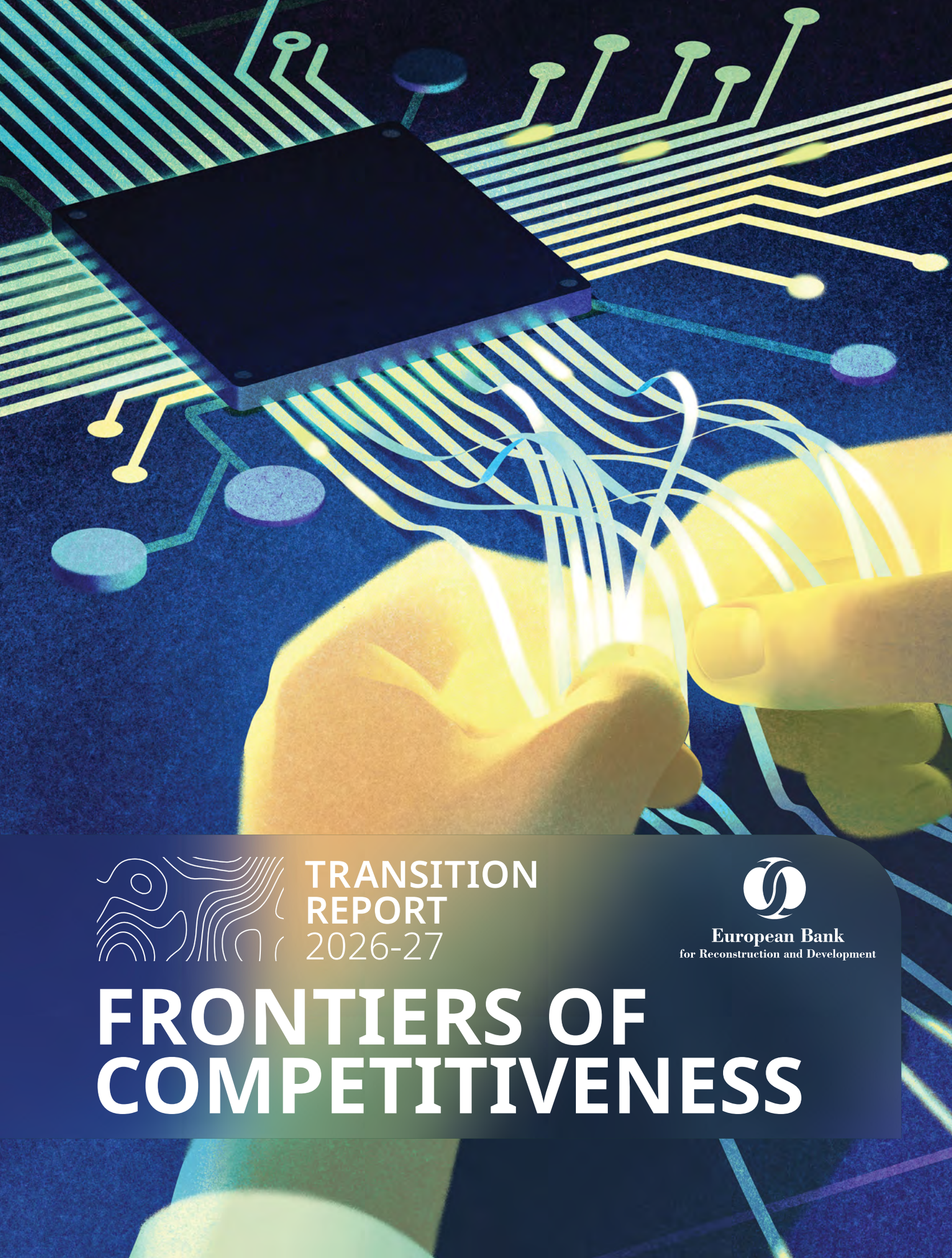


TRANSITION REPORT 2026-27

European Bank for Reconstruction and Development

FRONTIERS OF COMPETITIVENESS

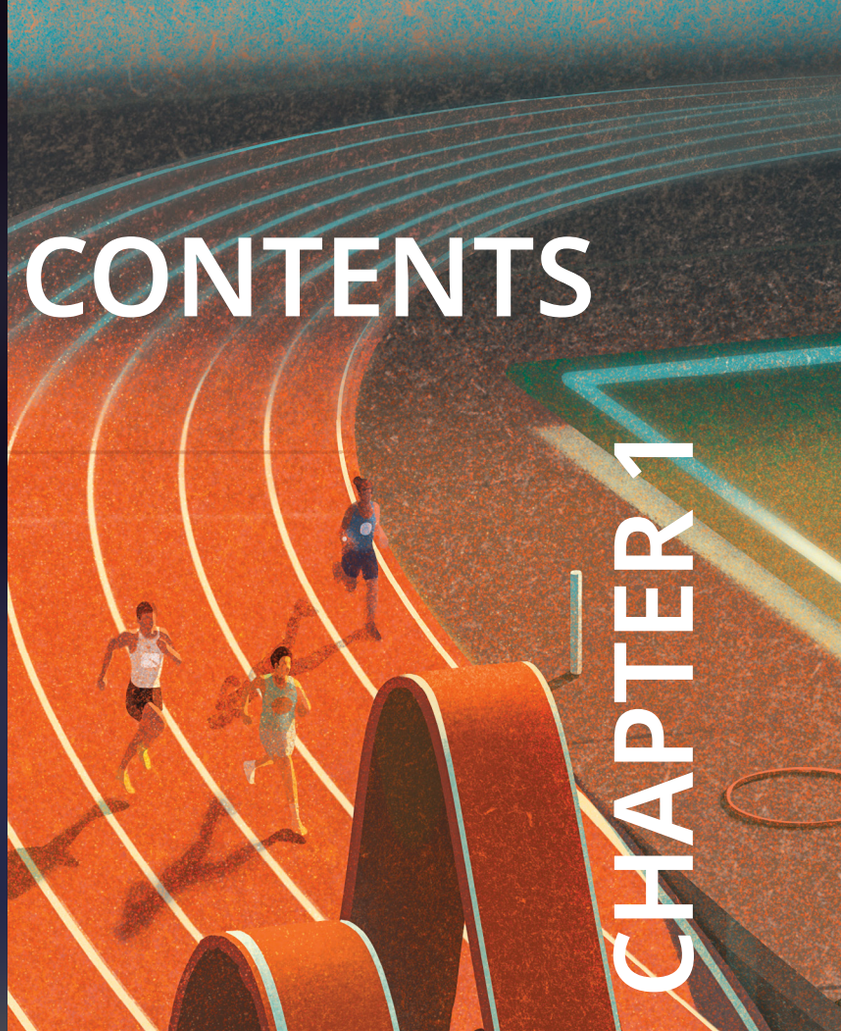
ABOUT THIS REPORT

The EBRD seeks to foster the transition to an open market-oriented economy and 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 share our analysis with partners.

The Office of the Chief Economist is responsible for the content of the report. 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 2026. In the report chapters, all assessments and data are based on information available in late August 2026.

CONTENTS



FOREWORD 2

EXECUTIVE SUMMARY 4

CHAPTER 1
CREATING COMPARATIVE ADVANTAGE 10

Introduction 12

Measuring export specialisation 13

Changing production and export structures 14

What affects the development of new capabilities? 20

Implications for developing new capabilities in AI-related and military goods 22

How do export specialisations respond to demand shocks? 25

Targeted policies to support the development of new capabilities 27

Firm-level evidence: the role of top firms 31

Conclusions and policy implications 34



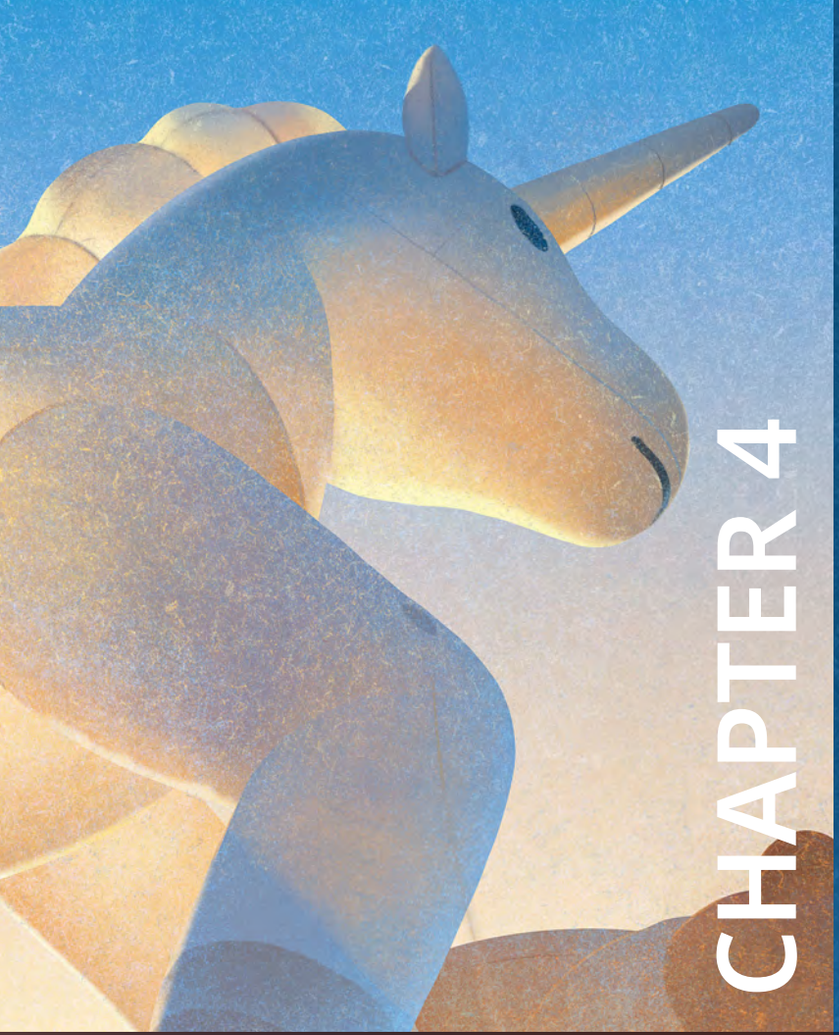
CHAPTER 2



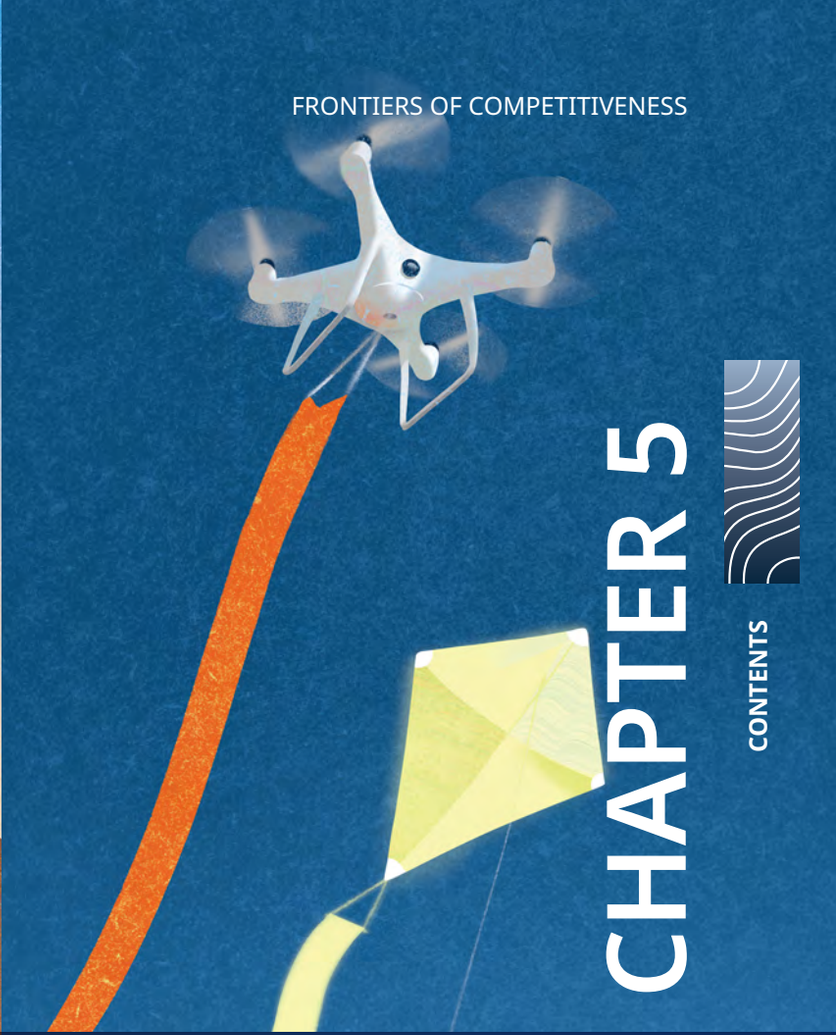
CHAPTER 3

CHAPTER 2
THE ECONOMICS OF DEFENCE SPENDING 44
Introduction 46
Rising spending on defence 47
The defence industrial base 50
Economic returns to defence spending 54
Is publicly funded defence R&D different? 57
Building military capability 60
Conclusions and policy implications 64

CHAPTER 3
BUILDING THE AI ECONOMY 70
Introduction 72
The AI supply chain 72
AI adoption 85
Policy and regulation 88
Conclusions and policy implications 90



CHAPTER 4



CHAPTER 5

CONTENTS

CHAPTER 4
ENTREPRENEURSHIP AT SCALE 102
Introduction 104
Declining business dynamism and convergence 105
Growth-oriented startups 107
Most founders have studied or worked abroad 109
Where startups compete 110
Serial entrepreneurship 112
Supporting the upscaling of firms 114
Access to venture capital and firm growth 115
Founders' ties shape capital flows 119
Conclusions and policy implications 121

CHAPTER 5
STRUCTURAL REFORM 130
Introduction 132
Recent changes to scores 134
Focus on SME competitiveness 137
Conclusions 140

ABBREVIATIONS 142
ACKNOWLEDGEMENTS 143

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FOREWORD

Beata Javorcik
EBRD Chief Economist



"The difficulty lies, not in the new ideas, but in escaping from the old ones," John Maynard Keynes wrote. For three decades, most economies in the EBRD regions benefited from deepening globalisation, a post-Cold War "peace dividend" and a clear path to technological catch-up. Those favourable conditions are now fading away. Globalisation is giving way to fragmentation, the peace dividend has succumbed to rising defence needs, and the predictable technological catch-up has been engulfed by an artificial intelligence (AI) revolution whose speed and implications remain uncertain. The challenge now is not simply to advance along an established path, but to define a new path entirely.

The post-communist economies of the EBRD regions have reinvented themselves before. In a typical EBRD economy, roughly half of the products in which the economy has a comparative advantage today differ from those of 25 years ago. That transformation has taken time and been supported by open export markets. The old playbook was relatively clear: import technology, invest in capital and upgrade product quality. The next transformation will be harder. Export structures are persistent, emerging sectors are complex, and building new capabilities involves trial and error.

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AI illustrates this challenge. The supply chain for advanced chips, data infrastructure and frontier models is concentrated in a handful of countries and firms. The EBRD regions supply just 0.8 per cent of global exports of AI-related products, despite accounting for 8 per cent of total global exports across all goods. Power constraints also restrict their capacity to host large-scale data centres.

For most economies, the greater opportunity lies in developing AI-enabled applications and adopting AI across the wider economy. Realising these gains will require digital and power infrastructure, skills, access to computing capacity, effective data governance and international cooperation. AI adoption is likely to generate significant productivity gains, but differences in adoption capacity mean that these benefits will be uneven. The automation of some tasks will also require workers to move across occupations, firms and sectors, with early signs of this adjustment already visible in divergent hiring patterns for experienced and junior workers.

Defence spending presents a different opportunity. While spending on defence is a burden on the taxpayer, it can lift demand. Yet this additional demand will not automatically create a competitive domestic industry. Where procurement is import-intensive, much of the economic benefit flows abroad. Most economies in the EBRD regions remain highly dependent on imported defence goods, while state ownership, limited scale and weak access to capital constrain domestic production and innovation. In addition, state-owned enterprises in the EBRD regions are less efficient than their counterparts in advanced economies. EBRD economies with a strong industrial base may nevertheless be able to expand production through retooling, joint procurement and the licensing of technology developed elsewhere.

The EBRD regions do not lack entrepreneurs; they lack the financing and investment networks that are needed to turn promising startups into large firms. Many founders are internationally experienced and develop products outside their economies' established export baskets, but relatively few manage to scale up. Growth-stage finance remains limited, geographically concentrated and increasingly dependent on foreign investors in later funding rounds. This restricts the emergence of large exporters, which play an important role in developing

For three decades, most economies in the EBRD regions benefited from deepening globalisation, a post-Cold War 'peace dividend' and a clear path to technological catch-up. Those favourable conditions are now fading away.

complex products, reaching international markets and generating positive spillovers for other firms.

The policy challenge, therefore, is to make good use of scarce public resources. With defence spending absorbing a growing share of constrained public budgets, support is best directed at the factors that can help existing capabilities to develop into new comparative advantages: skills, research infrastructure, access to finance and integration into cross-border supply chains. Where such capabilities are already present, they point towards AI-enabled applications, regional defence production and specialised roles in global value chains. Which of these are viable is something that firms will establish through experimentation, rather than something that policymakers can determine in advance.

This makes scaleup finance a critical missing link. The EBRD regions have entrepreneurs and ideas; what they lack is the capital and networks that are required to turn startups into globally competitive firms. Consequently, public policy should focus less on subsidising individual businesses and more on ensuring that private capital is willing to back growth through guarantees, co-investment, and deeper domestic and regional capital markets.
The prize is not self-sufficiency but reinvention, turning ideas born in the EBRD regions into firms that grow globally and anchor the next generation of high-value activity at home.



Beata Javorcik
EBRD Chief Economist

EXECUTIVE SUMMARY

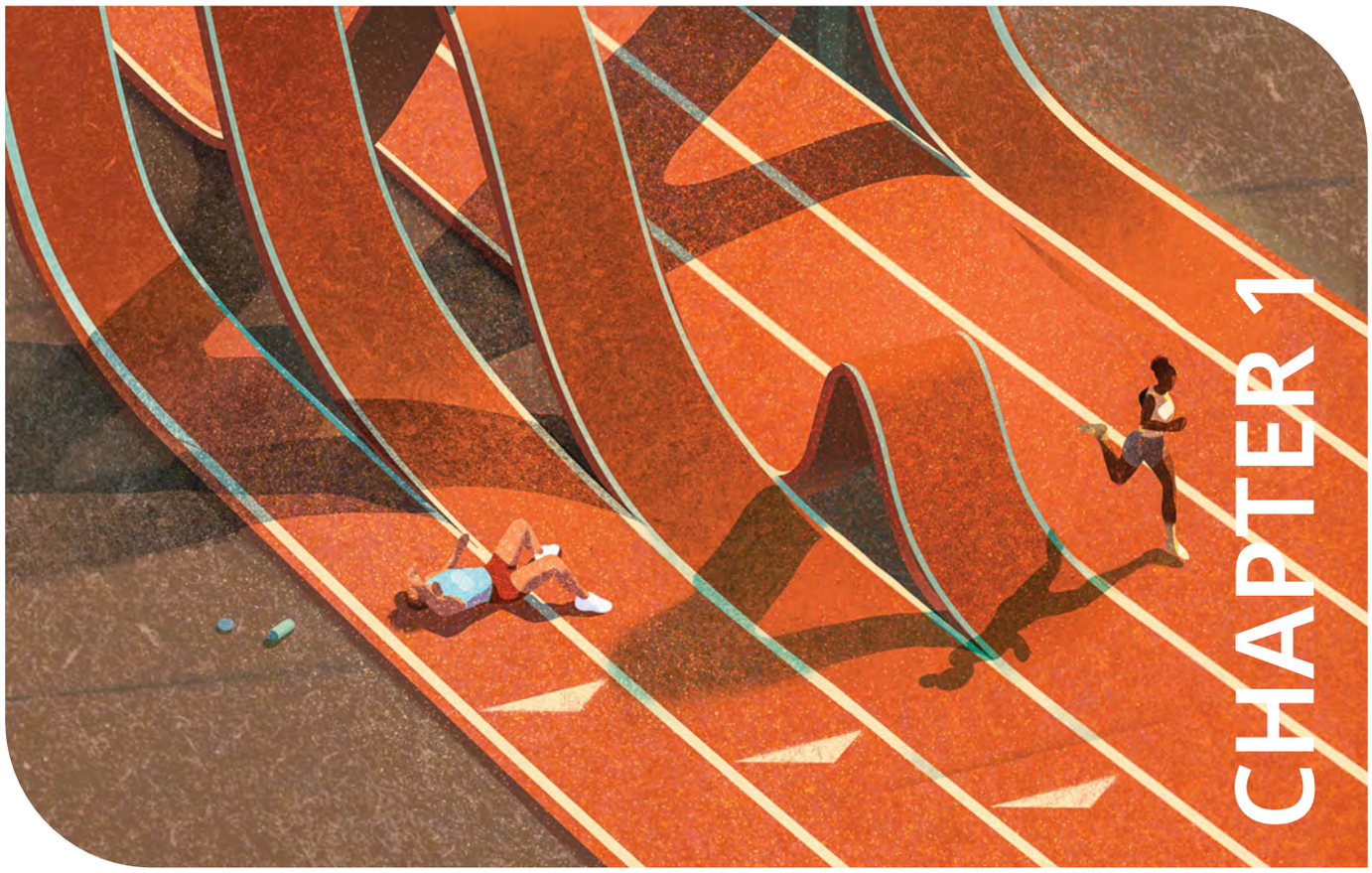


As technology advances and geopolitics shift, what countries produce and export changes. Rising global demand for artificial intelligence (AI) and increased defence spending could, in principle, create opportunities for economies to develop new export capabilities. Yet, leveraging these demand shocks will be challenging. Economies' export structures tend to be highly persistent, and developing new export specialisations is more difficult in the case of complex products such as AI and military goods. Building new capabilities involves trial and error, requires active policy support and tends to be more successful where economies already have established specialisations in related upstream or downstream products. Large exporters often play a key role in developing and marketing new complex products, with spillovers to the broader corporate population.

Rising geopolitical tensions have brought the "peace dividend" of the past three decades to an end, with defence spending increasing in many economies where the EBRD operates. While increased defence expenditure can raise debt levels and draw resources away from welfare spending, it can also spread to civilian industries and boost overall output in an economy. At the same time, most economies in the EBRD regions remain highly dependent on imports of defence-related goods, with state ownership, limited scale and weak access to capital constraining domestic production and innovation. For economies with a strong industrial base, retooling, joint procurement schemes and the licensing of technologies developed elsewhere can help to expand domestic defence production.

Advanced AI relies on a capital-intensive supply chain of chips, data centres, electricity and specialised research. Economies in the EBRD regions play a limited role in these upstream segments: their AI-related hardware exports, frontier-model development and AI-firm valuations lag global leaders significantly, while power constraints restrict their capacity to host large-scale data centres. Greater opportunities lie downstream in the development of AI-enabled applications and the use of AI to boost productivity. As adoption capacity varies widely, benefits are likely to be uneven. Policymakers could facilitate successful AI adoption by prioritising infrastructure, skills, access to computing capacity, data governance and international cooperation.

Entrepreneurship is the engine of business dynamism and economic growth, and the EBRD regions are home to many growth-oriented startups. Their founders tend to have international experience, they frequently found more than one firm, often in different countries, and they tend to focus on products that are outside their economies' established export baskets. Yet relatively few of these firms manage to scale up their operations successfully. Venture-capital funding remains thin, and in later funding rounds it comes largely from abroad, often from economies where founders previously studied or worked. Deepening venture-capital markets, connecting founders to investors and widening the geographical spread of finance are all essential in order to turn more startups into large productive firms.



CREATING COMPARATIVE ADVANTAGE

As technology advances and economies develop, the structure of countries' production changes. Over the past three decades, many economies in the EBRD regions have managed to reinvent themselves to a significant extent, substantially changing their export structures and moving up the value chain as they have benefited from trade liberalisation and closer integration with the European Union (EU). Exporting a diverse mix of relatively complex products to a larger number of destinations has supported economic growth.

The rapid increase in global demand for artificial intelligence, higher spending on defence, and technological advances in new areas, such as the space economy, could further catalyse the development of new export capabilities. In recent years, demand for AI-related products has boosted global growth, while spending on defence has been on the rise. The markets for AI and defence goods are large, and the goods in question tend to be complex and highly connected to other goods in production networks. This makes these markets attractive in principle. Yet, as globalisation stalls and export markets become more concentrated, capitalising on the AI- and defence-related demand shocks will be challenging for economies in the EBRD regions. Economies' export structures tend to be persistent, and developing new export specialisations is often difficult for complex products.

Building new capabilities involves trial and error and tends to be more successful where economies already have established specialisations in related upstream or downstream products. It also requires active policy support, including the promotion of investment, the negotiation of free-trade agreements granting preferential access to large markets, worker training, tax incentives, the selective use of special economic zones and other well-targeted industrial policies, and measures promoting the rule of law and ensuring macroeconomic stability.

Large exporters can play a key role in developing and marketing new complex products, as in the case of AI and military goods, generating spillovers to the broader ecosystem of firms. However, such capabilities remain concentrated in a limited number of countries: while some economies in the EBRD regions specialise in specific AI-related and military goods, average specialisation in such goods remains relatively low.



THE ECONOMICS OF DEFENCE SPENDING

After the end of the Cold War, governments worldwide reduced the share of public resources allocated to defence. In Europe, the resulting "peace dividend" averaged about 0.9 per cent of gross domestic product (GDP) a year. Rising geopolitical tensions have brought this peace dividend to an end. Following Russia's full-scale military invasion of Ukraine in 2022, governments across Europe and in the United States of America have committed to substantial and sustained increases in defence spending. Several economies in the EBRD regions are at the forefront of this shift.

Defence budgets comprise personnel and operating expenses, military infrastructure, procurement of equipment, and military research and development (R&D). While higher defence expenditure can raise debt levels and draw resources away from welfare spending, it can also increase demand for metals, electronics and the output of other civilian industries, and boost R&D. On average, it is estimated that a €1 increase in defence spending in the EBRD regions is associated with a subsequent €1.47 increase in GDP.

While increases in defence spending are determined primarily by security considerations, comparable security objectives can be met and financed in different ways, with varying impacts on innovation, the output of domestic civilian industries and citizens' welfare. Most economies in the EBRD regions remain highly dependent on imports of defence-related goods, with the notable exceptions of Poland and Türkiye, as defence production and R&D remain highly concentrated globally. Eight countries are estimated to supply more than 80 per cent of the world's arms exports. The aerospace and defence sector in the EBRD regions is disproportionately state owned, and these state-owned firms tend to be less productive than private counterparts. Defence technology startups in EBRD economies rarely raise capital beyond the earliest funding round.

Inefficiencies associated with the state ownership of military equipment manufacturers, the limited scale of domestic markets, a deficit of skills and weak access to capital all constrain innovation and the domestic production of military hardware and software in the EBRD regions. For economies with a strong industrial base, retooling, joint procurement and the licensing of technologies developed elsewhere can help to expand domestic production.



BUILDING THE AI ECONOMY

Unlike previous waves of automation, generative AI primarily affects knowledge-intensive work, such as writing, software development (coding) and data analysis. AI capabilities continue to improve rapidly, giving firms and workers less time to adjust to innovation than in the past. In the United States, workplace adoption of generative AI has been faster than that of the personal computer (relative to their respective mass-market launches), while its overall adoption has outpaced the rollout of the internet.

The capacity to build AI systems remains heavily concentrated: a handful of economies and firms dominate the markets for advanced semiconductor chips, data infrastructure and the development of frontier AI models. Economies in the EBRD regions play a limited role in these upstream segments of the AI supply chain, accounting for just 0.8 per cent of global exports of related products (but around 8 per cent of total global exports across all goods). The EBRD regions' potential is stronger in the application layer, where AI models are turned into products and services for end users. The barriers to entry are lower in this market segment, and firms in the EBRD regions are already active in many areas relating to AI applications.

The biggest opportunity lies in AI adoption. Under a medium adoption scenario (modelled on the diffusion of the internet), AI could add around 0.03-0.7 percentage points to annual labour productivity growth across the EBRD regions over the coming decade. Economies with strong digital infrastructure and the skills needed to adopt and use new technologies effectively are best positioned to benefit from AI. Those starting from a lower level of digital economy development, including many economies in the southern and eastern Mediterranean region and sub-Saharan Africa, risk falling further behind, with AI contributing to income divergence.

Realising the potential gains from AI will depend first and foremost on the ability of firms, workers and governments to use AI effectively, and on policy choices that support digital infrastructure, govern data use, facilitate the upgrading of skills and foster international cooperation.



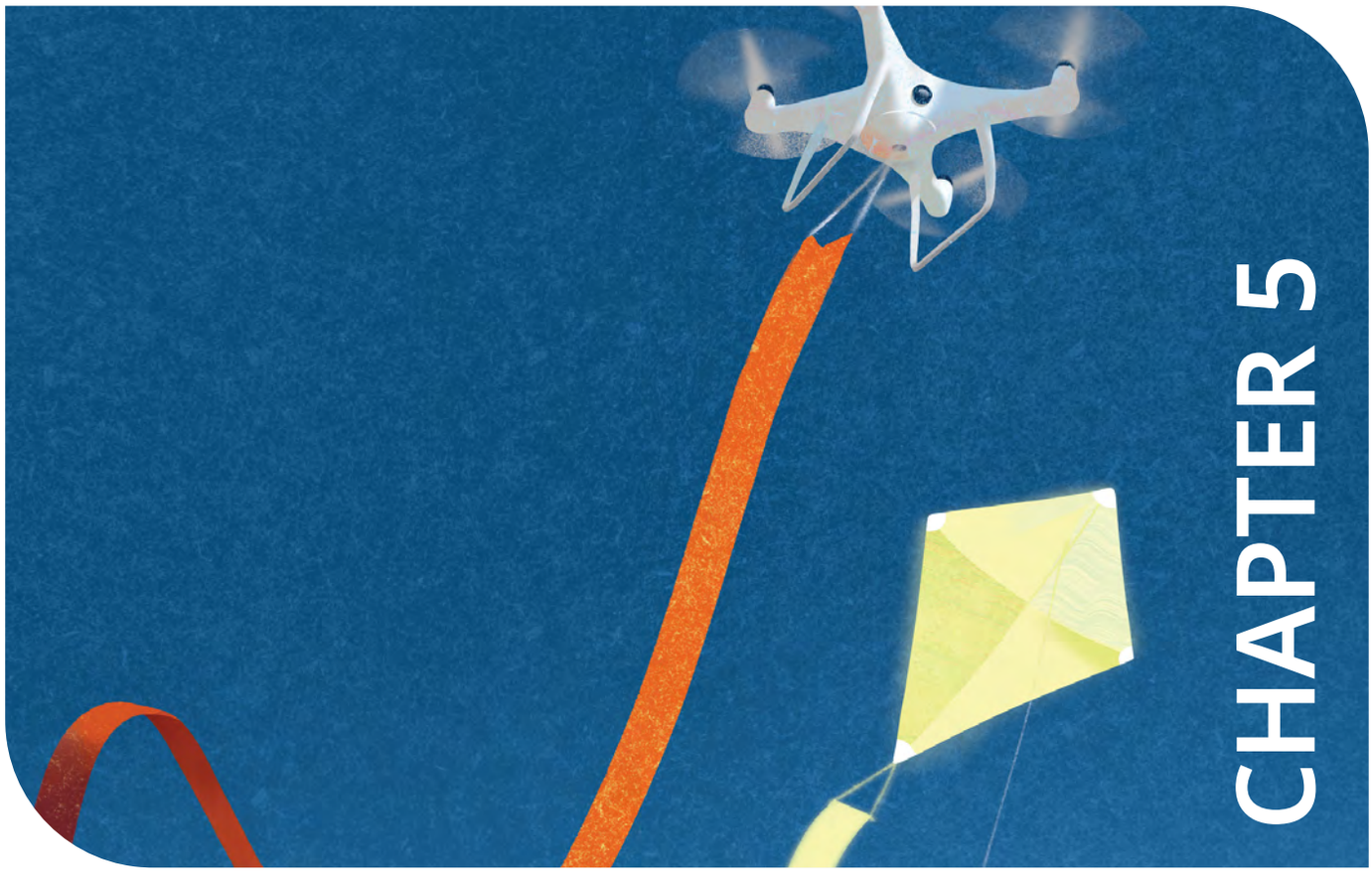
ENTREPRENEURSHIP AT SCALE

Entrepreneurship is the engine of business dynamism and economic growth. While firms in the EBRD regions have continued to catch up with their advanced-economy peers in terms of average productivity levels, young, high-growth firms' share of total firms has fallen steadily over the past two decades in EBRD economies in the EU. Nonetheless, the EBRD regions remain home to many growth-oriented startups.

As in advanced European economies, the majority of startup founders in the EBRD regions have previously studied or worked abroad. They tend to focus on products that are outside their economies' established export baskets, often in information technology, professional or financial services. Serial founders – entrepreneurs who have established more than one firm – typically account for 12-19 per cent of total founders in EBRD economies, with most serial founders tending to target a different sector when they launch a new venture. In many cases, the new venture is also in a different economy to the founder's previous one.

However, relatively few growth-oriented startups in the EBRD regions manage to scale up their operations successfully. Founders whose firms succeed in reaching scale are more likely to have (i) studied or worked abroad before founding the firm, (ii) had a senior role at another firm before launching the startup, (iii) started their firm with at least one co-founder and (iv) obtained funding from at least one foreign investor. Meanwhile, venture-capital funding remains thin and tends to be concentrated in a single metropolitan area in each economy, with a focus on finance and other services. Startups in the EBRD regions tend to raise less venture capital per firm than their counterparts in advanced Europe, and most of what they do raise comes from abroad, predominantly the United States, the United Kingdom and advanced Europe.

Founders in the EBRD regions are more likely to raise funds from investors headquartered in economies where they have previously studied or worked. This reliance on foreign money intensifies as startups grow and mature: domestic and mixed syndicates dominate early funding rounds, but founders in the EBRD regions are far more dependent on foreign funders than their advanced European peers at later stages. Consequently, deepening venture-capital markets, connecting founders to investors and widening the geographical spread of finance will all be central to turning more startups into large productive firms.



STRUCTURAL REFORM

This chapter presents the EBRD's latest assessment of transition challenges in its regions and selected comparator economies, tracking progress on structural reforms. The assessment 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 10 corresponds to the standards of a sustainable market economy. Those scores are based on a wide range of external and internal data sources.

This year's assessment also introduces the EBRD's SME Competitiveness Index. Small and medium-sized enterprises (SMEs) are major sources of employment and make an important contribution to innovation and growth. For each economy, the SME Competitiveness Index aggregates numerous performance indicators in five specific areas: bank financing; non-bank financing; legal frameworks; business skills and standards; and the business environment.

Compared with the Bank's broader measure of economic competitiveness, the SME Competitiveness Index puts greater emphasis on sources of bank and non-bank financing and the business environment. This is because SME competitiveness revolves around those firms' ability to grow in the early stages of their development, access finance, innovate, expand into new markets and compete successfully with domestic and international firms.

Assessments of SME competitiveness and the competitiveness of the broader economy are closely, yet imperfectly, aligned. Between 2016 and 2026, increases in overall competitiveness have tended to outpace improvements in SME competitiveness, particularly in central Europe and the Baltic states. This underlines the importance of fine-tuning dedicated SME policies across the EBRD regions, with a focus on access to finance, skills and legal frameworks for small firms.

CHAPTER 1



CREATING COMPARATIVE ADVANTAGE

As technology advances and economies develop, the structure of countries' production and exports changes. The rapid increase in global demand for artificial intelligence and increased spending on defence may catalyse the development of new export capabilities, but leveraging this demand shock will be challenging. Economies' export structures tend to be highly persistent, and developing new export specialisations tends to be more difficult for more complex products. Building new capabilities involves trial and error, requires active policy support and is generally more successful where economies already have established specialisations in related upstream or downstream products. Large exporters often play a key role in developing and marketing new complex products, with spillover effects on the broader corporate ecosystem.



INTRODUCTION

As technology advances and economies develop, the structure of countries' production changes. Over the past three decades, many economies in the EBRD regions have managed to reinvent themselves to a significant extent, making substantial changes to their export structures and moving up the value chain as they have benefited from trade liberalisation and closer integration with the European Union (EU).[1] Exporting a diverse mix of relatively complex products to a larger number of destinations has supported economic growth. Globalisation has stalled, however, and export markets have become more concentrated. For instance, in his 2024 report on the future of European competitiveness,[2] Mario Draghi notes that Europe needs to change radically in order to remain competitive, as the era of rapid global trade growth looks to have passed and EU companies face both greater competition from abroad and reduced access to overseas markets.

The rapid increase in global demand for artificial intelligence (AI) and increased spending on defence could further catalyse the development of new export capabilities. In recent years, demand for AI-related products has boosted global growth, while average spending on defence has been on the rise.[3] The markets for AI and military goods are large. These goods tend to be complex and highly connected to other goods in production networks. This makes these markets attractive. Box 1.1 discusses the space economy as another promising sector with intensifying global competition. Falling launch costs and smaller satellites are commercialising the space economy, creating opportunities for EBRD economies even though they operate relatively few satellites, with most revenue concentrated downstream in communications, Earth observation and climate analytics, as well as space-enabled applications relating to agriculture, water and natural capital.

Could countries in the EBRD regions and beyond take advantage of such shifts in technology and policy priorities to reinvent themselves? Specifically, could economies capitalise on the resulting demand shocks to boost their competitiveness and build new areas of comparative advantage? What does historical experience suggest for economies aiming to build strong production capabilities in AI-related goods or military sectors?

To answer these questions, this chapter examines the recent evolution of economies' export specialisations, looking at how common it is for economies to develop new capabilities, how lasting such shifts are, and under what circumstances it tends to be easier for economies to develop new export specialisations. The focus on exports is, in part, driven by the availability of detailed data on international trade in various goods (and less detailed data on exports of services). It also reflects the fact that exporters tend to be the most productive firms,[4] making exports a good reflection of economies' strongest capabilities in most cases.

The analysis looks at average experiences in a large set of economies, as well as specific case studies, since for most products (AI and military products included), strong production capabilities are concentrated in a handful of exporting economies. Consequently, outlier experiences are of interest here. In the second part of the chapter, country-level analysis is complemented by a detailed analysis of individual firms, as country export specialisations are a sum total of the advantages developed by individual exporters.

The analysis in this chapter shows that economies' export structures tend to be persistent, and developing new export specialisations tends to be more difficult for more complex products.

Building new capabilities involves trial and error and tends to be more successful where economies already have established specialisations in related upstream or downstream products. It also requires active policy support, including investment promotion, negotiation of free trade agreements that grant preferential market access, worker training, tax incentives, the use of special economic zones and other well-targeted industrial policies.

[1] See Kóczán, Konovalov and Plekhanov (forthcoming).
[2] See European Union (2024).
[3] See also EBRD (2026b) and IMF (2026).
[4] See, for instance, Berthou et al. (2015).



Large exporters often play a key role in developing and marketing new complex products, especially in the case of AI-related and military goods. In doing so, they have knock-on effects on the broader ecosystem of firms. While some economies in the EBRD regions specialise in exports of specific AI-related and military goods, the average specialisation in goods connected to AI and the military is relatively low.

This chapter starts by introducing measures of export specialisation and looks at the evolution of economies' specialisation.[5] It then examines the development of new export capabilities over time and among products with different characteristics, and draws implications for developing specialisations in AI-related and military products. The chapter then turns to the impact of demand shocks and firm-level evidence on the role of top firms. The last section presents conclusions and policy implications.

MEASURING EXPORT SPECIALISATION

The analysis in this section builds on trade data for both goods and services, with the caveat that many services are not traded and services data are available at a much higher level of aggregation. Trade data for goods draw on the BACI International Trade Database developed by the Centre d'Études Prospectives et d'Informations Internationales (CEPII), which provides harmonised bilateral trade flows reconciled from the exports and imports of trading partners.[6] Depending on the analysis, the data are classified according to the HS1992, HS2002 or HS2022 revisions of the World Customs Organization (WCO) Harmonized System (HS).[7] These classifications distinguish around 5,000 products at the six-digit level (HS6) and cover 229 economies from 1995 to 2024. This level of disaggregation distinguishes between, say, other automatic data-processing machine units (HS6 847180) and parts and accessories for automatic data-processing machines (HS6 847330), and between aircraft launching and arresting equipment (HS6 880510) and air-combat flight simulators (HS6 880521).

Trade data for services have been obtained from the Balanced Trade in Services (BaTIS) database compiled by the World Trade Organization (WTO) and the Organisation for Economic Co-operation and Development (OECD).[8] The database covers 202 economies from 1995 to 2024. To construct a consistent long-run series, total services exports from the earlier version of the dataset (covering 1995-2012, based on the fifth edition of the *Balance of Payments Manual* (BPM5))[9] have been rescaled to match the later series (covering 2005-24 (BPM6))[10] based on the earliest overlapping year (2005).

The following analysis examines countries' export specialisations, relying on the concept of revealed comparative advantage (RCA). The RCA for a given product is the ratio of the product's share of the country's total exports to the product's share of world trade. If the ratio is greater than 1, a country specialises in exports of that particular product. In such cases, the country's market share of global exports of a given good exceeds its share of global exports for all products. For instance, in 2024, medicaments (HS code 300490) accounted for 1.7 per cent of world trade, but 34 per cent of Slovenia's total exports. Slovenia, therefore, exports 20 times its "share" of all medicament exports and is considered to have a (strong) RCA in the sector. Similarly, China has an RCA in electric vehicles. RCA thus reflects economies' competitive export strengths as "revealed" by observed trade flows and is straightforward to calculate using global trade data.

In 2024, medicaments accounted for just
1.7%
of world trade, but
34%
of Slovenia's exports

[5] The analysis builds on Kóczán et al. (forthcoming), which explores these issues in greater detail.

[6] See Gaulier and Zignago (2010).
[7] See WCO (2022).
[8] See WTO and OECD (n.d.).
[9] See IMF (2007).
[10] See IMF (2013).

RCA scores are further normalised to range from 0 to 1 by applying the transformation x/(1 + x).[11] Transformed values of more than 0.5 correspond to products in which the country has an above-average market share and enjoys an RCA. To restrict analysis to meaningful exports, the country-level analysis of non-zero exports is restricted to country product observations with at least US$ 100,000 in exports and a normalised RCA of more than 0.01. Changes in RCA could also reflect price effects.

CHANGING PRODUCTION AND EXPORT STRUCTURES

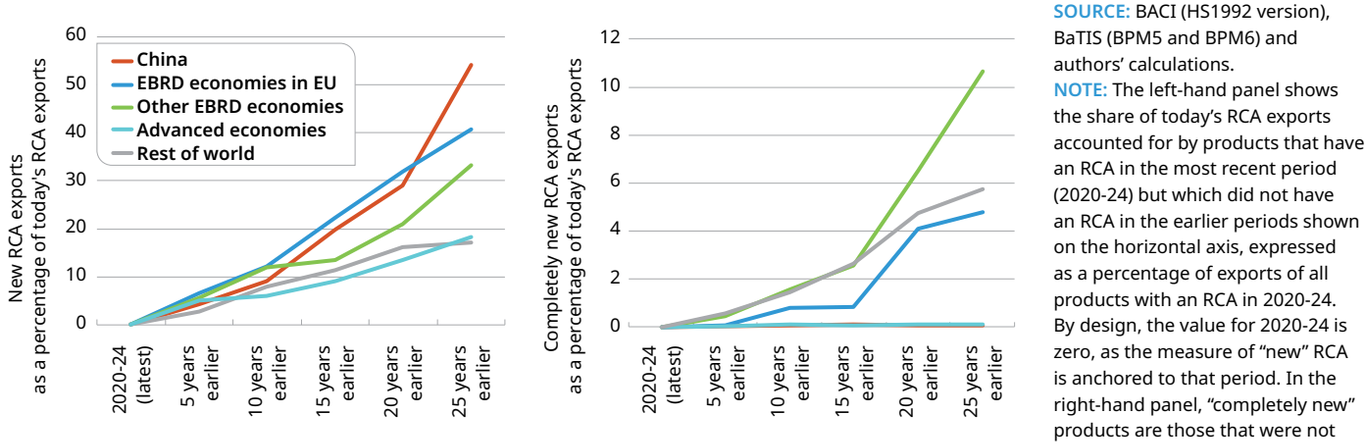
The structure of countries' exports changes over time. These changes reflect technological advances, skills upgrades and the development of new production capabilities. Over the past three decades, many economies in the EBRD regions have managed to reinvent themselves to a significant extent, substantially changing their export structures and moving up the value chain. Of the products in which a typical (median) economy in the EBRD regions specialises today, around half were not exported with an RCA 25 years ago (in 1995-99) and almost 40 per cent were not exported at all.

In the median EBRD economy, products that have an RCA today but did not have one 25 years ago currently account for about 35 per cent of total RCA exports (with goods accounting for 34 percentage points and new specialisations in services accounting for 1 percentage point; see Chart 1.1, left-hand panel). Products with an RCA today that were not exported at all 25 years ago currently account for about 6 per cent of total RCA product export sales (see Chart 1.1, right-hand panel). Many countries' export specialisations from 25 years ago were not retained.

In other words, new comparative advantages have largely replaced old ones in a typical economy, with some exceptions. The Baltic states, Egypt, Türkiye and Uzbekistan, for instance, have substantially expanded their range of export specialisations while retaining a relatively large share of their earlier comparative advantages.

In the median EBRD economy, products that have an RCA today but did not 25 years ago currently account for about **35%** of total RCA exports

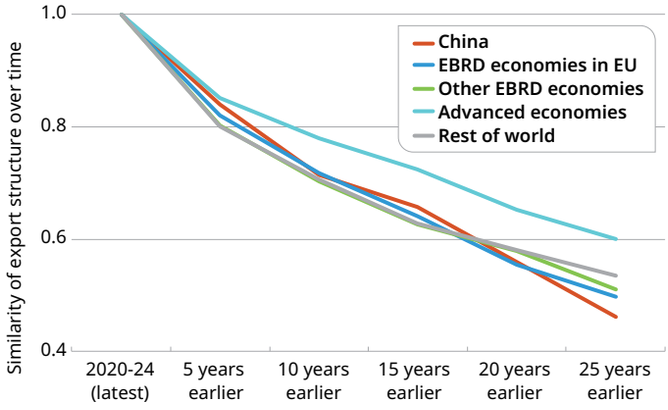
CHART 1.1 The reinvention of export baskets



SOURCE: BACI (HS1992 version), BaTIS (BPM5 and BPM6) and authors' calculations.
NOTE: The left-hand panel shows the share of today's RCA exports accounted for by products that have an RCA in the most recent period (2020-24) but which did not have an RCA in the earlier periods shown on the horizontal axis, expressed as a percentage of exports of all products with an RCA in 2020-24. By design, the value for 2020-24 is zero, as the measure of "new" RCA is anchored to that period. In the right-hand panel, "completely new" products are those that were not exported at all in the earlier periods.

[11] See also Harvard Growth Lab (2026) and Dalum, Laursen and Villumsen (1998).

CHART 1.2 China has experienced the most significant changes in its export structure over time, while advanced economies have changed far less



SOURCE: BACI (HS1992 version), BaTIS (BPM5 and BPM6) and authors' calculations.
NOTE: The export similarity index is calculated based on Finger and Kreinin (1979).

Advanced economies, such as Germany and the United States of America, have seen far less turnover when it comes to export specialisation than the median economy in the EBRD regions. Here, products that were not exported with an RCA 25 years ago account for 18 per cent of today's RCA exports. Products that were not exported at all 25 years ago account for only 0.1 per cent of RCA exports today, as these economies already enjoyed diversified export baskets in the 1990s.

In contrast, the "reinvention" of exports has been stark in China and a number of other economies in Asia, including India and Vietnam. In China, products that were not exported with an RCA 25 years ago now account for 54 per cent of the value of exports in which China specialises. Yet completely new exports account for only 0.1 percentage points of these (similar to the case of large advanced economies). China and a number of other large Asian economies have developed new comparative advantages while largely retaining their existing ones.

EXPORT SIMILARITY OVER TIME

The concept of RCA is useful for comparing specialisations in small and large economies. At the same time, it introduces a discontinuity, with a country "specialising" in products when it has a share of exports that is just above the world average and "not specialising" in exports when the product share is just below the cut-off point. The picture remains similar when looking at exports of all products.

Here, the export structures of a given economy at different points in time (for instance, Kenya today and Kenya five years ago) can be compared using a similarity index following the approach in Finger and Kreinin (1979). For each country-year, the calculation constructs shares of each product in a country's total exports in a given year and takes the minimum of those shares for each product across different years. Export similarity is then measured as a sum of these minimum export shares across all products. This yields an index ranging from 0 (where product baskets have no overlap) to 1 (where a country's export structure is unchanged).[12]

Looking at the similarity of past and present structures of a country's exports confirms the patterns described above. China has experienced the most significant changes in its export structure over time, followed by EBRD economies in the EU. To put this into perspective, China's export structure today is more similar to Japan's export structure in 1995-99 than to China's own export structure in the same period. For advanced economies, the extent of the change has been smaller, but nonetheless significant (see Chart 1.2).

Products with an RCA today that were not exported at all 25 years ago currently account for about
6%
of total RCA exports in the median EBRD economy

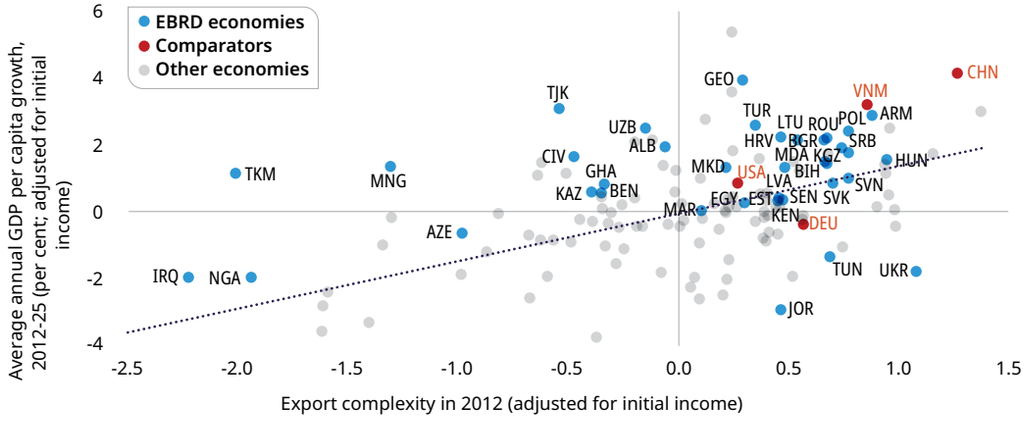
[12] See also EBRD (2025b), which looks at export similarity across countries rather than over time.

EXPORTING A DIVERSE MIX OF COMPLEX PRODUCTS HAS SUPPORTED ECONOMIC GROWTH

Which products countries export matters. Beyond looking at the number of products in which economies specialise or the volume of exports, the "complexity" of those products is also pertinent. Complexity can be seen as a proxy for the "productive knowledge" embedded in a country's exports. It is measured as the "diversity" of the export basket (how many different products a country exports competitively) discounted by "ubiquity" (how many countries specialise in exporting that product).[13] Complex goods, therefore, are those that are exported by few complex countries. Complex countries export many products competitively. This iterative procedure yields standardised complexity scores, with a mean of zero and a standard deviation of 1, with semiconductors, photographic plates and film, and nickel plates, sheets, strip and foil deemed relatively complex. Examples of low-complexity products include cocoa beans, tin ores and concentrates, and crude oil.

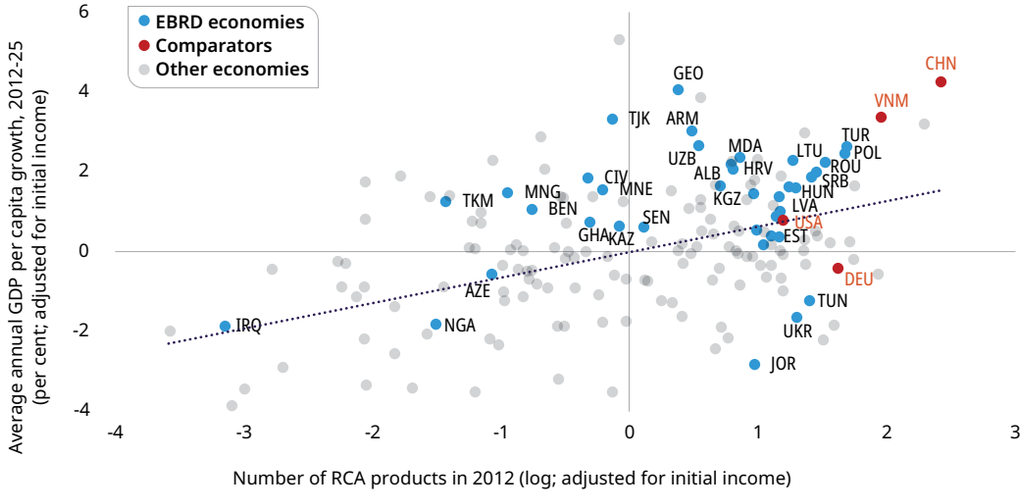
Exporting more diversified baskets containing more complex products tends to be associated with faster subsequent economic growth.[14] Charts 1.3 and 1.4 illustrate these associations for per capita income growth since 2012.

CHART 1.3 More complex exports are associated with faster subsequent growth



SOURCE: Harvard Growth Lab (2026), IMF (2026) and authors' calculations.
NOTE: The vertical axis shows residual gross domestic product (GDP) per capita growth after controlling for the logarithm of initial GDP measured at market exchange rates. The horizontal axis shows the residual average complexity of countries' exports in 2012 after controlling for the logarithm of initial GDP per capita measured at market exchange rates.

CHART 1.4 More diversified exports are associated with faster subsequent growth



SOURCE: BACI (HS1992 version), BaTIS (BPM5 and BPM6), IMF (2026) and authors' calculations.
NOTE: The vertical axis shows residual GDP per capita growth after controlling for the logarithm of initial GDP per capita measured at market exchange rates. The horizontal axis shows the residual logarithm of the number of products exported with an RCA in 2012 after controlling for the logarithm of initial GDP per capita measured at market exchange rates.

[13] See Hausmann et al. (2014).

[14] See, for instance, Hausmann, Hwang and Rodrik (2007), Hidalgo and Hausmann (2009) and Mania and Rieber (2019).

DIVERSIFICATION OF EXPORT BASKETS IN THE EBRD REGIONS

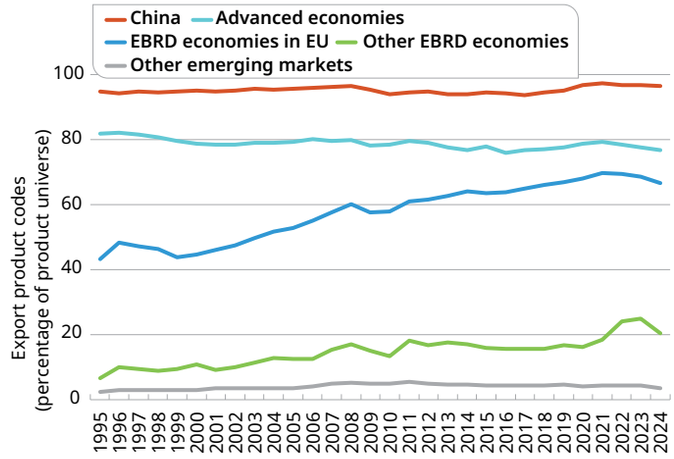
As economies in the EBRD regions have benefited from increases in trade and foreign direct investment inflows over the last three decades, they have become significantly more diversified exporters. The median economy in the EBRD regions now exports around 28 per cent of all HS6 product categories, up from around 13 per cent in 1995 (see Chart 1.5). This is a much starker increase than in the rest of the world (the trend for a typical economy in emerging Asia, for instance, being similar to that of the rest of the world). Export diversification has been especially pronounced in EBRD economies in the EU and Türkiye, where it has increased from 43 per cent to 67 per cent and from 63 per cent to 87 per cent, respectively. In general, richer and larger economies tend to export more products.

EXPORTS TO MORE DESTINATIONS

Economies in the EBRD regions also export to more destinations. In the median EBRD economy in the EU, the average product is now exported to 37 economies, up from 12 in 1995 (see Chart 1.6). In China, the number of destinations for the (trade-weighted) average product has almost tripled to 139 during this period. In the rest of the EBRD regions, the average has also increased somewhat, from 10 to 14 destinations. Advanced economies, too, have seen a gradual increase in the average number of export markets. In the rest of the world, change has been muted: in a typical economy, the average product is exported to only eight destinations.

The median EBRD economy now exports around
28%
of all product categories, up from around
13%
in 1995

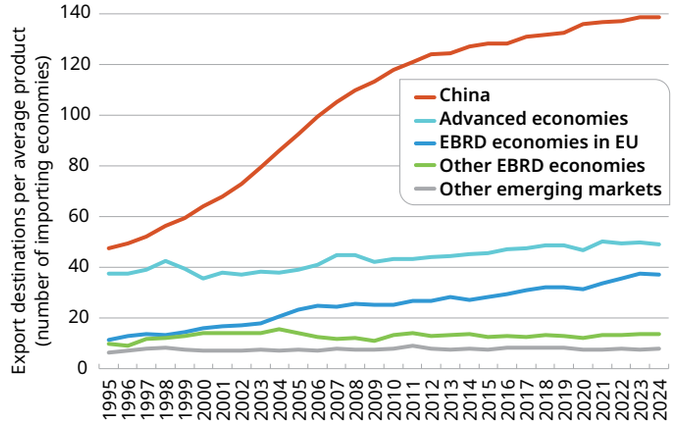
CHART 1.5 The EBRD regions have become more diversified in the goods they export



SOURCE: BACI (HS1992 version), BaTIS (BPM5 and BPM6) and authors' calculations.

NOTE: A product is considered to be exported if its export value in a given year exceeds US$ 100,000 (discounted annually by 2 per cent relative to 2024 prices). Medians are shown for each region.

CHART 1.6 In the median EBRD economy in the EU, the average product is now exported to 37 destinations, more than three times as many as in the 1990s



SOURCE: BACI (HS1992 version), BaTIS (BPM5 and BPM6) and authors' calculations.

NOTE: A country is considered to be an export destination for a given product if the value of exports to that destination in a given year exceeds US$ 100,000 (discounted annually by 2 per cent relative to 2024 prices). Averages weighted by export volumes are calculated for products in each economy, and medians are calculated for economies within a region.

BROADLY STABLE NUMBER OF EXPORT SPECIALISATIONS

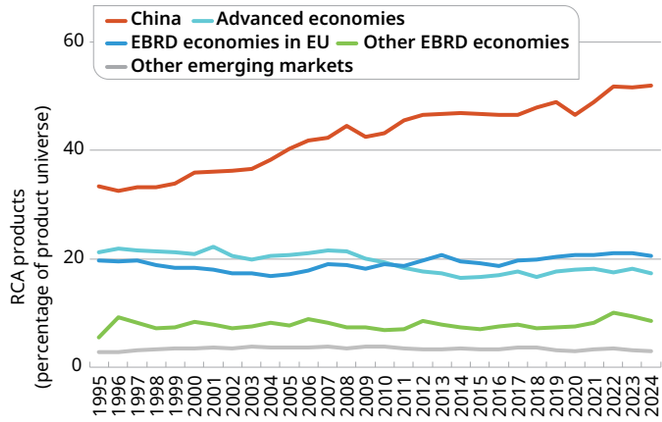
The number of products exported with an RCA has, however, remained broadly stable in the median economy in the EBRD regions, at around 500, corresponding to 11 per cent of HS6 product codes (see Chart 1.7). A notable exception is Türkiye, which has seen a large increase in the number of goods exported with an RCA over the past three decades, from 21 per cent to 35 per cent.

Advanced economies have experienced overall declines in the number of products in which they hold a comparative advantage, as comparative advantages gained have been outnumbered by those lost. For instance, the share has declined from 34 per cent to 29 per cent in the United States and from 45 per cent to 42 per cent in Germany. In contrast, the share of products in which China enjoys an RCA has risen from 33 per cent to 52 per cent over the last three decades.[15]

GROWING COMPLEXITY IN EBRD ECONOMIES IN THE EU

Goods exported by EBRD economies in the EU and China have become more complex over time (see Chart 1.8). In contrast, the average complexity of exports has declined in advanced economies since the early 2000s to a level in line with China's. It has changed little in the rest of the world, on average. In the EBRD regions, the average complexity of exports has increased most in the Baltic states, Hungary, Poland, the Slovak Republic and Slovenia, as well as in Ghana, Morocco, Tunisia and Türkiye, sometimes from a low initial level. Trends in terms of the complexity and diversification of exports have been reflected in economies' average growth performance, with EBRD economies in the EU (and China) enjoying exceptional growth in income per capita.[16]

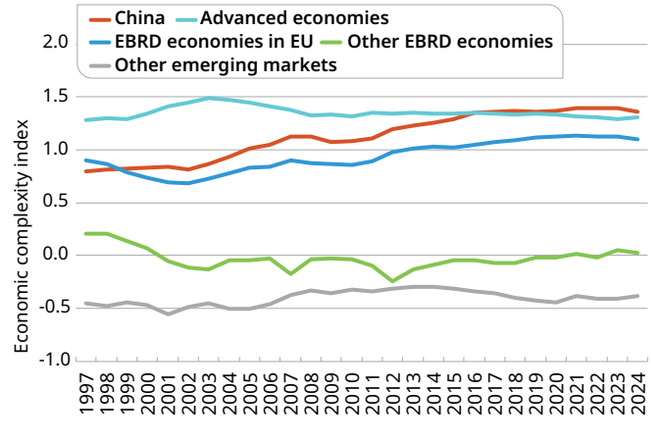
CHART 1.7 The number of products exported with an RCA has remained broadly stable in the EBRD regions



SOURCE: BACI (HS1992 version), BaTIS (BPM5 and BPM6) and authors' calculations.

NOTE: Medians are shown for all regions.

CHART 1.8 The average complexity of goods exported by EBRD economies in the EU and China has been increasing



SOURCE: BACI (HS1992 version), BaTIS (BPM5 and BPM6) and authors' calculations.

NOTE: The economic complexity index has been calculated based on a Harvard Growth Lab methodology.

The median EBRD economy has an RCA in about **11%** of all products

[15] See also EBRD (2026a).

[16] See Chupilkin, Kóczán and Plekhanov (2025).

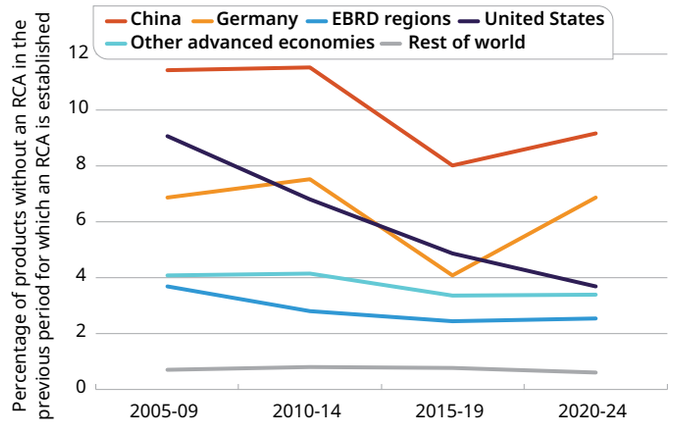
DEVELOPING NEW EXPORT CAPABILITIES HAS BECOME MORE DIFFICULT

With rising competition in export markets, developing new export capabilities has become more difficult (see Chart 1.9). While export capabilities change significantly over time, developing a specialisation in any specific product is challenging. Over a five-year period, a typical economy develops new capabilities in 55 products (which includes products without any exports in the previous period), corresponding to 7.2 per cent of products exported by that economy without an RCA in the preceding five years. Put differently, it would take a typical country 70 years to develop an RCA in a given export product, calculated as the inverse of the five-year transition rate multiplied by five years. This remains true in exceptional circumstances: fewer than 5 per cent of economies manage to develop an RCA in more than 20 per cent of previously exported products over a five-year period.

In the EBRD regions, as in many other developing economies, new comparative advantages have tended to emerge in products that are somewhat more complex than those where an RCA has been lost. The typical EBRD economy has lost RCA in products around the 40th percentile of the complexity distribution and gained RCA in products around the 50th percentile. China is characterised by a very pronounced shift towards higher-complexity products, losing RCA in products around the 28th percentile and gaining it in products around the 72nd percentile.[17]

In contrast, as emerging markets have developed export specialisations in more complex products, some advanced economies have lost their RCA in those products. For instance, 11 economies in the EBRD regions (9 economies in emerging Europe, plus Tunisia and Türkiye) have gained an RCA in motor vehicle parts and accessories (HS6 code 870899), while the United States has lost this RCA. The next section examines factors that can facilitate the development of new export capabilities.

CHART 1.9 Developing new export capabilities has become more difficult over time



SOURCE: BACI (HS2002 version) and authors' calculations.
NOTE: This analysis only counts advantages developed; it disregards advantages lost. It also includes products without any previous exports.

Over a
FIVE-YEAR PERIOD,
a typical economy develops new capabilities in
55 PRODUCTS

[17] See also EBRD (2025a) on the rising complexity of China's export basket and the rising similarity between China's export basket and those of other economies.

WHAT AFFECTS THE DEVELOPMENT OF NEW CAPABILITIES?

SPECIALISATION IN RELATED GOODS

New export capabilities are somewhat easier to develop if economies already specialise in the production of related goods – either those that are used as inputs in production (upstream linkages) or products that use a given output as an input in production (downstream connection). For example, car parts may be linked to finished steel products upstream and vehicle manufacturing downstream. A country specialising in the export of finished steel products and/or the export of vehicles is more likely to develop a new specialisation in vehicle parts, partly due to existing supply or demand in local production chains and partly due to the availability of related skills.

In this analysis, connectedness is measured as the product's position (linkages) in the production network, calculated using a PageRank algorithm applied to the AI-generated Production Network (AIPNET), taking the average of upstream and downstream connectedness. Specialisation in related goods is defined as a country's weighted average normalised RCA in those goods. The weights give greater importance to more specific production linkages. For upstream linkages, an input receives a larger weight if it is used in relatively few other products, while generic inputs used in the production of many goods are allocated smaller weights. For downstream linkages, greater weight is assigned to products that represent a relatively more specific input. For example, if one input into vehicle parts is used in five different products and another is used in 20, the former receives four times the weight of the latter, before weights are normalised to sum to 1. Upstream and downstream specialisation measures are calculated separately and then averaged.

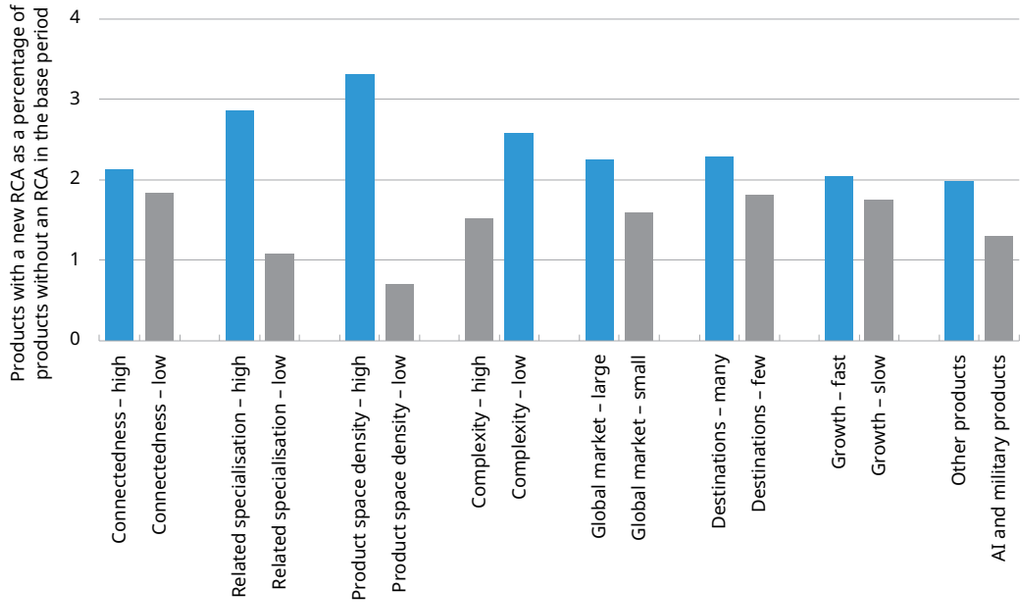
The probability of developing a new specialisation is, indeed, more than twice as high when an economy is specialised in related goods as when such specialisation is low (see Chart 1.10). Most of this effect is due to a country's structure of production, although the probability of developing a specialisation is generally somewhat higher for products that are connected to many other products (that is, products that have many inputs or are commonly used as production inputs).

Similarly, new export capabilities also tend to be easier to develop in products with greater "density" in the product space nearby. Density is measured as the weighted average of an economy's normalised RCAs in related products, where the weights are determined by the proximities between products (that is, the conditional probability of having an RCA in one product given an RCA in another). For example, economies with an RCA in electric vehicles have, on average, a 33 per cent probability of also having an RCA in battery-powered locomotives, while economies with an RCA in battery-powered locomotives have a 31 per cent probability of having an RCA in electric vehicles, yielding a proximity of 31 per cent. In contrast, the proximity between wine and beer is only 15 per cent: while 29 per cent of countries with an RCA in wine also have an RCA in beer, only 15 per cent of countries with an RCA in beer have an RCA in wine. An economy that already specialises in rubber products, vehicle components and industrial machinery would have a relatively high density of product space around tyres, as these products require similar capabilities. It would, therefore, be more likely to develop a new RCA in tyres than economies that have lower density around tyres.

THE CHALLENGE OF LEARNING TO PRODUCE COMPLEX GOODS

In turn, export markets for complex goods are considerably harder to break into, as competitive production of these goods requires many specialised capabilities.

CHART 1.10 New export capabilities are easier to develop when economies have specialisations in related goods



SOURCE: BACI (HS2002 version) and authors' calculations.

NOTE: "High" refers to values above the median and "low" refers to values below the median – except for product market growth and market size, where the "high" and "low" categories correspond to the top and bottom quintiles of the relevant distributions, respectively. Connectedness, complexity, global market, number of destinations and global market growth are product specific, but do not vary from country to country. Related specialisation and product space density vary among product-country combinations.

LARGE VERSUS SMALL MARKETS

New export capabilities tend to be easier to develop in products with larger global markets, as global market shares may be easier to "reallocate" in such markets than in smaller markets. Global market size (the share of global trade) varies dramatically between HS6 products, from niche products, such as whale meat and ski equipment, to cars and crude oil, which account for the largest shares of global trade.

New export capabilities are also easier to develop in products that tend to be exported to more destinations by a given economy, underscoring the importance of economies of scale and diversification. The number of export destinations is measured as the median number of importing economies served by exporters of a product, capturing how widely traded the product is across international markets. For instance, cars, laptops, motors or refined petroleum products are very widely exported (to 10-18 destinations on average), while music boxes, nuclear reactors and railway rolling stock tend to be exported to one or two destinations, on average. Looking at the number of export destinations for a given country rather than the average across economies yields similar results.

It also tends to be easier to develop an export specialisation in markets where global trade is growing than in markets where it is shrinking. Fast-growing markets are defined here as those products where global exports have grown most (top 20 per cent of products) between the periods in which RCA development is measured; slow-growing products are those in the bottom quintile of the distribution of global export growth. The calculations are specific to each period. Between 2010-14 and 2015-19, for instance, slower-growing industries include black-and-white display tubes (HS6 code 854050), while faster-growing goods include semiconductor photolithography equipment (HS6 code 901042) and instant cameras (HS6 code 900640).

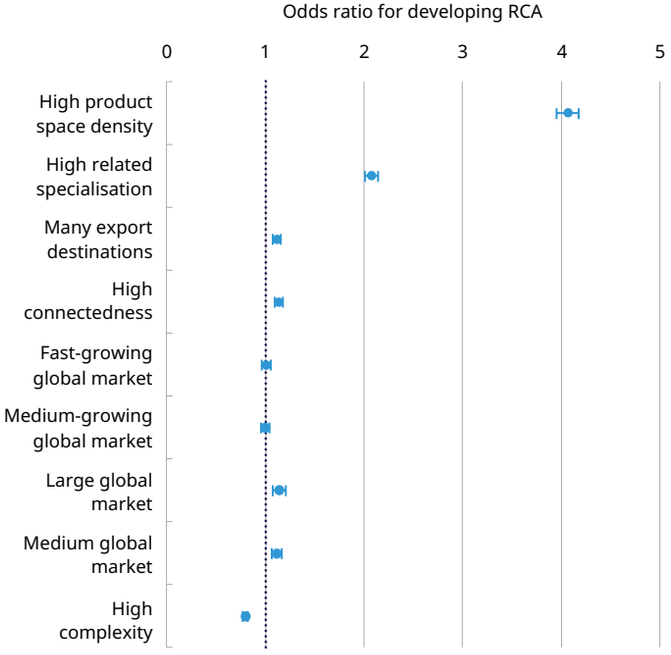
Next, the importance of these various characteristics is examined in a regression framework, where the probability of a country developing a new RCA in a given product in a given period between the two consecutive five-year periods is linked to various product characteristics.[18] Specifications include country-period fixed effects that take into account characteristics that impact all products, such as a country's level of development, the quality of the

[18] Cases where a country has an RCA in a given product in the base period are excluded from this analysis.

business environment or the average quality of skills. The results are summarised in Chart 1.11.

High product space density and specialisation in related products have the largest effects on economies' ability to develop new comparative advantages. In particular, a country is, on average, more than four times as likely to develop a new RCA in a product where it has "dense" product space as where it does not, and it is more than twice as likely where it has export specialisations in upstream or downstream products. The smaller effects of lower product complexity and larger global markets remain statistically significant, while the growth rate of global trade loses its statistical significance.

CHART 1.11 New export capabilities are easier to develop in products where the country has high density and those where it has related specialisations



SOURCE: BACI (HS2002 version), Kóczán et al. (forthcoming) and authors' calculations.

NOTE: Based on regression analysis where a unit of observation is a transition between consecutive five-year periods for a given country and product. The dependent variable equals 1 if a country develops a new RCA in a product and 0 otherwise. Coefficients are reported as odds ratios from a logit model, with country-period fixed effects and standard errors clustered at the product level. Explanatory variables are defined as in Chart 1.10. Whiskers denote 95 per cent confidence intervals. Including product-time fixed effects points to similar estimates for the density and connectedness measures.

SPECIALISATION IN SERVICES

While the analysis also includes trade in services, direct comparisons between goods and services are difficult, as trade in services is measured with less granularity. When looking at comparable levels of aggregation (at the sectional level, corresponding to 21 groups of services and 21 groups of goods), new export capabilities appear to be easier to develop in services (see also Box 1.2 on the importance of trade in services in Türkiye). In part, this could reflect the fact that traded services tend to be less complex than goods. For instance, empirically derived measures of product complexity put the most complex services, such as contract manufacturing, information technology (IT) services, business services and intellectual property, on a par with wine, plastic tableware, beer or maize seeds.

IMPLICATIONS FOR DEVELOPING NEW CAPABILITIES IN AI-RELATED AND MILITARY GOODS

AI-RELATED AND MILITARY GOODS ARE CONNECTED AND COMPLEX

In recent years, demand for AI-related products has boosted global growth, while average spending on defence has been on the rise (see the discussion in Chapters 2 and 3, as well as EBRD (2025a and 2025b)). Based on the historical patterns surveyed above, could countries build on these booms to develop export specialisations in related goods?

The following analysis defines AI-related products as semiconductors, semiconductor manufacturing equipment, semiconductor materials and inputs, and computing hardware (Chapter 3 discusses the AI supply chain in detail). As the analysis covers the last three decades, in large part predating the recent rise in AI technologies, the definition used here is intentionally broad, including, for instance, photographic chemicals,

phosphorus oxychloride ($POCl_3$) and high-purity silicon. In turn, military products are goods classified under the following HS6 codes: tanks and other armoured fighting vehicles (871000); aircraft launching gear and deck-arrestor equipment, and ground flying trainers (880510); air combat simulators and their parts (880521); warships (890610); artillery weapons (930110); rocket launchers, flamethrowers, grenade launchers, torpedo tubes and similar military weapons (930120); other military weapons (930190); parts of military weapons (930591); and military ammunition and munitions (930690). Chapter 2 provides a detailed discussion of defence spending; the results of the analysis are robust to using broader definitions of military goods.

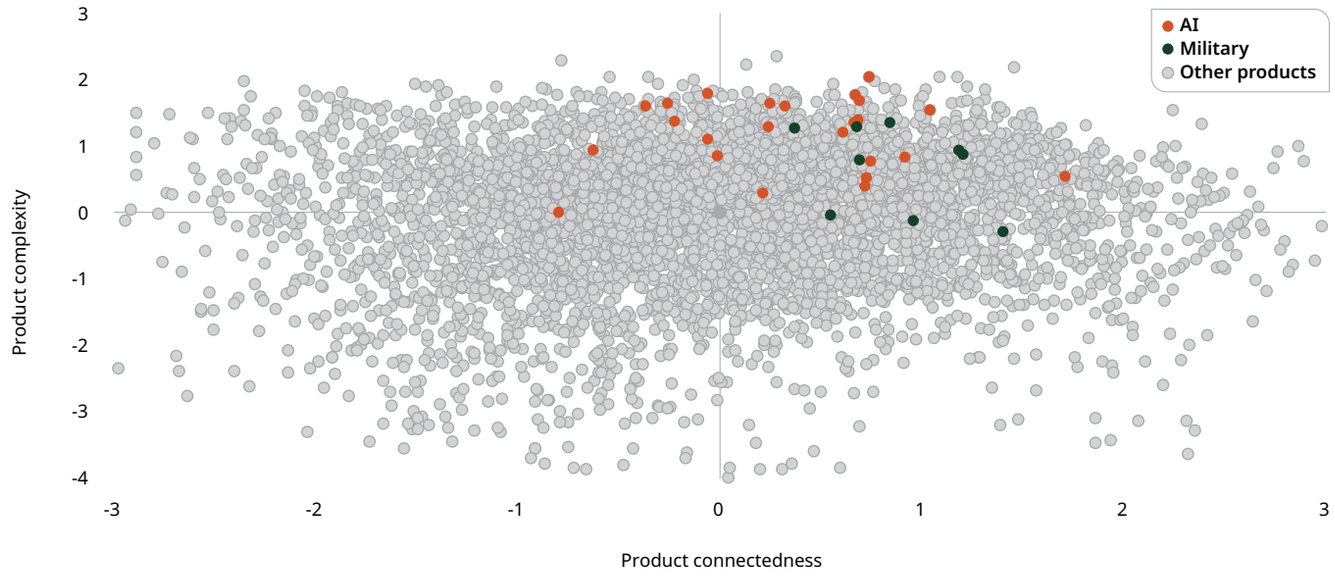
The markets for AI and military goods are large. AI-related goods as defined in this report account for 6 per cent of global trade. In terms of the size of individual product markets, the median AI-related product is in the top 5 per cent of the distribution across all HS6 codes. While the median military good is in the top half (56th percentile), the actual percentile is likely to be higher, as it is possible that not all military contracts will be reflected in official trade statistics. On average, a country exports an AI-related product to seven destinations, compared with three for other products (with military products being similar to other products in terms of destinations).

These goods also tend to be complex and highly connected to other goods in production networks. AI and military goods are, on average, around the 94th and 82nd percentiles of the complexity distribution, respectively – similar to, for instance, the complexity of electric trains and black-and-white photographic film, respectively (see Chart 1.12).

Large markets, rapidly growing demand, and the high complexity and connectedness of underlying products make AI and military markets attractive from a development perspective. The same characteristics – in particular, the high levels of complexity and reliance on existing capabilities along complex supply chains – also make these markets more difficult to break into.

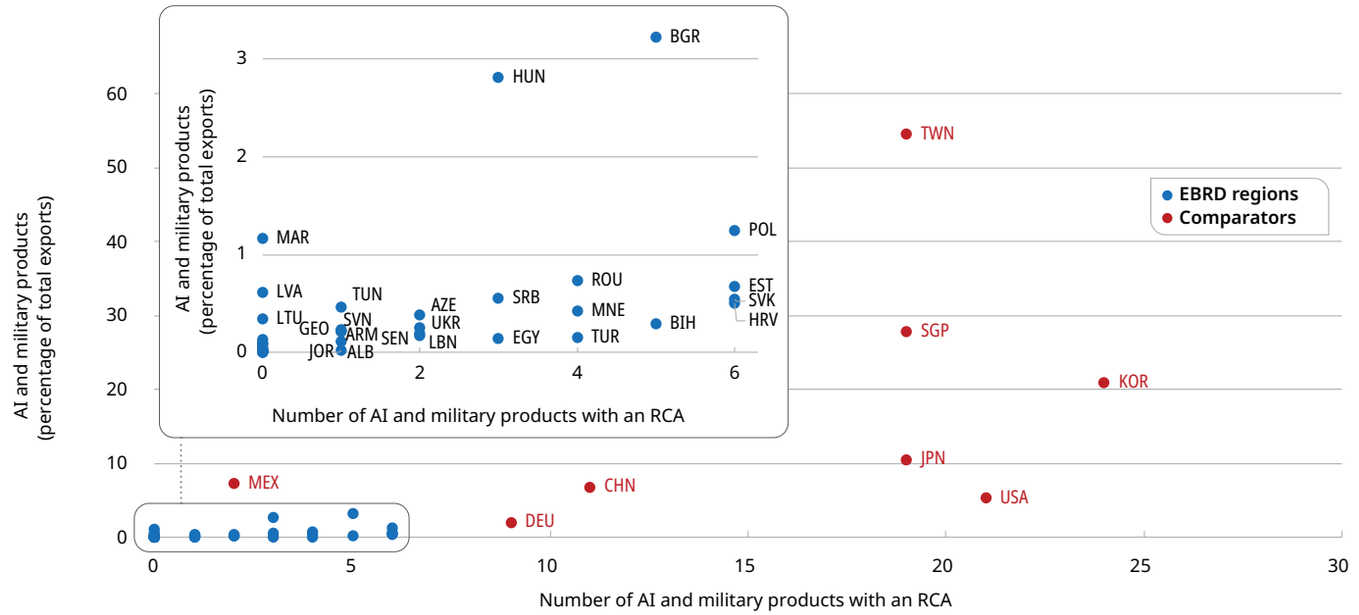
AI-related goods account for **6%** of global trade

CHART 1.12 AI-related and military goods tend to be complex and highly connected to other products throughout supply chains



SOURCE: BACI (HS2022 version) and authors' calculations.
NOTE: Data refer to 2022-24. Product connectedness measures the average intensity of upstream and downstream linkages.

CHART 1.13 Some economies in the EBRD regions already specialise in exports of specific AI-related and military goods



SOURCE: BACI (HS2022 version) and authors' calculations.
NOTE: Data refer to 2022-24. Calculated for 33 AI-related and military products versus 5,606 other products.

EXISTING SPECIALISATIONS IN SOME AI-RELATED AND MILITARY GOODS

Some economies in the EBRD regions already specialise in exports of specific AI-related and military goods (see Chart 1.13). Examples include Romania's comparative advantage in ships; Estonia's specialisation in aircraft launching and landing-arrest equipment, and critical metals; Hungary's specialisation in computer processors and processing units; and specialisations in heavy military weapon launchers in various economies, including Bosnia and Herzegovina, Bulgaria, Croatia and Poland.

LOW LEVELS OF SPECIALISATION IN RELATED GOODS

However, most economies in the EBRD regions have, on average, relatively low specialisation in AI-related goods and, to a lesser extent, military goods (see Chart 1.14). Notable exceptions, where some exposure to AI-related value chains could facilitate the development of new RCAs, include the Slovak Republic, which does not have an RCA in computer processing units, but has an RCA in related products, such as other data-processing machines. Estonia does not have an RCA in parts of integrated circuits (computer chips), but has an RCA in telecommunications testing and measuring instruments, and in navigation instruments and equipment. Hungary, the Slovak Republic, Estonia and Latvia generally have relatively high specialisation in products connected to AI products. Nigeria and Senegal do not have an RCA in processed semiconductor metals, but have an RCA in upstream inputs – niobium, tantalum and vanadium ores and concentrates – used to produce these materials. Among comparator countries, Japan's average specialisation in related products is higher for AI goods than for other products.

Some economies in the EBRD regions have also developed an RCA in exports of related services over the past two decades. Most notably, Ukraine, Serbia and Estonia have established an RCA in information and communications technology (ICT) services.

Some economies specialise in sectors with strong upstream or downstream links to military production, typically as a result of strong manufacturing bases. For instance, Türkiye has an RCA in aluminium sheets and plates; the Slovak Republic and Montenegro have RCAs in steel, aluminium alloys, copper waste and scrap; and Ukraine has an RCA in upstream steel and iron products, as well as some aircraft products (see Chart 1.14). Among comparators, the United States and Russia have higher-than-average specialisation in sectors linked to military production.

CONCENTRATED MARKETS

Military exports are highly concentrated. Only 60 economies worldwide have an RCA in any military products, with strong specialisation in a handful of economies, including China, Czechia, Germany, Israel, the United Kingdom and the United States. Military procurement contracts can be long and sticky.

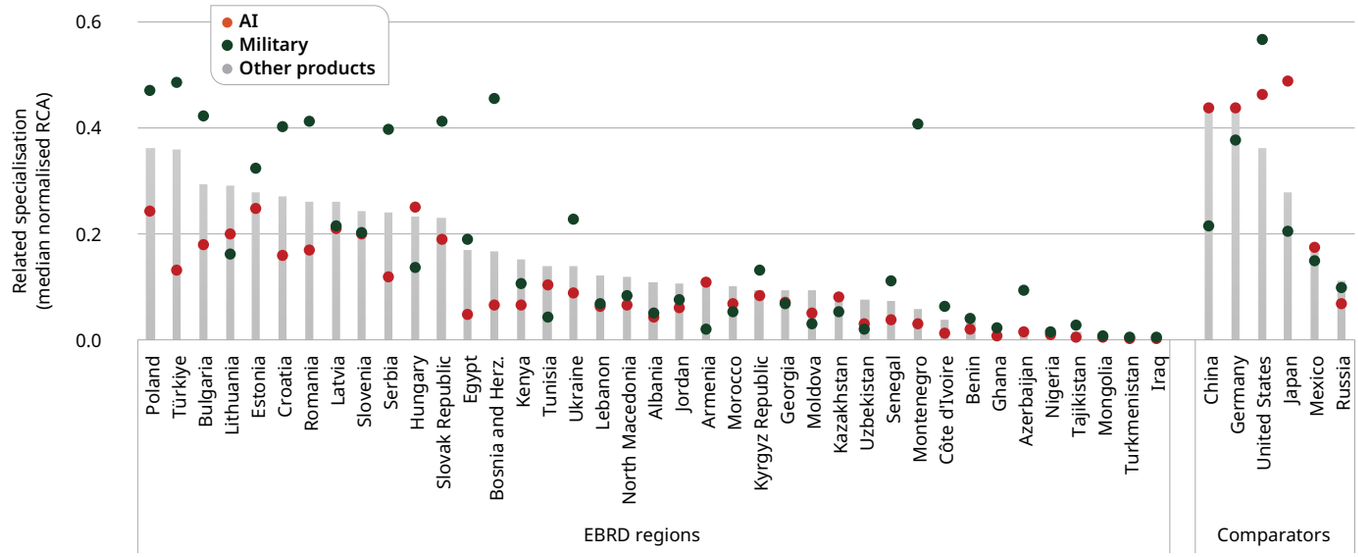
AI exports are also concentrated. Only 67 economies have an RCA in one or more AI product codes. Relatively high shares of RCA in AI-related products can be observed in Singapore, Taipei China, Malaysia, South Korea, the Philippines, Japan, the United States, Israel and China.

Only
67 ECONOMIES
have an RCA in one or more AI product codes

HOW DO EXPORT SPECIALISATIONS RESPOND TO DEMAND SHOCKS?

This section, which is based on the analysis of Kóczán et al. (forthcoming), examines the extent to which sudden increases in demand for particular products (akin to those observed recently for AI and military goods) can help economies to develop export capabilities. The analysis uses the local projections method to study the response of export specialisations to demand shocks specific to countries and products.[19] Looking at the imports of each economy, the analysis calculates a measure similar to RCA for exports. For instance, the United Kingdom has a "revealed import preference" (for simplicity, referred to as an "import RCA") in electric vehicles, as it accounts for 3 per cent of global imports overall, but 10 per cent of global imports of electric vehicles.[20] The import demand shock for a particular product is calculated as the weighted average "import RCA" of that product across a country's export partners.

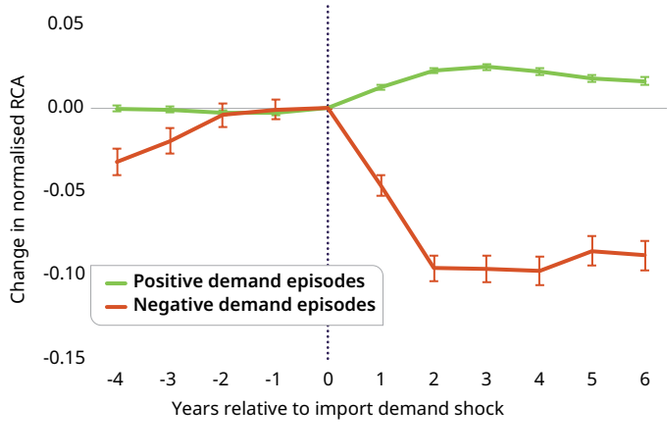
CHART 1.14 Most economies in the EBRD regions have relatively low specialisation in AI-related goods and, to a lesser extent, military-related goods



SOURCE: BACI (HS2022 version) and authors' calculations.
NOTE: Data refer to 2022-24. Related specialisation for each product is calculated as the weighted average of normalised RCA in products with upstream and downstream linkages to that product. The chart shows the median related specialisation across products within each group of goods (AI, military and other products).

[19] See Jordà (2005) for a discussion of the local projections method.
[20] This measure is similar to that used by Hummels et al. (2014), who look at the effect that increased imports by Danish firms have on workers' wages and construct an instrument that is conceptually similar to the import RCA measure used here.

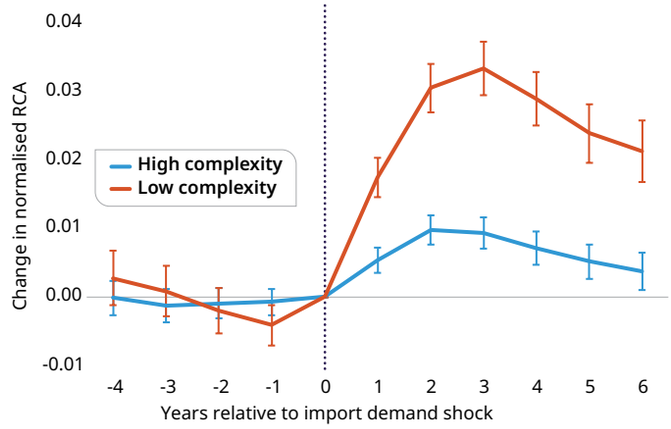
CHART 1.15 Negative demand shocks destroy export specialisation immediately for economies that are exposed



SOURCE: BACI (HS2002 version), Kóczán et al. (forthcoming) and authors' calculations.

NOTE: This chart shows the changes in normalised export RCA that are associated with positive and negative external demand shocks, estimated using the local projections method. At each horizon, the dependent variable is the change in a country-product's normalised export RCA relative to the year preceding the start of the demand episode (t = 0); t = 1 denotes the first year of the episode. A demand episode consists of consecutive annual changes in the same direction in the import RCA of the country's trading partners, with the shock measured as the total change over the episode. For example, if the trading partners' import RCA for cars rises in 2010 and 2011 before falling in 2012, 2010 marks the start of a positive episode and 2012 the start of a new negative episode. Import RCA is constructed analogously to export RCA, using imports rather than exports. For each country-product, trading partners' import RCA is aggregated using bilateral trade weights, excluding imports from the country in question to avoid a mechanical relationship between the demand measure and the country's own exports. All country-products are included when estimating the effects of positive demand episodes. For negative demand episodes, the sample is restricted to country-products with a positive export RCA in the year preceding the episode, as the RCA cannot fall below zero. Regressions include country-product, country-year and product-year fixed effects. Standard errors are clustered at the product level. Whiskers denote 95 per cent confidence intervals.

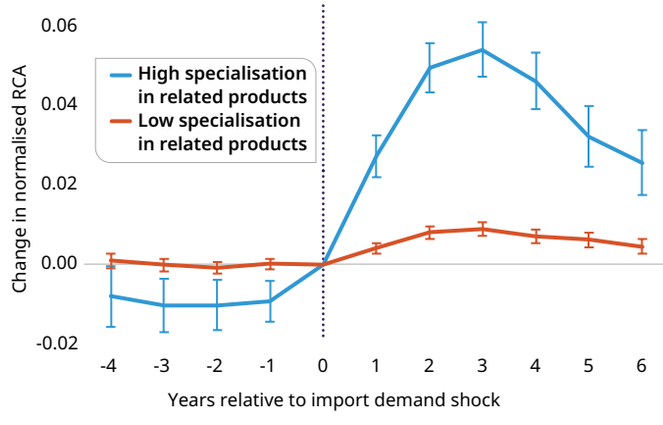
CHART 1.16 Positive demand shocks are harder to leverage for more complex products



SOURCE: BACI (HS2002 version), Kóczán et al. (forthcoming) and authors' calculations.

NOTE: This chart shows the changes in normalised export RCA that are associated with positive external demand shocks, estimated using separate local projections for low- and high-complexity products. A positive demand episode consists of consecutive annual increases in the import RCA of the country's trading partners, with the shock measured as the total increase over the episode. Product complexity is calculated annually using the economic complexity methodology, and products are ranked by complexity within each year. Low- and high-complexity products correspond to the bottom and top terciles of the annual product-complexity distribution, respectively. All country-products are included in the estimation sample. Regressions include country-product, country-year and product-year fixed effects. Standard errors are clustered at the product level. Whiskers denote 95 per cent confidence intervals.

CHART 1.17 Specialisation in related products helps to leverage positive demand shocks



SOURCE: BACI (HS2002 version), Kóczán et al. (forthcoming) and authors' calculations.

NOTE: This chart shows changes in normalised export RCA associated with positive external demand shocks, estimated using local projections separately for country-products with low and high specialisation in related products. Specialisation in related products is measured in the year preceding the episode and captures the extent to which a country is already specialised in products that are closely related to the product experiencing the demand shock. Country-products are divided separately into terciles of specialisation within each event year. Low and high specialisation correspond to the bottom and top terciles, respectively. All country-products are included in the estimation sample. Regressions include country-product, country-year and product-year fixed effects. Standard errors are clustered at the product level. Whiskers denote 95 per cent confidence intervals.

To remove any mechanical effects, the calculation of import RCAs excludes any imports originating from the country in question, while weights assigned to trading partners exclude trade in products under consideration. Positive demand shocks are defined as above-zero changes in this measure, while below-zero changes constitute negative demand shocks. For instance, Lithuania's trading partners, many of which are Alpine and Nordic economies, have a high import RCA in snow-ski equipment (HS 950619; 1.93). An increase in that import RCA would constitute a positive external demand shock for ski equipment production in Lithuania (regardless of Lithuania's existing capabilities in that area). This analysis focuses on episodes of positive or negative demand changes, defined as consecutive years of increasing (or falling) demand, with year 1 corresponding to the first year of each episode.

In general, a negative external demand shock is associated with a sizeable immediate drop in an economy's export RCA (see Chart 1.15). Positive demand shocks are associated with a statistically significant increase in export RCA, but the average effect is decidedly smaller. Positive shocks may be harder to leverage, in part because many countries may be responding to the increase in global demand, while only some countries have the right capabilities to scale up production in the near term.

Positive demand shocks also tend to be harder to leverage for more complex products, such as AI-related and military goods, although the effects are present for both more complex and less complex goods (see Chart 1.16). While the effects diminish as time passes, they remain positive and statistically significant at the end of the five-year analysis window.

As in the analysis in previous sections, economies tend to be in a better position to leverage positive demand shocks if they have relatively high export specialisations in related products. The increase in a country's export RCA is an order of magnitude higher where a country's specialisation in related products is in the top tercile in the sample (see Chart 1.17).

TARGETED POLICIES TO SUPPORT THE DEVELOPMENT OF NEW CAPABILITIES

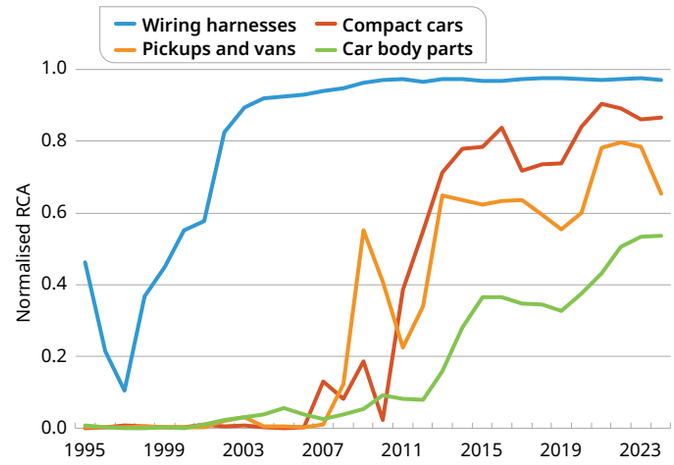
MOROCCO'S AUTOMOTIVE EXPORTS

Targeted policies also play a key role in supporting the development of new production capabilities. Morocco's emergence as a key car exporter shows how industrial policies and anchor investments can contribute to the development of export capabilities in a complex product with a large global market.

Before 2010, car exports from Morocco were negligible.[21] A sequence of industrial policies, combining tax incentives, special economic zones, worker training and previously negotiated preferential access to the EU market, helped to attract foreign direct investment (FDI) to the large export-oriented assembly plants of major multinational companies, such as those established by Renault in 2012 and Stellantis in 2019.[22]

As production expanded, Morocco built on a pre-existing specialisation in vehicle wiring sets, developing a strong RCA in small petrol cars, then pickup trucks and, more recently, car steering parts. It also diversified its export destinations (see Chart 1.18).

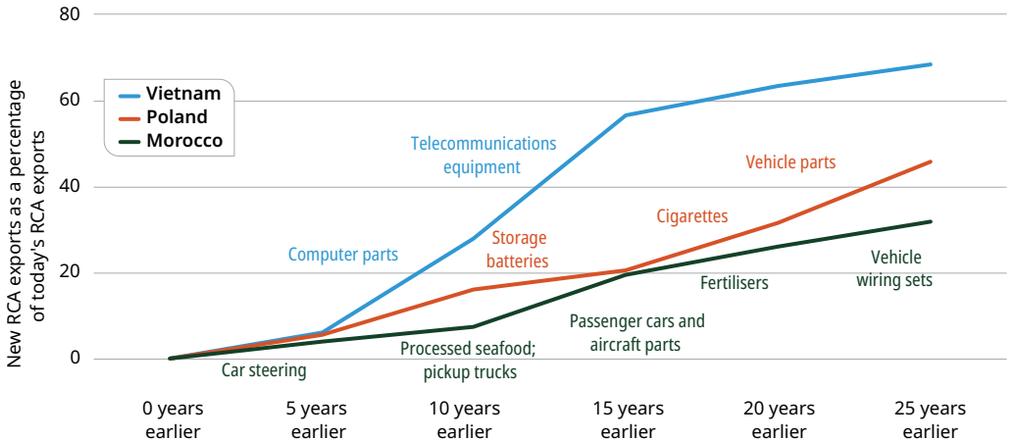
CHART 1.18 Morocco has established export specialisations in a number of automotive products



SOURCE: BACI (HS1992 version) and authors' calculations.

[21] See Hahn and Vidican-Auktor (2017).
[22] See Chauffour (2018).

CHART 1.19 Morocco has developed an RCA in cars, supported by anchor FDI investments and long-term policy frameworks



SOURCE: BACI (HS1992 version), BaTIS (BPM5 and BPM6) and authors' calculations.
NOTE: This chart indicates selected new export specialisations developed by Morocco, Poland and Vietnam at various points in time. These specialisations have made a significant contribution to the export baskets of these economies in recent years.

Chart 1.19 shows the share of current RCA exports where specialisation did not exist 5-25 years ago and indicates selected new export specialisations developed by Morocco, Poland and Vietnam at various points in time.

With cars now accounting for around 13 per cent of its exports, Morocco is one of the EU's largest external car suppliers by volume and Africa's largest car exporter. Initial anchor investments helped to catalyse related capabilities, resulting in a supplier ecosystem of more than 250 firms forming alongside the assembly plants.[23]

These accumulated capabilities have since underpinned further expansion into electric-vehicle supply chains. As global demand for electric vehicles and battery inputs has picked up, Morocco's automotive ecosystem and trade agreements have helped to attract investment from Chinese battery-materials firms, which have located processing activities in the country – partly in order to secure access to US and European markets (including through free trade agreements), as both have raised barriers to inputs of Chinese origin.[24] This illustrates how accumulated capabilities, combined with existing trade agreements, can help countries to benefit from global demand booms and shifts in global trading patterns.[25]

POLAND'S AUTOMOTIVE SECTOR

Poland provides a complementary example in the automotive sector. From the 1990s, low labour costs, geographical proximity to advanced Europe, EU integration and generous investment incentives attracted automakers and component producers to central and eastern Europe. In Poland, FDI was concentrated in components, light commercial vehicles and heavy trucks rather than passenger-car assembly, with firms such as Toyota and Mercedes-Benz investing in engine production. Accordingly, the country's strongest RCAs emerged in components such as engines, wiring harnesses, seating systems and trailers, as well as in light commercial vehicles (see Chart 1.19). This established base also helped Poland to integrate into electric-vehicle supply chains. Functional upgrading nevertheless remained limited: business research and development (R&D) expenditure as a share of production value is less than 15 per cent of German levels, and a state-led attempt to establish a domestically owned electric-vehicle producer has had only limited success so far.[26] While FDI can underpin diversification into related industries, it does not automatically generate domestic ownership of higher-value activities.[27]

[23] See Amachraa (2023).
[24] See Metz (2024) and European Commission (2024).
[25] See Cheng, Konovalov and Plekhanov (2025).
[26] See Pavlínek (2023).
[27] See Pavlínek and Ženka (2016).

VIETNAM'S ELECTRONICS SECTOR

Vietnam illustrates the rapid development of new capabilities in the electronics sector. Anchor investments by Intel and Samsung from the mid-2000s, attracted by Vietnam's large and relatively skilled manufacturing workforce, investment incentives and integration into Asian electronics supply chains, helped to build an electronics ecosystem and contributed to the emergence of RCA in consumer electronics (see Chart 1.19). Intel's assembly-and-test facility at Saigon Hi-Tech Park and Samsung's smartphone complexes in Bac Ninh and Thai Nguyen became major production hubs, attracting a wider supplier ecosystem.[28] Electronics subsequently became Vietnam's largest export sector.

This FDI-built capability base enabled Vietnam to harness new waves of demand for computing equipment and AI-related hardware, with rising RCAs from 2019 onwards in computers, processors and related parts (with some of the export surge also reflecting a rerouting of Chinese goods).[29] This expansion has, however, remained heavily concentrated among foreign firms, which account for over 90 per cent of total electronics output (and around 98 per cent of electronics exports – of which Samsung alone accounts for around a third), while domestic firms have so far enjoyed more limited technological spillovers.[30] Vietnam's semiconductor strategy, therefore, seeks to increase the local value added of production over time.

In Morocco, Poland and Vietnam, these new capabilities have been built in complex goods with large global markets. In all three countries, there were pre-existing specialisations in related sectors, albeit modest ones. A package of targeted policies centred on investment promotion, market access and skills upgrades supported the development of new specialisations over time. In each country, the number of export destinations increased sharply – more than for other products.

WARS AND EXPORT SPECIALISATIONS IN MILITARY GOODS

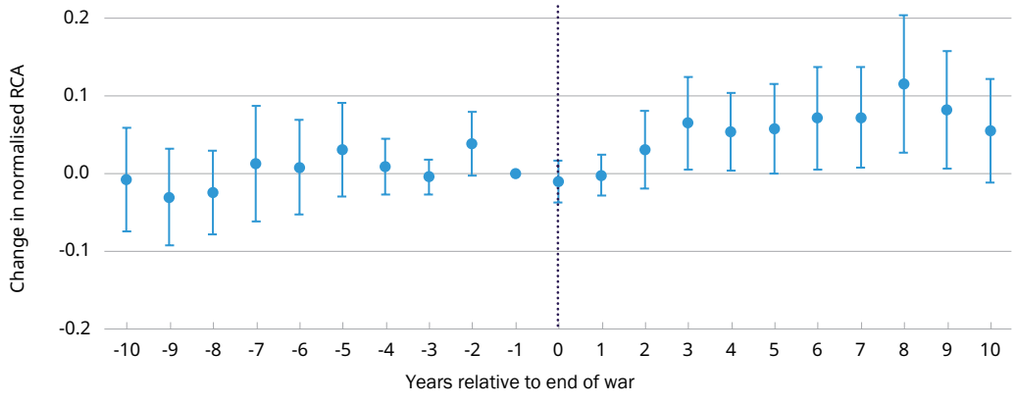
Conflicts tend to shift resources strongly towards the military sector. For example, military production increased sharply in Ukraine between 2022 and 2025 (based on industrial production data from Ukrstat). Could economies such as Ukraine build on this surge in military production to establish themselves as leading exporters of military hardware (such as drones) once the war is over? (See Box 2.1 for more on Ukraine's defence industry.)

The analysis in this section looks at whether conflict can provide impetus for the development of a competitive military industry, drawing on a sample of 39 countries involved in 58 wars from 1996 to 2014 (with the time window dictated by the availability of detailed trade data for the years before, during and after the wars in question).

Across these recent episodes of conflict, there were 60 instances of new specialisation in exports of military-related products (such as weapons, firearms and their parts, armoured vehicles and prosthetics) developed within five years of the end of the given war. This is but a modest fraction of the specialisations it is theoretically possible to develop given the number of countries and products involved (more than 10,000 possible combinations).

[28] See OECD (2025).
[29] See Iyoha et al. (2025).
[30] See Nguyen et al. (2026).

CHART 1.20 Wars can help to develop an RCA in military products



SOURCE: BACI (HS1992), EBRD (2026b) and authors' calculations.
NOTE: This chart shows the average change in chapter-level export RCA for military products (Chapter 93 of the WCO HS) over time. The definition of war follows that of the Correlates of War database – sustained combat involving organised armed forces and resulting in at least 1,000 battle-related deaths per year, excluding civilian fatalities – and includes civil as well as interstate wars.[31] The average is calculated for 58 conflict episodes in 39 economies over the 1996-2014 period (with post-conflict years extending to 2024). Year 0 is the year in which a conflict ends. Whiskers denote 95 per cent confidence intervals.

On average, therefore, wars are associated with a modest increase in export specialisation in military products. The effect appears with a delay and is, on average, around one-third of a standard deviation of changes in an RCA around three years after the end of the war (see Chart 1.20). The effect may in part reflect exports or re-exports of stocks accumulated during the conflict. The rise in RCA for military goods may also reflect a decline in exports of civilian goods during or shortly after wars.[32] The modest nature of the average effect may also stem from the difficulty of sustaining a technological advantage in the production of military products (such as drones or rifles) once the conflict has ended.

Small average effects nonetheless hide a number of lasting successes. These are typically built on a combination of a sustained (perceived) security threat (often lingering for decades after the actual fighting has ended), public procurement contracts, specialisation in related sectors and pre-existing capabilities allowing countries to take advantage of external demand booms.

In India, for instance, precision manufacturer Indo-MIM's metal injection moulding expertise has underpinned a lasting niche in pistol parts.[33] In Finland, rifle-making capabilities maintained under the country's security-of-supply doctrine underpin strong exports by firms such as Sako, whose brands include Tikka. Most of those products are sold to civilian buyers in the United States, but a rising RCA in rifles reflects growing military orders, including purchases under a Finnish-Swedish rifle procurement agreement of 2023.[34]

Israel built its defence industry around state-owned firms such as IAI and Rafael, alongside the privately owned Elbit Systems, relying on exports to sustain production at scale given its small home market,[35] an orientation reflected in persistent RCA in military and other aircraft categories. Defence-electronics expertise embodied in firms such as Elbit Systems spilled over into the civilian high-technology sector, supporting RCA in dual-use products such as radio-navigation and optical equipment. In Pakistan, successive embargoes prompted domestic production efforts through defence cooperation with China, with recent Super Mushshak trainer aircraft deliveries contributing to a rising RCA in small aircraft.[36]

In South Korea, firms such as Hanwha and Hyundai Rotem responded rapidly to the surge in European demand after 2022, because long-running domestic production programmes had kept engineering capabilities and manufacturing capacity in place (with these firms being the direct corporate descendants of the 1970s "rich nation, strong military" drive).[37]

[31] See Correlates of War Project (n.d.).
[32] See EBRD (2022).
[33] See North (2025).
[34] See Suorsa and Cannon (2025); for details of Sako's US export position, see Sako (2021).
[35] See Evron (2025).
[36] See Saw (2024).
[37] See Kim and Liang (2025).

This contributed to the emergence of RCA in military weapons and armoured vehicles.

Türkiye's centralised procurement system supported the development of domestic firearms and ammunition capabilities, with state-owned ammunition producer MKE expanding exports during the post-2022 surge in global ammunition demand.[38] The longstanding Huğlu gun-making cluster in Konya province built a strong position in civilian sporting arms, and state policy is now drawing on the cluster's skilled workforce to build defence capability, including through ASELSAN's Konya facility and dedicated technician training.[39]

In most cases, however, military export surges have proved short lived, as security shocks alone have not generated the industrial capabilities needed to sustain competitiveness. Some reflect the disposal of inherited equipment rather than new production, as with Albania's exports during its accession to the North Atlantic Treaty Organization (NATO) and Bosnia and Herzegovina's exports in the early 2000s, which drew largely on existing stockpiles before production was later upgraded under foreign operational management. Where industrial capabilities were absent, prolonged uncertainty left countries such as Yemen, Mali and Eritrea without the firms, supplier networks and technological capabilities that are needed to build a competitive defence industry.

Only a
TENTH
of firms directly export
10%
or more of their sales

FIRM-LEVEL EVIDENCE: THE ROLE OF TOP FIRMS

EXPORTS ARE CONCENTRATED IN A FEW FIRMS

As the previous examples illustrate, the export specialisations of economies reflect strong competitive positions achieved by individual firms. This section complements the earlier country-level analysis by drawing on a range of firm-level datasets. It starts off by looking at the largest firms in each country by revenue, drawing on the Forbes Global 2000 list (which includes the 2,000 largest publicly traded firms in the world), the Jeune Afrique 500 (which includes the 500 largest firms operating in Africa by revenue) and, where coverage from these two sources is limited, the Orbis online database (looking at the 20 largest firms by revenue in 45 economies).[40]

The analysis then zooms in on granular data on annual firm-level exports at the HS6 level, using customs data on 11 economies (Albania, Bulgaria, Burkina Faso, Guatemala, Jordan, Malawi, Mexico, Peru, Senegal, Uruguay and Yemen) for the period from 1997 to 2014, sourced from the World Bank's Exporter Dynamics Database,[41] complemented by 2005-16 firm-level data for Egypt from the Economic Research Forum's Egypt Imports and Exports Data.[42] Because of the small economy and firm samples, the definitions of AI- and military-related goods are broader than those used in the aggregate analysis: AI products are defined as those related to electronics (HS chapter 85) and computers (8471), while military products are those on the EU-Russia dual-use sanctions list under its dual-use, military-technology and firearms headings (a total of 391 and 1,067 HS6 product codes, respectively).[43]

As has been widely documented in various studies, only a subset of firms export, and they tend to be larger and more productive than non-exporters. Data on manufacturing firms covering 144 economies in 2006-11 show that about a quarter of firms are direct exporters and only a tenth of firms directly export 10 per cent or

[38] See Kurç et al. (2025); MKE export figures as reported to the Turkish parliament's State Economic Enterprises Commission (Türkiye Today, 2025).
[39] See Konya Investment Support Office (2023).
[40] See also Kalemli-Özcan et al. (2024) and Ayerst, Nguyen and Restuccia (2024).
[41] See Fernandes, Freund and Pierola (2016).
[42] See OAMDI (2017).
[43] See Chupilkin, Javorcik and Plekhanov (2026).

On average, the largest exporter in a country accounts for about
11%
of its total exports

more of their sales. These data come from the Enterprise Surveys, representative surveys of enterprises with at least five employees and some private ownership conducted by the World Bank in partnership with the EBRD and the European Investment Bank.[44] Direct exporters are, on average, about four times larger in terms of sales and employment than non-exporters.[45] On average, they are also 2.6 times more productive (with productivity measured as sales per employee), twice as likely to spend on R&D and 50 per cent more likely to market a new product.[46]

Exports are also highly concentrated among a few firms. The median number of exporters in a given country-product market is three.[47] In the median economy globally, the aggregate revenue of the five largest firms is equivalent to around 16 per cent of GDP (based on data for 115 economies in 2024), and this share tends to be even higher for higher-income economies.[48] Of these large firms, 36 per cent are private domestic firms, 37 per cent are state-owned domestic firms (with majority state ownership accounting for 13 percentage points) and 27 per cent are majority foreign-owned firms.

In the median of the sample of 12 economies, the single largest exporter in the country typically accounts for about 11 per cent of the country's total exports; the top 5 exporters typically account for 27 per cent; and the 10 largest exporters account for 37 per cent. These exporters account for an even higher share of export growth in the median economy: the top exporter accounts for 16 per cent of total export growth over a four-year period, while the top 10 exporters account for more than half of total growth.[49]

LAUNCHING NEW PRODUCTS REQUIRES TRIAL AND ERROR

Starting to export new products is difficult.[50] Most attempts by firms to export a new product "fail": fewer than a fifth of firms that launch a new export still sell that product abroad a year later. This holds for the largest exporters, as well as for AI-related and military products. These patterns in the sample are consistent with previous research documenting the fact that trade flows tend to be short lived.[51]

Diversification into new product exports, therefore, requires a lot of trial and error. Large exporters tend to experiment more with new products than other firms. In any given year, the top five exporters introduce, on average, 14 new products that they did not export the previous year, compared with only three new products per exporter for other exporters. Chapter 4 documents similar patterns for startups, where serial entrepreneurs account for the bulk of venture capital moving from one sector to another.

TOP EXPORTERS ARE MORE LIKELY TO BREAK INTO NEW MARKETS

Top exporters are also somewhat more likely to scale up exports and thereby drive the development of a country's new export specialisation. When one of its top five exporters launches a new export product, that country has a 16 per cent chance of gaining a new RCA in that product over the following five years. This likelihood is somewhat lower, at 12 per cent, when a smaller firm launches an export product. This finding is consistent with previous studies showing that large firms – often multinationals – drive new export discoveries.[52]

Fewer than a
FIFTH
of firms that launch a new export still export that product a year later

[44] See EBRD, EIB and World Bank (2020).
[45] See also Bernard et al. (2007).
[46] See EBRD, EIB and World Bank (2020).
[47] For a similar finding, see Crowley, Han and Prayer (2024).
[48] A similar pattern is documented in Chen (2026).
[49] See also Freund and Pierola (2015 and 2020).

[50] See Hausmann and Rodrik (2003) on economic development requiring self-discovery, with positive externalities from trial and error, such as some transfer of knowledge from leading firms to other firms.
[51] See Iacovone and Javorcik (2010), Békés and Muraközy (2012) and Cadot et al. (2013).
[52] See Artopoulos, Friel and Hallak (2013), Freund and Pierola (2010) and Hausmann and Rodrik (2003).

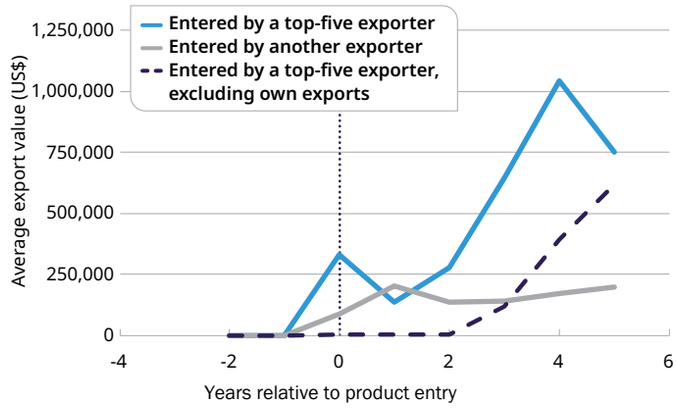
As a result, large exporters become more diversified, exporting a wider range of products. On average, the five largest exporters in a country export 20 products (at the HS6 level of disaggregation), compared with five for smaller exporters. The largest firms also tend to export more complex products, with the average complexity across their products being 0.3 standard deviations above the average for the economy as a whole (equivalent to the difference, say, between semiconductor chips and vacuum cleaners or fork-lift trucks).

LARGE EXPORTERS CREATE GAINS FOR SUPPLIERS AND SMALLER COMPETITORS

Large exporters, in turn, generate spillovers into the broader ecosystem of firms, with gains shared by their suppliers and smaller competitors.[53] Product markets where top firms start to export grow more than those where other firms start to export (see Chart 1.21). Importantly, this holds when top exporters' own exports are excluded from the calculation. The sales values of such new exports for top exporters in the year of discovery are around three times larger than for other exporters, with the differential rising to four times after five years. Smaller exporters account for 40-75 per cent of export sales for the new product four to five years after the discovery.

Large exporters buy inputs from domestic producers, thus providing smaller firms with opportunities for "indirect exports". Such indirect exporters tend to be larger and more productive than firms that do not export directly or indirectly (see Box 1.2 for an analysis of Turkish firms exporting directly and indirectly to the EU).

CHART 1.21 Product markets where top exporters start to export grow more than those where other firms start to export, even excluding the top exporters' own exports



SOURCE: World Bank Exporter Dynamics Database (EDD) exporter-level data 1997-2014 (2026 version), Economic Research Forum (ERF) Exports Dataset, BACI (HS1992 version), HS92/02/12 harmonised as in Crowley, Han and Prayer (2024) and authors' calculations.

NOTE: This analysis looks at cases of export discovery in which a country starts to export a new product (at the HS6 level) that it did not export before. Top exporters are defined as the five largest exporters by total export value in the country's first year in the sample.

LARGE EXPORTERS IN THE MARKETS FOR AI AND MILITARY PRODUCTS

Large exporters play an even more prominent role in markets for AI and military products. RCA gains in AI and military goods are also more likely to be observed in markets that are dominated by a single firm (accounting for at least half of a country's exports of that product throughout) and where the market share of that dominant firm is growing over time.

Empirical analysis suggests, on the one hand, that dominant firms can support the development of export specialisations – perhaps more so in the case of complex goods, such as AI and military goods. On the other hand, dominant firms often emerge through trial and error in competitive environments rather than as a result of strategic bets on "national champions". In addition, while dominant firms are more likely to break into new markets, specialisations are also more likely to be lost where they are concentrated in dominant firms. This highlights the risks associated with the concentration of production and lower competitive pressures in the domestic market.

[53] See also Freund and Moran (2017) and Wagner and Zahler (2015) on spillovers from pioneers to followers, and see Javorcik (2004 and 2008), Javorcik, Lo Turco and Maggioni (2018), Javorcik and Spatareanu (2011), Swenson (2008) and Swenson and Chen (2012) on spillovers from multinational to domestic enterprises in up- or downstream sectors.

CONCLUSIONS AND POLICY IMPLICATIONS

Geopolitical developments and changes in technology are reshaping policy priorities and global trading patterns. Economies can leverage these changing circumstances to develop new areas of expertise in an environment where the pursuit of export-led growth has become more challenging.

Historical experience suggests that countries can adapt their production structures to take advantage of global demand booms, such as those related to AI supply chains or fuelled by increased defence spending. In doing so, they can "reinvent" themselves and often move up the value-added chain. The analysis in this chapter identifies several factors that can facilitate this process. Developing new export specialisations is easier where related capabilities already exist – for example, where a country has an RCA in sectors upstream or downstream from the new product or otherwise possesses relevant expertise. Success is also more likely in products with larger and growing global markets, where competitive pressures may be less binding, as well as in the case of less complex products.

Trial and error are central to the discovery of new export opportunities. Research shows that experimentation by leading exporters generates benefits for the wider economy, including suppliers and competitors. With large positive externalities, experimentation tends to be underprovided by individual firms relative to the levels that are optimal from the point of view of society as a whole. Policies that encourage trial and error and support the emergence of new export specialisations could correct such externalities.[54]

Examples of policies that facilitate the building of new capabilities include the negotiation of free trade agreements granting preferential access to large product markets, worker training, tax incentives, the use of special economic zones, other well-targeted industrial policies and measures promoting the rule of law and ensuring macroeconomic stability.[55]

Attracting foreign direct investment has been shown to help countries to develop RCAs. Top exporters – often multinationals – play an important role in the development and marketing of new export products. FDI can raise the quality of exports,[56] increase complexity across the economy through the development of sophisticated supplier networks[57] and, ultimately, boost productivity.[58] Sector-specific FDI promotion efforts have been shown to play an important role in economies' "reinvention", particularly in capital-intensive industries and sectors requiring investment specific to a relationship with a specific customer.[59] More broadly, the importance of a relatively small number of large firms in export markets implies that policy changes affecting the behaviour of such firms can have a disproportionately large effect on a country's export structure.[60]

Overall, the evidence suggests that while developing new export specialisations is inherently difficult, countries can improve their chances of success by building on existing capabilities, fostering experimentation and creating an environment that attracts and supports globally competitive firms.

[54] See Hausmann and Rodrik (2003); see also Fasteau and Fletcher (2024).
[55] See also EBRD (2024) and Fasteau and Fletcher (2024).
[56] See Harding and Javorcik (2012).
[57] See Javorcik, Lo Turco and Maggioni (2018).
[58] See Abebe, McMillan and Serafinelli (2022) and Moran (1998).
[59] See Harding, Javorcik and Maggioni (2013).
[60] See Freund and Moran (2017).

BOX 1.1 DOWN TO EARTH: THE SPACE ECONOMY IN THE EBRD REGIONS

Most economies are now dependent on space without operating in it. Satellite signals and data underpin communications, navigation, transport, agriculture and finance, and the recent expansion of supply in this sector has come almost entirely from commercial operators rather than state agencies.

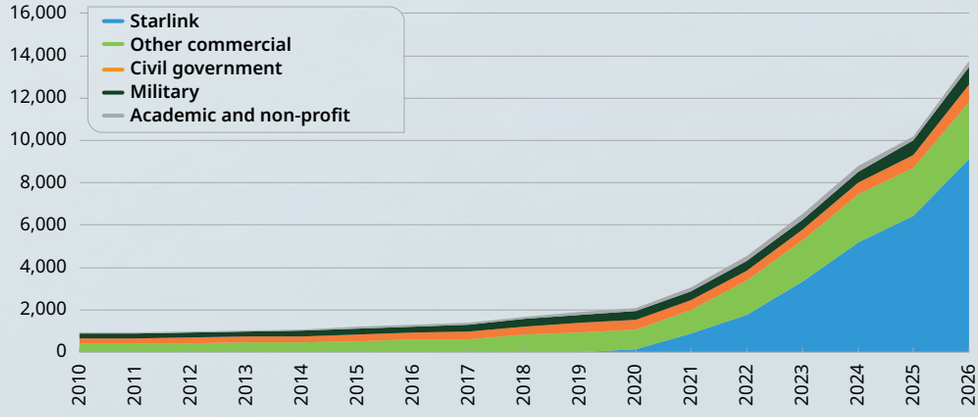
The space economy consists of three main segments. The first is the upstream segment, which covers the scientific and technological foundations of space activity: R&D, the manufacture of satellites and launch vehicles, and the launch process itself. The second is the downstream segment, which covers the daily operation of satellites and ground systems, together with products and services that require satellite signals or data to function. This includes communications, Earth observation and positioning, the equipment through which those signals are received, and the analytics that are built on them. The third segment, space-derived activities, covers activities in a number of different economic sectors that originally stemmed from space activity and technologies but are no longer dependent on that sector. Examples include technologies that have spilled over from the space sector to other parts of the economy.[61] For instance, technologies developed in the space sector have been adapted for use in crash-safety testing in the automotive sector and patient-monitoring systems in the healthcare sector. Revenue is mostly concentrated downstream.[62]

Two recent developments have turned space from a largely state-led activity into a commercial market. First, launches have become cheaper. Sending a kilogram of weight into orbit cost roughly US$ 15,000 in the early 2000s; by 2023 it only cost around US$ 4,000. This fall in cost owes much to reusability: rockets that used to be discarded after a single flight can now be recovered and reused.[63] Second, satellites have become smaller. The median launch mass has fallen from 1,450 kg in the 2000s to 305 kg in the 2020s, as constellations comprising many small satellites have replaced small numbers of large, individually designed satellites.[64]

Chart 1.1.1 shows how the composition of ownership has changed. The stock of active satellites has risen from about 2,100 at the start of 2020 to around 13,700 at the start of 2026. Commercial operators

CONTINUED

CHART 1.1.1 Commercial satellites are expanding the space economy



SOURCE: McDowell (2020) and authors' calculations.
NOTE: This chart shows satellites that are operational (that is to say, in Earth's orbit and not yet retired) on 1 January of each year. Owner classification follows the classes of organisation in the General Catalog of Artificial Space Objects (GCAT; see McDowell, 2020); satellites with several owners are assigned to the one listed first, and Starlink is shown separately.

[61] See OECD (2022).
[62] See OECD (2023).
[63] See Terzi and Nicoli (2024).
[64] See also McDowell (2020).

BOX 1.1 CONTINUED

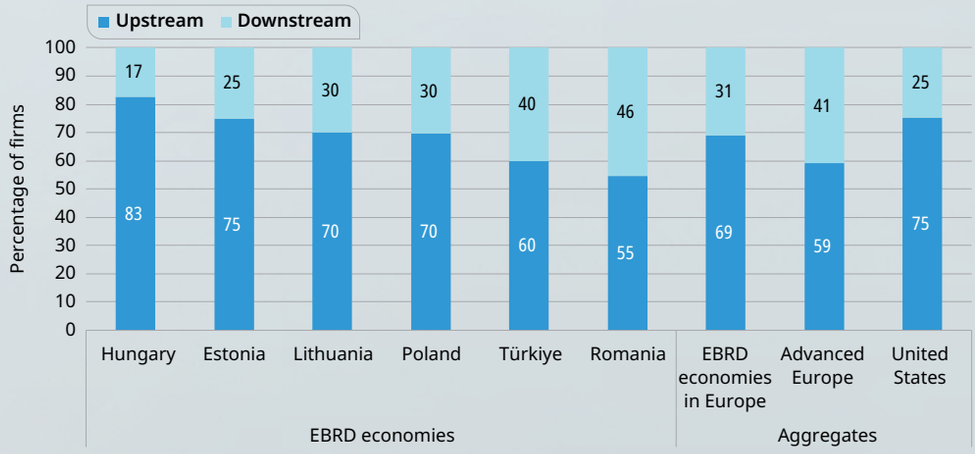
have accounted for about 92 per cent of that increase, driven largely by the rapid expansion of SpaceX's Starlink constellation from 2020 onwards. The active stock is also concentrated by function: communications satellites account for over 80 per cent of the total, while Earth observation satellites make up 9 per cent.[65]

The operation of satellites is concentrated geographically. As regards EBRD economies, Türkiye operates a total of 37 active satellites, more than any of the EBRD's regional groupings: 26 are operated by EBRD economies in the EU, 15 by economies in the southern and eastern Mediterranean, 8 by economies in eastern Europe, the Caucasus and central Asia, 3 by sub-Saharan African countries, and 1 by an economy in the Western Balkans. Together, the EBRD economies operate 90 satellites, compared with 1,085 in advanced Europe and 10,827 in the United States. Although space-based capacity is largely operated from outside the EBRD regions, commercial satellites in low Earth orbit are increasingly being integrated into terrestrial activities, including across EBRD economies.

Satellites in orbit are only one part of the space economy, however. In EBRD economies in Europe, 69 per cent of space firms are upstream, building spacecraft, launch vehicles, ground equipment and components, while 31 per cent are downstream in the navigation and Earth observation segments (see Chart 1.1.2).[66] This breakdown varies across economies in the region: Romania and Türkiye have the largest downstream shares at 46 per cent and 40 per cent, respectively, while Hungary has the smallest at 17 per cent. The upstream share is high partly because equipment manufacturing is counted as being upstream even where the work is entirely terrestrial.

Because EBRD economies operate few satellites, accessible activities tend to be on the ground rather than in orbit. On the upstream side, this means manufacturing rather than launch activities: antennae, software-defined modems, terminals and components. On the downstream side, it means operations and services: running ground stations, cloud mission control, cybersecurity, data processing and managed network services. These activities do

CHART 1.1.2 Most space firms in EBRD economies in Europe are upstream, building spacecraft and equipment



SOURCE: Dealroom (2026) and authors' calculations.
NOTE: "Space firms" are defined as companies that are active in the space economy, classified on the basis of an AI-assisted review of each firm's Dealroom record. Space firms are split into two categories, upstream and downstream, on the basis of the definition in OECD (2022). "EBRD economies in Europe" comprise EBRD economies in the EU and the Western Balkans, plus Moldova, Ukraine and Türkiye.

[65] Source: McDowell (2020) and authors' calculations.

[66] Data on space-derived activities are not available. The OECD notes that this segment is not readily measurable (see OECD, 2022); firms with products that originated in space programmes but are no longer dependent on them are also unlikely to be recorded as space firms in the underlying data.

not need assets in orbit, require less capital than launch activities or satellite manufacturing, and build skilled employment locally. Ground-station and mission-support providers are expanding into emerging hubs, including in Türkiye and Kazakhstan.

The majority of the revenue lies further downstream, in services built on satellite data, with three areas holding particular promise for some of the EBRD regions: (i) satellite communication, (ii) Earth observation, climate analytics and environmental monitoring, and (iii) space-enabled agriculture, water and natural capital. Governments remain the largest customers for Earth observation services, so public procurement shapes what is commercially viable in the second and third of these areas.

Satellite communication is the most mature of the three. Increasingly, capacity is being integrated into terrestrial networks to extend broadband coverage, reach rural and remote areas, connect local networks to wider communications networks, and maintain continuity of service for critical infrastructure. In Ukraine, direct-to-mobile services have supported emergency communications and network resilience, and infrastructure of this kind will also be crucial in post-war reconstruction efforts.

Earth observation, climate analytics and environmental monitoring are becoming increasingly mainstream. The market for raw satellite data is competitive, and market opportunities are present for firms that convert Earth observation, satellite navigation and artificial intelligence into tools for agriculture, insurance, the energy sector, cities, infrastructure and environmental monitoring. Much of the input for this comes from public programmes: the Copernicus Sentinel fleet, developed by the European Space Agency (ESA) and the European Organisation for the Exploitation of Meteorological Satellites (EUMETSAT), will be extended into the 2030s with new mission classes, and the EU's Space 2030 Agenda envisages a single European space market by the end of the decade. Economies participating in EU and ESA programmes can draw on both. For example, Terrasigna in Romania supplies analytics of this kind for insurance and risk assessment.

The third area, space-enabled agriculture, water and natural capital, includes yield forecasting, crop mapping, irrigation management, soil conservation and parametric insurance. Platforms such as SatAgro and Gisat already support crop monitoring and input optimisation across central and eastern Europe.

BOX 1.2 TÜRKIYE AND THE EU: PRODUCTION NETWORKS AND THE MARGINS OF DEEPER INTEGRATION

The EU has been Türkiye's largest trading partner for three decades, taking around 40 per cent of its goods exports and supplying a similar share of its imports. While industrial tariffs have been zero since the establishment of a customs union between the bloc and Türkiye in 1995, that customs union does not cover services, procurement, unprocessed agricultural produce or regulatory convergence. It is also asymmetrical, with Türkiye following EU policy where trade in goods is concerned.

Recent EU initiatives have reopened the debate over the optimal depth of Türkiye's economic integration with the EU. The proposed Industrial Accelerator Act (IAA) introduces EU content and low-carbon requirements for procurement and industry support schemes, preferences that can extend to third countries with an EU trade agreement, with ambiguity as to whether preferential treatment under the IAA extends to Türkiye.[67] This box assesses the merits of alternative integration paths based on detailed data on ties between Turkish firms and the EU market.

DIRECT AND INDIRECT EU DEMAND FOR THE OUTPUT OF TURKISH FIRMS

Many Turkish firms export to the EU. In addition, EU demand propagates through the supply chain: a Turkish exporter buys inputs from domestic suppliers, who buy from other domestic suppliers. A change in EU demand affects all those firms, even if they never need to fill in a customs form.

Three linked administrative datasets covering the universe of Turkish firms over the period 2006-23 make it possible to follow EU demand throughout the production network. These data encompass customs records on exports to the EU, value-added tax (VAT) filings recording transactions between firms, and balance sheets with information on sales, wages, employment and sector, yielding a panel of about 900,000 active firms in 2023.

Firms fall into three groups: direct exporters to the EU; firms that do not export directly but participate in the supply chains of exporters to the EU; and firms with no exposure to EU demand. In line with Dhyne et al. (2021), each firm's total EU exposure is built up recursively from its direct sales to Europe plus a share of its sales to other domestic firms, weighted by those buyers' own EU dependence.

Firms' indirect exposure to EU demand is large. About 9.5 per cent of Turkish employment is accounted for by direct exporters to the EU, with a further 11.5 per cent in firms indirectly exposed to EU demand. Therefore, around a fifth of Turkish employment is tied to European final demand, but only half of that link is visible in external trade statistics.

On average, within the same narrow industry, a direct exporter to the EU employs around 90 per cent more people than a firm unexposed to EU demand, reports four times its sales and pays wages that are roughly 55 per cent higher – the familiar exporter premium.

[67] See EBRD (2026b).

TABLE 1.2.1 Significant welfare effects of alternative integration paths (percentage change in real GNP)

No.	Scenario	Türkiye	EEA
1	Services, EU opens (one-sided)	0.22	0.01
2	Services, mutual	0.36	0.02
3	Buy European, Türkiye excluded	-0.48	-1.34
4	Buy European, Türkiye included	0.14	-1.31
5	Buy European (including Türkiye) + services	0.52	-1.29
6	Agrifood tariffs removed	-0.56	0.02
7	Agrifood + services	-0.20	0.03
8	Agrifood + services + Buy European	-0.04	-1.27

SOURCE: CEPII Gravity database, OECD Inter-Country Input-Output (ICIO) tables, OECD Services Trade Restrictiveness Index (STRI) and authors' calculations.
NOTE: Based on a production-network general equilibrium model and trade-elasticity estimates in Caliendo and Parro (2015). EEA figures are averages across 24 economies weighted by final-demand GNP.

Firms that are exposed to EU demand indirectly are almost indistinguishable from firms with no EU exposure, with a sales premium of 10 per cent and no significant premium in terms of employment or wages, suggesting that those firms represent ordinary (small) businesses.

INTEGRATION PATHS AND THEIR WELFARE EFFECTS

The following analysis draws on Demir, Javorcik and Yıldırım (forthcoming), which takes detailed Türkiye-EU firm linkages into account in estimating the welfare effects of various paths for economic integration between Türkiye and the EU based on a production-network general-equilibrium model published in Baqaee and Farhi (2024). The analysis also draws on the OECD Services Trade Restrictiveness Index and estimates the effects of barriers to trade in services using a structural gravity model of trade.[68] Estimations cover 15 scenarios (8 of which are included in Table 1.2.1), which differ in terms of EU-Türkiye integration in several respects: trade in services, EU content preferences, trade in agricultural produce, public procurement rules and non-tariff harmonisation. Table 1.2.1 summarises the results. Three findings stand out.

Mutual services integration (whereby barriers to trade in services between the EU and Türkiye are lowered to intra-European Economic Area (EEA) levels) raises Turkish real gross national product (GNP) by 0.36 per cent to 0.80 per cent, with a smaller gain in the EEA concentrated in services-intensive economies such as Luxembourg, Ireland and Greece. The liberalisation of trade in agricultural produce, in contrast, is estimated to be contractionary. In this scenario, a substantial protection is removed on Türkiye's side, while the reduction in EU tariffs is relatively low.

The introduction of the proposed "Buy European" preferences in EU procurement could cost Türkiye around 0.5 per cent of real GNP if Türkiye is excluded from local-content treatment. (In the model, this scenario raises costs for a firm sourcing inputs from outside the preference bloc.) The effect of those provisions turns mildly positive if "Buy European" provisions are extended to Türkiye. For the EEA, the cost of "Buy European" provisions is estimated at around 1.3 per cent of GNP in either scenario on account of the increased cost of sourcing.

[68] The estimations are run using four trade-elasticity calibrations from economic literature; the figures reported here use the baseline calibration of Caliendo and Parro (2015), with full results in Demir, Javorcik and Yıldırım (forthcoming).

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CHAPTER 2



THE ECONOMICS OF DEFENCE SPENDING

Rising geopolitical tensions have put an end to the post-Cold War "peace dividend", and defence spending is now rising in many EBRD economies. While increased spending on defence can raise debt levels and draw resources away from welfare spending, it can also raise output, spill over to civilian industries and boost R&D. However, most EBRD economies depend on imports for their military goods. State ownership, limited domestic demand and weak access to capital all constrain domestic production and innovation. Economies with spare industrial capacity can repurpose civilian production for military use and pool demand through joint procurement to reach efficient scale, while production under licence can support domestic manufacturing and employment, as well as facilitating a transfer of knowledge.



INTRODUCTION

After the end of the Cold War, governments around the world reduced the share of public resources that they allocated to defence. In Europe, the resulting "peace dividend" averaged about 0.9 per cent of GDP a year in 1992-2025 relative to defence spending in 1986-89. With defence spending now on the rise again, that peace dividend has been completely eroded.

Following Russia's full-scale military invasion of Ukraine in 2022 and the ensuing rise in geopolitical tensions, governments in Europe and beyond have committed to substantial, sustained increases in defence spending. NATO's new annual spending target has been set at 5 per cent of GDP. Several economies in the EBRD regions are at the forefront of this shift.

While the size of defence spending is determined primarily by security considerations, comparable military objectives can be met and financed in different ways, with implications for economic output, knowledge creation and citizens' welfare. Defence budgets cover personnel and operating expenses, military infrastructure, the procurement of equipment, and military R&D. This chapter focuses on equipment purchases and R&D, as choices made in these areas can directly translate into demand for domestic industries and a transfer of knowledge. How the additional spending is financed – by borrowing, taxation or reallocation from other budget lines – is beyond the scope of this research.

Military equipment can be imported, manufactured domestically under licence or produced independently. Likewise, knowledge can be generated domestically or acquired through licensed production or collaborative programmes. These choices are shaped by the size and structure of the industry, technological capabilities and any international agreements in place.

Globally, the defence industry is highly concentrated, with eight countries accounting for more than 80 per cent of the world's arms exports. With the exception of Poland and Türkiye, arms exports from the EBRD regions are limited. Ukraine, however, has rapidly expanded its domestic defence production, particularly for drones and electronic warfare, since Russia's full-scale invasion.

Where domestic defence industries exist in the EBRD regions, they have a disproportionate tendency to be state owned. These state-owned firms are less productive than their private counterparts. Defence-technology startups rarely raise capital beyond the earliest funding round.

While higher spending on defence can raise debt levels and draw resources away from welfare spending, it can also increase demand for metals, electronics and the output of other civilian industries, and boost R&D. Defence spending shocks propagate through the production network and reach civilian industries, particularly electronics and metals. Publicly funded R&D can have substantial knowledge spillovers, but these typically rely on large-scale R&D spending. Economies in the EBRD regions that do not reach such scale have gleaned productivity gains from defence research in the United States through channels that do not require domestic research capacity.

Overall, an increase in defence spending in the EBRD regions totalling 1 per cent of GDP is associated with an estimated 1.47 per cent increase in GDP in the medium term – a multiplier comparable to that of advanced economies and towards the upper end of the typical range for government spending.

Firms specialising in drone production are emerging in the EBRD regions. Poland and Türkiye both command a significant share of global military drone exports, although the military drone market is considerably smaller than the commercial equivalent. While defence innovation capability remains limited in the EBRD regions, firms can build on licensed technology obtained from elsewhere.

This chapter begins by documenting the rise in defence spending in recent years. It then characterises the defence industry in the EBRD regions and discusses economic returns to defence expenditure, before examining the potential to redirect civilian production to defence and looking at the emerging drone industry.

In EBRD economies in the EU, defence spending has risen from **1.3%** of GDP in 2013 to **2.7%** in 2025

RISING SPENDING ON DEFENCE

For a quarter of a century after 1989, defence spending declined almost everywhere. The global average halved from about 3.9 per cent of GDP in 1991 to less than 2 per cent by the mid-2000s. Scarce resources were reallocated to other uses, with economies enjoying a "peace dividend".

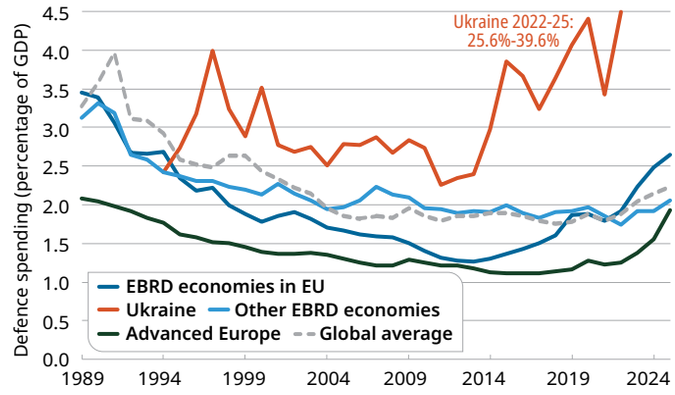
That peace dividend has now come to an end (see Chart 2.1). Globally, military expenditure has been rising since 2021 and NATO defence spending targets have been revised upwards.

Defence spending tends to be higher in economies located closer to violent conflicts (see Chart 2.2). In EBRD economies in the EU, defence spending has risen strongly, increasing from just 1.3 per cent of GDP in 2013 (the year before Russia's illegal annexation of Crimea) to 2.7 per cent in 2025. In 2019, it exceeded the global average for the first time since 1989. Since the start of Russia's full-scale invasion in 2022, Ukraine's defence spending has ranged from 25.6 per cent to 39.6 per cent of GDP. In the rest of the EBRD regions, such spending has remained broadly stable, after declining in the 1990s.

CONCENTRATION IN DEFENCE MARKETS

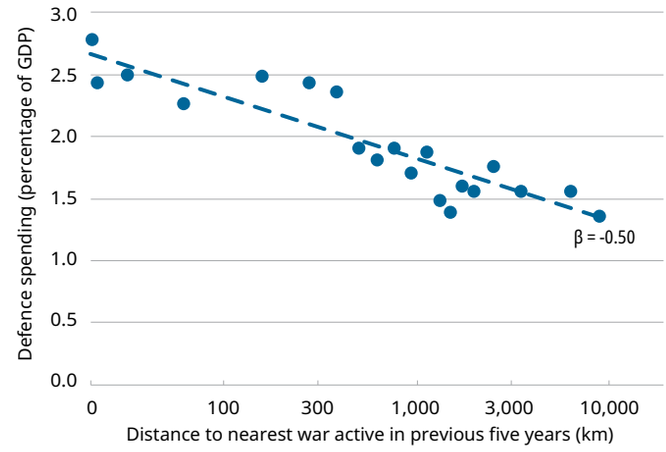
National security is a public good. The protection extended to one individual does not diminish the protection available to others and, once security is provided, no one can be denied its benefits. The provision of such non-rival, non-excludable goods

CHART 2.1 Defence spending is on the rise again after a 20-year decline



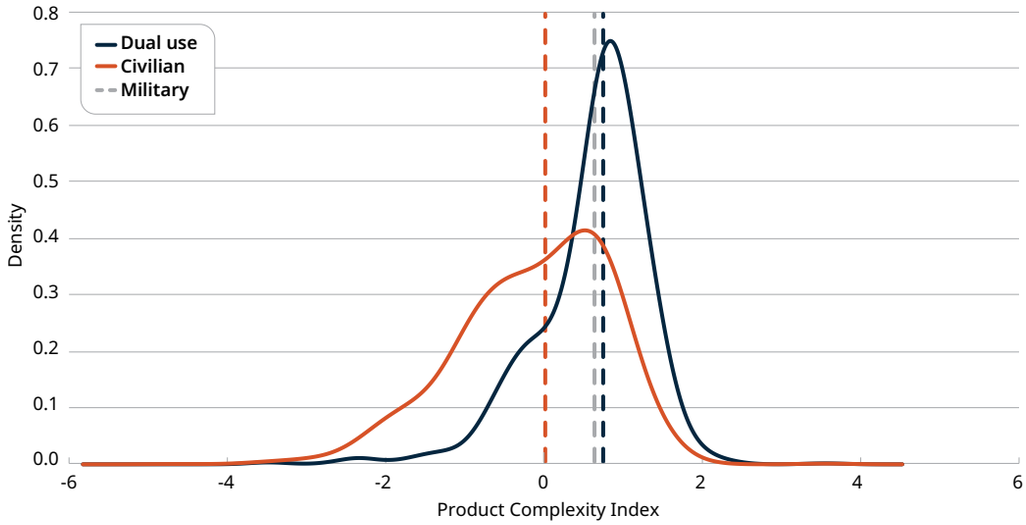
SOURCE: SIPRI (2026a), Müller et al. (2025) and authors' calculations.
NOTE: "Other EBRD economies" does not include Ukraine. All averages are unweighted. Ukraine's defence spending (truncated) reached 39.6 per cent in 2025.

CHART 2.2 Defence spending tends to be higher as proximity to conflicts increases



SOURCE: SIPRI (2026a), Müller et al. (2025), Davies, Pettersson and Öberg (2026) and authors' calculations.
NOTE: Binned scatterplot of defence spending as a percentage of GDP, demeaned by year, against distance to the nearest fighting involving at least 1,000 combat deaths per year in any of the preceding five years. Sample comprises non-belligerent economies in 1992-2025.

CHART 2.3 Dual-use goods are more complex than civilian goods



SOURCE: Harvard Growth Atlas (2026), Alekseev and Lin (2026) and authors' calculations.
NOTE: This chart shows kernel densities for the Product Complexity Index across 975 dual-use goods and 4,039 other traded goods. See Chapter 1 for a discussion of complexity scores. Dashed lines correspond to median complexity scores for each type of good.

falls to the state, which often becomes the only buyer of weapon systems. Consequently, while firms compete for procurement contracts, once a contract has been awarded, the price is negotiated rather than set in a competitive market. In addition, the government sets the performance requirements the equipment must meet.

Weapon systems are technologically sophisticated (see Chart 2.3) and a technological lead is a source of military advantage. This is true for finished military products and their components, for components also used in civilian goods, and for dual-use goods (that is, goods that have both civilian and military uses).

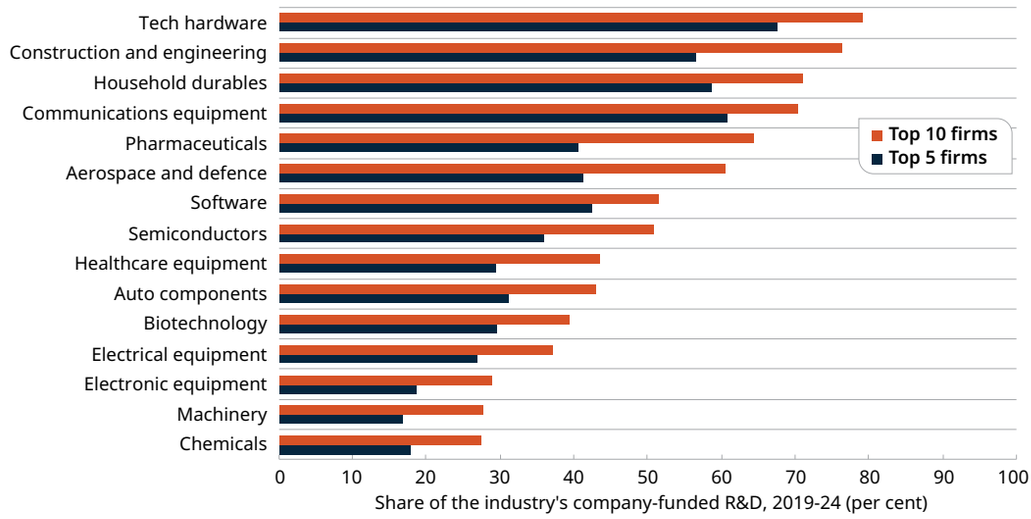
Defence production is also R&D intensive. Defence firms spend roughly as much on R&D as they do on physical capital outlays. R&D spending per US dollar of capital expenditure in the aerospace and defence industry averaged 1.1 in 2015-24, according to Compustat data,[1] compared with 0.72 in other machinery industries and 0.77 in semiconductors. Indeed, company accounts probably understate this intensity, as customer-funded development, much of it paid for by governments, is recorded as a cost of sales rather than an R&D expense.[2] Governments typically fund a large share of defence R&D, with defence absorbing a substantial share of public research budgets at the technological frontier. For example, in the United States, more than 50 per cent of government-funded R&D goes to defence, according to government budget allocations for R&D (GBARD) data.[3]

The high concentration of military goods production reflects the industry's high barriers to entry: sunk costs in both R&D and specialised capital, and economies of scale.[4] In addition, suppliers must meet qualification and security requirements, while buyers put a premium on the proven capability of military systems.[5] Cross-border supply is also constrained by security considerations and export controls.[6] Lastly, new military equipment must often be interoperable with systems already in service, giving incumbents a further advantage.[7] In 2014-25, the Herfindahl-Hirschman Index (HHI) of supplier concentration for the European aerospace and defence industry was twice as high as the equivalent for high- and medium-tech manufacturing, based on data from Orbis.[8]

As a result, a small number of firms account for most of the industry's global aerospace and defence R&D (see Chart 2.4). Notably, the five largest spenders account for 41 per cent of all aerospace and defence R&D, while the top 10 firms account for 60 per cent.

[1] See S&P Global Market Intelligence (2026).
[2] See Nindl et al. (2025).
[3] See Eurostat (2025a).
[4] See Rogerson (1995).
[5] See Dunne (1995).
[6] See Hartley (1995).
[7] See Dunne (1995).
[8] See Bureau van Dijk (2026).

CHART 2.4 A small number of firms undertake most aerospace and defence research



SOURCE: S&P Global Market Intelligence (2026) and authors' calculations.
NOTE: The industries shown are the 15 Global Industry Classification Standard (GICS) industries with at least US$ 150 billion of company-funded R&D and at least 250 R&D reporting firms in the 2019-24 period. Customer-reimbursed R&D (which accounts for most US government-funded defence R&D) is excluded.

This concentration is higher than the equivalent for software and comparable to that of the pharmaceuticals industry, although it falls short of the levels observed for communications equipment.

The supply of finished weapon systems is also geographically concentrated in a small number of countries and firms. Among the global top 100 arms producers, US firms account for nearly half of revenue, Europe for 22 per cent and China for 12 per cent.[9] The 20 largest firms, 14 of which are American or European, account for about 65 per cent of total revenue.

Eight countries supply more than 80 per cent of global arms exports. In the EBRD regions, Poland and Türkiye are the top exporters of military goods, together accounting for about 3 per cent of global exports based on data from the Stockholm International Peace Research Institute (SIPRI) Arms Transfers Database.[10]

EBRD ECONOMIES AND TRADE IN MILITARY GOODS

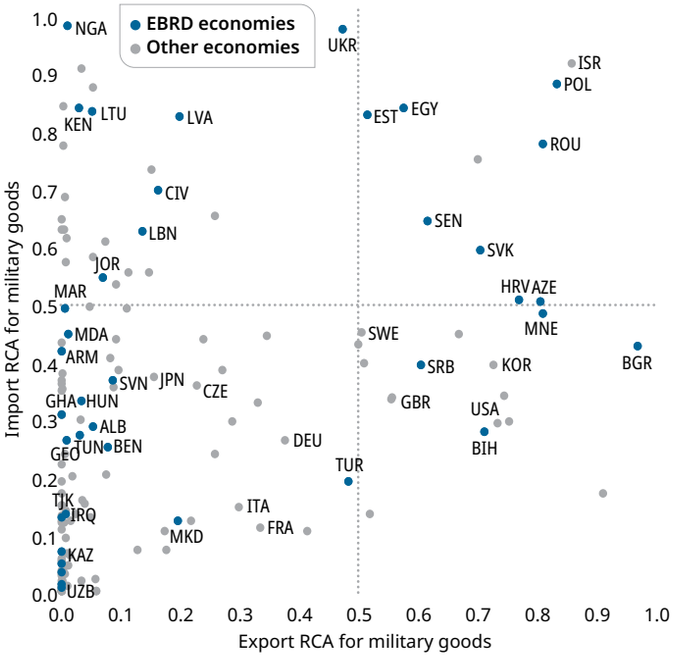
Most economies in the EBRD regions do not specialise in the production and export of military goods, importing relatively large amounts of them (see Chart 2.5). As discussed in Chapter 1, an economy is considered to specialise in exports of a product when that product's share of the economy's exports exceeds the product's share of world exports. Normalised revealed comparative advantage (RCA) values of more than 0.5 indicate a specialisation in exports of a certain product. Import specialisation is defined in the same way.

A few economies, including Bosnia and Herzegovina, Bulgaria and Serbia, are net specialised exporters of military goods. Romania and Türkiye both have a significant comparative advantage in exporting warships, while Poland and Croatia have RCAs in artillery and armoured vehicles, respectively.

Egypt, Poland and Romania specialise in exporting military products while simultaneously purchasing large quantities of military goods. Estonia, Poland and Romania import military goods worth between 0.27 per cent and 0.53 per cent of GDP each year. (By way of comparison, Israel imports military goods

[9] See SIPRI (2026a).
[10] See SIPRI (2026b).

CHART 2.5 Many EBRD economies are import dependent when it comes to military goods



SOURCE: CEPII (2026) and authors' calculations.
NOTE: Based on data for 2022-24. Export RCAs are calculated as defined in the text; import RCAs are calculated as a product's share of an economy's imports relative to the product's share of world imports. Both are normalised to range from 0 to 1, with values of more than 0.5 indicating specialisation.

worth 0.32 per cent of GDP annually, on average.) In Ukraine, imports of military goods in 2024 were estimated at 2.16 per cent of GDP,[11] as the war both increased demand for military equipment and weighed on output.

In some cases, import data partly reflect domestic production under a foreign licence. This accounts for about 90 per cent of arms imports in Türkiye, around 50 per cent in Poland, approximately 47 per cent in Egypt and about 34 per cent in Bulgaria.[12] The two arrangements have very different economic consequences. Producing under licence contributes to domestic employment and output, and may facilitate the transfer of knowledge under certain circumstances, as discussed later in the chapter.

[11] See SIPRI (2026b).
[12] Ibid.

THE DEFENCE INDUSTRIAL BASE

The EBRD regions' reliance on imports for military hardware reflects small domestic industrial bases in many economies. With defence spending on the rise again, some economies have the potential to expand their industrial bases and build the necessary ecosystems of firms and researchers.

In the United States, the world's largest economy and defence market, the defence sector is made up of three intersecting parts: (i) a state-owned industrial base that produces ammunition, shells, propellants and explosives; (ii) large, multi-domain prime contractors (Lockheed Martin, General Dynamics, Northrop Grumman, Boeing and RTX) that research, develop and manufacture established weapon systems, with R&D and investment in specialised capital benefiting from economies of scale across multiple programmes; and (iii) a defence-technology sector that has emerged over the past decade with a focus on frontier software and hardware technologies, such as uncrewed vehicles and AI-enabled systems.

Advanced Europe's ecosystem is more fragmented, combining multi-domain groups (such as BAE Systems, Thales, Leonardo, Airbus Defence and Space, Rheinmetall and KNDS) and national champions (such as Dassault Aviation, Naval Group, SAAB, Kongsberg and Fincantieri). National procurement markets limit scale. Where consolidation has occurred, it has mainly taken the form of joint ventures, such as MBDA and the European space businesses of Airbus, Thales and Leonardo. The defence-technology sector is less mature than in the United States, where firms have strong ties to Silicon Valley, are backed by venture funds and sell into a larger market.

Türkiye produces about
90%
of its arms imports
domestically under licence

The defence ecosystem in EBRD economies in emerging Europe combines legacy incumbents and defence-tech startups. Incumbent firms are largely state owned, such as Romarm in Romania, VMZ Sopot in Bulgaria and PGZ in Poland. State ownership of firms that used to produce equipment for the Warsaw Pact forces has largely persisted through the transition to open market economies. As Russia's war on Ukraine has shifted procurement towards drones, defence-tech startups have emerged, drawing on the software and technology developed in ICT services (see Box 2.1 for a discussion of the Ukrainian defence industry, from its Soviet legacy to its wartime shift towards unmanned systems).

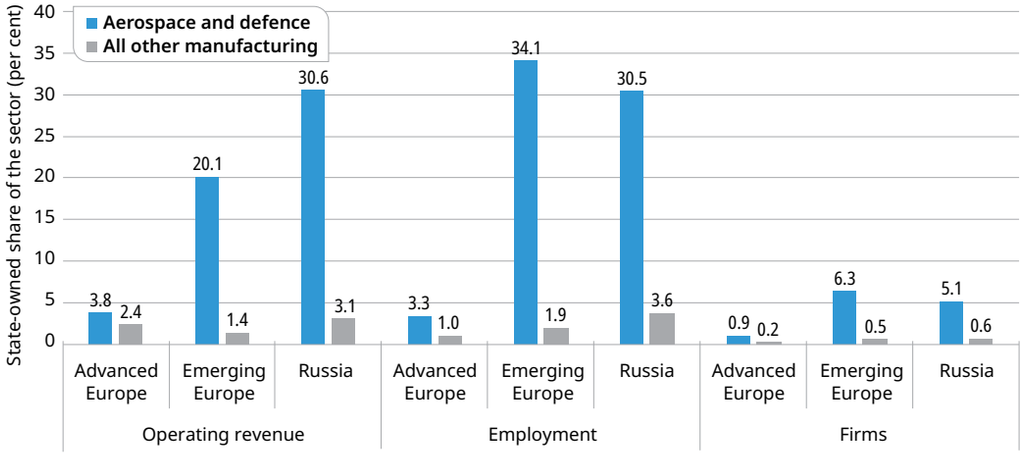
This chapter takes a closer look at the region's defence firms using detailed data on ownership, employment and revenues from Orbis.[13] In this analysis, the aerospace and defence sector is considered to encompass weapons and ammunition, explosives and military combat vehicles, as well as a considerably larger dual-use segment comprising measuring and navigation instruments, ships and floating structures, air and spacecraft, and optical instruments.

By this definition, the sector is relatively small in both advanced and emerging Europe, accounting for around 2-3 per cent of manufacturing firms, employment and revenue. In Russia, by contrast, the aerospace and defence sector accounts for almost 9 per cent of manufacturing employment and 5 per cent of manufacturing revenue.

While state-owned enterprises (SOEs) in advanced Europe account for just 4 per cent of revenue and 3 per cent of employment in the aerospace and defence sector, in emerging Europe they account for 20 per cent of the sector's revenue and 34 per cent of its employment (see Chart 2.6). This level of state ownership is more akin to Russia than it is to advanced Europe and is specific to defence; in the rest of the manufacturing sector, state ownership accounts for 1-2 per cent of revenue and employment in both advanced and emerging Europe.

In emerging Europe, SOEs account for
34%
of the aerospace and defence sector's employment and
20%
of its revenue

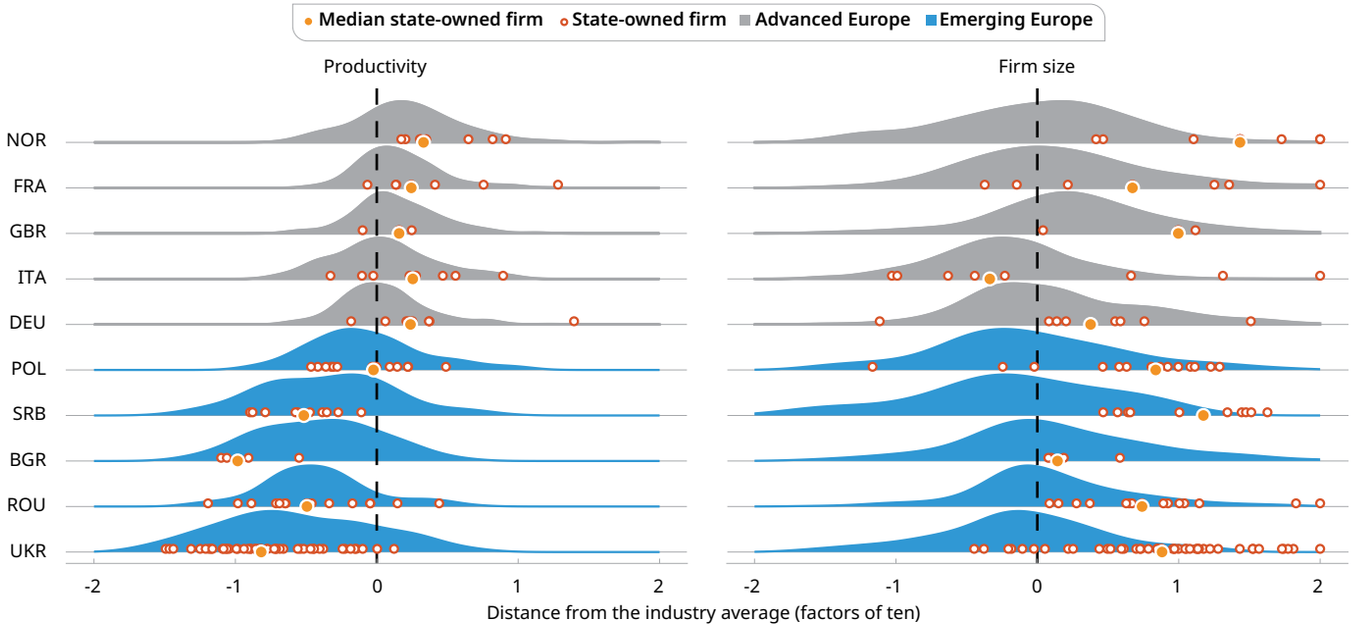
CHART 2.6 SOEs are more prevalent in emerging Europe and Russia than in advanced Europe



SOURCE: Bureau van Dijk (2026) and authors' calculations.
NOTE: Shares are within each sectoral-regional cell. Ownership is defined as the global ultimate owner of the firm. Listed firms and those with unknown ownership count as private, so estimates of state-owned shares are lower bounds. "Advanced Europe" comprises Austria, Belgium, Finland, France, Germany, Ireland, Italy, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom; "Emerging Europe" comprises Bulgaria, Croatia, Hungary, Latvia, Lithuania, Poland, Romania, Serbia, the Slovak Republic, Slovenia and Ukraine.

[13] See Bureau van Dijk (2026). The Orbis panel is cleaned per Ayerst, Nguyen and Restuccia (2024).

CHART 2.7 State-owned defence firms in emerging Europe are larger but less productive than the typical private firm



SOURCE: Bureau van Dijk (2026) and authors' calculations.
NOTE: This chart shows the distribution of the productivity and size of private firms in the aerospace and defence sector in each country. State-owned firms are shown as markers along the distribution. The data point for each firm corresponds to the latest year in the 2015-24 period for which positive revenue and employment are recorded. All economies shown have at least 30 privately owned firms in the sample.

Those shares imply that state-owned defence firms in emerging Europe employ, on average, about eight times as many workers as private firms and generate roughly half the revenue per employee. While, in theory, large firms can generate economies of scale, the effective productivity of large state-owned defence contractors in the region is low (see Chart 2.7).

The median private defence firm in advanced Europe is around 2.5 times as productive as the equivalent in emerging Europe. For state-owned firms, this differential rises to 6.6 times (productivity being measured here as revenue per employee).[14] In emerging Europe, the median state-owned firm tends to fall below the private median when it comes to productivity but sit towards the upper end of the distribution in terms of firm size. In advanced Europe, SOEs tend to be both large and relatively productive.

Dealroom data shed further light on defence-tech startups.[15] Between 20 per cent and 28 per cent of defence firms in emerging Europe, advanced Europe and the United States have raised funding in at least one private-equity venture round during their lifecycle (see Chart 2.8). Venture-backed firms in emerging Europe are younger, with 35 per cent having been founded in or after 2022, compared with fewer than 20 per cent in the United States and advanced Europe. They are also far more concentrated in drone technology, where barriers to entry are lower than in established defence technologies. Lastly, firms in emerging Europe are lagging in terms of knowledge production: fewer than 2 per cent hold patents, against around 12 per cent and 13 per cent in the United States and advanced Europe, respectively.

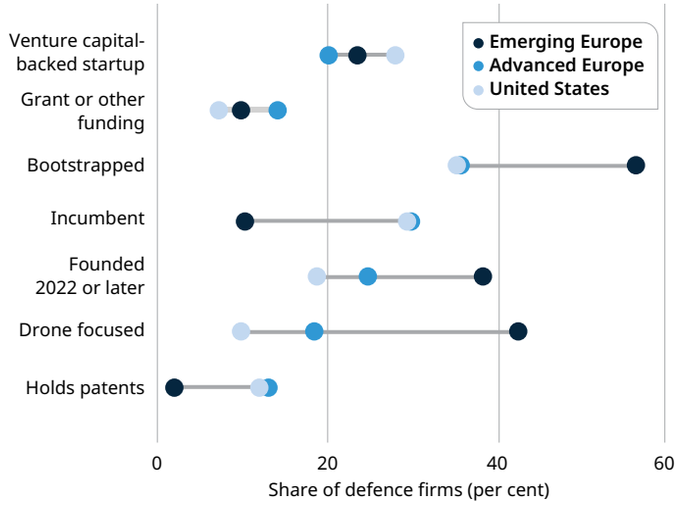
[14] Productivity is measured as revenue per employee in logs (base 10), as a deviation from the average of the same industry in the same year.

[15] See Dealroom (2026).

The share of venture-backed defence startups in emerging Europe is similar to those in the United States and advanced Europe, but these firms raise little capital and seldom advance beyond the earliest funding stage (see Chart 2.9). A startup's progress can be traced through its successive venture-capital funding rounds (pre-seed and seed funding, followed by Series A, B, C and so on), with each representing a step up in terms of capital raised and the scale of the business as it matures (see Chapter 4). Among defence firms in emerging Europe that have raised funding at pre-seed or seed stage, only 18 per cent go on to a Series A funding round or beyond, compared with 42 per cent in advanced Europe and 50 per cent in the United States. Just 4 per cent reach Series B or beyond, against 22-28 per cent in advanced economies. For Series C or beyond, the differential is similar: 4 per cent versus 18-21 per cent. Thus, a new defence industry is emerging in the region, although limited progression through venture equity rounds suggests that access to growth capital remains a constraint.

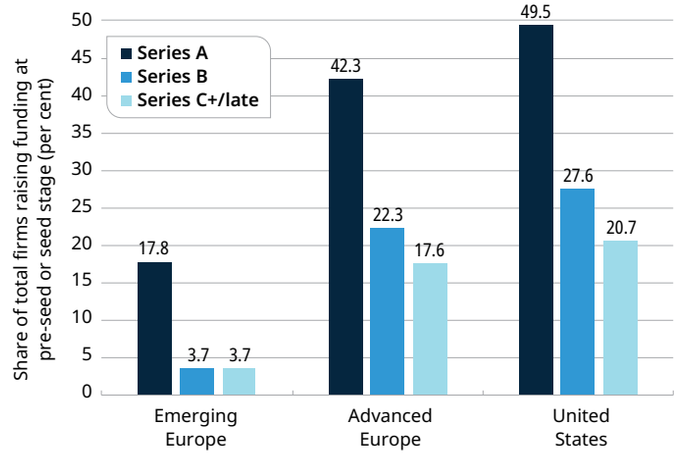
Only
18%
of defence firms in emerging Europe that raise funding at pre-seed or seed stage go on to a Series A funding round or beyond

CHART 2.8 Emerging Europe's new defence firms are young and focused on drones, but hold fewer patents than firms in the United States and advanced Europe



SOURCE: Dealroom (2026) and authors' calculations.
NOTE: The first four categories are mutually exclusive and cover every firm: venture capital-backed startups (disclosed funding or venture ownership); firms funded only through grants and other funding; bootstrapped firms (no disclosed funding, privately held); and incumbent firms (mature firms, listed or founded before 1990). "Emerging Europe" comprises EBRD economies in the EU and the Western Balkans, plus Moldova, Ukraine and Türkiye.

CHART 2.9 Defence-technology firms in emerging Europe rarely scale up beyond the earliest funding stage



SOURCE: Dealroom (2026) and authors' calculations.
NOTE: Based on firms with at least one equity round (from pre-seed through to late-stage and growth equity), including those that raised equity only at pre-seed stage. Grants, debt, and mergers and acquisitions are excluded. Bars show firms reaching each funding stage or above as a percentage of total firms raising funding at pre-seed or seed stage. "Emerging Europe" comprises EBRD economies in the EU and the Western Balkans, plus Moldova, Ukraine and Türkiye.

ECONOMIC RETURNS TO DEFENCE SPENDING

HOW LARGE IS THE DEFENCE MULTIPLIER?

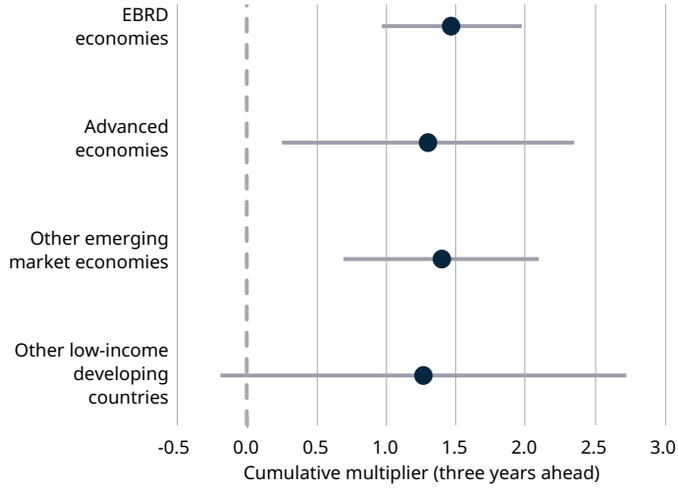
Higher spending on defence can raise an economy's output. Early research into the magnitude of these effects relied mainly on US data, using military build-ups as spending shocks in order to identify their effects on output.[16] Subsequent cross-country research has shown that the size of the multiplier varies depending on country circumstances.[17]

The following analysis estimates the cumulative defence multiplier by applying panel local projections to changes in detrended GDP and defence spending in 133 economies over the 1991-2025 period (see Box 2.2 for details).[18] In the EBRD regions, it is estimated that increasing defence spending by 1 per cent of GDP is associated with a 1.47 per cent increase in output in the medium term (see Chart 2.10). This multiplier effect is broadly in line with estimates for advanced economies.

DEFENCE MULTIPLIERS AND LOCAL CIRCUMSTANCES

Defence multipliers tend to be smaller where imports are higher and extra demand associated with increased defence spending is met by producers abroad. Higher levels of government debt also tend to be associated with smaller multipliers, as higher debt increases the likelihood of concurrent or future tax rises or expenditure cuts to accommodate higher spending on defence.[19] Debt-funded increases in defence spending have nearly twice the output effect of defence spending increases financed by the reprioritisation of other expenditure or higher taxes.[20] Such local circumstances vary greatly from economy to economy. In Türkiye, for instance, where the domestic industrial base is large and public debt is relatively modest, the defence multiplier can be expected to be higher than in economies that rely more heavily on imports to meet additional defence demand or have higher levels of public debt.

CHART 2.10 In the EBRD regions, increasing defence spending by 1 per cent of GDP is associated with a 1.47 per cent increase in output in the medium term

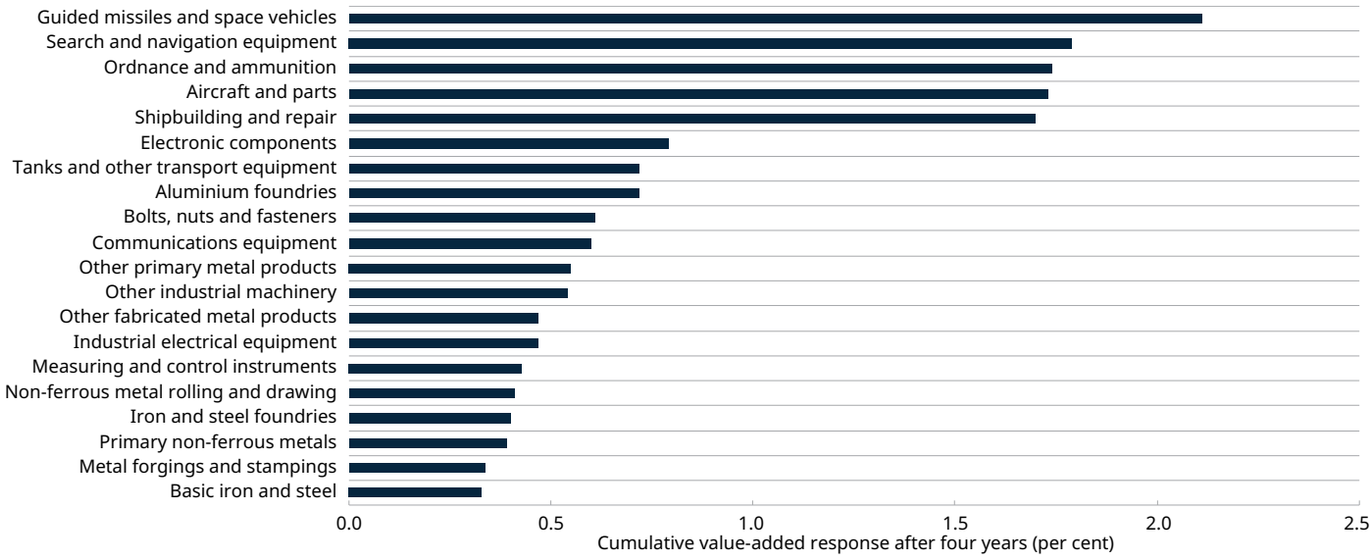


SOURCE: SIPRI (2026a), IMF (2026) and authors' calculations.
NOTE: Multipliers estimate an increase in output in response to an increase in defence spending totalling 1 per cent of GDP based on data for 1991-2025, excluding fragile and conflict-affected states (see Box 2.2 for details). Data for "advanced economies", "other emerging market economies" and "other low-income developing countries" are based on IMF classifications excluding EBRD economies. "EBRD economies" comprises Albania, Armenia, Azerbaijan, Benin, Bosnia and Herzegovina, Bulgaria, Côte d'Ivoire, Croatia, Egypt, Estonia, Georgia, Ghana, Hungary, Jordan, Kazakhstan, Kenya, the Kyrgyz Republic, Latvia, Lithuania, Moldova, Mongolia, Montenegro, Morocco, North Macedonia, Poland, Romania, Senegal, Serbia, the Slovak Republic, Slovenia, Tajikistan, Tunisia, Türkiye, Turkmenistan and Uzbekistan. Bars denote 90 per cent confidence intervals.

The composition of defence spending is also central to its effects on output. Recent evidence, for example, suggests that defence spending on equipment has a significantly higher multiplier than defence spending on personnel.[21] While NATO members as a whole allocated around 43 per cent of their 2022-25 increase in defence spending to equipment, members in the EBRD regions allocated 56 per cent of their increase to equipment (with such expenditure accounting for 72 per cent of the increase in Montenegro, 68 per cent in Poland and 62 per cent in Lithuania). Multipliers also depend on the structure of the industry, as discussed in the next subsection.

[16] See, for instance, Barro (1981) and, more recently, Ramey and Zubairy (2018).
[17] See, for instance, Ilzetzki, Mendoza and Végh (2013), Sheremirov and Spirovska (2022) and Furceri et al. (2026).
[18] See Jordà (2005) and IMF (2026) for a discussion of the methodology.
[19] See Ilzetzki, Mendoza and Végh (2013).
[20] See IMF (2026).
[21] See Sarasa-Flores (2025).

CHART 2.11 Defence demand shocks extend well beyond the defence industry



SOURCE: Becker, Gray and Marvakov (2021), Acemoglu, Akcigit and Kerr (2015) and authors' calculations.
NOTE: Bars show the predicted cumulative four-year response of real value added to a 1 per cent increase in defence demand by three-digit SIC industry group for the top 20 manufacturing groups. Estimates are based on local projections for 1991-2018.

THE TRANSMISSION OF DEFENCE DEMAND ACROSS SECTORS

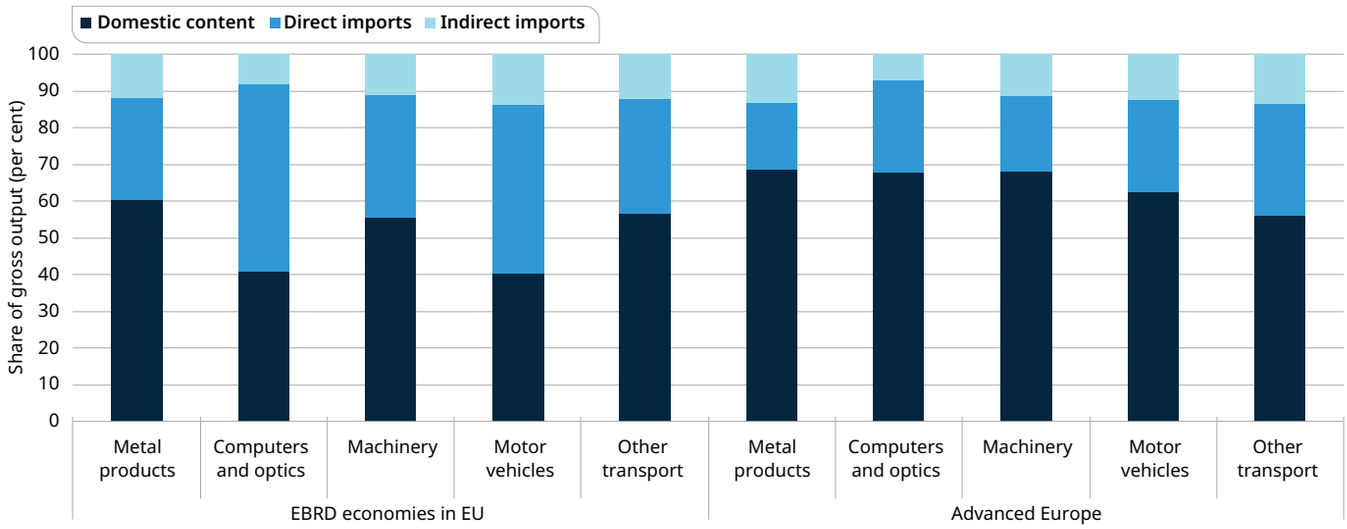
The production of complex goods relies on intricate production networks. Shocks associated with increased demand for defence goods propagate through these networks.[22] The analysis in Box 2.2 sheds light on this propagation.[23] By way of example, an industry facing additional demand increases its purchases of intermediate goods from suppliers, which, in turn, increase their own input purchases. Higher defence spending is typically a demand shock that can spread upstream. Likewise, a competitive industry that becomes more productive (due to, say, increased economies of scale) sells output at lower prices. This supply shock reduces costs for the industries that buy from it and, in turn, for customers of those industries, with the shock transmitting downstream.

This exercise distinguishes the direct effect of increased defence spending, where an industry supplies military goods to the government, from the upstream effect, where an industry supplies a customer that is expanding production in response to increased government demand. Such indirect effects can span multiple stages of production beyond first-tier suppliers. The analysis uses data from the United States, a large, diversified economy for which sufficiently detailed data are available (in smaller economies, in contrast, many supply links may lie outside the domestic enterprise network).

The largest responses are found in industries that supply the military directly: guided missiles and space vehicles, search and navigation equipment, aircraft and parts, shipbuilding, and ordnance and accessories (see Chart 2.11). In each case, value added increases by 1.5-2 per cent in response to a 1 per cent increase in defence spending. However, the defence demand shock also propagates further, extending to electronic components and communications equipment, foundries and metal forgings, and industrial machinery and electrical apparatuses – industries that primarily serve civilian customers.

[22] See Gabaix (2011) and Acemoglu et al. (2012).
[23] See Acemoglu, Akcigit and Kerr (2015).

CHART 2.12 In EBRD economies in the EU, defence-related sectors rely more on imported inputs



SOURCE: Eurostat (2025b) and authors' calculations.
NOTE: "Direct imports" are imported intermediate goods. "Indirect imports" are embodied in domestically sourced inputs through the Leontief inverse.

In economies with shallower domestic networks than the United States, the propagation of defence shocks to other industries can be expected to be weaker while working similarly across a multitude of civilian sectors. In EBRD economies in the EU, the import content of production tends to be higher – almost 60 per cent in the case of electronics, for instance, compared with about 30 per cent in advanced Europe. In such cases, the share of the demand shock that is captured by domestic suppliers tends to be lower.

Likewise, domestic producers can benefit from increases in military spending abroad if they supply foreign defence contractors. Defence procurement contracts often seek to impose local content requirements, a common industrial policy that pursues growth, employment and national security objectives. Under EU defence funding and joint-purchasing instruments, such as Security Action for Europe (SAFE) and the European Defence Industry Programme (EDIP), components from outside the EU perimeter may not exceed 35 per cent of the end product's estimated cost. In other cases, market access depends on agreements between governments. Türkiye, for example, has access to US procurement procedures through a reciprocal defence procurement agreement, while its customs union with the EU does not extend to public procurement (see also Box 1.2 in Chapter 1, which examines government procurement as a possible area for deeper Türkiye-EU integration). Goods may also be subject to export licensing, security clearance and continuity-of-supply requirements. Dual-use goods, for example, circulate freely within the EU, but require authorisation to leave the single market.

EBRD economies in the EU import almost **60%** of the inputs needed for electronics production, compared with about **30%** in advanced Europe

Evidence from the United States indicates that large-scale military procurement can boost innovation among firms winning defence contracts and along their supply chains. The indirect response is about half as large as the direct response, but it reaches significantly more firms, raising the estimated aggregate effect of defence spending on innovation by at least 20 per cent. Defence build-ups can, therefore, affect innovation and, ultimately, productivity growth through such upstream linkages.[24]

IS PUBLICLY FUNDED DEFENCE R&D DIFFERENT?

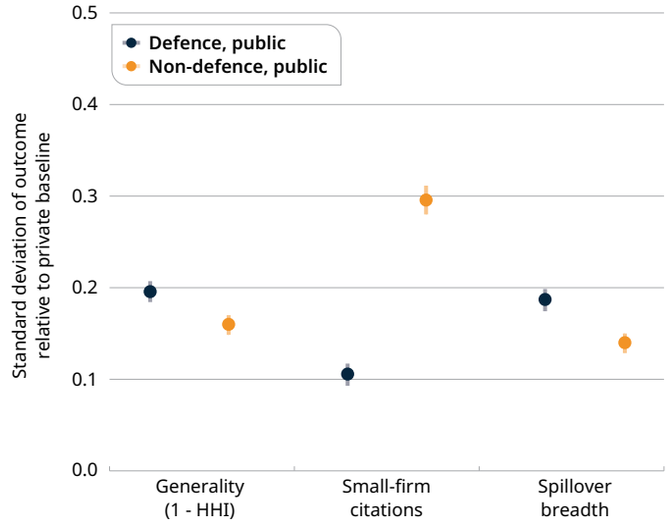
Several of the most transformative technologies developed since the 1950s have military origins. The jet engine, solar photovoltaics, nuclear power, integrated circuits, the laser, satellite navigation, the touchscreen, the computer mouse, the internet and the methods underlying modern AI, among other things, were all developed either through defence research budgets or through military procurement contracts that guaranteed a buyer for technologies too uncertain to attract private capital and justify investment. Thus, knowledge generated by defence research can extend far beyond the military purposes that it is initially meant to serve.

Advanced economies responsible for these inventions allocate a large share of public R&D funding to defence. In the United States, this share has been consistently above 50 per cent since the 1980s, based on GBARD data.[25] In contrast, defence R&D spending has averaged 2.5 per cent of total public R&D spending in EBRD economies in the EU in recent years and 6 per cent in Türkiye. Poland has raised defence's share of public R&D spending from an average of 5 per cent in 2005-21 to 10 per cent since Russia's military invasion of Ukraine in 2022.

Public R&D creates knowledge spillover effects, as it is disproportionately directed towards fundamental, basic science. Private firms underinvest in basic research because they cannot fully capture the associated returns, which trickle out to other firms and individuals. Spillovers from public R&D to the productivity of individual firms appear to be two to three times as impactful as private R&D spillovers. Grants to small firms have been shown to generate three spillover patents from other firms for every patent produced by the grant recipient.[26] There is also evidence that publicly funded R&D crowds in private R&D in the same industry and that this crowding-in extends to firms in the same industry abroad.[27]

US Patent and Trademark Office records identify the government agency behind each publicly funded patent. The related government-interest statements make it possible to separate research supported by defence agencies, such as the Defense Advanced Research Project Agency, from civilian agencies, such as the National Institutes of Health.[28] The regression analysis presented in Chart 2.13 distinguishes between patents

CHART 2.13 Publicly funded defence R&D produces patents that are more general and have broader spillovers



SOURCE: Dyèvre (2024), US Patent and Trademark Office (2025) and authors' calculations.
NOTE: This chart reports ordinary least squares (OLS) estimates of coefficients on indicator variables for publicly funded defence and non-defence patents and the respective 95 per cent confidence intervals, using US patents applied for in 1976-2020. Estimates are relative to the omitted category of privately funded patents. The dependent variables are shown on the horizontal axis. "Generality" is measured as 1 minus the Herfindahl-Hirschman Index of concentration of technology classes for citing patents; "small-firm citations" are the share of citations received from small entities; and "spillover breadth" is the number of distinct technology classes in which citing patents are located. All regressions include application-year and technology-class fixed effects and control for inventor and assignee productivity.

[24] See, for example, Carvalho and Draca (2017).
[25] See Eurostat (2025a).
[26] See Dyèvre (2024) and Myers and Lanahan (2022).
[27] See Moretti, Steinwender and Van Reenen (2025).
[28] This analysis follows the approach of Dyèvre (2024).

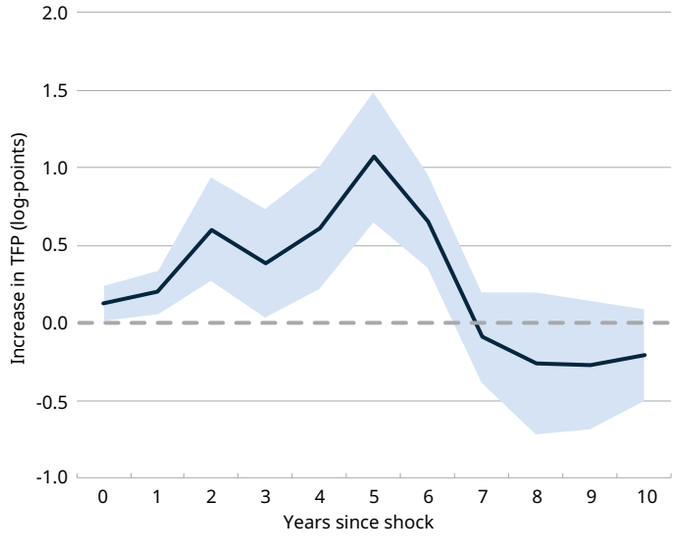
financed by defence budgets and those financed by other public budgets, while patents funded by private firms serve as a benchmark. It links various outcomes, such as measures of how widely patents are cited, to these patent characteristics.

Relative to privately funded patents, publicly funded patents in the United States are more general, are cited by patents in a larger number of other technology classes and are more frequently cited by small firms. Within publicly funded research, defence-funded patents are more general and are cited more broadly, but receive fewer citations by small firms than non-defence-funded patents. This suggests that research funded by defence agencies produces technologies that are more general and later serve as the basis for innovation across a wider range of technological fields, while civilian funding produces technologies that small firms are more likely to build on. It should also be noted that not all innovations are patented. Inventions that are considered militarily sensitive, for instance, can be withheld from publication.

Knowledge can benefit countries beyond those that fund or generate it. For instance, public research funded in the United States raises productivity in other countries, particularly in non-OECD economies and those with small stocks of R&D capital.[29] In these cases, foreign firms benefit from scientific results that are published and freely accessible, as well as from technology carried across borders embedded in traded capital goods (machinery that raises the productivity of its users).

This kind of cross-border boost to total factor productivity (TFP) in response to publicly funded R&D in the United States can be observed in post-communist economies in the EBRD regions (see Chart 2.14).[30] This analysis looks at legislated increases in the research budgets of federal defence agencies in the United States. Using a local projection method, the logarithm of TFP at each horizon is regressed on the defence R&D shock and its five lags, two lags of the dependent variable and real GDP per capita growth, two lags of US TFP, and country fixed effects.

CHART 2.14 TFP in post-communist economies in the EBRD regions increases in response to an increase in defence R&D in the United States

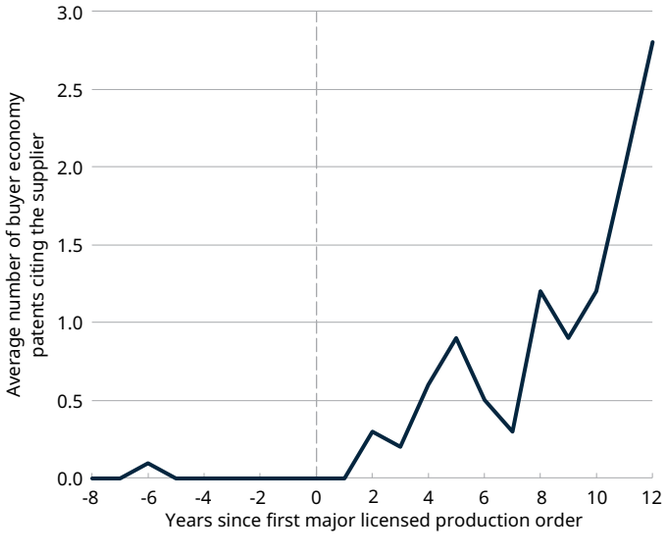


SOURCE: Feenstra, Inklaar and Timmer (2015), De Souza et al. (2026) and authors' calculations.
NOTE: The sample comprises Albania, Armenia, Bulgaria, Croatia, Estonia, Hungary, Kazakhstan, the Kyrgyz Republic, Latvia, Lithuania, Moldova, Mongolia, Poland, Romania, Serbia, the Slovak Republic, Slovenia, Tajikistan and Ukraine in 1991-2019. The chart shows the response of TFP in these economies to an unanticipated increase in defence R&D in the United States, estimated by panel local projections based on the approach of De Souza et al. (2026). The shading indicates 95 per cent confidence intervals.

An increase in US defence R&D equivalent to
1%
of the existing R&D stock raises productivity in post-communist EBRD economies by as much as
1%
after five years

[29] See De Souza et al. (2026).
[30] Ibid.

CHART 2.15 After a licensed production deal, patenting in the buyer economy increasingly cites the technology of the supplier firm in the deal



SOURCE: European Patent Office (2022), SIPRI (2026b) and authors' calculations.
NOTE: This chart shows numbers of patents with buyer economy applicants citing the supplier, per supplier-buyer pair, around the pair's first US$ 1 billion-plus order with licensed local production. The sample consists of 10 deals between Türkiye and foreign defence firms. The first deal was in 1984 and the last deal was in 2003.

A budget increase equivalent to 1 per cent of the stock of prior defence research in the United States is associated with a 1 per cent increase in TFP in post-communist economies in the EBRD regions after five years. This effect builds gradually, peaks at five years and is no longer distinguishable from zero after seven years. The effects of non-defence R&D in the United States are similar, but somewhat larger in magnitude.

The response is partly driven by the composition of trade: knowledge comes inside imported capital goods, with industry in the EBRD regions a heavy importer of machinery, vehicles and electronics during the 1990s and early 2000s. In addition, many of these economies joined NATO between 1999 and 2004, which lowered restrictions on the transfer of defence-related technology.

There is also suggestive evidence that production under a foreign licence can help firms to build on foreign defence technology. The analysis presented in Chart 2.15 draws on 10 major licensing agreements under which the Turkish government acquired the right for domestic firms to produce weapon systems. Following each agreement, patents filed by Turkish firms cite patents held by the firm supplying the licensed technology. The effect builds over time, consistent with learning under the licensing agreement. While the sample is small, the patterns suggest that production under licence, in addition to generating local jobs, can help local firms to expand their knowledge base.

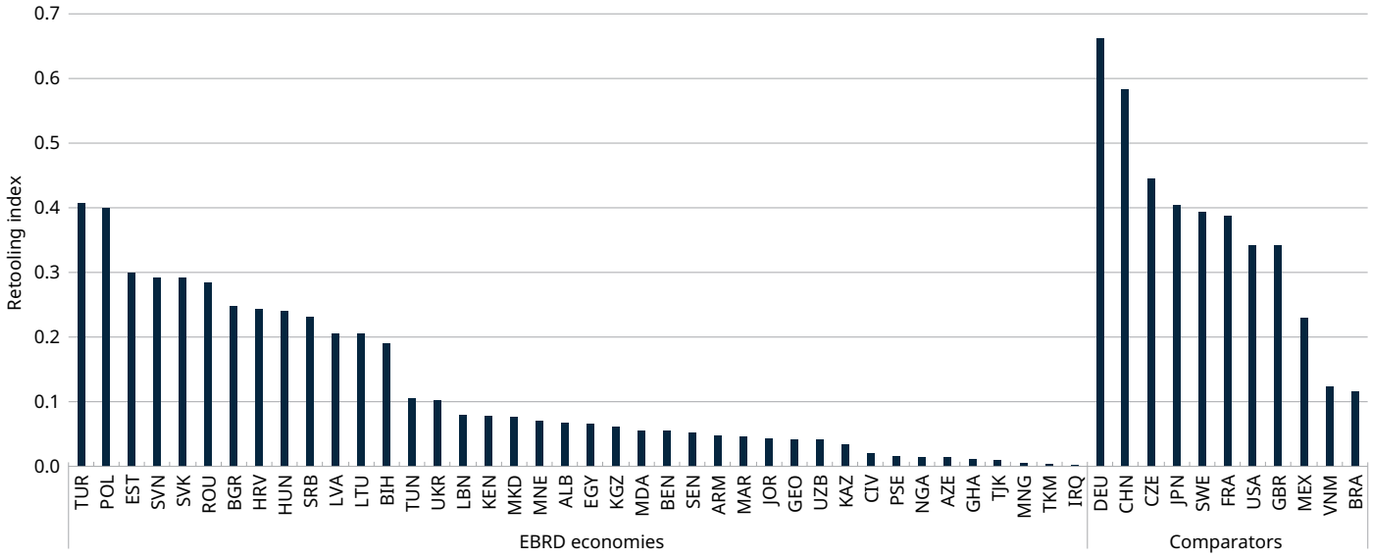
ACHIEVING SCALE IN RESEARCH AND DEVELOPMENT

The analysis does not necessarily imply that defence research is a more effective use of public funds than alternative uses. Nonetheless, it shows that public spending on defence R&D can boost productivity in civilian sectors, raising defence spending multipliers. However, such effects often rely on a scale of research spending that may not be attainable for small economies.

In such cases, collaborative programmes offer a route to achieving research and production at a viable scale. The European Defence Fund has €7.95 billion available for collaborative research and development, which is open to EU member states. NATO's Defence Innovation Accelerator for the North Atlantic is supported by all 32 allied nations (including those in the EBRD regions). The NATO Innovation Fund is available to a narrower set of 24 allies, including Türkiye.[31] Horizon Europe, the EU's key funding programme for R&D, has been amended to include dual-use research and extends to the EU neighbourhood, including Armenia, Georgia and Moldova, albeit on a smaller scale.[32]

[31] See NATO (2026) and NATO Innovation Fund (2026).
[32] See European Commission (2025 and 2026).

CHART 2.16 Potential to redirect civilian production to defence is relatively high in Poland and Türkiye



SOURCE: Fetzer et al. (2024), CEPII (2026) and authors' calculations.
NOTE: Readiness for retooling is calculated as the similarity-weighted share of military-related civilian goods for which an economy has an RCA. Higher values indicate greater potential to redirect existing export capabilities to defence production.

BUILDING MILITARY CAPABILITY

Higher military spending does not automatically translate into the required military capabilities. In many advanced economies, the industrial base that is needed to expand defence output quickly has been weakened by years of low demand for military equipment and because the overall manufacturing base has shrunk with production moving to China. Where the available industrial base is small, a larger part of any increase in spending is likely to be absorbed by higher prices for domestic outputs and imports.[33]

The potential for an economy to effectively redirect resources to defence production can be measured using a composite index of readiness for retooling, which builds on 450,000 technological input links between products, drawn from the AI-generated Production Network (AIPNET).[34] When combined with trade data for 2022-24, this produces relatedness scores ranging from 0 to 1. For the purposes of this analysis, two goods are treated as being related if they are assembled from the same components (rather than one being an input to the other). For instance, a passenger car has a relatedness score of 0.52 with respect to a tank, whereas a cotton shirt scores 0. Cars and tanks draw on similar components, such as transmissions, bearings, castings, mountings and heavy metalworking and, by extension, on similar production methods and factories.

The ability to convert civilian production to military use is, therefore, assumed to depend on the similarity of military supply chains and production to civilian equivalents, based on historical experience. For example, after the United States prohibited civilian automobile production in February 1942 and redirected the sector to war output, tank production rose from 331 units in 1940 to 29,497 in 1943.[35] In 2025, the Europe-based KNDS converted a former railway plant to produce components for tanks and artillery systems.[36]

Poland and Türkiye score relatively highly on the economy-wide retooling readiness index, which compares economies' industrial structures with relatedness scores for military goods (see Chart 2.16). Both have deep specialisations in automotive components, machinery

[33] See Antonova, Luetticke and Müller (2026).
[34] See Fetzer et al. (2024).
[35] See Hyde (2013).
[36] See KNDS (2026).

and fabricated metal products, supplying customers in Europe. Germany has the highest retooling index globally, followed by Italy and China, reflecting an industrial base centred on machinery, motor vehicles and electrical equipment.

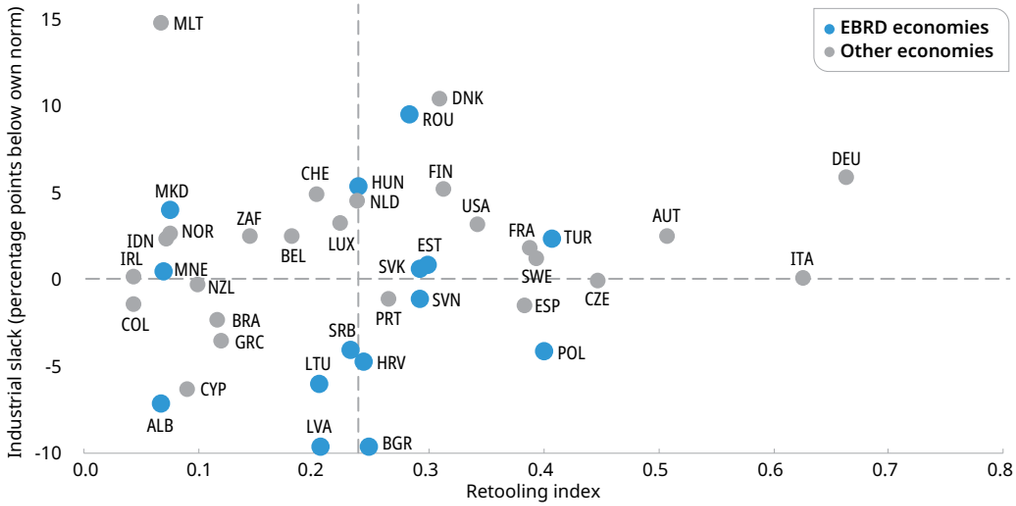
While Poland's retooling potential is high, its industrial capacity utilisation is also relatively high, leaving more limited scope to increase military production in the short term without exacerbating inflationary pressures (see Chart 2.17). More generally, where capacity utilisation is already high and relatively little slack is available in an economy, an increase in defence expenditure is more likely to draw resources away from civilian production and generate upward pressure on prices.

The choice between contracting defence production domestically or internationally also depends on whether domestic production can reach an efficient scale, the adjustment costs of converting civilian production to military use, such as retraining workers and reconfiguring capital for a different product, the output lost while doing so and the strategic value of ensuring domestic supply.

The necessary scale can sometimes be achieved through joint procurement. European programmes such as the Global Combat Air Programme (GCAP), the Eurofighter Typhoon, the Panavia Tornado and the MBDA Meteor missile have pooled participating countries' demand to achieve production at scale. At the same time, cross-border programmes tend to be more expensive and slower. A rule of thumb in defence economics approximates the development cost of a collaborative programme using the square root of the number of partner nations. Thus, a four-nation project could cost twice as much as a comparable national programme.[37] As a result, the savings from multinational procurement may not be fully realised.[38]

Pooling demand internationally also requires a strong governance framework. Partners must agree who leads the programme, which may involve multiple "national champions", and how intellectual property rights are assigned and upheld.[39] GCAP and the Future Combat Air System (FCAS), both three-nation efforts to build a next-generation fighter aircraft, illustrate the importance of thinking through governance arrangements. GCAP (established by the United Kingdom, Japan and Italy) decided on its organisation and leadership before the industrial phase, while FCAS (established by France, Germany and Spain) left work-sharing and leadership issues unresolved and its joint fighter element was abandoned in 2026.[40]

CHART 2.17 Some EBRD economies have both the potential to redirect civilian production to defence and spare industrial capacity



SOURCE: Fetzer et al. (2024), CEPII (2026), Federal Reserve Bank of St. Louis (2026), Eurostat (2026), OECD (2026) and authors' calculations.
NOTE: Industrial slack is defined as each economy's average manufacturing capacity utilisation in 1972-2019 (subject to data availability) minus its latest four-quarter average, in percentage points. The vertical dashed line indicates the sample median for retooling readiness.

[37] See Hartley (2008).
[38] See Lorell and Lowell (1995).
[39] See Clapp, Höflmayr and Vambrie (2025).
[40] See Petrie (2024) and Euronews (2026).

Various existing instruments seek to pool demand for military products across borders. EDIP has €1.5 billion in grants available for 2025-27 for common procurement and industrial capacity, while SAFE has up to €150 billion available for loans conditional on joint procurement and has been extended to Ukraine. This includes large allocations for Poland (€43.7 billion), Romania (€16.7 billion) and Hungary (€16.2 billion). EU Security and Defence Partnerships also open up common procurement to Moldova, North Macedonia and Albania, although access to EU funding for their suppliers requires a further agreement. Outside Europe, firms in EBRD economies with qualifying country status under US defence procurement rules – including Egypt, Estonia, Latvia, Lithuania, Poland, Slovenia and Türkiye – can compete for US programme subcontracts on the same terms as domestic suppliers.

The nature of military conflict has changed, with drones (unmanned, uncrewed and autonomous systems) becoming central, as Russia's war on Ukraine has shown. Barriers to entry in this sector are lower than for traditional defence equipment with high fixed production costs. Consequently, smaller economies in the EBRD regions have established strong positions in markets for drone inputs and finished systems. Four

FOUR

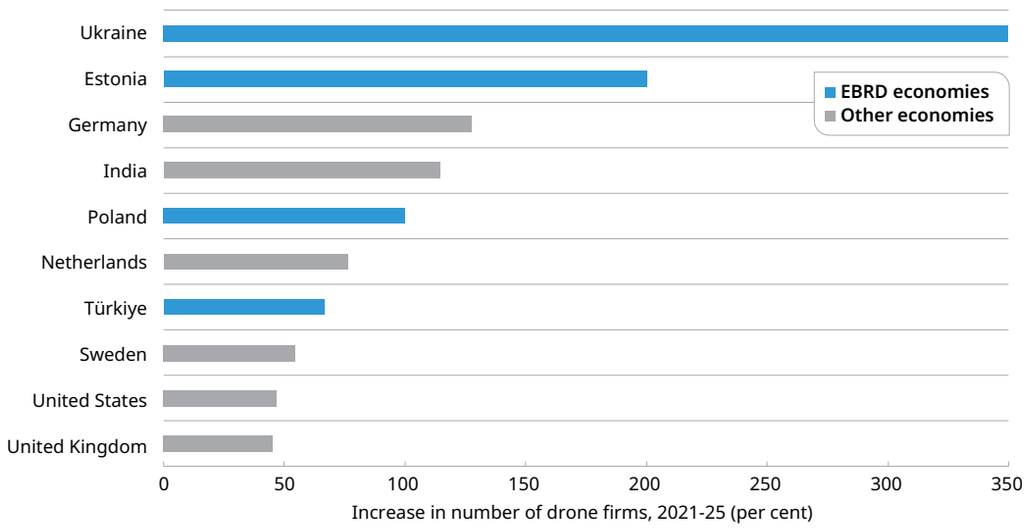
EBRD economies are among the world's 10 fastest-growing hubs for drone firm creation since 2021

economies in the EBRD regions are among the top 10 economies globally in terms of drone company growth since 2021 (see Chart 2.18).

As a result, in July 2026, firms specialising in drones accounted for 40.1 per cent of domestic defence firms in emerging Europe, compared with 15.0 per cent in advanced Europe and 8.6 per cent in the United States (see Chart 2.19).

Exports of drones by EBRD economies have also grown rapidly. Serbia's exports of drone inputs grew 3.2-fold between 2019-21 and 2024, while Bulgaria's doubled, and Morocco's, Slovenia's and the Slovak Republic's grew 1.6-fold.[41] Türkiye is the world's largest exporter of finished military drones, with 41 per cent of global

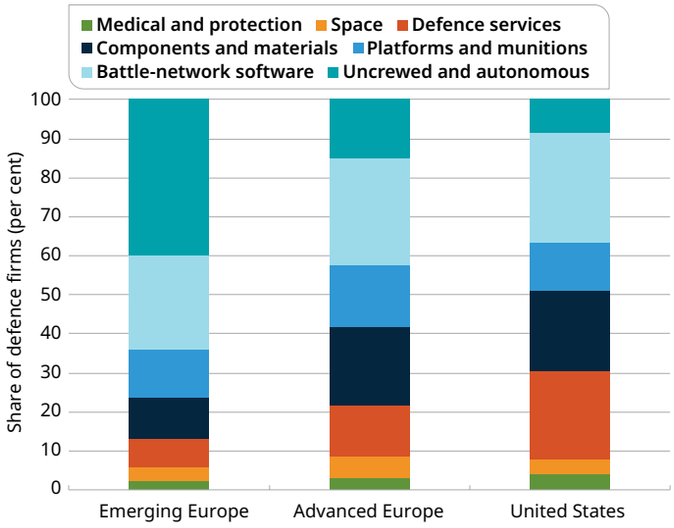
CHART 2.18 Four EBRD economies are in the top 10 globally for post-2021 drone company growth



SOURCE: Dealroom (2026) and authors' calculations.
NOTE: Drone companies are defined as firms whose recorded activities involve unmanned systems, such as the development or manufacture of aerial, ground or underwater drones, or of related components, software and services (including counter-drone technology). Firms are grouped together on the basis of the country in which they are headquartered.

[41] Authors' calculations based on CEPII (2026).

CHART 2.19 Defence firms in emerging Europe often specialise in drones



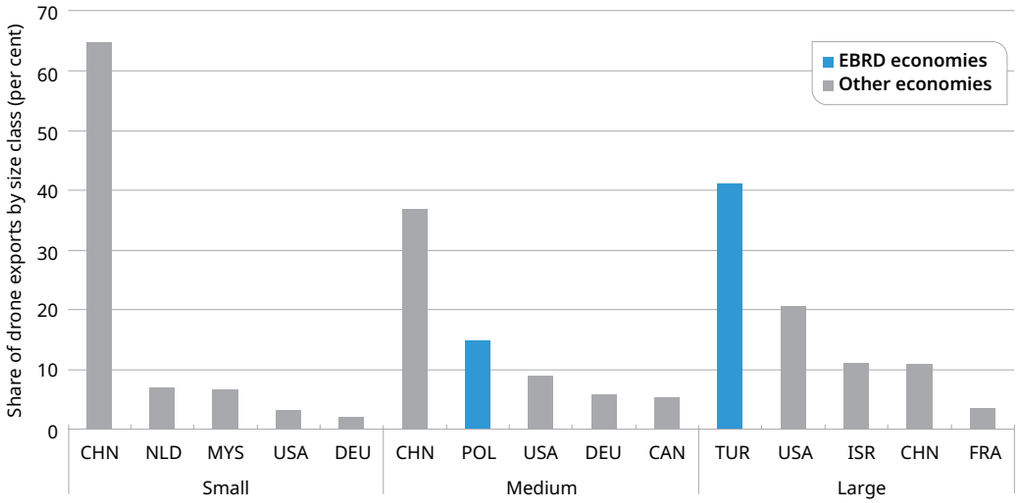
SOURCE: Dealroom (2026) and authors' calculations.
NOTE: Sample includes all firms where a primary product domain could be assigned. "Battle-network software" covers cyber and electronic warfare and sensing. "Platforms and munitions" spans weapon systems and aviation. "Components and materials" encompasses semiconductors, photonics, advanced materials, propulsion and manufacturing. "Emerging Europe" comprises EBRD economies in the EU and the Western Balkans, plus Moldova, Ukraine and Türkiye.

exports in the heavyweight class, ahead of the United States (at 21 per cent) and Israel and China (at 11 per cent each; see Chart 2.20). Poland is the second-largest exporter of drones in the medium-weight class. (In trade data, drones are classified by weight, with the overwhelming majority of small drones having commercial uses and large drones mainly being used for military purposes.)

The commercial market for drones is larger than the military market and worth in excess of US$ 5 billion annually, compared with US$ 1.6 billion for large and medium-sized drones. It is dominated by China, which accounts for 65 per cent of all exports (with the second-largest exporter, the Netherlands, accounting for 7 per cent of the market, followed by Malaysia with 6.7 per cent). Looking at EBRD economies, Poland, with a market share of 1 per cent (on a par with France), is one of the 10 largest exporters.

New drone producers in the EBRD regions face constraints in their attempts to increase their share of the global market. Capital remains scarce and such firms rarely progress beyond the earliest funding stage. In the market for small commercial drones, China's leading position is particularly strong.

CHART 2.20 Türkiye is the world's largest exporter of finished military drones



SOURCE: CEPII (2026) and authors' calculations.
NOTE: Drones are defined as HS2022 code 8806, "unmanned aircraft". Size classes are based on maximum take-off weight, combining subheadings from the remotely piloted (8806.2) and autonomous flight (8806.9) categories. The three panels show the top five exporters in 2024 for the three size classes.

CONCLUSIONS AND POLICY IMPLICATIONS

Rising geopolitical tensions have put an end to the peace dividend of the past three decades. Defence spending is rising globally, with a number of economies in the EBRD regions at the forefront of that increase following Russia's full-scale military invasion of Ukraine in 2022.

An increase in defence spending totalling 1 per cent of GDP in economies in the EBRD regions is associated with a 1.47 per cent increase in output in the medium term. Multipliers of defence spending tend to be smaller where imports are higher. The composition of defence spending matters: large-scale, publicly funded defence research often generates general-purpose technologies that have broad spillovers into technological fields. The resulting productivity gains can be transmitted across borders: economies in the EBRD regions have enjoyed productivity gains as a result of increased spending on defence research in the United States, for instance.

Military and dual-use goods are complex and technologically advanced, and sunk costs, economies of scale, qualification requirements and incumbent lock-in keep defence production concentrated in a small number of countries and firms.

In many economies in the EBRD regions, the defence industry is disproportionately state owned. State-owned defence firms are less productive than private firms, while defence-tech firms rarely raise capital beyond the earliest funding round. Policies that support firms in accessing growth capital can help new entrants in these industries to establish themselves as national and global players.

Where a domestic production base and spare industrial capacity exist, further economies of scale could be achieved through participation in joint procurement programmes, such as those led by the EU. Participating in a shared programme can also give a smaller country's industry access to know-how. When such programmes are established, governance arrangements require early and careful consideration. Production under licence is another way to support domestic activity and can also facilitate some degree of knowledge transfer.

Economies with little or no defence industry can provide inputs to defence production and benefit from increased global demand for defence products, although participation in such supply chains may be limited by local content requirements, export controls or requirements for security clearance and reliable supply.

BOX 2.1 UKRAINE'S DEFENCE INDUSTRY: FROM WARTIME NECESSITY TO EXPORT INDUSTRY?

In 1991, Ukraine inherited about 30 per cent of the Soviet defence-industrial base, with around 700 enterprises, including Pivdenmash, a rocket manufacturer, and Antonov, an aircraft manufacturer, employing a million people. These enterprises were regarded as the most advanced and technologically sophisticated segment of Ukraine's manufacturing sector. Capabilities were concentrated in missiles, transport aircraft, tanks, surface ships and turbine engines.[42] Despite this, the Ukrainian defence industry never managed to move up the value chain and establish itself as a major supplier of advanced weapon systems. Three constraints limited the sector's development over subsequent decades.

First, Ukraine's supply chains relied on foreign inputs, and re-establishing domestic production of inputs required large-scale investment. In 2013, Russia supplied 25 per cent of critical inputs for Ukraine's military production.

Ukraine inherited about
30%
of the Soviet defence-industrial base

Second, domestic demand was weak. Ukraine depended on Russia for final demand. It absorbed 16 per cent of Ukraine's military exports and 52 per cent of its dual-use and strategic exports. Force reductions mandated under the 1990 Treaty on Conventional Armed Forces in Europe, nuclear disarmament under the 1994 Budapest Memorandum and fiscal constraints meant that state procurement was limited to essential maintenance. The number of arms-producing enterprises fell by nearly two-thirds to 267 by mid-1993 and domestic military procurement totalled just US$ 62 million in 2014.[43]

Producers resorted to exports as a substitute for domestic demand, selling modernised Soviet-era systems and establishing joint ventures in Africa, Asia, Latin America and the Middle East. This gave rise to the third problem. While Ukraine was one of the world's 15 largest arms exporters for most of 1993-2013 and was the fourth largest in 2012, little attention was paid to upgrading technology.[44] Clientelism and corruption remained a problem in state-owned enterprises such as UkrOboronProm, a state conglomerate that oversaw more than 100 companies and was the armed forces' principal supplier, deterring Western investment.[45]

Following Russia's illegal annexation of Crimea and the outbreak of conflict in the Donbas region, a rapid increase in domestic defence procurement coincided with the severing of Russian supply chains, as the share of inputs from Russia fell to 14 per cent. This forced partial reshoring and the reorientation of the remainder of external sourcing to Western suppliers. State-owned enterprises were slow to adapt. As a result, private firms' share of military procurement rose from 25 per cent in 2015 to 54 per cent in 2020.[46]

The full-scale military invasion of Ukraine in 2022 prompted rapid battlefield innovation, shifting priorities from the legacy defence sector to unmanned systems and electronic warfare, a segment worth an estimated US$ 6.8 billion in 2025, comprising drones (US$ 6.6 billion) and electronic warfare (US$ 220 million).[47] Brave1, the state coordination platform established in 2023, has been central to this shift, linking developers, military end-users, budget holders and investors, and disbursing over US$ 60 million in grants to more than 600 companies in 2025. Publicly disclosed private investment in Ukrainian defence-tech firms rose from US$ 1.1 million in 2023 to over US$ 105 million in 2025.[48]

CONTINUED

[42] See Kuzmuk and Scarazzato (2025).
[43] Ibid.
[44] Ibid.
[45] See Bukkvoll and Solovian (2020).
[46] See Kuzmuk and Scarazzato (2025).
[47] See KSE Institute (2026).
[48] See Crebo-Rediker (2026).

BOX 2.1 CONTINUED

Capability has grown nonetheless, to the point that Ukraine authorised its first wartime exports in February 2026 and announced 10 European export centres.[49]

While the sector is now larger, more diversified and more technologically capable than at any point since 1991, major constraints on scaling up production remain. Supply chains in the defence-tech sector remain dependent on external suppliers, with China accounting for 71 per cent of Ukraine's imports of key drone inputs. Leveraging the country's capability in drones in the post-war period will depend on managing and phasing out that reliance, as potential export markets will place a greater premium on secure supply chains that do not rely heavily on any single supplier country.[50] With defence spending running at 39.6 per cent of GDP in 2025, export demand is likely to play a far greater role in peacetime.

Amid limited global capability in drones, counter-drone systems and electronic warfare, there is scope for establishing joint ventures in future. The United Kingdom signed a licensing agreement in November 2025 to produce the Ukrainian-designed Octopus interceptor drone at scale, making it the first Ukrainian combat system to be serially manufactured in a NATO country.[51]

While Ukraine has considerable export potential, realising it will require compliance with demanding certification standards, including those of the EU and NATO, which few Ukrainian firms currently satisfy. Moreover, competition is on the rise, with Türkiye, South Korea and well-capitalised private entrants such as Helsing and Anduril rapidly gaining share in the higher-end segment of the drone market.

[49] See Crebo-Rediker (2026).
[50] See Dee et al. (2025).
[51] See Ministry of Defence of Ukraine (2025).

BOX 2.2 METHODOLOGY

ESTIMATING DEFENCE SPENDING MULTIPLIERS

The defence spending multipliers presented in this chapter are estimated using the approach set out in IMF (2026). Cumulative multipliers are obtained from panel local projections, where the cumulative change in the real GDP of a country between years t and $t+3$ is regressed on the cumulative change in defence spending over the same time horizon.

Output is measured by real GDP, and both output and defence spending are normalised by potential GDP. Potential GDP is estimated as the exponentiated fitted value of a sixth-order time polynomial in log real GDP. Controls comprise one- to four-year lags for output, defence spending and non-defence spending as shares of potential GDP, a contemporaneous onsite conflict indicator, and country and year fixed effects. Standard errors are clustered at the country level. The sample comprises all economies with available data, excluding the 26 countries on the World Bank's list of fragile and conflict-affected states, and spans the post-Cold War period from 1991 to 2025. Each country-group estimate comes from a separate regression, estimated by ordinary least squares.



ESTIMATING THE PROPAGATION OF DEFENCE SHOCKS

The analysis of predicted sectoral responses to US defence spending shocks draws on an annual panel of 392 four-digit manufacturing industries from the Manufacturing Industry Database compiled by the National Bureau of Economic Research (NBER)[52] and the US Census Bureau's Center for Economic Studies (CES) for the period 1991-2018.[53] Each industry's exposure to defence demand is measured as its defence-related sales as a share of total sales in 1992, derived from US final defence demand. The industry's own shock is constructed as a shift-share term that interacts this exposure with the change in the logarithm of aggregate national defence expenditure. The shock is then propagated through the 1992 input-output network to obtain an upstream shock (capturing demand reaching an industry from its customers) and a downstream shock (capturing the input-cost channel operating through its suppliers). The input-output network and the defence exposures are held fixed at their 1992 values, so that variations in the shocks reflect movement in aggregate defence spending as opposed to the endogenous evolution of industry linkages.

The own, upstream and downstream effects are estimated using cumulative local projections on a four-year time horizon. The log-change in real value added, cumulated from t to $t+4$, is regressed on the three lagged defence shocks, controlling for lagged value-added growth and year fixed effects. Standard errors are clustered at the industry level. For each industry, the fitted value is evaluated at that industry's realised own and upstream shocks, and averaged over its estimation sample years, isolating the component of predicted growth that is attributable to defence demand. Four-digit estimates are then aggregated to the three-digit level.

[52] See Becker, Gray and Marvakov (2021).
[53] This analysis is based on Acemoglu, Akcigit and Kerr (2015).

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CHAPTER 3

BUILDING THE AI ECONOMY

Advanced AI relies on a capital-intensive supply chain of chips, data centres, electricity and specialised research. Economies in the EBRD regions play a limited role in these upstream segments: their AI-related hardware exports, frontier-model development and AI firm valuations lag those of global leaders considerably, while power constraints restrict their capacity to host large-scale data centres. Greater opportunities lie downstream in the development of AI-enabled applications and the use of AI to boost productivity. As adoption capacity varies widely, benefits are likely to be uneven. Policymakers could facilitate successful AI adoption by prioritising infrastructure, skills, access to computing capacity, data governance and international cooperation.





INTRODUCTION

Unlike previous waves of automation, generative AI primarily affects knowledge-intensive work, such as writing, developing software (coding) and analysing data. AI capabilities continue to improve rapidly, giving firms and workers less time to adjust to innovation than in the past. In the United States, workplace adoption of generative AI has been faster than that of the personal computer (relative to their respective mass-market launches), while its overall adoption has outpaced the rollout of both personal computers and the internet.[1]

The capacity to build AI systems remains concentrated: a handful of economies and firms dominate the fields of advanced semiconductor chips, data infrastructure and frontier models. Economies in the EBRD regions play a limited role in these upstream segments of the AI supply chain, and the potential for expanding that role is frequently limited by the size and structure of those economies. The potential is stronger in the application layer, where AI models are turned into products and services for end users. The barriers to entry are lower in this market segment, and firms in the EBRD regions are already active in many areas relating to AI applications.

The biggest opportunity lies in AI adoption. While the potential economic gains from AI are substantial, they are likely to be distributed unevenly across economies and sectors. Economies with strong digital infrastructure and the skills needed to adopt and use new technologies effectively are best positioned to benefit; those starting from a lower level of digital economy development, including many in the southern and eastern Mediterranean (SEMED) and sub-Saharan Africa (SSA) regions, risk falling further behind.

Realising gains from AI will depend first and foremost on the ability of firms, workers and governments to use AI effectively and on policy choices governing digital infrastructure, data use, the upgrading of skills and international cooperation.

This chapter starts by documenting the supply chain underpinning the production and use of AI, including the participation of the EBRD regions in those networks. It then estimates the potential productivity gains from AI adoption and reviews early evidence on affected workers, particularly new entrants into the labour market. Lastly, it considers policies that can facilitate the effective adoption of AI.

THE AI SUPPLY CHAIN

Recent progress on AI capabilities rests on specialised hardware or accelerators, such as AI semiconductor chips. These form the basis of processors suited to the computations involved in training and running AI models, which consist of very large numbers of simple arithmetic operations carried out in parallel. For such workloads, AI chips are faster and use far less energy than the general-purpose central processing units (CPUs) found in ordinary computers. Most AI computing capacity comes from graphics processing units (GPUs), which were originally designed to render images for video games.

The computing power used to train leading models has grown more than fourfold per year since 2010,[2] and training a frontier model now requires tens of thousands of chips working together for months. This expansion is visible in the global stock of AI computing capacity, which reached the equivalent of about 20 million H100 chips[3] at the end of 2025, around a threefold increase relative to its level a year earlier (see Chart 3.1).

The supply of AI chips has struggled to keep pace with demand, however.[4] Semiconductor fabrication is one of the most exacting industrial processes, with each step, from the design of production equipment to chip fabrication, dominated by a handful of specialised firms. As a result, output can only grow as fast as the weakest link in the chain.

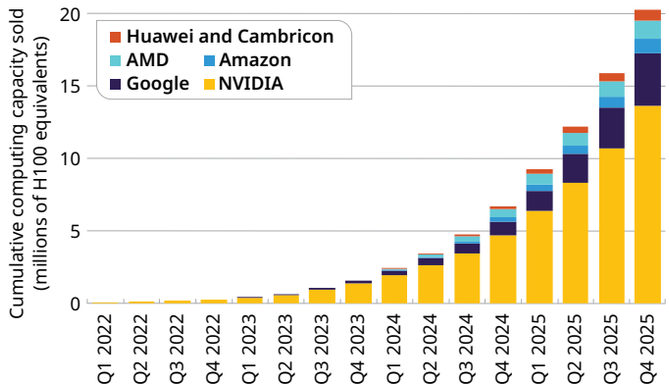
[1] See Bick, Blandin and Deming (2026).

[2] See Epoch AI (2026a).

[3] H100 is a widely used AI accelerator produced by NVIDIA.

[4] See Epoch AI (2026b).

CHART 3.1 The global stock of AI computing capacity is growing exponentially



SOURCE: Epoch AI (2026c).

DESIGNING CHIPS: THE "FABLESS" MARGIN

Chip design involves deciding how its transistors are arranged, depending on the unit's purpose. For a frontier AI accelerator, this stage can take several years of engineering work and hundreds of millions of dollars in R&D expenditure.[5]

A few "integrated device manufacturers" design and fabricate their own chips, while most other chip designers are "fabless": they design chips and contract manufacturers, known as foundries, to build them based on the blueprints provided. The fabless model now dominates the supply of AI accelerators: NVIDIA, the world's largest fabless designer, accounted for an estimated 79 per cent of global spending on AI chips in 2025.[6] Designers also capture most of the value, with the margins retained by the designers of leading chips estimated at between 58 per cent and 90 per cent of the chip's selling price.[7]

MAKING CHIPS: A FEW FOUNDRIES

At the fabrication stage, a polished silicon wafer passes through several hundred steps in which layers of material are deposited, patterned with light and etched away. Each new generation of this technology, known as a process node, makes chips more powerful and energy efficient. Frontier accelerators are built on the most advanced nodes, overwhelmingly produced by foundries.

The entire supply chain is highly concentrated. Most leading AI chips flow through a single foundry, TSMC. Based in Taipei China, it accounts for around 70 per cent of the global foundry market for all chips.[8] The extreme ultraviolet lithography machines needed to produce leading-edge chips are, in turn, supplied by a single firm, ASML of the Netherlands. High-bandwidth memory, which allows data to move rapidly between memory and the processor, is produced at scale by just three firms: SK Hynix, Samsung and Micron. Advanced packaging, which integrates processor and memory into a working unit, is dominated by a single TSMC process, chip-on-wafer-on-substrate (CoWoS). High-bandwidth memory and advanced packaging were the main bottlenecks constraining AI accelerator supply in 2025.[9]

TSMC in Taipei China accounts for around **70%** of the global foundry market

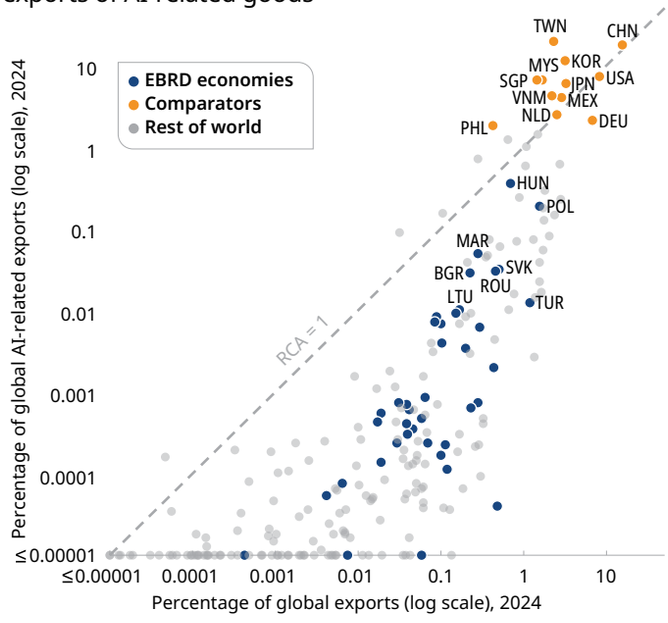
[5] See SIA and BCG (2022).
[6] See Epoch AI (2026c).
[7] See Silicon Analysts (2026). This calculation covers 12 AI accelerators sold by NVIDIA, AMD, Intel and Groq.
[8] See TrendForce (2026).
[9] See Epoch AI (2026b).

TRADE IN AI-RELATED PRODUCTS

Analysis of global trade in AI-related inputs for this year's *Transition Report* identifies a basket of 24 product codes at the six-digit level of the WCO Harmonized System (HS6),[10] the most detailed level at which trade data are internationally comparable. This basket covers the chips, boards and servers that AI workloads run on, along with chip fabrication equipment and manufacturing materials (see Box 3.1). These product codes are not always specific to AI: servers and processing units (HS 847150), for instance, include both ordinary business servers and AI accelerators.

Together, the 24 AI-related products accounted for an estimated 6.4 per cent of world merchandise trade in 2024.[11] As in Chapter 1, this analysis uses the concept of revealed comparative advantage (RCA): an economy holds an RCA in a product if it exports more of that product than its overall share of world trade would suggest.

CHART 3.2 EBRD economies are underrepresented in exports of AI-related goods



SOURCE: CEPII (2026) (HS17 version) and authors' calculations.
NOTE: AI-related goods comprise 24 HS6 codes linked to the AI hardware supply chain. Comparators are economies above the 95th percentile of world AI-related export shares.

AI-related goods accounted for an estimated **6.4%** of world merchandise trade in 2024

By this measure, EBRD economies are underrepresented in trade in AI-related goods (see Chart 3.2). In 2024, they supplied around 8 per cent of world goods exports, but only 0.8 per cent of AI-related goods exports, and no EBRD economy holds an RCA in the AI-related basket as a whole. In contrast, Taipei China's share of exports of AI-related goods is around 9 times its share of world trade; for South Korea, this ratio is almost 4 to 1.

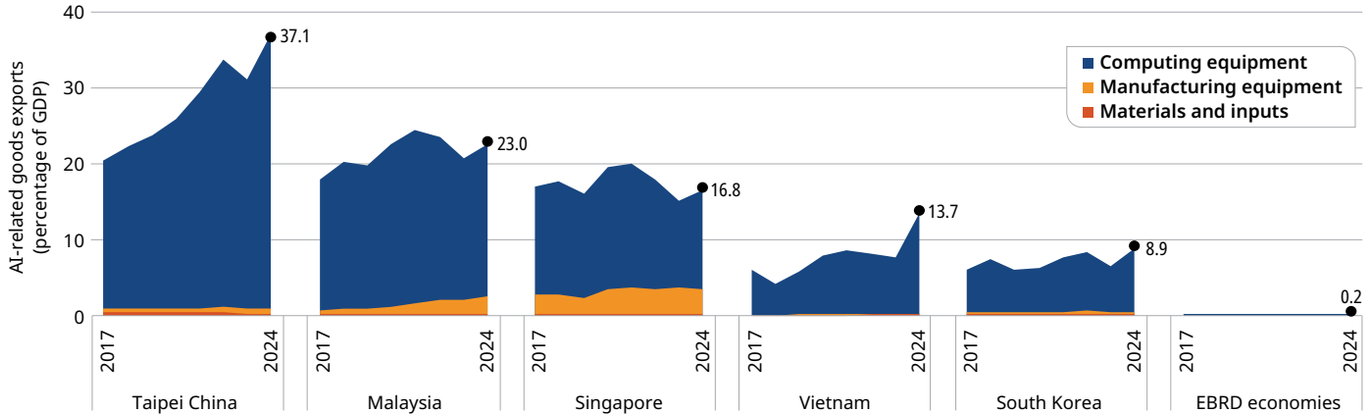
In 2024, AI-related exports in the EBRD regions amounted to 0.2 per cent of GDP, compared with 37.1 per cent in Taipei China and 8.9 per cent in South Korea (see Chart 3.3). Singapore, which ranks among the five largest economies by wafer capacity in mature logic and specialty memory chips,[12] has the highest exports of semiconductor manufacturing equipment as a share of GDP, at 3.3 per cent.

Malaysia and Vietnam specialise in hardware assembly, with AI-related exports reaching 23 per cent and 13.7 per cent of GDP, respectively, in 2024. Their leading positions were cemented by anchor investments by foreign firms. Malaysia's industry grew around Intel's Penang plant, opened in 1972 as the firm's first assembly site outside the United States.[13] In Vietnam, investments by Intel and Samsung from the mid-2000s made electronics the country's largest export sector (see Chapter 1).

Current exports also provide information on the products an economy might be able to produce in future, as discussed in Chapter 1. For each AI-related product,

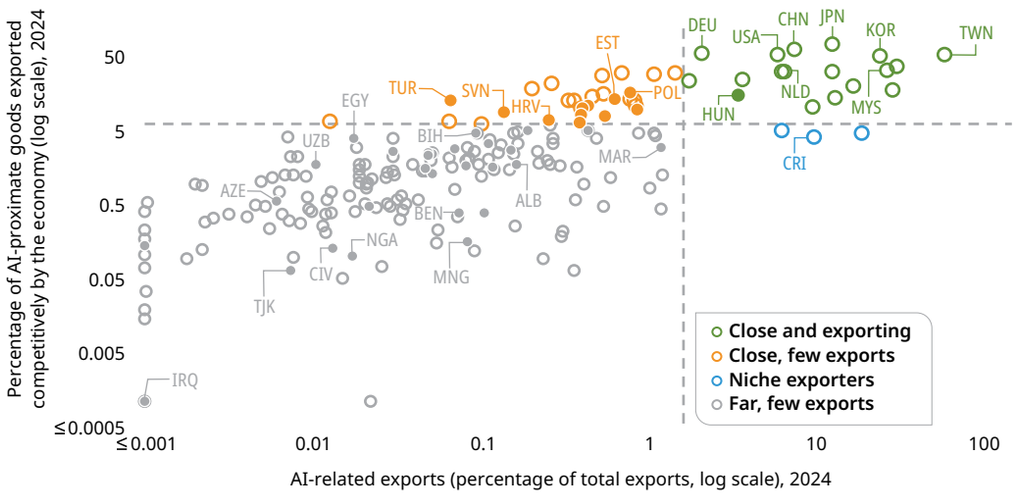
[10] See WCO (2022).
[11] Authors' calculations based on CEPII (2026) (HS17 version).
[12] See OECD (2025a).
[13] See Intel (n.d.).

CHART 3.3 Exports of AI-related goods remain small relative to GDP in EBRD economies



SOURCE: CEPII (2026) (HS17 version), IMF (2026) and authors' calculations.
NOTE: AI-related goods comprise 24 HS6 codes linked to the AI hardware supply chain. Weighted average for the EBRD regions.

CHART 3.4 Most EBRD economies export few AI-related goods and hold few proximate capabilities



SOURCE: CEPII (2026) (HS17 version) and authors' calculations.
NOTE: AI-related goods comprise 24 HS6 codes linked to the AI hardware supply chain. The product links defining each product's neighbourhood are validated against exports pooled over 2022-24 (see Box 3.1). Niche exporters are economies whose exports of AI-related goods consist largely of a single product, while few of the AI-proximate goods are exported competitively. Quadrants are split at the sample mean for each measure. Filled circles denote economies in the EBRD regions.

the analysis identifies its neighbouring or proximate products – those typically exported alongside it – and measures how much of that neighbourhood an economy already exports competitively, giving greater weight to products that are more closely linked. Higher coverage of that neighbourhood indicates that an economy has a stronger position, potentially enabling it to develop a comparative advantage in the AI-related product itself (see Box 3.1).

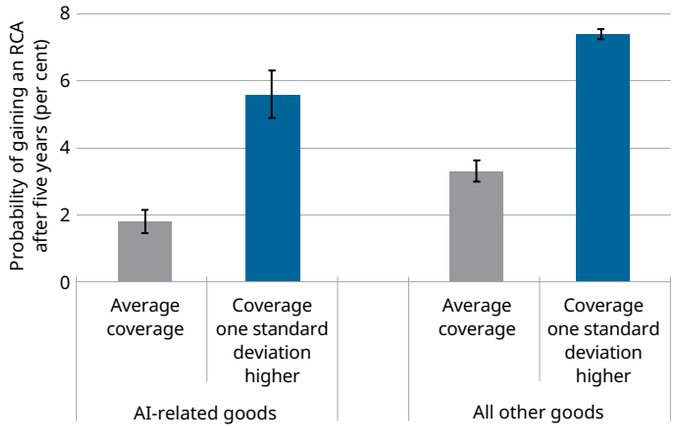
Most EBRD economies export few products that are typically exported alongside AI-related goods (see Chart 3.4 and Chapter 1). In Central Asia, eastern Europe and the Caucasus (EEC), SEMED and SSA, only 2 per cent of AI-proximate products are exported competitively, compared with a global average of 5.7 per cent. In contrast, China, Germany, Japan, South Korea, Taipei China and the United States each export competitively some 50 per cent or more of AI-proximate products.

Hungary is the only EBRD economy with sizeable AI-related goods exports and relatively high coverage of proximate products. This reflects the presence of several major foreign manufacturers: Lenovo has built servers and workstations at its Üllő plant since 2022,[14] alongside contract manufacturers such as Foxconn, Flex and Jabil. Processing units and servers (HS 847150) are Hungary's largest AI-related export line, at nearly four times the level implied by Hungary's share of world trade. Hungary is further specialised in instruments for measuring and checking semiconductor wafers and devices (HS 903082), hosting a domestic supplier in that niche, Semilab, which sells metrology and inspection tools to wafer and device manufacturers. Hungary is also a competitive exporter of related products, such as desktop computers.

Some EBRD economies that lack sizeable AI-related goods exports are already competitive in proximate products. Poland holds an RCA in complete data-processing systems (HS 847149) and desktop computers (HS 847141), while Estonia has an RCA in parts for electrical measurement instruments (HS 903090) and other precision measuring instruments (HS 903190), components closely related to semiconductor manufacturing and testing equipment.

Expertise in proximate goods more than triples the likelihood of developing an RCA in AI-related products, from 1.8 per cent to around 6 per cent (see Chart 3.5 and Box 3.1).

CHART 3.5 Economies are more likely to develop an RCA in products close to their existing capabilities, including AI-related goods



SOURCE: CEPII (2026) (HS02 version) and authors' calculations.
NOTE: Estimates are from a linear probability model relating an economy's holding of an RCA in a product five years after the baseline year to its coverage of that product's neighbourhood at baseline. The product links defining each product's neighbourhood are validated against exports over the three years up to and including the baseline year (2002-04 for a 2004 baseline, and so on). The sample pools economy-product pairs without an RCA in the baseline year with baseline years from 2004 to 2019 and products classified under HS02 throughout. The model is estimated jointly, with separate slopes for AI-related and all other goods, and includes economy-year and product-year fixed effects. AI-related goods comprise 22 HS6 codes linked to the AI hardware supply chain. Whiskers show 95 per cent confidence intervals, with standard errors clustered by economy.

AI INFRASTRUCTURE

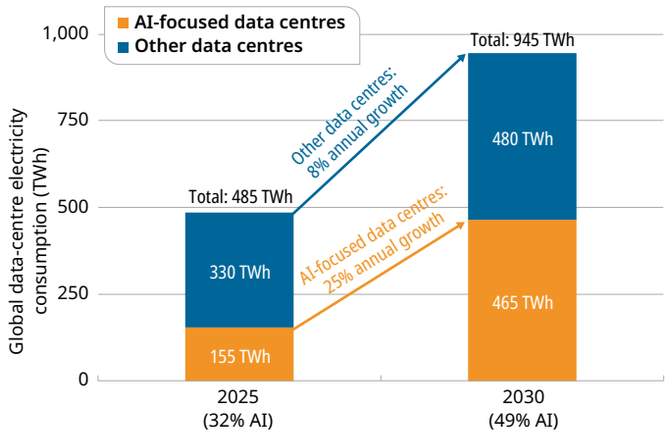
Once AI chips have been manufactured, they are assembled into servers, networked and installed in data centres in large numbers, together with the power supply, cooling technology and connectivity needed to operate them. Most installed data-centre capacity serves general-purpose cloud computing, enterprise software, data storage and streaming, running general-purpose processors and typically drawing 10-25 megawatts (MW) of power.[15]

AI-focused facilities are built around accelerated servers and are much larger, drawing around 100 MW or more, with the largest sites exceeding 1 gigawatt (GW) of power.[16] A 1 GW facility running at full load for a

Data centres consumed an estimated 485 TWh of electricity in 2025, about **1.5%** of global electricity demand

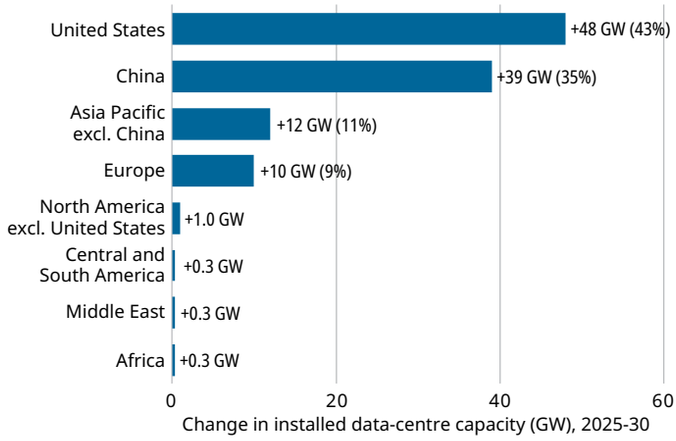
[14] See Lenovo (2022).
[15] See IEA (2025).
[16] See IEA (2025) and Epoch AI (2026d).

CHART 3.6 AI is projected to drive most of the increase in data-centre electricity demand to 2030



SOURCE: IEA (2026).
NOTE: "AI-focused data centres" refers to the electricity consumption of data centres running a large number of accelerated servers. Figures for 2030 reflect the base-case scenario of the International Energy Agency (IEA; see IEA, 2026).

CHART 3.7 Projected growth in data-centre capacity is concentrated in the United States and China



SOURCE: IEA (2026).
NOTE: This chart shows the change in total installed data-centre capacity (including cooling and auxiliary equipment) between 2025 and 2030 under the IEA's base-case scenario.

year would use more electricity than Armenia or Latvia consumes annually.[17] Training (building) AI models requires large accelerated server clusters running continuously for weeks or months without serving any users, so it can take place wherever power and land are available. In contrast, inference – where the trained AI model applies its learned patterns to new data – benefits from being near end users of the data. It can be run for smaller deployments with lower power requirements per site.[18]

Data centres consumed an estimated 485 terawatt-hours (TWh) of electricity in 2025, about 1.5 per cent of global electricity demand (see Chart 3.6). Consumption is expected to roughly double by 2030 to around 3 per cent of the global total. AI-focused facilities accounted for around a third of all 2025 data-centre demand, but are projected to drive two-thirds of the increase to 2030 as their share reaches about half of total data-centre consumption.

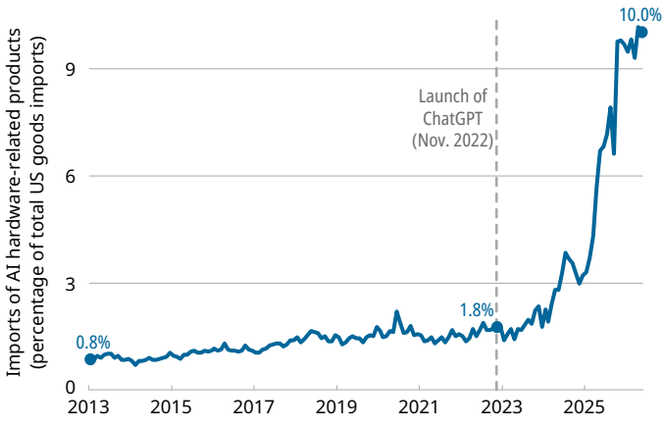
Projected growth in data-centre capacity is concentrated in the United States and China. Together, these two countries are expected to account for 78 per cent of the increase in global data-centre capacity between 2025 and 2030, while Africa, Central and South America and the Middle East are only projected to gain around 0.3 GW each over the five-year period (see Chart 3.7).[19]

The United States and China are expected to account for **78%** of the global increase in data-centre capacity

This large-scale AI build-out has been driving a rapid increase in trade in AI-related goods. Since 2018, world imports of servers and related data-processing equipment at the core of AI infrastructure have more than quadrupled.[20] In the United States, which is building more data-centre capacity than any other economy,

[17] Authors' calculations based on Ember (2026).
[18] See IEA (2025).
[19] See IEA (2026).
[20] Based on HS codes 847150, 847180 and 847330 and a balanced panel of 64 economies reporting to UN Comtrade in every quarter. See United Nations (2026).

CHART 3.8 AI hardware-related products now account for around 10 per cent of US goods imports



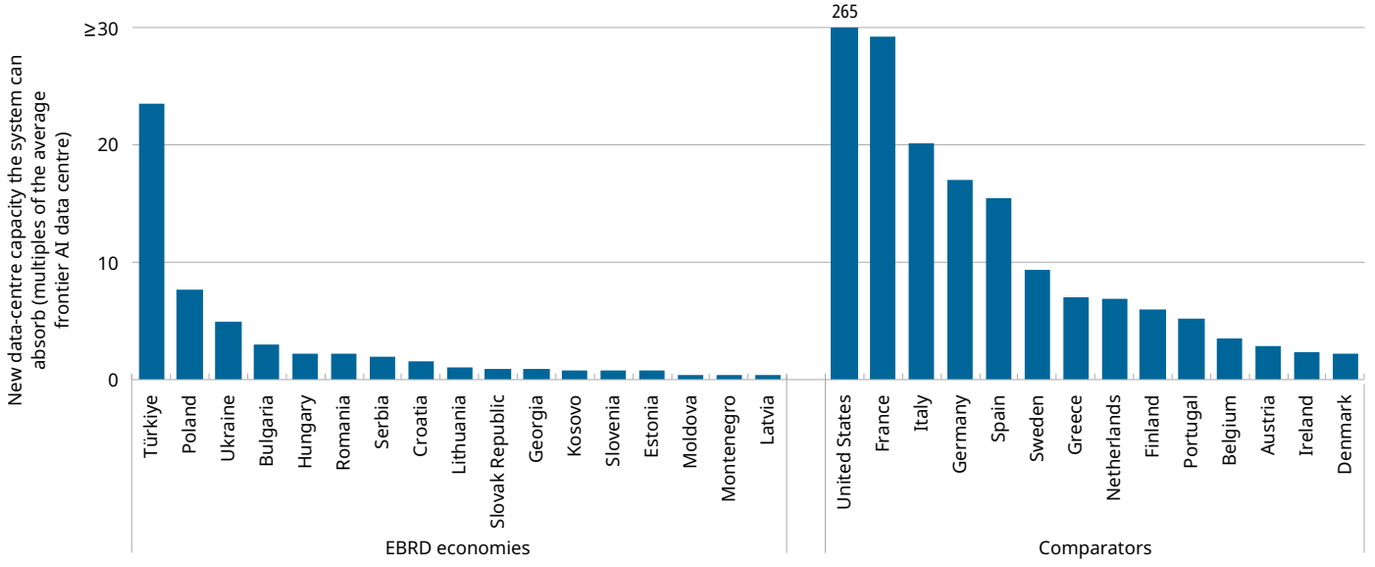
SOURCE: US Census Bureau (2026) and authors' calculations.
NOTE: Based on servers and processing units (8471.50.0150), server and GPU boards (8473.30.1180) and accelerator cards (8471.80.4000).

Close to 80% of European data-centre operators cite access to electricity as their biggest challenge over the next three years

imports of AI hardware-related products now account for around 10 per cent of total imports of goods, up from less than 2 per cent before the launch of ChatGPT (see Chart 3.8).[21]

Siting a large data centre involves balancing considerations related to energy supply, the local network, the availability of land and a skilled workforce, construction costs, environmental conditions and community relations.[22] Access to electricity is increasingly becoming the binding constraint: close to 80 per cent of European data-centre operators cite it as their biggest challenge over the next three years, with connection lead times running from a few years to more than a decade in congested markets.[23]

CHART 3.9 Most power systems in the EBRD regions have limited headroom for large AI data centres



SOURCE: EIA (n.d.), ENTSO-E (2026b), EPİAŞ (2026), IEA (2025), Epoch AI (2026d) and authors' calculations.
NOTE: This chart shows the number of average frontier data centres (262 MW) that a country's electricity system could accommodate without raising peak demand, provided the data centre pauses during the busiest 1 per cent of hours, based on hourly electricity demand over the 2019-25 period. Data start later for Georgia (December 2021), Kosovo (June 2021) and Moldova (January 2020). Ukraine data cover the period from 2019 to early 2022.

[21] See US Census Bureau (2026).
[22] See Arciniegas Rueda et al. (2026).
[23] See ENTSO-E (2026a).

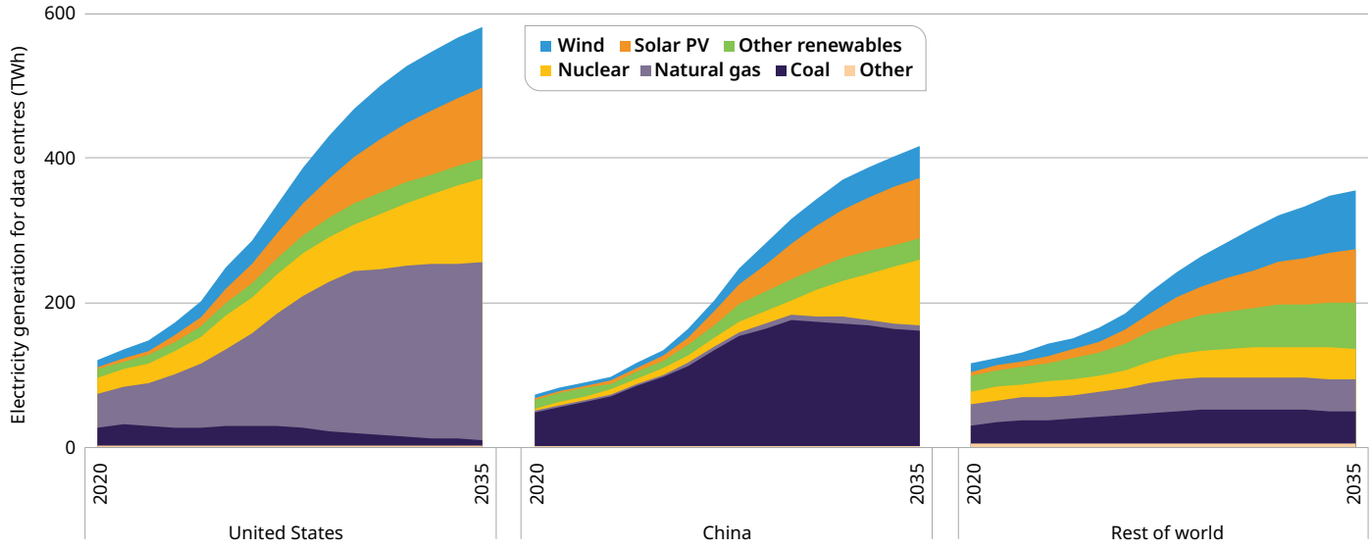
The following analysis estimates how much new data-centre load each economy's power system could take on today, based on hourly electricity demand over the period 2019-25. It assumes that the data-centre facility pauses during the busiest 1 per cent of hours (roughly 88 hours a year).[24] At these times, it could run on batteries or backup generation, or shift computing elsewhere. Otherwise, it is assumed not to raise peak demand (the 99.99th percentile of each country's hourly demand over the 2019-25 period). Estimates of spare capacity are expressed in multiples of the average frontier AI data centre (262 MW).[25] The analysis abstracts from additional bottlenecks that may arise in transmission and any future capacity additions.

The estimated power-supply headroom varies from economy to economy (see Chart 3.9). Türkiye could accommodate roughly 23 frontier AI data centres, comparable to spare capacity in the largest western European markets; Poland could take around eight. Nearly half of the EBRD economies covered could not accommodate a single frontier AI data centre without raising peak load. By comparison, headroom in the United States is around 69 GW, equivalent to around 265 such data centres.

Meeting the resulting electricity demand will require a broad mix of generation capacity. Renewables are expected to supply nearly half of the increase in global data-centre electricity demand to 2030, while natural gas and coal will account for over 40 per cent. The use of fossil fuels reflects the need for reliable round-the-clock power supply when wind and solar output is low and storage capacity remains limited. The mix differs sharply across markets: demand is predominantly gas powered in the United States and coal powered in China (see Chart 3.10).

Renewables are expected to supply nearly
HALF
of the increase in global data-centre electricity demand to 2030

CHART 3.10 Data-centre electricity is set to rely on a mix of gas, coal, renewables and nuclear-powered generation



SOURCE: IEA (2025) and authors' calculations.
NOTE: Electricity generation for data centres by fuel source is based on the IEA's base-case scenario. "Rest of world" is calculated as global generation net of the United States and China.

[24] See IEA (2025).
[25] Calculations are based on Epoch AI (2026d).

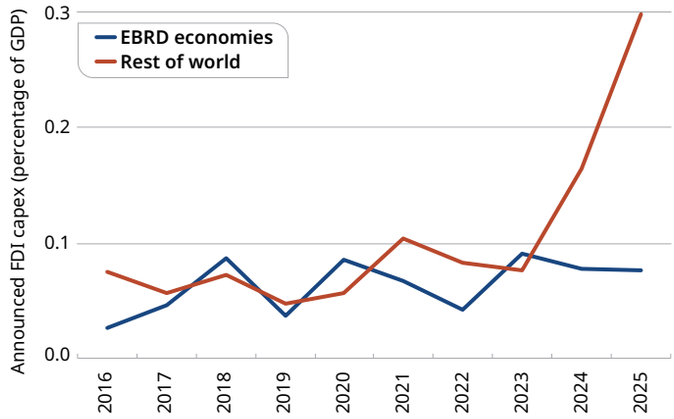
Grid constraints are also changing how that power is supplied. Data centres can be completed in two to three years, much faster than major transmission infrastructure, and estimates suggest that grid constraints could delay around 20 per cent of planned global capacity to 2030.[26] Developers are responding by locating data centres in places where power is readily available and pairing computing capacity with dedicated generation (including co-located renewables and, particularly in the United States, on-site gas). Technology companies are also securing nuclear and geothermal power through long-term agreements.[27] For instance, WBS Power plans to develop a 3.2 GW data-centre campus in Choczewo, Poland, in four phases, with the first part expected to begin operating in 2028-29. The proposed site is close to a major substation and the planned location for Poland's first nuclear power plant.[28]

Efficiency gains could ease grid constraints: faster progress on chips, software and data-centre design relative to AI demand could allow data centres to deliver the same services in 2035 using more than 15 per cent less electricity than is currently projected.[29] Well-integrated data centres can also support the wider energy system. Backup batteries can provide grid flexibility, while waste heat can be channelled to nearby buildings or district heating networks.[30]

At a global level, cross-border data-centre investment has accelerated sharply since 2023, to an average of 0.3 per cent of GDP per year based on data on the capital expenditure of announced projects (see Chart 3.11).[31] However, in the EBRD regions, announced cross-border capital expenditure has remained relatively stable since 2018, at 0.07 per cent of GDP.

Data centre-related FDI is unevenly distributed across the EBRD regions (see Chart 3.12). SSA is the largest recipient, at a cumulative US$ 9.7 billion (€8.6 billion) between 2019 and 2025, followed by EBRD economies in the EU (US$ 7.8 billion, or €6.9 billion) and SEMED (US$ 5.1 billion, or €4.5 billion). Over the same period, Türkiye, EEC and Central Asia each attracted between US$ 1.2 billion (€1.1 billion) and US$ 1.5 billion (€1.3 billion). North American investors supply roughly

CHART 3.11 Global investment in data centres has risen sharply, but EBRD economies have largely missed the surge



SOURCE: fDi Markets (2026), IMF (2026) and authors' calculations.
NOTE: Based on weighted averages across 41 economies in the EBRD regions and all other economies in the rest of the world.

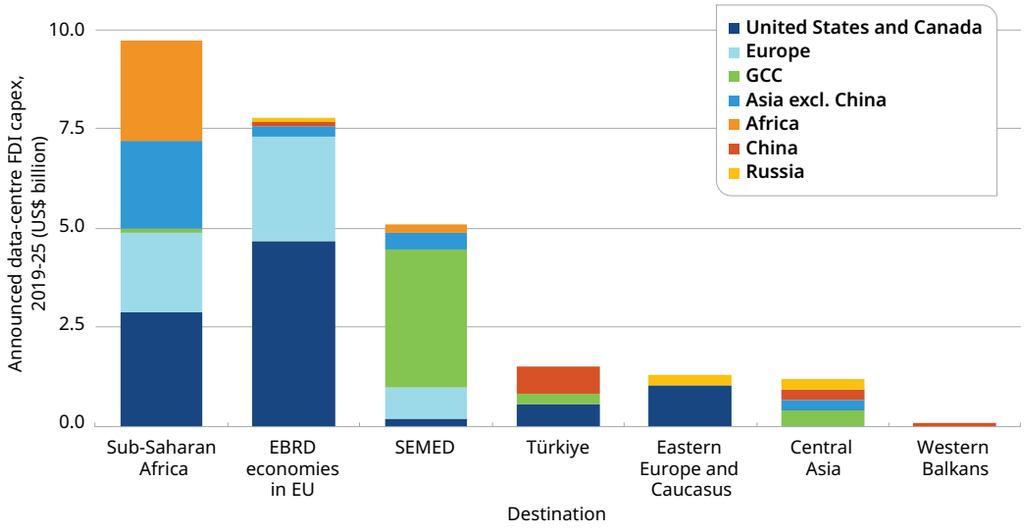
Among EBRD regions, SSA is the largest recipient of data-centre FDI, at a cumulative US$ 9.7 BILLION between 2019 and 2025

three-fifths of the capital directed to EBRD economies in the EU, while investors from Gulf Cooperation Council states provide the largest share in SEMED. Box 3.2 looks in more detail at the opportunities and challenges facing EBRD economies in SSA when it comes to the global AI economy.

Local economic gains from hosting data centres are estimated to be modest relative to the capital invested. Some studies identify employment and wage increases following data-centre expansion in the United States, concentrated in metropolitan areas and facilities owned by large technology firms.[32] Others find limited effects, with the creation of a typical data centre being associated with 100-200 additional local jobs and no significant effect on wages.[33] Greater data-centre capacity may

[26] See IEA (2025).
[27] See IEA (2025 and 2026).
[28] See WBS Power (2026).
[29] See IEA (2026).
[30] See Yuan et al. (2025).
[31] Authors' calculations based on fDi Markets (2026) and IMF (2026).
[32] See Alvarez et al. (2026) and Yue and Zeng (2026).
[33] See Bahar and Wright (2026a and 2026b).

CHART 3.12 Data-centre investment in the EBRD regions is concentrated in SSA and EBRD economies in the EU



SOURCE: fDi Markets (2026) and authors' calculations.
NOTE: Capital expenditure includes estimated values.

also support exports of cloud, hosting and data-processing services, although evidence on this channel's size remains limited. The computing capacity needed for AI can be provided as a cloud service and traded across borders, but competitiveness depends on connectivity, financing costs, reliable electricity, regulation and trust, as well as the scale and cost of the computing capacity itself.[34]

Domestic data-centre capacity can further reduce latency for applications requiring rapid response times, allow sensitive data to be stored or processed domestically[35] and enable hosting economies to retain some control over how AI is deployed.[36]

These potential economic and security gains must be weighed against the pressure on power systems and the environmental costs involved. The evidence on electricity prices is mixed: some studies find higher local costs after data-centre entry, while others show that historical data-centre growth has lowered average retail rates by spreading the system's fixed costs over a larger customer base.[37] One estimate puts the annual public-health and climate damage from air pollution and greenhouse gas emissions associated with US data-centre electricity use at around US$ 25 billion (€21.5 billion), varying by region according to the power source involved.[38] Water use is a further concern: by 2030, global AI data centres are projected to consume water equivalent to the basic annual domestic needs of all African countries south of the Sahara (1.3 billion people).[39]

PRODUCING AI KNOWLEDGE

Until the early 2010s, AI knowledge was generated mainly in universities by small research groups whose methods and results were published. Today, training a state-of-the-art model involves a single run costing hundreds of millions of US dollars and a limited pool of specialised researchers, placing it beyond the reach of universities and most firms.[40] Production of frontier AI

North American investors supply about **THREE-FIFTHS** of total data centre-related FDI in EBRD economies in the EU

[34] See Lokshin (2026).
[35] See Ferracane, González Ugarte and Rogaler (2025) and the "Policy and regulation" section of this chapter.
[36] See Meinhardt et al. (2026).
[37] See Alvarez et al. (2026), Yue and Zeng (2026) and Watten, Bistline and Blanford (2026).
[38] See Muller (2026).
[39] See Aczel et al. (2026).
[40] See Epoch AI (2026a).

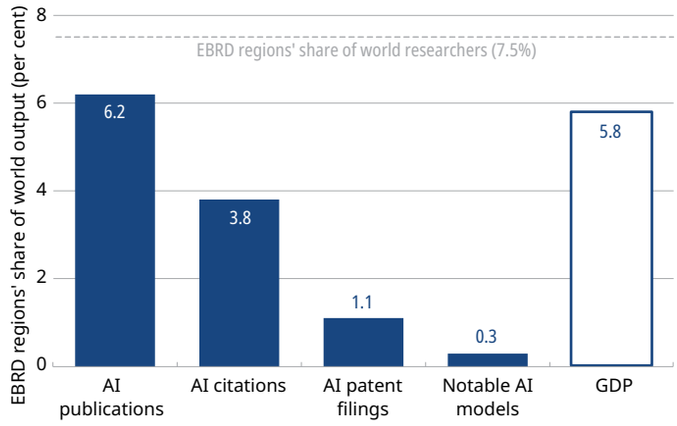
knowledge has become concentrated in a small number of corporate laboratories.[41]

EBRD economies' participation in AI knowledge production becomes more limited in areas where output is more capital intensive (see Chart 3.13). The EBRD regions' share of the world's AI research articles, at 6.2 per cent, falls short of their 7.5 per cent share of the world's researchers, and those articles' share of total citations is even smaller. The EBRD regions' share of AI patent filings is smaller still and their share of frontier AI models is almost zero: of 920 notable AI models released since 2010, only two involved a developer based in the EBRD regions, both at the Jagiellonian University in Poland. This concentration persisted in 2025, when 63 of 106 notable models came from US-based developers and 35 from China, against two from Europe. What is more, over 95 per cent came from industry rather than academia.[42]

The terms on which these models are made available to users in other economies may prove more favourable than the current concentration of production suggests. Open-weight models[43] have narrowed the performance gap to leading proprietary systems, driven most recently by Chinese developers such as Z.ai and Moonshot AI. Model capability may yet become a commodity (an input where suppliers compete on price because their products are close substitutes).[44] For instance, the chief executive of Mistral, Europe's largest AI model developer, has argued that the market is too large for any single provider to dominate.[45]

Should that view prove correct, competition would erode some of the rents currently earned in model production, with some of the surplus passing downstream to firms that apply models to products and services. Gains from AI would then depend primarily on the capacity of firms and workers to use AI rather than on economies' capacity to build frontier models.

CHART 3.13 EBRD economies are better represented in AI research than in AI patents and frontier models



SOURCE: CSET ETO (n.d.), Google Patents (n.d.), Epoch AI (2026a), UNESCO UIS (n.d.), IMF (2026), World Bank (n.d.a), OECD (2025b) and authors' calculations.
NOTE: AI publications are AI research articles attributed to economies through author affiliations. AI citations are the forward citations those articles receive. AI patent filings are Patent Cooperation Treaty applications, de-duplicated to one per patent family, with at least one inventor based in an EBRD economy and flagged as AI related in line with OECD (2025b). Notable AI models are landmark AI models with at least one developer organisation based in an EBRD economy. Publications, citations and notable AI models are summed over 2016-25 and patent filings over 2016-24, dated by the year of first filing. GDP is EBRD economies' share of world GDP in 2025 at market exchange rates in current US dollars. EBRD economies' share of the world's researchers compares the latest available figure for each EBRD economy with the sum of the latest available figures for all economies with data.

THE MARKET FOR END USER-FACING AI APPLICATIONS IS FLOURISHING

AI-based software and services sold to end users are the most downstream layer of the AI production chain. The analysis of that market segment in this section is based on July 2026 firm-level data from Dealroom, a data provider covering both listed and private startups and technology companies.[46] Firms are assigned to AI production stages using a large language model, with manual checks for big companies.[47]

Application-layer firms build products, tools or services powered by AI models, rather than a single upstream component. Because they depend heavily on the quality of models and infrastructure built upstream, their market entry was limited until 2022, but it rose sharply once commercial-grade generative AI became available.

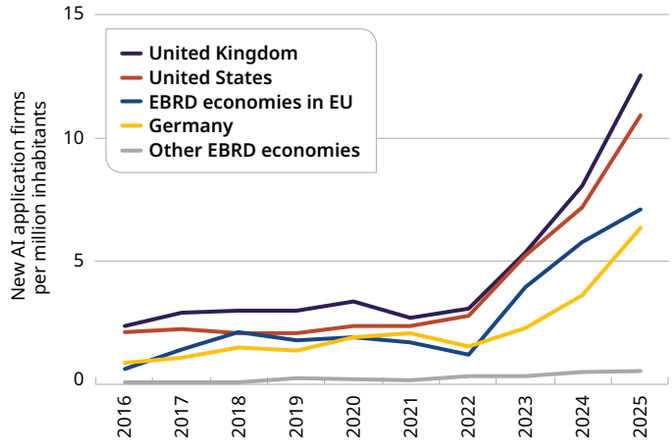
[41] See Ahmed, Wahed and Thompson (2023).
[42] See Epoch AI (2026a).
[43] Open-weight models are trained AI models whose parameters ("weights") are made publicly available, allowing third parties to run and often fine-tune the model on their own infrastructure, even though the training data, code or methodology may not be disclosed.
[44] See Demirer, Fradkin and Tadelis (2026).
[45] See The Economist (2026).
[46] See Dealroom (n.d.).
[47] The approach employed builds on Rishabh and Shreeti (2026); see Box 3.1 for methodological details.

In advanced comparators, such as Germany, the United Kingdom and the United States, the founding rate rose by around 70 per cent, on average, between 2022 and 2023 alone and roughly fourfold from 2021 to 2025.

Activity varies widely across the EBRD regions, broadly in line with income levels: in 2025, the average EBRD economy in the EU saw 7.1 new AI application firms per million inhabitants, roughly 13 times the average across other economies in the EBRD regions (see Chart 3.14). The Baltic states stand out: Estonia recorded roughly 40 new AI application firms per million people in 2025, surpassing the United Kingdom and the United States, while Lithuania (11) and Latvia (7) both placed above the 80th percentile of the cross-country distribution of newly founded AI application firms per capita.[48] This pattern mirrors the stronger startup ecosystems in those economies (see Chapter 4).[49]

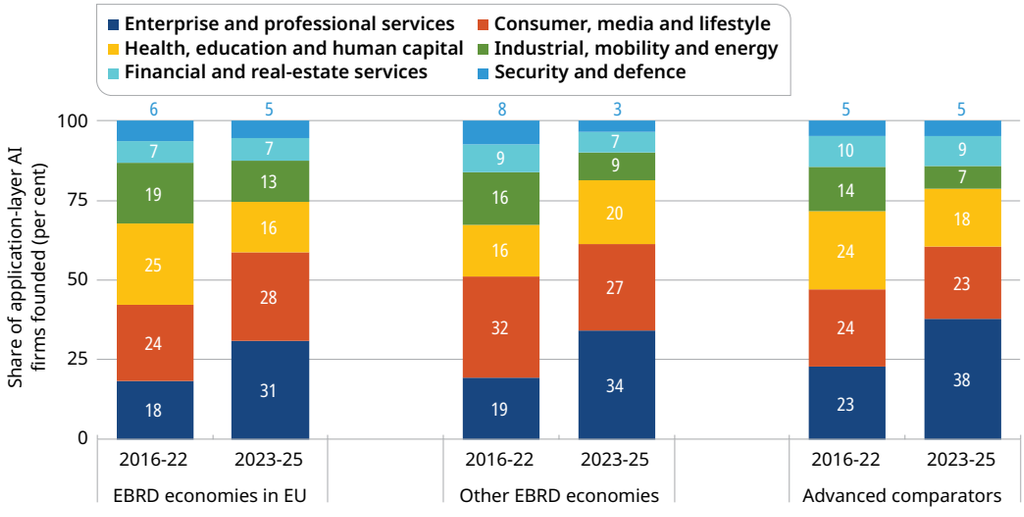
The sectoral mix of AI applications is broad (see Chart 3.15). The share of new firms targeting enterprise and professional services increased from about a fifth in 2016-22 to about a third in 2023-25. While many of these firms remain young and small, some have already scaled up, including Insider, a Turkish AI marketing platform, and Veriff, an Estonian identity verification company.

CHART 3.14 Firms building AI applications are proliferating, but most EBRD economies create few such firms



SOURCE: Dealroom (n.d.), World Bank (n.d.a) and authors' calculations.
NOTE: "EBRD economies in EU" comprises Bulgaria, Croatia, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, the Slovak Republic and Slovenia. Group averages are unweighted averages across economies. Application-layer AI firms are identified using a large language model-based classification (see Box 3.1).

CHART 3.15 For AI application firms, enterprise and professional services are the fastest-growing end market



SOURCE: Dealroom (n.d.) and authors' calculations.
NOTE: AI application firms with no Dealroom industry tag are omitted. "Advanced comparators" comprises Canada, France, Germany, the United Kingdom and the United States. AI application firms are identified using a large language model-based classification (see Box 3.1).

[48] Based on data for 98 economies with at least one AI application firm founded since 2016.
[49] See Rishabh and Shreeti (2026).

The combined valuation of AI application firms in the EBRD regions stood at around US$ 11 billion (€9.6 billion) in 2026, based on market capitalisation for publicly listed firms and the most recent post-money valuation for private firms. The largest and most valuable AI application firms are mostly US-based: the top 1 per cent globally by valuation account for around 90 per cent of the segment's total valuation.

AI FIRMS ACROSS THE SUPPLY CHAIN

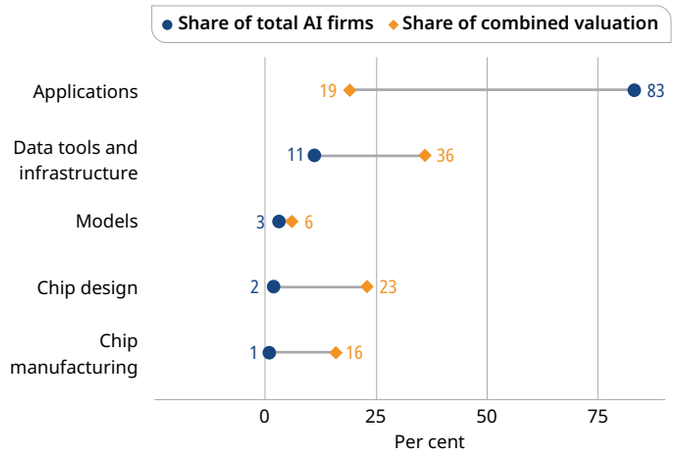
AI applications are a less concentrated market segment than AI-related hardware, with lower barriers to entry. Across the 91 economies covered in Dealroom, applications account for 83 per cent of firms, but only 19 per cent of their combined valuation (see Chart 3.16). In contrast, data tools and infrastructure providers account for 11 per cent of firms, but 36 per cent of valuation, while chip design and manufacturing account for a combined 39 per cent of valuation but only 3 per cent of firms – reflecting the high entry barriers, substantial fixed costs and economies of scale that characterise the upstream layers.[50]

The top
1%
of AI application firms globally by valuation account for around
90%
of the segment's total valuation

Advanced chip manufacturing or frontier-model training requires investment and capabilities that few economies can sustain. More realistic opportunities for new entrants lie in manufacturing niches and downstream activities: supporting application firms serving domestic and regional markets and supplying the skills, connectivity, data access and risk capital they need. Consequently, for most economies in the EBRD regions, larger gains from AI are likely to come from using the technology rather than producing it.

AI applications account for
83%
of firms, but only
19%
of their combined valuation

CHART 3.16 More than four-fifths of AI firms build applications, but value is concentrated upstream in infrastructure and chips



SOURCE: Dealroom (n.d.) and authors' calculations.
NOTE: The sample comprises AI supply-chain firms carrying a valuation in 91 economies (including 32 economies in the EBRD regions). See Box 3.1 for details of the methodology.

[50] See Gambacorta and Shreeti (2025) and Korinek and Vipra (2025).

AI ADOPTION

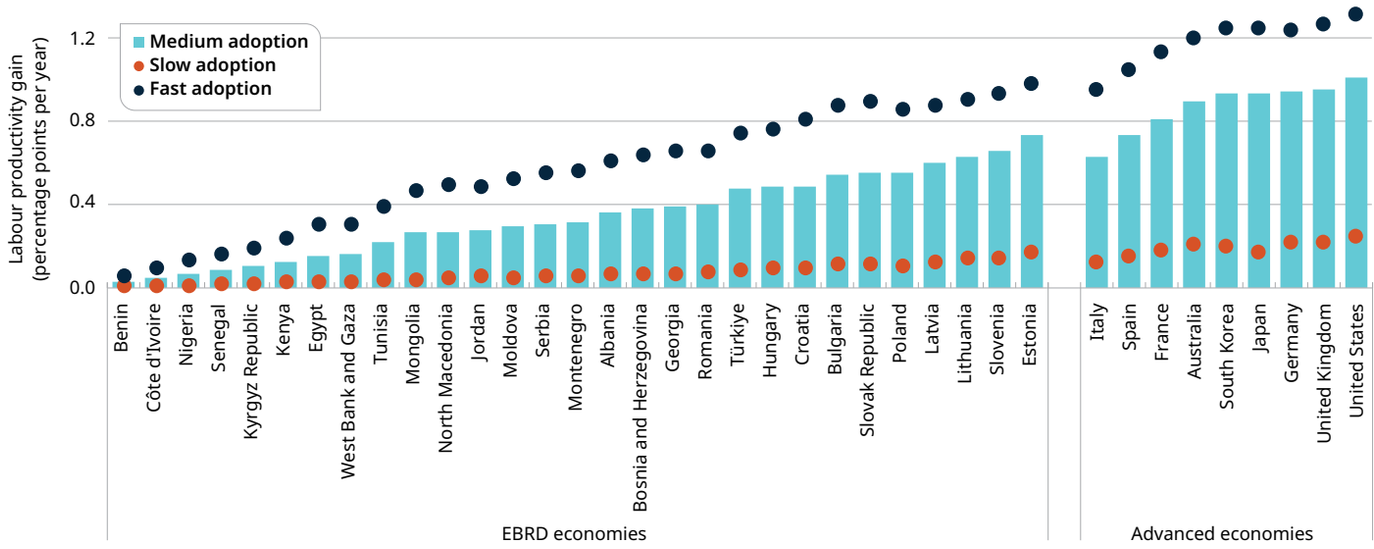
UNEVEN GAINS FROM AI

Experimental studies demonstrate sizeable productivity gains from using AI to complete specific tasks, such as professional writing, copy editing and software development. In customer support, productivity gains are estimated at around 15 per cent, with larger gains for less experienced workers.[51] Whether these translate into economy-wide gains depends on how many tasks AI can improve, how quickly and widely firms adopt it, and how much weight the benefiting activities carry in national output in the future.[52]

The following analysis combines three elements to estimate potential labour productivity gains from AI adoption in EBRD economies: a 30 per cent productivity gain when AI suits a task well (from experimental evidence); the share of each sector's tasks that AI can meaningfully accelerate; and a projected diffusion of intensive AI use over the next decade, following the adoption paths of earlier general-purpose technologies – slow, medium and fast scenarios benchmarked to electricity, the internet and mobile phones, respectively. Gains are weighted by sector value-added shares and converted into labour productivity effects (see Box 3.1).

Under the medium adoption scenario (modelled on the diffusion of the internet), AI could add around 0.03-0.7 percentage points (pp) to annual labour productivity growth across the EBRD regions over the coming decade (see Chart 3.17). Under the slow adoption scenario, gains remain below 0.2 pp a year in all EBRD economies, while under the fast adoption scenario (modelled on mobile phones), gains exceed 0.5 pp, on average, and approach 1 pp in the Baltic states and Slovenia. Estimated gains are much smaller in lower-income economies in Central Asia, SEMED and SSA.

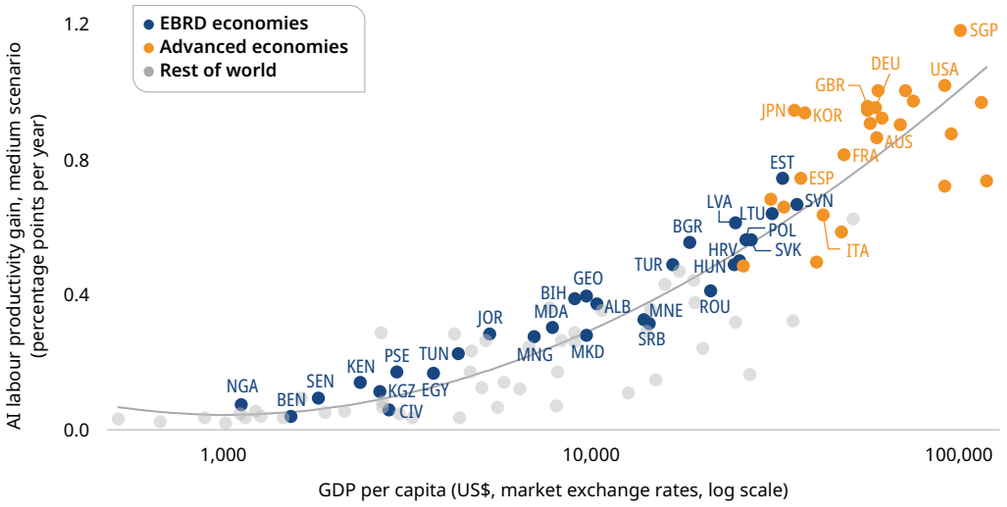
CHART 3.17 AI could add most to labour productivity in higher-income economies



SOURCE: Filippucci et al. (2025), OECD (2022), United Nations Statistics Division (n.d.), ILO (n.d.) and authors' calculations.
NOTE: This chart shows AI's contribution to annual labour productivity growth over a 10-year horizon. Adoption is assumed to follow an S-shaped path under each scenario. See Box 3.1 for details of the methodology.

[51] See Noy and Zhang (2023) and Brynjolfsson, Li and Raymond (2025).
[52] See Acemoglu (2025).

CHART 3.18 Estimated AI productivity gains rise with income



SOURCE: Filippucci et al. (2025), OECD (2022), United Nations Statistics Division (n.d.), ILO (n.d.), IMF (2026) and authors' calculations.
NOTE: Estimated under the medium adoption scenario (see Chart 3.17). The fitted line is a cubic polynomial in logged GDP per capita.

Globally, the estimated productivity gains from AI adoption rise strongly with income (see Chart 3.18), reaching around 0.6-1 pp a year in several advanced economies. Richer economies tend to have more employment in occupations and sectors such as professional services and finance, where generative AI can assist with a meaningful share of tasks.[53]

AI may, therefore, widen rather than narrow productivity differences. Without faster adoption and complementary investment, economies with the most ground to make up stand to gain least.

UNDERSTANDING AI ADOPTION

The effective rate of AI adoption depends on how many people or firms use AI, how often they use it and for what tasks, and how deeply the use of AI is integrated into workflows. Recent worker and firm surveys that shed light on these aspects are limited to the United States and selected European countries.[54] This section relies on usage data from AI model providers across the EBRD regions to shed light on various dimensions of AI adoption.

Intensive generative AI use is greater in economies where the conditions for AI adoption are assessed as being more favourable (see Chart 3.19). In this analysis, the intensity of AI adoption reflects each economy's share of global Claude.ai usage relative to its share of the global working-age population, while the AI Preparedness Index spans digital infrastructure, skills, innovation and regulation in the area of AI.[55]

Cross-country differences suggest comprehensive AI adoption does not materialise automatically as frontier AI capabilities improve. Most economies in the EBRD regions are assessed as having little AI preparedness and limited use of AI, with notable exceptions. In Estonia, for instance, usage is approaching advanced-economy levels.

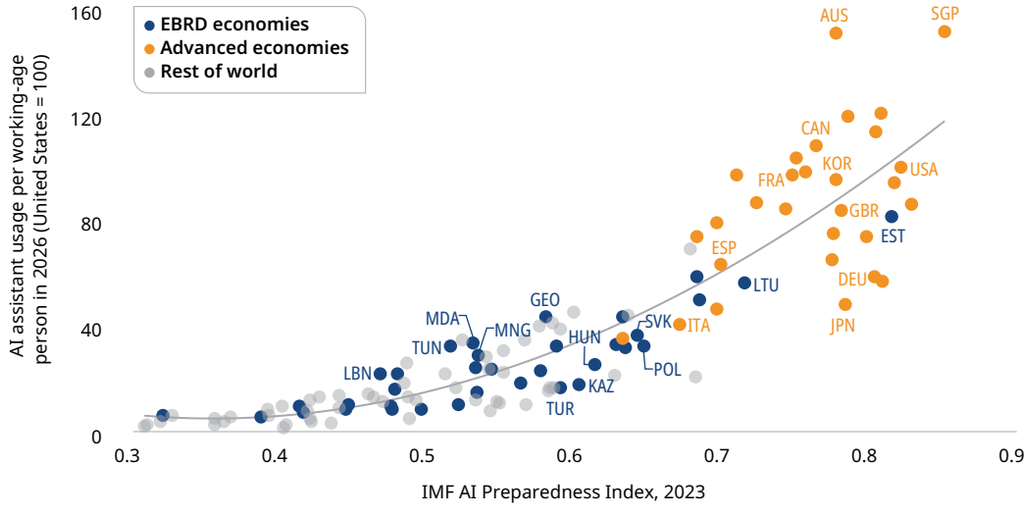
AI AND WORKERS: EARLY EVIDENCE

Technological advances have long raised concerns about worker displacement. The patterns of such displacement tend to be complex: technology automates some tasks while raising demand for others and creating new ones. Unlike industrial robots and earlier waves of IT automation, generative AI reaches directly into knowledge-intensive work – writing, coding and data analysis – and its rapidly improving capabilities may leave workers with less time to adjust to technological change.

So far, evidence does not point to widespread job losses, though studies remain concentrated in advanced economies, and AI's effects are difficult to separate from

[53] See Cazzaniga et al. (2024).
[54] See Bick et al. (2026) for international survey evidence on these countries.
[55] See Cazzaniga et al. (2024).

CHART 3.19 AI assistant usage and AI preparedness track each other closely



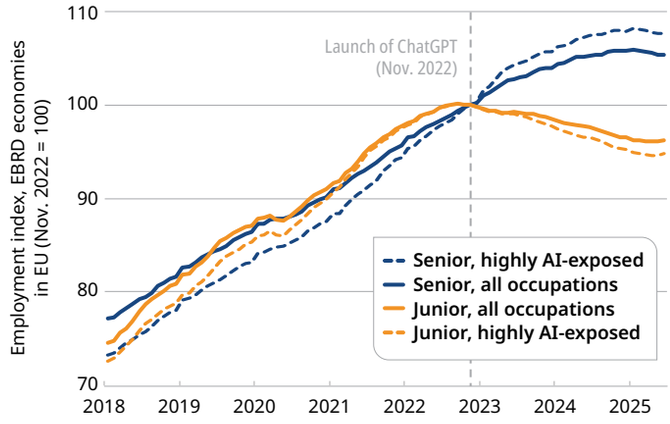
SOURCE: Anthropic (2026), Cazzaniga et al. (2024) and authors' calculations.
NOTE: AI assistant usage is each economy's share of global Claude.ai usage relative to its share of the global working-age population, rebased so that the United States equals 100. The fitted line is a cubic polynomial in the AI Preparedness Index.

other labour-market changes. US payroll data show no economy-wide displacement, but employment among 22- to 25-year-olds in highly AI-exposed occupations is now 19 per cent below where it would have been had it grown in line with employment in less exposed occupations. This gap largely reflects weaker hiring of junior staff once firms have integrated generative AI, detected in firm-level studies. Other studies, including from Norway, find little or no effect; remote working may also explain part of the decline in junior hiring.[56] The analysis that follows uses employment histories compiled by Revelio Labs from online professional profiles to examine whether similar patterns are emerging in EBRD economies in the EU, comparing employment trends among junior and senior workers.[57]

Since late 2022, junior employment in EU economies in the EBRD regions has lagged senior employment overall, more so among the most AI-exposed occupations (see Chart 3.20 and Box 3.1). However, the patterns are descriptive and factors other than AI may have contributed to this divergence.

It remains too early to assess AI's long-term impact on labour markets and hierarchies. Junior workers often perform the codified tasks that AI can most readily automate, and reducing new recruitment is easier than cutting existing jobs. At the same time, younger workers tend to learn faster; with the help of AI, they can learn

CHART 3.20 Since access to generative AI spread in 2022, junior employment has lagged senior employment, especially in AI-exposed occupations



SOURCE: Revelio Labs (2025), Eurostat (2026b), Eloundou et al. (2024) and authors' calculations.
NOTE: Unweighted average across the EBRD economies in the EU, adjusted for population growth. Solid lines cover all occupations, while dashed lines cover the top quintile of occupations by exposure to AI.

to perform more complex tasks.[58] Policy can steer AI development and adoption towards technologies that augment rather than replace workers, while supporting reskilling for those displaced by automation. In healthcare, for example, public procurement and training can encourage the use of AI tools that expand the range of tasks performed by nurses and technicians.

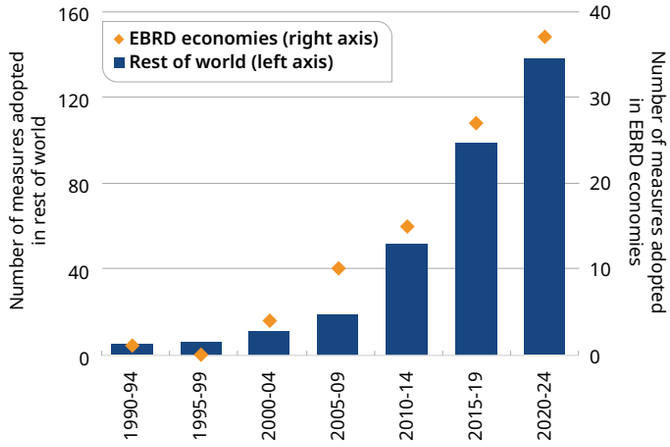
[56] See Brynjolfsson, Chandar and Chen (2026), Hosseini and Lichtinger (2026), Facius and Iacono (2026) and Lambert and Schindler (2026).
[57] See Revelio Labs (2025).
[58] See Acemoglu, Autor and Johnson (2026).

POLICY AND REGULATION

AI is a new general-purpose technology with far-reaching implications for data rights, labour markets and geopolitics. A country's influence over AI governance depends on the size of its market, its control over critical technologies and supply chains, its technological capabilities and its ability to enforce rules.[59]

Governments retain considerable authority over data governance, privacy and intellectual property, and over education and labour markets. Network connectivity and conventional data-centre siting remain largely within domestic control, while computing capacity is typically located outside an economy's borders and depends on concentrated global supply chains and large-scale investments. Governments also retain control over procurement of AI-based services domestically, while AI security and export controls are matters requiring international coordination.

CHART 3.21 The number of data localisation measures being adopted has increased dramatically since 2000



SOURCE: Ferracane, González Ugarte and Rogaler (2025) and authors' calculations.
NOTE: Countries adopting multiple measures are counted more than once. EU-wide measures are excluded. Data capture policy adoption, not the stringency or enforcement of measures.

DOMESTIC GUARDRAILS AND CAPACITY BUILDING

Governments are increasingly seeking more control over how data are collected, stored, processed and transferred. Data localisation measures – explicit requirements that data be stored or processed within a territory – have proliferated since the early 2000s, including in the EBRD regions (see Chart 3.21). Latvia was the first EBRD economy to require data to be stored locally, in 1992, followed by Estonia, Kazakhstan and Tunisia in 2004. Such measures can strengthen control over data handling, but may raise the cost of cloud access and AI adoption for domestic firms.

Safe cross-border data flows could be facilitated by interoperable privacy rules, secure transfer channels and safeguards tailored to sensitive sectors. Within economies, effective data use could be supported by AI-ready public datasets, data-sharing frameworks, controlled access for researchers and clear lines of responsibility for AI-assisted government decisions. Governments should also provide clear rules on copyright, data ownership and the status of AI-generated content, reducing uncertainty for both creators and adopters of AI.

Many AI models, however, are trained primarily on data from a small number of countries and in a limited set of languages, restricting their effectiveness in local contexts. Governments can help to close these gaps by supporting local-language datasets, sovereign AI infrastructure and open foundation models. Examples include Poland's PLLuM and Kazakhstan's KazLLM, which aim to improve AI performance in local languages and strengthen digital sovereignty.[60]

Better supporting infrastructure, including broadband internet, access to cloud services and data centres, reliable power grids and effective cybersecurity, can further help businesses, schools and governments to develop and use AI-based solutions. Transparency regarding available grid capacity can make the planning of data-centre projects more effective. Following a 2024 EU reform requiring the disclosure of available grid capacity, the European Network of Transmission System Operators for Electricity (ENTSO-E) and the EU

[59] See Bradford (2012) and Farrell and Newman (2019).

[60] See NASK NLP Research Group (n.d.) and Institute of Smart Systems and Artificial Intelligence (n.d.).

Distribution System Operator (DSO) Entity launched Capacitypedia in 2026 as a single access point for national hosting-capacity information.[61]

AI infrastructure can be coordinated across borders. For instance, the EU's InvestAI initiative aims to mobilise €200 billion for AI investment, including a €20 billion fund for large AI "gigafactories", alongside smaller AI "factories" where several countries pool computing power and expertise. Bulgaria, Lithuania, Poland, Romania and Slovenia have been selected to host AI factories, with smaller "antenna" sites planned for Hungary, Latvia, Moldova, North Macedonia, Serbia and the Slovak Republic.[62] In Africa, Cassava Technologies is partnering with NVIDIA to build similar AI factories in Egypt, Kenya, Morocco, Nigeria and South Africa.[63]

Human capital is equally important for the effective rollout of AI.[64] Analysis based on data from a recent representative household survey, the EBRD's Life in Transition Survey, suggests that basic digital proficiency remains lower in the EBRD regions than in Germany, even among young cohorts.[65] Training curricula and sectoral skills standards will need to be updated to reflect changing skills needs, complemented by on-the-job learning. Labour-market policies must also help workers adapt to changing occupational demand through retraining, job-search assistance and career guidance.

Several economies in the EBRD regions are piloting universal AI access. Estonia's AI Leap, combining student access with teacher training, is the most advanced example (see Box 3.3). However, returns to AI will depend less on access than on the capacity to use it effectively: schools need trained teachers, local-language content, data safeguards and evidence on what works.

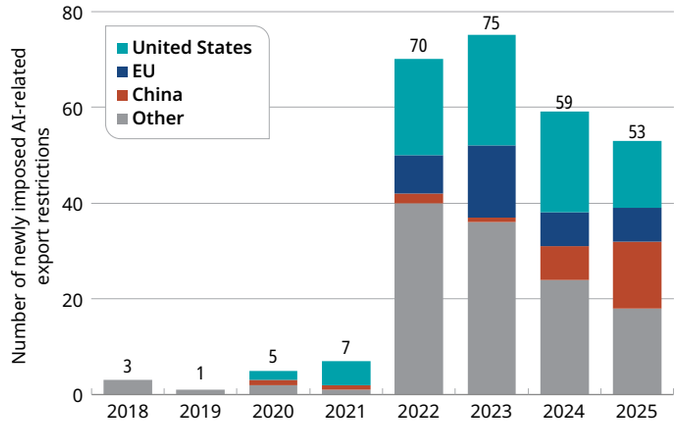
INTERNATIONAL COOPERATION AND GEOPOLITICS

As global AI governance takes shape, for most economies in the EBRD regions, market size may be too small for effective bespoke rules. However, those economies could exert influence through coalitions and joint procurement and, where appropriate, by aligning policy with the EU or another major market. For instance, the EU market is large enough that many firms find it cheaper to follow the bloc's rules everywhere rather than lose access to the single market – a phenomenon sometimes referred to as the "Brussels effect".[66]

Geopolitical alignment matters most where investment carries technology-transfer risk, as in semiconductor fabrication or battery production for electric vehicles. Investment-screening regimes have expanded in scope, and geopolitical alignment is increasingly shaping FDI in such strategic sectors.[67]

Export restrictions on AI-related goods have also surged since 2022 (see Chart 3.22). The United States, for instance, has limited access to advanced chips and semiconductor manufacturing equipment, targeting the production chain directly.

CHART 3.22 Export restrictions on AI-related goods have surged



SOURCE: Global Trade Alert (n.d.) and authors' calculations.
NOTE: This chart shows newly imposed export restrictions applicable to at least one AI-related HS6 product code by year of inception and implementing jurisdiction.

[61] See ENTSO-E (2026c).
[62] See European Commission (2025) and European High Performance Computing Joint Undertaking (2026).
[63] See Cassava Technologies (2025).
[64] See Cazzaniga et al. (2024).
[65] See EBRD (2025).
[66] See Bradford (2012).
[67] See Aiyar, Malacrino and Presbitero (2024) and Alfaro and Chor (2023).

The EU's AI Act, adopted in 2024, further regulates AI models and their deployment. Providers of general-purpose AI models face transparency and copyright-related obligations, while providers of models classified as posing a systemic risk face additional requirements for model evaluation, risk assessment and mitigation, serious-incident reporting and cybersecurity.[68]

Economies in the EBRD regions could seek to secure reliable access to AI technology and investment through credible cybersecurity rules, open procurement, data-centre security standards and compliance with relevant export controls. EU candidate economies in the Western Balkans and EEC could also benefit from early alignment with EU regulation. Other economies may find sector-specific rules and international standards better suited to their circumstances.

International banking regulation offers an example of such selective alignment. Basel banking standards are set by a small group of countries, while many other economies adopt and adapt those elements most relevant to their financial systems.[69]

Governments can also support AI adoption through sector-specific guidance on issues such as AI bias, accountability and data governance. Such guidance can reduce uncertainty and help unlock investment and domestic capabilities.

Effective regulation depends on regulatory expertise and enforcement capacity, including the ability to test AI systems and conduct risk-based procurement of AI tools. Regulatory expertise and enforcement capacity are particularly important, as AI is increasingly seen as a source of catastrophic risk, including potential human extinction. If the same willingness to reduce small mortality risks across large populations that underpins road safety and health policy were applied to AI in the United States, spending on AI risk mitigation equivalent to at least 1 per cent of GDP a year could be justified, even without accounting for future generations' well-being.[70]

CONCLUSIONS AND POLICY IMPLICATIONS

AI production is highly concentrated: advanced chips, semiconductor equipment, large data centres, frontier research and model development are dominated by a small number of economies and firms. EBRD economies' shares of global exports of AI-related goods are much smaller than their shares of other goods, and they remain marginal participants in frontier-model production.

Some, however, have strengths in electronics, software, precision equipment and application development that could support entry into new manufacturing niches. Developing and exporting AI-based applications, with their lower barriers to entry, may be within reach for a broader range of economies. Where power, connectivity and local conditions permit, investment in data centres can improve access to cloud-computing power and digital services, complemented by investment in reliable electricity supply, digital connectivity infrastructure and skills. Deeper local capital markets can further facilitate access to financing for this highly capital-intensive sector.

Measures to promote AI production and investment should be paired with policies that expand renewable energy generation or otherwise offset AI's environmental costs: US evidence suggests that localities more exposed to AI experience faster emissions growth, as nearby power plants shift to greater fossil-fuel use.[71]

[68] See US Department of Commerce, Bureau of Industry and Security (2022 and 2023) and European Union (2024).
[69] See Jones and Zeitz (2017).
[70] See Jones (2025).
[71] See Bonfiglioli et al. (2025).



For most economies in the EBRD regions, however, opportunities are greater in the area of adoption. Under the medium adoption scenario, AI could add around 0.03-0.7 pp to annual labour productivity growth over the next decade. Larger gains are expected in more advanced economies, reflecting their occupational mix, better digital infrastructure and stronger digital skills. Without large-scale investment and targeted policy action, AI could widen productivity gaps across economies. Early labour-market evidence does not point to widespread displacement of workers, but does indicate weaker hiring of junior workers in knowledge-intensive occupations exposed to AI automation.

Whether AI narrows or widens productivity gaps will depend on policy choices. Economies retain meaningful authority over how AI is used. Governments can act now by establishing domestic guardrails on data, privacy and intellectual property, and issuing sector-specific guidance on AI bias, accountability and data governance. They can also adopt transparent AI procurement rules, provide job-search assistance and retraining for workers displaced by automation, update training curricula, and align with EU or international standards where market access rewards it.

Other elements are capabilities that take time to build and cannot be fast-tracked by political will or funding alone: the credibility needed to attract AI technology, investment and partnerships, built through consistent cybersecurity practice and export control compliance; the regulatory expertise required to test AI systems and conduct risk-based procurement; and the broader digital skills base needed for AI to be used effectively. The sooner that work starts, the sooner these economies can put AI to its most productive use.

BOX 3.1 DATABASES AND DEFINITIONS

TRADE IN AI-RELATED PRODUCTS

The analysis of trade in AI-related products draws on the CEPII BACI database of reconciled bilateral trade flows, using the 2017 Harmonized System (HS) vintage for 2017-24 (unless stated otherwise).[72] AI-related goods comprise 24 six-digit (HS6) codes in three tiers: computing hardware (854231, 854232, 854239, 854290, 847150, 847180 and 847330); semiconductor manufacturing equipment (848610, 848620, 848640, 848690, 903082 and 903141); and semiconductor materials and inputs (381800, 280461, 280429, 281212, 285000, 811292, 811299, 370790, 370500, 281290 and 370199).

The relatedness of products A and B is measured as the minimum of (i) the probability of competitively exporting product A conditional on competitively exporting product B and (ii) the probability of competitively exporting product B conditional on competitively exporting product A.[73] Products are treated as "neighbours" or proximate only where links are statistically significant at the 1 per cent level.[74] For each AI-related product, coverage is the share of its neighbourhood that an economy already exports competitively, weighted by product relatedness. In Chart 3.4, neighbourhoods exclude other products in the AI basket.

REVELIO LABS AND ONLINE RÉSUMÉ WORKFORCE ANALYSIS

This analysis uses Revelio Labs data based on harmonised public LinkedIn profiles.[75] Employment spells contain profile-reported information – employer, job title, location and dates – alongside model-assigned information on occupations, seniority and countries. Revelio groups job titles into occupational clusters based on titles, descriptions and skills, mapped to O*NET-SOC occupations;[76] seniority is similarly predicted from titles, employers and job histories.

Employment spells at firms continuously active from January 2018 to June 2025 are aggregated into monthly economy-level counts of distinct workers by occupation and seniority. Counts for junior and senior employment are indexed to 100 in November 2022 and adjusted for population growth using populations aged 20-34 and 35-59, respectively. The resulting indices are then averaged across EBRD economies in the EU. Occupations highly exposed to AI are those in the top quintile of the Eloundou et al. (2024) task-level measure of exposure.

LinkedIn profiles overrepresent younger, urban, white-collar workers at larger firms and may be updated with a lag. Indexing reduces changes in coverage common to junior and senior workers, but not differential changes between these categories. The resulting patterns should, therefore, be viewed as suggestive rather than comprehensive or causal.

AI FIRMS ACROSS THE SUPPLY CHAIN

AI firms across the supply chain are identified using an extract from Dealroom,[77] a commercial database of private and listed technology companies compiled from filings, funding announcements, investor reporting and websites. Data were accessed in July 2026. Firms are assigned to economies based on their headquarters.

[72] See CEPII (2026).
[73] See Hidalgo et al. (2007).
[74] See Saracco et al. (2015).
[75] See Revelio Labs (2025).
[76] See O*NET (n.d.).
[77] See Dealroom (n.d.).

First, a broad filter on Dealroom's technology tags identifies firms that are potentially related to AI. A large language model then uses those tags and each firm's description to separate producers of AI from adopters and to assign producers to one of five supply-chain layers, building on Rishabh and Shreeti (2026). A firm is not counted as a producer of AI unless AI is central to what it sells; firms that merely embed third-party models or use AI internally are treated as adopters. Producers are separated into chip design, chip manufacturing, data tools and infrastructure, models, and applications. Assignments are individually reviewed for all firms valued at US$ 1 billion or more.

A MODEL OF PRODUCTIVITY GAINS FROM AI ADOPTION

Estimates of AI's potential contribution to labour productivity build on the methodology of Filippucci et al. (2025). Exposure to AI is measured at the level of work tasks using the Global Automation Atlas dataset.[78] The resulting exposure scores are economy-specific. A narrower measure of exposure counts tasks that a language model can perform alone, such as scoring, classification and the transformation of information. A broader measure of exposure adds tasks where automation requires AI to be combined with complementary software to a significant extent.

Task ratings are mapped to occupations using O*NET task statements, converted from the US occupational classification to the international standard (ISCO). Occupation-specific scores are, in turn, combined with each economy's occupation-by-industry employment structure from ILOSTAT,[79] yielding exposure scores for 18 broad sectors (the sections of ISIC Revision 4/NACE Revision 2). Economies without a recent occupation-by-industry employment survey are excluded; those covered by the employment data but absent from the AI exposure data receive their region's average occupation-level ratings (using the World Bank regional classification).[80] Sector-level gains are aggregated to the economy-wide gain using value-added shares from the OECD Inter-Country Input-Output tables[81] or, where unavailable, the latest available United Nations national accounts statistics,[82] adjusted by the inverse of the labour share (assumed to be 1.5). This analysis assumes unchanged sectoral employment shares.

The current AI adoption rate is anchored in the share of enterprises using AI in Eurostat's Community survey on ICT usage and e-commerce in enterprises,[83] supplemented by comparable rates that Filippucci et al. (2025) report for Canada and the United States. In line with that study, survey readings are averaged with an OLS prediction based on the IMF's AI Preparedness Index,[84] which reduces noise in individual surveys and extrapolates estimates to additional economies.

Within a scenario, economies differ in their starting levels of AI adoption and exposure. Moreover, the slow adoption scenario uses the narrower measure of task exposure to AI, covering only tasks a language model can perform alone, while the medium and fast adoption scenarios use the broader measure.

Adoption is then projected along a logistic curve to an 80 per cent ceiling over 10 years, its speed common to all economies within each scenario and set by analogy with earlier general-purpose technologies: electricity (slow), the internet (medium) and mobile phones (fast).

[78] See Garg, Crosta and Baier (2026).
[79] See ILO (n.d.).
[80] See World Bank (n.d.b).
[81] See OECD (2022).
[82] See United Nations Statistics Division (n.d.).
[83] See Eurostat (2026a).
[84] See Cazzaniga et al. (2024).

BOX 3.2 AI IN SSA

EBRD economies in SSA remain on the periphery of the global AI production chain. Their participation is concentrated in data services and application deployment, while weaknesses in terms of reliable electricity, network connectivity and computing capacity are limiting deeper AI rollout. The application layer is a source of significant near-term opportunity, provided these foundations can be strengthened.

Access to electricity ranges from relatively high in Ghana to low in Benin and Nigeria, and unreliable supply is limiting the expansion of digital infrastructure.[85] Africa accounted for only 0.4 per cent of global data-centre capacity in 2025[86] and most of the continent's data are hosted abroad, mainly in Europe and North America. Mobile broadband coverage has expanded rapidly, yet 60 per cent of people in African countries south of the Sahara live within reach of mobile internet services but do not use them, primarily due to affordability constraints.[87] Data centres are also energy and water intensive, which places a premium on siting decisions and on water-efficient cooling in locations where water resources are already under pressure.

SSA economies primarily contribute to global AI value chains through annotation and content moderation work. Nigeria and Kenya rank among the top global outsourcing destinations for AI data work, with several large annotation and content-moderation operations based in Nairobi.[88] These activities create employment, but independent labour assessments, as well as Kenya's own AI strategy, find this employment poorly paid and potentially exposed to automation as models improve, with workers stuck in entry-level roles, such as data annotation for foreign platforms, that do not necessarily meet basic standards of pay or conditions.[89]

More promising near-term opportunities lie further downstream in AI applications. For instance, AI-assisted agricultural advisory and health diagnostics applications have been deployed in Kenya and Nigeria.[90]

All six countries in the EBRD's SSA region have published national AI strategies: Benin and Senegal in 2023, Côte d'Ivoire, Kenya and Nigeria in 2025 and Ghana in 2026. However, implementation capacity varies across countries, with budget allocations, dedicated regulatory bodies and inter-ministerial coordination arrangements at different stages of development.[91]

Africa's mobile-first financial systems have generated structured, behaviourally rich data at scale: mobile money accounts processed transactions with a combined value of US$ 1.4 trillion (€1.2 trillion) across all African countries south of the Sahara in 2025,[92] and the resulting data are already being used to train credit-scoring models that extend financial access to borrowers without formal credit histories.[93] African languages, underrepresented in global foundation models, are another asset: Nigeria, Senegal and Kenya are making early investments in local-language AI.[94]

Where data are sourced from African users and workers, but models are owned and monetised elsewhere, the economic surplus largely accrues outside the continent.[95] Nigeria and Kenya have adopted data protection frameworks that put conditions on cross-border transfers of personal data; implementation and enforcement capacity is still being built.[96]

Africa's experience with mobile money demonstrates the potential of new technology to bypass legacy systems, but the analogy has limits when it comes to AI. Mobile money could operate on existing hardware with modest computing requirements, whereas frontier AI is highly capital and energy intensive. Technology adoption alone cannot act as a substitute for foundational investment in power, network connectivity, data governance and human capital.

[85] See Babayomi (2026).
[86] See IEA (2026).
[87] See GSM Association (2024).
[88] See Obia (2025) and Ndege (2026).
[89] See Du and Okolo (2025).
[90] See Begho, Daubry and Irabor (2025) on agricultural advisory and Obi et al. (2024) on health diagnostics.
[91] See OECD (2026).
[92] See GSM Association (2026).
[93] See Mwesigwa, Jackson and Csikszentmihalyi (2026).
[94] See Munga and Quansah (2025) and Mwangi (2024).
[95] See Du and Okolo (2025) and Melatagia Yonta (2025).
[96] See Federal Republic of Nigeria (2023) and Republic of Kenya (2019).

BOX 3.3 AI IN EDUCATION: A BICYCLE FOR THE MIND?

Steve Jobs, the founder of Apple, described the personal computer as a "bicycle for the mind" – a tool extending human capabilities. Generative AI, by offering low-cost personalised explanations and tailored advice, promises to provide cognitive assistance that surpasses past expectations. But when it comes to AI applications, education differs from most other goods and services in an important respect: it aims not just to complete tasks more efficiently, but to build the skills required to complete them independently.

Early evidence from the EBRD regions shows both the promise and risks of AI in education. In Nigeria, a randomised trial found that six weeks of AI-supported tutoring with teachers' guidance raised secondary-school students' test scores by 0.31 standard deviations.[97] In Türkiye, meanwhile, access to a standard AI assistant helped secondary-school students to solve mathematics problems while using it, but they subsequently performed 17 per cent worse than students who did not have access to an AI assistant when both groups were tested unaided. A tailored AI tutor that gave hints rather than answers substantially reduced the penalty associated with the use of AI assistance.[98] These results suggest that the ways in which AI is used may matter as much as its availability.

Governments in the EBRD regions have been moving towards system-wide adoption of AI in education. Estonia, Jordan, Kazakhstan and the Slovak Republic are among the first participants in OpenAI's Education for Countries initiative, pairing access to AI tools with teacher training and university-led evaluation of pilot programmes.

Estonia's AI Leap is one of the most ambitious system-wide initiatives, providing AI tools and training to around 20,000 upper-secondary students and more than 4,000 teachers while tracking learning outcomes. Its tailored Estonian-language tool is designed to prompt students with questions and hints rather than simply supply answers. Evidence from early implementation of the programme has been mixed: take-up has fallen short of universal use and no clear learning gains have yet emerged. Competition from general-purpose AI assistants that can provide answers immediately, without pedagogical guardrails, presents a notable challenge when it comes to rolling out AI tools for schools.

Early experience suggests that some learning tasks and assessments should remain unaided while foundational skills are acquired, and assessments should capture students' own reasoning. AI literacy is an essential new set of skills that goes beyond prompting and involves verifying, challenging and evaluating large language models' outputs. In fostering AI literacy, teachers need training and discretion over the use of AI to ensure that AI strengthens human learning and does not replace it. Independent evaluation of large-scale rollouts can help to fine-tune the use of AI in education.

As industry leaders offer free or discounted tools in a highly competitive market, public procurement systems can help to close gaps in access to AI while protecting student data, ensuring that products are sufficiently tailored to local languages and curricula, and avoiding excessive dependence on a single provider. The educational market also creates opportunities for firms in the EBRD regions, such as Poland's Brainly (providing AI tutoring with expert support) and Estonia's Lingvist (offering AI-based personalised language learning).

[97] See De Simone et al. (2025).
[98] See Bastani et al. (2025).

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CHAPTER 4



ENTREPRENEURSHIP AT SCALE

Entrepreneurship fuels business dynamism and, ultimately, economic growth. Across EBRD regions, however, dynamism is slowing, with young, fast-growing firms accounting for a shrinking share of all businesses. The bottleneck lies in firm growth, rather than firm creation: companies entering the market remain smaller than advanced European peers at every stage of the lifecycle. Growth stalls at the financing stage: few firms that raise early funding progress to institutional rounds. Venture funding per firm is scant, comes largely from abroad, is heavily dependent on founders' educational and professional networks, and typically remains concentrated in a single city. Helping more startups to grow into larger firms will, therefore, require deeper venture-capital markets and stronger connections between founders and a broader set of investors.



INTRODUCTION

Young firms are the engine of business dynamism,[1] and that engine is running out of steam in many EBRD regions. New market entrants, particularly the small group of fast-growing startups, account for a disproportionate share of net job creation and aggregate productivity growth.[2] However, in EBRD economies in the EU, young, high-growth firms' share of total firms has fallen steadily over the past two decades. Firms that do enter the market are already somewhat smaller than their advanced European counterparts and the gap widens over the corporate lifecycle: mature enterprises in the region employ far fewer people than their advanced European peers. Business dynamism in the EBRD economies is, therefore, constrained not so much by a shortage of startups but by the fact that too few of those startups scale up. This chapter analyses startups across the EBRD regions and takes stock of what factors drive their ability to reach scale. Three findings stand out.

First, founders of growth-oriented firms in the EBRD regions are internationally connected. The majority have studied or worked abroad before founding their firm – a pattern similar to that seen in advanced Europe. Startups also tend to branch out from what their economies already do well. They are concentrated in computer, professional, financial and trade-related services. In most economies, the majority of startups enter markets for products in which the economy has no revealed comparative advantage (RCA). In more diversified economies (largely EU member states and other advanced European economies), these new products tend to sit close to the economy's existing exports; in less diversified economies (mostly outside the EU), they tend to lie further away from any existing strength. Within an individual economy, startups show only a mild preference for products related to existing exports.

Second, serial founders – people with prior entrepreneurial experience – account for as much as a quarter of all founders in the EBRD regions, and their later ventures tend to be in a different sector to their first. Firms that manage to scale up funding are more likely to attract at least one foreign investor than peers that do not scale up.[3]

Third, the constraints bite at the scaleup stage. Only a small minority of funded startups in the EBRD regions reach a first institutional round, well below the rates in advanced Europe and the United States, and the gap is only partly explained by smaller seed rounds. Startups in EBRD economies also raise less venture capital per firm than those in advanced Europe, although lower funding is consistent with the thin supply of risk capital or weaker demand for it, and does not in itself distinguish between the two.

Most of the capital comes from outside the founding economy, with the overwhelming majority coming from the United States, the United Kingdom and advanced Europe. The sectoral composition of that funding is concentrated in finance and other services. This reliance on international finance is greatest in sub-Saharan Africa (SSA), which has the highest share of firms with at least one foreign investor.

Financial capital tends to follow human capital: founders have a stronger tendency to raise funding from investors in economies where they have previously studied or worked. In EBRD regions, domestic and mixed syndicates dominate early funding rounds, but founders are far more reliant on foreign funders than their advanced European peers when it comes to the later stages. Within economies, venture capital is typically concentrated in just one metropolitan area. As a result, local startups face limited upscaling opportunities.

This chapter starts by documenting the decline in business dynamism in the EBRD regions and its coexistence with continued productivity convergence. It then looks at who founds growth-oriented startups, examining international linkages, product choice and

[1] See Biondi et al. (2025) and Botelho, Fehder and Hochberg (2026).
[2] See Decker et al. (2016).
[3] See Dealroom (n.d.).

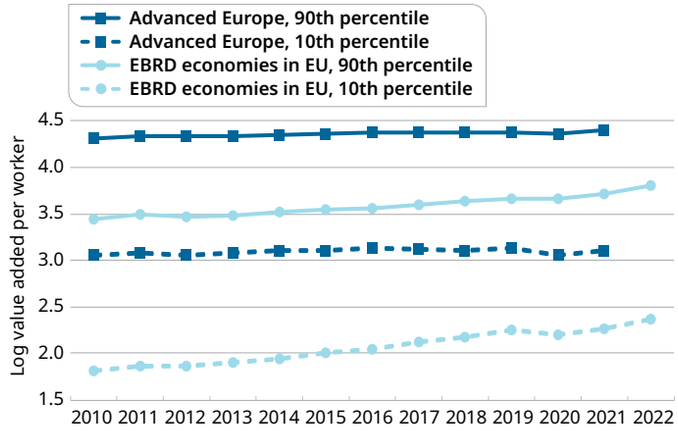
serial entrepreneurship in turn, before asking which founder and firm characteristics distinguish the startups that reach the scaleup stage. It then turns to venture capital, examining how much is raised, in which sectors, where it comes from and where it goes within each economy. Lastly, it considers the lessons from two case studies, looking at founder networks in Estonia and at Tunisia's Startup Act.

DECLINING BUSINESS DYNAMISM AND CONVERGENCE

This section draws on the 10th edition of the database compiled by the Competitiveness Research Network (CompNet) to document trends in firm entry, growth and productivity.[4] CompNet collects harmonised indicators from national statistical institutes and central banks using a common protocol that aggregates information from each country's firm-level records. The database covers 17 European economies (some in the EBRD regions and some in advanced Europe) between the late 1990s and 2023. Coverage varies by country and indicator, with several series restricted to firms with at least 20 employees.

A first look at the CompNet data shows considerable progress on productivity convergence in EBRD economies in the EU since 2010. The improvement is larger for the least productive firms (which have raised their labour productivity by 75 per cent, compared with 45 per cent for the most productive firms; see Chart 4.1). In advanced Europe, both the most and least productive firms have improved their productivity by less than 10 per cent over the same period. Within EBRD economies in the EU, the distance between frontier and laggard firms in the same industry has narrowed, suggesting that technologies and business practices continue to spread between firms, even though the reallocation of jobs between those firms has slowed.

CHART 4.1 Firms in EBRD economies in the EU are catching up with peers in advanced Europe at both ends of the productivity distribution



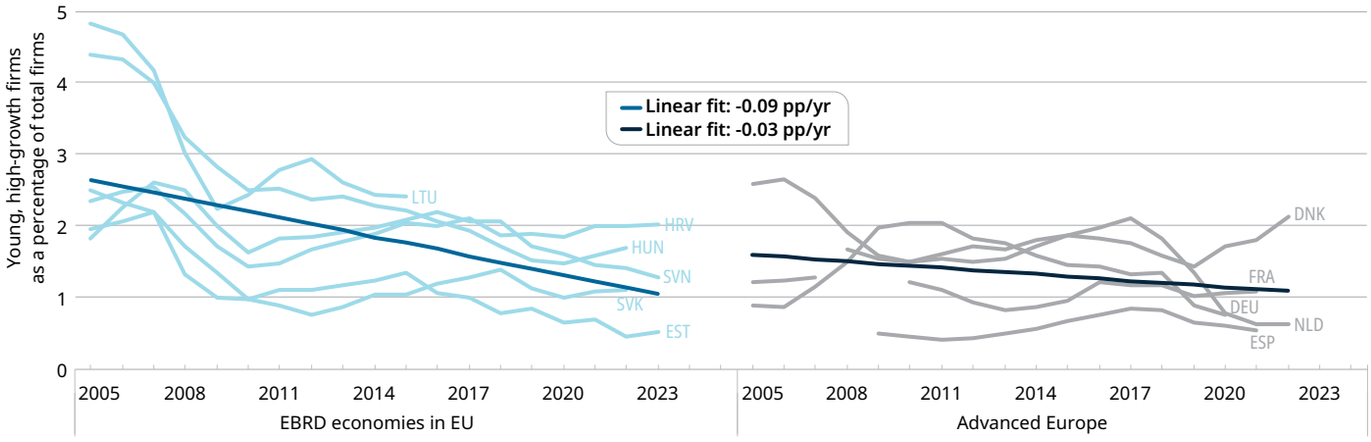
SOURCE: IWH (n.d.) and authors' calculations.
NOTE: Firms are grouped based on the percentiles of log value added per worker, which are computed within cells defined by economy, NACE two-digit industry code[5] and year. Cells with fewer than 20 observations are excluded. The lines correspond to the 10th and 90th percentiles of the productivity distribution. Economy-year figures are firm-count-weighted means across two-digit industries; group-year figures are unweighted means across economies. The panel is balanced from 2010. "EBRD economies in EU" comprises Croatia, Estonia, Hungary, Lithuania, Poland, Romania, the Slovak Republic and Slovenia; "advanced Europe" comprises Denmark, France, the Netherlands, Portugal and Spain, based on data availability.

The least productive firms in EBRD economies in the EU have raised their productivity by **75%**, compared with **45%** for the most productive firms

[4] See IWH (n.d.).

[5] NACE (Nomenclature Statistique des Activités Économiques) is the statistical classification of economic activities in the EU.

CHART 4.2 Young, fast-growing firms' share of total firms in EBRD economies in the EU has more than halved in around two decades



SOURCE: IWH (n.d.) and authors' calculations.
NOTE: Young, high-growth firms ("gazelles") are those aged five years or under that have expanded employment by more than 25 per cent a year, on average, over a period of three years, under CompNet's "definition 0". This chart shows three-year centred moving averages. Bold lines are regional linear fits from an ordinary least squares regression of the raw economy-year share on year, pooled within each region, with figures indicating declines in percentage points (pp) per year. "EBRD economies in EU" comprises Croatia, Estonia, Hungary, Lithuania, the Slovak Republic and Slovenia; "advanced Europe" comprises Denmark, France, Germany, the Netherlands and Spain, based on data availability.

Despite convergence in productivity, sustaining business dynamism will increasingly depend on the ability of new firms to enter the market, grow and innovate. The most productive firms in EBRD economies in the EU (those in the 90th percentile of the productivity distribution) remain 49 per cent less productive than their advanced European counterparts. There is a limit to how far an economy can catch up by improving the firms it already has, which is why sustaining convergence will depend increasingly on new firms reaching scale. Young firms (those aged less than five years) typically account for a disproportionate share of net job creation. Economies with higher rates of firm entry tend to record faster productivity growth, because the entry of new competitors forces less productive incumbents to either improve or go out of business.[6]

Young, high-growth firms' share of total firms in EBRD economies in the EU is declining. It has more than halved since the mid-2000s (see Chart 4.2). Also known as "gazelles", these firms are aged five years or younger and have expanded their employment by more than 25 per cent a year, on average, over a period of three years. In the mid-2000s, gazelles made up 2.6 per cent of firms in EBRD economies in the EU, compared with 1.6 per cent in advanced Europe. The relatively high number of gazelles in EBRD economies in the EU was emblematic of the post-transition decades and supported the rapid convergence of income per capita towards the levels of advanced European economies.

Young, fast-growing firms' share of total firms in EBRD economies in the EU has
MORE THAN HALVED
in the past two decades

[6] See Decker et al. (2016), Haltiwanger et al. (2016) and EBRD (2025).

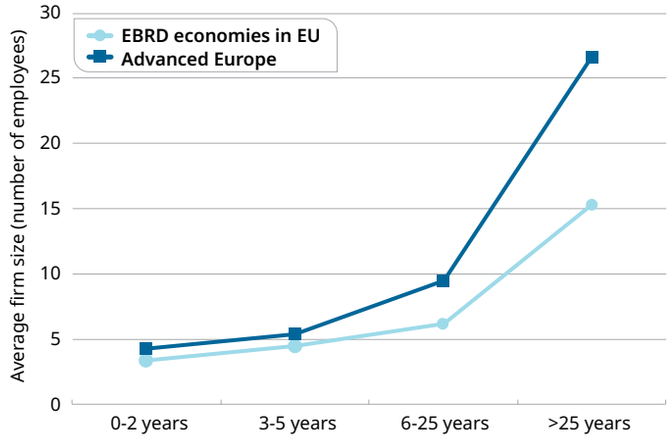
Gazelles' share of total firms in EBRD economies in the EU has since declined by an average of 0.09 percentage points a year, three times the pace of decline recorded in advanced Europe, leaving both groups at around 1.1 per cent of firms in the most recent data. The declining share of gazelles is not specific to the EBRD regions. A similar trend has been documented in the United States, where gazelles' share of total firms has been falling since the mid-1980s.[7]

Another symptom of declining firm dynamism is the decrease in the flow of employment from shrinking to growing firms across 19 European economies over the past two decades, with the steepest drops recorded in EBRD economies, alongside a falling share of employment in young firms.[8]

In addition, firms in EBRD economies in the EU are smaller than their advanced European counterparts in every age band (see Chart 4.3). The average firm aged two or under in the region employs 3.4 people, around 1 employee fewer than an average peer in advanced Europe, a difference of around a quarter at that size. The difference is of a similar order among firms aged 3 to 5 years, at 4.5 against 5.4 employees, and wider among firms aged 6 to 25 years, at 6.2 against 9.5 employees. Chart 4.3 sets age bands side by side rather than following the same firms over time, and the bands are broad, so the chart cannot trace how a given cohort grows. What it does show is a downward shift in size distribution throughout: firms in the region are small when they enter the market and, among those still trading a decade or more later, they remain smaller than their advanced European peers.

Further convergence requires the very dynamism that is now declining. Whether firms that enter go on to grow is therefore a first-order concern for EBRD economies. The rest of this chapter takes a closer look at the founders of growth-oriented startups in the EBRD regions, examining the opportunities and constraints that they face.

CHART 4.3 Firms in EBRD economies in the EU start smaller and stay smaller than their advanced European peers



SOURCE: IWH (n.d.) and authors' calculations.
NOTE: Average firm size is total employment divided by the number of firms, pooled over the 2018-22 period. Figures are employment-weighted group means. "EBRD economies in EU" comprises Croatia, Estonia, Hungary and Slovenia; "advanced Europe" comprises Denmark, the Netherlands and Spain.

GROWTH-ORIENTED STARTUPS

The following analysis focuses on growth-oriented startups, defined as companies designed for rapid growth: firms whose product, platform or business model is scalable by design and whose product or business model is innovative, in most cases enabled by technology. In short, these are companies that could, in principle, attract venture capital, whether or not they have done so. Such growth-oriented startups often introduce new technologies and provide platforms and inputs that allow other firms to grow as well.[9] This distinguishes them from the much larger population of small and relatively stagnant businesses that serve a local market at a stable size.

The analysis draws on two datasets. The first is Dealroom, a database of growth-oriented startups, funding rounds and investors.[10] The second is Revelio

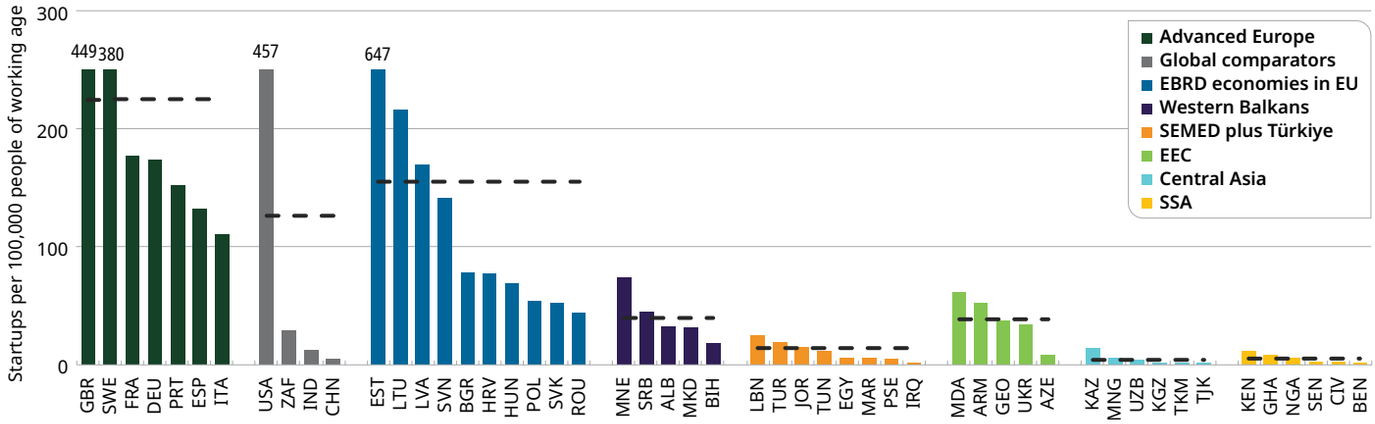
[7] See Sterk, Sedláček and Pugsley (2021).
[8] See Biondi et al. (2025).
[9] See Colonnelli et al. (2026).
[10] See Dealroom (n.d.).

Labs, which constructs individual educational and employment histories from public professional profiles.[11] The two are linked using identifiers common to both sources: firm website domain, company LinkedIn page and, where those are not available, the founder's LinkedIn profile. This procedure matches each founder's education and career history to the funding and growth outcomes of the venture they started.

The prevalence of growth-oriented startups varies substantially across emerging-market and advanced economies, with higher rates in the United States, the United Kingdom and Sweden, as well as Estonia and Lithuania (see Chart 4.4). The variation within geographical regions is as notable as that between them. For example, Kenya has a higher ratio than Egypt and Morocco, despite having lower per capita income, while the ratios in Jordan and Lebanon are comparable to that of Türkiye, where GDP per capita is roughly three times higher.

Startup formation tends to be higher where entrepreneurial ecosystems are supportive – with institutions that protect young firms, highly skilled workers and financial systems that can price risk. Successful startups can themselves reinforce these ecosystems by spawning new ventures, as illustrated by the entrepreneurial lineage of Skype (see Box 4.1). As these features are more commonly found in high-income economies, startup ratios tend to be higher in economies with higher per capita incomes.

CHART 4.4 Advanced Europe, the United States and EBRD economies in the EU have the most startups per 100,000 people of working age

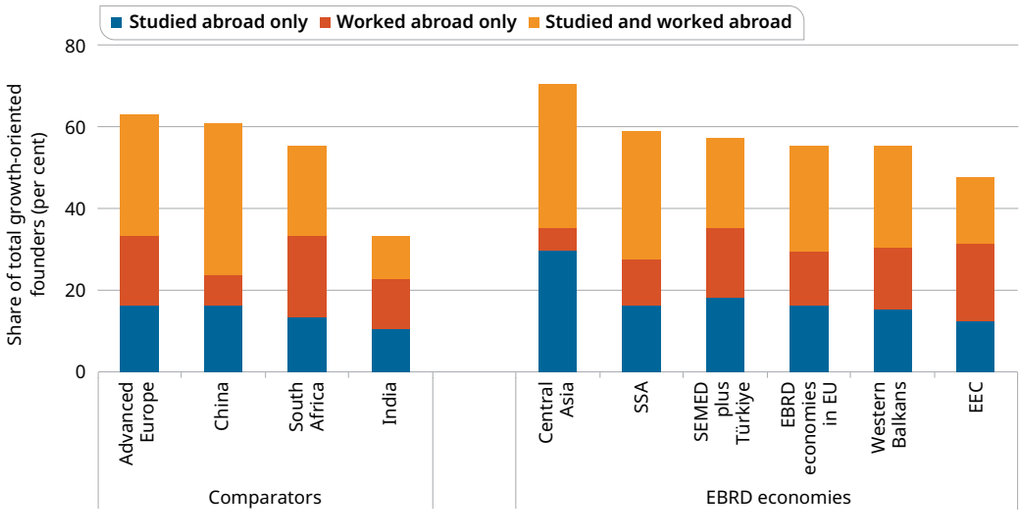


SOURCE: Dealroom (n.d.) and World Development Indicators (World Bank, n.d.).
NOTE: Bars indicate the number of startups currently operating in an economy per 100,000 people of working age (aged 15-64). For values exceeding 250, bars are capped at 250 and actual values are reported above the bar. Horizontal dashed lines are the unweighted means of the economies in each region. A startup is any company in the Dealroom universe, allocated to the economy where its current headquarters are located. Economies with fewer than 10 startups are not shown. SEMED = southern and eastern Mediterranean; EEC = eastern Europe and the Caucasus; SSA = sub-Saharan Africa.

In most EBRD regions,
MORE THAN HALF
of growth-oriented founders studied and/or worked abroad before starting their firm

[11] See Revelio Labs (n.d.).

CHART 4.5 In most EBRD regions, more than half of all growth-oriented founders gained international experience before founding



SOURCE: Dealroom (n.d.), Revelio Labs (n.d.) and authors' calculations.
NOTE: The sample comprises founders from the Revelio Labs dataset with first founding events in 2015-24 who also have at least one venture in the Dealroom data. Bars show the percentage of founders in each category within each founding region, comparator group or economy. "Studied abroad" refers to education completed before the first founding event and "worked abroad" refers to employment held before that event, with each being defined relative to the founding economy. "Advanced Europe" comprises France, Germany, Italy, Portugal, Spain, Sweden and the United Kingdom.

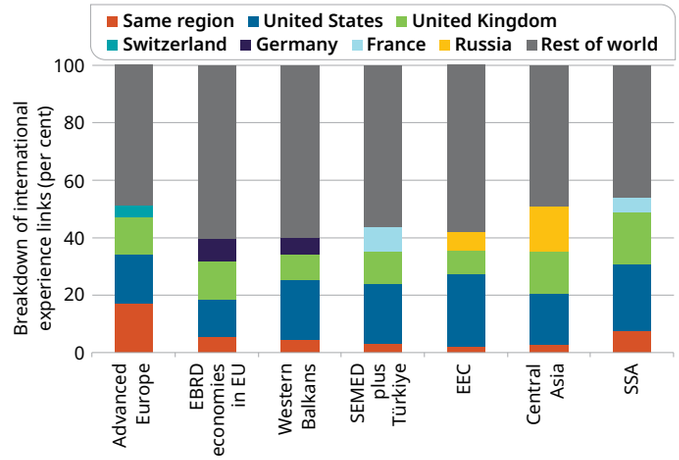
MOST FOUNDERS HAVE STUDIED OR WORKED ABROAD

The analysis in this section looks at founders (as identified in Revelio Labs data)[12] that launched at least one growth-oriented startup in the 2015-24 period.

In most EBRD regions, more than half of all growth-oriented founders studied and/or worked abroad before starting their firm (see Chart 4.5).[13] A substantial minority of founders have both previously studied and worked in a country other than that of their startup. The share of founders with such international experience is particularly high in Central Asia, exceeding that of both advanced Europe and China. It is also high in SSA and the southern and eastern Mediterranean region (SEMED) and Türkiye, at around 60 per cent.

Founders' international experience is concentrated in a small number of destinations. The United States and the United Kingdom together typically account for between a quarter and a third of this experience, with higher shares among founders from SSA. Otherwise, geographical patterns reflect longstanding migration corridors and historical ties: Germany is the third most common destination for founders from the Western Balkans and EBRD economies in the EU, while Russia is the third most popular destination for founders from eastern Europe and the Caucasus (EEC) and ranks second, ahead of the United Kingdom, for founders from Central Asia. The remaining destinations are numerous and widely dispersed (see Chart 4.6).

CHART 4.6 Growth-oriented founders' international experience combines global hubs and regional links



SOURCE: Dealroom (n.d.), Revelio Labs (n.d.) and authors' calculations.
NOTE: Bars show the composition of international experience, with one link per founder and foreign destination economy, drawn from pre-founding education or work, and excluding the founding economy. "Same region" denotes foreign destinations in the founder's own region. Each bar shows the top three destinations outside the founder's own region; the remainder are grouped together as "rest of world". "Advanced Europe" comprises France, Germany, Italy, Portugal, Spain and Sweden.

[12] See Revelio Labs (n.d.).
[13] Founders of firms not in Dealroom have a similar incidence of international experience, at 52 per cent versus 55 per cent for founders of firms in Dealroom.

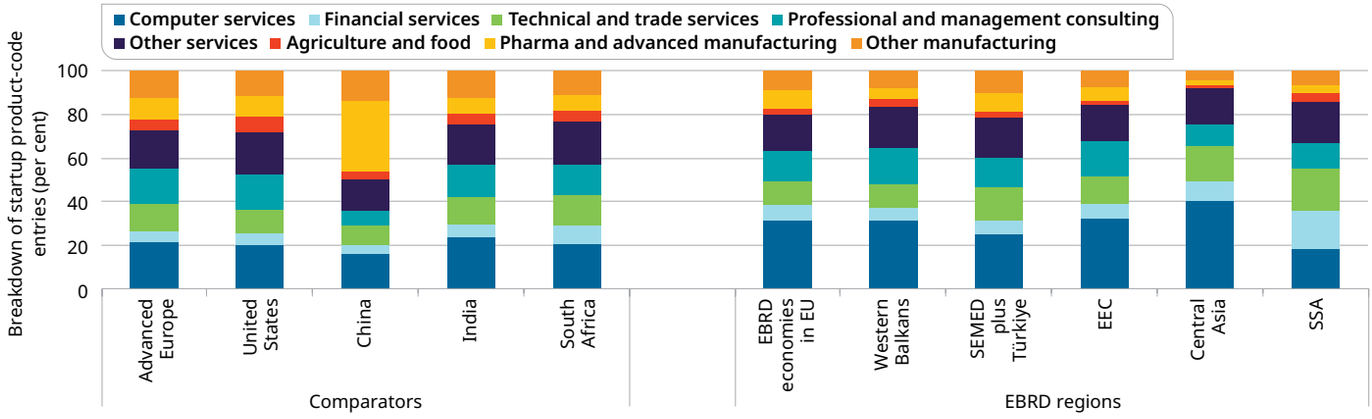
The concentration of international experience exposes founders to risks associated with shifts in visa policies or business cycles in major "experience donor" economies. Scholarship programmes targeting a wide range of destinations, such as Kazakhstan's Bolashak programme, can provide a hedge against such concentration risks. Concentration can also be a source of opportunity, as it facilitates network connections to other entrepreneurs, scientists and financiers.

WHERE STARTUPS COMPETE

Product choice shapes startups' growth prospects. Software and software-enabled services are highly scalable, with low costs for serving additional customers. In manufacturing, by contrast, additional capacity often involves costly and time-consuming investment. The composition of startup activity in the EBRD regions reflects the scalable nature of software and software-enabled services (see Chart 4.7). The product mix is dominated by computer and professional services (in EBRD economies in the EU and in SEMED and Türkiye), as well as financial and trade-related services (in Central Asia and SSA). This concentration in services is greater than in advanced Europe, the United States and China.

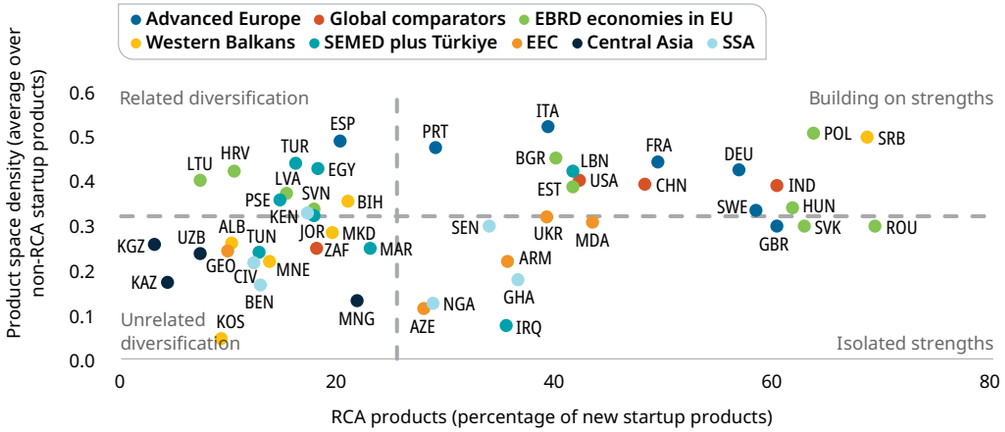
Some founders choose a product close to what the country already does well (such capabilities are measured using the concept of RCA introduced in Chapter 1). In such cases, new firms can draw on established production capabilities, supplier networks and client bases. This lowers the risk of failure, but may also offer more limited upside for founders and investors. Other founders aim to push the frontier of what an economy produces. In doing so, they may help to establish new production capabilities and areas of comparative advantage. They may draw on existing capabilities in related products that are already produced and exported. For example, in an economy with a strong comparative advantage in agriculture, startups may seek to diversify into supply-chain software or agri-fintech. Successful agri-fintech ventures can, for instance, create a pool of engineers and data infrastructure, fuelling

CHART 4.7 Startups in the EBRD regions are more concentrated in services than their peers in comparator countries



SOURCE: Dealroom (n.d.) and authors' calculations.
NOTE: The shares are calculated based on the counts of startup-product combinations. The sample covers all firms in Dealroom for which a product code could be assigned (HS2, 2022 edition, for goods or EBOPS 2010 for services). Where a firm is assigned several codes, its weight is split equally among them. The figures shown are the means of shares across countries within a region, weighted by the number of Dealroom firms. "Agriculture and food" comprises HS chapters 01 to 24; "pharmaceuticals and advanced manufacturing" comprises HS codes 30, 84, 85, 88 and 90. Each firm is placed in its Dealroom founding economy, or the economy of its current headquarters if the founding economy is absent. "Advanced Europe" comprises France, Germany, Italy, Portugal, Spain, Sweden and the United Kingdom.

CHART 4.8 Most startups enter markets for products that their economy does not yet export competitively



SOURCE: BACI (HS2012 version), Gaulier and Zignago (2010), BaTIS (BPM6), Dealroom (n.d.) and authors' calculations.
NOTE: The horizontal axis measures the percentage of startup products in which the economy already has an RCA; the vertical axis indicates the average density of startup products in which the economy has no RCA (ranging from 0 to 1). Firms are assigned one or more of 117 product codes (96 goods and 21 services), with one entry per code (see the notes on Chart 4.7). An economy is considered to have an RCA in a product if the normalised RCA exceeds 0.5 in the firm's founding year. Dashed lines denote the medians of the economy-level means. The sample for this chart comprises firms founded in the 2012-24 period. Economies with fewer than 10 startups or 10 matchable entries are excluded.

further diversification into logistics or finance. In this way, economies can establish new capabilities step by step.

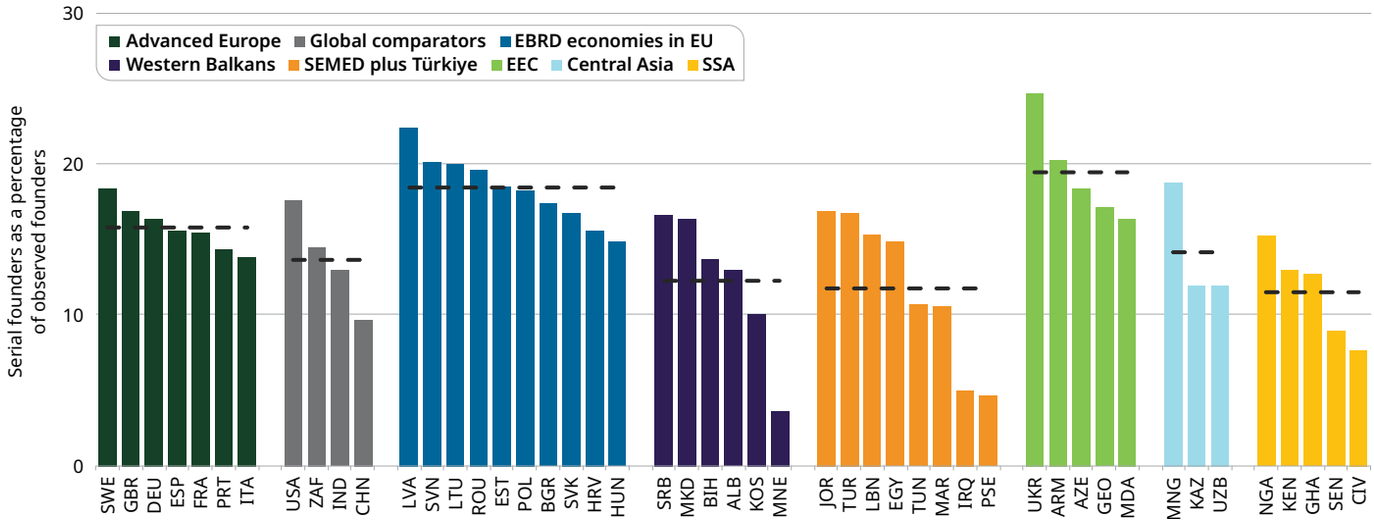
In the analysis presented in Chart 4.8, the horizontal axis tracks the share of startup goods and services in which the economy already holds an RCA. This is a measure of how often startups build on the existing export base. The vertical axis considers the startup products that fall outside that base and measures how close those products are to it, using the "density" measure introduced in Chapter 1. In this analysis, density measures the closeness between startups' non-RCA product mix and the economy's existing RCA basket, with higher values indicating greater proximity.

In most advanced economies and China, larger percentages of startups build on products where the economy already has an advantage (right-hand quadrants), and other startups tend to enter markets for closely related products. This is also the case for several EBRD economies in the EU. Diversification into related products (upper left quadrant) is also prevalent in many economies in SEMED, as well as in Kenya and Bosnia and Herzegovina.

In certain economies in Central Asia, the Western Balkans, SSA and SEMED, many startups enter markets for products that are only loosely related to their economy's existing exports (see Chart 4.8, lower left quadrant). Such entries can be transformative when the conditions are right, as they were in the case of Kenya's M-Pesa, a mobile payment system, which leveraged a combination of donor funding and supportive central bank policies to this end.[14] Such ventures are risky, however, because of the shallow pools of related talent. This places greater emphasis on the informal and public backing of such ventures at the earliest stage of development, before a successful track record helps to attract private venture capital.

[14] See Jack and Suri (2014).

CHART 4.9 Serial founders typically account for 12-19 per cent of founders across the EBRD regions



SOURCE: Dealroom (n.d.) and authors' calculations.
NOTE: Serial founders are founders with more than one venture (anywhere in the world) in their full founded-company history. Each founder is placed in the founding economy of their earliest venture; the founding economy is Dealroom's recorded founding location, where available, or otherwise the current location of the firm's headquarters. Only economies with at least 30 founders are included. Horizontal dashed lines indicate unweighted regional averages.

SERIAL ENTREPRENEURSHIP

Most entrepreneurs start one firm, but a minority start and run several, and the conditional probability of founding another firm rises with the number of firms previously launched.[15] These serial founders carry entrepreneurial know-how from one venture to the next. Previous experience is associated with an increase in the longevity of the newly established firm. Serial founders also tend to enjoy better access to finance, partly due to their networks of existing contacts.

Serial founders typically account for between 12 per cent and 19 per cent of observed founders across the EBRD regions, a share similar to that in advanced Europe (see Chart 4.9). Ukraine, at around 25 per cent, has the highest share in the EBRD regions. Its serial founders have focused on the IT sector, launching companies such as Grammarly, Ajax Systems and Preply, with a significant population of founders now on their second or third venture. Serial founders also make up a large percentage of total founders in Armenia, Latvia, Lithuania and Slovenia. In contrast, numbers of serial founders are relatively low in Côte d'Ivoire, Iraq, Kosovo, Montenegro, Morocco, Senegal, Tunisia and the West Bank and Gaza.

Prior success in attracting funding helps to raise funding for the next venture (see Chart 4.10).[16] The analysis in this section (described in more detail in Box 4.2) examines the business outcomes of two groups: serial founders whose earlier venture succeeded and those whose earlier venture did not. Outcomes include reaching a first institutional equity round (at least Series A, typically US$ 4-15 million), reaching a scaleup round (at least Series B, typically US$ 15-40 million) and having a realised exit. The analysis also estimates differences in the probability that a founder subsequently becomes an angel investor – a private individual who invests their own money in early-stage ventures in exchange for an equity stake.

Founders who previously succeeded in raising funds are around 21 percentage points more likely than first-time founders to achieve a Series A funding round in their next venture and around 13 points more likely to achieve a Series B round (see Chart 4.10). Founders whose earlier venture failed to raise funds are no more likely than

[15] See Lafontaine and Shaw (2016).

[16] See Gompers et al. (2010).

first-time founders to raise funding for their current project. The differences in the likelihood of obtaining funding may reflect both the skill of the fundraisers and information that investors infer from an observable track record of success.[17]

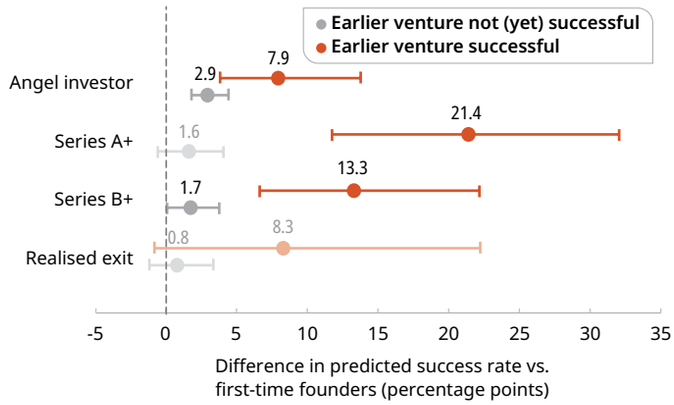
Neither group of serial founders is statistically significantly more likely to achieve a realised exit (possibly because relatively few exits are observed in the data, as some recent ventures have not yet had sufficient time to mature).

Both groups of serial entrepreneurs are more likely than one-off founders to become angel investors – by around 8 percentage points for previously successful founders and 3 percentage points for unsuccessful ones.

As proven founders increase the likelihood of successful fundraising, they also help their first-time co-founders to create a successful track record of fundraising, providing mentoring and strategic guidance in addition to capital.[18] A cohort of successful founders, therefore, helps to develop an ecosystem of early-stage finance.

Around 70 per cent of serial founders' ventures in the EBRD regions target a different product category to the founder's previous one, a ratio similar to those recorded in advanced Europe, the United States, India, China and South Africa (see Chart 4.11).

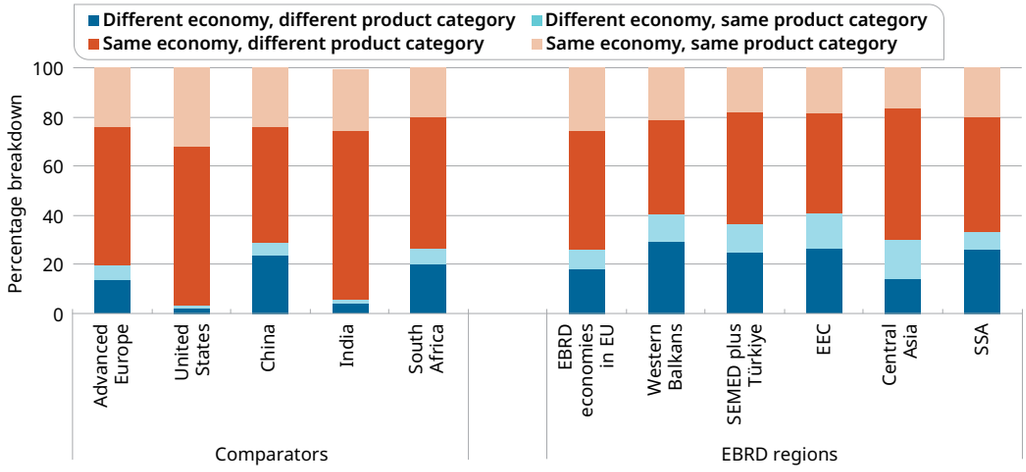
CHART 4.10 Prior entrepreneurial success helps to predict the success of subsequent ventures



SOURCE: Dealroom (n.d.) and authors' calculations.
NOTE: The sample comprises venture capital-backed founder firms headquartered in the EBRD regions and founded in 2010-24. Points are the difference in the predicted probability of raising funding relative to first-time founders, in percentage points, with 95 per cent confidence intervals. Lighter markers denote estimates that are not statistically significant at the 5 per cent level. An earlier venture is considered to have been a "success" if it was successful in raising funding.

Around
70%
of serial founders' ventures are in a different sector to their previous venture

CHART 4.11 Most subsequent ventures are in a different product category, and often a different economy



SOURCE: Dealroom (n.d.) and authors' calculations.
NOTE: The unit of observation is a consecutive venture-to-venture transition by a serial founder, retaining transitions where both the previous venture and the next one carry at least one product code and are founded in an EBRD economy or a sampled comparator. "Same product category" means the two ventures have an identical set of product codes; see the notes on Chart 4.7 for details of the classification. The founding economy is used throughout. "Advanced Europe" comprises France, Germany, Italy, Portugal, Spain, Sweden and the United Kingdom.

[17] See Brandt et al. (forthcoming).
[18] See Lerner et al. (2018).

Moreover, founders often move across national borders in the EBRD regions. In the Western Balkans, EEC, and SEMED and Türkiye, for example, between 37 per cent and 41 per cent of serial founders' ventures are formed in a different country to the previous one (compared with just 3 per cent in the United States, 6 per cent in India, 20 per cent in advanced Europe and 29 per cent in China).

Founders who have raised capital, hired teams and sold to customers in multiple economies build extensive networks of contacts and accumulate broad knowledge. Armenia and Moldova, for instance, have established high-complexity IT sectors by leveraging such international networks.

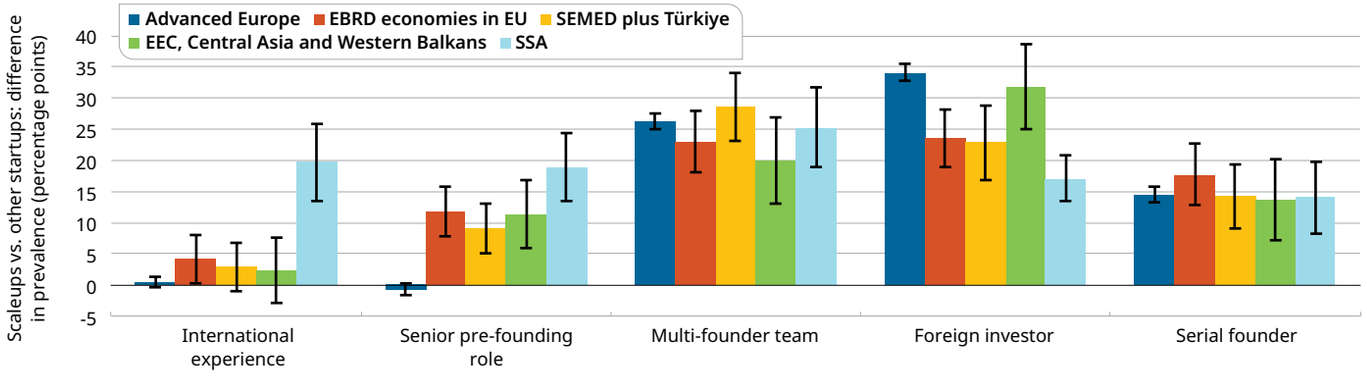
SUPPORTING THE UPSCALING OF FIRMS

High-growth startups are distinguished by their ability to reach scale, expanding from a handful of employees and a local client base to hundreds of staff and an international footprint within a few years. Not only do they create jobs, but they also help to spread new technologies and business practices, making a disproportionate contribution to aggregate employment and productivity growth.[19] Venture capital is designed to identify these firms early and help them to reach their potential. Staged financing funds many experiments and withdraws quickly from the weakest – a model that has backed a large share of the world's most valuable companies. Alphabet, Amazon, Apple, Meta and Microsoft in the United States, and Alibaba and Tencent in China, were all backed by venture capital before their public listings.[20]

This section profiles founders whose firms have reached scale ("scaleups") across the EBRD regions. A scaleup is defined as a startup that has raised at least US$ 15 million in cumulative funding, employs at least 50 people or carries a valuation of more than US$ 100 million. It then examines the financing of these ventures, looking at the geography, sectoral composition and origin of venture capital.

What founder experiences distinguish the firms that reach scale? Chart 4.12 shows the percentage gap in prevalence between scaleups and the rest of the startup population for five founder and financing characteristics: international study or work before founding; having at least one co-founder; having held a director-level or more senior position; having raised funds from a

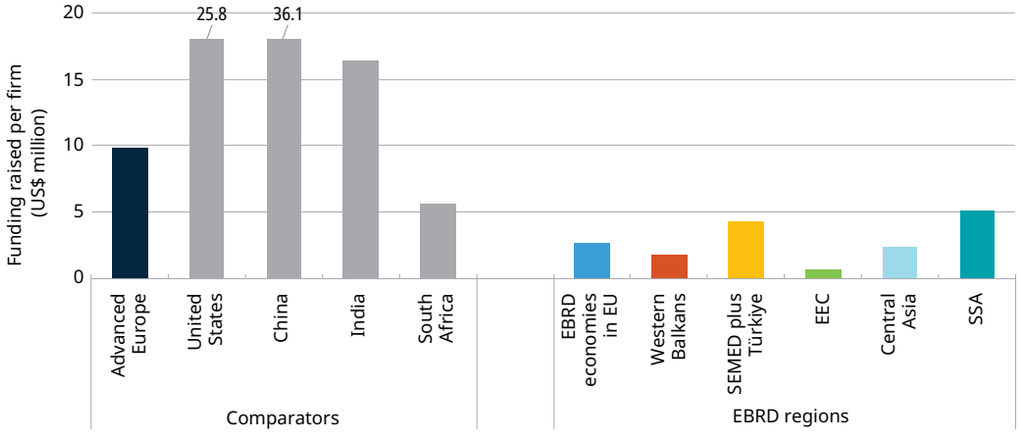
CHART 4.12 Founders of scaleups are more likely to have had a senior pre-founding role and had previous experience as a founder



SOURCE: Dealroom (n.d.), Revelio Labs (n.d.) and authors' calculations.
NOTE: Each bar indicates the percentage-point difference in the prevalence of a founder or firm characteristic between startups at scale and other startups; whiskers denote 95 per cent confidence intervals, with standard errors clustered by firm. "International experience" (meaning the founder studied or worked outside the founding economy before founding) and "senior pre-founding role" (meaning the last pre-founding job was at director level or above) are measured using Revelio Labs data on firms matched to a Revelio founder; see the notes on Chart 4.5. "Serial founder" (meaning at least one founder already had a previous venture at the time of founding), "multi-founder team" (meaning Dealroom records at least two founders) and "foreign investor" (meaning at least one investor was headquartered outside the founding economy) are measured using the full Dealroom sample. The sample comprises firms founded in 2015-24. "Advanced Europe" comprises France, Germany, Italy, Portugal, Spain, Sweden and the United Kingdom.

[19] See Haltiwanger et al. (2016) and Criscuolo, Gal and Menon (2014).
[20] See Lerner and Nanda (2020).

CHART 4.13 Startups in the EBRD regions raise less venture capital per firm than those in advanced Europe and other comparator countries



SOURCE: Dealroom (n.d.) and authors' calculations.
NOTE: Each bar denotes the mean funding raised per firm, in US$ million by region. A firm enters the sample if it records at least one round classified as "accelerator" or "incubator", "seed", "early-stage venture capital", "late-stage venture capital" or "growth and expansion". Funding is the firm's all-time total disclosed amounts for those rounds in nominal US dollars. A firm whose rounds carry no disclosed amount is imputed as zero. Firms are allocated to regions on the basis of their current headquarters. The figures shown are the means of venture capital per firm across countries within a region, weighted by the number of in-sample firms. Bars taller than India's have their height capped so that the smaller groups remain readable, with their true values printed above them; every other bar is drawn at its true height. "Advanced Europe" comprises France, Germany, Italy, Portugal, Spain, Sweden and the United Kingdom.

In the Western Balkans, EEC, and SEMED and Türkiye, between a **THIRD** and **TWO-FIFTHS** of serial founders' ventures are in a different economy to the previous one

foreign investor; and having founded a firm before. Two of these consistently distinguish scaleups from other startups across all regions: multi-founder teams are 20-29 percentage points more common among scaleups, while foreign investors are 17-34 percentage points more prevalent. The traits that most strongly distinguish scaleups from other startups are having foreign investment (in advanced Europe and the EEC region) and having a team of founders (in SSA and in SEMED and Türkiye).

Across the EBRD regions, scaleups are 9-19 percentage points more likely than other startups to have a founder who held a senior position in another firm prior to founding their own. In advanced Europe, there are no links between such pre-founding senior-level experience and scale. While in most EBRD regions, more than half of all growth-oriented founders studied or worked abroad prior to founding their companies (see Chart 4.5), founders' international experience is only strongly associated with scaleups in SSA. Where domestic capital markets and entrepreneurial ecosystems are deep, local networks, mentoring and early-stage finance are available without going abroad. Where they are thin, founders who have been abroad can access capital, know-how and contacts that others cannot, and the trait becomes a determinant of which firms grow.[21]

Lastly, prior founding experience is equally important in all regions: serial founders are 14-18 percentage points more prevalent among scaleups than other startups. This is consistent with the earlier finding that serial founders reach later funding stages more often.

ACCESS TO VENTURE CAPITAL AND FIRM GROWTH

Access to venture capital is also a powerful tool when it comes to scaling up. Startups in the EBRD regions raise relatively little venture capital per firm (see Chart 4.13). Consequently, it is more appropriate

[21] See Nanda and Khanna (2010).

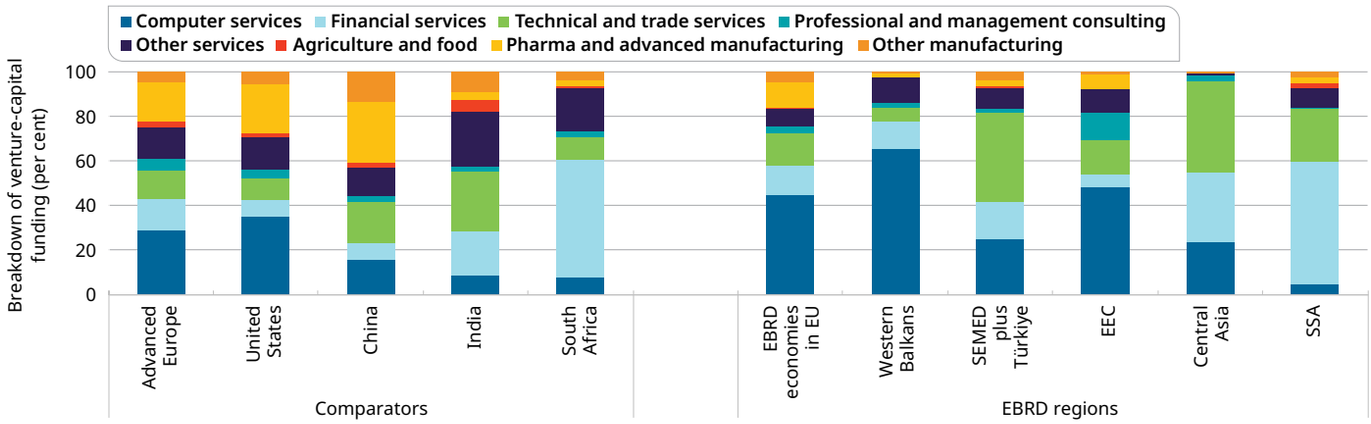
to evaluate them against other middle-income comparators. Funding per firm in the United States and China runs to tens of millions of US dollars, but on the back of capital markets with a depth that no EBRD economy has. On average, India's startups raise around US$ 16.5 million each and South Africa's US$ 5.6 million. No EBRD region achieves the South African figure. SSA comes closest, at US$ 5.1 million, with SEMED and Türkiye following at US$ 4.3 million.

Venture-capital funding is not spread evenly among the EBRD regions. Firms in the EEC region raise US$ 0.7 million, on average, roughly one-seventh of the SSA figure and the lowest of any group shown. Figures for EBRD economies in the EU, Central Asia and the Western Balkans range between US$ 1.7 million and US$ 2.6 million per firm. This ranking does not correlate strongly with economic or financial development. In SEMED and Türkiye and in SSA, fewer startups reach the venture-capital stage than in EBRD economies in the EU, but the average deal per startup is larger.

In capital-scarce environments, the quality of funding may be as important as the quantity. Evidence indicates that growth capital such as private equity creates value not only through the provision of funding, but also by fostering operational and managerial improvements, boosting employment and sales long after investors have exited.[22]

Venture capital in the EBRD regions flows overwhelmingly into services (see Chart 4.14). Services attract more than four-fifths of all venture funding in every EBRD region, compared with around three-quarters in advanced Europe and only about half in China. This largely mirrors the sectors where startups themselves cluster (see Chart 4.7): funding tends to follow the emergence of startups, rather than determine it. Within services, the concentration is sharper still, with funding usually dominated by just one or two categories, which differ from region to region. Computer services dominate in the Western Balkans, soaking up roughly two-thirds of all venture funding, and they account for close to half in EEC and EBRD economies in the EU. In SSA, in contrast, financial services account for a little over half of all funding, reflecting the region's prominent payments and mobile-money firms. Technical and trade-related services lead in Central Asia and in SEMED and Türkiye. Advanced Europe stands apart: no single category accounts for more than about a third, and funding is spread more evenly across services.

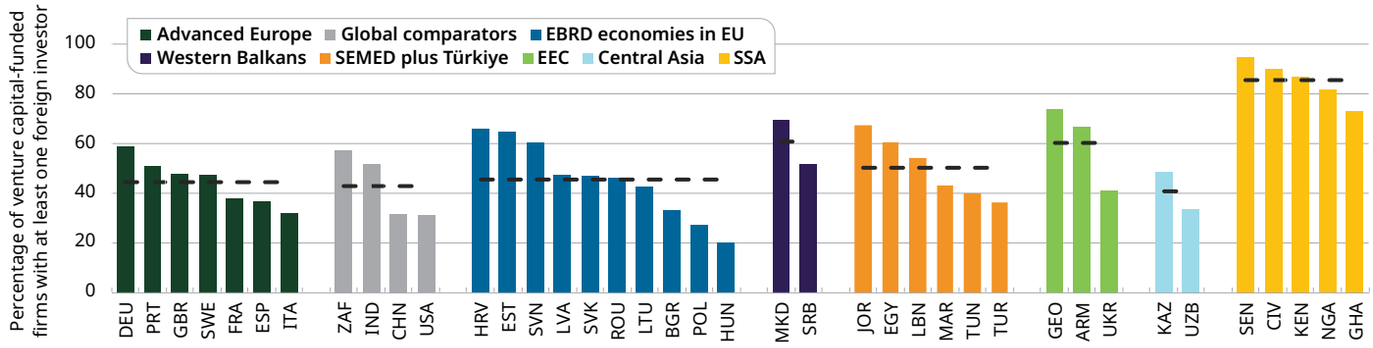
CHART 4.14 In every EBRD region, at least 80 per cent of venture capital is concentrated in services



SOURCE: Dealroom (n.d.) and authors' calculations.
NOTE: Each bar represents a region, and its segments denote each category's share of the region's total venture-capital funding. Coverage, product-code assignment and category definitions are as in Chart 4.7. "Advanced Europe" comprises France, Germany, Italy, Portugal, Spain, Sweden and the United Kingdom.

[22] See Biesinger et al. (2020).

CHART 4.15 Most growth-oriented startups have at least one foreign investor, particularly in SSA



SOURCE: Dealroom (n.d.) and authors' calculations.
NOTE: Each bar represents an economy and its height denotes the percentage of that economy's venture capital-funded firms that have at least one foreign investor. An investor is deemed to be foreign when its headquarters and the headquarters of the firm in question are located in different economies. The denominator is firms that raised funding in any staged round, from pre-seed to Series F. Investor-economy information covers about 96 per cent of staged transaction-investor links, and firms with no identified investor cannot be flagged as foreign backed. Economies with fewer than 10 venture capital-funded firms have been omitted. The horizontal dashed lines are unweighted means for the economies shown in each region. "Advanced Europe" comprises France, Germany, Italy, Portugal, Spain, Sweden and the United Kingdom.

Services absorb more than **FOUR-FIFTHS** of all venture funding in every EBRD region

What venture capital in the EBRD regions barely funds at all is pharmaceuticals and advanced manufacturing. These sectors absorb around a fifth to a quarter of all venture capital in China, the United States and advanced Europe, but only a fraction of that in the EBRD regions – about a tenth of total funding in EBRD economies in the EU, less in EEC and next to nothing elsewhere.

Reliance on foreign investors varies more within the EBRD regions than between those regions and advanced Europe. Chart 4.15 reports, for each economy, the percentage of growth-oriented startups that have at least one investor headquartered abroad. This share ranges from 20 per cent in Hungary to 95 per cent in Senegal. EBRD economies in the EU average around 45 per cent, matching advanced Europe, while Central Asia sits slightly below.

Reliance on foreign investors is consistently high across SSA, averaging around 85 per cent. Recent work on startup financing in the region attributes the scarcity of domestic equity to three factors, each of which has a counterpart in other EBRD regions.[23] The first is the supply of local equity capital, which is small relative to the savings that could, in principle, fund it. The second is the pool of local entrepreneurs able to attract startup finance at all. The third is the set of frictions limiting those entrepreneurs' access to foreign investors, which means that capital reaches founders who are already connected to it rather than those with the strongest ventures.

The first and third factors lend themselves most readily to policy intervention. On the supply of local equity capital, the binding constraint is rarely a regulatory ceiling: pension funds and insurers across SSA hold substantial and fast-growing assets, but use only a small fraction of their permitted allocation. What holds institutional investors back is complex fund licensing, a thin pipeline of investable opportunities

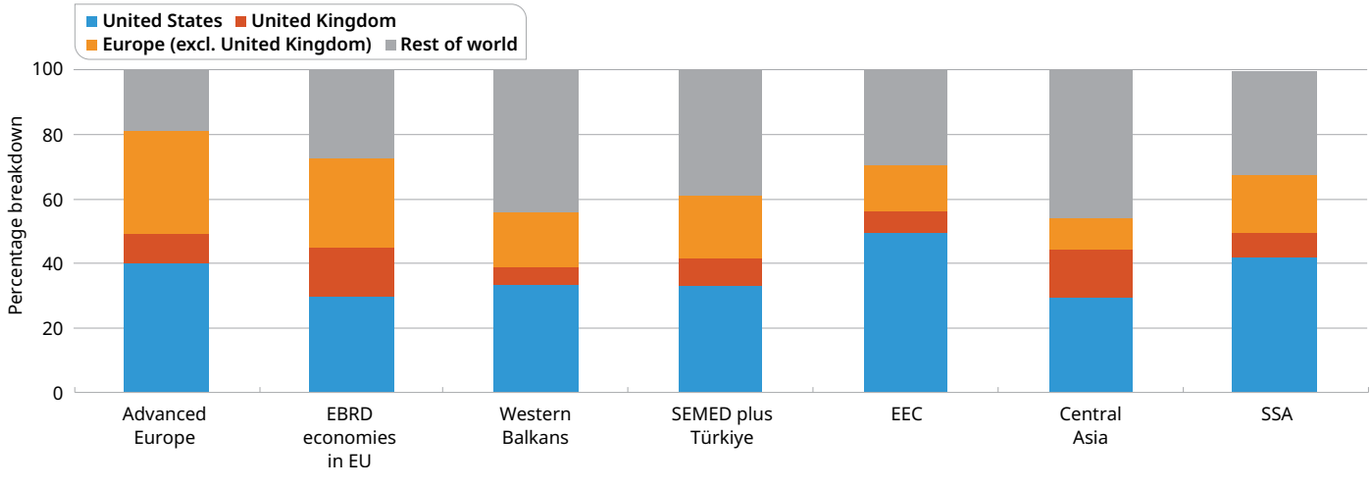
[23] See Colonnelli et al. (2026).

and the narrow set of fund managers with which most institutions deal. One option is to set a floor, in addition to a ceiling, on pension funds' allocations to private equity and venture capital, the asset class that funds later rounds. Where prudential rules have traditionally capped allocations to risky, illiquid assets in order to protect beneficiaries, a floor puts the same institutional capital to developmental use. In May 2025, for example, Ghana's National Pensions Regulatory Authority directed pension funds and insurers to allocate at least 5 per cent to private equity and venture capital by 2026. The success of minimum-allocation requirements generally depends on sequencing and safeguards: local fund-management capacity and a credible deal pipeline need to be in place, with requirements phased in alongside limits on individual-fund concentration, since a mandated inflow into a thin market risks chasing too few deals.

Frictions in access to foreign capital, in turn, are shaped by policy as well. Restrictions on foreign ownership work against the channel that supplies most startup finance at scale: in Tunisia, foreign equity of more than 49 per cent in most onshore non-industrial companies requires government authorisation, a constraint the 2019 Startup Act aims to circumvent (see Box 4.3).

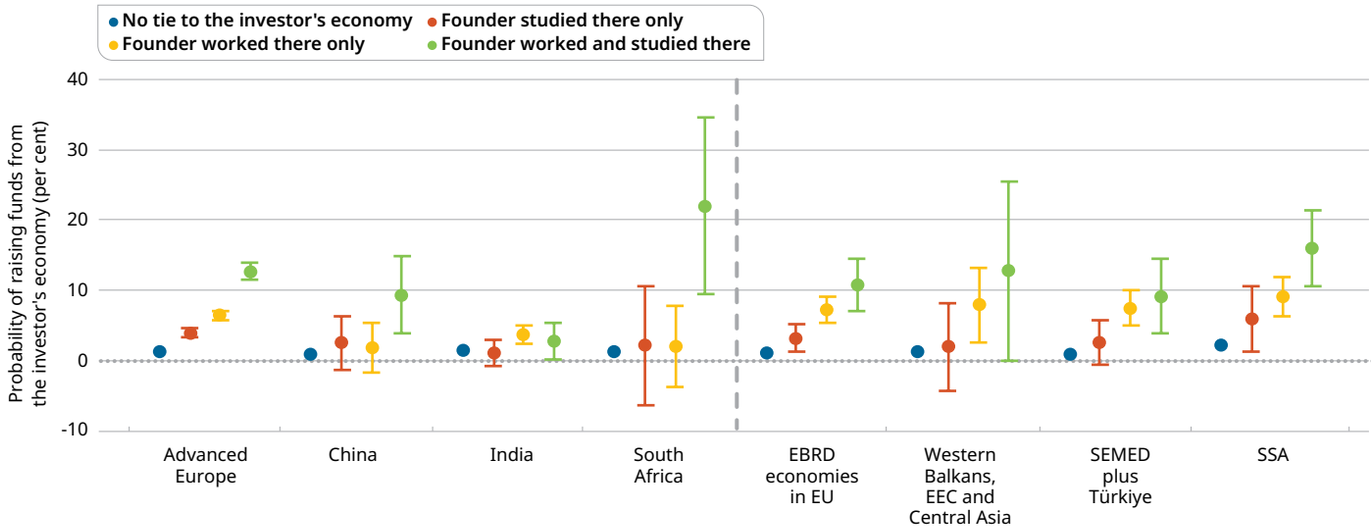
As with international experience, most foreign venture capital originates in the United States, the United Kingdom and Europe (see Chart 4.16). The United Kingdom plays a smaller role as a source of finance than as a source of founders' experience. EBRD economies in the EU are similar to advanced Europe in terms of the distribution of foreign-investor participation, but with a larger share coming from the United Kingdom. Other EBRD regions are less similar: the Western Balkans and Central Asia draw close to half of their venture capital from outside this concentrated set of countries, while SSA and EEC depend heavily on the United States, in particular.

CHART 4.16 The overwhelming majority of foreign venture capital comes from the United States, the United Kingdom and Europe



SOURCE: Dealroom (n.d.) and authors' calculations.
NOTE: The founding economy is taken from Dealroom, where available, and is otherwise the current location of the firm's headquarters. Only foreign capital is shown, meaning capital from investors headquartered outside the firm's founding economy, and the bars show the composition of foreign-investor participation, with each foreign investor in a round counted once. Here, "advanced Europe" comprises the EU-15 plus Norway and Switzerland, and excludes the United Kingdom, so it is a broader group than the "advanced Europe" comparator defined in the notes on the previous chart.

CHART 4.17 Founders are more likely to raise funds from economies where they have studied and/or worked



SOURCE: CEPII Gravity Database (Conte, Cotterlaz and Mayer, 2022), Dealroom (n.d.), Revelio Labs (n.d.) and authors' calculations.
NOTE: Points show the estimated probability that a founder's startup raised funding in a staged venture-capital round, from pre-seed to Series D and above, from an investor headquartered in a given economy, by EBRD region of the startup's current listed headquarters. A founder studied or worked in an economy if any university attended or any job held before founding was located there. The four rows per region are the mutually exclusive combinations of the founder's ties to that economy, from a single regression interacting one tie with the other. Each observation pairs a founder with one of the 94 investor economies backing at least five staged deals in EBRD economies, excluding the startup's own economy. The sample comprises 27,959 startups and 64,867 Revelio-matched founders. See Box 4.4 for the specification. "Advanced Europe" comprises France, Germany, Italy, Portugal, Spain, Sweden and the United Kingdom.

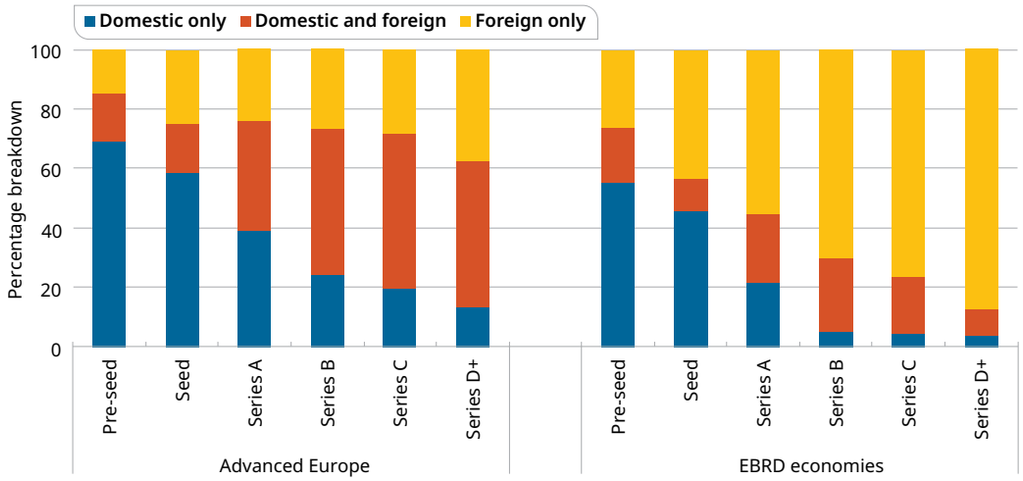
FOUNDERS' TIES SHAPE CAPITAL FLOWS

Relationships matter when it comes to the question of how venture capital is allocated. Better-networked venture-capital firms see better fund performance and their companies are more likely to survive to later financing rounds.[24] Chart 4.17 shows how this plays out in the EBRD economies. The markers correspond to estimates of the probability that a firm will raise capital from a given investor economy, conditional on whether its founder studied or worked there, controlling for distance, deal year, and investor and firm characteristics (see Box 4.4). Probabilities are estimated for each EBRD region and comparator in four cases: no tie to the investor's economy, study only, work only, and both study and work.

Having studied and/or worked in the investor's economy raises the probability of investment across almost the entire sample, with India the sole exception. This effect is larger in the EBRD regions than in South Africa, India or China, and larger still for advanced European comparators. In an advanced European economy, having both studied and worked there doubles the probability of raising capital from that economy relative to work experience alone and triples it relative to study alone.

[24] See Hochberg, Ljungqvist and Lu (2007).

CHART 4.18 Founders in the EBRD regions lean more on foreign capital than those in advanced Europe, especially at the scaleup stage



SOURCE: Dealroom (n.d.) and authors' calculations.
NOTE: Bars show percentage breakdowns of venture-capital funding rounds by investor composition across funding stages for firms founded in the EBRD regions, compared with advanced European comparators, using the full Dealroom sample. Funding is classified as "domestic only", "domestic and foreign" (a mixed syndicate) or "foreign only" based on investors' origin relative to the founding economy. The founding economy is taken from Dealroom, where available, and is otherwise the current location of the firm's headquarters. Non-venture growth rounds and rounds with no classifiable investor location are excluded. "Advanced Europe" comprises France, Germany, Italy, Portugal, Spain, Sweden and the United Kingdom.

Reliance on foreign capital is most pronounced at later funding stages, where the sums required are largest. Chart 4.18 shows the percentages of startups that are funded by three investor groups: domestic investors only, a combination of domestic and foreign investors, and foreign investors only. At pre-seed and seed stage, the distribution in EBRD economies is broadly comparable to that in advanced Europe. After that, the two diverge. Startups in EBRD economies draw increasingly on foreign capital as they mature, and by the pre-scale stage (Series D and above), they rely on it almost exclusively. Reliance also rises across stages in advanced Europe, but the share funded entirely from abroad remains lower and relatively stable until the latest stages.

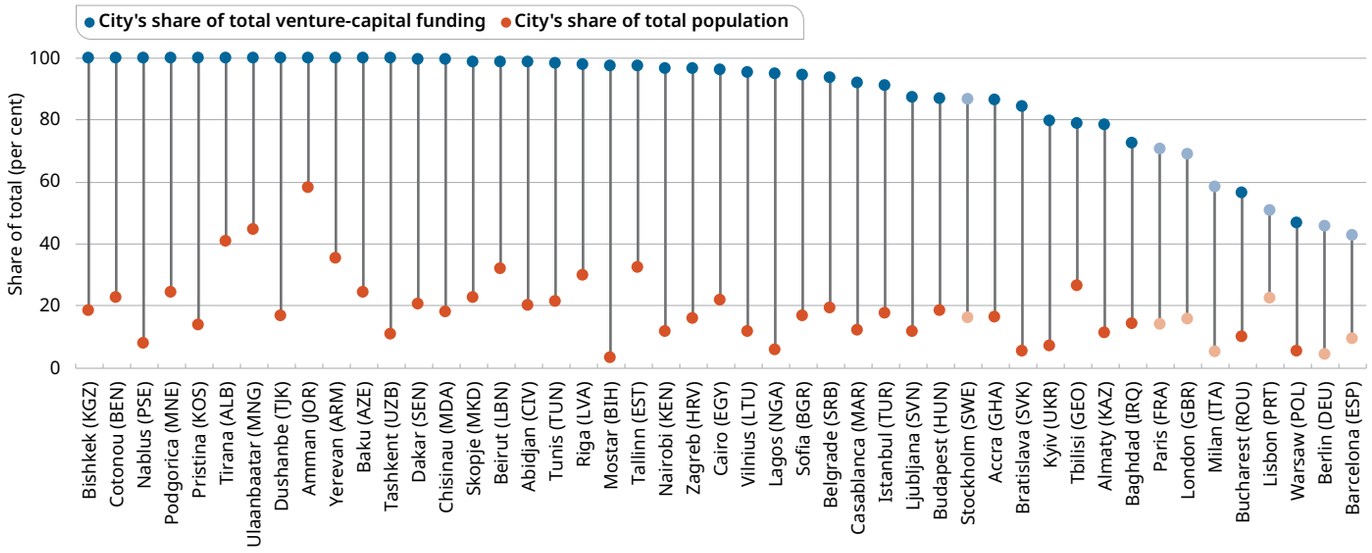
Venture capital in the EBRD regions is concentrated not only by sector and source, but also geographically within economies. Much of what makes an entrepreneurial ecosystem work is set at the national level: the depth of capital markets, financial regulation, the rule of law and the funding of universities. What startups draw on from day to day is more local. Founders have a disproportionate tendency to come from firms that are already operating in the same city, hiring is dependent on a deep local market for a narrow set of skills, and investors monitor and advise companies they can reach easily.[25] Venture activity, therefore, clusters more tightly than population does – a pattern documented in both advanced and emerging market economies.[26]

In most EBRD economies, this clustering is close to absolute (see Chart 4.19). In 14 of the economies shown, the leading metropolitan area accounts for 99 per cent or more of recorded venture funding, with those cities including Amman, Baku, Bishkek, Dushanbe, Podgorica, Pristina, Tashkent, Tirana, Ulaanbaatar and Yerevan. While this is not a problem in small economies, such

In 14 EBRD economies, a single city accounts for **99% OR MORE** of all recorded venture-capital funding

[25] See Gompers, Lerner and Scharfstein (2005).
[26] See Chen et al. (2010).

CHART 4.19 In most EBRD economies, venture capital is concentrated in one city, with the city's share of capital far exceeding its share of the population



SOURCE: Dealroom (n.d.), GeoNames (2026), United Nations (2025), World Development Indicators (World Bank, n.d.) and authors' calculations.
NOTE: This chart shows the key metropolitan areas for venture-capital funding in each economy, indicating the city's share of the economy's disclosed venture-capital funding and its share of the economy's population. Lighter markers denote cities in advanced European comparators. Firms are assigned to metropolitan areas based on the location of their headquarters, with GeoNames places of at least 15,000 inhabitants merged within 40 km. The city's share of the total population is the mid-2025 population of United Nations urban centres within the same radius, a tighter delineation than administrative city limits, relative to population data for the entire economy from the World Bank. Economies with fewer than 10 geocoded firms have been omitted.

concentration is not limited to economies of that size. Tunis soaks up 98 per cent of Tunisia's venture funding but houses only 21 per cent of its population; Nairobi absorbs 97 per cent of funding but is home to just 12 per cent of inhabitants; and Istanbul receives 91 per cent of venture funding, even though just 18 per cent of the population live there. The advanced European comparators are markedly less concentrated. Only two EBRD economies are similar to the average for those comparators in terms of concentration: Poland, where Warsaw takes 47 per cent of venture funding, and Romania, where Bucharest takes 57 per cent. Both countries are among the region's larger economies, with several sizeable university cities, which is consistent with more than one place being able to sustain a venture ecosystem.

Concentration of this kind is not, in itself, a problem. Clusters exist because proximity to investors, skilled workers and other founders raises the odds of a venture succeeding. When a country's entire venture market exists in one metropolitan area, founders elsewhere are potentially separated from it by distance rather than by the quality of what they build.

CONCLUSIONS AND POLICY IMPLICATIONS

The binding constraint in the EBRD regions is company growth, not company creation. Nothing in the evidence points to a shortage of founders or startups. There are several EBRD economies where growth-oriented startups are at least as prevalent as in advanced Europe, but they remain smaller than their advanced European counterparts at every stage and the gap widens rather than closes over the firm's lifecycle. In EBRD economies in the EU, the share of young firms achieving rapid growth has fallen steadily over the past two decades, even as productivity has continued to converge towards the frontier across the distribution. Whether that convergence continues or stalls will depend on firms' ability to make the transition from startup to scaleup.

Founders bring a wide range of experience to that transition. In most EBRD regions, more than half of all growth-oriented founders studied and/or worked abroad before launching their firm, drawing on a mix of global hubs and regional links. Serial founders are roughly as common in the EBRD regions as they are

in advanced Europe, and what carries value from one venture to the next is prior success rather than prior experience. At the same time, entrepreneurial careers in EBRD regions are more likely to be cross-border than they are in comparator countries, with second ventures far more likely to be founded in a different economy to first ventures.

The finance available to those founders, in contrast, is thin, narrow and concentrated. Startups in every EBRD region raise less venture capital per firm than those in middle-income comparators, and what they do raise goes overwhelmingly to services, pooling in a small number of categories, with relatively little reaching advanced manufacturing. Reliance on investors abroad (primarily in the United States, the United Kingdom and advanced Europe) rises with each funding stage, so that by the scaleup round, most capital comes from outside the founding economy.

Together, these findings set the terms for policy. Founder and firm characteristics shift the odds that a venture will scale up, but they leave most of the outcome unexplained, so schemes that stake public resources on picking individual winners in advance face long odds. What policy can shape instead is the environment in which many ventures attempt to grow: the depth of domestic finance, the stock of experienced founders, the use made of cross-border ties, and the geographic reach of investment.

On finance, foreign capital will remain important, but it cannot replace the development of domestic capital markets. Pension funds and insurers have a promising pool of long-horizon domestic savings, large enough for this asset class, yet where prudential rules already permit allocations to private equity and venture capital, those allowances often go unused. Some regulators have responded by setting minimum allocations in addition to ceilings, although such mandates carry risks: pension assets are held on behalf of beneficiaries and, in a thin market, a floor may bid up the price of the few later-stage deals available rather than increase the number of firms that reach them. Publicly backed funds of funds are another option, as they can help build the track record that domestic institutions need before they are prepared to take these risks on their own account. Which instrument is right depends on the constraint: where long-horizon domestic savings are scarce, pension and insurance reform comes first; where funds already exist but have too few firms to back, the problem lies further upstream.

The stock of experienced founders is a second asset that policy can build on. Because every venture that comes to an end returns an experienced founder to the ecosystem, the treatment of business failure matters as much as the treatment of business formation. Insolvency regimes that discharge honest failure quickly, without criminal or reputational consequences being carried over into the founder's next attempt, keep that stock in circulation. Similarly, the tax treatment of employee share options can determine whether the employees of a successful firm accumulate the capital and appetite that are required to found their own company.

Lastly, the region's cross-border founder base is an advantage that its market size would not otherwise deliver, and the task for policymakers is to make those connections worth deploying at home. Diaspora investment vehicles, workable foreign-currency and cross-border payment arrangements for early-stage firms, and tax treatment that does not penalise reinvestment from abroad all lower the cost of routing capital and expertise back through founders who have already raised, hired and sold in more than one market.

BOX 4.1 THE SCALEUP LEGACY OF SKYPE

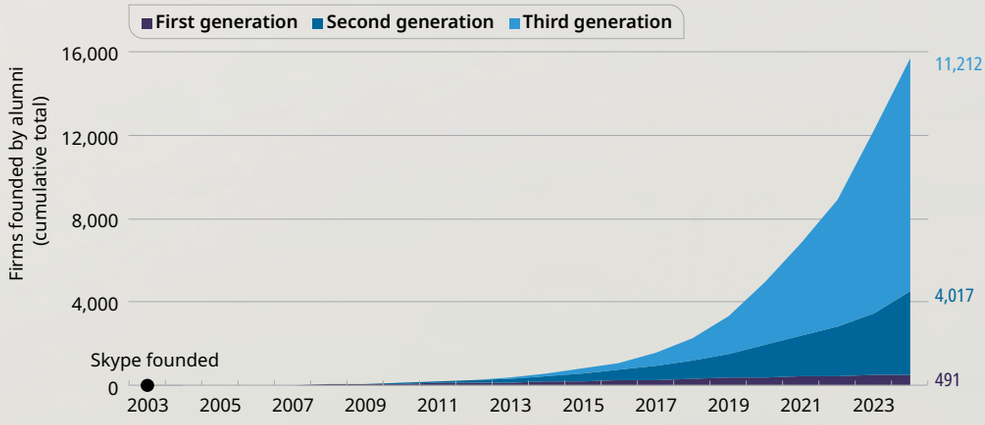
Successful scaleups may contribute to entrepreneurial ecosystems beyond the employment, output and innovation they generate directly, when their employees go on to establish ventures of their own. This box looks at such "entrepreneurial spawning" by examining the entrepreneurial footprint associated with Skype, an internet telephone and video-calling company that was acquired by Microsoft in 2011 and retired as a service in 2025. Skype was one of the first tech companies originating in Estonia to become a global household name. Using employment histories from Revelio Labs,[27] this box identifies all employees recorded as having worked at Skype since its founding in 2003 and looks at whether they subsequently founded firms themselves.

After joining Skype, 9.4 per cent of its employees went on to found a firm, compared with just 2.6 per cent of workers who began a job at a different company in the same economy in the same year. This differential remains when Skype alumni are compared with workers entering at similar levels of seniority. By 2024, Skype alumni had (co-)founded 491 first-generation companies, including Bolt (which developed a ride hailing app), Wise (a fintech company) and Pipedrive (which provides customer relations management software).

The firms founded by Skype alumni, in turn, became the origins of founders themselves. Employees of those 491 firms founded 4,017 second-generation firms, while employees of the second generation founded a further 11,212 third-generation firms. In total, more than 15,700 companies worldwide are connected to Skype through successive employment-to-founding links (see Chart 4.1.1). Of the 2,092 companies that have originated in Estonia since 1995, Skype ranks first in terms of the number of firms that its alumni have gone on to found. Moreover, this activity is highly concentrated: the top 1 per cent of those 2,092 companies are linked to 38 per cent of all alumni-founded firms, and Skype alone is linked to 1 in 12.[28]

CONTINUED

CHART 4.1.1 More than 15,700 firms worldwide can be traced back to Skype through chains of employment



SOURCE: Revelio Labs (n.d.) and authors' calculations.
NOTE: This chart traces the cumulative genealogy of firms worldwide that are connected to Skype through employment-to-founding links over the 2003-24 period. First-generation firms are founded by Skype alumni; later generations are founded by alumni of the preceding generation.

[27] See Revelio Labs (n.d.).

[28] Companies are counted as having originated in Estonia if at least one-fifth of their workforce was located there in their first five years.

BOX 4.1 CONTINUED

9.4%
of Skype's former employees went on to start a firm, seeding more than
15,700
companies over three generations

The data also reveal ongoing professional and financial relationships between some of the connected firms and Skype alumni. In total, 36 firms were co-founded by multiple alumni, while 278 alumni later joined firms founded by former Skype colleagues. With 87 of Skype's former employees later taking up investor roles, 22.7 per cent of first-generation firms with investors in Dealroom received funding from at least one other former employee, while 8 per cent of those firms share at least one investor with Skype itself.

Lastly, compared with the median firm founded in the same economy in the same year with no links to Skype, the median first-generation firm raises roughly 1.8 times the amount of first-round funding, reaches that first round about five months sooner and accumulates 2.4 times as much disclosed equity within three years of its first round.[29]

This analysis cannot establish why Skype sits at the root of such a large and interconnected lineage; its high rate of entrepreneurship may reflect worker selection, the experience and networks acquired at the firm, exposure to entrepreneurial peers, or some combination of these factors. What it does illustrate is that the return on a single successful scaleup extends well beyond the employment, output and innovation it generates directly. A firm that achieves global scale can become part of the entrepreneurial infrastructure of its economy: a recurring source of founders, experienced employees and, as the reappearance of alumni as investors shows, risk capital that stems from earlier success. Seen this way, the contributions of a small number of firms that make the transition from entry to scale may compound over time in a manner that standard, contemporaneous measures of firm performance do not capture. That potential strengthens the case for policies that ease the scaleup constraints identified in this chapter and keep open the channels through which talent and capital circulate (including across borders).

[29] Based on equity rounds for venture-tracked firms in Dealroom (n.d.).



BOX 4.2 MEASURING THE RETURNS ON PRIOR FOUNDING EXPERIENCE

Regardless of whether an earlier venture succeeded, founding a company generates know-how and network connections that a founder can draw on in the future. At the same time, however, investors, employees and commercial partners may be discouraged by a track record of failure if an earlier venture did not succeed.

The analysis reported in Chart 4.10 follows research from the United States and applies the same design to ventures headquartered in the EBRD regions.[30] In this probit regression framework, the probability of a venture achieving a given outcome is linked to a dummy variable for founders with an earlier venture, a separate dummy variable for an earlier venture that succeeded before the current one was founded, company age at the time of the first funding round, and the experience of the venture-capital firms participating in that round, as well as fixed effects for sector, headquarters economy, founding cohort and entry stage.

Four outcomes are examined: reaching a Series A round or later; reaching a Series B round or later; realising an exit through an initial public offering or acquisition; and the founder subsequently becoming an angel investor in another firm. The first three are venture-level outcomes. The fourth is a founder-level outcome and is estimated without the control for venture-capital firm experience. A prior realised exit is the benchmark for the exit outcome; a prior Series A round is the benchmark for the other three outcomes.

The Dealroom data on ventures in the EBRD regions cover ventures that were founded between 2010 and 2024 and raised at least one round of venture capital.[31] For the exit outcome, the sample is restricted to cohorts founded in or before 2020. Each venture enters the data at the time of its first funding round, which removes any differences arising from where firms are in their lifecycle; a founder may appear in several ventures, and a venture with several founders will appear once per founder. Standard errors are two-way clustered, by company and by founder, to account for this.

The predicted funding rate for previously successful founders is obtained by switching on both dummy variables for every venture in the sample, holding its other characteristics fixed and averaging the predicted probabilities, while the coefficient for prior success captures the difference in outcomes between serial founders who succeeded previously and those who failed.

[30] See Gompers et al. (2010).

[31] See Dealroom (n.d.).

BOX 4.3 TUNISIA'S STARTUP ACT AND ITS IMPACT ON FIRM SURVIVAL AND JOB CREATION

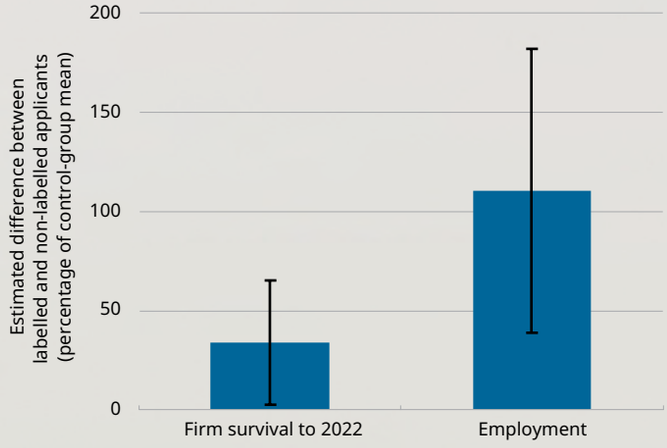
As young firms account for a disproportionate share of job creation and productivity growth, governments in both advanced and developing economies are introducing targeted measures to encourage their creation and growth.[32] These policies typically seek to ease the financial and administrative constraints faced by young and small firms through instruments such as grants and other forms of capital support, or employment and wage subsidies.[33] Rigorous assessments of the effectiveness of these programmes are scarce, particularly in developing economies. The evaluation of Tunisia's Startup Act in Ali, Calì and Rijkers (2025) provides quasi-experimental evidence on this question.

In an effort to support innovative firms, the Startup Act, adopted in Tunisia in 2019, introduced the "Startup Label", a merit-based designation that gives selected firms access to a range of financial and regulatory benefits. Once it has been labelled in this way, a firm receives benefits including full social security coverage, corporate tax exemptions, access to foreign-currency bank accounts, easier customs procedures (based on "Authorised Economic Operator" status) and, in certain cases, a founder stipend and a technology card (a prepaid international payment card that enables resident firms to pay for digital services from abroad in a foreign currency). The label is awarded following a multi-stage voting process by a nine-member expert committee. Firms with at least five affirmative or five negative votes are accepted or rejected immediately. Firms on which the committee is undecided are sent to a "pitch stage". These marginal cases are arguably highly comparable, reducing concerns about selection bias when comparing the performance of label recipients with that of other firms.

Linking the programme's voting records to the Répertoire National des Entreprises, an administrative register of firms' tax, social security and customs records, Ali, Calì and Rijkers (2025) follow the 466 firms that applied between 2019 and 2021 through to the end of 2022. In particular, they track the performance of the 118 marginal pitch-stage firms and compare the outcomes for the accepted and rejected applicants using a difference-in-differences design that accounts for the staggered timing of labelling.

By the end of 2022, labelled firms were 18 percentage points more likely to remain active than the rejected firms (for which the survival rate was 53 per cent; see Chart 4.3.1). Similarly, labelled firms increased their staff by an extra 110 per cent (two full-time workers) on average, in addition to increasing their annual wage bill. These gains were driven primarily by growth within surviving firms, rather than reductions in firm exits. Further analysis suggests that these gains were primarily enabled by preferential customs treatment and access to foreign exchange afforded by the programme.

CHART 4.3.1 Tunisian firms awarded the Startup Label are more likely to survive and add employment



SOURCE: Ali, Calì and Rijkers (2025).
NOTE: Estimates are taken from published tables. Effects are expressed as a percentage of the control-group mean; 90 per cent confidence intervals are shown.

[32] See Juhász, Lane and Rodrik (2024).
[33] See Betcherman, Daysal and Pagés (2010).



The programme is estimated to have generated TND 2.7 (€0.81) in benefits for every TND 1 (€0.30) of public expenditure, taking into account stipend payments, administrative expenses and forgone tax and social-security revenues. The implied public cost per additional full-time job created was approximately TND 14,606 (€4,400).

While the Startup Act has improved firm survival and employment and generated positive returns on public spending, its impact remains modest relative to the programme's stated ambitions. At the time the paper was published, only 17.4 per cent of labelled firms had achieved the programme's target of having 10 or more waged employees in total within three years of receiving the label, and the programme was not on track to achieve its goal of generating 10,000 jobs by 2025.

BOX 4.4 FOUNDER-INVESTOR CONNECTIONS SHAPE CAPITAL FLOWS

This box explains the estimates presented in Chart 4.17, demonstrating that founders who worked and/or studied in a particular economy before launching their venture have a higher probability of raising venture-capital funding from that economy. The estimates are based on a linear probability model, which links a dummy variable capturing whether a founder obtained venture-capital funding from a particular economy to variables capturing their experience of studying there and working there.[34] Specifications include an interaction term capturing instances in which a founder both studied and worked in the economy in question, as well as control variables, including the distance between the economy where the recipient firm's headquarters are currently located and the investing economy, firm-economy and deal-year fixed effects, and fixed effects for each economy of education and work experience. These effects absorb differences in access to funding across economies and over time.

The analysis uses Revelio Labs data on founders and their past experience and Dealroom data on venture-capital funding for founders' companies.[35] The combined dataset contains 27,959 startups and 64,867 founders. Each observation is a combination of a founder and one of the 94 investor economies, focusing only on economies that have backed at least five staged deals in the EBRD regions (excluding the founder's own economy).

The estimated effects are likely to be conservative. While funding location is determined by the firm's current headquarters, some firms may have raised funding before moving their headquarters to the current location – instances that are not observed in the data. This may result in experience matches being undercounted in the analysis.

[34] See Colonnelli et al. (2026).

[35] See Revelio Labs (n.d.) and Dealroom (n.d.).

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CHAPTER 5



STRUCTURAL REFORM

This chapter presents the EBRD's latest assessment of transition challenges in its regions, looking at whether economies are competitive, well governed, green, inclusive, resilient and integrated. It also introduces the SME Competitiveness Index. Assessments of the competitiveness of small and medium-sized enterprises (SMEs) are closely, yet imperfectly, aligned with assessments of the competitiveness of the broader economy. Between 2016 and 2026, perceived increases in overall competitiveness have tended to outpace improvements in SME competitiveness, particularly in central Europe and the Baltic states. This underlines the importance of fine-tuning dedicated SME policies across the EBRD regions, with a focus on access to finance, skills and legal frameworks for small firms.





INTRODUCTION

This chapter presents the EBRD's latest assessment of transition challenges in its regions and selected comparator economies, tracking progress in the area of structural reform. The assessment 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 Tables 5.1 and 5.2 and Chart 5.1).[1]

TABLE 5.1 ATQ scores for six key qualities of a sustainable market economy: EBRD regions

	Competitive			Well governed			Green			Inclusive			Resilient			Integrated		
	2026	2025	2016	**2026**	2025	2016	**2026**	2025	2016	**2026**	2025	2016	**2026**	2025	2016	**2026**	2025	2016
Central Europe and the Baltic states (CEB)																		
Croatia	6.75	6.71	6.77	6.48	6.47	6.30	6.92	6.92	5.98	6.54	6.51	6.47	7.45	7.43	6.05	6.73	6.66	6.16
Estonia	7.88	7.86	8.23	8.79	8.79	8.62	7.20	7.21	6.27	7.25	7.23	6.82	7.76	7.76	7.32	7.93	7.91	7.49
Hungary	6.62	6.60	6.64	5.86	5.90	5.90	6.92	6.93	6.15	5.75	5.77	5.73	7.18	7.18	6.60	7.01	7.73	7.49
Latvia	6.57	6.55	6.61	7.60	7.60	6.88	7.13	7.13	6.31	6.68	6.67	6.38	7.45	7.47	6.92	7.51	7.45	7.28
Lithuania	6.79	6.74	6.70	7.96	8.10	7.35	7.16	7.16	6.51	7.01	6.91	6.58	7.51	7.44	6.73	7.58	7.57	6.84
Poland	6.48	6.44	6.69	7.01	7.00	7.49	7.18	7.18	6.60	6.34	6.33	6.63	7.73	7.70	7.27	7.14	7.10	6.78
Slovak Republic	6.66	6.64	6.52	6.57	6.60	6.27	7.26	7.26	6.79	6.35	6.36	6.19	7.64	7.61	7.28	7.25	7.17	7.30
Slovenia	6.85	6.82	6.79	7.29	7.30	7.31	7.32	7.32	6.77	7.06	7.06	6.72	7.61	7.61	7.12	7.26	7.20	6.55
South-eastern Europe (SEE)																		
Albania	5.23	5.22	5.05	5.09	5.00	5.44	4.97	4.97	4.88	5.06	5.23	4.90	4.95	4.95	4.45	5.43	5.43	5.28
Bosnia and Herzegovina	4.99	4.97	4.84	4.31	4.33	4.87	5.40	5.40	4.72	5.12	5.11	5.26	5.57	5.57	5.01	5.08	5.07	4.59
Bulgaria	6.41	6.39	6.05	6.01	6.07	5.96	6.84	6.84	5.63	5.81	5.77	5.51	6.69	6.56	5.89	6.60	6.57	6.68
Kosovo	4.61	4.47	4.21	5.05	5.10	5.14	3.78	3.78	3.55	5.39	5.32	5.31	4.96	4.95	4.35	5.51	5.47	4.92
Montenegro	6.15	6.11	5.42	6.40	6.42	6.08	6.29	6.29	5.50	5.59	5.57	5.22	5.69	5.72	5.11	6.01	6.04	5.54
North Macedonia	5.71	5.68	5.38	5.53	5.55	5.91	5.95	5.94	4.89	5.48	5.47	5.16	5.60	5.57	4.89	6.23	6.19	5.35
Romania	6.27	6.26	6.07	6.64	6.64	6.15	6.74	6.74	5.98	5.71	5.71	5.67	6.90	6.89	6.37	6.66	6.59	6.43
Serbia	5.51	5.49	5.47	6.10	6.17	5.89	5.59	5.58	5.02	5.52	5.49	5.34	5.44	5.41	5.11	6.36	6.32	5.72
Türkiye	5.66	5.76	5.85	6.22	6.28	6.14	5.47	5.47	5.04	5.12	5.08	5.19	7.07	7.08	6.57	5.96	5.89	5.88
Eastern Europe and the Caucasus (EEC)																		
Armenia	5.10	4.96	4.46	6.61	6.61	6.00	6.02	6.02	5.48	4.99	4.99	4.82	6.62	6.55	5.19	5.71	5.88	5.12
Azerbaijan	4.51	4.50	4.31	5.89	5.85	5.36	5.31	5.31	4.79	5.28	5.28	4.93	3.80	3.80	3.55	5.08	5.10	5.62
Georgia	5.71	5.68	5.31	6.11	6.19	6.68	5.71	5.71	5.18	5.37	5.39	5.08	5.75	5.77	4.58	6.45	6.42	6.02
Moldova	5.01	5.03	4.82	5.43	5.44	4.73	4.72	4.72	4.37	5.28	5.27	5.20	4.88	4.90	4.44	5.20	5.15	5.13
Ukraine	5.25	5.26	5.50	4.82	4.81	4.33	5.62	5.62	5.16	5.98	6.02	5.53	4.93	4.85	4.30	5.30	5.26	5.29
Central Asia																		
Kazakhstan	5.47	5.41	5.24	6.27	6.36	5.76	5.19	5.19	4.73	5.20	5.22	4.95	5.91	5.89	5.15	5.21	5.22	5.06
Kyrgyz Republic	4.08	4.04	3.72	4.34	4.41	4.57	4.98	4.98	4.63	4.67	4.67	4.54	4.56	4.45	4.29	4.40	4.44	3.99
Mongolia	4.34	4.33	4.44	5.44	5.51	5.46	4.69	4.69	4.81	5.40	5.40	5.04	5.10	5.20	4.55	5.49	5.51	4.58
Tajikistan	3.73	3.72	3.60	4.66	4.67	4.42	5.57	5.57	5.21	4.14	4.15	3.93	3.55	3.55	2.98	4.01	3.97	3.33
Turkmenistan	3.37	3.36	3.31	3.15	3.18	3.36	4.67	4.67	4.65	4.22	4.23	4.02	3.06	3.06	2.87	4.11	4.11	4.18
Uzbekistan	4.35	4.35	4.05	5.03	5.05	4.81	5.61	5.55	4.88	4.46	4.49	4.24	4.07	4.04	3.30	5.03	5.01	4.00
Southern and eastern Mediterranean (SEMED)																		
Egypt	3.62	3.62	3.59	5.63	5.65	5.01	4.93	4.92	4.57	4.20	4.20	4.02	4.60	4.62	3.68	5.55	5.43	4.43
Iraq	2.26	2.27	2.07	2.85	2.82	2.86	3.87	3.87	3.89	3.63	3.61	3.56	3.57	3.57	3.61	3.44	3.42	2.68
Jordan	5.04	5.08	4.88	6.08	6.11	6.09	5.30	5.30	5.59	4.98	5.00	4.40	5.54	5.56	4.72	5.50	5.48	5.56
Lebanon	4.97	4.97	4.87	3.64	3.62	4.25	4.92	4.89	4.88	4.23	4.20	4.33	3.19	3.22	3.95	5.07	5.08	4.78
Morocco	4.12	4.18	4.13	5.97	5.94	5.61	5.34	5.34	5.23	4.23	4.23	4.15	5.47	5.41	4.63	5.34	5.27	5.04
Tunisia	4.33	4.34	4.59	4.85	4.91	5.32	4.77	4.77	4.62	4.77	4.77	4.86	4.80	4.79	3.88	4.92	4.90	4.70
West Bank and Gaza	3.13	3.20	2.99	3.23	3.23	3.59	4.37	4.37	4.19	3.74	3.74	3.62	3.32	3.36	3.37	4.55	4.54	3.98
Sub-Saharan Africa (SSA)																		
Benin	3.81	3.77	3.08	4.45	4.49	3.82	4.56	4.47	4.36	4.08	4.05	3.91	3.60	3.61	3.14	3.37	3.34	3.16
Côte d'Ivoire	4.05	4.07	3.26	4.01	4.03	3.85	4.63	4.63	4.31	4.16	4.15	3.91	3.72	3.65	3.52	3.78	3.72	3.28
Ghana	3.67	3.67	3.35	5.15	5.10	4.91	4.69	4.68	4.54	4.23	4.25	4.22	4.75	4.55	4.24	3.24	3.19	3.29
Kenya	4.15	4.10	4.09	4.38	4.44	4.30	4.90	4.90	4.75	4.09	4.08	4.09	4.31	4.24	3.92	3.66	3.63	3.86
Nigeria	3.54	3.54	3.20	3.48	3.45	3.69	4.13	4.13	3.79	4.30	4.25	4.10	4.49	4.56	3.83	3.03	2.99	3.16
Senegal	3.81	3.81	3.49	4.83	4.79	4.44	4.56	4.55	4.41	4.11	4.12	3.74	3.65	3.57	3.45	3.85	3.80	3.00

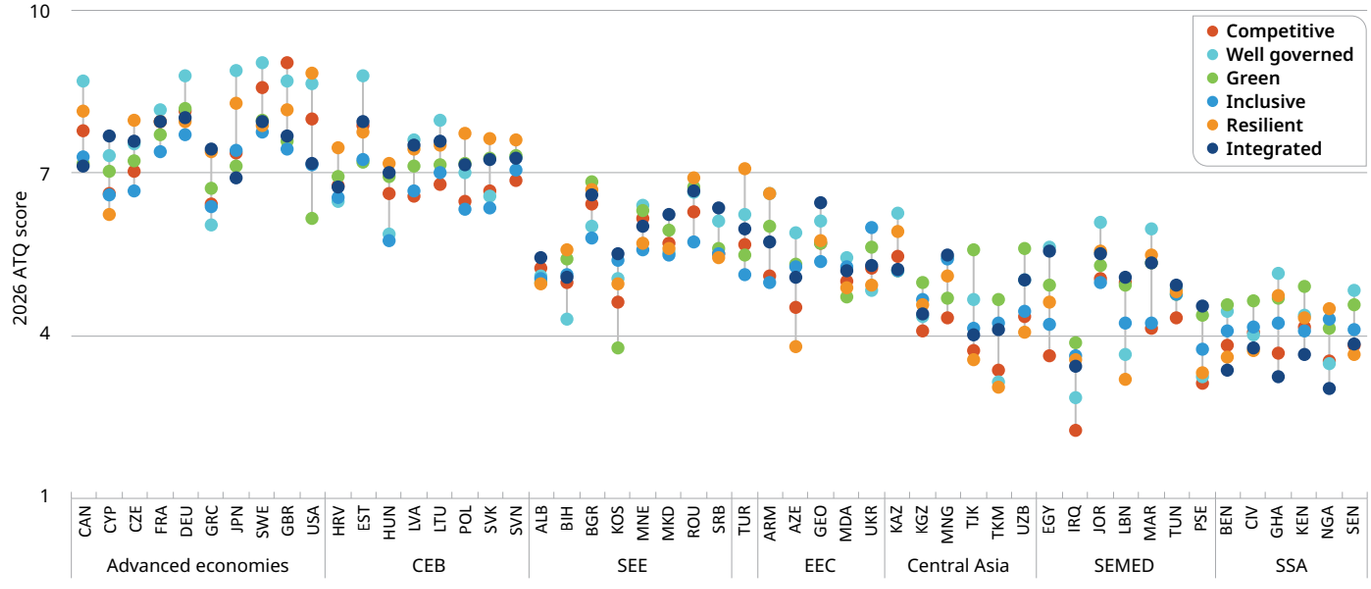
SOURCE: EBRD.
NOTE: Scores are on a scale of 1 to 10, where 10 represents a synthetic frontier corresponding to the standards of a sustainable market economy. All scores have been updated following methodological changes in 2026[2] and may differ from previously published versions. Owing to lags in the availability of underlying data, ATQ scores for the last two years may not fully correspond to developments in those calendar years.

TABLE 5.2 ATQ scores for six key qualities of a sustainable market economy: comparator economies

	Competitive			Well governed			Green			Inclusive			Resilient			Integrated		
	2026	2025	2016	**2026**	2025	2016	**2026**	2025	2016	**2026**	2025	2016	**2026**	2025	2016	**2026**	2025	2016
Advanced economies																		
Canada	7.77	7.76	7.67	8.70	8.73	9.06	7.17	7.17	6.55	7.30	7.29	7.29	8.15	8.13	7.53	7.12	7.10	7.12
Cyprus	6.62	6.59	6.74	7.31	7.35	7.25	7.02	7.02	6.02	6.60	6.57	6.38	6.23	6.22	5.30	7.67	6.88	7.09
Czechia	7.03	6.98	7.00	7.53	7.50	7.24	7.23	7.23	6.58	6.67	6.64	6.46	7.96	7.94	7.77	7.58	7.55	7.76
France	7.94	7.93	7.79	8.15	8.19	8.18	7.69	7.69	7.44	7.40	7.41	7.50	7.94	7.94	7.60	7.94	7.87	7.61
Germany	8.13	8.12	8.00	8.79	8.77	9.05	8.18	8.18	7.94	7.69	7.68	7.80	7.93	7.97	7.53	8.01	7.99	7.81
Greece	6.43	6.41	6.49	6.04	6.07	5.96	6.71	6.71	5.96	6.37	6.35	6.22	7.39	7.39	6.54	7.43	7.39	6.05
Japan	7.36	7.35	7.40	8.87	8.87	8.80	7.12	7.12	7.28	7.41	7.41	7.29	8.29	8.28	7.45	6.92	6.91	6.97
Sweden	8.57	8.56	8.40	9.02	9.03	9.29	7.98	7.97	7.78	7.75	7.74	7.77	7.87	7.88	7.28	7.93	7.86	7.75
United Kingdom	9.02	9.00	8.91	8.69	8.68	9.17	7.58	7.58	7.27	7.43	7.44	7.60	8.16	8.16	7.42	7.68	7.70	7.83
United States of America	8.00	8.01	7.98	8.63	8.67	8.83	6.16	6.16	6.72	7.14	7.16	7.08	8.83	8.78	8.20	7.17	7.33	7.19
Other comparators																		
Algeria	2.53	2.51	2.53	3.47	3.49	3.45	3.44	3.44	3.40	4.06	4.07	4.20	3.52	3.50	3.51	3.35	3.32	3.11
Bangladesh	3.65	3.65	3.54	5.95	5.91	5.75	4.27	4.26	4.09	3.62	3.62	3.65	5.91	5.90	5.38	3.91	3.89	4.23
Belarus	5.25	5.23	4.69	4.53	4.55	4.81	5.52	5.52	5.55	4.98	4.98	5.18	3.89	3.86	3.27	6.08	6.11	5.27
Brazil	5.19	5.25	4.88	6.14	5.90	6.04	5.99	5.99	5.82	5.41	5.38	5.28	6.46	6.44	5.54	5.02	4.96	4.80
Colombia	5.04	5.04	5.04	6.26	6.28	6.31	5.86	5.86	5.64	4.69	4.69	4.82	6.22	6.17	5.63	5.54	5.50	4.98
Libya	2.00	1.96	2.22	2.35	2.35	2.45	3.15	3.15	3.09	3.43	3.41	3.49	3.34	3.34	3.07	3.38	3.35	2.75
Mexico	5.15	5.15	5.20	6.15	6.18	6.33	5.63	5.63	5.51	4.82	4.80	4.77	6.17	6.11	5.44	5.74	5.73	5.55
Russia	5.63	5.60	5.38	5.46	5.50	5.57	5.63	5.63	5.18	4.65	4.69	4.68	6.10	6.10	5.45	4.89	4.88	5.43
South Africa	6.22	6.23	6.23	7.45	7.43	7.99	4.59	4.59	4.80	4.75	4.75	4.73	6.03	6.02	5.20	5.85	5.77	5.70
Thailand	5.73	5.67	5.67	6.99	7.10	6.78	5.34	5.34	5.14	4.84	4.79	4.69	6.03	5.99	5.41	6.22	6.16	5.52

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. All scores have been updated following methodological changes in 2026[3] and may differ from previously published versions. Owing to lags in the availability of underlying data, ATQ scores for the last two years may not fully correspond to developments in those calendar years.

CHART 5.1 ATQ scores for six key qualities of a sustainable market economy, 2026



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.

[1] For a detailed description of that methodology, see https://www.ebrd.com/content/dam/ebrd_dxp/assets/pdfs/office-of-the-chief-economist/transition-report-archive/transition-report-2026/chapters/transition-report-2026-27-methodological-notes.pdf. For a comprehensive overview of structural reforms over the past 12 months, see https://www.ebrd.com/home/news-and-events/publications/economics/transition-reports/transition-report-2026-27/country-assessments.html.

[2] For a detailed description of methodological changes in 2026, see https://www.ebrd.com/content/dam/ebrd_dxp/assets/pdfs/office-of-the-chief-economist/transition-report-archive/transition-report-2026/chapters/transition-report-2026-27-methodological-notes.pdf.

[3] For a detailed description of methodological changes in 2026, see https://www.ebrd.com/content/dam/ebrd_dxp/assets/pdfs/office-of-the-chief-economist/transition-report-archive/transition-report-2026/chapters/transition-report-2026-27-methodological-notes.pdf.

RECENT CHANGES TO SCORES

Since 2016, when the ATQ scores were first published, average scores in the EBRD regions have improved most for the "resilient", "green" and "integrated" qualities, while the least progress has been observed for the "competitive" and "well governed" qualities (see Chart 5.2). This picture is largely unchanged from last year's assessment.[4]

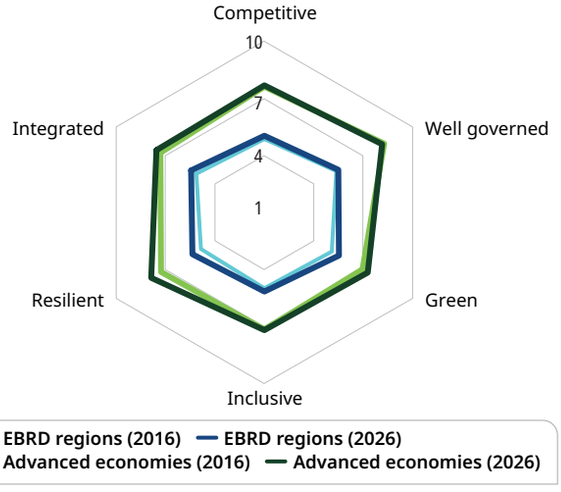
In terms of the "integrated" quality, for instance, most economies have improved their digital connectivity and trade integration through greater access to fixed broadband, higher internet use, increases in the coverage of the Long-Term Evolution (LTE) wireless communications standard, faster internet speeds, lower trade costs and more widespread bilateral and regional trade agreements. Trade volumes have also continued to grow, although some economies, particularly EBRD economies in the EU and Ukraine, have experienced a sustained decline in their ratios of trade to GDP, in Ukraine's case as a result of Russia's continued war of aggression.

At the same time, some economies have introduced greater barriers to trade in goods and services, placed additional restrictions on FDI and seen an increase in mobile broadband costs. Looking at economies' relative standings in terms of economic integration, Hungary, Azerbaijan, Moldova and Ukraine have seen the most pronounced declines, driven by weaker logistics services, lower FDI inflows, slower perceived internet speeds, and reduced trade volumes and damage to infrastructure resulting from Russia's war on Ukraine (see Chart 5.3, which tracks the relative standings of economies over time). Ukraine and Moldova's "integrated" scores have increased modestly over the last 10 years, but their relative standings have declined as a result of greater improvements in the scores of most other economies.

When it comes to economic competitiveness, overall progress has been more limited. Between 2016 and 2026, many economies have seen improvements in labour productivity, better access to finance for SMEs, greater economic complexity, stronger skills and increases in business formation. Notable improvements have been observed in Armenia, Benin and Côte d'Ivoire, driven by better infrastructure and logistics, higher exports of advanced business services, stronger labour productivity and improved SME financing (see Chart 5.4).

At the same time, some economies, including Tunisia and Ukraine, have seen a deterioration in their assessed levels of competitiveness as a result of higher tariffs, lower ratios of private-sector credit to GDP, a deterioration in the quality of infrastructure (in Ukraine's case, as a result of Russian attacks) and lags in exports of advanced business services.

CHART 5.2 Since 2016, average scores in the EBRD regions have improved most for the "resilient", "green" and "integrated" qualities

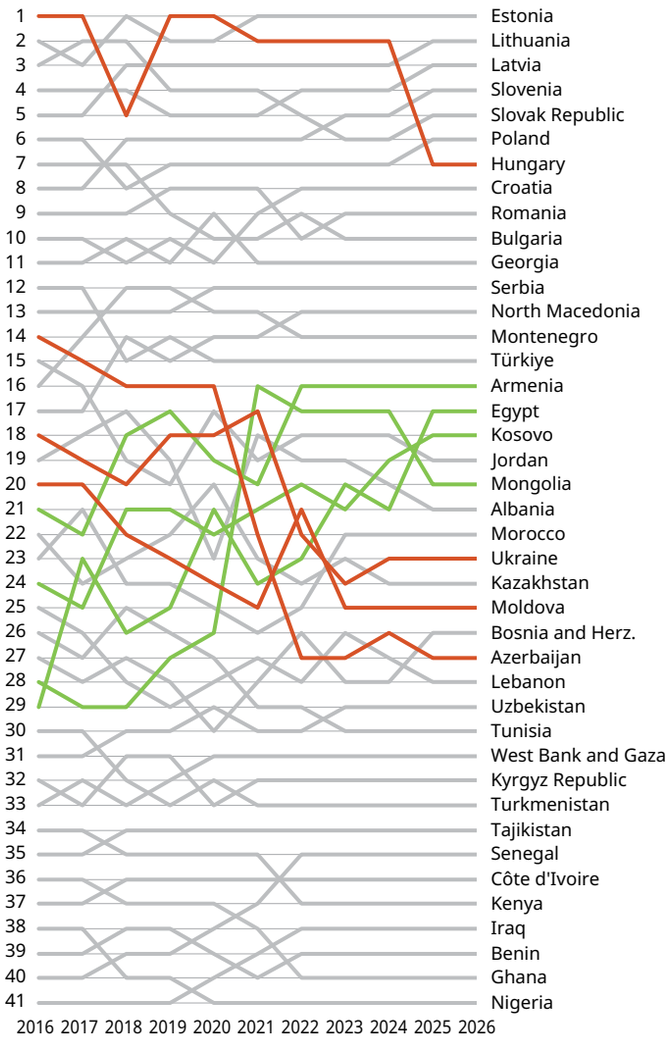


SOURCE: EBRD and authors' calculations.
NOTE: Simple averages of 2026 and 2016 scores across all economies in each group.

Some economies have seen declines in their relative standings for **INTEGRATION** as a result of restrictions on trade and FDI, higher mobile broadband costs and weaker trade

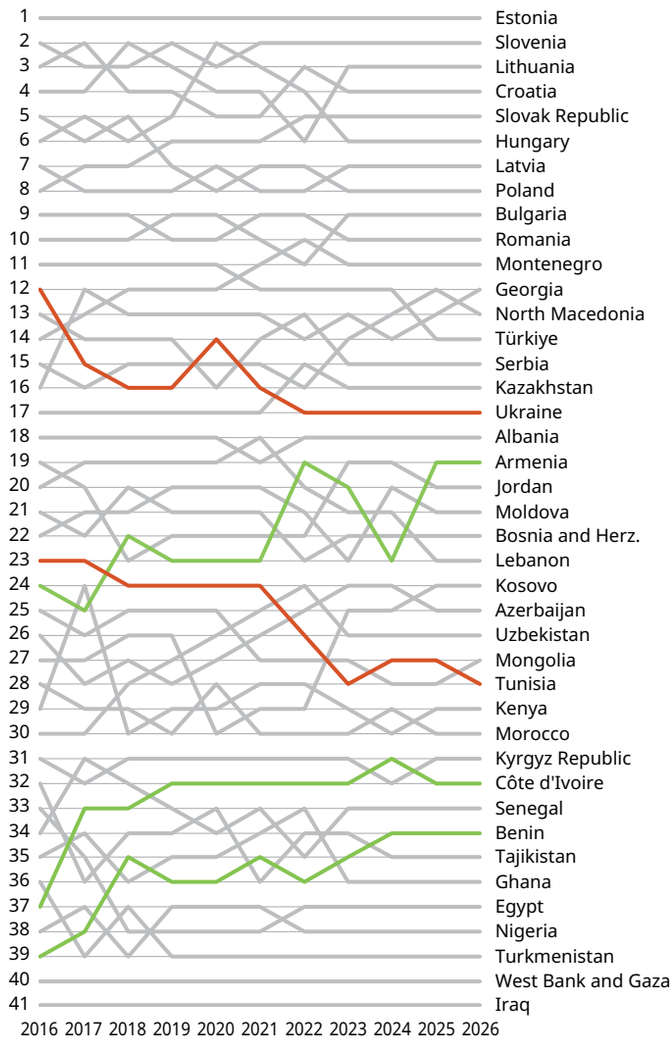
[4] See EBRD (2025).

CHART 5.3 Evolution of economies' relative levels of economic integration, 2016-26



SOURCE: EBRD.
NOTE: Economies are ranked on the basis of their "integrated" scores in each year. Green and red lines indicate the economies with the largest improvements and declines in their relative rankings, respectively.

CHART 5.4 Evolution of economies' relative levels of competitiveness, 2016-26



SOURCE: EBRD.
NOTE: Economies are ranked on the basis of their "competitive" scores in each year. Green and red lines indicate the economies with the largest improvements and declines in their relative rankings, respectively.

CHANGES TO SCORES SINCE LAST YEAR

Changes to scores since the *Transition Report 2025-26* reflect the latest developments across the Bank's regions. The following analysis looks at differences between the updated ATQ scores for 2025[5] (as presented in Table 5.1, largely reflecting data up to 2024) and the newly calculated scores for 2026 (which draw on the latest available data, typically covering developments in 2025).

Across the six qualities of a sustainable market economy, increases in scores over the last year have been concentrated in the CEB, SEE and SSA regions, while declines have been observed primarily in the SEMED region and Central Asia, contributing to further divergence in average score levels across economies.

[5] ATQ scores for 2025 have been updated to reflect the availability of new data and methodological changes outlined in **https://www.ebrd.com/content/dam/ebrd_dxp/assets/pdfs/office-of-the-chief-economist/transition-report-archive/transition-report-2026/chapters/transition-report-2026-27-methodological-notes.pdf**.

Across the EBRD regions, larger improvements have tended, on average, to be recorded in the areas of integration and competitiveness.

"Integrated" scores have increased significantly in Croatia, Egypt, the Slovak Republic and Türkiye, driven mainly by higher net FDI inflows. In Türkiye and Egypt, improvements also reflect increases in the penetration of broadband services and higher trade flows as a percentage of GDP. In contrast, Armenia's lower score largely reflects declining trade volumes as a percentage of GDP, while Hungary's decline reflects a significant drop in net FDI inflows as a percentage of GDP.

Notable increases in "competitive" scores have been observed in Armenia, Kazakhstan, Kosovo and Lithuania, primarily as a result of lower import tariffs. In contrast, average import tariffs have increased in the vast majority of economies in the EBRD regions, mirroring the latest trends in the global economy.[6] Higher scores also reflect the expansion of domestic credit to the private sector, modest increases in average labour productivity and improvements in SMEs' access to finance.

Changes to "green" scores have been more modest over the past year, with notable increases recorded in Benin and Uzbekistan following the introduction of new protected areas for the conservation of biodiversity. In Uzbekistan's case, progress has also been seen in the area of just transition planning, which is now reflected in the country's Nationally Determined Contribution.[7]

Developments in the area of economic inclusion have been mixed, with the most notable increases in "inclusive" scores being seen in Kosovo, Lithuania and Nigeria. Increases reflect a rise in the number of firms reporting that they offer training to employees, as well as higher labour productivity. In Kosovo and Nigeria, improvements also reflect greater universal access to fixed broadband services. "Inclusive" scores have declined in Albania, Kazakhstan, Ukraine and Uzbekistan, however, as a result of lower labour-force participation rates and higher youth NEET (not in education, employment or training) rates. In Albania, this reduction also reflects a lower proportion of firms providing training to their employees, while Ukraine's score also takes account of increasingly uneven access to fixed broadband.

At the same time, "well governed" scores have declined further, on average, contributing to a widening gap to advanced economies (see Chart 5.2). Improvements in governance, albeit from a low base, have been observed in Albania, Ghana and Senegal. In Albania, the perceived effectiveness of the country's courts has improved, as has judicial independence. In Ghana and Senegal, higher scores reflect perceptions of a reduction in corruption, greater press freedom and improved compliance with anti-money laundering and countering the financing of terrorism (AML/CFT) standards. In Senegal's case, the latter reflects its October 2024 removal from the Financial Action Task Force's list of jurisdictions under increased monitoring. As elsewhere in this assessment, these indicators reflect developments up to 2025 and do not yet capture more recent events. Notable downward revisions to governance scores can be observed for Georgia, Kazakhstan, the Kyrgyz Republic and Lithuania. In Georgia and Kazakhstan, these changes are driven by increases in perceived corruption and declines in press freedom. In Lithuania, this is compounded by a larger share of enterprises citing political instability, informality and declines in court effectiveness as major obstacles to doing business. In the Kyrgyz Republic, perceived improvements in corruption have been offset by deteriorating assessments of press freedom and compliance with AML/CFT standards.

Across the EBRD regions, changes in "resilient" scores have tended, on average, to be driven by assessments of financial-sector stability. Notable improvements

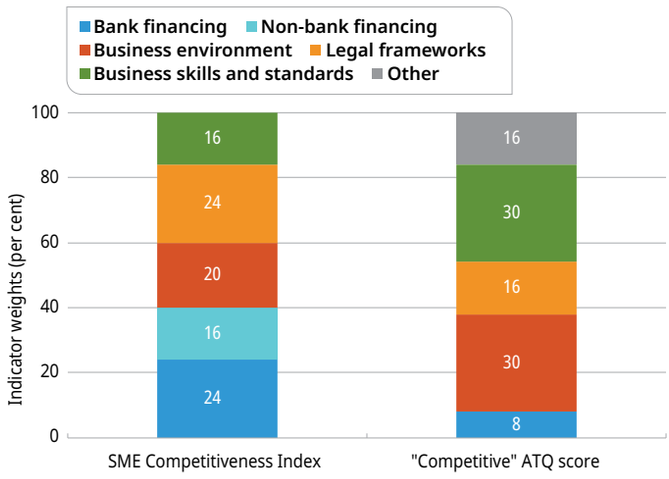
WELL GOVERNED

scores have declined, on average, in the EBRD regions, widening the existing gap to advanced economies

[6] See EBRD (2025).
[7] See Government of Uzbekistan (2025).

have been observed in Bulgaria, Ghana and the Kyrgyz Republic, driven by lower levels of non-performing loans (NPLs), improved capital adequacy ratios and higher liquidity. In Bulgaria and the Kyrgyz Republic, those score increases also reflect higher stock-market capitalisation as a percentage of GDP and higher ratios of trading volumes to market capitalisation. Resilience scores have declined in Mongolia and Nigeria, among others, often reflecting a decline in credit to the private sector as a percentage of GDP. In Mongolia, this mainly reflects a fall in indicators of access to non-bank financing, lower stock-market activity and a less diversified investor base. In Nigeria, increases in NPLs, lower capital adequacy ratios and a lower return on assets have weighed on scores. These indicators largely predate the completion in March 2026 of a banking-sector recapitalisation programme, which has raised substantial amounts of new capital across the sector and should be reflected in subsequent assessments.

CHART 5.5 The SME Competitiveness Index puts greater emphasis on access to finance and legal frameworks for SMEs



SOURCE: EBRD and authors' calculations.
NOTE: The index used to calculate the overall ATQ score for economic competitiveness is analysed net of the SME Competitiveness Index, which usually serves as one of the inputs for that score (with a weight of 8 per cent).

Improvements in
FINANCIAL RESILIENCE
have been driven by declines in NPLs, stronger capital adequacy ratios and higher liquidity

FOCUS ON SME COMPETITIVENESS

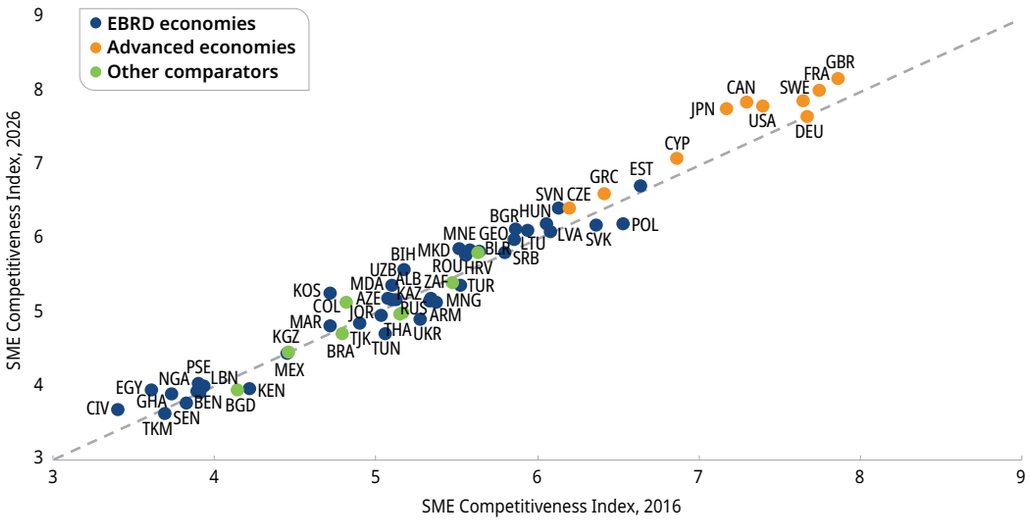
ASSESSING SME COMPETITIVENESS

This section focuses on SME competitiveness, complementing the broader assessment of economic competitiveness that is produced as part of the commentary on ATQ scores. SMEs are major sources of employment. They also make significant contributions to innovation and, ultimately, economic growth. Competitive SMEs are better able to adopt new technologies, access international markets, increase labour productivity and withstand adverse economic shocks.

For each economy, the EBRD's SME Competitiveness Index aggregates numerous performance indicators in five specific areas: bank financing; non-bank financing; legal frameworks; business skills and standards; and the business environment (see Chart 5.5). Compared with the Bank's broader measure of economic competitiveness, it puts greater emphasis on access to finance and legal frameworks for SMEs. This is because SME competitiveness revolves around those firms' ability to grow in the early stages of their development, access finance, innovate, expand into new markets and compete successfully with domestic and international firms.[8]

[8] See also OECD (2025).

CHART 5.6 EBRD economies' progress on SME competitiveness has lagged that of major advanced economies



SOURCE: EBRD.
NOTE: 45-degree line shown.

The SME Competitiveness Index was originally developed independently of the "competitive" ATQ score as part of the EBRD's work on a strategy to support SMEs' development in emerging Europe, Central Asia and the SEMED region following the establishment of the EBRD's Small Business Initiative in 2016. In the comparison summarised in Charts 5.7 and 5.8, overall ATQ scores for the "competitive" quality are net of the SME Competitiveness Index, which usually serves as one of the inputs for those scores (with a weight of 8 per cent).

In contrast, broader economic competitiveness, as measured by the "competitive" ATQ score, refers to an economy's overall capacity to achieve sustainable economic growth, attract investment, create jobs and raise living standards through efficient institutions, infrastructure, human capital and market conditions.

THE CHALLENGE OF IMPROVING SME COMPETITIVENESS

On average, progress on SME competitiveness in the EBRD economies has lagged that of major advanced comparator economies (see Chart 5.6, which compares assessments for 2016 and 2026). The economies that have progressed most over this 10-year period include Bosnia and Herzegovina, Kosovo and Montenegro, which have seen declines in fully and partially credit-constrained SMEs, lower collateral requirements on loans, improved access to non-bank financing, greater adoption of international standards and certifications (helping to boost SMEs' competitiveness abroad) and a perceived improvement in labour regulation.

SME COMPETITIVENESS VERSUS BROADER ECONOMIC COMPETITIVENESS

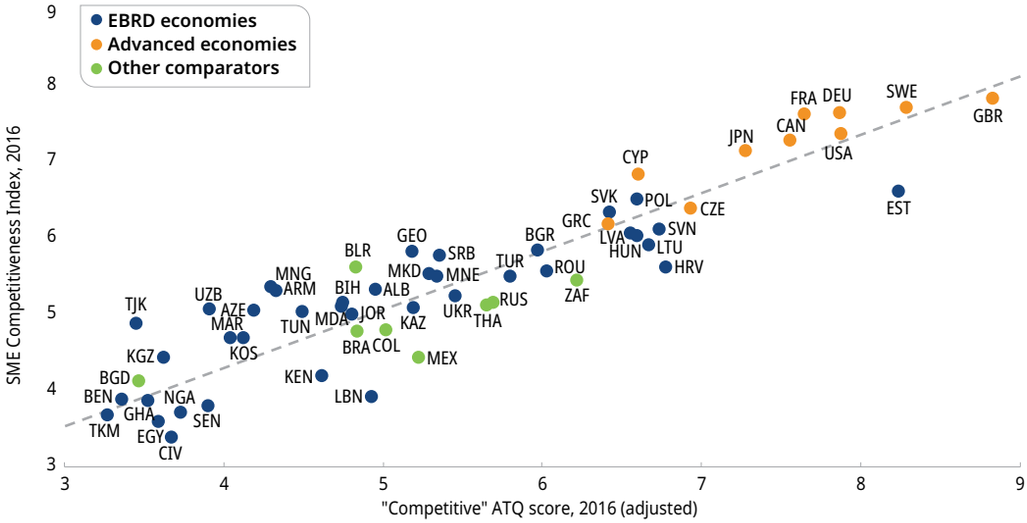
Assessments of SME competitiveness and broader economic competitiveness tend to be closely aligned (see Chart 5.7 for 2016 and Chart 5.8 for 2026). This is unsurprising, as the two assessments cover similar areas crucial to enterprise growth, such as access to finance, skills, legal frameworks and the business environment.[9]

At the same time, the relationship between SME competitiveness and the broader competitiveness of the economy is far from perfect. Indeed, the correlation between the two variables is similar to the relationships between different qualities of a well-functioning market economy, such as "inclusive" and "well governed", or "integrated" and "competitive".[10]

[9] See OECD (2025) for a detailed discussion of the relationship between SME competitiveness and economy-wide competitiveness.

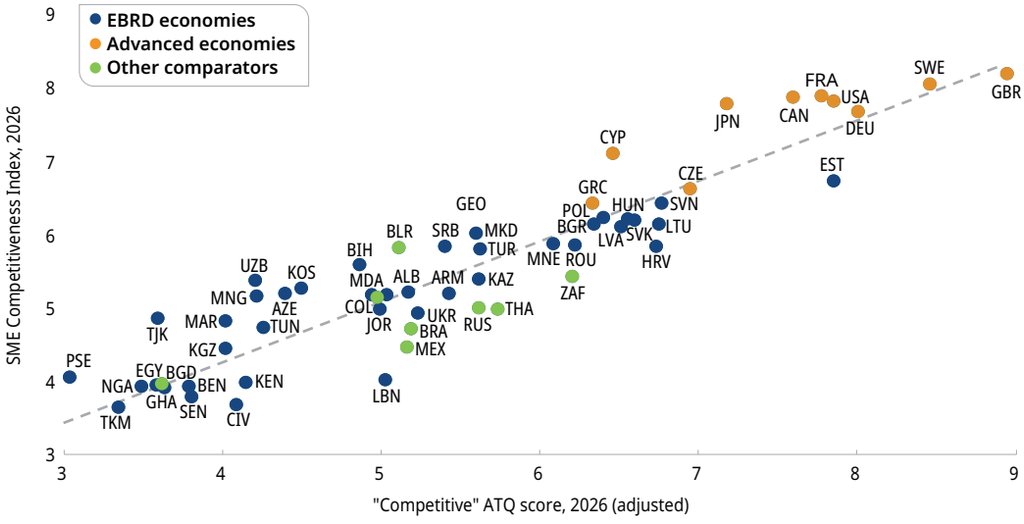
[10] See Carruthers and Plekhanov (2023) for a discussion of those relationships.

CHART 5.7 Assessments of SME competitiveness and broader economic competitiveness tend to be closely aligned, 2016



SOURCE: EBRD.
NOTE: Line of linear fit shown. "Competitive" ATQ scores have been adjusted here to remove the SME Competitiveness Index, which usually serves as one of the inputs for those scores.

CHART 5.8 Assessments of SME competitiveness and broader economic competitiveness tend to be closely aligned, 2026



SOURCE: EBRD.
NOTE: Line of linear fit shown. "Competitive" ATQ scores have been adjusted here to remove the SME Competitiveness Index, which usually serves as one of the inputs for those scores.

Assessments show SME-specific policies to be stronger, in relative terms, in Azerbaijan, Kosovo, Mongolia, Tajikistan, Uzbekistan and the West Bank and Gaza, among others (with the corresponding dots lying significantly above the trend line in Chart 5.8). In Mongolia, Tajikistan and Uzbekistan, for instance, this reflects perceived improvements to the business environment and legal frameworks for SMEs, although persistent gaps remain in relation to SMEs' access to non-bank financing.

In contrast, overall economic competitiveness is assessed as being stronger (relative to SME competitiveness) in Croatia, Estonia, Lebanon and Lithuania, among others (with those dots lying significantly below the trend line in Chart 5.8). In Estonia, this stems from a relatively low score for SMEs' access to non-bank financing (including private equity and venture capital), in contrast to relatively high scores in other areas, which put Estonia's overall competitiveness on a par with that of advanced economies. In Lithuania and Croatia, SMEs' limited access to non-bank financing is compounded by limits on SMEs' access to bank financing compared with large firms. Lebanon, meanwhile, is lagging in terms of both access to finance and the adoption of legal frameworks that support SME development (such as insolvency frameworks).

Between 2016 and 2026, increases in overall competitiveness have tended to outpace improvements in SME competitiveness, particularly in central Europe and the Baltic states. This can be seen in the fact that these economies have shifted significantly to the right of the line of linear fit in Chart 5.8. This trend underscores the importance of fine-tuning dedicated SME policies across the EBRD regions, with a focus on improving access to finance, skills and legal frameworks for small firms.

CONCLUSIONS

This chapter presents the annual assessment of six qualities of sustainable market economies for the EBRD regions and a number of comparator economies. These ATQ scores are expected to be updated further in the coming years, alongside the continued introduction of more detailed sub-scores for various qualities of a sustainable market economy.

Between 2016 and 2026, increases in
OVERALL COMPETITIVENESS
have tended to outpace improvements in
SME COMPETITIVENESS



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ABBREVIATIONS

AI	artificial intelligence
AIPNET	AI-generated Production Network
ATQ	assessment of transition qualities
BaTIS	Balanced Trade in Services database
CEB	central Europe and the Baltic states
CEPII	Centre d'Études Prospectives et d'Informations Internationales
CES	US Census Bureau Center for Economic Studies
CompNet	Competitiveness Research Network
CPU	central processing unit
EBRD	European Bank for Reconstruction and Development
EDIP	European Defence Industry Programme
EEA	European Economic Area
EEC	eastern Europe and the Caucasus
ENTSO-E	European Network of Transmission System Operators for Electricity
ESA	European Space Agency
EU	European Union
FCAS	Future Combat Air System
FDI	foreign direct investment
GCAP	Global Combat Air Programme
GCAT	General Catalog of Artificial Space Objects
GDP	gross domestic product
GICS	Global Industry Classification Standard
GNP	gross national product
GPU	graphics processing unit
GW	gigawatt
H100	an AI accelerator produced by NVIDIA
HHI	Herfindahl-Hirschman Index
HS	Harmonized System
ICT	information and communications technology
IEA	International Energy Agency
ILO	International Labour Organization
IMF	International Monetary Fund
IT	information technology
MW	megawatt
NATO	North Atlantic Treaty Organization
NEET	not in employment, education or training
NPL	non-performing loan
OECD	Organisation for Economic Co-operation and Development
pp	percentage point
RCA	revealed comparative advantage
R&D	research and development
SAFE	Security Action for Europe
SEE	south-eastern Europe
SEMED	southern and eastern Mediterranean
SIPRI	Stockholm International Peace Research Institute
SMEs	small and medium-sized enterprises
SOE	state-owned enterprise
SSA	sub-Saharan Africa
TFP	total factor productivity
TWh	terawatt-hour
UK	United Kingdom
US	United States
VAT	value-added tax
WCO	World Customs Organization
WTO	World Trade Organization

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