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Europe & Central Asia Economic Update

Making AI Work:
Jobs, Firms, and Productivity



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Contents

Acknowledgments	ix
Abbreviations	x
Regional classification used in this report	xi
Executive Summary	xiii

Chapter 1	Recent Developments, Policies, and Outlook.....	3
	Global challenges, slower growth.....	3
	Consumption moderates	7
	Labor markets remain broadly resilient.....	9
	Investment growth holds firm	11
	Exports remain mixed	14
	Inflation remains elevated.....	17
	Monetary policy is largely on hold.....	19
	Fiscal consolidation remains limited	20
	Outlook: Uneven recovery across a diverse region.....	22
	References	30
 Chapter 2	 Making AI Work: Jobs, Firms, and Productivity.....	 33
	Section 1: The State of AI in ECA.....	35
	Section 2: Challenges and Constraints in a World of AI	52
	Section 3: Opportunities Created by AI	60
	Section 4: From Diagnosis to Action: Enabling AI to Work for ECA	70
	References	85

Boxes

1.1	The promise of structural reforms	23
2.1	From exposure to use: What household surveys reveal about AI at work in Central Asia	40
2.2	Adoption of AI by frontier firms: Insights from a survey of private equity– and venture capital–funded IFC clients	46
2.3	Using AI to improve students’ foundational skills: How to make ECA educational systems AI–ready	72

Figures

1.1	Growth in ECA has slowed	3
1.2	Growth in the Russian Federation is likely to weaken	5
1.3	Resilient consumption in Central Europe	5
1.4	Tourism remains strong in parts of ECA despite tourism disruptions, rising transport and labor costs	6
1.5	Consumption growth slows	7
1.6	The increase in wages and remittances has eased	7
1.7	A surge in money transfers from the Russian Federation to Georgia has largely unwound	8
1.8	Consumer credit growth has eased	8
1.9	Labor markets in ECA	9
1.10	The share of labor income in GDP has increased even with weak productivity	10
1.11	Investment growth has been broadly resilient	12
1.12	EU funds supported public investment in Central Europe and the Western Balkans	12
1.13	Investor caution has slowed private investment	13
1.14	ECA exporters are facing increasing competitive pressure from China	14
1.15	High concentration of automotive exports in some ECA countries	15
1.16	The countries of ECA have limited exposure to the booming AI trade	15
1.17	Losses of fuel supply in the Russian Federation due to refinery outages	16
1.18	Fallout from Middle East disruptions remained limited in most ECA countries	16
1.19	Inflation in ECA has remained elevated	17
1.20	External inflationary pressures have risen but remain milder than in 2022	18
1.21	Underlying inflation pressures persist	18
1.22	Persistent energy price shocks are likely to prolong inflation pressures	19
1.23	External price pressures slowed further easing	19
1.24	Structural increases in spending keep fiscal deficits broadly unchanged	20

1.25	Defense spending has increased in most countries.	21
1.26	Borrowing costs have risen since March	21
1.27	Government debt increases are driven by persistent primary deficits	22
B1.1.1	EU accession drives reforms	23
B1.1.2	Regulatory constraints hold back business dynamism	24
1.28	Modest expansion	25
1.29	Renewed energy shocks would further slow growth and disinflation in many ECA countries	27
1.30	Higher reliance on agriculture is correlated with heightened climate vulnerability	28
1.31	Adverse weather and trade disruptions could deepen hardship globally and across ECA	28
2.1	Mobile broadband penetration is high across ECA	36
2.2	Data center capacity in ECA significantly lags that of other developing regions	36
2.3	On average, around 20 percent of ECA's workforce is exposed to AI.	38
2.4	People with tertiary education, women, and the young are more exposed to AI than other demographic groups in the region	38
2.5	Age-friendly jobs are more exposed to AI than other jobs in ECA.	39
B2.1.1	Exposure to AI and use of it at work differ widely in Uzbekistan	40
2.6	The share of jobs requiring GenAI skills increased significantly between 2022 and 2025, reaching almost 1 percent of total job postings in some ECA countries	42
2.7	AI jobs are more concentrated in capital regions than the average job in ECA	43
2.8	The difference in labor demand between high- and low-AI- substitution occupations remains small in ECA	43
2.9	In Türkiye, AI adoption is associated with worker augmentation, not greater risk of displacement	44
2.10	In western ECA, about 9.4 percent of firms used AI in 2025, with use rates varying widely across countries and firm sizes	45
B2.2.1	Frontier firms in ECA have higher AI adoption rates than the global average	46
B2.2.2	Frontier firms in ECA report that people and skills are the greatest barrier to further AI adoption	47
2.11	Sophisticated use of AI among firms in Türkiye is close to the United States benchmark	48
2.12	Use of AI in ECA's government tracks the expected pattern given their income level	50
2.13	Countries with fewer developers per capita need to pay higher wages to IT workers relative to GDP per capita and the average salary	53
2.14	AI jobs are still very much digital-intensive jobs	54

2.15	Non-AI jobs in AI-adopting firms are more intensive in digital, cognitive, and managerial skills, and less intensive in creative and character-specific skills than similar jobs in firms that do not adopt AI	55
2.16	ECA's labor tax gap with the rest of the world is explained entirely by social security contributions	59
2.17	Under the assumption that it works as a TFP shock, AI can provide a temporary offset to the negative economic consequences of population decline	68

Tables

1.1	Europe and Central Asia Economic Growth Summary, 2023–28	4
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Abbreviations

AFI	age-friendliness index
AI	artificial intelligence
ECA	Europe and Central Asia
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
FAT	firm adoption of technology
FDI	foreign direct investment
GenAI	generative artificial intelligence
GDP	gross domestic product
GDPR	General Data Protection Regulation
GNI	gross national income
GPU	graphics processing unit
ICT	information and communication technology
IFC	International Finance Corporation
ISCO	International Standard Classification of Occupations
IT	information technology
KPI	key performance indicator
LLM	large language model
Mbps	megabits per second
MKD	North Macedonia
MW	megawatt(s)
OECD	Organisation for Economic Co-operation and Development
PE	private equity
R&D	research and development
RRF	Recovery and Resilience Facility
SMEs	small and medium-size enterprises
SOE	state-owned enterprise
STEM	science, technology, engineering, and mathematics
VAT	value added tax
VC	venture capital
WBES	World Bank Enterprise Survey

Regional classification used in this report

This report covers the emerging markets and developing economies (EMDEs) in Europe and Central Asia (ECA). These are divided into the

following groups: Central Asia, Central Europe, Eastern Europe, the Russian Federation, the South Caucasus, Türkiye, and the Western Balkans.

Central Asia: Kazakhstan, Kyrgyz Republic, Tajikistan, Turkmenistan, Uzbekistan

Central Europe: Bulgaria, Croatia, Poland, Romania

Eastern Europe: Belarus, Moldova, Ukraine

Russian Federation

South Caucasus: Armenia, Azerbaijan, Georgia

Türkiye

Western Balkans: Albania, Bosnia and Herzegovina, Kosovo, Montenegro, North Macedonia, Serbia

Executive Summary

Amid higher prices for imported energy, heightened uncertainty, and weaker economic expansion in the European Union (EU), growth in Europe and Central Asia (ECA) is likely to slow from 2.6 percent in 2025 to 2.2 percent in 2026.¹

Excluding the Russian Federation, regional growth is expected to decline from 3.7 percent in 2025 to 3.0 percent in 2026.

Growth is set to slow this year in Russia and Türkiye, ECA's two largest economies. In Russia, a major energy producer, growth is likely to ease to 0.8 percent from 1.0 percent in 2025, as higher global energy prices have provided little relief because of lower crude oil production at home due in part to refinery outages. Tighter economic policies and higher prices for imported energy are projected to slow growth in Türkiye to 2.8 percent in 2026 from 3.7 percent in 2025. Restrictive policies have weakened domestic demand and helped contain inflationary pressures, while tight credit, weaker real wage growth, and sharply higher diesel prices have weighed on consumer spending. Exports have remained subdued amid weaker EU demand, geopolitical uncertainty, and intensifying competitive pressures.

Several ECA countries have maintained solid growth despite broader headwinds, supported by fiscal measures, favorable labor market conditions, rising real wages, and remittances. Central Asia remains the fastest-growing subregion, expanding by 5.8 percent in 2026, supported by strong domestic demand and higher public investment. Growth is projected at 9.6 percent in the Kyrgyz Republic and 7.9 percent in Uzbekistan. Growth in the Western Balkans is likely to strengthen to 3.1 percent in 2026 from 2.6 percent in 2025, reflecting resilient consumption and more expansionary fiscal policies. In Central Europe, Poland stands out, with growth holding at 3.6 percent as temporary energy-cost relief measures cushion consumption and EU funds support strong investment.

Elsewhere in the region, however, the growth momentum has weakened. Lower oil production has slowed growth in Kazakhstan. The contributions from re-exports, remittances, and migrant inflows to growth in the South Caucasus have diminished from earlier highs. Intensified attacks on critical infrastructure and export disruptions are likely to slow growth in Ukraine to 1.2 percent. In Romania, the economy is likely to contract by 0.5 percent in 2026, reflecting the impacts of fiscal consolidation and higher energy costs.

Consumption growth is slowing in most of the ECA countries this year. It is expected to decline from 5.9 percent in 2025 to 4.0 percent in 2026 as real wage growth slows and support from remittances and government transfers recedes. Labor markets remain stable, although slower hiring and fewer vacancies signal weakening labor demand. Despite weaker hiring, labor shortages are becoming a structural constraint and, in some countries, coexist with untapped labor supply. A defining feature of most ECA labor markets, labor shortages have occurred not just in highly skilled occupations but increasingly in construction, manufacturing, and transport.

Public investment has kept overall investment growth steady despite heightened uncertainty. Investment is expected to expand by 6.8 percent on average in 2026, driven by increased public spending on energy and transport infrastructure and faster absorption of EU funds. Private investment has been weaker amid geopolitical tensions, rising energy costs, and tighter financing conditions. Nevertheless, energy, digital infrastructure, artificial intelligence (AI), and industrial projects have continued to attract private capital, particularly in Central Asia and the South Caucasus.

Export performance has remained mixed across the region. Subdued European demand and intensifying competition from other countries continue to weigh on exporters in Central Europe, Türkiye, and parts of the Western Balkans, particularly through automotive supply chains. Refinery outages in Russia have also tightened regional fuel supplies.

1. ECA includes Central Europe, Eastern Europe, Central Asia, the South Caucasus, the Western Balkans, the Russian Federation, and Türkiye. See the section "Regional classification used in this report"

At the same time, export growth has been supported by expanding trade, with new markets and resilient manufacturing exports in some ECA countries.

Higher energy prices have kept inflation elevated. Median annual inflation in ECA amounted to 5.4 percent in August, up by 0.6 percent from a year ago and almost twice its 2018–19 average. Rising transportation costs accounted for one-fifth of headline inflation, although lower food inflation and temporary government relief measures helped contain the overall impact. The shock has been less broad-based than in 2022, reflecting more stable exchange rates, smaller food price increases, and reduced dependence on imported energy. Even so, persistent domestic price pressures and the pass-through of higher energy costs could delay inflation's return to central bank targets.

Monetary policy has been largely on hold this year. While several central banks have cut policy rates modestly in 2026, most have kept rates unchanged as inflation risks remained tilted to the upside, particularly where strong credit growth and expansionary fiscal policy threatened to amplify the pass-through of higher energy costs to broader prices and de-anchor inflation expectations.

Across ECA, fiscal consolidations are likely to be delayed again in 2026. The average fiscal deficit is projected to remain broadly unchanged at 2.6 percent of gross domestic product (GDP) this year because of high spending on wages and social benefits, rising defense and investment spending, and temporary measures to offset higher energy costs. Deficits remain especially large in Central Europe, although Romania is undertaking the region's most ambitious fiscal adjustment. Higher energy prices have improved fiscal balances in some ECA energy producers, but provided little relief to Russia, where the general government deficit is likely to widen to 4.5 percent of GDP this year.

Growth in ECA is projected to remain modest through 2028, with a gradual but uneven recovery. Regional growth is expected to strengthen to 2.4 percent in 2027 and 2.6 percent in 2028. Russia's growth is projected to slow to an average of 0.7 percent in 2027–28 as fiscal support fades

and sanctions, weaker investment, labor shortages, and lower oil prices constrain activity. Excluding Russia, growth in the region is likely to strengthen to an average of 3.6 percent, nearly 1 percentage point below its 2000–19 average.

Türkiye is expected to make a large contribution to the regional pickup, with growth strengthening to 3.8 percent in 2027 and 4.5 percent in 2028. Declining inflation and easing financing conditions should support consumption and investment, while stronger EU demand should lift exports. Central Asia will remain the fastest-growing subregion, averaging 5.3 percent growth in 2027–28, supported by real wage gains, remittances, and public investment. Growth is expected to remain broadly stable in Central Europe and the South Caucasus and strengthen in the Western Balkans. Ukraine's recovery will be much weaker than previously projected, as it is now assumed that active hostilities will persist through 2027.

The risks to the outlook are tilted to the downside. Further escalation of the Middle East conflict could lead to higher energy, freight, food, and fertilizer costs; weaken activity; and rekindle inflation. An intensification of regional geopolitical tensions could prolong disruptions to fuel supplies and Black Sea grain exports. Other risks include tighter global financing conditions, trade fragmentation, mounting debt pressures, and weaker growth in key trading partners. Extreme weather could also damage transport and energy systems, reduce agricultural output, and worsen food insecurity, with poorer households especially exposed.

Against a difficult external backdrop and sluggish growth, creating more and better-paid jobs may become harder across ECA. The challenge differs across the countries in the region. Some economies face aging workforces and labor shortages, while others must create jobs for growing working-age populations. Faster productivity growth will be critical, supported by reforms that strengthen skills and the business environment while attracting private capital. AI and other digital technologies could help address the jobs and productivity challenges. Chapter 2 of this economic update examines how the region can harness AI's potential.

The potential of AI to transform ECA economies outpaces the region's capacity to absorb it. About one in five workers in ECA hold jobs that are meaningfully exposed to AI, concentrated among the well-educated and young workers. Exposure to AI rises from about 7 percent of workers at the lowest education levels to 34 percent at the highest. The occupations best suited to an aging workforce are among the most exposed. Yet, usage of AI does not necessarily equate with exposure, and exposure does not equate with job displacement or creation. Fewer than one in 10 firms use AI in their business operations, roughly half the share of firms in the European Union. This gap is a challenge that can be addressed. These estimates measure generative AI only. As agentic and physical AI mature, exposure is likely to change and extend to manual occupations.

AI has the potential to make up for the declining productivity and aging population. The working-age population is set to contract sharply in most of the region by 2060, removing labor as a source of growth. As a general-purpose technology, AI has the potential to raise output per worker by compressing the time required for routine tasks. Adopting and adapting this technology can be a solution in a region where output needs to be raised with fewer workers. In addition, exporting AI services could be an opportunity for countries with abundant energy, provided they resolve the institutional constraints that prevent large-scale capital investments.

Many of the analog foundations and some of the digital foundations for AI are largely in place in ECA, with mobile coverage nearly universal, favorable energy costs, and advantageous technical human capital. However, the region has a deficit of computational resources, such as processing power, memory, and supporting infrastructure. Data center capacity per million people is roughly 2.1 megawatts in ECA, against 31.6 megawatts in high-income countries outside the region. The cost of capital and institutional credibility are the main determinants of compute capacity. Management capabilities to absorb this technology along with data integration present additional challenges to scaling up adoption.

Firms across ECA apply AI to a wide range of functions but mostly in a shallow form to speed up processes. Most applications focus on routine augmentation, such as chatbots to resolve customer inquiries, internal knowledge assistance, back-office support, and internal document preparation that cuts time from two weeks to a couple of hours. For the most part, these uses have reduced operational time without measurable productivity effects.

A narrow set of firms have pushed AI into the core of their operations. Financial institutions scoring loan applications, retailers using AI to make decisions on stock replenishment, and optimizing inputs for energy production are notable examples. The extensive deployment of AI is characterized by firms that have addressed the constraints on skills and data integration, driven by management that prioritizes returns on investment, as opposed to adoption for its own sake.

Graduates with university degrees in sciences and mathematics are plentiful in the region, but business-oriented engineers and managers who can redesign operational processes are scarce. A sizable part of the workforce lacks the foundational skills critical to adoption. Demand for AI workers has nearly quadrupled in the region, albeit starting from a low level. Self-directed learning and a willingness to experiment are valued traits in the evolving labor market. Managers must identify valuable applications of AI, redesign workflows, and guide workers through organizational change. Managerial quality is among the strongest predictors of adoption: obtaining a license for a model does not equal adoption. Early signals of the labor market impact of AI point to reduced hiring, little displacement, and some augmentation of tasks that current workers are doing.

Data readiness is an equally important constraint. Data are abundant but often siloed and unstructured, limiting AI deployment for many firms. The main constraint is the lack of usable data rather than limited access to models. Concerns about data leakage, output accuracy, uncertain returns on investment, and changing regulations discourage firms from moving beyond the experimental stage.

AI changes what workers and firms do, who does it, and how. Plenty of use cases from firms in ECA demonstrate the impact that AI can have. Coupling this new technology with existing tasks has the potential to accelerate document preparation, software development, customer service, compliance, cybersecurity, and administrative processes. It also enables nonspecialist and nontechnical staff to engage in analysis, develop prototypes, and build simple applications through natural-language interfaces that previously required extensive human capital. Most consequentially, AI enables monitoring and decision-making at volumes beyond human capacity: comprehensive review of customer calls, continuous industrial safety monitoring, and animal-level agricultural monitoring, which previously were not possible or prohibitively costly.

Governments, like firms, are adopting AI broadly but shallowly. Governments in ECA are using AI for internal processes such as knowledge management, chatbots and virtual assistance, and processing applications. A few notable exceptions exist where AI is used in a more sophisticated way. For example, Türkiye's tax administration scores every value-added taxpayer monthly for fraud risk to target audits, and a national AI assistant in Ukraine is embedded in the country's digital services platform. Beyond its other operations, government can act as an anchor customer to help de-risk local suppliers.

The appropriate policy is to prioritize AI adoption and adaptation, to use "small AI" adapted to local circumstances, languages, and the legal base, rather than advancement of AI. Governments should focus their efforts on expanding affordable compute access and strengthening foundational, digital, managerial, and

business-oriented technical skills. Education and training systems need dedicated attention given the declining trends in skill proficiency. Investing in structuring data and making it transparent as a public good can improve models' capabilities, making them more useful to users. Labor market programs should support upskilling workers in need of transitioning to AI-complementary activities. Confusing adoption and adaptation with innovation may lead governments to build national models at substantial and unnecessary cost.

The inevitable transition that AI adoption will entail may be slower than what the headlines suggest, but it will still be disruptive. Aggregate employment effects that are modest and hard to detect can coexist with sharp, concentrated losses in particular occupations, firms, and regions. Managing the transition is not a matter of compensating the displaced after the fact; it requires building protection, retraining workers, and establishing labor market institutions before disruption arrives. Nor is managing the transition exclusively a matter of equity; it is also a matter of efficiency. Without adequate income support during job search, effective reskilling, and labor market institutions, the reallocation of workers will simply not take place. Well-designed social protection is thus an input into an efficient transition, not merely a cushion against its costs.

The private sector needs to be the principal engine of adoption, adaptation, and innovation. The government's role is to provide the foundations, reduce the cost of investment, preserve competitive neutrality, improve data governance and interoperability, and ensure a business-friendly environment. The main risk over the next decade is likely to be too little adoption and adaptation of AI across the region, not too much.



CHAPTER 1

RECENT DEVELOPMENTS, POLICIES, AND OUTLOOK

Chapter 1. Recent Developments, Policies, and Outlook

Global challenges, slower growth

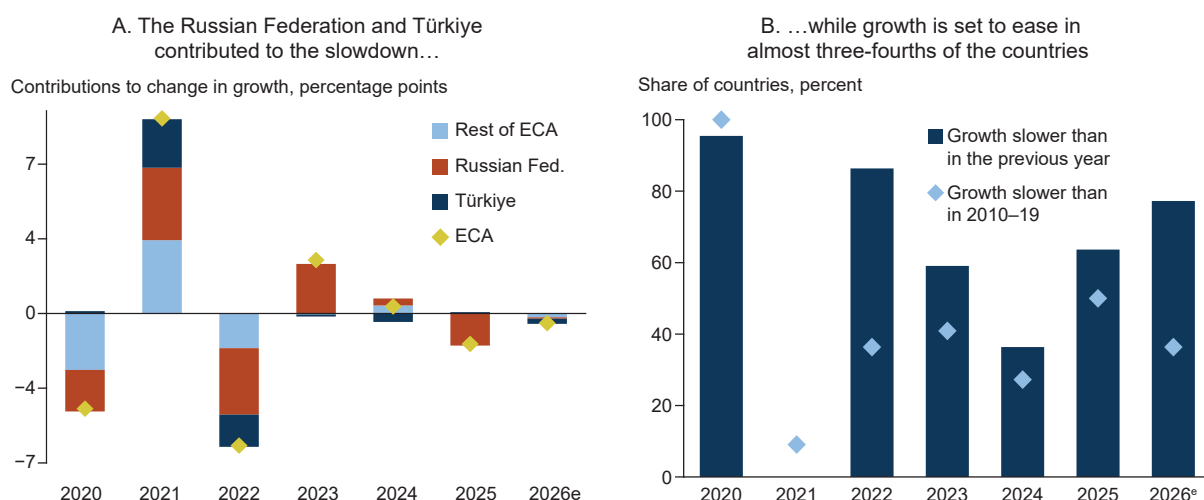
Amid a challenging external environment and slower growth in the European Union (EU), growth in the Europe and Central Asia (ECA) region¹ has weakened this year. ECA's gross domestic product (GDP) is likely to expand by 2.2 percent in 2026, down from 2.6 percent in 2025. The projected growth is little changed from the forecast in the April 2026 *ECA Economic Update*. Economic growth is likely to slow in most countries in the region, including in the Russian Federation and Türkiye, the two largest economies which account for more than 60 percent of ECA's GDP (figure 1.1). Behind the regional aggregates, there are substantial regional differences. Growth remains strong in most countries in the South Caucasus and Central Asia. Some countries in the Western Balkans are also experiencing a stronger expansion. Excluding Russia, growth is projected to weaken to 3 percent in 2026 from 3.7 percent in 2025, its slowest pace since 2022 (table 1.1).

1. Includes Central Europe, Eastern Europe, Central Asia, South Caucasus, Western Balkans, Russian Federation, and Türkiye.

The impact of commodity market disruptions and global tensions has been more limited than earlier anticipated. Oil prices rose less than expected in substantial part due to an adjustment in Chinese oil demand and the release of oil reserves by Organization for Economic Cooperation and Development (OECD) countries. Domestic demand has weakened less than anticipated, supported by favorable labor market conditions, continued real wage growth, and strong remittance inflows and tourism activity. Temporary government relief measures helped to partly contain the impact of higher energy costs on households and firms, although in some countries they added to fiscal pressures. However, although the effects of the short-term global supply chain disruptions on the countries of ECA have been milder than feared, long-term challenges from increased competitive pressures, sluggish growth in the EU, and modest productivity growth in ECA have increased.

Growth in Russia is likely to slow to 0.8 percent in 2026 from 1 percent last year. The economic expansion in the first half of the year was supported by robust private consumption and spending in defense-related sectors, with activity in construction,

FIGURE 1.1 Growth in ECA has slowed



Sources: World Bank.

Note: e = estimate; ECA = Europe and Central Asia; GDP = gross domestic product.

A. ECA and subregional aggregates are calculated using real GDP measured in average 2010–19 prices and market exchange rates.

TABLE 1.1. Europe and Central Asia Economic Growth Summary, 2023–28*Real GDP growth, percentage annual change*

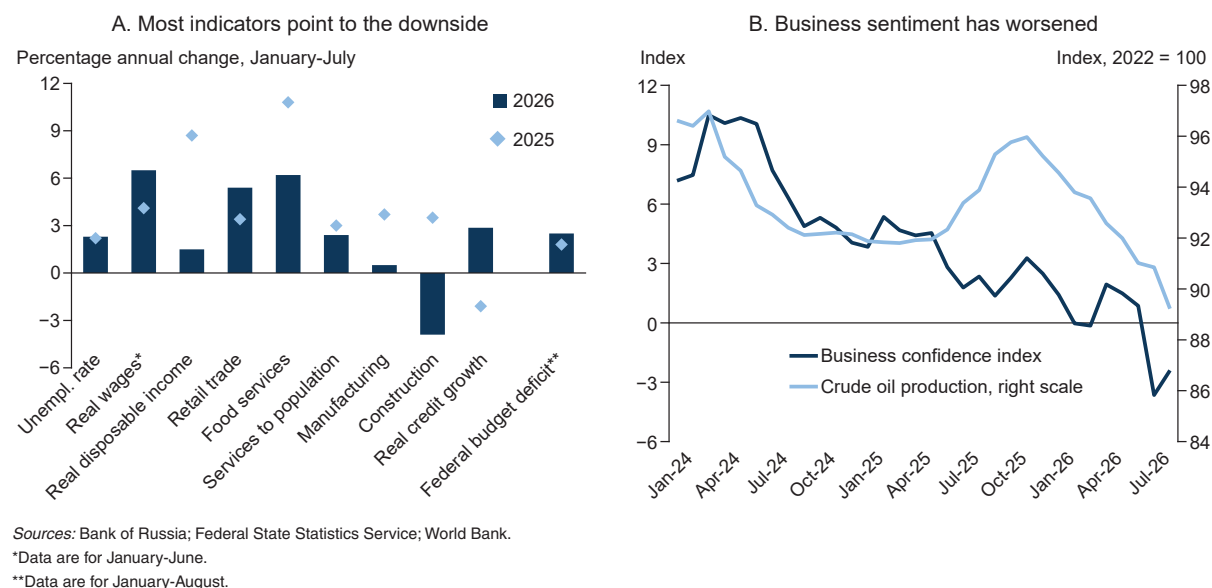
	2023	2024	2025	2026 ^e	2027 ^f	2028 ^f
ECA	3.7	4.1	2.6	2.2	2.4	2.6
ECA excl. the Russian Federation	3.5	3.6	3.7	3.0	3.4	3.7
Central Europe	1.0	2.7	2.9	2.5	2.6	2.5
Bulgaria	1.7	3.4	3.1	2.6	2.6	2.7
Croatia	3.8	3.8	3.4	2.2	2.1	2.1
Poland	0.2	3.2	3.6	3.6	2.9	2.7
Romania	2.3	0.9	0.7	−0.5	1.7	2.0
Eastern Europe	4.7	3.4	1.7	1.6	1.4	2.2
Belarus	4.1	4.3	1.3	2.3	0.9	0.8
Moldova	1.2	0.3	2.4	1.9	3.0	3.2
Ukraine	5.5	3.2	1.8	1.2	1.5	3.0
Central Asia	5.7	5.8	7.1	5.8	5.4	5.1
Kazakhstan	5.1	5.0	6.5	4.6	4.2	3.9
Kyrgyz Republic	9.0	11.5	11.1	9.6	7.3	7.5
Tajikistan	8.3	8.4	8.4	7.5	6.2	5.6
Uzbekistan	6.3	6.7	7.7	7.9	7.5	7.1
South Caucasus	3.8	5.8	3.9	3.5	3.4	3.3
Armenia	8.3	5.9	7.1	5.6	5.3	5.1
Azerbaijan	1.1	4.1	1.4	1.2	1.8	1.9
Georgia	7.8	9.7	7.5	7.0	5.5	5.0
Western Balkans	3.9	3.6	2.6	3.1	3.4	3.4
Albania	4.0	4.0	3.7	3.4	3.6	3.7
Bosnia and Herzegovina	3.8	2.6	2.1	2.4	2.9	3.1
Kosovo	4.1	4.6	3.6	3.6	3.8	3.9
Montenegro	6.5	3.2	2.7	3.3	3.0	3.1
North Macedonia	2.6	3.0	3.5	3.2	3.0	3.0
Serbia	3.8	3.9	2.0	3.1	3.7	3.5
Russian Federation	4.1	4.9	1.0	0.8	0.7	0.7
Türkiye	5.0	3.5	3.7	2.8	3.8	4.5

Source: World Bank.

Note: ECA = Europe and Central Asia; e = estimate; f = forecast; GDP = gross domestic product. GDP is measured in average 2010–19 prices and market exchange rates.

services, and other areas showing limited momentum (figure 1.2.A). Labor markets remain tight, with unemployment near a record low of 2.3 percent. Retail sales have been temporarily boosted by savings drawdowns and positive real wage growth. Defense spending has helped partly offset weakness in civilian industries facing tighter credit, softer demand, and supply constraints. Challenges to the growth outlook include refinery outages, lower crude oil production, logistics and infrastructure disruptions, and worsening business sentiment (figure 1.2.B).

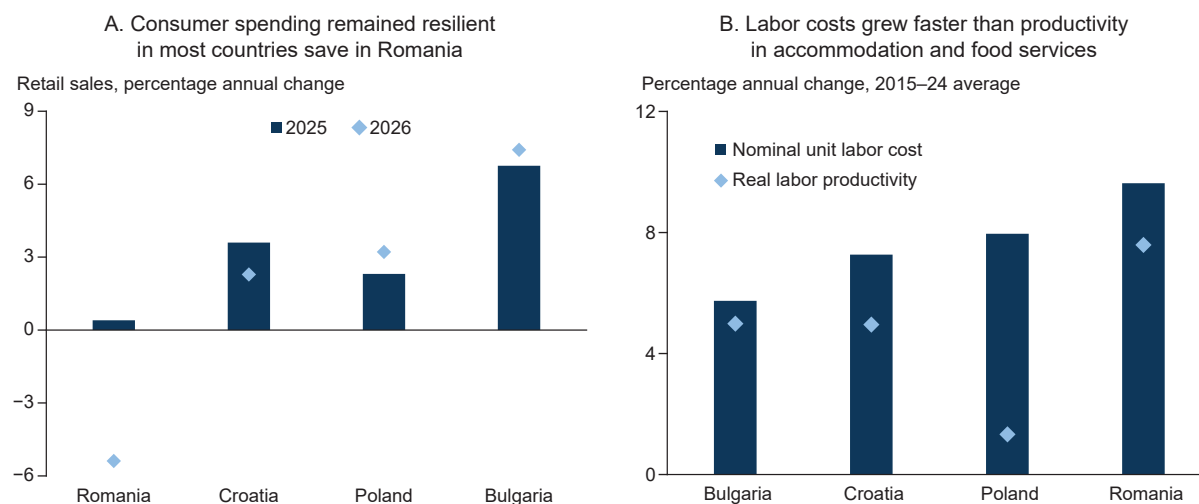
Tighter economic policies and higher prices for imported energy are projected to slow growth in Türkiye to 2.8 percent in 2026 from 3.7 percent in 2025. Restrictive policies have weakened domestic demand and helped contain inflationary pressures, while tight credit, weaker real wage growth, and sharply higher diesel prices have weighed on consumer spending. Export growth remained volatile amid geopolitical uncertainty, weak EU demand, and stronger competition. However, trade diversion for certain products toward Türkiye, partly reflecting higher logistics costs and disruptions elsewhere, provided some support.

FIGURE 1.2 Growth in the Russian Federation is likely to weaken

Poland stands out for its steady expansion among the countries of Central Europe.

Growth in ECA's third-largest economy is estimated at 3.6 percent in 2026, unchanged from 2025, helped by higher public spending, particularly on defense and infrastructure, and solid consumer demand. In Bulgaria, strong domestic demand, fueled by rising real wages, credit growth, and fiscal loosening, sustained growth but also pushed up inflation and sharply widened the fiscal deficit. In Romania, by contrast, fiscal consolidation and higher energy

costs have sharply reduced consumer spending, resulting in a projected decline in real GDP by 0.5 percent (figure 1.3.A). Across Central Europe, past increases in labor costs were at times faster than productivity growth and have weighed on growth and competitiveness, particularly in labor-intensive services (figure 1.3.B). In Croatia, for example, growth is projected to slow from 3.4 percent in 2025 to 2.2 percent in 2026, partly as competitiveness challenges constrain exports and tourism.

FIGURE 1.3 Resilient consumption in Central Europe

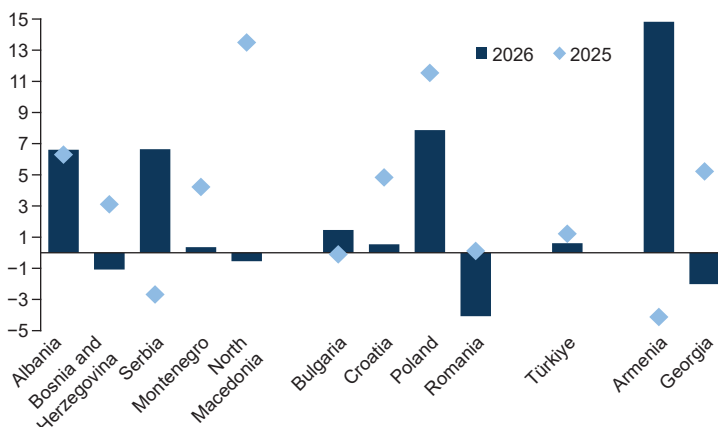
Central Asia remains the fastest-growing subregion in ECA. The Kyrgyz Republic is set to post ECA's fastest growth at 9.6 percent in 2026, an upward revision by 3.5 percentage points from the April 2026 *ECA Economic Update*. The upgrade is due to robust private consumption and higher public investment in transport and energy, with preparatory work on the Kambarata-1 Hydropower Plant and the China–Kyrgyz Republic–Uzbekistan railway providing a major boost to construction activity. Real GDP in Uzbekistan is projected to expand by 7.9 percent this year, reflecting a 1.5 percentage point upgrade from the earlier projection. Broad-based expansion has been driven by resilient domestic demand, sustained by strong real wage growth, employment gains, robust remittances, and investment in infrastructure, energy and housing. Growth in Kazakhstan is projected to decline to 4.6 percent in 2026 from 6.5 percent in 2025 as disruptions on the Caspian Pipeline Consortium export route as well as maintenance and unplanned shutdowns at major oilfields weigh on oil production. Crude production fell by 8.4 percent year-on-year during January–August, although higher energy prices supported oil revenues. The non-oil economy remained resilient, with manufacturing, construction, trade, and investment offsetting softer consumer demand.

The countries of the South Caucasus are set to grow by 3.5 percent this year, 0.4 percentage point slower than in 2025. Growth in Azerbaijan is likely to ease modestly to 1.2 percent from 1.4 percent because of the continued structural decline of the oil sector and weaker-than-expected growth in the non-oil economy amid cuts to government capital spending. The earlier gains from re-exports of precious metals in Armenia and cars in Georgia have continued to fade. Tourism in Georgia has cooled due to the impact of the Middle East conflict, reflecting the sector's reliance on high-spending visitors from that region. For example, Georgia's income from tourists from Israel and Saudi Arabia was down by 12 percent in the first half of this year. In Armenia, activity in agriculture has weakened because of weather-related disruptions and tighter Russian restrictions on Armenian food imports. Across the South Caucasus, services, particularly information and communication technology, transport, and tourism-related activities, remain key growth drivers, while strong housing and infrastructure construction added momentum in Armenia.

Growth in the Western Balkans is likely to strengthen to 3.1 percent this year from 2.6 percent in 2025. The economic expansion is led by resilient consumption and a stronger fiscal impulse in some countries, even as higher energy prices, weaker EU demand, and softer manufacturing constrain confidence. In Serbia, substantially stronger expansion is due to solid real wage gains, expanding credit, higher government spending, and resilient exports despite weaker external demand. Tourism also benefited from Serbia's growing role as a regional transit and aviation hub, with Belgrade's expanding air connectivity supporting travelers from Russia and Türkiye, even as Middle East–related disruptions weighed on some routes (figure 1.4). However, political uncertainty in some countries of the Western Balkans continued to weigh on private investment and stalled some EU accession-related reforms, limiting the upside to the recovery.

FIGURE 1.4 Tourism remains strong in parts of ECA despite travel disruptions, rising transport and labor costs

Tourists arrivals, percentage annual change



Sources: Haver Analytics; national statistics offices; World Bank.

Note: Percentage annual change in total number of inbound tourist arrivals during the first half of each year. The last observation is June 2026.

Intensified attacks on critical infrastructure are likely to slow growth in Ukraine to 1.2 percent in 2026, the slowest pace in four years. Labor shortages and high energy costs are compounding the growth challenge. Tighter access to EU markets and damage to production, ports, warehouses,

and transport networks constrain export growth. Stronger fiscal stimulus partly offset the broader economic weakness as a sharp increase in military spending boosted production in defense-related manufacturing.

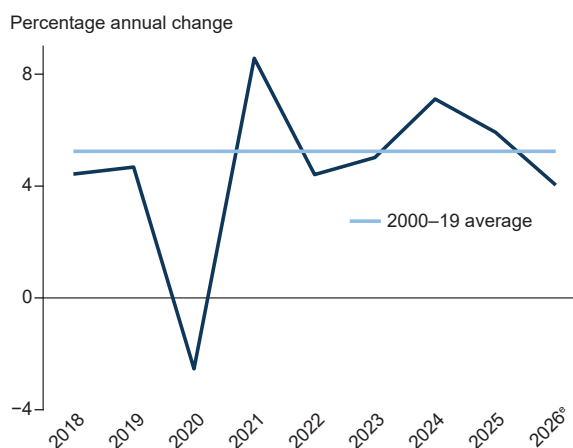
Consumption moderates

Consumption growth is slowing in most of the ECA countries this year. Average consumption growth in ECA is likely to slow to 4.0 percent in 2026 from 5.9 percent in 2025 because of moderating real wage growth and slower expansion of consumer credit (figure 1.5). Across ECA, and particularly in Central Asia and the South Caucasus, the pace of consumption is converging toward the earlier trend as the exceptional support from remittances, rapid wage growth, and government transfers has begun to normalize. In Russia and Türkiye, restrictive monetary policies are contributing substantially to the slowdown as they have resulted in higher borrowing costs.

Real wage growth continued to decline in 2026.

Real wages grew by 3 percent year-on-year in the second quarter of 2026, half the pace in 2025 (figure 1.6.A). This moderation occurred even as labor markets across ECA remained resilient and

FIGURE 1.5 Consumption growth slows



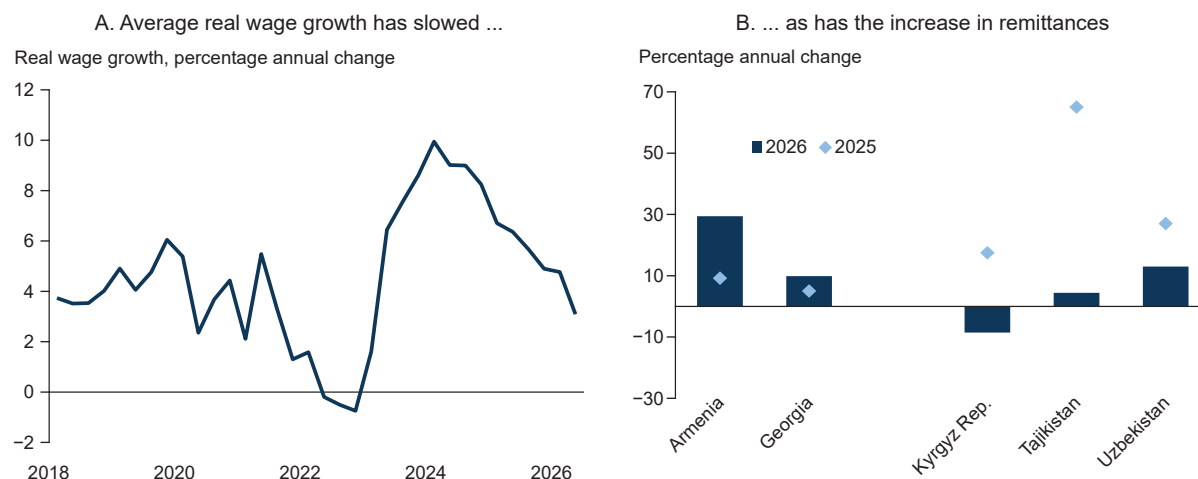
Source: World Bank.

Note: e = estimate.

Aggregates are averages.

unemployment stayed low. Nominal wage growth also declined, especially in better-paying sectors such as information technology, finance, and construction, which previously recorded sizable earnings gains. Public-sector pay restraint has added to the slowdown. In Kazakhstan, more modest public sector wage increases have depressed real wage growth, especially in education and healthcare. In Romania, fiscal consolidation has included a freeze of public sector salaries. In Montenegro, the effects of the one-off boost last year from the *Europe Now*

FIGURE 1.6 The increase in wages and remittances has eased



Sources: Haver Analytics; national statistics offices; national central banks; World Bank.

Note: ECA = Europe and Central Asia; Q2 = second quarter.

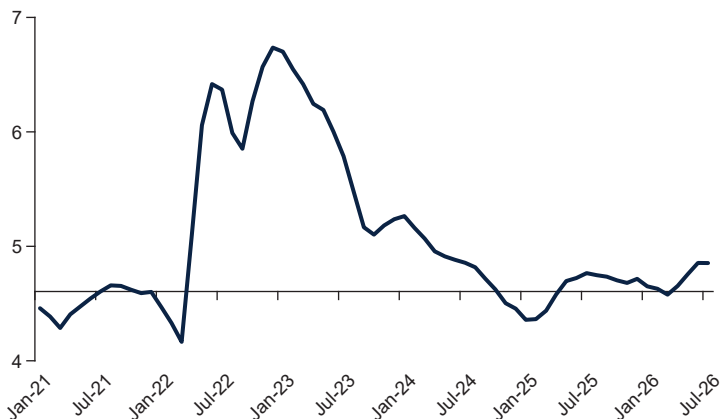
A. Median real wage growth for the sample of 13 ECA countries. The last observation is the second quarter of 2026.

B. Personal remittances in January-June. Data for Georgia show inflows of money transfers for January-July.

2 reform which raised wages by lowering pension contributions have faded, leaving nominal wage growth below inflation. Meanwhile, real wages in other countries in Central Asia grew at more than twice the ECA average rate, supporting resilient private consumption. This strength reflected tight labor markets, robust private sector growth, and large public-sector pay increases in some countries. For example, the Kyrgyz Republic posted the fastest real wage growth in ECA, driven by a substantial public-sector pay increase in April.

FIGURE 1.7 A surge in money transfers from the Russian Federation to Georgia has largely unwound

Logarithmic scale, 2018–19 = 100

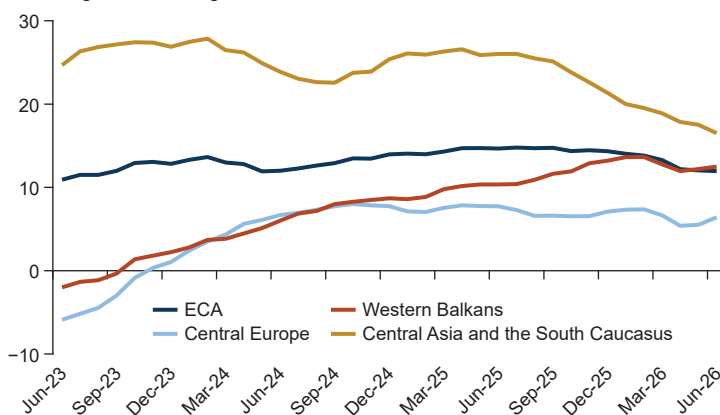


Sources: The National Bank of Georgia; World Bank.

Note: Three-month moving average. The last observation is June 2026.

FIGURE 1.8 Consumer credit growth has eased

Percentage annual change



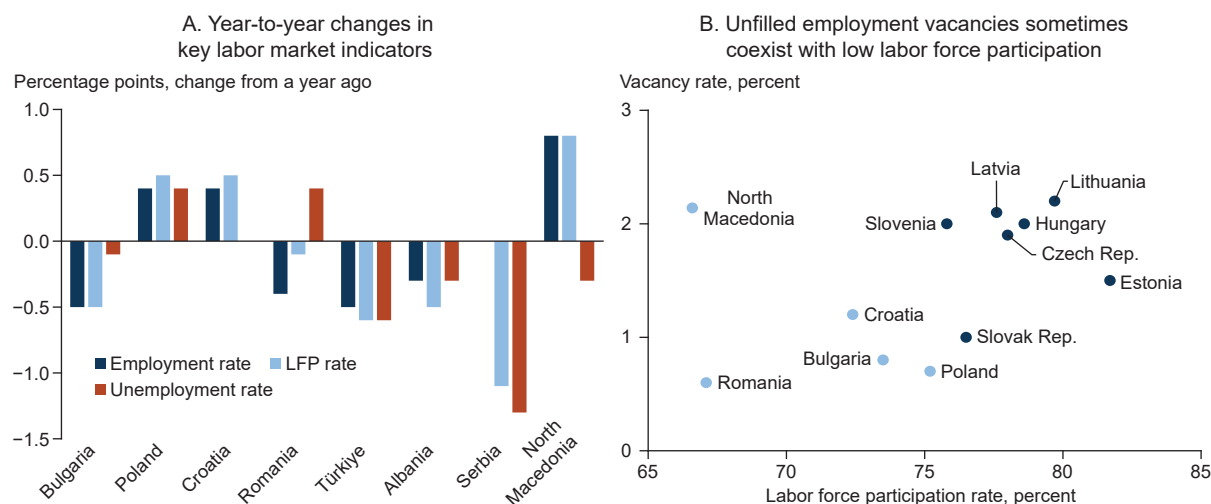
Sources: Haver Analytics; national statistics offices; national central banks; World Bank.

Note: ECA = Europe and Central Asia. Aggregates are averages. Real credit growth is the difference between nominal credit growth and the headline inflation rate. The last observation is June 2026.

Remittances remain an important driver of consumption. Russia is a key source of remittances across most countries of Central Asia and the South Caucasus. Transfers from Russia accounted for more than 90 percent of inflows to Tajikistan, nearly 80 percent to the Kyrgyz Republic, and about 70 percent to Armenia and Uzbekistan. In Uzbekistan, the dollar value of transfers rose to a record \$9.2 billion in the first half of this year or up by 13 percent. By contrast, transfers from Russia to the Kyrgyz Republic fell by about 12 percent after increasing by 16 percent in 2025, partly reflecting weaker migrant hiring and slower activity in migrant-intensive sectors such as construction (figure 1.6.B). In Armenia, personal transfers from abroad jumped by almost 30 percent during the first half of 2026 as inflows from Russia grew by 36 percent. In Georgia, money transfers from Russia also recovered, although the post-2022 surge has largely subsided (figure 1.7).²

Housing and consumer demand supported household credit, but tighter policies and macroprudential measures increasingly restrained its growth. Across ECA, real credit growth slowed to a still-strong 12 percent in June 2026 from 14.5 percent on average last year (figure 1.8). In Tajikistan, consumer loans drove growth, although funding and collateral constraints continued to restrain the expansion of mortgages. In Central Europe, robust housing demand, particularly in Bulgaria, and improving lending conditions sustained credit. Wage gains and robust housing and consumption demand also supported strong growth in the Western Balkans, although tighter macroprudential policy cooled lending in some countries. Household credit growth improved modestly in Russia, as subsidized mortgages continued to support the recovery. In Türkiye, credit growth has been moderating with high borrowing costs and tighter lending restrictions constraining borrowing. Lending growth slowed in Kazakhstan, Romania, and Uzbekistan because of tighter policies and in Croatia because of the introduction of macroprudential measures.

2. Money transfers are funds sent through banks and transfer systems, commonly used as a timely proxy for remittances but also covering some non-remittance transactions.

FIGURE 1.9 Labor markets in ECA

Sources: Eurostat; ILOSTAT (database); World Bank.

Note: ECA = Europe and Central Asia; LFP = labor force participation; LFS = labor force survey.

A. Year-on-year changes in percentage points versus the same quarter of 2025. The second quarter of 2026 is used where a complete comparable 15–64 LFS release is available; otherwise, the first quarter of 2026 is used. Georgia is excluded because a comparable 15–64 observation could not be verified.

Labor markets remain broadly resilient

Labor markets in ECA remain resilient overall, but with signs of cooling in parts of the region. Most ECA countries experienced a modest decline in total employment in the first quarters of 2026. However, unemployment has not increased in most of the region. The unemployment rate declined in Albania, North Macedonia, Serbia, and Türkiye.³ In Bulgaria, Croatia and Georgia, unemployment remained mostly unchanged. In most of ECA, the modest decline in employment was mostly driven by lower participation, as opposed to a rise in unemployment. In contrast with the rest of the region, Romania and Poland experienced a modest increase in unemployment (figure 1.9.A).

Slower hiring and weaker labor force engagement, rather than widespread job destruction, explain this partial slowdown. Recent labor market dynamics are mostly driven by flows and margins rather than large employment losses. Hiring slowed as moderating growth, rising costs, and

heightened uncertainty prompted firms to reduce vacancies and postpone recruitment rather than cut existing jobs. In Central Europe, vacancy rates declined in the first quarter of 2026, indicating that labor demand cooled while headline unemployment remained low. In Georgia and Türkiye, the recent decline in the unemployment rate was mostly driven by a decline in labor force participation, rather than a drop in the number of unemployed. In the Western Balkans, falling unemployment has coincided with declining employment rates, pointing to weaker job creation and outward migration. These patterns also suggest that labor market adjustment has so far occurred primarily through lower hiring and participation rather than layoffs, possibly reflecting firms' continued caution about workforce reduction in persistently tight labor markets. Central Asia remains the exception to the regional slowdown in hiring, as strong domestic activity and investment continue to support labor demand, particularly in services and construction.

Despite weaker hiring, labor shortages are becoming a structural constraint and, in some countries, coexist with untapped labor supply. One of the striking features of the current cycle is that weaker labor demand coexists with persisting labor scarcity. Labor shortages are becoming a

3. However, Türkiye's increasing labor underutilization rate, which reached 30.6 percent in July, indicates that the headline unemployment rate understates labor market slack, as many workers struggle to find full-time jobs.

defining feature of most ECA labor markets and have occurred not just in highly skilled occupations but increasingly affect construction, manufacturing, and transport. Labor shortages increasingly reflect structural factors including declining working-age populations, inadequate vocational education, slow reskilling, outward migration, and limited female participation in some occupations. Such shortages are expected to persist even under slower economic growth. In countries such as North Macedonia and to a milder extent in Croatia, unfilled labor vacancies increasingly coexist with untapped domestic labor supply (figure 1.9.B). In most ECA countries, tighter labor markets, low unemployment rates, and increasing employment of foreign workers are also accompanied by a substantial percentage of young people who are not in employment, education, or training (NEET). NEET rates reached 23 percent in Türkiye and Central Asia, 18 percent in the Western Balkans, 15 percent in the South Caucasus and 12 percent in Central Europe, compared to 7.6 percent in Germany.

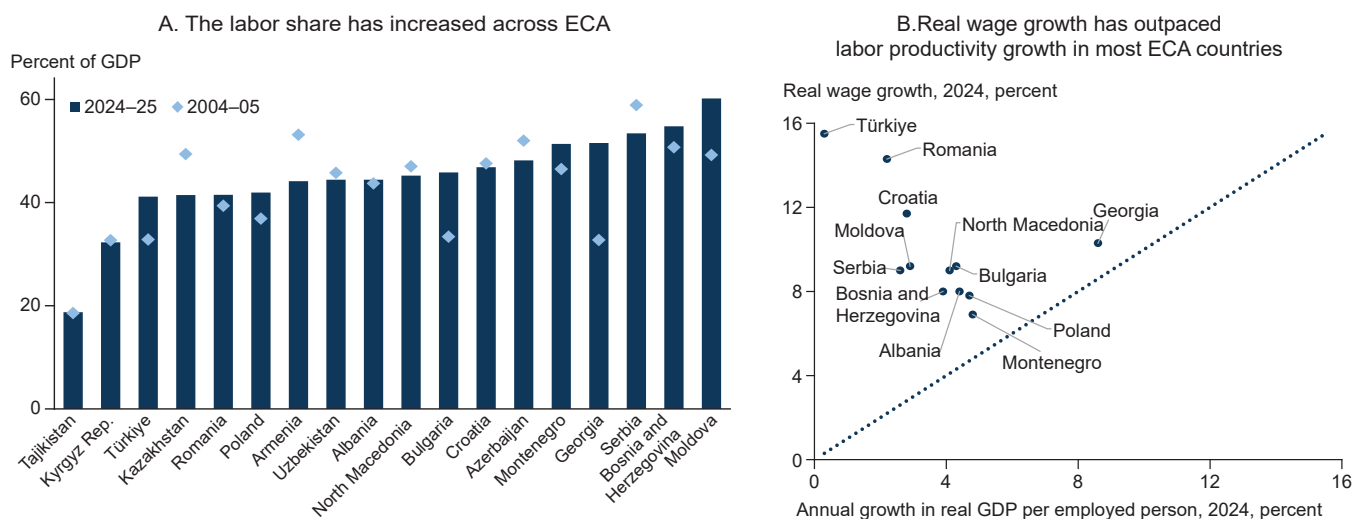
Wage gains are likely to continue in the short term, supported by continued labor shortages. In contrast to what is observed in high-income countries, the labor income share as a percentage of GDP has been on the rise in most of ECA since the early 2000s (figure 1.10.A). Following a renewed compression during the 2022–23 inflation shock,

labor income has recovered in ECA as nominal wages caught up with prices and tight labor markets generated strong real-wage growth: in recent years, real wage growth has outpaced labor productivity growth in most of ECA (figure 1.10.B). Looking ahead, binding labor supply constraints due to significant demographic pressures may put additional upward pressure on the labor share unless automation, capital deepening and migration substantially offset domestic labor shortages.

Over the medium to long term, however, weak productivity growth, unless reversed, may cap future wage growth. Labor scarcity can redistribute income toward workers and support household consumption, but wage growth persistently exceeding productivity growth will eventually weaken competitiveness and investment. Policies that raise productivity—through skills, technology adoption, better firm dynamics, and greater labor mobility—are therefore increasingly important for allowing real wages and labor’s income share to rise sustainably.

Migration patterns are changing and are becoming an increasingly important labor market adjustment mechanism. Migration has become a key mechanism for alleviating labor shortages in the region and is increasingly viewed as a structural component of labor market policy rather than a temporary response to cyclical shortages. Countries

FIGURE 1.10 The share of labor income in GDP has increased even with weak productivity



Sources: Eurostat; World Bank.

Note: ECA = Europe and Central Asia; GDP = gross domestic product.

such as Kazakhstan, Poland, and Romania are increasingly receiving labor migrants. The migrant workforce in ECA countries other than in Russia increasingly originates in Kazakhstan, the Kyrgyz Republic, Moldova, Tajikistan, and Uzbekistan and outside of ECA, in South Asia. Labor migration enables workers to access employment opportunities that are lacking at home, however, it may also reinforce issues of low participation in home labor markets, for example in Central Asia (Bossavie, Garrote Sánchez, and Makovec 2024; World Bank 2026b). While Central Asia still experiences a labor surplus, countries in the Western Balkans already face the dual challenge of continued emigration and growing labor shortages, compounded by population aging.

Informality continues to decline in parts of the region, but less so in lower-income countries where it remains a structural issue.

In Central Europe, informal employment has gradually declined over the past two decades, especially in Bulgaria and Romania, and continues to trend downward. This reduction was driven by labor shortages and reforms that made formal employment easier, more attractive, and better enforced. In Central Asia, the South Caucasus, and the Western Balkans, however, informality remains significant. In Central Asia, informality rates have remained stubbornly high, largely due to the strong structural nature of informality in the subregion. In the Kyrgyz Republic, Tajikistan, and Uzbekistan, over 60 percent of private-sector employment remains informal, with hardly any change over the past five years (World Bank 2026a). Compared to most of ECA, the main challenge in Central Asia is that growth does not currently generate enough productive, formal jobs for a still-expanding working-age population (World Bank 2026b). Informality and labor migration thus remain two major labor adjustment mechanisms in this part of the region.

Artificial intelligence (AI) and digitalization can help address structural labor shortages, while possible impacts on job displacement remain unclear (refer to chapter 2 of this update). There is not yet evidence of large aggregate employment losses in ECA due to AI. The impacts of AI are likely to be skill-biased, as suggested by higher levels of

exposure among higher-skilled workers, but it remains uncertain whether AI will act as a substitute or complement to higher-skilled jobs in ECA. Beyond possible job displacement effects, the demographic pressures make productivity-enhancing technologies such as AI and digitization especially important for the region. In that context, AI has the potential to become a critical tool to help address the rising labor shortage in the region. Policymakers in ECA are increasingly focused on reskilling workers, digital competencies, automation in manufacturing, public-sector digitalization, and productivity gains to offset shrinking workforces. The demographic imperative makes efforts to support the adoption of productivity-enhancing technologies especially important for the region.

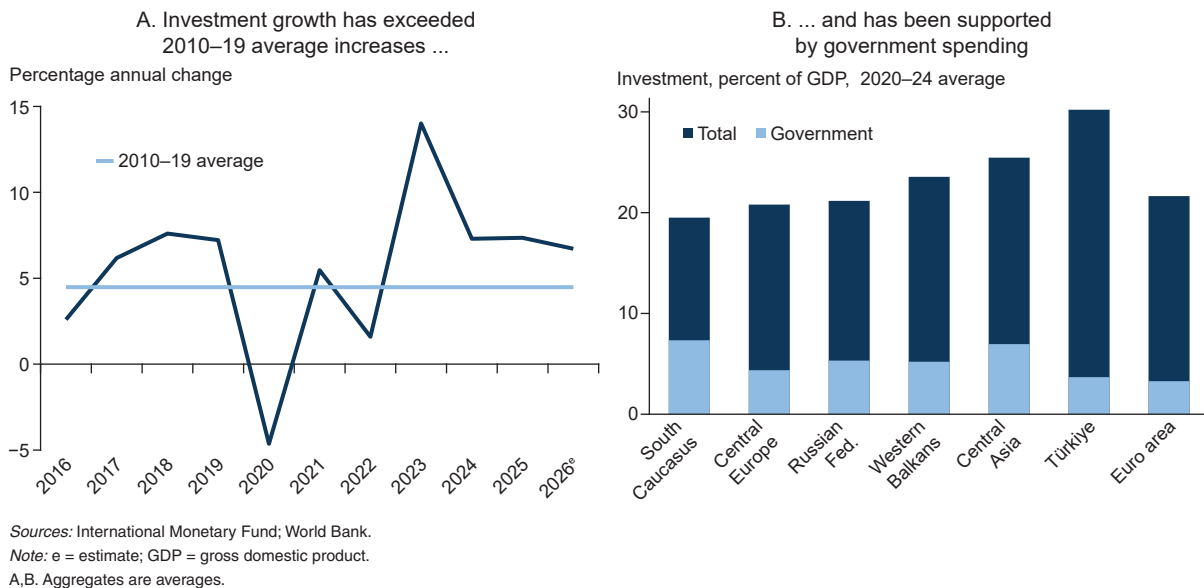
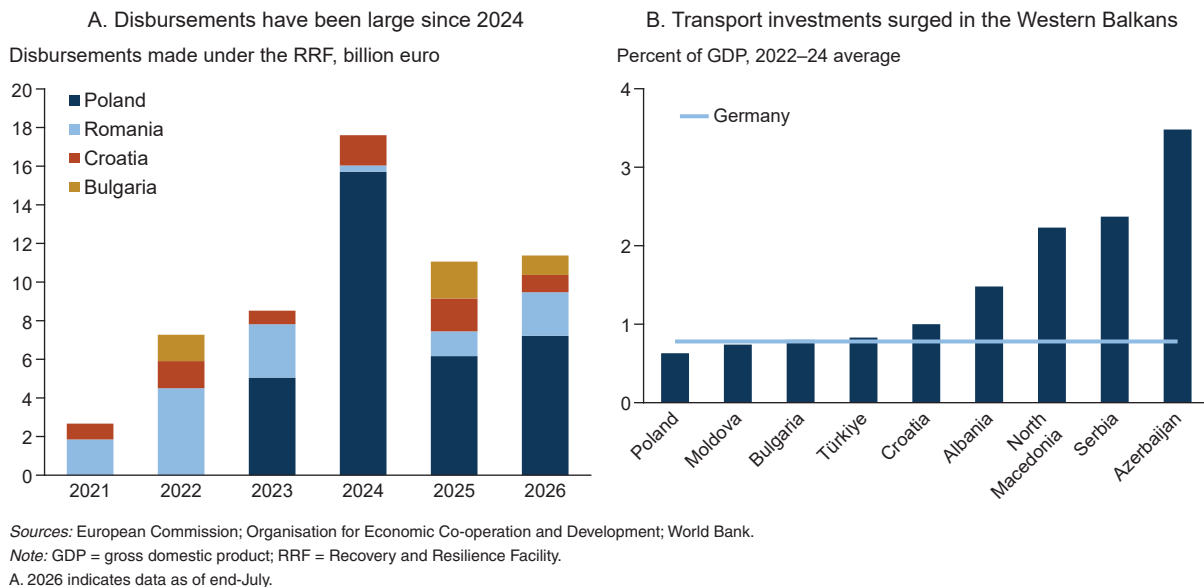
Investment growth holds firm

Increased public investment in infrastructure has helped support investment despite the heightened global uncertainty and energy shock.

Investment is likely to expand by 6.8 percent on average this year, little changed from 7.3 percent in 2025 (figure 1.11.A). Robust government capital spending is especially important in Central Asia and the South Caucasus, where large public projects account for a larger share of the overall investment spending (Kasyanenko and Izvorski 2026) (figure 1.11.B).

EU-funded projects have boosted public investment in Central Europe and the Western Balkans.

As the 2026 Recovery and Resilience Facility deadline approached, faster EU-fund disbursement and absorption lifted public investment in transport, energy, health care, defense, and municipal and digital infrastructure across Central Europe (figure 1.12.A). Major projects included Sofia's metro expansion, railway modernization in Romania, continued post-earthquake reconstruction in Croatia, and clean-energy and transport investments in Poland. EU-financed transport corridors also boosted investment across the Western Balkans, where high investment in transport networks reflected ongoing motorway and railway modernization, although

FIGURE 1.11 Investment growth has been broadly resilient**FIGURE 1.12 EU funds supported public investment in Central Europe and the Western Balkans**

slow progress with reforms delayed fund releases in some countries (figure 1.12.B). EU funds from the 2025–27 Growth Plan also supported public investment in Moldova, where government capital outlays grew by nearly 29 percent in the first half of 2026.⁴

4. Under the Growth Plan, Moldova is set to receive €1.9 billion in EU funding during 2025–27, equivalent to more than 10 percent of its 2025 GDP, conditional on implementing agreed reforms.

Public investment continues to sustain Central Asia's state-led construction boom. The expansion has been especially pronounced in the Kyrgyz Republic, where fixed investment surged by almost 60 percent in the first half of 2026. Large transport and energy projects across the subregions include the China–Kyrgyz Republic–Uzbekistan railway, the Trans-Caspian Transport Corridor, and the Rogun hydropower plant. However, public

investment has lost momentum in Kazakhstan, as capital spending has increasingly shifted from the budget to state-owned enterprises, following the completion of the major budget-funded schools construction project last year.

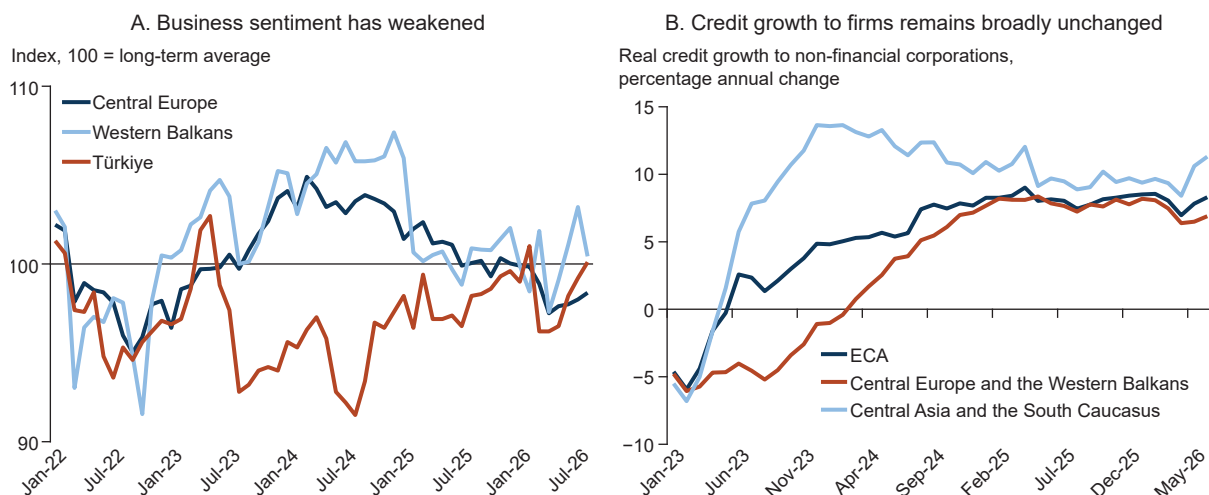
Geopolitical tensions, policy uncertainty, rising energy costs, and tighter financing conditions have weighed on business confidence and private investment across ECA (figure 1.13.A). Foreign direct investment (FDI) has followed a similar pattern. Excluding Russia, FDI inflows to the region fell by about 17 percent in the first quarter of 2026, reflecting weaker flows to Central Europe and Türkiye, which together account for more than 70 percent of the ECA totals. In the Western Balkans, inflows to Serbia, which receives over 40 percent of the Western Balkan's FDI, fell sharply, partly as global and domestic uncertainty prompted investors to repatriate earnings and postpone some projects.

Energy, AI, digital infrastructure, and industrial projects have continued to attract capital across the region despite broader investment headwinds. In Romania, major offshore infrastructure was installed this year as work advanced on the €4 billion Neptun Deep project, with gas production expected to begin in 2027. Meanwhile, Bulgaria's

renewable energy boom has spurred battery investment, with operating storage capacity reaching over 16 percent of the electricity system in 2026, among the highest shares globally. Large-scale investment in AI and digital infrastructure is gaining momentum in Türkiye, supported by major long-term commitments from global technology firms and domestic investors. FDI strengthened in Armenia and Georgia led by investment in AI and digital infrastructure. For example, the first phase of Firebird AI's \$4 billion AI data center project, developed with NVIDIA and the Armenian government, was opened in August and is the largest AI facility in the region. Established foreign-owned firms, particularly in banking and real estate, also continued to reinvest profits amid robust earnings and improved macroeconomic stability. Uzbekistan continued to attract substantial FDI, supported by major energy, digital infrastructure and industrial projects. Foreign-funded investment spending, including FDI and loans, already accounts for over 70 percent of all investment in Uzbekistan.

Corporate credit growth has remained strong. In June, outstanding loans to non-financial corporations grew by an average of 8.3 percent in real terms across ECA (figure 1.13.B). Real credit growth exceeded 12 percent in Central Asia,

FIGURE 1.13 Investor caution has slowed private investment



Sources: European Commission; Haver Analytics; national central banks; World Bank.

Note: ECA = Europe and Central Asia.

A. Aggregates are averages. The last observation is July 2026.

B. Aggregates are averages. Real credit growth is the difference between nominal credit growth and the headline inflation rate. The last observation is June 2026.

by robust lending to construction. In the Kyrgyz Republic, for example, construction loans more than doubled in nominal terms from June 2025. By contrast, corporate credit recovered only modestly in Central Europe and the Western Balkans, as weak external demand, particularly from the EU automotive industry, heightened uncertainty, and still-elevated borrowing costs in some countries led firms to postpone major projects. In Türkiye, real corporate credit growth slowed to just 2.3 percent by June from more than 10 percent on average in the first quarter of 2026, constrained by high borrowing costs and tighter lending standards.

Exports remain mixed

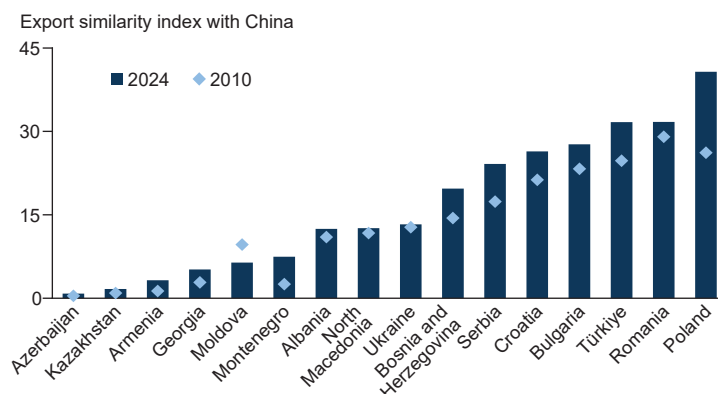
ECA's exports of goods and services are on track to rise by 2.9 percent in 2026, after a 0.7 percent decline last year. Within the average, there is substantial divergence. Export growth has strengthened in over half of ECA countries, mostly in Central Asia and the South Caucasus. By contrast, the pace of export growth eased in Central Europe and declined in Türkiye; exports remained flat in Russia following a sharp decline in 2025.

Rising competition from China and increased challenges for European car brands on global markets have reverberated through supplier networks in which companies in ECA are strongly present.

A high and increasing degree of similarity with China's export basket leaves firms in Central Europe, Türkiye, and the Western Balkans particularly exposed to intensifying competition (figure 1.14). Pressures are especially pronounced in the automotive sector, where the share of Chinese brands in the European market more than doubled over the past year. This surge has been driven not only by electric vehicles, but increasingly by competitively priced plug-in and conventional hybrids, which remained exempt from the EU's additional tariffs on China-made fully electric cars. The share of electric vehicles in total registrations in the EU increased to more than 20 percent from 15.6 percent in 2025.⁵ At the same time, German exports of passenger cars fell by 4 percent in the first half of this year.

Reflecting these developments, passenger car production in Poland and Romania fell by 13 percent in January-July year-on-year, mirroring a drop in exports to the EU. In Poland, however, overall vehicle production was supported by a 3.4 percent increase in the production of vans and trucks, which account for the largest share of domestic car industry. Car production in Türkiye fell by 8 percent due to both weaker external demand and tighter domestic financing conditions. On a positive note, Romania and Serbia started production of battery-electric models for the European market in early 2025. Car production in Serbia surged by nearly a third in January-July, as a new plant substantially expanded production and exports to Italy in the second year of its operation.⁶ Toyota's Sakarya plant in Türkiye is also boosting production, after becoming the company's first European site to produce plug-in hybrids, and exports a majority of its output. Car production rose by 37 percent in Kazakhstan and 8 percent in Uzbekistan, largely directed to domestic consumers of gasoline-powered vehicles.

FIGURE 1.14 ECA exporters are facing increasing competitive pressure from China



Sources: Eurostat; World Bank; World Trade Organization.

Note: ECA = Europe and Central Asia; EU = European Union. The index measures the similarity between the product composition of ECA countries' exports to the EU and that of China's exports to the EU. It ranges from 0, indicating no overlap, to 100, indicating identical export baskets (Finger and Kreinin 1979).

5. Chinese automakers are rapidly gaining market share across ECA as well. For example, according to the European Automobile Manufacturers' Association, in Türkiye, the share of Chinese-made passenger cars rose from near zero in 2021 to 8 percent of car sales in 2025.

6. Resilient automotive exports supported export performance across the Western Balkans, particularly in Serbia and North Macedonia, partly offsetting weaker Serbian electricity exports affected by the European Union's Carbon Border Adjustment Mechanism (CBAM).

Concentration of automotive exports remains a vulnerability for some countries. Romania is particularly exposed to developments in European passenger car markets. The automotive sector accounts for 17 percent of the country's goods exports, with passenger cars representing over half of automotive exports (figure 1.15). Passenger car exports are heavily concentrated in Europe, with the EU absorbing about 83 percent of the total and Germany and France serving as the largest destinations. More than 90 percent of Türkiye's passenger car exports are shipped to the EU, with France accounting for a particularly large share. This concentration leaves both countries vulnerable to the rapid shift toward electric vehicles, changing consumer preferences, and intensifying competition in European markets. These pressures are compounded by incentives increasingly tied to the environmental footprint of vehicle and battery production, potentially weakening the competitiveness of exporters that lag in electrification and low-carbon supply chains (European Commission 2025).

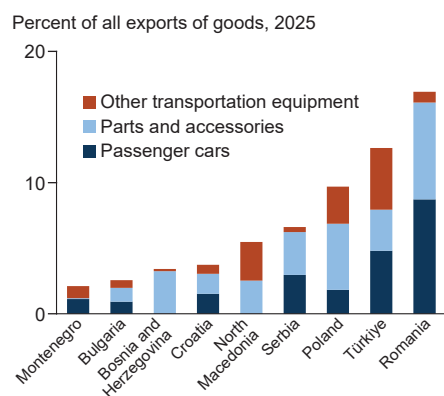
Thus far, firms in ECA have not captured the AI-driven expansion of global trade. AI-enabling products still account for only a small share of the region's exports (figure 1.16). Chapter 2 discusses this crucial issue.

The unwinding of re-export flows weighed on trade in some countries of Central Asia and the South Caucasus. In Armenia, for example, exports to the United Arab Emirates fell sharply as re-exports of gold and precious stones normalized after surging in previous years. Meanwhile, China became an increasingly important export market, particularly for Central Asia. In Uzbekistan, total exports declined because of lower gold shipments, but non-gold exports surged by almost 30 percent, supported by faster growth of exports to China as well as neighboring Central Asian economies.

The disruptions to commodity markets from the conflict in the Middle East have had asymmetric effects across ECA's hydrocarbon producers. Higher crude prices have supported oil exporters, while the contraction in Russian refining capacity has constrained fuel supply to importers in Central Asia and the South Caucasus. The intensification of Ukraine's attacks on major oil refining facilities in Russia has disrupted the production of gasoline, diesel, and jet fuel.⁷ In July, the amount of crude oil processed by Russia's refineries dropped to the lowest level in more than 20 years with sharp

7. Drone strikes have targeted at least 25 Russian refineries since August 2025.

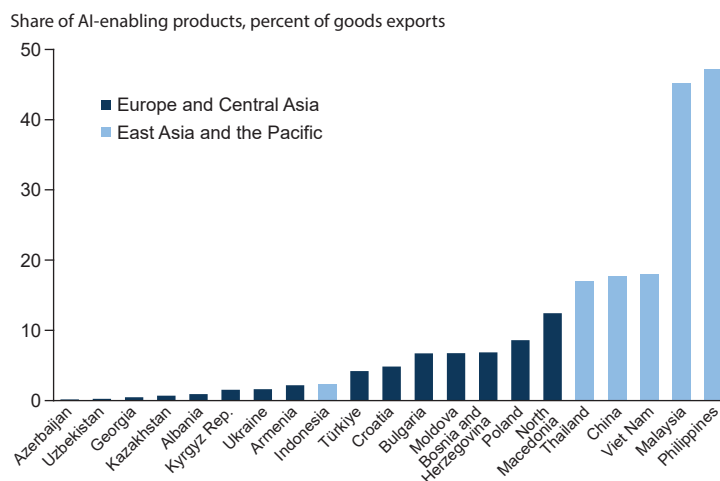
FIGURE 1.15 High concentration of automotive exports in some ECA countries



Sources: World Bank.

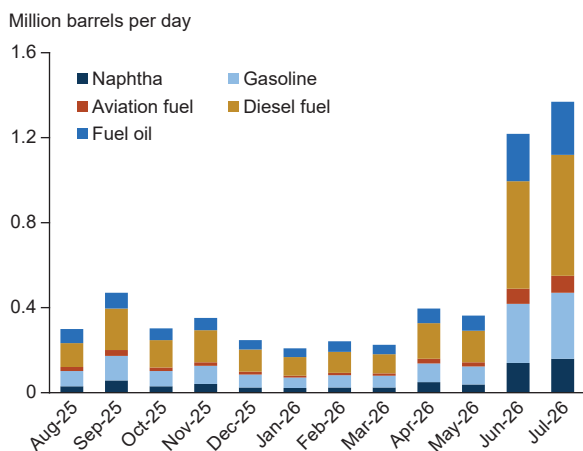
Note: ECA = Europe and Central Asia. Automotive exports are defined as products classified under HS Chapter 87 (vehicles and related transport equipment) of the Harmonized Commodity Description and Coding System (HS) developed by the World Customs Organization. Parts and accessories also include vehicle bodies, chassis, and other components used in motor vehicle manufacturing.

FIGURE 1.16 The countries of ECA have limited exposure to the booming AI trade



Sources: World Bank; World Trade Organization.

Note: AI = Artificial intelligence; ECA = Europe and Central Asia. Values are for 2025 or the latest available. The list of the AI-enabling products is from the 2025 World Trade Report (WTO 2025).

FIGURE 1.17 Losses of fuel supply in the Russian Federation due to refinery outages

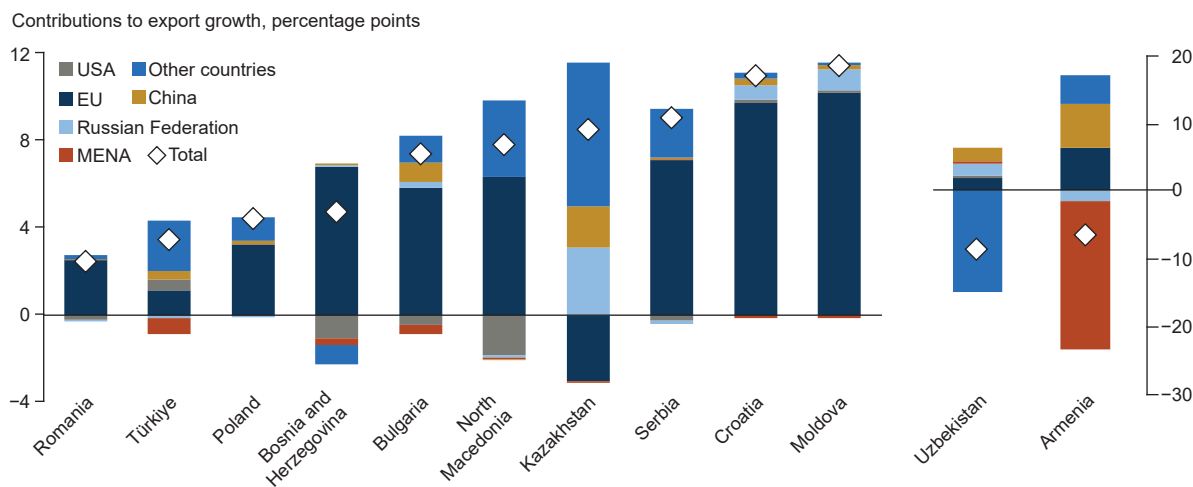
Sources: Kpler; World Bank.

increases in outages (Kpler 2026) (figure 1.17). In response, the authorities have tightened export restrictions, including bans on gasoline and diesel exports, further limiting supplies to import-dependent neighbors. Oil production dropped in Kazakhstan because of disruptions at major oil fields and along export routes. Oil production fell in Azerbaijan, continuing a long-term structural decline after a peak in 2011. The Kyrgyz Republic and Tajikistan are most exposed to tighter regional energy supplies because they rely heavily on Russian fuel imports and have limited domestic refining

capacity. Other ECA countries have stronger buffers but are still affected through global prices and more-challenging logistics.

In contrast to the indirect effects of higher prices, ECA's direct exposure to Middle East disruptions remains contained. In Türkiye, lower exports to the Middle East subtracted nearly 1 percentage point from its export growth in the first half of 2026 (figure 1.18). However, this decline was more than offset by stronger demand elsewhere. Global trade uncertainty and disruptions to shipping through the Strait of Hormuz lengthened delivery times and raised freight and insurance costs, redirecting some foreign demand to Türkiye. Precautionary and front-loaded purchases and continued realignment of global supply chains also supported exports (Barlas and Oğuz 2026).

Grain exporters from the region face headwinds. Ukraine's cereal yields and production have increased substantially this year, but exports have fallen. By early September, Ukraine's grain harvest reached 32 million tons, about 13 percent more than in 2025, while grain exports were 14 percent down from a year earlier due to the deteriorating security in the Black Sea and the restoration of EU import quotas (FAO 2026). In Kazakhstan, the constraint is on the production side. Hot and dry weather and an earlier shift of acreage toward oilseeds are expected

FIGURE 1.18 Fallout from Middle East disruptions remained limited in most ECA countries

Sources: Eurostat; national statistical offices; World Bank.

Note: EU = European Union; MENA = Middle East and North Africa; USA = United States. Contributions to percentage annual change in the value of exports during the first six months of 2026 by destination market. Data for Bulgaria, Croatia, and Romania are for January-May. Data for Armenia and Uzbekistan are shown on the right scale. MENA includes the Islamic Republic of Iran, Iraq, Kuwait, Oman, Qatar, Saudi Arabia, and the United Arab Emirates.

to reduce wheat output by about a fifth during the 2026/27 marketing year, also limiting exports (USDA 2026). Poor harvests linked to an exceptionally strong El Niño, transport disruptions, more frequent and severe weather events, and elevated fertilizer costs could disrupt agriculture and worsen food insecurity in the region and beyond.

Inflation remains elevated

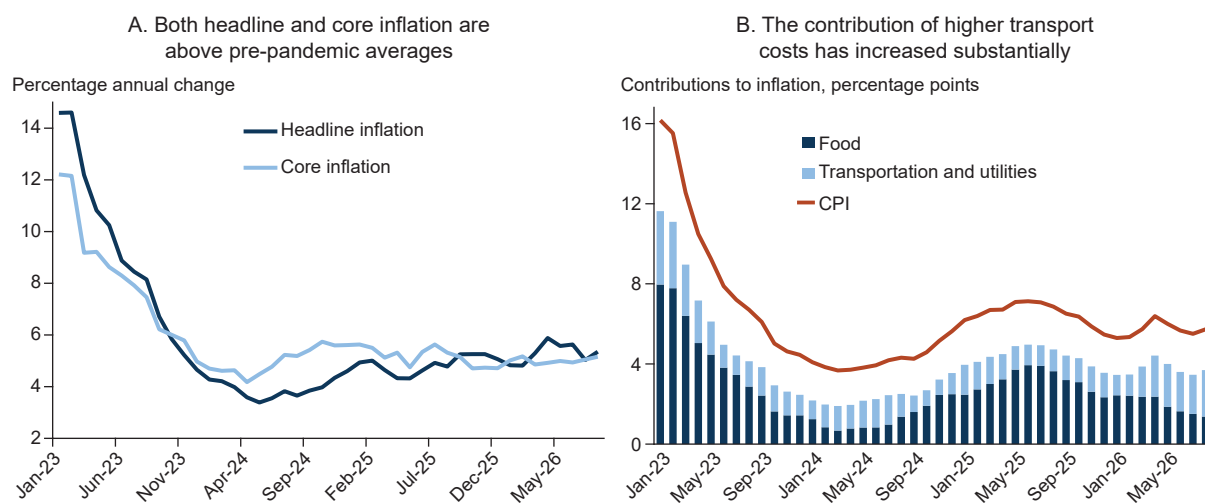
Higher energy prices have kept inflation elevated. Median annual inflation in ECA amounted to 5.4 percent in August, up by 0.6 percent from a year ago and almost twice as high as the 2018–19 pre-pandemic average (figure 1.19.A). Higher energy costs have been the main driver of price increases since early 2026, reflecting disruptions to global energy markets (figure 1.19.B). Transportation prices in ECA rose by almost 12 percent, the fastest pace since end-2022. These price increases alone accounted for one-fifth of headline inflation, about four times as much as in 2025. In contrast to energy prices, and contrary to earlier expectations, the contribution from food price inflation slowed because of more favorable supply conditions in most markets. Median 12-month food price inflation in ECA fell to 3.2 percent, its lowest rate in almost two years.

With the conflict in the Middle East, ECA has faced an energy shock like that of 2022. As in 2022, inflation in ECA is again being driven by an energy supply shock. However, the 2022 shock was broader and came at a time of stronger dependence in most countries in the region on imported oil and natural gas. Strong post-pandemic consumption, supply chain disruptions, and soaring food prices were already pushing inflation higher even before energy prices surged in 2022 (figure 1.20.A). During 2026, by contrast, stable nominal exchange rates, a more modest rise in global food prices, and reduced dependence on imported energy have helped contain the broader impact of energy inflation (figure 1.20.B).⁸

Government measures have helped households manage the impact of higher energy prices this year. Across ECA, governments deployed temporary relief measures, including fuel tax cuts, price caps, export restrictions, and targeted household or sectoral support. Albania capped retail fuel prices, Serbia reduced excises and regulated prices, and Türkiye adjusted special consumption taxes to help partly absorb refinery-price movements. Bulgaria provided fuel subsidies for low-income car owners,

8. ECA, especially in countries of Central Europe, has become less dependent on energy imports since 2022 as efficiency and renewable generation increased, although progress remains uneven across the region.

FIGURE 1.19 Inflation in ECA has remained elevated

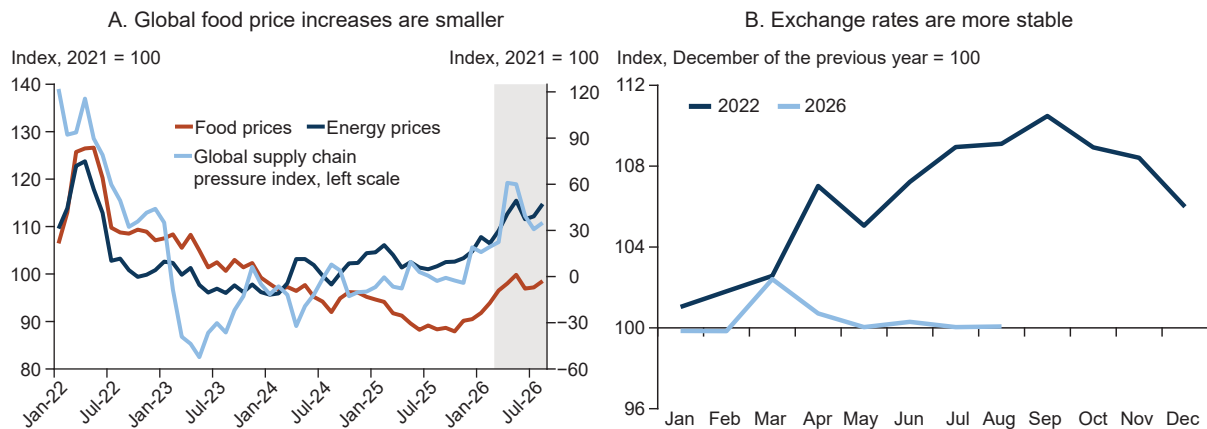


Sources: Eurostat; Haver Analytics; national statistical offices; World Bank.

Note: CPI = Consumer Price Index; ECA = Europe and Central Asia.

A. Aggregates are medians. The last observation is August 2026.

B. Averages for 12 ECA economies. The last observation is August 2026.

FIGURE 1.20 External inflationary pressures have risen but remain milder than in 2022

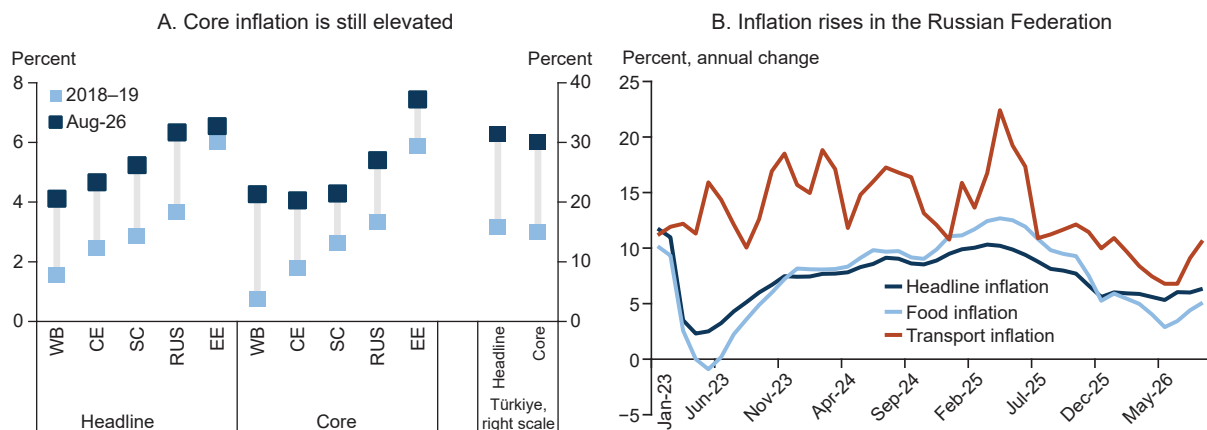
Sources: Haver Analytics; Federal Reserve Bank of New York; World Bank.

A. The shaded area indicates the period covering the conflict in the Middle East.

B. The figure shows the nominal exchange rate against the US dollar. Medians for the sample of 13 countries in Europe and Central Asia excluding the Russian Federation and Türkiye. The last observation is August 2026.

tax relief for agricultural producers, and support for energy-intensive industries. Poland introduced a temporary cap on retail petrol and diesel prices and cut the value added tax on fuel. These measures helped shield consumers from the immediate effects of the oil price shock, although in some countries import dependence and limited supplier diversification weakened the impact of the relief measures. The measures also entailed trade-offs, including forgone fiscal revenues, the opportunity costs associated with broad-based support, and potential distortions to competition and investor perceptions arising from market interventions.

High inflation persists across ECA, as entrenched domestic price pressures keep it well above pre-pandemic levels. Average inflation remained lowest in Central Europe, the South Caucasus, and the Western Balkans. At the same time, inflation remains furthest above pre-pandemic levels in Central Europe and the Western Balkans. This largely reflects persistent domestic price pressures, as strong wage growth over the previous several years and rising labor costs continue to feed into the prices of goods and services (figure 1.21.A). Core inflation has also risen furthest above its pre-pandemic trend in these subregions, indicating that inflation

FIGURE 1.21 Underlying inflation pressures persist

Sources: Haver Analytics; World Bank.

Note: CE = Central Europe; EE = Eastern Europe; RUS = Russian Federation; SC = South Caucasus; WB = Western Balkans.

A. Aggregates are averages. Shaded bars indicate the difference between the latest inflation level and the 2018–19 average. The last observation is August 2026.

has broadened beyond food and energy and may therefore take longer to subside. In Türkiye, disinflation continued, with headline inflation easing to 31.5 percent in August as food price pressures moderated. Annual inflation in Russia increased to 6.3 percent in August, because of higher fuel and food prices (figure 1.21.B).

The second-round effects of higher energy prices are likely to keep inflation elevated as increased transport and production costs feed through the economy. A sustained 10 percent jump in global oil prices could raise annual inflation in ECA by up to 0.4 percentage points on average, making the return to the inflation target more difficult (figure 1.22).⁹

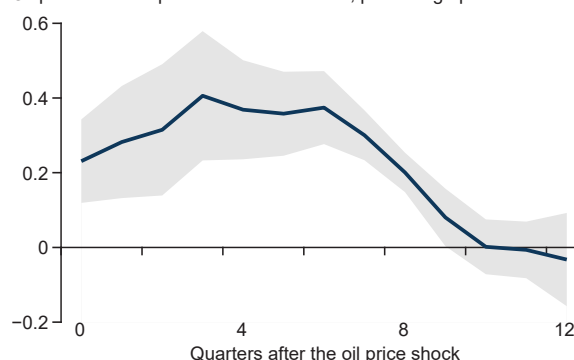
Monetary policy is largely on hold

Elevated inflation has largely kept central banks on hold this year. Inflation remains above central bank targets in more than half of the countries in ECA. As a result, more than half of the region's monetary authorities have kept their policy rates unchanged so far in 2026 (figure 1.23.A). Central

banks hiked rates modestly in Georgia, Moldova, North Macedonia, and Ukraine, where the impact of the energy shocks was compounded by stronger domestic demand. Türkiye's central bank kept the policy rate unchanged after reducing rates by 1 percentage point in January. However, it shifted from one-week repo funding to overnight lending in March, effectively raising banks' funding costs from the 37 percent policy rate to 40 percent. The resumption of one-week repo auctions in late August reversed this operational tightening and returned

FIGURE 1.22 Persistent energy price shocks are likely to prolong inflation pressures

Oil price shock impact on annual inflation, percentage points

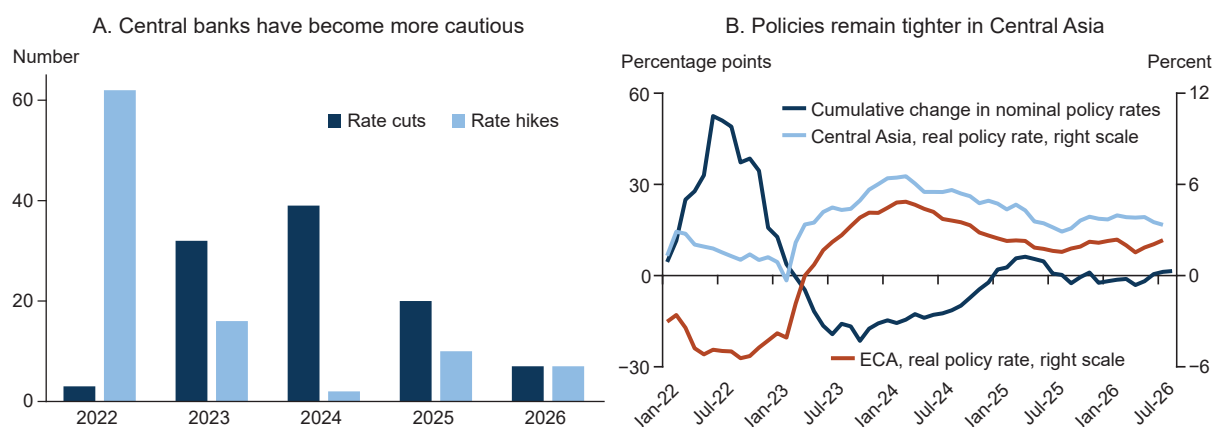


Sources: Eurostat; Haver Analytics; national statistical offices; World Bank.

Note: ECA = Europe and Central Asia. Estimated impact of a 10 percent annual increase in global oil prices on headline inflation in ECA. Shaded areas denote 90 percent confidence intervals. Estimates are based on local projections using an unbalanced panel of 13 ECA countries spanning the first quarter of 1994 to the first quarter of 2026, controlling for output gaps and changes in nominal effective exchange rates.

9. These estimates are consistent with earlier evidence of the pass-through from global oil price shocks to domestic inflation (see, for example, Choi et al. 2018).

FIGURE 1.23 External price pressures slowed further easing



Sources: Haver Analytics; World Bank.

Note: ECA = Europe and Central Asia.

B. A real policy rate is the difference between the nominal policy interest rate and the headline inflation rate. The blue line shows six-months cumulative change of the nominal policy rates for the sample of 14 ECA economies. Aggregates are averages. The sample excludes the Russian Federation and Türkiye. The last observation is August 2026.

funding costs closer to the policy rate without a formal rate cut. The central banks of Kazakhstan and Russia, by contrast, delivered large policy rate cuts. In Kazakhstan, policy action followed a continued decline in inflation, even if price increases remained above central bank targets (figure 1.23.B). In Russia, the central bank continued its easing cycle to support the slowing economy but reduced the size of its two most recent rate cuts as it adopted a more cautious approach.

Increased uncertainty, especially in commodity markets, geopolitical tensions, and growth risks are making policy choices more challenging. The balance of inflation risks in ECA remains tilted to the upside. Energy supply disruptions could keep energy and food costs elevated, pushing up inflation expectations. The risk of second-round effects from energy prices is greatest in countries where credit growth is stronger and fiscal policy remains expansionary.

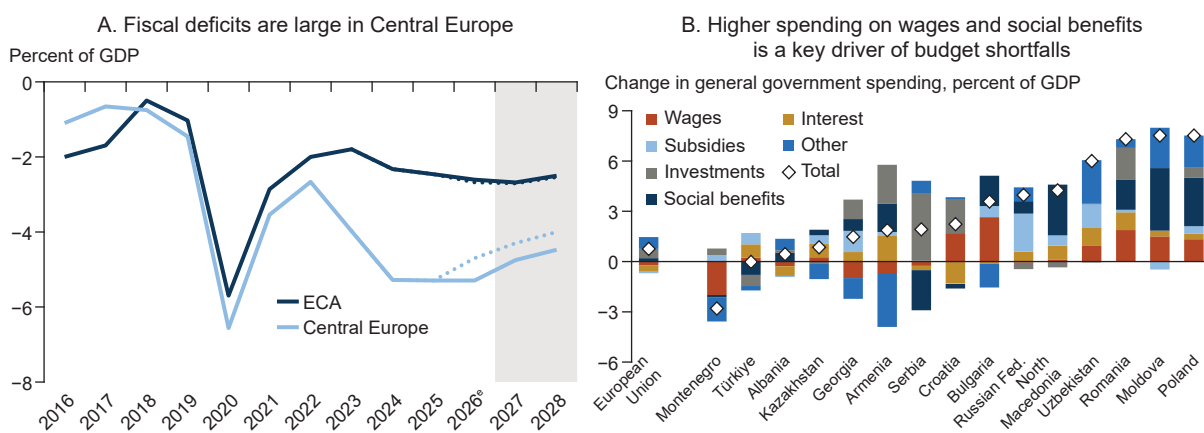
Fiscal consolidation remains limited

Across ECA, fiscal consolidations are likely to be delayed again this year. Despite stronger revenues and growth at potential, higher outlays on public wages, social benefits, and investment are likely to

leave the average fiscal deficit little changed at 2.6 percent of GDP (figure 1.24.A). There is a wide variation across the countries.

In more than half the countries, the fiscal stances are becoming more expansionary this year. Deficits in Central Europe remain the highest in ECA, largely because of rising defense spending and age-related and healthcare costs (figure 1.24.B). Poland's deficit is mostly unchanged this year and remains at 7 percent of GDP, as rising defense spending, social transfers, and investment constrain consolidation. Defense is a particularly important driver. Poland already spends the largest share of GDP on defense among North Atlantic Treaty Organization members and has seen one of the sharpest increases among ECA countries not experiencing active conflict (figure 1.25). Romania is undertaking the region's most ambitious fiscal adjustment, with the deficit expected to narrow by almost 2 percentage points to 6 percent of GDP in 2026, supported by revenue measures and tighter control of current expenditure. At the same time, public investment remains high at about 8 percent of GDP, with EU funds financing more than 70 percent of investment spending. Although government borrowing costs have risen across ECA amid heightened concerns about fiscal sustainability, the more moderate increase in Romania may

FIGURE 1.24 Structural increases in spending keep fiscal deficits broadly unchanged

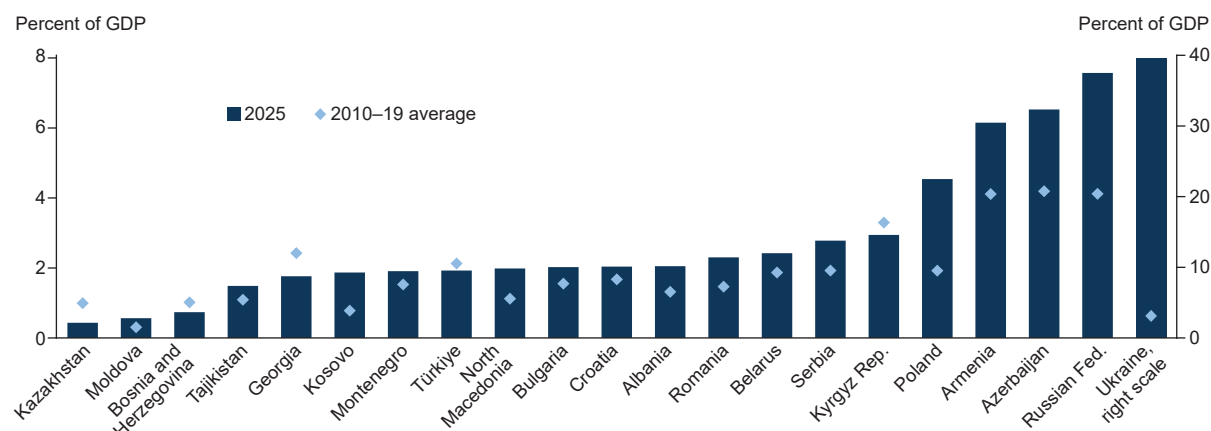


Sources: Eurostat; International Monetary Fund; national central banks; national ministries of finance; national statistical offices; World Bank.

Note: e = estimate; ECA = Europe and Central Asia; GDP = gross domestic product.

A. Aggregates are averages. The shaded area indicates forecasts. Dotted lines show previous (April 2026) projections. ECA excludes Ukraine.

B. The figure shows the key drivers of the change in general government spending from 2010–19 to 2024–25.

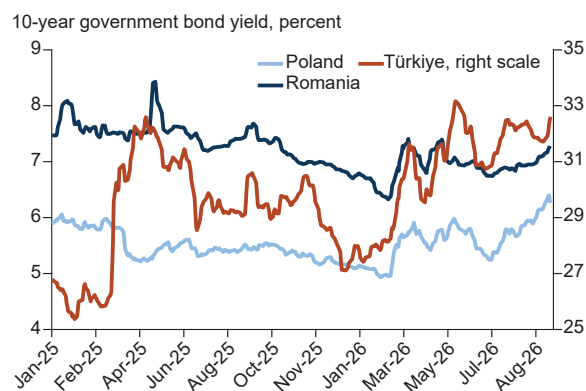
FIGURE 1.25 Defense spending has increased in most countries

Sources: Stockholm International Peace Research Institute; World Bank.

Note: GDP = gross domestic product.

reflect improving market perceptions of the fiscal consolidation effort (figure 1.26). Fiscal pressures are pronounced in Bulgaria, where the deficit is projected to widen sharply to 5.3 percent of GDP in 2026 from 3 percent of GDP last year because of rapid growth of social spending, increasing municipal investment, and rising energy subsidies. These three Central European countries are under the EU Commission's excessive deficit procedure, which is designed to enforce the EU fiscal rules on public debt and fiscal deficits.

Fiscal stances are loosening across most of Central Asia, reflecting sustained investment in energy and transport, alongside policy responses to the energy shock and sizable public sector wage increases in some countries. In Tajikistan, the deficit is expected to widen to 1.5 percent of GDP after a surplus of 0.3 percent in 2025, reflecting higher spending on the Rogun hydropower plant and further public sector wage increases. In the Kyrgyz Republic, the fiscal surplus is projected to narrow by almost 1 percentage point to 1.7 percent of GDP in 2026, due to increased outlays on higher education and healthcare wages, capital injections into state-owned banks, and major infrastructure projects. By contrast, the fiscal deficit in Uzbekistan is projected to remain broadly unchanged at 2.2 percent of GDP as higher social and investment spending is offset by lower energy subsidies, reduced directed lending to state-owned enterprises (SOEs), and stronger revenues.

FIGURE 1.26 Borrowing costs have risen since March

Sources: Haver Analytics; World Bank.

Note: The last observation is September 2026.

Fiscal balances in some of ECA's energy producers are improving because of higher energy prices, but by less than previously expected. In Kazakhstan, for example, the deficit narrowed to 2.2 percent of GDP, or almost a full percentage point of GDP below its 2025 level, amid tighter spending and lower public investment. In Russia, however, the general government deficit is expected to widen to 4.5 percent of GDP from 3.9 percent in 2025, reflecting slowing growth and persistently high expenditure. The federal budget deficit was already at 2.5 percent of GDP during the first eight months of 2026, or up from 1.8 percent a year earlier. Weak demand and rising borrowing costs prompted the

government to suspend bond auctions temporarily in July, while liquid assets of the National Wealth Fund fell to 1.6 percent of GDP by end-August, from 1.8 percent a year earlier, as the government drew on the fund to cover the budget shortfall.

Türkiye's central government primary surplus increased by more than 31 percent in January–August 2026 from a year earlier. However, interest payments, which rose by over 40 percent, and energy-related tax relief limited the improvement in the overall balance.

The divergence in fiscal stances across the ECA countries is also reflected in the divergence of government debt trajectories. Persistent primary deficits in Central Europe since the pandemic have resulted in a surge of government debt (figure 1.27.A). Government debt has already surpassed 65 percent of GDP in Poland and 60 percent in Romania (figure 1.27.B). By contrast, stronger growth and greater fiscal discipline are keeping debt modest and stable in Central Asia, the South Caucasus, and Türkiye.

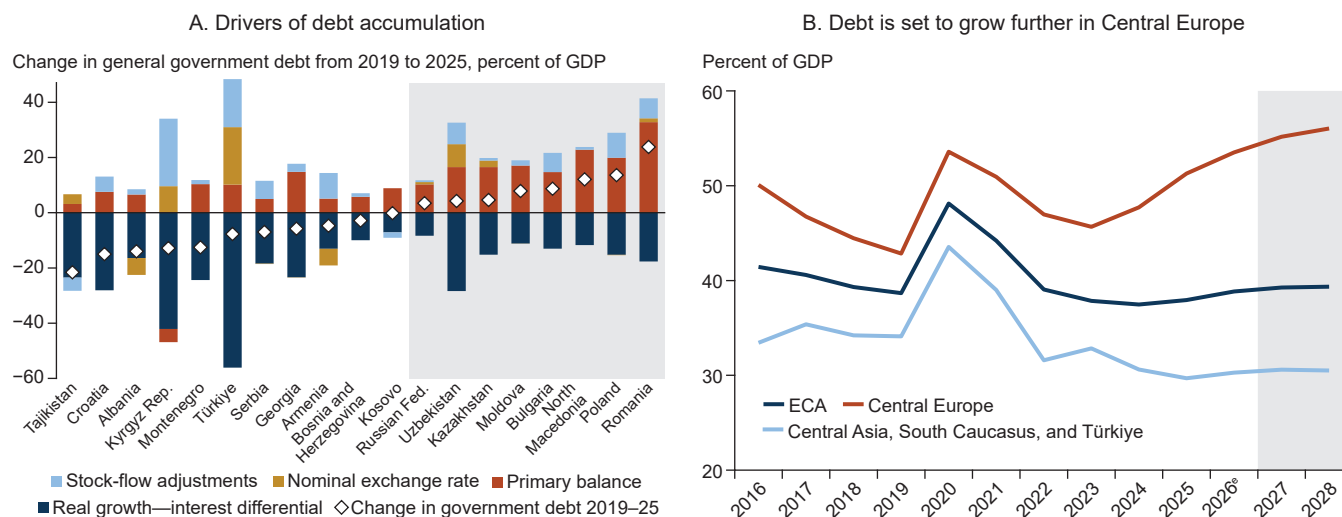
More-favorable fundamentals are also reflected in sovereign ratings. Central Asia, the South Caucasus

and Türkiye account for most of ECA's sovereign rating upgrades since 2022, including S&P's upgrades of Kazakhstan and Tajikistan in August 2026.

Outlook: Uneven recovery across a diverse region

Russia's invasion of Ukraine, the conflict in the Middle East, and geopolitical tensions continue to weigh on ECA's economic outlook. While energy prices have eased from their peaks this year and remain broadly in line with baseline assumptions in the April 2026 *ECA Economic Update*, renewed disruptions to commodity markets or shipping could again raise energy, freight, food and fertilizer costs, adversely affecting ECA's energy and food importers. Even without another price surge, prolonged uncertainty could further weaken consumer and business confidence, and slow the recovery in trade and manufacturing, particularly in economies closely integrated into European supply chains. With disinflation and fiscal adjustment in the region stalled, policy and market interest rates are likely to remain higher for longer, negatively affecting investment. Global demand to adopt and adapt AI could

FIGURE 1.27 Government debt increases are driven by persistent primary deficits



Sources: European Central Bank; International Monetary Fund; national central banks; national ministries of finance; national statistical offices; World Bank.

Note: e = estimate; ECA = Europe and Central Asia; GDP = gross domestic product.

A. Bars show the cumulative contribution of each factor to the change in the general government debt-to-GDP ratio between 2019 and 2025. The real growth–interest differential is the difference between the real effective interest rate on general government debt and real GDP growth. The nominal exchange rate component captures valuation effects arising from exchange rate depreciation or appreciation on foreign currency–denominated government debt, relative to nominal GDP growth. Where data on the currency composition of government debt are unavailable, the share of foreign currency–denominated debt is proxied by the share of external government debt. The shaded area indicates countries where the general government debt-to-GDP ratio was higher in 2025 than in 2019.

B. Aggregates are averages. The shaded area indicates forecasts. ECA excludes Ukraine.

BOX 1.1 The promise of structural reforms

Structural reforms could deliver substantial growth dividends. The largest benefits would come from a broad and mutually reinforcing package of measures to strengthen governance and human capital, deepen competition in product and financial markets, reform SOEs, and accelerate firm-level technology adoption (Budina et al. 2025).

Progress in advancing structural reforms remains uneven and gaps with high-income countries persist, especially in Central Asia (figure B1.1.A). The EU remains a strong anchor for structural reforms, particularly in the Western Balkans, Moldova, and Ukraine. Albania, Moldova, and Montenegro lead in advancing reforms (figure B1.1.B). Montenegro has shown the strongest momentum, advancing fiscal and SOE governance, digital tax administration, renewable energy, and Single Euro Payments Area integration. Albania and Montenegro have strengthened fiscal institutions, and Serbia and Montenegro have advanced SOE reforms. Other recent measures include SME financing and property taxation in Albania, trade integration in Kosovo, education and judicial reforms in North Macedonia, and carbon pricing and trade facilitation in Serbia.

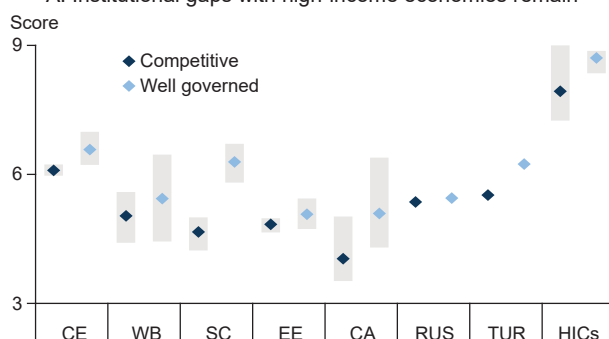
The EU's Recovery and Resilience Facility has helped spur reform momentum across Central Europe.

Reforms have advanced in digital government, energy decarbonization, transport, taxation, and governance. Croatia and Poland have made substantial progress in reforming education, modernizing electricity grids, improving transport, healthcare access, and labor inclusion. Romania has advanced key digital, fiscal, and energy reforms. Bulgaria is rapidly catching up in renewable energy, energy-sector restructuring, and anti-corruption, although legislative delays and institutional bottlenecks continue to impede reforms in some areas (European Commission 2026).

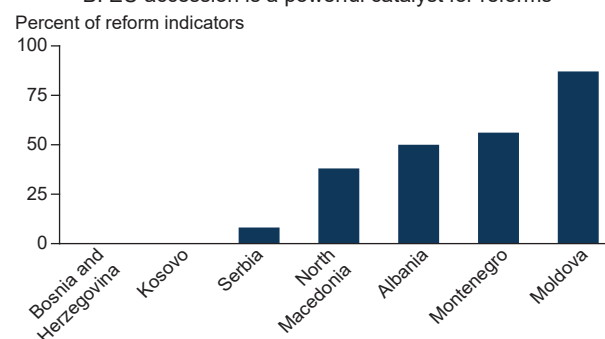
Limited business dynamism remains a central constraint on productivity, investment, and job creation across ECA. Regulatory barriers and uneven implementation weigh on firm entry, competition, and growth. The quality of the business environment varies widely (figure B1.1.2) (World Bank 2025). Across the region, firm entry is slowed by paper-based registration and lengthy licensing and construction permits, and weak insolvency frameworks impede the exit of unproductive firms. Large and unevenly governed SOEs further limit competition, especially in parts of Central Asia. Access to finance remains difficult for young firms, with high loan-rejection and collateral requirements in some countries. Skills shortages, limited firm-provided training, and labor-regulation burdens also constrain

FIGURE B1.1.1 EU accession drives reforms

A. Institutional gaps with high-income economies remain



B. EU accession is a powerful catalyst for reforms



Sources: European Bank for Reconstruction and Development; European Commission; World Bank.

Note: CA = Central Asia, CE = Central Europe, EE = Eastern Europe, EU = European Union, HICs = high-income countries, RUS = Russian Federation, SC = South Caucasus, TUR = Türkiye, WB = Western Balkans.

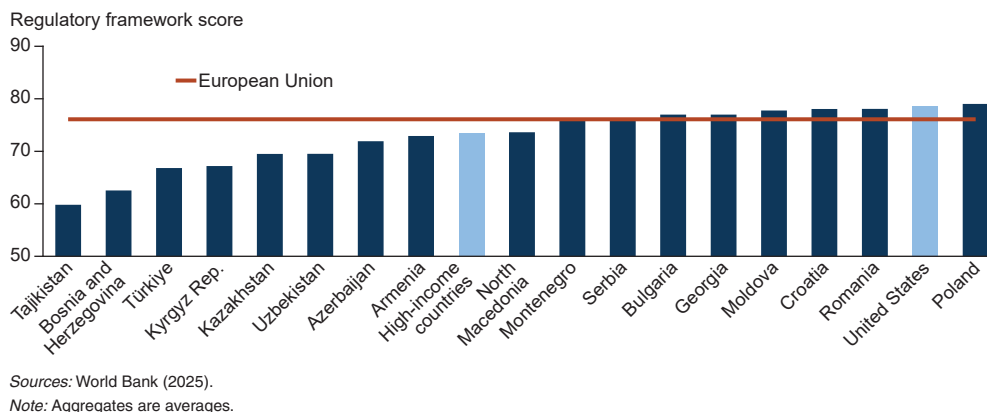
A. Aggregates are averages. The figure uses the European Bank for Reconstruction and Development's assessment of two key qualities of a sustainable market economy: competitiveness and good governance. Progress is measured on a scale of 1 to 10, with 10 representing the standards of a sustainable market economy. Shaded areas indicate the min-max range. HICs include Canada, France, Germany, Japan, the United Kingdom, and the United States. Data are for 2025.

B. Each bar shows the share of Reform and Growth Facility indicators met by end-2025.

(continued next page)

BOX 1.1 (continued)

FIGURE B1.1.2 Regulatory constraints hold back business dynamism



hiring and technology adoption. Meanwhile, long border-clearance times, restrictions on services trade, unreliable electricity, and slow grid connections limit firms' access to markets and infrastructure, weakening investment, innovation, productivity, and job creation.

Business-friendly reforms can strengthen private-sector dynamism by lowering entry and operating costs, strengthening competition, mobilizing capital, and enabling productive firms to expand. This is increasingly important as AI creates new opportunities and raises the value of skills, financing, reliable infrastructure, and market access (refer to chapter 2 of this update).

Competition and firm entry and exit. Albania and Poland issue operating licenses within three days, while Uzbekistan completes construction permitting in under two weeks, showing that faster processes are achievable. Further efforts could focus on digitizing company registration, accelerating licensing and construction permits, and modernizing insolvency and out-of-court restructuring.

State-owned enterprises and competitive neutrality. Steps governments are taking include consolidating ownership oversight, strengthening boards and disclosure, applying common procurement rules, imposing hard budget constraints, and corporatizing and then privatizing firms in contestable sectors.

Finance and long-term capital mobilization. In Croatia, with pension assets amounting to about 34 percent of GDP, professionally managed pension funds provide long-term capital through domestic equities and investment funds. Government policies to boost capital mobilization include reducing collateral burdens, expanding movable-asset and credit registries, developing local-currency capital markets, and channeling pension savings toward corporate investment.

Global and regional integration. Albania, Kosovo, and North Macedonia clear exports in about one day, illustrating how efficient border procedures can reduce trade costs and improve firms' access to larger markets. Further efforts could emphasize establishing trade-information portals, expanding single-window customs systems, accelerating border clearance, and recognizing professional qualifications across borders.

Digital and energy foundations. Uzbekistan and Kazakhstan connect firms to the electricity grid within about two weeks; Poland has the lowest incidence of electricity outages in ECA. By contrast, connections can take more than six months in some countries in ECA. Reform priorities include the need to digitize electricity connections, coordinate infrastructure permits, strengthen independent oversight, and publish grid-capacity and reliability data.

support growth in some economies, but near-term gains will likely be constrained by their limited integration into global technology value chains.

Growth in ECA is projected to remain modest through 2028, with substantial divergence among the countries in the region. Real GDP growth is likely to increase from 2.2 percent in 2026 to 2.4 percent in 2027 and 2.6 percent in 2028. Growth of Russia's economy—the largest in the region—is expected to slow further to 0.7 percent on average in 2027–28, well below its long-term trend, as the boost from high commodity prices and fiscal stimulus fades (figure 1.28.A). Excluding Russia, ECA's growth is projected to strengthen from 3 percent in 2026 to an average of 3.6 percent in 2027–28, still nearly 1 percentage point below its 2000–19 average.

The likely slowdown in Russia reflects a weaker expansion in consumption with moderating real wage increases and high borrowing costs. In addition, growth in 2027–28 is expected to be constrained by tightening fiscal space, high borrowing costs, and weak investment. The reconstruction of damaged refineries and energy infrastructure could provide some temporary support to capital spending. However, it is unlikely to offset weaker investment elsewhere because of subdued activity in non-defense sectors, the impact of sanctions, and

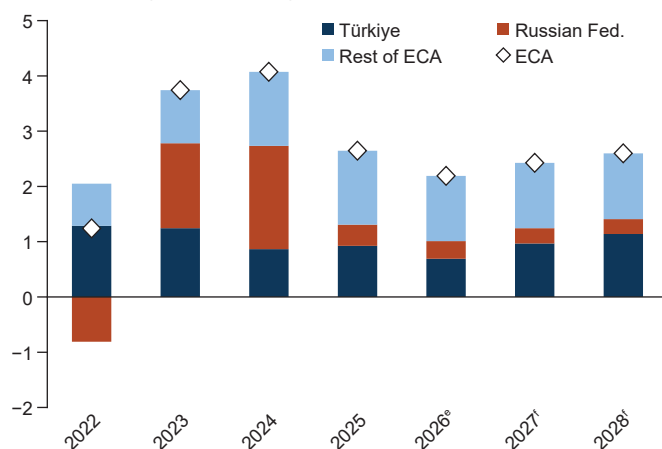
difficulties sourcing specialized equipment. Labor shortages, limited spare capacity, and lower oil prices will also curb growth.

Türkiye is expected to provide the largest contribution to overall economic growth in ECA through 2028. Real GDP is projected to strengthen from 2.8 percent in 2026 to 3.8 percent in 2027 and 4.5 percent in 2028, as declining inflation and easing financial conditions support consumption and investment (figure 1.28.B). Easing commodity disruptions and reduced tensions in the Middle East should help bolster tourism and reduce energy import costs. Firmer EU demand should also support a stronger recovery in exports.

Central Asia will remain ECA's fastest-growing subregion even with headline growth moderating to an average of 5.3 percent in 2027–28. In per capita terms, growth in Central Asia is likely to average 3.6 percent in 2027–28, or broadly like that of the rest of ECA excluding Russia. Forecasts for the next two years have been upgraded by an average of 0.6 percentage points relative to the April 2026 *ECA Economic Update*, reflecting resilient consumption and strong public investment in transport and energy. Rising real wages, robust remittances, and higher social spending are likely to support household demand.

FIGURE 1.28 Modest expansion

A. Growth in the Russian Federation will remain weak
Contributions to growth, percentage points

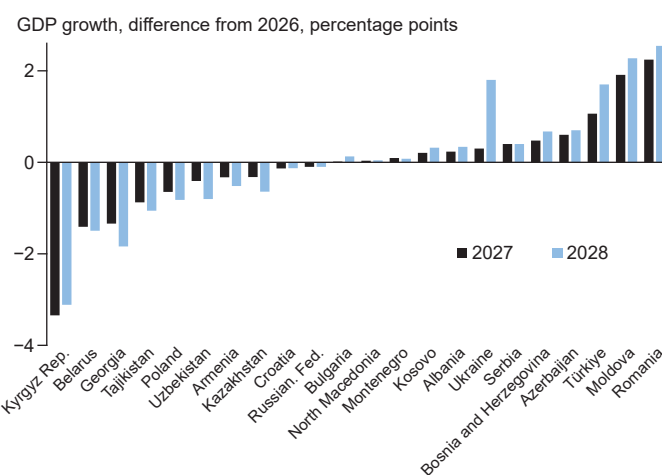


Sources: World Bank.

Note: ECA = Europe and Central Asia; f = forecast; GDP = gross domestic product.

A. ECA and subregional aggregates are calculated using real GDP measured in average 2010–19 prices and market exchange rates.

B. The pickup is mainly due to stronger growth in Türkiye



Stronger economic expansion in the EU should help keep growth in Central Europe broadly steady at about 2.5 percent in 2027–28. In Romania, a recovery in real incomes with slowing inflation should help growth recover to about 1.9 percent in 2027–28 after a contraction in 2026. Nonetheless, fiscal consolidation will continue to constrain domestic demand as the economy transitions toward investment-led growth. Poland will move in the opposite direction, with growth slowing from 3.6 percent in 2026 to an average of 2.8 percent in 2027–28, as the disbursement of funds under the EU Recovery and Resilience Facility comes to an end, while slower real wage growth tempers household consumption. In Bulgaria, fiscal consolidation and slower real wage increases should moderate growth to about 2.6 percent a year in 2027–28, after a surge in consumption and government spending.

Growth in the South Caucasus is projected to stabilize at an average of 3.4 percent in 2027–28, with forecasts little changed from earlier projections. In Armenia and Georgia, growth should average about 5.2 percent as consumption growth eases from previously elevated, above-trend rates boosted by re-exports, remittances, and migrant inflows, and investment remains resilient. Stronger expansion in the non-oil economy in Azerbaijan is likely to lift growth from 1.2 percent in 2026 to an average of 1.8 percent in 2027–28 despite declining oil production and planned fiscal consolidation.

Growth in the Western Balkans is projected to strengthen to an average of 3.4 percent in 2027–28, supported by domestic demand, public investment, tourism, and improving exports. Infrastructure projects will remain important growth drivers in Montenegro and North Macedonia, while tourism and construction will continue to support activity in Albania. As election-related and political uncertainty recedes, stronger investment should lift growth in Bosnia and Herzegovina, Kosovo, and Serbia. In Serbia, growth is projected to rise from 3.1 percent in 2026 to an average of 3.6 percent in 2027–28, supported by public investment, tourism, rising household incomes, and stronger exports.

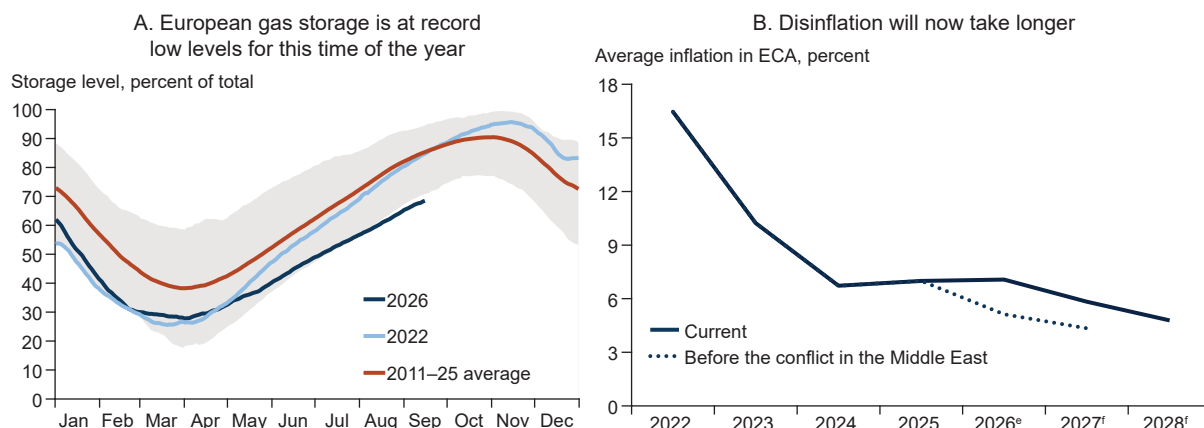
Growth in Ukraine is projected to recover to 1.5 percent in 2027. The baseline scenario now envisages active hostilities persisting through 2027, compared to the earlier assumption of an end by late 2026. As a result, growth projections were downgraded by 2.5 percentage points from the 4 percent forecast in the April 2026 *ECA Economic Update*. Securing external financing for 2027 remains the major source of uncertainty, as substantial needs have yet to be fully covered and negotiations with international partners are ongoing. Delays in implementing agreed reforms could also slow disbursements and widen the financing gap.

The outlook in the region is tilted to the downside as continued disruptions to Gulf energy shipments could keep global energy supplies tighter for longer. Without a recovery in Middle Eastern gas exports, European natural gas prices could increase further, particularly if a colder winter boosts demand. This could negatively affect the countries of Central Europe, Türkiye, the Western Balkans, and Ukraine. EU gas storage, for example, was just above 71 percent full in late September, well below the 87 percent 15-year average and a record low for this time of year (figure 1.29.A). More broadly, continued severe disruptions to global oil, natural gas, food and fertilizer supplies could keep prices elevated, weaken activity, and rekindle inflation.

Disinflation in ECA is already expected to take longer, and the broader pass-through of higher energy costs could further delay a return to inflation targets (figure 1.29.B). Energy shock relief measures may be harder to sustain as their fiscal costs rise and policy space tightens. Furthermore, as inflationary pressures reemerge, they could delay monetary policy normalization or even trigger policy tightening in some countries, keeping financing conditions more restrictive for longer, with negative impacts on consumption and investment.

Major risks include further escalation of geopolitical tensions, tighter global financial conditions, mounting debt stress, and domestic political uncertainty. A prolonged conflict in the Middle East could trigger renewed energy and commodity price shocks, eroding household purchasing power,

FIGURE 1.29 Renewed energy shocks would further slow growth and disinflation in many ECA countries



Sources: Gas Infrastructure Europe; World Bank.

Note: e = estimate; ECA = Europe and Central Asia; f = forecast.

A. The shaded area shows the 2011–25 minimum–maximum range.

B. Aggregates are averages. Pre-conflict inflation forecasts are from the October 2025 edition of the World Bank's *Macro Poverty Outlooks*.

especially among poorer households. Persistent inflation and fiscal concerns could keep interest rates and bond yields elevated, and credit-rating downgrades could raise sovereign borrowing costs and crowd out private investment. New trade restrictions, secondary sanctions, and disruptions to major shipping and air routes could weaken trade, tourism, and investment. Domestic political uncertainty could delay policy decisions, weaken reform momentum, slow the absorption of EU funds, and undermine investor confidence. Weaker recoveries in key trading partners, particularly the EU, would add to these pressures. More frequent and severe weather events could damage infrastructure, disrupt agriculture, and worsen food insecurity. Persistent labor-market slack, structural unemployment, and, in some countries, high levels of informality could limit wage growth and poverty reduction.

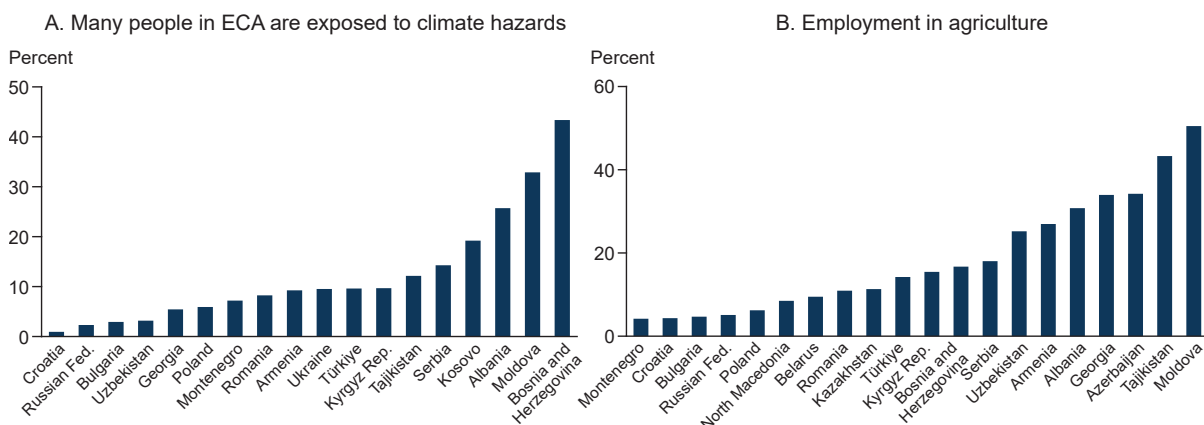
Intensifying regional tensions pose another major downside risk. Further escalation could disrupt energy supplies and trade, particularly in refined petroleum products, amplifying inflation pressures in some countries. Recent damage to ships and port infrastructure in the Black Sea also threatens wheat exports from Russia and Ukraine, which together account for nearly one-third of global exports.¹⁰

Prolonged disruptions could constrain supplies, raise shipping and insurance costs, and push wheat prices higher.

A strong El Niño could also intensify weather extremes, disrupting agriculture, water, transport, and energy systems. Simultaneous crop losses in major producing regions outside ECA could raise global food and input prices, adding to existing pressures from high energy and fertilizer costs. More than one-third of the people in ECA are exposed to at least one severe climate hazard, with poor and rural households least able to cope and recover (figure 1.30.A) (Rozenberg, Farole, and Lee 2026). Risks are particularly acute along the Danube and in agriculture-dependent parts of Central Asia and the South Caucasus, where weak agrifood systems heighten vulnerability, and in Ukraine, where ongoing hostilities compound climate risks (figure 1.30.B). The 2026 drought, for example, pushed Danube water levels to record lows, disrupting river transport and electricity generation in Bulgaria and Romania and increasing Romania's reliance on electricity imports (European Commission, Joint Research Centre 2026).¹¹

10. For example, Ukraine's exports of agricultural products fell to 1.5 million tons in August, down 60 percent year-on-year, as shipments through the Black Sea ports plunged by 95 percent.

11. The Danube ports also provide a critical alternative route for Ukraine's exports when Black Sea shipping is disrupted, but drought-related low water levels constrain their capacity and increase logistics costs.

FIGURE 1.30 Higher reliance on agriculture is correlated with heightened climate vulnerability

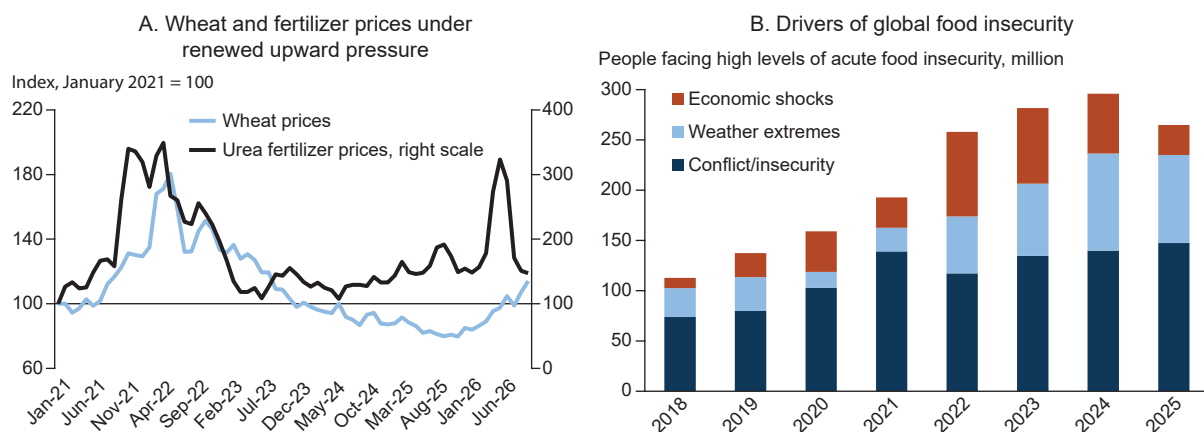
Source: World Bank.

A. Share of people exposed to climate hazards and vulnerable to their impacts, including limited ability to cope; 2024 or latest available.

B. Data are for 2025.

El Niño-driven weather extremes and disruptions to global food trade threaten to worsen food insecurity in ECA and globally. Several shocks are now converging, raising the risk of renewed stress in global food markets. Disruptions to Black Sea and Sea of Azov ports continue to constrain grain exports from Russia and Ukraine, which together accounted for about one-fifth of global grain exports in 2025/26 (USDA 2026). The closure of the Strait of Hormuz has disrupted roughly one-third of global fertilizer trade, driving up urea prices and tightening input supplies ahead of the 2026/27 planting season (figure 1.31.A). Severe drought across Europe and an exceptionally

strong El Niño are compounding supply pressures, reducing cereal output, threatening wheat harvests in major Southern Hemisphere producers, and raising the risk of further increases in global food prices. This combination of trade disruptions and weather shocks risks reigniting a global food crisis in a world where 265 million people already face acute food insecurity (figure 1.31.B). Within ECA, risks are greatest in Central Asia and the South Caucasus, where 14 million people already face severe food insecurity and where reliance on grain imports is high. Kazakhstan's wheat harvest is projected to be about 22 percent lower in 2026/27, reducing export availability for neighboring importers. The

FIGURE 1.31 Adverse weather and trade disruptions could deepen hardship globally and across ECA

Source: FAO, WFP, and GNAFC (2026); World Bank.

outlook for 2027 is even more concerning. Reduced fertilizer use in 2026 is likely to depress yields in the next growing season, while regional grain trade remains constrained. Any further increase in food prices would disproportionately affect low-income households, particularly in the region's most import-dependent and fiscally constrained economies, turning a temporary shock into a prolonged food security and macroeconomic challenge.

Against this harsher external backdrop, subdued growth will make creating more and better-paid jobs increasingly difficult. The jobs challenge

varies across ECA. Some economies face aging and shrinking workforces with labor shortages, while others have rapidly growing working-age populations. Faster productivity growth, supported by better skills and wider technology adoption, can help address both challenges. Yet ECA's gap with the technology frontier continues to widen. Although AI holds a substantial promise to reverse ECA's productivity slowdown, adoption remains uneven and mostly shallow. Chapter 2 explores how ECA can realize the opportunities provided by AI.

References

- Barlas, Y., and Ş. Oğuz. 2026. “How Have Geopolitical Developments Reshaped Foreign Trade?” *CBRT Blog*, Central Bank of the Republic of Türkiye, July 6. https://tcmbblog.org/wps/wcm/connect/blog/en/main+menu/analyses/how_have_geopolitical_developments_reshaped_foreign_trade.
- Bossavie, L., D. G. Sánchez, and M. Makovec. 2024. “The Journey Ahead: Supporting Successful Migration in Europe and Central Asia.” Washington, DC: World Bank.
- Budina, N., O. Adilbish, D. Cerdeiro, R. Duval, B. Égert, D. Kovtun, A. Nguyen, A. J. Panton, and M. Tejada. 2025. “Europe’s National-Level Structural Reform Priorities.” IMF Working Paper 25/104. Washington, DC: International Monetary Fund.
- Choi, S., D. Furceri, P. Loungani, S. Mishra, and M. Poplawski-Ribeiro. 2018. “Oil Prices and Inflation Dynamics: Evidence from Advanced and Developing Economies.” *Journal of International Money and Finance* 82: 71–96.
- European Commission. 2025. “France Extends Ecological Bonus to Support Private Electric Vehicle Purchases in 2026.” *European Alternative Fuels Observatory*, November 28, 2025. <https://alternative-fuels-observatory.ec.europa.eu/general-information/news/france-extends-ecological-bonus-support-private-electric-vehicle-purchases>.
- European Commission. 2026. “Positive Preliminary Assessment of the Satisfactory Fulfilment of Milestones and Targets Related to the Fourth Payment Request Submitted by Bulgaria.” Brussels: European Commission.
- European Commission, Joint Research Centre. 2026. “Worsening Drought and Record Heat Grip Europe, Fueling Extraordinary Wildfires and Extremely Low River Flows.” *JRC News and Updates*, August 12, 2026. https://joint-research-centre.ec.europa.eu/jrc-news-and-updates/worsening-drought-and-record-heat-grip-europe-fuelling-extraordinary-wildfires-and-extremely-low-2026-08-12_en.
- FAO (Food and Agriculture Organization of the United Nations). 2026. “GIEWS Country Brief: Ukraine.” Global Information and Early Warning System, March 12, 2026. Rome: FAO.
- FAO (Food and Agriculture Organization of the United Nations), WFP (World Food Programme), and GNAFC (Global Network Against Food Crises). 2026. *2026 Global Report on Food Crises: Joint Analysis for Better Decisions*. Rome: FAO and WFP.
- Finger, J. M., and M. E. Kreinin. 1979. “A Measure of ‘Export Similarity’ and Its Possible Uses.” *The Economic Journal* 89 (356): 905–12.
- Kasyanenko, S., and I. Izvorski. 2026. *Public Investment as a Catalyst: Crowding in Private Capital in Europe and Central Asia*. Europe and Central Asia in Focus. Washington, DC: World Bank.
- Kpler. 2026. “Ukraine’s Drone Campaign Pushes Russian Refinery Runs to 21-Year Lows.” Kpler, July 2026. <https://www.kpler.com/blog/ukraines-drone-campaign-pushes-russian-refinery-runs-to-21-year-lows>.
- Rozenberg, J., T. Farole, and J. Lee. 2026. *Building Resilience and Climate Adaptation in Europe and Central Asia*. Europe and Central Asia in Focus. Washington, DC: World Bank.
- United States Department of Agriculture (USDA). 2026. *Grain: World Markets and Trade*. July 2026. Washington, DC: Foreign Agricultural Service, USDA.
- World Bank. 2025. “Business Ready 2025.” Washington, DC: World Bank.
- World Bank. 2026a. “Informal Jobs in Central Asia: Debunking the Myths and Looking Ahead.” Washington, DC: World Bank.
- World Bank. 2026b. “Jobs and the Green Economic Transformation of Central Asia.” Washington, DC: World Bank.
- World Trade Organization (WTO). 2025. *World Trade Report 2025: Making Trade and AI Work Together to the Benefit of All*. Geneva: World Trade Organization.



CHAPTER 2

MAKING AI WORK

Jobs, Firms, and Productivity

Chapter 2. Making AI Work: Jobs, Firms, and Productivity

Artificial intelligence (AI) has arrived in Europe and Central Asia (ECA) faster than the region's capacity to make use of it. Firms in Warsaw, Istanbul, and Astana are running generative models through their design, customer service, and back-office functions, but across the region as a whole, the technology remains something most workers are exposed to rather than use. This report is about closing that gap and what the region stands to gain—and lose—depending on how quickly it does so.

AI offers substantial opportunities, especially given the region's circumstances. ECA's productivity has slowed for two decades, with conventional capital deepening unable to stem it. The demographic contraction will shrink the labor force in several of the region's countries in the coming decades. AI is one of the few technologies that raises output per worker without requiring more workers—a boost to the level of productivity, and potentially, if AI accelerates innovation itself, to its growth rate.

The region also has a strong advantage in technical human capital, although that advantage is slimmer than it appears. Science, technology, engineering, and math (STEM) graduates are plentiful in most of the region. The skills that constrain adoption in ECA are mostly not the hard, technical ones. They are managerial and organizational, such as the capacity to identify which processes are worth changing, redesign workflows around a new technology, and see a reorganization through. ECA's persistent management-quality gap with Western Europe is among the better-documented reasons why its firms have been slow to capture returns from earlier waves of digital investment. In parts of the region, particularly in Central Asia, the binding constraint sits farther back still, in weak foundational literacy and numeracy, which leave a substantial share of the workforce unable to use these tools productively.

AI adoption in ECA is therefore less a technology problem than a firm-capability challenge, layered on top of an uneven skills base with constrained access to computing capacity and usable data. The

last two constraints separate casual use of AI from the intensive, embedded use that has the potential to increase productivity across economies. On compute—the computational resources, such as processing power, memory, and supporting infrastructure, that are used to train and run AI models—the region's deficit is massive: Data center capacity per million people is roughly 2.1 megawatts (MW) in ECA, against 31.6 MW in high-income countries outside the region. For most firms, the deficit in computing capacity is not an absolute barrier, as capacity can be rented from foreign hyperscalers, but doing so raises concerns about the price of compute and dependency on foreign providers. Data residency requirements and emerging model-sovereignty legislation compound this risk by pushing firms toward local or on-premises capacity that is often slower and more expensive than what they would buy if unconstrained.

The data constraint is less visible but at least as binding. Within firms, the raw material (the data) usually exists, but it sits unstructured and siloed across systems that were never designed to talk to each other. As a result, manufacturers cannot readily join production data to administrative records. Deployment stalls not for want of a model but for want of anything to point it at. These problems are compounded by concerns about confidential data leaking into third-party models, which can hold back adoption.

The public conversation about AI and employment has run ahead of the evidence. In the United States—where adoption is farthest along and the displacement narrative originated—the picture has grown considerably more ambiguous over the past year, with the aggregate employment effects of AI proving far harder to detect than early projections implied. Diffusion of general-purpose technologies has been slow. It will be even slower in ECA, where capital markets are thinner, firms older, and managerial capacity weaker. The region's binding problem over the next decade is thus far more likely to be too little rather than too much AI.

The risks of AI are real, but they are not principally the ones that dominate the headlines. Three matter most in the region:

- *The widening gap between rather than within countries.* The returns to AI are concentrated in the United States, China, and a small number of high-income economies that own the models, computational resources, and data centers. On current trends, ECA will import the technology while capturing little of the value it creates.
- *The fact that AI's effects will fall unevenly, tracking education, geography, and age.* Exposure to AI rises from about 7 percent of workers at the lowest education levels to 34 percent at the highest. The occupations best suited to an aging workforce are among the most exposed.
- *The scale of AI investment, which has raised concerns of an asset bubble.* A correction would transmit to ECA through capital flows, currencies, and financing costs. The dot-com precedent is instructive: The equity losses were severe, but the fiber-optic cables, protocols, and firms they funded outlasted them. A financial reversal would change the cost of AI capital for ECA; it would not change the technological trajectory the region needs to prepare for.

Proximity to the European Union (EU) shapes the region's regulatory environment, whether or not policy makers choose it. Much of ECA will align with the European Union's AI rulebook, through accession, trade, or the practical convenience of a single compliance regime. That alignment will yield benefits in data protection, product safety, and market access. It should not, however, be mistaken for a competitive advantage. The European Union is not a frontier jurisdiction in AI; its regulatory approach is still being revised. ECA countries could import compliance costs calibrated for economies operating at the frontier without importing the capabilities that make those costs worth bearing. The challenge is to meet the essential standards while preserving room to move faster than the template allows.

This report distinguishes between two agendas that are frequently conflated: (1) adoption and (2) innovation, which comprises both

advancement and adaptation. Adoption—the diffusion of existing, largely foreign-built models into firms, schools, and public administration, much of it small scale—is where nearly all of ECA's realistic near-term gains lie. It requires broadband and cloud access; domestic compute at modest scale; data that are available and sufficiently usable; digital, foundational, and managerial skills; an enabling policy environment; and enough public trust for people to use the tools. Innovation—the building of new models or the adaptation of existing ones—is a far more demanding proposition, requiring sustained research and development (R&D) spending in a region that spends very little on it, research universities of international standing, deep talent pools, venture capital with the ecosystem that surrounds it, and compute at a scale ECA does not currently possess. Within innovation, adaptation is the accessible end: “small AI”—compact models fine-tuned to local languages, domains, and regulatory contexts, cheap enough to run on modest hardware or even offline on mobile devices—can deliver much of AI's value without frontier-scale compute or talent (World Bank 2026b). Keeping the two agendas distinct matters because their demands are so different: adoption is within every country's reach and adaptation within many countries', while advancement is not—and governments that blur the line end up funding national model-building projects while firms still lack cloud access.

Where each country stands between these two agendas—and how far it can pursue either—varies enormously across a region that spans EU member states and lower-middle-income economies. Differences in income, informality, skills, firm capabilities, infrastructure, and demographics mean that region-wide statements in this chapter are best read as averages over very different starting points: the binding constraint can be foundational skills in some countries, while it can be managerial capability among SMEs in others, and institutional credibility can be a constraint where investment in compute power is contemplated. The policy agenda therefore requires explicit differentiation across subregions.

This chapter starts by assessing the current state of AI in ECA. It then looks at the constraints and challenges of further adoption before examining where opportunities lie and setting out a policy agenda.

Section 1: The State of AI in ECA

ECA's starting position on AI is defined less by what the region lacks in access than by how unevenly its foundations have been laid. The physical preconditions are only half met. Connectivity is largely in place, with 4G and 5G reaching around 95 percent of the population and most of the region online, though Central Asia continues to trail on speed and affordability. Computing capacity is a different matter. The binding infrastructure deficit is the massive gap between data center capacity per million people in ECA (roughly 2.1 MW) and in high-income economies (31.6 MW). Recent investments are increasing data center capacity, but the gap remains huge.

On the labor side, exposure is substantial but unevenly distributed. Around a fifth of the ECA workforce works in occupations that are meaningfully exposed to AI capabilities. That exposure is concentrated among people with tertiary education, women, and younger workers—a pattern that inverts the usual assumption that technological change falls hardest on the least skilled. But exposure is a measure of technical potential, not behavior, and the two diverge sharply. Where usage data exist, the occupations most exposed are not always those using AI most; the gap between the two is where the region's unrealized gains sit.

Realized engagement remains thin. Employer demand for AI skills is growing rapidly—job postings requiring generative AI (GenAI) skills quadrupled between 2021 and 2025—but from a low base, and it is heavily concentrated in capital regions, which account for more than 90 percent of postings in some of the region's countries. Firm adoption tells the same story: Fewer than 1 in 10 firms in western ECA report using AI, against roughly one in five in the EU-27. Among firms that do, a small group of frontier and large enterprises accounts for most sophisticated use, while the broad mass of enterprises experiments at the margins. The productivity gains adopting firms describe at the micro level remain invisible in aggregate data.

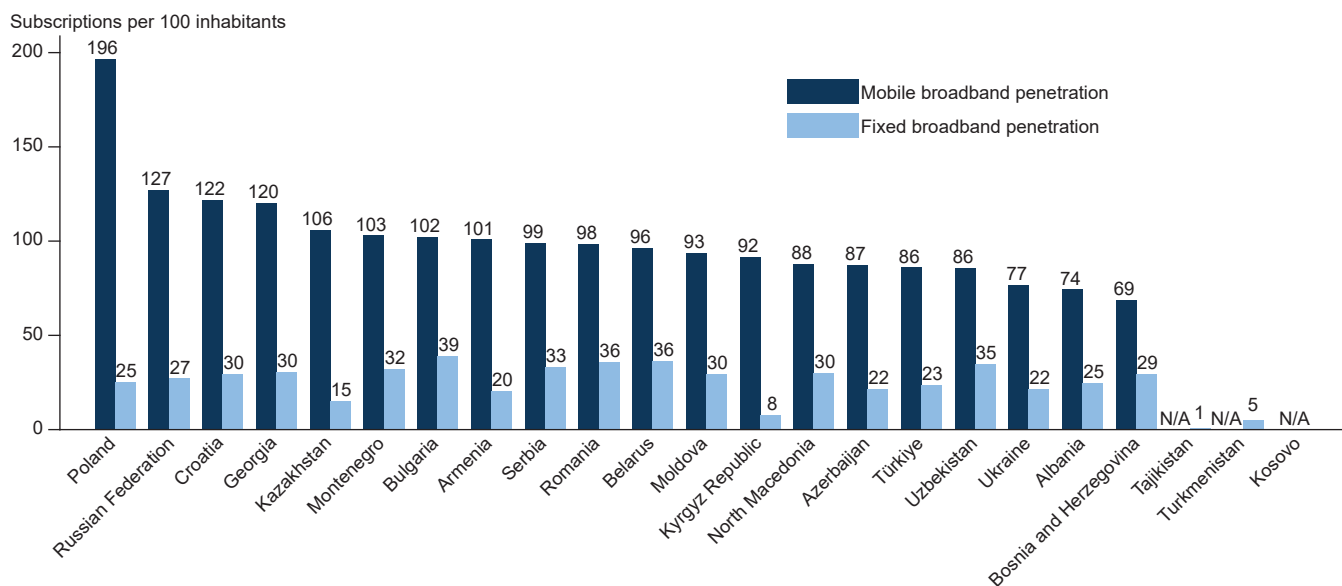
The rest of this section examines the evidence in turn on: digital infrastructure and the compute deficit; labor market exposure across educational levels, age, and geography; realized hiring demand from online vacancy data; adoption at firm level and across governments in the region; and observed productivity effects.

Digital infrastructure, the physical foundation of AI

Connectivity and compute are the pillars that underpin a country's capacity to adopt and adapt AI. Connectivity is essential to ensuring that individuals, firms, and institutions can access and use AI technologies. Compute refers to the availability and affordability of processing power, such as AI chips, data centers, and cloud computing, which are necessary to train and deploy models at scale. Together, they represent the physical foundations of AI adoption.

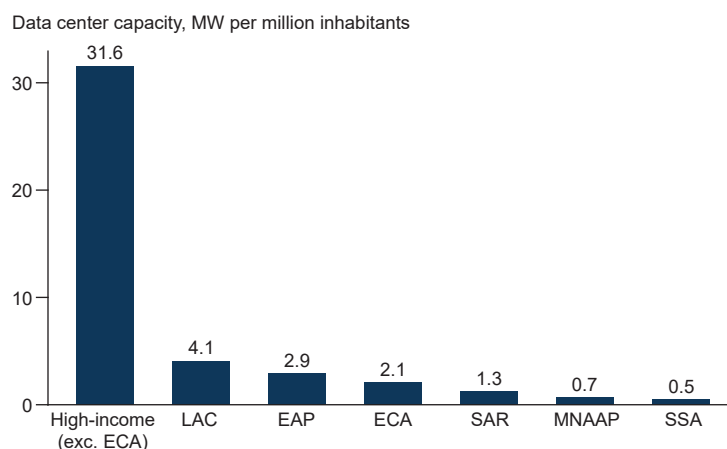
Connectivity foundations are largely in place. By most conventional measures, ECA has built a solid connectivity base. As of 2025, mobile broadband subscriptions were, on average, about 101 per 100 inhabitants, indicating wide coverage (figure 2.1). 4G/5G networks covered about 95 percent of the population in middle-income ECA, and about 86 percent of the population were online, up from 82 percent a year earlier. Most coverage is on 4G rather than 5G, however; 5G penetration (around 10 percent) lags that of other developing regions, including East Asia and the Pacific (EAP) and South Asia (SAR), where it exceeds 70 percent. Broadband performance improved sharply in recent years, with median fixed and mobile network speeds roughly doubling between 2022 and 2024.

Access masks wide subregional disparities, with some countries lacking the necessary infrastructure. Fixed broadband speeds range from around 250 megabits per second (Mbps) in Georgia to less than 30 Mbps in Tajikistan and Belarus. Internet penetration spans from above 90 percent in Kazakhstan and Belarus to 57 percent in Tajikistan (World Bank 2025). Affordability compounds these gaps: Median fixed broadband costs about 2.2 percent of

FIGURE 2.1 Mobile broadband penetration is high across ECA

Source: World Bank Digital Transformation Database, based on ITU.

Note: Values correspond to active mobile broadband subscriptions per 100 inhabitants (dark blue bars) and fixed broadband subscriptions per 100 inhabitants (light blue bars). Data are for 2025 or the latest available year. Data on mobile broadband subscriptions are not available for Kosovo, Tajikistan and Turkmenistan. Data on fixed broadband subscriptions are not available for Kosovo.

FIGURE 2.2 Data center capacity in ECA significantly lags that of other developing regions

Source: World Bank Digital Transformation Database, based on Telegeography.

Note: Values correspond to megawatts of data center capacity per million inhabitants. Data are for 2025 or the latest available year.

monthly gross national income (GNI) per capita regionally, but prices exceed 4 percent of income in several Central Asian economies (Turkmenistan, the Kyrgyz Republic, and Tajikistan), keeping intensive use out of reach of lower-income households even where access is available. Central Europe and parts of the Western Balkans and South Caucasus sit at the frontier of the region; Central Asia consistently trails on speed, penetration, and affordability.

The gap in compute capacity is massive. The countries of ECA had just 2.1 MW of data center capacity per million people as of 2025, compared with about 31.6 MW in high-income countries outside the region (figure 2.2). ECA hosts less than 1 percent of the world's top 500 supercomputers. Secure internet server density tells the same story: about 7,300 per million people, far behind the high-income benchmark of nearly 88,000. In data center capacity, only Poland (6.62 MW per million inhabitant), Russia, (3.82 MW) and Bulgaria (2.89 MW) exceed the 1 MW per million people figure. Poor compute infrastructure most directly restricts intensive AI use; it is where ECA's gap with high-income peers is widest.

ECA countries are investing in expanding compute capacity. In Armenia, the 300 MW Firebird AI data center—developed as a public-private partnership between the Armenian government, NVIDIA, and Dell, with the support of local commercial banks—is under construction. In Kazakhstan, a consortium of state-owned enterprises (SOEs) is leading the construction of a “Data Center Valley” with a projected capacity of 50 MW by 2027, with plans to scale up to 1 gigawatt (GW) by 2031. It is complemented by the Al-Farabium supercomputer, launched in October 2025, which is ranked 103rd

globally in terms of computing capacity. The government of Serbia, which spearheaded the opening of a data center in Kragujevac in 2020, is now investing in a third supercomputer in collaboration with the French government. In Croatia, a US-led investment group is planning to build a 1 GW data center 90 kilometers south of Zagreb.

The cost of capital and institutional credibility are the main determinants of compute capacity. They are unevenly distributed across the region and only partly correspond to how countries look on paper. Electricity cost matters, but less than is commonly assumed: As discussed in section 3 of this chapter, on electricity cost-recovery pricing alone, several ECA economies rank among the cheapest potential computing producers globally, yet almost none of them is where capacity is being built. What distinguishes the countries attracting investment is the cost of capital and the institutional trust that determines it, as data centers are long-lived, capital-intensive assets whose viability depends more on financing terms than on operating costs.

Who is exposed: Mapping AI exposure across ECA labor markets

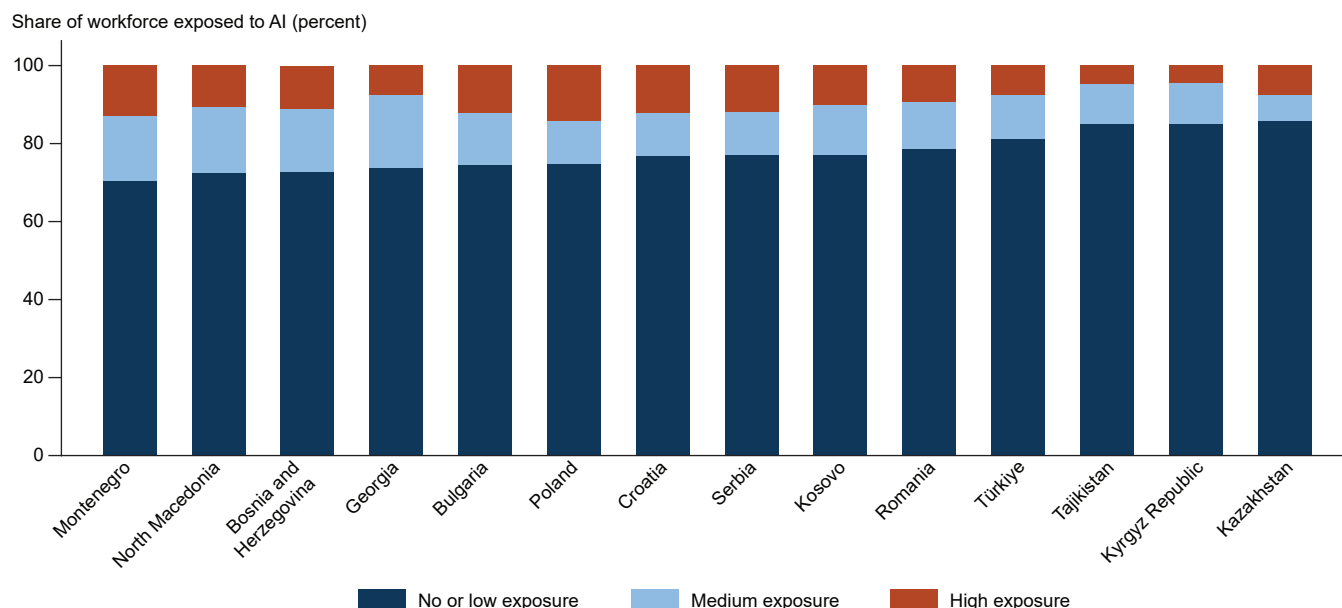
Like any new technology, AI will affect the workforce. It is increasingly reshaping the nature of work by augmenting non-routine cognitive and analytical tasks that require judgment, contextual understanding, and problem-solving abilities. By helping workers perform complex tasks, AI can enable less experienced employees to undertake activities previously reserved for specialists, facilitate the redistribution of tasks across occupations with different skill levels, and raise productivity within existing jobs. These effects can expand access to expertise and improve the efficiency of labor utilization. At the same time, the growing adoption of AI may have disruptive consequences, including the displacement of some jobs and the erosion of worker skills if technology substitutes for, rather than complements, human capabilities (World Bank 2026b).

An initial way of understanding the potential impact of AI in the workforce is to quantify the share of tasks performed by workers that could be automated by AI, a measure known

as exposure to AI. The methodology of Gmyrek, Viollaz, and Winkler (2026), used in World Bank (2026b),¹ distinguishes jobs that are amenable to automation by GenAI—jobs with high exposure—from jobs that are amenable to be complemented by GenAI—jobs with medium exposure. Globally, the share of jobs with high exposure ranges from 4.9 percent in low-income countries to 14.8 percent in high-income countries. Within ECA, the average is about 9.7 percent, ranging from 4.8 percent in Tajikistan to almost 14.0 percent in Poland (figure 2.3). Estimates of the share of jobs with medium exposure range from around 10 percent in upper-middle-income countries to more than 20 percent in high-income countries. Across ECA, these jobs represent 13 percent of employment on average, ranging from 7 percent in Kazakhstan to almost 17 percent in Montenegro and North Macedonia.

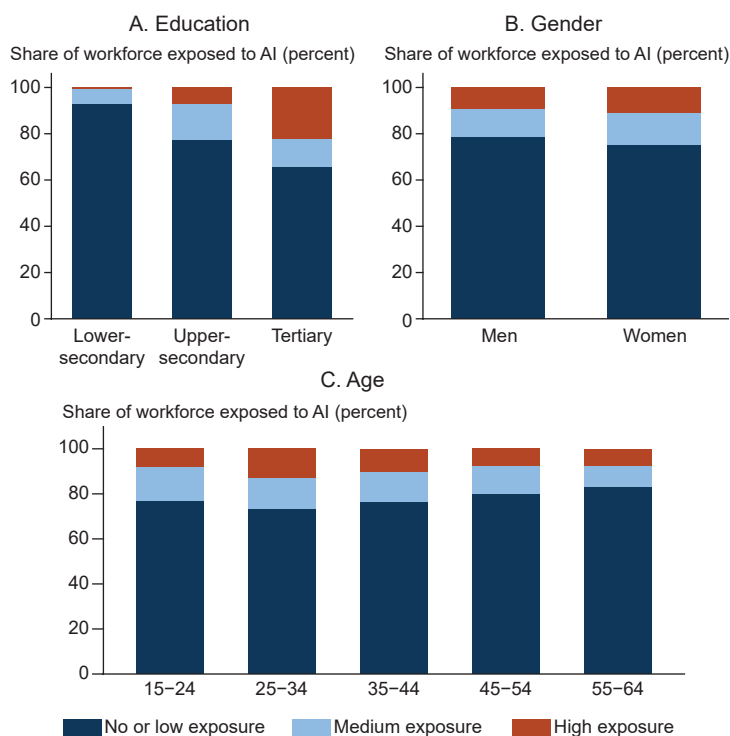
The dispersion of exposure across countries tracks the occupational and sectoral composition of employment. Economies with large shares of employment in professional, clerical, and technical work reveal high exposure, whereas economies with substantial agricultural or manual employment register low exposure. Tajikistan's low exposure (4.8 percent) reflects an employment structure that remains weighted toward agriculture; Poland's high exposure (14.0 percent) reflects its services- and knowledge-intensive economy. These estimates capture exposure to generative AI, which operates on cognitive and language-intensive tasks; they do not account for physical AI—smart robotics, autonomous vehicles, and automated logistics—whose progress would extend exposure to manual occupations in manufacturing, transportation, and warehousing that remain major employers across much of the region, particularly in Central Europe, Türkiye, and the Western Balkans. The low measured exposure of manual work should therefore be

1. This report follows the methodology adopted by the *World Development Report 2026*. Other reports follow different methodologies (such as the methodologies of Felten, Raj, and Seamans 2023; Hartley et al. 2024; Lewandowski, Madoń, and Park 2025; and Pizzinelli et al. 2023, to name a few). Although patterns in levels may differ (some methodologies show higher levels of exposure than others), the relative patterns are broadly similar (the occupations and countries most exposed and the least exposed are the same across methodologies). Box 4.2 of the *World Development Report 2026* compares the methodologies.

FIGURE 2.3 On average, around 20 percent of ECA's workforce is exposed to AI

Source: Authors, based on national labor force survey data.

Note: The figure applies the methodology of Gmyrek, Viollaz, and Winkler (2026). Only countries with occupational data available at least at the two-digit ISCO level are included.

FIGURE 2.4 People with tertiary education, women, and the young are more exposed to AI than other demographic groups in the region

Source: Authors, based on national labor force survey data.

Note: Figure uses the methodology of Gmyrek, Viollaz, and Winkler (2026). Only countries with occupational data available at least at the two-digit ISCO level are included.

read as a feature of current AI capabilities rather than durable insulation. More broadly, all such estimates are snapshots of a moving frontier: they reflect the capabilities of today's generative models, and as agentic AI systems—capable of planning and executing multi-step tasks with limited supervision—mature, measured exposure, adoption patterns, and workers' willingness to adapt are all likely to shift.

Exposure to AI in ECA is concentrated among people with tertiary education, women, and the young. On average, just 7 percent of employed people with less than secondary education are moderately or highly exposed to AI; among employed people with tertiary education, exposure is about 34 percent (figure 2.4). Gender differences are smaller: On average, around 25 percent of employed women in the region and 21 percent of employed men are exposed to AI. Exposure is highest for workers 25–34 (27 percent) and lowest among workers 55–64 (17 percent).

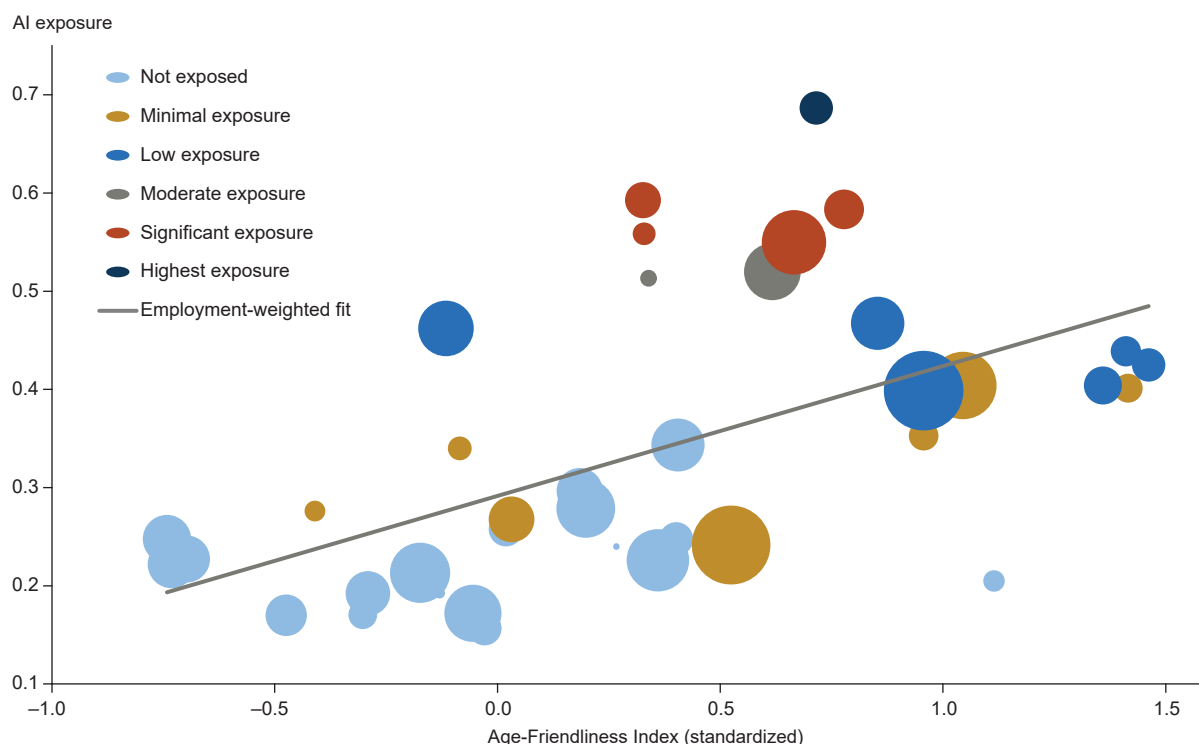
Jobs that are more friendly to an aging workforce (age-friendly jobs) are also highly exposed to AI. Schedule flexibility, telecommuting, low

physical demand, autonomy, cognitive content, and social tasks are job characteristics that can be considered amenable to employment by older workers. These characteristics can be aggregated into the Age-Friendliness Index (AFI) created by Acemoglu, Mühlbach, and Scott (2022). Applying this index to the workforce of ECA, Lokshin and Valverde Rodriguez (forthcoming) find that the more age-friendly a job is, the higher its exposure to AI (figure 2.5). However, age-friendly jobs do not necessarily always employ older workers—in fact, across most ECA countries, older workers are underrepresented in the most age-friendly occupations, underutilizing the work capacity of older workers. Shifting older workers into these occupations could increase overall productivity, but it could also increase older workers' exposure to AI. To the extent that most of ECA's workforce is aging, these conflicting trends may lead to an inclusivity paradox: As ECA's employment becomes more inclusive to older workers, it may also become more exposed to AI-driven automation.

Exposure does not automatically correlate with displacement or augmentation. A first condition for AI to have a meaningful impact in a job is that it is used. Evidence from household surveys reveals that there may be a significant gap between exposure at the occupational level and use of AI at work (box 2.1). This gap could reflect technical constraints (e.g., workers may not have access to a computer or Internet at work) or lack of digital skills. Lagging digital skills may partly explain the gap between exposure and use. In the 2022–23 round of the Life in Transition Survey, only 46 percent of respondents in ECA reported being able to send an email with attached files (compared with 80 percent in Germany) and only 30 percent reported being able to install new software or devices (compared with 62 percent in Germany).

Jobs are bundles of tasks that are not necessarily decomposable, limiting the displacement effect of AI. Garicano, Li, and Wu (2026) classify jobs along a “messiness” scale. At one end of the spectrum

FIGURE 2.5 Age-friendly jobs are more exposed to AI than other jobs in ECA



Source: Lokshin and Valverde Rodriguez (forthcoming). Employment data are from national labor force surveys and ILOSTAT (2024).

Note: Occupational groups are at the two-digit International Standard Classification of Occupations (ISCO) level. The size of the bubbles indicates the share of employment. Values are averages across 18 ECA countries. GenAI exposure is as calculated by Gmyrek, Viollaz, and Winkler (2026).

BOX 2.1. From exposure to use: What household surveys reveal about AI at work in Central Asia

The latest rounds of the Listening to Central Asia surveys for Kazakhstan and Uzbekistan provide insights into the extent to which exposure to AI—defined as the share of tasks in a job that can be automated by AI—is correlated with use of AI on the job. These surveys are implemented monthly in Uzbekistan and quarterly in Kazakhstan. The March 2026 round in Uzbekistan and the April–June 2026 round in Kazakhstan included a brief module on the use of AI at work.

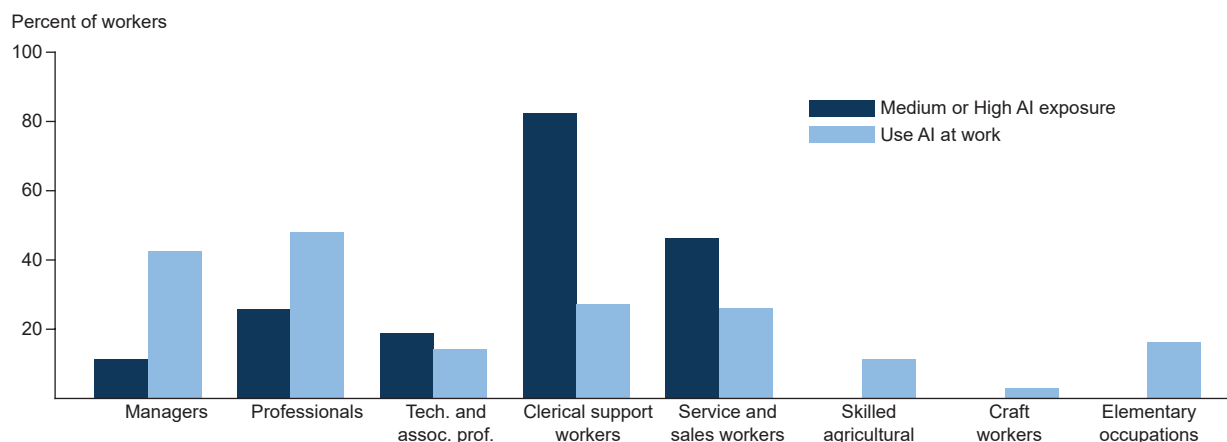
Information on respondents' occupation, available in detail only in the case of Uzbekistan, can be used to estimate the level of exposure to AI following the methodology of Gmyrek, Viollaz, and Winkler (2026) and reproduced in the 2026 *World Development Report* (World Bank 2026b). In Uzbekistan, the highest level of exposure is among clerical support workers (Figure B2.1.1), about 80 percent of whom are estimated to have medium or high levels of exposure. Service and sales workers are also exposed, with more than 45 percent having medium or high levels of exposure. The lowest levels of exposure are among agricultural workers, craft workers, and people employed in elementary occupations.

The prevalence of use of AI at work differs from the prevalence of exposure to AI. The highest usage of AI at work is found among professionals (48 percent), followed by managers (43 percent). Usage of AI at work among clerical support workers—the most exposed occupational group—is 27 percent. Occupational groups with almost zero levels of exposure report using AI at work. For instance, 16 percent of people employed in elementary occupations report using AI at work.

Many factors may account for the large difference between the patterns of AI exposure and use at work. One, discussed by Gmyrek, Viollaz, and Winkler (2026), concerns the low degree of digitalization of the workplace in many low- and middle-income countries. In Uzbekistan, however, the April 2026 round of the survey found that access to the Internet was almost universal among workers.

Digital skills are another potential explanatory factor. In a following round of the survey, about 39 percent of employed respondents reported not being able to copy or move a file on a phone or computer without help. This limitation can only partially explain the

FIGURE B2.1.1 Exposure to AI and use of it at work differ widely in Uzbekistan



Source: Authors, based on data from the Listening to Uzbekistan (March 2026 round).

Note: Exposure estimates are based on the methodology in Gmyrek, Viollaz, and Winkler (2026), using data from the Uzbekistan Household Survey (2024). Exposure estimates are calculated at the two-digit occupation level and aggregated to the one-digit occupation level. Given the lack of two-digit occupational data in the survey, the two-digit structure of the Kyrgyz Republic is used within each one-digit occupation group. "Use of AI at work" indicates the percent of respondents in each occupational group that responded "Yes" to the question "Do you personally use AI in your job?" Only employed respondents are included. The occupational group "Plant and Machine Operators" (ISCO group 8) was excluded because of too few observations.

(continued next page)

BOX 2.1 (continued)

difference between exposure and use of AI at work, however. Among clerical support workers, digital skills proficiency is low (almost 60 percent of respondents are unable to copy a file without help), and the difference between exposure and use of AI is significant. Other occupational groups with low digital skill proficiency (such as agricultural workers) show evidence of use of AI at work despite almost no exposure. This finding suggests that although lack of digital skills may be reducing the correlation between exposure and use of AI, other factors may be contributing to the gap.

Data from Kazakhstan help clarify where the gap between exposure and use is located. If workplace-level barriers—lack of digitalization, employer restrictions, or job content—were the main obstacle, one would expect to find a sizable group of workers who use AI regularly in their daily lives but not in their jobs. The April–June 2026 round of the Listening to Kazakhstan survey, which asked employed respondents about the frequency of AI use both at work and outside of work, shows that this group is small. Only 14 percent of workers use AI more outside of work than at work. The vast majority—75 percent of workers—use AI as frequently at work as outside of it (which in 45 percent of the cases

is never), and only 11 percent use it more at work than in the rest of their daily lives. In this sense, data from the survey indicate that, rather than dividing into those who use AI at work and those who use it elsewhere, workers in Kazakhstan divide into AI users and AI non-users. The tight association between use at work and outside of it points to limited overall diffusion of AI among workers rather than workplace-specific barriers as the main driver of the gap between exposure and use in Kazakhstan. However, it is important to note that worker-level and workplace-level factors are unlikely to be independent: firms that lag in digitalization may also tend to employ workers with weaker digital skills, producing the same correlation even where workplace barriers may be binding for some workers.

The difference between AI exposure and AI usage at work suggests that many of the employment and productivity effects that are technically possible could take time to materialize or do so in very different ways. Further research into the factors that enable use of AI at the worker, workplace, and country level will help illuminate the ways in which AI will affect the economy and society in Central Asia.

are single-task jobs (jobs consisting of a single, well-defined, verifiable task). At the other end of the spectrum are “messy jobs” (jobs that require tasks that are entangled or embedded in a complex nexus of human relationships and therefore hard to separate). What makes a job replaceable by AI is not how many of its tasks are automatable but whether those tasks can be separated from the rest of the job without destroying value. Some jobs may have a substantial share of automatable tasks, but they need to be coordinated by a single individual. Despite high automation exposure, these jobs may not necessarily be displaced by AI. An example is radiology. Although interpretation of medical images is increasingly automatable, it is part of a bundle that includes patient context, clinical coordination, difficult-case judgment, and legal responsibility.

Jobs may be changing significantly or demand for them may be growing despite automation.

OpenAI’s AI Job Transition Framework moves beyond exposure by combining technical capability with human necessity and demand elasticity (Richmond 2026a). It sorts occupations into four groups:

- jobs that will grow in number, as lower costs thanks to AI make new activity viable or create new demand
- jobs with substantial potential for automation
- jobs in which AI can change a large share of tasks without removing the need for a person to deliver the service
- jobs with less immediate change driven by AI.

Richmond (2026b) finds that across the EU-27, 12 percent of employment is in jobs that may grow as a result of AI, 14 percent is in jobs with higher automation potential, 27 percent is in jobs likely to be reorganized, and 47 percent is in jobs that will experience less immediate change. For the ECA countries in the European Union, 12 percent of employment is in jobs that may grow with AI, 11 percent is in jobs with higher automation potential, 26 percent is in jobs likely to be reorganized, and 51 percent is in jobs that will experience less immediate change.

Labor market demand for AI roles

Adoption of AI throughout the economy has increased the demand for AI roles (jobs for which AI skills are required). AI skills are defined as the ability to use, adapt, or develop AI models and applications. They include GenAI skills (i.e., mastery of the large language models [LLMs] behind ChatGPT, Claude, Gemini, or DeepSeek). Data from online job postings across ECA indicate

that the share of postings requiring GenAI skills rose significantly after 2022, reaching almost 1 percent of total job postings in some countries by 2025 (figure 2.6). The trend in ECA mirrors the trend observed in other high- and middle-income countries across the world, where the average share of job postings requiring GenAI skills increased by a factor of more than four between 2021 and 2024 (World Bank 2026b).

Demand for AI jobs is concentrated in capital regions of ECA countries. In Bulgaria and Tajikistan, for instance, more than 90 percent of the AI jobs originate in the capital regions. In every country for which data are available, the share of AI postings in capital regions significantly exceeds the share of non-AI postings in the same regions (figure 2.7). Although this type of regional inequality in labor demand is not new to ECA countries, the patterns observed with respect to AI-driven labor demand suggest that the advent of AI is reinforcing, rather than changing, structural trends.

FIGURE 2.6 The share of jobs requiring GenAI skills increased significantly between 2022 and 2025, reaching almost 1 percent of total job postings in some ECA countries

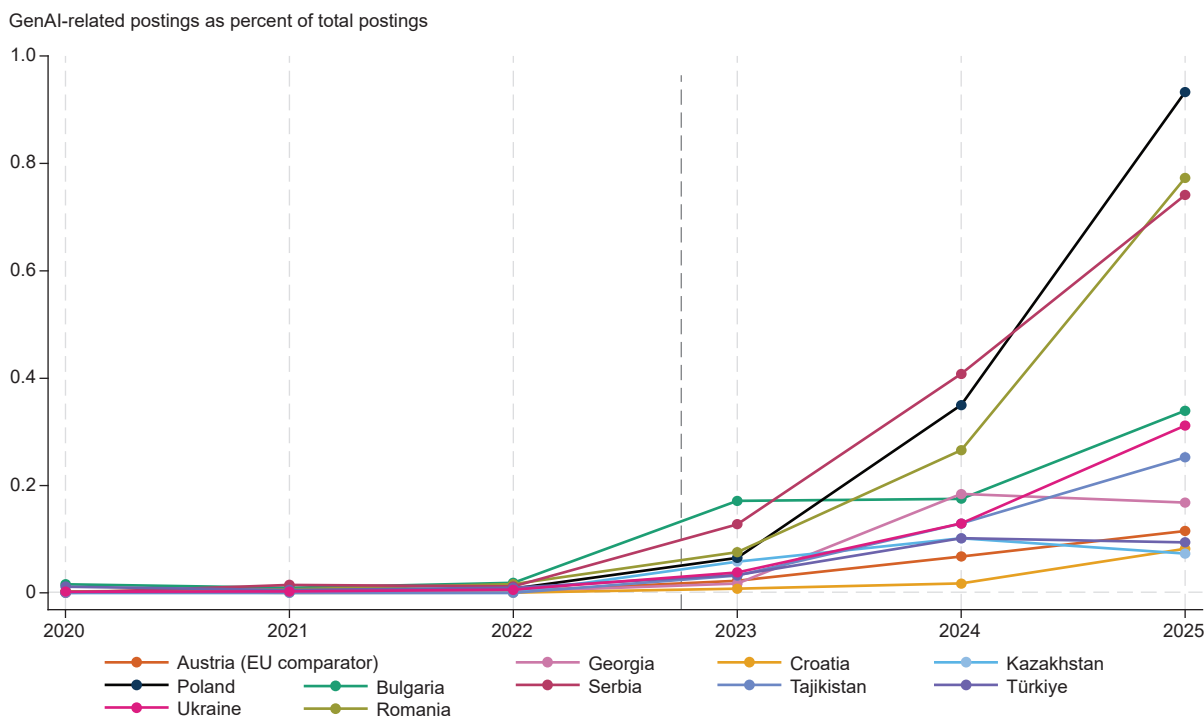
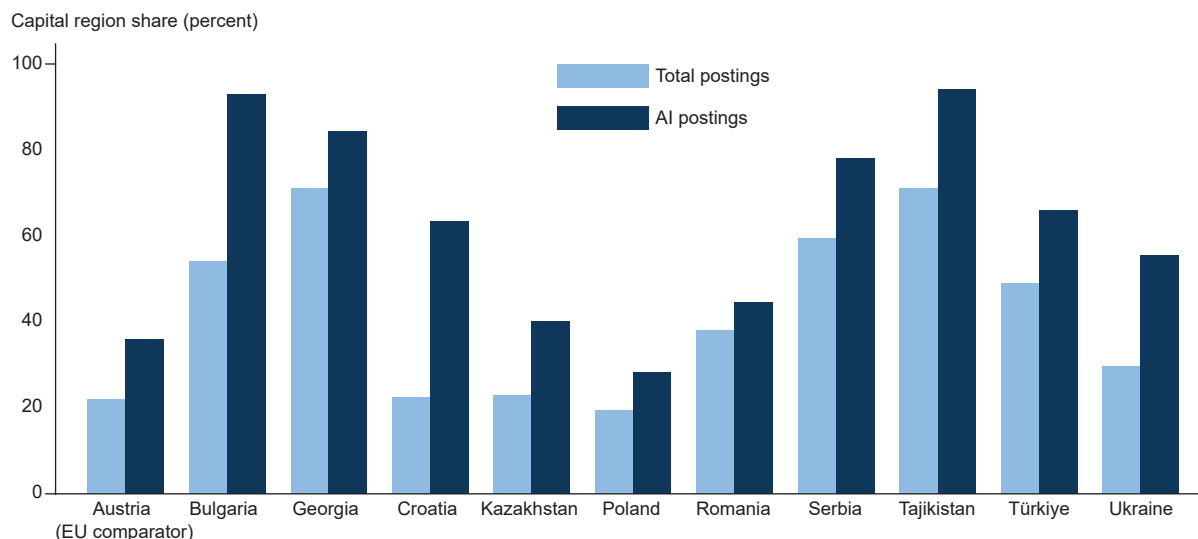


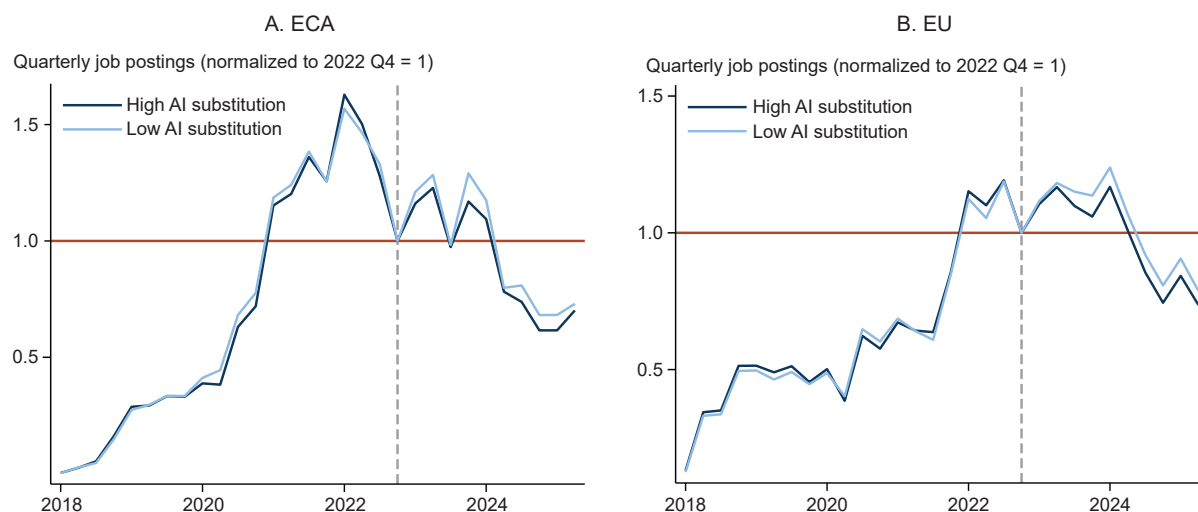
FIGURE 2.7 AI jobs are more concentrated in capital regions than the average job in ECA

Source: Authors, based on Lightcast data.

Note: Figure shows the share of job postings that correspond to jobs in the capital region among the total number of postings (grey bar) and the total number of AI postings (blue bar). The capital region corresponds to the capital of the country, except in Türkiye, where it refers to Istanbul. A job posting is defined as an AI job posting if it includes at least one skill in the list of AI skills as defined by the Lightcast Skills Taxonomy. Austria is included as a non-ECA EU comparator country. Data are for 2023–25.

AI-driven job displacement is not yet evident in most of ECA (figure 2.8.A). In contrast, in EU countries a gap between demand for high- and low-AI-substitution occupations is starting to appear (figure 2.8.B). This finding mirrors evidence at the global level, which suggests that the advent of GenAI had strong displacement effects

in high-income countries and less of an effect in middle- and low-income countries (World Bank 2026b). Country-specific trends—such as those observed in Türkiye by Aşık et al. (2026a)—suggest limited compositional shifts in employment despite substantial exposure. The smaller displacement effects in ECA do not necessarily mean that the region

FIGURE 2.8 The difference in labor demand between high- and low-AI-substitution occupations remains small in ECA

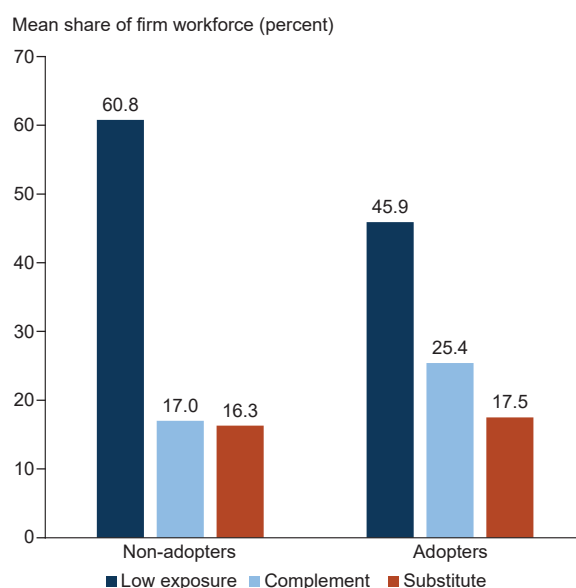
Source: World Development Report 2026 team, using Lightcast data.

Note: The figure shows the quarterly number of job postings for occupations with high AI-substitution risk (orange line) and low AI-substitution risk (blue line). Panel A presents aggregate values for 23 ECA countries; panel B presents aggregate values for the EU-27. Values are normalized to the number of job postings in the fourth quarter (October–December) of 2022. The AI-substitution vulnerability measure is constructed as the inverse of the AI complementarity index in Pizzinelli et al. (2023). The vertical dashed line indicates the release of ChatGPT in the fourth quarter of 2022.

will be insulated from these effects but rather that the pace of adoption of AI may not have reached a point at which these effects are sufficiently large.

Recent developments in business services have raised concerns about labor demand in that sector. The business services sector, which employs high-skilled workers in formal jobs, is expected to undergo a functional reconfiguration with the advent of GenAI, as routine activities are automated and human inputs become more concentrated in supervision, exception handling, and quality assurance (World Bank 2026a). Evidence from South Asia, where this sector is sizable, shows that labor displacement is already emerging among white-collar occupations in globally connected firms (World Bank 2026b, 2026c). The business services sector in ECA has seen substantial growth in the last decades and represents a substantial share of high-skilled employment, particularly in Bulgaria and Poland. Modeling for Poland suggests that AI adoption may lead to a contraction in employment in knowledge-intensive services sectors; the extent to which it leads to permanent job losses will depend on the extent of labor mobility (World Bank 2026a).

FIGURE 2.9 In Türkiye, AI adoption is associated with worker augmentation, not greater risk of displacement



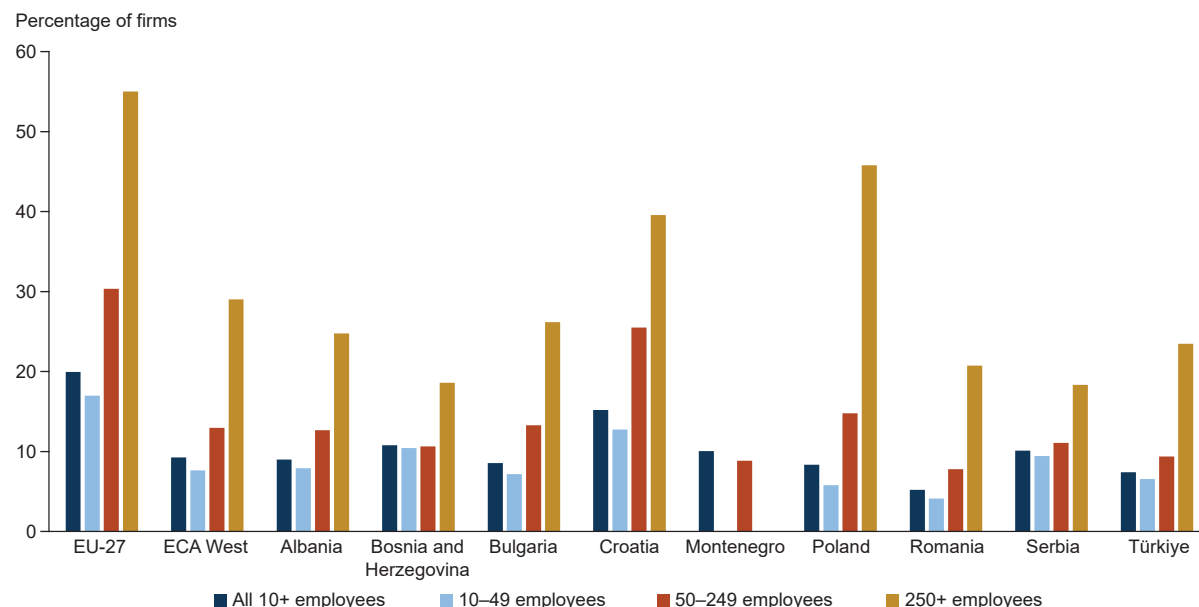
Source: Demir, Grover, and Panigrahi (forthcoming).

Most firms have adopted a wait-and-see approach with respect to hiring and firing. Almost 91 percent of AI-adopting firms in the recent Firm Adoption of Technology (FAT) survey in Romania reported no hiring or layoffs as a result of AI adoption (Cirera et al. 2026). In Türkiye, results from the World Bank Enterprise Survey (WBES) module on AI use among formal firms revealed that only 2 percent of the firms reported firing workers and 7 percent reported hiring workers because of AI adoption. Similarly, an analysis using matched employer-employee data in the same country by Demir, Grover, and Panigrahi (forthcoming) reveals that AI adoption is taking place among firms where the share of occupations complementary to AI is higher than the share of occupations where AI is a substitute (figure 2.9), suggesting that labor effects may be more muted than expected. In fact, the trend seems more positive in developing economies than in the United States (Davies et al. 2026). Qualitative evidence from interviews with AI-adopting firms also indicates that firms have at worst reduced their hiring rate but have engaged in almost no firings, preferring instead to reassign workers to other tasks. Many interviewed firms did indicate that workforce reductions could take place in the future, however (Jolevski and Torre forthcoming).

AI adoption by firms

Firms in ECA are quickly adopting AI, but they are doing so unevenly. Simple adoption measures—which track the extensive margin (i.e., whether a firm uses AI tools in any business or productive process)—show rapid adoption. In all sectors except agriculture and finance, about 9.4 percent of firms in the western part of ECA with 10 or more employees used AI in 2025. This figure is almost three times higher than in 2021 (Eurostat). However, the 2025 value lags that of the EU-27 countries, where almost 20 percent of comparable firms use AI, on average (figure 2.10). Across western ECA countries for which data are available, use of AI among firms ranges from 5.2 percent in Romania to 15.2 percent in Croatia. Within countries, use of AI varies significantly by firm size. In enterprises with 10–49 employees, the share of firms using AI ranges from 4.1 percent in

FIGURE 2.10 In western ECA, about 9.4 percent of firms used AI in 2025, with use rates varying widely across countries and firm sizes



Source: Eurostat, table isoc_eb_ai. Data are for 2025.

Note: The figure plots, for each country and region, the share of firms using at least one AI technology among all firms with 10 or more employees (dark blue bars), firms with 10–49 employees (orange bars), firms with 50–249 employees (green bars), and firms with 250 or more employees (light blue bars). Missing bars indicate that data for the firm-size category were not available. “ECA West” is the average for Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Montenegro, Poland, Romania, Serbia, and Türkiye.

Romania to 12.8 percent in Croatia; in enterprises with more than 250 employees, the share ranges from 18.3 percent in Serbia to 45.8 percent in Poland. Patterns of adoption in the most advanced and productive segment of the firm landscape differ from patterns in the average firm (box 2.2).

Differences in AI adoption across countries at similar income levels are wide. For instance, adoption in Croatia is roughly three times as great as in Romania, and the gap between large enterprises in Serbia and Poland is even wider. Differences of this magnitude between economies with broadly comparable infrastructure and skills endowments suggest that the constraint is not primarily technological. Firm size is the most consistent correlate across the region, with adoption rising steeply with scale in every country observed, so part of the cross-country variation reflects differences in enterprise structure rather than willingness to adopt; economies dominated by small firms reveal lower aggregate adoption, even where individual firms behave identically to their peers elsewhere. Size does not account for the whole gap, however, as large-enterprise rates

themselves vary by a factor of 2.5. The difference may reflect organizational factors—managerial capability, the state of data systems, and integration into networks where adoption practices circulate, including foreign ownership and participation in EU supply chains—examined in Section 2 of this chapter.

More detailed quantitative measures reveal relatively shallow AI use. The in-depth surveys on AI use among firms in ECA point to AI use that is not core to production process and operations. Results of the FAT survey in Romania reveal that use of AI technology in general business functions (such as administration, planning, sourcing, marketing, and quality control) is very low, with no more than 3 percent of Romanian firms using AI applications in any given business function and intensive use in these functions close to zero (Cirera et al. 2026). In the World Bank Enterprise Survey (WBES) results on AI use among formal firms in Türkiye, only 21 percent of adopters report sophisticated use of AI, defined as advanced use of AI technologies (agents, process automation, robotics) across multiple

BOX 2.2 Adoption of AI by frontier firms: Insights from a survey of private equity– and venture capital–funded IFC clients

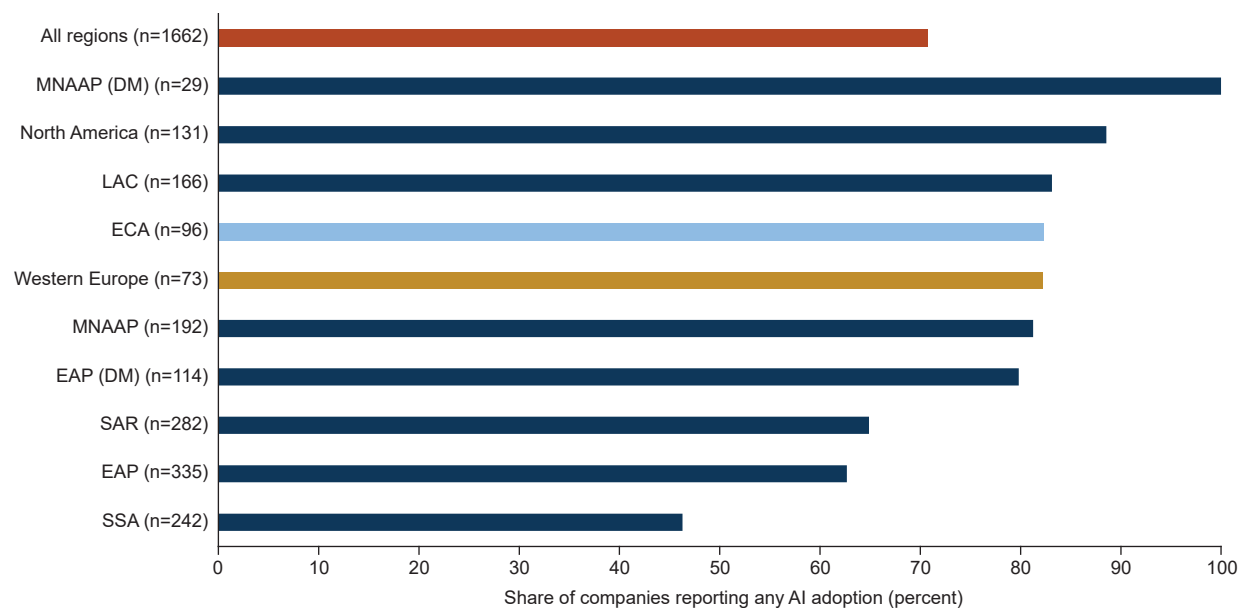
New technology is not adopted uniformly across firms—or necessarily in the expected direction. Indeed, evidence from the Firm Adoption of Technology (FAT) surveys in ECA indicates that the gap in usage intensity with respect to the technological frontier is larger for firms that are more technologically sophisticated prior to the advance of new complementary technologies than those that are not (Iacovone, Aviomoh et al. 2025). Lagging usage intensity among more sophisticated firms is particularly problematic because those firms drive productivity.

The International Finance Corporation (IFC) regularly surveys client companies that receive private equity (PE) or venture capital (VC) financing. The PE/VC Development Impact Questionnaire includes

a 15-question module on AI adoption (Smeets et al. 2026). Firms that secure equity financing are typically younger, larger, and more formalized than the average firm. They represent the advanced segment of the private sector.

The 2026 edition of the PE/VC Development Impact Questionnaire covered 1,662 companies globally, of which 96 were headquartered in emerging ECA and 73 were headquartered in a developed European economy. Having headquarters in a developed market does not necessarily imply there is no economic activity in an emerging market, as companies frequently redomicile their holding company in a major financial center or technology hub while keeping operations, the workforce, and customers in emerging markets.

FIGURE B2.2.1 Frontier firms in ECA have higher AI adoption rates than the global average



Source: Authors, based on Smeets, Olarte, Guaqueta, and Strusani (2026).

Note: SSA = Sub-Saharan Africa; EAP = East Asia and Pacific; SAR = South Asia; MNAAP = Middle East, North Africa, Afghanistan, and Pakistan; ECA = Europe and Central Asia; LAC = Latin America and the Caribbean. DM = developed markets.

Regions with fewer than 5 companies are not shown (LAC-DM n=2); they remain in the All regions bar. Regions follow the company's reported headquarters, which for some firms is not where they operate.

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BOX 2.2 (continued)

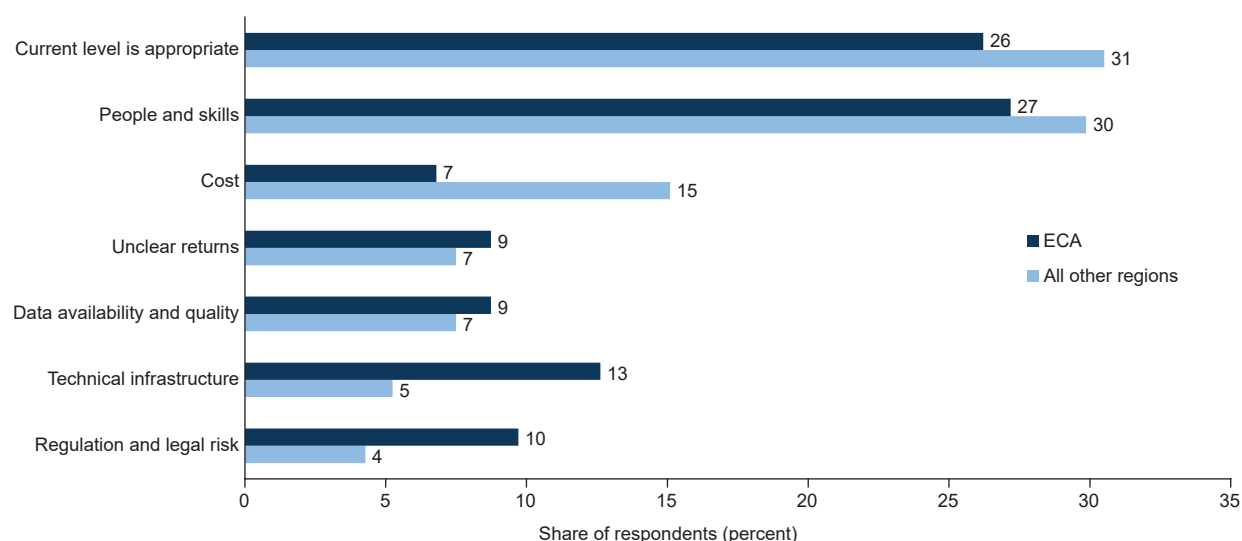
The survey results reveal that AI adoption rates among this group of frontier firms headquartered in emerging markets in ECA are almost identical to those of developed European economies and about 11 percentage points above the average across all regions (Figure B2.2.1). Companies headquartered in developed economies of North America and the Middle East have higher rates of adoption.

Frontier firms in ECA also report having adopted AI technologies earlier than frontier firms in the rest of the world. The average share of frontier firms adopting AI before 2025 was 63 percent in ECA and 48 percent in the rest of the world. Adoption appears to have started earlier in developed than in emerging economies: 35 percent of adopters in developed European countries report first adopting by 2023, against 22 percent in ECA. Companies in the ECA region were also more likely to have deployed AI across multiple functions rather than a select set of functions or pilots, with 45 percent of adopters in ECA and 44 percent of adopters

in developed Europe reporting a broad deployment of AI in operations and 12 percent in ECA and 15 percent in developed Europe reporting that AI is core to their business model (the average for other regions was 29 percent and 18 percent, respectively). In all regions (including ECA), frontier firms tend to integrate AI into internal business functions rather than external products, although 60 percent of companies use AI for both.

Among both non-adopters and adopters, people and skills emerge as the greatest barrier to adoption of AI, in both ECA and the rest of the world. More than a quarter of AI companies report these factors as the greatest barrier (Figure B2.2.2). Frontier firms in ECA also cited technical infrastructure, regulation, and legal risk as the greatest barriers to further adoption more frequently than companies in the rest of the world. Evidence from interviews on AI among firms in five ECA countries provides further insights into these aspects (see Section 2 of this chapter).

FIGURE B2.2.2 Frontier firms in ECA report that people and skills are the greatest barrier to further AI adoption



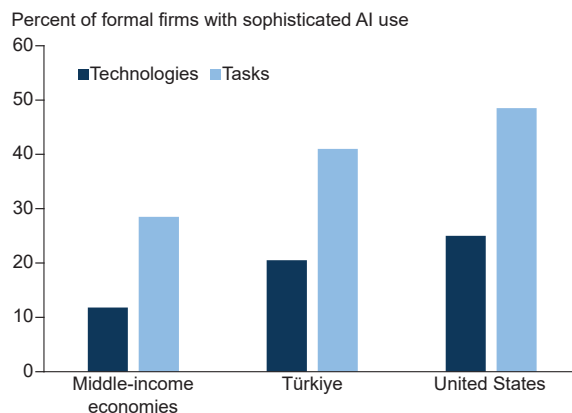
Source: Authors, based on Smeets, Olarte, Guaqueta, and Strusani (2026).

Note: Single-select question. All firms which answered the question, whether or not they have adopted AI, are included in the graph. Sample size for ECA is 103 firms, while for all other regions is 934 firms.

business functions and with customized solutions. This figure is 25 percent in the United States and 12 percent among developing middle-income countries (figure 2.11). Similar patterns hold for the type of tasks businesses use AI for. Among users of AI, 41 percent of firms in Türkiye use it for cognitively demanding tasks, such as coding, software development, data analysis, and control of business or production processes. This figure is close to the share in the United States (48 percent) and well above the average share in developing middle-income economies (29 percent). Only slightly more than a third of the Turkish firms using AI pay for it, a share below that in middle-income economies (47 percent) and the share in the United States (53 percent). Less than 10 percent of firms in the United States use AI tokens, use of which signals more automated and complex use through API integration. In Türkiye the figure is about 7 percent, slightly higher than the average for middle-income economies (5 percent) and close to the figure in the United States.

Quantitative measurements of AI adoption face limitations and a qualitative approach provides additional insights. To examine how firms think about and use the technology, this report draws on

FIGURE 2.11 Sophisticated use of AI among firms in Türkiye is close to the United States benchmark



Source: Authors, using data from the World Bank Enterprise Survey special module on AI use.

Note: Figures on technologies show the percent of firms that use sophisticated forms of AI such as AI agents, automation, and robotics. Figures on tasks show the percent of firms that use AI for cognitively demanding tasks, such as coding, software development, data analysis, and control of business or production processes. Both definitions come from Davies et al. (2026). Figures for middle-income economies are average use in India, Jordan, Kenya, Malaysia, Mexico, Nigeria, and Thailand. All estimates use sampling weights.

a series of in-depth qualitative interviews conducted with 38 firms across 5 ECA countries: Armenia, Croatia, Georgia, Kazakhstan, and Serbia (Jolevski and Torre forthcoming; hereafter the ECA firm interviews). Firms were selected to span a range of sectors, sizes, and adoption experiences rather than to be statistically representative. The interviews are therefore informative about mechanisms—for instance, how firms understand AI, why they adopt it, what obstructs them, and what changes when they do—but cannot establish how common any given pattern is across the region. The firms interviewed included AI start-ups and developers; AI integrator firms; companies in the services sector, such as financial institutions, telecommunications companies, and retail firms; and companies in the manufacturing sector (low-tech, high-tech) and SOEs.

The interviews reveal the lack of a common understanding of what AI means. AI is treated as an umbrella, but firms differ on how broad that umbrella is. Different firms include different combinations of machine learning, GenAI, computer vision, agents, analytics, and even rule-based automation under AI, with some drawing a clear line between AI and ordinary automation or classical logic. AI can be a product, a solution, a helper, or an intangible asset. For some firms—but not others—simply querying a free version of a GenAI chatbot for information is a meaningful use of AI. Some firms see AI primarily as a tool to help them automate processes; others understand it primarily as a team assistant or an extra pair of hands. Yet others see it as core infrastructure. Part of this heterogeneity reflects the nature of the technology, which allows for many different uses. But part of it represents a lack of clarity about what this specific technology is, which can lead to wildly different estimates of AI adoption in quantitative surveys with a closed choice of possible responses.

Adoption of AI among firms is growing rapidly, for different reasons in different countries. In Croatia and Serbia, the most common driver of AI adoption is competitive pressure. Firms fear missing out on AI; when queried about the biggest risk they face in the next years, many are concerned about the prospect of a competitor using AI to drive the rest of the firms out of business. This pressure is

most evident in the most competitive sectors, such as retail and low-tech manufacturing, where firms closely follow the technological choices of their competitors and profit margins are slim. In regulated sectors, such as finance and telecommunications, opportunities to achieve internal efficiencies are more important drivers.

Industrial policy can propel AI adoption, but it may not be sustainable. Governments can be investors and early adopters of AI, coordinating broad adoption. In Kazakhstan, many firms cited the government's plan to make 2026 the "Year of Digitalization and Artificial Intelligence" as a key driver behind their adoption of AI. SOEs in Kazakhstan established Key Performance Indicators (KPIs) and targets for AI adoption, which cascaded down to suppliers and private companies. This strong push from the government, however, may have led many companies to adopt AI tools solely to meet a target. AI integrator firms in Kazakhstan reported receiving requests from clients to implement visible AI solutions in order to "check a box." Faced with limitations to absorb such solutions on the client side, AI structures sometimes emerged next to legacy ones within companies. The AI firms' ecosystem also ends up being focused on solutions for SOEs and government agencies, reducing efforts to create solutions that could be useful for private firms and generate value added.

When competitive pressure or government push is absent, entrepreneurial and innovative spirit may be the driving force. In Armenia and Georgia, where competitive pressure is limited and governments are fiscally constrained, most interview respondents reported that individual initiative by entrepreneurs and CEOs matters most for adoption of AI. As a result, adoption patterns within countries are very heterogeneous. Some firms apply AI in very advanced uses in their operations, while others have only begun using AI. Armenia, for example, has a vibrant information, communications, and technology (ICT) sector, in which firms export AI solutions, but rarely, if at all, sell to local clients. Armenian firms in sectors with potential applications of AI solutions (such as logistics or financial intermediation) have been very slow to adopt them, relying on personal use of GPT models. In Georgia,

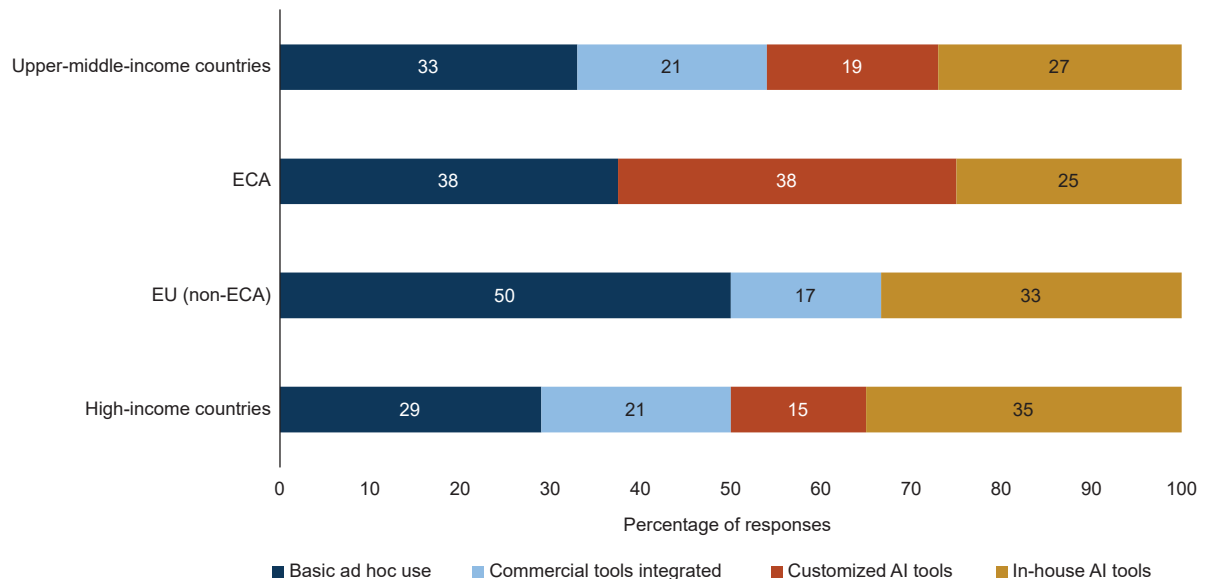
the financial sector leads the charge on AI adoption, driven largely by the desire to be a global leader in digital finance. Large manufacturing firms, as well as smaller retail companies, are just exploring the use of AI chatbots, mostly as a result of the initiative of tech-savvy managers.

Nearly all firms expect to expand the use of AI in the coming years, going beyond experimental and early-stage adoption. Over half of firms are cautious about AI use, however, leery of hype-driven adoption, expectations that have outpaced what the technology can easily do, and unclear returns on investment. Some firms are concerned about an AI bubble bursting. The main concerns focus on the uncertainty of potential increases in the cost of computing and hardware necessary, cloud costs, and price of LLMs as demand and usage increase, coupled with the risk of both commercial and geopolitical dependencies. Some firms are already taking steps to hedge these risks by implementing token monitoring, switching to open-weight models, or using smaller compressed models to control costs.

AI adoption in government

Governments in ECA are also adopting AI—and their adoption matters beyond the public sector itself. Evidence from the AI and Data for Better Governance Survey, conducted for the World Development Report 2026 across 60 economies including 8 ECA ones (Lundy et al. 2026), shows that AI adoption among governments worldwide is broad but often shallow: most governments report some internal use of AI, but much of it consists of individual public servants using AI tools for discrete tasks—such as searching for information or summarizing documents—without integration into formal workflows. Governments in ECA compare favorably on this margin. All surveyed ECA governments report at least some internal use of AI, and 38 percent characterize that use as ad hoc—a lower share than among EU governments outside the region (50 percent) and close to the averages for upper-middle-income (33 percent) and high-income (29 percent) economies (figure 2.12). More distinctive is how ECA governments have moved beyond ad hoc use: integration has occurred entirely through customized tools (38 percent of

FIGURE 2.12 Use of AI in ECA’s government tracks the expected pattern given their income level



Source: Lundy et al. (2026), based on the AI and Data for Better Governance Survey, agency questionnaire, question 7.

Note: The agency questionnaire gave the following definition of “basic ad hoc use”: “Individuals may use AI for ad hoc tasks (e.g. search, summarizing, simple assistance) but it has not been integrated into internal workflows.”

governments) or systems developed in-house (25 percent), with no ECA government reporting the integration of commercial tools into its operations—compared with about a fifth of governments in high-income economies and in the EU outside ECA.

ECA governments apply AI across a broad range of functions. As is the case globally, the most common applications of AI among ECA governments are general-purpose ones: seven of the eight surveyed governments in the region report using AI for workflow automation and knowledge management, and six of eight for chatbots and virtual assistants that respond to public queries. More distinctive is the breadth of use beyond these entry-level applications. Six of the eight ECA governments report using AI for the direct provision of services to citizens and businesses—such as processing applications and renewals—compared with 62 percent of high-income governments. Half report AI use in forecasting and predictive decision-making, and half in the allocation of public resources, shares again comparable to those of high-income governments. Türkiye illustrates how these more sophisticated applications are already operating at

scale: its tax administration runs a risk-analysis program that uses AI to calculate a monthly fraud-risk score for every value added taxpayer in the country, supporting the targeting of audits (Lundy et al. 2026). While these responses measure the presence of an application area rather than the depth or scale of use, they suggest that ECA governments are experimenting with AI across a broad front.

In contrast with the global pattern, citizen-facing AI use in ECA is at least as deep as internal use—and, as with internal use, it relies mostly on tools built rather than bought. Globally, governments adopt AI more readily for internal functions than for external, citizen-facing services, where integration tends to remain shallow (Lundy et al. 2026). ECA departs from this pattern. Six of the eight surveyed governments in the region report citizen-facing AI use that goes beyond ad hoc applications: half of the region’s governments report customized AI tools for citizen-facing services, one reports systems developed fully in-house, and one the integration of commercial tools—a distribution at least as deep as that of their internal use. The reliance on purpose-built rather than off-the-shelf systems at the interface between states and citizens

is consistent with the national AI assistants and language-specific models under development in the region. The most prominent example is Ukraine's Diia AI, an assistant embedded in the government's digital services platform that the government describes as the world's first national AI assistant, with a national large language model as the stated next step (Lundy et al. 2026).

Has AI adoption already increased productivity?

AI adoption has the potential to substantially increase productivity. Various empirical studies evaluating the causal impacts of using AI tools on productivity for specific white-collar tasks have found gains of 6–88 percent, with the largest effects for coding (World Bank 2026b).

There is not yet evidence of an AI-driven productivity impact in most of ECA, however. A recent study of EU countries found that AI adoption increased labor productivity levels at the firm level by 4 percent on average between 2019 and 2024 (Aldasoro et al. 2026). The estimates show wide variation across firm size, with positive effects concentrated among medium-size and large firms and no significant effect on smaller firms. The extent to which these productivity effects at the firm level translate into economy-wide effects is yet to be seen, although studies from the United Kingdom and the United States suggest that a productivity premium is starting to emerge in GDP. No studies have estimated the effect in ECA.

Adopting firms in ECA perceive productivity gains, although there is no quantitative evidence of it. The vast majority of firms interviewed, which

had some significant degree of AI adoption, were not able to estimate the impact on productivity. Only ICT firms, among which adoption is highest, could provide quantitative estimates. Of the non-ICT firms interviewed, only one (a financial institution) had conducted a proper experiment, implementing an AI solution in a group of treated branches and comparing some financial outcomes with those of a comparable group of control branches. Anecdotal and non-quantified evidence points to a reduction in the amount of time workers spent on tasks, a reduction in the manual workload, and improved quality. Despite these results, firms' headcounts and labor costs remained largely unaffected. With AI used primarily as a back-office tool, revenue is also unlikely to be affected.

Productivity impacts of AI may be hard to measure. Implementation of an internal AI chatbot for general queries can have only very diffuse productivity effects, for example. It is not easy to translate estimated cost reductions into an effect on company-wide profits. For customer-facing uses (e.g., AI assistants in retail websites), firms were able to estimate how much of their revenue was attributable to the AI tool itself but could not determine whether that revenue was additional or a substitute for revenue generated by non-AI-enhanced means. AI has also enabled firms to undertake tasks and processes that previously did not exist; the lack of a counterfactual makes estimating productivity gains difficult. The difficulty of estimating productivity is evident not only from users of AI but also from producers of AI solutions, which find it difficult to quantify the return on investment—a key measure for scaling the AI solutions past the proof-of-concept stage.

Section 2: Challenges and Constraints in a World of AI

The growing availability of AI will not automatically translate into widespread adoption, locally relevant applications, or sustained productivity gains in ECA. The constraints are less about access to the technology, which is now cheap and near-universal, than about the capabilities, institutions, and financing arrangements that surround it. Chief among those capabilities are workers' skills and firms' capabilities. The resource that is scarce depends on whether a country is trying to advance AI or simply use it.

For the small set of economies with ambitions to adapt AI to local needs or move toward the frontier, the missing capability sits at the boundary between technical and commercial work. AI developer firms in the region report being able to hire people who can build AI, but they struggle to find people who can judge what is worth building—namely, engineers with enough business orientation to identify a viable application, scope it against a market, and create a product. This skill is scarcer than the ability to program, and it is not produced by expanding STEM enrollment alone. The scarcity is compounded by thin research and innovation ecosystems, with R&D spending well below that of comparators. As a result, the environments in which such judgment is normally developed—dense networks of firms, universities, and repeat founders—are underdeveloped. At the same time, countries in ECA face a financing constraint. Early-stage capital exists in pockets, but Series A and later scale-up finance is largely absent. Firms that do build the capability therefore often stall or relocate before it matures. Rising costs of computing and regulatory uncertainty compound both.

For the much larger set of firms that would like simply to adopt AI, the constraints are both organizational and skill-related. Managerial quality is one of the strongest predictors of adoption in the firm-level evidence. Firms that successfully adopt AI differ from those that do not less in terms of the technical staff they employ than in their managers'

capacity to see where a tool fits, redesign a process around it, and carry staff through the change. For this reason, adoption cannot simply be bought: Licensing a model does not license the judgment to deploy it. Below the managerial layer, what is lacking is not specialist expertise but a general working fluency across the workforce, so that all staff can use AI tools competently in routine work. Additional obstacles include (a) the often unstructured, siloed nature of data across systems, or simply the lack of usable data and the capability to organize them; and (b) concerns about reliability, privacy, and workflow integration.

A third set of challenges is fiscal: the technology being adopted erodes the revenue base that ECA governments rely on most. Governments in the region depend unusually heavily on labor-based revenues, which provide some 30 percent of government revenue (against 17 percent globally). A technology that substitutes for labor in exposed occupations, or shifts value toward capital and toward foreign providers beyond the reach of domestic tax instruments, erodes this base precisely as the fiscal demands of the transition—and of aging—grow. The challenge is less the size of the economy AI will produce than the share of it that tax systems will still reach.

Challenges and constraints to adapting and potentially advancing AI

Adapting AI to local contexts and potentially advancing the frontier requires a deeper set of capabilities than using off-the-shelf tools. ECA mostly has the highly skilled information technology (IT) workers it needs. In shorter supply are engineers who can connect technical solutions to business needs—an increasingly important constraint as GenAI tools reduce or eliminate the need for routine coding. Adaptation is further hindered by limited scale-up finance, rising compute costs, restricted access to publicly supported infrastructure, and regulations that may narrow firms' choice of models. Low R&D spending and weak links between universities, research institutions, and start-ups leave the region with a limited pipeline of locally relevant AI projects.

The skills gap to adapt and advance AI

High-skilled IT workers are critical to advancing countries toward the AI frontier and adapting AI solutions to the local context. ECA's tertiary education system produces a vast number of STEM and ICT graduates, with a distribution of graduates by field similar to that of high-income countries (World Bank 2025). Skilled IT staff may be scarce and expensive in less developed parts of ECA, however. The number of people who upload code on GitHub per capita (a proxy for the density of skilled IT personnel in an economy) is inversely correlated with the average IT salary (Iacovone, Aviomoh et al. 2025). Countries with a smaller supply of digitally skilled people need to pay higher salaries to IT workers relative to GDP per capita (figure 2.13.A) and the average salary (figure 2.13.B). The correlation between IT salaries and average salary is weaker, but it confirms the negative association between IT salaries and GDP per capita.

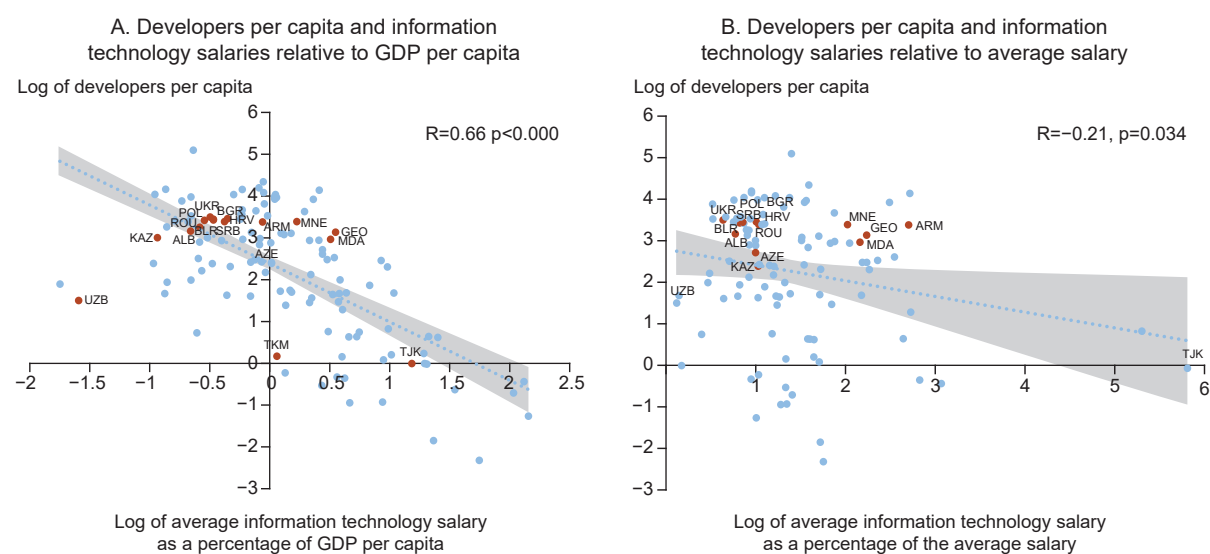
Digital skills remain critical for AI roles. Analysis of online job postings in ECA in 2023–25 reveals that postings for AI roles (jobs requiring AI skills) demand much higher digital skills than non-AI roles. The share of digital skills in the demanded

skill mix is two to almost eight times larger in job postings of AI roles than in job postings of non-AI roles (figure 2.14). The share of cognitive and creative skills is roughly similar. Other non-digital skills are much less demanded in AI roles than in non-AI roles. AI jobs are still very much digital-intensive and predominantly ICT roles.

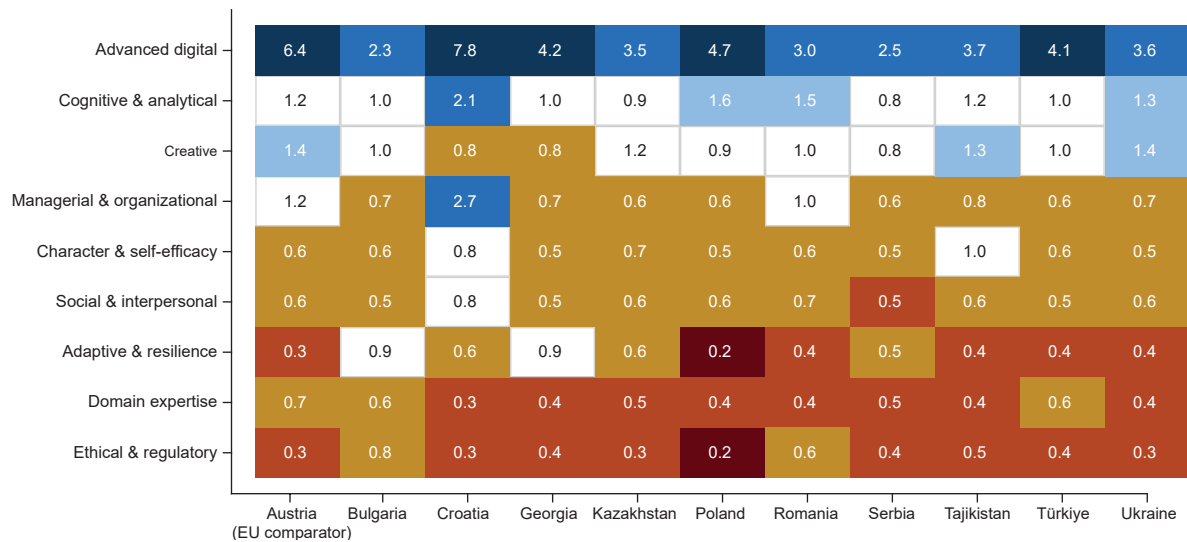
Expertise in routine digital tasks may become less important as AI is adopted more widely. In the early post-pandemic years, the IT labor market was extremely tight. There is no longer a significant shortage of digitally savvy IT workers in ECA. The change partly reflects the global cooling in demand for IT roles. It also reflects the growing role GenAI tools play in software development. Several respondents to the ECA firm interviews noted that “vibe coding” has lowered the barriers to entry to software development, particularly for routine tasks. IT firms are encouraging their workers to use AI tools in their workflow.

The lack of business-oriented IT engineers is emerging as an important skill gap in the AI industry. AI startups and large IT companies interviewed as part of the ECA firm surveys indicate that a sales- and business-oriented mindset

FIGURE 2.13 Countries with fewer developers per capita need to pay higher wages to IT workers relative to GDP per capita and the average salary



Source: Iacovone, Aviomoh et al. (2025), based on GitHub (2025); International Labour Organization; World Bank World Development Indicators database; and Worldsalaries.com.
Note: R = Pearson correlation coefficient. Dots in red indicate countries in ECA. Shaded areas show 95 percent confidence interval. Data on developers per capita are based on the number of people that upload code on GitHub. Data cover 2020–24.

FIGURE 2.14 AI jobs are still very much digital-intensive jobs

Source: Authors, using Lightcast data.

Note: Figure shows the ratio between the share of a given skill category in the total skill mix of an AI job posting and the share of the same skill category in the total skill mix of a non-AI job posting in a given country in 2023–25. For example, if digital skills represent 50 percent of the skill mix of an AI job posting and 25 percent of the skill mix of a non-AI job posting, the ratio is 2.0. A ratio above 1 means that the skill category is overrepresented in the skill mix of AI job postings; a ratio below 1 means that the skill category is underrepresented. Skill categories are defined following Deming and Noray (2020), Stephany et al. (2026), and Soares Martins Neto et al. (2026). Digital skills correspond to “advanced digital” skills per the classification of Soares Martins Neto et al. (2026). A job posting is defined as an AI job posting if it includes at least one skill in the list of AI skills defined by the Lightcast Skills Taxonomy.

is becoming a critical skill for success. As AI tools allow firms to code faster, it is the ability to link technical solutions to business needs that leads to success. AI start-ups report spending considerable time educating their customers about technology and designing solutions that meet their needs. Workers with very narrow IT skills may not be a good fit for the AI and ICT sector over time.

Constraints to innovation and adaptation in AI

Lack of financing to scale up is a common challenge in the ECA AI ecosystem. Interviews revealed that early-stage funding is constrained yet attainable but that domestic Series A financing is largely absent, particularly for start-ups seeking international expansion. AI start-ups face the same challenge that other young firms face in ECA—namely, the lack of robust venture capital funding (Iacovone, Aviomoh et al. 2025). Foreign investors are the only source of funding for scaling up activities, and their willingness to invest in firms in developing ECA economies is limited, as geopolitical factors discourage foreign investment in some countries.

Increases in the cost of compute and technical infrastructure can be constraints. Affordable data infrastructure options for start-ups are limited.

Except for start-ups that receive credits from hyperscalers through special programs, most AI innovator firms in ECA face a steeply rising cost curve for compute. Countries like Kazakhstan and Serbia have government-owned or government-sponsored supercomputers, but access to them remains limited. AI start-ups thus depend on procuring computational resources and data capacity from large hyperscalers, which have quasi-monopoly power in certain markets, particularly where regulatory restrictions limit the choice of providers.

Regulation can limit adaptation capabilities. As they develop AI tools adapted to the local context, AI innovators sometimes face regulatory barriers in terms of the frontier models they can choose. In EU countries, innovators are cornered by the limits on using non-EU models. EU frontier models remain behind non-EU models in terms of their performance, holding back the performance of any EU model-based AI tool. In non-EU countries with advanced technological capabilities, such as Serbia, local AI firms have more freedom in terms of their choice of models than their EU counterparts. As not all models perform in the same way across all tasks, being able to choose which model to use allows AI firms to deliver the best results.

Low levels of R&D produce weak local pipelines of AI projects. ECA countries have lower levels of R&D than high-income economies, and the patents generated tend to lag major economies in terms of novelty. AI start-ups' links with local research institutions are less structured and more reliant on personal networks than in high-income countries. Research knowledge reaches start-ups mainly through founders, graduates, mentoring relationships, and informal networks rather than through an organized R&D collaboration system.

Challenges and constraints to adopting AI

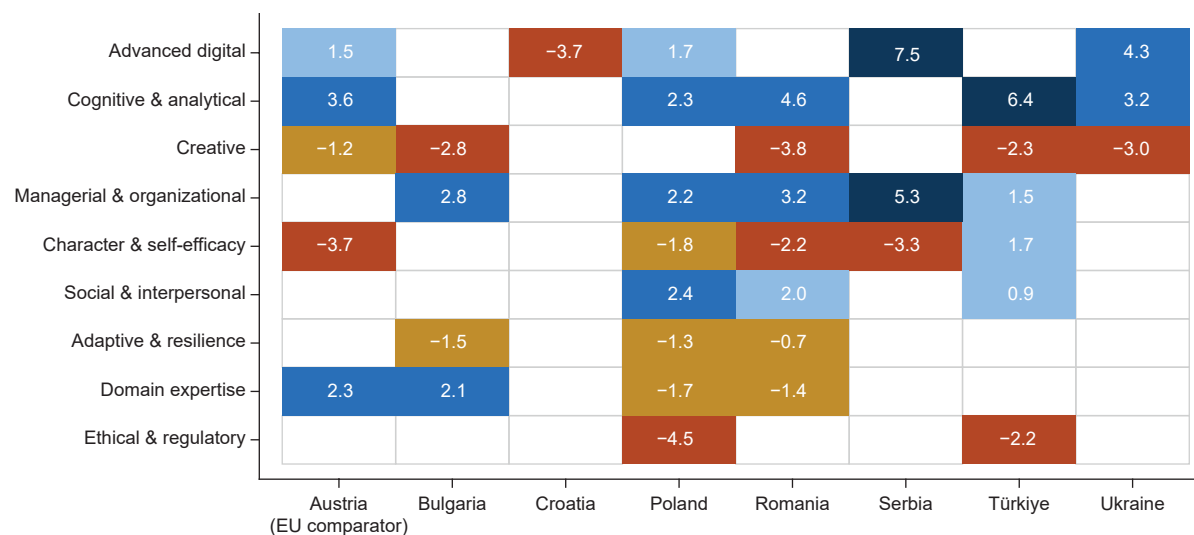
Adopting AI is neither frictionless nor purely technical. Curiosity, self-directed learning, and a willingness to experiment can initiate use, but firms capture sustained gains only when they convert individual experimentation into redesigned workflows and organization-wide capability. Doing so requires complementary cognitive, foundational, and managerial skills, as well as experienced workers who can evaluate AI outputs and identify errors. These capabilities are not produced overnight: they are the cumulative output of the region's education and training systems, which makes education a core

part of the economics of AI adoption rather than a separate sectoral concern. Adaptability to the new ways of working opens new opportunities. Adoption of AI also depends on firm readiness, in the form of access to modern systems, well-structured data, safeguards against data leakage, and trust in the reliability of AI tools. Even where these conditions exist, uncertainty about returns and evolving regulatory requirements may discourage firms from moving beyond experimentation to deployment at scale. Complacency can also slow adoption of AI.

The skills gap to adopt AI

Adopting AI requires more than just digital skills. As AI is adopted throughout the economy, complementary skills will increasingly be demanded. Job postings for non-AI roles demand much more cognitive and managerial skills when the firm has adopted AI. This pattern is evident in most countries in ECA for which reliable online job posting data are available (figure 2.15). This suggests that, as AI is adopted, the type of tasks that workers are expected to do may be shifting towards understanding, organizing, and managing the workflow more than developing specific outputs.

FIGURE 2.15 Non-AI jobs in AI-adopting firms are more intensive in digital, cognitive, and managerial skills, and less intensive in creative and character-specific skills than similar jobs in firms that do not adopt AI



Source: Authors, using Lightcast data. Data are for 2023–25.

Note: Figure shows the coefficient associated with a dummy variable indicating that the hiring firm has adopted AI in a linear probability model in which the dependent variable indicates the presence or not of a given skill in a job posting. The regression includes fixed effects by occupation, month, and year. The sample is limited to job postings that do not include AI skills and to countries with at least 100 AI-adopting firms. Standard errors are clustered at the occupation and month-year level. A non-significant coefficient is shown as a white cell. A hiring firm is defined as an AI adopter if it posted a job including AI skills in the period 2023–25. The skill categories are defined following Deming and Noray (2020), Stephany et al. (2026), and Soares Martins Neto et al. (2026). Digital skills correspond to “advanced digital” skills per the classification of Soares Martins Neto et al. (2026). A job posting is defined as an AI job posting if it includes at least one AI skill as defined by the Lightcast Skills Taxonomy.

The importance of managerial skills among the set of skills complementary to AI is reinforced, through a distinct channel, by evidence from firm analysis. The job postings data show that AI adoption raises the demand for managerial skills as tasks change; firm-level evidence points to the opposite direction of the same complementarity: managerial capability also shapes whether firms adopt AI in the first place. Managerial quality is one of the strongest predictors of firms' adoption of digital technology, including AI, in many ECA countries (Cirera et al. 2026; Iacovone, Izvorski et al. 2025). Evidence from interviews indicates that adoption of AI is more widespread once management is on board and endorses a companywide strategy. AI integrators report that adoption is more successful when the clients' management understands the implications of technological change: "Change management" is a substantial part of the AI adoption process. The two channels are not independent: firms with stronger management adopt AI more readily, and adoption in turn raises the value of managerial skills, a mutually reinforcing dynamic that deepens the complementarity as the technology diffuses.

The managerial constraint binds everywhere in ECA, but it does not bind in the same way, and the differences shape what would relieve it. In EU member states and the more integrated Western Balkan economies, the constraint is concentrated among small and medium-size enterprises (SMEs). Foreign-owned firms and firms embedded in EU supply chains import managerial practice along with capital and customer requirements. These firms adopt AI at rates approaching their Western European counterparts. The gap is between them and domestically owned firms of similar size operating outside those networks. In the South Caucasus and Central Asia, the constraint sits farther upstream. As fewer firms have encountered the AI adoption process-redesign problem, there is less domestic practice to diffuse; the question is less how to spread managerial capability than how to establish it (Bloom, Schweiger, and Van Reenen 2012; Iacovone, Izvorski et al. 2025).

The complementarity of cognitive skills to AI reveals the value of foundational skills. Proficiency in literacy skills has been associated with proficiency

in digital skills, which in turn is associated with increased use of digital technologies (Wicht, Reder, and Lechner 2021). Foundational skills make it easier to acquire the technical skills needed to thrive in an increasingly demanding labor market (World Bank et al. 2022). Although AI tools may substitute for the lack of skills in some contexts, successful adoption is correlated with foundational skill proficiency.

The same complementarity implies a risk: used passively, AI can erode the very skills it rewards. New evidence on students is cautionary. PISA 2025 finds that AI use among 15-year-olds is already widespread, but its association with learning varies sharply with how the technology is used: students who rely on AI most heavily perform worst, consistent with offloading cognitively demanding work rather than engaging with it (OECD 2026). Panel evidence from roughly 27,000 Chinese secondary students points in the same direction and suggests causality: after adopting generative AI, students completed homework faster and with higher scores, but closed-book exam performance fell by about a fifth within six months, and high-stakes entrance-exam scores fell by 18–24 percent, with losses concentrated among the roughly 80 percent of users whose behavior is consistent with outsourcing homework to AI (Stromberg, Lei, and Wu 2026). The mechanism extends to professionals: in a three-month randomized experiment with U.S. patent lawyers, AI assistance raised the quality of delivered work across the board, but the durable gains in unaided professional judgment accrued only to senior lawyers—those with the foundational expertise to learn from AI-assisted practice—while junior lawyers showed no average improvement (Autor et al. 2026). Expertise, in other words, mediates whether AI use builds or erodes human capability (World Bank 2026b).

Country-level evidence confirms that exposure to AI and readiness to use it are not the same. In Armenia and Georgia, workers in occupations that are highly exposed to AI tend to have above-average digital capabilities; workers in occupations that are vulnerable to conventional computerization face the widest digital skill gaps. This finding suggests that policies on skills should differentiate between

workers who need support to use AI productively and those who require more foundational preparation to transition into digitally intensive work (World Bank 2026d).

Firms report that worker experience is associated with more successful adoption of AI. This is consistent with the empirical evidence from Autor et al. (2026). The set of tacit skills and knowledge associated with extended professional experience appears to be associated with successful adoption of AI tools, according to managers interviewed, particularly in the services sector, where experienced workers are at the forefront of adoption of GenAI tools. The experience they possess allows them to identify inaccuracies and hallucinations more easily and more efficiently allocate tasks to AI agents. Experienced workers are also less worried about AI-driven displacement, a fear that sometimes slows adoption of AI tools among less experienced workers. The fact that experienced workers appear to be more enthusiastic users of AI tools suggests that, despite evidence showing that AI could compress the productivity premium of experience (Brynjolfsson, Li, and Raymond 2025), this premium may still persist if AI adoption is lower among those with less experience. An older workforce does not necessarily imply a workforce that is reluctant to adopt AI tools.

Skill constraints also emerge as a strong barrier to AI adoption in government. Data from the AI and Data for Better Governance Survey show that, when asked to name the three main barriers to AI use in their administrations, five of the eight surveyed ECA governments cite a lack of talent to design and develop AI solutions—a higher share than among high-income (31 percent) or up-per-middle-income (47 percent) governments—and four of eight cite a lack of staff skills to use AI tools effectively, a barrier named by only 12 percent of high-income governments. Six of the eight name at least one of these two skills constraints, and three governments—Kosovo, Tajikistan, and Ukraine—devote two of their three choices to them. Just as notable is what ECA governments do not report: none cites resistance to change, limited political interest, doubts that AI tools will work, or a lack of clear use cases. The constraint on government AI

adoption in the region, as governments themselves describe it, is not demand or willingness but the capability to build and use the technology. Governments in the region are beginning to respond. Kazakhstan, for example, delivers free AI training to public servants at introductory and advanced levels through a dedicated AI Center of Excellence (Lundy et al. 2026).

Constraints to successful adoption at the firm level

Many firms believe they are ready to adopt AI but are not. Across interviews with AI integrators, a typical example emerged. Firms would approach the integrators with the intention of adopting an AI tool, but realized after a few meetings that they were not ready to do so. Getting the client firm ready for adoption could take months or even years. Legacy firms, in particular, may have outdated internal systems that in some cases require complete replacement before they can adopt AI.

Data management and structure are key limiting factors. Many ECA firms do a poor job of managing data—the inputs AI works with. The lack of data or the presence of unstructured data stored in silos limits the deployment of AI applications. Firms in regulated sectors such as finance and telecommunication tend to be ahead in terms of AI adoption because they are used to having structured data in centralized warehouses. Firms in other service sectors may be producing significant amounts of operative data that are not stored at all or not structured in a meaningful way. Manufacturing firms are often unaccustomed to integrating data—notably, production and administrative data—across departments.

Concerns about data leakage stifle adoption. Concerns about data leakage lead some firms to be very cautious when considering using AI. This concern is particularly prevalent in interviewed firms in the South Caucasus and the European Union. Concern about data leakage stems primarily from (a) the use of “shadow AI” (unauthorized or unregulated use of AI) by workers and the potential for disclosure of confidential data and (b) the integration of AI tools that can leak data. Firms are mitigating the risk of data leakage in various ways. Some firms have invested in internal systems that

restrict access to public LLMs and local deployment of models on premises. Others are investing in enterprise licenses and internal LLMs, to encourage safe usage of the technology. More established firms in ECA are betting on their established reputation on good governance and data protection as a way to retain customers. Firms that started operations after 2022 take the most flexible approach: staff are encouraged to use whatever model they desire, though this could be a function of the sector and size of the firm.

Lack of reliability of GenAI tools constrains adoption. GenAI tools sometimes hallucinate or provide inaccurate information. Some firms cannot risk the errors they produce. In manufacturing, particularly in design tasks within the production process, and in some customer-facing services, misleading information can be reputationally damaging. This has also changed the work for some employees: the time they save by delegating to AI some part of their work is compensated by the time they now need to spend reviewing the work of AI, hence constraining the productivity gains of the firm.

Uncertainty about returns on investment can lead to unsustainable adoption paths. It is very rare for adopting firms to have a clear sense of the return on investment of an AI solution. Almost none of the interviewed firms across ECA could clearly identify how much profit, revenue, or productivity they were obtaining from the AI solutions they were implementing. For firms in very competitive sectors, where profit margins are low (such as grocery retailers), the lack of a clear return on investment can constrain deployment of AI. When the return is clear, adoption is rapid. In firms that face lower competitive pressure—such as SOEs and firms in regulated sectors—uncertainty about return on investment may lead to adoption trajectories that may not be cost-effective. AI integrators and developers report that they usually have to make the case for a positive return on investment to their own clients, who often seek to adopt AI solutions without clear productivity benchmarks.

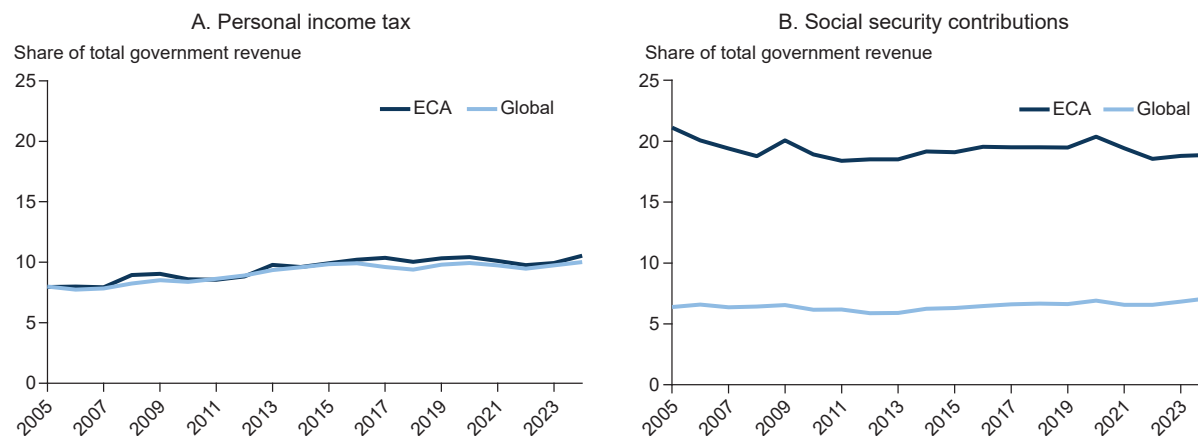
Regulatory concerns loom over the horizon. Most firms report that regulations have not had a significant effect on their AI adoption strategies

so far, but many express concern about regulation becoming an issue in the future. Firms in Croatia are aware that their choice of AI technology stack will be conditioned by what EU regulation will allow. Firms in Serbia expressed concerns about the introduction of legislation enforcing model sovereignty—the idea of hosting, running and fine-tuning models as opposed to depending on developer’s infrastructure. This could restrict the model optionality they presently enjoy, something that is restricted for firms in EU countries. By and large, however, firms in regulated industries report that they already operate in an environment that is constrained, particularly by data governance and localization frameworks. Residency rules restrict the competition of AI firms and hosting locations by firms toward local, regional, or on-premises providers. In some cases where the AI ecosystem is undeveloped and where compute and data storage are not readily available, regulation can stifle the private sector by limiting the ability to adopt and use AI. This problem is particularly constraining for AI start-up firms, which require access to the most advanced models. In countries where governments are building data centers and bringing in compute power, concerns exist about the capacity of the state to efficiently allocate that digital space. Firms that are subject to some of these regulations are reporting higher costs than firms that are not, which are associated with more manual work and slower AI deployment. The added administrative burden comes in the form of extra documentation, data-processor agreements, legal review, and project-by-project checks. Given the scarcity of Graphics Processing Units (GPUs), stricter hosting regimes could delay AI development by years.

Fiscal challenges from AI adoption

Even where adoption succeeds, it creates a challenge of its own: the erosion of the revenue base on which ECA governments disproportionately rely. On average, taxes on labor account for about 30 percent of government revenue in ECA. Personal income tax raises around 10–11 percent of general government revenue, essentially the same as the global average (figure 2.16.A). By contrast, social security contributions account for a much larger share in ECA (19 percent) than in the world as a whole (7 percent) (figure 2.16.B). The entire

FIGURE 2.16 ECA's labor tax gap with the rest of the world is explained entirely by social security contributions



Source: Authors, using World Bank Fiscal Dataset (WBFD).

Note: The figure plots the average share of personal income tax (panel A) and social security contributions (panel B) in total government revenue for ECA and the world. Both are simple country averages.

12-percentage-point gap is concentrated in the financing of pensions, health insurance, and other social transfers. To the extent that AI may lead to labor displacement, its adoption affects not just the level of revenue but the redistributive social contract that revenue supports. This problem is exacerbated by the demographic pressure on social spending caused by aging and the region's declining population size. AI will accelerate the need to address the structural fiscal deficit in most of ECA's social and especially pension systems.

Exposure is uneven and highest where social insurance is deepest. Labor taxes account for 45 percent of revenue in Romania, 43 percent in North Macedonia and around 41 percent in Poland and Serbia. Their share is far smaller in Kazakhstan (15 percent) and Azerbaijan (14 percent).

The foreign ownership of the technology compounds the problem. Because the models, cloud services, and compute behind the region's adoption are overwhelmingly imported, part of the value

adoption generates accrues abroad, beyond the reach of domestic tax instruments, and AI adoption could potentially lower the tax-to-GDP ratio even when incomes rise in absolute terms, because the large tax bases—labor and consumption—grow more slowly than GDP (Blum forthcoming). The risk, in short, is that the gains of AI adoption and the revenues accrue in different places, leaving governments with a narrowing tax base.

The upside is that there remains policy space to counter the tax base erosion that AI adoption could cause. Value added tax (VAT) is widely applied to digital services in ECA. Two other instruments remain available. Increased reliance on the taxation of capital is a first line of defense, as capital tax bases are less vulnerable than taxes on labor to AI displacement. In the medium term, governments can also expand their tax base to capture rents accruing to AI owners, as Korinek and Lockwood (2026) suggest. Taxing digital services is one way of doing so; taxing consumption and AI-enabled export earnings is another.

Section 3: Opportunities Created by AI

AI's potential extends well beyond firm-level efficiency, reaching new export opportunities and greater resilience against demographic decline.

The region's long-standing productivity slowdown and an impending contraction of the workforce mean that gains in output per worker are critical. AI is one of the few technologies that could plausibly deliver such gains at scale.

Evidence from the ECA interviews points to three types of benefits for firms:

- AI changes how tasks are performed, reducing the time required for documentation, coding, and analysis.
- AI changes who can perform tasks, lowering the expertise threshold, so that non-specialists can handle work that previously required trained staff.
- AI changes what firms can attempt, making feasible forms of monitoring and decision making—such as reviewing millions of individual replenishment decisions rather than sampling them—that were previously out of reach. This margin matters most for growth, because it expands the frontier of what firms do rather than simply lowering the cost of what they already do.

These patterns differ markedly across the region, with some countries pursuing efficiency gains in existing processes and others pursuing more ambitious transformations.

A small subset of ECA economies could monetize AI directly rather than only using it. Some countries in the region already export ICT services; AI potentially extends that route. In addition, a newer opportunity lies in compute. For economies with energy advantages, exporting computing capacity is a genuine, if demanding, possibility. The important qualification is that cheap electricity alone does not confer an automatic advantage, as the cost of capital rather than energy price is what determines where capacity is built.

The demographic opportunity is arguably the most consequential for the region. ECA faces a sustained contraction in its labor force, which will reduce its economic growth. By raising output per worker, AI offers a partial offset: fewer workers producing more each need not mean less output in aggregate. How much of the demographic drag can be absorbed this way depends heavily on which of the plausible productivity scenarios materializes. Under conservative assumptions, the offset is modest; under more optimistic ones, it could significantly affect growth. The offset is not automatic, however; it will accrue only to economies that achieve broad adoption.

Where AI is augmenting work and increasing productivity: specific use cases from the ECA firm interviews

The ECA firm interviews offer a window into how firms in the region are actually using AI. Three types of opportunity emerge.

The first concerns how work is done. AI reduces the time needed for tasks people were already performing, from producing promotional leaflets and drafting contract templates to reviewing cybersecurity alarms and handling customer queries. It allows firms and people to be more productive at what they currently do.

The second concerns who does the work. AI lowers the expertise required to perform tasks that previously required specialists, allowing non-technical staff to run their own analysis, business analysts to build applications, and product owners to launch prototypes without developers. It can also shift a cognitive task to adjacent occupations that employ people with less expertise (World Bank 2026b).

The third concerns what work is possible at all. AI extends observation and decision making to volumes and frequencies that humans could never cover, from evaluating every sales call rather than a sample of them to processing millions of weekly replenishment decisions to monitoring the physiological signals of individual animals on a farm.

The how: Improving the productivity of existing tasks

AI is changing how work is done by reducing the time required for tasks that firms were already performing. This is the most common pattern cited in the interviews, the easiest for firms to recognize, and the one for which reported gains are largest.

Document and content production has become more efficient. Retailers in Croatia and Serbia that automated the production of promotional leaflets reported a 90 percent reduction in designer time and a five-day reduction in the production cycle. Managers reported that AI reduced the time needed to prepare presentations from two weeks to one to two hours; legal and administrative staff reported completing contract templates in hours rather than days. A large conglomerate in Kazakhstan translated more than 20,000 documents in two months. AI generates 50–100 attributes per new item for web-shop listings and turns photographs sent over WhatsApp into property listings, yielding an estimated 90 percent time saving.

Customer interaction reveals a similar pattern. A financial institution in Georgia used a chatbot to resolve about 70 percent of interactions without escalation. In Croatia, a WhatsApp AI assistant resolved 40 percent of client inquiries at a financial company. At a Serbian retail firm, an AI call center agent reduced call volumes by 23 percent in the first month and by almost 50 percent after three months. In financial services, chatbots have moved beyond answering questions to executing actions, blocking lost cards and sending and confirming payments, for example.

In software development, firms describe acceleration rather than substitution. Coding assistants have shortened the time required to perform certain tasks from months or weeks to days. Developer velocity is reported as two to three times faster than it was before adoption of GenAI, and the time between idea and prototype reportedly fell from two or three months to about two weeks.

Back-office and financial processes have also become more efficient, with internal chatbots handling in minutes tasks that previously took hours or a day. A financial institution in Serbia reported

300 to more than 600 chatbot conversations daily. In finance, 20 AI agents performing repetitive transfers and data extraction were estimated to save some 20,000 manual work hours. Other tools detect discrepancies between invoices and contracted terms. At a bank in Kazakhstan, almost 100 percent of unsecured consumer-loan credit decisions have been automated, with funds reaching customers in a little over a minute. AI-driven compliance and client risk scoring has significantly reduced the time spent on know-your-customer procedures. In cybersecurity, a multi-agent assistant cut the time needed for alarm review from 20 to 2 minutes. In Croatia, an insurer's end-to-end digitalized claims process handled thousands of claims in a single day during a natural disaster, work that previously required months. In automotive component manufacturing, a wheel producer in Türkiye reported using AI-based image processing to identify more than 600 rim models with 99 percent accuracy. It is extending the technology to defect detection, predictive maintenance, and automated document scanning (Aşık et al. 2026a).

The who: Changing who can do certain tasks

AI is changing the level of experience required to perform certain tasks. Several firms use AI to provide the judgment that would otherwise be acquired over years on the job, allowing newer staff to perform at a level that previously required experience. A pharmaceutical and retail firm in Croatia uses AI coaches to train sales staff in objection handling. Sales representatives receive AI-suggested next-best-action follow-up emails. At an energy company in Kazakhstan, AI generates operational reports that mark errors in red and indicate the preventative action required, automating a judgment that once rested on familiarity with the process. A manufacturer in Georgia is using AI to retrieve machine documentation and act as a sounding board during breakdowns, substituting for the senior colleague who would otherwise have to have been consulted.

AI can also lower the skill threshold, so that tasks that previously required formal technical qualification can be performed by staff who do not hold one. Several firms mentioned that vibe coding has dramatically lowered the skill levels required to

develop software. A large conglomerate in Kazakhstan has started teaching vibe coding to its employees, with the goal of having each employee create his or her own AI agent. Firms in Croatia and Serbia are using Copilot in Excel to allow non-technical employees to run analysis through natural-language instructions rather than the functions and formulas that previously gated the work.

Tasks are also being shifted to adjacent occupations. At a retailer in Georgia, a self-taught business analyst used Codex to build internal web applications that replaced complex Excel workflows—a task that previously required a developer. Product owners at a financial services firm in Croatia now build prototypes themselves rather than commissioning them, cutting the path from idea to prototype from two or three months to about two weeks. At a retailer in Serbia, an analytics agent returns loyalty metrics in minutes through a chat interface, replacing a request to the reporting team and the wait that followed it. In Croatia, an insurer's knowledge tool used by more than 60 percent of employees has displaced the practice of consulting colleagues.

The what: Expanding the set of tasks that firms and workers can perform

The third type of potential impact of AI is the least visible and the most consequential in ECA. AI not only makes an existing task faster or moves it to a different worker, but also makes possible work that firms were previously not doing at all. The common thread across these cases is observation and decision making at volumes and frequencies that human attention could never have covered. The result is the expansion of output rather than the mere economizing of labor.

AI can significantly expand monitoring capacities. A startup firm in Georgia provides an AI tool which allows firms to transcribe and evaluates all of its sales calls, against roughly 5 percent reviewed monthly by a team leader before it adopted AI. The saving of team-leader time is the smaller part of the gain, as the system also generates coaching dashboards from calls no one had ever listened to. A

large agri-food holding in Armenia reports that one of its farm systems uses wearables to track chewing, heartbeat, movement, and breathing of individual cows, feeding the analysis to operators and linking it to milk quality and volume. These physiological data did not exist at the animal level before AI was adopted. At warehouses in Croatia, drones equipped with computer vision count inventory and assess the state of goods, replacing manual scanning that was both slow and hazardous. At industrial sites in Kazakhstan, AI detects missing protective equipment and entry into restricted zones and issues instructions, converting intermittent supervision into continuous coverage. At a retail firm in Serbia, anti-fraud agents flag abnormal transaction patterns at a granularity no reviewer could attempt. In Türkiye, a mining conglomerate is using AI to monitor driver fatigue and track the location of personnel in real time, and a major appliance producer has been using AI-driven computer vision to monitor shop-floor safety (Aşık et al. 2026a).

Decisions at a scale beyond human tractability can now be implemented thanks to AI. A retail group in Croatia uses AI and advanced analytics to determine orders for each store-item combination, processing around 3 million combinations and 6 million ordering decisions every week. It uses machine learning to estimate the impact and cannibalization of new items and the net incremental effects of promotions. These counterfactual questions were previously matters of judgment rather than estimation.

AI can bring capabilities that are genuinely new to firms. A retail firm in Serbia runs customized customer interviews of more than 40 questions through an AI agent and monetizes the resulting insights by selling them to vendors and partners—a new revenue line. AI start-ups in Croatia and Georgia have developed AI tools that allow firms to glean insights from customer data. An AI firm in Armenia has developed a tool for SMEs that allows them to photograph a balance sheet and income statement on a mobile phone and receive non-binding information on whether they might qualify for a loan within seconds.

Opportunities across sectors

The interviews point to three broad sectoral clusters of how AI is creating value. Data-rich service sectors, particularly retail and financial services, combine improvements in existing workflows with new capabilities made possible by large volumes of structured customer and transaction data. In “physical” sectors, such as manufacturing, energy, mining, and agriculture, AI is used primarily to expand monitoring, prediction, and operational control. Knowledge-intensive activities, including software development, analytics, and legal and administrative work, show the clearest changes in how work is performed and who can perform it.

Data-rich service sectors display the broadest range of applications—affecting how work is carried out, who performs it, and what is done. In retail, AI is handling customer inquiries and accelerating the production of promotional materials and online catalogues. It changes who performs the work when business analysts build internal applications and employees retrieve loyalty metrics without relying on reporting teams. It also expands what firms can do: Retailers use AI to process millions of weekly replenishment decisions, estimate product cannibalization, detect fraud, personalize customer offers, and generate product information at a scale that manual processes could not support. Financial firms use AI to improve how work is done by automating credit decisions, compliance checks, claims authorizations, and customer service, while changing who can perform work, by, for instance, allowing financial product owners to develop product prototypes themselves.

Knowledge-intensive activities show the clearest effects on how work is performed and who is able to perform it. Software firms report that coding assistants compress development tasks measured in weeks or months into days or weeks and substantially increase developer velocity. At the same time, natural-language interfaces lower the skills needed for some analytical tasks: “vibe coding” allows software development to be carried out by less specialized workers. Across professional services, AI helps to compress the time needed to draft documents, to prepare presentations, and to

translate any written material. Business analysts can also now build internal applications that were previously outsourced to developers. Compared with data-rich sectors, however, the interviews provide fewer examples of AI expanding the set of outputs produced by knowledge-intensive activities; the dominant effects remain faster execution and fewer specialist bottlenecks.

In “physical” sectors, the dominant opportunity is to expand what firms can observe, predict, and control. Manufacturers use computer vision to count goods, detect defects, monitor safety conditions, and recognize patterns on the shop floor. Warehouse drones extend inventory inspection beyond what manual scanning can safely and regularly cover, while predictive tools support wind-farm maintenance and optimize inputs in extraction processes. The complementary evidence from Türkiye by Aşık et al. (2026a) points in the same direction: firms use AI to schedule truck movements dynamically, monitor driver fatigue, identify hundreds of component models, simulate electricity-grid changes, and inspect transformers across multiple provinces. In agriculture, greenhouse monitoring and livestock wearables generate continuous operational and physiological information that firms did not previously possess. AI also changes how existing work is done through predictive maintenance and process optimization, but evidence that it changes *who* performs physical-sector tasks remains more limited.

How, who, and what across countries

The interviews reveal patterns that distinguish the five case countries from each other. Because firms were selected purposively and the number and composition of interviews vary across countries, observed differences may reflect the firms included in the sample rather than the broader national context. The findings should therefore be read as qualitative indications of how adoption is unfolding rather than as estimates of the prevalence or relative maturity of AI use across countries.

Firms in Croatia and Serbia use AI mainly to change how existing work is performed—by making it faster, cheaper, or more accurate.

Applications span software development, back-office processes, internal knowledge retrieval, cybersecurity, retail, and customer service. Firms report substantial reductions in the time required for contract preparation, information retrieval, alarm triage, and content production. Changes in who performs the work are more selective: Natural language tools allow employees to conduct analysis, develop prototypes, and build simple agents, but firms generally describe these benefits as lowering barriers rather than redistributing expert responsibilities. Expansions of what firms can do arise through two distinct routes. AI-native companies supply them as products—drone-based inventory counts, market-prediction tools, automated customer research, and multi-agent cybersecurity services. But they also emerge inside established firms where scale and data allow. The overall pattern is therefore one of efficiency-led adoption, with new capabilities emerging where firms—whether AI-native or established—combine the scale and data foundations that make them feasible.

Efficiency is also the main AI use by firms in Armenia and Georgia, with pockets of more transformative use. Firms in both countries use AI to accelerate software development, document processing, meeting summarization, recruitment, customer service, and other established workflows. AI-native firms are also developing new products, including automated analysis of financial statements, voice and chat services, call-center analytics, and virtual try-on applications. These opportunities remain more prospective among traditional firms. The clearest difference between the two countries concerns who performs the work. In Armenia, lowering skill barriers is cited mainly as a future possibility; in Georgia, some workers without conventional software-development backgrounds are already using AI to build websites, applications, and analytical workflows. These examples remain concentrated in technology-oriented firms, however; adoption elsewhere is often limited to senior staff. Armenia also exhibits a bimodal pattern, with a small group of firms embedding AI in core products while others remain at the experimental or individual-use stage.

Kazakhstan exhibits the broadest and most ambitious opportunity profile among the five countries. Its most distinctive feature is the range of new products and capabilities under development, including integrated consumer platforms, tools for building AI agents, speech and compliance products, smart-city and cargo-tracking systems, and synthetic data for credit-risk and other applications. Firms report training office employees to build their own agents, accelerating the progression of junior engineers, shifting recruitment from traditional modeling skills toward agent orchestration, and reallocating some business-analysis tasks to product and sales staff. AI is also improving how existing work is performed across finance, energy, and industry through risk assessment, production optimization, safety monitoring, and predictive analytics. Some ambitions remain contingent on complementary infrastructure and ecosystem readiness, making Kazakhstan both the most advanced case in the interviews and the clearest illustration of the dependencies surrounding adoption.

The difference in how firms use AI across the region is not primarily a difference in ambition. Firms that use AI to change what they attempt to do, rather than only to perform existing work more quickly, differ from other firms in three main ways:

- They operate at sufficient scale that building automated judgment is worthwhile. The replenishment case is instructive precisely because its value comes from volume; the same tool applied to a few hundred decisions would not repay the effort.
- They hold data in a form AI can act on, thanks to years of investment in enterprise systems.
- They have managers who are able to reorganize a process around the tool rather than inserting it into an unchanged workflow.

Where these conditions are absent—as they are in much of the region—firms adopt the efficiency uses. Drafting, translating, and general assistance require no data infrastructure and no process redesign, which is why they appear first everywhere and adoption in less integrated economies clusters there.

AI as an export opportunity

ECA countries can monetize AI demand through two complementary channels: (a) skills-based IT and AI service exports and (b) infrastructure-based compute exports (producing floating-point operations, the standard unit of computational work, in one country for consumption in another). Several ECA countries have already pursued the first channel, building on the region's exceptional IT talent. The second route—exporting compute—is in its infancy. How much of either channel countries can capture also depends on their services and digital trade regimes: restrictions on cross-border data flows and on professional and business services raise the cost of delivering AI-enabled services abroad, a constraint recent trade diagnostics identify as significant in parts of the region (World Bank forthcoming a, b).

Strong investments in data centers suggest that countries in ECA are looking into the possibility of becoming global players in compute. Kazakhstan's initiative of creating a "Data Center Valley" in the Pavlodar region, with up to 1 GW of planned capacity by 2031, seeks to attract global hyperscalers. The 300 MW capacity of the Firebird AI data center currently under construction in Armenia targets foreign customers. The South Caucasus is emerging as a central node in a "digital middle corridor," with public officials touting the possibility of becoming exporters of data center services by capitalizing on their strategic geographic location.

The economics of compute exports hinge on a simple cost structure. Hardware accounts for roughly 90 percent of unit costs and is globally priced, making electricity a clear margin of competition (Lokshin 2026). ECA has strong natural endowments of electricity. Under cost-recovery pricing, the Kyrgyz Republic produces the world's cheapest compute; Tajikistan, Montenegro, Ukraine, and Azerbaijan also rank in the top tier. While Kosovo also has a relatively low cost of electricity, it is overwhelmingly sourced from two aging coal-fired power plants. Countries combining hydropower with cold weather face particularly low power usage costs. The economic stakes are

significant: A back-of-the-envelope calculation suggests that a 40 MW data center could generate \$630–\$950 million in annual wholesale revenue, exceeding 15 percent of the total goods exports of a country like the Kyrgyz Republic.

Water, not only electricity, will condition where compute exports can scale. Large-scale data centers require reliable water for cooling as well as power, and much of Central Asia is already under significant water stress, with competing demands from agriculture, hydropower, industry, and households, and with seasonal variability increasing as glaciers retreat. The same hydrology that delivers cheap electricity is thus a constrained input: water-intensive evaporative cooling may be difficult to sustain at hyperscale, and dry or closed-loop cooling alternatives raise energy use and cost, eroding the region's price advantage.

Not all computing tasks are equally tradable. Model training is insensitive to latency (the time delay in sending and receiving data). For this kind of tasks, geographical position is irrelevant; operations can locate wherever electricity is cheapest, making them fully offshorable. Inference (generating predictions, answers, or other outputs from new inputs), by contrast, carries a cost penalty per intercontinental round-trip. This kind of task tends to concentrate in regional hubs close to demand centers. Countries from the Western Balkans to the South Caucasus are well positioned to serve as inference hubs for the European Union, Türkiye, and the GCC countries.

The binding constraint is not electricity or geography but the availability of GPUs and institutional credibility. Setting up a data center requires procuring the GPUs that will operate in it. Several countries with relatively cheap energy costs face US trade restrictions that limit their ability to acquire GPUs from leading producers, such as NVIDIA; regulations on data localization may limit importer countries' demand for compute tasks. Bilateral trust between exporter and importer countries of compute is a key factor driving trade flows.

The capital cost of the investment is substantial. A 10-percentage-point gap in the weighted average cost of capital between OECD countries (8 percent) and developing economies (18 percent) adds approximately \$0.29 per GPU-hour—four times more than the spread in electricity costs across the top 20 producers. Because hardware is globally priced, the sector is acutely sensitive to small policy frictions. Governance failures translate directly into financing costs that swamp any underlying energy advantage.

Taking account of the cost of capital and the level of bilateral trust radically changes the ranking of countries with the cheapest price for delivering one hour of compute exports. Under electricity prices only (at their cost-recovery prices, excluding price subsidies), most of the top 20 countries by price are developing countries, including several ECA countries. Including the cost of capital removes almost all developing countries from the top 20.

Cheap energy is not enough to become a global compute exporter. The binding policy levers for developing countries lie mostly outside electricity tariffs. They include first of all the financing, as hardware dominates the cost stack. Second, regulatory credibility is another important policy lever, given that it minimizes the trust cost affecting foreign buyers.

Another relevant aspect concerns how much surplus the exporting country captures—net of the costs that hosting imposes. An investment in a data center for compute exports may have positive returns, but if the data center is fully owned by foreign companies, the exporting country may retain little beyond electricity payments and construction-phase jobs, as the operation of data centers usually involves minimal staffing. The extent to which exporting countries capture surplus from compute exports will depend, then, on taxation, equity participation, and royalty terms (Lokshin 2026). The net benefit calculus must also account for costs that data centers impose locally: upward pressure on electricity, water, and land prices for households and competing industries; e-waste from short hardware replacement cycles; noise and land use; and the fiscal cost of tax holidays and subsidized

power tariffs often used to attract investors. For countries pursuing compute exports as a strategy, the relevant test is not whether a data center is privately profitable, but whether the surplus captured domestically exceeds these externalities and fiscal transfers.

The export opportunity must be read against the region's position as a net importer of AI services.

An economy like that of most ECA countries, which adopts foreign-owned, labor-substituting AI, can see output, competitiveness, and exports all rise while the share of export earnings accruing domestically falls—higher exports are then partly a mirage, since the demand behind them originates in AI rents that have already left the country (Blum forthcoming). GDP and export growth will therefore overstate the domestic gains from AI adoption, and macroeconomic monitoring should track gross national income alongside them.

Exposure to this income leakage through the service trade channel varies with what countries sell. It is highest where exports are concentrated in digitally delivered, labor-intensive services—the delivery mode most amenable to AI substitution—and where that labor is in highly exposed roles, as in ICT and financial services. It is lower, and can even turn favorable, where AI exposure is concentrated on the import side and not on the export side, as in tourism- and transit-dependent economies whose export services are delivered in person; and the channel is largely inactive for commodity exporters, whose service trade is small.

AI as a means of buffering ECA's demographic headwinds

Whether AI-related productivity gains can partially offset the constraints associated with population aging depends on how AI's economic effects are conceptualized. Two approaches can be considered. The first treats AI as a shock to total factor productivity, raising the efficiency of existing production as it diffuses through the economy. The second assumes that AI affects the generation of knowledge itself, automating parts of the research process and accelerating the production of new ideas.

Population aging in ECA is proceeding at one of the world's fastest rates. And unlike countries in the European Union, most countries in the region are aging rapidly before reaching high-income status. The median age in ECA, which was 36.4 in 2023, is projected to rise to 48.9 by 2060; the old-age dependency ratio is expected to increase from 22.1 percent in 2025 to 40.1 percent by 2050; and the share of the population 65 and older, which was less than 9 percent in 1990, is projected to exceed 27 percent by 2060 (UN 2024; Aksoy and Lokshin forthcoming). Demographic patterns vary widely across the region, with the median age, the age where half of the population is older or younger, ranging from 21.9 in Tajikistan to 44.9 in Bosnia and Herzegovina.

The labor market implications are substantial. The population of the western part of ECA is projected to shrink by more than one-fifth by 2060, with declines exceeding 40 percent by 2100 in the most affected countries, including Bulgaria and Ukraine (UN 2024). A smaller and older workforce will need to support a growing number of retirees. Labor scarcity tends to tighten labor markets and draw older workers, women, and other secondary earners into employment (Acemoglu and Restrepo 2017). Governments may respond by raising statutory retirement ages (Börsch-Supan and Coile 2025).

One way of understanding whether AI can help offset the impacts of population aging is by treating it as an increase in total factor productivity. Doing so assumes that the productivity shock raises the efficiency of existing production as it diffuses through the economy, much as earlier general-purpose technologies did. This approach, together with a modeling of the demographic trends in the region, can be applied to understand the interaction between AI and aging in ECA (Aksoy and Lokshin forthcoming).²

2. Their analysis uses the demographic-attractor framework of Aksoy et al. (2019) based on data for 28 ECA economies over 1996–2023. Growth, investment, saving, real interest rates, and labor force participation are modeled as dynamic, interdependent variables; the population shares of the young (0–19), prime-age adults (20–59), and older adults (60+) enter as slow-moving external drivers. AI is introduced as a counterfactual productivity shock calibrated to recent US estimates. In the conservative scenario, based on Acemoglu (2025), AI increases annual productivity growth by about 0.11–0.16 percentage

Under this approach, AI can offer a temporary buffer against the negative economic consequences of aging. Aging is projected to reduce per capita GDP growth across ECA by roughly 0.9 percentage points between 2025 and 2045 (by 1.15 points among the EU member states in the sample, 0.85 points in Eastern Europe, South Caucasus, and the Western Balkans, and 0.69 points in the younger Central Asian economies). These effects operate through the macroeconomy as a whole, not just through labor supply. Under a conservative scenario, AI's peak contribution to growth remains below 0.5 percentage points everywhere—too little to offset demographic drag in any part of the region. Under an optimistic scenario, gains are substantially larger but temporary, peaking around 2033–34 at roughly 2.0 percentage points for the regional averages and at more than 2.3 percentage points in the best-prepared economies, including Poland, before receding as adoption matures. Poland and Tajikistan mark the two ends of this AI preparedness gradient: Under the model's calibration, Poland captures 88 percent of the US productivity uplift and Tajikistan 69 percent. In both scenarios, the growth trajectories are hump-shaped, rising during the adoption phase and converging back toward the demographic baseline once diffusion is complete (figure 2.17).

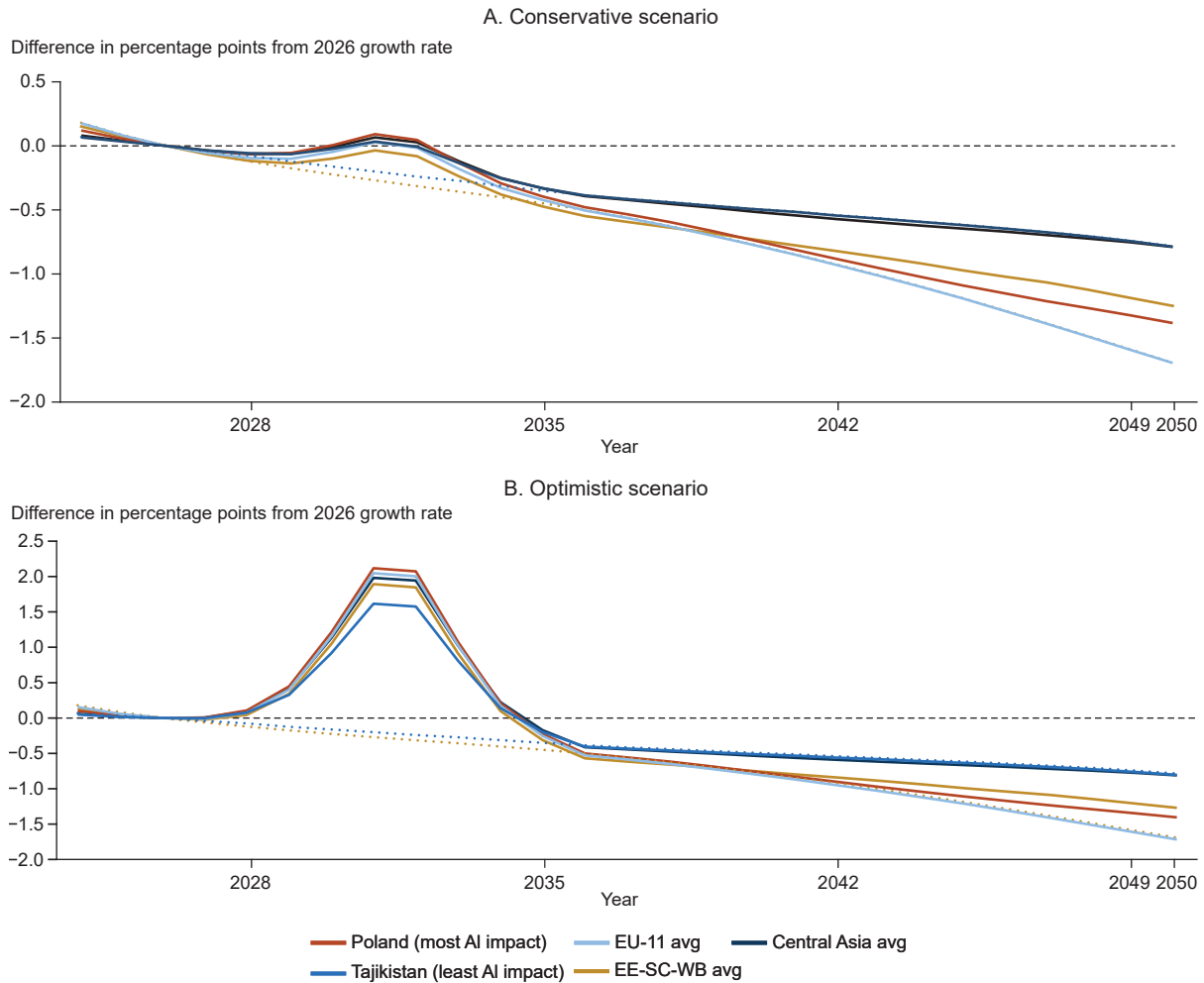
The size of the temporary buffer varies across countries. The analysis reveals a three-tier pattern:

- AI-ready, rapidly aging EU members can come close to stabilizing per capita growth under favorable assumptions.
- Eastern Europe, South Caucasus, and the Western Balkans are likely to enjoy a partial cushion.
- Central Asia gains the least, despite its younger population, because preparedness gaps limit its ability to absorb the gains.

Aksoy and Lokshin (forthcoming) also find that AI's principal offset channel is broad-based productivity growth rather than accelerated automation.

points. In the optimistic scenario, based on Aghion and Bunel (2024), productivity rises by 0.8–1.3 percentage points. Country-level gains are scaled by each economy's score on the IMF AI Preparedness Index (Cazzaniga et al. 2024) and introduced through an S-shaped adoption path over 2026–35.

FIGURE 2.17 Under the assumption that it works as a TFP shock, AI can provide a temporary offset to the negative economic consequences of population decline



Source: Aksoy and Lokshin (forthcoming).

Note: The figure shows the projected real GDP per capita growth rate with AI (expressed as a difference with respect to the 2026 growth rate) under (a) a conservative scenario based on Acemoglu (2025) and (b) an optimistic scenario based on Aghion and Bunel (2024). Solid lines show AI-scenario trajectories, defined as the demographic baseline plus AI; dotted lines show the demographic baseline without AI. The sample includes 28 countries. EU-11 = Bulgaria, Croatia, Czechia, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovak Republic, Slovenia. EE-SC-WB (Eastern Europe–South Caucasus–Western Balkans) = Albania, Armenia, Azerbaijan, Belarus, Bosnia and Herzegovina, Georgia, Moldova, Montenegro, North Macedonia, Russian Federation, Serbia, Ukraine. Central Asia = Kazakhstan, Kyrgyz Republic, Tajikistan, Uzbekistan. Regional averages are GDP-weighted.

Another way to understand AI's effects on aging and shrinking economies is to assume that it accelerates innovation. Under this assumption, AI affects the generation of knowledge itself, automating parts of the research process and speeding the production of new ideas. No empirical estimates of this effect exist yet, but its implications can be sketched. The first approach treats AI as a one-time adoption wave, whose benefits diminish once diffusion is complete, helping explain why demographic drag reasserts itself over longer horizons. If AI instead generates new knowledge and accelerates

scientific discovery, the productivity gain would take the form of a lasting increase in trend growth rather than a temporary surge. This increase would compound over time rather than dissipate in the late 2030s; projected paths would shift upward permanently rather than converge back to the demographic baseline. Knowledge-generating AI would also operate through a channel that adoption-based frameworks treat as fixed. Aging slows growth partly because older societies produce fewer new ideas; AI that automates aspects of research could weaken the link between age structure and innovative capacity.

A scenario in which AI increases knowledge generation could more than offset the impact of demographic decline in some countries. It could also widen regional inequality. Knowledge generation depends even more than adoption on frontier talent, research systems, and data and computing infrastructure. Its gains would likely vary more with AI preparedness, approaching a winner-takes-most dynamic rather than the catch-up process assumed under the first approach. Under such a scenario, the region's better-prepared economies might avoid demographic stagnation altogether, whereas lagging economies would fall farther behind both the global frontier and their regional peers. Investments in AI preparedness would matter even more in this approach than under the first one.

AI is not a substitute for demographic adjustment, but it is an important policy lever. The

binding constraint across the region is preparedness investment rather than access to technology. EU member countries in the region (Bulgaria, Croatia, Poland, and Romania) could plausibly use AI as a demographic offset if investment in retraining and enterprise-level adoption is sustained. The Western Balkans and the economies of Eastern Europe and the South Caucasus must first close gaps in digital infrastructure and reduce the emigration of young skilled workers before an AI dividend can emerge. Central Asia retains a demographic buffer until aging accelerates after 2040. It should use that period to strengthen the STEM, digital, and regulatory capacity that a later adoption wave will require. Countries that use the coming decade as a preparation window can make an unavoidable demographic transition more manageable. Countries that delay such preparation will see the technology arrive without the capacity to benefit from it.

Section 4: From Diagnosis to Action: Enabling AI to Work for ECA

ECA is exposed to AI but not using it intensively, missing out on the opportunities it can yield. The gap in ECA is one of capability rather than access; returns therefore lie in building absorptive capacity rather than in acquiring the technology itself, which markets are already delivering. The central lessons of the *World Development Report 2026* (World Bank 2026b) are that AI's value depends on the foundations that allow it to be used safely and effectively and that its full potential to raise productive capabilities will be realized only when the required analog and digital complements become widespread.

Governments can shape AI in three capacities: as enablers, users, and regulators. As enablers, governments can establish the complements that allow productive adoption and adaptation by the private sector. As users, they can leverage their position as anchor customers and wield buying power to support solutions adapted to local needs. As regulators, they can build on existing legal instruments and voluntary standards rather than starting from scratch.

Passivity is not an option. As stated in the *World Development Report 2026*, developing economies cannot afford to watch new AI technologies from the sidelines, since the costs of defensiveness in earlier waves of innovation proved too high. And it is equally clear about where the realistic ambition lies for most countries, recommending strategies “in which adaptation is the mainstay” and noting that advancement cannot form a large part of an AI strategy for most economies. ECA's position maps closely onto this: for the great majority of the region, adoption and adaptation are where the near-term gains sit, with frontier advancement relevant to a narrow subset. Five priorities follow from that diagnosis.

Priority 1: Build the foundations for adoption and adaptation. Policy makers need to support (a) affordable compute access, delivered through

mechanisms such as cloud credits rather than only through sovereign facilities; (b) foundational literacy, numeracy, and critical thinking, alongside managerial capability, without which tools go unused; and (c) the provision of government data that are AI-ready, so that public systems can both use AI and crowd in local solutions through procurement.

Priority 2: Manage the transition equitably. Active support should be provided for workers in highly exposed occupations. Attention should be paid to sectors such as caregiving, which are least easy to automate and where opportunities for job creation may arise. Governments should avoid tax and regulatory arrangements that make it cheaper to replace than to employ workers, except when substitution is desirable because of demographic changes or because of occupational quality. An AI value chain concentrated among a few providers creates dependency risks; keeping markets contestable—so that smaller domestic firms can access AI tools on reasonable terms and adopt them without being locked into a single provider, for instance by enforcing interoperability rather than only sovereignty—is part of the same equity question.

Priority 3: Govern and finance the transition. Alignment with emerging AI governance regimes should be selective rather than wholesale. Arrangements should be adopted that are suited to the region's smaller countries. The potential erosion of the tax base driven by AI adoption may require governments to change their taxation regimes.

Priority 4: Address the constraints to advance AI. For the set of economies which are in a position to push the frontier of AI, R&D investment and insolvency reform that permits survivable failure matter most. Scaled-up finance, the absence of which stalls firms before they mature, is also critical. The same set of constraints matters also for those economies where adaptation is a prerequisite for adoption.

Priority 5: Ensure that the private sector leads on adoption, adaptation, and innovation, with public action clearing the way rather than substituting for it.

As AI evolves rapidly, policy makers need to adapt and continually reevaluate their approaches. The use and power of AI a year ago were very different from what they are today; it is difficult to predict where this technology will be a year from now, let alone in the long term. State capacity to shape and implement policies will be a key determinant of how governments respond to the changing economy. Policy makers should avoid overregulating the use of AI, which could stifle innovation and adoption, hurting business dynamism and competitiveness.

Priority 1: Build the Foundations for Adoption and Adaptation

For most ECA countries, the immediate bottleneck is not the technology itself but the infrastructure, skills, and business environment needed to use and adapt it where necessary. These foundations are sequential: Connectivity and compute access are prerequisites for AI deployment, data availability must come before adaptation efforts can be fruitful, basic literacy and numeracy before AI-specific training yields meaningful returns, and improvements in organizational capacity before firm-level adoption (World Bank 2026b).

Access to infrastructure and compute

Governments should move beyond broadband coverage metrics and invest in affordable compute access that allows SMEs and public institutions to engage with AI, not just connect to the Internet. Access can come from cloud credits, shared computing facilities, and regional aggregation of demand. Viability gap financing models for first-, middle-, and last-mile connectivity are being scaled in Kazakhstan and deployed as part of Ukraine's reconstruction effort; cross-border and Black Sea submarine cable investments are expanding backbone capacity for Romania, Moldova, and Ukraine.

A prerequisite for these investments is a demand assessment: understanding which firms, sectors, and government entities have workloads that justify shared compute infrastructure and at what scale. The World Bank is piloting fit-for-purpose public-private partnership models for data and AI compute to do so country by country, ensuring that infrastructure commitments are sized to actual demand rather than aspirational projections.

Smaller countries with limited compute capabilities should establish digital embassies to access the necessary compute power for local demand. Estonia's digital embassy in Luxembourg hosts critical back-ups and data while maintaining sovereignty through identification, authentication, and access to records. The model can be extended by applying a similar structure for compute and AI infrastructure.

Advance purchase commitments by governments can help bring data infrastructure investments.

An example of this is Estonia's commitment to purchase up to €20 million of AI computing services for government use between 2028 and 2032 from a supplier that establishes data center operations in the country.³ This can help expand local supply while relying on market incentives, avoiding some of the risks associated with governments directly investing in and operating large compute infrastructure themselves.

Skills to adopt and adapt

Foundational literacy and numeracy gaps must be addressed alongside, not after, AI-specific training.

The returns to AI upskilling are limited where these building blocks are absent. The relevant foundations extend beyond literacy and numeracy to critical thinking: the capacity to formulate problems, evaluate AI-generated information, verify sources, and judge when AI should not be used—skills whose value rises in a world of abundant, unverified information. The results from PISA 2025 underscore both the urgency and the regional differentiation of this agenda: performance in reading, mathematics, and science, with some notable exceptions like Georgia, Montenegro, Türkiye, and Uzbekistan, has declined in most ECA countries since 2022, continuing a longer-term deterioration that predates the pandemic, and the size of foundational-skill gaps varies widely across the region's subregions. AI tools can be used to improve foundational skills, but educational systems need to be ready for them (box 2.3). The complementarity of skilled workers and AI tools underscores the importance of education in equipping the future workforce with high-quality skills.

3. "Estonia is committing to buy AI compute that no supplier has built yet," ai4dev, August 11, 2026. <https://ai4dev.ai/posts/estonia-is-not-building-a-data-centre/>.

BOX 2.3 Using AI to improve students' foundational skills: How to make ECA educational systems AI-ready

AI tools can help improve foundational skills. Adoption should be judged by three metrics: use, effectiveness, and scalable impact. AI tutors can raise immediate task performance, but unguarded systems may weaken unaided learning by supplying answers directly. This risk is no longer hypothetical: PISA 2025 shows that students who use AI most intensively have the weakest performance, and quasi-experimental evidence from China finds that generative AI adoption raised homework scores while substantially lowering exam performance, with losses concentrated among students who outsourced rather than engaged (OECD 2026; Stromberg, Lei, and Wu 2026). PISA also reports declining school preparedness for digital learning since 2022 and shows that opportunities to critically assess AI-generated information are unevenly distributed, with socioeconomically disadvantaged students least likely to encounter them—so effective use, not access, is the emerging divide. Stronger models of AI adoption in student use embed tutoring in instruction, align it with the curriculum, require students to attempt to solve problems before receiving hints, explain errors, gradually withdraw support, and leave teachers in control. Tools for lesson planning, assessment, and administration should improve teaching or learning, not simply save time. Readiness therefore means having the governance, capacity, infrastructure, and evidence needed to select tools that produce durable foundational learning.

A World Bank study of Bulgaria, Romania, and Türkiye (Almeida et al. 2026) reveals a persistent gap between national ambition and classroom practice. Across the three systems, strategies, platforms, and growing EdTech ecosystems coexist with limited teacher and student competence, weak translation of strategy into funded implementation, fragmented public and private coordination, and no institutionalized demand for evidence on learning and cost-effectiveness. High-stakes examinations remain weakly aligned with digital competence and AI literacy, limiting incentives for schools to integrate these skills systematically. Governments should assess readiness across institutional

coordination, data governance, sustainable infrastructure, workforce capacity, and effective safeguards rather than treating strategies, platforms, or pilots as evidence of readiness at scale.

The first policy priority is to translate broad AI strategies into accountable governance. Implementation should be assigned to an accountable institutional owner, supported by a technical coordination mechanism with defined decision rights, responsibilities, resources, and annual deliverables. Initial implementation measures could include a registry of AI systems used in schools; common technical and approved-use standards; and a monitoring framework that measures access and use, implementation quality, learning outcomes, equity, safety incidents, and cost. Data-governance measures could define permitted purposes, collection, retention and deletion, access controls, security incidents, and lawful transfers. For applications that affect assessment or risk identification, qualified professionals should retain responsibility for high-stakes decisions, and clear review mechanisms should be available for automated outputs.

Second, governments need to treat teachers' capabilities and assessment incentives as core AI infrastructure. One-off training needs to be replaced with structured pathways from assessment of competence to progressively more advanced, practice-based competencies that are assessed and recognized through subject-specific practice, mentor feedback, and school-based coaching. Pre-service teacher education should cover these competencies. Teachers need to evaluate AI-generated content, protect student data, detect bias and hallucinations, redesign assignments, and determine when AI should not be used. Curricula and assessments should require students to verify sources, explain reasoning, and demonstrate foundational mastery without AI when appropriate. Well-designed national training platforms can support delivery at scale, but success should be measured through assessed performance and changes in classroom practice, not enrollment or course completion alone.

(continued next page)

BOX 2.3 (continued)

Third, an AI strategy must be an equity and implementation strategy. Governments should publish a minimum digital service level covering connectivity, device access, technical support, accessibility, local-language content, and low-bandwidth or offline operation. Schools below the minimum service level should receive targeted support while governments monitor access, use, learning, safety, and cost using the minimum lawful data required to identify geographic and socioeconomic disparities and barriers affecting vulnerable learners. Budgets should include cloud and model use, licenses, maintenance, content updates, technical support, teacher development, and device replacement every four to five years, with reporting total cost per student. Public platforms can broaden access only when they are interoperable and monitored for participation, learning, safety, cost, and equity across schools and learner groups.

Fourth, governments should apply a risk- and evidence-proportionate pathway. Applications capable of affecting learning or high-stakes decisions should progress through supervised testing, school pilots, independent evaluation, conditional procurement, controlled expansion, and post-deployment monitoring. Before testing, pilots should define their learning outcome, comparison strategy, duration, subgroup analysis, safety indicators, teacher workload measure, and total-cost threshold. Scale-up should require evidence of delayed, unaided learning, acceptable error rates, equitable effects, operational feasibility, and lifecycle cost. Procurement measures could include curriculum alignment, accessibility and bias testing, security documentation, interoperability, data portability, model-update procedures, and exit provisions. Innovation hubs can connect firms with educators, researchers, and public priorities while procurement and financing authorities retain responsibility for applying evidence, safety, and cost requirements.

Source: Based on Almeida et al. (2026).

At the advanced end, tertiary and vocational systems need reform to expand the supply and quality of IT and AI specialists. The shortage of business-oriented IT engineers—professionals who combine technical proficiency with the ability to translate business problems into AI applications—warrants specific attention.

For the current workforce, upskilling should run through two channels: firm-led training and public programs. Workers need the foundational and complementary skills that job postings consistently bundle with AI roles. Industry-led deep-dive skilling programs offer a replicable model for bridging the gap between foundational proficiency and AI-ready workforce capacity; Kazakhstan, Serbia, Uzbekistan, and Ukraine are implementing such programs. For workers outside such firm-led pathways—including those in exposed occupations who need to move—active labor market programs are the complementary channel, discussed under Priority 2.

Public co-financing of these investments is justified by a classic market failure. Both AI skills and their complements—cognitive, managerial, and digital capabilities—are transversal: they are portable across firms and sectors, so firms that train workers risk losing the returns to poaching and will systematically underinvest in them. Instruments that share training costs—co-financed programs or training tax incentives—address this underinvestment; support for firms' own adoption capacity is discussed under organizational capacity below.

Government's own skill capability constraint is as much about retention as training. Governments identify lack of staff skills as a key barrier to their own AI adoption, and in government IT departments the problem is compounded by civil service pay scales that cannot match market wages, making trained staff hard to retain. The choice of delivery model is therefore consequential: an in-house state-owned implementer or a dedicated

central digital agency can operate outside standard pay scales and build and retain skills within the state, while relying on the open market avoids the payroll problem but shifts the risk toward higher costs and vendor lock-in.

Data availability

Governments can act as anchor producers of locally relevant data (on health, agriculture and legal and regulatory matters, for example). They can help spur innovation in adaptation efforts by making structured public datasets available to firms and researchers at low cost relative to their potential returns. Doing so needs to be carefully aligned with strong data protection and cybersecurity mechanisms.

ECA governments can look to existing country-level roadmaps in which public data infrastructure is already being built with AI-readiness as an explicit design criterion. World Bank-supported investments are supporting public data systems in Kazakhstan, Uzbekistan, and Ukraine and the development of LLMs in Romania and Serbia.

Governments are encouraged to invest in the language-specific improvement of existing AI models, both to serve domestic markets and position ECA as a provider of localized AI applications for regional and global markets. Digitalizing old records and making digitalized records in local languages available to the models for the training of neural networks could help do so and can also serve as a public good to promote the development of local AI solutions, including small AI models suited to local languages and domains.

Organizational capacity of firms

Governments and industry associations could support firm-level technical assistance programs. Such programs can help non-tech firms in manufacturing, agriculture, logistics, and retail integrate AI into their processes.

Promoting management capabilities can expand the absorptive capacity of firms to integrate AI in their operations. Direct management consulting programs and infusion of managerial expertise from

abroad, especially for multinationals, can contribute to greater knowledge sharing. For family-owned businesses, addressing governance and succession issues can improve meritocracy in the firms.

These extension services could be delivered through small AI academies that replicate proven AI use cases in priority sectors and train non-tech firms to deploy them. This sector-specific, demand-anchored academy format is structurally close to what agricultural and manufacturing extension programs did for technology diffusion in earlier decades. It represents a scalable template for the broader ECA context.

Shared services extend capability to organizations that are too small to build it. Small firms cannot sustain the technical staff integration requires. Shared-service arrangements—common data models, pooled technical personnel, and reusable connectors—distribute a capability that individual organizations cannot justify. They are the only realistic model in countries with a predominantly small-firm economy.

Subregional differentiation

Different parts of the region require different approaches:

- **Central Asia.** Weight basic digital literacy and enterprise data systems ahead of AI-specific training, which yields little until foundations are in place. Kazakhstan differs: scale and connect what exists, using demand assessment to test whether domestic workloads justify shared compute, and pair any sovereign facility with cloud credits so SMEs can use it. Elsewhere, aggregate compute demand regionally rather than nationally, and deliver firm support through sectoral shared services given the predominance of small firms.
- **Central Europe.** With access largely in place, the constraint is intensive use. Target cloud credits at domestically owned SMEs, tied to a specific use case with technical assistance attached rather than issued as general vouchers. Prioritize AI-ready public datasets, where a

domestic supplier base already exists to build on them. Recruit AI academy cohorts from domestic suppliers to multinational anchor firms.

- **South Caucasus.** Strong digital capability among exposed workers sits alongside small domestic markets, favoring regional compute aggregation and cloud credits over national facilities. The region could be part of a Digital Middle Corridor, but financing and GPU access are the primary constraints. Digital public infrastructure—digital ID, payments, and data-sharing frameworks—is an equally foundational enabler, notably for finance. The skills agenda is dual: at the top, build business-oriented engineering capacity and managerial capabilities, paired with retention—competitive public-sector pay and conditions letting engineers build commercially at home; at the bottom, close the foundational and digital skill gaps of workers outside the exposed occupations, who face the widest deficits (World Bank 2026d).
- **Türkiye.** Scale an existing compute base and make Türkiye the one economy where domestic workloads plausibly justify substantial shared infrastructure on national demand alone, and the clearest candidate for fit-for-purpose PPP models. The country's large concentration of non-tech firms in manufacturing and logistics represents the region's largest addressable market for AI adoption. This makes firm-level technical assistance and management capability development key priorities for accelerating uptake. A curated solutions catalog with vendor accreditation (on the model of the Republic Korea's AI Vouchers or Spain's Kit Digital) and sectoral AI labs linked to organized industrial zones would target the SME segment where adoption lags most (Aşık et al. 2026b).
- **Ukraine.** Reconstruction makes AI readiness a design criterion rather than a retrofit. Sequence viability gap financing and cable investment so connectivity and compute access are built together. Extend existing AI-ready data work to administrative records being reconstituted, including digitalizing legacy records for

Ukrainian-language model improvement. Weight industry-led skilling toward remote and modular delivery given displacement and mobilization and treat public-sector retention as the most acute challenge in the region.

- **Western Balkans.** The combined gap between basic access and intensive use is the region's steepest, so run instruments in parallel rather than sequentially—cloud credits and shared compute alongside firm-level assistance. Regional demand aggregation has its clearest rationale here, since no single market justifies facilities at scale. Add retention to skills expansion, given proximate EU labor markets.

Priority 2: Manage the Transition Equitably

The inevitable transition that AI adoption will entail may be slower than what the headlines suggest but still disruptive. Aggregate employment effects that are modest and hard to detect can coexist with sharp, concentrated losses in particular occupations, firms, and regions. Managing that transition is not a matter of compensating the displaced after the fact; it requires building protection, retraining workers, and establishing labor market institutions before disruption arrives. Nor is managing the transition exclusively a matter of equity; it is also a matter of efficiency. Without adequate income support during job search, effective reskilling, and labor market institutions—including labor taxation—that do not obstruct movement between jobs, the reallocation of workers on which AI's productivity gains depend will simply not take place. Well-designed social protection is thus an input into an efficient transition, not merely a cushion against its costs.

Active labor market programs could target workers in high-exposure occupations. The focus should be on shifting transitions from substitution toward augmentation. For older workers and women, dedicated retraining and job-matching support are warranted, as the jobs that are most accessible and age-friendly are precisely the roles most exposed to displacement.

Making the workforce more resilient also implies identifying the sectors and occupations in which human involvement remains necessary. Caring, creativity, judgment, accountability, and social connection are all dimensions in which human presence remains essential. As ECA is aging rapidly, demand for caregiving is rising. It is among the least automatable of sectors. The care economy is complementary to economy-wide AI adoption and where government and training institutions have the opportunity to guide displaced workers to.

Workers with higher levels of education are most directly exposed to AI, but workers with lower levels of education will not remain insulated. As in previous technological transitions, displaced high-skilled workers will put pressure on the wages and employment of workers with lower skill levels, who may be pushed to the margins of the labor market. Dedicated support should be extended to vulnerable groups.

The AI transition calls for social protection conceived more broadly than assistance to the poor, with social insurance at its core. Because exposure is concentrated among educated workers whose displacement then cascades down the wage distribution, the relevant risk pool spans the entire workforce, not only its most vulnerable segments. Yet unemployment insurance—the region’s principal instrument for insuring workers against job loss—remains underdeveloped across much of ECA: some countries lack statutory schemes altogether, and where systems exist, eligibility restrictions often exclude workers with short tenures, the self-employed, and the informally employed, while benefits are calibrated to normal labor market conditions (Hari et al. 2026). Strengthening these systems goes beyond extending benefit duration for workers in retraining: it means broadening eligibility, including for workers in nonstandard employment, and connecting benefit receipt to job-search and reskilling services. Moreover, AI-driven restructuring may generate losses that are partial or correlate within occupations, sectors, and regions, whereas standard unemployment insurance was designed for idiosyncratic, individual-level risk. This strengthens the case for complementary instruments: partial unemployment insurance, wage

insurance that cushions displaced workers who accept lower-paid jobs, and carefully designed short-time work schemes that preserve viable job matches without propping up jobs the technology has made obsolete (Boeri and Cahuc 2023; Hari et al. 2026).

Governments should also review social protection frameworks to ensure that they do not exclude informally employed workers. These workers may also need support during occupational transitions triggered by AI adoption. This design gap is particularly acute in ECA countries with large informal sectors, such as Türkiye and countries in Central Asia.

Managing the transition equitably means protecting workers, not existing jobs—and letting substitution proceed where it raises welfare. The case for supporting displaced workers is not a case for slowing displacement itself. Where jobs are hazardous, physically punishing, or of poor quality, automation is a direct welfare gain. And demography strengthens the case: in a region where the working-age population is contracting and workers in many occupations are retiring faster than they can be replaced, AI-driven substitution is less a threat than a necessity.

Firms also face market risks in the transition. In interviews, firms flag risks that the current policy discussion does not fully address, including the consolidation of dominant market positions by early and successful AI adopters and growing dependency on specific platforms. These risks deserve attention, because they can lead to suboptimal market structures and productivity losses.

AI could concentrate markets rather than simply raise productivity across them. Interviewed firms in Croatia and Serbia revealed that they were motivated to adopt AI largely by fear that a competitor would move first and take the rest of the market with it rather than by an identified business case. Whether that fear is warranted is an open question, but the underlying dynamic is plausible: If AI raises productivity mainly in firms that already have the scale, data, and managerial capacity to deploy it, adoption will widen productivity dispersion. The

policy response should be not to limit the move to the frontier but to ensure that competition authorities develop the capability to recognize AI-driven concentration when it emerges.

Policy makers need to consider the risks of platforms. ECA firms overwhelmingly rent AI capability from a small number of foreign hyperscalers, who hold quasi-monopoly power in several regional markets, particularly where regulatory restrictions narrow the choice of provider. Interviewed firms report a steeply rising cost curve for compute once introductory credits expire. Policy can reduce the severity of that lock-in, even though the region is unlikely to substitute for foreign providers in the short term. Countries can require data portability and interoperable formats, so that switching remains technically feasible; set exit and migration terms in public procurement contracts that private buyers can then use as a template; and review the residency and sovereignty restrictions that narrow provider choice in the first place. An assessment of platform dependency should treat AI products and tools, models, computing, and storage of data separately, as each carries its own intrinsic dependency risk and alternatives.

Where governments build data centers and procure compute, the state becomes an allocator of a scarce input. Public ownership of data infrastructure may be warranted for countries with underdeveloped ICT markets. But if computational resources and data infrastructure are rationed, by scarcity or policy, governments should allocate on transparent and competitively neutral terms rather than granting priority to SOEs or national champions. There is a risk that dominant positions favored by government connections could be reinforced by unequal allocations of compute.

Subregional differentiation

Different parts of the region require different approaches:

- **Central Asia.** Large informal sectors leave conventional active labor market programs reaching only a fraction of affected workers, so the prior task is extending social protection

eligibility beyond formal employment before disruption arrives. Direct exposure is lower, but displaced higher-skilled workers will press on wages at the bottom, warranting support for vulnerable groups rather than exposed occupations alone. Where states allocate scarce compute, allocate on transparent, competitively neutral terms rather than favoring state-owned enterprises.

- **Central Europe.** Reorient active labor market programs toward jobs and occupations that are complementary to AI, informed by real-time monitoring of skills in demand. Introduce portable training entitlements so access does not depend on employer willingness, with targeted outreach to women and mid-career workers facing the highest displacement risk. Consider extending unemployment insurance duration for high-exposure workers undertaking certified retraining (World Bank 2026a).
- **South Caucasus.** Build employment services on integrated labor market information systems that publish skill demand and transition potential, using high-frequency vacancy data. Introduce individual learning accounts and mobility vouchers, with tax incentives for firms financing certified training. Target women, who are markedly more AI-exposed than men, through modular courses with childcare support. Finance retraining through unemployment insurance funds and adapt just-transition models to digitalization (World Bank 2026d). Reskilling efforts should be coupled with workforce retention incentives. On the firm side, small markets make platform dependency acute: few providers serve them, switching costs are high, and residency restrictions narrow choice further. Competition authorities in markets this small need capability to assess concentration that may originate outside the jurisdiction.
- **Türkiye.** Improve labor market adjustment through reskilling, career guidance and strengthened employment services, with targeted support for women, youth, and overqualified workers—including a narrowly

targeted adjustment support scheme combining temporary income support with mandatory counseling, retraining, and placement, rigorously evaluated before scale-up. A modern labor market information system integrating administrative, vacancy, and job-posting data is the key institutional gap for targeting this support. Substantial informality makes extending social protection coverage beyond formal employment the binding constraint, and rising care demand offers a destination for displaced workers (Aşık et al. 2026b).

- **Ukraine.** Displacement, mobilization and reconstruction make labor market institutions the binding constraint and rebuilding them creates an opening to design coverage for informal and displaced workers from the outset rather than retrofitting. Retraining should be sequenced against reconstruction labor demand.
- **Western Balkans.** EU market proximity means both displacement pressure and outward mobility for exposed workers, so retraining competes with emigration and must be paired with retention. Build integrated labor market information systems to track in real time the evolution of skill demand. In active labor market programs, emphasize the opportunities of sectors which may be complementary to AI—such as the care economy (Johansson de Silva and Santos 2026).

Priority 3: Govern and Finance the AI Transition

Governance is often treated as the brake on AI and taxation as an afterthought. However, for ECA, these may be better understood as determinants of how the region can finance and sustain the transition. Excessive regulation ahead of adoption and adaptation may be counterproductive. Governance frameworks shape the possibilities for compute investment, for regulatory alignment with the EU, and the capacity of public sector institutions to adopt AI themselves. Moreover, the way governments tax will need to shift both to reflect changes in the tax base and to finance the AI transition costs.

Institutional credibility as the binding constraint on compute investment

The substantial investments needed to close the compute gap hinge on institutional credibility. Simply having low-cost energy does not mean that compute and data capacity will be quickly set up. The capital cost of hardware for data centers is substantial, and no investor will sink its money into an institutional environment without regulatory certainty. Governance failures raise financing costs, which swamp any underlying comparative advantage a country may have in terms of energy or human capital.

Regulatory credibility is fundamental. Stable power purchase agreements, transparent procurement, and credible long-term contracting can reduce the risk associated with substantial hardware investments. Data-adequacy status, mutual recognition agreements, and recognized cloud security certifications can attract business from potential foreign customers, whose demand may be needed to ensure a viable scale.

Geopolitical considerations also matter for large compute investments. The supply of critical hardware, such as GPUs, is concentrated in a handful of countries. Investments in large data centers will be possible only if access to that hardware is permitted. Countries should therefore be mindful of how they navigate the geopolitical context if they want to expand their local compute capacity.

EU alignment as a calibrated choice

The EU led the world in establishing comprehensive regulation to protect its citizens by restricting how AI is used, regardless of whether it is within or outside the union. Uses of AI for social scoring, biometric categorization, subliminal or manipulative techniques to distort behavior, emotion recognition in workplaces and schools, and crime-risk profiling are already banned. High-risk uses of AI such as AI embedded in products, or deployed in processing of biometric data, critical infrastructure, employment, credit scoring, or law enforcement will be subject to a risk management system, data governance framework such as quality and bias checks on training data, technical documentation,

human oversight mechanisms, record-keeping, and cybersecurity requirements which are expected to come into full effect by December 2027.

For non-EU member governments, alignment with EU AI governance frameworks should be seen as a strategic leveler to be used judiciously rather than a default to adopt wholesale. Alignment with EU AI governance frameworks can allow expanded access to European service markets and help attract investment. Firms that want to provide services in EU markets have to meet EU requirements. Adopting the EU framework as national law, however, extends those obligations to firms and services with no EU exposure, imposing compliance costs and narrowing the range of AI models and tools they can deploy. The goal should be to preserve freedom and optionality over the AI technologies firms can access, which premature or comprehensive alignment can reduce.

The pragmatic path for most non-EU ECA economies is selective and sequenced. Governments can enable EU-facing firms to align where the market payoff is clear. Data-adequacy agreements, for example, can open access to the services market. Governments can rely on existing legal instruments of competition law, data protection, and labor regulation to address the most salient AI risks domestically, reserving fuller alignment for areas where market access makes it worthwhile or unavoidable.

Governance of public sector adoption of AI

The principle of “procuring only what you can govern” is especially relevant for ECA governments adopting AI in public services. Procurement choices depend on the level of government readiness for AI solutions. When system complexity exceeds operational capacity, cost overruns prevail and implementation fails. Avoiding vendor lock-in, maintaining audit trails, and preserving exit options should be embedded in public procurement frameworks for AI tools.

For workers in the public sector, transparency requirements should be incorporated into existing labor frameworks rather than waiting for stand-alone AI legislation. These requirements should

cover algorithmic decision-making disclosure and the right to human review in high-stakes settings.

The legal basis for reusing administrative data requires resolution before public AI can scale. Governments hold data collected under specific statutory purposes. Using it to develop or operate AI systems requires an explicit legal basis under frameworks that are aligned with General Data Protection Regulation (GDPR).

Adapting the financing of government

AI creates a twofold challenge for government finances. Reliance on foreign-owned compute, cloud, and model services, as well as the wide adoption of a labor-saving technology, will erode the domestic tax base, and the fiscal needs of the social protection system to address the labor market consequences of AI adoption will increase.

Shifting more of the tax burden onto corporate income can make the system fairer and accommodate the erosion of labor-based income taxes. Corporate income taxes are typically ranked as one of the most distortive taxes, but that ranking assumes constant factor shares. Estimates for Poland indicate that a 2-percentage-point increase in the effective corporate income tax rate in the context of AI adoption can generate enough revenue to reduce government borrowing and crowd in private investment through lower interest rates, more than offsetting the disincentive effect of higher taxation on profits (World Bank 2026a). In any case, any changes to corporate income taxation would need to be carried out with an understanding that global coordination on this matter is fundamental, and that countries also need to have the administrative capacity (and, presumably, political space) for such reforms.

Tax authorities should distinguish between taxing early-stage risk capital and taxing the rents of incumbent foreign platforms. ECA lacks sufficient venture capital to allow start-ups to scale up. Any increase in taxation of capital should therefore make sure not to discourage early-stage risk capital investments.

Alternative tax instruments, such as a digital services tax, should be considered. Korinek and Lockwood (2026) suggest that in the medium term, governments can tax consumption of AI services and AI-enabled export earnings. Poland has announced plans to implement this type of digital services taxes.

Subregional differentiation

Different parts of the region require different approaches:

- **Central Asia.** Focus on institutional reform: independent regulators, sanctity of contracts, transparent procurement, and stable long-term power purchase agreements. Pursue cloud security certification and data-adequacy status to reach viable scale for foreign-facing data centers.
- **Central Europe.** As governance-takers within the EU framework, the task is implementation capacity rather than framework design—supervisory capability, SME compliance support, and resolving the legal basis for administrative data reuse under GDPR before public-sector AI scales. On financing, accommodate erosion of labor-based revenues by rebalancing toward capital and consumption.
- **South Caucasus.** Institutional reform is also key, particularly if export of data center services is to be prioritized, since financing costs, not energy prices, may be what price small markets out of compute investment. An explicit AI strategy, with one institutional anchor, should coordinate public, private, and cross-border efforts. Improve adoption capacities of government institutions, which lag considerably behind that of the private sector.
- **Türkiye.** Scale permits governance choices unavailable elsewhere in the region: selective alignment calibrated to EU-facing sectors rather than economy-wide, addressing domestic risks through existing competition, data protection and labor instruments. Market size supports genuine provider competition, making portability requirements and procurement exit terms effective rather than nominal.
- **Ukraine.** EU accession sets the direction, so alignment is a sequencing question rather than a strategic one—prioritize data adequacy and the instruments unlocking market access and investment credibility. Reconstruction volumes make public procurement unusually influential: embedding audit trails, exit options and lock-in avoidance in contracts now will shape private practice.
- **Western Balkans.** The strategic case for EU alignment as a market-access and investment-credibility lever is strongest here, and accession makes it sequenced rather than optional. Where state-level coordination for these reforms is difficult, subnational entities can carry strategy development in the interim, though EU accession will ultimately require a coherent state-level framework (Hurtic 2026). On financing, the labor-tax dependency common to the region argues for rebalancing toward capital and consumption, alongside exploring taxation of AI service consumption.

Priority 4: Enable Adaptation and Advancement

Adoption of AI alone will not close the gap with the frontier. Some ECA economies have the ability to adapt AI to local needs at scale and, in a few cases, reach or even extend the frontier. To do so, they need to increase research capacity, attract risk capital, and create rules that permit experimentation and tolerate failure.

A pipeline of AI projects can be possible only with solid R&D to back it. ECA's research base is thin. Public R&D spending is low relative to both the EU average and the region's own ambitions, and it is concentrated in institutions with weak links to industry. Building research universities of international standing is a decades-long undertaking. In the short to medium term, countries could benefit from competitive research funding, international collaboration, and career structures that discourage researchers from leaving for other countries.

AI start-ups in ECA need funds to scale. The region's venture capital ecosystem is shallow, dominated by early-stage tickets; few investors are willing

to fund growth rounds, where AI firms become internationally competitive. Deepening the venture capital ecosystem requires addressing both supply and structure—by allowing pension and institutional capital to allocate to venture capital, establishing fund-of-funds arrangements that crowd in foreign investors, and revising the tax treatment of employee stock options, which determines whether start-ups can compete for talent against employers paying cash. Activating other forms of non-bank finance such as pension fund and insurance assets could provide the financing to scale up start-ups beyond the proof-of-concept stage.

Selectively stimulating demand can support adaptation efforts. Where firms perceive AI costs as prohibitive—and the interviews suggest that sometimes perception runs ahead of actual costs—targeted digital adoption grants can shift the calculation, particularly for smaller firms. Anderson et al. (forthcoming) show that schemes like the one implemented in Romania increase adoption of digital technologies even beyond the grant recipients. Indeed, the second-order effect matters more than the first: A larger base of adopting firms generates commercial demand for locally adapted tools, giving domestic AI developers a market to build for rather than leaving them dependent on public procurement or export.

Frontier activity requires failure to be survivable. Some ECA countries, particularly in Central Asia and the Western Balkans, have insolvency regimes that are slow, costly, and stigmatizing, discouraging both founders and investors. Insolvency reform is unglamorous and rarely framed as AI policy, but functioning bankruptcy procedures, reasonable discharge periods, and restructuring options are a precondition for the risk-taking that innovation requires.

Regulatory uncertainty deters experimentation. Regulatory sandboxes allow firms to test AI applications under supervision in sectors in which the rules were written for other technologies (such as finance, health, or transport) while giving regulators direct evidence of how the technology behaves before they legislate. Sandboxes with unclear entry criteria, long queues, or no route to authorization become bureaucratic obstacles rather than accelerators.

Subregional differentiation

Different parts of the region require different approaches:

- **Central Asia.** With the thinnest private-sector base, adaptation rather than advancement is the realistic ambition. “Small AI” is a form of adaptation that could be particularly useful for some of the countries in the region. These models can be fine-tuned for regional languages and local domains where frontier models perform poorly, keeping data in-country (World Bank 2026b). Countries like Kazakhstan, which is pursuing the development of local LLMs and betting on pushing the frontier, should make sure that innovation aims at generating value to the growing private sector.
- **Central Europe.** The deepest ecosystems in the region make this subregion one where advancement is partly realistic, so weight instruments toward scale-up finance: pension and institutional capital allocated to venture, fund-of-funds structures crowding in foreign investors, and stock option tax treatment that lets start-ups compete for talent. Strengthen industry–university links through competitive research funding.
- **South Caucasus.** Growing tech sectors can anchor local AI capacity, with diaspora networks—strongest for Armenia and Georgia—providing knowledge flows worth deliberately channeling through return-and-collaboration schemes. The binding constraint is capital, not ideas: markets this small lack growth-stage institutional investment, so the priority is instruments that attract foreign institutional capital into these markets—co-investment vehicles and regional funds—rather than additional incubation. Public-sector demand, used as anchor procurement, can seed domestic digital industry and talent.
- **Türkiye.** Scale gives Turkish-language adaptation genuine commercial viability without export dependence, providing a strong case for a domestic developer base building on

open-weight models. Deepen growth-stage capital, where the constraint binds harder than early-stage. Regulatory sandboxes in finance and health have enough market depth here to attract serious entrants, provided entry criteria are clear and a route to authorization exists. Selective adoption grants could widen the commercial market for locally adapted tools. Address the binding constraint of talent: Türkiye is a net exporter of AI professionals, so a focus on researcher retention (competitive supplements, industry-linked fellowships) and diaspora engagement could be welcomed. Export incentives for IT services should be complemented by credits tied to domestic AI product development (Aşık et al. 2026b).

- **Ukraine.** Reconstruction could generate unusual public demand, making government the most consequential anchor customer in the region—procurement should be structured to build domestic adaptation capacity rather than only to buy solutions. Sandboxes offer a route to test applications in sectors being rebuilt. Retaining researchers and founders through the transition is the binding constraint.
- **Western Balkans.** Growing tech sectors and EU proximity create knowledge flows, but insolvency regimes remain slow, costly and stigmatizing, deterring founders and investors alike—reform here is a precondition for the risk-taking adaptation requires. Expansion of the financing ecosystem is also necessary. Regional coordination on research funding and sandboxes compensates for individual markets lacking scale.

Priority 5: Make the Private Sector the Engine of Adoption, Adaptation, and Innovation

The AI transition depends entirely on private sector adoption. Every gain this chapter identifies—productivity effects, export opportunities, the offset to demographic decline—materializes only if firms adopt AI, adapt it to their processes and markets, and over time innovate with it. This priority therefore cuts across the first four priorities, because

the test of every recommendation in this section is whether it makes firm-level adoption more likely. Compute access matters because firms cannot experiment without it, managerial capability matters because firms cannot deploy without it, and governance matters because uncertainty deters investment.

Government's role is to remove what stands in the way, build what markets will not supply on their own, and then let firms move. Government officials rarely possess the granular, real-time market knowledge of private actors, and they do not bear the risk of failure. Where the state does act directly—as an anchor customer, co-financier of training, or guarantor of risk that private capital will not absorb alone—it should do so to enlarge the space in which firms operate, not to substitute for them. Support that is not consistent with market discipline, that fails to promote a level playing field for all enterprises, or that erodes the contestability of markets will be a liability for countries (World Bank 2026e). Firms must be at the table when policy is made, not consulted after policy is drafted, as they understand what constrains adoption.

The private sector as driver of policy changes

Private firms should be engaged constructively in regulatory consultations. Voluntary industry standards are a good starting point for AI governance; governments are encouraged to allow the private sector to develop them. Where voluntary standards are not suitable, governments have much to gain by keeping the private sector, including multinationals and platform companies operating in ECA, in the loop.

Responsible private sector conduct is critical. Adhering to transparency standards, including disclosure of training data sources and algorithmic decision-making processes, can ensure that the private sector remains a trusted partner of society in shaping the AI regulatory framework.

The private sector as investor in skills

Firms should partner with the government in delivering AI-related training. Evidence from both quantitative surveys and firm interviews indicates that firms perceive inadequate workforce

skills as one of the main barriers to AI adoption. The government and the private sector should join forces in addressing these skill deficiencies, with the government providing the foundational and transferable skills that make workers productive overall in an AI-driven economy and firms providing the hands-on training in AI that is specific to their needs.

The government and the private sector can collaborate in many ways to develop workforce skills. Sector educational associations are co-financing training schemes, and public-private skills partnerships can help narrow the AI skills gap.

The private sector as builder of local AI capacity and provider of capital

Tech firms and AI developers in ECA are best placed to develop the localized applications, datasets, and sector-specific tools that generic AI models cannot provide. The firm interviews suggest that this capacity already exists in pockets, with domestic developers building tools adapted to local languages, regulatory requirements, and sector-specific workflows that foreign vendors have little commercial incentive to serve.

Government procurement can play a catalytic role. The government can act as an anchor customer for locally developed AI solutions in health, education, and public administration, reducing the market risk of early-stage development. This role is important, because the need for efficient procurement processes is amplified given the volatility in the cost of AI and AI-associated products, such as computer chips.

Procurement is not the only instrument governments can use. Other operational models—including digital marketplace programs, such as those being implemented in Serbia and Ukraine, and support to IT parks, as provided through the Astana Hub in Kazakhstan and similar parks in Uzbekistan—represent government-catalyzed ecosystems in which private firms are the primary builders of local digital capacity. Governments can also help the private sector, particularly AI startups, to increase their scale by acting as a bridge to international markets through promotion activities and accelerator programs focused on exports.

Private capital can play a much more significant role if governments reduce the risk that deters investment in compute and connectivity. Guarantee and risk-sharing instruments that absorb political and noncommercial risk can make otherwise unbankable infrastructure attractive to private investors. Blended-finance vehicles that pool public and private capital can lower the effective cost of early-stage AI and data investments. Multilateral guarantee platforms are one channel for reducing risk.

Across countries, governments can coordinate to present private investors with a coherent regional opportunity rather than fragmented national ones. Pooled project pipelines and joint financing platforms by development partners reduce duplication and transaction costs and give private capital a larger, more legible market to invest in.

Subregional differentiation

Different parts of the region require different approaches:

- **Central Asia.** State-heavy economies risk crowding out the firms that must drive adoption, so the priority is competitive neutrality—public compute, data and procurement offered on terms open to private and state-owned firms alike. Where private capacity is thin, government demand should be structured to build a supplier base rather than to substitute for one. Structured engagement with the growing private sector needs building deliberately.
- **Central Europe.** The size of the private sector makes voluntary industry standards a credible starting point for governance, with firms carrying compliance capability that supervisors currently lack. Co-investment should run through the training system: employer co-financing under existing national training funds, with simplified procedures for SMEs where take-up is lowest. Business associations can make structured consultation genuine rather than nominal and should be used to identify regulatory blockages to adoption.

- **South Caucasus.** Small, relatively dynamic private sectors make industry-led standard-setting workable despite limited state capacity, and governments should lean on it rather than legislate ahead of evidence—as a bridge, not a substitute: where EU integration is the ambition, most clearly in Georgia, industry standards should be written to fold into the legislative alignment the *acquis* will ultimately require, not to defer it. Finance, the subregion’s most advanced adopter, can lead demonstration—within frameworks safeguarding operational resilience and consumer protection. Co-investment is most credible in skills, through firm co-financed demand-driven training. Anchor procurement matters disproportionately given market size but must avoid entrenching the handful of incumbent suppliers that dominate small markets.
- **Türkiye.** A large and diversified private sector can carry most of the transition unaided, so the state’s contribution lies in removing regulatory obstacles and ensuring contestability as adoption scales. Market depth supports genuine voluntary standards with real coverage. Co-investment should concentrate on the SME segment, where adoption lags the corporate sector most sharply, with grant design guarding against subsidizing large firms that would have adopted regardless.
- **Ukraine.** Reconstruction gives the state unusual weight as customer and financier, which makes crowding out a live risk rather than a theoretical one—procurement should be structured to build private capacity and avoid locking in a small set of favored suppliers. Firms operating through the transition hold information about what works that no ministry can generate, making structured engagement in reconstruction design a practical necessity rather than good practice.
- **Western Balkans.** Competitive pressure can drive adoption, so the binding task is keeping markets contestable rather than stimulating demand. Regional business associations can support standard-setting where individual markets lack scale. Co-investment in training is most credible with employer co-financing, and sunset clauses matter here given fiscal constraints and the persistence of legacy support to incumbents.

References

- Acemoglu, D. 2025. “The Simple Macroeconomics of AI.” *Economic Policy* 40 (121): 13–58. <https://doi.org/10.1093/epolic/eiae042>.
- Acemoglu, D., N. S. Mühlbach, and A. J. Scott. 2022. “The Rise of Age-Friendly Jobs.” *Journal of the Economics of Ageing* 23: 100416. <https://doi.org/10.1016/j.jeo.2022.100416>.
- Acemoglu, D., and P. Restrepo. 2017. “Secular Stagnation? The Effect of Aging on Economic Growth in the Age of Automation.” *American Economic Review* 107 (5): 174–79. <https://doi.org/10.1257/aer.p20171101>.
- Aghion, P., and S. Bunel. 2024. “AI and Growth: Where Do We Stand?” Policy Note, Federal Reserve Bank of San Francisco.
- Aksoy, Y., H.S. Basso, R.P. Smith, and T. Grasl. 2019. “Demographic Structure and Macroeconomic Trends.” *American Economic Journal: Macroeconomics* 11 (1): 193–222. <https://doi.org/10.1257/mac.20170114>.
- Aksoy, Y., and M. Lokshin. Forthcoming. “Aging, Artificial Intelligence, and Growth: Evidence from Eastern Europe and Central Asia.” Working paper, Birkbeck, University of London, and World Bank.
- Aldasoro, I., L. Gambacorta, R. Pal, D. Revoltella, C. Weiss, and M. Wolski. 2026. “AI Adoption, Productivity and Employment: Evidence from European Firms.” *BIS Working Paper 1325*, Bank for International Settlements, Basel. <https://www.bis.org/publ/work1325.htm>.
- Almeida, R., C. Avitabile, C. Cobo, and A. Muñoz-Nájar. 2026. “From Ambition to Impact: Closing the AI Readiness Gap in Europe and Central Asia’s Education Systems: Findings and Policy Priorities from Bulgaria, Romania, and Türkiye.” Education & Skills Working Paper 28, Washington, DC: World Bank.
- Anderson, S., A. Avdeenko, J. Espinosa-Balbuena, R. Chandy, L. Iacovone, and L.M. Marc. Forthcoming. “Digital Adoption Grants and Spillovers. Evidence from a Large Scale Randomized Field Experiment.” Policy Research Working Paper Series, Washington, DC: World Bank.
- Aşık, G.A., S. Hari, E.N. Ozen, and D. Raju. 2026a. “Artificial Intelligence and Labor Market Adjustment in Türkiye: Exposure and Complementarity.” Social Policy and Labor Discussion Paper 2704, Washington, DC: World Bank. <https://ideas.repec.org/p/wbk/hdnspu/213012.html>.
- Aşık, G.A., S. Hari, E.N. Ozen, and D. Raju. 2026b. “Artificial Intelligence and Türkiye’s Labor Market: Managing Exposure, Expanding Opportunity.” Social Policy and Labor Discussion Paper 2701, Washington, DC: World Bank.
- Autor, D., T. Rodchenko, J. Martin, Z. Iscenko, S. Strand, D. Pearl, and M. Ferere. 2026. “Does AI Assistance Enhance or Erode Expertise? Evidence from a Three-Month Field Experiment in Patent Drafting.” *NBER Working Paper 35720*. <https://doi.org/10.3386/w35720>.
- Bloom, N., H. Schweiger, and J. Van Reenen. 2012. “The Land That Lean Manufacturing Forgot? Management Practices in Transition Countries.” *Economics of Transition and Institutional Change* 20 (4): 593–635. <https://doi.org/10.1111/j.1468-0351.2012.00444.x>.
- Blum, F. Forthcoming. “Macroeconomic Impacts of AI in Europe and Central Asia.” ECA Policy Note, Washington, DC: World Bank.
- Boeri, T., and P. Cahuc. 2023. “Labor Market Insurance Policies in the Twenty-First Century.” *Annual Review of Economics* 15: 1–22. <https://doi.org/10.1146/annurev-economics-082322-035621>.

- Börsch-Supan, A., and C. Coile. 2025. *Social Security Programs and Retirement around the World: The Effects of Reforms on Retirement Behavior*. Chicago: University of Chicago Press for the National Bureau of Economic Research. <https://www.nber.org/books-and-chapters/social-security-programs-and-retirement-around-world-effects-reforms-retirement-behavior>.
- Brynjolfsson, E., D. Li, and L. Raymond. 2025. “Generative AI at Work.” *Quarterly Journal of Economics* 140 (2): 889–942. <https://doi.org/10.1093/qje/qjae044>.
- Cazzaniga, M., F. Jaumotte, L. Li, G. Melina, A.J., Panton, C. Pizzinelli, E.J. Rockall, and M.M. Tavares. 2024. “Gen-AI: Artificial Intelligence and the Future of Work.” IMF Staff Discussion Note 001, International Monetary Fund, Washington, DC. <https://doi.org/10.5089/9798400262548.006>.
- Cirera, X., D. Comin, M. Cruz, and K. Lee. 2026. “AI Adoption in Developing Countries: Lessons from the Adoption of other Advanced Digital Technologies.” Background paper for the *World Development Report 2026: The Promise of Artificial Intelligence*.
- Davies, E., D. Francis, F. Jolevski, G. Nayyar, K. Stapleton, and S. Yu. 2026. “Adopting Fast and Slow: Cross-Country Evidence on Business Adoption of Artificial Intelligence.” Background paper for *World Development Report 2026: The Promise of Artificial Intelligence*.
- Deming, D.J., and K. Noray. 2020. “Earnings Dynamics, Changing Job Skills, and STEM Careers.” *Quarterly Journal of Economics* 135 (4): 1965–2005. <https://doi.org/10.1093/qje/qjaa021>.
- Demir, B., A. Grover, and P. P. Panigrahi. Forthcoming. “Firm Adoption of AI and Labor Market Outcomes: Evidence from Matched Employer-Employee Data in Türkiye.”
- Felten, E.W., M. Raj, and R. Seamans. 2023. “Occupational Heterogeneity in Exposure to Generative AI.” SSRN Scholarly Paper 4414065, Social Science Research Network. <https://doi.org/10.2139/ssrn.4414065>.
- Garicano, L., J. Li, and Y. Wu. 2026. “Weak Bundle, Strong Bundle: How AI Redraws Job Boundaries.” Discussion Paper 21453, Center for Economic Policy Research, Washington, DC. <https://cepr.org/publications/dp21453>.
- Gmyrek, P., M. Viollaz, and H. Winkler. 2026. “Disruption without Dividend? How the Digital Divide and Task Differences Split GenAI’s Global Impact.” Background paper for *World Development Report 2026: The Promise of Artificial Intelligence*. <https://doi.org/10.1596/1813-9450-11328>.
- Hari, S., S. Laporsek, I. Santos, and M. Vodopivec. 2026. “Stress Testing Unemployment Insurance and Labor Market Programs.” Social Policy and Labor Discussion Paper 2630, Washington, DC: World Bank.
- Hartley, J., F. Jolevski, V. Melo, and B. Moore. 2024. “The Labor Market Effects of Generative Artificial Intelligence.” SSRN Scholarly Paper 5136877, Social Science Research Network. <https://doi.org/10.2139/ssrn.5136877>.
- Hurtic, Z. 2026. “Bosnia and Herzegovina’s AI Strategy and Digital Transformation. An Overview of the State of Development and Key Challenges.” Background note prepared for this report.
- Iacovone, L., H. Aviomoh, M. Belacin, L. Bossavie, A.P. Cusolito, H. de Hoyos, G. Ottaviano, F. Scheifele, I. Torre, and Y. Yoshino. 2025. *TIDES of Change: Igniting Productivity Growth in Europe and Central Asia*. <https://doi.org/10.1596/978-1-4648-2287-2>. Europe and Central Asia Studies. Washington, DC: World Bank.
- Iacovone, L., I. Izvorski, C. Kostopoulos, M. Lokshin, R. Record, I. Torre, and S. Doczi. 2025. *Greater Heights: Growing to High Income in Europe and Central Asia*. Europe and Central Asia Studies. Washington, DC: World Bank. <https://doi.org/10.1596/978-1-4648-2206-3>.
- Johansson de Silva, S., and I. Santos. 2026. *Long-Term Care in the Western Balkans: Investing in Better Lives and More Jobs*. Washington, DC: World Bank.

- Jolevski, F., and I. Torre. Forthcoming. *Decomposing Artificial Intelligence*. Unpublished manuscript. Washington, DC: World Bank.
- Korinek, A., and L.M. Lockwood. 2026. "Public Finance in the Age of AI: A Primer." In *The Economics of Transformative AI*. Chicago: University of Chicago Press for the National Bureau of Economic Research. <https://www.nber.org/books-and-chapters/economics-transformative-ai/public-finance-age-ai-primer>.
- Lewandowski, P., K. Madoń, and A. Park. 2025. "Workers' Exposure to AI across Development Stages." IZA Discussion Paper 18235, IZA Institute of Labor Economics, Bonn. <https://www.iza.org/publications/dp/18235/workers-exposure-to-ai-across-development-stages>.
- Lokshin, M. 2026. "Cheap Energy Might Not Be Enough: A Trade Model of AI Compute Services." World Bank Policy Research Working Paper 11426, Washington, DC: World Bank. <https://doi.org/10.1596/1813-9450-11426>.
- Lokshin, M., and F.J. Valverde Rodriguez. Forthcoming. "Does Making Jobs More Age-Friendly Help Older Workers? Sorting, Gender, and AI in Eastern Europe and Central Asia." Social Policy and Labor Discussion Paper Series, Washington, DC: World Bank.
- Lundy, T., M. Ramos-Maqueda, S. J. Patel, D. Rogger, F. Sacco Capurro, and J. Silva Fuentealba. 2026. "How Is Government Using Artificial Intelligence?" Background paper for *World Development Report 2026: The Promise of Artificial Intelligence*.
- OECD. 2026. *PISA 2025 Results (Volume I): Future-Ready Students*. PISA, OECD Publishing, Paris, <https://doi.org/10.1787/73451bc5-en>.
- Pizzinelli, C., A. J. Panton, M. Mendes Tavares, M. Cazzaniga, and L. Li. 2023. "Labor Market Exposure to AI: Cross-Country Differences and Distributional Implications." IMF Working Paper WP/23/216, International Monetary Fund, Washington, DC.
- Richmond, A.M. 2026a. "The AI Jobs Transition Framework." OpenAI Economic Research. <https://openai.com/index/modeling-ai-jobs-transition/>.
- Richmond, A.M. 2026b. "The AI Jobs Transition Framework for the EU." OpenAI Economic Research. <https://openai.com/index/mapping-ai-jobs-transition-eu/>.
- Smeets, E., L. Olarte, J. Guaqueta, and D. Strusani. 2026. *AI Adoption Among Frontier Firms in FY26*. World Bank Group, Washington, DC.
- Soares Martins Neto, A., Liu, Y., Khunara, S., and J.M. Porras Lopez. 2026. "Click, Code, Earn : The Returns to Digital Skills." Policy Research Working Paper 11313, Washington, DC: World Bank. <https://doi.org/10.1596/1813-9450-11313>.
- Stephany, F., Mäkelä, E., Bone, M., Nanji, F., and M. Sehner, M. 2026. "Complement or substitute? How AI increases the demand for human skills." Research Square preprint. <https://doi.org/10.21203/rs.3.rs-8893293/v1>.
- Stromberg, D., V. Lei, and Y. Wu. 2026. "The Generative AI Learning Penalty: Evidence from Chinese Secondary Education." SSRN Scholarly Paper 6868618, Social Science Research Network. <https://doi.org/10.2139/ssrn.6868618>.
- UN. 2024. *World Population Prospects*. United Nations. New York.
- Wicht, A., S. Reder, and C. M. Lechner. 2021. "Sources of Individual Differences in Adults' ICT Skills: A Large-Scale Empirical Test of a New Guiding Framework." *PLOS ONE* 16 (4): e0249574. <https://doi.org/10.1371/journal.pone.0249574>.
- World Bank. 2025. *Digital Progress and Trends Report 2025: Strengthening AI Foundations*. Washington, DC. <https://doi.org/10.1596/978-1-4648-2264-3>.
- World Bank. 2026a. *Navigating the Age of AI: Implications for Poland's Economy. What AI Means for Growth, Firms and Jobs*. Washington, DC. <https://documents.worldbank.org/en/publication/documents-reports/documentdetail/099061826172092709>.

World Bank. 2026b. *World Development Report 2026: The Promise of Artificial Intelligence*. Washington, DC. <https://doi.org/10.1596/978-1-4648-2331-2>.

World Bank 2026c. *South Asia Economic Update: Working with Industrial Policy*. April. Washington, DC. <https://doi.org/10.1596/978-1-4648-2326-8>.

World Bank 2026d. *Skills for Change: Preparing the Armenian and Georgian Workforce for the Future*. Washington, DC. <https://doi.org/10.1596/44716>.

World Bank 2026e. *Industrial Policy, Europe and Central Asia Economic Update (April 2026)*. Washington, DC. <https://doi.org/10.1596/978-1-4648-2332-9>.

World Bank. Forthcoming (a). *Albania Trade and Competitiveness Diagnostic: Trading up for Productivity, Better Jobs, and Growth*. Washington, DC: World Bank.

World Bank. Forthcoming (b). *Serbia Trade and Competitiveness Diagnostic: Trade for Faster Growth and Better Jobs*. Washington, DC: World Bank.

World Bank, UNESCO, UNICEF, FCDO, USAID, and Bill & Melinda Gates Foundation. 2022. *The State of Global Learning Poverty: 2022 Update*. Conference Edition, June 23. Washington, DC: World Bank.

Amid higher prices for imported energy, heightened uncertainty, and weaker economic expansion in the European Union, growth in Europe and Central Asia (ECA) is likely to slow from 2.6 percent in 2025 to 2.2 percent in 2026. Excluding the Russian Federation, regional growth is expected to decline from 3.7 percent in 2025 to 3.0 percent in 2026. Growth in ECA is projected to remain modest through 2028, with a gradual but uneven recovery.

Against a difficult external backdrop and sluggish growth, artificial intelligence (AI) could help make up for declining productivity. However, AI's potential to transform ECA's economies runs well ahead of the region's capacity to absorb it. About one in five workers in ECA holds a job that is meaningfully exposed to AI. Yet, usage of AI does not necessarily equate with exposure, and exposure does not equate with job displacement or creation.

ECA has established many of the analog foundations and some of the digital foundations for AI, with near-universal mobile coverage, favorable energy costs, and advantageous technical human capital. However, the region has a deficit of computational resources. Data readiness is an equally important constraint: data are abundant but often siloed and unstructured, limiting AI deployment.

The appropriate policy prioritizes AI adoption and adaptation—to use “small AI” adapted to local circumstances, languages, and the legal base—rather than frontier AI development. Governments should focus their efforts on expanding affordable compute access and strengthening foundational, digital, managerial, and business-oriented technical skills. Dedicated attention to education and training systems would improve skill proficiency. Investing in developing structured and transparent data as a public good would improve the capabilities of AI models, making them more useful to users. Confusing adoption and adaptation with innovation may lead governments to build national models at substantial and unnecessary cost. The main risk over the next decade is likely to be too little adoption and adaptation of AI across the region, not too much.

