Transition Report 2023-24

Transitions big and small

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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 do this 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 analysis and data in the online country assessments are based on information available in late October 2023. In the report chapters, all assessments and data are based on information available in late August 2023.


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This scramble for critical minerals comes at a time of geopolitical tension amid the 'return of history', with trade policy being driven by geopolitics rather than economics. Further fragmentation of the global economy and the resulting restrictions on exports could thwart countries' efforts to secure a stable supply of these inputs.

Foreword

The global shift towards a low-carbon economy will leave no area of economic and social life untouched. As the transition to net zero accelerates, it will result in major structural changes, both within individual economies and across international value chains. These changes will touch people's lives in myriad ways – from requiring job changes and retraining to necessitating the reduction of households' carbon footprints through insulation and the installation of meters. Thus, the green transition will consist of many different transitions, both big and small.

Starting with big transitions taking place at the global level, this report shows that addressing the climate emergency is dependent on having reliable and secure access to certain raw materials. Governments around the world are now waking up to the urgent need to secure a supply of such critical minerals, whose production tends to be heavily concentrated in a handful of countries. As documented in the report, there are significant deposits of critical raw materials in several economies in the EBRD regions, but setting up new mines and refining facilities will take time and significant investment. This scramble for critical minerals comes at a time of geopolitical tension amid the "return of history", with trade policy being driven by geopolitics rather than economics. Further fragmentation of the global economy and the resulting restrictions on exports could thwart countries' efforts to secure a stable supply of these inputs.

Individual citizens and their interests will be at the very heart of the green transition, and this report examines two aspects of people's lives that will take centre stage in the adjustment process: jobs and homes. The current growth in green jobs forms part of a historic reshaping of the world of work, driven by new technologies and accelerated by the Covid-19 pandemic.

As the report shows, although green jobs tend to be better paid, the transition to such jobs is proving to be slow on account of the time and resources needed to acquire new skills. This aspect of the green transition will affect different localities in different ways, potentially upending local labour markets in places that specialise in mining and emission-intensive manufacturing. The report emphasises that green innovation holds great promise, but can also lead to the displacement of jobs – a phenomenon that particularly affects men and less-educated workers.

As regards homes, residential buildings in many EBRD economies continue to have a significant environmental footprint, with the residential sector accounting for more than a quarter of total emissions and energy use across the EBRD regions as a whole. In addition to phasing out coal, there is also scope for significant reductions in emissions through improvements to insulation and the metering of energy consumption.

The change and upheaval that stems from these trends will affect people's lives for the foreseeable future. Policymakers will need to establish a deep understanding of those effects in order to plan future stages of the green transition, as individual attitudes will both shape and be shaped by that transition process. Using rich data that have recently been collected by the EBRD and the World Bank via the Life in Transition Survey, this report paints a detailed picture of people's outlook on life and economic transformation. The good news is that people's lives are becoming happier, wealthier and healthier. Gone is the happiness gap between the EBRD regions and the G7 countries that was documented in the first couple of decades of the transition process. The bad news is that, while about three-quarters of people living in the EBRD regions acknowledge the existence of climate change and its consequences, many of them are not yet prepared to pay more tax in order to support environmental policies. The success of the green transition will depend on winning their hearts and minds as we continue our journey towards a cleaner future. If there is one thing we have learned from 30 years of transition in the EBRD regions, it is that reforms will not last unless they have broad-based support.

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Chief Economist
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Executive summary

This report examines the ways in which the deep structural transformation of the global economy is impacting the lives, livelihoods and living conditions of people across the EBRD regions. It focuses on important "big transitions" such as the shift towards a sustainable economy, the reconfiguration of global supply chains, and the scramble for the raw materials required by the digital and green economies. The report uses unique data from the fourth round of the Life in Transition Survey, a household survey conducted in 2022 and 2023, to see how these macro-level trends translate into "small transitions": career moves, changes in physical and mental health, the refurbishment of housing and – ultimately – changes in people's satisfaction with life.

In terms of major transitions, the report emphasises that greening the economy will require a rapid and large-scale roll-out of clean technologies, the success of which will depend on access to critical raw materials and the availability of the necessary green skills in the labour market. China currently dominates the production and processing of many of those materials, so manufacturers are trying to diversify their supplier bases. This will take time and significant investment, but may ultimately benefit several economies in the EBRD regions.

Meanwhile, demand for workers with green skills is rising, with such workers now commanding a 4 per cent wage premium. Despite that increasing demand, workers' ability to move from brown to green jobs remains limited, partly reflecting the inelastic supply of newly required skills in the short term.

This profound economic transformation is happening against the backdrop of rising geopolitical tensions. The decoupling of trade and financial links between Russia and Western economies has intensified since the invasion of Ukraine in 2022, with trade patterns shifting as a result. Firms are giving greater consideration to reshoring and nearshoring as ways of shortening supply chains and guaranteeing stable access to scarce inputs.

Housing markets in EBRD economies are changing, too – though more slowly, as housing policies have long-lasting effects. While home ownership rates remain high, decent social housing is limited, with pronounced spatial segregation along income lines. Housing in the EBRD regions has a substantial environmental footprint, but there is scope to significantly reduce emissions by phasing out coal, improving the insulation of buildings and metering energy consumption, even taking the building stock as given.

How, then, are these "big transitions" affecting individual citizens across the EBRD regions? Overall, average satisfaction with life has risen since 2016, reflecting rising incomes, a shift towards more pleasant and higher-skill jobs, and better physical health. Survey results also reveal the importance of good mental health for satisfaction with life, with mental distress tending to be more prevalent in poorer countries and among individuals who are financially insecure. As regards the transition to a green economy, people tend to be aware of climate change and its consequences, but that does not necessarily translate into a willingness to pay more tax or forgo economic growth and job creation in order to prioritise environmental policies.

1. HAPPINESS, HEALTH AND GOOD JOBS

Preliminary data from the fourth round of the Life in Transition Survey indicate that average satisfaction with life has risen further relative to 2016 across the EBRD regions. Certain countries in Central Asia continue to score very highly, despite their relatively low levels of GDP per capita, while economies in south-eastern Europe, eastern Europe and the Caucasus have seen notable increases in life satisfaction. Importantly, that increase in satisfaction with life is broadly based, covering all age cohorts, both males and females, and people in both urban and rural areas.

That increase in life satisfaction probably reflects rising incomes, favourable developments in labour markets (including a shift towards more pleasant and higher-skilled jobs) and improvements in the health of the population. In particular, more men and women now have high-skilled jobs, with correspondingly fewer having medium and low-skilled occupations. Meanwhile, there have also been changes to working practices and a reduction in the average time spent commuting to work.

People's assessments of their own health have improved significantly over time. Those improvements are broadly based across all age groups, but the decline in health as people age is still steeper than it is in the G7 countries, particularly for older women. The prevalence of some specific health problems – particularly vision loss and anaemia – is also higher in the EBRD regions than in the G7.

Importantly, such self-assessments include not only physical aspects, but also mental health. Survey results show that mental distress is associated with lower satisfaction and tends to be more prevalent in poorer countries and among individuals who are financially insecure. It is also more common among women than men – a pattern that can be observed across all economies in the EBRD regions.

https://2023.tr-ebrd.com/happiness-health-and-good-jobs

2. GLOBAL SUPPLY CHAINS AND THE GREEN TRANSITION

Climate change, technological development and geopolitical tensions are all reshaping global supply chains in significant ways. Limiting global warming to 1.5°C will require a rapid roll-out of clean technologies in order to decarbonise the electricity supply, electrify the economy and scale up the use of low-carbon hydrogen. In parallel, digital technologies are becoming increasingly important in many areas of business.

Green and digital technologies both require various critical raw materials. Production of those inputs is heavily concentrated in certain countries at present, with few substitutes (if any) available. China dominates the mining and processing of many critical raw materials, from germanium to lithium, amplifying supply chain risks in the transition to a green economy.

Meanwhile, geopolitical tensions are on the rise. The decoupling of trade and financial links between Russia and Western economies has intensified since the invasion of Ukraine in 2022. Countries that are not politically aligned with the West have started making greater use of currencies other than the US dollar in cross-border transactions. Trade patterns have been shifting, with greater consideration being given to reshoring and nearshoring in order to shorten supply chains and minimise risks associated with the supply of scarce inputs.

More than 80 per cent of investment promotion agencies across the EBRD regions see this reshaping of global value chains as an opportunity for their country. Many are seeking to attract foreign investors that are looking to diversify their supply chains (particularly firms active in green transition sectors). Given their existing comparative advantages, many economies in the EBRD regions are well placed to produce products required by the solar energy and fuel cell sectors. In addition, several economies boast significant deposits of critical raw materials, although establishing new mines and refining facilities will require significant time and investment.

https://2023.tr-ebrd.com/global-supply-chains-and-the-green-transition

3. LABOUR MARKETS IN THE GREEN ECONOMY

People in the EBRD regions tend to be aware of climate change and its consequences. However, that does not necessarily translate into a willingness to pay higher taxes or forgo economic growth and job creation in order to prioritise environmental policies. Unwillingness to support green policies tends to be greater among the socio-economic groups that are most vulnerable to such changes, including those in the bottom half of the income distribution and the less educated.

Major economic transitions of the past, such as the roll-out of digital technologies, the globalisation of trade and investment, and the phasing-out of coal, were associated with significant reallocation of employment across sectors and changes to job requirements. They benefited workers, but also created risks, with their impact varying across geographical areas and demographic groups, sometimes exacerbating economic disparities. The current transition to a green economy can be expected to have a similar impact.

Indeed, demand for workers with green skills is already rising, with such workers commanding a 4 per cent wage premium in the EBRD regions; however, that premium accrues disproportionately to highly skilled workers, with lower-skilled workers tending to be more sceptical about the need for environmental policies. Despite that increasing demand for green skills, workers' ability to move from brown to green jobs remains limited, partly reflecting the inelastic supply of newly required skills in the short term.

Green policies will affect different localities and labour market segments in different ways, potentially upending local labour markets. With that in mind, policymakers need to combine localised short-term income support with sector-specific long-term workforce development to facilitate labour-market adjustments. Labour-market programmes that focus on retraining and upskilling can help to ensure that the transition to a green economy is fair and enjoys broad support, as can regional development initiatives.

https://2023.tr-ebrd.com/labour-markets-in-the-green-economy

4. HOUSES, HOMES AND HEATING

Higher-quality housing is closely associated with superior socio-economic outcomes. People whose homes are in a better condition tend to be healthier and less likely to experience mental distress, taking into account education, income and other individual characteristics.

The housing stock in the EBRD regions reflects the legacies of past policies. More than half of all people in those economies live in buildings constructed between the 1950s and the 1980s. In some economies, up to 40 per cent of households live in prefabricated housing blocks. As a result of widespread mass privatisation in the early 1990s (whereby social housing tenants were able to buy their home from the state for a nominal fee), home ownership rates tend to be unusually high, with lower-income households just as likely to be homeowners as high-income households. On the other hand, social housing is now limited.

At the same time, spatial segregation is pronounced, with poorer households more likely to live in buildings that are older and in a worse condition, having inferior access to public transport and green space. Meanwhile, rents have increased as a share of income and relative to average mortgage payments.

The residential sector has a large environmental footprint in the EBRD regions, accounting for 26 per cent of total emissions and 29 per cent of total energy use. Differences in countries' fuel mix (particularly their reliance on coal) explain around 40 per cent of all cross-country variation in residential emissions per capita. In addition to altering countries' energy mix, findings from the latest round of the Life in Transition Survey suggest that there is also scope for significant emission reductions through improvements in insulation and metering of energy consumption (for instance, through energy-efficient upgrades to prefabricated housing blocks), even taking the building stock as given.

https://2023.tr-ebrd.com/houses-homes-and-heating

5. STRUCTURAL REFORM

This final chapter of the report presents updated transition scores for economies in the EBRD regions, as well as conducting equivalent assessments for selected comparators. It focuses on six key qualities of a sustainable market economy, looking at whether economies are competitive, well governed, green, inclusive, resilient and integrated.

Over the last year, economies in the EBRD regions have made modest improvements in the area of competitiveness, as well as more substantial progress in the areas of inclusion and integration thanks to previous reforms. At the same time, scores for governance have declined over the past year. Across all six areas under consideration, improvements over the last year have been concentrated mainly in central Europe, the Baltic states and south-eastern Europe, while declines have mostly been observed in the southern and eastern Mediterranean, eastern Europe and the Caucasus.

During the period 2016-23, many economies have made progress in the area of competitiveness through improved access to finance for small and medium-sized enterprises, as well as improvements in labour productivity and the quality of logistics services. Developments in the area of governance have been mixed, however: scores for indicators assessing participation in e-government services and frameworks for challenging regulations have increased, whereas scores for indicators measuring the effectiveness of courts and informality have gradually declined.

Green scores have improved in most economies, driven by the strengthening of emission reduction commitments and increased production of renewable energy. Inclusion scores have also tended to increase on the back of greater financial inclusion, continued human capital development, and improvements in trade and transport infrastructure. Meanwhile, improvements in the area of financial resilience have been driven by declining non-performing loan ratios and progress with capital market infrastructure and regulatory frameworks for the banking sector.

https://2023.tr-ebrd.com/structural-reform

HAPPINESS, HEALTH AND GOOD JOBS

Average satisfaction with life has risen further relative to 2016 across the EBRD regions. That increase probably reflects rising incomes, favourable developments in labour markets (including a shift towards more pleasant and higher-skilled jobs) and improvements in health. Notably, people's assessments of their own health have improved significantly over time, with such assessments including not only physical aspects, but also mental health. Survey results show that mental distress is associated with lower satisfaction and tends to be more prevalent in poorer countries and among individuals who are financially insecure.

Introduction

Recent decades have seen enormous growth in research into subjective measures of well-being.[1] How do countries in the EBRD regions perform in that regard, and how are happiness trends affected by changes to labour markets and health outcomes? This chapter addresses those questions and presents a number of new findings.

The good news is that many of the post-communist countries of central, eastern and south-eastern Europe and the former Soviet Union have experienced steady increases in their happiness levels, having been clustered near the bottom of global league tables earlier in the transition process. This trend has continued even in the post-Covid period: for example, in the *World Happiness Report 2023*, the average "life evaluation" score for central and eastern Europe stood at 6.1 (on a scale of 0 to 10), up from 5.6 in 2021.[2] In that report, 12 post-communist economies were in the top 50 countries globally, compared with just three in the 2016 report. Thus, for many people in the EBRD regions, it seems that the transition process is increasing overall satisfaction with life.[3]

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[1] See, for example, Clark et al. (2018) and Layard (2020) for an overview of the available literature.
[2] See Helliwell et al. (2023).
[3] This chapter uses the terms "life satisfaction" and "happiness" interchangeably.

Previous editions of the *Transition Report* (and other special reports produced by the EBRD) have examined subjective well-being and its cross-country variation in the EBRD regions using the Life in Transition Survey (LiTS) conducted by the EBRD and the World Bank. Early waves of the LiTS showed a severe happiness deficit in the EBRD regions, as did other research using data from the World Values Survey.[4] However, an important finding emerged in the third survey round (LiTS III) in 2016: the happiness gap between post-communist countries in the EBRD regions and their comparators had closed at last.[5] In other words, once differences in gross domestic product (GDP) per capita had been controlled for, people in transition countries were, on average, no longer less satisfied with their lives than people in Germany and Italy (the two western European comparator countries included in LiTS III). Indeed, they were in fact more satisfied than people in Cyprus, Greece and Türkiye. Research using the annual Gallup World Poll and a broader range of comparator countries suggests that the gap closed around 2012.[6]

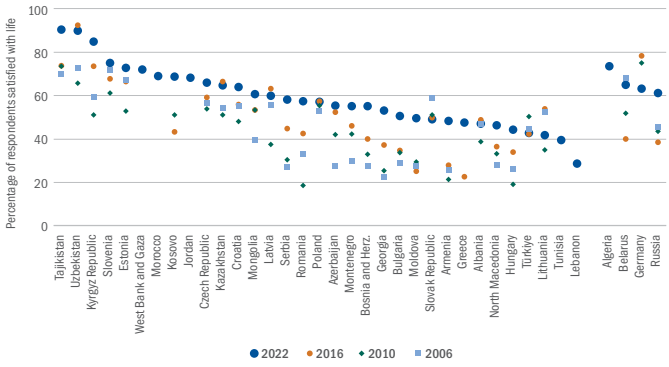
This chapter revisits the topic of satisfaction with life in the EBRD regions using early data from the fourth round of the Life in Transition Survey (LiTS IV), which is in the process of being conducted across the EBRD regions and in selected comparator countries. The analysis includes preliminary data for all economies where at least 250 interviews have been completed (out of a total of 1,000). That survey round started in October 2022 and is expected to conclude later in 2023.

Average life satisfaction levels have risen further relative to 2016 in almost all countries. Certain countries in Central Asia continue (as in previous rounds) to score very highly, notwithstanding their relatively low levels of GDP per capita, while south-eastern Europe (SEE) and eastern Europe and the Caucasus (EEC) have seen notable increases in life satisfaction. Importantly, the increase in life satisfaction is broadly based overall, covering all age cohorts, both males and females, and people in both urban and rural areas.

Why are the EBRD regions doing so well in terms of satisfaction with life? One possibility is that people's answers have been influenced by growing prosperity. LiTS IV was launched at a time when most economic aggregates were moving in a favourable direction, with supply chains reopening and household demand bouncing back following the relaxation of Covid restrictions. However, two other issues are probably also influencing the results: improvements in the health of the population and favourable developments in labour markets (including a shift towards more pleasant and higher-skilled jobs).

A comparison of different rounds of the LiTS shows that people's assessments of their own health have also improved significantly over time. Those improvements are broadly based across all age groups, but the decline in health as respondents age is still steeper in the EBRD regions than it is in the G7 countries

CHART 1.1. Levels of life satisfaction have risen over time



Source: LiTS and authors' calculations.
Note: This chart shows the percentage of respondents who either agree or strongly agree that, overall, they are satisfied with their life.

(Canada, France, Germany, Italy, Japan, the United Kingdom and the United States of America), particularly for older women. The prevalence of some specific health problems – particularly vision loss and anaemia – is also higher in the EBRD regions than in the G7.[7]

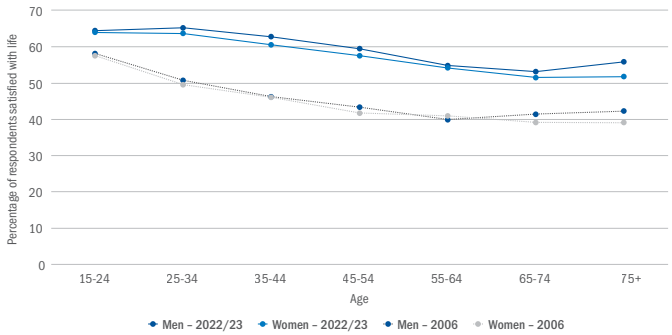
Importantly, self-assessed health includes not only physical aspects, but also mental health, which is itself closely linked to satisfaction with life. The World Health Organization (WHO) estimates that 12 billion working days are lost globally each year because of depression and anxiety,[8] with many economists arguing strongly that increased resources need to be devoted to improving mental health.[9]

This chapter uses data from LiTS IV to construct a new index of mental distress, and the results show that poor mental health is not only associated with lower satisfaction with life, but also tends to be more prevalent in poorer countries and among individuals who are financially insecure. Partly for these reasons, mental distress is particularly prevalent in the southern and eastern Mediterranean (SEMED) region. It is also more common among women than men – a finding that can be seen in all countries in the EBRD regions.

Lastly, there has been an important shift in the labour markets of some EBRD economies since 2019: more men and women now have high-skilled jobs, with correspondingly fewer having medium and low-skilled occupations. Furthermore, there have also been changes to working practices and a reduction in the average time spent commuting to work.

[4] See Sanfey and Teksoz (2007) and Guriev and Zhuravskaya (2009).
[5] See EBRD (2016).
[6] See Guriev and Melnikov (2018).
[7] See Institute for Health Metrics and Evaluation (2020).
[8] See WHO (2022).
[9] See, for example, Layard (2020).

CHART 1.2. Life satisfaction has increased for both men and women across all age cohorts



Source: LiTS and authors' calculations.
Note: This chart shows the percentage of respondents who are satisfied with their life by age cohort.

Happiness

All rounds of the LiTS contain a question on happiness, which is measured in terms of self-reported satisfaction with life. Respondents are asked about the extent to which they agree or disagree with a series of statements, one of which is the following: "All things considered, I am satisfied with my life now." Five options are available, ranging from "strongly disagree" to "strongly agree". The analysis below divides respondents into two groups: (i) those who say that they agree or strongly agree with the statement and are therefore satisfied with their life; and (ii) those who disagree, strongly disagree, or say that they neither agree nor disagree.

Trends in terms of satisfaction with life

Satisfaction scores have risen over time in most economies (see Chart 1.1). As in previous rounds of the LiTS, high scores can be found in three Central Asian countries – the Kyrgyz Republic, Tajikistan and Uzbekistan – a perennially surprising result, given that GDP per capita is usually positively correlated with happiness in cross-country regressions and these three countries are still among the poorest in the EBRD regions.[10] One region that has made substantial progress since 2016 is south-eastern Europe (which includes both (i) European Union (EU) member states Bulgaria and Romania, and (ii) the Western Balkans), with nearly all countries recording significant increases in satisfaction (the sole exception being Albania, where that score has remained more or less unchanged). Meanwhile, the percentage of satisfied people in Greece has doubled since 2016, reflecting dramatic improvements in the country's economic situation over the past six or seven years.

At the same time, there is substantial variation in the level of life satisfaction across the economies of the SEMED region. Barely one in four people in Lebanon say that they are satisfied, the lowest percentage of any country covered by the survey, reflecting the prolonged socio-economic crisis seen in that country in recent years. In contrast, Jordan, Morocco and the West Bank and Gaza all show happiness levels comparable to some of the best performers in central Europe and the Baltic states (CEB).

The rise in happiness over time is broadly based, rather than being concentrated in certain groups. Across all age groups, levels of life satisfaction are, on average, significantly higher than they were in 2006 (see Chart 1.2), as well as being higher than in 2010 and 2016. For both genders, happiness drops steadily as age increases, before rising slightly in later years. Thus, the data conform to the U-shaped pattern, which is found in most of the literature on happiness, although the turning point comes a bit later than usual in the EBRD regions. Levels of life satisfaction have also risen steadily in both urban and rural areas.

[10] For more on the link between happiness and GDP per capita, see, for example, Helliwell et al. (2023).

TABLE 1.1. Cross-sectional analysis of life satisfaction between 2010 and 2022/23

	(1)	(2)	(3)	(4)
	LiTS II	LiTS III	LiTS IV	LiTS IV
Post-communist	-0.217*** (0.074)	0.024 (0.149)	0.042 (0.064)	0.028 (0.044)
Household income (log)	0.035*** (0.011)	0.013 (0.015)	0.075*** (0.015)	0.066*** (0.013)
GDP per capita (US$ at PPP; log)	-0.063 (0.039)	-0.027 (0.048)	-0.102** (0.043)	-0.117*** (0.039)
Age	-0.010*** (0.001)	-0.009*** (0.002)	-0.008*** (0.003)	-0.008*** (0.002)
Age squared (divided by 100)	0.011*** (0.001)	0.010*** (0.002)	0.009*** (0.002)	0.009*** (0.002)
Own assessment of health: good or very good	0.118*** (0.012)	0.133*** (0.012)	0.110*** (0.015)	0.075*** (0.014)
Mental distress				-0.066*** (0.006)
Secondary education	0.100*** (0.017)	0.132*** (0.024)	0.085** (0.034)	0.068** (0.032)
Tertiary education	0.179*** (0.021)	0.213*** (0.023)	0.136*** (0.038)	0.120*** (0.033)
Female	0.021** (0.009)	0.035*** (0.006)	0.009 (0.008)	0.019** (0.008)
Urban area	-0.035*** (0.009)	-0.045*** (0.015)	-0.061*** (0.012)	-0.058*** (0.012)
Unemployed and looking for work	-0.105*** (0.016)	-0.170*** (0.018)	-0.096*** (0.021)	-0.087*** (0.020)
Out of labour force	0.005 (0.010)	-0.030** (0.012)	-0.014 (0.012)	-0.010 (0.013)
People can be trusted	0.118*** (0.013)	0.099*** (0.012)	0.099*** (0.014)	0.093*** (0.013)
Number of children under 18 at home	0.003 (0.006)	0.015** (0.006)	0.012* (0.006)	0.010 (0.006)
Married	0.008 (0.013)	0.021 (0.015)	0.058*** (0.014)	0.057*** (0.014)
Widowed	-0.053*** (0.018)	-0.053*** (0.018)	0.008 (0.017)	0.014 (0.017)
Divorced or separated	-0.072*** (0.018)	-0.067*** (0.016)	0.008 (0.012)	0.007 (0.011)
R^2 Number of observations	0.105 23,225	0.099 34,341	0.090 22,057	0.107 21,788

Source: LiTS, World Economic Outlook Database and authors' calculations.

Note: This table reports the results of a linear probability model where a life satisfaction dummy is regressed on a dummy indicating whether a country is post-communist in nature, the log of GDP per capita in US dollars at purchasing power parity (PPP), and individual and household-level characteristics (including religion dummies). Standard errors in parentheses are clustered at the country level. *, ** and *** denote values that are statistically significant at the 10, 5 and 1 per cent levels respectively. LiTS II does not include self-reported data on household incomes, so spending on key goods and services and savings is used instead as a proxy. The results in column 4 control for mental distress. All specifications include the same 20 post communist countries, plus Germany and Türkiye.

Correlates of life satisfaction

Are people in post-communist economies still as happy as those elsewhere once differences in income have been controlled for? Regression analysis can be used to answer this question and examine a range of other socio-economic variables related to satisfaction with life, linking the binary measure of satisfaction to correlates of happiness such as gender, age, income, education, labour-market status, health, religious beliefs, trust, marital status and numbers of children. The analysis covers a group of 20 post-communist countries that have been involved in each of the last three rounds of the LiTS (2010, 2016 and 2022/23), plus two comparators: Germany and Türkiye.

The results confirm that a negative and statistically significant happiness gap was present in post-communist countries in 2010, and that this gap had been eliminated by 2016 (with the relevant coefficient turning positive, without being statistically significant; see Table 1.1). In LiTS IV, the coefficient on the post-communist dummy variable is again positive (and slightly larger than in 2016) but still not significant at conventional levels.

Thus, people in former communist countries are, on average, just as happy as those in Germany and Türkiye, taking into account differences in income and other variables. Similar results can be obtained using an ordered probit model for various degrees of satisfaction with life or using an unbalanced panel of countries.

We can also see that happiness is positively correlated with better levels of education and higher household income. The coefficient on national income is negative when included together with individual income, perhaps suggesting that higher income relative to the national average is a particularly strong correlate of satisfaction with life.

The familiar U-shaped relationship with age can also be observed, with a turning point reached at the age of 49 – somewhat later than is typically found by other researchers. This finding of a U-shape also holds when using age group dummy variables rather than controlling for age and age squared. Women tend to be happier than men, although the differences are not always statistically significant. People living in a rural area, married individuals and people who trust others also tend to report greater satisfaction with life. The finding regarding trust echoes one of the core points of the *World Happiness Report:* average levels of happiness are higher when governments and businesses can generally be trusted to be free from corruption.[11]

Happiness is also strongly linked to good physical and mental health. On average, people with a self-reported health status of "good" or "very good" (as opposed to "fair", "bad" or "very bad") are more than 10 percentage points more likely to be satisfied with life. LiTS IV data allow us, for the first time, to explore the issue of mental health and its impact on well-being, and it is noticeable that an index of mental distress derived from various answers to the survey is negatively correlated with satisfaction. The next section of this chapter contains an in-depth assessment of health trends and disabilities across the EBRD regions.

A strongly negative correlation between being unemployed and happiness is one of the most robust findings in the literature on happiness. Many countries in the EBRD regions have seen high levels of job creation in recent years, along with a shift towards higher-skilled jobs and, in the post-Covid era, greater flexibility and less commuting. These trends and their implications for well-being are explored in depth in the last section.

Since including variables for health and labour-market status increases the share of total variation in life satisfaction that is explained by the econometric model by around 15 per cent, the next two sections take a detailed look at trends in those areas.

[11] See Helliwell et al. (2023).

Health

Happiness and prosperity in the EBRD regions are both dependent on health. Healthy workers are both happier and more productive, with good health supporting longer working lives (which are particularly valuable in rapidly ageing populations). Against that background, this section looks at self-assessed health, disability and mental distress in the EBRD regions.

Self-assessed health

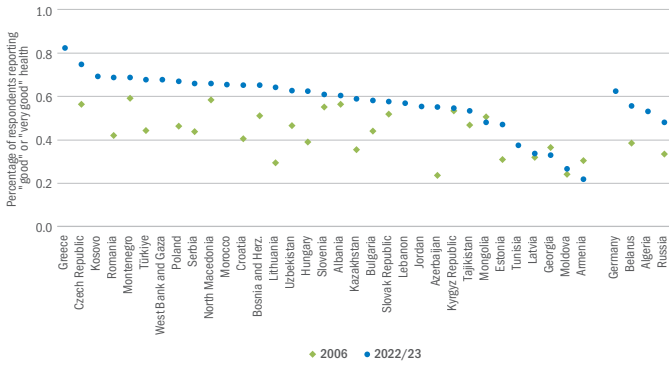
In almost all economies in the EBRD regions, the percentage of people reporting that their health is "good" or "very good" (as opposed to "medium", "bad" or "very bad") has increased since 2006 (see Chart 1.3). In some economies (such as Azerbaijan, Lithuania and Romania) the increase has been quite dramatic, while in others (particularly in the EEC and SEMED regions) the results are less encouraging. While such self-assessments are clearly imperfect, measures of self-reported health have been widely found to give a good approximation of objective health outcomes, including physical and mental health and demand for healthcare.[12]

In LiTS IV, the highest level of self-assessed health can be found in Greece. Meanwhile, in most other EBRD economies in the EU and the Western Balkans, levels of self-assessed health are comparable to – or even higher than – the level observed in Germany. Eurostat data paint a similar picture. While higher-income economies tend to be healthier overall, at a certain level additional GDP per capita no longer consistently translates into better health. Middle-income countries can achieve gains through public health infrastructure, proper sanitation and water supply, and access to nutritious foods, while richer countries may struggle to overcome health inequality.

People's assessment of their own health tends to decline steadily as they age. However, the improvement seen in self-assessed health since 2006 encompasses all age groups. The LiTS data also show that there has been further progress since 2016, suggesting that the Covid-19 pandemic has not halted the steady improvement in health outcomes over time. These trends are further corroborated by the European Social Survey (with some countries being surveyed in the same year that they were covered in the LiTS).

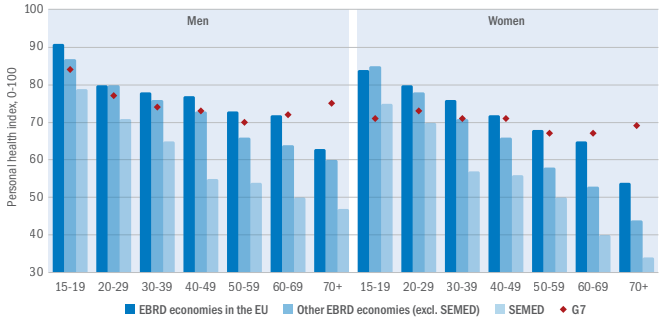
Self-assessed health can also be tracked using the Gallup World Poll – a representative household survey with a strong focus on satisfaction with life and well-being. That annual survey includes a variety of questions about physical and mental health, five of which have been aggregated here to construct an index of overall health. Those five questions ascertain whether respondents feel healthy, well-rested, in physical pain, worried or sad (see Chart 1.4).

CHART 1.3. Self-assessed health in the EBRD regions has improved since 2006



Source: LiTS and authors' calculations.
Note: This chart shows the percentage of respondents who reported "good" or "very good" health.

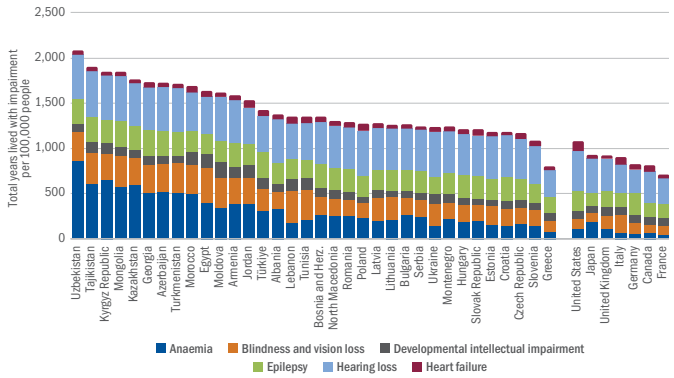
CHART 1.4. Self-assessed health in EBRD economies in the EU has mostly caught up with the G7, with the exception of the oldest age groups



Source: Gallup World Poll (2022 or latest available year) and authors' calculations.
Note: This chart shows average personal health index scores taken from the Gallup World Poll, broken down by age group and gender. Sampling weights are used. The index is based on the following five questions on physical and mental health: (i) "Do you have any health problems that prevent you from doing any of the things people your age normally can do?"; (ii) "Now, please think about yesterday, from the morning until the end of the day. Think about where you were, what you were doing, who you were with, and how you felt. Did you feel well rested yesterday?"; (iii) "Did you experience the following feelings during a lot of the day yesterday? ... How about physical pain?"; (iv) "... How about worry?"; and (v) "... How about sadness?"

[12] See Smith and Goldman (2011).

CHART 1.5. Anaemia and vision loss are more prevalent in the EBRD regions than in the G7



Source: Institute for Health Metrics and Evaluation (2020) and authors' calculations.
Note: This chart shows estimated total years lived with each impairment per 100,000 people, adjusted for countries' age structures. Estimates do not include use of or access to corrective devices such as hearing aids.

Data from the Gallup World Poll indicate that perceived health in the relatively rich EBRD economies in the EU is generally comparable to that seen in the industrial nations of the G7. This is true for both genders up to the age of 70, at which point the EBRD economies start to fall behind the G7, especially in the case of women. In other EBRD economies (excluding the SEMED region), perceived health falls significantly short of G7 levels after the age of 50 for men and after the age of 40 for women. The low level of self-reported health among 15 to 19 year-old women in the G7 reflects low self-assessments of both physical and mental health, particularly in the United States and Canada. In SEMED economies, perceived health declines sharply from an early age.

Debilitating conditions

People's assessments of their own health are often influenced by whether or not they are affected by debilitating conditions. A debilitating condition or impairment is defined as a situation where a person's body structure or function differs from the norm. Some occur with age (such as loss of mobility or vision), while others may be linked to nutrition, lifestyle and healthcare (such as anaemia and heart failure). Efforts to address such impairments may be particularly beneficial when it comes to the development of human capital.

Some debilitating conditions are more prevalent in the EBRD regions than in the G7, but others are not (see Chart 1.5). Across all countries, the impairments with the highest prevalence are anaemia and hearing loss. Vision loss and anaemia are more common in the EBRD regions than in the G7 and are especially prevalent among women. Globally, anaemia is typically associated with nutritional deficiencies (and that is true even in middle-income EBRD economies).[13] Anaemia particularly affects people in lower socio-economic groups, as well as menstruating adolescent women, pregnant women and those who have recently given birth. Symptoms include fatigue, impaired concentration and weakness, among others. It is also associated with reduced productivity and lower household incomes.[14] Meanwhile, men are more likely to suffer heart failure and hearing loss. In the absence of a hearing aid, hearing loss can lead to increased fatigue, the need to take sick leave more often and earlier retirement.[15] Hearing loss is more common among men across all age groups, but that is particularly true of men over the age of 45.

VISION LOSS AND ANAEMIA ARE MORE COMMON IN THE EBRD REGIONS THAN IN THE G7 AND ARE ESPECIALLY PREVALENT AMONG WOMEN

[13] See Safiri (2021).
[14] See Niemesh (2015).
[15] See Nachtegaal et al. (2012) and Helvik et al. (2013).

Mental health

Good mental health increases the amount of time that people are able to work, their productivity when they do so, and, ultimately, their income and wealth.[16] Strong mental health also goes hand in hand with greater satisfaction with life, as shown earlier in this chapter. Mental disorders such as depression, anxiety and personality disorders are in the top 10 leading causes of disability-adjusted life years globally, with depression and anxiety being the most prevalent.[17]

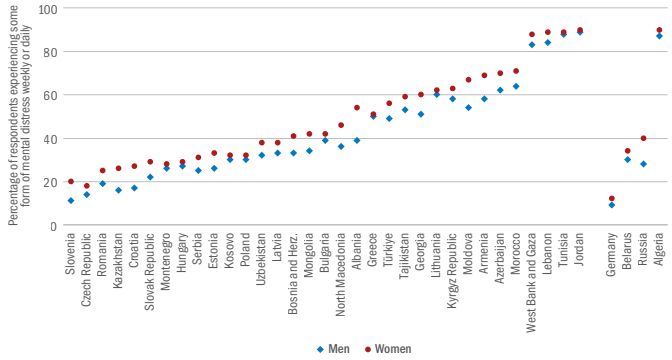
Against that background, LiTS IV asks respondents whether and how often they experience sadness, depression, anxiety and apathy. Those answers have been aggregated here to construct an index of self-assessed mental distress.

Levels of mental distress vary considerably, both across economies and by gender (see Chart 1.6). In Slovenia, mental distress is almost as infrequent as it is in Germany, whereas in Algeria, Jordan and Tunisia, around 90 per cent of respondents report feeling some form of mental distress at least once a week. The average incidence of distress is higher for women than for men in all countries. This difference is statistically significant in most cases and holds across age cohorts, consistent with global trends as reported in the annual Global Burden of Disease Study. Other signs of mental distress that are not covered by the survey, such as substance abuse and lack of impulse control, are typically more common among men. At the same time, men may under-report symptoms that could indicate weakness, such as low mood or illness, especially if they adhere more strongly to traditional norms regarding masculinity.[18]

Mental distress differs from disabilities and overall health assessments in that the prevalence tends to be broadly similar across different age groups (see Chart 1.7). The percentage of LiTS IV respondents reporting that they experience some form of mental distress at least weekly stands at around 40 per cent for the young, the middle-aged and the elderly alike. Globally, the severity and prevalence of mental illness are estimated to peak in people's mid-thirties and remain high in their prime working and child-rearing years.[19]

In LiTS IV, respondents also reported their ability to perform sensory-related, mobility-related and cognitive tasks. Physical disabilities include problems seeing, hearing and walking/climbing steps, while cognitive ability is about being able to remember things and concentrate and communicate well. Not surprisingly, the percentages of respondents reporting a disability (or describing their health as "bad" or "very bad") increase with age. Just over 20 per cent of people aged 35 or younger report being limited by a disability, compared with 80 per cent of respondents over the age of 65.

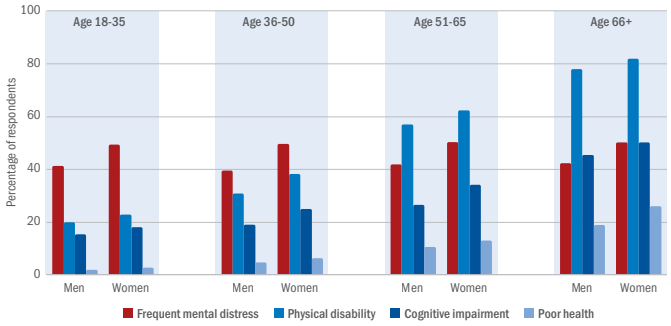
CHART 1.6. The percentage of the population experiencing mental distress at least weekly ranges from 10 per cent in Germany to 90 per cent in Algeria, Jordan and Tunisia



Source: LiTS IV and authors' calculations.
Note: This chart shows the percentage of respondents who report experiencing at least one of depression, sadness, anxiety and apathy weekly or daily.

[16] See, for instance, Ridley et al. (2020).
[17] See Institute for Health Metrics and Evaluation (2020).
[18] See, for instance, Cavanagh et al. (2017).
[19] See GBD 2019 Mental Disorders Collaborators (2022).

CHART 1.7. Physical and cognitive impairment increase rapidly with age, while the frequency of mental distress is broadly constant across age groups



Source: LiTS IV and authors' calculations.
Note: This chart shows the percentage of respondents who report having some form of health problem. "Physical disability" includes problems seeing, hearing and walking/climbing steps, while "cognitive impairment" includes problems remembering, concentrating and communicating. "Frequent mental distress" indicates the percentage of respondents who report feeling at least one of anxiety, sadness, depression and apathy at least weekly. "Poor health" indicates the percentage of respondents who report that their health is "bad" or "very bad".

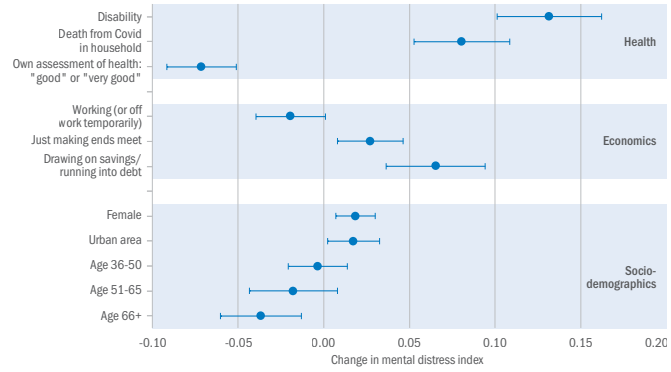
ACROSS ALL AGE GROUPS, PEOPLE WITH A DISABILITY ARE

11

PERCENTAGE POINTS

LESS LIKELY TO REPORT THAT THEY WORK THAN THOSE WITH NO DISABILITY

CHART 1.8. Disabilities, financial fragility, being female and living in an urban area are all strongly correlated with mental distress in the EBRD regions



Source: LiTS IV and authors' calculations.
Note: This chart shows the coefficients that are derived from a linear probability model regressing mental distress (defined as feeling at least one of sadness, depression or anxiety or taking little pleasure in doing things at least weekly) on various measures of health and other characteristics. A respondent is classified as having a limiting disability if they struggle with or are completely unable to do any of the following: (i) seeing, (ii) hearing, (iii) climbing steps, (iv) remembering or concentrating, (v) communicating and (vi) exercising self-care. Control variables include employment status, the ability to save (whereby the base category is "able to save"), measures of the economic impact of the Covid-19 crisis, age, marital status, children in the household, living in an urban area, education and living alone. Additional controls include adherence to traditional gender norms, satisfaction, religious beliefs, trust in society and country fixed effects. The 95 per cent confidence intervals shown are based on standard errors clustered at the country level.

Differences between men and women in terms of the prevalence of health problems mostly arise in middle age (30-54), with only minimal gender differences in disability and poor health among those aged 18-29. In the EBRD regions, however, there is also a gender difference in mental distress among the young.

Countries with lower GDP per capita tend to have higher levels of mental distress. However, other factors are also relevant. Regression analysis can be used to link mental distress as reported in LiTS IV to a number of other self-reported measures of health, as well as other individual characteristics such as labour-market status (see Chart 1.8).

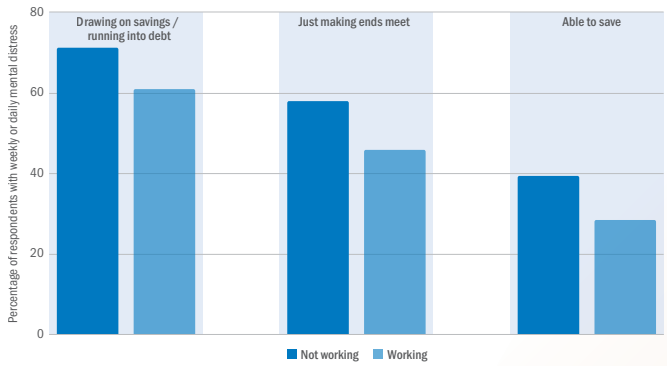
First, all other things being equal, people who have disabling impairments such as problems with their memory, vision or hearing are the most likely to experience frequent mental distress. This probably reflects the psychological challenge of living with impairments in social and work settings that do not allow for full participation in normal activities. People with a disabling impairment are also likely to have fewer opportunities to work, perhaps as a result of unsuitable workspaces and inflexible processes. Across all age groups, people with a disability are 11 percentage points less likely to report that they work than those with no disability. Meanwhile, the percentage of people with a disability who are not in the labour force is about 12 percentage points higher than the equivalent figure for people without a disability.

Second, there is a clear association between mental distress and having a household member who died from Covid-19. This is a poignant reminder of the lingering and lasting impact of the pandemic.

Third, financial fragility is clearly associated with mental distress (see Chart 1.9). Approximately 65 per cent of those who are unable to save experience distress at least weekly, compared with about 35 per cent for those who are able to save. This echoes the results of recent studies, which have found that economic crises have a negative effect on mental health through the impact of sudden unemployment and the associated decline in living conditions.[20]

Furthermore, being in work seems to have a positive impact. Looking only at individuals who are drawing on savings/ running into debt, the percentage of people in work who report experiencing frequent mental distress is about 10 percentage points lower than the equivalent figure for people who are not in work, with the same differential being observed among individuals who are able to save and among individuals who are just making ends meet. These differentials are statistically significant at the 1 per cent level.

CHART 1.9. Working partially alleviates mental distress caused by an inability to save



Source: LiTS IV and authors' calculations.
Note: This chart shows the percentage of respondents who report having weekly or daily mental distress, broken down by employment status and the ability to save.

Adapting to changing labour markets

For many people, being employed is a crucial aspect of their self-worth and well-being.[21] With that in mind, this section looks at the changing nature of work during and after the Covid-19 pandemic and the links between new working practices, such as hybrid working, and satisfaction with life.

Shifting skill requirements in the job market

Over the past two decades, the typical skill-set of employees in the EBRD regions has changed substantially, with medium-skilled roles (such as clerks, craft workers and machine operators) experiencing a substantial decline.[22]

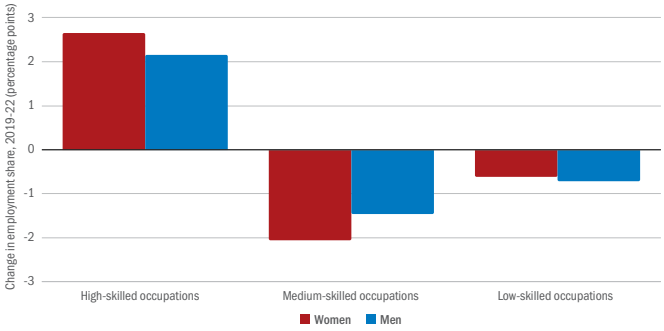
This trend continued between 2019 and 2022 (see Chart 1.10, which is based on data for 16 countries). At the same time, economies with large primary sectors (defined as agriculture, forestry, fishing and mining) have seen continued declines in the employment shares of low-skilled occupations, such as unskilled agricultural or construction work (with the largest falls being observed in agriculture). This trend has been particularly pronounced in Azerbaijan, Moldova and Mongolia, where agriculture, mining and utilities still account for more than 30 per cent of total employment. Meanwhile, high-skilled jobs in sectors such as law or information technology (IT) have increased as a percentage of total employment. These occupations are also more likely to be conducive to teleworking.

APPROXIMATELY
65%
OF THOSE WHO ARE UNABLE TO SAVE EXPERIENCE MENTAL DISTRESS AT LEAST WEEKLY

[20] See Cutler and Sportiche (2022).

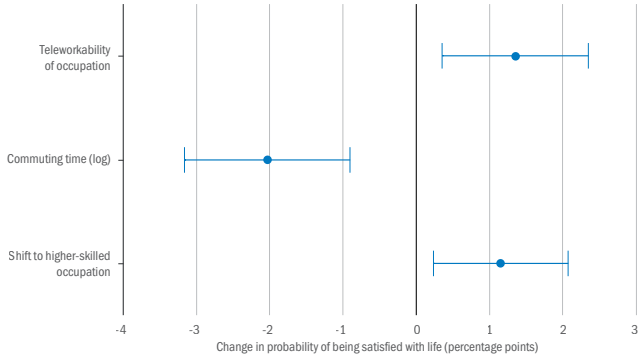
[21] See Theodossiou (1998) and EBRD (2016).
[22] See EBRD (2018).

CHART 1.10. A greater percentage of the labour force now have high-skilled jobs



Source: International Labour Organization (ILO) and authors' calculations.
Note: Occupations are categorised on the basis of ILO data. "High-skilled occupations" comprise the following ISCO-88 major groups: legislators, senior officials and managers (group 1), professionals (group 2), and technicians and associate professionals (group 3). "Medium-skilled occupations" comprise clerks (group 4), service workers, and shop and market sales workers (group 5), skilled agricultural workers (group 6), craft and related trades workers (group 7), and plant and machine operators and assemblers (group 8). "Low-skilled occupations" comprise elementary occupations (group 9). This chart shows data for Bosnia and Herzegovina, Bulgaria, Croatia, Cyprus, the Czech Republic, Estonia, Greece, Hungary, Latvia, Lithuania, Moldova, North Macedonia, Poland, Romania, the Slovak Republic and Slovenia, weighted by population.

CHART 1.11. Job characteristics are important predictors of happiness



Source: LiTS IV, Dingel and Neiman (2020) and authors' calculations.
Note: This chart shows standardised coefficients derived from a linear model regressing satisfaction with life on age and age squared, being female, marital status dummies, having children in the household, access to the internet, being able to afford the consumption of meat, fish or an equivalent, being able to afford a holiday once a year, living in an urban area, industry fixed effects and country fixed effects. Satisfaction with life is a dummy variable that is equal to 1 if the person responds "strongly agree" or "agree" to the statement "All things considered, I am satisfied with my life now" and is 0 otherwise. The sample is restricted to employed respondents. The 95 per cent confidence intervals shown are based on standard errors clustered at the country level.

Job characteristics and happiness

Job satisfaction and the quality of a job are important factors influencing overall satisfaction with life.[23] At the same time, the quality of employment also makes a significant contribution to both physical and mental well-being.[24] In order to investigate this further, regression analysis can be used to explore the relationship between satisfaction with life in the latest round of the LiTS and three aspects of respondents' jobs: (i) the extent to which a job can be done remotely ("teleworkability"); (ii) the average commuting time; and (iii) whether the respondent has transitioned to a more skilled occupation following their previous job. As before, regressions take into account income, education and other characteristics of the respondents.

The results show that employees do indeed tend to value the possibility of working from home at least part of the time: a 1 standard deviation increase in teleworkability (equivalent to the difference between teachers and production managers) corresponds to a 1.3 percentage point increase in the probability of being satisfied with life today (see Chart 1.11). This equates to roughly 9 per cent of the gap between the satisfaction of employed and unemployed respondents. Similarly, reduced commuting time and a shift to a higher-skilled job are also associated with higher levels of satisfaction. The link between moving to a higher-skilled occupation and happiness also holds when focusing specifically on workers who have shifted to a higher-skilled job more recently (that is to say, since 2000).

Recent trends in remote work

The sudden closure of workplaces during the Covid-19 pandemic marked the onset of a new era of working arrangements, affecting employees around the world and catalysing a substantial shift in attitudes and expectations surrounding remote work. No other episode in modern history has involved such a pronounced and widespread shift in working practices in such a short space of time.

The pandemic is now over, but the shift to working from home will probably endure.[25] In the light of this development, several questions arise: How prevalent is remote work across EBRD countries? What are the main working arrangements at present? And what are the primary benefits of hybrid work?

In order to answer those questions, the analysis in this section draws on the results of a comprehensive recent survey conducted in 34 countries (including six economies in the EBRD regions: the Czech Republic, Greece, Hungary, Poland, Romania and Türkiye) in April and May 2023. The survey, which was conducted online, covered full-time workers between the ages of 20 and 64 with a secondary, tertiary or postgraduate education. The samples used were broadly representative with respect to age, gender and education; however, the results largely reflect trends among workers who are able to use smartphones, computers or tablets and are therefore able to take part in online surveys (rather than being applicable to the population as a whole).

[23] See EBRD (2016).
[24] See, for instance, Llena-Nozal et al. (2019).
[25] See Barrero et al. (2021) and Aksoy et al. (2022).

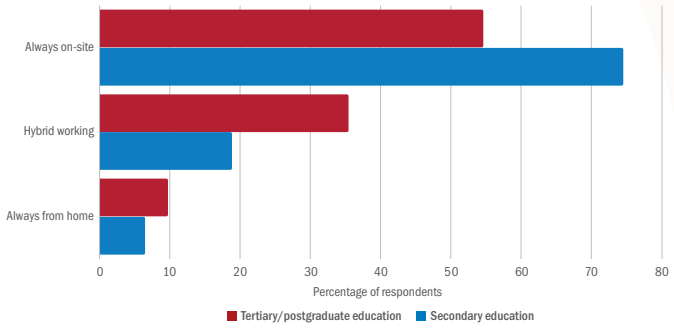
A new normal? Changes to working practices in the EBRD regions

People with a tertiary education or a postgraduate qualification are more likely to telework than those with only a secondary education (see Chart 1.12). While around 55 per cent of full-time employees with at least a tertiary education always work on-site at their employer's premises, a further 35 per cent now have hybrid working arrangements in which they split the working week between their home and their employer's premises, and the remaining 10 per cent work entirely from home. Among people with just a secondary education, only about a quarter report having the option of working remotely.

People greatly value the opportunity to work from home. To elicit information on people's willingness to pay for the option of working from home, the survey first asked: "How would you feel about working from home two or three days a week?" If the response was "neutral", the willingness to pay was coded as 0. Those who answered positively ("I would view it as a benefit or extra pay") were asked: "How much of a pay rise (as a percentage of your current pay) would you value as much as the option to work from home two or three days a week?"

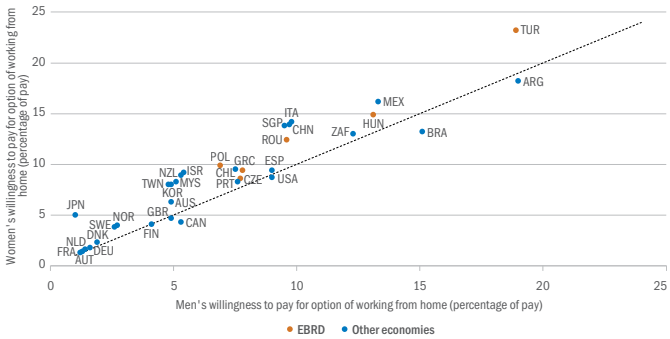
On average, the option of working from home two or three days a week was deemed to be worth 8 per cent of earnings (see Chart 1.13), ranging from 1 per cent of pay in Austria and France to about 10 per cent of pay in Greece, Poland and Romania, and nearly 20 per cent in Türkiye. The results also show that, in most economies, women value the option of working from home more highly than men. This is true even when taking

CHART 1.12. People with a tertiary education or a postgraduate qualification are more likely to telework



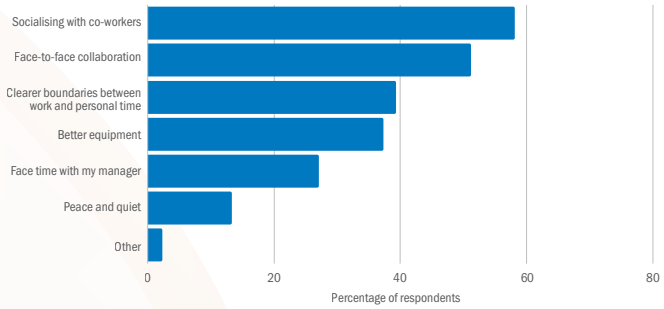
Source: Global Survey of Working Arrangements (April and May 2023) and authors' calculations.
Note: People who worked four or more days during the reference week for the survey were asked: "For each day last week, did you work six or more hours, and if so where?" The sample comprises workers in the Czech Republic, Greece, Hungary, Poland, Romania and Türkiye.

CHART 1.13. Women value the option of working from home more highly



Source: Global Survey of Working Arrangements (April and May 2023) and authors' calculations.
Note: Workers who worked four or more days during the reference week for the survey were asked: "How much of a pay rise (as a percentage of your current pay) would you value as much as the option to work from home two or three days a week?" The sample comprises workers in 34 economies.

CHART 1.14. The main perceived benefit of working on-site is the opportunity to socialise



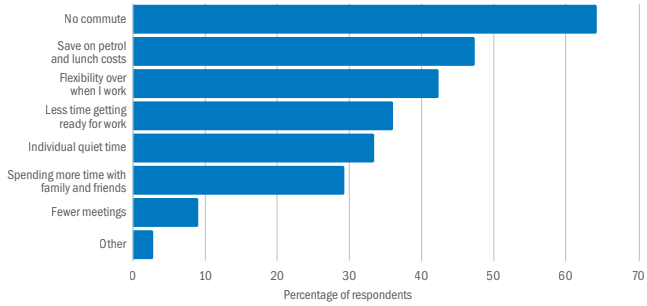
Source: Global Survey of Working Arrangements (April and May 2023) and authors' calculations.
Note: This chart shows responses to the question: "What are the top benefits of working on your employer's business premises? Please choose up to three." The sample comprises workers in the Czech Republic, Greece, Hungary, Poland, Romania and Türkiye.

ON AVERAGE, THE OPTION OF WORKING FROM HOME TWO OR THREE DAYS A WEEK IS DEEMED TO BE WORTH

8%

OF EARNINGS

CHART 1.15. The main perceived benefit of working from home is the lack of commute



Source: Global Survey of Working Arrangements (April and May 2023) and authors' calculations.
Note: This chart shows responses to the question: "What are the top benefits of working from home? Please choose up to three." The sample comprises workers in the Czech Republic, Greece, Hungary, Poland, Romania and Türkiye.

into account the presence of children and other observable demographic characteristics. Indeed, this gender difference is also observed among single persons without children, suggesting that the result is not fully driven by childcare responsibilities. It may be that women are also more likely to take on other care-giving and household responsibilities, leading them to place greater value on the flexibility and time savings offered by the option of working from home (see also Box 1.1 for a discussion of the role that gender and gender norms play in labour force participation decisions).

Main benefits of working on-site and from home

Socialising with co-workers was viewed as the main benefit of working in the office (being cited by 58 per cent of respondents), followed by face-to-face collaboration (51 per cent) and clearer boundaries between work and personal time (39 per cent; see Chart 1.14). When it came to the main benefits of working from home, 64 per cent of respondents mentioned the absence of a commute, followed by savings on petrol and lunch costs (47 per cent) and flexibility with respect to working time (42 per cent; see Chart 1.15).

In conclusion, high-skilled roles, which have increased in number in the EBRD regions, can often be performed remotely. The ability to work from home is, in turn, associated with greater satisfaction, particularly because of the reduction in average commuting time.

Conclusion

This chapter has identified a number of encouraging interrelated trends across economies in the EBRD regions. Happiness and health levels are increasing, and employed people are more likely to have high-skilled and flexible jobs. Flexible working and the ability to work from home at least some of the time are increasingly common and valued by employees. Moreover, improvements in health will not only help people to enjoy life more and become more productive, but also allow them to remain in the labour force for longer.

At the same time, however, there is no room for complacency. The data show major variation in many of these trends across the EBRD regions, with some economies and individuals lagging significantly behind. And even in the most advanced countries in the EBRD regions, policy changes are still needed to catch up with standards in richer parts of the world.

This chapter has looked at disabilities and mental health, building on the new questions in the most recent LiTS and identifying several areas where urgent policy action is needed. One of the main findings is the existence of a gender gap as regards mental health and limiting disabilities. Policies to address this should include improvements to women's health services, as well as legislative action. Women and girls should have regular access to specialists in menstrual health, who can properly diagnose impairments and support school attendance and labour force participation. Meanwhile, legislation requiring processed foods to be iron-fortified can be an effective way of addressing impairments resulting from anaemia.[26]

At the same time, further investment in health infrastructure and the training of healthcare workers is also needed. This includes integrating mental health services into universal healthcare, reducing waiting times for doctors' appointments and providing community-based cancer screening clinics. Efforts to vaccinate children and educate parents will remain indispensable when it comes to controlling the spread of communicable diseases.

Firms can also do more to support workers' well-being. A first step for many firms would be to offer paid leave for physical and mental health needs, while firms that provide private health insurance could expand their coverage of mental health. Firms can also make their processes more flexible and their workplaces more accommodating (for example, by making specialist equipment available for hearing or visually impaired people) in order to improve economic opportunities for workers with disabilities. Governments can support firms in their efforts to make workplaces more accommodating by introducing tax breaks, as well as by adopting legislation penalising discrimination based on disability.

As regards job flexibility and working from home, a total of 17 economies have introduced permanent teleworking regulations since March 2020. Many of these have increased the cost of remote working for employers. For example, legislation enacted in Slovenia and Türkiye in March 2021 requires employers to reimburse additional expenses related to remote working, while as of 2022 employers in Mexico are required to check, among other things, that their employees have adequate ventilation, ergonomic conditions and safety when working from home.[27] When evaluating such policies, it is important to take into account the fact that increasing the cost of remote work limits markets' capacity to satisfy people's preferences, especially in economies with fluid labour markets.

In light of the shift towards high-skilled jobs, governments should invest in robust digital infrastructure in order to ensure the consistent facilitation of remote working. By taking this step, they can actively encourage activities aimed at extending internet connectivity to underprivileged regions, thus fostering equal opportunities to work.[28] Furthermore, labour-market policies that actively help people to obtain green or digital skills can facilitate employment security, and thus mental health, as economies become greener and more service based.

Healthy lifestyles can be supported by planning urban developments with overall well-being in mind – from ensuring access to clean water and sanitation to helping urban vendors to stock fresh fruit and vegetables, and developing public spaces that encourage exercise and socialising. (Chapter 4, for instance, documents the scarcity and uneven distribution of green spaces in urban agglomerations across the EBRD regions.) Meanwhile, school curriculums can be amended with a view to de-stigmatising mental health issues and promoting well-being.

Such policies will have a particularly important role to play when it comes to alleviating mental and physical distress in a post-war context. Against that background, Box 1.2 looks at Ukrainian refugees and their intentions to return home, while Box 1.3 assesses the impact that the war has had on Ukraine's human capital.

[26] See Niemesh (2015).

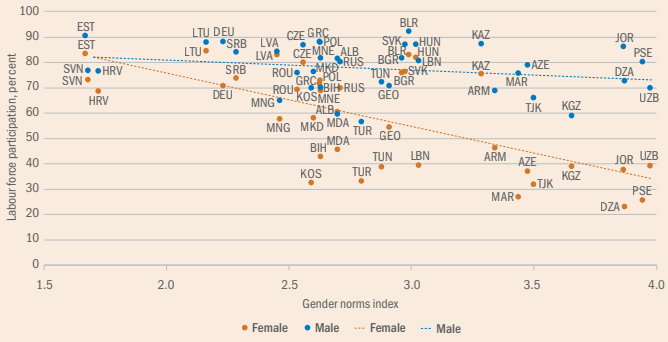
[27] See Lockton (2022).
[28] See OECD (2022).

BOX 1.1.

Gender norms and occupational segregation in the EBRD regions

People differ across countries in terms of what they consider to be appropriate social and economic roles for men and women.[29] This box uses LiTS IV data to construct a country index showing the extent to which people assign different socio-economic responsibilities to men and women. Survey respondents were asked whether they agreed or disagreed with the following eight statements: (i) "Women are as competent as men to be business executives"; (ii) "On the whole, men make better political leaders than women do"; (iii) "A woman should do most of the household chores, even if the husband is not working"; (iv) "Men should take as much responsibility as women for the home and the children"; (v) "Both the man and woman should contribute to household income"; (vi) "If a man and a woman have dinner together in a restaurant, the man should always pay the full bill"; (vii) "Men are as competent as women to be nurses"; and (viii) "It is better for everyone involved if the man earns the money and the woman takes care of the home and children". The index counts how often a respondent agrees or disagrees with these statements, assigning a 1 to less gender-equal views. For example, a 1 is assigned if the respondent indicates that they "disagree" or "strongly disagree" with the statement "Women are as competent as men to be business executives". Thus, each individual respondent has a score ranging from 0 to 8, with lower scores indicating more gender-equal views.

CHART 1.1.1. Unequal gender norms are associated with lower female labour force participation



Source: LiTS IV and authors' calculations.
Note: This chart is a scatter plot mapping the gender norms index (horizontal axis) against labour force participation (vertical axis). The latter is calculated on the basis of working-age respondents between 18 and 64 years of age.

Across the EBRD regions, the average score is 2.8. Economies in central Europe tend to have relatively gender-equal norms (especially Estonia, Slovenia and Croatia), while economies in Central Asia and the SEMED region have more gender-stereotypical views (especially Uzbekistan, the West Bank and Gaza, and Jordan). Within countries, men and people living in rural locations tend to have more gender-stereotypical views than women and people living in urban centres (with these differences being statistically significant at the 1 per cent level).

Cross-country analysis shows that less equal gender norms are associated with lower levels of female labour force participation across the EBRD regions (see Chart 1.1.1).[30] Moreover, even *within* economies, people with conservative gender norms are less likely to be in the labour force themselves. Strikingly, this effect is driven entirely by women – even when controlling for other individual characteristics such as age, age squared, marital status, an indicator for children in the household and an urban dummy, as well as country of residence fixed effects. A 1 point increase in the gender norms index is associated with a 3 percentage point reduction in the probability of a woman being in the labour force. This equates to 5 per cent of the total female labour force participation rate.

Gender norms may also influence the ways in which individuals sort into occupations. As part of LiTS IV, respondents were asked whether they believed that certain occupations – nine in total – were suitable for (i) men, (ii) women or (iii) both. Across all EBRD regions, people regarded "engineer" and "surgeon" as relatively male occupations, while regarding "nurse" and "primary school teacher" as stereotypically female occupations. For each respondent, one can count the number of times that they indicate that an occupation is "definitely/somewhat more suitable for men" or "definitely/somewhat more suitable for women". The absolute occupational skewness is then a simple count of the number of occupations for which there is perceived unequal suitability.

The gender views that individuals hold correlate strongly with how much they perceive occupations as gendered (see Chart 1.1.2). Similarly, a regression framework that controls for country fixed effects and individual characteristics shows that a 1 point increase in the extent to which someone's gender norms are unequal is associated with an increase of 0.56 in absolute occupational skewness. This amounts to 16 per cent of the mean extent to which occupations are seen to be gender-specific. This suggests that conforming to stereotypical gender norms may influence the ways in which men and women sort into occupations.[31]

[29] See Alesina et al. (2013) and Giuliano (2018).

[30] See also Fortin (2005), Verick (2014) and Jayachandran (2021).

[31] See also Baranov et al. (2023).

BOX 1.1.

Gender norms and occupational segregation in the EBRD regions

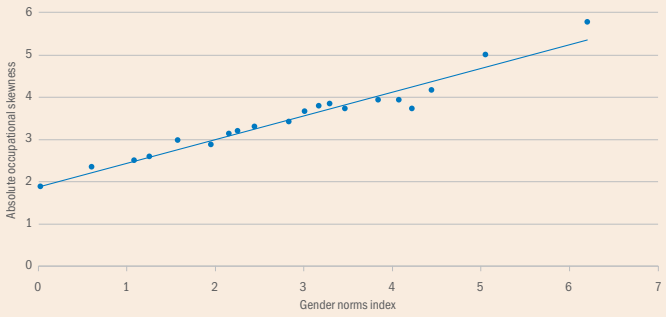
(Continued)

Individual occupations (defined at the two-digit level using ISCO codes) can be classified as (i) STEM (science, technology, engineering and mathematics) occupations; (ii) HEAL (health, education, administration and literacy) occupations;[32] or (iii) neutral occupations. In contrast to STEM occupations, HEAL occupations tend to be more people-focused than technology-oriented and tend to require literacy skills rather than numeracy.

As Chart 1.1.3 shows, there is considerable variation across economies in the importance of HEAL and STEM occupations, with men tending to have more of the STEM jobs and women tending to have more of the HEAL jobs. Strikingly, across the EBRD regions as a whole, the percentage of women who report having HEAL jobs is 11 percentage points higher than the equivalent figure for men, whereas the percentage of female respondents with STEM jobs is only 2 percentage points lower than the figure for men. A similar pattern can be observed for a sub-sample of countries covered by European Labour Force Surveys.

The EBRD Just Transition Initiative is one example of the ways in which the Bank helps countries to harness the capacity of their workforce, paving the way for more women to join STEM sectors. In Tunisia, the EBRD helped the national electricity and gas utility company to improve women's access to technical and STEM roles by strengthening its equal opportunity policies and practices (see also Box 3.3).

CHART 1.1.2. Absolute occupational skewness increases as gender norms become less equal

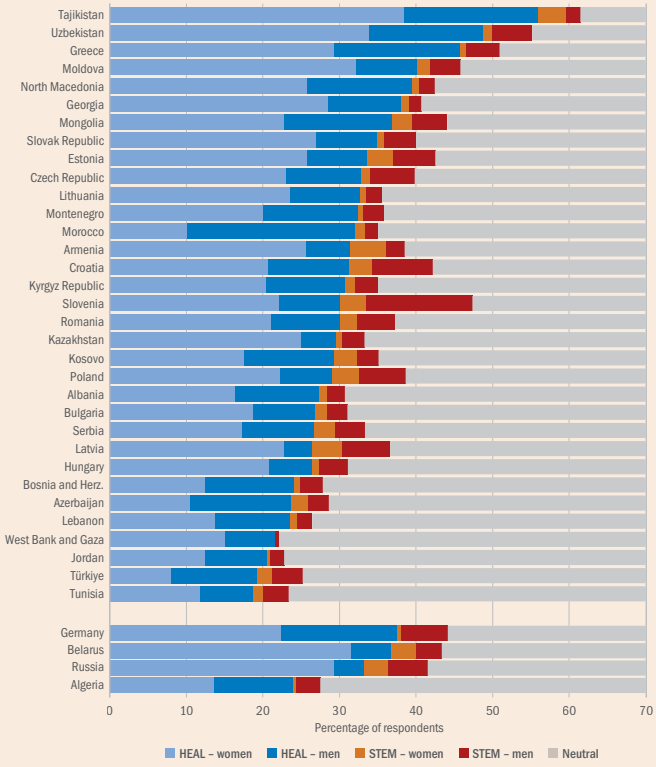


Source: LiTS IV and authors' calculations.
Note: This chart is a bin-scatter plot mapping absolute occupational skewness (vertical axis) against the gender norms index (horizontal axis). First, the residuals derived from regressing the vertical and horizontal axis variables on country dummies are identified. Second, the sample means are added back to those residuals, so that magnitudes are comparable to the original indices. Lastly, the gender norms index is grouped into 20 bins of equal size, and the mean gender norms score and the absolute occupational skewness are computed and plotted for each bin. The sample spans 33 EBRD economies.

One reason for encouraging men to take up HEAL jobs is to tackle labour shortages, particularly when it comes to healthcare. The WHO estimates that countries need at least 4.5 healthcare professionals per 1,000 people in order to provide universal healthcare and achieve health-related Sustainable Development Goals. In the EBRD regions, Egypt, Morocco and Tunisia are not expected to meet that criterion by the end of 2023.[33]

Strong gender norms – and, consequently, strong views about occupations that are only suitable for men or women – may contribute to a misallocation of human capital.[34] In particular, they may prevent men from applying for jobs in HEAL professions, such as nursing, thus making it more difficult for countries to achieve health-related development goals.

CHART 1.1.3. Men tend to have more STEM jobs, while women sort into HEAL jobs



Source: LiTS IV and authors' calculations.
Note: This chart shows, for each economy, the percentages of respondents who report having HEAL and STEM occupations, broken down by gender, and the percentage that have neutral occupations.

[32] See Reeves (2022).

[33] Data and projections are based mainly on pre-Covid trends, in line with Scheffler et al. (2016).
[34] See Hsieh et al. (2019).

BOX 1.2.

The return intentions of Ukrainian refugees

Russia's invasion of Ukraine has triggered Europe's largest refugee crisis since the Second World War. Russian military forces are increasingly targeting residential areas and vital civilian infrastructure.[35] Approximately 8 million people – including those forcibly relocated to Russia – have been displaced as a result.[36] In addition, there are several million internally displaced persons within Ukraine itself.[37]

Even before the invasion, Ukraine's population was experiencing a rapid decline owing to low fertility rates. There is concern that if a significant number of Ukrainian refugees choose to remain abroad, this could hinder post-war reconstruction efforts and make Ukraine more vulnerable to future military aggression. Against that background, this box investigates Ukrainian refugees' future intentions using Kantar's online "Voice of Ukraine" panel surveys, which cover Ukrainian refugees across Europe. In the first wave of the survey, respondents were recruited primarily through Facebook ads. They were then invited by email to take part in follow-up waves. The survey asks individuals about their plans as regards returning to Ukraine, with the possible answers being: "I intend to go back very soon"; "I intend to go back at some point later when I feel it is safe to return"; "I do not intend to go back and plan to settle outside Ukraine"; "I don't know"; and "I prefer not to answer".

Most Ukrainian refugees want to return to their home country

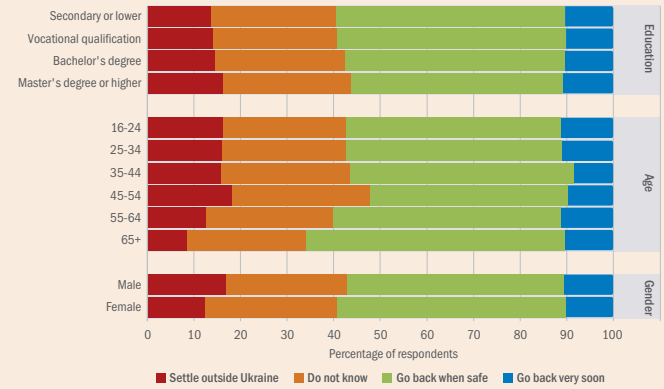
Only 8 per cent of respondents intend to settle outside Ukraine, with the vast majority planning to return very soon (8 per cent) or when it is safe (59 per cent). These percentages are broadly consistent across gender, age brackets and education levels (see Chart 1.2.1).[38]

Return intentions do not decline with time spent abroad

The longer Ukrainians spend in their various destination countries, the more likely they are to find employment (see Chart 1.2.2). After 200 days, their employment rate increases by about 20 percentage points. However, despite that strong labour-market integration over time, the percentage of individuals who plan to settle outside Ukraine does not increase significantly with time spent abroad.

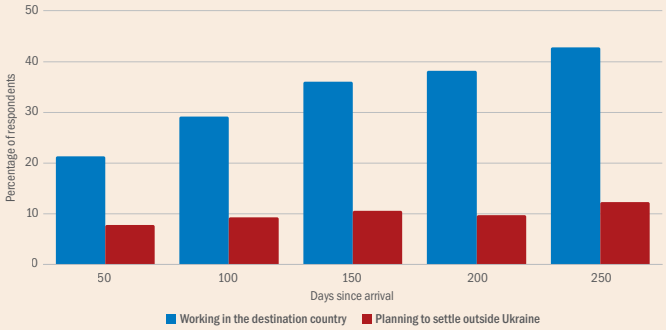
In conclusion, recent surveys indicate that the vast majority of Ukrainian refugees in Europe intend to return to Ukraine. This determination to return to their homeland contrasts with the strong desire to emigrate that tended to be expressed in surveys before the war. It may be that they now have a stronger national identity, which is acting as a powerful counterpoint to the push and pull factors that typically drive cross-border migration (such as differentials in per capita income or the quality of economic institutions). The actual level of return migration remains to be seen, and that return migration will play a pivotal role in future reconstruction efforts.

CHART 1.2.1. Ukrainian refugees' return intentions



Source: Kantar "Voice of Ukraine" survey and authors' calculations.
Note: The survey asks individuals about their plans as regards returning to Ukraine. The possible answers are: "I intend to go back very soon"; "I intend to go back at some point later when I feel it is safe to return"; "I do not intend to go back and plan to settle outside Ukraine"; "I don't know"; and "I prefer not to answer".

CHART 1.2.2. Ukrainian refugees' return intentions are not influenced by the amount of time spent in their destination country



Source: Kantar "Voice of Ukraine" survey and authors' calculations.
Note: Bars indicate bin-level averages for employment in the destination country and the intention to settle outside Ukraine net of controls. The analysis assigns all observations to five bins of equal size based on the number of days since arrival. Residuals are derived by regressing the outcome variable on gender, seven age brackets, partnership status, the presence of children under 18, living in an urban location, educational attainment, whether the respondent speaks English, whether the respondent answered the survey in Russian, the person's employment status in Ukraine prior to 22 February 2022 ("employed", "unemployed" or "student"), whether the respondent has continued their job in Ukraine remotely, whether the person left before 24 February 2022, and destination and day of leaving fixed effects.

[35] See Stepanenko et al. (2023).
[36] See UNHCR (2023).
[37] See EBRD (2022) and IOM Global Data Institute (2023).
[38] A 2023 report on Ukrainian migrants in Poland, published by Narodowy Bank Polski, found that 19 per cent of refugees indicated that they would stay permanently in Poland, while 56 per cent intended to return within three months of the war ending. See Narodowy Bank Polski (2023).

BOX 1.3.

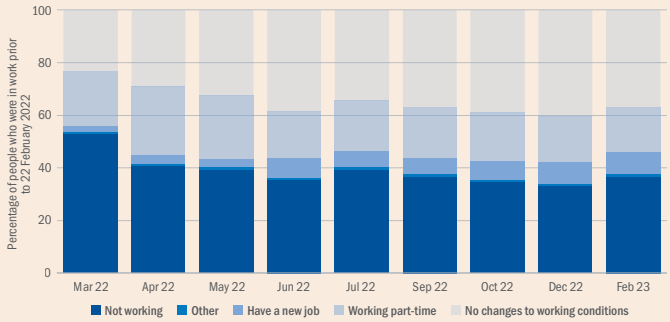
The impact that Russia's invasion has had on human capital in Ukraine

Russia's invasion of Ukraine has caused massive loss of life and major damage to the economy. While the many images of destroyed residential buildings, schools, hospitals and other physical infrastructure are an indication of the enormous suffering inflicted on the Ukrainian people, the cost of the war goes far beyond the ruins seen in Ukrainian cities, encompassing the destruction of both current and future human capital.[39] That destruction has the potential to scar Ukraine for many years to come.[40]

How significant has the loss of human capital been? The fog of war means that reliable data are hard to come by, but the numbers involved are certainly large.

First, human capital is directly reduced by the loss of human life, as well as debilitating physical or mental injuries. Tens of thousands of civilians have been killed, with 80 per cent of Ukrainians estimated to have at least one family member or close friend who has been killed or injured in the war.[41] At least 8 million have become refugees, seeking sanctuary across Europe and beyond, another 8 million have been displaced internally within Ukraine, and millions more are under Russian occupation.

CHART 1.3.1. Many Ukrainians who were in employment prior to the invasion are no longer working



Source: National Bank of Ukraine.
Note: This chart shows the employment status as at April 2023 of people who were in employment in Ukraine prior to the Russian invasion in February 2022. It is based on data in the National Bank of Ukraine's April 2023 *Inflation Report*.

Second, the education of many Ukrainian children continues to suffer severe disruption as a result of those children being displaced or stranded in war-torn regions, with access to schools limited. Indeed, more than 3,000 educational institutions have been destroyed or severely damaged.[42] Evidence from previous wars shows that such disruption to schooling reduces the productivity and future earnings of affected individuals. We know, for instance, that childhood exposure to war during the Second World War and the Vietnam War had long-lasting detrimental effects on education, health and labour-market outcomes that extended far beyond the conclusion of those conflicts.[43] Residents of Austria and Germany who were ten years old during the Second World War experienced reduced educational attainment and were still facing significant earnings gaps four decades after the war.[44]

Third, adults can lose human capital even without being directly affected by the war. For example, a year without work is estimated to reduce human capital by between 4 and 8 per cent.[45] This is a major concern, given that survey evidence suggests that 40 per cent of workers employed in Ukraine before the war were out of work in April 2023 (see Chart 1.3.1) and unemployment stood at approximately 30 per cent in 2022.

Recent surveys reveal that many reallocated workers have had to switch sectors and accept jobs for which they are over-qualified. For example, 20 per cent of the Ukrainian refugees living in Poland had pre-war jobs that required specialist skills, but only 3 per cent have found comparable high-skilled jobs in Poland.[46] At the same time, between 500,000 and 1,000,000 men and women are estimated to have been drafted into the armed forces.[47] In addition to the risk that such people could lose some of the skills required for their pre-war jobs, members of the armed forces also risk suffering physical or mental injuries, which could reduce their productivity.[48]

Thus, a substantial amount of resources will need to be committed to the rebuilding of human capital if Ukraine's post-war recovery is to be successful. It is vital, in that regard, that children have continuous access to education – both during and after the war. This can be achieved by offering classes for Ukrainian refugees, providing tutoring online or in person, and adapting curriculums to enhance learning, especially for refugee children. Universities and colleges should also facilitate the transfer of credits in order to foster continuity of education.

Further investment in the quality of education remains crucial. Ukraine's average scores in standardised international comparisons of students' ability (such as the Programme for International Student Assessment (PISA) run by the Organisation for Economic Co-operation and Development (OECD)) have been modest, despite relatively high levels of spending on education in relative terms (5.4 per cent of GDP in 2019, compared with 3.6 per cent of GDP in Greece, which enjoyed better PISA results).

[39] See Gorodnichenko et al. (2022).
[40] See Kóczán (2023).
[41] See Kyiv International Institute of Sociology (2023).
[42] See Kyiv School of Economics (2023).
[43] See Akbulut-Yuksel (2022).
[44] See Ichino and Winter-Ebmer (2004).
[45] See Blundell et al. (2016) and Dinerstein et al. (2020).
[46] See Centre for Economic Strategy (2023).
[47] See Zelensky (2022).

The war will exacerbate skill mismatches between labour demand and labour supply.[49] The post-war recovery will require new skills, as some jobs may disappear, while new ones will emerge. Construction, civil engineering, health, IT and agricultural export industries may all gain in importance. Identifying the skills that are needed in the post-war economy and establishing retraining centres for displaced workers will be essential. At the same time, retraining programmes can also support veterans' reintegration into civilian life after their military service.

Given the enormous negative effects that the war will inevitably have on health (including post-traumatic stress disorder), it is vital to develop disability-inclusive infrastructure and workplace policies that make it easier for people with disabilities to return to their previous roles and help to rebuild Ukraine. The Ukrainian Ministry of Veterans' Affairs estimates that the total number of war veterans in Ukraine could triple to about 3 million.

Lastly, the war can be expected to exacerbate Ukraine's demographic challenges, including its relatively low fertility rate. In this context, childcare could be made more affordable by establishing subsidy programmes, introducing targeted incentives to encourage private providers to enter the market, and having childcare facilities offer extended opening hours.

In summary, rebuilding human capital will be at the very heart of Ukraine's reconstruction efforts and will represent a huge challenge.

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[48] According to a recent survey on migration, nearly half (46 per cent) of Ukrainian refugees working in Poland say they are employed in jobs for which they are overqualified. See Narodowy Bank Polski (2023).
[49] See Anastasia et al. (2022) and Kupets et al. (2023).

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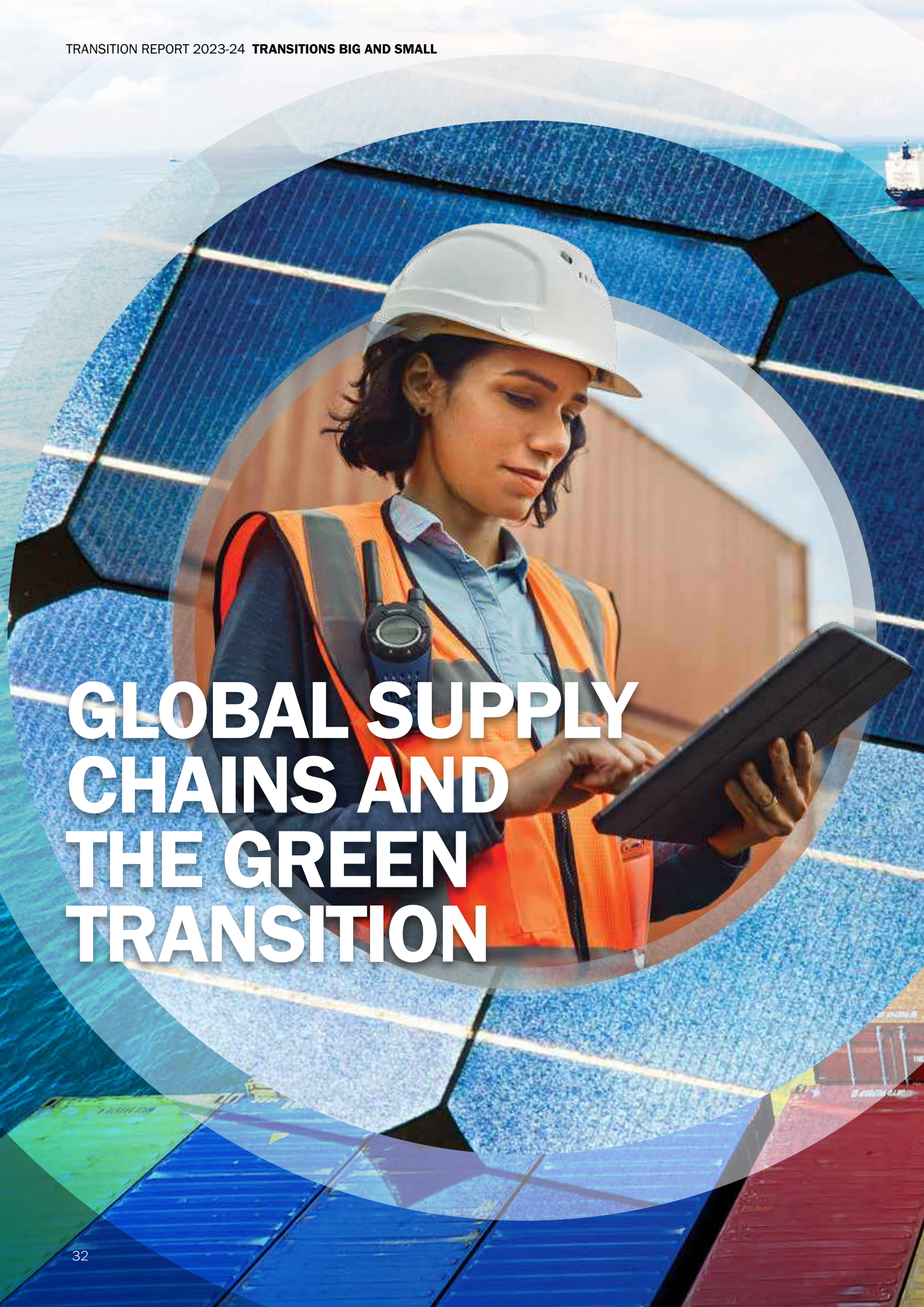


GLOBAL SUPPLY CHAINS AND THE GREEN TRANSITION

A successful transition to a green economy – which will require a rapid roll-out of clean technologies – will depend on the availability of various critical raw materials. Currently, China dominates the production and processing of many of these materials, so manufacturers around the world are trying to diversify their supplier bases. This diversification will take time and require significant investment, but it may benefit several economies in the EBRD regions. There are clear opportunities, for example, when it comes to supplying materials for the solar power and fuel cell sectors.

Introduction

This chapter looks at the reshaping of global supply chains in the context of both the transition to a green economy and rising geopolitical tensions. Limiting global warming in line with the Paris Agreement – keeping global temperature rises well below 2°C (and ideally as low as 1.5°C) relative to pre-industrial levels – will require a rapid and large-scale roll-out of clean technologies in order to fully decarbonise the electricity supply, electrify most final energy use and scale up the use of low-carbon hydrogen.[1] In parallel, digital technologies are becoming increasingly important in many areas of business.

The green and digital transitions both require a range of critical raw materials. Few substitutes (if any) are available for these inputs at present, and their production is heavily concentrated in a handful of countries. China is the dominant player in the mining and processing of many critical raw materials, from germanium to lithium,[2] which amplifies the risk of supply chain disruptions in the transition to a green economy.

Geopolitical tensions have been on the rise. Covid-19 and Russia's war on Ukraine have intensified firms' search for alternatives to offshoring, with "reshoring" (bringing the production of goods back to the firm's home country) and "nearshoring" (shortening supply ›

[1] See Energy Transitions Commission (2023).
[2] See Overland (2019) and Righetti and Rizos (2023).

chains by sourcing inputs from nearby economies) receiving increased attention. The decoupling of trade and financial links between Russia and Western economies has intensified since the invasion of Ukraine in 2022. Countries that are not politically aligned with the West have started to make greater use of currencies other than the US dollar in their cross-border transactions, while trade patterns have been shifting.

A recent survey conducted by the EBRD shows that more than 80 per cent of investment promotion agencies (IPAs) across the EBRD regions regard this reshaping of global value chains as an opportunity for their country. Moreover, many are actively seeking to attract foreign investors that are looking to diversify their supply chains (particularly companies that are active in green transition sectors).

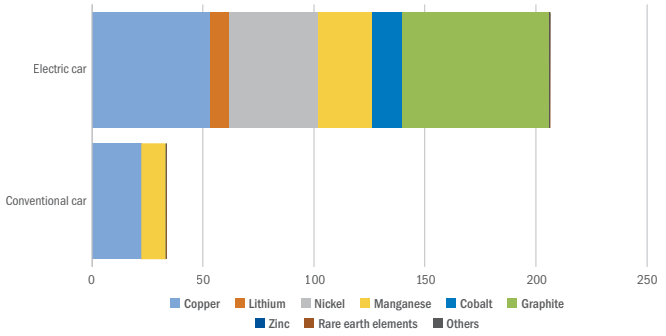
Of the various products that are necessary for the green transition, the products that economies in the EBRD regions are best positioned to produce – given their existing comparative advantages – are those required by the solar power and fuel cell sectors. Opportunities may also follow from the tightening of regulations on supply chain sustainability, which will require companies to report emissions for the whole of their supply chains and seek to reduce those emissions. Commercial information and communications technology (ICT) services are one sector where the EBRD regions would stand to benefit from such tightening of green reporting requirements. In addition, several economies in the EBRD regions boast significant deposits of critical raw materials. However, it takes time and investment to establish new mines and processing facilities.

This chapter examines, in turn, the scramble for key raw materials that are required for the green transition, changes in supply chains and global firms' feelings about reshoring and nearshoring, as well as changes to invoicing currencies in international trade. It considers the implications that these trends have for the EBRD regions, looking at how IPAs view the opportunities arising from the reshaping of global supply chains and identifying the most promising green transition sectors from the perspective of the existing export capabilities of economies in the EBRD regions. The chapter ends with a number of policy recommendations.

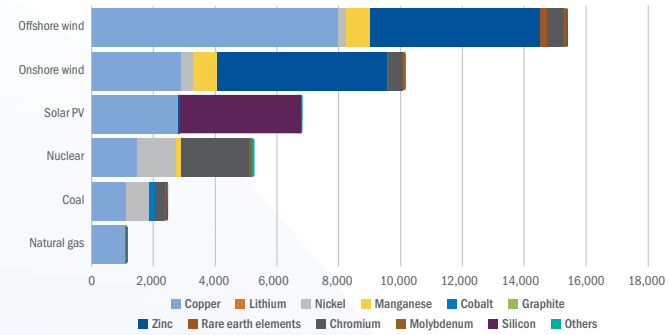
MORE THAN
80%
OF ALL IPAs IN THE EBRD REGIONS SEE THE RESHAPING OF GLOBAL VALUE CHAINS AS AN OPPORTUNITY FOR THEIR COUNTRY

CHART 2.1. Clean energy technologies and electric cars use large amounts of minerals

Panel A. Materials used in transport (kg per vehicle)



Panel B. Minerals used in power generation (kg per MW)



Source: IEA (2022).

Critical raw materials

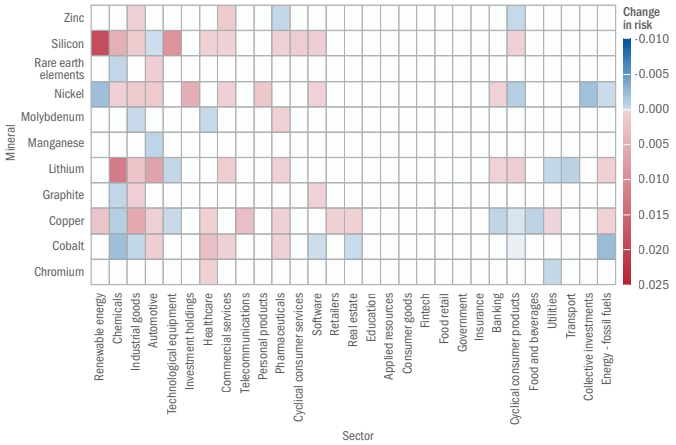
The generation of green energy requires a number of key raw materials, including (i) copper for wiring, (ii) rare earth elements for electric motors, (iii) lithium, nickel and graphite for batteries, and (iv) silicon for solar photovoltaic (PV) panels. The amounts of materials involved are significant (see Chart 2.1).

Supplying these materials in sufficient quantities to keep the green transition moving at pace will require large-scale investment in mining and refining capacity. While there are concerns today about the supply of raw materials, that is nothing new. As far back as 1977, the Council of the European Communities noted the dependence of member countries on raw materials from abroad and called for action. In 2008, the European Commission launched the Raw Materials Initiative – the first integrated strategy aimed at improving access to raw materials. China, India and the United States of America took early action as well.[3]

The specific raw materials that are regarded as critical differ from country to country, reflecting differences in development priorities and industrial needs. Only a handful of countries published such lists prior to 2020; however, the supply chain disruption

[3] See, for example, Righetti and Rizos (2023), IEA (2016) and Gupta et al. (2016).
[4] See IEA (2022).
[5] See IEA (2021), p. 248, and European Commission (2023), Annex II, Section 1, respectively. See also Box 2.1.

CHART 2.2. Risks relating to critical minerals rose in green economy sectors between 2015 and 2023



Source: NL Analytics and authors' calculations.
Note: Data as at 11 July 2023. Sectors are sorted on the basis of the average change in risk across all listed minerals.

caused by the Covid-19 pandemic, the war on Ukraine and recent geopolitical tensions has prompted many others to follow suit.[4] This chapter classifies a raw material as critical if it is on the International Energy Agency (IEA) list or in the EU's proposed Critical Raw Materials Act.[5] Thus far, no EBRD economies outside the EU have published critical raw materials lists of their own.

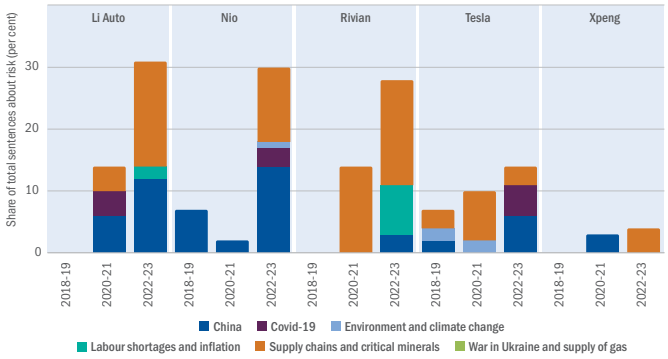
Global firms and critical raw materials

This section looks at trends in terms of references made to critical raw materials in earnings calls – regular calls between managers of listed companies and analysts and potential investors. The analysis is based on NL Analytics' transcripts of almost 220,000 earnings calls between 2013 and the second quarter of 2023. Those transcripts cover 11,445 publicly listed firms, which are headquartered in 85 countries.

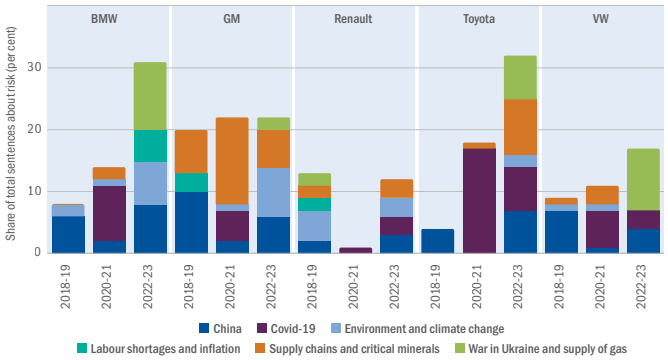
The analysis focuses on firms' concerns about factors that could affect their future revenues. It identifies sentences relating to critical raw materials, supply chains, the environment and climate change, Covid-19, inflation, labour shortages, China's economic outlook, the war on Ukraine and the supply of natural gas by checking for the relevant keywords, which were chosen with the aid of NL Analytics' keyword tool.[6] The analysis also tracks (i) whether the terms "risk", "risky", "uncertainty" or "uncertain" (or any synonyms for those terms) were used in combination with those keywords and (ii) whether the sentiment of the surrounding sentence was positive or negative. For example, someone saying "we are balancing imports with local sourcing to de-risk the company from tariffs and supply chain risks" indicates that supply chains are contributing to uncertainty, while someone talking about "the disruption felt in India, where aggressive shutdown mandates were enacted, impacting market demand and supply chain infrastructure" indicates negative sentiment regarding supply chains.

CHART 2.3. Supply chains and critical raw materials are more of a concern for pure EV companies than for traditional car manufacturers diversifying into EVs

Panel A. Pure EV companies



Panel B. Other automotive companies



Source: NL Analytics and authors' calculations.
Note: Data as at 11 July 2023.

While concerns about the operating environment have fallen overall since the second quarter of 2022, they are still higher than they were prior to 2020. Such concerns are more prevalent where firms operate in sectors that are exposed to risks relating to critical raw materials (such as industrial goods, renewable energy, chemicals, automobiles and automobile parts, and technological equipment), particularly when it comes to supply chain-related risks. The perceived risks relating to critical raw materials increased markedly in key green transition-related sectors between 2015 and the second quarter of 2023 (see Chart 2.2), with the largest increase being seen for risks relating to silicon (which is used in solar panels) in the renewable energy sector.

As expected, supply chains and critical minerals are a major concern for pure electric vehicle (EV) companies such as Li Auto, Rivian Automotive and Tesla (see Chart 2.3). They are also of considerable – albeit lesser – concern for companies that produce both EVs and conventional cars with internal combustion engines, such as Volkswagen (VW), Renault and BMW.

[6] The keywords used for supply chains were "global chain", "logistic chain", "logistical chain", "sub-supplier", "supplier", "supplier chain", "suppliers", "supply chain", "supply logistic", "supply network", "supply technologies" and "value chain". The keywords used for critical raw materials were "critical mineral(s)", "rare mineral(s)" and "rare earth(s)", plus all of those listed in Table 2.1.1; the words "lead" and "Silicon Valley" were excluded from the analysis. The Covid-19 keywords were taken from Hassan et al. (2020). The keywords relating to the invasion of Ukraine were taken from Hassan et al. (2021) and NL Analytics' keyword tool. The keywords relating to climate change and the environment were taken from Sautner et al. (2021) and NL Analytics' keyword tool.

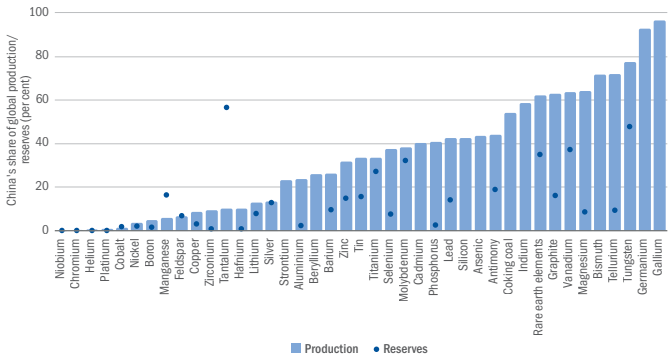
Existing mining capacity is concentrated – reserves less so

The supply risk that is associated with a critical raw material is determined by (i) where it is mined and processed, and (ii) the general availability of reserves (that is to say, known commercially viable deposits in the ground). For example, rare earth elements tend, on average, to be more abundant than silver, gold and platinum (despite what their name suggests); however, few of those deposits are concentrated and economically viable to mine.[7]

The mining of most raw materials is concentrated to some degree. If one looks at standard measures of concentration such as a Herfindahl-Hirschman index (HHI), the minerals with the highest levels of geographical concentration are gallium and germanium (used in chips), followed by niobium (used in steel alloys) and tungsten (used in wear-resistant metals). In contrast, zinc (used to protect steel from corrosion), silver (used in solar cells) and copper are the most diversified geographically.

In 2021 – the most recent year for which detailed country-level production data are available – China dominated the production of most critical raw materials (see Chart 2.4). Other major producers of critical raw materials included Brazil (which supplied more than 90 per cent of all niobium), the United States (which accounted for almost two-thirds of all production of beryllium, an important input in the aerospace and defence industries) and the Democratic Republic of Congo (which supplied almost 70 per cent of all cobalt, which is used in rechargeable batteries).

CHART 2.4. In 2021, China dominated the production of most critical raw materials



Source: Reichl and Schatz (2023), US Geological Survey (2023), Ministry of Natural Resources, PRC (2022) and authors' calculations.
Note: Both here and in subsequent charts, "platinum" refers to the platinum group of metals. Data on reserves are not available for certain minerals.

Reserves are more diversified geographically. While China has more than half of all known reserves of tantalum (used in electronic components), as well as significant percentages of the world's reserves of tungsten, vanadium (used in batteries and steel) and rare earth elements, almost 90 per cent of all known reserves of niobium and boron (used in fertilisers, EVs, wind turbines and solar panels) are located in Brazil and Türkiye respectively.

The scramble for resources

As the scramble for resources has intensified, major mining companies have sought to explore deposits and buy mines around the world. While companies headquartered in the United States and Canada have the most mines overseas, Chinese companies have been actively buying overseas mines over the past decade. In Africa, which is home to about 30 per cent of all known mineral resources, the number of Chinese-owned mines has doubled since 2013 on the basis of data from Standard & Poors (S&P). From an individual country's perspective, acquiring overseas mines increases the security of supply of critical raw materials.

The analysis that follows combines data on mine ownership with trade data at the six-digit level of the Harmonised System (HS6 – a level of disaggregation that corresponds to product groups such as cobalt ore and concentrates, for instance). Owing to a lack of detailed data, this exercise assumes that production and imports are distributed equally across the mines in a particular country, regardless of whether mines have domestic or foreign owners. The analysis provides a number of insights.

ALMOST
90%
OF ALL KNOWN RESERVES OF BORON ARE IN TÜRKIYE

[7] See Van Gosen et al. (2014).

First, global sourcing of critical minerals is more diversified than the sourcing of such materials by individual countries. This indicates that countries could, in principle, further diversify their supply of critical raw materials. Their reluctance to do so may be driven by inertia and geopolitical considerations, or it may be caused by differences in the quality of supplied products that are not visible in trade data.

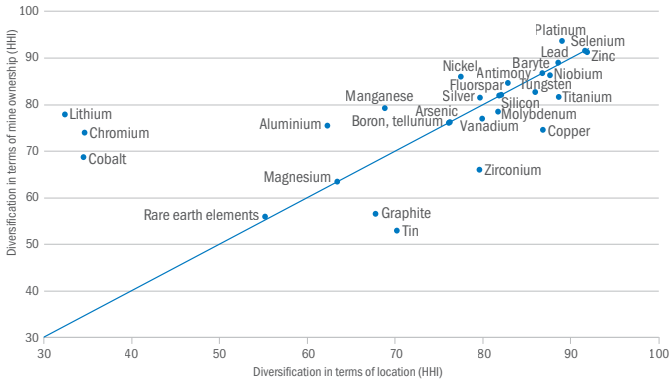
Second, measures of diversification differ depending on whether imports are assigned to source countries on the basis of (i) the location of mines or (ii) ownership of those mines (see Chart 2.5). For example, lithium production is geographically concentrated (with most of it taking place in Australia and Chile), but ownership of lithium mines is fairly diverse, with owners headquartered in countries around the world. Thus, producers who need a stable supply of lithium can reduce their supply risk somewhat by sourcing it from different mining companies, although the risk of export restrictions being imposed by the countries where the mines are located remains unchanged.

Protecting green and digital assets

While demand for critical raw materials has grown in recent years, the percentage of critical products that are subject to export restrictions shot up around 2020. Data on export restrictions taken from the Global Trade Alert can be combined with data on international trade flows to gauge the economic importance of such restrictions.[8] This analysis reveals that around 30 per cent of global exports of critical raw materials by value were subject to restrictions in 2022, up from just 5 per cent in 2019 (see Chart 2.6). An increase was also observed for other products over that period, reflecting broader trends in terms of geopolitical tensions and the fragmentation of global trade, but that increase was limited to 5 percentage points.

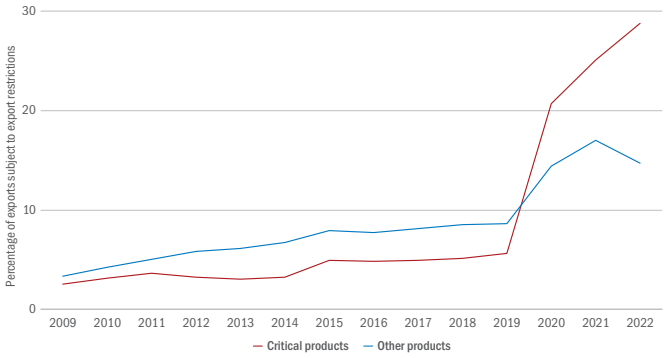
The biggest increases in the percentage of critical materials that are subject to export restrictions have been observed in the United States, Vietnam and China, while economies such as Armenia, Egypt, the Kyrgyz Republic and Uzbekistan have bucked the trend and *reduced* the percentage of critical products that are subject to restrictions. In terms of individual materials, export restrictions have been tightened for feldspar, lithium and rare earth elements, while trade in selenium, baryte and palladium has become less restricted (see Chart 2.7).

CHART 2.5. The sourcing of some critical raw materials is more diverse in terms of mine ownership than it is in terms of location



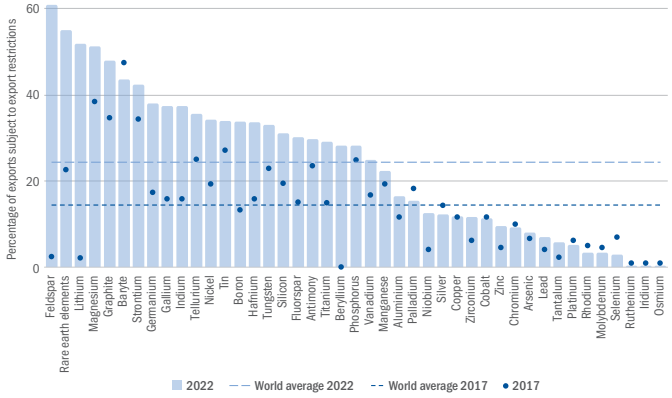
Source: S&P, UN Comtrade annual data and authors' calculations.
Note: Based on international trade in 2022, disaggregated at the HS6 level. When calculating diversification in terms of mine ownership, the owner of a mine is defined as the company that owns the largest equity share. The country of ownership is based on the location of the owner's headquarters.

CHART 2.6. Export restrictions on critical products have surged since 2019



Source: Global Trade Alert, UN Comtrade, US draft list of critical supply chains and authors' calculations.
Note: Global Trade Alert data as at 11 July 2023. Critical materials are defined in Box 2.1.

CHART 2.7. Export restrictions have increased substantially for lithium and rare earth elements



Source: Global Trade Alert, UN Comtrade, US draft list of critical supply chains and authors' calculations.
Note: Global Trade Alert data as at 11 July 2023. Critical materials are defined in Box 2.1.

[8] See Evenett and Fritz (2020) for a discussion of data on export restrictions.

Countries impose export restrictions on critical raw materials in an attempt to capture more of their value by embedding them in other domestically manufactured products, or to make it more costly for others to obtain certain critical materials. For example, when the US CHIPS and Science Act of 2022, which provides subsidies for the construction of semiconductor manufacturing plants, prohibited recipients of such subsidies from expanding semiconductor manufacturing in China or other countries that pose a threat to US national security, China retaliated by imposing restrictions on exports of gallium and germanium. China accounts for more than 90 per cent of all global production of those two key metals, which are used in semiconductors and electric vehicles.

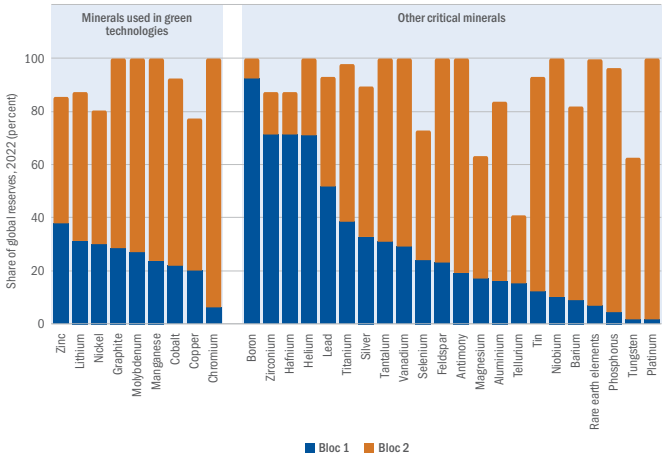
While export restrictions on critical raw materials have been on the rise, import tariffs for those materials – which were already less than half of the average tariff across all products in 2002 – have dropped further, to less than 1 per cent in 2022, compared with an average of 2.4 per cent across all products.

Friends to the rescue?

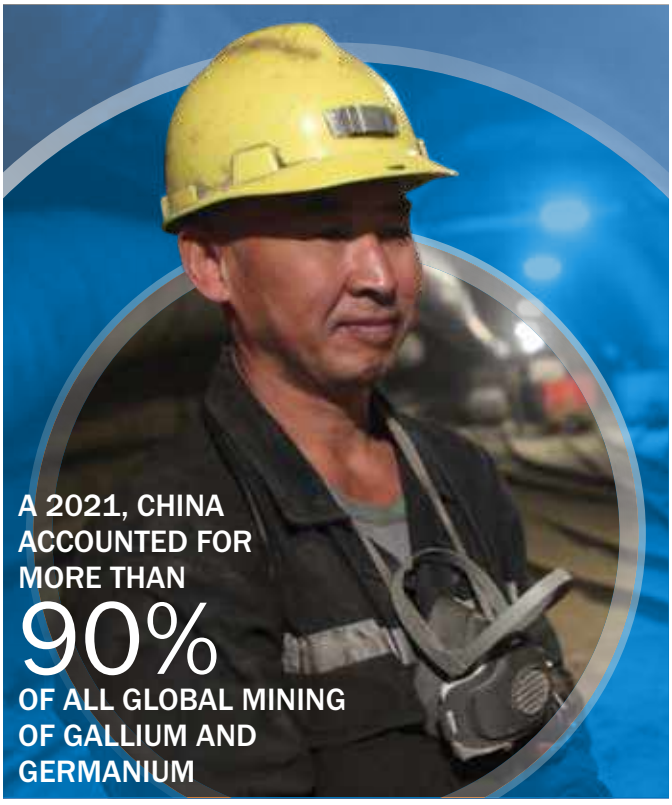
If a country does not have critical raw materials within its territory, firms located in that country may seek to acquire mines overseas or import such materials from trading partners that are regarded as being reliable (for instance, economies that share similar values or are otherwise closely aligned in geopolitical terms). This section looks at the extent to which such similarities in values might affect countries' bilateral trade in critical raw materials. The analysis, which is based on the votes that were cast by each country in the United Nations (UN) General Assembly between 2014 and 2021, uses those votes to divide countries into two blocs:[9] one ("Bloc 1") comprising countries that are more closely aligned with the United States and other Western economies (see the notes accompanying Chart 2.8 for details); and another ("Bloc 2") containing the rest of the world (including China).

Bloc 2 dominates the known reserves of all raw materials critical for the green transition, as well as most other critical raw materials (with the exception of boron, zirconium, hafnium, helium and lead; see Chart 2.8). Box 2.2 presents related analysis for products further up the value chain, identifying areas where Bloc 1 economies could establish or scale up manufacturing of critical supply chain products.

CHART 2.8. Reserves of critical raw materials in countries geopolitically aligned with the West and the rest of the world

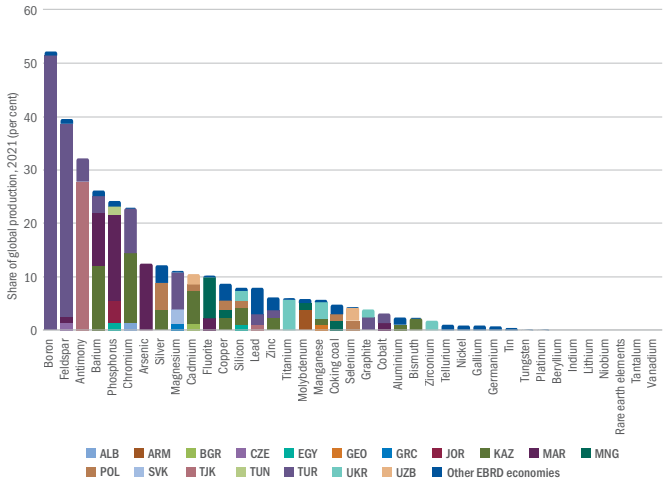


Source: S&P, Voeten (2013) and authors' calculations.
Note: Based on the location of mines. Bloc 1 consists of countries that are more closely aligned with Western economies and comprises Albania, Andorra, Australia, Austria, Belgium, Bosnia and Herzegovina, Bulgaria, Canada, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Georgia, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Japan, Latvia, Liechtenstein, Lithuania, Luxembourg, Malta, the Marshall Islands, Micronesia, Moldova, Monaco, Montenegro, Nauru, the Netherlands, New Zealand, North Macedonia, Norway, Palau, Poland, Portugal, Romania, San Marino, Serbia, the Slovak Republic, Slovenia, South Korea, Spain, Sweden, Switzerland, Türkiye, Ukraine, the United Kingdom and the United States. Bloc 2 contains all other economies.



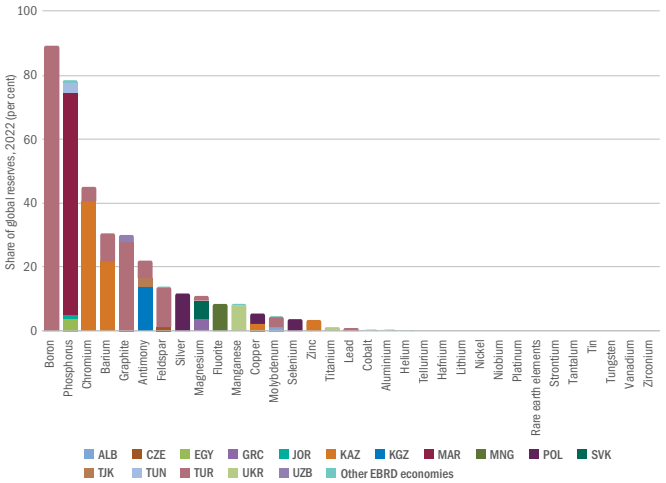
[9] Following in the footsteps of Bailey et al. (2017), countries are divided into blocs on the basis of (i) average ideal points on a unidimensional scale and (ii) the Jenks natural breaks classification method, with two clusters. Of the various countries in Bloc 2, Armenia is the closest to Bloc 1 using this measure.

CHART 2.9. Most economies in the EBRD regions are not major producers of critical raw materials



Source: Reichl and Schatz (2023) and authors' calculations.

CHART 2.10. Some countries in the EBRD regions have substantial reserves of critical raw materials



Source: US Geological Survey (2023) and authors' calculations.

EBRD economies are not generally major producers of critical raw materials – with a few exceptions

Most economies in the EBRD regions are not major producers of critical raw materials – particularly the key materials used in clean technologies at present – but there are a few exceptions (see Chart 2.9). Türkiye, for example, is the world's largest producer of both boron and feldspar (the latter being used in glass and ceramics) and an important producer of chromium (used in stainless steel) and magnesium (used in electronic components). Tajikistan is the world's third-largest producer of antimony (used in batteries and flame retardants), while Morocco is the second-largest producer of phosphates (used in fertilisers) and one of the top three producers of barium (used in the cement and petroleum industries). As battery technologies evolve, new materials might be needed. For example, one possible area of growth is lithium iron phosphate batteries, with Morocco, Tunisia and Jordan all boasting phosphate reserves. Taken as a whole, the EBRD regions' total share in the global production of 19 critical raw materials was higher than their share in global GDP at market exchange rates in 2021 (3.6 per cent).

Moreover, some countries in the EBRD regions are home to relatively large reserves of critical raw materials (see Chart 2.10). In addition to its boron reserves, Türkiye also accounts for 28 per cent of the world's known graphite reserves, while almost 70 per cent of all phosphate rock reserves are located in Morocco. Meanwhile, Kazakhstan has over 40 per cent of the world's known chromium reserves and more than 20 per cent of its barium reserves. European Metals Holdings Ltd (which the EBRD has an equity stake in) has been developing lithium-tin deposits in the Czech Republic with a view to producing battery-grade lithium and by-products such as tin and tungsten. The EBRD also has an equity stake in Euro Manganese Inc., which is looking to extract manganese from waste tailings in the Czech Republic.

In order to fully reap the benefits of those critical minerals, the economies in question need to update, digitise and publicise all relevant information on their geological endowments to help facilitate investment in exploration.[10] For instance, new feasibility studies may be needed to check whether deposits identified by geological surveys decades ago are economically viable. Adopting the Extractive Industries Transparency Initiative (EITI) standards on contracts, revenues and beneficial ownership can help to improve transparency in the industry, in addition to providing greater clarity regarding companies' rights and obligations, as well as fiscal and permit regimes (including fair and competitive licensing). Countries also need to invest in the acquisition and development of skills specific to the geological exploration, mining and refining of critical minerals.

[10] See EBRD (2023) for a discussion.

Expanding production: social, environmental and economic challenges

Once critical minerals have been mined, they need to be refined – turned from ore into concentrate that can be used to manufacture goods such as batteries or wire. However, mined rare earth elements, for instance, have to go through several processing steps before they can be used to produce magnets, and China accounts for around 90 per cent of global production at each of these stages. It is also the world's largest processor of cobalt and lithium, and one of the three largest refiners of copper, and it has a large share in the manufacturing of related goods (such as battery cell components and solar panels).[11]

Meeting demand for the critical raw materials that are required for the green and digital transitions will require significant increases in mining and refining capacity, as well as the establishment of manufacturing facilities for intermediate products such as batteries.[12] Setting up new mines takes time, with various permits needing to be obtained and any legal challenges relating to the social and environmental impact of mining needing to be addressed. For instance, when LKAB, a state-owned mining company in Sweden, announced the discovery of a large deposit of rare earth elements in Kiruna, Sweden, it estimated that it would be at least 10 to 15 years before mining could start.[13] Long investment lags increase the risks associated with such projects, given that demand for certain minerals can change quickly as technology evolves or alternative supplies come on stream. For example, 60 per cent of China's EVs are predicted to use cobalt-free batteries in 2023, up from just 18 per cent in 2020.[14]

Processing facilities can be built faster, but they may face shortages of ore and/or skilled labour. Shortages of skilled engineers and other experts can be acute throughout the supply chain, while interest rate rises can significantly increase the effective cost of exploiting new deposits.

While many critical raw materials reduce pollution at the point of consumption (as in the case of the emissions savings associated with driving an EV), the processes involved in producing the relevant goods may be far from green. Refining rare earth elements, for instance, produces extremely large amounts of pollution, releasing toxic and radioactive waste. Emissions produced by the mining and production of metals account for about 10 per cent of total greenhouse gas (GHG) emissions worldwide, most of them stemming from the production of aluminium and steel.

Moreover, the extraction of mineral ore has knock-on effects on local ecosystems and biodiversity as a result of changes to local land use, the movement of large amounts of rock and the accumulation of left-over materials. Although mining plays a more limited role in deforestation and other forms of biodiversity loss than agriculture, it can affect ecosystems indirectly through the construction of roads and other infrastructure required to establish a mine or a processing facility.[15] Other issues include the degradation of local air, water and land quality, corruption and tax avoidance, as well as inadequate standards in terms of health and safety, human rights abuses and the use of child labour. (See Box 2.3 for a detailed discussion of the impact that air pollution has on health and labour market outcomes.) For these reasons, it is often the case that countries' tariff schedules effectively encourage imports of pollution-intensive inputs by imposing lower import tariffs on those goods relative to other imports.[16]

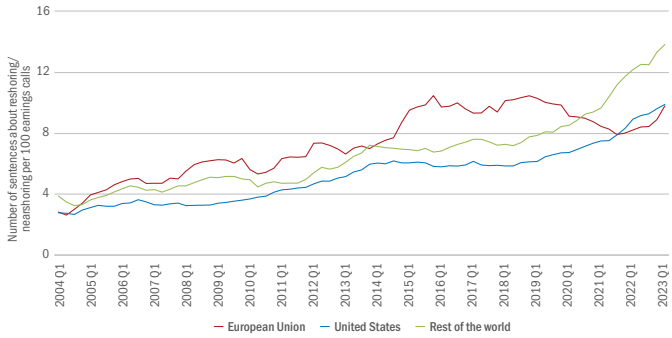
[11] See Khan (2023) and White (2023).
[12] See Energy Transitions Commission (2023).
[13] See https://lkab.com/en/press/europes-largest-deposit-of-rare-earth-metals-is-located-in-the-kiruna-area (last accessed on 8 August 2023).
[14] See Hook et al. (2023).
[15] See, for example, De Haas and Poelhekke (2019) and Aragón and Rud (2016).
[16] See Shapiro (2021).

Reshaping global supply chains

Greater attention being paid to reshoring and nearshoring

Firms have recently been paying greater attention to the resilience of their supply chains. Many responded to Covid-related disruption by increasing their stocks of inputs and sourcing the same inputs from additional suppliers.[17] In parallel, firms have also been expressing greater interest in shortening supply chains through reshoring and nearshoring (see Chart 2.11). Evidence from earnings calls suggests that this trend actually predates the Covid-19 pandemic, reflecting increased anti-globalisation sentiment in many economies and growing restrictions on international trade.[18]

CHART 2.11. Firms are talking more about reshoring and nearshoring



Source: NL Analytics and authors' calculations.
Note: Sentences are regarded as relating to reshoring/nearshoring if they contain the keywords "reshoring", "nearshoring", "onshoring", "regionalisation", "local sourcing", "nearshore", "insourcing", "localisation", "localise", "localising", "localised" or "local production".

Increased use of alternative invoicing currencies

Rising geopolitical tensions have translated into increased use of import tariffs and other administrative measures (such as approval procedures and economic sanctions) to reshape trade patterns.[19] In addition, Russia's invasion of Ukraine has also led to the rapid decoupling of trade and financial links between Russia and Western economies, with Russia being replaced by other trading partners (see Boxes 2.4 and 2.5).

These changes have, in turn, led to a rapid increase in the use of currencies other than the US dollar and the euro for settling trade between third countries. These shifts may reflect a preference for not clearing payments through the US or eurozone banking systems when dealing with sanctioned countries or fears that assets denominated in those currencies (including central bank reserves) could be frozen. They may also reflect difficulties with the clearing of payments denominated in those currencies, as well as the steady decline in the number of cross-border correspondent banking relationships (visible in data compiled by the Bank for International Settlements), which largely reflects the rising cost of compliance with sanctions and other restrictive regimes.

Notably, countries that did not impose economic sanctions in the aftermath of the invasion of Ukraine have made greater use of the Chinese yuan in their trade with Russia (see Box 2.4). Increased geopolitical risk has also affected the choice of trade finance instruments, with increased recourse to advance payments for riskier trades (see Box 2.5).

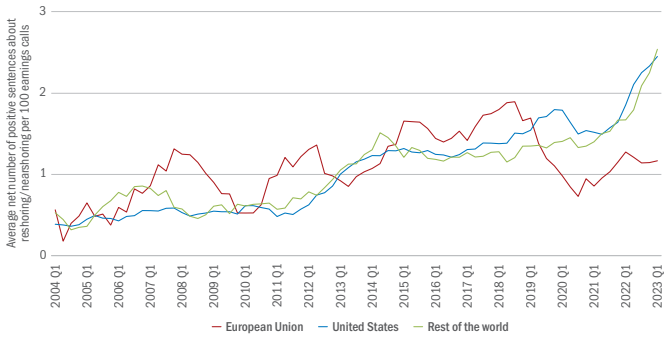
[17] See EBRD (2022).
[18] See, for example, Delis et al. (2019) and De Backer et al. (2016).
[19] See Freund et al. (2023).

Positive sentiment regarding reshoring and nearshoring

Against that backdrop of trade flows and terms being rapidly reshaped by rising geopolitical tensions, managers and investors in the United States have increasingly regarded reshoring and nearshoring as making a positive contribution to firms' business outlooks, particularly since 2020 (see Chart 2.12). That shift in the perception of nearshoring, as reflected in earnings calls, may have been driven by the Build Back Better Plan, which eventually led to the Inflation Reduction Act (IRA). Among other things, a domestic content bonus for clean energy projects and facilities that meet American manufacturing and sourcing requirements presents an opportunity for firms looking to reshore their production.[20]

In the EU, in contrast, sentiment regarding reshoring/nearshoring, although positive in net terms, has exhibited no clear upward trend over time, perhaps because EU manufacturing has been less affected by offshoring outside the EU, while incentives to reshore/nearshore production have not been as strong as in the United States.

CHART 2.12. Firms' sentiment on reshoring and nearshoring has improved



Source: NL Analytics and authors' calculations.
Note: Data as at 11 July 2023. The net number of positive sentences is the difference between (i) the number of sentences containing a reshoring/nearshoring-related keyword and a positive term and (ii) the number containing a reshoring/nearshoring-related keyword and a negative term. The keywords used are "reshoring", "nearshoring", "onshoring", "regionalisation", "local sourcing", "nearshore", "insourcing", "localisation", "localise", "localising", "localised" and "local production".

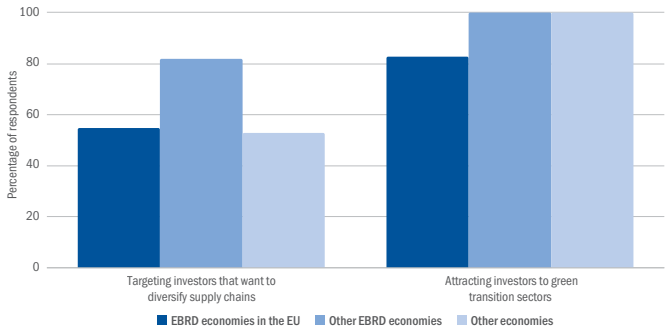
Has the red carpet been rolled out for the right investors?

In order to better understand countries' perspectives on opportunities related to the reshaping of global supply chains, the EBRD conducted an online survey of national IPAs in its shareholder economies between June and August 2023.[21] The analysis that follows is based on the responses received from 44 economies (including 27 in the EBRD regions) as at 7 August 2023. The survey collected basic information about each IPA, such as its year of establishment, details of its mandate and governance, perceptions regarding inward foreign direct investment (FDI), sector-specific information on investment promotion activities over time and incentives provided to foreign investors, details of restrictions on FDI inflows, and information on budgets and staff resources.

IPAs are government bodies tasked with attracting international investors. That focus on promoting investment reflects the fact that FDI can produce multiple benefits, including technological expertise, skills and jobs, helping to raise the quality of countries' exports and increase value added.[22]

More than 80 per cent of all IPAs across the EBRD regions regard the reshaping of global value chains as an opportunity for their country, and many are actively seeking to attract foreign investors that are looking to diversify their supply chains or plan to do so in the future (see Chart 2.13). Almost all IPAs have a stated interest in attracting investors to sectors relevant for the green transition.

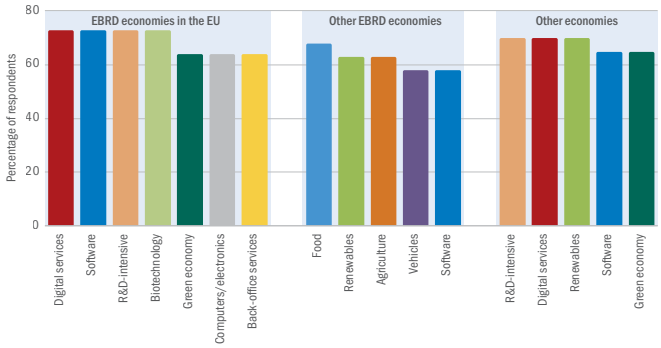
CHART 2.13. Many IPAs are targeting foreign investors that are looking to diversify their supply chains



Source: EBRD survey of IPAs and authors' calculations.

[20] See https://home.treasury.gov/news/press-releases/jy1477 (last accessed on 3 August 2023).
[21] This survey did not cover Belarus, Russia, Mexico (which closed its IPA in 2019) or Belgium (which does not have a national IPA – just two sub-national IPAs). Tunisia's two IPAs were both included.
[22] See Harding and Javorcik (2012).

CHART 2.14. Digital services, software, R&D-intensive sectors and the green economy are among the most targeted sectors for inward FDI



Source: EBRD survey of IPAs and authors' calculations.

Inward FDI is generally regarded as being at least as attractive now as it was five years ago, with IPAs in most countries in eastern Europe and the Caucasus (EEC) and Central Asia reporting an increased interest in FDI (perhaps reflecting recent success in this area).[23]

IPAs often focus on priority sectors when it comes to investment promotion, helping to concentrate efforts and increase FDI inflows (see Box 2.6 for details of developments in Egypt and Morocco, for instance).[24] The percentage of IPAs reporting such prioritisation ranges from 50 per cent of respondents in the EEC region and Central Asia to 100 per cent of respondents in the southern and eastern Mediterranean (SEMED) and Türkiye. There is substantial variation across countries in terms of the sectors that are targeted, as IPAs tend to focus on sectors where their economies have comparative advantages in terms of skills, production inputs, infrastructure or consumer markets. However, there are also remarkable similarities across countries.

Investment in software development is targeted across the board (see Chart 2.14). Most higher-income economies (including EU member states in the EBRD regions) also emphasise digital services, sectors requiring large amounts of research and development (R&D) and the green economy. In contrast, other economies in the EBRD regions remain focused on the automotive sector, transport equipment, other manufacturing industries, agriculture and food processing.

Picking the low-hanging fruit

While economies may target similar sectors, their ability to leverage shifts in global supply chains may depend on their existing skill-sets, technologies and business environments – which are, in turn, a reflection of the prevailing structure of production and exports. This section looks at economic opportunities for the EBRD regions in the context of the green transition on the basis of their exports to date. The analysis focuses on specific green transition sectors which saw growth in global exports of at least 25 per cent between 2012 and 2022: critical minerals (including platinum group metals), fuel cells, large-capacity batteries, and solar and wind power. (In contrast, growth in carbon capture, hydroelectric power, neodymium magnets and nuclear power fell short of the 25 per cent threshold.)

The analysis first identifies products where economies in the EBRD regions currently have a revealed comparative advantage (that is to say, products whose share of a country's exports exceeds their share of total international trade). For example, in 2022, lithium-ion batteries accounted for 2.4 per cent of Poland's total exports, but just 0.4 per cent of all international trade worldwide, so Poland has a revealed comparative advantage in exporting lithium-ion batteries.

[23] See, for instance, Silk Road Briefing (2023).
[24] See Harding and Javorcik (2011).

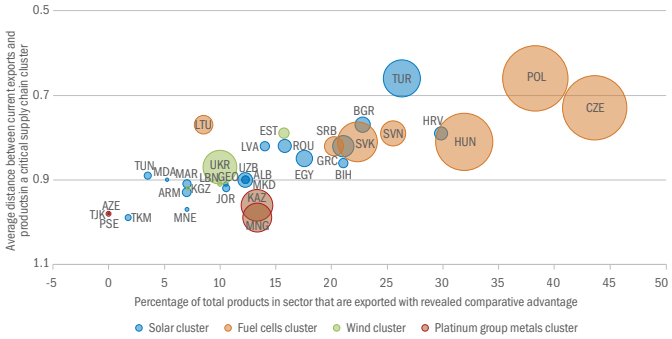
The analysis then assesses those products' proximity to the products that are needed to supply fast-growing green transition sectors. This proximity is measured in terms of the probability of product A being exported by a country (with a revealed comparative advantage) conditional on that country already exporting product B (and, conversely, the probability of a country exporting product B conditional on it already exporting product A). The higher the lower of those two probabilities is, the greater the proximity of the two products is considered to be (typically reflecting similar requirements in terms of technology, skills and other production inputs), and this is fixed globally. For example, the proximity score for transistors and diodes is around 0.8, while transistors and phosphorus have a score of 0 using this metric. In contrast, the "distance" between two products captures an individual country's ability to make a product in terms of technology, skills and other production inputs. A country that already exports transistors will find it easier to start producing diodes than phosphorus, for example.

If a product that a country has a revealed comparative advantage in is close to another product which is in a supply chain critical for the green transition, the country has a higher chance of successfully exporting that second product in the future, building on its existing production capabilities and leveraging the high level of global demand. With that in mind, the analysis presented in Chart 2.15 calculates the average distance between (i) the products that a country already produces and (ii) products in critical supply chain clusters (such as those related to fuel cells), plotting that distance (on the vertical axis) against the percentage of total products in the selected sector that the country currently exports with a revealed comparative advantage (on the horizontal axis).

This analysis suggests that, for the majority of countries, the most promising critical supply chain products to diversify into are those required by the solar power, fuel cell, wind power and platinum group metal sectors. The countries with the greatest potential can be found in the top-right corner of Chart 2.15. For example, Croatia already successfully exports 30 per cent of all critical supply chain products required by the solar power sector and its exports generally lie in reasonable proximity to the solar power sector. In the case of Türkiye, the distance between its existing revealed comparative advantages as an exporter and supply chain products required by the solar power sector is even smaller.

Fuel cell supply chains hold the greatest promise for the Czech Republic (which already exports 44 per cent of all products required by the fuel cell sector) and Poland (given that its existing exports lie in close proximity to that sector). Diversifying into products required by the wind power sector is the most promising option for Estonia, which has both the greatest average proximity to that sector and the largest established presence. Meanwhile, Kazakhstan and Mongolia have the most potential when it comes to platinum group metals (with most of the related products being raw materials).

CHART 2.15. Products required by the solar power and fuel cell sectors hold promise for many economies in the EBRD regions



Source: UN Comtrade and authors' calculations.
Note: The size of the circle is proportionate to the value of the economy's 2022 exports in the relevant sector in nominal thousand US dollars. The chart shows selected economies and clusters.

When it comes to the fastest-growing green energy sector – large-capacity batteries – opportunities for the EBRD regions are less clear-cut on the basis of existing export structures. Türkiye has the largest established presence in terms of exporting products required by that sector, while Poland's export structure is most compatible with an expansion into that sector based on existing know-how and capabilities.

Supply chains and carbon footprints

Global supply chains involve large carbon footprints – an issue that policymakers are increasingly conscious of. On average, the indirect (Scope 3) upstream emissions that are generated by a company's supply chains exceed its Scope 1 and 2 emissions (that is to say, those generated by the company's own production and energy consumption) by a factor of 11.[25] Those indirect emissions are, among other things, embodied in purchased goods (including their transport), outsourced back-office functions and commuting by company employees.

While supply chain decisions are based primarily on cost and the reliability of supply, they effectively involve outsourcing some of a firm's carbon emissions to foreign suppliers. In the case of US firms, that outsourced component's share of companies' total Scope 3 emissions has been rising over time.[26]

The disclosure of Scope 3 emissions may soon become a requirement under the EU's European Sustainability Reporting Standards (ESRSs), which were adopted on 31 July 2023. Moreover, the EU's proposed Corporate Sustainability Due Diligence Directive (CS3D) obliges firms to prepare and disclose

[25] See CDP (2023).
[26] See Dai et al. (2022).

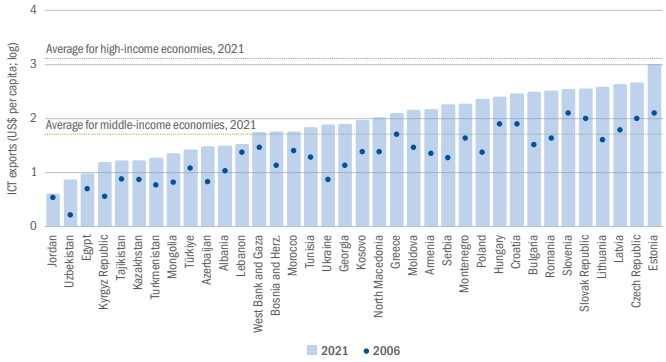
a transition plan demonstrating that their business model and strategy are compatible with the transition to a sustainable economy and limiting global warming to 1.5° C (see Box 2.7 for more details). In parallel, the US Securities and Exchange Commission (SEC) and the International Sustainability Standards Board (ISSB) have also proposed climate disclosure rules and standards.

The combination of those various standards may strengthen incentives for large firms to monitor and reduce emissions across the whole of their supply chains (see Box 2.8 on the greening of supply chains using sustainable supply chain finance for a discussion). The new emphasis on comprehensive reporting of embedded emissions may, in turn, lead to a review of outsourcing decisions. India, for example, has long been a preferred outsourcing destination for IT services owing to its low labour costs and its well-established software industry, but the associated emissions may prove to be large or hard to verify.

The potential reshaping of outsourcing with Scope 3 emissions in mind may present opportunities for other providers of services, from basic back-office processing of transactions to knowledge-intensive services. In the EBRD regions, exports of commercial ICT services per capita increased markedly between 2006 and 2021 (see Chart 2.16), rising more than fivefold in almost a third of economies. Despite that, those exports were still well below the level seen in India and the average for high-income economies.

In order to leverage the expansion and reshaping of cross-border exports of services, economies can invest in digitalisation and reduce administrative barriers to trade in services. Indeed, exports of commercial ICT services per capita tend to be higher in economies with less restrictive trade in services (as measured by an OECD index) and higher levels of digitalisation (including better digital infrastructure and more sophisticated regulations governing the provision of digital solutions and the use of digital technology by firms and individuals).[27]

CHART 2.16. Exports of commercial ICT services per capita increased in all EBRD economies between 2006 and 2021



Source: OECD-WTO Balanced Trade in Services (BaTIS) dataset and authors' calculations.

ON AVERAGE, THE EMISSIONS GENERATED BY A FIRM'S SUPPLY CHAIN EXCEED THE DIRECT EMISSIONS FROM THAT FIRM'S OPERATIONS BY A FACTOR OF

11

[27] See EBRD (2021) and OECD (2023).

Conclusion and policy implications

A successful transition to a green economy will require massive investment in clean energy and a wide range of critical raw materials. In many cases, China dominates the production and/or processing of those materials, as well as the manufacturing of intermediate inputs made from them, such as batteries. However, reserves of those minerals can also be found in other countries around the world, suggesting that there might be scope to diversify their supply as geopolitical tensions rise and the scramble for resources intensifies. That being said, new manufacturing facilities and – in particular – new mines will take many years to establish.

The EU and the United States, in particular, are working to reduce their dependence on China and other economies seen as strategic competitors by developing their own supply chains for critical raw materials. In the absence of sufficient reserves and/or production capacity for critical raw materials, economies may seek partnership agreements with countries that can supply them. The EU, for example, has already concluded partnerships with Canada, Kazakhstan, Namibia and Ukraine, and it is in negotiations with Argentina, Chile and the Democratic Republic of Congo.[28]

For mineral-rich countries seeking to leverage the opportunities afforded by the green transition, it is important to minimise the environmental, social and governance-related challenges that are associated with the mining and processing of critical raw materials. Legislation covering environmental and social standards for operations and due diligence reporting standards needs to be enforced, while signing up to the Extractive Industries Transparency Initiative can help to improve transparency and governance in the sector. Policymakers also need to pay due attention to the efficiency of planning and permit policies, while upholding adequate environmental standards.

At the same time as diversifying the supply of critical raw materials, policymakers can seek to manage demand through measures that accelerate improvements in technological efficiency (such as improved load factors for wind farms or shifts to cobalt- and nickel-free batteries). Such measures should include regulatory standards (for instance, rules favouring technologies with high levels of recycled content, or performance standards for new clean energy technologies, akin to fuel-efficiency standards for vehicles), as well as targeted inducements and R&D-related and economic incentives for recycling, such as cost-reflective land disposal fees. The EU's proposed Critical Raw Materials Act, for example, is aiming to have 15 per cent of total demand for certain metals met by recycled supply by 2030.

[28] See Banya (2023).

BOX 2.1.
Data on critical raw minerals

A novel database

This chapter constructs a novel database of critical raw materials (defined as those that are on the IEA's list or in the EU's proposed Critical Raw Materials Act) by combining (i) information on the location, ownership and reserves of 12,000 selected mines between 2013 and 2023 taken from S&P's SNL Metals & Mining database with (ii) country-level information on annual production of minerals between 2017 and 2021 taken from the Austrian Federal Ministry of Finance's World Mining Data (WMD) dataset and (iii) country-level data on reserves in 2022 taken from the US Geological Survey (USGS). Table 2.1.1 provides an overview of the data coverage.

The materials in the combined set are mapped to the critical mineral list. A mine can be mapped to more than one mineral. For example, "heavy mineral sands" in the S&P dataset of mines is mapped to zirconium, titanium, tungsten and rare earth elements, while in the country-level analysis, this mine is only counted once. Chromite and ferrochrome, on the other hand, are both mapped to chromium. The mapping is based on the primary commodity: a mine producing gold as the primary output and silver as the secondary output is considered to be a gold mine. The analysis also disregards closed or relinquished mines (which account for around 10 per cent of the total number); it also disregards mines where S&P was unable to obtain data for two years or more.

The owner of a mine is defined as the company that owns the largest equity share. The country of ownership is based on the location of the owner's headquarters. In the absence of equity shares, the first shareholder is considered to be the owner. Reserves are based on the most recent estimates/reports. Analysis of reserve ownership is based on S&P data, as other sources are not available.

Critical supply chain products

US Executive Order 14017 of 14 February 2021 was accompanied by a draft list of critical supply chains, with products defined on the basis of 8 or 10-digit HS codes and assigned to the critical minerals and materials, energy, ICT and public health sectors.[29] This chapter focuses on the first two sectors, which cover critical minerals, carbon capture, fuel cells, hydroelectric power, large-capacity batteries, neodymium magnets, nuclear power, platinum group metals, and solar and wind power.

Names of critical raw materials were manually assigned to relevant HS6 codes. For example, manganese ore (260200), manganese dioxide (282010), manganese articles, waste and scrap (811100), and bars and rods of silico-manganese steel (722820) were all classified as manganese. (Manganese

[29] See www.trade.gov/data-visualization/draft-list-critical-supply-chains (last accessed on 11 August 2023).

TABLE 2.1.1. Coverage of critical raw materials

	Listed by		Data available				Listed by		Data available		
Critical raw material	IEA	EU	S&P	USGS	WMD	Critical raw material	IEA	EU	S&P	USGS	WMD
Aluminium		✔	✔	✔	✔	**Rare earth elements (REEs)**	✔	✔	✔	✔	✔
Antimony		✔	✔	✔	✔	***Light REEs***		✔			
Arsenic	✔	✔		✔	✔	Cerium (Ce)		✔			
Baryte		✔		✔	✔	Lanthanum (La)		✔			
Beryllium		✔		✔	✔	Praseodymium (Pr)	✔	✔			
Bismuth		✔		✔	✔	Neodymium (Nd)	✔	✔			
Boron	✔	✔		✔	✔	Promethium (Pm)		✔			
Cadmium	✔			✔	✔	Europium (Eu)		✔			
Chromium	✔		✔	✔	✔	Gadolinium (Gd)		✔			
Cobalt	✔	✔	✔	✔	✔	Samarium (Sm)		✔			
Coking coal		✔			✔	***Heavy REEs***		✔			
Copper	✔	✔	✔	✔	✔	Dysprosium (Dy)	✔	✔			
Feldspar		✔		✔	✔	Terbium (Tb)	✔	✔			
Fluorspar		✔		✔	✔	Yttrium (Y)	✔	✔			
Gallium	✔	✔		✔	✔	Holmium (Ho)		✔			
Germanium	✔	✔		✔	✔	Erbium (Er)		✔			
Graphite	✔	✔[b]	✔	✔	✔	Thulium (Tm)		✔			
Hafnium	✔	✔		✔		Ytterbium (Yb)		✔			
Helium		✔		✔		Lutetium (Lu)		✔			
Indium	✔			✔	✔	Scandium (Sc)		✔	✔	✔	
Lead	✔		✔	✔	✔	Selenium	✔			✔	✔
Lithium	✔	✔	✔	✔	✔	Silicon	✔	✔[c]		✔	✔
Magnesium	✔	✔		✔	✔	Silver	✔		✔	✔	✔
Manganese	✔	✔	✔	✔	✔	Strontium		✔		✔	
Molybdenum	✔		✔	✔	✔	Tantalum	✔	✔	✔	✔	✔
Nickel	✔	✔[a]	✔	✔	✔	Tellurium	✔			✔	✔
Niobium	✔	✔	✔	✔	✔	Tin	✔		✔	✔	✔
Phosphorus		✔	✔	✔	✔	Titanium	✔	✔[c]	✔	✔	✔
Platinum group metals		✔	✔	✔	✔	Tungsten	✔	✔	✔	✔	✔
Platinum (Pt)	✔	✔				Vanadium	✔	✔	✔	✔	✔
Iridium (Ir)	✔	✔				Zinc	✔		✔	✔	✔
Palladium (Pd)		✔				Zirconium	✔		✔	✔	✔
Rhodium (Rh)		✔									
Ruthenium (Ru)		✔									
Osmium (Os)		✔									

Source: IEA (2021), European Commission (2023), S&P, US Geological Survey (2023) and World Mining Data dataset.
Note: [a] – battery grade, [b] – natural graphite, [c] – metal.

dioxide, for instance, is also used as a cathode in the production of lithium-ion batteries.) For the analysis of mines, minerals were, in turn, mapped to the subset of HS6 codes that is closest to mined ores (for example, 260200 in the case of manganese and 250410 and 250490 in the case of graphite).

BOX 2.2.

Critical supply chain products and friendshoring

This box focuses on relatively complex processed critical supply chain products (as opposed to raw materials) that experienced growth of at least 25 per cent in global exports between 2012 and 2022, with the total value of global trade exceeding US$ 500 million. Specifically, it examines a subset of those products where (i) Bloc 2 countries (those not geopolitically aligned with the West) account for more than 40 per cent of exports and (ii) Bloc 1 economies have the capabilities needed to manufacture those products and could prioritise an expansion of their production facilities as geopolitical tensions escalate.

For each of those products, the analysis identifies the top three exporters among Bloc 1 economies (see Table 2.2.1). For example, the Czech Republic is one of the top three exporters of certain computer parts and insulated electrical conductors, while Poland and Hungary are two of the top three exporters of lithium-ion accumulators, and Jordan is one of the top suppliers of inorganic acids (largely derived from minerals mined around the Dead Sea).

The analysis also identifies the three economies where existing export structures have the lowest average distance to the product in question (a group which may overlap with the top three exporters for that product). While those distance lists are dominated by the United States, Japan and larger economies in the EU, reflecting the diversified nature of their existing export bases, Poland is one of the economies that has the greatest potential to scale up exports of electrical machines and electrical static converters.

TABLE 2.2.1. Priority export products for Bloc 1 economies, the top three Bloc 1 exporters, and the three Bloc 1 economies that are best placed to start/expand production and exports of these products

HS code	Brief description	Top three exporters	Top three by distance
281119	Inorganic acids (other than hydrogen fluoride)	ISR **JOR** JPN	DEU ITA ESP
282690	Complex fluorine salts	KOR JPN USA	DEU ITA USA
284290	Salts of inorganic acids or peroxoacids (other than double or complex silicates)	KOR JPN USA	JPN DEU ITA
285390	Phosphides, rare gases and other inorganic compounds	JPN USA DEU	DEU ITA ESP
380110	Artificial graphite	JPN USA ESP	DEU ITA NLD
380190	Graphite	KOR DEU JPN	DEU ITA ESP
381800	Chemical elements doped for use in electronics	JPN USA KOR	DEU ITA ESP
392112	Plastics; polymers of vinyl chloride	USA DEU ITA	ESP FRA NLD
760900	Aluminium tube or pipe fittings	USA DEU ITA	FRA PRT NLD
841590	Air conditioning parts	USA **CZE** JPN	DEU ITA ESP
847150	Computer parts	USA **CZE** DEU	DEU ITA ESP
847180	Computer units	USA NLD DEU	DEU ITA ESP
850131	Electric motors (< 750w)	DEU JPN **HUN**	ITA ESP FRA
850440	Electrical static converters	DEU USA JPN	ITA ESP **POL**
850760	Lithium-ion accumulators	**POL HUN** DEU	DEU ITA ESP
853321	Electrical resistors for power (< 20w)	JPN DEU USA	ITA ESP USA
854110	Diodes (other than photosensitive or light-emitting diodes)	DEU JPN USA	ITA ESP USA
854129	Non-photosensitive transistors, dissipation (≥ 1w)	DEU JPN USA	ITA ESP USA
854141	Light-emitting diodes	JPN USA DEU	DEU ITA USA
854149	Photovoltaic cells/panels	JPN DEU USA	DEU ESP FRA
854151	Semiconductor-based transducers	DEU JPN ISR	ITA ESP USA
854231	Electronic integrated circuits: processors and controllers	USA KOR JPN	DEU ITA ESP
854232	Data storage	KOR JPN USA	DEU ITA USA
854233	Amplifiers	KOR USA JPN	DEU JPN ITA
854239	Electronic integrated circuits not included elsewhere	KOR JPN USA	DEU ITA ESP
854370	Other electrical machines and apparatus	USA DEU JPN	ITA ESP **POL**

Source: UN Comtrade annual data, Voeten (2013) and authors' calculations.
Note: See Box 2.1 for more details regarding critical supply chain products. Bloc 1 consists of countries that are more closely aligned with Western economies, while Bloc 2 contains the rest of the world.

BOX 2.3.

The hidden costs of pollution from mining

From excavation to transport and final processing, mining produces pollution, impacting local land, water and air quality. Exposure to air pollution, for example, has a detrimental effect on health through its impact on lung, heart and brain functionality, with babies even being affected in the womb.[30] This, in turn, can have negative long-term effects on people's labour productivity and earnings, as corroborated by a recent study looking at the long-term impact of pollution in the German Democratic Republic (GDR).[31]

In 1982, the GDR significantly increased its mining of lignite, following the abrupt discontinuation of its supply of cheap energy from the Soviet Union. Lignite ore cannot be transported cost-effectively over great distances, so it inevitably ends up being processed close to mines. Consequently, GDR districts located close to lignite mines were significantly more exposed to air pollution than districts located further away. Because freedom to change employers was severely curtailed under central planning, people living in mining areas were typically unable to respond to rising pollution by moving elsewhere. Freedom of movement then increased following the collapse of the Berlin Wall in 1989 and the reunification of Germany in 1990.

The analysis in Lubczyk and Waldinger (2023) focuses on individuals from the GDR who moved between German regions straight after the fall of the Berlin Wall and follows them over a 40-year period. In particular, it compares (i) individuals who moved to a certain destination post-reunification from a district located within 60 km of a lignite mine established after 1982 with (ii) individuals who moved to the same destination from other parts of the GDR. Other than being home to mines, the affected districts were similar to other parts of the GDR in terms of various regional characteristics.

That study finds that, up to four decades after the initial air pollution shock, individuals who had previously lived close to lignite mines experienced significantly worse labour market outcomes relative to those who had lived further away. On average, they earned 3 per cent less, spent four months less in employment and retired two months earlier. These effects alone add up to a cost in terms of social security payments which is equivalent to 1 per cent of the GDP of West Germany in 1989.

[30] See, for instance, Chay and Greenstone (2003).
[31] See Lubczyk and Waldinger (2023).

BOX 2.4.

Geopolitical tensions and invoicing currencies for international trade

International trade is often carried out using US dollars or – to a lesser extent – euros, including in situations where neither the producer nor the importer uses that currency as its local currency.[32] This has contributed to demand for US dollars and helped to put the currency in a highly privileged position, with low interest paid on US liabilities relative to the return on US dollar assets.[33]

Prior to March 2022, up to 80 per cent of Russia's imports were invoiced using those two currencies, with most of those imports coming from third countries (such as China) that were using the US dollar and the euro as "vehicle" currencies for trade (see Chart 2.4.1). Historically, the percentages of total trade that were denominated in the various currencies were fairly stable.

However, after Russia's invasion of Ukraine in February 2022, the United States, the EU and a number of other advanced economies imposed economic sanctions on Russia, which covered imports and exports of a wide range of goods, certain types of investment, the provision of financial services, and transactions involving a wide range of companies and individuals. Following the imposition of economic sanctions, more of Russia's imports began to be invoiced using the Chinese yuan (see Chart 2.4.1).

By the end of 2022, invoices in Chinese yuan accounted for 20 per cent of Russia's imports, up from just 3 per cent a year earlier, while the combined share of the US dollar and the euro fell to 67 per cent. Only part of this shift reflected the fall in exports from sanctioning economies and the growth in trade with China.[34] Indeed, by the end of 2022, yuan-denominated invoices accounted for 63 per cent of imports from China, up from 23 per cent a year earlier, with China's currency having displaced the US dollar (as well as the Russian rouble) as the currency of choice for such trade.

In trade with third countries (that is to say, countries that do not have the US dollar, the euro or the yuan as their national currency), the yuan's share of imports rose from 1.2 per cent to 4.2 per cent over the same period. Use of the yuan as a vehicle currency increased significantly more rapidly for trading partners that have an active currency swap line with the People's Bank of China (such as Mongolia and Tajikistan).[35] Such swap lines aim to promote trade and investment and make it easier for an exporter to make use of yuan received from a Russian importer.[36] However, the effect that swap lines have on use of the yuan can be seen only for third countries that have not imposed economic sanctions on Russia.

[32] See Gopinath and Stein (2021).
[33] See Gourinchas et al. (2010).
[34] See Chupilkin et al. (2023b).
[35] See the analysis in Chupilkin et al. (2023a).
[36] See Bahaj and Reis (2023).

BOX 2.4.

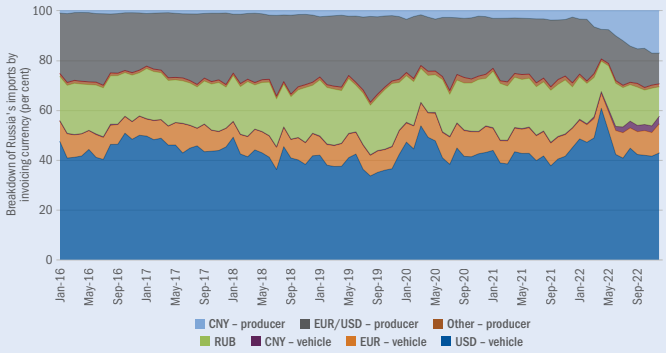
Geopolitical tensions and invoicing currencies for international trade

(Continued)

Use of the currencies of other exporters that have not imposed economic sanctions on Russia, such as the Turkish lira and the Indian rupee, has also increased, albeit such use has remained much more limited overall. For instance, rupee-denominated trade accounted for 12.5 per cent of India's exports to Russia in the fourth quarter of 2022, although this amounted to only 0.2 per cent of Russia's total imports.

This analysis covers only a relatively small percentage of international trade – the bilateral transactions of the 11th-largest economy in the world. However, it illustrates a broader point: rising geopolitical tensions, and the use of trade sanctions in particular, may reduce the attractiveness of the US dollar as a vehicle currency in international trade and facilitate the rise of new vehicle currencies, as well as greater use of producers' or importers' currencies for the settling of trades. This, in turn, could lead to greater fragmentation of global payment systems.

CHART 2.4.1 Use of the Chinese yuan as an invoicing currency in Russia's trade with China and third countries has increased since March 2022



Source: Chupilkin et al. (2023a).
Note: Shares are calculated on the basis of volumes of transactions expressed in US dollars at market exchange rates.

BOX 2.5.

Changing patterns in Türkiye's exports to Russia

By now, it is well established that the invasion of Ukraine has led to significant changes in Russian trade.[37] In particular, Russian imports from sanctioning countries have been replaced by imports from other countries. Thanks to its proximity to Russia and the already strong trade links between the two countries, Türkiye's share of Russian imports increased significantly following Russia's invasion of Ukraine. Relative to their value in January 2022, Turkish exports to Russia increased by an average of 69 per cent between February 2022 and February 2023 (in seasonally adjusted terms), compared with increases of 40 per cent for exports to other members of the Eurasian Economic Union and 9 per cent for exports to other countries.

This box uses detailed monthly Turkstat data on Turkish exports at the level of destination countries and six-digit HS product codes to investigate the channels through which international trade has responded to the Russian invasion of Ukraine.[38] The data used for this empirical analysis are broken down by payment method (open account, cash in advance, letter of credit or documentary collection) and invoicing currency (such as the US dollar, the euro or the Turkish lira). These unique additional dimensions allow us to look at the trade-offs faced by Turkish exporters to Russia during a period characterised by heightened risks.

The empirical analysis estimates the differential change in Turkish exports to Russia relative to exports to other destination countries following the invasion of Ukraine in February 2022, taking into account time-varying product-specific demand and time-invariant factors that determine product-country-level Turkish exports. The relative change in export-related outcomes for Russia is estimated on a monthly basis for a 26-month period starting in January 2021, with January 2022 being the base period.

The results suggest that the rise observed in the total value of exports to Russia primarily reflects growth in volumes, rather than increases in the unit values of goods being shipped. Relative to other countries and its value in January 2022, the typical value of monthly product-level Turkish exports to Russia increased by an average of 105 percentage points following the start of the war, 77 per cent of which was due to growth in volumes. The remaining 23 per cent is explained by higher unit values.

[37] See, for example, Chupilkin et al. (2023b) and Steinbach (2023).
[38] The analysis in this box is based on Demir and Javorcik (2023).

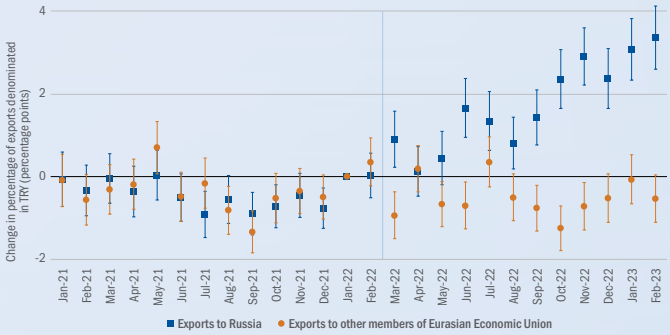
In the face of increased payment and currency-related risks owing to the war, Turkish exporters have not only adjusted their prices, but also reconsidered their payment methods for Russian importers. In particular, the heightened risks have led to a shift towards payment on cash-in-advance terms – the safest payment method for exporters, since it places all of the risks associated with an international trade transaction on the importer's shoulders. In 2021, three-quarters of Turkish exports to Russia were on open account terms (with trades needing to be settled within a certain time frame). That fell to about 65 per cent after the invasion of Ukraine – a decline that was almost completely matched by an increase in the percentage of payments made on cash-in-advance terms. Similar – albeit more limited – substitution (totalling about 6 percentage points) was observed for Turkish exports to other members of the Eurasian Economic Union.

In conclusion, price changes and adjustments to payment terms have both been used to counter the increased risks of exporting to Russia, with exporters typically choosing either one or the other. About half of the total value adjustment seen for Turkish exports to Russia following the invasion is explained by unit prices for exports on open account terms (the riskiest method of payment for exporters), and less than 8 per cent is explained by unit prices for exports on cash-in-advance terms (the safest method for exporters).

Another significant issue faced by firms that engage in international trade is currency risk. The volatility of the rouble's exchange rates has increased since the start of the war. As a result, the percentage of exports to Russia that are denominated in Turkish lira has increased by around 2.3 percentage points (see Chart 2.5.1).

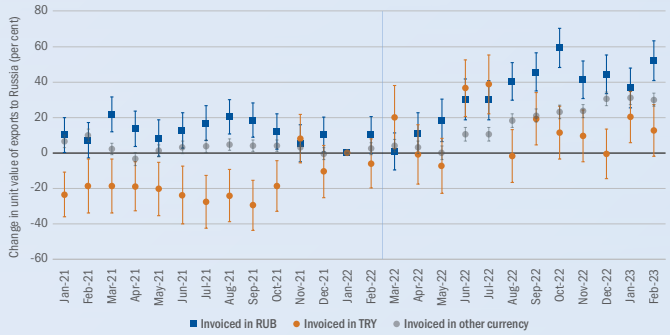
At the same time, in order to compensate for increases in currency risk, Turkish exports to Russia that are denominated in roubles now have a higher price premium (see Chart 2.5.2). Increases in the prices of exports explain less than 40 per cent of growth in the total value of lira-denominated trade, but almost 85 per cent of growth in the total value of rouble-denominated trade.

CHART 2.5.1. The percentage of Turkish exports to Russia that are denominated in Turkish lira has increased since February 2022



Source: Turkstat and authors' calculations.
Note: This chart shows the coefficients that are derived from a linear model regressing the average logarithm of the volume of Türkiye's exports by destination, month, HS6 product group and terms of contract on product-month and product-importer fixed effects and interaction terms combining dummy variables for each month with the variable of interest. January 2022 is the base period. 90 per cent confidence intervals are shown.

CHART 2.5.2. To compensate for the increase in currency risk, Turkish exports to Russia that are denominated in roubles now have a higher price premium



Source: Turkstat and authors' calculations.
Note: This chart shows the coefficients that are derived from a linear model regressing the average logarithm of the unit values of Türkiye's exports by destination, month, HS6 product group and terms of contract on product-month and product-importer fixed effects and interaction terms combining dummy variables for each month with the variable of interest. January 2022 is the base period. 90 per cent confidence intervals are shown.

BOX 2.6.

The activities of IPAs in Egypt and Morocco

Many SEMED economies have sought to strengthen their investment promotion policies in recent years, recognising that foreign investment can play an important role in driving employment creation, the transfer of technology and skills, and the upgrading of exports.

For example, Morocco has become a major automotive manufacturing hub, with strong integration into global value chains. Building on the legacy of the state-owned Moroccan Society of Automotive Construction, which was established in the 1960s, Renault and Peugeot (PSA) set up a series of automotive production facilities in 2012 and 2019 respectively, taking advantage of Morocco's relative economic and political stability, its proximity to Europe and its lower labour costs relative to central and eastern Europe.

Morocco's Agency for the Promotion of Investment and Exports, which was created in 2017, sought to foster a consensus across government entities that the automotive value chain should be prioritised by attracting and accommodating key global manufacturers. With that in mind, it developed a package of incentives focusing on access to local labour. The Moroccan government committed to covering the cost of recruiting employees for greenfield production facilities and established a specialist training facility (the Institut de Formation aux Métiers de l'Industrie Automobile), with the training curriculum being determined in close cooperation with firms and leveraging technical assistance from international partners such as the EBRD.

The automotive sector accounted for around a third of Morocco's manufacturing FDI between 2013 and 2018 (a total of US$ 2.6 billion), while the sector's exports increased from US$ 14 billion in 2007 to US$ 41 billion in 2022. While foreign inputs continue to account for a large percentage of the value-added content of exports, domestic content has increased over time. By 2026, Morocco expects to be using 15 per cent of its production capacity for the manufacture of electric vehicles.

Egypt, meanwhile, established its General Authority for Investment and Free Zones (GAFI) many years earlier (in 1971), tasking it with promoting investment, managing special zones, and supporting entrepreneurship and innovation. Between 2010 and 2015, Egypt saw a decline in foreign investment-driven manufacturing. Recent efforts to reverse that decline have focused on (i) improving the business environment for investors in the Suez Canal Economic Zone, with technical assistance from international partners such as the EBRD, and (ii) establishing a manufacturing hub for green hydrogen in that area. Administrative formalities have been streamlined with the introduction of a one-stop shop, and work on the digitalisation of investor services is ongoing.

BOX 2.7.

Legislative and voluntary initiatives aimed at improving due diligence for supply chains

Identifying and addressing risks relating to adverse environmental impacts and human rights abuses in global supply chains is challenging for firms. However, it is increasingly becoming a necessity, with mandatory due diligence and disclosure legislation being introduced across jurisdictions. In February 2022, the European Commission published a proposal for a Corporate Sustainability Due Diligence Directive, seeking to harmonise existing legislation following the adoption of national legislative instruments such as Germany's Supply Chain Due Diligence Law and France's Duty of Vigilance Act.

The proposed CS3D requires companies to address any adverse impact that their operations have on human rights and the environment, including by conducting proper due diligence on human rights and environmental risks arising from their supply chains and the operations of their subsidiaries. The scope of the CS3D's application in terms of company size and sector coverage has yet to be agreed. This is being discussed by the European Commission, the European Parliament and the Council of the European Union in the context of "trilogue" negotiations.

Meanwhile, due diligence obligations in respect of certain specific raw materials are set out in other EU instruments. For example, the Conflict Minerals Regulation (Regulation (EU)2017/821) requires EU importers that are buying tin, tantalum, tungsten and their ores from conflict-affected or high-risk areas to undertake supply chain due diligence and arrange independent third-party audits to verify the fulfilment of disclosure obligations. Furthermore, the new Batteries Regulation (Regulation (EU) 2023/1542) requires companies of a certain size which are selling batteries above a certain capacity to establish due diligence policies that check for actual and potential environmental and human rights issues in their supply chains, including as regards four critical materials for battery production: cobalt, natural graphite, lithium and nickel.

The EU's supply chain due diligence legislation will complement and strengthen its corporate sustainability disclosure framework. The CS3D's sustainability-related due diligence obligations, combined with the reporting obligations under the Corporate Sustainability Reporting Directive (CSRD; Directive (EU) 2022/2464), are designed to provide detailed sustainability-related information on supply chains. The CSRD applies to both EU and non-EU companies with employment and turnover above certain thresholds. Companies within its scope must comply with mandatory reporting requirements for environmental, social and governance-related matters under the European Sustainability Reporting Standards (ESRS) adopted in July 2023.

Under the ESRS, the identification and assessment of a company's sustainability-related risks, impacts and opportunities must cover its supply chain. This is in line with the IFRS Sustainability Disclosure Standards that were published by the ISSB in June 2023. Those IFRS standards require disclosure of the risks and opportunities that are material to a company's financial position.

In practice, supply chain due diligence and sustainability reporting requirements entail significant legal obligations and costs. Strong internal governance and operational arrangements will be critical if firms are to deliver on these requirements.

The Corporate Climate Governance (CCG) facility established by the EBRD aims to help its clients to assess and manage climate-related and other sustainability-related risks and opportunities by enhancing their governance arrangements, strategy, disclosure practices and risk management policies. For example, building on technical assistance provided by the EBRD, ofi (a major food and agribusiness company) is working towards improving the resilience of Turkish hazelnut farms in its supply chains in the face of climate change, including by providing new suppliers with training on sustainable agricultural practices.

BOX 2.8.

Greening of supply chains

Sustainable supply chain finance can be an effective tool when it comes to greening the supply chains of large firms. It offers technical assistance and incentive payments to small and medium-sized suppliers that meet sustainability-related targets, including targets pertaining to emissions. This box looks at how sustainable supply chain finance works using the example of Metso Oyj (Metso), a company providing mining equipment and services.

Having signed up to targets under the Science Based Targets initiative, Metso has expanded its decarbonisation efforts to encompass its supply chain and is participating in a sustainable supply chain finance programme designed by Citibank and the EBRD. Under that programme, selected suppliers of Metso in Türkiye which commit to science-based targets will become eligible for a discount on the cost of supply chain finance offered by Citibank. Supply chain finance involves a bank extending – for a fee – advance funds to a company against future payments due to be received from off-takers of the company's products (in this case, Metso). The advantage of this scheme is that the bank has recourse to a larger firm with a better credit rating, rather than small and medium-sized enterprises (SMEs) in the relevant supply chain.

Participants in the programme are offered donor-funded incentive payments administered by the EBRD, which are conditional on the achievement of certain outcomes (such as reductions in greenhouse gas emissions). The EBRD also provides technical assistance to suppliers to help them develop expertise in the area of environmental practices. That assistance starts with an energy-efficiency audit, which includes a baseline assessment of a supplier's Scope 1, Scope 2 and, if agreed, Scope 3 emissions, as well as recommending improvements to the firm's environmental practices. On the basis of those recommendations, an energy-efficiency investment plan assesses opportunities for improving energy efficiency and the associated investment needs. Consultants also carry out monitoring and verification of suppliers' performance against the agreed outcomes.

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LABOUR MARKETS IN THE GREEN ECONOMY

People living in the EBRD regions tend to be aware of climate change and its consequences. However, that does not necessarily translate into a willingness to pay higher taxes or forgo economic growth and job creation in order to prioritise environmental policies. Economic history emphasises the importance of labour market adjustments during major economic transformations, offering insights for the transition to a green economy. Despite increasing demand for green skills, labour market adaptation remains sluggish across the EBRD regions, partly reflecting the slow pace of green innovation. In order to maintain public backing for climate action, it is vital to ensure a just transition process and address the economic concerns of vulnerable groups.

Introduction

Public support for environmental policies depends not only on their ecological benefits, but also on their perceived economic implications. This chapter documents people's attitudes towards climate change across the EBRD regions and provides in-depth analysis of what the transition to a green economy means for labour markets.

Overall, people living in the EBRD regions recognise that climate change is real and has serious consequences. However, those beliefs do not necessarily translate into a willingness to pay higher taxes or forgo economic growth and job creation in order to prioritise environmental policies. Unwillingness to support green policies tends to be greater among the socio-economic groups that are most vulnerable to such changes, including those in the bottom half of the income distribution and the less educated. It is essential that the green transition – the transition to a less

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carbon-intensive economy – is fair and benefits most members of society, in order to maintain public support for achieving net-zero greenhouse gas emissions.

Major economic transitions of the past, such as the roll-out of digital technologies, the globalisation of trade and investment, and the phasing-out of coal, have three main implications for the green transition.[1] First, such transitions entail a reallocation of employment across sectors and industries, as well as a transformation of job requirements. Second, they create substantial opportunities and benefits for workers, accompanied by new risks. And third, their impact varies across geographical areas and demographic groups, which can potentially exacerbate existing disparities.

The green transition cannot take place without an adequately skilled workforce that is able to satisfy the demands of a greener economy. New types of job will emerge as households and producers adopt greener technologies. Demand for workers with green skills is already on the rise, and this chapter documents a wage premium of 4 per cent for such workers. However, that green premium accrues disproportionately to highly skilled workers and less to individuals who are more likely to be climate sceptics.

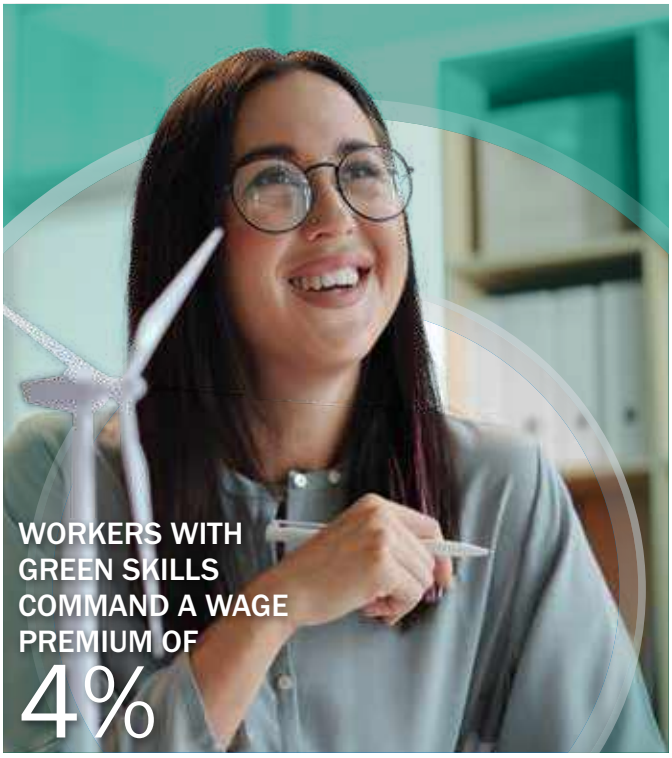
When faced with technological change, businesses often look to replace workers with machines as they adopt new technologies, a phenomenon known as "labour substitution". This chapter finds that green innovation generally involves less labour substitution than other types of innovation, but that this is not necessarily the case in the EBRD regions.

Despite the wage premium that green jobs command, workers' ability to move from "brown" (in other words, polluting) industries to greener sectors remains limited, partly reflecting the inelastic supply of newly required skills in the short term. At the same time, green policies affect different areas and different labour market segments in different ways, potentially upending local labour markets. For instance, the loss of existing jobs in sectors that are associated with the highest emissions (such as the extraction of fossil fuels) is likely to be concentrated in specific regions.

With that in mind, policymakers need to combine localised short-term income support with sector specific long-term workforce development to facilitate labour market adjustments. Labour market programmes that focus on retraining and upskilling can help to ensure that the transition to a greener economy is fair and enjoys broad support, as can regional development initiatives.

Attitudes towards the green economy

With a few exceptions, countries around the world have committed to achieving the climate goals set out in the Paris Agreement. For those goals to be achievable, they must enjoy broad support among citizens. This section uses data from the most recent wave of the Life in Transition Survey (LiTS IV), conducted in 2022 and 2023 by the EBRD and the World Bank, to explore people's attitudes towards climate policies and map out the level of support for green action at present. As part of that survey, respondents were asked about their beliefs regarding climate change and its consequences. Participants were also asked whether they would prioritise the environment at the expense of economic growth and jobs, and whether they would be willing to pay higher taxes in order to fund policies that addressed climate change and its effects.



[1] See OECD (2023).

CHART 3.1. Attitudes towards green issues vary from country to country

	AVERAGE	Climate change will seriously affect me during my lifetime	Climate change will seriously affect the children of today	Climate change is real	Concerned about air pollution	Concerned about lack of action on climate change	Concerned about loss of biodiversity	Concerned about natural disasters/extreme weather	Concerned about rising temperatures	Concerned about spread of disease	Concerned about waste disposal	In favour of climate refugees arriving in country	Would prioritise environment over growth/jobs	Would pay more tax to fight global warming	Would pay more tax to prevent biodiversity loss	Would pay more tax to reduce/prevent pollution
Moldova	74	86	91	79	84	74	85	90	87	94	88	49	56	45	48	52
Tunisia	73	86	94	70	70	61	75	85	86	94	83	74	41	49	56	64
Kyrgyz Republic	72	75	85	77	87	59	81	84	84	91	86	38	54	58	62	66
Mongolia	71	66	71	72	88	65	78	83	76	88	84	35	51	64	67	75
Armenia	71	78	84	73	85	47	80	88	73	90	84	62	47	53	58	61
Morocco	71	84	87	81	78	69	78	85	81	90	76	78	57	35	38	43
Azerbaijan	70	63	60	66	83	52	82	87	74	92	79	63	47	63	72	69
Albania	70	83	91	68	77	63	71	85	80	91	79	78	39	47	48	52
Kosovo	69	80	86	62	76	58	71	78	69	83	71	70	53	57	60	67
Uzbekistan	67	66	71	63	88	46	83	88	88	90	83	28	41	58	58	58
Tajikistan	66	66	75	64	71	52	69	74	75	77	65	47	44	67	71	73
est Bank and Gaza	66	80	91	75	73	45	67	69	75	93	80	58	44	40	45	50
Georgia	65	76	81	80	78	53	68	76	72	89	64	46	41	44	50	52
Slovenia	64	66	92	73	68	71	71	75	74	72	76	50	65	36	40	39
Türkiye	64	66	71	59	74	52	72	83	75	82	67	55	43	50	52	53
Greece	63	74	87	66	71	68	73	86	80	87	68	50	47	31	31	30
Kazakhstan	62	61	73	66	80	40	76	82	76	88	76	42	47	37	40	43
Serbia	61	65	83	57	76	54	71	76	75	78	70	51	49	32	37	39
Croatia	61	61	83	74	61	56	70	76	69	71	62	65	46	37	42	39
Jordan	59	75	88	69	58	41	59	68	69	85	67	63	37	30	38	37
Hungary	58	63	87	70	64	48	69	67	72	62	63	40	45	40	43	41
Romania	58	58	67	62	69	52	63	75	65	74	65	56	39	42	38	41
Poland	57	52	69	69	71	58	61	65	63	68	57	47	38	43	46	47
Algeria	57	72	81	55	68	25	64	72	69	81	63	44	41	35	39	40
Russia	56	50	65	61	76	36	73	73	60	85	77	42	46	23	32	35
North Macedonia	56	68	75	39	75	46	67	76	73	81	68	49	28	25	31	32
Bulgaria	54	51	73	53	64	50	58	77	62	85	67	59	37	24	25	28
Lebanon	53	60	66	54	74	40	44	57	59	89	78	54	44	23	24	36
Slovak Republic	50	51	73	54	61	42	62	70	66	74	62	38	39	18	19	19
Montenegro	49	51	64	52	60	39	53	55	52	70	54	49	45	25	32	30
Latvia	47	35	66	55	58	36	54	61	52	76	63	48	30	19	24	28
Bosnia and Herz.	47	50	66	61	54	40	43	61	46	62	45	52	30	25	28	34
Belarus	45	52	65	57	54	26	41	47	47	70	44	43	42	22	25	34
Czech Republic	40	37	58	50	36	31	49	47	39	43	43	37	35	26	36	31
Estonia	39	26	61	60	34	30	51	34	27	55	42	48	43	18	30	29
Germany	38	36	62	53	30	43	45	40	47	30	31	33	43	25	27	23
Lithuania	27	35	42	44	24	25	19	25	27	50	23	49	12	7	7	11
AVERAGE	59	62	75	63	67	48	65	71	67	78	66	51	43	37	41	43

Beliefs, concerns and willingness to act

Source: LiTS IV and authors' calculations.
Note: This chart shows the percentages of survey respondents who "agree" or "strongly agree" with each statement.

CHART 3.2. Twenty-nine per cent of respondents are disengaged – concerned about climate change, yet unwilling to fund green policies

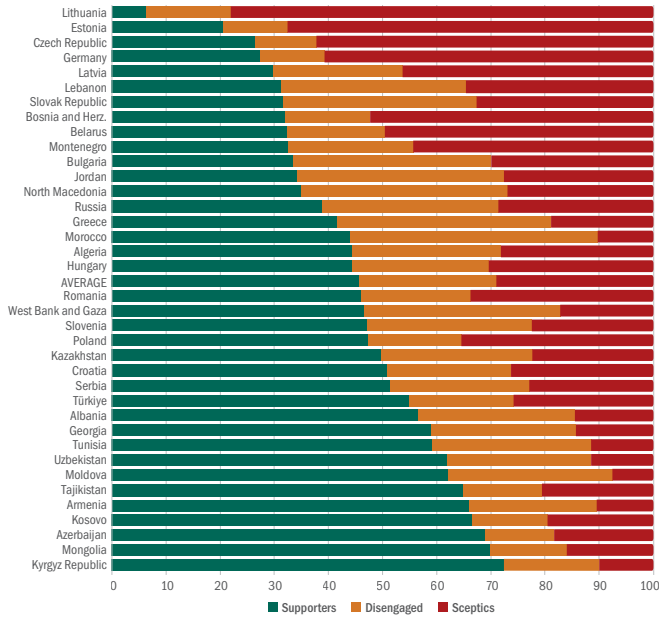
Beliefs, concerns and willingness to act	All	Supporters	Sceptics	Disengaged
Percentage of respondents	100	46	25	29
Climate change will seriously affect me during my lifetime	62	86	29	79
Climate change will seriously affect the children of today	75	94	47	92
Climate change is real	63	82	39	74
Concerned about air pollution	67	90	21	85
Concerned about lack of action on climate change	48	73	21	55
Concerned about loss of biodiversity	65	88	24	78
Concerned about natural disasters/extreme weather	71	92	24	90
Concerned about rising temperatures	67	88	19	85
Concerned about spread of disease	78	93	36	92
Concerned about waste disposal	66	88	24	83
In favour of climate refugees arriving in country	51	61	39	48
Would prioritise environment over growth/jobs	43	62	26	42
Would pay more tax to fight global warming	37	73	14	1
Would pay more tax to prevent biodiversity loss	41	77	19	4
Would pay more tax to reduce/prevent pollution	43	80	21	5

Source: LiTS IV and authors' calculations.
Note: This chart shows the percentages of respondents within each group who "agree" or "strongly agree" with each statement, with those groups being identified using a k-means algorithm. The three groups – "supporters", "sceptics" and "disengaged" – are mutually exclusive clusters of individuals across the EBRD regions who have been grouped together on the basis of their responses to a set of questions about their beliefs, concerns and willingness to act on climate change.

In most of the economies surveyed, a large percentage of respondents either agree or strongly agree that climate change is real and are concerned about its consequences (see Chart 3.1). All in all, 63 per cent of surveyed individuals believe that "climate change is real", with 75 per cent of them believing that "climate change will seriously affect the children of today". Although figures vary across economies, roughly two-thirds of the people surveyed are concerned about air pollution, the loss of biodiversity, natural disasters and extreme weather, rising temperatures, the spread of disease and environmental pollution. Around half of all respondents are also concerned about a lack of action on climate change.

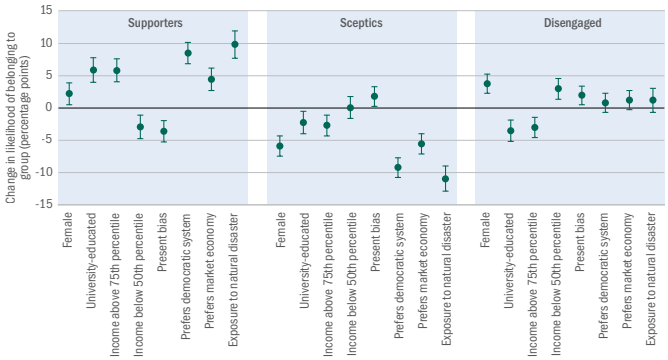
Although there is broad recognition that the consequences of climate change are severe, willingness to bear the economic cost of the green transition is significantly lower across much of the EBRD regions. For instance, only 43 per cent of surveyed individuals would prioritise the environment at the expense of economic growth and jobs, while between 37 and 43 per cent would pay more tax in order to fight global warming, prevent biodiversity loss or reduce/prevent pollution. In order to take a more detailed look at the tension between people's beliefs about the environment and their willingness to pay for green policies, an unsupervised machine learning algorithm called "k-means clustering" can be used to identify groups of individuals with similar attitudes towards climate change and environmental issues. This cluster analysis reveals three distinct groups of respondents (see Chart 3.2).

CHART 3.3. When it comes to support for environmental policies, numbers of supporters, sceptics and disengaged people vary significantly across countries



Source: LiTS IV and authors' calculations.
Note: This chart shows the percentages of respondents in each country who fall into the three groups, with those groups being identified using a k-means algorithm. The three groups are mutually exclusive clusters of individuals who have been grouped together on the basis of their responses to a set of questions about their beliefs, concerns and willingness to act on climate change.

CHART 3.4. People are more likely to be disengaged if they are less educated or in the bottom half of the income distribution



Source: LiTS IV and authors' calculations.
Note: This chart shows the coefficients that are derived by regressing an individual's probability of being in a particular group on the personal characteristics listed on the horizontal axis. Each regression includes industry, occupation and country fixed effects. The 95 per cent confidence intervals shown are based on standard errors clustered at the country level.

The first group, "supporters" (accounting for 46 per cent of respondents), are concerned about climate change and are largely willing to pay for climate-related policies. The second group, "sceptics" (accounting for 25 per cent of respondents), are less convinced that climate change is a threat and are largely unwilling to pay climate-related taxes. The remaining 29 per cent of respondents are classified as "disengaged" (a group that can be regarded as inconsistent in the sense that 79 per cent of them agree that climate change will seriously affect them during their lifetime, but just 1 per cent are willing to pay more tax in order to fight global warming).

Numbers of disengaged individuals – those who are concerned about the environment, but unwilling to pay for climate policies – are highest in Morocco, Greece, North Macedonia and Jordan, where they account for between 38 and 45 per cent of total respondents (see Chart 3.3).

Regression analysis can then be used to estimate the likelihood of an individual belonging to one of those three groups given their sector of employment, occupation, level of education, income, country of residence and other characteristics. Chart 3.4 shows standardised estimates based on this analysis.

Environmental policies are more likely to be supported by people with a university education, those in the top quartile of the income distribution in their country, and those who prefer a democratic system and a market economy. Personal exposure to natural disasters is also associated with a greater likelihood of supporting climate policies. Climate scepticism is more likely to be found among men, individuals with no past exposure to a natural disaster, those with negative attitudes towards market economics or democracy, and those who attach more weight to present consumption than future consumption (with this "present bias" being inferred from survey questions asking whether an individual would prefer to receive (i) a guaranteed payment of a specific size today or (ii) a much larger guaranteed payment in a month's time).

People are more likely to be disengaged if they are less educated, are in the bottom half of the income distribution, are female, have personally experienced natural disasters and prefer market economics and democracy. Lower levels of income and education tend to distinguish this group from supporters, while personal experience of natural disasters and greater support for democracy tend to distinguish this group from sceptics.

Demand for skills and labour mobility

As consumers' preferences shift and producers switch to cleaner production methods, there will be a significant increase in demand for green jobs throughout the economy, from the use of environmentally friendly materials in construction and manufacturing to a focus on sustainability in supply chain management and urban planning. At the same time, organisations providing financial and other services will be seeking individuals who can navigate the complexities of environmental regulations, carbon markets and sustainable investment. These various jobs will require new skill-sets that many existing workers do not yet possess.

Defining "green" jobs

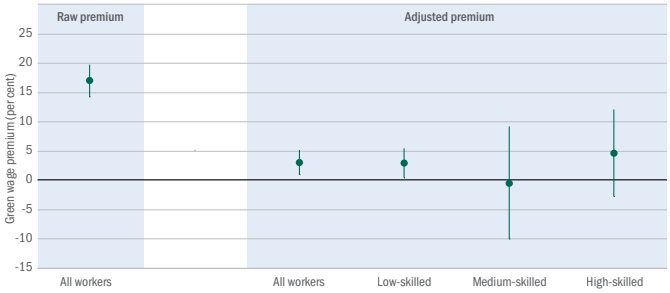
There is no universally accepted definition of what constitutes a "green" occupation or economic activity. While there are various different approaches that can be adopted, they typically fall into one of two main categories.

Top-down approaches classify jobs as green if they are in industries with low levels of emission intensity (in the bottom 20 per cent across all sectors, for instance). All jobs in the sector in question – renewable energy, for example – are considered green, regardless of the specific occupation or the level of skill content. Likewise, sectors can be classified as "brown" if they have high emissions per unit of value added.

In contrast, bottom-up approaches define green jobs on the basis of the skills or tasks involved, irrespective of the sectors that the jobs are in.[2] Every occupation is characterised by a mixture of tasks, with those related to the reduction of carbon emissions or improvements in environmental sustainability typically being classified as green. With this kind of approach, a solar energy engineer (a high-skill occupation) and a refuse truck driver (a low-skill occupation) will both be classified as green. These two types of approach complement each other.

In order to construct measures of the greenness of occupations, this section follows in the footsteps of recent literature by taking information on the task content of occupations from the US Department of Labor's O*NET database. First, the occupations reported by LiTS participants, which were provided as free-text answers, are matched to three-digit ISCO occupation codes. Then, each occupation is matched to the relevant eight-digit classification in O*NET, classifying it as green or non-green using an existing crosswalk.[3] Green occupations include physical and earth science professionals, recycling plant technicians and installers of electrical equipment, for example.

CHART 3.5. Green occupations command a wage premium



Source: LiTS IV and authors' calculations.
Note: This chart shows the estimates that are derived from regressing the logarithm of monthly income on a dummy variable indicating whether an individual has a green job, while controlling for the individual's gender, age (and age squared), level of education, skill level, years of work experience, hours worked, and sector and country fixed effects. The raw premium is the difference between mean wages.

Overall, around 27 per cent of LiTS respondents who are in work have green occupations on the basis of this classification. Similar percentages can be observed across the various economies participating in the survey.

Wage premium for green jobs

The transition to a green economy promises to introduce new high-skill and high-paying jobs, but it could also create low-wage or temporary positions in recycling, waste management or parts of the green manufacturing sector.

On average, workers with green jobs earn 17 per cent more than workers in other occupations (see Chart 3.5), with this wage differential being broadly consistent across the EBRD regions. However, those raw premia do not take account of other determinants of labour income, such as a worker's qualifications and experience. Regression analysis can be used to check

AROUND 27% OF EMPLOYED RESPONDENTS HAVE GREEN OCCUPATIONS

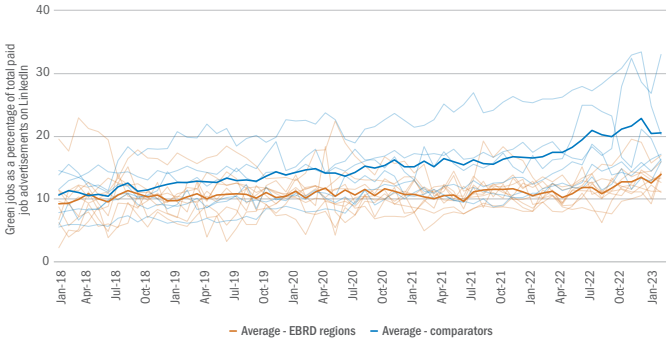
[2] See, for instance, Autor et al. (2022).
[3] See Sofroniou and Anderson (2021).

whether wages differ systematically between green jobs and other jobs, while controlling for an individual's sector of employment, country of residence and other characteristics.

When factors such as gender, age, education, skill level, years of work experience, hours worked, and sector and country of employment are considered, green jobs continue to command a wage premium, but at a much lower level of 4 per cent (see Chart 3.5). The difference between the raw premium and the adjusted premium suggests that, to a substantial extent, workers are sorted into green occupations on the basis of observable characteristics. The adjusted premium is larger for high skilled workers (at 5 per cent) than it is for low-skilled workers, while moderately skilled workers do not enjoy a green wage premium.

The green wage premium suggests that demand for green skills in the market exceeds the supply of workers with the requisite skills. The next section looks at demand for green skills across occupations, leveraging data from LinkedIn through the Development Data Partnership.

CHART 3.6. Green jobs have increased as a percentage of total paid job postings



Source: LinkedIn (via the Development Data Partnership) and authors' calculations.
Note: The pale lines indicate the ratios for individual economies. The figures for the EBRD regions cover Croatia, the Czech Republic, Estonia, Greece, Latvia, Lithuania, Poland, Romania, the Slovak Republic and Türkiye. The comparator countries are France, Germany, Italy, the United Kingdom and the United States.

Demand for green skills

The analysis in this section draws on the online activity of more than 200 million LinkedIn members across a number of economies in the EBRD regions where LinkedIn Economic Graph data are sufficiently representative of job vacancies, job to job transitions and job seekers' skills – plus France, Germany, Italy, the United Kingdom and the United States of America as comparators. Previous studies have shown that LinkedIn Economic Graph data do a good job of capturing an industry's employment share and employment growth; however, it is also worth noting that LinkedIn's coverage is skewed towards younger cohorts, women and individuals with a tertiary education.[4]

In the LinkedIn data, green jobs are defined as occupations that usually involve one or more green projects or are closely associated with green skills. In order to be defined as green, a project must include at least one green activity, such as pollution or waste prevention, energy management, generation of renewable energy, ecosystem management, sustainability education and research, environmental policy, sustainable procurement or environmental finance.[5] Green skills, in turn, capture the top skills of LinkedIn members whose work predominantly involves one or more green projects (as listed in those members' profiles).

Across the EBRD regions as a whole, green jobs accounted for 14 per cent of total paid job postings at the beginning of 2023, up from just under 9 per cent in 2018 (see Chart 3.6). In the advanced comparator economies, this ratio – a measure of demand for green skills – increased more rapidly, rising from 10 to 21 per cent on average over the same period.

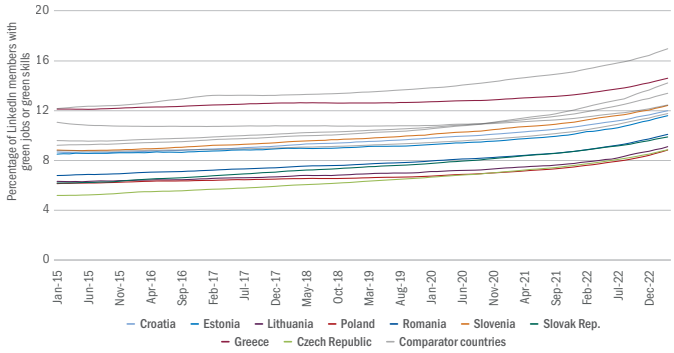
AROUND
10%
OF LINKEDIN MEMBERS IN THE EBRD REGIONS HAVE A GREEN OCCUPATION OR LIST GREEN SKILLS IN THEIR PROFILE

The fact that the EBRD regions have lower green jobs ratios than advanced economies may reflect the slower pace of their transition to net zero, as well as an insufficient supply of qualified individuals with green skills. According to LinkedIn data, the percentage of members in the EBRD regions who had a green occupation or listed green skills in their online profile stood at around 10 per cent in April 2023, below the average for the advanced economy comparators (see Chart 3.7). Within individual countries, the accumulation of green skills has accelerated somewhat over the past year, but it does not, overall, appear to have kept pace with the rise in demand.

In every economy, women are less likely to have a green occupation or list green skills in their online profile than men (see Chart 3.8). This may reflect the fact that women are under-represented in STEM jobs, which are particularly common in sectors such as renewable energy. Employment in the renewable energy sector is already estimated to account for half of total energy-related employment worldwide, and it is expected to grow rapidly as the transition to net zero accelerates.[6] Thus, the

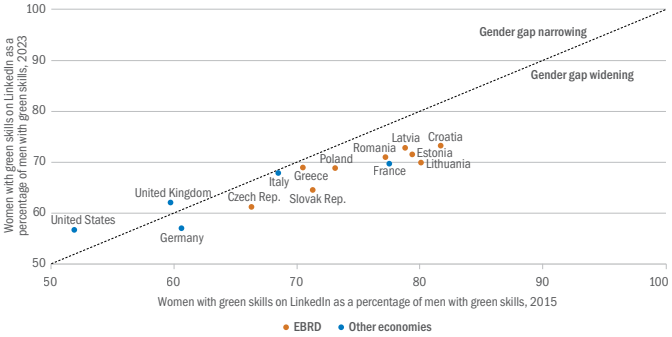
[4] See Zhu et al. (2018).
[5] There are 12 types of green activity in total, based on Dierdorff et al. (2009).
[6] See Box 1.1 and IEA (2022).

CHART 3.7. The percentage of LinkedIn members with green jobs or green skills has increased



Source: LinkedIn (via the Development Data Partnership) and authors' calculations.
Note: Green jobs are either (i) in a green occupation or (ii) associated with green skills. The grey lines denote the comparator countries France, Germany, Italy, the United Kingdom and the United States.

CHART 3.8. The gender gap is widening as the green transition progresses

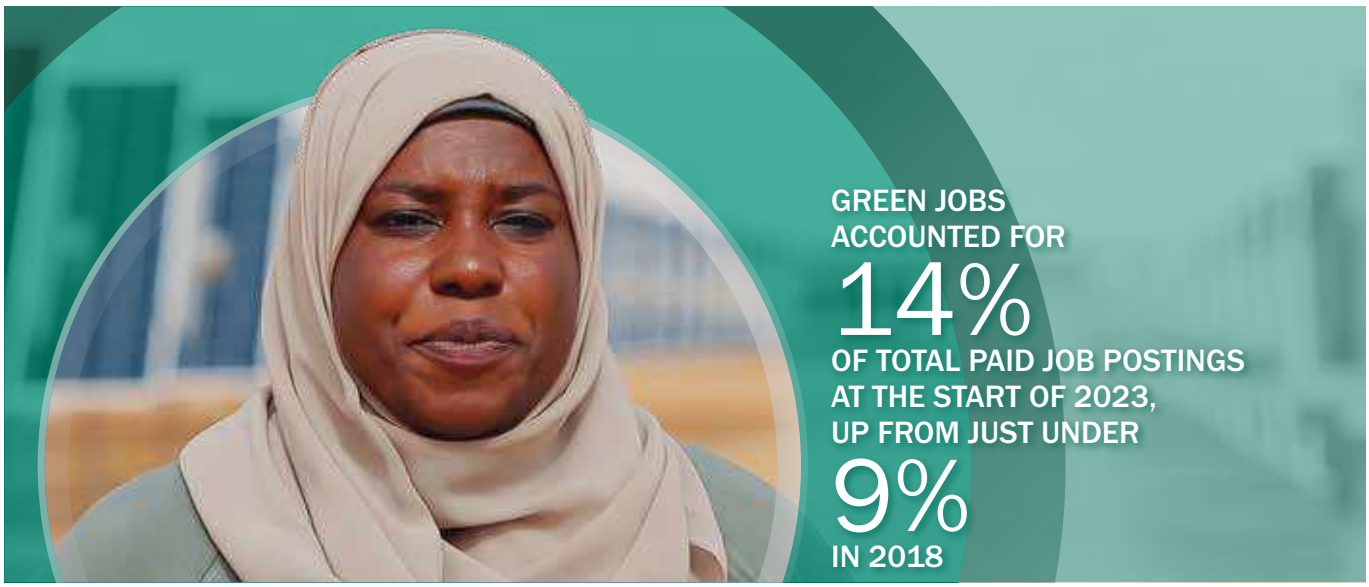


Source: LinkedIn (via the Development Data Partnership) and authors' calculations.
Note: LinkedIn members are considered to have green skills if (i) they explicitly list green skills in their profile or (ii) they have a green occupation.

emerging green economy gender gap has the potential to further widen the gender pay gap as the green transition progresses.

These results corroborate broader evidence for the OECD economies, where women are estimated to account for just 28 per cent of all jobs with green tasks.[7] The green economy gender gap is typically smaller in the EBRD regions than it is in advanced economies; however, that gap has widened since 2015.

Policy measures with the potential to arrest and reverse that trend include support for girls' engagement with STEM subjects in schools and career guidance after university. It should also be noted that while men are more likely to have green skills, as captured by LinkedIn data, they are also more likely to be employed in sectors that are home to disappearing brown jobs (that is to say, the sectors that may well end up bearing the brunt of job losses).[8]



[7] See OECD (2023).
[8] See ILO (2019).

Mobility across jobs

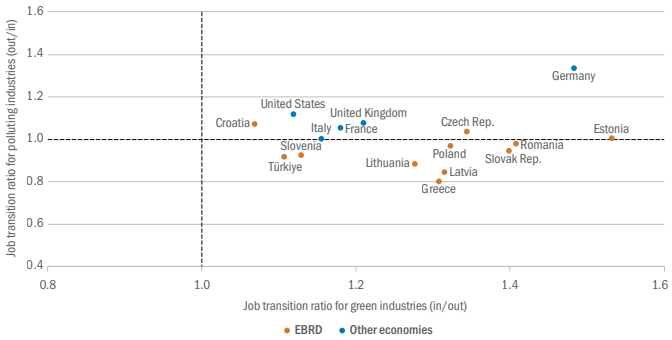
As societies and economies adopt more energy-efficient practices and green policies take effect, individuals working in carbon-intensive industries will experience dramatic changes to their jobs. While some industries will be able to transition to cleaner methods of production while maintaining their existing employment levels, others are likely to see jobs disappear. Such job losses may inflict particular pain on those regions that are most reliant on high-emission industries (see Box 3.1). Helping workers to move out of emission-intensive sectors and into other parts of the economy will therefore be an essential component of a just green transition.

Despite a substantial green wage premium in green sectors, mobility from brown to green sectors has been limited in the EBRD regions, as the analysis in this section shows. Green industries are defined as (i) those that support – directly or indirectly – the generation of renewable energy (for instance, solar, wind and hydroelectric power, or the manufacturing of PV cells), (ii) those with no direct carbon emissions (such as nuclear power), and (iii) those that administer environmental programmes and services. Brown industries are those that produce or support fossil fuels (including coal mining, oil extraction, and the use of fossil fuels to generate electrical power). Data on job-to-job transitions for LinkedIn members are used to document the net flow of workers into green and brown activities, which are classified on the basis of a top-down approach.

LinkedIn data indicate that there was a net flow of workers into green activities between 2015 and 2023 across all economies (that is to say, more workers moved into green industries than moved out of them; see Chart 3.9). Average net rates of transition into green activities were similar across the EBRD regions and advanced comparators, with the highest net transition rate being observed in Estonia. However, a net flow into polluting industries was also observed in the EBRD regions over that period. Thus, more workers found new employment in brown industries than left those industries. In advanced comparators, by contrast, more workers moved out of brown industries than moved into them (that is to say, there was a net outflow).

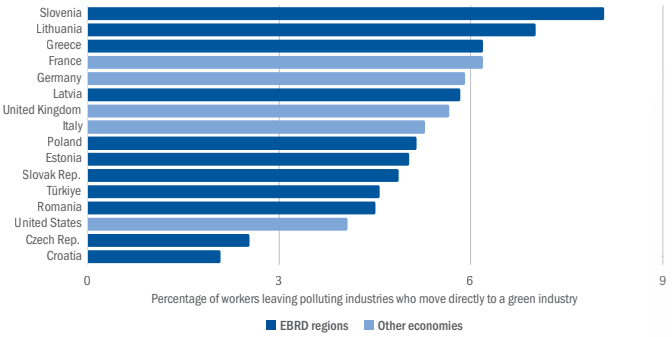
On average, only around 1 in 20 workers leaving a job in a brown industry immediately find employment in a green industry (see Chart 3.10). This transition rate is almost 1 in 10 in Slovenia, but as low as 1 in 50 in Croatia.

CHART 3.9. Between 2015 and 2023, more workers moved into green industries than moved out of them



Source: LinkedIn (via the Development Data Partnership) and authors' calculations.
Note: The vertical axis measures the number of workers moving out of a brown sector divided by the number moving into such a sector (so figures in excess of 1.0 denote a net outflow). The horizontal axis indicates the number of workers moving into a green sector divided by the number moving out of such a sector (so figures in excess of 1.0 denote a net inflow). All data relate to the period 2015-23. Brown industries are those that produce or support fossil fuels (including coal mining, oil extraction, and the use of fossil fuels to generate electrical power). Green industries are defined as (i) those that support – directly or indirectly – the generation of renewable energy, (ii) those with no direct carbon emissions, and (iii) those that administer environmental programmes and services.

CHART 3.10. It is rare for workers to move straight from brown to green jobs



Source: LinkedIn (via the Development Data Partnership) and authors' calculations.
Note: Brown industries are those that produce or support fossil fuels (including coal mining, oil extraction, and the use of fossil fuels to generate electrical power). Green industries are defined as (i) those that support – directly or indirectly – the generation of renewable energy, (ii) those with no direct carbon emissions, and (iii) those that administer environmental programmes and services.

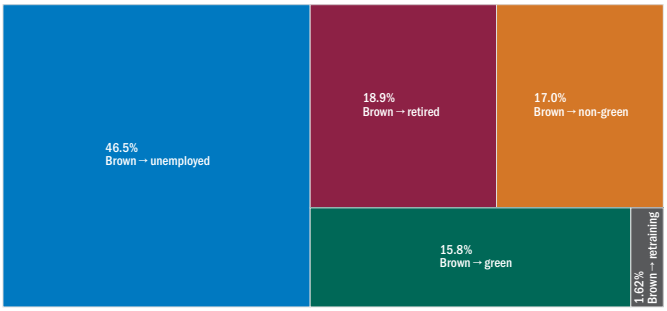
Alternatively, industries can be classified as green or brown on the basis of their average greenhouse gas emissions per unit of value added.[9] On that basis, wholesale and retail trade, public administration and various other services can be classified as green, while brown industries mainly comprise manufacturing sectors. Individual-level data from EU Labour Force Surveys can be used to track workers who move out of brown industries, looking to see whether, one year later, they are (i) employed in a green industry, (ii) employed in a non-green industry, (iii) retired, (iv) unemployed or (v) in training.

Over the period 1998-2019, an average of 16 per cent of all workers in the EBRD regions who moved out of brown sector jobs found employment in a green sector within a year (see Chart 3.11). Almost half of all workers who moved out of a brown sector were unemployed a year later, 19 per cent had retired, and only 2 per cent were undergoing retraining or upskilling.

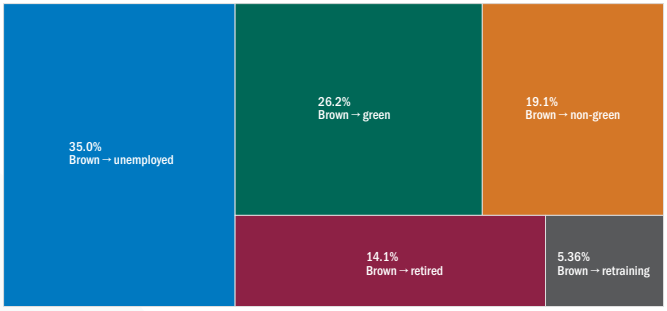
Mobility out of brown industries and into green industries was lower in the EBRD regions than in advanced European economies. In that group of comparator economies, 26 per cent of workers leaving brown-sector jobs found employment in a green sector within a year. Around one in three workers were unemployed a year after leaving their brown-sector job, 14 per cent had retired and 5 per cent were undergoing retraining or upskilling.

CHART 3.11. In the EBRD regions, almost half of all workers moving out of brown sectors in the period 1998-2019 were unemployed a year later

Breakdown of workers leaving brown sectors: EBRD regions



Breakdown of workers leaving brown sectors: advanced European economies



Source: EU Labour Force Survey micro data (1998-2019), World Input-Output Database (WIOD) environmental accounts (2016) and authors' calculations.
Note: Brown and green sectors are defined on the basis of their emission intensity. Employment status is captured one year after the worker has left a brown-sector job.

OVER THE PERIOD 1998-2019, AN AVERAGE OF

16%

OF ALL WORKERS IN THE EBRD REGIONS WHO MOVED OUT OF BROWN-SECTOR JOBS TRANSITIONED INTO GREEN-SECTOR JOBS WITHIN A YEAR

Green innovation and labour markets

The move towards a greener economy has been facilitated by rapid digitalisation. For instance, smart technologies and data analytics have increasingly been integrated into energy management, waste reduction and resource optimisation. Those innovations have created demand for workers with a combination of environmental knowledge and digital literacy. This section looks, more broadly, at how the development of green technologies affects local labour markets. It does so by drawing on individual-level data from the EU Labour Force Surveys covering Bulgaria, the Czech Republic, Estonia, Greece, Hungary, Latvia, Lithuania, Poland, the Slovak Republic and Slovenia, as well as Germany, Italy, Spain and the United Kingdom.

Those labour force survey data are combined with information on patents filed with the US Patent and Trademark Office (USPTO) over the period 1996-2019 (which includes the title of each

[9] This approach uses data from Gu and Hale (2023).

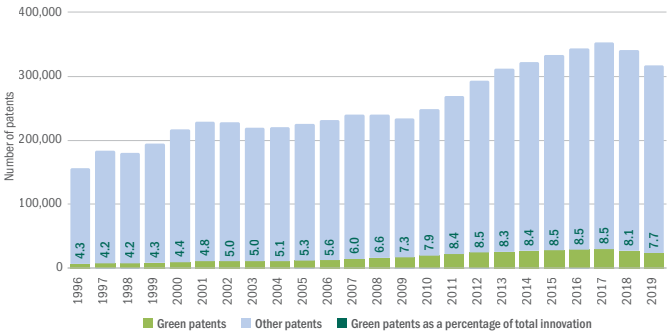
patent and a description of the purpose of the new technology and possible use cases). New green technologies are identified using the Y02 tagging scheme employed by the European Patent Office (EPO), which provides the most comprehensive and widely used classification of low-carbon technologies.[10] That scheme covers both mitigation and adaptation across a wide range of areas.

For computational convenience, the USPTO database was queried to retrieve all patents classified as green (418,199 in total) and a random sample of 20 per cent of all non-green patents per year. The largest category of green patents (comprising nearly 140,000 patents) relates to the reduction of greenhouse gas emissions and the generation, transmission or distribution of energy, with the next largest categories relating to mitigation technologies in respect of (i) transport, (ii) the production or processing of goods, (iii) ICT aimed at reducing one's own energy use and (iv) buildings.

The number of green patents filed per year increased from around 6,000 in 1996 to nearly 30,000 in 2017 as green innovation took off (see Chart 3.12). However, it continues to account for a relatively small share of overall innovation (just 7.7 per cent in 2019) owing to rapid increases in the numbers of patents filed in other fields, such as artificial intelligence. (The drop in patenting activity that can be seen post-2017 in Chart 3.12 is simply an artefact of the data, as patent applications are published with a significant lag.)

In terms of the geography of innovation, lead inventors located in Germany, Japan and the United States account for more than half of all green patents (whereby the first inventor listed on the patent is assumed to be the leader). In contrast, most middle-income economies continue to make a negligible contribution.[11] Only 0.3 per cent of all green patents included in this analysis had a lead inventor located in the EBRD regions (with a similar share being observed for non-green patents), with the Czech Republic, Hungary and Poland being home to the most lead innovators for green patents (see Chart 3.13).

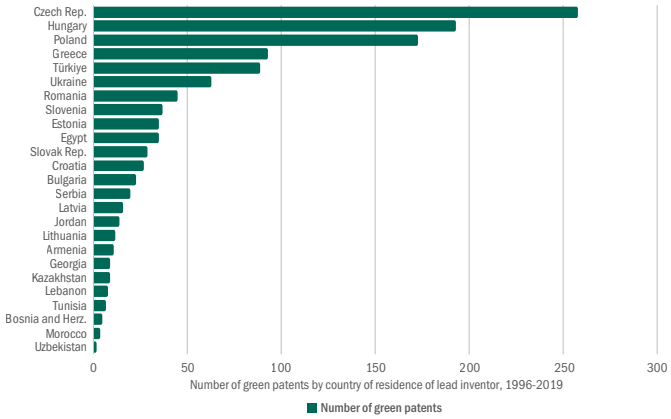
CHART 3.12. Green patents have increased, but still account for a small share of total innovation



Source: USPTO and authors' calculations.
Note: Green patents are identified using the EPO's Y02 tagging scheme.

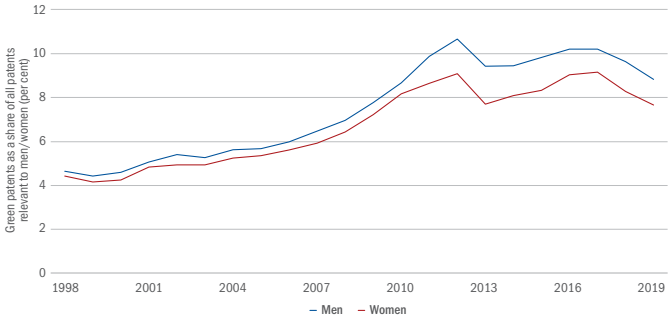
[10] See Angelucci et al. (2018) and Probst et al. (2021).
[11] See Probst et al. (2021).

CHART 3.13. Relatively few green patents have a lead inventor located in the EBRD regions



Source: USPTO and authors' calculations.
Note: Green patents are identified using the EPO's Y02 tagging scheme.

CHART 3.14. Men are more exposed to green innovation, given their occupations



Source: USPTO, EPO, EU Labour Force Survey and authors' calculations.
Note: Shares are first calculated by occupation and averaged using gender-specific weights based on occupation patterns. The sample comprises Bulgaria, the Czech Republic, Estonia, Greece, Hungary, Latvia, Lithuania, Poland, the Slovak Republic and Slovenia in the EBRD regions, plus Germany, Italy, Spain and the United Kingdom as comparators.

Exposure to green technologies

Although advances in the area of green technology are a global trend, their impact on labour markets is inherently local, being driven by the jobs and skills that are available in a local labour market when a new green technology arrives. In order to evaluate that impact, this section develops a novel measure of exposure to green (Y02) technologies compared with non-green technologies for each occupation at the three-digit level of the ISCO classification.[12] Specifically, it uses natural language processing to measure the textual similarity of (i) descriptions of the tasks performed by workers in a given occupation (based on O*NET data) and (ii) descriptions of innovation in patent documents. If the estimated similarity falls within the top 25 per cent of all similarity scores, the patent in question is mapped to an occupation. For example, a patent for a "remote controlled circuit breaker panel system" which "has been developed to provide a remote central control point for individual circuits, and [...] for retrofitting it to existing service panels or installing it in new service panels" is matched to "electrical equipment installers and repairers" who "install, fit and maintain electrical wiring systems and related equipment, electrical machinery and other electrical apparatus". For each occupation, the ratio of mapped green patents to total mapped patents tracks the relative exposure of that occupation to green innovation.

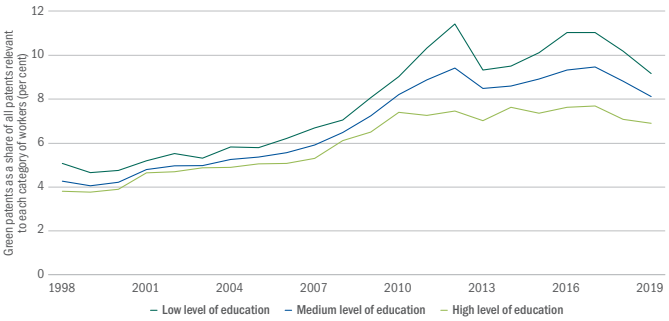
This measure shows that some occupations are more exposed to green innovation than others. For instance, installers and repairers of electrical equipment are highly exposed to green innovation, given the high levels of patenting activity in respect of the generation of renewable energy, power storage, electric vehicles and energy-efficient construction. Other occupations with large numbers of green patents as a percentage of all relevant patents include machinery mechanics and repairers, and mining and construction labourers. Workers with such occupations are more likely to be affected by the adoption of green technologies. Micro data from the EU Labour Force Survey can be used to calculate the likelihood of various groups (broken down by gender or place of residence, for instance) being employed in exposed sectors.

On average, men tend to have occupations that are more exposed to green innovation (see Chart 3.14, which shows green patents as a percentage of total innovation relevant to men and women, based on the sectors where they tend to be employed). The gender gap of 1.5 percentage points in 2019 is sizeable relative to the average exposure to green innovation across occupations in that year (8.5 per cent). On the one hand, this implies that if green innovation increases demand for labour and wages, men stand to benefit more than women, at least in the short term. On the other hand, however, it also implies that if new green technologies replace labour, men will be more likely to lose their jobs.

[12] See Autor et al. (2022) and Kogan et al. (2021).

This analysis also reveals that workers with low levels of education are more likely to have occupations with greater exposure to green innovation (see Chart 3.15). This may entail job displacement among lower-skilled workers[13] or create opportunities for them. For instance, innovation in the areas of recycling, power generation and grid maintenance is likely to increase demand for occupations that predominantly employ medium or low-skilled workers. Similarly, in construction, the need for energy-efficient buildings could, for instance, increase demand for installers of heat pump boilers, carpenters and joiners, bricklayers, and technicians.[14] There are no meaningful differences between urban and rural workers or between different age groups in terms of exposure to green innovation.

CHART 3.15. Workers with lower levels of education are more exposed to green innovation



Source: USPTO, EPO, EU Labour Force Survey and authors' calculations.
Note: Shares are first calculated by occupation and averaged using education-specific weights based on occupational patterns. The sample comprises Bulgaria, the Czech Republic, Estonia, Greece, Hungary, Latvia, Lithuania, Poland, the Slovak Republic and Slovenia in the EBRD regions, plus Germany, Italy, Spain and the United Kingdom as comparators.

Occupational exposure and employment growth

The arrival of new green technologies may create or destroy jobs. Over the last few decades, technological change in advanced economies has typically been found to be labour-substituting, with a specific bias against routine tasks, which are predominantly found in medium-skill jobs (those of typists, bank tellers, payroll clerks or supermarket cashiers, for example).[15] However, innovation also has the potential to be labour-*augmenting*, complementing the tasks performed by workers and increasing demand for labour. For instance, technological progress in the area of clean construction methods can benefit architects and designers who specialise in creating energy-efficient, environmentally friendly buildings and structures. Similarly, demand for installers of solar photovoltaic (PV) cells or specialists in carbon capture and storage may also increase. The regression analysis that follows seeks to establish which of these effects dominates when it comes to exposure to green innovation.

In particular, the analysis links local employment growth in a given occupation to the measure of exposure to green innovation and various local labour market characteristics, as well as region-period fixed effects. Employment growth is measured as the change in the logarithm of average employment for a three-digit ISCO occupation in a NUTS-2 subnational region between the four-year periods in question (2000-03, 2004-07, 2008-11, 2012-15 and 2016-19). Occupational exposure to green and non-green innovation is lagged by one period.

The results show that an occupation's overall exposure to technological innovation tends, on average, to be labour-substituting, in line with previous findings.[16] A 1 standard deviation increase in an occupation's exposure to non-green patents in one period is associated with an 8.9 per cent decline in the number of workers with that occupation in the region in question in the next period (see Table 3.1).

This labour-substituting effect is more muted where exposure to green innovation is greater. Conditional on an occupation's overall exposure to innovation and controlling for local employment trends, a 1 percentage point increase in green patents' share of an occupation's total exposure to innovation in one period is associated with a 3.9 per cent increase in employment for that occupation in the next period. This is a large impact in economic terms, as green patents account for 6.8 per cent of all relevant patents for the average occupation. However, this effect is larger in advanced economies, which are responsible for most green patents. In the EBRD regions, the positive correlation between green patents' share of total exposure and employment is much smaller and not estimated with statistical precision.

[13] See also Acemoğlu and Autor (2011).
[14] See OECD (2023).
[15] See Autor (2015).
[16] See, for instance, Autor et al. (2022) and Kogan et al. (2021).

TABLE 3.1. Impact of green innovation on employment growth

	(1)	(2)	(3)	(4)	(5)	(6)
	All economies		EBRD regions		Comparators	
Total number of relevant patents (standardised)	-8.930*	-8.624*	-9.719*	-9.637*	-8.775*	-8.436*
	(5.009)	(4.901)	(5.072)	(5.098)	(5.198)	(5.040)
Green patents as a percentage of relevant patents		3.935*		0.907		4.494*
		(2.233)		(2.151)		(2.341)
Region-period fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	35,899	35,899	12,842	12,842	23,057	23,057
Adjusted R^2	0.881	0.882	0.667	0.667	0.892	0.893

Source: USPTO, EPO, EU Labour Force Survey and authors' calculations.
Note: The dependent variable is 100 x the change in the logarithm of average employment for a given occupation, NUTS-2 region and four-year period. Each regression includes region-period fixed effects. Standard errors are clustered at occupation level, and occupation-region-period observations are weighted by their relative size in the previous period. * indicates statistical significance at the 10 per cent level. The sample comprises Bulgaria, the Czech Republic, Estonia, Greece, Hungary, Latvia, Lithuania, Poland, the Slovak Republic and Slovenia in the EBRD regions, plus Germany, Italy, Spain and the United Kingdom as comparators.

Fast and slow green transitions

In addition to changes to the occupational structure of employment, green innovation is transforming the skill-sets demanded by a wide range of existing professions. For instance, while demand for architects or urban planners may not be directly affected, urban planning and architecture are increasingly incorporating principles of eco-design and green infrastructure, requiring skills and knowledge relating to sustainable construction techniques and energy-efficient building practices.

How quickly the demand for these new skills is met in the labour market will, to a large extent, determine the speed at which countries can roll out green technologies. Experience gained from globalisation, automation and the ICT transition suggests that labour does not chase capital (that is to say, workers are not sufficiently mobile), and neither does capital chase labour (that is to say, firms are not sufficiently attracted to areas with lower wages).[17] Instead, labour shortages and skills mismatches have the potential to persist as local markets slowly adjust. For instance, in a recent survey of local municipalities across Europe, 69 per cent reported that their lack of environmental and climate assessment skills was a barrier to climate investment.[18]

The role of skill specificity

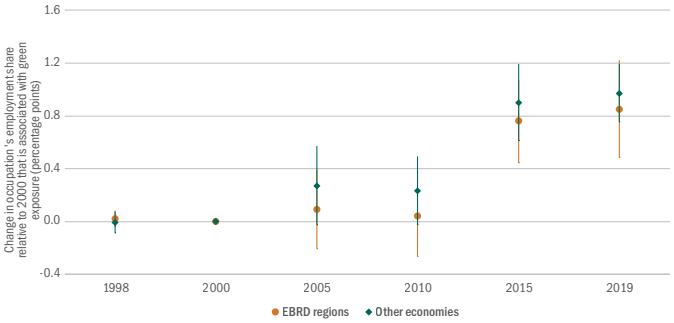
Sometimes, innovations benefit occupations which require skills that are rather different from those used by incumbent workers in the rest of the economy. Workers find it harder to transition into such jobs with strong skill specificity. Consequently, as the labour supply adjusts only slowly, the relative wages of those activities increase more rapidly.[19] With that in mind, this section analyses the speed at which local labour markets have adjusted to green transitions over the past two decades using individual-level data from the EU Labour Force Survey covering the Czech Republic, Estonia, Greece, Hungary, Latvia, Lithuania, Romania and the Slovak Republic, as well as Austria, Belgium, Denmark, Finland, Germany, Ireland, Italy, Portugal, Spain, Sweden and the United Kingdom.

This exercise estimates the relative elasticity of the labour supply for green occupations. Green occupations are identified using O*NET's green job classification, which is based on the task content of each occupation. For non-green occupations, the green exposure measure is zero; for green occupations, it is based on that occupation's share of the country's total employment

HOW QUICKLY THE DEMAND FOR THESE NEW SKILLS IS MET WILL, TO A LARGE EXTENT, DETERMINE THE SPEED AT WHICH COUNTRIES CAN ROLL OUT GREEN TECHNOLOGIES

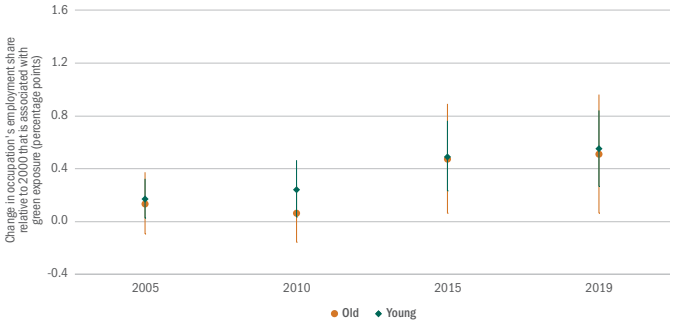
[17] See Adão et al. (2022) and Hanson (2023).
[18] See EIB (2023).
[19] See Adão et al. (2022).

CHART 3.16. Occupations with greater exposure to green innovation have seen increased employment since 2015



Source: EU Labour Force Survey, O*NET and authors' calculations.
Note: The estimates in this chart have been derived by regressing the change in an occupation's percentage share of a country's total employment relative to 2000 on a standardised measure of the occupation's exposure to green innovation. Each regression controls for country and time period fixed effects. Observations are weighted by the level of employment in the baseline period. The 95 per cent confidence intervals shown are based on standard errors clustered at the country level. The EBRD economies used are the Czech Republic, Estonia, Greece, Hungary, Latvia, Lithuania, Romania and the Slovak Republic. The comparator countries are Austria, Belgium, Denmark, Finland, Germany, Ireland, Italy, Portugal, Spain, Sweden and the United Kingdom.

CHART 3.17. The employment shares of occupations with greater exposure to green innovation have increased for old and young alike



Source: EU Labour Force Survey, O*NET and authors' calculations.
Note: The estimates in this chart have been derived by regressing the change in an occupation's percentage share of a country's total employment for young workers (age 37 and below) and older workers (age 38 and above) on a standardised measure of the occupation's exposure to green innovation. Each regression controls for country and time period fixed effects. Observations are weighted by the level of employment in the baseline period. The 95 per cent confidence intervals shown are based on standard errors clustered at the country level. The EBRD economies used are the Czech Republic, Estonia, Greece, Hungary, Latvia, Lithuania, Romania and the Slovak Republic. The comparator countries are Austria, Belgium, Denmark, Finland, Germany, Ireland, Italy, Portugal, Spain, Sweden and the United Kingdom.

in 2000. Thus, nuclear plant operators are assumed to have greater exposure to green innovation in countries with larger nuclear power industries, and zero exposure in countries with no nuclear plants. This measure also assumes that the increase in demand for an occupation is proportionate to the size of that occupation within the economy, all other things being equal. Regression analysis relates the change in the occupation's share of the country's total employment since 2000 to a standardised measure of the occupation's exposure to green innovation in that country, controlling for country fixed effects (the specificity of the local labour market) and time period fixed effects (general trends in the composition of occupations).

The results indicate that labour markets adjust fairly slowly in the face of a green transition. The employment shares of occupations that had greater exposure to green innovation in 2000 did not experience significant changes during the first decade of this century. That was true in the EBRD regions and advanced comparator economies alike (see Chart 3.16).

Stronger growth in relative employment for occupations with greater exposure to green innovation can be observed from 2015 onwards. By 2019, occupations where exposure to green innovation was 1 standard deviation greater saw extra growth in their employment shares of nearly 1 percentage point in the EBRD regions and 0.8 percentage points in advanced European economies.

There is very little difference between younger workers (age 37 and below) and older workers (age 38 and above) in terms of growth in the employment shares of occupations with greater exposure to green innovation (see Chart 3.17). This suggests that the requisite skills can be picked up through both formal education and on-the-job training.

The role of task distance

If workers are able to move between geographical areas and industries with little friction and are assisted by retraining and upskilling programmes, this will support the green labour-market adjustment. However, many workers in polluting jobs or sectors will require targeted support to enable them to move into new jobs.[20] Such mobility is easier when workers possess skills that are easily transferable from one job to another, with levels of switching tending to be higher where occupations require similar tasks.[21] For instance, nuclear technicians and ship engineers have similarly high task scores when it comes to operational monitoring – watching gauges and dials to make sure that machinery is working properly. Similarly, biomedical engineers and lawyers both engage in complex problem solving.

If the task requirements of a green occupation are similar to those of a non-green occupation and the wages for that green occupation are at least as high, job reallocation should take place more smoothly relative to situations where the task requirements

[20] See OECD (2023).
[21] See, for instance, Gathmann and Schönberg (2010).

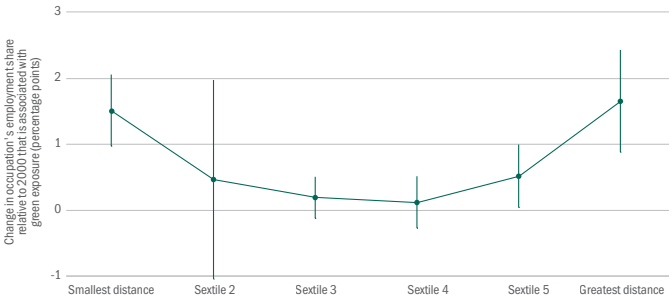
of green and brown jobs are far apart. Using O*NET data on the task content of every occupation, it is possible to calculate a measure of the distance between the tasks of a pair of occupations. Those distances can, in turn, be used to calculate a measure of the task distance between a given occupation and the rest of the economy as an average of all occupation task distances weighted by occupations' employment shares in a given country.[22] Occupations with a shorter distance to the rest of the economy (such as freight handlers) mostly require generic skills, rather than specialist skills. Aquatic life cultivators, in contrast, are characterised by a long distance to the rest of the economy.

In 2000, occupations classified as green had a slightly greater average distance to the rest of the economy relative to non-green occupations. The data on task distances can be incorporated into the analysis of changes in occupations' employment shares by adding interaction terms that combine exposure to green innovation with dummy variables for each sextile of the task distance distribution.

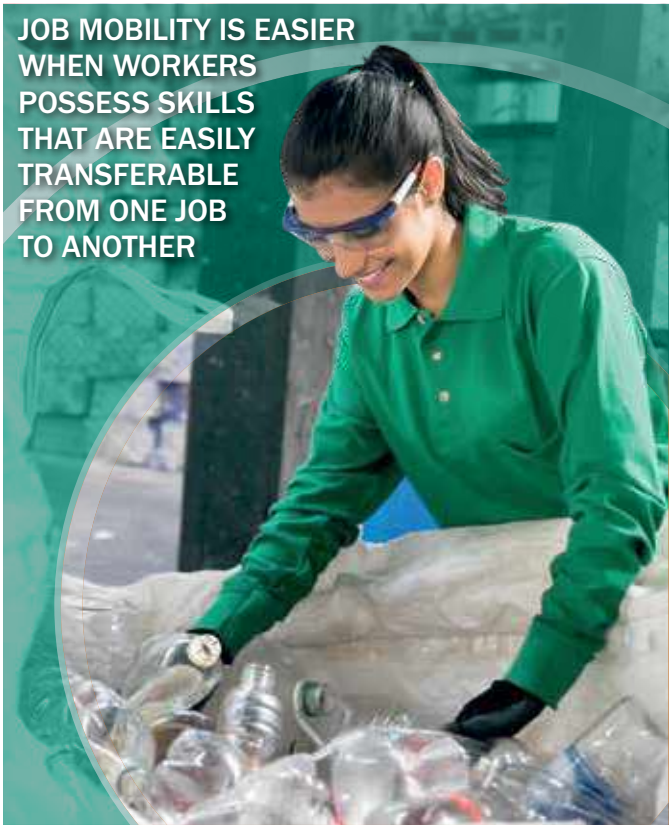
This analysis suggests that the occupations that are most similar to the rest of the economy in terms of their task content have experienced significantly stronger growth in their employment shares relative to 2000 on account of their exposure to green innovation (see Chart 3.18). The same is also true of the occupations that are least similar to the rest of the economy task-wise, where retraining existing workers is harder but entry rates are probably high as a result of the higher wages associated with task specificity. For occupations with moderate levels of task distance, exposure to green innovation has only had a small – and often statistically insignificant – effect on employment shares.

These findings are consistent with the relative labour supply being less elastic where occupations require tasks that are sufficiently different (although not very different) from those used in the rest of the economy. As green occupations tend to require somewhat more specialist skills than the rest of the economy, this can help to explain the modest pace of labour markets' adjustment to the roll-out of green technologies.

CHART 3.18. Task distance also has a role to play in explaining relative changes in labour supply



Source: EU Labour Force Survey, O*NET, Dworkin (2019) and authors' calculations.
Note: The estimates in this chart have been derived by regressing the change in an occupation's percentage share of a country's total employment on a standardised measure of the occupation's exposure to green innovation interacted with dummy variables for each sextile of the task distance distribution. Each regression controls for country and time period fixed effects. Observations are weighted by the level of employment in the baseline period. The 95 per cent confidence intervals shown are based on standard errors clustered at the country level. The sample comprises the Czech Republic, Estonia, Greece, Hungary, Latvia, Lithuania, Romania and the Slovak Republic, as well as Austria, Belgium, Denmark, Finland, Germany, Ireland, Italy, Portugal, Spain, Sweden and the United Kingdom.



[22] This analysis draws on data taken from Dworkin (2019).

Conclusion and policy recommendations

There are several lessons to be drawn from this analysis of the implications that the green transition has for the labour market.

First, it is crucial that the green transition is fair – providing decent and well-paid jobs for all workers regardless of their skill level or background – in order to maintain public support for achieving net zero greenhouse gas emissions in the economy. Second, there is high demand for green expertise, which tends to benefit highly skilled individuals in sectors with lower carbon emissions. Third, labour mobility between sectors and occupations remains low, despite the promise of higher pay, given the cost of retraining and upskilling. Fourth, new green technologies may be less labour-substituting than other technologies on average. Fifth, the green transition has the potential to progress faster than the ICT transition, insofar as workers of all ages have contributed to the reallocation of employment from non-green occupations to green occupations over the past two decades.

It is essential to acknowledge the labour-market challenges that could potentially result from the green transition and implement appropriate measures to support affected workers. Assistance for workers who experience the greatest impact from shifts in the job market can help to mitigate resistance to allocating public funding to environmentally friendly policies. Unemployment insurance and safety-net programmes can help in the short term, but their beneficiaries also need to be incentivised to invest in training and search for jobs.

Labour-market adjustment costs can be minimised by using the existing skill-sets of workers who are at the greatest risk of displacement in a local area, helping them to move into nearby jobs that require limited reskilling. This should be done with the explicit cooperation and guidance of local businesses. However, there will inevitably be adaptation challenges for specific workers and industries, who will need help in the form of reskilling and training programmes. The EU's Just Transition Fund seeks to support such labour-market programmes as part of the green transition.

Evidence from multiple countries suggests that labour-market programmes can be effective in supporting the green transition, provided that they meet certain criteria.[23] After screening candidates to assess their suitability for employment, these programmes need to provide training in sector-specific skills required by local employers (who often have input in that regard).[24]

Uptake of education and retraining often remains low in local labour markets that are hit by negative economic shocks, especially among more vulnerable workers in older age categories and lower income groups. For instance, the coal shock in the United States had almost zero impact on the uptake of education and training assistance – including programmes intended to help displaced workers retrain for new careers. In Germany, meanwhile, younger workers invested in ICT training when broadband arrived in their local labour markets, but older workers did not.[25]

One possible reason for that low uptake is a lack of coordination between policymakers and local businesses. Although such training is intended to provide workers with skills that potential employers will find attractive, employers often have limited involvement in those training programmes.[26] Skills gaps vary across occupations and regions, and finding appropriate ways of addressing local skills mismatches requires ongoing cooperation between industry, trade unions, and technical and vocational schools in affected communities. More generally, the content of education and vocational training needs to be better aligned with the emerging demands of the green economy.

Those programmes also need to offer wrap-around services encompassing career readiness, counselling, job placements and post-placement job advancement, recognising that workers of all backgrounds and skill levels value decent and well-paid jobs that promise career progression. Examples of such programmes in the context of the green transition in the EBRD regions can be found in Box 3.3.

Moreover, further efforts are needed to incentivise green innovation in middle-income economies (including in the EBRD regions). With the exception of China, middle-income economies have not generally caught up with the economies at the green innovation frontier and remain less specialised in low-carbon technologies than high-income economies, despite the fact that most of the future increases in emissions are projected to take place in middle-income economies.[27] The analysis in this chapter also shows that having green technologies account for a larger share of overall innovation has a positive effect on employment in local labour markets.

Because the green transition affects different geographical areas in different ways, a location-based strategy centred on local economic development and business support programmes will be vital in complementing national green transition policies, particularly when it comes to leveraging the potential of SMEs as primary sources of new employment growth.[28] With that in mind, policy measures need to foster the development of green start-ups and small businesses – especially those adopting green technologies and those at the frontier of green innovation.

[23] See Card et al. (2018) and Katz et al. (2022).
[24] See Hanson (2023).
[25] See Adão et al. (2022) and Hanson (2023).
[26] See Hanson (2023).
[27] See Probst et al. (2021).
[28] See OECD (2023).

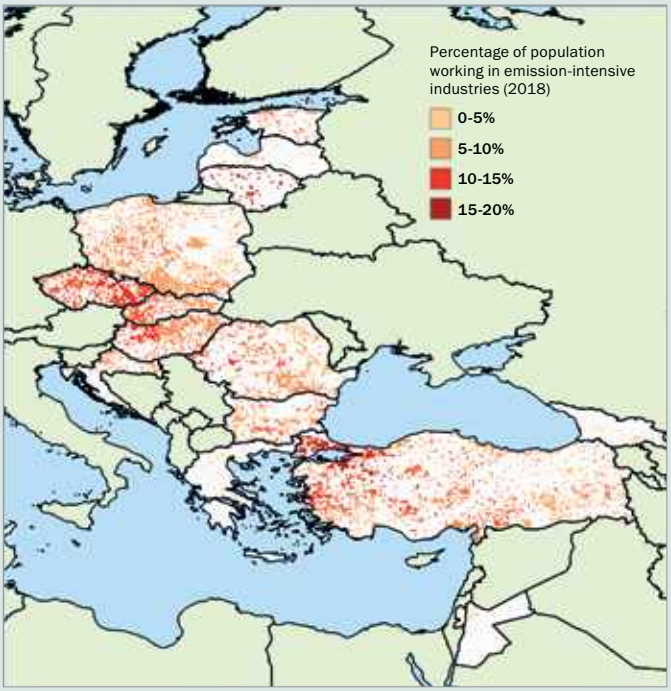
BOX 3.1.

The geography of carbon-intensive jobs in manufacturing

Transitioning to a greener economy is essential in order to address environmental challenges, but it can also have significant implications for the labour market. A key risk stems from job displacement in carbon-intensive areas. As the world shifts away from fossil fuels and towards renewable energy sources, there may be a decline in demand for jobs in traditional fossil fuel industries such as coal mining, oil drilling and the extraction of natural gas. Certain manufacturing sectors are particularly vulnerable to the green transition, as they have low value added relative to total emissions.[29] Workers in these sectors could face job losses or reduced employment opportunities, especially if they lack the transferable skills required for a move to the emerging green energy sector.

Where carbon-intensive activities are concentrated in specific local labour markets, communities that are heavily reliant on high-carbon industries may experience more significant job losses. This could give rise to higher local unemployment rates and a loss of social cohesion if adequate regional development plans are not put in place.

CHART 3.1.1. The percentage of the population employed in carbon-intensive manufacturing industries varies across the EBRD regions



Source: EDGAR, LandScan, EU Labour Force Survey, national statistical agencies and authors' calculations.
Note: Each dot denotes an 11 km by 11 km grid cell. Carbon-intensive manufacturing industries are defined as those with the lowest value added per unit of greenhouse gas emissions on the basis of Gu and Hale (2023).

This box uses highly granular geographical data on emissions and administrative data from labour-force surveys to identify the localities with the highest concentrations of carbon-intensive manufacturing jobs in the EBRD regions. The data cover Bulgaria, Croatia, the Czech Republic, Estonia, Georgia, Greece, Hungary, Jordan, Kazakhstan, the Kyrgyz Republic, Latvia, Lithuania, Mongolia, Poland, Romania, the Slovak Republic, Türkiye and the West Bank and Gaza (with the choice of economies dictated by the availability of data).

EDGAR carbon dioxide emissions data for manufacturing facilities have been mapped to a grid with 11 km by 11 km cells. The population count for those grid cells has been calculated using the LandScan dataset. On the basis of those data, the analysis in this box focuses on the 11 km by 11 km grid cells that have manufacturing emissions in the top 40 per cent of the total distribution of such emissions.

Each of those locations is characterised by the percentage of the population that is employed in emission-intensive manufacturing sectors. Those percentage shares are approximated using data from the EU Labour Force Survey and six country-level labour-force surveys (see Chart 3.1.1). Manufacturing employment – data on which are only available at a broader, regional level – is assumed to be distributed uniformly across all high-emission locations within that region. Those estimates of manufacturing employment are, in turn, divided by population data for each 11 km by 11 km grid cell as obtained from LandScan. For instance, the city of Győr in the Nyugat-Dunántúl region of Hungary is one of the dots on the map: it is in the 10 per cent of locations with the highest levels of emissions in the EBRD regions, with an estimated 15 per cent of the population employed in emission-intensive industries.

Despite the gradual rise in green jobs' share of total employment (as documented in this chapter), certain regions did in fact see a rise in the percentage of the population that was employed in carbon-intensive sectors between 2010 and 2018. For instance, provinces in north-western Hungary saw a 3 percentage point rise in the employment share of the manufacturing sector over that period, compared with 1 percentage point increases for construction, wholesale and retail trade, and public administration (the next biggest employers in those regions). A lack of diverse job opportunities, combined with high emission industries dominating the local labour market, can result in a large percentage of the local population continuing to work in carbon-intensive sectors.

[29] See Gu and Hale (2023).

BOX 3.2.

Migration in response to weather shocks

Climate change could have a direct impact on economies in the EBRD regions in the form of reduced agricultural output, lower labour productivity and weaker investment, but it could also have an indirect impact through changes to migration patterns from and to other regions.[30] Sub-Saharan Africa is one of the regions of the world that is expected to be worst affected by climate change, and significant numbers of migrants from sub-Saharan Africa are already coming to the EBRD regions each year (see Chart 3.2.1).

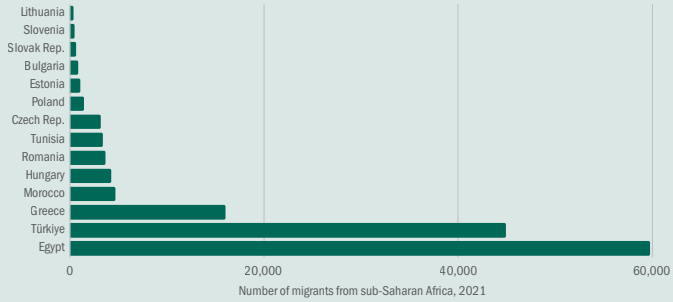
Climate change is having a significant impact on agriculture – particularly in rural economies in sub-Saharan Africa – while credit constraints and a lack of information are impeding adaptation in the face of that impact. In such circumstances, migration out of the affected areas could serve as an important adaptation strategy. In particular, weather shocks that harm agricultural yields could drive rural populations into urban agglomerations. At the same time, weather shocks could also discourage migration if they reduce the income that is available to cover expenses associated with relocation.

This box uses rich household-level panel survey data on weather shocks, migration decisions and socio-economic characteristics covering 38,000 unique households in rural regions of Ethiopia, Nigeria, Tanzania and Uganda between 2009 and 2019.[31] Those survey data contain information on whether a household has experienced a weather shock, an economic shock (a sudden drop in output prices or a sudden increase in the price of agricultural inputs, for instance) or a political shock (such as local violence) in the past year and whether a member of the household has migrated.

The frequency of weather shocks varies widely from year to year and country to country. In Tanzania, almost 50 per cent of households experienced a weather shock such as drought or flooding in 2009, compared with only 14 per cent of households in 2019. In most countries, economic shocks are more frequent than weather shocks, while political shocks are less frequent. For example, in Nigeria, 30 per cent of households were hit by an economic shock in 2013, compared with 12 per cent that suffered a weather shock and 4 per cent that experienced a political shock. On average, 1 per cent of households per year report a member of the household migrating.

Regression analysis based on data for Ethiopia and Nigeria shows that a weather shock increases the probability of a household member migrating by 0.6 percentage points. The impact of an economic shock is even greater, with the likelihood of migration rising by an estimated 1.6 percentage points. The estimated effect of a political shock is similar to that of a weather shock, but is not statistically significant.

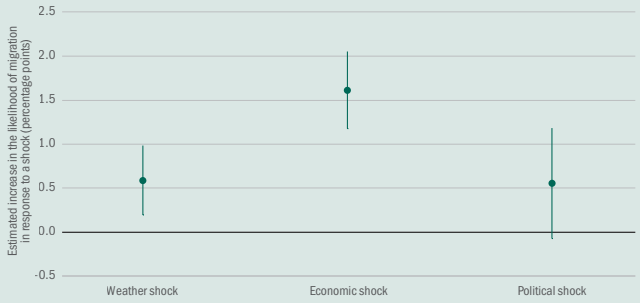
CHART 3.2.1. There is already significant migration from sub-Saharan Africa to the EBRD regions



Source: KNOMAD/World Bank Bilateral Remittance Matrix 2021 (December 2022) and authors' calculations.

[30] See Acevedo et al. (2020).
[31] See World Bank (2019).

CHART 3.2.2. Weather shocks have around a third of the impact of economic shocks when it comes to migration decisions



Source: World Bank (2019)
Note: This chart shows estimates derived from a linear probability model regressing the likelihood of a household member migrating in a given year on dummy variables for various shocks and various individual characteristics and country fixed effects. The sample comprises Ethiopia and Nigeria. The 95 per cent confidence intervals shown are based on robust standard errors.

The results also indicate that weather shocks can predict migration in households with a male head, but not in households with a female head. This may reflect the fact that female-led households lack the resources needed to migrate. Among survey respondents, households with a female head had lower average levels of education and income, as well as smaller farms, and suffered more often from food insecurity. Female-led households were also more likely to be single-parent households, making it harder for part of the household to migrate. That relative lack of ability or willingness to respond to weather shocks by migrating has the potential to further exacerbate inequality between male-led and female-led households.

Climate change may exacerbate existing gender disparities in other ways, too. For instance, in response to an adverse economic shock caused by extreme weather, a household might decide to cut back on a girl's education rather than a boy's.

The 2015 survey data for Nigeria also include limited information on where migrants go when they migrate. According to those data, most Nigerian migrants stay within the same local government area. Between 2 and 4 per cent go abroad – and of those, half stay on the African continent, while around a quarter move to Europe.

In conclusion, weather shocks do incentivise people to migrate, with most remaining in the same region or country; however, economic shocks are still more important predictors of migration decisions for now. Better-off households are more likely to respond to weather shocks by migrating, as they have the means to do so, while female-led households (which tend to be poorer) are less likely to migrate in response to adverse weather.

BOX 3.3.

A just green transition in the SEMED region

An inclusive green transition is the only way to obtain a collective mandate for change, which requires political, economic and social buy-in from all parts of society. This box discusses the opportunities and requirements for a just green transition in the southern and eastern Mediterranean (SEMED).

Economies in the SEMED region enjoy an advantage when it comes to renewable energy, given their abundant natural resources. In order to take advantage of low-cost green energy, governments need to ramp up their investment in the infrastructure required by renewables, including battery storage, grid upgrades and expansions, water supply, bunkering and hydrogen transport. They also need to address workforce-related challenges by identifying skill shortages and investing in green skills, while retraining, upskilling and redeploying affected workers in brown sectors.

The energy pillar of Egypt's recently launched Nexus of Water, Food and Energy (NWFE-EP) initiative envisages decommissioning 12 fossil fuel power plants with a total capacity of 5 GW (corresponding to 9 per cent of Egypt's total installed capacity for fossil fuels). Those plants will be replaced with 10 GW of private solar and wind energy by 2028, which will also be used to produce green hydrogen. That initiative also incorporates an investment plan aimed at scaling up the capacity of the electricity grid and a plan to support workers affected by the decommissioning of the fossil fuel plants. At the same time, the country's largest supplier of renewable energy, Infinity Energy, is rolling out work-based learning programmes with the support of the EBRD, aiming to provide young people with skills relevant to renewable energy, as well as introducing policies that help women to play a greater role in the company's workforce.

Meanwhile, the Société Tunisienne de l'Electricité et du Gaz (STEG), Tunisia's national electricity and gas company, has been using three channels to promote green skills for young people in the energy sector, supported by the EBRD. First, the introduction of national occupational skills standards for key energy-sector occupations (including jobs in renewable energy, data analytics and cybersecurity) will allow companies to base their recruitment on transparent criteria and help to ensure that the skills taught by educational establishments match those required by employers. Second, in cooperation with several local technical universities, STEG has launched an innovative training programme, combining internationally accredited master's programmes for young engineers with on-the-job learning. And third, a comprehensive gender action plan has been adopted, focusing on promoting women's access to technical and other STEM roles.

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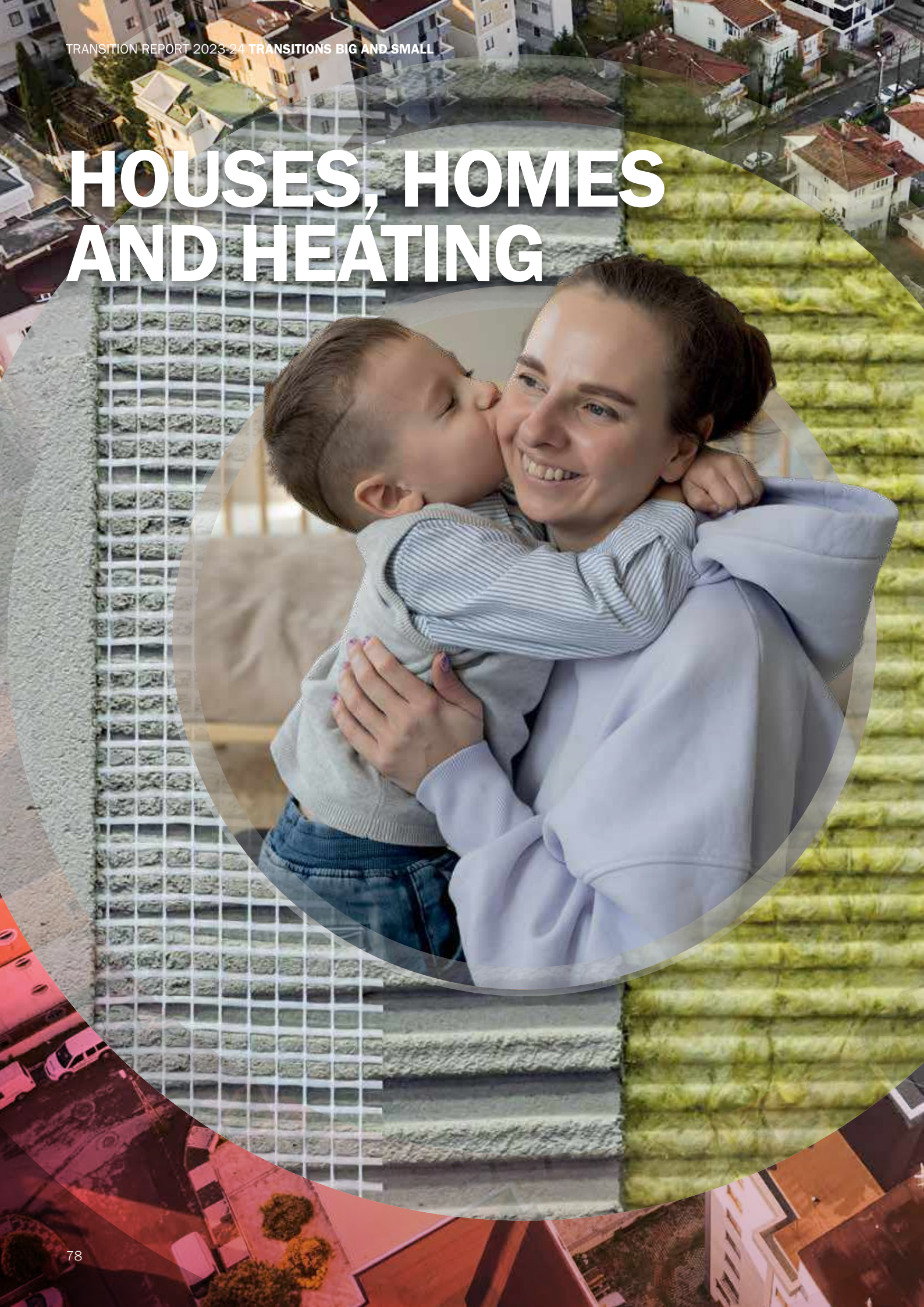
HOUSES, HOMES AND HEATING



Housing policies have lasting effects. For instance, post-war housing blocks continue to shape cityscapes across much of the EBRD regions. Levels of home ownership remain high across all income groups, but there is limited new construction and little social housing. Meanwhile, inequality in the condition of housing is pronounced, as is spatial segregation (the existence of low-income neighbourhoods separate from higher-income areas). Housing also has a substantial environmental footprint: residential emissions per unit of energy used are higher in the EBRD regions than in advanced European comparators, partly reflecting continued reliance on coal. However, there is scope for significant emission reductions through improvements in insulation and metering, even taking the building stock as given.

Introduction

This chapter provides an overview of housing in the EBRD regions. It starts with a discussion of why housing matters for economic outcomes and access to economic opportunities. The contours of cities are highly persistent: housing policies from decades ago – sometimes even centuries ago – affect outcomes to this day. Likewise, today's policy choices will continue to shape urban landscapes long into the future.

The second section paints a portrait of housing and home ownership in the EBRD regions, focusing on the specific legacies that differentiate economies in the EBRD regions from advanced economies and other emerging markets. That section also examines the link between home ownership and wealth and looks at the ways in which housing is related to socio-economic divides.

While housing and the associated heating, water and sewerage infrastructure matter greatly for well-being, housing also accounts ›

for a significant share of total energy use in the economy. Consequently, this chapter also considers the environmental footprint of housing, looking at the energy efficiency of the housing stock and heating systems in the EBRD regions. The chapter then concludes with a series of policy recommendations.

The analysis in this chapter draws on a range of different data sources, including the fourth round of the Life in Transition Survey (LiTS IV), which includes a special module on housing. That survey round, which was launched in 2022 and will conclude later in 2023, is being conducted in 37 economies, asking respondents in 1,000 randomly selected households per economy about a range of socio-economic outcomes (such as their employment and income), as well as their beliefs and attitudes (their views about the environment, for instance). For the first time, the survey also includes detailed questions on housing, with some of those questions being answered by the interviewer before the start of the interview (reporting on the condition of the building, for instance) and some being answered by respondents (providing information on the age of the building or the use of smart meters, for example).

Findings from the LiTS IV reveal that the quality of housing is closely linked to socio-economic outcomes. For instance, people living in higher-quality buildings tend to be healthier and less likely to experience mental distress than those living in buildings of inferior quality. Meanwhile, people who own their home are less likely to want to move. These associations hold even when taking into account people's education, income and other characteristics.

The housing stock in the EBRD regions reflects the legacies of past policies. More than half of all people in those economies live in buildings constructed between the 1950s and 1980s – that is to say, before the transition from centrally planned to market economies. Large multi-apartment buildings are more common than in advanced economies. Indeed, in some EBRD economies, up to 40 per cent of all households live in prefabricated housing blocks. As a result of widespread mass privatisation in the early 1990s (whereby social housing tenants were able to buy their home from the state for a nominal fee), home ownership rates in most economies in the EBRD regions are much higher than elsewhere. Moreover, ownership rates in EBRD economies are not related to household income, with lower-income households just as likely to be homeowners as high-income households. (Elsewhere, those on lower incomes are more likely to rent.) On the other hand, there is now very little social housing in the EBRD regions, reflecting the state's withdrawal from housing markets after the privatisation of the 1990s.

Housing inequality has started to increase, and vulnerabilities are emerging. Poorer households are more likely to (i) live in older buildings, (ii) live in housing that is in a worse condition, (iii) have more limited access to public transport and (iv) have less access to green space. Meanwhile, the percentage of the population who own their home outright has started to fall, and reliance on mortgages has been growing. At the same time, rents have increased as a share of income (and relative to average mortgage payments).

As far as the environmental footprint of housing is concerned, the residential sector accounts, on average, for 26 per cent of total emissions and 29 per cent of total energy use in the EBRD regions, compared with 22 per cent of total emissions and 26 per cent of total energy use in advanced European comparators. In some EBRD economies, emissions from the residential sector are the single largest contributor to total emissions, exceeding emissions from industry, transport or other services. In some cases, residential emissions remain high even as industry is becoming greener.

While total residential emissions per capita are lower in the EBRD regions than in advanced economies, the EBRD regions emit more per unit of residential energy use. Differences in countries' fuel mix (particularly their reliance on coal) can explain around 40 per cent of all cross-country variation in residential emissions per capita. In particular, appliances (such as refrigerators and air conditioning units) are more emission-intensive in the EBRD regions than in advanced economies, reflecting differences in countries' fuel mix. Differences in emission-intensity are smaller for heating. In addition to altering countries' energy mix, findings from the latest round of the Life in Transition Survey suggest that there is also scope for significant emission reductions through improvements in insulation and metering of energy consumption (for instance, through energy-efficient upgrades to prefabricated housing blocks), even taking the building stock as given.

OVER
HALF
OF ALL HOUSEHOLDS IN THE EBRD REGIONS LIVE IN HOUSING CONSTRUCTED BETWEEN 1953 AND 1989

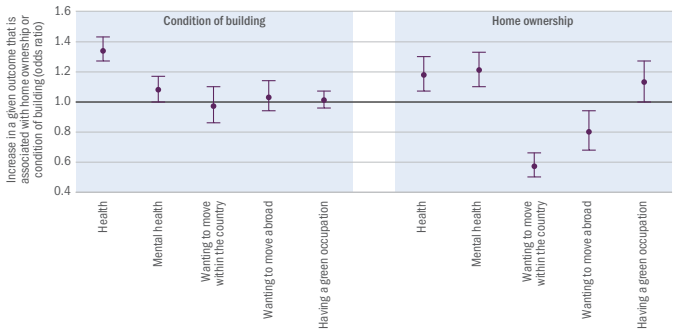
Housing matters

Housing is hard to measure. Dwellings differ in terms of their age, design and amenities; they are shaped by the characteristics of their neighbourhoods, such as access to infrastructure and utilities; and, in turn, they themselves shape neighbourhoods. Housing is not only a consumption good (providing accommodation), but also an investment, given its durability (typically being a household's main asset). And housing markets can be private, with varying degrees of regulation, or involve direct provision of housing by the state.

The link between (i) housing conditions and the characteristics of neighbourhoods, and (ii) economic outcomes and inequality has been well documented. Housing and the local environment affect access to healthcare, health (including mental health), educational attainment, employment and earnings in adulthood, as well as general well-being and intergenerational mobility.[1] In the United States of America, housing instability (being behind on rent, moving multiple times or having been homeless in the past) is associated with adverse health outcomes for adults and children alike.[2]

More generally, housing segregation (the emergence of low-income neighbourhoods separate from higher-income areas) leads to a host of poor socio-economic outcomes and lower levels of well-being.[3] Children growing up in poor-quality neighbourhoods perform less well in school and earn less as adults.[4] Studies based on panel data which have tracked individuals over time in the United States have found that children who live in a crowded household at any time before the age of 19 are less likely to complete their secondary education and more likely to have lower educational attainment at the age of 25.[5] Likewise, children living in poor-quality housing, in homes that have been in foreclosure, and in disadvantaged neighbourhoods tend to have lower nursery-readiness scores.[6] In contrast, children who live in – or move to – better neighbourhoods and are thus exposed to better environments tend to see higher levels of educational attainment and earn more in adulthood.[7]

CHART 4.1. Housing matters for well-being



Source: LiTS IV and authors' calculations.

Note: The condition of a building is measured on a four-point scale ("in urgent need of repair", "acceptable", "good" and "very good"); home ownership is a dummy variable, as are intentions to move and having a green occupation; all other variables are measured on a scale of 1 to 5. Physical and mental health are both self-assessed, with mental health being measured as described in Chapter 1. (Ordered) logit regressions control for the respondent's age, gender, marital status, level of education and employment status, as well as the logarithm of household income, the size of the household, the number of children in the household, whether the respondent lives in an urban or rural location, whether they moved there in the last five years and country fixed effects. The 95 per cent confidence intervals shown are based on standard errors clustered at the country level. An odds ratio greater than 1 indicates, for instance, that homeowners are more likely to report good health. The tests described in Oster (2016) suggest that the findings for health and mental health (particularly the correlation between mental health and home ownership) are more robust to potential bias caused by unobservable characteristics.

Chart 4.1 illustrates such correlations, drawing on the latest wave of the Life in Transition Survey. While it is possible that unobservable characteristics could be associated with both better outcomes and the quality of housing, people living in buildings that are in a better condition (that is to say, less in need of urgent repair) appear to be healthier, on average, than those living in buildings that are in a worse condition. They are also less likely to experience mental distress. Similar effects can be observed among people who own their homes. Furthermore, homeowners are also less likely to express a desire to move – whether within the country or abroad. These correlations are both economically and statistically significant, even when accounting for individual and household-level characteristics such as age, education, employment status and household income. For example, a person living in a better quality building is, on average, 30 per cent more likely to report being in good health. In contrast, if two people live in similar accommodation, but one earns twice as much as the other, that person is, on average, only around 3 per cent more likely to report being in good health.

[1] See Ziol-Guest and Kalil (2014) and Gaitán (2018).
[2] See Sandel et al. (2018).
[3] See Council of Europe Development Bank (2017).
[4] See Chetty and Hendren (2015).
[5] See Lopoo and London (2016).
[6] See Coulton et al. (2016).
[7] See Council of Europe Development Bank (2017).

Rome wasn't built in a day

Housing is highly path-dependent. Once established, cities are rarely abandoned; urban systems and city rankings are relatively stable over time; and local economic specialisations and regional political traditions often span centuries.[8] Housing is deeply embedded in infrastructure systems, from road networks to utilities. Large-scale infrastructure projects take years – decades, even – to complete; and once in place, that infrastructure depreciates slowly.[9] Historical buildings, bridges and sewer systems and the layout of road networks are often testimonials to the distant past.[10] When cities were first established, their locations were often dictated by natural advantages such as access to ports and rivers. However, those cities remain important today, despite their respective advantages no longer being as relevant as they once were.[11] Eastern parts of many former industrial cities (such as London and New York) are more deprived, as those with means escaped pollution from industrial chimneys. These spatial patterns of wealth and poverty persist, even though the pollution that helped to shape them has largely waned. While the spatial distribution of pollution is a result of interaction between industrial locations, wind patterns and city-specific topography, the correlation is robust to the addition of a large set of controls, such as access to public amenities and the distance to waterways.[12] Historical place-based R&D policies also have lasting effects: even in present day Russia, Science Cities (which were created in Soviet times) are more innovative and productive, and are home to more highly skilled and better-paid workers, than localities that were similar to them at the time of their establishment.[13] In addition to physical remnants, historical institutions (such as urbanisation regulations, zoning laws or policies affecting the provision of public goods) can also have long-lasting effects on cityscapes.[14] In many economies in the EBRD regions, secondary cities continue to play a more important role than in other economies, largely reflecting policy choices during central planning – building towns around large state-owned enterprises, in some cases specifically with a view to avoiding the front lines of the Second World War, without due regard for transport costs or environmental considerations.[15]

In conclusion, urban policies differ greatly and have very long-term effects on economic development. The following section provides a brief history of housing policies and looks at their legacy effect on housing and home ownership today.

A brief history of housing policies

In many advanced European economies, the private sector (typically employers) had primary responsibility for housing from the era of rapid industrialisation and urbanisation right up until the Second World War, leaving many households in low-quality dwellings and facing an expensive tenure system.[16] The rise of the modern welfare state after the Second World War brought significant changes to the housing market, with housing provision increasingly being seen as part of the state's responsibility for ensuring minimum standards of welfare.[17]

The 1970s and 1980s, in turn, saw a paradigm shift in many economies with the commodification of housing, whereby the provision and allocation of housing were left to market forces. The public provision of housing (that is to say, social housing), which was common in many welfare states at the time, went through a process of commercialisation whereby housing provision was privatised, or responsibility for allocating it was passed on to non-profit organisations and housing associations, while some countries launched "right-to-buy" schemes enabling households to buy social housing rented from the state at a relatively low cost.[18] As a result, the public sector retreated from the direct provision of housing in many countries (including in North America and the United Kingdom), focusing instead on indirect support for low-income households (through housing subsidies and allowances, for example). This policy shift resulted in a sharp rise in inequality, in terms of both the quality of housing and access to economic opportunities.[19] Spatial segregation based on ethnicity, race, migrant backgrounds and other socio-economic differences increased.

[8] See EBRD (2019, 2022).
[9] See Kalyukin and Kohl (2020).
[10] See Glaeser and Gyourko (2005a).
[11] See Bleakley and Lin (2012).
[12] See Heblich et al. (2021).
[13] See Schweiger et al. (2022).
[14] See Hanlon and Heblich (2020).
[15] See African Development Bank et al. (2019).
[16] See Dewilde and De Decker (2016).
[17] See van der Heijden (2013) and EBRD (2020).
[18] See Council of Europe Development Bank (2017).
[19] See Dewilde and De Decker (2016).

In contrast, under central planning in central, eastern and south-eastern Europe and Central Asia, housing was seen as a political priority. Nikita Khrushchev, the Soviet leader in the 1950s and the early 1960s, famously promised: "To every family its own apartment". The right to housing was often enshrined in constitutions,[20] and considerable resources were devoted to large-scale housing projects – addressing growing housing needs in rapidly industrialising and urbanising economies and, in some cases, in response to the destruction of housing stock during the Second World War.[21] In most economies, the state accounted for the bulk of the construction of housing and was the key provider of housing to the general population, typically in the form of multi-dwelling units.[22] The Soviet Union constructed about 2 million dwellings annually over almost three decades, while the construction of new housing in Yugoslavia increased more than five-fold between 1955 and 1965 and remained at or above that level until the late 1980s.[23]

A key characteristic of housing policies under central planning was the extraordinary occupancy rights enjoyed by tenants: once they had occupied their unit, it was almost certainly theirs for life, and it could be passed on to successive generations of occupants as long as the successors were registered as living there before the previous occupants died or moved away. Housing was also universally affordable: in 1970, rent in the Soviet Union absorbed about 5 per cent of household income on average, with utilities accounting for another 5 per cent; in Yugoslavia, average spending on accommodation fell from about 5.4 per cent of total expenditure in 1969 to 3.4 per cent in 1980 (with tobacco and alcohol accounting for about 4.5 per cent of spending during that period).[24]

When the transition process began, housing lost its privileged status, leading to the state's abrupt withdrawal from housing investment and the direct provision of housing services. Budget resources earmarked for housing were drastically reduced and construction was largely left to the private sector, with long-term effects on the supply of accommodation. Construction of new housing has fallen in all economies during the transition process, typically by half.[25]

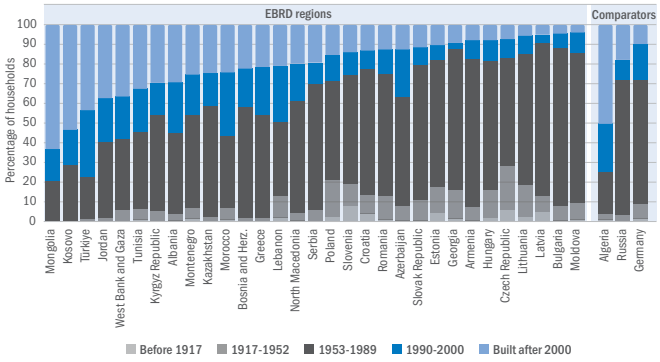
On the demand side, the privatisation of social housing through right-to-buy policies dramatically transformed housing markets. Under those schemes, sitting tenants had the right to purchase their units from the local government or state enterprises, typically at a price that was substantially lower than the market value – in some cases, for a nominal fee covering the cost of administering the sale.[26] Most of the housing involved was in multi-dwelling apartment buildings, with privatisation carried out on a unit-by-unit basis. The privatisation of housing proceeded rapidly. For instance, while 60 per cent of all units in Estonia were in state ownership before the transition process, by 1995 this share had fallen to just 10 per cent.[27] As a result, over half of all people in major post-socialist cities live in system-built, high-density housing estates where housing was transferred to tenants through privatisation programmes – perhaps the most enduring legacy of socialist housing policies and something that continues to define those cities today.[28]

In principle, the large amounts of home equity that have been created by those mass privatisation programmes have given new owners the opportunity to purchase larger or better units using that equity and mortgages with low loan-to-value ratios. However, right-to-buy schemes have also been associated with large increases in inequality and a decline in security of tenure for some households. Many private renters and homeowners with mortgages are now less secure than they would have been as renters of a state unit with the standard lifetime "social" rental contract.[29]

[20] See Smith (2010).
[21] See Andrusz et al. (1996).
[22] See Pichler-Milanović (1999).
[23] See Morton (1984) and Yugoslav Federal Statistics Institute (1991).
[24] See US Department of Commerce (1971).
[25] See Struyk (1996).
[26] See Tsenkova and Polanska (2014).
[27] See Struyk (2000).
[28] See Stanilov (2007).
[29] See Struyk (2000).

In the southern and eastern Mediterranean (SEMED), the public sector played an important role in the provision of housing in the 1970s and 1980s, usually keeping housing affordable through subsidies. This was particularly true in countries that had adopted elements of the Soviet Union's economic model, such as Egypt. Thousands of dwellings were built as part of major development plans. In the case of Egypt, the scarcity of agricultural land meant that new urban communities had to be built in the desert, resulting in the creation of 12 new towns. Mass housing policies resulted in large numbers of five-storey dwellings (typically without lifts). However, limited floor space often resulted in informal extensions being added to those buildings. The state's subsequent withdrawal from the housing market further exacerbated the situation. Across the SEMED region, rapid population growth and urbanisation, combined with limited urban planning (with cities being built back to front – buildings first and services afterwards), led to severe housing shortages, high levels of informality and insecurity of tenure.[30] In Egypt, the housing backlog is currently estimated at 3.5 million housing units, while Morocco is estimated to need an additional 600,000 units.[31] Nearly 70 per cent of Cairo's residents live in informal housing.[32] The next section describes the current housing stock in the EBRD regions, drawing on the latest round of the Life in Transition Survey.

CHART 4.2. Over half of all households in the EBRD regions live in dwellings constructed between 1953 and 1989



Source: LiTS IV and authors' calculations.

A portrait of housing stock

Over half of all households in the EBRD regions live in dwellings constructed between 1953 and 1989, reflecting high rates of construction under central planning (particularly between the 1960s and the 1980s). In some economies in the Caucasus and emerging Europe, more than two-thirds of the population live in dwellings constructed during that period (see Chart 4.2). Similar patterns can be observed in advanced European economies, reflecting reconstruction efforts after the Second World War and the expansion of the role of the state, but housing stocks in many other emerging markets are younger.

In many EBRD economies, construction rates have been low since the 1990s. Since 1995, the construction of dwellings has only accounted for 3 per cent of GDP in EBRD economies in the EU, 2 percentage points less than in advanced European economies, based on data from Eurostat. In both of those groups of economies, residential construction as a share of GDP increased temporarily in the boom years before the global financial crisis of 2008-09, fuelled by access to cheap credit, but is now back at levels comparable to those seen in the 1990s.[33]

This is despite demographic trends pointing to robust demand even in countries with shrinking populations (such as Bulgaria), as the number of individual households has continued to increase. Households have become smaller on average, as multi-generational households have fallen in relative terms, while single-person households have become more common. The increase in single-person households has actually been faster in emerging Europe than in advanced European economies, though that increase started at a lower level.

Reflecting the legacies of post-war housing construction, large multi-apartment buildings (defined as those with 10 dwellings or more) are more common in the EBRD regions than in Germany, being most prevalent in the Baltic states (see Chart 4.3). In contrast, small multi-apartment buildings (defined as those with less than 10 dwellings) are more common in the SEMED region and Türkiye.

Prefabricated housing blocks (assembled on-site using standard factory-made components) are common in many economies in the EBRD regions (see Box 4.1). Estimates from the latest round of the LiTS suggest that in some economies (such as Estonia, Latvia and Georgia) up to 40 per cent of households live in prefabricated housing blocks.

Many residential buildings in EBRD economies are in need of repair, partly reflecting their age. In the latest round of the LiTS, interviewers have been asked to rate the condition of the building in which the respondent lives on a four-point scale, with answers ranging from "very good" to "in urgent need of repair". Interviewers' responses suggest that in many economies in the Caucasus and the SEMED region, many dwellings are in need

[30] See Bah et al. (2018) and UN-Habitat (2011).
[31] See Centre for Affordable Housing Finance in Africa (2019).
[32] See Abadeer (2017).
[33] See Council of Europe Development Bank (2017).

of repair (see Chart 4.4). This is especially true of small multi-apartment buildings. In general, older buildings are regarded as being in a worse condition than newer buildings (with the age of the building being estimated by the respondent as part of the interview).

Almost a third of all households living in multi-apartment buildings in the EBRD regions have no formal building management, with that percentage rising to more than 70 per cent in Albania and some economies in the SEMED region. In general, buildings with no central management or only informal management tend to be in a worse condition than buildings run by management companies or homeowner associations. For instance, at the level of the EBRD regions as a whole, 4.5 per cent of all multi-apartment buildings without formal management are regarded as being in urgent need of repair, compared with just 2.1 per cent of multi-apartment buildings with homeowner associations. Similarly, around half of all buildings with no formal management have seen no major refurbishments in the last decade, compared with around 32 per cent of buildings with homeowner associations (see Chart 4.5).

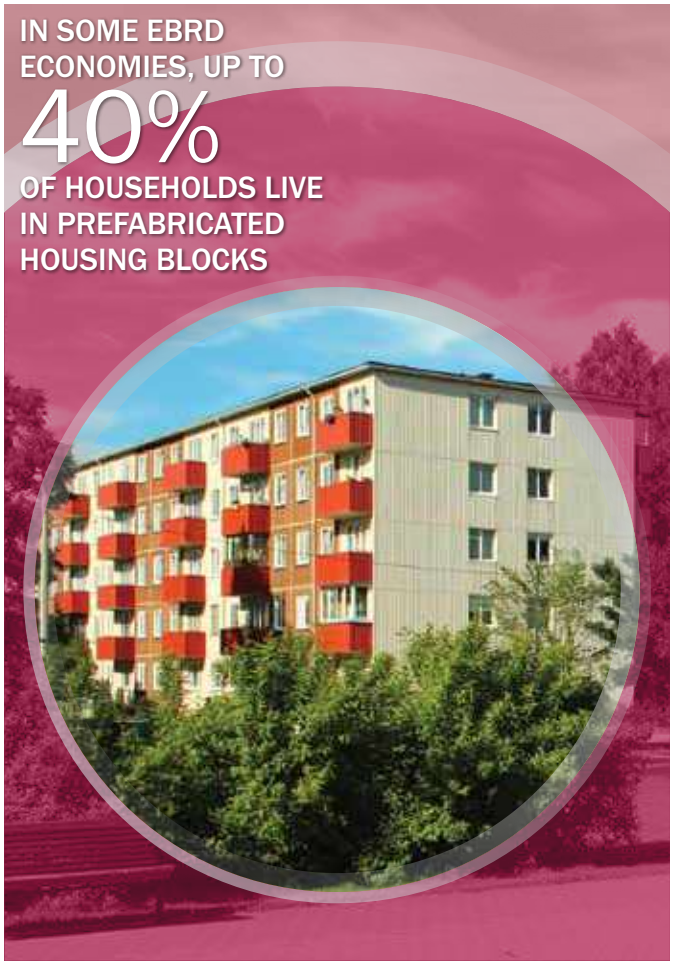
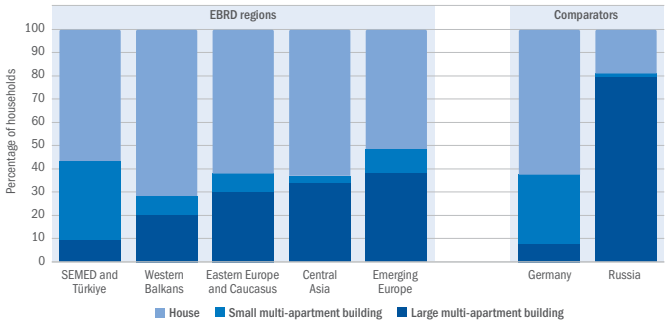
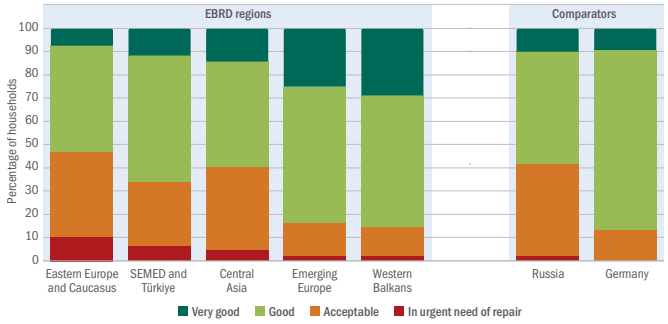


CHART 4.3. Large multi-apartment buildings are more common in the EBRD regions than in Germany



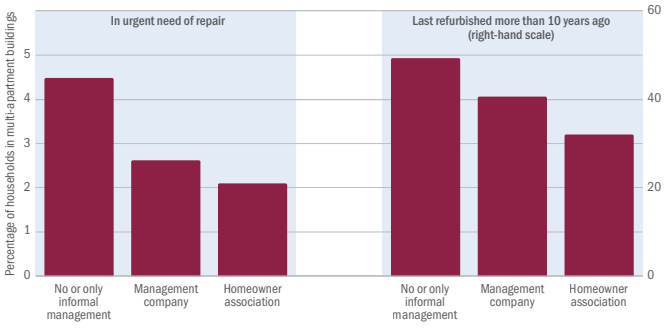
Source: LiTS IV and authors' calculations.
Note: In this chart, data for eastern Europe and the Caucasus cover only Armenia, Azerbaijan, Georgia and Moldova.

CHART 4.4. Many buildings in the Caucasus and the SEMED region are in need of repair



Source: LiTS IV and authors' calculations.
Note: In this chart, data for eastern Europe and the Caucasus cover only Armenia, Azerbaijan, Georgia and Moldova.

CHART 4.5. Multi-apartment buildings with no formal management tend to be in a worse condition than those with management companies or homeowner associations



Source: LiTS IV and authors' calculations.
Note: The figures in this chart (and those cited in the text) are based on household-level survey data and show, for each building management category, the percentage of households in multi-apartment buildings in that category whose building (i) is in urgent need of repair and (ii) was last refurbished more than 10 years ago.

A portrait of home ownership

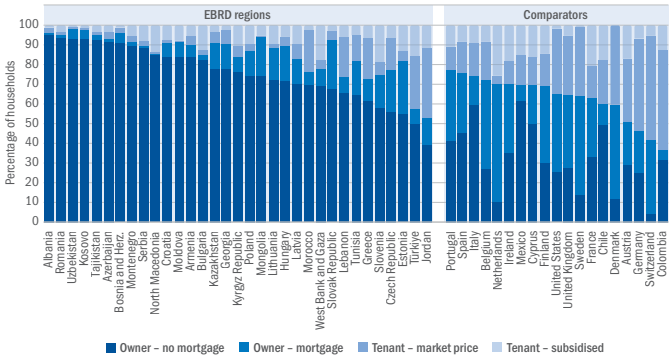
The composition of housing tenure (that is, ownership versus renting) varies greatly across economies, as do the relative shares of outright owners and owners with outstanding mortgages. These differences reflect current and past policies affecting housing supply and demand, such as privatisation, the regulation of mortgage and rental markets, the provision of social housing, taxation and land use policies.[34]

Today, advanced economies broadly follow one of two distinct approaches when it comes to the provision of housing: the unitary rental system (which is widespread in Germanic and Nordic countries) or the dualist rental system (which is common in Anglo Saxon countries).[35] The unitary rental market model is characterised by higher numbers of renters and a larger non-profit (or otherwise heavily regulated) housing association sector, which complements the private housing market to ensure more equitable access to housing.[36] Home ownership rates in Austria, Germany and Switzerland are around 40-50 per cent, and up to 20 per cent of households in these economies live in social housing (see Chart 4.6).

In contrast, the dualist rental system is characterised by a stronger role for free rental markets. It prioritises home ownership as a means of growing one's assets and wealth. For instance, the home ownership rate in the United Kingdom is around 65 per cent. The private rental market is profit-making and typically lightly regulated, providing only limited security for tenants. It is based on the notion that competition among landlords can increase the overall quality of housing. Social housing providers are less common, do not form part of the competitive market and act primarily as a safety net for the poor.[37]

Home ownership rates in former centrally planned economies remain high by international standards as a result of mass privatisation, with over 90 per cent of households owning their homes in some economies in the Western Balkans (compared with just over half in Türkiye and some economies in the SEMED region; see Chart 4.6). These economies have some characteristics of the dualist housing system, with high home ownership rates, but limited social housing. (Even in Poland and Slovenia, where social housing is most common, it accounts for less than 10 per cent of total dwellings.) In these economies, housing security is mainly available through ownership. Rental markets do, however, play a role in facilitating residential mobility. Such mobility is especially important in the context of significant technological shifts, where jobs disappear in some regions (such as those dependent on coal) but are created in others (see Chapter 3 and Box 4.2).

CHART 4.6. Levels of outright home ownership in the EBRD regions are much higher than in advanced economies



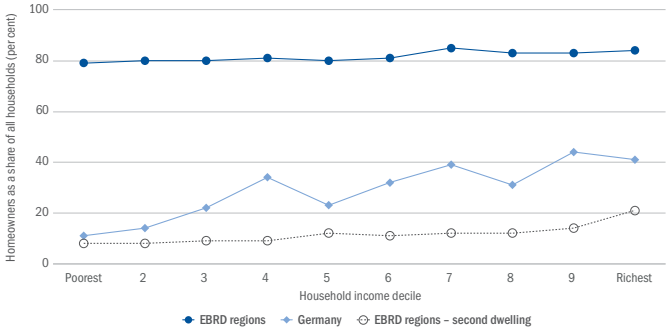
Source: Eurostat, LiTS IV, OECD and authors' calculations.
Note: OECD data are used for Chile, Colombia, Mexico and the United States. All of those economies' data relate to 2020, with the exception of Chile (2017). OECD data are based on occupied dwellings; where data on subsidised tenants are not available, the category "other and unknown" is regarded as comprising subsidised tenants. Data for all other advanced economies, plus Greece, Türkiye, central Europe and the Baltic states, and south-eastern Europe (with the exception of Bosnia and Herzegovina), are taken from Eurostat. All Eurostat data relate to 2022, with the exception of Montenegro (2021), Serbia (2021), Türkiye (2021), Albania (2020), North Macedonia (2020), Kosovo (2018) and the United Kingdom (2018). LiTS IV data are used for all other EBRD economies (for which Eurostat and OECD data are unavailable), adjusted for the average difference observed between LiTS and Eurostat data in the group of economies where both LiTS and Eurostat data for 2022 are available. On average, LiTS data have more outright owners and private renters than Eurostat data, but fewer owners with mortgages and fewer subsidised renters.

Many economies in the EBRD regions combine high levels of home ownership with low take-up of mortgages, again reflecting widespread privatisation. Other economies, such as Greece (as well as Chile, Colombia, Italy and Mexico), owe that combination of high ownership and low mortgage debt to a long history of inheritance being used as an alternative way of building savings and gaining access to home ownership. In contrast, in countries such as Denmark, Germany, Sweden and Switzerland, most households owning a home have outstanding mortgage debt, while home ownership rates are relatively low.[38]

Outright home ownership has been falling in the EBRD regions, albeit from a high level, while use of mortgages is on the rise. The percentage of households owning their home outright declined by about 5.7 percentage points between 2010 and 2022, falling to 77.8 per cent, while the percentage of households with mortgages increased by about 4.2 percentage points, rising to 8.6 per cent[39] (with a sharper increase in mortgage uptake being observed among richer households). In advanced European economies, home ownership and mortgage use are both in decline according to OECD data. The next section looks at how housing is related to socio-economic divides and access to economic opportunities.

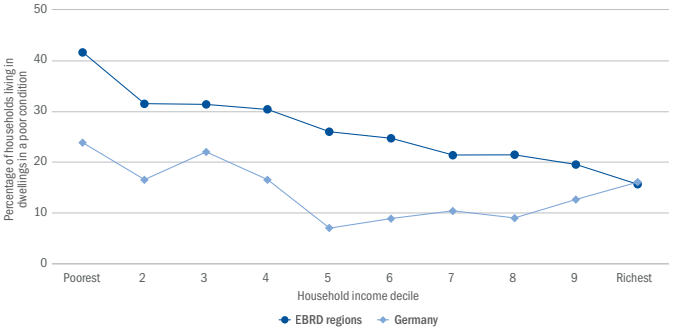
[34] See Causa et al. (2019).
[35] See Council of Europe Development Bank (2017).
[36] See Norris and Winston (2011).
[37] See Borg (2015).
[38] See OECD (2021).
[39] These are unweighted averages for 27 economies based on LiTS data. OECD data, where available, reveal similar patterns.

CHART 4.7. Home ownership is unrelated to income in the EBRD regions – unlike in Germany



Source: LiTS IV and authors' calculations.

CHART 4.8. Poor households are more likely to live in dwellings that are in a poor condition



Source: LiTS IV and authors' calculations.
Note: A building is considered to be in a "poor condition" if the interviewer assessed it as being "in urgent need of repair" or "acceptable".

IN SOME ECONOMIES IN THE WESTERN BALKANS, MORE THAN

90%

OF HOUSEHOLDS OWN THEIR HOME

Housing and inequality

Housing inequality reflects income inequality, but it can also contribute to it. In many advanced and emerging market economies, increases in income inequality in recent decades have been associated with rising concerns about the affordability of housing, widening disparities between renters and homeowners, and growing spatial segregation.[40]

In the EBRD regions, however, home ownership is largely unrelated to income – in stark contrast to Germany, where people in the top income decile are about 3.5 times as likely to own their home as those in the bottom decile (see Chart 4.7). (Similar patterns can be observed for other advanced economies, including those with higher home ownership rates (such as Italy), based on data obtained from earlier rounds of the LiTS and the OECD.) The lack of a relationship between home ownership and income levels in the EBRD regions reflects the high levels of home ownership in many economies on the back of right-to-buy schemes. Indeed, this pattern only holds for primary residences: ownership of other dwellings and land increases sharply with income. Take-up of mortgages also increases with household income (which is not surprising, as bank lending is conditional on households' ability to repay loans).

[40] See Council of Europe Development Bank (2017).

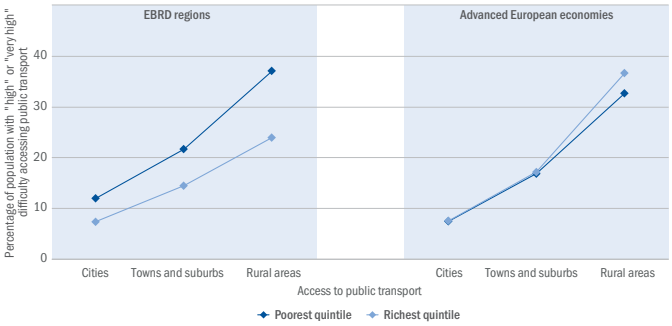
While home ownership is largely unrelated to income in the EBRD regions, the link between the condition of housing and income is stronger than in Germany (see Chart 4.8), with poorer households more likely to live in dwellings that are in a worse condition. In urban areas in the EBRD regions, those in the top quintile of the income distribution are somewhat more likely to live in large multi-apartment buildings (and less likely to live in houses) than those in the bottom quintile of the income distribution. In Germany, by contrast, the urban poor are most likely to live in small multi-apartment buildings, while richer households are more likely to live in houses. While most rural households in the EBRD regions live in houses, regardless of their income, small multi-apartment buildings are more common in rural Germany, especially for poorer households.

Housing also affects access to economic opportunities. In general, access to public transport is more difficult in rural areas. However, while access to public transport in advanced European economies is largely unrelated to income, in most of the EBRD regions poorer households are also less likely to have access to public transport than richer households – something that holds in cities, towns, suburbs and rural areas alike (see Chart 4.9, which draws on Eurostat data for a subset of economies). This pattern is also reflected in households' self-reported satisfaction with commuting time. Satisfaction with commuting time is significantly lower for the poorest 20 per cent in the EBRD regions – and this, again, holds across towns, suburbs and rural areas alike. In advanced Europe, meanwhile, differences between the poorest and richest quintiles are far smaller and, on average, only visible in rural areas – where the richest actually have more difficulty accessing public transport than the poorest.

It is also noticeable that urban areas in the EBRD regions (particularly in Central Asia and the SEMED region) lack access to green spaces relative to Germany. That lack of access to green spaces is more pronounced for lower-income households living in urban areas, who are more likely to live more than 30 minutes away from a public green space (see Chart 4.10). Eurostat data for a subset of economies in the EBRD regions point to similar patterns. Where the former centrally planned economies inherited generous public spaces in urban areas, those green spaces were often "lost in transition", being used for new housing developments. Meanwhile, the large-scale green development projects that have been implemented in recent years have typically been concentrated in the largest and wealthiest cities.[41]

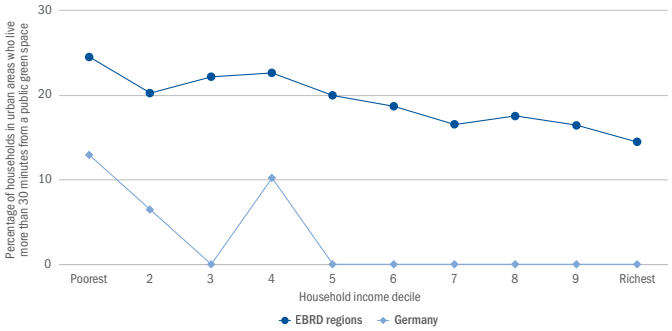
Monthly payments covering the cost of housing (mortgage or rent payments, plus the cost of utilities) account for a substantial share of household income, both in the EBRD regions and in advanced European economies (see Chart 4.11). In most EBRD economies, rent payments tend to be higher than mortgage payments as a share of income. In theory, renting and owning should be substitutes, but this is often not the case in practice – partly reflecting the segmentation of housing into renter-

CHART 4.9. In the EBRD regions, poorer households are less likely to have access to public transport



Source: Eurostat and authors' calculations.
Note: This chart is based on a question where respondents report on the difficulty they face in accessing public transport, replying "very low", "low", "high" or "very high". Data are for 2013.

CHART 4.10. Poorer households in urban areas also tend to have less access to public green spaces in the EBRD regions

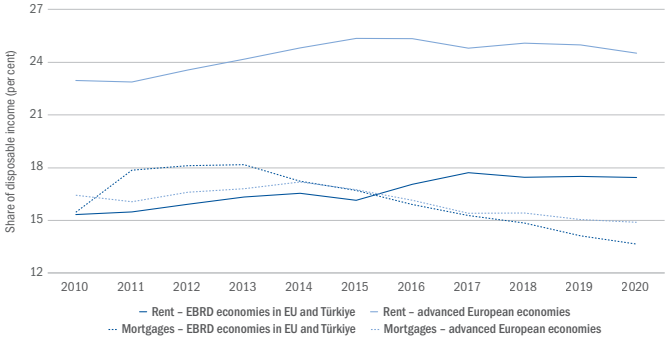


Source: LiTS IV and authors' calculations.

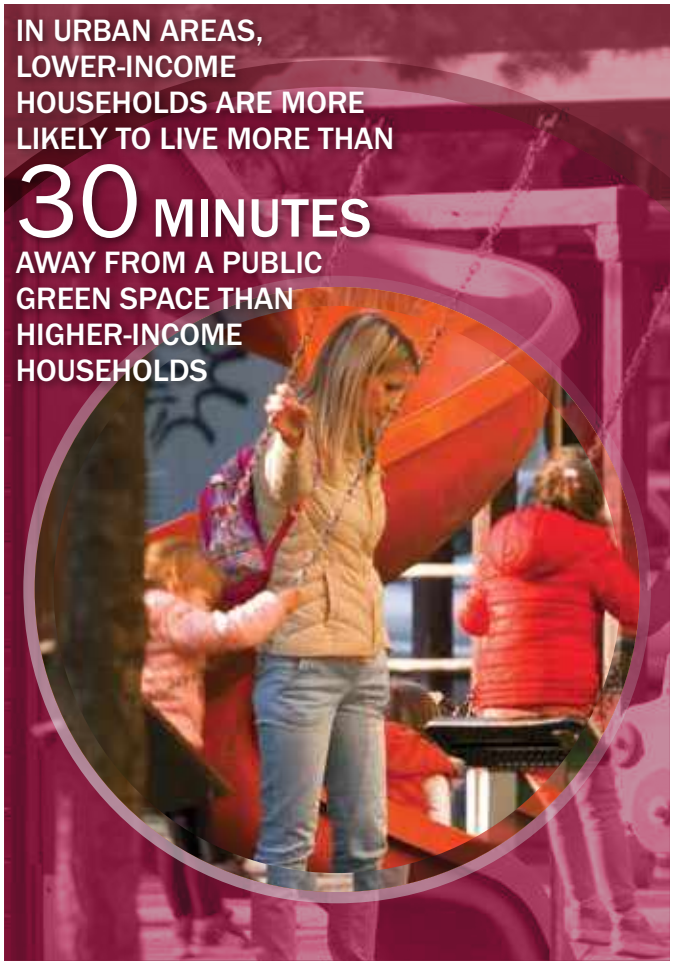
[41] See African Development Bank et al. (2019).

focused markets (typically consisting of smaller units closer to urban centres) and owner-focused markets (consisting of larger detached dwellings, often with higher maintenance costs).[42] Furthermore, the gap between rent and mortgage payments has widened of late (see Chart 4.11), reaching a record high (though the time series is relatively short).[43] Mortgage payments have fallen, both in the EBRD regions and in advanced European economies, reflecting the long-term decline in interest rates, while house prices have increased as mortgages have become more affordable. As house prices have risen, so has rent as a share of income, disadvantaging credit-constrained households, which are potentially unable to buy.

CHART 4.11. The gap between rent and mortgage payments has widened in the EBRD regions



Source: OECD and authors' calculations.
Note: Data for EBRD economies in the EU relate to Estonia, Greece, Hungary, Latvia, Poland, the Slovak Republic and Slovenia; figures for advanced European economies relate to Austria, Finland, the Netherlands, Norway, Portugal, Spain and the United Kingdom. Mortgage payments include both interest and repayments of principal.



Housing as an asset

In addition to being a place to live, housing is also an important asset, typically accounting for the bulk of households' wealth.[44] It is a fundamental driver of the accumulation of wealth, including across generations. For lower-income households, housing often represents the sum total of their inheritance.[45] The period since the Second World War has seen unprecedented accumulation of wealth in the form of residential property, supported by broad-based increases in house prices as mortgage products have become widely available.[46] As a result, residential property has become the largest capital asset in the investable economy, exceeding the total combined value of equities, commercial property, agricultural land, forestry and all the gold ever mined. Recent work in this area highlights the fact that housing accounts for (i) the majority of the increase seen in total private wealth in the 21st century, (ii) the bulk of the total return on aggregate wealth and (iii) the majority of the growth in wealth-to-income ratios.[47]

While the distributional implications of housing as an asset have received less attention, wealth inequality tends, in general, to be greater than income inequality, partly owing to the inherited nature of some wealth.[48] On average, the bottom 40 per cent of households in OECD countries receive around 20 per cent of total disposable income, but account for only 3 per cent of net wealth. Wealth also tends to be much more concentrated at the top than income.[49]

[42] See Glaeser and Gyourko (2005b) and Halket et al. (2020).
[43] See Gete and Reher (2018).
[44] See Causa et al. (2019).
[45] See Council of Europe Development Bank (2017).
[46] See Renaud and Kim (2007).
[47] See Piketty and Zucman (2014).
[48] See van Hoenselaar et al. (2021) and Causa et al. (2019).
[49] See Causa et al. (2019).

However, greater home ownership is actually associated with lower wealth inequality, as housing, as an asset class, is more important to middle-class households than to people at the top of the income distribution. Consequently, inequality in net non-housing wealth (including business and financial wealth) tends to be higher than inequality in net housing wealth. Consistent with the high levels of home ownership in the EBRD regions and its more equal distribution relative to other economies, wealth inequality tends to be lower in post-communist economies for which data are available than in other economies with similar income inequality. For instance, in Hungary, the Slovak Republic and Slovenia, the bottom 40 per cent account for around 5-10 per cent of net wealth; in Austria, Denmark, Germany and the Netherlands, which have similar levels of income inequality, the equivalent figure is around 1 per cent or less. In other words, many homeowners in post-communist economies may be relatively asset-rich, but income-poor.[50]

Just as housing tends to be households' largest asset, mortgages tend to be their largest liability. At the country level, mortgage debt makes up more than half of total household debt in almost all OECD countries. Among mortgage holders, mortgage debt represents more than 80 per cent of total debt. Young homeowners and homeowners at the bottom of the income distribution are the two groups where mortgages account for the largest share of household debt.[51] The increased use of mortgages in the EBRD regions over time has widened the range of options available to buyers. At the same time, however, increased choice comes with greater vulnerability relating to the potential loss of income or increases in interest rates. Variable-rate mortgages, which expose borrowers to greater interest rate risk, are more prevalent in EBRD economies in the EU than in advanced European economies (being particularly common in the Baltic states, Greece and Poland). Mortgages denominated in foreign currency, which expose borrowers to foreign-exchange risk, are less common than they were a decade or two ago, as the associated risks have been laid bare by large currency movements (such as the appreciation of the Swiss franc – once a popular currency for loans owing to its low interest rates). Nonetheless, in some countries (Poland and Romania, for instance) foreign currency-denominated mortgages have continued to account for more than 10 per cent of total mortgages in 2023.[52]

Housing and energy

Housing as a source of demand for energy

In addition to being an important consumption good and a major asset class, housing is also a major component of energy consumption. LiTS IV respondents in the EBRD regions report spending an average of 22 per cent of their household income on utilities (electricity, heating, water and sewerage, rubbish collection and so on), up from 17 per cent in 2016. This is significantly more than in Germany, and the figures for poorer households are higher still.

Housing is also a source of pollution and greenhouse gas emissions. While energy use and the associated emissions in industry and transport tend to receive more attention, the environmental footprint of the residential sector is sometimes larger. This section puts emissions from housing into the broader context of overall emissions (including those produced by industry, transport and other services) and breaks residential emissions down into their various components. In particular, it distinguishes between (i) heating and hot water (including gas boilers) and (ii) domestic appliances (such as refrigerators or air conditioning units). While the former are often supplied through integrated systems that are part of the building stock (such as district heating), the latter are typically electrified individual units that are not built into housing structures and can be changed at the household level.

ON AVERAGE, HOUSEHOLDS IN THE EBRD REGIONS SPEND

22%

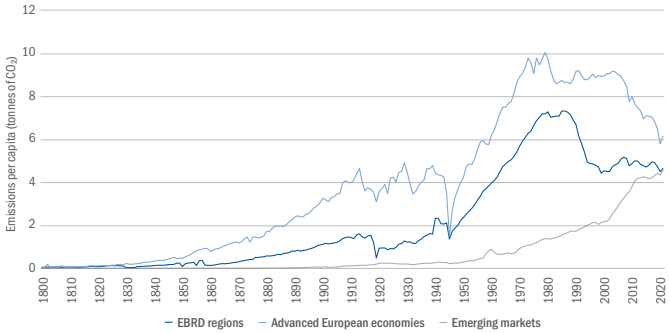
OF THEIR INCOME ON UTILITIES, UP FROM

17%

IN 2016

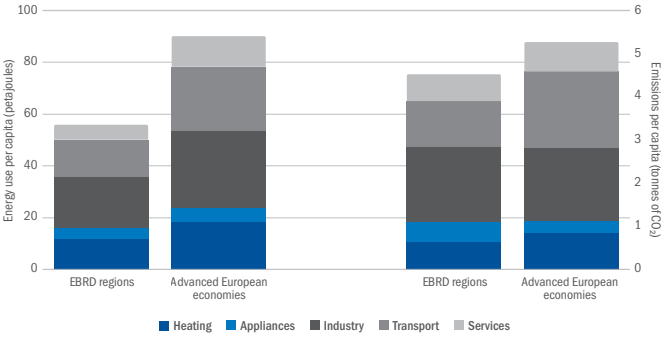
[50] See Causa et al. (2019) and OECD (2021).
[51] See Causa et al. (2019) and OECD (2021).
[52] See Causa et al. (2019).

CHART 4.12. Carbon emissions per capita in the EBRD regions have remained largely unchanged over the last two decades



Source: Our World in Data and authors' calculations.
Note: This chart shows population-weighted averages based on three unbalanced panels: up to 34 economies in the EBRD regions; 15 advanced European economies; and 15 emerging market economies.

CHART 4.13. The residential sector accounts for 29 per cent of total energy use in the EBRD regions and 26 per cent of total emissions



Source: IEA and authors' calculations.
Note: The data in this chart are estimates based on IEA surveys of statistical agencies and relate to 2021 or the latest available year. Residential energy use and emissions are broken down into "appliances" and "heating". "Appliances" includes cooking, cooling and lighting; "heating" refers to all heating, including hot water (such as gas boilers). Data represent population-weighted averages based on 27 economies in the EBRD regions and 15 advanced European economies.

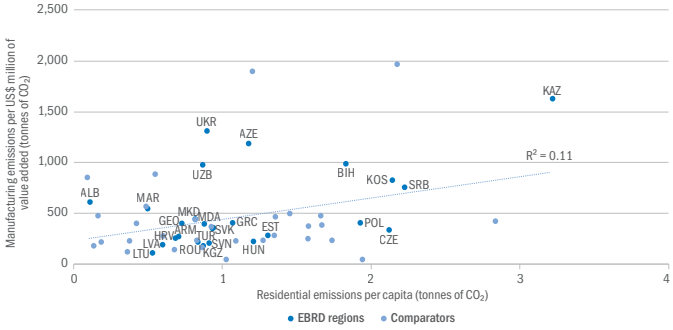
Environmental footprint of the EBRD regions over time

Until the late 1990s, the environmental footprint of economies in the EBRD regions closely tracked their development trajectory. Total emissions per capita in the EBRD regions increased sharply with industrialisation and urbanisation in the decades following the Second World War, peaking in 1985 (see Chart 4.12). Following the shift away from central planning (which largely disregarded the social cost of pollution) and the transition recession, emissions declined sharply, falling by almost 40 per cent.

Over the last two decades, carbon emissions per capita in the EBRD regions have remained largely unchanged, broadly in line with the levels observed in other emerging markets. Panel regressions suggest that emissions in the EBRD regions are now comparable to those observed in other economies with similar levels of development, urbanisation and industrialisation. Emissions per capita in advanced European economies are higher on average, but they have declined rapidly since the mid 2000s. At the same time, the average for the EBRD regions conceals significant variation across individual economies. Emissions per capita are highest in Central Asia (particularly in Kazakhstan, Mongolia and Turkmenistan) and central Europe (particularly in the Czech Republic and Poland), where levels exceed those seen in advanced European economies. Total emissions per capita are lowest in the SEMED region, followed by the Western Balkans, and eastern Europe and the Caucasus.

Across the EBRD regions as a whole, the residential sector accounts for 26 per cent of total emissions and 29 per cent of total energy use (see Chart 4.13). However, there are several economies where the residential sector is the single largest contributor to total emissions, surpassing industry, transport and other services. This is the case, for instance, in Azerbaijan, Kosovo, the Kyrgyz Republic, Moldova and Serbia.

CHART 4.14. Residential carbon emissions can remain relatively high even as industry becomes greener

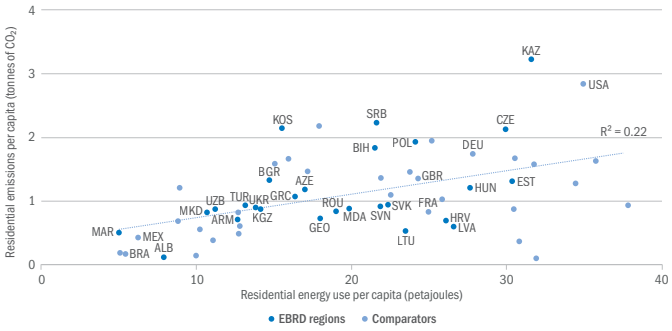


Source: IEA and authors' calculations.
Note: Data relate to 2021 or the latest available year.

Weak relationship between the residential sector and industry in terms of carbon efficiency

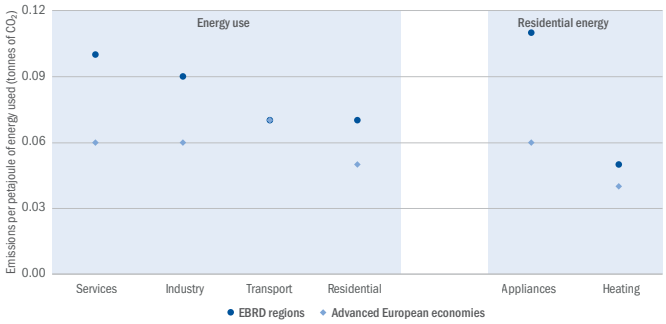
The correlation between emissions per capita generated by housing and emissions per unit of value added in industry is positive, but relatively weak (see Chart 4.14). In some economies (particularly Kazakhstan and the Western Balkans), industrial and residential emissions are both high. In contrast, economies in eastern Europe and the Caucasus have industrial sectors that pollute more than their residential sectors, while economies in central Europe have fairly carbon-efficient industrial sectors relative to their residential sectors (partly reflecting technology upgrades and decarbonisation policies focused on the manufacturing sector).

CHART 4.15. Residential emissions per capita are only weakly correlated with energy use per capita



Source: IEA and authors' calculations.
Note: Data relate to 2021 or the latest available year.

CHART 4.16. In the EBRD regions, heating and residential appliances pollute more per unit of energy used than in advanced European economies



Source: IEA and authors' calculations.
Note: Population-weighted averages based on data for 2021 or the latest available year. "Appliances" includes cooking, cooling and lighting; "heating" refers to all heating, including hot water (such as gas boilers). Data are based on 27 economies in the EBRD regions and 15 advanced European economies.

Differences in residential energy use explain only 22 per cent of total cross-country variation in residential emissions per capita (see Chart 4.15). For instance, residential emissions per capita in Kazakhstan are around 2.5 times the level seen in Estonia, despite Kazakhstan's residential sector using only 4 per cent more energy per capita. Similarly, Bosnia and Herzegovina, Poland and Serbia emit about twice as much as Slovenia and the Slovak Republic while using similar amounts of energy.

Differences in the carbon intensity of residential energy use

Economies with high emissions for a given level of energy use tend to be more dependent on coal for their energy. In contrast, economies where renewables account for a large proportion of energy generation (such as Albania, which gets almost all of its energy from hydroelectric power, or Lithuania, where wind and solar power play a significant role) have relatively low emissions for the same level of energy use.

While residential energy use per capita in the EBRD regions is less than half of the level seen in advanced European economies, the EBRD regions emit 43 per cent more carbon per unit of energy used (see Chart 4.16). As a result, total residential emissions per capita are only 3 per cent lower in the EBRD regions. The differential between advanced European economies and the EBRD regions in terms of the carbon efficiency of their energy supply is even larger for the industrial sector, with the EBRD regions emitting 57 per cent more carbon per unit of energy used.

In the EBRD regions, heating accounts for a smaller share of total residential energy use and emissions than in advanced European economies, partly reflecting the widespread use of district heating (see Box 4.3). However, it pollutes somewhat more per unit of energy used than in advanced European economies (see Chart 4.16). Appliances are even more emission-intensive in the EBRD regions than in advanced European economies, a fact that is largely explained by those economies' reliance on fossil fuels (particularly coal) for the generation of electricity.

Drivers of cross-country differences in residential emissions per capita

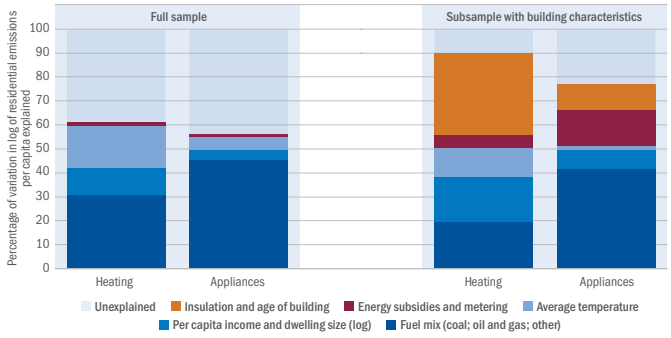
In addition to the fuel mix in the energy sector (that is, the relative shares of coal and other fossil fuels such as oil and gas), several other factors can also affect the environmental footprint of housing. For instance, people in economies with higher income per capita (at market exchange rates) may have greater purchasing power when it comes to energy-efficient boilers and other appliances.

Demand for heating and cooling is largely determined by the climate of the relevant economy. In general, demand for heating tends to rise linearly when average monthly temperatures fall below 15°C.[53] In Europe, a 1°C drop in the average winter temperature is associated with an increase of around 5 per cent in total consumption of natural gas, for instance.

Proper metering of heating and water, as well as cost-reflective pricing of gas and electricity, will strengthen incentives to use energy efficiently. Various characteristics of the building stock, such as its average age or the use of double or triple-glazed windows, will also affect energy consumption, while more spacious housing will consume more energy.

[53] See Plekhanov and Sassoon (2023).

CHART 4.17. Differences in countries' fuel mix, the use of metering and the condition of the housing stock explain the bulk of the cross-country variation in residential emissions



Source: IEA, LiTS IV and authors' calculations.

Note: Data relate to 2021 or the latest available year. "Heating" refers to all heating, including hot water; "appliances" includes cooking, cooling and lighting. Shapley decomposition based on a linear model regressing the logarithm of residential emissions per capita on various explanatory variables. "Fuel mix" comprises the share of coal and the share of oil and gas in total energy production. GDP per capita is measured at market exchange rates. In the case of heating, the "average temperature" variable is the sum of all downward deviations in average monthly temperatures from 15°C across all months; in the case of appliances, it is the sum of all downward deviations in average monthly temperatures from 15°C across all months plus the sum of all upward deviations in average monthly temperatures from 21°C. "Dwelling size" is measured as the logarithm of square metres per capita. "Metering" is the average share of metered heating (in percentage terms) plus the average share of smart meters (so smart meters are counted twice). "Energy subsidies" is calculated as the inverse hyperbolic sine transformation of the fossil-fuel subsidy as a percentage of GDP, based on data from the IMF and the IEA. "Insulation" is the percentage of buildings with at least some double-glazed windows plus the percentage of buildings with all windows double-glazed (so again, fully double-glazed buildings are counted twice).

The following regression analysis looks at these various factors and their relative importance in explaining differences in the logarithm of residential emissions per capita. The contributions of various groups of factors are derived using a Shapley decomposition. The left-hand panel in Chart 4.17 focuses on key variables available for a larger sample of countries; the right-hand panel presents more detailed analysis based on a small sample of 20 economies,[54] using information on building characteristics and metering derived from the Life in Transition Survey.

On average, differences in the prevalence of various fossil fuels in countries' fuel mixes can explain around 25 per cent of total cross-country variation in heating-related emissions per capita, and over 40 per cent for emissions caused by the operation of domestic appliances.

Higher income per capita and larger dwellings per capita significantly increase demand for heating, accounting for close to 20 per cent of total variation in emissions (and, unsurprisingly, a much smaller share of variation in total emissions from appliances).

Colder and longer winters can explain some of the cross-country variation in heating-related emissions. While on average they only explain around 12 to 18 per cent, colder winters in Estonia, for instance, are estimated to result in 65 per cent more heating emissions per capita than colder winters in Croatia. As expected, the climate matters less for emissions from appliances: average temperatures explain only 2 to 6 per cent of total variation in the environmental footprint of appliances, even taking demand for cooling into account.

Incentives to use energy efficiently, captured here as the use of metering and fossil fuel energy subsidies, explain 5 per cent of total variation in heating-related emissions and 15 per cent of emissions from appliances. In a broad sample of countries, the doubling of fossil-fuel subsidies (as a percentage of GDP) is associated with a 40 per cent increase in heating-related emissions per capita. Smart meters provide additional incentives. Unlike traditional meters, which provide a running total of the amount of energy used, smart meters can record consumption at a high frequency, providing more information about energy use and automatically sending meter readings to the energy supplier, making it easier for residents (and energy suppliers) to monitor the cost of energy consumption in real time.

Older buildings are, on average, associated with a significant increase in emissions from heating (but not emissions from appliances). Building age and the percentage of buildings with double-glazed windows explain around a third of total variation in emissions from heating and a tenth of total variation in emissions from appliances. These variables are likely to reflect insulation that is not directly reported in the data (since newer buildings and those with double or triple-glazed windows are also likely to be better insulated). Around 10 to 40 per cent of total variation in emissions from heating and appliances remains unexplained.

DIFFERENCES IN RESIDENTIAL ENERGY USE EXPLAIN ONLY

22%

OF TOTAL CROSS-COUNTRY VARIATION IN RESIDENTIAL EMISSIONS PER CAPITA

[54] Albania, Belarus, Bosnia and Herzegovina, Bulgaria, Croatia, Estonia, Georgia, Germany, Greece, Hungary, Kosovo, Latvia, Lithuania, Morocco, North Macedonia, Poland, Romania, Serbia, Slovenia and Türkiye.

Installing meters

Overall, this analysis suggests that relatively low-cost, technologically straightforward improvements, such as installing meters for water and heating, upgrading conventional meters to smart meters, and installing double-glazed windows, can help to significantly reduce residential emissions, taking the existing housing stock as given.

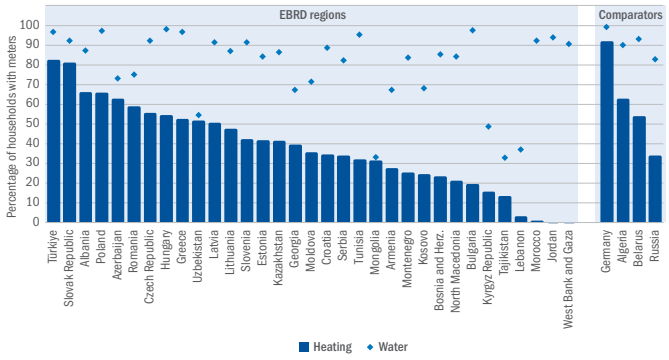
Proper metering of water and heating, as well as cost-reflective pricing of gas and electricity, will strengthen incentives to use energy efficiently. This allows consumers to pay for the energy units that they actually use and can support more demand-driven provision of services.[55] At present, 38 per cent of households across the EBRD regions report that they pay for heating on the basis of meter readings (see Chart 4.18). While there is some ambiguity in the way that respondents have interpreted the question about metered heating, given the variety of heating arrangements available (ranging from individual wood stoves to stand-alone gas boilers to district heating), the answers reflect substantial use of unmetered energy for heating. By way of comparison, 80 per cent of households across the EBRD regions (and 99 per cent in Germany) report having metered water. In addition to reflecting the metering of water, the figure for water meters also appears to be a good proxy for the prevalence of the metered supply of utilities in general and is therefore integrated into the regression analysis. Smart meters are not common in the EBRD regions: only 12 per cent of households have a smart meter for water, while 10 per cent have a smart meter for heating.

Insulating existing buildings

The use of double-glazing (which helps to keep homes warmer in the winter and cooler in the summer) is relatively common in emerging Europe, while single-glazing is particularly widespread in Central Asia and the SEMED region (see Chart 4.19). Across all economies in the EBRD regions, around 55 per cent of dwellings have at least some double-glazed windows, compared with 65 per cent in Germany.

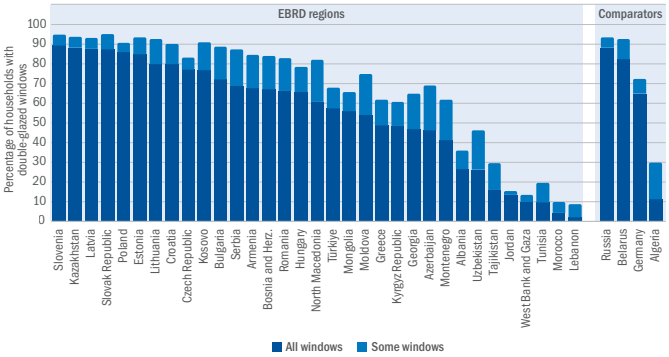
One of the key challenges when it comes to improving the energy efficiency of buildings is the availability of finance. The commercial banking sector is often unable to provide the necessary funding owing to its inability to assess projects and its focus on shorter-term lending. One example of a successful alternative financing vehicle is the Public Investment Development Agency (VIPA) in Lithuania, which was established in 2012. That agency oversees the Apartment Buildings Renovation Fund, a state-backed initiative targeting the renovation of older, energy-inefficient buildings. This initiative combines several different funding sources, including general government funding, government funding from earmarked emission levy revenues, EU structural funds and loans from multilateral development banks (including the EBRD). It works with Lithuania's Housing Efficiency Agency (BETA) to provide low-interest loans and grants covering the cost of setting up energy-efficiency projects, for example. The use of blended funding comes with strict eligibility criteria: energy savings must total at least 40 per cent (indeed, they average 60 per cent), with an energy performance rating of C or above.

CHART 4.18. There is substantial use of unmetered energy for heating in the EBRD regions



Source: LiTS IV and authors' calculations.
Note: This includes both smart meters and regular meters. Data for heating/water indicate the percentage of respondents replying "yes" to the question "Is heating/water metered?" If respondents decline to answer or respond "I don't know", that is treated as a "no".

CHART 4.19. Double-glazed windows are common in the EBRD regions



Source: LiTS IV and authors' calculations.

[55] See Akcura et al. (2023), EBRD (2018) and World Bank (2023).

Conclusion and policy implications

This chapter has discussed and illustrated several characteristics of housing and home ownership in the EBRD regions: many people live in multi-apartment buildings (which are often prefabricated) constructed between the 1960s and the 1980s, and home ownership rates are high across the income distribution. However, poorer households tend to live in buildings that are in a worse condition and have more limited access to public transport and green spaces. Wealth inequality, while modest by international standards, has risen. Greater use of mortgages creates new opportunities, but also vulnerabilities, reflecting the prevalence of variable-rate mortgages and the fact that some mortgages are denominated in foreign currency. Meanwhile, the gap between rent payments and mortgage payments as a share of income has been widening, partly reflecting limited construction of new buildings and the state's withdrawal from the provision of social housing.

These trends call for policy measures to address rising inequality in access to opportunities and public transport, and to maintain and restore green spaces and other communal areas. Macroprudential policies and lending standards need to properly account for the risks associated with variable-rate mortgages and foreign currency-denominated loans.[56] Increased provision of social housing based on clearly defined eligibility criteria can help to improve security of tenure for vulnerable households.

This chapter has also highlighted the significant environmental footprint of housing in the EBRD regions (as well as advanced economies), which is, to a large extent, shaped by countries' use of coal and other fossil fuels for the generation of electricity. While greening the electricity mix can reduce the emissions associated with appliances, decarbonising heating in cold climates presents unique technological and policy challenges. At the same time, however, differences in average temperatures explain only 15 per cent of total variation in heating-related emissions per capita across economies.

Findings from the latest round of the Life in Transition Survey suggest that there is scope to significantly reduce emissions by improving insulation and metering, even taking the building stock as given. The renovation of existing buildings and the incorporation of energy-efficiency requirements into construction standards for new buildings can help to reduce heating demand. The experiences of individual countries suggest that a combination of (i) incentives encouraging energy-efficient renovations and (ii) clearly defined and ambitious eligibility criteria can be effective in upgrading the EBRD regions' existing stock of ageing multi-apartment buildings.

More broadly, a combination of incentive schemes and financing mechanisms can help to increase energy efficiency. Incentives can include metering and pricing that takes account of environmental externalities, as well as schemes encouraging energy-efficient improvements and investments (such as partial investment grants, rebates, interest subsidies and tax incentives). Governments can work with banks and other financial institutions to develop appropriate financial products (possibly combined with subsidies and risk-sharing mechanisms) that support household investment. For instance, municipal credit lines could be used to help improve the energy efficiency of buildings. Such schemes could be complemented by other actions that help to publicise programmes, recruit participants, promote behavioural change, share good practices and lessons, lower transaction costs through standardised audits and other templates, offer training, and conduct monitoring and reporting.[57]

Such initiatives often involve a range of actors, including financial intermediaries (such as development, commercial or community banks), tax agencies (through tax credits or exemptions), public agencies or third parties appointed by the government (such as energy-efficiency or environmental funds, or energy agencies), or private companies (such as equipment vendors or energy providers). A central institution such as an energy-efficiency fund can help to coordinate the various actors involved by serving as a "one-stop shop" for financing, incentives, information and technical expertise.[58]

[56] See Causa et al. (2019).

[57] See EBRD (2018) and World Bank (2023).

[58] See EBRD (2018) and World Bank (2023).

BOX 4.1.

Renovating prefabricated housing

Prefabricated housing – buildings consisting of factory-made components that were transported to the relevant location and assembled on-site (known, for example, as *panelák*, *panelház*, *panelki*, *wielka płyta* or *ugsarmal* in the EBRD regions) – was the main type of urban housing under central planning. It continues to dominate many cityscapes today, from Bratislava to Bishkek and from Tallinn to Tirana.

The concept of prefabricated housing originally dates back to pre-war France, where architects were focused on enabling large groups of people to live comfortably in the city while having easy access to green areas. It then came into its own in the aftermath of the Second World War, when the use of load-bearing panels made from pre-stressed concrete allowed large amounts of housing to be built all year round at lower cost (with savings of between 5 and 20 per cent) and at greater speed than with conventional techniques. Construction times dropped by 30 to 45 per cent, while labour requirements were reduced by 40 to 50 per cent. In contrast, bricklaying required skilled masons and could not easily be scaled up, while the use of cast-in-place concrete was limited by severe winters.[59] Pre-casting also allowed for closer quality control.[60]

In the Soviet Union, standardised prefabricated housing accounted for 54 per cent of construction in 1980, up from just 1.3 per cent in 1959. In cities with a population of over a million, it accounted for more than 75 per cent of all construction by 1980.[61]

While some post-war housing estates have been demolished prematurely, others have been renovated and adapted to modern life. Their key shortcoming is poor thermal insulation. Retrofitting buildings can result in significant energy savings, create jobs and improve comfort. It is estimated to deliver €2 million in energy cost savings and create between 18 and 37 jobs for every €1 million invested.[62]

In the Baltic states, Bulgaria, the Czech Republic, Hungary, Poland, Romania and the Slovak Republic, the renovation of such housing estates has typically been heavily subsidised by the state (in some cases involving the use of EU funding). This has generally increased the value of such apartments, sometimes transforming the appearance of entire neighbourhoods through the use of coloured cladding panels.

In Hungary, for instance, about 788,000 prefabricated dwellings were built, predominantly in the 1960s and 1970s, and those dwellings still house about 18 per cent of the country's population today. Indeed, there are some cities, such as Székesfehérvár, where they house almost the entire population.[63] Almost a quarter of Hungary's prefabricated buildings were renovated between 2000 and 2007, reducing energy use by between 8 and 50 per cent. That renovation work, some of which was paid for using state and municipal funding, included repainting, the replacement of doors and windows, and the upgrading of heating systems. In Szeged, where prefabricated housing blocks account for about 38 per cent of all dwellings, 75 per cent of all prefabricated dwellings were renovated between 2002 and 2009. Those renovations cost around €3,900 per apartment,[64] with a third being covered by state funding and another third being paid for by the municipality, and achieved energy savings of 30 per cent for heating. Demand for renovated apartments has been high, resulting in a price premium of around 50 per cent for apartments located in refurbished buildings.[65]

Some cities have sought to turn their refurbished buildings into the next generation of smart homes. SmartEnCity, an EU-funded project focusing on the Estonian city of Tartu, has transformed 18 Khrushchev-era apartment blocks (a total of 664 apartments housing about 1,500 people) into self declared "smart blocks" ("smartkovki"). In addition to a thicker insulation layer, all buildings have been equipped with triple-glazed windows, a demand-based heat recovery ventilation system and roof-mounted solar panels. The hot water supply, which was previously generated by stand-alone boilers, has been integrated into district heating. The project also involved smart solutions in the areas of transport and street lighting through the creation of a city-level portal collecting city, building and apartment-level data, including information on energy use, lighting and vehicle traffic. Total energy demand has been reduced by 36 per cent overall (with a 54 per cent reduction for heating, corresponding to an average saving of €350 per year per tenant).[66]

Further east, in the Caucasus and Central Asia, such renovation work has been much less common, resulting in buildings becoming more dilapidated and eventually being demolished. Here, private renovation has been the norm, resulting in greater variation in the quality of buildings and the communal areas associated with them.

[59] See Navarro and Sobecka (2023).
[60] See US Department of Commerce (1971).
[61] See Malaia (2020).
[62] See IEA (2020), Buildings Performance Institute Europe (2023) and Government of the Republic of Lithuania (2021).
[63] Data taken from the country's 2011 census.
[64] Based on data for the period 2005-08.
[65] See Rafai (2019).
[66] See SmartEnCity (2022).

BOX 4.2.

Housing and mobility

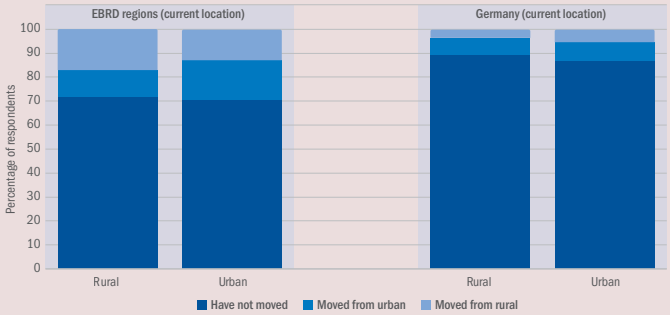
As documented in this chapter, the characteristics of neighbourhoods matter for economic outcomes and are highly persistent. With that in mind, it is not surprising that people choose to move during their lifetime, but they typically remain within their country of residence (with only around 3.5 per cent of the world's population living outside their country of birth). As part of the fourth round of the Life in Transition Survey, which will conclude later this year, respondents have been asked whether they have always lived in their current city, town or village and about their most recent move, as well as being asked about their place of birth. Across the EBRD regions, almost 30 per cent of respondents no longer live in the place where they were born (compared with around 12 per cent in Germany). Significant migration occurs not only from rural to urban areas (with 13 per cent of respondents in urban areas having moved there from rural areas), but also across urban areas (with 17 per cent of people in urban locations having moved there from other urban areas), across rural areas (17 per cent of respondents in rural areas) and from urban to rural areas (11 per cent of respondents in rural areas; see Chart 4.2.1).

Those high mobility rates are, in part, a legacy of the transition away from central planning and the associated structural changes, such as the decline in the importance of industry (and one-company towns) and the rise of services. At the country level, mobility peaked in the 1980s and has declined sharply since 2000 (with a similar pattern being observed in Germany).

Older respondents and women are more likely to have moved, while education, current employment status and household income are not predictors of mobility. Those working in higher-skill occupations are somewhat more likely to have moved than people with medium or low-skill jobs, with medium-skilled respondents the least mobile on average (although differences across skill groups are not statistically significant). Mobility and preferences regarding mobility are closely linked: those who have always lived in their current location (or have lived there for longer) are, on average, significantly more satisfied with life and less likely to want to move. Similarly, homeowners are also less likely to express an intention to move in the future. These correlations hold when taking into account a range of individual and household-level characteristics, such as age, gender, education, employment status, household income, household size, urban or rural location, the condition of the building and country fixed effects. In contrast, those who have moved recently (within the last five years) are more likely to want to move again.

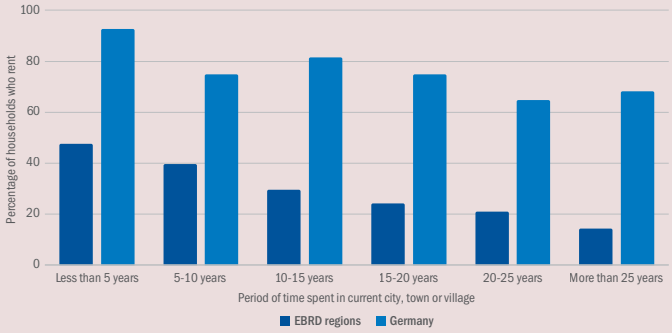
The rental market, while relatively modest in size in the EBRD regions, plays an important role in facilitating regional mobility. People who move are much more likely to rent (rather than own) accommodation in the years following the move, taking into account various individual and household-level characteristics (see Chart 4.2.2).

CHART 4.2.1. Domestic mobility is higher in the EBRD regions than in Germany



Source: LiTS IV and authors' calculations.

CHART 4.2.2. People who have recently moved are more likely to rent



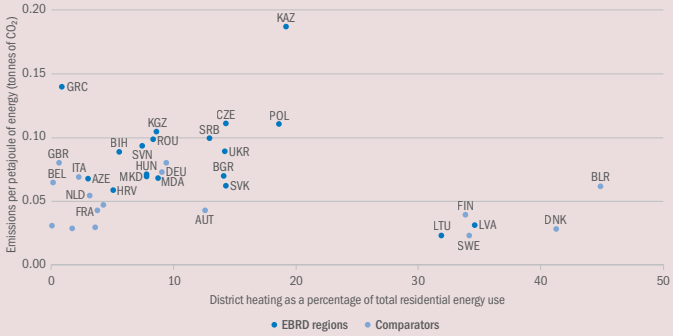
Source: LiTS IV and authors' calculations.
Note: Renters are defined as everyone who does not own their home.

BOX 4.3.
District heating

District heating systems – systems that generate heat centrally and distribute it to residential areas – are an alternative to stand-alone household boilers or apartment block boilers. The first known district heating system was established in Chaudes-Aigues, France, in the 14th century. Since then, those systems have evolved to incorporate alternative sources of energy, improving the efficiency of generation and reducing losses in distribution.[67]

District heating systems are especially prevalent in emerging Europe, a legacy of central planning. In the average economy in the EBRD regions, 14 per cent of total residential energy use is accounted for by centralised heating, ranging from less than 1 per cent in Greece to 35 per cent in Latvia (see Chart 4.3.1). Some advanced European economies with cold winters – Scandinavian countries, Austria and Germany – have comparable levels of penetration for district heating. The five largest district heating systems in the world are found in Moscow, St Petersburg, Kyiv, Warsaw and Stockholm.[68] Many smaller cities and towns rely on district heating systems connected to large industrial plants.

CHART 4.3.1. District heating is more prevalent in the EBRD regions than in advanced European economies – but also more emission-intensive



Source: LiTS IV and authors' calculations.
Note: The analysis assumes that the fuel source "heat" in the IEA dataset is equated with district heating.

While district heating can be less emission-intensive than individual heating systems, this depends on the type of fuel used. On average, district heating systems in the EBRD regions emit around 70 per cent more CO_2 per unit of generated heat than those in advanced comparator economies. District heating is most emission-intensive in coal-dependent economies in the EBRD regions such as the Czech Republic, Kazakhstan, Poland and Serbia. In contrast, a number of economies in Scandinavia and the Baltic states have both high levels of district heating and low emissions, with more than 50 per cent of that heat being generated using renewables (see Chart 4.3.1).[69]

The largest comparative advantage of district heating lies in its network infrastructure, which enables the use of local renewable heat and electricity sources and large-scale heat pumps, combined with the recovery of excess or waste heat from industrial and urban sources.[70] Combined heat and power plants generate electricity and use large amounts of waste heat as an input for the heating system. The Győrhő plant in Hungary, for example, achieves fuel efficiency of almost 82 per cent, converting about 43 per cent of fuel into electricity and around 38 per cent into heat.[71] Coal-fired cogeneration plants produce around half of the emissions produced by conventional coal plants in terms of greenhouse gases per unit of energy generated, with similar efficiency gains being observed for other fuels.[72] Cogeneration systems can also make use of industrial processes that generate large quantities of heat, such as steelmaking. For example, the Toplana Zenica project in Bosnia and Herzegovina – a joint venture between ArcelorMittal and local authorities in the city of Zenica (which involves funding from the EBRD) – uses waste gases from steelmaking to generate heat. Many initiatives at the frontier of waste heat technology are now seeking to recover heat from sources where heat recovery was previously considered uneconomical. For instance, the city of Odense in Denmark is using waste heat from a Facebook data centre, while the Hammarbyverket heat plant in Stockholm supplies 100 per cent of heating in the local area using heat from the treatment of wastewater.[73] Stockholm is also currently trying to incorporate heat generated by data centres into its district heating network.[74]

However, district heating systems have clear limitations. Heat is lost in transmission, and district heating is uneconomical in many rural and mountainous regions. In many cases, the supply of heat to individual apartments cannot be adjusted, which results in excess supply (as indoor temperature preferences vary).[75] In Hungary, for example, it was found that households in prefabricated housing blocks with district heating that could not be regulated at the level of individual apartments spent more of their income on energy and were more likely to accumulate energy-related debt than households with metered district heating or other heating systems. High levels of non-payment resulted in a vicious circle, with the supplier, in turn, having fewer resources and weaker incentives to modernise the district heating network.[76] Consumers' inability to change suppliers leads to a lack of customer focus, inefficiency and underinvestment.[77] Resolving these issues is crucial in order to successfully leverage the existing cogeneration infrastructure in emerging Europe and Central Asia.

Warsaw's district heating system, which was built during Poland's post-war reconstruction, is the largest in the EU.[78] Heating in Warsaw pollutes less than in Krakow, where coal-based heating of individual dwellings is still prevalent. At the same time, coal still powers around 70 per cent of Poland's district heating systems, despite ongoing work to replace coal as a fuel source.[79] At the same time, the installation of individual heating meters and apartment-level controls to regulate heat usage is under way.

[67] See Lake et al. (2017).
[68] See IEA (2004).
[69] See IEA (2023).
[70] See EBRD (2018) and World Bank (2023).
[71] See Rezaie and Rosen (2012).
[72] See IEA (2004).
[73] See Frost (2020) and Abbasi et al. (2021).
[74] See Biba (2017).
[75] See EBRD (2018) and World Bank (2023).
[76] See Herrero and Ürge-Vorsatz (2012).
[77] See IEA (2004).
[78] See Gardiner (2015).
[79] See Simon (2022).

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STRUCTURAL REFORM

5

This chapter presents the latest assessment of transition challenges in the EBRD regions, looking at whether economies are competitive, well governed, green, inclusive, resilient and integrated. Over the last year, scores in the areas of inclusion and integration have increased substantially on the back of previous reforms, while scores for governance have declined. Across all areas, improvements have been concentrated mainly in central Europe, the Baltic states and south-eastern Europe, while declines have mostly been observed in the southern and eastern Mediterranean region, and eastern Europe and the Caucasus.

Introduction

This chapter presents the latest assessment of transition challenges in the EBRD regions, tracking progress in the area of structural reform. It focuses on six key qualities of a sustainable market economy, looking at whether economies are competitive, well governed, green, inclusive, resilient and integrated. For each quality, progress is assessed on a scale of 1 to 10, where 1 denotes the worst possible performance and 10 corresponds to the standards of a sustainable market economy. Those "assessment of transition qualities" (ATQ) scores are based on a wide range of external and internal data sources and calculated in accordance with a detailed methodology (see Chart 5.1).[1]

Analysis of changes in ATQ scores over the last year points to a number of specific developments across the EBRD regions (see Table 5.1). Modest improvements have been made in the area of competitiveness, while scores for inclusion and integration have increased more substantially thanks to previous reforms. At the same time, scores for governance have declined over the past year.

Across the six qualities, increases in scores have been concentrated mainly in central Europe and the Baltic states (CEB) and south-eastern Europe (SEE), while declines have been observed primarily in the southern and eastern Mediterranean (SEMED) and eastern Europe and the Caucasus (EEC) regions.
›

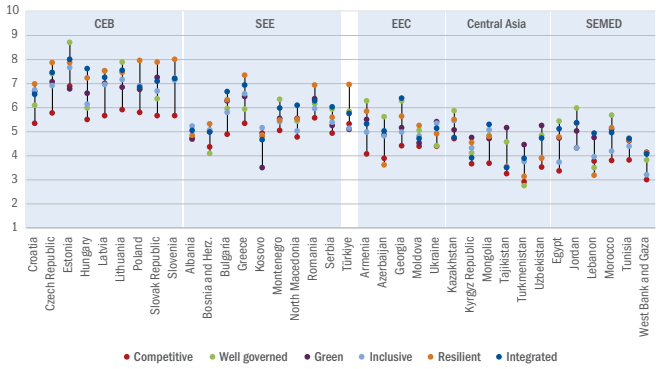
[1] See https://2023.tr-ebrd.com/structural-reform for a detailed description of that methodology and https://2023.tr-ebrd.com/countries/ for a comprehensive overview of structural reforms over the past 12 months.

Many of the underlying datasets on which scores are based are updated irregularly or with time lags. For that reason, some ATQ scores may not capture recent reforms. Consequently, a medium-term perspective on the period 2016-23 gives a better indication of economies' trajectories in terms of reforms and structural changes. With that in mind, this chapter looks at changes in scores over the period 2016-23 as a whole, as well as looking at developments in the last year.

From 2016 to 2023, many economies have made progress in the area of competitiveness through improved access to finance for SMEs, as well as improvements in labour productivity and the quality of logistics services. Developments in the area of governance have been mixed, however: scores for indicators assessing participation in e-government services and frameworks for challenging regulations have increased, whereas scores for indicators measuring the effectiveness of courts and informality have gradually declined.

Green scores have improved in most economies, driven by the strengthening of emission reduction commitments and increased production of renewable energy. Inclusion scores have also tended to rise thanks to greater financial inclusion, continued human capital development, and improvements in trade and transport infrastructure. Improvements in the area of financial resilience have been driven by declining non-performing loan (NPL) ratios and progress with capital-market infrastructure and regulatory frameworks for the banking sector. Lastly, increases in integration scores reflect the upgrading of ICT infrastructure and improvements in the quality of transport and logistics services.

CHART 5.1. ATQ scores for six key qualities of a sustainable market economy, 2023



Source: EBRD.
Note: Scores are on a scale of 1 to 10, where 10 represents a synthetic frontier corresponding to the standards of a sustainable market economy. Chapter 5 treats Greece as part of the SEE region.

Changes to scores since 2016

Competitiveness

Competitiveness scores have improved modestly in many economies in the EBRD regions over the last year, with notable increases being observed in Egypt, Greece, Latvia, Lithuania and North Macedonia. This is primarily a result of further incremental improvements in labour productivity and the quality of logistics services. Meanwhile, minor deteriorations have been recorded in the Czech Republic and the Kyrgyz Republic, driven mainly by declines in labour productivity and a reduction in exports of advanced business services (including information, telecommunication and financial services).

Over the period 2016-23, the most significant improvements in competitiveness have been observed in the EEC region, the SEE region and Uzbekistan, driven mainly by a rise in the number of new businesses (as a proportion of the total population), improved logistics services, better access to finance for SMEs, improved skills, higher labour productivity and greater sophistication of service exports. In contrast, Greece's competitiveness score has fallen significantly, reflecting a decline in credit to the private sector as a percentage of GDP, a fall in labour productivity and an increase in government spending on subsidies. Similarly, the decline in Mongolia's score reflects a significant increase in government subsidies, a rise in tariff rates and a decline in credit to the private sector.

Overall, significant gaps continue to be observed vis-à-vis more advanced comparators in terms of competitiveness, with more pronounced gaps being seen in Central Asia and the SEMED region. Those gaps tend to be larger when it comes to exports of advanced business services, skills and productivity, the quality of transport and logistics services, access to finance, and the economic complexity of production and exports.

Governance

Governance scores, in contrast, have mostly deteriorated over the last year. Declines have been driven mainly by reduced compliance with standards aimed at tackling money laundering and the financing of terrorism (AML/CFT standards), the erosion of press freedom and increases in perceived corruption. There have been a few exceptions, however – notably Latvia and Moldova, where the use of e-government services has increased.

Over the period 2016-23, notable improvements have been observed in Armenia, Egypt, Latvia, Lithuania and Moldova. Armenia has seen advances in the provision of public services online, perceptions of corruption, the framework for challenging regulations, judicial independence and the protection of property rights. In Egypt, the improvements relate to perceptions of political stability, corruption and the effectiveness of the courts. In Latvia

TABLE 5.1. ATQ scores for six key qualities of a sustainable market economy

	Competitive			Well governed			Green			Inclusive			Resilient			Integrated		
	2023	2022	2016	**2023**	2022	2016	**2023**	2022	2016	**2023**	2022	2016	**2023**	2022	2016	**2023**	2022	2016
Central Europe and the Baltic States																		
Croatia	**5.35**	5.26	5.38	**6.08**	6.13	6.21	**6.67**	6.44	5.83	**6.73**	6.71	6.42	**6.97**	6.99	6.41	**6.54**	6.39	5.95
Czech Republic	**5.78**	5.89	5.88	**7.41**	7.36	7.00	**7.07**	6.83	6.46	**6.91**	6.99	6.68	**7.87**	7.86	7.90	**7.44**	7.87	7.77
Estonia	**6.88**	6.80	6.72	**8.70**	8.69	8.52	**6.77**	6.52	6.04	**7.66**	7.53	7.19	**7.87**	7.80	7.67	**8.00**	7.76	7.24
Hungary	**5.51**	5.57	5.34	**5.97**	6.04	5.78	**6.60**	6.35	5.99	**6.14**	5.96	5.82	**7.23**	7.26	6.90	**7.62**	7.63	7.28
Latvia	**5.67**	5.45	5.62	**7.52**	7.36	6.84	**7.01**	6.75	6.10	**6.96**	6.84	6.44	**7.53**	7.50	7.31	**7.26**	6.89	7.28
Lithuania	**5.90**	5.78	5.94	**7.89**	7.89	7.28	**6.84**	6.57	6.23	**7.17**	6.94	6.92	**7.46**	7.46	7.03	**7.54**	7.38	6.81
Poland	**5.80**	5.79	5.80	**6.77**	6.90	7.36	**6.74**	6.50	6.37	**6.91**	6.82	6.63	**7.95**	7.97	7.78	**6.83**	6.76	6.52
Slovak Republic	**5.66**	5.60	5.59	**6.36**	6.36	6.23	**7.24**	7.00	6.68	**6.69**	6.67	6.41	**7.89**	7.93	7.78	**7.10**	7.02	7.25
Slovenia	**5.65**	5.64	5.68	**7.22**	7.30	7.19	**7.15**	6.93	6.52	**7.13**	7.06	6.77	**8.01**	7.99	7.61	**7.21**	7.08	6.82
South-eastern Europe																		
Albania	**4.68**	4.74	4.60	**4.71**	4.74	5.28	**4.71**	4.71	4.71	**5.22**	5.08	4.63	**4.85**	4.88	4.60	**5.05**	5.14	4.90
Bosnia and Herzegovina	**4.37**	4.32	4.38	**4.09**	4.17	4.68	**5.01**	4.81	4.55	**5.07**	5.03	4.85	**5.32**	5.30	5.23	**4.97**	4.84	4.48
Bulgaria	**4.88**	4.82	4.82	**5.95**	6.14	5.83	**6.27**	6.03	5.42	**5.80**	5.64	5.45	**6.31**	6.33	6.16	**6.66**	6.49	6.51
Greece	**5.34**	5.18	5.69	**5.93**	6.02	5.70	**6.46**	6.20	5.79	**6.57**	6.56	6.48	**7.33**	7.26	6.93	**6.93**	6.58	5.81
Kosovo	**4.92**	4.88	4.64	**4.85**	4.87	4.92	**3.49**	3.52	3.38	**5.16**	5.06	5.14	**4.80**	4.81	4.41	**4.66**	4.65	4.20
Montenegro	**5.05**	5.05	4.87	**6.34**	6.32	5.93	**5.56**	5.35	4.90	**5.41**	5.37	4.98	**5.48**	5.50	5.29	**5.98**	5.90	5.36
North Macedonia	**4.78**	4.65	4.62	**5.44**	5.43	5.76	**5.55**	5.16	4.75	**5.01**	4.91	4.80	**5.53**	5.51	5.17	**6.08**	5.69	5.18
Romania	**5.56**	5.54	5.34	**6.16**	6.24	5.99	**6.35**	6.12	5.78	**5.96**	5.89	5.84	**6.94**	6.94	6.70	**6.27**	6.19	5.88
Serbia	**4.93**	4.94	4.82	**5.94**	5.96	5.72	**5.25**	5.14	4.89	**5.39**	5.42	5.11	**5.58**	5.60	5.44	**6.03**	6.01	5.55
Türkiye	**5.32**	5.33	5.33	**5.84**	5.96	5.96	**5.09**	5.04	4.75	**5.14**	5.19	4.88	**6.96**	6.93	6.98	**5.75**	5.63	5.71
Eastern Europe and the Caucasus																		
Armenia	**4.07**	4.13	3.86	**6.26**	6.34	5.80	**5.51**	5.51	5.15	**4.97**	4.94	4.69	**5.84**	5.87	5.36	**5.32**	5.35	4.95
Azerbaijan	**3.89**	3.91	3.95	**5.62**	5.79	5.19	**4.87**	4.88	4.58	**4.82**	4.89	4.75	**3.61**	3.80	3.59	**5.02**	5.33	5.35
Georgia	**4.42**	4.36	4.21	**6.28**	6.34	6.46	**5.15**	5.17	4.80	**4.98**	4.99	4.75	**5.63**	5.60	4.75	**6.39**	6.24	5.93
Moldova	**4.38**	4.40	4.18	**5.04**	4.96	4.52	**4.52**	4.43	4.07	**4.81**	4.82	4.76	**5.24**	5.08	4.66	**4.70**	4.70	4.60
Ukraine	**4.38**	4.42	4.45	**4.40**	4.44	4.10	**5.40**	5.34	5.00	**5.33**	5.38	5.23	**4.92**	5.06	4.36	**5.14**	5.31	4.97
Central Asia																		
Kazakhstan	**4.71**	4.74	4.66	**5.87**	5.92	5.61	**5.08**	5.09	4.62	**5.47**	5.34	5.04	**5.50**	5.53	5.39	**4.74**	4.94	4.78
Kyrgyz Republic	**3.65**	3.74	3.47	**4.11**	4.28	4.24	**4.75**	4.76	4.35	**4.31**	4.27	4.19	**4.54**	4.45	4.56	**3.91**	3.95	4.09
Mongolia	**3.68**	3.63	3.98	**4.84**	4.88	5.33	**4.71**	4.69	4.62	**5.06**	4.93	4.62	**4.79**	4.79	4.57	**5.29**	5.32	4.89
Tajikistan	**3.24**	3.19	3.12	**4.56**	4.60	4.10	**5.16**	5.17	5.01	**3.54**	3.48	3.35	**3.51**	3.51	3.10	**3.51**	3.59	3.06
Turkmenistan	**2.92**	2.92	3.12	**2.75**	2.71	2.69	**4.46**	4.46	4.52	**3.75**	3.71	3.55	**3.14**	3.13	3.10	**3.88**	3.97	3.99
Uzbekistan	**3.52**	3.50	3.14	**4.85**	4.86	4.60	**5.24**	5.25	4.72	**3.91**	3.83	3.63	**3.88**	3.83	3.45	**4.73**	4.68	3.82
Southern and eastern Mediterranean																		
Egypt	**3.36**	3.25	3.41	**5.44**	5.54	4.77	**4.73**	4.73	4.24	**3.72**	3.73	3.71	**4.77**	4.76	4.33	**5.12**	5.27	4.57
Jordan	**4.33**	4.32	4.31	**5.97**	5.90	5.95	**5.03**	5.03	5.25	**4.32**	4.38	3.98	**5.34**	5.34	4.93	**5.36**	5.36	5.72
Lebanon	**3.77**	3.79	3.89	**3.51**	3.57	3.92	**4.75**	4.75	4.70	**3.96**	3.67	4.01	**3.18**	3.18	4.25	**4.93**	4.86	5.08
Morocco	**3.79**	3.80	3.69	**5.67**	5.82	5.44	**5.08**	5.10	5.04	**4.19**	4.19	3.97	**5.17**	5.17	4.95	**4.95**	4.94	4.77
Tunisia	**3.83**	3.83	3.77	**4.72**	4.89	5.09	**4.62**	4.62	4.42	**4.38**	4.38	4.29	**4.64**	4.64	4.24	**4.69**	4.69	4.39
West Bank and Gaza	**2.99**	3.00	2.84	**3.81**	3.90	3.75	**4.14**	4.14	3.91	**3.21**	3.21	3.39	**4.12**	4.12	3.84	**4.07**	4.03	3.85
Advanced comparators																		
Canada	**6.67**	6.44	6.70	**8.71**	8.72	9.02	**6.93**	6.92	6.34	**8.15**	8.11	8.07	**8.17**	8.18	8.06	**7.14**	7.01	7.14
Cyprus	**5.71**	5.69	6.10	**7.29**	7.42	7.09	**6.78**	6.54	5.82	**7.27**	7.29	6.99	**6.03**	6.02	5.40	**7.46**	7.74	7.25
France	**6.86**	6.86	7.02	**8.68**	8.69	8.97	**7.78**	7.53	7.64	**8.53**	8.51	8.36	**8.38**	8.35	8.31	**7.89**	7.94	7.71
Germany	**6.79**	6.76	6.74	**8.34**	8.35	8.21	**7.30**	7.05	7.21	**8.14**	8.12	8.04	**8.29**	8.29	8.18	**7.86**	7.73	7.47
Japan	**7.27**	7.29	7.23	**9.11**	9.12	9.32	**7.78**	7.54	7.61	**8.59**	8.62	8.51	**8.07**	8.02	7.88	**7.58**	7.69	7.70
Sweden	**7.66**	7.77	7.77	**8.66**	8.69	9.11	**7.34**	7.10	7.12	**8.19**	7.99	8.19	**8.25**	8.24	8.12	**7.59**	7.94	7.81
United Kingdom	**6.51**	6.55	6.54	**8.75**	8.77	8.68	**7.18**	7.17	7.14	**8.18**	8.18	7.96	**7.71**	7.71	7.75	**6.76**	6.95	6.81
United States of America	**7.38**	7.26	7.49	**8.71**	8.73	8.75	**5.92**	5.69	6.40	**7.93**	7.96	7.81	**9.02**	8.99	8.92	**6.87**	6.95	7.08
Other comparators																		
Bangladesh	**3.37**	3.39	3.33	**5.65**	5.74	5.53	**3.77**	3.77	3.73	**3.30**	3.20	3.15	**5.94**	5.95	5.66	**3.94**	3.95	3.88
Belarus	**4.33**	4.31	4.02	**4.55**	4.79	4.60	**5.54**	5.48	5.40	**6.02**	5.98	6.06	**3.67**	3.67	3.49	**5.62**	5.59	5.05
Brazil	**4.36**	4.29	4.18	**5.84**	5.87	5.89	**5.38**	5.36	5.36	**5.05**	4.98	5.10	**6.30**	6.33	6.02	**4.79**	4.63	4.53
Colombia	**4.09**	4.25	4.02	**6.08**	6.20	6.22	**5.36**	5.35	5.22	**4.56**	4.54	4.60	**6.18**	6.28	5.97	**5.22**	5.23	4.93
Mexico	**4.42**	4.47	4.29	**6.09**	6.16	6.21	**5.40**	5.38	5.26	**4.59**	4.57	4.45	**6.24**	6.26	5.89	**5.49**	5.60	5.46
Russia	**4.81**	4.86	4.75	**5.52**	5.69	5.38	**5.61**	5.61	5.04	**5.48**	5.52	5.36	**6.27**	6.30	5.93	**4.78**	4.98	5.01
South Africa	**5.04**	5.01	4.92	**6.94**	6.90	6.58	**4.92**	4.87	4.61	**4.67**	4.62	4.46	**6.03**	6.05	5.80	**5.79**	5.72	5.31
Thailand	**5.44**	5.34	5.41	**7.30**	7.42	7.87	**4.19**	4.25	4.32	**4.21**	4.16	4.21	**5.87**	5.88	5.41	**5.34**	5.24	5.49

Source: EBRD.

Note: Scores are on a scale of 1 to 10, where 10 represents a synthetic frontier corresponding to the standards of a sustainable market economy. Scores for years prior to 2023 have been updated following methodological changes, so they may differ from those published in previous *Transition Reports*. Owing to lags in the availability of underlying data, ATQ scores for 2023 and 2022 may not fully correspond to developments in those calendar years.

and Lithuania, improved scores reflect the strengthening of corporate governance as regards internal control, transparency, disclosure and the composition of boards. And in Moldova, improvements relate to the roll-out of e-government services, a decline in perceived corruption, less burdensome regulations, greater transparency and the enhancement of corporate disclosure standards. At the same time, notable deteriorations have been observed in Albania, Bosnia and Herzegovina, Lebanon, Mongolia and Poland, although in the case of Poland this decline has been from a higher score relative to the other four countries. Those deteriorations primarily reflect declines in indicators measuring the effectiveness of the courts and judicial independence (in Poland, for instance),[2] informality, perceived corruption, media freedom (in Lebanon and Mongolia), frameworks for challenging regulations and transparency regarding budgets.

Overall, gaps persist relative to advanced comparators when it comes to the protection of intellectual property rights, corruption, the rule of law, the effectiveness of government policymaking, and transparency and disclosure standards, especially in Central Asia.

Green economy

Green scores have improved somewhat over the last year, reflecting increased production of renewable energy in many economies in emerging Europe, greater protection of land and maritime areas, and a reduction in fossil fuel subsidies in the CEB region. Meanwhile, small declines have been observed in Georgia, Kosovo, the Kyrgyz Republic and Morocco, driven by increases in fossil fuel subsidies and a reduction in the production of renewable energy.

Over the period 2016-23, green scores have improved in almost all economies in the EBRD regions. Those improvements have been driven mainly by reduced emissions from agriculture and the heating of buildings (notably in Bulgaria and North Macedonia), greater uptake of renewable energy, and more ambitious nationally determined contributions (NDCs) aimed at meeting the targets set out in the Paris Agreement on climate change. The most significant improvements have been observed in Bulgaria, Croatia, Estonia, Greece, Latvia and North Macedonia, driven by stronger commitments in intended NDCs, the inclusion of adaptation considerations in NDCs, progress on a fair transition and increased production of renewable energy (with the exception of Croatia and North Macedonia). At the same time, Jordan's green score has declined on account of a failure to comply with the latest guidance on best practices for carbon-pricing mechanisms, a reduction in the size of its maritime conservation area and increases in greenhouse gas emissions from transport and industrial activities.

Most economies in the EBRD regions exhibit gaps relative to more advanced economies when it comes to a fair transition, vehicle emission standards, the implementation of carbon-pricing mechanisms and greenhouse gas emissions from industrial activities.

Inclusion

Over the last year, inclusion scores have improved in many economies – particularly Bulgaria, Estonia, Hungary, Lebanon, Lithuania and Mongolia. Those improvements have mainly been due to increased labour force participation (including for women), declines in the percentage of young people who are not in employment, education or training, and increases in the quality of trade and transport infrastructure. In Lebanon and Mongolia, those better scores have been driven mainly by the greater affordability of fixed broadband.

In contrast, notable deteriorations have been recorded in Azerbaijan, the Czech Republic, Jordan and Türkiye, driven primarily by the reduced affordability of fixed broadband services. In Jordan and Türkiye, those declines also stem from the worsening of national frameworks for ensuring equal treatment and preventing discrimination.

Over the period 2016-23, nearly all economies in the EBRD regions have improved their inclusion scores, with the most significant improvements being seen in Albania, Estonia, Kazakhstan, Latvia, Mongolia and Montenegro. In Albania and Montenegro, those increases have been driven primarily by greater access to internet services and digital skills. In Estonia and Latvia, they stem from improved access to training through employment, greater financial inclusion and improvements in the quality of transport-related services. In Kazakhstan and Mongolia, improvements in inclusion scores reflect greater financial inclusion, a decline in the cost of fixed broadband and increased social spending, with Mongolia also seeing the adoption of legislation aimed at improving opportunities for women.

Only Lebanon and the West Bank and Gaza have seen their inclusion scores fall over the period 2016-23. In Lebanon, the level of financial inclusion has continued to decline against the backdrop of the country's deep economic and financial crisis. In the West Bank and Gaza, new legislation has allowed for gender-based discrimination, while the quality of trade and transport infrastructure has declined. The gender gap in labour force participation has also widened, and the percentage of the population with standard ICT skills has declined.

Economies across the EBRD regions lag behind advanced economies when it comes to financial inclusion, penetration levels for standard ICT skills, access to affordable fixed broadband and attitudes regarding the role of women in the economy.

[2] Over the period from 2016 to 2023, Poland's score for the effectiveness of courts (based on data sourced from the EBRD-EIB-World Bank Group Enterprise Surveys) deteriorated from 8.13 to 6.14. Meanwhile, the country's judicial independence score (based on data sourced from World Economic Forum (2016; 2019)) decreased from 4.78 to 2.44.

Resilience

ATQ scores for resilience cover issues pertaining to (i) energy security and (ii) financial stability. Energy resilience scores have only changed very modestly over the last year, with the exception of Ukraine (where the operations of the state-owned gas company have been negatively impacted by the war).

Financial resilience scores have improved in most economies in the EBRD regions over the past 12 months, with notable improvements being observed in Estonia, Greece, the Kyrgyz Republic and Moldova. Those improvements have been driven mainly by higher capital adequacy ratios (in Greece, the Kyrgyz Republic and Moldova), increased provisioning for NPLs (in Estonia, Greece and Moldova) and lower NPL ratios (in Greece). At the same time, financial resilience scores have fallen in Azerbaijan and Ukraine. In Azerbaijan, this is a result of reduced provisioning for NPLs, an increase in the percentage of total loans that are denominated in foreign currency and a decline in capital adequacy ratios. In Ukraine, it stems from an increase in NPL ratios, reduced provisioning for NPLs and a decline in the return on assets.

Over the period 2016-23, marked improvements in energy resilience have been observed in Croatia, Estonia, Ukraine and Uzbekistan. In Croatia, higher scores reflect the diversification of gas supplies, while Ukraine has undertaken various reforms in its gas sector (including the unbundling of the state owned gas company). In Uzbekistan, those increased scores reflect continued efforts to improve the regulatory environment and the unbundling of the power sector. At the same time, declines have been observed in the Kyrgyz Republic and Moldova, where necessary reforms in the energy sector have been delayed.

Notable increases in financial resilience have been observed in Armenia, Georgia and Moldova over the period 2016-23, reflecting improved provisioning for NPLs, lower NPL ratios, declines in the percentages of loans denominated in foreign currency, increases in the activities of non-bank financial institutions, and improvements to legal and regulatory frameworks governing the banking sector. In Georgia, those improved scores also reflect the upgrading of capital market infrastructure. In Lebanon and Türkiye, meanwhile, financial resilience scores have fallen. In Lebanon, this stems from lower levels of liquidity in the financial system, greater market concentration, a sharp increase in NPLs, and the reversal of earlier reforms to regulatory frameworks and banking supervision. In Türkiye, the decline in the financial resilience score stems mainly from greater concentration in the banking sector, a fall in credit to the private sector as a percentage of GDP and a decline in the assets of non-bank financial institutions as a proportion of GDP.

Gaps between the EBRD regions and higher-income economies in terms of financial stability stem from the lower levels of development in money markets and local capital markets (as reflected in the absence of money market benchmarks, the relative lack of bond issuance in local currencies by financial institutions and firms, and lower levels of activity by non-bank financial institutions).

Integration

Over the last year, integration scores have increased significantly in Bulgaria, Estonia, Greece, Latvia, Lithuania and North Macedonia, driven mainly by improvements in the quality of transport and logistics services. In contrast, notable deteriorations have been seen in Azerbaijan, the Czech Republic, Egypt, Kazakhstan and Ukraine. In Azerbaijan, that lower score reflects a decline in FDI inflows as a percentage of GDP. In the Czech Republic and Kazakhstan, lower scores reflect deterioration in the quality of transport and logistics services and a reduction in portfolio inflows (with the Czech Republic's integration score remaining relatively high, despite that recent downward adjustment). In Egypt, portfolio inflows have declined, while the price of mobile broadband has increased. And in Ukraine, transport and trade infrastructure have been adversely impacted by the war, as have trade volumes.

Most economies in the EBRD regions have improved their integration scores over 2016-23. The largest improvements have been seen in Greece, North Macedonia and Uzbekistan, driven by better mobile and fixed broadband coverage, improvements in the quality of transport and logistics services, and increased trade volumes. In Greece and Uzbekistan, those increased scores also reflect greater financial openness and larger portfolio inflows. The most notable deteriorations have been observed in Azerbaijan, the Czech Republic and Jordan. In Azerbaijan and the Czech Republic, those deteriorations mostly reflect developments over the last year, as described above. In Jordan, the conditions for international trade and direct investment have worsened, as have logistics services.

Economies in the EBRD regions continue to lag behind advanced comparators in this area, especially when it comes to transport and logistics services, the quality of transport infrastructure and electricity. In most Central Asian economies, there are also significant gaps in the area of digital infrastructure, especially when it comes to mobile internet coverage.

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