind by refugees. This section examines the socio-demographic characteristics of refugees and irregular migrants, breaking them down on the basis of their economies of origin and destination. Analysis in this section is based not only on Gallup World Poll data, but also on the Flow Monitoring Survey (FMS) conducted by the International Organization for Migration (IOM), which is carried out in Europe as part of the IOM's Displacement Tracking Matrix and surveys refugees and irregular migrants aged 14 and over (see Annex 3.2 for details).

## Many economies in the EBRD regions act as transit points for refugees and irregular migrants

Many economies in the EBRD regions host refugees and irregular migrants in transit. In particular, from 2015 the Western Balkans migration route – formally "closed", as announced by the EU in

**TABLE 3.2.** Satisfaction with amenities and intentions to migrate are negatively correlated

| Dependent variable | | Intention to migrate (0/100) | | | | | |
|---|---|---|---|---|---|---|---|
| | | (1) | (2) | (3) | (4) | (5) | (6) |
| Satisfaction index | | -1.90*** (0.09) | -1.99*** (0.11) | -1.58*** (0.14) | | | |
| Satisfied with: | Air and water | | | | -0.53*** (0.07) | -0.47*** (0.08) | -0.36*** (0.10) |
| | Education | | | | -0.68*** (0.07) | -0.67*** (0.09) | -0.50*** (0.11) |
| | Healthcare | | | | -0.21*** (0.07) | -0.23*** (0.09) | -0.21** (0.10) |
| | Housing | | | | -0.35*** (0.06) | -0.47*** (0.08) | -0.42*** (0.10) |
| | Roads and transport | | | | -0.29*** (0.06) | -0.27*** (0.08) | -0.09 (0.10) |
| Wage differential (log) | | | 1.24*** (0.06) | 1.28*** (0.07) | | 1.33*** (0.06) | 1.33*** (0.07) |
| Number of observations<br>$R^2$ | | 755,121<br>0.03 | 462,339<br>0.05 | 324,733<br>0.05 | 594,064<br>0.04 | 378,739<br>0.05 | 281,227<br>0.05 |
| Wage differential and cost of migration from country of origin to country of destination | | No | Yes | Yes | No | Yes | Yes |
| Attitudes and perceptions | | No | No | Yes | No | No | Yes |

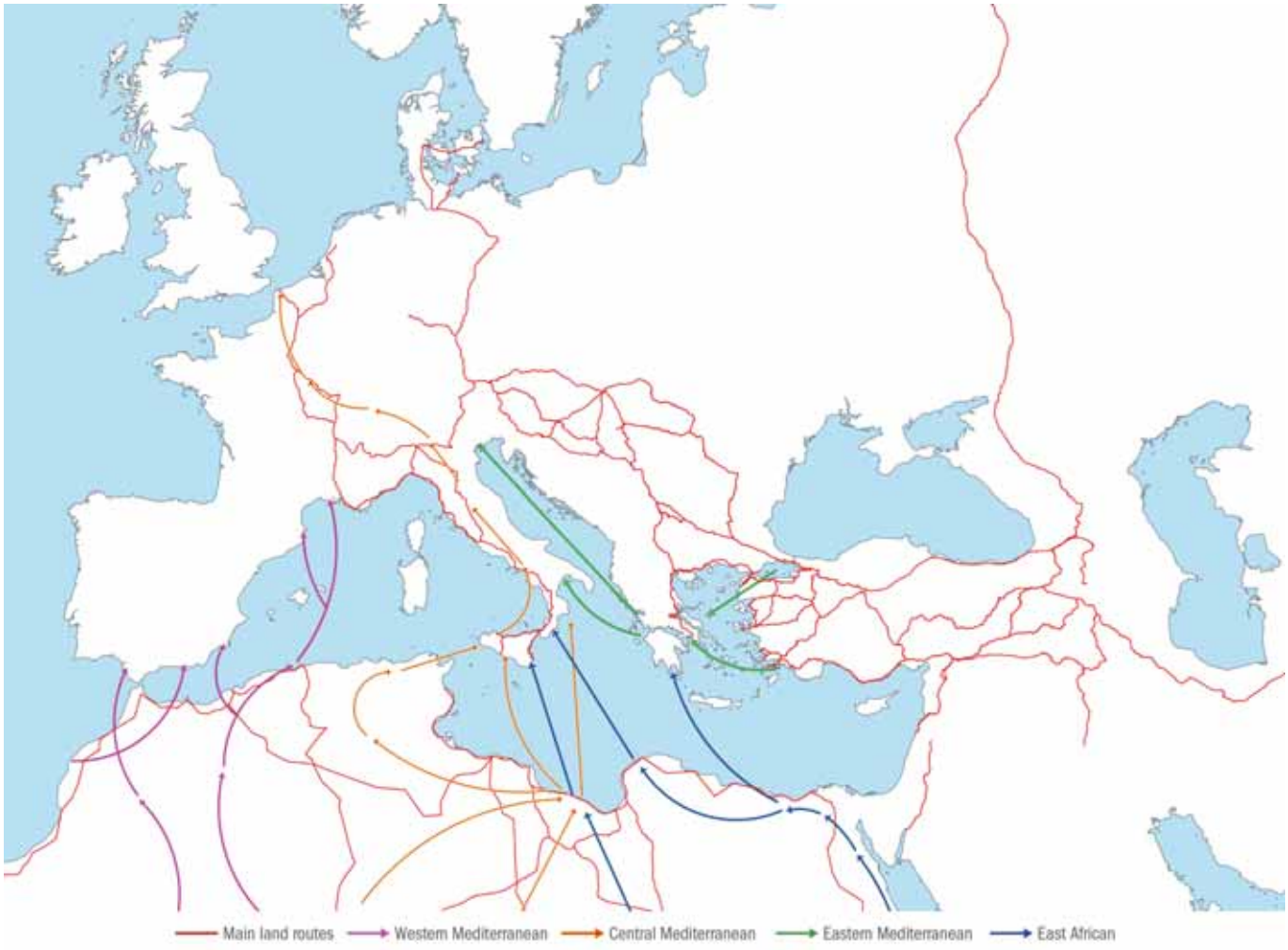
**Source:** Gallup World Poll, CEPII database and authors' calculations

**Note:** Estimated on the basis of a global sample using a linear probability model with survey-weighted observations. Robust standard errors are reported in parentheses, and *, ** and *** denote values that are statistically significant at the 10, 5 and 1 per cent levels respectively. All specifications take account of demographic characteristics, education and labour market outcomes, country of origin fixed effects and survey year fixed effects. Specifications in columns 2, 3, 5 and 6 also control for the wage differential and the cost of migration from the country of origin to the country of destination, whereas specifications in columns 3 and 6 include variables that capture the respondent's attitudes and perceptions. The results are robust to the inclusion of country of destination fixed effects.

[11] See UNHCR (2018).

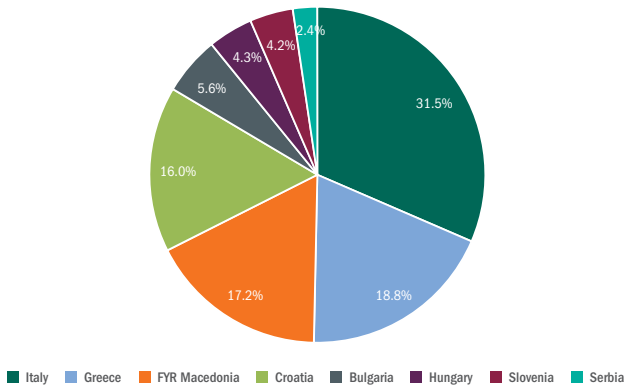
[12] See Dustmann et al. (2017) for a discussion of this issue.

**CHART 3.9.** Main Mediterranean Sea and land routes in 2015 and 2016




**Source:** IOM and authors' calculations.

**CHART 3.10.** Distribution of refugees and irregular migrants by country of interview




**Source:** FMS (2015-16) and authors' calculations.

March 2016 – saw sharp increases in the numbers of people on the move. This was a key route for migrants who entered the European Union via Bulgaria and Greece – travelling via Turkey by both land and sea – with the aim of reaching various countries in the Schengen area (see Chart 3.9).

Chart 3.10 shows the countries where the IOM has interviewed refugees and irregular migrants, indicating that Italy is Europe's main transit country, followed by Greece, FYR Macedonia, Croatia and Bulgaria. Other countries in the EBRD regions also host large numbers of refugees, such as Turkey (3.5 million according to the UNHCR), Lebanon (1 million), Jordan (700,000) and Egypt (300,000). In addition, the Western Balkans route was also used by migrants from other economies where the EBRD invests, such as Albania, Bosnia and Herzegovina, FYR Macedonia, Kosovo, Montenegro and Serbia. Box 3.5 discusses the impact that such influxes of refugees have had on host countries' labour markets, using the example of Turkey.

## Where do refugees and irregular migrants come from?

Refugees and irregular migrants predominantly originate from low or lower-middle-income countries. Indeed, Syria, Afghanistan and Iraq account for 55 per cent of all respondents interviewed by the IOM as part of its FMS surveys (see Chart 3.11). The overwhelming majority of respondents are male (83 per cent) and single (70 per cent), with an average age of 26. Around half of the respondents report having been employed before migrating, with 17 per cent being educated to tertiary level.

Most respondents have been displaced by war and conflict (77 per cent of the total; see Chart 3.12). This is very much the main reason for migrating among survey respondents originating from Afghanistan, Eritrea, Iraq, Somalia, Sudan and Syria.

At the same time, 17 per cent cite economic factors as the main reason for being on the move, including the vast majority of respondents from Morocco, Algeria and Pakistan. There are no real differences between men and women or between people of different ages when it comes to the reason for leaving their home country.

Nearly two-thirds of respondents cite Germany or Italy as their final destination (see Chart 3.13), followed by France, Sweden and the United Kingdom (see Box 3.6 for an overview of the impact that immigration has had on populist voting in those countries). More than 80 per cent of people heading for Austria, Denmark, Finland, Germany or Norway have left their home country because of conflict. That figure is less than 60 per cent among people heading for Italy, Belgium and France, with more respondents migrating for economic reasons in the case of those destination countries.

## Socio-demographic characteristics of refugees and irregular migrants

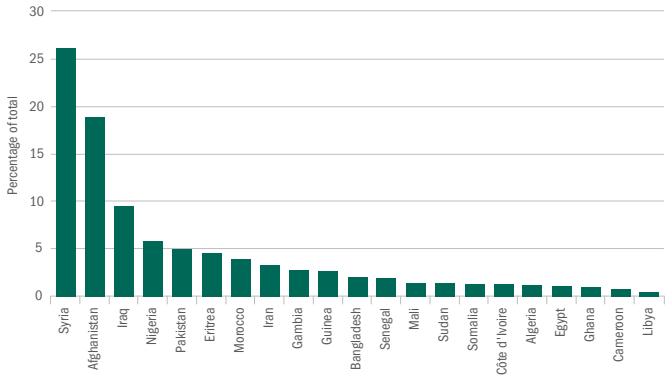
Regression analysis indicates that people who are educated to secondary or tertiary level are significantly more likely to migrate than people with lower levels of education, particularly when people are fleeing a major conflict (see columns 1 and 2 of Table 3.3). In countries with only a minor conflict or no conflict at all (see column 3), education plays less of a role (and only tertiary education remains a statistically significant predictor of becoming a migrant). Thus, refugees and irregular migrants escaping major conflicts tend to be highly educated relative to the national average in their country of origin, possibly because better-educated individuals will be in a better position to finance their trip, while liquidity constraints and immigration restrictions will prevent the poorest people from migrating.[13] Full details of this regression analysis can be found in Annex 3.3.

Like respondents to the Gallup survey who report an intention to migrate, refugees and irregular migrants who are interviewed by the IOM are also more likely to be single, male and young. Being in employment increases the likelihood of migration where a person lives in an area with a major conflict (perhaps because only people with sufficient financial resources can afford to escape a conflict zone), but otherwise it has no impact. There is no real difference between the findings for men and women.

Since the FMS surveys did not ask respondents about their income (which may be an important determinant of people's willingness and ability to leave their home country), this analysis uses Gallup data to estimate earnings for those respondents on the basis of their characteristics and the earnings profiles in their respective countries of origin, as discussed in Annex 3.3.

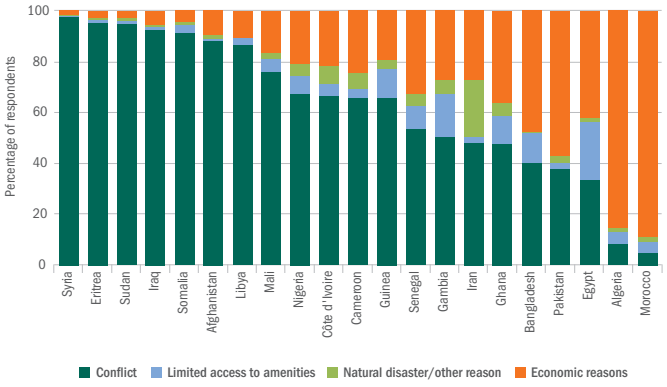
Higher levels of estimated pre-migration income strongly increase the probability of emigration – both in countries with major conflicts and in other countries, and for both men and women (see Table 3.4). However, the impact is stronger in countries with a major conflict, and it is also stronger for men. A similar pattern is observed if we estimate household income,

**CHART 3.11.** Most refugees and irregular migrants come from Syria, Afghanistan and Iraq




**Source:** FMS (2015-16) and authors' calculations.

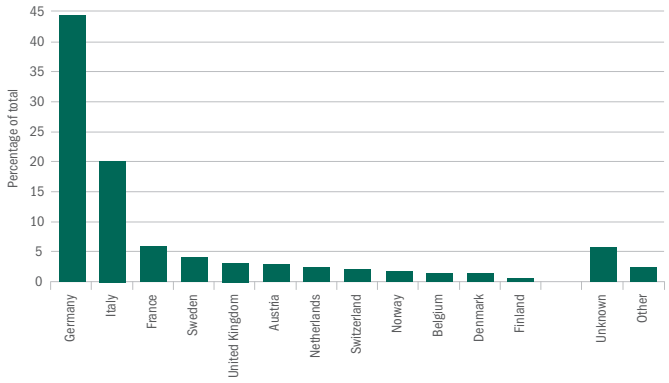
**CHART 3.12.** The main reason for leaving varies depending on the country of origin




**Source:** FMS (2015-16) and authors' calculations.

[13] See Aksoy and Poutvaara (2018) for a theoretical framework and Docquier et al. (2009) for evidence of greater mobility among more highly skilled individuals.

**CHART 3.13.** Most refugees and irregular migrants interviewed intend to settle in Germany or Italy




**Source:** FMS (2015-16) and authors' calculations.

rather than personal income. Thus, better-educated people with jobs and higher levels of income are more likely to be able to leave countries affected by severe conflicts.

For many refugees and irregular migrants, education and experience are their only assets. It is perhaps not surprising, then, that people try to maximise their returns on those assets. As Table 3.5 shows, highly educated refugees and irregular migrants are more likely to target countries where returns to education tend to be higher. In this regression analysis, the sample is restricted to respondents covered by FMS surveys and the dependent variable is the potential return to education in the intended country of destination. Potential returns to education have been estimated on the basis of wages in the relevant destination country for individuals with the same level of education and the same socio-demographic characteristics as the refugees and irregular migrants in question (see Annex 3.3 for details). Returns to primary education in intended destination countries tend to be relatively low, while returns to higher levels of education vary. These findings do not imply causality, as other factors may affect the choice of destination and be linked to a person's education. Nonetheless, these results indicate that education may have an important role to play when refugees and irregular migrants choose their destination.

**77%**
**OF ASYLUM SEEKERS CITE WAR AND CONFLICT AS THE MAIN REASONS FOR MIGRATING, WHILE**
**17%**
**MIGRATE PRIMARILY FOR ECONOMIC REASONS**

**TABLE 3.3.** Factors explaining the decision to migrate (adults aged 25-64)

| | (1) All | (2) Major conflict | (3) Minor/no conflict |
|---|---|---|---|
| Secondary education | 0.038*** (0.003) | 0.053*** (0.004) | 0.000 (0.004) |
| Tertiary education | 0.050*** (0.005) | 0.065*** (0.007) | 0.015** (0.006) |
| Employed | 0.007*** (0.003) | 0.009*** (0.003) | 0.006 (0.004) |
| Male | 0.054*** (0.002) | 0.057*** (0.003) | 0.046*** (0.004) |
| Aged 25-34 | 0.081*** (0.003) | 0.092*** (0.004) | 0.070*** (0.004) |
| Aged 35-44 | 0.041*** (0.003) | 0.054*** (0.004) | 0.021*** (0.003) |
| Aged 45-54 | 0.013*** (0.002) | 0.021*** (0.004) | 0.005** (0.002) |
| Married | -0.031*** (0.004) | -0.030*** (0.005) | -0.038*** (0.006) |
| Country fixed effects | Yes | Yes | Yes |
| $R^2$<br>Number of observations | 0.203<br>44,272 | 0.227<br>29,794 | 0.058<br>14,478 |

**Source:** FMS (2015-16) and Gallup World Poll (2009-14).
**Note:** Robust standard errors are reported in parentheses, and *, ** and *** denote values that are statistically significant at the 10, 5 and 1 per cent levels respectively. Data relate to people from the following nine countries: Afghanistan, Algeria, Iran, Iraq, Libya, Morocco, Nigeria, Pakistan and Syria. The dependent variable is equal to 1 for refugees and irregular migrants in the FMS data and 0 for participants in Gallup World Polls. Reference categories are as follows: education below secondary level, unemployed or out of labour force, female, aged 54+, and single. All specifications include dummies for widowed and divorced, although these are not reported above. A "major conflict" is defined as a country with 1,000 or more conflict-related deaths in any of the years in question.

**TABLE 3.4.** Self-selection of refugees and irregular migrants on the basis of estimated income (adults aged 25-64)

| | (1) All | (2) Major conflict | (3) Minor/no conflict |
|---|---|---|---|
| Men and women | | | |
| Log of estimated income | 0.113*** (0.006) | 0.137*** (0.007) | 0.069*** (0.008) |
| $R^2$<br>Number of observations | 0.174<br>44,272 | 0.198<br>29,794 | 0.011<br>14,478 |
| Men | | | |
| Log of estimated income | 0.150*** (0.008) | 0.172*** (0.011) | 0.106*** (0.013) |
| $R^2$<br>Number of observations | 0.192<br>23,665 | 0.219<br>16,448 | 0.014<br>7,217 |
| Women | | | |
| Log of estimated income | 0.048*** (0.006) | 0.058*** (0.007) | 0.032*** (0.008) |
| $R^2$<br>Number of observations | 0.110<br>20,607 | 0.123<br>13,346 | 0.010<br>7,261 |

**Source:** FMS (2015-16) and Gallup World Poll (2009-14).
**Note:** Robust standard errors are reported in parentheses, and *, ** and *** denote values that are statistically significant at the 10, 5 and 1 per cent levels respectively. Data relate to people from the following nine countries: Afghanistan, Algeria, Iran, Iraq, Libya, Morocco, Nigeria, Pakistan and Syria. The dependent variable is equal to 1 for refugees and irregular migrants in the FMS data and 0 for participants in Gallup World Polls. All specifications take account of country fixed effects. A "major conflict" is defined as a country with 1,000 or more conflict-related deaths in any of the years in question.

As the regression analysis in Table 3.6 shows, a number of other factors also appear to influence refugees and irregular migrants' choice of destination. As with the previous analysis, the sample is again restricted to respondents covered by FMS surveys, while outcome variables represent various characteristics of the intended destination country of each respondent.

Refugees and irregular migrants who are educated to primary level (or less) and secondary level are more likely to head for countries that have lower unemployment rates and more comprehensive migrant integration policies. The nature of integration policies is captured by the Migrant Integration Policy Index (MIPEX), which ranges from 0 to 100 and is based on 167 policy indicators covering the following eight policy areas: labour market mobility, reunification of families, education, political participation, long-term residence, access to nationality, measures tackling discrimination and health.

Refugees and irregular migrants who are educated to primary (or less) and secondary level are also more likely to choose destination countries where asylum applications are considered faster and where work permit applications, once asylum has been granted, take less time to process. More highly developed social safety nets also make a destination country more attractive for migrants with primary and secondary education. In other words, refugees and irregular migrants coming to Europe respond to incentives at all stages of the migration process.[14]

**TABLE 3.5.** Self-selection of refugees and irregular migrants in respect of returns to education (adults aged 25-64)

| | (1) All | (2) Major conflict | (3) Minor/no conflict |
|---|---|---|---|
| Secondary education | 0.021*** (0.006) | 0.018*** (0.006) | 0.032** (0.014) |
| Tertiary education | 0.024*** (0.009) | 0.011 (0.009) | 0.048** (0.021) |
| Employed | 0.002 (0.006) | -0.012 (0.007) | 0.038*** (0.012) |
| Male | -0.011 (0.009) | -0.006 (0.009) | -0.009 (0.022) |
| Aged 25-34 | -0.018 (0.037) | -0.04 (0.04) | 0.151*** (0.021) |
| Aged 35-44 | -0.025 (0.037) | -0.033 (0.04) | 0.106*** (0.025) |
| Aged 45-54 | 0.000 (0.038) | -0.024 (0.041) | 0.217*** (0.059) |
| Widowed | 0.017 (0.032) | 0.023 (0.036) | 0.002 (0.061) |
| Married | 0.006 (0.007) | 0.000 (0.007) | 0.023 (0.015) |
| Divorced | 0.01 (0.022) | 0.024 (0.032) | 0.014 (0.031) |
| $R^2$<br>Number of observations | 0.241<br>3,429 | 0.243<br>2,478 | 0.246<br>951 |

**Source:** FMS (2015-16) and Gallup World Poll (2009-14).
**Note:** Robust standard errors are reported in parentheses, and *, ** and *** denote values that are statistically significant at the 10, 5 and 1 per cent levels respectively. The dependent variable is the return to education in the intended country of destination (as calculated on the basis of Gallup World Poll data). Reference categories are as follows: less than secondary education, unemployed or out of labour force, female, age 54+, and single. A "major conflict" is defined as a country with 1,000 or more conflict-related deaths in any of the years in question.

**TABLE 3.6.** Self-selection of refugees and irregular migrants in respect of characteristics of destination countries (adults aged 25-64)

| Outcome variable | (1) Log of unemployment rate in destination country | (2) MIPEX (0-100) | (3) Average duration of asylum procedure (0-1) | (4) Waiting time before accessing labour market (0-1) | (5) Social expenditure (as a percentage of GDP) |
|---|---|---|---|---|---|
| Primary education or less | -0.092*** (0.019) | 0.844*** (0.27) | -0.035*** (0.007) | -0.072*** (0.014) | 0.687*** (0.14) |
| Secondary education | -0.084*** (0.018) | 0.841*** (0.265) | -0.011*** (0.003) | -0.051*** (0.013) | 0.723*** (0.137) |
| Employed | 0.024* (0.015) | 0.020 (0.189) | 0.002 (0.005) | 0.004 (0.009) | -0.136 (0.103) |
| Male | 0.042** (0.017) | -0.774*** (0.27) | -0.020*** (0.007) | -0.005 (0.012) | 0.384*** (0.132) |
| Aged 25-34 | 0.075* (0.044) | -0.311 (1.145) | 0.007 (0.03) | 0.043 (0.044) | 0.437 (0.369) |
| Aged 35-44 | 0.005 (0.045) | 0.460 (1.152) | -0.002 (0.03) | 0.011 (0.044) | 0.290 (0.37) |
| Aged 45-54 | -0.031 (0.05) | 0.357 (1.217) | 0.010 (0.031) | -0.008 (0.044) | -0.314 (0.393) |
| Married | -0.012 (0.014) | 0.637*** (0.19) | -0.001 (0.005) | -0.016* (0.009) | 0.068 (0.104) |
| $R^2$<br>Number of observations | 0.302<br>3,492 | 0.053<br>3,509 | 0.192<br>3,484 | 0.076<br>3,509 | 0.353<br>3,423 |

**Source:** Eurofound, FMS (2015-16), MIPEX, OECD, World Bank and authors' calculations.
**Note:** Robust standard errors are reported in parentheses, and *, ** and *** denote values that are statistically significant at the 10, 5 and 1 per cent levels respectively. At least 100 nationals have been surveyed for each country included in this analysis. All specifications include survey country fixed effects. Reference categories are as follows: more than secondary education, unemployed or out of labour force, female, age 54+, and single. All specifications include widowed and divorced dummies, though not reported above.

[14] See MEDAM (2018).

## Conclusion

International migration is on the rise, both globally and in the EBRD regions. Emigration rates in the EBRD regions have risen since 1990, with almost 10 per cent of people born there now living outside their country of birth or citizenship. Many economies in the EBRD regions have also become major destinations for migrants or important transit countries on migration routes.

The emigration of workers is a concern for many countries, particularly in central and eastern Europe. People who express an intention to migrate tend to be single, male and young and live in cities. They also tend to be better educated than the average person. Many of those people also believe that corruption is widespread in the local business sector and they are often dissatisfied with local amenities such as healthcare, education, air and water, housing, and roads and transport. Satisfaction with the local education system is particularly important for the young and the highly educated when it comes to deciding whether to move abroad.

These findings suggest that improving the business environment and the quality of public services may significantly reduce people's desire to emigrate. Indeed, increasing satisfaction with local amenities can have the same impact in terms of lowering intentions to migrate as closing 70 per cent of the wage gap between the country of origin and the country of destination. At the same time, the impact of wage increases in the economy of origin is not straightforward: at lower levels of economic development, rising wages can actually increase emigration, as low-skilled workers find it easier to afford the cost of migration. Moreover, the findings presented in Chapter 2 suggest that emigration by skilled workers results in a decline in total factor productivity for firms in countries of origin, but emigrants do send back knowledge, thereby helping those countries to boost innovation and move towards the technological frontier.

In order to minimise the costs of emigration and maximise the associated gains, governments can work with firms to establish training programmes so as to foster skills that are widely sought after in their domestic labour markets. Policies aimed at attracting highly qualified migrants can also help to address specific labour market shortages in the short term. The EU's Blue Card initiative is a good example of this kind of approach.[15]

Many economies in the EBRD regions also serve as transit and/or host countries for refugees and irregular migrants from other parts of the world, many of whom are likely to seek asylum. Like economic migrants from the EBRD regions, these people tend to be single, male, young and reasonably well educated (relative to the average level in their country of origin). It appears that they often select their intended country of destination with a view to maximising the return on their skills – typically the only assets they possess. Refugees and irregular migrants who are educated to primary and secondary level are more likely to head for countries with lower unemployment rates, better migrant integration policies, faster asylum processes, easier access to the labour market for people who have successfully claimed asylum, and stronger social safety nets.

While the vast majority of refugees and irregular migrants leave their country in order to escape conflict, the main motivation of a significant number of migrants from countries such as Algeria, Egypt, Morocco and Pakistan is a desire to seek out better economic opportunities abroad. While many of these migrants may ultimately be denied asylum, they can slow down asylum application procedures. This may, in turn, undermine popular support for a well-managed and fair asylum system.[16] Ageing European economies – including some countries where the EBRD invests – could consider tackling this problem by increasing legal employment opportunities for African citizens on a selective basis, depending on local needs. Such initiatives could form part of a broader strategy aimed at containing irregular migration to Europe.[17]

Moreover, policies that support the integration of refugees and irregular migrants into the labour market need to be tailored to those people's skills.[18] Refugees escaping major conflicts (such as the fighting in Syria) may well benefit from receiving early access to language courses and other basic training while waiting for decisions on their asylum applications. Prompt access to employment will also help refugees to integrate better into society.[19]

**ALMOST**
**TWO-THIRDS**
**OF REFUGEES AND IRREGULAR MIGRANTS CITE GERMANY OR ITALY AS THEIR INTENDED FINAL DESTINATION**

[15] See Giesing and Laurentsyeva (2018).

[16] See Hatton (2017).
[17] See MEDAM (2018) for a discussion of this issue.
[18] See World Bank (2018) for a discussion of this issue.
[19] See OECD (2018).

## BOX 3.1. Circular migration: key to economic development?

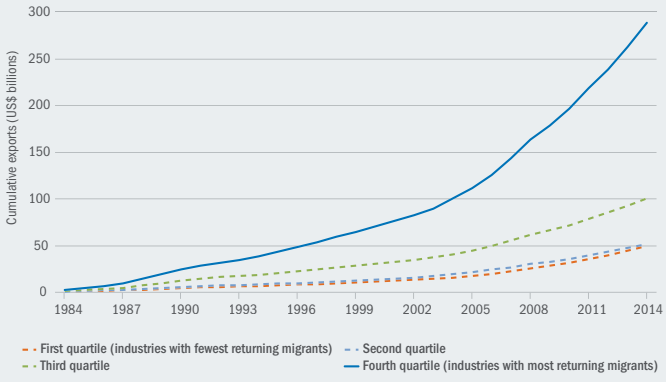
Multinational firms spend millions of dollars seconding their workers to foreign subsidiaries and branches for training and work experience. Evidence suggests that such largesse pays off, since hiring managers and workers with foreign experience increases productivity, profitability and innovation.[20] These beneficial effects of international migration do not just apply to firms: migration is also an important driver of the spread of knowledge across economies.

Average productivity levels differ very considerably from country to country, and a large percentage of those differentials are arguably due to differences in the knowledge deployed in production. Such knowledge comes in different forms. It may, for example, be embedded in goods and referred to as "technology". Somebody who possesses a calculator, for instance, does not need to understand the mechanics of addition or multiplication. Knowledge may also be codified – for example, if it is written down in the form of patents. Other forms of knowledge are confined to people's brains. For instance, a worker's productivity largely reflects his/her accumulated experience and ability to learn on the job. Knowledge that is embedded in goods or codified in patents can be easily traded, both within and across borders, but the knowledge that is held in the brain of a surgeon, a pilot or a senior manager can only be shared through personal interaction over the course of many years.

This is why migration plays such a crucial role in the transfer of knowledge: foreign workers and returning migrants act as a "revolving door" for the kinds of tacit knowledge that cannot be traded even when goods and capital move freely. Thus, migrants who move abroad – taking their acquired knowledge and know-how with them – and then subsequently return home again boost productivity in both economies.

A recent study documenting the benefits of circular migration looked at the experiences of refugees who fled the former Yugoslavia during the 1990s.[21] In the early 1990s, more than half a million citizens of the former Yugoslavia travelled to Germany in order to escape the war. Most of them were integrated into the German labour force, with almost no restrictions on employment. Following the signing of the Dayton Peace Accords in 1995, most of those refugees were repatriated to their home countries. Data suggest that this led to a significant increase in exports from those former Yugoslav economies. Strikingly, the highest rates of export growth were seen in the sectors where those former refugees had tended to work while living in Germany (see Chart 3.1.1). This effect was particularly strong for professionals and people in management roles, where the transfer of knowledge has the potential to be most valuable.

**CHART 3.1.1.** Cumulative exports of countries of former Yugoslavia broken down by the number of returning migrants employed in the relevant industries in 2000




**Source:** Bahar et al. (2018).
**Note:** The first quartile contains the 25 per cent of industries with the lowest numbers of returning migrants in 2000, the second quartile contains the next 25 per cent, and so on.

## BOX 3.2. Concentration of migrants and remittance flows from Italy

According to Eurostat, there were more than 5 million foreigners living in Italy in 2017, up from 1.5 million in 2003. If we look at the economies where those migrants come from, we can see that 6 of the top 10 are in the EBRD regions: Romania, Albania, Morocco, Ukraine, Moldova and Egypt (in declining order of importance). Italy is also home to large numbers of Chinese migrants.

Migrants living in Italy tend to cluster together in specific regions in the richer, northern parts of the country (see Chart 3.2.1).[22] Data point to migrants from the SEE region[23] being relatively strongly concentrated in Piacenza in the Emilia-Romagna region and Asti in the Piedmont region. Meanwhile, migrants from the SEMED region are concentrated in specific provinces of the Emilia-Romagna and Lombardy regions, in Sicily's Ragusa province, and in Aosta. Strikingly, there are very large numbers of Chinese immigrants in the province of Prato, where their density is 17 times higher than the national average. There are also large numbers of Serbs in Vicenza and Trieste, a significant cluster of migrants from Bosnia and Herzegovina in the province of Gorizia, and a large Tunisian population in Ragusa.

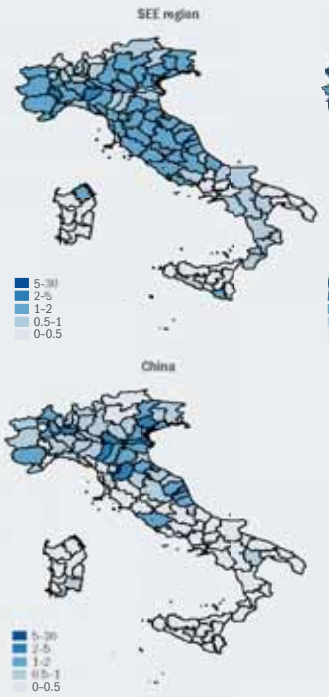
The presence of large numbers of migrants in particular geographical areas raises an interesting question: do migrants in such areas behave differently when it comes to sending money home, and does this vary by region and country of origin? To answer this question, this box uses bilateral panel data on remittances and migrant stocks, broken down by province and country of origin. Those data, which come from the Bank of Italy and Italy's National Institute of Statistics, cover the period 2005-16. In line with the approach adopted by Santos Silva and Tenreyro (2006), remittances (expressed in euros per migrant) are modelled as a function of the quotient value (see note accompanying Chart 3.2.1) in a regression framework using the Poisson pseudo-maximum likelihood. This analysis controls for province and year fixed effects, as well as province-level economic conditions that are likely to affect labour market outcomes, including income per capita, unemployment rates, the shares of agriculture, manufacturing and services in value added, the age structure of residents and the percentage of migrants who are women.

[20] See, for instance, Markusen and Trofimenko (2009) and Choudhury (2016).

[21] See Bahar et al. (2018).
[22] See Plane and Rogerson (1994).
[23] Figures for the SEE region are based on data for Albania, Bosnia and Herzegovina, Bulgaria, FYR Macedonia, Montenegro, Serbia and Romania.

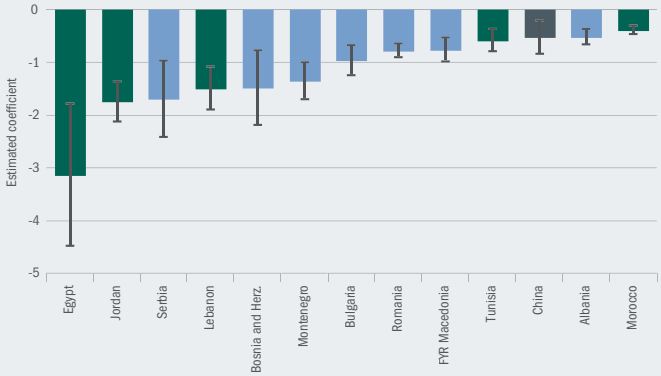
Larger numbers of migrants from a particular country of origin in a given province are associated with lower levels of remittances (see Chart 3.2.2). This pattern holds across various countries of origin, with the smallest effect being observed for migrants from Morocco and the largest being observed for migrants from Egypt. This may suggest that migrants who live in close proximity to large numbers of their compatriots establish stronger local financial links, resulting in weaker financial links with networks in their countries of origin.

**CHART 3.2.1.** Residential concentration of migrants in Italy at province level




**Source:** ISTAT (2018) and author's calculations.
**Note:** The maps above show residential concentration quotients for 2016. The index is equal to 1 if the distribution of the migrant group across provinces is identical to the distribution across the general population, less than 1 if the migrant group is under-represented in a province, and greater than 1 if the group is over-represented.

**CHART 3.2.2.** Effect of residential concentration quotient on remittances



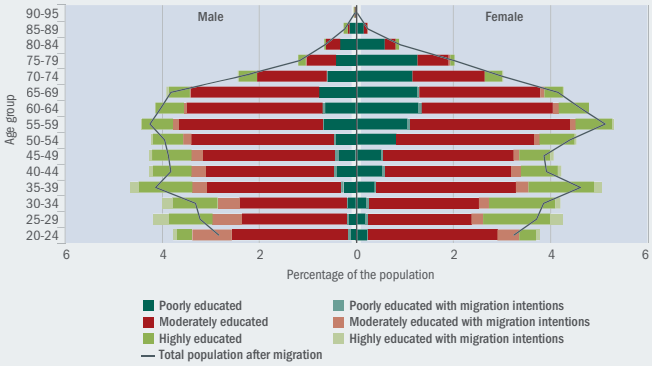

**Source:** Bank of Italy (2018), ISTAT (2018) and author's calculations.
**Note:** The chart shows the estimated coefficients from a regression framework using the Poisson pseudo-maximum likelihood. The error bars indicate the 95 per cent confidence intervals.

## BOX 3.3. Migration intentions in central and south-eastern Europe: a socio-demographic profile

In 2017, the Austrian central bank, the Oesterreichische Nationalbank (OeNB) conducted another round of its regular Euro Survey, asking questions of 1,000 people aged 15 and over in 10 countries in central and south-eastern Europe (Albania, Bosnia and Herzegovina, Bulgaria, Croatia, the Czech Republic, FYR Macedonia, Hungary, Poland, Romania and Serbia). Just over 8 per cent of respondents of working age (25 to 64 years old) reported intentions to move abroad within one year of the survey. As in the Gallup survey, migration intentions were higher among younger individuals and among men. If those intentions are representative of the entire population and all those who intend to migrate do so, the demographic profile of the region will change considerably (see Chart 3.3.1). In particular, the median age of the labour force will increase further, as will the old-age dependency ratio.

Further econometric analysis of those intentions to migrate reveals that migration intentions vary considerably across regions within individual countries.[24] People who live in regions with high average incomes, low levels of unemployment and a dynamic economy tend to be less likely to migrate. Moreover, it tends to be the level of regional income and unemployment, rather than the rate of economic growth, that influences migration intentions.

**CHART 3.3.1.** Potential future population pyramid in central and south-eastern Europe




**Source:** OeNB Euro Survey (2017) and author's calculations.

[24] See Raggl (forthcoming).

## **BOX 3.4.** Economic development and "brain drain" in transition economies

International migration exhibits two general patterns. First of all, there is an inverted U-shaped relationship between migration and economic development, typically referred to as the "migration transition curve".[25] At income levels below approximately US$ 6,000 per capita, emigration increases as incomes rise (see Chart 3.4.1). If incomes continue to increase, emigration then subsides again. Various explanations for this relationship have been put forward, the most common being the existence of credit constraints preventing potential migrants in poorer economies from realising their aspirations. As financial constraints ease, emigration initially rises. It then falls again as income differentials between the economy of origin and potential destination economies decline.

Second, well-educated people exhibit a much greater propensity to emigrate than their less-educated compatriots, and they tend to cluster in countries or regions where skills are well rewarded.[26] Highly skilled people tend to be more responsive to economic opportunities abroad and have more transferable skills. They may also find it easier to comply with the skills-based immigration policies that are in place in many potential destination countries. Skills-based selection into migration decreases with economic development. In low-income economies, university graduates are 20 times more likely to emigrate than their less-educated peers, whereas the ratio of the emigration rate for university graduates to the emigration rate for less-educated individuals is slightly above unity in high-income countries. Eight economies in the EBRD regions have levels of skills-based selection into migration that are higher than one might expect on the basis of their per capita incomes: Tajikistan, Egypt, Jordan, the Kyrgyz Republic, Uzbekistan, Azerbaijan, Latvia and Armenia (see Chart 3.4.2).

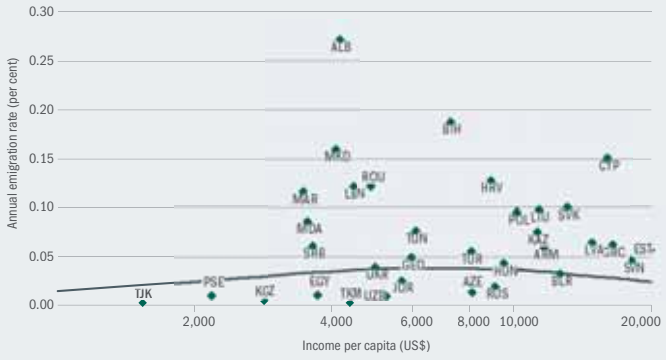
This gives rise to concerns that economic development could be accelerating the brain drain and slowing down the accumulation of human capital – which may, in turn, reduce the effectiveness of development policies. In order to examine this question, we can look at the links between per capita income growth and emigration using the migration accounting method proposed by Dao et al. (2018).

It turns out that the inverted U-shaped relationship only holds for low-skilled workers. The emigration rate of university graduates always decreases with economic development. However, the percentage of university graduates in the local population rises with economic development, and more highly skilled workers are more likely to emigrate than low-skilled workers. As a result, a country's emigrants may become more highly skilled as incomes rise, even though better-educated people become less likely to emigrate.

Regression analysis can also shed light on other factors explaining emigration, such as financial incentives and constraints, the geographical proximity of high-income economies, the linguistic proximity of potential destination countries and the presence of existing migrant networks in destination economies. Increases in skill levels in economies of origin explain around a quarter of the increase in emigration where income per capita is below US$ 1,000 or between US$ 4,000 and US$ 6,000. Macroeconomic drivers – such as income differentials and proximity to existing migrant networks – play a major role in explaining emigration. The effect of financial constraints exceeds that of skill sets in economies where per capita incomes are less than US$ 1,000. However, at higher levels of income, changes in skill sets are more important than financial constraints when it comes to explaining increases in emigration rates.

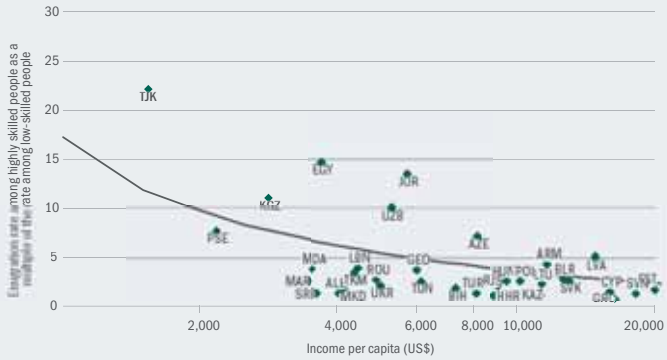
Although it has a significant impact in the poorest economies, the relaxation of financial constraints leads to only a small rise in emigration in middle-income economies (including those in the EBRD regions). Of greater importance is the increase in education that is associated with rising incomes, which leads to a higher emigration rate overall. Nonetheless, the rate of emigration among the highly skilled continues to fall as countries develop. In that sense, the risk of economic development resulting in a brain drain is smaller than is commonly believed.

**CHART 3.4.1.** As per capita incomes increase, emigration first rises and then falls




**Source:** OECD and authors' calculations.
**Note:** Based on a sample comprising 123 economies which excludes periods of major conflict. The results have been obtained using non-parametric kernel density estimation.[27]

**CHART 3.4.2.** In low-income economies, highly skilled people are much more likely to emigrate




**Source:** OECD and author's calculations.
**Note:** Based on a sample comprising 123 economies which excludes periods of major conflict. The results have been obtained using non-parametric kernel density estimation.[28]

[25] See Zelinsky (1971).
[26] See Docquier and Rapoport (2012) and Kerr et al. (2016).
[27] See Epanechnikov (1969).
[28] See Epanechnikov (1969).

## **BOX 3.5.** Large-scale influxes of low-skilled labour and their impact on locals' use of skills

The Syrian civil war, which has been raging since 2011, has seen more than 5 million refugees flee to neighbouring countries. The majority of those refugees are in the EBRD regions, with more than 3.5 million in Turkey and many others in Jordan and Lebanon. Understanding the impact that these large numbers of refugees have had on local labour markets can help governments to design effective policies aimed at addressing the relevant issues.[29]

Syrian refugees tend to be low-skilled relative to the population of the host country and are likely to represent a source of relatively cheap labour.[30] Owing to a lack of documentation, they work almost exclusively in the informal sector. Consequently, economic research looking at this issue has focused on the impact that refugees have on the employment rates and wages of local workers.[31] That research suggests, in line with most previous studies, that Syrian refugees have had a small negative impact on employment rates, particularly for unskilled locals and people working in the informal sector. Those studies do not typically find any large-scale displacement of local people by Syrian refugees. The limited nature of that impact, despite very large numbers of refugees, suggests that adjustment mechanisms beyond employment and wages have played an important role.

One such mechanism involves changes to the combination of production factors that firms use. Refugee labour is likely to complement some production inputs and replace some others. A recent study looked at differences between the numbers of refugees living in different Turkish regions, accounting for the fact that some regions are more attractive to refugees than others.[32] It seems that large inflows of refugees have increased the complexity of the tasks performed by local workers. In particular, many locals have reduced the amount of time spent on manual tasks and focused more on abstract, routine and IT-intensive tasks. Turkish middle-school graduates have shifted to routine tasks and high-school graduates have moved to more abstract tasks, while people who are only educated to primary level (that is to say, people at the bottom of the skills distribution) and university graduates (people at the top of the skills distribution) appear to have been unaffected.

The lack of impact on the complexity of less-educated locals' tasks is in line with the negative impact on their employment rates and wages. Thus, poorly educated Turks have not managed to switch to more complex forms of labour when confronted with large numbers of Syrian refugees. The increased competition they have faced in the labour market has resulted in lower wages.

In response to the sharp increase in the supply of low-skilled labour, firms have also reduced the amount of machinery and equipment they use relative to the amount of labour, making production less capital-intensive. This effect has been stronger in sectors where firms have traditionally relied more on informal labour (even before the arrival of the Syrian refugees).

While firms that have started using more low-cost labour in lieu of capital may outperform other firms in the short run, this rational adjustment may have undesirable long-term implications.[33] Firms may start to rely too heavily on informal refugee labour and be left with a suboptimal combination of production inputs when refugees start to return to Syria.

In order to mitigate the long-term impact that the presence of refugees has on labour markets and productivity, vocational training could be given to disadvantaged locals who have lost their jobs. In addition, firms that are located in areas with large numbers of Syrian refugees need stronger incentives to invest in machinery and equipment. Syrian refugees can also be given training, helping them to provide more highly skilled labour.

[29] See Erdoğan (2014).
[30] See Aksoy and Ozcan (2018).
[31] See Ceritoğlu et al. (2017) and Del Carpio and Wagner (2015).
[32] See Akgündüz and Torun (2018).
[33] See Foster et al. (2008).

## **BOX 3.6.** Immigration and populist voting in Europe

Has the recent rise in populism in advanced economies been caused by immigration and the refugee crisis? This box surveys the evidence, looking at recent studies carried out in Austria, France, Greece, Italy, Sweden and the United Kingdom – as well as a Europe-wide study of immigration and emigration. These studies show that the impact that immigration has on political outcomes depends on the composition and intensity of immigration. In particular, some studies identify a non-linear relationship between the intensity of immigration and populist voting, with a limited increase in immigration reducing support for right-wing populists – consistent with the "contact theory" posited by Allport (1954) – and a large increase in immigration having the opposite effect.

Most of these studies use sophisticated empirical strategies to identify the *causal* effect that the presence of immigrants in specific regions or municipalities has on the voting patterns of local residents. It is essential, in this regard, to go beyond the correlation between populist voting and immigration and analyse the direction of causality.

Indeed, in certain European countries the global financial crisis resulted in populist parties winning elections even before the recent increase in immigration. Those populists then saw an opportunity to use anti-immigrant discourse to strengthen their hold on power and introduced strict anti-refugee policies. Consequently, there are currently very few immigrants (especially asylum seekers) in those specific countries. Some of those governments have also established firm control over public authorities, the media and the judiciary, allowing them to keep winning elections. If the direction of causality were not identified correctly, such countries would suggest a negative correlation between immigration and populist voting.

The most common way of addressing the issue of causality is to assume that new immigrants are most likely to head for areas where previous generations of immigrants settled. Consequently, an increase in immigration (for instance, owing to the recent refugee crisis) will have a disproportionate effect on areas that already have large immigrant populations. Other studies (such as recent research looking at Austria, Denmark and France) are based on central government's random or quasi-random allocation of refugees to specific municipalities. All studies also control for trends in pre-influx election results.

In Denmark, the assignment of refugees to particular municipalities in the period 1986-98 led to increases in anti-immigrant voting in all but the largest and most urbanised municipalities (the largest 5 per cent).[34] In smaller municipalities, each percentage point increase in refugees' share of the municipality's population resulted in a 1-2 percentage point increase in voting for anti-immigration parties. In the largest municipalities, however, the opposite was observed: each percentage point increase in refugees' share of the municipality's population resulted in a 1.5-3 percentage point *decline* in anti-immigrant voting.

In Upper Austria, the assignment of refugees improved attitudes towards refugees and reduced the vote share of the far-right Freedom Party (FPO) by approximately 3.5 percentage points in 2015.[35] Interestingly, however, the FPO's share of the vote *increased* by 2.7 percentage points in municipalities that refugees travelled through on their way to the German border. This result is in line with the contact theory, in the sense that locals who had regular contact with refugees that had settled in their municipalities developed sympathy for them. It is important in this regard that refugee resettlement programmes limit the number of refugees to 1.5 per cent of the local population (with refugees averaging no more than 1.35 per cent of the population across the municipality as a whole).

Similar results can be seen in France, where a recent study found that Marine Le Pen's share of the vote *fell* in the 2017 presidential election in municipalities that had received refugees following the dismantling of the "Calais Jungle" refugee camp.[36] In this case, the average municipality received 1.7 refugees per 100 inhabitants. That study also found that the pro-immigrant effect declines as the number of refugees increases, turning negative at 4 refugees per 100 inhabitants.

The importance of the intensity of exposure to refugees is confirmed by Dinas et al. (2017), who looked at the impact that refugees arriving on Greek islands had on the Greek elections in January and September 2015. Here, the intensity of immigration was far higher than in Austria or France. Indeed, among islands that were exposed to arrivals of refugees, the median island received 2.5 refugees per local resident (with one island receiving 125 refugees per local resident). In this case, the arrival of refugees increased the vote share of the far-right Golden Dawn party by between 2.5 and 4.5 percentage points.

Burkart (2018) identifies a similar effect in Sweden. Using a quasi-random allocation of refugees, he shows that an increase of 1 percentage point in refugees' share of the population resulted in an increase of about 0.6 percentage point in the vote share of the anti-immigrant Sweden Democrats party in the 2014 election relative to the 2010 election.

Becker and Fetzer (2016) find that eastern European migrants who came to the United Kingdom following the opening-up of the UK labour market in 2004 had a similar effect. That migration wave was very substantial (totalling 1 million people – 3 per cent of the UK labour force). Their study finds that eastern European migration explains about 2 percentage points of the increase in UKIP's share of the vote in the European elections in 2009 and 2014 relative to the 1999 and 2004 elections.

Other historical studies also point to a causal link between immigration and voting for the far right. Barone et al. (2016) examined Italy's 2001, 2006 and 2008 elections, finding that a 1 percentage point increase in immigrants' share of the population led to a 1.3 percentage point increase in the vote share of the anti-immigrant centre-right coalition led by Silvio Berlusconi. Halla et al. (2017) studied Austrian elections from 1983 to 2013, finding that a 1 percentage point increase in immigrants' share of the population resulted in a 0.16 percentage point increase in the FPO's vote share. And Edo et al. (2017) studied French presidential elections from 1988 to 2017, finding that immigration boosted support for the far right, but not the far left. What is more, that effect was a strong one: a 1 percentage point increase in immigrants' share of the population resulted in a 2 percentage point rise in the far right's share of the vote.

[34] See Dustmann et al. (2016).
[35] See Steinmayr (2018).
[36] See Vertier and Viskanic (2018).

**TABLE 3.6.1.** Impact of migration on vote shares of populist parties

| Dependent variable (vote share) | All populists | Right-wing populists | Left-wing populists | Other populists | Anti-immigrant populists | Non-anti-immigrant populists |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| External immigration rate | -6.12** (3.06) | 1.34 (1.49) | -5.65** (2.33) | -1.80 (1.58) | 0.64 (0.84) | -6.75** (2.82) |
| External emigration rate | 4.23 (2.93) | -1.84 (1.32) | 4.93** (1.94) | 1.13 (1.75) | 0.88 (0.79) | 3.35 (2.73) |
| Net internal migration rate | 0.94 (1.07) | -0.19 (0.56) | 0.86 (1.08) | 0.27 (0.47) | -0.00 (0.41) | 0.94 (1.12) |
| Unemployment | -0.10 (0.32) | 0.04 (0.28) | -0.40 (0.36) | 0.26 (0.35) | -0.80 (0.50) | 0.70 (0.46) |
| Number of observations | 510 | 510 | 510 | 510 | 510 | 510 |
| $R^2$ | 0.93 | 0.93 | 0.86 | 0.94 | 0.94 | 0.86 |

**Source:** Guriev et al. (2018).
**Note:** These estimates are derived from a second-stage estimation, with immigration instrumented by immigrants' share of the population at the beginning of the period, interacted with Europe-wide immigration rates. "Other populists" are populist parties that are neither right-wing nor left-wing. Fixed effects for NUTS-2 regions and year dummies are included in all specifications. The unit of observation is the NUTS-2 region. Robust standard errors are reported in parentheses (clustered at the country level), and *, ** and *** denote values that are statistically significant at the 10, 5 and 1 per cent levels respectively.

Thus, the results of such research tend to point to a positive correlation between immigration and anti-immigrant voting – although some studies do support the contact theory (especially when the number of refugees is sufficiently small). The effect of immigration may also depend on the skill sets of the immigrants in question. For example, Mayda et al. (2018) studied US elections from 1990 to 2010, showing that high-skilled immigration reduces the Republican vote share in presidential elections, while low-skilled immigration increases it. The magnitude of that impact is similar to those observed in other studies: a 1 percentage point increase in immigrants' share of the population leads to a 1 percentage point change in the vote share in one direction or the other. The impacts on Senate and House elections have the same sign, but are smaller in magnitude.

In contrast to the studies above, which investigate the impact that migration has on populist voting in individual Western countries, Guriev et al. (2018) conduct Europe-wide analysis of 510 elections in 160 NUTS-2 regions in 19 countries since 2001. They follow the approach developed by Algan et al. (2017) when it comes to identifying right-wing, left-wing and other populist parties. Their dataset includes five post-communist countries (Bulgaria, the Czech Republic, Poland, Romania and the Slovak Republic). Given the demographic and migration challenges in eastern and southern Europe, their analysis considers gross cross-border emigration and gross cross-border immigration flows separately – also controlling for regional and time fixed effects, regional unemployment and regional intra-country migration. Their identification of the causal effects that gross immigration flows have on populist voting is based on the strategy detailed above, using immigrants' pre-crisis population shares in the relevant subnational regions.

The results of their analysis can be found in Table 3.6.1. Immigration is associated with declines in the vote shares of left-wing and non-anti-immigrant populists. The magnitude of that impact is substantial: a 1 percentage point rise in immigrants' share of the population since the previous election is associated with a 6 percentage point decline in the combined vote share for left-wing populist parties (and a 7 percentage point decline in the combined vote share for non-anti-immigrant populist parties) in a given election. While the impact observed on the vote share of right-wing and anti-immigrant populist parties is positive, it is not statistically significant. Meanwhile, emigration has a positive effect on the vote share of left-wing populist parties. Overall, these Europe-wide results confirm the mixed messages of the single-country studies detailed above, showing that the impact of immigration varies when it comes to the vote shares of right-wing and anti-immigrant parties.

# Annex 3.1.
## Estimating determinants of migration intentions for potential migrants

The following linear probability models are used to study determinants of intentions to migrate abroad:

(1) $$intention\ to\ migrate_i = \beta_0 + \beta_1 X_{1i} + \beta_2 X_{2i} + \beta_3 X_{3i} + \gamma_c + \delta_t + \varepsilon_i$$

(2) $$intention\ to\ migrate_i = \theta_0 + \theta_1 X_{1i} + \theta_2 X_{2i} + \theta_3 X_{3i} + \theta_4 satisfaction\ indicators_i + \gamma_c + \delta_t + \varepsilon_i$$

(3) $$intention\ to\ migrate_i = \omega_0 + \omega_1 X_{1i} + \omega_2 X_{2i} + \omega_3 X_{3i} + \omega_4 satisfaction\ index_i + \gamma_c + \delta_t + \varepsilon_i$$

The dependent variable, $intention\ to\ migrate$, takes a value of 100 if individual $i$ is planning to move permanently to another country within the next 12 months and 0 otherwise. $\gamma_c$ and $\delta_t$ denote country of origin and year fixed effects respectively. $X_1$ is a set of demographic characteristics and education and labour market outcomes including gender, age bracket, marital status, level of education, employment, place of residence (urban or rural) and presence of children under the age of 15 in the household.

The second set of controls ($X_2$) includes the log differential between the individual's current wage and the average expected wage in the stated destination country. The expected wage in the country of destination was obtained using a set of multivariate regressions, estimated separately for each country and each survey year, whereby a person's annual log wage is explained by their age, gender and education. The coefficients from those models were then applied to each person on the basis of their preferred country of destination, assuming that returns to age, gender and education in the country of destination are the same for locals and migrants alike. Where respondents intended to migrate, but did not identify an intended destination country, the wage differential and the variables reflecting the cost of migration were calculated as weighted averages on the basis of the preferred destinations of individuals from the same country of origin with the same level of education in the same survey year.

Controls also include the log of the distance between the most populous cities in the two countries, dummy variables for a common border between the two countries and a common colonial history, and an index of linguistic proximity. Additional variables capture social networks abroad and at home.

The third set of controls ($X_3$) captures individual perceptions and attitudes. It includes an index reflecting life satisfaction (on a scale of 0 to 10), a dummy variable which takes the value of 1 if the respondent feels safe walking alone at night in their place of residence, a measure of trust in the national government, a dummy variable which is equal to 1 if the respondent believes that corruption is widespread within businesses located in their country, and a similar dummy for corruption in the government.

A set of satisfaction indicators measure whether an individual is satisfied with (i) the quality of air and water, (ii) the country's education system and schools, (iii) the availability of high-quality healthcare, (iv) the availability of good affordable housing, and (v) the quality of roads, highways and public transport systems. The satisfaction index indicates the average level of satisfaction across all of these various aspects.

# Annex 3.2.
## Data on refugees and irregular migrants, populations of countries of origin and country characteristics

### Data on refugees and irregular migrants

Data on refugees and irregular migrants are taken from the three waves of FMS surveys conducted by the IOM. The FMS survey seeks to produce quantitative estimates of the numbers of third-country nationals originating from outside the European Union who are migrating towards Europe via the central and eastern Mediterranean routes. The first wave (October to December 2015) saw interviews being conducted in Bulgaria, Croatia, FYR Macedonia, Greece, Hungary, Italy, Serbia and Slovenia. The second wave (January to November 2016) covered Bulgaria, Croatia, FYR Macedonia, Greece, Hungary, Serbia and Slovenia. And the final wave (June to November 2016) covered Italy. All in all, this sample includes data on nearly 21,000 individuals.

FMS data contain a wealth of information on migrants' demographic characteristics (age, gender, level of education and marital status), their employment status prior to migration, key transit points on their route, the cost of the journey, their reasons for leaving and their intended destination.

Those surveys, which are conducted in a total of 11 different languages, are administered by trained data collectors with a range of cultural backgrounds. Respondents are approached by IOM field staff, told about the objectives of the research and advised that participation will not influence their legal status in the country where the interview is conducted. Despite fast-changing conditions on the ground, FMS data do provide a good picture of migrant groups.[37]

### Population data for refugees and irregular migrants' countries of origin

Population data for refugees and irregular migrants' countries of origin are taken from the Gallup World Polls conducted between

[37] See Aksoy and Poutvaara (2018).

2009 and 2014. These nationally representative surveys are conducted every year in more than 160 economies around the world. Each survey round covers approximately 1,000 individuals in each economy. These surveys provide detailed information on people's demographic characteristics (such as their age, gender, level of education and marital status), as well as labour market outcomes, income levels and intentions to migrate within the next 12 months.

The Gallup and FMS data have been combined in a single sample in order to provide information on the pre-migration populations of refugees and irregular migrants' countries of origin (those with at least 100 respondents in the FMS dataset). Each variable in the Gallup dataset has been brought into line with the definitions used in the FMS data.

### Other data

The Uppsala Conflict Data Program (UCDP) dataset on conflict-related deaths has been used to classify refugees and irregular migrants' countries of origin in terms of the intensity of conflicts. Countries are regarded as experiencing a major conflict if 1,000 or more conflict-related deaths occur in a single year between 2009 and 2014, with all other countries being placed in the "minor/no conflict" category. The results remain broadly unchanged if a year-specific measure of conflict intensity is used, with few countries moving between the two categories from one year to the next.

Country-level unemployment rates have been taken from the World Bank's World Development Indicators database. For details of the compilation of the MIPEX, see Huddleston et al. (2015). Information on the average duration of asylum procedures comes from Eurofound and represents the average number of months between the submission of an asylum claim and the initial decision. The waiting time before accessing the labour market comes from the OECD and represents the time, in months, that it takes to obtain a work permit after successfully claiming asylum. For ease of interpretation, both variables have been rescaled such that they range from 0 to 1. The social expenditure indicator comes from the OECD and is measured as a percentage of GDP.

# Annex 3.3. Estimating socio-demographic characteristics of refugees and irregular migrants

This analysis uses a series of multivariate regressions to assess the ways in which the socio-demographic characteristics of refugees and irregular migrants differ from those of the general population in their economies of origin.[38] The main explanatory variables of interest are age, gender, marital status and level of education. In some specifications, estimated incomes are also included in order to understand differences between the earning potential of refugees and irregular migrants from different economies.

The following linear probability model is estimated using a combined sample comprising individuals completing FMS surveys and Gallup World Polls:

$$(1)\quad refugee/migrant_{ic} = \propto + \beta_1 X_i + \beta_2 C_c + \varepsilon_i$$

where the dependent variable, $refugee/migrant$, takes a value of 1 if individual $i$ from country $c$ is in the FMS sample and 0 if he/she is in the Gallup sample. The set of controls ($X$) includes age groups, levels of education, employment status prior to migration (employed or not) and marital status. A set of source country ($C_c$) dummies control for all time-invariant differences across countries of origin. The analysis focuses on individuals aged 25 and over, who are therefore likely to have completed their education.

Models are estimated separately for men and women and for different levels of conflict in countries of origin. Logit regressions (not reported) yield similar results.

The regressions reported in Tables 3.5 and 3.6 are based on a sample of refugees and irregular migrants whereby the outcome variables ($outcome$) represent various characteristics of the stated destination country ($d$). The same set of control variables is included in these specifications.

$$(2)\quad outcome_d = \propto + \beta_1 X_i + \beta_2 C_c + \varepsilon_i$$

[38] This analysis is based on Aksoy and Poutvaara (2018).

# References


**Y.E. Akgündüz and H. Torun (2018)**
"Two and a half million Syrian refugees, skill mix and capital intensity", GLO Discussion Paper No. 186.

**C.G. Aksoy and B. Ozcan (2018)**
"The Impact of Immigration on Natives' Fertility: Evidence from Syrians in Turkey", EBRD working paper, forthcoming.

**C.G. Aksoy and P. Poutvaara (2018)**
"Self-Selection of Refugees and Other Migrant Groups", EBRD working paper, forthcoming.

**Y. Algan, S. Guriev, E. Papaioannou and E. Passari (2017)**
"The European trust crisis and the rise of populism", *Brookings Papers on Economic Activity*, Fall.

**G. Allport (1954)**
*The Nature of Prejudice*, Addison-Wesley.

**D. Bahar, A. Hauptmann, C. Ozgüel and H. Rapoport (2018)**
"Let their knowledge flow: the effect of Yugoslavian returning refugees on export productivity", mimeo.

**G. Barone, A. D'Ignazio, G. de Blasio and P. Naticchioni (2016)**
"Mr. Rossi, Mr. Hu and Politics. The Role of Immigration in Shaping Natives' Voting Behavior", *Journal of Public Economics*, Vol. 136, pp. 1-13.

**S.O. Becker and T. Fetzer (2016)**
"Does Migration Cause Extreme Voting?", CAGE Working Paper No. 306.

**G.J. Borjas (1987)**
"Self-selection and the earnings of immigrants", *American Economic Review*, Vol. 77(4), pp. 531-553.

**S. Burkart (2018)**
"Asylum seekers and populist voting in Sweden", background note for this *Transition Report*.

**R. Cai, N. Esipova, M. Oppenheimer and S. Feng (2014)**
"International migration desires related to subjective well-being", *IZA Journal of Migration*, Vol. 3.

**E. Ceritoğlu, H.B. Gürcihan-Yüncüler, H. Torun and S. Tümen (2017)**
"The impact of Syrian refugees on natives' labor market outcomes in Turkey: evidence from a quasi-experimental design", *IZA Journal of Labor Policy*, Vol. 6.

**P. Choudhury (2016)**
"Return migration and geography of innovation in MNEs: a natural experiment of knowledge production by local workers reporting to return migrants", *Journal of Economic Geography*, Vol. 16, pp. 585-610.

**A. Clark (2007)**
"Understanding community: a review of networks, ties and contacts", ESRC NCRM Working Paper No. 9/07.

**T.H. Dao, F. Docquier, C. Parsons and G. Peri (2018)**
"Migration and Development: Dissecting the Anatomy of the Mobility Transition", *Journal of Development Economics*, Vol. 132, pp. 88-101.

**X.V. Del Carpio and M. Wagner (2015)**
"The impact of Syrian refugees on the Turkish labor market", World Bank Policy Research Working Paper No. 7402.

**E. Dinas, K. Matakos, D. Xefteris and D. Hangartner (2017)**
"Waking Up the Golden Dawn: Does Exposure to the Refugee Crisis Increase Support for Extreme-Right Parties?", mimeo.

**F. Docquier, B.L. Lowell and A. Marfouk (2009)**
"A gendered assessment of highly skilled emigration", *Population and Development Review*, Vol. 35, pp. 297-321.

**F. Docquier, G. Peri and I. Ruyssen (2014)**
"The cross-country determinants of potential and actual migration", *International Migration Review*, Vol. 48, pp. S37-S99.

**F. Docquier and H. Rapoport (2012)**
"Globalization, Brain Drain, and Development", *Journal of Economic Literature*, Vol. 50, pp. 681-730.

**C. Dustmann, F. Fasani, T. Frattini, L. Minale and U. Schönberg (2017)**
"On the economics and politics of refugee migration", *Economic Policy*, Vol. 32, pp. 497-550.

**C. Dustmann and A. Okatenko (2014)**
"Out-migration, wealth constraints, and the quality of local amenities", *Journal of Development Economics*, Vol. 110, pp. 52-63.

**C. Dustmann, K. Vasiljeva and A. Piil Damm (2016)**
"Refugee Migration and Electoral Outcomes", CReAM Discussion Paper No. 19/16.

**A. Edo, Y. Giesing, J. Oztunc and P. Poutvaara (2017)**
"Immigration and electoral support for the far left and the far right", CEPII Working Paper No. 2017-20.

**V.A. Epanechnikov (1969)**
"Non-Parametric Estimation of a Multivariate Probability Density", *Theory of Probability and its Applications*, Vol. 14, pp. 153-158.

**M. Erdoğan (2014)**
"Syrians in Turkey: Social acceptance and integration research", Hacettepe University Migration and Politics Research Centre (HUGO).

**L. Foster, J. Haltiwanger and C. Syverson (2008)**
"Reallocation, Firm Turnover, and Efficiency: Selection on Productivity or Profitability?", *American Economic Review*, Vol. 98(1), pp. 394-425.

**G. Friebel, M. Manchin, M. Mendola and G. Prarolo (2017)**
"Human smuggling and intentions to migrate: global evidence from a supply shock along Africa-to-Europe migration routes", DEMS Working Paper No. 375.

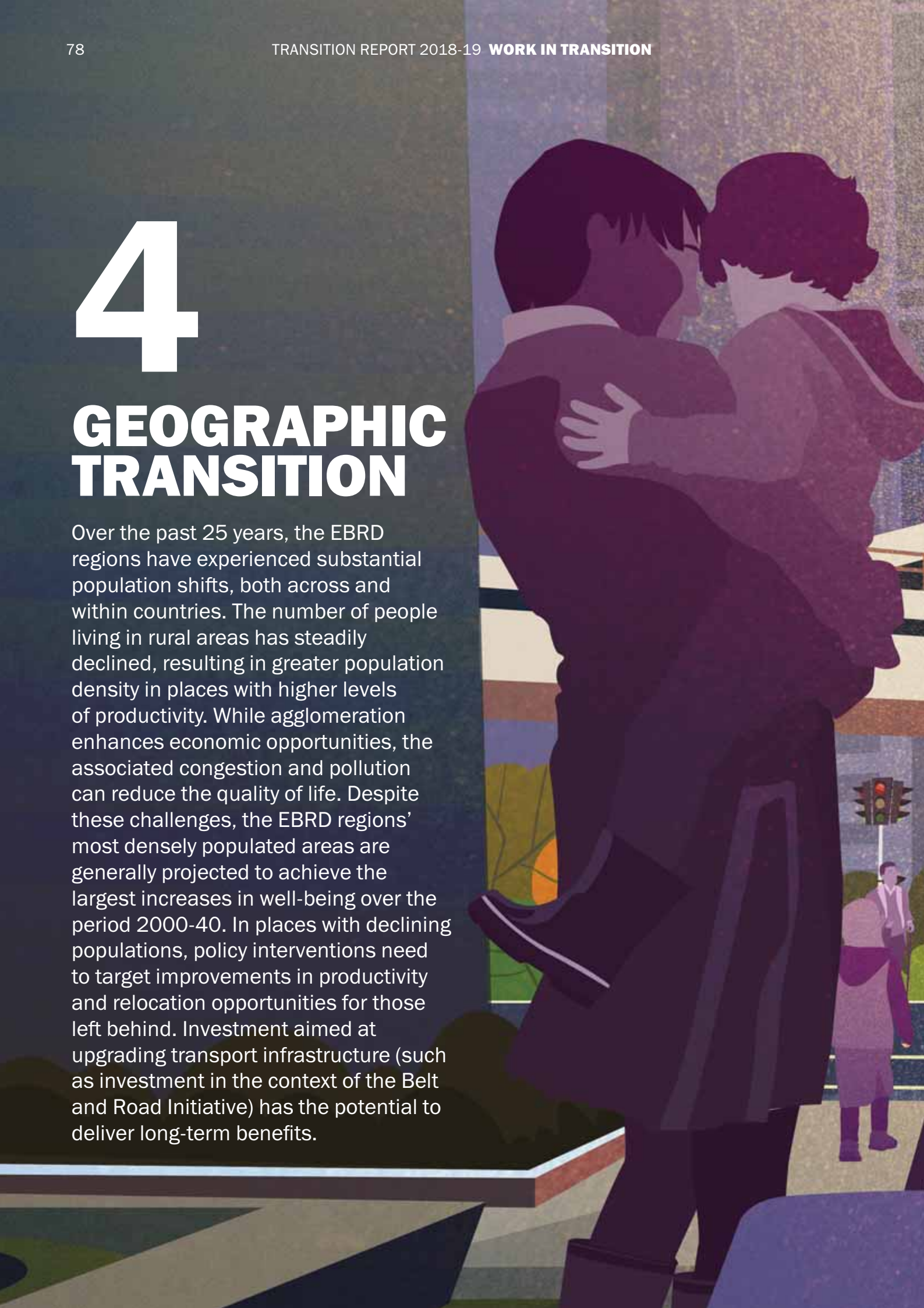
**Y. Giesing and N. Laurentsyeva (2018)**
"Firms Left Behind: Emigration and Firm Productivity", CESifo Working Paper No. 6815.

**S. Guriev, N. Melnikov and D. Treisman (2018)**
"Immigration, Emigration, and Populist Vote in Europe", background note for this *Transition Report*.

**M. Halla, A. Wagner and J. Zweimüller (2017)**
"Immigration and Voting for the Far Right", *Journal of the European Economic Association*, Vol. 15, pp. 1341-1385.

**T.J. Hatton (2017)**
"Refugees and asylum seekers, the crisis in Europe and the future of policy", *Economic Policy*, Vol. 32, pp. 447-496.

**T. Huddleston, O. Bilgili, A.-L. Joki and V. Zvezda (2015)**
"Migrant Integration Policy Index 2015", Barcelona Center for International Affairs (CIDOB) and Migration Policy Group (MPG).
**S.P. Kerr, W. Kerr, C. Ozden and C. Parsons (2016)**
"Global talent flows", *Journal of Economic Perspectives*, Vol. 30, pp. 83-106.
**J.J. Lewer, G. Pacheco and S. Rossouw (2009)**
"Do Non-Economic Quality of Life Factors Drive Immigration?", IZA Discussion Paper No. 4385.
**P. Mahajan and D. Yang (2017)**
"Taken by storm: hurricanes, migrant networks, and U.S. immigration", NBER Working Paper No. 23756.
**A. Mansoor and B. Quillin (eds.) (2006)**
*Migration and Remittances: Eastern Europe and the Former Soviet Union*, World Bank.
**J. Markusen and N. Trofimenko (2009)**
"Teaching locals new tricks: Foreign experts as a channel of knowledge transfers", *Journal of Development Economics*, Vol. 88, pp. 120-131.
**A.M. Mayda (2005)**
"International migration: a panel data analysis of economic and non-economic determinants", IZA Discussion Paper No. 1590.
**A.M. Mayda, G. Peri and W. Steingress (2018)**
"The Political Impact of Immigration: Evidence from the United States", CEPR Discussion Paper No. 12848.
**MEDAM (2018)**
*Flexible Solidarity: A comprehensive strategy for asylum and immigration in the EU – 2018 MEDAM assessment report on asylum and migration policies in Europe*, Mercator Dialogue on Asylum and Migration, Kiel.
**K. Munshi (2003)**
"Networks in the modern economy: Mexican migrants in the U.S. labor market", *The Quarterly Journal of Economics*, Vol. 118, pp. 549-599.
**OECD (2018)**
*Engaging with Employers in the Hiring of Refugees*, Paris.
**D.A. Plane and P.A. Rogerson (1994)**
*The Geographical Analysis of Population: With Applications to Planning and Business*, John Wiley.
**A. Raggl (forthcoming)**
"Migration intentions in CESEE – Evidence from OeNB Euro Survey data", *Focus on European Economic Integration*, Oesterreichische Nationalbank.
**J.M.C. Santos Silva and S. Tenreyro (2006)**
"The log of gravity", *The Review of Economics and Statistics*, Vol. 88, pp. 641-658.
**A. Steinmayr (2018)**
"Contact Matters: Exposure to Refugees and Voting for the Far-Right", mimeo.
**UN DESA (2017a)**
*Trends in international migrant stock: The 2017 revision*, New York.
**UN DESA (2017b)**
*International Migration Report 2017*, New York.
**UNHCR (2018)**
*Global Trends: Forced Displacement in 2017*, Geneva.
**P. Vertier and M. Viskanic (2018)**
"Dismantling the 'Jungle': Migrant Relocation and Extreme Voting in France", CESifo Working Paper No. 6927.
**World Bank (2018)**
*Asylum seekers in the European Union: building evidence to inform policy making*, Washington, D.C.
**W. Zelinsky (1971)**
"The Hypothesis of the Mobility Transition", *Geographical Review*, Vol. 61, pp. 219-249.
**N. Zoubanov (2004)**
"Assessing general and country-specific determinants of migration in the European Union: a panel data approach", paper presented at the IZA Summer School.



# 4

# GEOGRAPHIC TRANSITION

Over the past 25 years, the EBRD regions have experienced substantial population shifts, both across and within countries. The number of people living in rural areas has steadily declined, resulting in greater population density in places with higher levels of productivity. While agglomeration enhances economic opportunities, the associated congestion and pollution can reduce the quality of life. Despite these challenges, the EBRD regions' most densely populated areas are generally projected to achieve the largest increases in well-being over the period 2000-40. In places with declining populations, policy interventions need to target improvements in productivity and relocation opportunities for those left behind. Investment aimed at upgrading transport infrastructure (such as investment in the context of the Belt and Road Initiative) has the potential to deliver long-term benefits.

# Introduction

When a worker relocates from a small town in Poland to London, there are two distinct aspects to that move. First, a working-age adult emigrates from Poland to the United Kingdom, with all of the economic and demographic implications that entails (as discussed in previous chapters). Second, a person moves from a relatively sparsely populated area (rural Poland) to a densely populated area (a city with a population of 10 million). The movement of people to more densely populated areas has economic implications of its own, and they are the focus of this chapter.

Over the past 25 years, the EBRD regions have experienced a steady process of urbanisation. The number of people living in sparsely populated areas has declined, both in absolute terms and as a percentage of the total population. Cities with populations in excess of 500,000 people have, in general, either grown or experienced lower rates of population loss than smaller cities. However, the precise nature of those population shifts has varied considerably across countries. This chapter quantifies and discusses those cross-country differences.

Unsurprisingly, people generally choose to live in places with good economic opportunities. In the EBRD regions, that leads people to move to more densely populated areas, which tend to be more productive than other places (a relationship that holds in western Europe and the United States of America (USA) as well). Moreover, places becoming more densely populated also tend to be getting more productive. Indeed, more densely populated areas benefit from agglomeration effects. Businesses are able to access larger markets of potential customers and suppliers; they benefit from larger pools of applicants when filling vacancies; and the provision of public goods and infrastructure tends to be cheaper thanks to economies of scale.

However, growing populations eventually result in congestion and pollution – phenomena that will be familiar to anyone who has visited a major city. Congestion during morning commutes, elevated noise levels and scarcity of housing all detract from people's quality of life and encourage them to move away from the city centre. Improvements to infrastructure may allow people to redistribute outward, or create new economic opportunities and drive further consolidation into cities and central business districts.

These influences are not fully captured by measures such as GDP or productivity. To understand population movements and evaluate their impact, it is crucial to account for the effects that pollution and overcrowding have on health and well-being. In fact, most people are willing to accept a slight reduction in income in order to escape poor conditions and live in a healthier environment. The analysis in this chapter uses a spatial model that balances those competing agglomeration and dispersion forces to shed light on the long-term economic implications of population movements in the EBRD regions.

The EBRD regions' most densely populated areas are projected to achieve the largest increases in well-being over the period 2000-40. However, that can only be achieved if congestion is kept in check. Investment in municipal infrastructure (such as public transport, water, wastewater and recycling) can help in this regard.

At the same time, in almost half of all economies in the EBRD regions, more than 50 per cent of people live in areas with declining populations. If productivity levels in those areas fall along with population density, depopulation risks will become self-reinforcing. Investment aimed at boosting economic efficiency (such as irrigation in rural communities) can help to mitigate such developments.

The spatial model that is employed in this chapter can also be used to evaluate the potential impact of transport upgrades aimed at facilitating trade. Upgrades to specific routes – such as roads and railways in the Western Balkans or transport links envisaged as part of China's Belt and Road Initiative (BRI) – deliver economic gains to the communities that they pass through. These effects become weaker as distance from the upgraded infrastructure increases.

The first section of this chapter examines the links between changes in the spatial distribution of populations and economic performance at a highly granular level. The second section then looks at the location-specific impact of major investment in infrastructure over the longer term. The last section compares various different scenarios involving reductions in trade costs, looking at their economic impact.

**AVERAGE LOCALISED DENSITY IN THE EBRD REGIONS HAS RISEN BY**

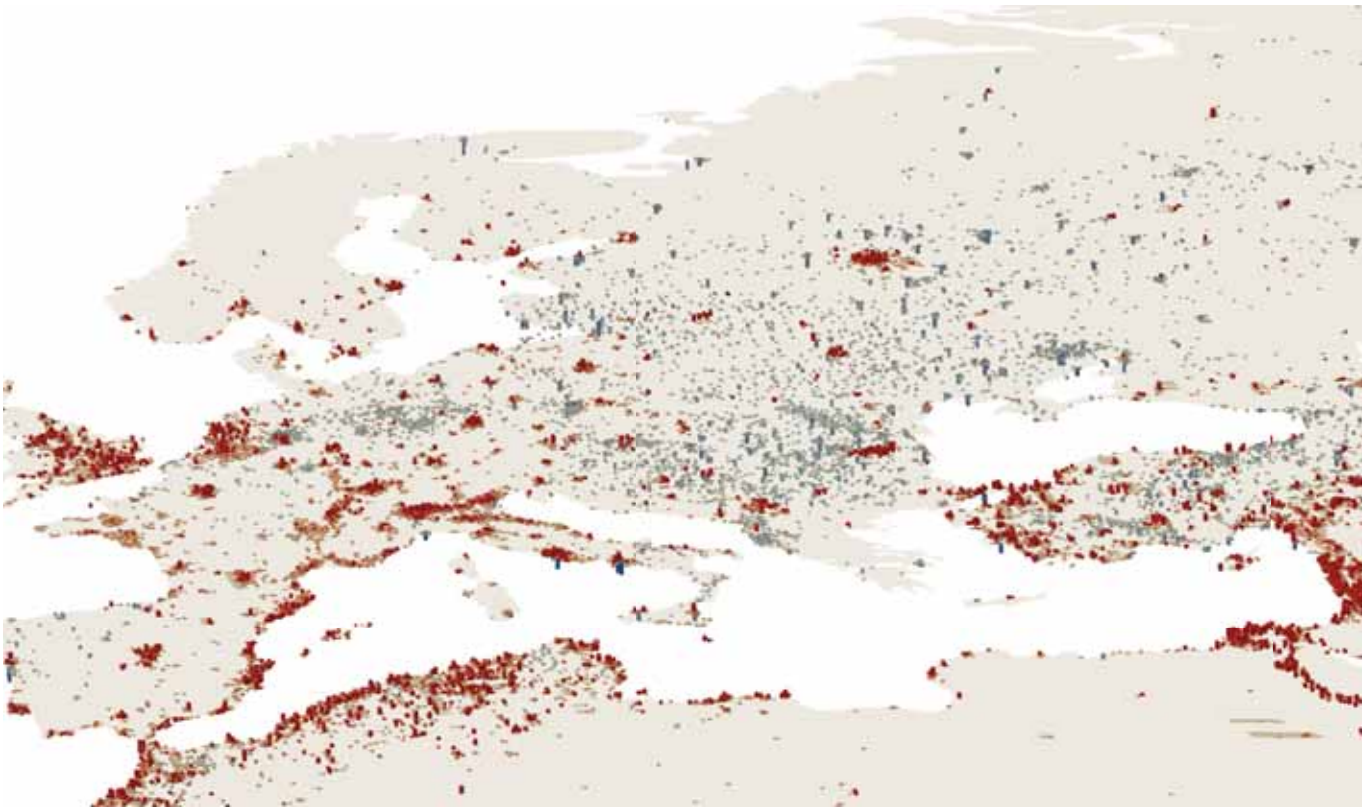
**ALMOST 1%**

**SINCE 2000**

**IN 45%**

**OF ECONOMIES IN THE EBRD REGIONS, MORE THAN HALF OF ALL PEOPLE LIVE IN PLACES WHERE LOCALISED POPULATION DENSITY HAS DECLINED SINCE 2000**

**CHART 4.1.** Population growth has been concentrated in major metropolitan areas



**Source:** European Commission, Columbia University and authors' calculations.
**Note:** Based on 100 km$^2$ grid squares for the period 1990-2015. Bar heights convey population changes, with red bars denoting population increases and grey bars indicating decreases. Beige areas without bars are places with population changes of less than 200 people.

**IN THE EBRD REGIONS, A DOUBLING OF POPULATION DENSITY IN A GIVEN AREA IS ASSOCIATED WITH APPROXIMATELY**

**5%**

**HIGHER OUTPUT PER CAPITA**

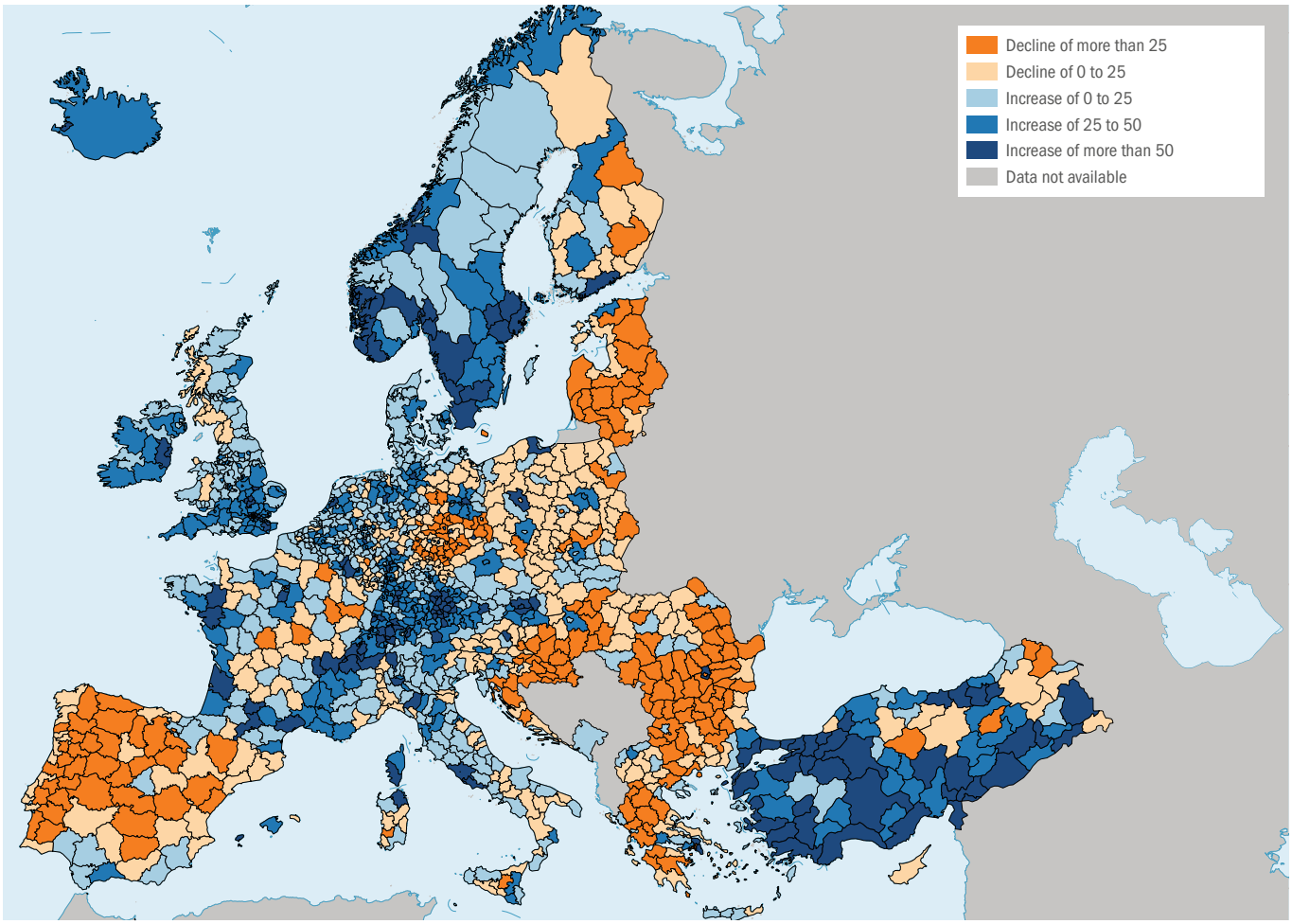
## Population shifts over the past 25 years

Vast population shifts have taken place across the EBRD regions and western Europe over the last 25 years. Analysis of population changes using 100 km$^2$ grid squares shows strong population growth in major metropolitan areas such as Istanbul, London, Madrid, Milan, Moscow, Paris, Rome and St Petersburg (see Chart 4.1). In the southern and eastern Mediterranean (SEMED) region, high rates of population growth have been seen in Tunis, Cairo, parts of Morocco, the Nile valley and delta, and much of Jordan, Lebanon, the West Bank and Gaza. Meanwhile, populations have fallen in much of the Western Balkans and across large parts of central Europe and the Baltic states (CEB).

Moreover, Eurostat data for the period 2012-17 indicate declining populations on the periphery of the European Union and rising populations in the geographic heart of the EU (see Chart 4.2). Although populations generally declined in the CEB region, Spain and the Western Balkans, some places in those areas recorded strong population growth in that period.[1]

[1] See Eurostat (2017). The period 2012-17 was chosen in order to ensure maximum coverage in terms of countries.

**CHART 4.2.** Net population change in Europe by NUTS-3 region




**Source:** Eurostat and authors' calculations.
**Note:** Data relate to the period 2012-17. Changes are reported as population increases/declines per 1,000 residents on the basis of the 2012 population.

In particular, predominantly urban regions of Europe are much more likely to experience population growth, while the opposite is true of predominantly rural regions (see Chart 4.3 and 4.4). Indeed, predominantly urban regions of European countries have seen their populations rise by 34 per cent since 2012, compared with just 5 per cent in predominantly rural regions.

Unlike in advanced European economies, people in EBRD countries of operations in Europe are more likely to live in intermediate or predominantly rural areas (see Chart 4.4). With the exception of Turkey, those countries are also more likely to have experienced declining populations (across all three types of region).

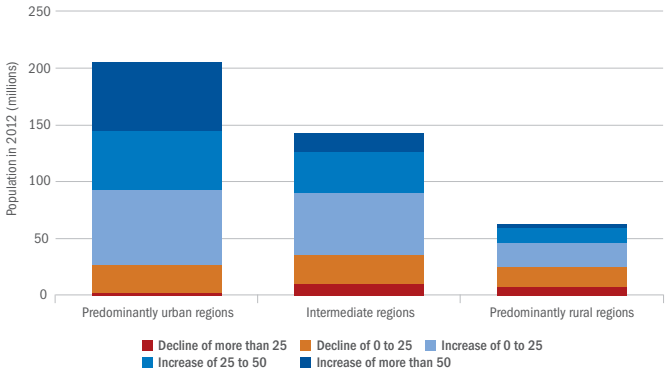
Natural population gains have driven much of the population growth that has been observed across Turkey. Meanwhile, net migration patterns in Turkey generally mimic those seen in the EU, with net outward migration in Turkey's interior (particularly in regions located further east) and net inflows around Istanbul, Ankara and Turkey's western coast, where economic opportunities tend to be more abundant. The variation in these outcomes is largely lost when looking at total population change at the regional level. To address this shortcoming, the next section examines population change at a much more granular level.

## Evolution of localised population density since 1990

Data compiled by the European Commission and Columbia University projects population data into 1 $km^2$ grid squares, providing deeper insight into rural-to-urban population shifts at a local level, as well as the attendant agglomeration effects.

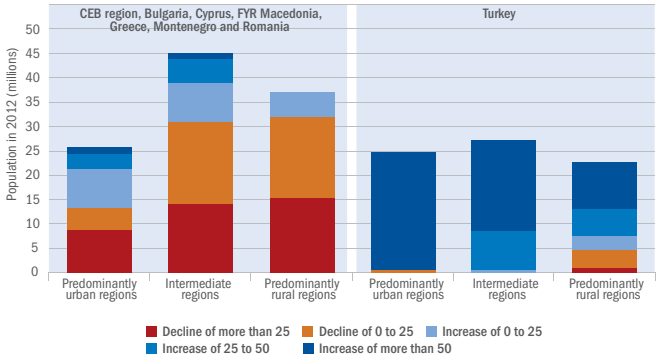
Data on the number of people living in the square kilometre around an individual tell a lot more about that person's immediate

**CHART 4.3.** Net population change in advanced European economies by NUTS-3 region type



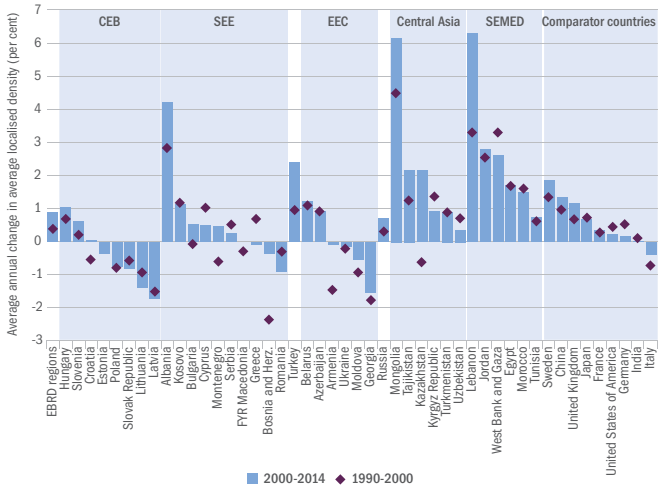

**Source:** Eurostat and authors' calculations.
**Note:** Data relate to the period 2012-17. Changes are reported as population increases/declines per 1,000 residents on the basis of the 2012 population. "Predominantly urban", "intermediate" and "predominantly rural" regions are defined as regions where the rural population accounts for less than 20 per cent, 20 to 50 per cent and more than 50 per cent of the total population respectively. This chart covers the following 20 countries: Austria, Belgium, the Czech Republic, Denmark, Finland, France, Germany, Iceland, Ireland, Italy, Liechtenstein, Luxembourg, Malta, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

**CHART 4.4.** Net population change in EBRD countries of operations in Europe by NUTS-3 region type




**Source:** Eurostat and authors' calculations.
**Note:** Data relate to the period 2012-17. Changes are reported as population increases/declines per 1,000 residents on the basis of the 2012 population. "Predominantly urban", "intermediate" and "predominantly rural" regions are defined as regions where the rural population accounts for less than 20 per cent, 20 to 50 per cent and more than 50 per cent of the total population respectively.

**CHART 4.5.** Changes in average localised density, 1990-2014




**Source:** European Commission, Columbia University and authors' calculations.
**Note:** Figures are based on people's place of residence in 2014. Average localised density is the average number of people living within 5 km of each individual, discounted locally by distance.

environment than average population density figures. Indeed, if everyone in a 4 km$^2$ area was forced to move into a 1 km$^2$ corner of that area, people's lives would be significantly affected, despite the overall population density of the 4 km$^2$ area remaining unchanged. Likewise, the economic impact of people moving away will vary depending on whether they're moving to a new neighbourhood 1 km away or one that is 60 km away, even if both are in a different administrative region.

In order to measure population density in the vicinity of each individual, the analysis below uses a measure of the number of people residing in all nearby geographic cells (each of which measures 1 km$^2$), discounting people more as the distance increases.[2] This measure captures everyone living within 5 km of the individual in question and is referred to as the "localised population density" of the relevant square. Localised population densities can be averaged across a country or a metropolitan area (in which case, such averages are referred to as "average localised densities").[3] In the presence of extensive depopulation, the average localised density may decline despite a population becoming substantially more concentrated in a small number of cities.

A large percentage of the people living in EBRD regions live in areas with declining populations. Indeed, the majority of economies in the CEB region experienced decreases in average localised density in the period 2000-14, with Latvia recording the greatest declines (see Chart 4.5), and the percentage of

[2] Discounted as $e^{-0.7d}$, where $d$ is the distance from the centroid of the cell in which each person resides.
[3] See De La Roca and Puga (2017).

people in those economies who live in areas where localised population density declined over the period 2000-14 ranges from 40 to 90 per cent (see Chart 4.6). In south-eastern Europe (SEE), Albania stands out as an economy that has seen large increases in average localised density, while Romania has seen large decreases. Armenia, Bosnia and Herzegovina, Croatia and Montenegro have all experienced particularly sharp declines in localised population density, reflecting the scars of conflict and large-scale emigration.

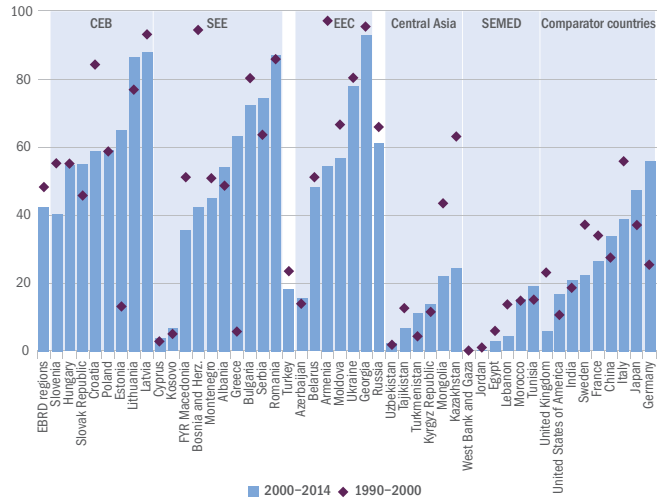
The picture is different in Central Asia, the SEMED region and Turkey. These economies have seen fairly consistent increases in localised density across geographical areas, reflecting their rapid population growth (see Chapter 1). There, relatively few people live in areas that have experienced declines in localised population density (see Chart 4.6). Overall, average localised density in the EBRD regions has risen by almost 1 per cent since 2000 (see Chart 4.5).

There is a fairly strong correlation between changes in average localised density and changes in total population,[4] with most economies clustered around the 45-degree line in Chart 4.7. However, that correlation is far from perfect. In Mongolia, for example, average localised density has risen far more strongly than the total population, reflecting large numbers of people concentrating in the capital city, Ulaanbaatar. Likewise, Albania has experienced a substantial increase in average localised density, despite a moderate decline in its population. Similar – though less pronounced – developments can be observed in Belarus, Bulgaria, Hungary, Russia, Serbia and Ukraine. In contrast, Estonia (not shown on the chart) has seen its average localised density decline by an average of more than 7 per cent per annum, compared with population losses of less than 1 per cent per annum, with dispersions of populations also being observed in Poland and the Slovak Republic. Outside the EBRD regions, India and the USA have seen their populations rise, while their average localised densities have remained more or less unchanged. In Italy, meanwhile, average localised density has declined, despite a small increase in the size of the population.

In fact, if we look at population changes at the 1 km$^2$ grid level, we can see that, even in Turkey, localised population density declined in many areas between 2000 and 2014 (see Chart 4.8), particularly in smaller communities and more sparsely populated areas, while it increased further around major urban areas.

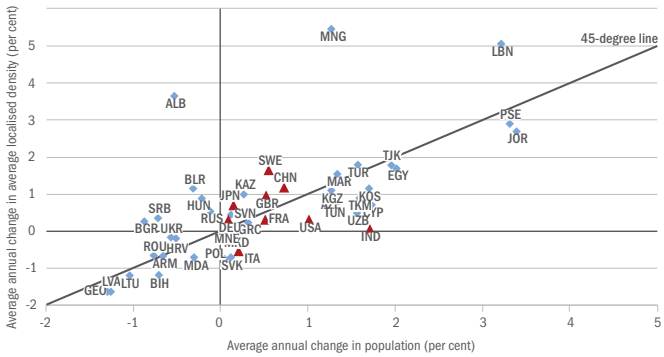
In contrast, in Jordan, Lebanon, the West Bank and Gaza, and Egypt's Nile valley and delta, the localised population density of populated areas has increased across the board, as population growth has been fairly evenly distributed.

**CHART 4.6.** Percentage of people living in an area with declining localised population density




**Source:** European Commission, Columbia University and authors' calculations.
**Note:** Figures are based on people's place of residence in 2014. Localised population density is a measure of the number of people living within 5 km of a person, discounted by distance.

**CHART 4.7.** Changes in average localised density and total population, 1990-2014




**Source:** European Commission, Columbia University and authors' calculations.
**Note:** Average localised density is the average number of people living within 5 km of each individual, discounted locally by distance.

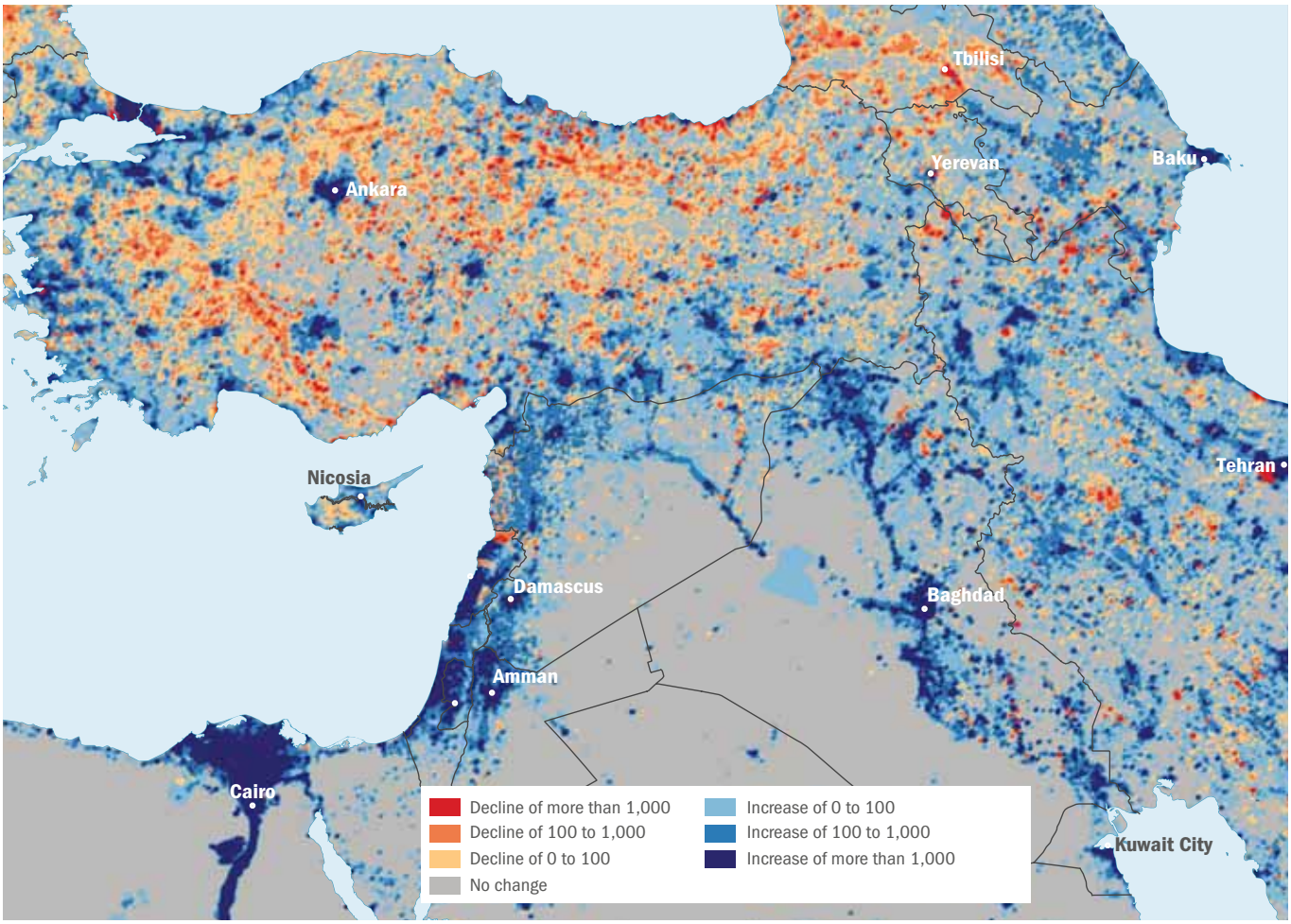
## Concentration of populations in large cities

This section provides detailed analysis of population trends in cities, using 1 km$^2$ grid squares similar to those employed in Chart 4.8. Across the EBRD regions, populations are increasingly becoming concentrated in larger cities. In 2000, approximately 375 million people lived in cities of various sizes in the EBRD regions, with 60 per cent of them living in cities with more than 500,000 inhabitants (see Chart 4.9). Those large cities have continued to grow, with almost half of their inhabitants experiencing large increases in localised population density between 2000 and 2014, and another 23 per cent experiencing moderate increases. In smaller cities, more than half of residents experienced at least moderate declines in localised population density. In line with the rising population density of large cities, the percentage of people living in sparsely populated areas has dropped by 6 percentage points since 1990, reflecting both intra-country and cross-border migration.[5]

[4] Note that, with fixed borders, changes in total population are equivalent to changes in population density.

[5] See also Cadavid et al. (2017).

**CHART 4.8.** Changes in localised population density around Turkey, 2000-14



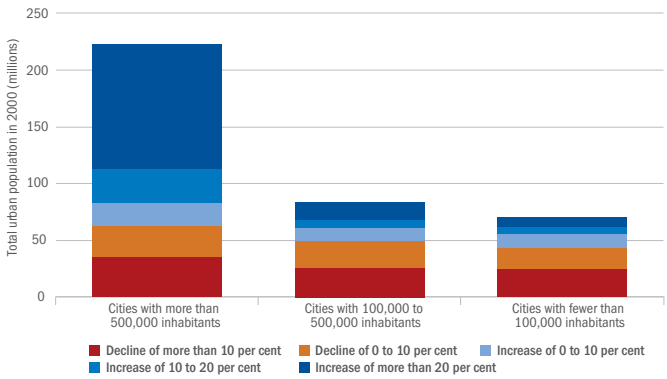

**Source:** European Commission, Columbia University and authors' calculations.
**Note:** Localised population density is a measure of the number of people living within 5 km of a person, discounted by distance. The unit of change is the number of people in a 5 km radius.

**THE PERCENTAGE OF PEOPLE LIVING IN SPARSELY POPULATED AREAS OF THE EBRD REGIONS HAS DROPPED BY**

# 6

**PERCENTAGE POINTS**
**SINCE 1990**

**CHART 4.9.** Changes in average localised density of cities in the EBRD regions, 2000-14




**Source:** European Commission, Columbia University and authors' calculations.
**Note:** Population settlements have been defined by the authors on the basis of contiguous 1 km² cells with more than 500 inhabitants after applying a smoothing procedure.

## Productivity is higher in areas with greater population density

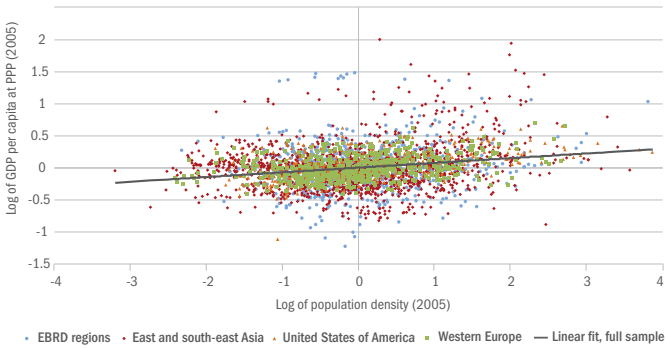
People gravitate towards larger cities in search of economic opportunities. When firms operate close to one another in large markets, it is easier for them to source inputs, they have more potential customers nearby, and they have a larger pool of potential workers from which to select. Ideas can spread faster in more densely populated areas, fostering innovation,[6] which allows consumers to access a wider variety of products. Moreover, the provision of infrastructure and other public goods tends to be cheaper per capita on account of economies of scale.

However, increases in population density can also lead to traffic congestion, noise and pollution. The loss of work and leisure time to commuting and the detrimental effects that pollution has on health can lead to a reduction in people's well-being. Over time, congestion and pollution can encourage people to sacrifice some of their income and move away to less crowded areas. To examine how these countervailing agglomeration and dispersion forces play out, one can look at detailed data on economic activity (GDP per capita at PPP) using a 1 degree by 1 degree grid where cells represent approximately 111 km$^2$ at the equator.

Places with higher population densities tend to also be places with higher productivity levels (see Chart 4.10). This correlation holds under regression analysis when taking account of country-specific effects, the latitude and longitude of the cell and the availability of transport infrastructure. It also holds across all regions around the world, with the exception of northern Africa and southern Asia. In the EBRD regions, a doubling of population density is associated with approximately 5 per cent higher output per capita. Furthermore, places with stronger growth in real GDP per capita over time also tend to attract more people.

This relationship also holds across cities in the EBRD regions and advanced European economies. In order to calculate output per capita for individual cities, data from the 1 degree by 1 degree grid are assigned to more granular cells in proportion to the intensity of night lights. The resulting measure of city-level output per person is then regressed on the city's localised population density and a number of control variables. This analysis reveals that output per capita tends to be higher in more densely populated cities, in line with the theory on agglomeration effects.

**CHART 4.10.** GDP per capita is higher in more densely populated areas




**Source:** G-Econ dataset and authors' calculations.
**Note:** Each dot represents a 1 degree by 1 degree cell with a minimum population of 10 people and minimum GDP per capita of US$ 7.38 at PPP.

## Changes in space: linking population shifts with economic activity

Despite the strong links between higher population density and greater productivity, some large cities in the EBRD regions (such as Warsaw) have seen their populations disperse, with people moving away from densely populated city centres in search of less congested living environments (see Box 4.1).

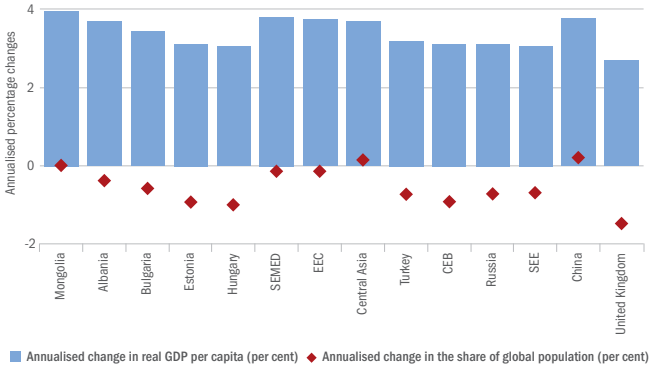
### Modelling agglomeration and dispersion effects

In order to assess the trade-offs that are associated with rising population densities, the analysis in this section uses the dynamic spatial model developed by Desmet et al. (2018). In that model, people improve their well-being by consuming goods sold by firms and enjoying the features of the location in which they live (see Box 4.2). Increases in the number of people living in an area reduce the value of local features owing to congestion. Meanwhile, increases in population density encourage firms to innovate, as they are able to spread the fixed cost of developing a new product across a larger number of potential buyers. Goods can also be traded – at a cost – across different locations, with costs depending on the quality of infrastructure. People are free to move between locations, but incur migration costs. Each person in the model chooses to live in the location that

**IN 2000, APPROXIMATELY**
**375**
**MILLION**
**PEOPLE**
**LIVED IN CITIES OF VARIOUS SIZES IN THE EBRD REGIONS, WITH**
**60%**
**LIVING IN CITIES WITH MORE THAN 500,000 INHABITANTS**

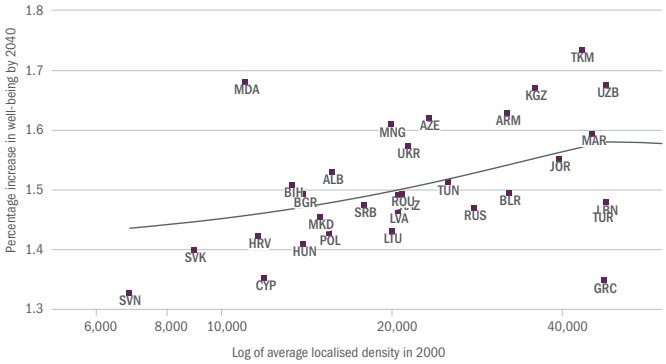
[6] See Duranton and Puga (2004) and Rosenthal and Strange (2004).

**CHART 4.11.** Estimated annualised change in real GDP per capita, 2000-40




**Source:** Authors' calculations.
**Note:** Based on model estimates (see Box 4.2 for details).

**CHART 4.12.** Increases in well-being are expected to be larger in countries with higher average localised density




**Source:** Authors' calculations.
**Note:** Based on population-weighted average model estimates for the period 2000-40. Average localised densities have been obtained using 1 km$^2$ grid cells.

promises the highest expected level of well-being at that point in time. That links the decisions of individual people with the levels of productivity and congestion that are observed in different geographical locations. Note that the model abstracts from differences between the economic policies that are pursued in the various countries.

## Agglomeration and projected output growth in the EBRD regions

Two countries with exceptionally large increases in average localised density, Albania and Mongolia (see Chart 4.7), have been examined for exceptional outcomes on the basis of the model. Both countries are estimated to achieve larger increases in real GDP per capita than certain countries and other EBRD regions with less concentrated populations shown in Chart 4.11. Likewise, Estonia, which recorded the largest decline in localised population density, is projected to achieve a relatively small increase in real GDP per capita, on account of weak agglomeration effects. At a broader level, Central Asia and China are expected to account for a larger share of the world's population in 2040, while the combined population of the rest of the EBRD regions is projected to decline as a share of the global population. China's growth as a share of the global population might be expected to be even stronger in reality, though the model abstracts from policy reforms carried out in reality that could otherwise affect estimates.

Places that are more densely populated today are projected, on average, to enjoy larger improvements in well-being by 2040 (see Chart 4.12), suggesting that increases in per capita consumption tend to outweigh the disutility that is associated with higher levels of congestion. On balance, the growth rates of productivity, output per capita and residents' well-being in the EBRD regions are projected to outpace the corresponding global averages by around 1 percentage point per annum over that period. The patterns returned by this model vary across regions, as discussed in Box 4.3.

## Impact of investment in transport infrastructure in the Western Balkans

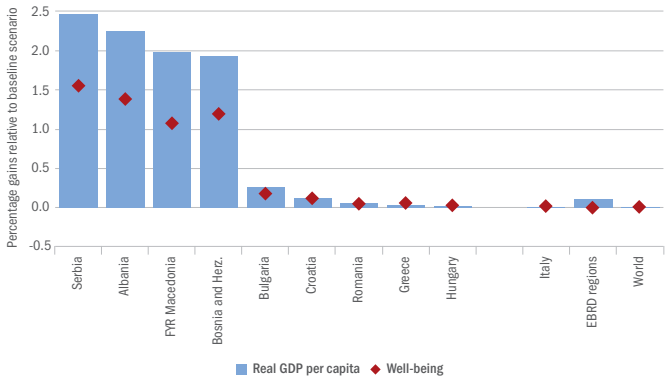
The model can also be used to evaluate the impact of road and railway infrastructure by comparing new enhanced infrastructure with a baseline scenario consisting of the transport infrastructure that was in place in 2000.[7] The analysis in this section starts by evaluating actual and planned investment in roads and railways in the Western Balkans since 2000 (including EBRD-backed projects), before turning its attention to the investment envisaged under China's BRI initiative, which encompasses a large number of countries across several continents.

In the period since the early 2000s, the EBRD and its partners have supported a significant number of investment projects aimed at establishing new road and railway infrastructure in the Western Balkans and upgrading existing infrastructure, with 17 projects relating to roads and 32 relating to railways. On the basis of supporting documentation, those projects have been mapped to geographic information system (GIS) data and incorporated in the model, resulting in a new set of estimates for the cost of point-to-point transport which are lower than those incorporated in the baseline scenario.

As a result of those infrastructure projects, Albania, Bosnia and Herzegovina, FYR Macedonia, Kosovo[8] and Serbia are

[7] See Desmet et al. (2017).
[8] Owing to its size and the granularity of input data, separate estimates for Kosovo are not available. However, the impact on that country is reflected in the estimates for its closest neighbours.

**CHART 4.13.** Gains from Western Balkans transport investment by 2040




**Source:** Authors' calculations.
**Note:** Estimates for Kosovo are not available, but are reflected in those of its neighbours.

projected to achieve cumulative increases in real GDP per capita of around 2 to 2.5 per cent by 2040 relative to the baseline scenario (see Chart 4.13). The corresponding increases in well-being range from around 1 to 1.5 per cent. These estimates are similar to those reported by Allen and Arkolakis (2014) in relation to the impact of the interstate highway system in the USA.

Areas that are further away from the location of the investment also benefit, thanks to the reduced cost of shipping goods to and through the region, as well as the impact of having relatively richer neighbours, but the overall impact is smaller. Greece, Hungary and Italy are all projected to achieve increases in income per capita and well-being, but those increases are fairly small. The impact on other economies further afield is negligible. It is also worth noting that this analysis does not identify any absolute declines in real income per capita or well-being as a result of economic activity shifting from other markets to the Western Balkans transport corridor.

## Belt and Road Initiative

China's current and suggested future investment projects around the world in the context of the Belt and Road Initiative (BRI) are a matter of great interest. The analysis in this section evaluates the impact that BRI-sponsored investment in roads and railways could potentially have on trade (and, ultimately, per capita incomes and well-being), abstracting from the cost of such investment and all wider environmental and geopolitical considerations. The impact of investment in maritime infrastructure also lies outside the scope of this analysis, as the model does not account for additional frictions involved in the transfer of goods from land to the sea and vice versa.

The first scenario used in this analysis ("planned" BRI investment) envisages a relatively limited set of road and railway infrastructure projects with a high likelihood of completion. Some of these may have been completed by now, or construction may be about to start (see solid lines in Chart 4.14). The second scenario ("ambitious" BRI investment) also incorporates a set of potential railway investment projects spanning Eurasia (see dotted lines in Chart 4.14). Those projects serve three main transport routes: a northern route stretching through Russia and parts of central Europe; a southern route running through China and parts of Central Asia, which drops down through Iran and Turkey before working its way through south-eastern Europe; and a middle route which branches off from the other two and covers parts of Central Asia, passing via the Caspian Sea and possibly also the Black Sea. Concrete plans for the construction of these railway lines do not appear imminent, and if these projects do go ahead, they are not certain to be financed via the BRI.

Adapting those investment projects for use in the model requires a set of assumptions. First, all roads and railways are assumed to be fully accessible anywhere along the route. For railways, this is equivalent to placing major stations at intervals of around 100 km (so that each 1 degree by 1 degree cell has a station). Second, BRI-supported rail upgrades are assumed to result in transport costs that are 80 per cent lower than the standard rate applied to railways, on account of the assumed large capacities of those rail links and the fact that expected improvements in supporting logistics should lead to significantly reduced transfer times. Lastly, BRI-supported rail segments are, for the purposes of this exercise, assumed to end at the western border of the EBRD regions, before continuing into advanced European economies as ordinary rail links.

The results of these simulations show substantial gains by 2040 in areas that are direct recipients of BRI-supported investment, with increases in output per capita and well-being dissipating across nearby areas (see Chart 4.15). The overall pattern is similar to that observed in the case of the Western Balkans.

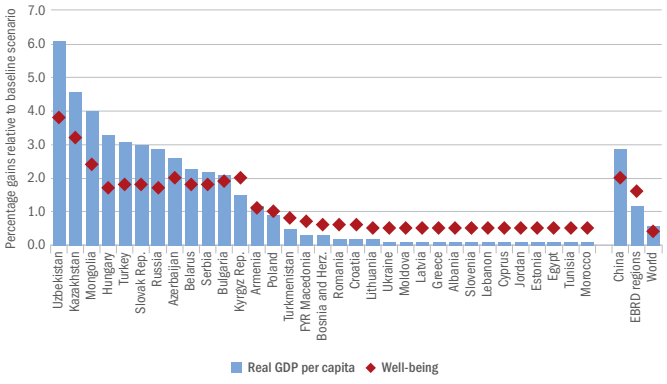
Real GDP per capita in Kazakhstan, Mongolia and Uzbekistan is estimated to be around 4 to 6 per cent higher than it would be in the absence of infrastructure investment supported by the Belt and Road Initiative. These gains reflect the much-improved access to international markets in those land-locked economies and exceed the estimates for China, where real GDP per capita is projected to increase by 3 per cent relative to the baseline scenario. Similar increases in per capita output are estimated for Hungary, Russia, the Slovak Republic and Turkey. In the SEE region, output per capita is estimated to increase by around 2 per cent relative to the baseline in Bulgaria and Serbia, with more modest gains in other economies. The impact on economies in the SEMED region is minimal, as those economies are relatively far removed from the planned infrastructure upgrades.

The impact on well-being closely follows the patterns observed for real GDP per capita. In the Kyrgyz Republic, gains in terms of well-being are projected to outpace increases in income per capita, suggesting that the decline in trade costs on account of improved road and rail links will encourage people to move to nicer areas and possibly reduce congestion. An additional boost to average well-being comes from some limited relocation of populations within countries, with people moving to areas that are directly benefiting from investment in new transport infrastructure. Such relocation also has the potential to reduce congestion in large cities that are not located directly on routes supported by the Belt and Road Initiative.

**CHART 4.14.** Planned and ambitious Belt and Road Initiative investment projects


**Source:** Mercator Institute for China Studies and authors.
**Note:** "Planned" investment projects are projects where construction has been completed, is under way or is about to start. "Ambitious" projects, in contrast, comprise an extensive set of hypothetical routes.

**CHART 4.15.** Gains under the ambitious Belt and Road Initiative investment scenario by 2040 relative to the baseline scenario




**Source:** Authors' calculations.
**Note:** This "ambitious" scenario includes the hypothetical routes depicted in Chart 4.14.

## Comparing different scenarios involving reductions in trade costs

### A uniform reduction in trade costs across the EBRD regions and Asia

Policies aimed at reducing the cost of trade are not limited to investment in infrastructure. They may also target improvements in logistics or the adoption of common health and safety standards, or they may involve other measures aimed at lowering non-tariff barriers. As a thought experiment, this section investigates the impact of achieving a uniform reduction in bilateral trade costs with no changes to supporting infrastructure (which remains unchanged from the baseline scenario). In this scenario, the reduction in trade costs applies to both domestic and international trade. In absolute terms, cost reductions will be higher for international trade, as initial trade costs tend to be higher over greater distances.

The first scenario considers a simultaneous reduction in trade costs across the EBRD regions, east Asia and south-east Asia. These regions are broadly connected by the projects involved in the ambitious BRI scenario. Analysis of this scenario reveals that a 2 per cent reduction in trade costs across all locations in this area delivers the same boost to world output per capita as the infrastructure upgrades in the ambitious BRI scenario or a 2 per cent reduction in trade costs across the EBRD regions and advanced European economies by 2040.

**TABLE 4.1.** Estimated impact of reducing trade costs relative to the baseline scenario (in percentage terms)

| | Belt and Road Initiative | | 2 per cent reduction in trade costs | |
|---|---|---|---|---|
| | Planned upgrades | Ambitious upgrades | EBRD regions + east Asia + south-east Asia | EBRD regions + advanced European economies |
| | (2) | (3) | (4) | (5) |
| | Real GDP per capita | | | |
| World | - | 0.6 | 0.7 | 0.9 |
| EBRD regions | - | 1.7 | 1.8 | 1.8 |
| China | - | 2.9 | 2.1 | 0.0 |
| Russia | - | 2.9 | 1.8 | 1.7 |
| Turkey | - | 3.1 | 1.9 | 1.9 |
| | Average well-being | | | |
| World | 0.2 | 0.4 | 0.2 | 0.5 |
| EBRD regions | 0.1 | 1.7 | 1.8 | 1.5 |
| China | 0.1 | 2.0 | 1.9 | 0.1 |
| Russia | 0.1 | 1.7 | 1.8 | 1.4 |
| Turkey | 0.1 | 1.8 | 1.8 | 1.5 |

**Source:** Authors' calculations.
**Note:** Estimates for the 2 per cent reduction are linearly extrapolated from results modelling a 1.0 per cent uniform reduction in the relevant areas. Estimates smaller than one-tenth of a per cent after rounding are suppressed.

(see Table 4.1).[9] However, in the case of China and Russia, both of which are direct recipients of infrastructure upgrades under the ambitious BRI scenario, a uniform reduction in trade costs of around 3 per cent would be required in order to achieve the same impact on real GDP per capita as the ambitious BRI scenario. These estimates involve a large margin of error on account of the underlying assumptions (which include an assumed 80 per cent reduction in railway transport costs over rail segments covered by the ambitious BRI scenario). In contrast, increases in GDP per capita average less than 0.02 per cent across all regions in the planned BRI scenario.

## A uniform reduction in trade costs across the EBRD regions and advanced European economies

The second scenario envisages an equivalent reduction in trade costs across the EBRD regions and advanced European economies.[10] The associated increase in output per capita in the EBRD regions is similar to that estimated for the scenario involving a reduction in trade costs across the EBRD regions and parts of Asia. The specific estimates for Russia and Turkey are also similar to those obtained for the previous scenario.

Global output per capita increases slightly more in response to reduced trade costs across the EBRD regions and advanced European economies than it does in response to reduced trade costs across the EBRD regions and parts of Asia, as reducing trade costs in today's higher-productivity region (Europe) incentivises additional migration to those locations and encourages increased investment in innovation owing to the agglomeration forces discussed earlier, reinforcing the higher levels of productivity in those places.

Average global well-being increases significantly more in response to reduced trade costs across the EBRD regions and advanced European economies than it does in response to a similar reduction in trade costs across the EBRD regions and parts of Asia. This is because the changes to trade costs in that first scenario incentivise people to migrate to areas where the quality of amenities is currently higher, reflecting lower levels of congestion and pollution.

The different scenarios that are compared in Table 4.1 need not be mutually exclusive. Policies that reduce trade frictions at a regional or global level have the potential to complement major investment in infrastructure, amplifying the positive impact on output per capita and well-being across all trading partners. In addition, analysis suggests that relatively small uniform reductions in the cost of trade across a large number of markets can achieve the same gains as highly ambitious transport infrastructure projects.

**EXTENSIVE INVESTMENT IN TRANSPORT INFRASTRUCTURE UNDER THE BRI COULD, IN THE MOST EXTREME SCENARIO, POTENTIALLY SEE REAL GDP PER CAPITA RISE BY AROUND**

**4-6%**

**IN KAZAKHSTAN, MONGOLIA AND UZBEKISTAN**

[9] Estimates are linearly extrapolated from the results of modelling a 1.0 per cent uniform reduction in trade costs.
[10] See Mayer et al. (2018) for related analysis of a hypothetical break-up of the European Union.

## Conclusion

The EBRD regions have experienced dramatic changes in the concentration of populations and the geographical distribution of economic activity over the last 25 years. Central Asia, the SEMED region and Turkey have experienced strong population growth, while the populations of many economies in central, eastern and south-eastern Europe and the Caucasus have declined.

Detailed population data at the level of 1 $km^2$ cells show that, across the EBRD regions, populations have shifted towards large cities, while population density in rural areas and many smaller cities has declined further. In almost half of all countries in the EBRD regions, more than 50 per cent of the population live in places where the localised population density – a distance-weighted measure of the number of people residing in a 5 km radius – has declined since 2000. In Turkey, for instance, rapid overall population growth has been concentrated in and around provincial capitals, with widespread declines in the numbers of people living in small towns in more remote areas.

Areas with greater population density tend to have higher levels of output per capita, both within the EBRD regions and at a global level, reflecting agglomeration effects. Large cities give firms access to large markets and large pools of potential applicants for vacancies, while the provision of infrastructure tends to be cheaper as a result of economies of scale.

On the other hand, high levels of population density result in congestion, noise and environmental pollution. These take their toll on the well-being of people living in particularly dense environments and incentivise them to move outward and forego some of their consumption potential in return for better amenities. These opposing agglomeration and dispersion forces produce different net effects in different places. For instance, agglomeration forces have dominated in Moscow in recent decades, while the population of central Warsaw has been dispersing.

In order to examine the trade-offs between agglomeration and dispersion forces, the analysis in this chapter used a model of the spatial economy that was developed by Desmet et al. (2018), which estimates real GDP per capita and well-being, among other outcomes, in each cell of a 1 degree by 1 degree grid. In that model, reductions in the cost of trade (including reductions on account of improvements in the quality of transport infrastructure) enable firms to reach out to larger markets, strengthen incentives to innovate and encourage people to migrate to areas with greater economic opportunities.

According to the analysis in this chapter, current and planned investment in transport infrastructure in the Western Balkans and the ambitious scenario for the Belt and Road Initiative (which envisages major improvements in road and railway capacity across Asia and Europe) are both projected to result in increases in real GDP per capita and well-being in countries that are direct recipients of infrastructure upgrades. Those effects are particularly large in the immediate vicinity of the infrastructure corridors in question.

Investment in public transport, water and waste treatment can help to relieve the pressures that rising population densities place on major cities and leverage the economic benefits that agglomeration can provide. Meanwhile, in places with dwindling populations, there is potential for declining productivity and further population losses to become self-reinforcing. Policy interventions in these areas need to target increases in productivity (for instance, through improved irrigation in agriculture), as well as relocation opportunities for those left behind.

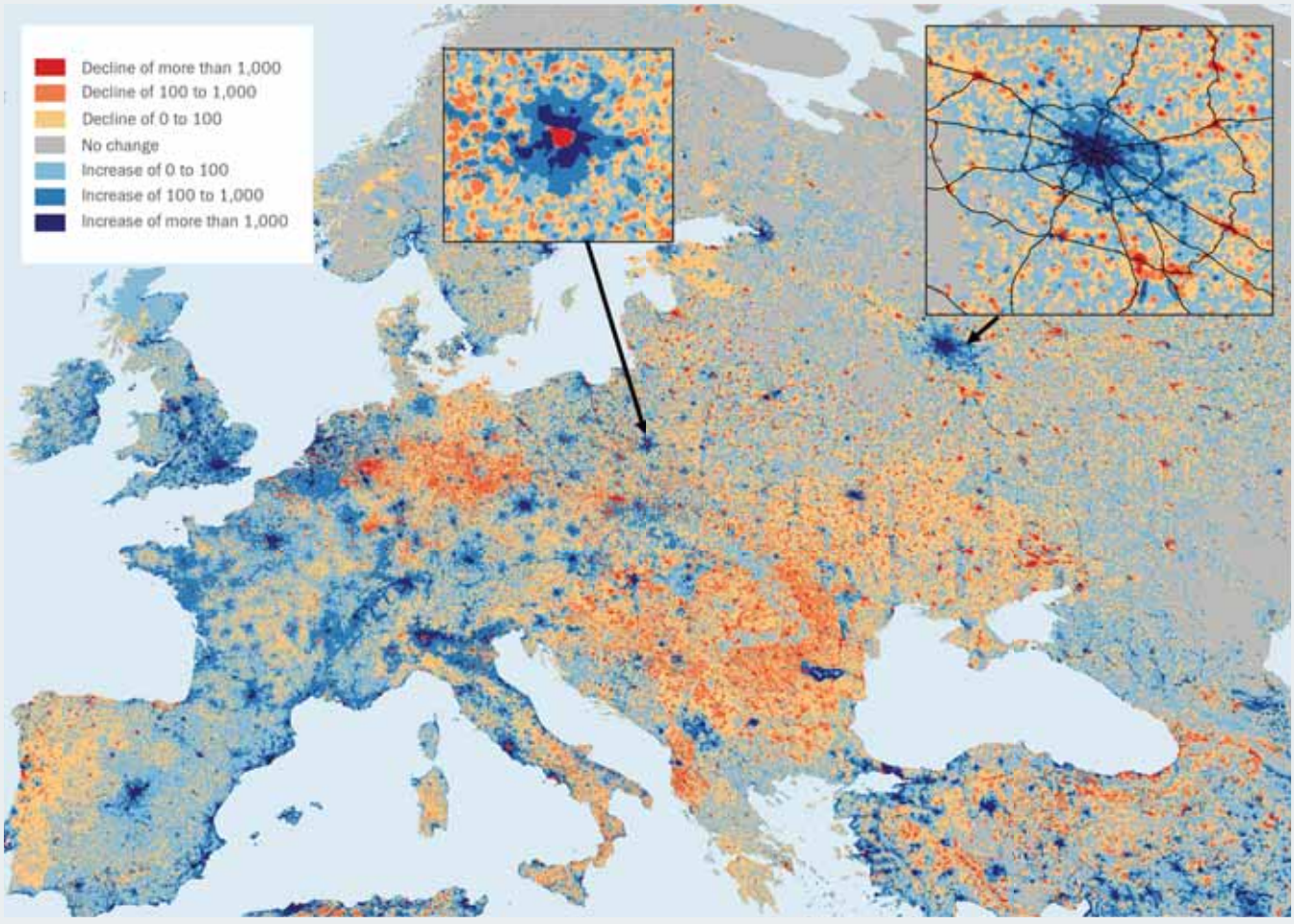
## **BOX 4.1.** Agglomeration and dispersion forces at work

Cities simultaneously attract people through promises of economic opportunity and amenities, while repelling them as a result of nuisances such as overcrowding and pollution. Together, these agglomeration and dispersion forces influence changes in population at local levels. When people weigh up the pros and cons of moving to a new location, they take these factors into account, together with the cost of moving.

As a result, patterns of population change vary from location to location (see Chart 4.1.1). In Moscow, for example, agglomeration forces dominate, with localised population density increasing in the centre of the city and declining on the periphery. Transport opportunities around the Russian capital have resulted in people relocating to the city centre in pursuit of higher levels of productivity and easy outward transportation of goods (see black lines on chart, which denote major roads). In contrast, localised population density in the centre of Warsaw has been falling, with dispersion forces dominating. Residents of the Polish capital have been moving away from congested areas in order to benefit from the more spacious housing, lower rents and higher-quality amenities that are available outside the city centre. Upgrades to Poland's railway system may have facilitated such developments by increasing the number of areas from which residents can commute to work at a reasonable cost.

Natural features such as rugged terrain can shape a city's geography, with consequences for industry and productivity.[11] Similarly, artificial barriers such as landmines left over from an armed conflict can

**CHART 4.1.1.** Changes in localised population density, 2000-14




**Source:** European Commission, Columbia University and authors' calculations.
**Note:** Localised population density is a measure of the number of people living within 5 km of a person, discounted by distance. The unit of change is the number of people in a 5 km radius.

[11] See Harari (2016).

restrict connectivity between nearby markets, compounding the human suffering that resulted from the conflict by causing long-lasting economic inefficiencies.[12] Investment in transport infrastructure, on the other hand, can have a transformative impact on an economy by fostering the mobility of goods and people, and overcoming natural barriers.[13]

## Policy responses to urban congestion

The provision of infrastructure in densely populated urban environments tends to be relatively cost-effective in per capita terms, as new facilities serve large numbers of people. Projects aimed at tackling the congestion and pollution that are associated with urban growth help people to enjoy the benefits of living in large markets. The returns to such investment are likely to be particularly high in the SEMED region and Turkey, where urbanisation has been especially rapid, driven by strong natural population growth and, in some cases, an influx of refugees fleeing nearby conflicts. In major population centres such as Cairo, investment in public transport can help to make it easier to move around, while in smaller cities such as Batumi in Georgia, investment in electric buses can help to reduce the pollution generated by road traffic. Sometimes overlooked, but no less important, is investment in the removal of solid waste and the efficiency of landfills, and recent projects in Amman and Dushanbe are good examples of such initiatives.

## **BOX 4.2.** A spatial model of agglomeration and congestion effects

This box highlights key features and assumptions of the model developed by Desmet et al. (2018) as applied to the EBRD regions. Locations are considered in two dimensions, like places on a map, as in Allen and Arkolakis (2014). Each location, which exhibits a unique set of amenities and productivities, houses firms. Firms produce goods and choose how much to innovate in order to improve their productivity. The ability of firms to sell to other locations depends on transport costs.

People choose where to live on the basis of the level of consumption a place offers, after taking account of relocation costs and the amenities they can enjoy, in addition to idiosyncratic preferences. The value of local amenities can be eroded on account of congestion.

The assumption of agglomeration economies features prominently in the model's dynamics, drawing on Desmet and Rossi-Hansberg (2014). Locations with higher population densities innovate more, as they benefit from access to broader customer bases. Some locally generated advances in technology spread to the rest of the world, benefiting firms in other locations.

Increases in output per capita in densely populated areas help those locations to attract more people, further increasing local returns to innovation. At the same time, congestion effects reduce the value of local amenities as populations rise, productive returns from the land decline on account of overcrowding, and high-income cities become more costly to migrate to.

This model divides the Earth's surface into a 1 degree by 1 degree grid, with a total of 64,800 cells. Real GDP and population data for 2000 and 2005 are taken from the G-Econ dataset. Subjective measures of well-being taken from the Gallup World Poll help to pin down the initial quality of local amenities. The cost of transport across each cell is calculated on the basis of GIS data on the location of minor and major roads, railways and waterways taken from www.NaturalEarthData.com. An algorithm is used to determine the least costly route for each pair of cells. Other key parameters of the model are taken from various different studies.

Importantly, the model abstracts from a number of issues. For instance, political borders do not exist in the model. While migration policies across countries are captured in the estimated costs of migrating to a given location, political borders have no impact on trade. Also, transport costs do not account for air transport or the cost of handling goods locally (for instance, when transferring goods in railway yards or at ports).

Despite its natural limitations, the model performs well against historical data. The ratio of international trade to global GDP that is estimated by the model for the period 2000-01 matches the actual level for the year 2000. When the model is run backwards in time, the degree of correlation between estimated outcomes and historical data remains high, with a solid performance going back 130 years (beyond which data cease to be available).

[12] See Chiovelli et al. (2018).
[13] See Fajgelbaum and Redding (2014).

## **BOX 4.3.** Expected evolution of output per capita across 64,800 locations over the period 2000-40

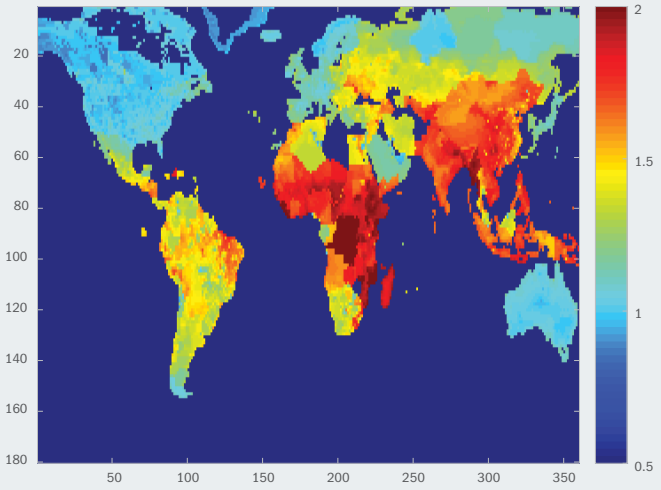
This box looks at the disaggregated results of the modelling exercise at the level of 1 degree by 1 degree cells (of which there are 64,800, with cells covering approximately 111 $km^2$ at the equator). The strongest growth in GDP per capita (expressed in constant prices) over the period 2000-40 occurs in places with high population densities today, with particularly high growth rates in sub-Saharan Africa and south and south-east Asia. Places where levels of productivity are currently high, such as North America and western Europe, still show growth, but that growth is weaker than it is in much of the EBRD regions and Latin America (see Chart 4.3.1). An increase in relocation to North America and western Europe, which currently involves high migration costs for immigrants, would lead to stronger growth in those economies, as can be seen in Desmet et al. (2018). Areas experiencing stronger growth in output per capita will attract proportionally more new inhabitants.

While many densely populated places around the world (such as large cities in lower-income economies in south Asia and sub-Saharan Africa) currently exhibit low levels of productivity, this model expects to see higher rates of productivity growth in such locations in the future as access to large markets incentivises firms to invest and innovate. Here, the model abstracts from constraints on innovation in lower-income economies, such as deficiencies in terms of economic and political institutions. Moreover, while the world's most densely populated locations are expected to achieve the strongest productivity growth, economic convergence will take a long time to complete, and today's high-income locations will still be enjoying relatively high levels of consumption and well-being in 2040.

Places with strong population growth experience increases in congestion, noise and environmental pollution, while competition for scarce land resources drives rents up. This cuts into disposable income and personal well-being, reducing the extent to which people can enjoy their homes and limiting the goods and services that they can afford to purchase. For these reasons, estimated increases in well-being tend to be smaller than increases in real GDP per capita (see Chart 4.3.2).

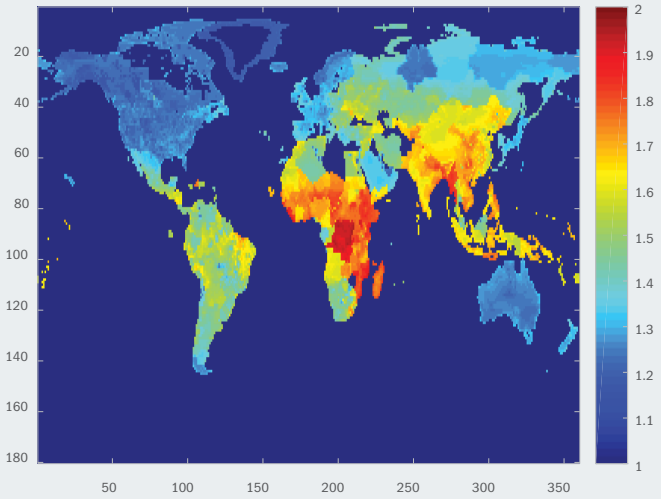
Many of the countries in the EBRD regions do not have high initial levels of population density, with the exception of some parts of the SEMED region (such as the Nile valley and the eastern Mediterranean). In this model, the EBRD regions benefit from the moderate cost of relocating there and the fairly high quality of the amenities available to residents. In addition, economies benefit from transfers of knowledge from abroad (as discussed in Chapter 2). In this model, knowledge is transferred from densely populated areas with high rates of innovation to neighbouring regions.

**CHART 4.3.1.** Estimated growth in GDP per capita, 2000-40 (per cent)




**Source:** Authors' calculations.
**Note:** See Box 4.2 for a description of this model.

**CHART 4.3.2.** Estimated growth in well-being, 2000-40 (per cent)




**Source:** Authors' calculations.
**Note:** See Box 4.2 for a description of this model.

# References


**T. Allen and C. Arkolakis (2014)**
"Trade and the Topography of the Spatial Economy", *The Quarterly Journal of Economics*, Vol. 129, pp. 1085-1140.

**P. Cadavid, G. Cineas, L. Quintero and S. Zhukova (2017)**
"Cities in Eastern Europe and Central Asia: A Story of Urban Growth and Decline", World Bank Report No. AUS12288.

**G. Chiovelli, S. Michalopoulos and E. Papaioannou (2018)**
"Appendix VII: Details and Sensitivity Analysis, Market Access Effects", in *Landmines and Spatial Development*.

**J. De La Roca and D. Puga (2017)**
"Learning by working in big cities", *The Review of Economic Studies*, Vol. 84, pp. 106-142.

**K. Desmet, D. Nagy and E. Rossi-Hansberg (2017)**
"Asia's Geographic Development", *Asian Development Review*, Vol. 34(2), pp. 1-24.

**K. Desmet, D. Nagy and E. Rossi-Hansberg (2018)**
"The geography of development", *Journal of Political Economy*, Vol. 126, pp. 903-983.

**K. Desmet and E. Rossi-Hansberg (2014)**
"Spatial Development", *American Economic Review,* Vol. 104(4), pp. 1211-1243.

**G. Duranton and D. Puga (2004)**
"Micro-foundations of urban agglomeration economies", *Handbook of Regional and Urban Economics*, Vol. 4, pp. 2063-2117.

**European Commission (Joint Research Centre) and Columbia University (Center for International Earth Science Information Network) (2015)**
GHS population grid, derived from GPW4, multitemporal (1975, 1990, 2000, 2015).

**Eurostat (2017)**
*Eurostat* regional yearbook, Luxembourg.

**P. Fajgelbaum and S. Redding (2014)**
"External integration, structural transformation and economic development: Evidence from Argentina 1870-1914", NBER Working Paper No. 20217.

**M. Harari (2016)**
"Cities in bad shape: Urban geometry in India", University of Pennsylvania working paper.

**T. Mayer, V. Vicard and S. Zignago (2018)**
"The Cost of Non-Europe, Revisited", Banque de France Working Paper No. 673.

**S. Rosenthal and W. Strange (2004)**
"Evidence on the nature and sources of agglomeration economies", *Handbook of Regional and Urban Economics*, Vol. 4, pp. 2119-2171.

# 5 MACROECONOMIC OVERVIEW

Following several years of relatively weak economic performance, growth in the EBRD regions averaged 3.8 per cent in 2017 – the second consecutive year of strengthening growth. That growth was broadly based, with support provided by stronger investment activity and increases in exports. In the longer term, the growth trajectories of countries in the EBRD regions are, to a large extent, shaped by those countries' demographic profiles. When analysing countries' economic performance, the concepts of GDP growth, per capita income growth and labour productivity growth are often used interchangeably. However, the large differences across countries in terms of rates of population growth and labour force growth imply that the relationships between these three concepts are in fact complex and country-specific. Indeed, some EBRD regions have similar rates of real output growth, despite differing considerably in terms of growth in per capita income and the underlying growth in output per worker.


OUTPUT
OUTPUT

# Introduction

The first part of this Macroeconomic Overview provides a brief summary of economic developments in the EBRD regions in 2017 and the first half of 2018.[1] (For the most up-to-date information on economic performance in those regions, see the latest issue of *Regional Economic Prospects in the EBRD Regions*.) With the longer-term growth trajectories of countries where the EBRD invests being largely shaped by their demographic profiles, the second part of this overview then looks at the average economic performance of the EBRD regions and other countries around the world in relation to basic demographic variables.

## Strong growth momentum

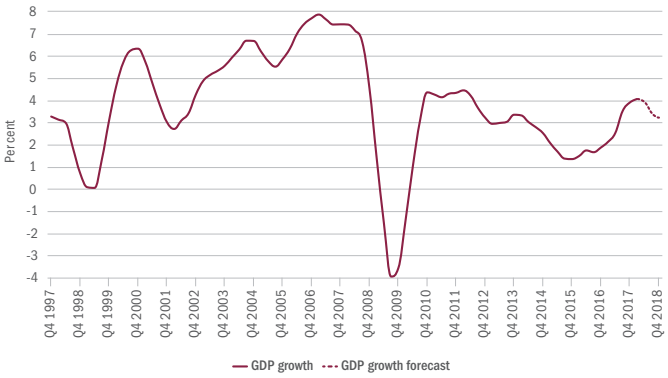
### Growth in the first quarter of 2018 was the strongest seen since mid-2012

Economic growth in the EBRD regions averaged 3.8 per cent in 2017 (weighted on the basis of countries' gross domestic product (GDP) at purchasing power parity (PPP)), up from 1.9 per cent in 2016. In the first half of 2018 growth moderated somewhat overall in year-on-year terms, but remained relatively strong. Indeed, it stood at 4 per cent in the first quarter of the year on a 12-month rolling basis – the strongest rate seen since the second quarter of 2012 (albeit it remained some way short of the levels observed in the middle of the last decade, when growth rates of 6 to 8 per cent were recorded; see Chart M.1).

The growth momentum observed in 2017 was broadly based across the various EBRD regions, with more than a third of countries recording their strongest growth since 2011. Growth was supported, in particular, by a recovery in investment activity and robust export performance. Global trade grew by 4.7 per cent (the first time since 2011 that it had exceeded global GDP growth by a significant margin), aided in part by increases in investment (with investment goods more likely to be traded across borders) and a weakening of the US dollar (the dominant currency when it comes to pricing cross-border sales).[2] Indeed, exports strengthened across the board in the EBRD regions in 2017, contributing to the economic recovery. At the same time, however, global trade tensions continued to escalate, with the United States of America (USA) and China imposing large tariffs on selected imports and trade tensions deepening both between the three North Atlantic Free Trade Agreement (NAFTA) countries and between the USA and the European Union.

The broader economic environment has been supportive, with PPP-weighted global growth rising by 0.4 percentage point to stand at 3.7 per cent in 2017,[3] before showing signs of moderation in 2018. Similarly, growth in the EU-15 averaged 2.3 per cent in 2017, up from 1.8 per cent in 2016.

**CHART M.1.** Average annual growth rates in the EBRD regions




**Source:** National authorities, International Monetary Fund (IMF) and authors' calculations.
**Note:** Each figure relates to a 12-month period. For example, the figure for the first quarter of 2018 indicates average growth over the period from April 2017 to March 2018. The dotted line indicates short-term forecasts based on a principal component model incorporating 152 global economic indicators.

### Foreign direct investment flows remain broadly stable

Gross inward foreign direct investment (FDI) in the median EBRD economy totalled 2.8 per cent of GDP in the 12 months to March 2018 – broadly equivalent to the levels observed in emerging Asia, but somewhat below those seen in Latin America. Levels of FDI have remained broadly stable over the last five years, with the increase in investment in the EBRD regions being accounted for primarily by domestic sources, as well as greater use of EU structural and cohesion funds in central and south eastern Europe. At a global level, FDI flows have exhibited a slight downward trend, partly reflecting growing hostility to globalisation and trade tensions. Diminishing returns to technological advances in telecommunications and transport – which are typically leveraged by multinational companies participating in global value chains – may also be having an impact.

### Favourable financing conditions

As a result of the global search for yield, financing conditions in emerging markets have remained favourable, despite the US Federal Reserve continuing to gradually raise its policy rate. Although global stock markets experienced a correction in February 2018, followed by a period of somewhat higher volatility, equity prices in emerging Europe were, on average, 8 per cent higher in October 2018 in US dollar terms than they had been three years earlier. Russian stocks experienced a larger downward correction following the announcement of a new round of US sanctions in April 2018, with affected firms including Rusal, a major aluminium producer. Yields on emerging market bonds were not greatly affected by the increase in stock market volatility.

[1] In this section of the *Transition Report 2018-19*, data on "the EBRD regions" do not include figures for the West Bank and Gaza.
[2] See Boz et al. (2017).
[3] See IMF (2018) for a discussion and current projections.

## Increases in average oil prices

The price of Brent crude oil briefly exceeded US$ 70 per barrel in January 2018, and then again in April 2018, on account of strengthening demand, cuts to production by Russia and members of the Organization of Petroleum Exporting Countries (OPEC), and concerns about disruptions to supply. As a result, the average oil price in the period from January to July 2018 was 31 per cent higher than it had been in the equivalent period in 2017, following a 24 per cent increase the previous year. So far, those higher prices have more than offset the impact of smaller production volumes for Russia and other exporters that have committed to production caps. The adverse impact on commodity importers has been limited, as global consumption of oil tends to be spread fairly evenly across countries, while global production is concentrated in a relatively small number of major oil exporters.

## Growth momentum broadly based across the EBRD regions

Growth in central Europe and the Baltic states (CEB) has picked up strongly, averaging 4.3 per cent in 2017 (up from 2.9 per cent in 2016) and 4.7 per cent year on year in the first half of 2018, boosted by increases in investment and stronger wage growth. Similarly, growth in south-eastern Europe (SEE) averaged 4.1 per cent in 2017, up from 3 per cent in 2016, before moderating somewhat to stand at 3.4 per cent year on year in the first half of 2018. In particular, Romania's growth rate was close to 7 per cent in 2017, well above its estimated long-term growth potential, on the back of an expansionary fiscal policy and rising wages, before falling back to stand at 4 per cent year on year in the first half of 2018. Greece, meanwhile, saw modest levels of positive GDP growth in 2017, after two years of marginally negative growth rates.

Growth in eastern Europe and the Caucasus (EEC) rose to 2.3 per cent in 2017 and 3.6 per cent year on year in the first half of 2018, up from around zero in 2016, with Azerbaijan and Belarus returning to growth and economic activity expanding vigorously in Armenia and Georgia.

Various stimulus measures, including the establishment of a Credit Guarantee Fund for small and medium-sized enterprises (SMEs) and a variety of tax incentives, have helped to boost Turkey's growth rate, which stood at 7.4 per cent in 2017 and 6.2 per cent year on year in the first half of 2018, up from 3.2 per cent in 2016. However, the Turkish economy has been exhibiting classic symptoms of overheating, with a widening current account deficit (that is to say, investment growing faster than savings), rising inflation and a depreciating currency. In response, Turkey's central bank has simplified the framework for its monetary operations and repeatedly raised its policy rates by several percentage points. Despite these measures the lira has depreciated significantly against the US dollar.

Russia's economy has returned to growth, expanding by 1.5 per cent in 2017 and 1.6 per cent year on year in the first half of 2018, following a cumulative contraction of around 3 per cent in 2015-16. At the same time, the new round of US economic sanctions in April 2018 has added to the economic uncertainty faced by investors.

Growth in Central Asia averaged 4.8 per cent in 2017 (up from 3.6 per cent in 2016) and 4.6 per cent year on year in the first half of 2018, supported by increases in the average prices of oil and other commodities, with Uzbekistan continuing to implement an ambitious programme of liberalisation reforms.

Growth in the southern and eastern Mediterranean (SEMED) rose to 3.7 per cent in 2017 (up from 3.3 per cent in 2016) and 4.7 per cent year on year in the first half of 2018, with agricultural output rebounding in Morocco and Tunisia and improved competitiveness and greater investor confidence supporting growth in Egypt. At the same time, however, economic activity in Jordan and Lebanon continued to be negatively impacted by the geopolitical uncertainty in the region and the resulting refugee crisis.

For the most up-to-date information on developments in the economies of the EBRD regions, as well as growth forecasts for the next two years, see the latest issue of *Regional Economic Prospects in the EBRD Regions*.

**COUNTRIES WHERE LABOUR FORCE GROWTH EXCEEDS POPULATION GROWTH ACCOUNT FOR ONLY**

**38%**

**OF GLOBAL GDP**

**IN THE EBRD REGIONS, COUNTRIES WHERE DEMOGRAPHICS ARE EXPECTED TO SUPPORT BOTH GROWTH AND CONVERGENCE BETWEEN NOW AND 2040 ARE FORECAST TO ACCOUNT FOR ONLY**

**17%**

**OF THOSE REGIONS' GDP**

**2.8%**

**OF GDP**

**GROSS INWARD FDI IN THE MEDIAN EBRD ECONOMY IN THE 12 MONTHS TO MARCH 2018**

## Wage growth picks up as labour markets tighten

As the economic recovery has taken hold, labour markets have gradually tightened. Across the EBRD regions, unemployment rates have declined from their peaks, but they remain elevated in many countries, with average unemployment rates ranging from 4 per cent in central Europe to 11 per cent in the SEE region (weighted by population). As labour markets have tightened, wage growth has picked up, particularly in countries with declining labour forces (such as Bulgaria, Latvia, Lithuania, Romania and Slovenia). That stronger wage growth has, in turn, boosted domestic demand, contributing to the stronger-than-expected economic performance in 2017.

## Limited impact on inflation so far

Those falling unemployment rates have not yet resulted in strong inflationary pressures, mirroring trends in advanced economies.[4] In part, this may reflect the existence of substantial economic slack following a prolonged period of modest economic growth after the 2008-09 global financial crisis.[5] Technological change may further weaken the link between unemployment and wage growth. Technology makes it easier for workers to be matched with job openings or to be employed part time on a freelance basis in the "gig economy", reducing the structural rate of unemployment. In addition, there are many occupations where the risk of automation may be limiting workers' ability or willingness to seek pay rises, even as labour markets become tighter.[6]

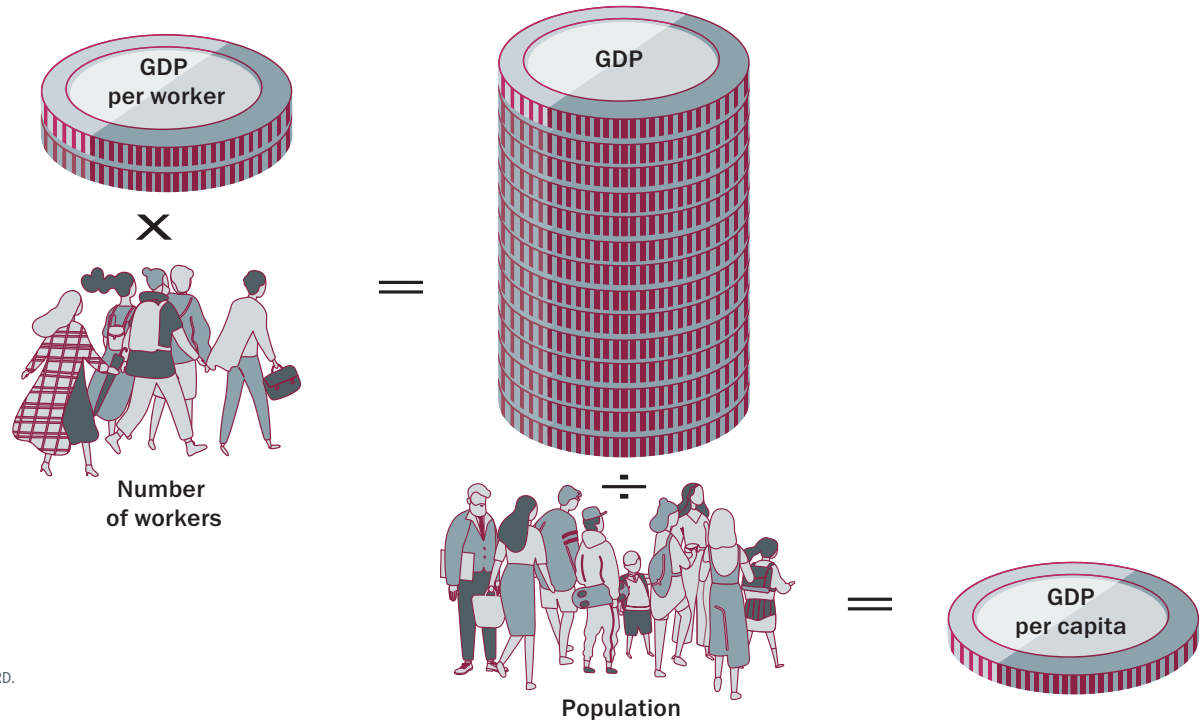
## Persistently high inflation in several countries

In several countries, however, inflation has been high and rising. In Turkey, an expansionary fiscal policy and measures to increase the supply of credit and raise economic growth above its long-term potential have resulted in an overheating economy and contributed to persistent double-digit inflation. In Egypt, Ukraine and Uzbekistan, meanwhile, high inflation rates are a legacy of earlier sharp depreciations in those countries' currencies. In Egypt, inflation stood at 14 per cent in June 2018, down from an average of 30 per cent in 2017. In Ukraine, inflation stood at just under 10 per cent in June 2018, following repeated increases in the National Bank of Ukraine's policy rate in 2017 and 2018 with the aim of curbing inflationary pressures. And in Uzbekistan, an inflation rate of just under 20 per cent was recorded in early 2018.

## Remittances surpass previous peak in local currency terms

Economic growth in Central Asia, Moldova and the Caucasus was also supported by growth in remittances from Russia turning positive again, with remittance growth in US dollar terms standing at 27 per cent in 2017 and 11 per cent year on year in the first quarter of 2018. While in US dollar terms (at constant US prices) the level of remittances in 2017 was still around 40 per cent below the peak observed in 2013, in real local currency terms (adjusted for local inflation) remittances surpassed that previous peak.

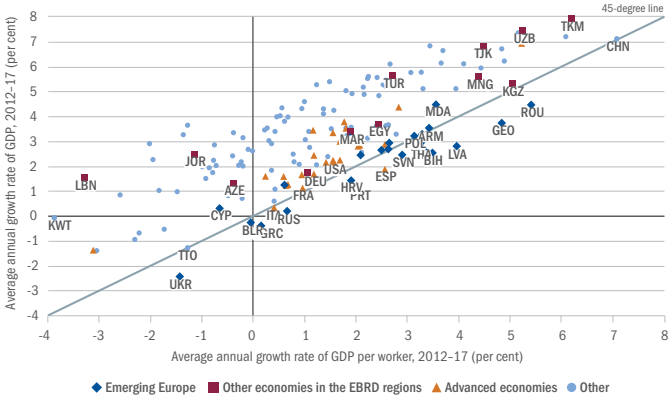
**CHART M.2.** Relationships between GDP growth, per capita income growth and labour productivity growth




**Source:** EBRD.

[4] See, for instance, McLeay and Tenreyro (2018). The concept of the inflation-unemployment curve was first proposed by Phillips (1958).
[5] See EBRD (2017) for a discussion of this issue.
[6] See IDB et al. (2018) for a discussion looking at the future of work in emerging markets.

**CHART M.3.** Average growth in output per worker and average GDP growth




**Source:** National authorities, IMF, International Labour Organization (ILO) and authors' calculations.
**Note:** Figures represent simple averages across the five years in question. GDP per worker is defined as output divided by the number of people in the labour force.

## Rise in corporate debt denominated in foreign currencies

Across the EBRD regions, companies and governments alike have been taking advantage of favourable global financing conditions and borrowing in international financial markets, with total non-financial corporate debt in the EBRD regions averaging 63 per cent of GDP in 2017, up from 58 per cent of GDP in 2007. These trends have been broadly based, with significant increases in corporate indebtedness being observed in the median economy.

Much of that recent increase in corporate debt is accounted for by external borrowing or domestic borrowing denominated in foreign currencies, with foreign currency-denominated domestic and external debt accounting for around 79 per cent of the total debt of the non-financial corporate sector in 2017. At the same time, real growth in domestic credit (adjusted for inflation and exchange rate movements) has been moving in line with growth in real output.

## Capital flows resilient to date

Such an increase in corporate indebtedness in foreign currency would represent a potential source of vulnerability if global financing conditions tightened rapidly and net capital flows to emerging markets weakened substantially. So far, capital flows to emerging markets have remained broadly resilient. For instance, net mutual fund flows to the EBRD regions in the 12 months to June 2018 equated to around 4 per cent of assets under management, according to data compiled by EPFR Global. The resilience of capital flows has, in part, been supported by the relative weakness of the US dollar, with a weaker dollar making it easier to service debt obligations denominated in that currency and increasing dollar-referenced returns for emerging market investors. Between mid-2017 and mid 2018 the currencies of the EBRD regions remained broadly stable overall, appreciating somewhat against the US dollar and depreciating slightly against the euro.

**63% OF GDP**
**AVERAGE DEBT OF THE NON-FINANCIAL CORPORATE SECTOR IN THE EBRD REGIONS**

## Progress made in reducing NPLs, but much remains to be done

A combination of policy measures and an economic upswing has led to reductions in the ratio of non-performing loans (NPLs) to total loans, with that ratio declining by almost 10 percentage points relative to the peak observed after the 2008-09 financial crisis in the median economy. That being said, NPL ratios remain in double digits in around a third of all economies where the EBRD invests. Meanwhile, a banking scandal in Latvia in February 2018 highlighted other challenges in terms of the regulation and supervision of banks in the EBRD regions. Following accusations of money laundering and corruption, ABLV, Latvia's third-largest commercial bank, submitted a voluntary liquidation plan and is expected to be wound up with the assistance of independent international auditors.

All in all, the short-term economic outlook for the EBRD regions has improved. In the longer term, however, those economies' growth trajectories are, to a large extent, shaped by their demographic profiles. The next section examines the links between the demographic characteristics of countries where the EBRD invests and various economic indicators.

## Growth in GDP, per capita income and labour productivity

When policymakers and economists discuss economic growth in the short term, they typically focus on headline economic growth – the change in gross value added at constant prices. Over the longer term, however, a more typical metric of economic development is the change in income *per capita*. And when looking at the challenge of improving growth performance, the focus is often on labour productivity growth, or the change in *output per worker* – a metric that is also available to individual firms.

Those three metrics – GDP growth, per capita income growth and labour productivity growth – are closely related, but may nonetheless behave differently, depending on a country's demographics (see Chart M.2).

In particular, the way in which productivity growth translates into GDP growth depends on growth in employment: similar rates of real output growth may be underpinned by very different rates of labour productivity growth. For example, Turkey and economies in the SEMED region and Central Asia tend to experience stronger GDP growth than economies in emerging Europe at a given level of labour productivity growth (see Chart M.3).

In the short term, changes in employment reflect both changes in the labour force and changes in the rate of unemployment, while changes in unemployment tend to reflect the economic cycle. Over the longer term, however, changes in employment closely track changes in the labour force. Thus, the way in which productivity translates into per capita income growth also depends on growth in the overall population – including the young, the old and adults who choose not to seek employment and are therefore not counted as part of the labour force. At the same time, inward and outward migration also affect the rate of labour force growth.

## Growth and labour productivity

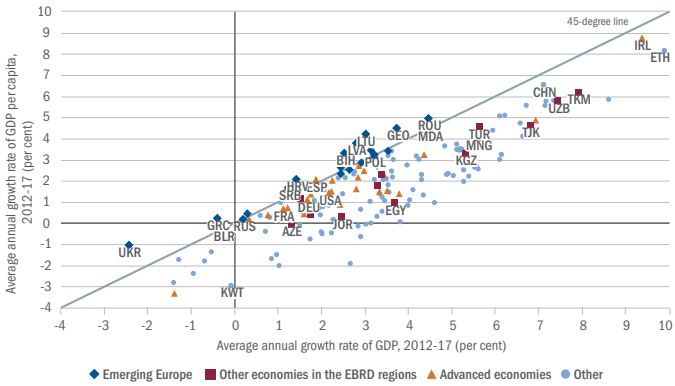
At a global level, 89 per cent of all economies have seen their labour force grow in recent years, accounting for 91 per cent of global value added. Notable exceptions include emerging Europe, southern Europe, Thailand and, most recently, China (see the economies sitting on or below the 45 degree line in Chart M.3). In these economies, headline economic growth has fallen short of productivity growth.[7] At the level of the EBRD regions, 76 per cent of economies saw their labour force grow in the 2000s, accounting for 81 per cent of total output. However, in the period 2012-17, only 24 economies experienced labour force growth, accounting for 54 per cent of total output.

By 2040, shrinking labour forces are expected to be commonplace. Around 80 per cent of economies around the world are expected to see continued labour force growth between now and 2040, but those economies currently account for only around 55 per cent of global GDP. Thus, global GDP growth can be expected to weaken accordingly unless labour productivity growth picks up. These labour force projections take account of demographic trends forecast by the United Nations (UN), as well as projected migration flows, while the labour force participation rate is assumed to remain constant over time. Chapters 1 and 2 discuss other key demographic trends and their drivers, as well as policies that influence labour force participation rates, such as pension reforms.

## GDP growth and per capita income growth

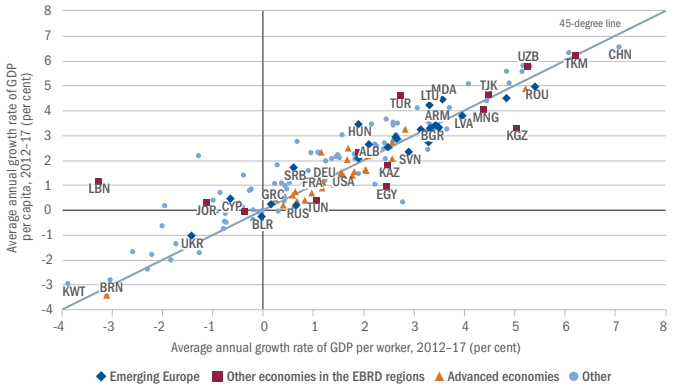
Differences in demography also shape the relationship between real GDP growth and growth in real output per capita, which determines the speed at which incomes converge with the levels seen in advanced economies (see Chart M.4). For instance, central European and SEMED economies may average similar rates of GDP growth (around 4 per cent in recent years), but their rates of population growth differ substantially. As a result, annual per capita income growth averages around 2 per cent in the SEMED region, compared with more than 4 per cent in central Europe. In other words, the SEMED region currently requires significantly higher rates of GDP growth in order to create jobs and push per capita incomes towards the levels seen in advanced economies.

**CHART M.4.** Average GDP growth and average growth in GDP per capita




**Source:** National authorities, IMF, ILO and authors' calculations.
**Note:** Figures represent simple averages across the five years in question.

**CHART M.5.** Average growth in output per worker and average growth in GDP per capita




**Source:** IMF, ILO and authors' calculations.
**Note:** Figures represent simple averages across the five years in question. GDP per worker is defined as output divided by the number of people in the labour force.

**4.1%**

**AVERAGE GROWTH RATE IN THE EBRD REGIONS IN THE 12 MONTHS TO JUNE 2018**

[7] Both here and elsewhere in this report, the term "emerging Europe" refers to a subset of emerging markets in the EBRD regions that share common demographic trends: Armenia, the countries of the CEB region, Georgia, Russia and the countries of the SEE region.

## Labour productivity growth and per capita incomes: the first demographic dividend

At a given level of labour productivity growth, per capita incomes rise faster in economies where labour force growth is stronger relative to general population growth (see Chart M.5). To see why, imagine a typical EBRD economy with labour productivity growth of around 3 per cent in 2017. If the number of workers rises by 2 per cent a year, while the population rises by 1 per cent, income per capita (productivity times the number of workers, divided by the population) rises by approximately 4 per cent a year. In this scenario, demographics amplify productivity growth and deliver stronger per capita income growth.

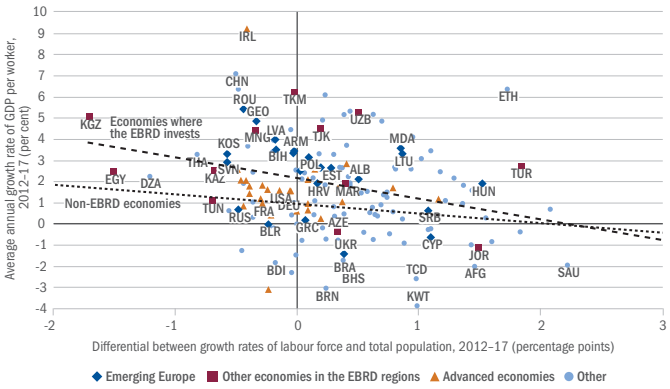
The differential between those two growth rates is sometimes referred to as the "first demographic dividend" – a term coined by Bloom, Canning and Sevilla.[8] As discussed in Chapter 1, the first demographic dividend can be large as a result of (i) the country having had a higher birth rate in the past, (ii) an influx of migrant workers or (iii) an increase in labour force participation rates (typically among women). A low old-age dependency ratio (defined as the number of people aged 65 or over as a percentage of the working-age population) also contributes to a higher demographic dividend when it comes to per capita income growth. The first demographic dividend is further reinforced by the second demographic dividend, which is reflected in higher savings rates and greater human capital, as discussed further in Chapter 1.

Leveraging the demographic dividend is often a challenge: economies with rapidly growing labour forces often struggle to achieve high levels of productivity growth (see Chart M.6). Young economies with fast-growing labour forces often have a weaker skills base, low savings and thus a lower capital stock per worker, all of which have an adverse impact on labour productivity. Thus, fully leveraging the demographic dividend in countries with fast-growing labour forces requires proactive policies aimed at speeding up the accumulation of physical and human capital. In contrast, advanced economies facing adverse demographic trends often leverage technological advances as a substitute for labour and specialise in capital- and knowledge-intensive goods and services, enabling them to achieve stronger labour productivity growth.[9] Chapter 1 discusses these adjustment mechanisms in greater detail.

**79%**

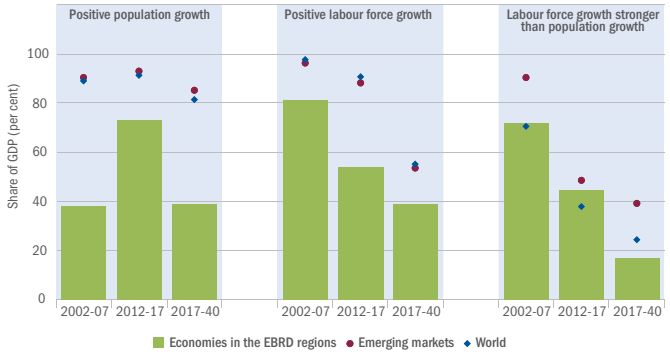
**PERCENTAGE OF THE NON-FINANCIAL CORPORATE SECTOR'S DEBT THAT IS ACCOUNTED FOR BY EXTERNAL DEBT AND FOREIGN CURRENCY-DENOMINATED DOMESTIC DEBT IN THE EBRD REGIONS**

**CHART M.6.** Growth in output per worker tends to be weaker in economies that enjoy a larger demographic dividend




**Source:** IMF, ILO and authors' calculations.
**Note:** Figures represent simple averages across the five years in question. GDP per worker is defined as output divided by the number of people in the labour force.

**CHART M.7.** Demographic change can occur fast




**Source:** UN, IMF and authors' calculations.
**Note:** Shares of GDP are based on GDP at PPP. Emerging markets are defined as economies where GDP per capita remains less than 50 per cent of the US level, measured at market exchange rates.

## Demographic trends constraining medium-term growth potential and convergence

Today, the differential between the growth rate of the labour force and that of the population remains positive in only 64 per cent of economies, accounting for 38 per cent of world GDP. What is more, those percentages have been declining rapidly. In the years preceding the 2008-09 global financial crisis, countries experiencing a demographic dividend accounted for 70 per cent of world GDP. A similar trend can be observed by looking solely at economies that face a greater challenge in terms of per capita income convergence – defined here as countries where GDP per capita remains less than 50 per cent of the level observed in the USA. In the period 2002-07, countries where labour force growth outpaced population growth accounted for 90 per cent of those economies' contributions to GDP. By 2012-17, however, that figure had dropped to 48 per cent (see Chart M.7).

[8] See Bloom et al. (2003), which is based on earlier work on the "demographic gift" in Bloom and Williamson (1998).
[9] See Galor and Mountford (2008) and Acemoğlu and Restrepo (2018).

This illustrates the power of the recent demographic headwinds to affect per capita income convergence. Between now and 2040, countries where demographics make a positive contribution to per capita income growth are only expected to account for around 20 per cent of global GDP.

In the EBRD regions, around 75 per cent of countries enjoyed a demographic dividend in terms of per capita income growth a decade ago (see Chart M.8). However, in many of those countries, the growth rate of the labour force is projected to slow considerably or become negative by 2040. In fact, it will continue to outpace population growth in only eight countries, accounting for less than 20 per cent of the EBRD regions' GDP.

In the period 2012-17, demographics were supportive of both headline growth and per capita income growth in only 43 per cent of economies in the EBRD regions, compared with two-thirds of economies at a global level (see the economies in the upper-right quadrant of Chart M.9). What is more, the economies where the EBRD invests in which demographics are expected to remain supportive of both headline growth and per capita income growth between now and 2040 are forecast to account for only 17 per cent of the EBRD regions' GDP.

## Conclusion

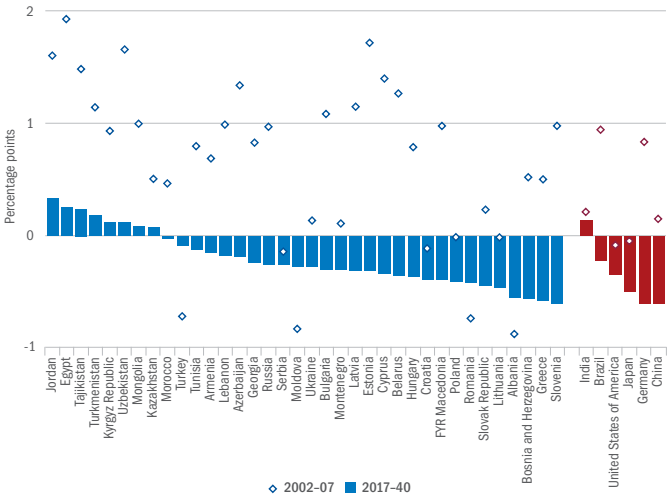
Following several years of relatively weak economic performance, growth in the EBRD regions averaged 3.8 per cent in 2017 – the second successive year of strengthening growth. That growth was broadly-based, with support provided by stronger investment activity and increases in exports.

In the longer term, the growth trajectories of economies where the EBRD invests are, to a large extent, shaped by those countries' demographic profiles. In particular, economies in the EBRD region have very different rates of population growth and labour force growth, implying that the relationships between productivity growth, per capita income growth and headline economic growth – three concepts that are often used interchangeably – are in fact somewhat complex and country-specific. For instance, while central European and SEMED economies are currently averaging similar rates of real output growth, central European economies are, on average, enjoying higher rates of per capita income growth.

In the future, both population growth and labour force growth are projected to weaken in the EBRD regions. The slow-down in labour force growth is projected to be more rapid on average, resulting in a diminishing first demographic dividend. This, in turn, will mean weaker growth in per capita income, unless labour productivity growth picks up.

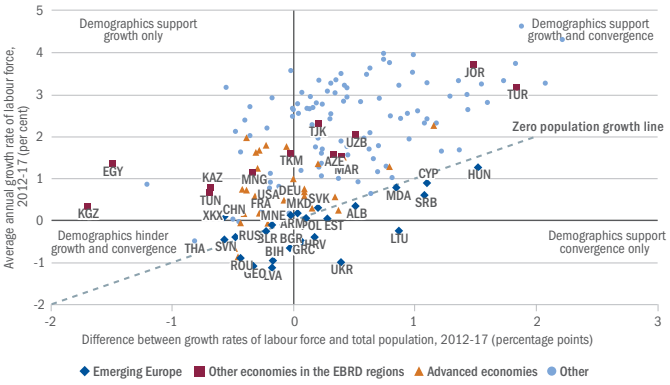
The remainder of this report looks at other ways in which the demographic transformation helps to shape growth and the ways in which it interacts with technological change and migration patterns.

**CHART M.8.** Declining differential between the rates of labour force growth and population growth




**Source:** IMF, ILO, UN and authors' calculations.
**Note:** For the period 2002-07, figures represent simple averages across the five years in question. Projections are based on the median scenario.

**CHART M.9.** Demographics support both headline growth and per capita income growth in fewer than half of all EBRD countries




**Source:** IMF, ILO and authors' calculations.
**Note:** Figures represent simple averages across the five years in question.


# References

**D. Acemoğlu and P. Restrepo (2018)**
"Demographics and Automation", NBER Working Paper No. 24421.
**D. Bloom, D. Canning and J. Sevilla (2003)**
"The demographic dividend: A new perspective on the economic consequences of population change", RAND Monograph MR 1274.
**D. Bloom and J. Williamson (1998)**
"Demographic Transitions and Economic Miracles in Emerging Asia", *The World Bank Economic Review*, Vol. 12, pp. 419-456.
**E. Boz, G. Gopinath and M. Plagborg-Møller (2017)**
"Global Trade and the Dollar", IMF Working Paper No. 17/239.
**EBRD (2017)**
*Transition Report 2017-18 – Sustaining Growth*, London.
**O. Galor and A. Mountford (2008)**
"Trading Population for Productivity: Theory and Evidence", *The Review of Economic Studies*, Vol. 75, pp. 1143-1179.
**IDB, AfDB, ADB and EBRD (2018)**
*The Future of Work: Regional Perspectives*, Washington, DC.
**IMF (2018)**
*World Economic Outlook*, October.
**M. McLeay and S. Tenreyro (2018)**
"Optimal Inflation and the Identification of the Phillips Curve", CEPR Discussion Paper No. 12981.
**A.W. Phillips (1958)**
"The Relation between Unemployment and the Rate of Change of Money Wage Rates in the United Kingdom 1861-1957", *Economica*, Vol. 25, pp. 283-299.

# 6 STRUCTURAL REFORM

While progress in the area of structural reform has been modest, positive developments outweigh negative ones in most of the economies where the EBRD invests. Competitiveness scores have been revised upwards in multiple countries, driven by improvements in the business climate. Modest progress has also been observed in the area of good governance. Green scores have improved, with countries continuing to strengthen their commitment to reducing greenhouse gas emissions. While financial inclusion has also improved, progress in respect of other areas of inclusion is lacking. Despite little change in financial resilience scores, marked progress has been seen in the area of energy resilience. Modest increases have also been observed in integration scores, driven by improvements in the quality of logistics services and related infrastructure.

# Introduction

The EBRD has been tracking the progress of transition and structural reforms since the first *Transition Report* was published back in 1994. However, the methodology underlying that assessment has evolved over the years. A major change occurred last year, when the *Transition Report 2017-18* unveiled a new set of indicators based on the EBRD's revised concept of transition, which was developed in 2016.[1]

As explained in last year's report, EBRD economists have developed a methodology which measures transition economies' progress against six key qualities of a sustainable market economy, looking to see whether they are competitive, well-governed, green, inclusive, resilient and integrated. Each of the resulting "assessment of transition qualities" (ATQ) scores has a scale of 1 to 10 (where 1 is the worst and 10 is the best) and is based on a wide range of indicators.

The purpose of this section of the report is threefold. First, updated ATQ scores are presented for all of the economies where the EBRD invests, allowing us to see where each economy stands in relation to its neighbours and countries in other regions. Second, a comparison is drawn with last year's scores, highlighting countries and sectors where significant developments have occurred. And third, for selected economies (based on the availability of data), an analysis of developments over a longer period (from 2010 to 2017) is also carried out.

## Transition scores

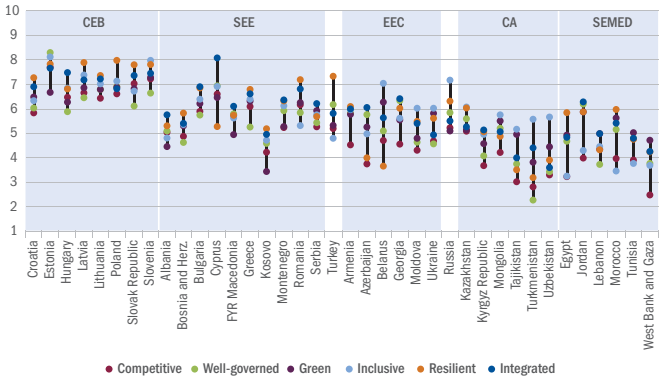
While progress with structural reforms has been slow in many areas and many countries, positive developments outweigh negative ones overall (see Table S.1 and Chart S.1).[2] It should be noted, in this regard, that the methodology has been refined further since last year's report, and the new refined methodology has been applied to calculate scores for both 2017 and 2018. Therefore, scores for 2017 may differ from those published last year. One example of such a change is the addition of a knowledge economy index to the data used to assess economies' competitiveness, as discussed below.[3]

A number of countries in south-eastern Europe (SEE) and eastern Europe and the Caucasus (EEC) have increased their ATQ scores for **competitiveness**, mainly owing to further improvements in the business climate. Several economies in the EEC region have also seen progress in the area of **good governance**. Meanwhile, many countries have achieved modest improvements in their **green** scores, following ratification of the Paris Agreement and the adoption of legislation strengthening their commitment to reducing greenhouse gas emissions and tackling climate change.

Developments across the three components of the **inclusion** score – youth, gender and regional inclusion – have been uneven. Some progress appears to have been made with financial aspects of youth and gender inclusion, but progress in other areas is still lacking. The picture is also mixed when it comes to **resilience**. Progress in the area of financial resilience has been very modest, but energy resilience appears to have improved in many economies across the EBRD regions. Ukraine has been the standout performer in this area, thanks to significant improvements in the legal and regulatory framework governing the energy sector. Lastly, the SEE and EEC regions have also seen some improvements in **integration** scores, largely owing to improvements in the quality of logistics services and related infrastructure.

Within certain indicators, one notable development is an increase in the risk of inadequate compliance with frameworks aimed at combating money laundering and the financing of terrorism (AML/CFT frameworks), particularly in a number of southern and eastern Mediterranean (SEMED), Central Asian and SEE economies. Moreover, several economies have seen declines in the perceived transparency of government policymaking. A number of indicators of financial resilience have worsened as well, with further increases in non-performing loan (NPL) ratios being observed in Kazakhstan and Ukraine, and banking-sector liquidity deteriorating in certain Central Asian countries. Meanwhile, net FDI and non-FDI capital inflows have, with few exceptions, generally remained unchanged or declined as a percentage of GDP.

**CHART S.1.** Transition scores for six qualities of a sustainable market economy




**Source:** EBRD.

**ATQ SCORES FOR THE 6 KEY QUALITIES OF A SUSTAINABLE MARKET ECONOMY ARE BASED ON 139 INDICATORS**

[1] For more details, see www.ebrd.com/news/2016/ebrd-updates-transition-concept-.html

[2] Due to lags in the availability of data, ATQ scores for a given year may not correspond fully to that calendar year. In particular, ATQ scores for 2018 reflect progress in transition based primarily on data available for the years 2016-17.

[3] For more details of changes to the methodology, see the methodological notes at http://2018.tr-ebrd.com.

**TABLE S.1.** Transition scores for six qualities of a sustainable market economy

| | Competitive | | Well-governed | | Green | | Inclusive | | Resilient | | Integrated | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2018 | 2017 | 2018 | 2017 | 2018 | 2017 | 2018 | 2017 | 2018 | 2017 | 2018 | 2017 |
| **Central Europe and the Baltic states** | | | | | | | | | | | | |
| Croatia | 5.8 | 5.9 | 6.0 | 6.2 | 6.5 | 6.2 | 6.3 | 6.4 | 7.3 | 7.2 | 6.9 | 6.9 |
| Estonia | 7.7 | 7.7 | 8.3 | 8.4 | 6.7 | 6.7 | 8.1 | 8.1 | 7.8 | 7.8 | 7.7 | 7.7 |
| Hungary | 6.5 | 6.5 | 5.9 | 5.9 | 6.3 | 6.3 | 6.8 | 6.8 | 6.8 | 6.8 | 7.5 | 7.6 |
| Latvia | 6.6 | 6.6 | 6.4 | 6.7 | 6.9 | 6.6 | 7.4 | 7.4 | 7.9 | 7.7 | 7.2 | 7.5 |
| Lithuania | 6.4 | 6.4 | 6.8 | 6.9 | 6.8 | 6.5 | 7.0 | 6.9 | 7.4 | 7.4 | 7.2 | 7.5 |
| Poland | 6.6 | 6.5 | 6.9 | 7.1 | 6.9 | 6.9 | 7.1 | 7.0 | 8.0 | 7.9 | 6.8 | 6.8 |
| Slovak Republic | 7.0 | 7.1 | 6.1 | 6.1 | 6.8 | 6.8 | 6.7 | 6.6 | 7.8 | 7.8 | 7.4 | 7.5 |
| Slovenia | 7.2 | 7.2 | 6.6 | 6.7 | 7.3 | 7.0 | 8.0 | 7.8 | 7.8 | 7.8 | 7.4 | 7.3 |
| **South-eastern Europe** | | | | | | | | | | | | |
| Albania | 5.0 | 4.9 | 5.1 | 5.1 | 4.4 | 4.4 | 4.8 | 4.8 | 5.3 | 5.2 | 5.7 | 5.7 |
| Bosnia and Herzegovina | 4.9 | 4.9 | 4.6 | 4.8 | 5.3 | 5.0 | 5.3 | 5.3 | 5.8 | 5.8 | 5.4 | 5.3 |
| Bulgaria | 5.9 | 5.9 | 5.7 | 5.8 | 6.2 | 6.0 | 6.4 | 6.2 | 6.8 | 6.8 | 6.9 | 6.8 |
| Cyprus | 6.6 | 6.5 | 6.9 | 6.8 | 6.5 | 6.2 | 6.9 | 7.0 | 5.3 | 5.2 | 8.1 | 7.9 |
| FYR Macedonia | 5.7 | 5.6 | 5.8 | 5.8 | 4.9 | 4.9 | 5.6 | 5.6 | 5.7 | 5.6 | 6.1 | 6.0 |
| Greece | 6.1 | 6.0 | 5.2 | 5.3 | 6.3 | 6.3 | 6.4 | 6.3 | 6.8 | 6.8 | 6.6 | 6.3 |
| Kosovo | 4.2 | 4.1 | 4.6 | 4.6 | 3.4 | 3.4 | 4.7 | 4.7 | 5.2 | 5.0 | 4.9 | 4.7 |
| Montenegro | 5.2 | 5.2 | 5.9 | 5.8 | 5.3 | 5.3 | 6.1 | 6.1 | 6.3 | 6.3 | 6.4 | 6.2 |
| Romania | 6.2 | 6.2 | 5.8 | 5.8 | 6.2 | 6.0 | 5.3 | 5.3 | 7.2 | 7.2 | 6.8 | 6.7 |
| Serbia | 5.3 | 5.1 | 5.4 | 5.4 | 5.9 | 5.7 | 5.7 | 6.0 | 5.7 | 5.7 | 6.2 | 6.2 |
| **Turkey** | 5.2 | 5.2 | 6.2 | 6.2 | 5.3 | 5.3 | 4.8 | 4.7 | 7.3 | 7.2 | 5.8 | 5.9 |
| **Eastern Europe and the Caucasus** | | | | | | | | | | | | |
| Armenia | 4.5 | 4.5 | 5.8 | 5.7 | 5.8 | 5.5 | 6.0 | 5.6 | 6.1 | 6.2 | 6.0 | 5.8 |
| Azerbaijan | 3.7 | 3.6 | 5.8 | 5.4 | 5.2 | 5.0 | 5.0 | 4.8 | 4.0 | 3.9 | 6.0 | 5.9 |
| Belarus | 4.7 | 4.5 | 5.1 | 4.9 | 6.3 | 6.3 | 7.0 | 6.9 | 3.6 | 3.6 | 5.6 | 5.5 |
| Georgia | 4.5 | 4.5 | 6.3 | 6.4 | 5.5 | 5.3 | 5.6 | 5.4 | 6.0 | 5.8 | 6.4 | 6.3 |
| Moldova | 4.3 | 4.3 | 4.6 | 4.5 | 4.8 | 4.5 | 6.0 | 5.7 | 5.5 | 5.3 | 5.4 | 5.5 |
| Ukraine | 4.7 | 4.6 | 4.6 | 4.4 | 5.8 | 5.8 | 6.0 | 6.0 | 5.6 | 4.9 | 4.9 | 4.9 |
| **Russia** | 5.2 | 5.1 | 5.8 | 5.8 | 5.1 | 5.1 | 7.2 | 7.1 | 6.3 | 6.2 | 5.5 | 5.4 |
| **Central Asia** | | | | | | | | | | | | |
| Kazakhstan | 5.1 | 5.0 | 5.6 | 5.7 | 5.1 | 4.9 | 6.1 | 6.1 | 6.0 | 6.0 | 5.3 | 5.2 |
| Kyrgyz Republic | 3.7 | 3.7 | 4.1 | 4.1 | 4.6 | 4.6 | 4.9 | 4.8 | 5.1 | 5.1 | 5.1 | 4.9 |
| Mongolia | 4.2 | 4.2 | 5.2 | 5.3 | 5.5 | 5.5 | 5.7 | 5.7 | 4.9 | 4.9 | 5.1 | 5.4 |
| Tajikistan | 3.0 | 3.0 | 3.7 | 3.8 | 4.9 | 4.7 | 5.2 | 4.7 | 3.5 | 3.3 | 4.0 | 3.9 |
| Turkmenistan | 2.8 | 2.8 | 2.3 | 2.4 | 3.8 | 3.8 | 5.6 | 5.3 | 3.2 | 3.4 | 4.4 | 4.3 |
| Uzbekistan | 3.3 | 3.3 | 3.4 | 3.6 | 4.4 | 4.1 | 5.7 | 5.7 | 3.9 | 3.9 | 3.6 | 3.5 |
| **Southern and eastern Mediterranean** | | | | | | | | | | | | |
| Egypt | 3.2 | 3.1 | 4.7 | 4.8 | 4.9 | 4.7 | 3.2 | 3.1 | 5.8 | 5.6 | 4.8 | 4.7 |
| Jordan | 4.0 | 4.0 | 6.2 | 6.3 | 5.9 | 5.9 | 4.3 | 4.3 | 5.9 | 5.9 | 6.3 | 6.4 |
| Lebanon | 4.3 | 4.4 | 3.7 | 3.8 | 5.0 | 5.0 | 4.4 | 4.5 | 4.3 | 4.3 | 5.0 | 5.0 |
| Morocco | 4.0 | 3.9 | 5.1 | 5.1 | 5.6 | 5.6 | 3.4 | 3.5 | 6.0 | 6.0 | 5.4 | 5.4 |
| Tunisia | 3.9 | 3.9 | 4.8 | 5.0 | 5.0 | 4.8 | 3.8 | 3.7 | 4.7 | 4.7 | 4.8 | 4.7 |
| West Bank and Gaza | 2.5 | 2.3 | 3.8 | 3.9 | 4.7 | 4.7 | 3.7 | 3.8 | 4.2 | 4.2 | 4.2 | 4.2 |

**Source:** EBRD.
**Note:** Scores range from 1 to 10, where 10 represents a synthetic frontier corresponding to the standards of a sustainable market economy. Scores for 2017 have been updated following methodological changes, so may differ from those published in the *Transition Report 2017-18*.

## Competitive

Over the last year, many countries have seen improvements – albeit very modest ones – in their competitiveness scores. Increases have been observed in several SEE and EEC countries (including Albania, Azerbaijan, Belarus, FYR Macedonia, Kosovo and Serbia), driven by further improvements in the business climate.

A number of SEE and EEC countries have also taken steps to support the development of SMEs, with Greece, Romania, Serbia and Ukraine all seeing improvements in the EBRD's SME index.[4] Meanwhile, Azerbaijan has established a new Agency for the Development of Small and Medium-Sized Enterprises, which aims to improve and better coordinate the provision of public services to SMEs. Similarly, Georgia has eased the tax burden for small businesses, increased the number of firms that fall into this category and abandoned the requirement

[4] This index is an indicator that measures progress with reforms aimed at supporting the financing and development of SMEs in the economies where the EBRD invests.

for advance payment of tax, significantly improving the business environment for these firms.

Most countries have made modest progress in the area of the knowledge economy. This year, a knowledge economy index was added to the competitiveness index in order to measure progress in this area.[5] A number of countries have implemented further reforms, which are expected to bear fruit in the near future. For example, a presidential decree on the development of the digital economy was issued in Belarus at the end of 2017. The decree increases the number of activities that are subject to preferential regulatory treatment, expanding that category to include services relating to software development, marketing and advertising. In Tunisia, meanwhile, the country's parliament recently approved the Start-Up Act, which incentivises local entrepreneurs to launch new ventures. The new legislation aims to increase the number of Tunisian start-up companies, with a particular focus on the tech industry, with a view to boosting innovation and increasing the country's international competitiveness.

## Well-governed

Improvements in the area of good governance have been concentrated primarily in the EEC region, with progress being observed in Armenia, Azerbaijan, Belarus, Moldova and Ukraine. Increases in these countries' scores have been driven by marginal improvements in the perceived quality of governance practices and standards in key areas, including the protection of private property and the availability of adequate frameworks for challenging regulations.

A number of changes – both positive and negative – have been observed in the perceived transparency of government policymaking. Scores have tended to be revised downwards overall, with notable declines being seen in Egypt, Latvia and Mongolia, but improvements have been observed in Hungary and Ukraine. Increases in the perceived regulatory burden have also been seen in a number of countries, particularly in Jordan, Kazakhstan and Latvia, while some improvements have been observed in Azerbaijan, Hungary and Morocco.

There has also been an increase in the risk of inadequate compliance with AML/CFT frameworks (as measured by the Basel AML Index). These risks have increased in Egypt, Hungary, Kazakhstan, Morocco, Serbia, Tunisia and Uzbekistan. However, some countries are making efforts to address this issue. For instance, Serbia recently agreed a 30-month Policy Coordination Instrument with the IMF, which involves commitments aimed at addressing weaknesses in the country's AML/CFT framework.

## Green

Some improvements have been observed in green scores over the past year, especially in central Europe and the Baltic states (CEB) and the SEE and EEC regions. These have been driven primarily by changes in indicators measuring economies' commitments and actions in respect of their preliminary plans for addressing greenhouse gas emissions and tackling climate change (termed "intended nationally determined contributions" or INDCs).

In line with commitments made under the Paris Agreement, a total of 18 CEB, EEC, Central Asian and SEMED economies have now formally submitted final versions of their climate plans (termed "nationally determined contributions" or NDCs). For example, Uzbekistan's green score has been revised upwards as a result of the country signing up to the Paris Agreement and submitting its NDC (albeit it has done so slightly later than its neighbours). As regards biodiversity measures, a number of countries have seen improvements over the past year, particularly in the South Caucasus region, but notable deteriorations have been observed in Greece, Hungary, Lebanon and the Slovak Republic.

Overall, significant challenges remain across the EBRD regions in the area of green transition, particularly as regards (i) reducing emissions in the construction, industrial and energy sectors, (ii) strengthening resistance to the negative impact of climate change in the area of agricultural production, and (iii) increasing protection for land and marine areas. In many parts of the EBRD regions, additional work also needs to be carried out with a view to increasing the amount of electricity that is derived from renewable sources.

## Inclusive

Modest progress has been seen across the three components of the inclusion index (youth, gender and regional inclusion) over the past year. Notable improvements have been observed in Armenia, Azerbaijan and Moldova, where percentages of women and young people with bank accounts have risen further, and improvements have also been seen in the perceived quality of education. In addition, women now account for a larger percentage of employers in Moldova. Several SEE countries have also seen some progress – albeit from a low base – in respect of financial aspects of youth and gender inclusion. In the Slovak Republic, meanwhile, a new law was adopted in early 2018 with a view to addressing regional disparities by incentivising investment in economically disadvantaged regions. At the same time, the country's newly launched 10-year educational development programme aims to reduce skills mismatches in the labour market.

## Resilient

This quality consists of two distinct components: financial resilience and energy resilience. These are discussed in turn below.

### Financial resilience

Very little progress has been observed over the last year in indicators of financial resilience. A number of countries have seen modest declines in the dollarisation of the financial sector, while loan-loss provision coverage ratios have increased in several economies (including Kazakhstan, Tajikistan and Ukraine). At the same time, the resilience of the financial sector remains weak in some countries, with further increases in NPL ratios being observed in Kazakhstan and Ukraine.

Ukraine's banking system has now been stabilised, following

[5] This index was established in 2018 in order to assess obstacles to innovation and the development of knowledge economies in the EBRD regions. It comprises 38 different indicators, which are grouped together in four pillars: (i) institutions for innovation, (ii) skills for innovation, (iii) the innovation system, and (iv) ICT infrastructure.

three years of intensive operations aimed at cleaning up and consolidating under-performing and poorly governed banks. At the same time, systemic risks remain, with high NPL ratios and a high degree of state ownership. After much delay, the Law on the Corporate Governance of State-Owned Banks was finally approved in 2018, which represents a positive development and is expected to reshape state-owned banks' supervisory boards. In Azerbaijan and Tajikistan, meanwhile, weak capital buffers, low levels of provisioning, rising NPL ratios and deficiencies in terms of banking regulation and supervision all represent significant challenges. Moldova's efforts to restore fit and proper ownership and governance in systemically important banks continue, following the successful sale of a 39.2 per cent stake in Victoriabank to a Romanian strategic investor in January 2018. And in Egypt, banks have weathered the aftermath of the currency depreciation seen at the end of 2016, with the chronic shortage of foreign currency in the economy having largely been resolved. In Turkey, meanwhile, the weakening of the lira, worsening asset quality and volatile investor sentiment are all weighing on the country's macroeconomic prospects, but its banking sector has proved resilient thus far.

While financial sectors in the EBRD regions remain bank-dominated, efforts are under way to foster the development of local capital markets, non-bank financial institutions, and venture capital and private equity funds. The availability of non-bank funding has the potential to enhance the corporate sector's ability to finance firms' expansion, which is particularly important for innovative firms that may not be in a position to obtain bank loans with high collateral requirements. In the EEC region and Central Asia, major challenges include further improving the adequacy of legal and regulatory frameworks, strengthening the independence and capacity of financial regulators, and introducing modern risk management and corporate governance practices.

**Energy resilience**

The CEB, EEC and SEE regions have seen the most notable improvements in energy resilience over the past year. Thanks to its adoption of the Electricity Market Law in 2016 and the Regulator Law in 2016, Ukraine is now compliant with the EU's Third Energy Package Directives, with a substantially improved legislative and regulatory framework governing the energy sector and a stronger role for the country's energy regulator. Meanwhile, a number of changes to the gas sector have improved the overall investment climate in the industry across the value chain.

Improved legal frameworks can also be found in Egypt, FYR Macedonia and Moldova. Moldova transposed the EU's Gas Directive in 2016 and has made significant progress in the area of implementation. In Egypt, midstream and downstream gas sectors continue to be dominated by the state monopoly, but the country's new Gas Market Law, which was approved by parliament in summer 2017, and the executive regulations that were approved in February 2018 have established the legal basis for unbundling and third-party access, supporting private-sector participation. A gas regulator has also been established, and that body has taken important steps with a view to building capacity. In FYR Macedonia, meanwhile, a new Energy Law was passed in May 2018. That law sets out a timetable for full retail market liberalisation and requires the competitive procurement of new renewable energy capacity, which is to be subsidised via a premium paid on top of the wholesale price.

In Kosovo and Latvia, significant progress has been made with the unbundling of the electricity and gas sectors respectively. In Kosovo, the unbundling of the transmission network has progressed further, with parliament assuming control of the transmission system operator KOSTT in line with the 2016 Electricity Market Law. Latvia, meanwhile, has chosen a model involving full unbundling of ownership for its gas sector, with unbundling of transmission, distribution and retail taking place throughout 2017. In Egypt, credible tariff reforms are ongoing and are being pushed through against an inflationary backdrop, although there remains uncertainty as to when cost reflectivity and market pricing will be achieved.

In Turkey, the private sector's role in the energy sector has grown significantly over the past few years, with further progress being achieved in 2017. In the area of power generation, new investment is predominantly carried out by independent producers, and the privatisation of existing public plants (especially small to medium-sized hydropower plants) is ongoing. According to the latest figures, 77 per cent of Turkey's total installed capacity (78.5 MW) is either owned or operated by private entities.

Despite recent progress, much remains to be done in terms of improving domestic and inter-country connectivity, boosting private-sector participation in the energy sector, implementing tariff reforms and further improving regulatory frameworks across the EBRD regions.

**UKRAINE'S ENERGY RESILIENCE SCORE HAS INCREASED BY**

**1.7**

**POINTS FOLLOWING SIGNIFICANT IMPROVEMENTS IN THE LEGAL AND REGULATORY FRAMEWORK GOVERNING THAT SECTOR**

## Integrated

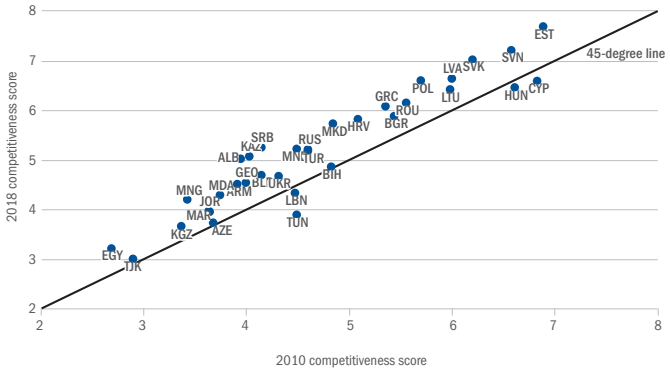
Modest increases in integration scores have been observed in several countries over the last year, most notably in Armenia, Azerbaijan, Belarus, Kosovo, Montenegro and Romania. Those increases have been driven primarily by improvements in the quality of logistics services and infrastructure (particularly transport infrastructure), as well as further increases in net FDI and non-FDI capital inflows as a percentage of GDP. At the same time, integration scores have declined in some CEB countries, with the quality of logistics services (as measured by

the World Bank's Logistics Performance Index) deteriorating in Latvia, Lithuania and the Slovak Republic. A similar trend can be observed in Egypt, Jordan and Turkey. Some improvement – albeit from a relatively low base – can also be observed in the quality of logistics and related services in certain Central Asian countries.

In many economies, domestic integration needs to improve further. While indicators of the quality of logistics services facilitating domestic trade and the timeliness of shipments have largely improved in the CEB and EEC regions, they have declined or remained unchanged in several Central Asian and SEMED economies. Further reforms aimed at improving the quality of domestic and international logistics and enhancing critical infrastructure are necessary across the EBRD regions.

When it comes to other aspects of integration, the degree of financial integration in the EBRD regions is yet to recover from the global financial crisis of 2008-09. In most economies where the EBRD invests, inward FDI has declined or remained unchanged over the past 10 years as a percentage of GDP. The strongest declines have been seen in Estonia, Hungary, Kazakhstan, Mongolia and Montenegro.

**CHART S.2.** Competitiveness scores, 2010 and 2018




**Source:** EBRD.

**A multi-year analysis**

The assessments above are based on score changes over a very short period of time, so they tell us little about the underlying long-term trends. In order to explore such longer-term patterns, the analysis in this section focuses on developments in respect of selected economies and qualities over the period 2010-17, on the basis of available data.

The results of this analysis point to a number of positive trends. Over the period 2010-17, there were marked improvements in competitiveness and integration across the EBRD regions, with weaker progress being observed in respect of the other qualities of sustainable market economies.

Indeed, the **competitiveness** of the EBRD regions has improved in a number of ways since 2010 (see Chart S.2). The general business climate and the business environment for SMEs have improved in many economies, particularly in Central Asia and the EEC region (albeit from a relatively low base). Significant declines in import tariffs (particularly in the SEMED region) have contributed to that improved environment. Gradual improvements have also been observed in the quality of logistics and related services.

Progress in respect of selected indicators of **good governance** was uneven over the period 2010-17. Although the perceived regulatory burden declined in many of the economies where the EBRD invests, the perceived transparency of government policymaking did not generally improve (with the exception of certain specific countries, such as Kazakhstan, Romania and Ukraine). Moreover, judicial independence and the availability of frameworks for challenging regulation were assessed as having weakened in some countries. Major obstacles remain as regards frameworks for challenging regulation, the protection of property rights, the transparency of government policymaking and the efficiency of legal frameworks for settling disputes.

The longer-term picture is also mixed as regards **inclusion**. Youth unemployment has declined somewhat, particularly in the SEE region, but it remains a key challenge for many countries. There have been marked improvements in the perceived quality of education (particularly in Armenia, Azerbaijan and Tajikistan), but some worsening has been observed in Morocco, Tunisia and a number of SEE countries. Meanwhile, the flexibility of hiring and firing practices appears to be declining, albeit with some exceptions. Significant challenges remain as regards ensuring access to critical services and infrastructure (such as heating and ICT) in economically disadvantaged regions, improving labour force participation rates among women, increasing the number of female employers, increasing the flexibility of hiring and firing practices, and improving the quality of education.

Long-term trends in the area of **financial resilience** have also been mixed. NPL ratios have declined in most countries in the CEB and SEE regions (aided by reforms in the context of an EBRD-supported regional NPL initiative). The stock of NPLs in Greece remains large, but thanks to increased provisioning, banks are making progress with the resolution of those impaired loans, with the sale of loan portfolios forming part of that approach. Meanwhile, credit has contracted in inflation-adjusted terms in a number of CEB, SEE, EEC and Central Asian countries, with deleveraging by subsidiaries of eurozone banks contributing to this trend in the CEB and SEE regions.

The overall level of **integration** and the quality of supporting hard and soft infrastructure both improved over the period 2010-17, with the exception of selected SEMED economies. The cost of trading across borders declined substantially over this period, with the largest cost reductions being observed in Central Asia. Exceptions to this trend include Egypt, Lebanon and Tunisia.

## **BOX S.1.** How sensitive are these quality scores to the choice of methodology?

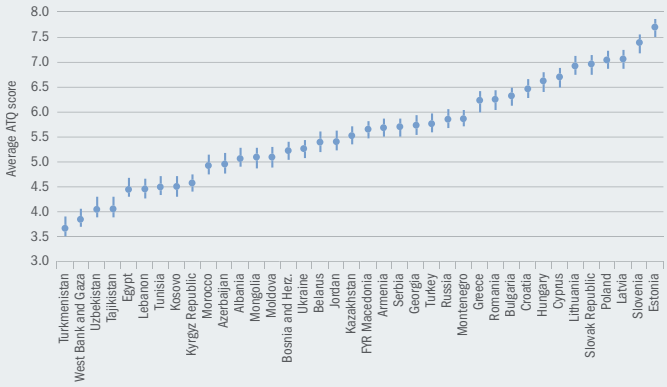
Calculating composite indicators such as the ATQ scores involves multiple steps and a number of methodological choices. If different choices are made, the values that are calculated for these composite indicators may vary, and so may the resulting rankings for each economy. The issue of the quality of the underlying data and the difficulty of measuring the phenomena of interest (such as the quality of education) introduces further measurement errors.

Sensitivity analysis can help to shed light on the extent to which final rankings are dependent on the choice of methodology. Two separate exercises have been carried out to this end, looking at both the indicators that are included in the composite index and the weights that are assigned to those various indicators when calculating an aggregate score.

In the first exercise, up to 50 per cent of the indicators included in each ATQ index were randomly excluded from the calculation in each simulation run. And in the second exercise, weights were subject to random shocks. In each exercise, the distribution of scores and rankings for each economy and each quality were obtained on the basis of 1,000 simulation runs. Charts S.1.1 and S.1.2 show the results of the first exercise, and the results of the second exercise (which are similar) are available on request.

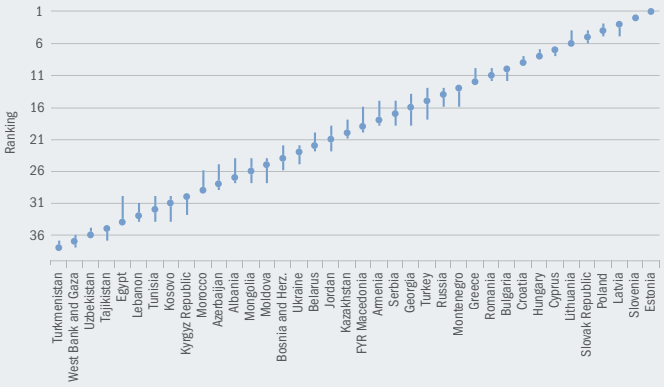
Overall, decisions regarding the specific indicators that are included in composite indices and the weights that are assigned to those indicators have a limited effect on the rankings and average ATQ scores of economies at the top and the bottom of the distribution of scores. However, the estimated variation in rankings is larger for economies in the middle of the score distribution. This needs to be taken into account when analysing the results of the EBRD's ATQ assessments. In particular, while the differences between the top-scoring economies and those at the bottom of the score distribution tend to be statistically significant, that is not necessarily the case when economies have relatively similar scores.

**CHART S.1.1.** Sensitivity of average ATQ scores to the exclusion of indicators




**Source:** EBRD and authors' calculations.
**Note:** The ranges shown indicate the 10th and 90th percentiles of the distributions of average scores across all six qualities. Calculations are based on 1,000 simulation runs.

**CHART S.1.2.** Sensitivity of country rankings based on average ATQ scores to the exclusion of indicators




**Source:** EBRD and authors' calculations.
**Note:** The ranges shown indicate the 10th and 90th percentiles of the distributions of rankings, calculated based on average scores across all six qualities. Calculations are based on 1,000 simulation runs.

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## NOTES

Abbreviations: For charts in this *Transition Report*, the abbreviations used for each economy follow the ISO 3166-1 three-letter economy codes published by the International Organization for Standardization (ISO).

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