INVESTMENT REPORT 2025/26

CAPITALISING ON EUROPE'S STRENGTHS

European Investment Bank | Group

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Investment Report 2025/26: Capitalising on Europe's strengths

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

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About the report

The annual EIB report on investment and investment finance is a product of the EIB Economics Department. The report provides a comprehensive overview of the developments and drivers of investment and investment finance in the European Union. It combines an analysis and understanding of key market trends and developments, with a thematic focus explored in greater depth. This year, the focus is on Europe's transition to a digital and green future, social investment and maximising the effect public financing. The report draws extensively on the results of the annual EIB Investment Survey (EIBIS), combining internal EIB analysis with contributions from leading experts in the field.

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KEY MESSAGES FROM THE INVESTMENT REPORT 2025/26

In recent years, the European economy has shown remarkable resilience despite unprecedented shocks. Going forward, a decisive push for private investment is crucial to maintaining momentum and continuing to grow overall investment. Private investment will respond to clear business opportunities and a more integrated EU single market that enables companies to flourish.

1 Investment resilience has relied largely on strong public investment and support, with a focus on structural transformation.

- Public investment has grown faster than gross domestic product (GDP), and government incentives for private investment remain above pre-pandemic levels. Despite heightened uncertainty, corporate investment has remained resilient, though broadly stable in real terms.
- Investment in intangibles (research and development, innovation and skills) continues to grow but has proved particularly vulnerable to increased uncertainty.

2 Europe is now at a critical turning point. Decisive policy action and large-scale capital investments are needed to deal with risks and embrace opportunities.

- A new global order is testing Europe's traditional sources of security, stability and competitiveness. Global tensions and the repositioning of the transatlantic alliance coincide with a major technological revolution. At the same time, industries serving the net-zero economy are set to grow exponentially.
- The digital revolution is enhancing productivity and efficiency, and will foster economic, social and territorial integration, while boosting innovation.
- Globally, intensifying competition among superpowers is bringing the European Union and other like-minded countries together.
- These rapid-fire adjustments demand a step change in investment, particularly in private investment, for security, defence, technology, energy, natural resources, access to markets and trade.

3 Accelerating investment requires stronger corporate activity, which will be stimulated by improved business prospects. European Investment Bank Group analysis shows untapped potential from further leveraging the EU single market by improving efficiency and scale. This would bolster the European Union domestically and internationally.

Better exploiting the EU single market

- The EU single market provides scale, business opportunities and the efficient and secure organisation of European supply chains. It has a clear track record of boosting investment opportunities. The single market has underpinned 25% of new investment recorded in the European Union since the 1980s.

- Yet integration is stalling: 62% of EU firms say they have to deal with a fragmented EU market when exporting. Removing these barriers could improve firms' investment intensity by 10%, with even stronger gains for intangible investment, which is critical for EU innovation.

- The single market is also a driver of resilience and economic security. European Investment Bank Group (EIB Group) analysis shows that existing trade within the European Union has helped to cushion sudden shocks, particularly for products that depend on supplies from foreign countries. When shocks hit, intra-EU trade at least partially offsets trade with countries beyond the European Union. That stabilising effect would not be possible without a minimum of production and trade already taking place within the European Union.

- The efficiency and scale of the EU market are critical assets domestically and globally. Globally, Europe continues to be seen as a stable and trusted partner, actively forging new cooperation agreements with Latin America (Mercosur) and India. EIB Group estimates show that free trade agreements currently under negotiation – which cover 12.5% of EU exports to the rest of the world – have the potential to increase exports to countries involved by 20.6% and to raise total EU exports by 2.6%.

Putting significant EU savings to work

- The savings and investments union could unlock EU savings to finance innovative companies across Europe. Proven public-sector instruments such as risk sharing, securitisation, venture capital and venture debt effectively mobilise private savings. Pan-European mechanisms help level the playing field, expanding firms' access to growth capital and fostering stronger innovation ecosystems. For investors like pension funds and insurance companies, pan-European instruments open new opportunities and enhance risk diversification.

- The EIB Group is a leader in venture debt and venture capital, accounting for 30% of the venture debt market and 24% of the venture capital market. Through the European Tech Champions Initiative 2.0, it seeks to close Europe's later stage financing gap by scaling investment in large and mid-size tech growth funds and attracting long term institutional capital.

4 For Europe, the coming years are about execution, impact and scale.

Capitalising on Europe's strengths

- Europe's competitive edge in fast-moving sectors relies on its ability to combine innovation, sustainability and market scale. Europe retains a strong global standing in several strategic industries, including healthtech, advanced manufacturing and robotics, clean energy technologies, agriculture and the bioeconomy, semiconductor equipment, aerospace, quantum and high-performance computing, and automotive.

- Strong support for innovation can be effectively combined with Europe's adaptable industrial expertise, which can be strengthened and scaled. Three elements are needed to maintain a balance between efficiency and security: (1) targeted intervention; (2) a focus on innovation and scaling; and (3) predictable demand, leveraging the power and size of the EU market. In some cases, building strategic independence might require time and measures to help industries transition. Scale is an asset. A pan-European strategy and strong global alliances – especially for critical raw materials and markets – are essential.

A technological revolution is reshaping business

- Digitalisation and AI adoption are boosting the productivity of European firms, but they are also creating strategic dependencies in an increasingly polarised world. EIB analysis shows that AI adoption has already had a material impact on EU firms' productivity, accounting for about 12% of the total productivity increase recorded since 2019.

- In the short term, Europe will benefit from its strong industrial base and supportive digital infrastructure. Looking ahead, the expansion of generative AI will intensify strategic dependencies and investment needs for innovation, data centres and energy. Europe's strategic position will be strengthened by a coordinated pan-European approach that aligns initiatives and investment in frontier computational infrastructure, EU data spaces and cybersecurity.

Energy bottlenecks need to be addressed

- The remaining bottlenecks in the energy sector need to be addressed, to unlock the benefits of a system that fully integrates renewable energy to bring down energy costs for EU businesses and individuals. Europe weathered the energy shock, and used it as an opportunity to enhance the security of its energy market. Energy costs are being pushed down, as structural transformation and market integration advance. However, those costs remain an issue, not least for energy-intensive industries.

- To prevent new bottlenecks from emerging, investment needs to accelerate in cross-border interconnectors and in system flexibility (combining energy storage with generation, for example), in the electricity grid and in wider electrification. Transforming the energy sector involves substantial upfront costs. Financial instruments that reduce investment risks – built on proven successful models – will be key to sustaining momentum.

Stronger European security and defence

- Large investment needs in defence call for coordination, mobilising private resources and a strengthening of European defence industries. Public defence spending is increasing rapidly, with European NATO members targeting defence and security spending of 5% of GDP by 2035.

- While the primary purpose of defence spending is to ensure Europe's security and resilience, it can also deliver broader growth through higher productivity, particularly spending on military and dual-use research, development and innovation, and investment. The European Union has identified capability gaps and a need for more coordination. Co-financed investments in European defence firms and infrastructure and harmonised standards can enhance spillover effects across EU countries and the private sector.

- The composition of the supply chain matters for security. The EU market for mergers and acquisitions shows the increasing maturity and interconnectedness of EU domestic production, even though the presence of foreign players remains significant.

Protecting Europe's greatest resource: Its people

- Europe continues to lead globally on social and wellbeing outcomes, underpinned by comprehensive social protection systems, high standards of public services and strong social cohesion. Europe is healthier, safer and more inclusive than any other region globally.

- People in high-income EU countries live up to five years longer on average than in the United States. Employment rates in 2025 reached historically high levels of 76% of the working-age population.

- Sustained social investment is key. Housing needs are increasingly urgent: 51% of people living in EU cities say a lack of affordable housing is their most urgent problem. Addressing housing shortages would free people to move to areas with better job opportunities and could increase EU GDP by 1.7% and decrease EU-wide wage inequality by around 1.5%.

5 Given limited available resources, future public support will need to focus even more on impact and mobilising private capital. Pan-European instruments that are available to firms across the European Union and targeted to achieve specific policy objectives have proven to be the most effective way of mobilising private resources.

- The experience of the European Fund for Strategic Investments and InvestEU shows the power of mobilising EU resources. An InvestEU guarantee of €1 delivers €15 of investment in the real economy. Private sources accounted for 70% of resources mobilised under InvestEU.

- A deeper analysis of EIB Group data shows that well-designed financial instruments deliver tangible impacts by strengthening firms' performance and promoting innovation and EU competitiveness. For example, companies receiving EIB-funded loans invested 15% more and had 5% higher productivity compared to peers. The European Investment Fund crowds in institutional investors to venture and growth funds through a fund-of-funds approach. Companies that receive EIB venture debt – which accounts for about 30% of the European market – raise 1.5 times more additional finance.

- Efficiency and effectiveness are key to delivering on large investment programmes in infrastructure and housing. Productivity in the construction sector needs to improve, and projects could benefit from following successful practices used in other public infrastructure projects. Labour productivity in European construction has declined 15% since 2000, contributing to the problem of unaffordable housing and raising the cost of infrastructure. Digitalisation – particularly among firms in the construction industry supply chain – could improve coordination and efficiency. Streamlining regulatory frameworks across the European Union would reduce administrative complexity and market fragmentation. Comparing experiences across the European Union shows the importance of standardised technology, streamlined governance and improved procurement to delivering public infrastructure more cheaply.

Executive summary

The EU economy and investment have resisted shocks well in recent years

- **The EIB Group Investment Survey 2025/2026 shows that EU firms adapted well to rapid technological advancement and the demands of the green transition, as well as sharp rises in US tariffs.** EU firms' adoption of digitalisation and generative artificial intelligence (AI) matches that of US firms, while 90% of EU firms invested in the green transition. When the United States raised tariffs, American firms expressed more concern than their EU counterparts. So far, the impact of tariffs has largely been absorbed by US importers, with the effect remaining manageable for EU exporters.

- **Europe's energy sector is transforming, strengthening energy affordability and enhancing autonomy.** Renewable energy now accounts for two-thirds of power capacity and half of electricity generation. The share of EU firms seeing energy costs as a major investment obstacle has declined significantly in recent years (41% in 2025, down from 60% in 2022). Still, high energy costs make it difficult for EU firms to compete. As the transformation continues, the investment focus will expand to address emerging bottlenecks in areas like electricity grids, interconnectors and energy storage.

- **Defence and security spending is rising** towards the long-term target of 5% of gross domestic product (GDP). The European Union remains Ukraine's main financial supporter.

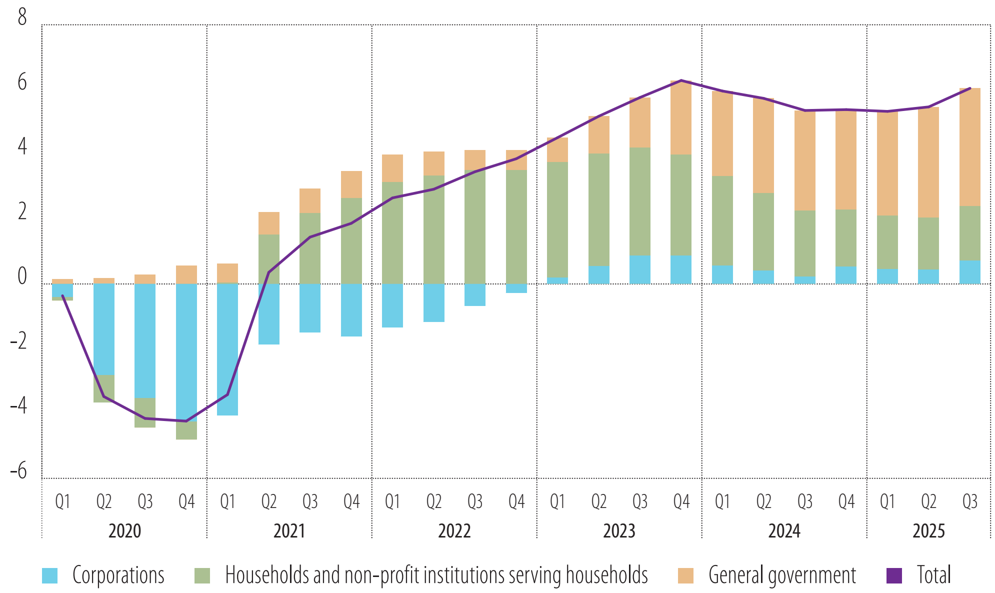
- **Europe is seen as an anchor of stability by global investors,** with European assets in high demand. The European social model underpins social cohesion and stability.

Investment resilience has benefited significantly from strong public support, which focuses on structural transformation (Figure 1). Public investment grew faster than GDP, and government incentives for private investment remain above pre-pandemic levels. Despite heightened uncertainty, corporate investment remained broadly stable in real terms (Figure 2). Investment in intangibles (research and development, innovation and skills) continues to grow but is particularly vulnerable to uncertainty (Figure 3).

Europe is now at a critical turning point. Decisive policy action and large-scale capital investments are needed to mitigate risks and seize opportunities. A new global order is testing Europe's traditional sources of security, stability and competitiveness. Global tensions and the repositioning of the transatlantic alliance coincide with a major technological revolution. At the same time, decarbonisation of the economy will cause cleantech and other green-technology industries to grow exponentially. The digital revolution is increasing productivity and efficiency and will foster economic, social and territorial integration while boosting innovation. Globally, intensifying competition among superpowers is bringing the European Union and other like-minded countries together. This evolution demands a step change in investment, particularly in private investment in key areas such as security, defence, technology, energy, natural resources and access to markets and trade.

Figure 1

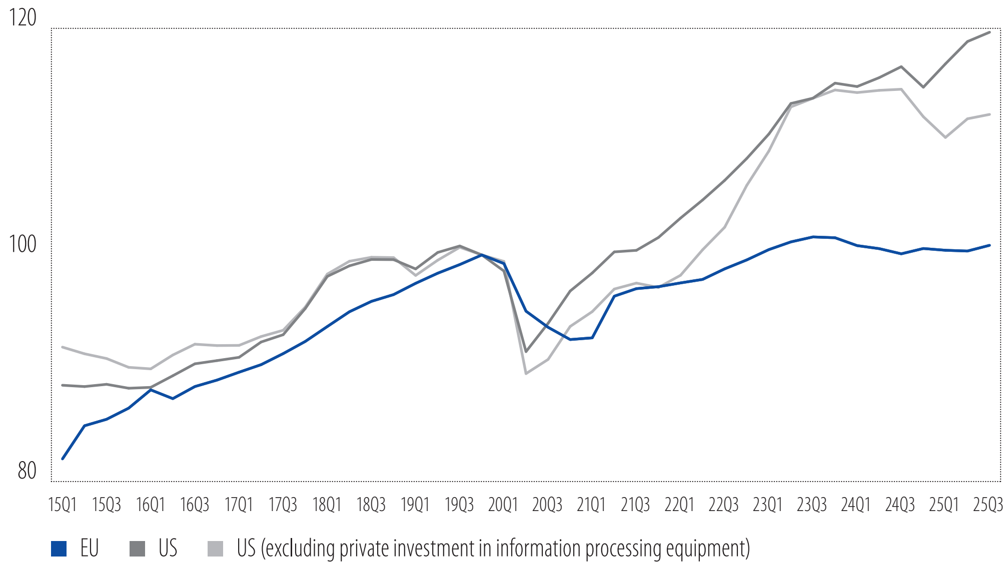
Change in real gross fixed capital formation in the European Union (cumulative investment since the fourth quarter of 2019, in %)**, by sector**



Source: *EIB staff calculations based on Eurostat.*
Note: *EU data exclude Ireland. Real gross fixed capital formation by sector, deflated using total investment. Total gross fixed capital formation over one year (until the fourth quarter of 2019) is normalised to 0.*

Figure 2

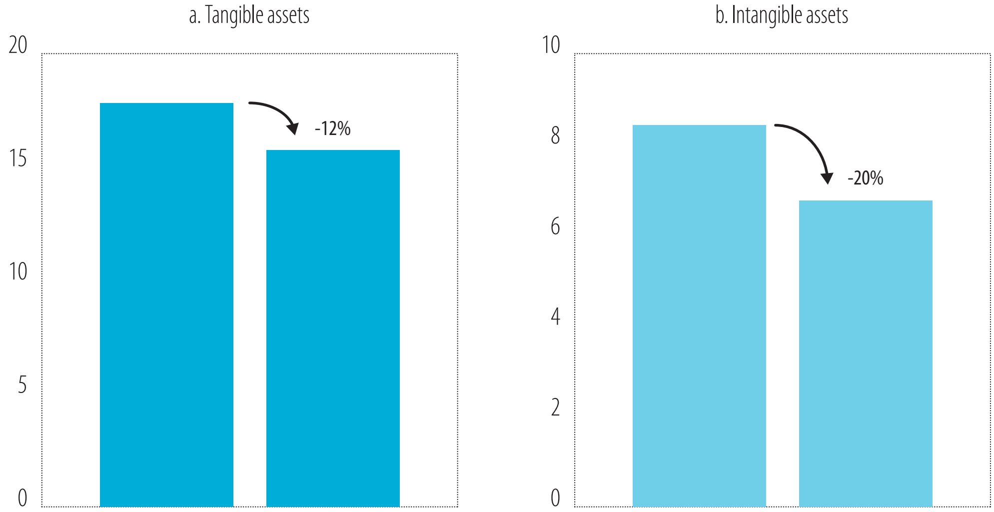
Real corporate investment (index, 2019Q4=100)



Source: *EIB staff calculations based on Eurostat and Federal Reserve economic data (FRED).*
Note: *EU data exclude Ireland. All figures were adjusted using the implicit price index for gross fixed capital formation for the European Union and the United States. The most recent data for the United States were for the second quarter of 2025, and for the European Union, the first quarter of 2025. Private investment in information processing equipment was adjusted using the specific price index for that kind of investment. Quarterly data are presented as four-quarter moving averages.*

Figure 3

Change in investment relative to total fixed assets when firms perceive uncertainty as a major barrier to investment (in percentage points)



Source: *EIB staff calculations based on EIB Investment Survey (EIBIS) 2025.*
Note: *The figure shows the investment intensity of firms and the effect of uncertainty. Uncertainty reduces firms' investment in tangible and intangible assets, but the effect is stronger for intangible assets. The regression of investment intensity on uncertainty controls for (lagged) investment intensity, a cyclical component, a structural financial component, and firms' future demand expectations.*

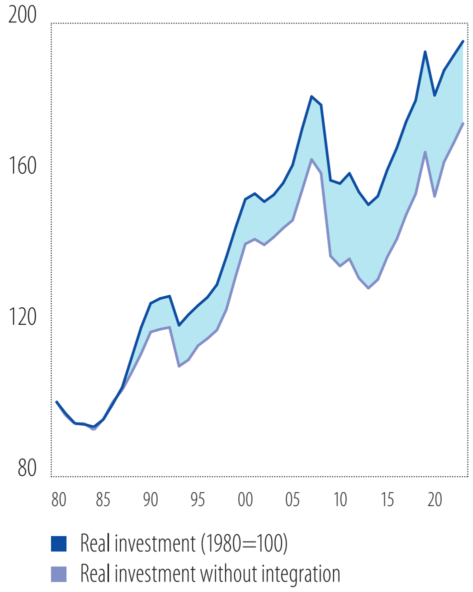
Leveraging the efficiency and scale of the EU single market can unlock business opportunities to drive a needed acceleration in corporate investment

The EU single market provides scale, business opportunities and efficient and secure organisation of European supply chains. It has a clear track record, underpinning 25% of new investment recorded in the European Union since the 1980s (Figure 4). Yet integration is stalling: 62% of EU firms have difficulty exporting to other EU countries because of fragmented rules and regulations. Removing these barriers could boost the ratio of firm investment to assets by 10%, with even stronger gains for intangible investment, which is critical for EU innovation. The EU single market also drives resilience and economic security. Analysis shows that even limited intra-EU trade has helped companies better weather shocks. This is true even for companies that rely on imports of vulnerable products (those for which Europe has dependencies). When shocks hit, intra-EU trade helps by offsetting changes in trade with countries beyond the European Union – a stabilising effect that requires a minimum of EU production and trade (Figure 5).

A successful savings and investments union could unlock considerable EU savings to finance innovative companies. Public-sector instruments such as risk-sharing, securitisation, venture capital and venture debt have already proven successful in mobilising private savings. The EIB Group has pioneered venture debt and venture capital and now accounts for 30% of the EU venture debt market and 24% of the venture capital market. Pan-European mechanisms provide an additional critical boost to investment, enabling firms to access growth capital regardless of where they are located and fostering the development of supportive environments. For financial investors, pan-European instruments unlock new investment opportunities and enhance risk diversification. Through the European Tech Champions Initiative 2.0, the EIB Group seeks to close the European gap in late-stage financing by increasing investment in large and mid-size tech growth funds and attracting long-term institutional capital.

Figure 4

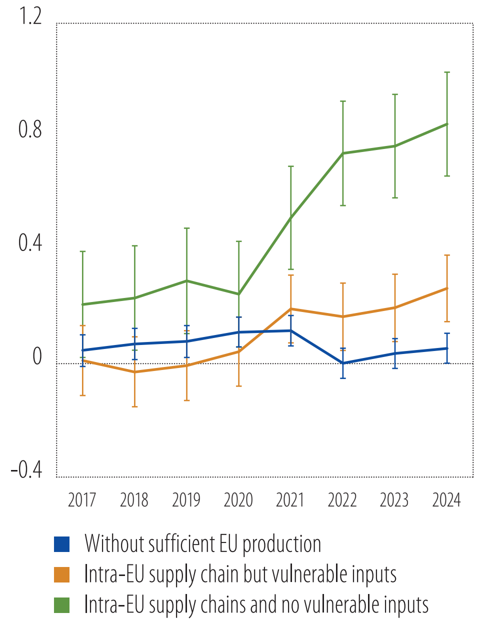
Real private investment, with and without an integrated EU single market (index, 1960=100)



Source: EIB staff calculations.

Figure 5

Changes in the evolution of imports from within and beyond the European Union for dependent and non-dependent products (estimated coefficient, in percentage points)



Source: EIB staff calculations based on Comext.
Note: Estimated coefficients and 90% confidence intervals are represented as vertical bars.

The breadth and efficiency offered by the EU single market is a key strength for Europe, domestically and internationally. Globally, Europe continues to be seen as a stable and trusted partner that is actively cooperating with other countries through trade deals with Latin America (Mercosur) and India. EIB estimates show that free trade agreements, which cover some 12.5% of EU exports to the rest of the world, have the potential to increase exports to the countries involved by 20.6%, and to raise total EU exports by 2.6%.

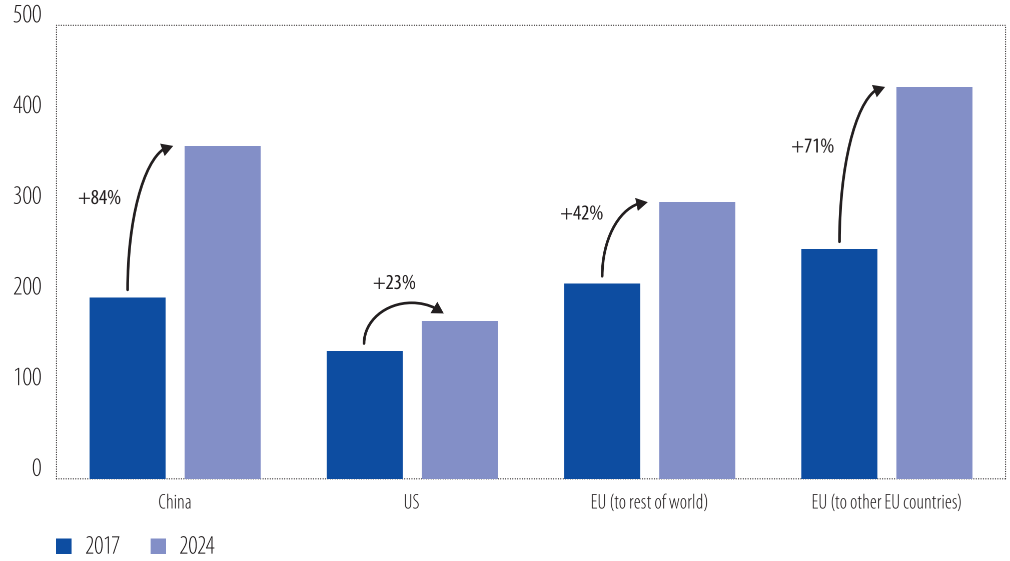
Simplification is a core EU policy goal, with several legislative bills and omnibuses being discussed that would cut companies' administrative burden by 25% overall and 35% for small businesses. For the EU single market to fully exploit its potential, these efforts should be further pursued by individual EU countries. Bureaucratic costs consume 1.8% of revenue for small and medium-sized firms. In comparison, such firms spend 3.9% of turnover on energy, on average. Firms facing heavy regulation invest less, particularly in intangible assets. Reducing the cost of bureaucracy and improving the business environment increases investment opportunities and amplifies the effectiveness of policy support. EIB analysis shows that policy support boosts investment in intangible assets by two-thirds when firms work in a supportive business environment and do not see regulation as a major obstacle.

For Europe, the coming years are about execution, impact and scale

Europe's competitive edge in fast-moving sectors lies in its ability to combine innovation, sustainability and market scale. Europe has a strong global standing in several strategic industries, including healthtech, advanced manufacturing and robotics, clean energy technologies, agriculture and the bioeconomy, semiconductor equipment, aerospace, quantum and high-performance computing, and automotive. Europe combines significant support for innovation with adaptable industrial expertise that can be strengthened and scaled. To balance efficiency and security, three things are key: targeted intervention with a focus on innovation, scaling companies and predictable demand (for which the power and size of the EU market should be leveraged).

Building Europe's strategic independence will take time. A pan-European strategy is essential, as are strong global alliances – especially for critical raw materials and markets. Cleantech provides a clear example of the potential. China is highly competitive in global markets, yet EU cleantech exports continue to grow rapidly – 42% from 2017 to 2024. Trade among EU countries grew 71%, underscoring the importance of the single market and value chains contained within the European Union (Figure 6).

Figure 6
Exports of cleantech goods ($ billion)



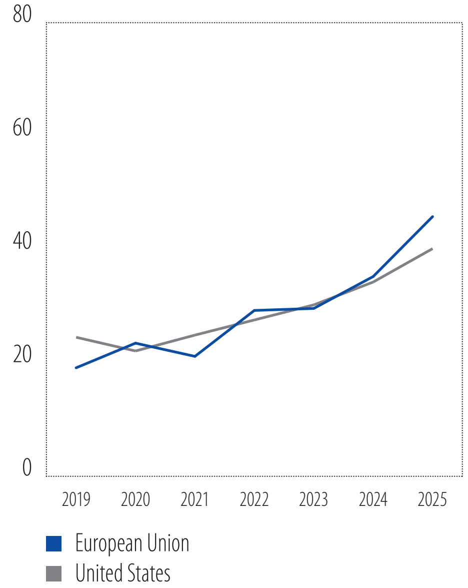
Source: EIB staff calculations based on UN Comtrade data.

Digitalisation and AI adoption are pushing up EU firms' productivity, but are also creating strategic dependencies in an increasingly polarised world. According to EIB analysis, not only do as many EU firms use big data analytics and AI as US firms (Figure 7), but AI adoption already has a material impact on EU firms' productivity, accounting for about 12% of the total productivity increase recorded since 2019 (Figure 8). In the short term, Europe benefits from its strong industrial base and supportive digital infrastructure. Looking ahead, the expansion of generative AI will intensify strategic dependencies and investment needs for innovation, data centres and energy. Europe needs a coordinated pan-European approach that aligns initiatives and investment in frontier computational infrastructure, key EU data spaces and cybersecurity.

Addressing remaining bottlenecks is essential to unlock the benefits of a fully integrated energy system, which is key to cutting energy costs for EU businesses and individuals. Europe has weathered the energy shock and increased the security of its energy market. Energy costs are slowly being pushed down as clean energy is rolled out and markets become better integrated. Costs remain an issue, however, particularly for energy-intensive industries. For manufacturing firms, lower energy costs have been shown to support more productive investment and improve short-term profit margins and turnover, particularly when firms face external competition (Figure 9). While significant progress has already been made in renewables deployment, new bottlenecks are emerging. Investment is needed to accelerate cross-border interconnection and flexibility (combining energy storage with generation, for example), in the electricity grid and in wider electrification. Because transforming the energy sector involves substantial upfront costs, financial instruments that reduce investment risks – building on proven successful models – will be key to sustain investment momentum.

Figure 7

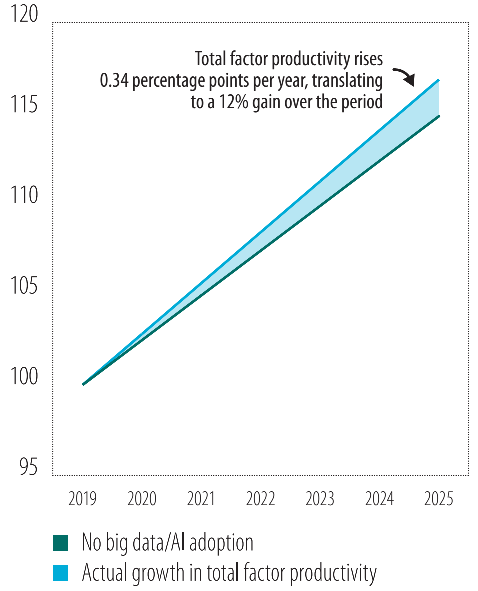
Share of EU and US firms using big data analytics and AI (in %)



Source: *EIB staff calculations based on EIBIS 2019-2025.*

Figure 8

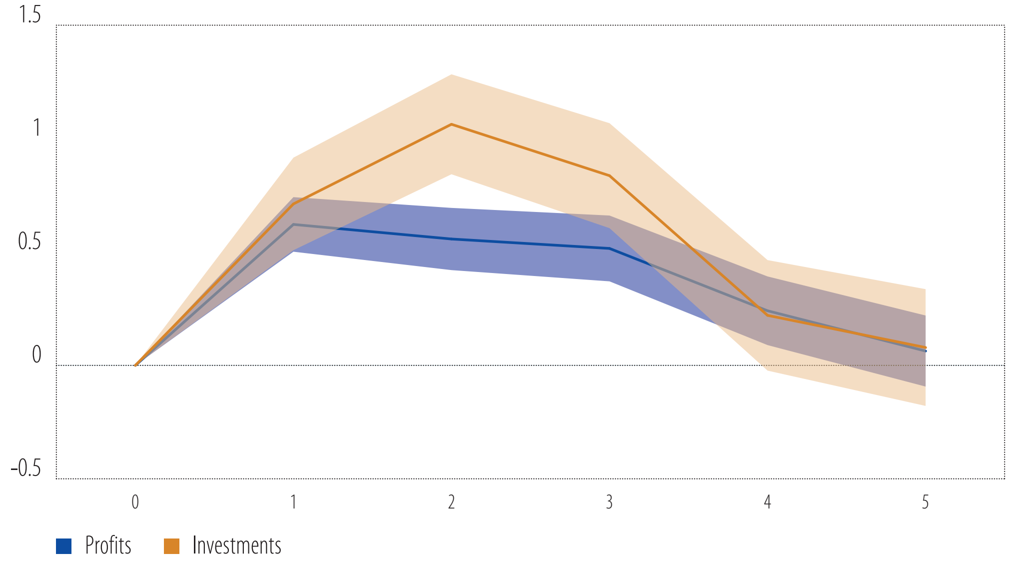
Impact of big data and AI adoption on total factor productivity (index)



Source: *EIB staff calculations based on EIBIS 2019-2025.*
Note: *Aggregate total factor productivity derived from firm level regression for the 2019-2025 period.*

Figure 9

Estimated response of manufacturing firm profits and investment (in percentage points) **to a 1 percentage point decline in energy costs**

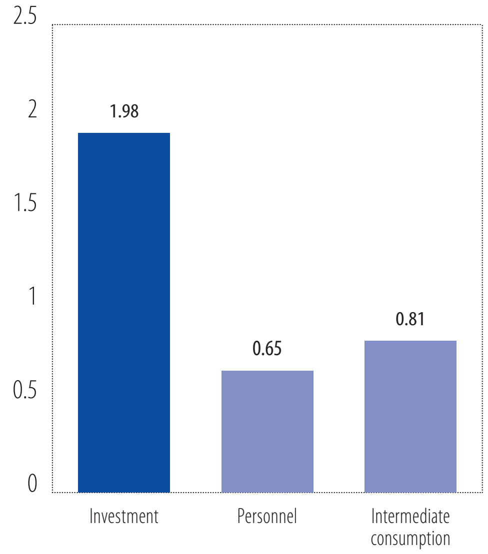


Source: *EIB staff calculations based on EIBIS 2016-2025, Organisation for Economic Co-operation and Development (Input-Output Tables, 2025) and Moody's Orbis database. The x-axis refers to years after the decline in energy costs.*

Large needs for security and defence investment call for coordination, mobilisation of private resources and reinforcement of existing EU defence industries. Public defence spending is increasing rapidly, with European NATO members targeting defence and security spending at 5% of GDP by 2035. While the primary purpose of defence spending is to ensure Europe's security, it can spur overall growth by improving the productivity of the whole economy – particularly when military spending targets dual-use projects, research, innovation and investment (Figure 10). The European Union has identified military capability gaps and a need for more coordination. EU members could enhance the impact of security and defence spending by co-financing investments in the EU defence industrial base and harmonising standards. The composition of the supply chain matters, as strong cooperation among EU firms reinforces them. Mergers and acquisitions activity illustrates that Europe's domestic defence industry is maturing, although foreign players remain a significant presence (Figure 11).

Figure 10

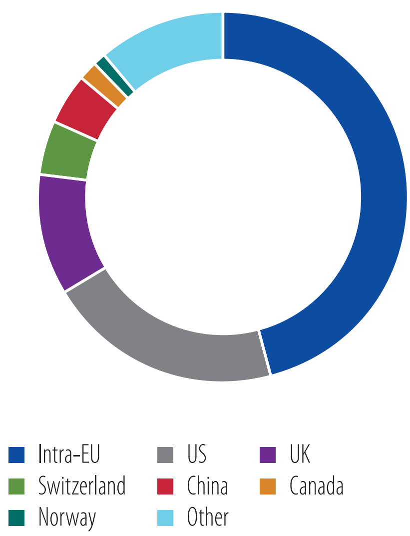
Cumulative impact of a 1 percentage point of GDP increase in defense spending (% GDP), **after three years**



Source: *García-Serrador, Sarasa-Flores and Ulloa (2025). See Chapter 2.*
Note: *The plots display the estimated cumulative fiscal multipliers, taking into account local projections three years after the increase in defence spending.*

Figure 11

Origin of companies investing across borders in the European Union (number of firms)**, 2016-2025**



Source: *EIB staff calculations based on Moody's data on cross-border investments.*

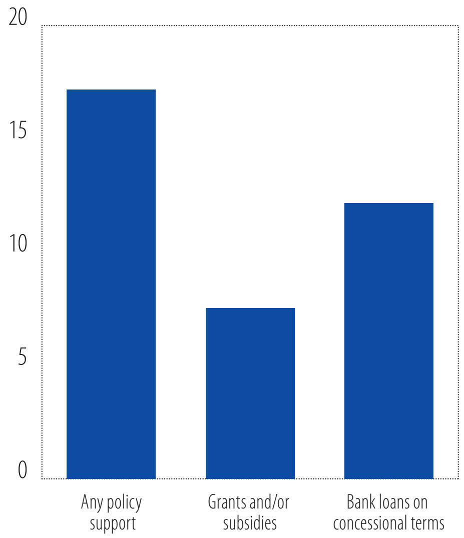
Europe continues to lead globally on social issues and general well-being. This is underpinned by comprehensive social protection systems, high standards of public service and strong social cohesion. Europe is healthier, safer and more inclusive than any other region globally. People in high-income EU countries live up to five years longer on average than in the United States. Employment rates in 2025 reached historically high levels: 76% of the working-age population. Sustained investment is key if Europe's social model is to remain a foundation for inclusive growth. The lack of affordable housing needs urgent attention: 51% of people living in EU cities identified the lack of affordable housing as their most pressing problem. Addressing housing shortages would free people to move to areas with better job opportunities, and could increase EU GDP by 1.7% and decrease EU-wide wage inequality by around 1.5%.

Given limited resources, public policy support must focus more on impact and mobilising private capital

Pan-European and targeted instruments can effectively mobilise private resources, especially for firms operating in better business environments. Such instruments reduce investment risks (and costs), level the EU playing field and diversify and optimise opportunities. On average, 17% of investing EU firms benefited from policy support in the form of grants or finance on favourable terms (Figure 12). Targeted policy has proven more effective at mobilising private investment. Moreover, firms operating in a supporting business environments benefit more from policy support. (Figure 13).

Figure 12

Share of firms receiving policy support (in %)

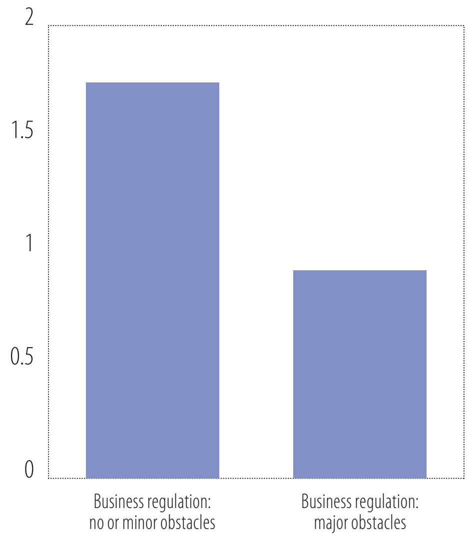


Source: EIB staff calculations based on EIBIS 2019-2025.

Note: The chart includes all firms that invested in the last financial year excluding those that did not know or did not answer the question. Any policy support includes either grants/subsidies or bank finance with favourable terms. The question on bank loans on concessional terms was not asked in EIBIS 2023.

Figure 13

Impact of policy support on intangible investment by measuring the change in investment over total assets (in percentage points)



Source: EIB staff calculations based on the EIBIS and Moody's ORBIS database for 2022-2025.

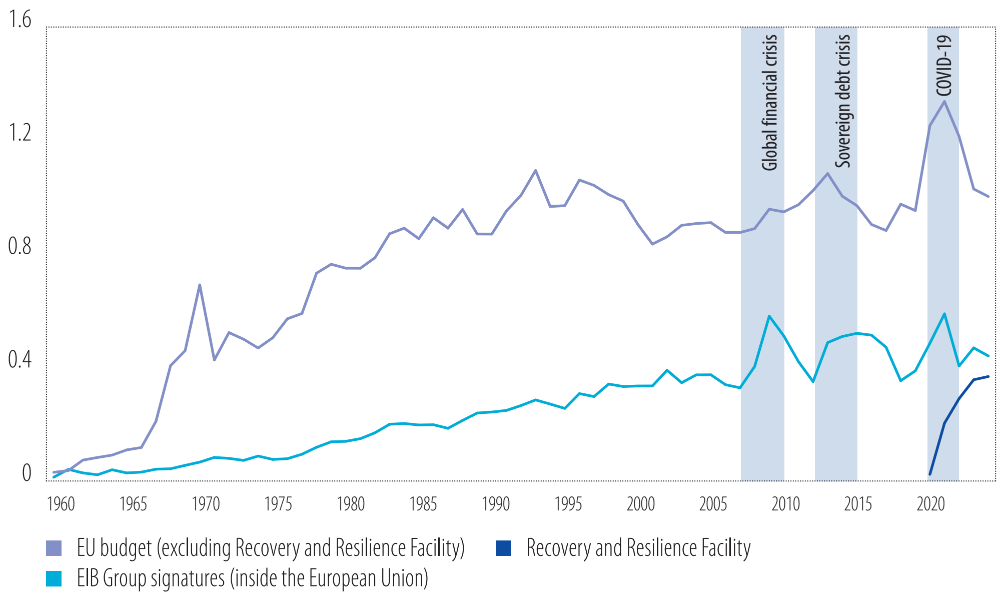
Note: The chart compares companies that received policy support with a matched sample of those that did not (three nearest neighbours) with similar characteristics. Policy support includes grants/subsidies and bank loans on favourable terms.

Experience with the European Fund for Strategic Investment and InvestEU shows the power of mobilising EU resources. A guarantee of €1 from the EU budget under InvestEU delivers an estimated €15 of investment in the real economy. A substantial share of that mobilisation comes from private sources (70% of resources mobilised under InvestEU were private).

A deep dive into EIB Group data shows that well-designed financial instruments deliver tangible impact, strengthening firms' performance and promoting innovation and EU competitiveness. For example, firms receiving EIB loans invest 15% more than their peers and have 5% higher productivity (Figure 15). The European Investment Fund crowds in institutional investors to venture and growth funds through a fund-of-funds approach, while EIB-financed venture debt, which accounted for around 30% of the EU market, enables beneficiaries to raise 1.5 times more additional finance.

Figure 14

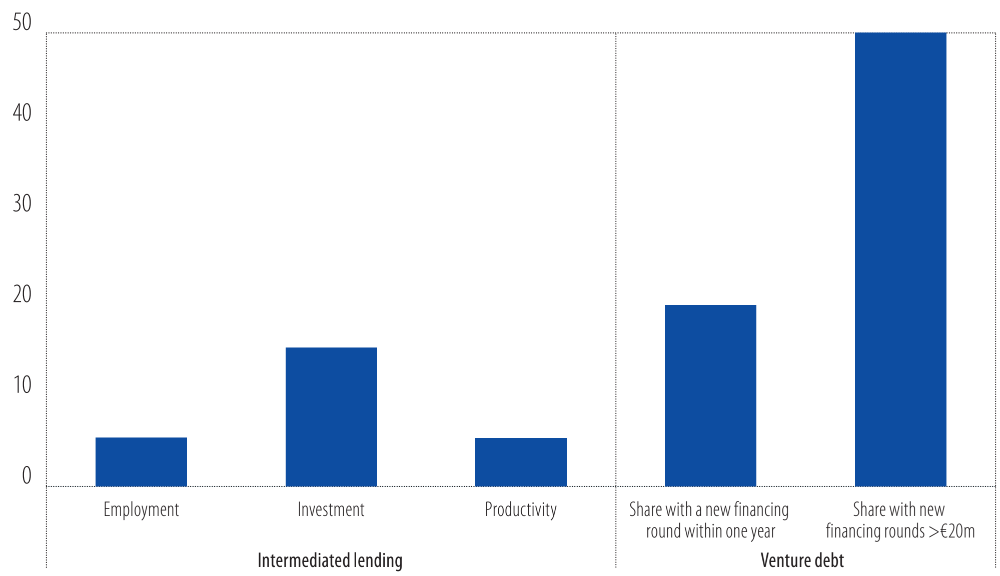
EIB Group signatures, EU budget and Recovery and Resilience Facility resources (% EU GDP)



Source: *EIB staff calculations.*
Note: *Data are shown as a percentage of EU GDP, where the European Union consists of six countries to 1973; nine countries to 1981; ten countries to 1986; 12 countries to 1995; 15 countries to 2004; 25 countries to 2007; 27 countries to 2013; 28 countries to 2020; and 27 from then on.*

Figure 15

Performance of EIB beneficiary firms vs. comparable firms (% difference)

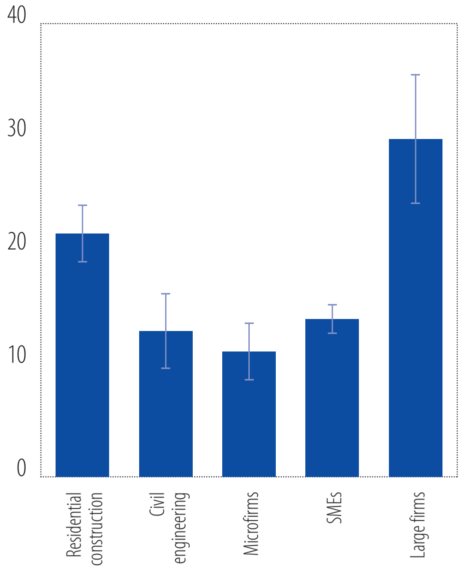


Source: *EIB staff estimates based on internal EIB loan data, the Orbis database and PitchBook data.*
Note: *For intermediated lending, the graph reports the average impact for recipients of multibeneficiary intermediated loans relative to a matched sample of their peers in the three years after the loan. For venture debt, the graph reports the differences in financing rounds (venture capital and private equity rounds) between EIB venture debt recipients and a comparative sample of beneficiaries of venture debt from other lenders.*

To deliver results, large investment programmes in infrastructure and housing need to be effective and efficient. The EU construction sector must become more productive, and lessons about best practices can be drawn from public-sector investment projects. Labour productivity in construction has fallen 15% since 2000, making housing less affordable and raising the cost of infrastructure projects. Digitalisation, particularly across the construction supply chain, can improve coordination and efficiency (Figure 16). Streamlining regulatory frameworks across the European Union would reduce administrative complexity and market fragmentation. Comparing experiences across the European Union shows the importance of standardised technology, streamlined governance and improved procurement to build crucial infrastructure more cheaply (Figure 17).

Figure 16

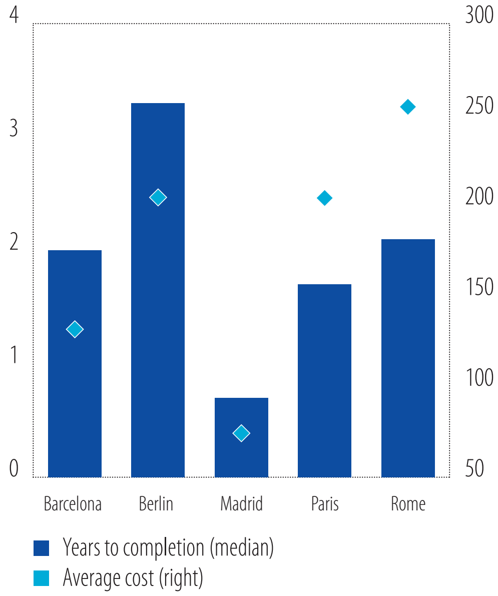
Impact of digital technologies on the productivity of construction firms
(productivity difference, in %)



Source: *EIB staff calculations based on EIBIS 2019-2025.*
Note: *Estimates are based on pooled ordinary least squares regressions. All regressions control for country, sector, wave and firm age (younger than ten years old) with robust standard errors. The vertical lines represent 95% confidence intervals. SMEs stands for small and medium enterprises.*

Figure 17

Metro line completion time (left axis: years) **and costs** (right axis: $ million per km)



Source: *EIB staff calculations based on Transit Costs Project data, Marron Institute, 2024.*
Note: *The figure shows average cost per kilometre and the distribution of completion times for metro lines. The figure includes EU cities with four or more transit lines under construction from 1984 to 2024. The dataset covers a sample of lines with available information. Completion time is defined as the difference between the reported start and end years of construction in the Transit Costs Project data. Cost figures are shown in US dollars in 2023 prices.*

PART 1

FROM INVESTMENT RESILIENCE TO ACCELERATION

Government investment was 3.7% of GDP in the first half of 2025.

Government incentives for private investment are higher than they were before the COVID-19 pandemic, **at 1% of GDP.**

Real corporate investment remains flat, hovering just **1% above pre-pandemic levels.**

Temporarily raising military spending by **1% of GDP could raise long-term productivity 0.25 percentage points,** largely through extra R&D spending.

Corporate investment is hampered by uncertainty.

Long term, firms' investment intensity is **5** percentage points **lower if they see uncertainty as a major obstacle.**

The European Union could increase exports by **0.3%** **of GDP** **if it finalised trade agreements currently under negotiation.**

The EU single market accounts for **25%** of the investment increase since 1980.

At the same time, **62%** **of EU firms say they struggle with fragmentation of the EU market.**

Eliminating this fragmentation could boost firms' investment-to-asset ratios **10%**

Most EU members have a long-term target of increasing spending on security and defence to **5%** **of GDP.**

Chapter 1

Europe in a shifting global order: Risks, resilience and investment trends

Europe's economic environment is increasingly shaped by geopolitical events. The European economy has demonstrated remarkable short-term resilience in the face of successive global shocks, from the COVID-19 pandemic to energy disruptions to escalating trade tensions. Investment has outpaced gross domestic product (GDP) growth. And yet there are widely acknowledged, persistent investment gaps. As geopolitical dynamics give rise to longer-term structural changes – including a less predictable, more transactional approach to international relations – Europe's ability to adapt and lead globally is being put to the test. To remain strong, EU countries must act in a unified manner to harness the European Union's full potential and maintain its position as a promoter of international collaboration and positive change.

The global economy is moving toward a multipolar structure, with the United States, the European Union and China as the main players. Over the past two decades, China's share of global GDP at purchasing power parity has surged: from 4.6% in 2005 to 19.6% in 2025. Meanwhile, the shares of the United States and European Union have declined. The United States has fallen from 19.8% to 14.7% and the European Union from 21.4% to 14%. Part of the reason is that average growth in China has been much higher in recent years (around 5% annually) than in the United States (2.5%) or European Union (1%). This trend is likely to persist.

The European Union, the United States and China remain deeply dependent on one another. The United States is the European Union's largest export destination and a major source of imports: accounting for about 20.6% of EU exports and 13.7% of imports in 2024. China is the European Union's biggest supplier of goods and an important export market. Financial relationships have grown alongside trade. The market value of EU firms' direct investment in China has doubled over the past decade, to around €240 billion, but still represents less than one-tenth of EU direct investment in the United States. Chinese direct investment in the European Union has also roughly doubled, to €80 billion, though it is still only a small fraction compared to US investment in Europe. EU investors are the largest foreign holders of US government debt, while China remains the third largest, directly holding around $700 billion in US Treasury securities despite having significantly reduced its exposure.

The relationships between the European Union, the United States and China lead to significant gains in efficiency but also created strategic vulnerabilities. Free trade and specialisation have improved efficiency, underpinning growth and greater choice for consumers. For example, China's accession to the World Trade Organization (WTO) is estimated to have increased its GDP by 20% within five years (Li et al., 2023), while the liberalisation of EU-US trade under the Transatlantic Trade and Investment Partnership would generate annual gains of an estimated €119 billion for the European Union and €95 billion for the United States, according to the Centre for Economic Policy Research (CEPR) (2013). But a progressively more transactional world is gradually transforming strong relationships into potential vulnerabilities. The share of world imports subject to trade restrictions has steadily increased, reaching 11% in October 2025, compared to negligible levels in 2009 (World Trade Organization (WTO), 2024, 2025a). What marks a departure from the past is not just the scale, but the growing volatility of these restrictions, and their increasing use as leverage in unrelated policy areas. The sharp increase in US import tariffs in April 2025, followed by pressured negotiations to roll them back, illustrates this new dynamic.

Geopolitical risks intensified over 2025. This points to a deeper and more structural transformation of the global order than initially expected. Russia's invasion of Ukraine, the war in Gaza, the United States' intervention in Venezuela and its repeated threats to Greenland, and the social unrest in Iran underscore the growing uncertainty and volatility of the international landscape.

European firms and policymakers need to adapt to these changing circumstances. Firms navigate a world where resilience increasingly depends on agility, innovation, investment and diversified supply chains and export markets, geopolitical awareness, and the ability to operate under heightened uncertainty. For EU policymakers, this means creating an environment that brings business opportunities, exploiting the full potential of the EU single market and European integration. It also involves building new trade alliances, presenting a unified EU position in relations with the United States and China, and using industrial policy to help European firms adapt, while staying open to trade and foreign investment where security allows.

Introduction

This chapter looks at three central themes:

- **From resilience to renewal:** European unity, economic diversity and agile policy responses have cushioned the impact of external shocks. Services and domestic demand have been supportive, while fiscal policy has prioritised investment, and monetary policy has reduced funding costs. In this context, investment has been resilient, although it has still fallen short of the amounts needed to fund Europe's green and digital transitions. Higher investment rates must remain a priority for the coming years despite rising fiscal pressures, low potential growth, high volatility and risks.

- **Strategic positioning in trade and investment:** European firms have adapted agilely to recent shocks, but competitiveness requires innovation, efficiency, and resilient supply chains. As trade shocks and security challenges emerge, the EU single market offers a buffer that should be further exploited. An increasingly transactional global economy requires a balanced approach to supply chains – embracing international trade while maintaining European autonomy in certain areas like energy and critical raw materials and avoiding over-reliance on single sources. Europe has considerable strengths that it can leverage. It leads in services, a key driver of global trade growth. The inputs it exports are also primarily consumed in immediate destination markets, which shields them against the risk of longer value chains. Policy initiatives should continue to focus on innovation, improving the single market to support productivity and competitiveness, deepening trade partnerships and securing strategic supplies.

- **Global finance and the role of the euro:** Geopolitical tensions, economic fragmentation and financial innovation are reshaping the international financial system. While the US dollar remains the dominant global currency, shifts in global reserves and in the allocation of assets held by investors present significant new opportunities for the European Union and the euro. Strengthening the euro's international position – through reforms, deeper capital markets and digital innovation – will increase resilience and autonomy, while reducing funding costs.

The chapter has three sections and four boxes. Section 1 examines Europe's investment needs against the background of recent shocks, highlighting the role of services, labour markets and policies. Section 2 explores the European Union's position in global trade, focusing on the shift towards services, the impact of tariffs and protectionism, and the importance of economic security, supply chain resilience and strategic autonomy. Section 3 analyses global funding sources and the international role of the euro, highlighting initiatives to make Europe's financial markets and currency more attractive.

The four boxes in this chapter provide deeper insights into key themes. Box A compares investment trends across the European Union, United States and China, shedding light on the drivers and composition of capital formation. Box B explores the potential gains from EU trade agreements, employing a gravity model to estimate their impact on exports. Box C looks at the European Union's economic ties and strategic global partners. Box D discusses the transformative role of digital innovations in the international financial system, including the rise of crypto-assets and central bank digital currencies.

From resilience to renewal: Europe's investment outlook

Investment resilience

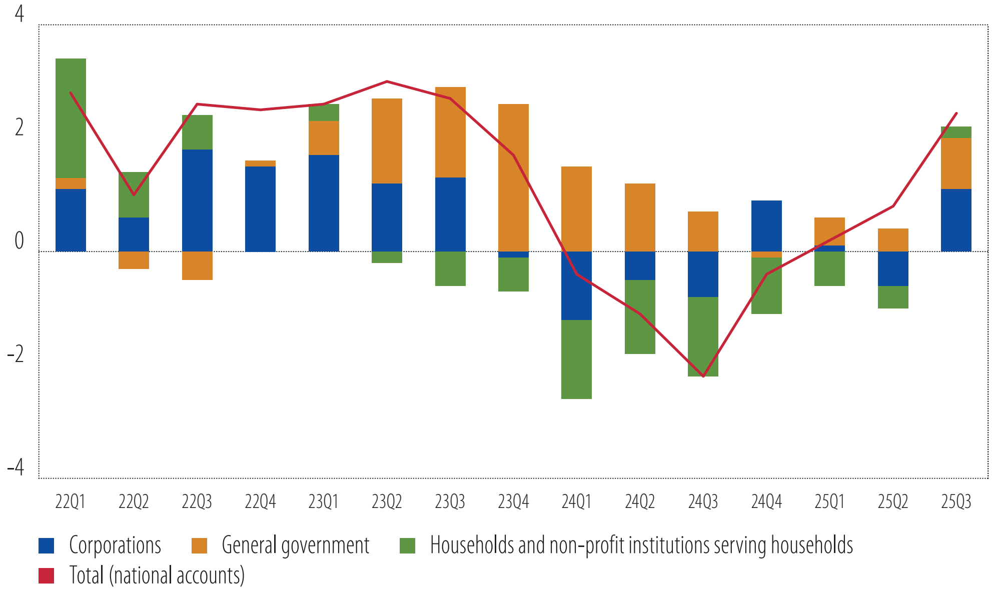
Europe has faced a series of structural and cyclical challenges in recent years. These include geopolitical tensions, the green and digital transitions, an ageing workforce and constrained public finances. These pressures have underscored the importance of investing in new technologies and processes to support growth and reduce reliance on scarce resources, be they skilled labour or imported critical raw materials. Targeted public investment, in turn, can improve the environment for private-sector innovation, laying the groundwork for a more resilient and adaptable economy (see Chapter 2).

In recent decades, investment in Europe has persistently lagged behind global peers. Historically, investment levels in the European Union have trailed those of the United States and China, particularly in areas such as intangible assets (intellectual property, among others), research and development and high-growth sectors. Although public investment in Europe has recovered from the lows of the sovereign debt crisis, investment remains less focused on innovation-intensive fields. Business investment is still about 1.5 percentage points of GDP below that of the United States. To remain competitive in a world of disruptive innovation, Europe needs to shift investment towards sectors with the greatest potential for productivity gains, while maintaining healthy finances and leveraging EU funds to crowd in private investment.

Investment in the European Union exhibited remarkable resilience and adaptability in 2025, remaining steadfast despite global uncertainty. Government investment remained supportive of economic growth (see Chapter 2). The Recovery and Resilience Facility (RRF) continued to boost government investment and shift its overall composition towards digital and green priorities (Figure 1). Corporate investment remained broadly constant, with firms raising efficiency, diversifying supply chains, and investing in digitalisation and sustainability (Figure 2 and European Investment Bank (EIB), 2025). These strategies are strengthening Europe's resilience and competitiveness and positioning its firms to seize emerging opportunities. Faced with pressing needs, EU countries have ramped up investment in defence, the transformation of the energy sector, and digital infrastructure.

Aggregate trends hide significant regional differences within the European Union. Private investment was more subdued in Western and Northern Europe, where industry was challenged by declining competitiveness. In Central and Eastern Europe, the end of the 2014-2020 programming period for EU long-term budget funding (which financed investment until 2023) triggered a peak in public investment that year, followed by a sharp decline. The Recovery and Resilience Facility helped offset this drop. In Southern Europe, it supported private investment through financial instruments, including capital transfers. (For the evolution of public investment in the European Union with macro-regional analysis, including details on RRF support for capital expenditure, see Chapter 2.)

Figure 1
Contributions to EU investment growth (gross fixed capital formation, % change from the same period a year earlier)**, by institutional sector**



Source: *Eurostat and EIB staff calculations.*
Note: *Data exclude Ireland. Because of methodological issues, the sum of the investment of the institutional sectors does not precisely equal the total investment shown by official national accounts. The "Total" line shows investment of the EU 27 countries, excluding Ireland, according to official sources.*

Figure 2
Contributions to EU investment growth (gross fixed capital formation, % change from the same period a year earlier)**, by asset class**

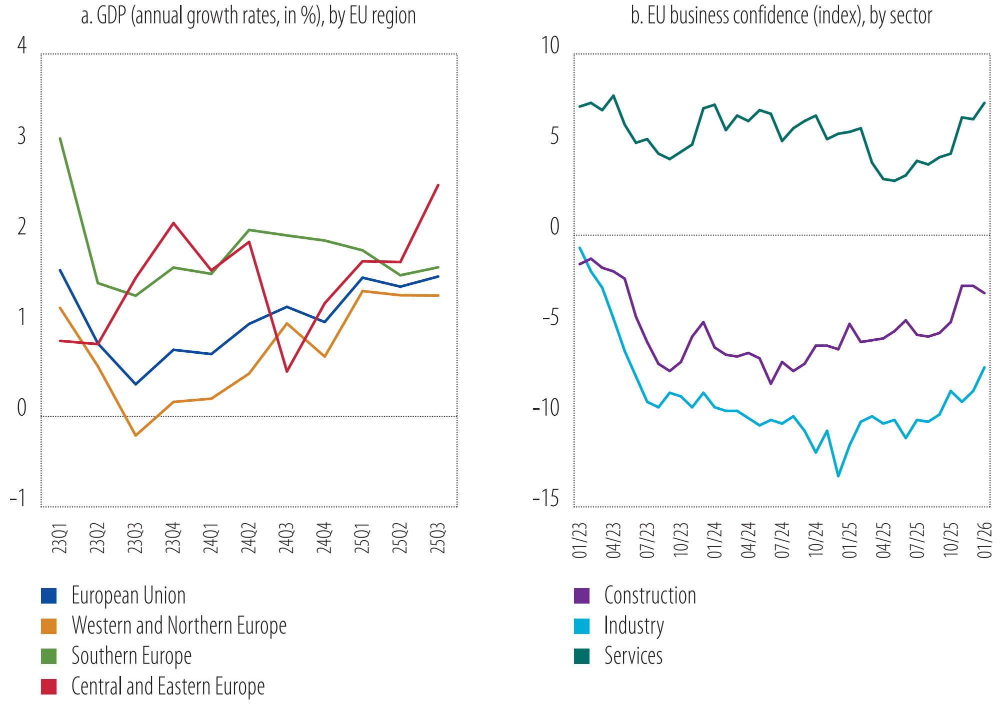
Source: *Eurostat.*
Note: *Data exclude Ireland and Greece.*

Services, labour markets and policy lent support

The investment pattern has unfolded against a backdrop of shifting macroeconomic conditions. Falling inflation has allowed swift monetary easing, and ongoing fiscal support (albeit constrained by debt countries built up during the COVID-19 crisis) has helped the EU economy to outperform the pessimistic expectations that prevailed after the increase in US tariffs in April 2025. GDP growth has edged higher, to about 1.4% year-on-year in 2025, demonstrating the European Union's capacity to adapt and recover, even in the face of external shocks.

Figure 3

GDP and business confidence



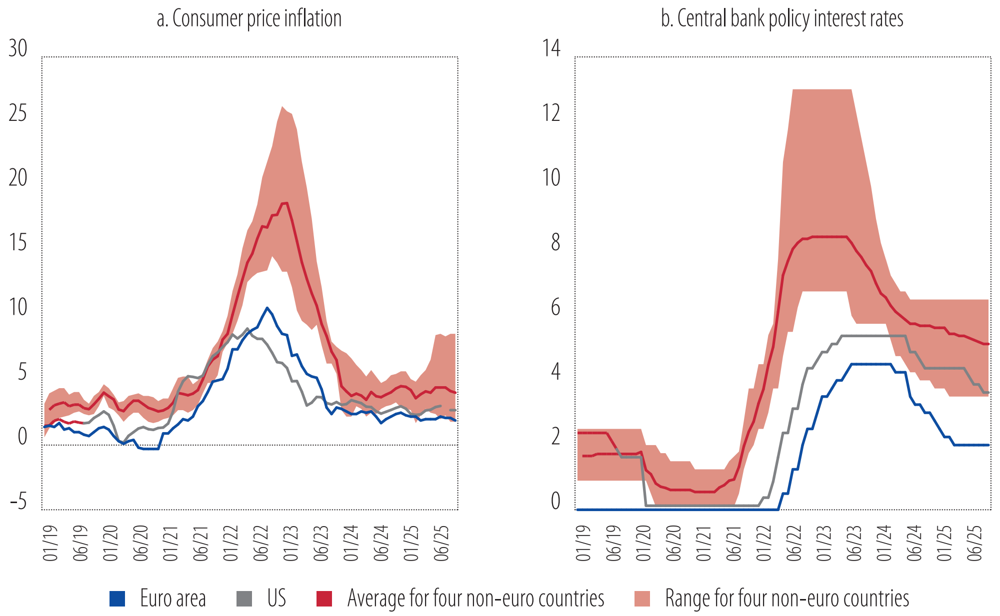
Source: Eurostat.

Source: European Commission.

Falling inflation has allowed central banks to reduce interest rates, which are gradually bringing down corporate funding costs. In the euro area, the European Central Bank (ECB) has continued to lower policy rates. While inflation is moving toward its target of 2%, geopolitical uncertainty remains high, and the impact of previous rate hikes is still filtering through the lending market. The ECB continued to ease monetary policy throughout the year, bringing the deposit facility rate down to 2% from 3% at the end of 2024. After rapid declines during 2024, policy rates in Czechia, Poland, Hungary and Romania remain higher, because tighter labour markets or more expansionary fiscal policy are preventing inflation from falling towards the target level (Figure 4). Throughout the European Union, lower interest rates and reduced risk helped spark a rebound in residential investment. After a deep slump in 2022-2023 (when interest rates were higher), housing construction and purchases picked up once mortgage rates fell back from their peaks.

Figure 4

Consumer price inflation and central bank policy interest rates (in %)**, by region**



Source: *Eurostat, Federal Reserve Bank of St. Louis, Bank for International Settlements.*

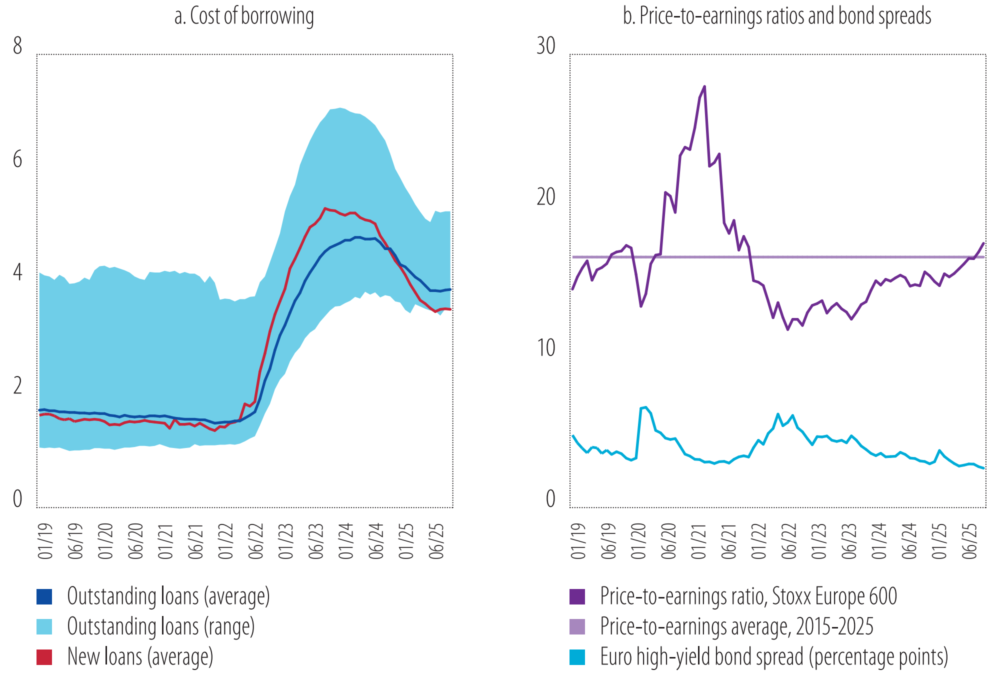
Note: *For the United States, the Consumer Price Index for All Urban Consumers is used. For the European Union, the Harmonised Index of Consumer Prices is used. The shaded area indicates the range of inflation rates (left panel) and policy rates (right panel) for four non-euro area Central and Eastern European countries: Czechia, Hungary, Poland and Romania. The maximum rate reached was in Hungary during monetary tightening in 2022 and corresponds to the base rate set by the country's central bank.*

Improved financial conditions are supporting investment across Europe. Corporate funding costs have declined gradually but remain much higher than before the sharp rise in energy prices that followed Russia's invasion of Ukraine. The differences between the costs of borrowing from banks for outstanding loans for non-financial firms across euro area countries have also declined, as the impact of differences in fixation periods (after which interest rates reset) and maturities diminished (blue band in Figure 5a). However, these disparities remain substantial, with non-financial corporations in Central and Eastern Europe typically facing higher interest rates than those in the Western and Northern Europe and, to a lesser extent, those in Southern Europe. Average euro area credit spreads have declined, along with the cost of equity (which is approximated by the price/earnings ratio for listed companies in Figure 5b).

Alongside improving financial conditions, record-low unemployment and rising real wages have supported investment by strengthening domestic demand in Europe. At 6%, the EU unemployment rate hovers around record lows (Figure 6a). Real wages increased as inflation declined, particularly in Central and Eastern Europe (Figure 6b), where labour productivity has risen faster than in the rest of the European Union and where labour markets have been very tight. Household finances and consumer spending were in better shape compared to the previous year, giving the European Union a more solid cushion of domestic demand.

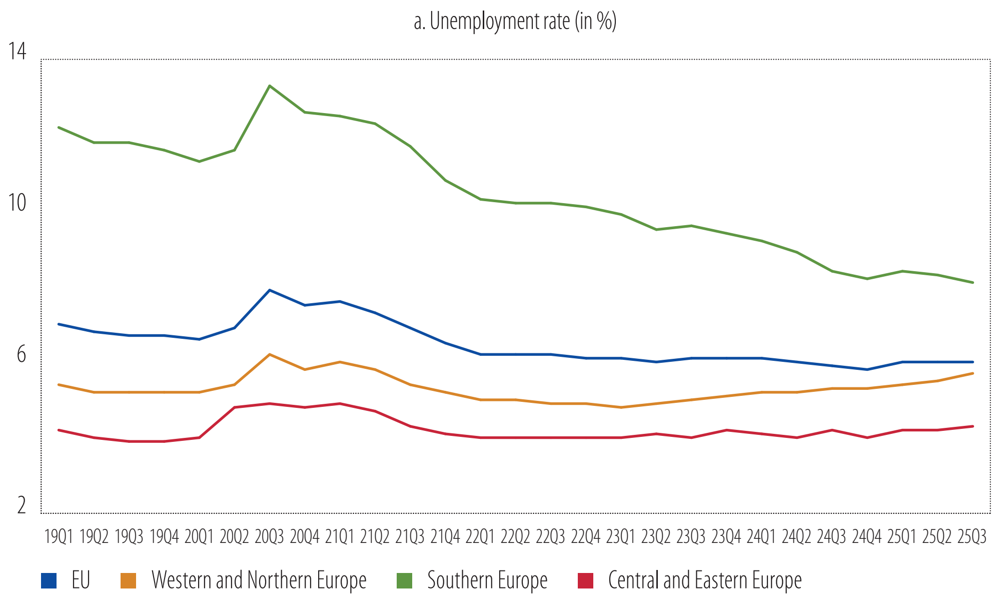
The services sector has also provided stability. Services activity has been increasing, led by information technology and communications, whose output in the first quarter of 2025 was 3.6% higher than in 2024. Services trade was another bright spot (see below). While the US trade war has focused on goods, Europe's trade in services is less directly exposed to tariffs (although some service exports are linked to those of manufactured goods).

Figure 5
Corporate borrowing cost in the euro area (in %)



Source: *European Central Bank (ECB), Bloomberg, Federal Reserve Economic Data and EIB staff calculations.*
Note: *Cost of new borrowing weighs maturities according to their use. Bond spreads refer to euro issues, including those outside the euro area.*

Figure 6
Unemployment rates and real wages, by region



Source: *Eurostat.*
Note: *Household consumption price index used to deflate nominal wages. The numbers represent a four-quarter moving average.*

A unifying theme emerges across EU regions. Each region has demonstrated resilience and adaptability, although they tapped into different sources of growth. Countries in Southern Europe have leveraged the early deployment of EU funds and public incentives to sustain private investment momentum, while the countries of Central and Eastern Europe have relied on stable corporate investment and robust demand stemming from tight labour markets. Countries in Western and Northern Europe have drawn strength from robust services. Collectively, these examples underscore the European Union's capacity to absorb shocks through diversification and policies designed to support recovery. Ultimately, the interplay of regional strengths, targeted public support and private-sector adaptability form the backbone of Europe's investment resilience.

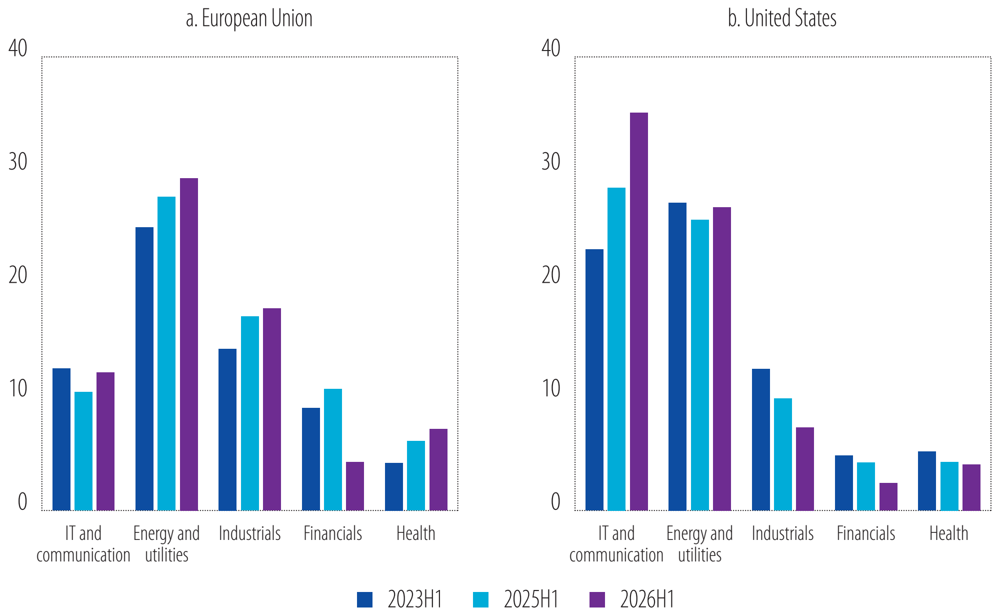
Resilience achieved, acceleration required

Although several factors supported investment in 2025, overall investment in Europe still falls short of what is needed. This shortfall is particularly apparent in comparison with the United States. Whereas corporate investment in the European Union has been almost flat since the pandemic, investment has risen robustly in the United States. Between the first quarter of 2020 and the second quarter of 2025, real private fixed investment grew by just 4% in the European Union, compared to 18% in the United States. Looking ahead, company forecasts suggest that sectoral investment patterns will continue to diverge. Investment in the United States will be driven by IT and communications, while EU investment remains more broadly distributed and relatively concentrated in energy and health (Figure 7). In a context of subdued growth, tighter fiscal constraints and ongoing uncertainty, there is a pressing need to boost corporate investment. The priority must be to unlock business opportunities that drive innovation and productivity, rather than relying solely on policy support.

On the fiscal front, Europe is transitioning from a supportive to a broadly neutral stance. Through 2024 and 2025, fiscal policy in most EU countries has remained mildly supportive, with full deployment of the Recovery and Resilience Facility continuing into 2026. However, thanks to cyclical improvements (most notably continued employment growth, which is pushing up government revenue), and by prudent spending, the deficit is gradually declining relative to GDP. It was 2.7% in the euro area and 2.9% in the European Union in the first half of 2025, while public debt has remained broadly stable at

88.2% of GDP in the euro area and 81.9% in the European Union in the second quarter of 2025. According to the European Commission's Autumn Forecast, the structural adjusted primary balance is projected to remain unchanged in 2025, and to decline by 0.1 percentage point in both 2026 and 2027, pointing to a broadly neutral fiscal stance, with support mainly stemming from a reallocation of spending (see Chapter 2). Importantly, the effects of the Recovery and Resilience Facility will persist as resources are transferred to national promotional banks and financial instruments, and as disbursements continue for ongoing programmes and projects. In countries that are major recipients of EU funds, deployment is likely to accelerate before the facility closes, further boosting investment.

Figure 7
Capital spending of publicly listed companies (% of total capital expenditure)**, by sector**

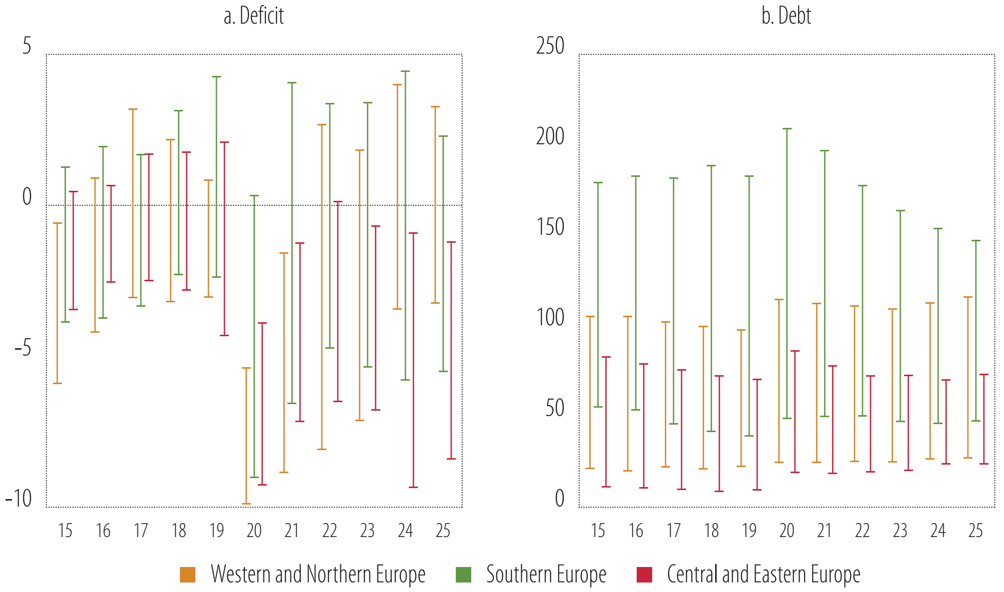


Source: *Bloomberg.*
Note: *The figures show the changing distribution of corporate investment across sectors. Sectoral aggregates are calculated from publicly listed companies' reports. Investment in the first half of 2026 is calculated on the basis of the companies´ quarterly or semi-annual reports available in November 2025.*

The European Union's medium-term strategy is to restore its finances without stifling growth. This is a delicate balancing act that requires credible debt reduction alongside measures to support investment (see Chapter 2). Given that investment needs remain substantial, there is a renewed emphasis on mobilising private capital towards public policy objectives, building on the positive experience of financial instruments like InvestEU and its anticipated successor in the forthcoming EU budget, the Multiannual Financial Framework for 2028-2034. The challenge is to crowd in private investment, ensuring that public resources act as a catalyst for broader economic transformation.

Germany's fiscal expansion stands out with a €500 billion debt-financed infrastructure fund, and €300 billion to €400 billion in additional defence spending planned over the next decade (see Box A in Chapter 2). This package, enabled by more flexible fiscal rules, is expected to lift Germany's public investment above the EU average and provide a substantial boost to growth, while also generating positive – though limited – spillovers to other EU members. Implementation will depend on overcoming capacity constraints and ensuring that new investment supplements, rather than replaces, existing spending.

Figure 8
Government budget balance and debt (% GDP)**, by region**



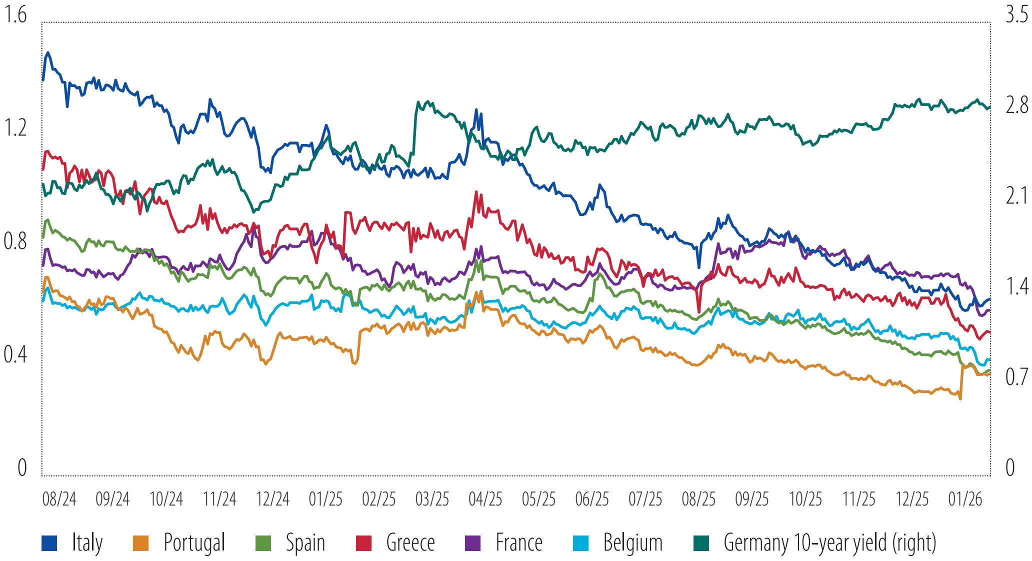
Source: *Annual macroeconomic database of the European Commission's Directorate-General for Economic and Financial Affairs.*
Note: *The lines indicate the range of values across countries within each region.*

Looking ahead, the investment environment for 2026 will be shaped by the continued impact of the Recovery and Resilience Facility, the mobilisation of EU funds, the evolving interest rate landscape and the need to strengthen defence spending. The progressive steepening of rates for sovereign debt globally – and in the European Union – signals that long-term public-sector financing is becoming more challenging. This development warrants attention, given that heightened geopolitical uncertainty – including questions around the durability of US engagement in the North Atlantic Treaty Organization (NATO) – may place additional demands on defence spending in the European Union. The trajectory of long-term yields in the euro area remained stable compared to other advanced economies in 2025, though they were not immune to global volatility and have been rising for longer, 30-year maturities. Encouragingly, yield spreads within the euro area have declined, reflecting strong confidence in long-term policy frameworks and macroeconomic stability (see Figure 9 for the countries with larger outstanding debt in absolute terms).

As in previous episodes, financial markets are likely to amplify future shocks to policies, political institutions or the real economy. The baseline outlook for Europe points to continued, if modest, economic expansion. Model estimates place the lower bound of likely GDP growth (the 10th percentile) at around 0.4% per year and the probability of a recession at only about 2%.[1] Risks have shifted towards the financial sphere. While recession risks remain low in the current environment, a deterioration in market sentiment – such as a spike in volatility or tighter credit – would substantially raise the risk of a recession.

1 The risk assessment is based on a Growth-at-Risk framework, which links current macro-financial indicators to the probability distribution of future GDP growth. Conditional quantiles are estimated using bootstrapped linear quantile regressions, interpolated with a skewed generalised t density to obtain a full distribution. The model incorporates data on GDP, financial stress, interest rates, credit, asset prices, exchange rates, exports and oil prices, allowing for a probabilistic evaluation of downside risks under both baseline and stress scenarios. Details are available from the authors.

Figure 9
Government bond spreads above Germany (left axis: in percentage points) **and 10-year German bond rate** (right axis: in %)



Source: *Refinitiv.*
Note: *France was downgraded by S&P Global Ratings in October 2025 from AA-/Negative to A+/Stable and by Fitch Ratings from AA- to A+/Stable in September 2025. Italy was upgraded by S&P Global Ratings (from BBB to BBB+/Stable) in April 2025, by Fitch (from BBB to BBB+/Stable) in September 2025 and by Moody's Ratings (from Baa3 to Baa2/Stable) in November 2025.*

Concerns are rising about the growing role of non-bank financial intermediaries and their links to banks, which could transmit stress across the financial system (International Monetary Fund (IMF), 2025a; ECB, 2025). European firms remain highly dependent on bank credit, and would be vulnerable to tighter lending produced by falling bank equity values. At the same time, European banks are far better capitalised than in past crises, which strengthens their capacity to absorb shocks.[2] Sovereign debt sustainability also remains a risk to EU and global financial stability. A repricing of sovereign risk would increase borrowing costs and banks' market risk, likely constraining loan supply.

Finally, global equity markets have risen rapidly despite continued uncertainty about economic activity. High valuations of US technology firms are increasingly being questioned, making these stocks sensitive to negative news (see Chapter 5). A sharp correction could spill over to EU markets through direct channels (portfolio exposures) and indirect channels (sentiment, funding conditions and wealth effects).

Against this background of macro-financial risks and fiscal constraints, public policy can stimulate corporate investment by enabling firms to diversify risks and to exploit new business opportunities (see also Chapters 2 and 3). Strengthening the single market will provide EU businesses with a more stable source of demand, more diverse funding sources and more room to exploit economies of scale. Trade policy can further diversify supply chains and open new export markets. Simplifying regulation, including the further alignment of national regulations, can remove constraints holding back corporate investment. There is a role for some targeted and coordinated EU-level industrial policy to support innovation, diversification and supply chain resilience, where external dependencies are judged to be too risky.

2 See, for example, European Banking Association (EBA) (2025). International Monetary Fund (IMF) (2025a) finds that global banking systems were resilient to a geopolitical risk/stagflation scenario, with somewhat larger reductions in the capital buffers of EU banks than in the United States.

Box A

Investment trends in the European Union, United States and China: Implications for Europe's future

Investment levels – and more importantly, investment composition – have profoundly shaped the growth of the European Union, the United States and China over the past two decades. Beyond the volume of capital formation, where economies invest, and in what, determine their capacity to innovate, adapt to structural change and respond to shocks.

The investment growth divide

Investment has grown markedly faster in China and the United States than in the European Union. From 2000 to 2015, gross capital formation increased roughly three times more in the United States than in the European Union, and about 13 times more in China than in the United States. Even more recently (from 2016 to 2024), investment in the United States expanded around 1.8 times faster than in the European Union, while investment in China grew around 1.6 times faster than in the United States.

China continues to devote an exceptionally high share of output to capital formation (around 40% of GDP in 2024), compared with just over 21% in the European Union and the United States.

This sustained investment has arguably accelerated the renewal of capital stock in the United States and China, facilitating the rapid adoption of new technologies and a robust expansion of productive capacity in cutting-edge sectors.

Government vs. private investment: Different models, different constraints

The three regions follow distinct investment models. China relies heavily on public sector investment (around 20% of GDP in recent years, after a dip to roughly 14% in 2015), allowing infrastructure and strategic industries to scale rapidly, including in response to shocks such as the current trade conflict, the pandemic and the real estate downturn.

The US model is more market-driven, with government investment playing a limited but stable role (roughly 4% of GDP in the 2000s, declining to around 3.5% more recently), underpinned by deep capital markets and strong private-sector dynamism.

In Europe, government investment fell below 3% of GDP after the global financial crisis and has only recently recovered, to around 3.5%, with a further boost expected from accelerated RRF spending in 2025-2026. Defence spending absorbs a stable share of public investment (around 21% in the United States and 8% in the European Union).

These institutional and fiscal differences matter not only for the quantity of public investment, but also for its potential to leverage private capital. For Europe, the central issue is therefore not simply how much the state invests, but whether public investment and regulation are designed in a way that catalyses private financing of innovative and high-risk projects.

R&D and intangibles: A persistent innovation gap

Of all asset classes, investment in research and development (R&D) and intangible assets is most closely linked to long-run productivity. The United States has steadily increased its R&D (from 2.8% of GDP in 2000 to around 3.5% in 2024, with private R&D rising from 1.9% to 2.7%), while China has rapidly closed the gap (from 0.9% to around 2.7% of GDP in 2024). Europe has also progressed (from 1.6% to around 2% of GDP), with public funding accounting for roughly 10%.

These differences are significant because innovation is cumulative. Each generation of R&D builds on the last, strengthening the business environment, universities, venture capital, skilled labour and complementary infrastructure. Regions that reach critical mass in innovation-intensive sectors benefit from powerful, self-reinforcing dynamics.

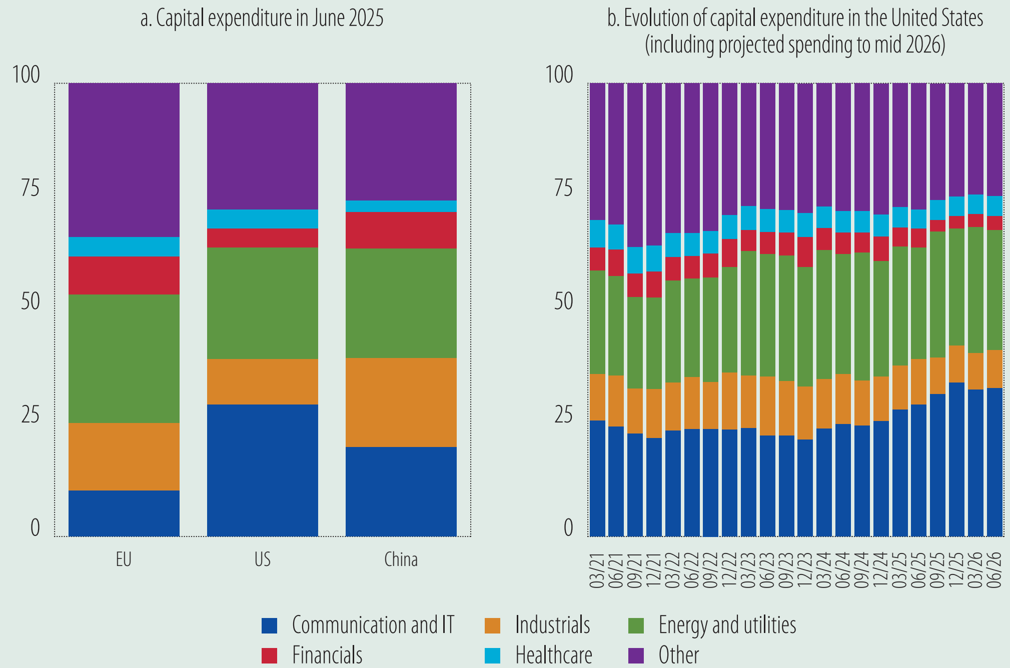
The gap is particularly visible when it comes to investment in intangible assets, such as intellectual property. Information and communications hardware has declined as a share of total investment (in the United States, from about 11.4% to 8%; in the European Union, from 5.5% to 3.2%), while software and databases have risen (from 8% to 13.5% in the United States, and from 5.6% to 8.7% in the European Union). In the United States, investment in information and data processing services alone increased from 0.9% of total investment in 2000 to 5.5% in 2024.

Sectoral allocation: Focus vs. diversification

In the United States, a rising share of capital is channelled towards information and communications technology, digital services, data processing and other high-spillover sectors that underpin productivity growth and innovation. China combines heavy investment in physical infrastructure and manufacturing with expanding capital flows into advanced technologies and strategic industries. Investment in construction has also played a much larger role in China than in the United States and the European Union, peaking at 13.7% of GDP in 2014 before falling sharply to 7.5% amid real estate difficulties.

Figure A.1

Composition of public companies' capital expenditure (in %)**, by sector**



Source: *EIB staff calculations based on Bloomberg data.*
Note: *Panel A shows the share of capital expenditure coming from various industries in June 2025. Panel B shows the evolution of industries' contribution to capital expenditure in the United States, including projected spending until mid-2026.*

European investment, by contrast, remains more evenly distributed across sectors, with relatively larger shares directed towards traditional manufacturing, materials, construction, real estate and consumer goods, and a comparatively lower weight for communication and IT-related activities. Quarterly capital expenditure data show that these digital-intensive sectors have been the main drivers of investment growth in the United States, while contributing much less in Europe (Figure A.1).

This broad diversification can increase resilience to sector-specific shocks, including the risk that expectations about the transformative impact of AI could prove overly optimistic. However, it also means that Europe captures fewer of the strong dynamic returns associated with concentrated investment in innovative sectors. Over time, this affects not only productivity growth, but also the technological composition of exports, the quality of jobs created, and Europe's position in global value chains.

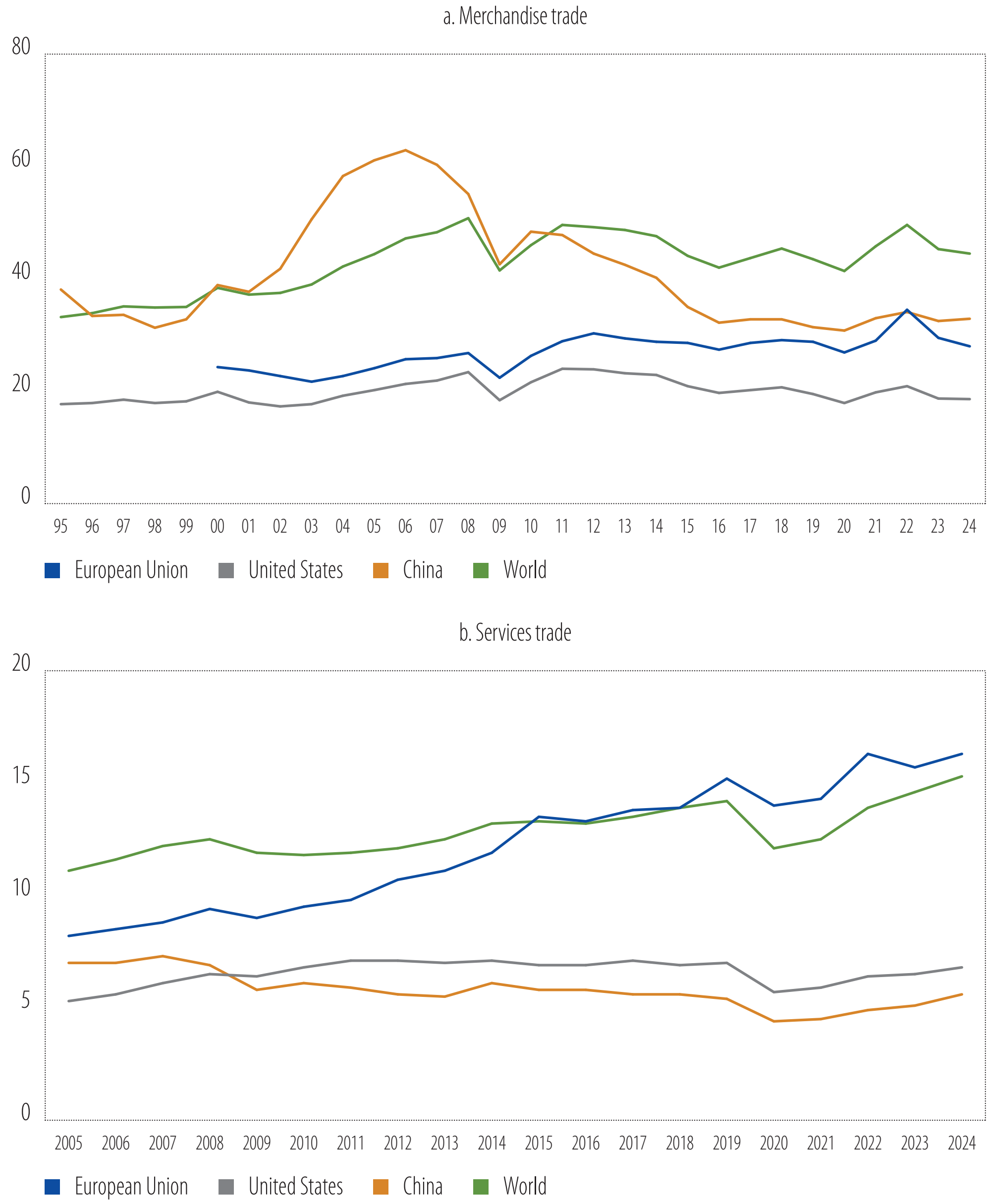
Tariffs, security of supply and change in trade patterns

The world is increasingly uncertain, and the European Union is dealing with structural shifts such as tariffs, protectionism, fragmentation and geopolitical tensions. The European Union not only remains committed to trade, it also leads exports and imports of services, which are the new engine of global trade growth. At the same time, the focus has shifted to economic security, specifically the delicate balance between efficiency and industrial resilience. This strategy necessitates staying active in global value chains to optimise supplies, while simultaneously reducing the exposure associated with longer supply chains. Furthermore, it requires diversifying demand through trade agreements with like-minded partners and actively defending the rules-based system by reforming the WTO. Europe's agile firms can take advantage of business opportunities by further exploiting the untapped potential of the single market, guaranteeing stable access to critical raw materials and related products, and reducing other key dependencies in goods and services.

Globalisation and the European Union

Globalisation is slowing, but more markedly for the United States and China than for Europe. Globalisation, measured as exports plus imports as a percentage of GDP, has been decelerating for merchandise since 2015, although the patterns show many differences by sector and trade bloc (Baldwin, 2024). While this began for China as early as 2006, the decline for the United States has been slower, and the European Union is still resisting it (Figure 10). At the same time, services trade (accounting for 26% of total trade) has expanded consistently in the past two decades and is now the engine of global trade growth. Services trade is expected to grow 4.5 percentage points on average in 2025 and 2026, compared to 1.5 for merchandise trade (WTO, 2025b).

Figure 10
Merchandise and services trade (% GDP)



Source: EIB staff calculations based on WTO and IMF data.

Services lead global trade growth, and the European Union leads the services trade. While China dominates the world's merchandise trade, the European Union is the world's biggest exporter and importer of services, in absolute terms and as a percentage of GDP. The idea that EU leadership is based on tourism is a misperception, as 80% of EU service exports contain a high amount of value added. Legal, consulting, architectural and engineering services drive those exports (24% of total, grouped under other business services), followed by information and communications technology services (20%), logistics and transportation (19%) – and only then followed by tourism services (12% of total exports), financial and insurance (9%) and intellectual property (7%). However, services trade is relatively concentrated (Germany, Ireland, France, the Netherlands, Spain, Denmark and Luxembourg make up three-quarters of all EU services trade), and some services might be affected by the slowdown in the trade of goods. Regardless, the European Union remains competitive in services, which buoys confidence and stability.

Supply-side trade challenges for the European Union

Supply-side disruptions are no longer physical, but geopolitical. Indicators of physical trade disruptions, such as the Global Supply Chain Pressure Index – which peaked during the COVID-19 pandemic and at the beginning of Russia's invasion of Ukraine – are now oscillating around their long-term average (Federal Reserve Bank of New York, 2025). The EIB Investment Survey (EIBIS) confirms that companies are no longer primarily concerned about access to raw materials. Most supply chain disruptions are now driven by geopolitical factors. On the supply side, these include energy sanctions, export restrictions related to US-China tensions, and military interventions such as those in Venezuela. On the demand side, they primarily manifest as tariffs.

Although these shocks might eventually lead to shifts in trade and investment patterns, such movements are generally slow. Bringing production back to domestic markets (reshoring) can be too costly, and sourcing from politically and economically compatible countries (friendshoring) may also prove risky, if partners are unreliable.

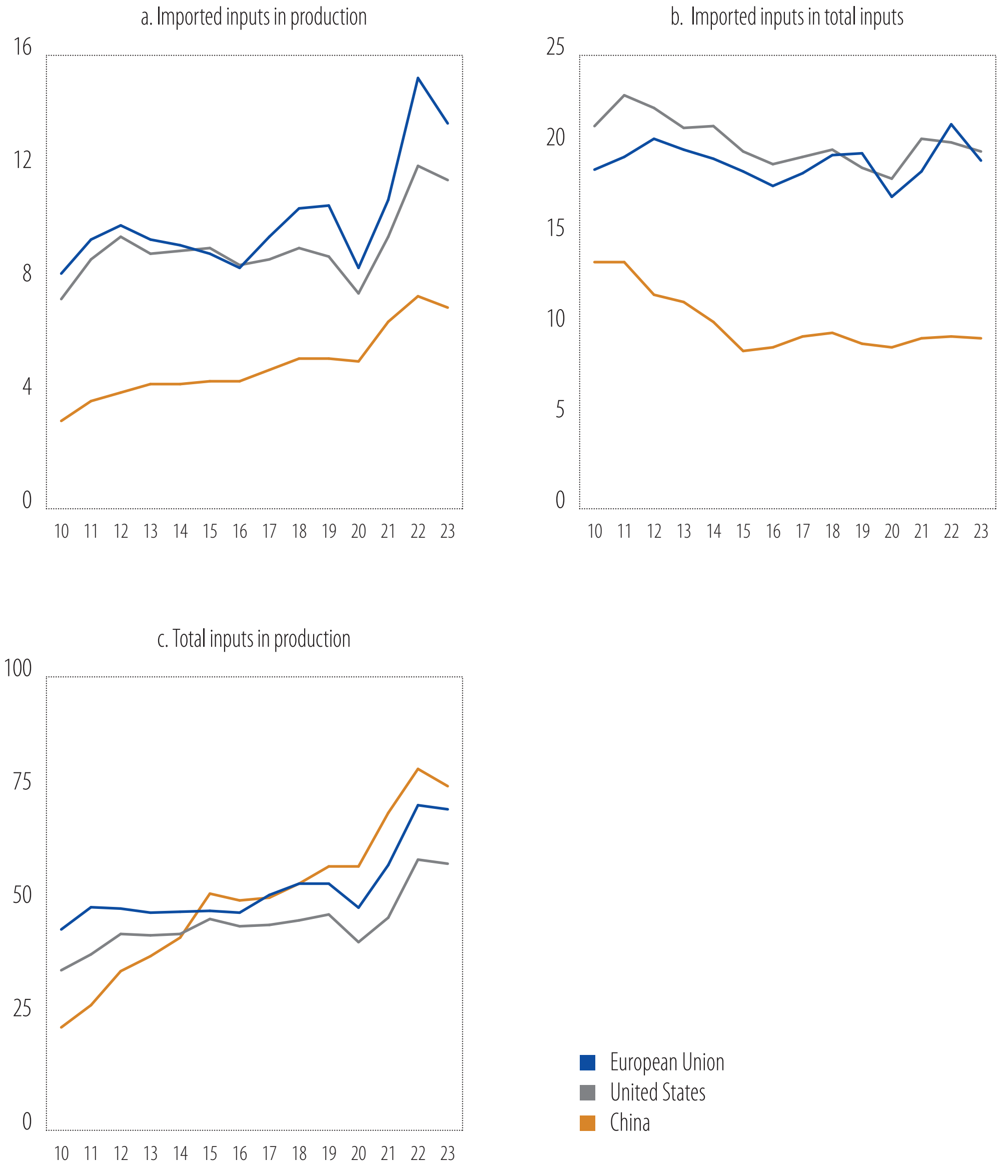
In a world of global value chains, foreign supplies remain crucial to produce and export, which is pushing companies to find ways to deal with supply risks. The invasion of geopolitics into trade has led to a rethinking of global value chains – considering not just costs, but also disruption risks. The concepts of derisking (reducing exposure to an unreliable partner) or even decoupling (severing ties with it) are now part of any trade bloc's definition of strategic autonomy. Today, however, after many decades of globalisation and specialisation, intermediate supplies represent more than 50% of total trade, making diversification difficult. Derisking implies reducing the use of foreign inputs per unit of production, especially from unreliable partners. Figure 11 shows that production in the three main trading blocs (the European Union, the United States and China) grew increasingly reliant on foreign inputs until 2022, when the ratio began to decline in line with the rise of derisking strategies.

The European Union has managed to remain more open to trade, while still being able to reduce risks posed by foreign supplies partly by enhancing productivity. We can analyse the role of foreign inputs in production by breaking it down into two drivers: first, the extent to which a sector relies on foreign rather than domestic suppliers (strategic autonomy); and second, the intensity of inputs required in the production process, which is a key indicator of value creation and productivity. Figure 11 shows that the share of foreign inputs in total inputs has been rapidly decreasing for the United States and China, while remaining relatively stable for the European Union, which is more open to trade. At the same time, all of the regions increasingly need more inputs per unit of output (which means less value added generated per unit of output).

This points to the role played by productivity. On average, the United States uses less inputs than the European Union or China, and less imported inputs – not just because it is more self-sufficient, but also because it generates more value added per unit of product. China has substantially increased the use of inputs in production in the past decade and has concentrated on using domestic inputs wherever possible (thus becoming more vertically integrated). The European Union, for its part, requires less inputs per unit of production than China, although more than the United States. At the same time, it has not retrenched from trade, relying on foreign inputs for a more efficient production mix. Overall, the European Union is trying to de-risk by maintaining a delicate balance, focusing on productivity, diversification of foreign sources along with a new network of trade alliances. This is also confirmed by EIBIS, which shows that trade shocks have led EU firms to stockpile more inventory, increasing digital tracking and diversifying their import partners, but they have less actively substituted imported goods with domestic production.[3]

Figure 11

Breakdown of share in imported manufacturing inputs (in %), **2010-2023**



Source: *EIB staff calculations based on Eurostat FIGARO (2025) input-output tables.*

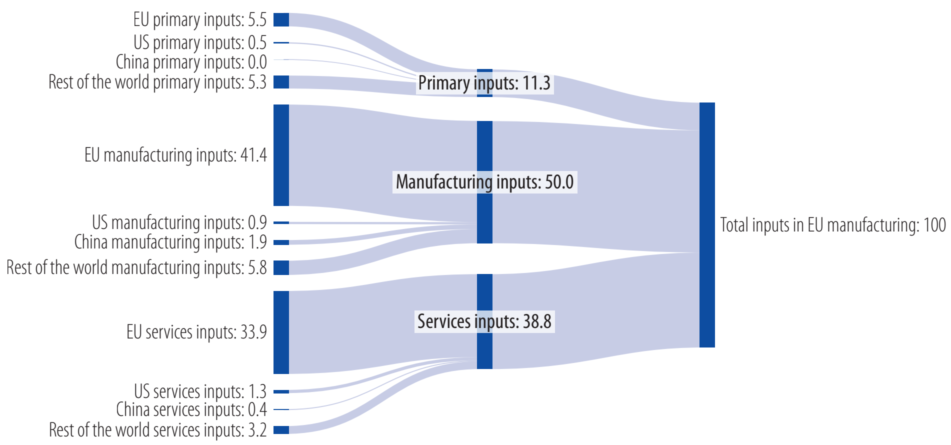
The European Union's strength in services can help its manufacturing industry stay competitive. One of the most remarkable effects of globalisation is that it has transformed the concept of industry. On the one hand, virtually no complex product is entirely produced in one country. On the other hand,

3 See the data annex to this report for an explanation of the EIB Investment Survey.

many key industrial inputs are now services, many of which (R&D, design, logistics, after-sales, etc.) give many manufacturing sectors their competitive edge. For instance, manufacturing's value added in the production of high-end mobile phones is less than 5%. The rest is services like design or R&D (Xing and Detert, 2010). Today, even the most traditional sectors can become competitive by incorporating value-added services (EU textile companies are a good example of how R&D, design and logistics can totally transform a traditional sector). There is thus scope for making the EU competitive advantage in services a source of competitiveness for its manufacturing sectors.

Strengthening the single market can reinforce the European Union's strategic autonomy and bolster resilience. The EU manufacturing sector is a good example of the concept of the "servitisation" of industry (Vandermerwe and Rada, 1988), with services representing almost 40% of its inputs (Figure 12). It has also benefited from market integration. More than 80% of all EU inputs are sourced in the single market, with only 2.3% coming from the United States and 2.3% from China. If we also consider indirect inputs (those required to produce direct inputs), the internal sourcing rate increases to 83%, and dependence on China to 3.3% (2.4% for the United States). Just as its powerful domestic market gives the United States a huge advantage, strengthening the EU internal market (along the lines of the Draghi Report; see Draghi (2024)) could improve the strategic autonomy of the European Union, for goods and services alike. Promoting market integration, increasing productivity and improving input diversification could improve the European Union's ability to withstand external shocks, especially in a context of increasing geopolitical risk.

Figure 12
Origin of intermediate inputs in EU manufacturing (in %)



Source: EIB staff calculations based on Eurostat FIGARO (2025) input-output tables.

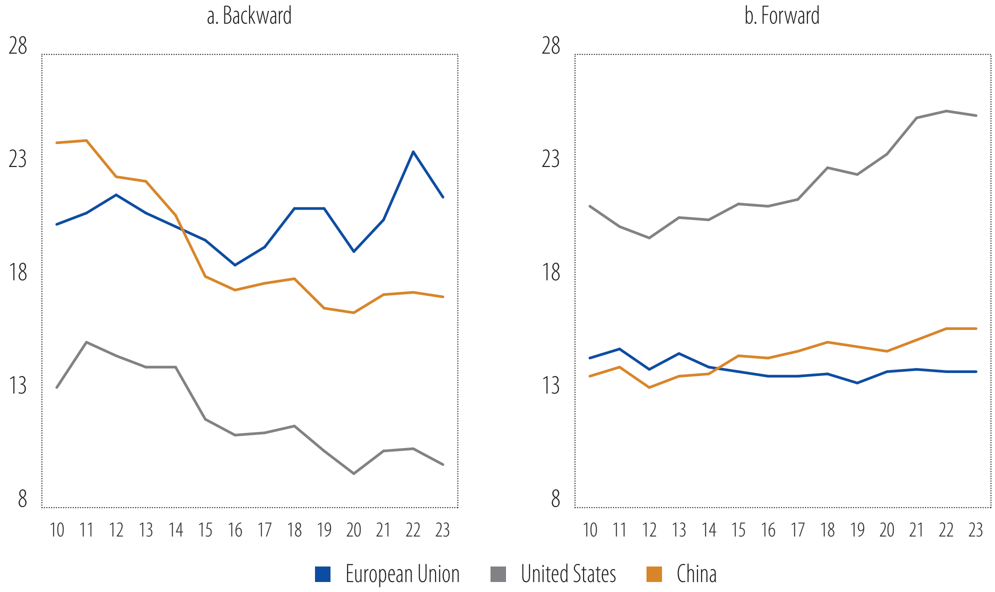
Dependence also has a qualitative component, linked to substitutability. Dependence on foreign inputs should be considered from a qualitative point of view as well. There are goods and services that may not be quantitatively relevant, but they are very hard to replace and could be used as geopolitical weapons. A good example is rare earth minerals, a group of 17 metals whose value in production and trade is relatively small, but which are indispensable in the industrial production of key technology and defence products. China's absolute dominance in the global supply of rare earths – not only in raw form, but especially in the processed and refined form (99% for heavy rare earths) – gives it considerable leverage against the United States through export restrictions that also affect the European Union.

The European Union needs to guarantee its access to rare earths and other key supplies. The European Commission periodically examines the risks associated with critical raw materials (including rare earths) based on their economic importance, and on the risk of supply disruption. Both factors are high for rare earths, which classifies them as strategic.[4] That sensitivity calls for strategic agreements with reliable partners, as well as investment in all parts of the value chain. The EU Critical Raw Materials Act and the EU Stockpiling Strategy facilitate joint buying and stockpiling of critical raw materials, setting up a system for aggregating demand that could form the basis of future purchase agreements. Such agreements could effectively boost private investment in extraction, processing and refining.

Services are also key for the European Union's economic security. Services create dependency through two distinct channels: directly, through standalone products like US-dominated cloud software; and indirectly, through services embedded in physical infrastructure, such as the cybersecurity protocols within 5G networks. The digital network component of services makes coordination among EU members and with like-minded countries even more relevant.

Imports are also required to produce competitive exports. Foreign supplies are needed not only to satisfy domestic demand, but also to produce competitive exports. Figure 13 shows the participation of the three main trading blocs in global value chains, in the form of foreign inputs used to produce domestic exports (backward global value chains) and domestic inputs used by the rest of the world to produce their exports (forward global value chains). We can see that both the United States and China are progressively reducing their backward participation in global value chains, while the European Union continues to import inputs to optimise the input mix and produce more competitive exports.

Figure 13
Participation in global value chains, backward and forward (% of gross exports)



Source: *EIB staff calculations based on Eurostat FIGARO (2025) input-output tables.*

4 The European Commission considers critical raw materials strategic when they have an economic importance higher than 2.7 and a supply risk higher than 1. All rare earths are considered strategic, with the highest levels registered for dysprosium, terbium and lutetium among the heavy rare earth elements, and neodymium and samarium among the light rare earth elements (European Commission, 2023).

Demand-side trade challenges for the European Union

US tariffs and new protectionism pose a challenge to global demand. The reciprocal tariffs imposed by the Trump administration since April 2025 – whose size remains uncertain after the US Supreme Court's ruling in February 2026 – are a threat to global demand. The United States is the world's biggest importer of merchandise (13% of global imports). To analyse the impact of US tariffs we need to consider effective tariff rates (rather than nominal ones), and exports in terms of value added (rather than in gross terms).

Effective tariff rates differ from nominal rates. Effective tariff rates are calculated using the custom duty revenue as a percentage of gross imports, thus reflecting the real impact of tariffs, considering exemptions and other factors. Figure 14a shows that the United States increased its effective tariff rate against the rest of the world by 16 percentage points in 2025, one of the biggest increases in history. Figure 14b reflects the difference between the nominal and effective rates for the United States' main trading partners. The effective tariff rate applied to European Union imports is similar to the nominal rate, but this is not true for other countries like Mexico or Canada (where effective rates are much lower due to exemptions under the US-Mexico-Canada Agreement) or China or Korea (where they are higher). The effective tariff rate faced by individual EU countries also differs. Countries whose main exports are steel, aluminium and iron (like Luxembourg, Romania or Bulgaria) face higher effective tariff rates, while they are lower for big exporters of currently exempted goods, like commercial aircraft and jet engines and parts and pharmaceuticals (for example, Ireland or Slovenia).

To understand exposure to tariffs, we must also consider the share of total exports that are sent to the United States. Luxembourg, Romania, Bulgaria, Slovenia and Denmark have high effective tariff rates, but only a small share of their exports go to the United States, while Ireland, Belgium and the Netherlands (with relatively low effective tariff rates) are much more exposed. Germany, Slovakia, Greece, Austria, Italy and Sweden face both high effective tariff rates and send a high share of their exports to the United States. Meanwhile, Malta, Croatia, Estonia, Portugal and France have both low effective tariff rates and limited exports to the United States (European Commission, 2025a).

Tariffs have spillover effects within the European Union. In merchandise trade, the European Union must deal not only with bilateral US tariffs, but also with the indirect impact of US tariffs on third countries (trade diversion). Negative effects may spill over to other EU countries in the short term. US tariffs on EU goods could result in lower net EU exports and real GDP. These effects could be amplified by the fall in the prices of merchandise provided by third countries as US demand for their products weakens. This would raise imports into the European Union and decrease the competitiveness of its exports, even though this effect could be partially offset by a relatively low tariff on the European Union vs. other countries (and domestic disinflationary pressures).

In the medium term, trade diversion could prove to be beneficial for the European Union. Because the European Union faces relatively lower US tariffs compared to other competitors, it could gradually increase its market share in the United States. The impact of trade diversion would then become positive, and the adverse economic consequences would be mitigated (European Commission, 2025a). And while the euro could weaken in the medium term compared to the US dollar, it could strengthen on a trade-weighted basis due to an even stronger depreciation of the currencies of tariff-hit third countries. In this scenario, trade diversion would reduce EU consumer prices, increasing real income.

There is also an indirect exposure to tariffs linked to global value chains. When analysing the impact of US tariffs on exporting countries, we must consider not only the direct impact on exports, but also the indirect effect of supplies coming from global value chains. We use input-output data to analyse how the GDP of exporting countries could be influenced by US demand for foreign products. The analysis shows that tariffs might have a significant effect on countries directly exposed to the United States (like Ireland, Germany or Italy), as well as on countries that sell supplies used in exports to the United States (such as Denmark).

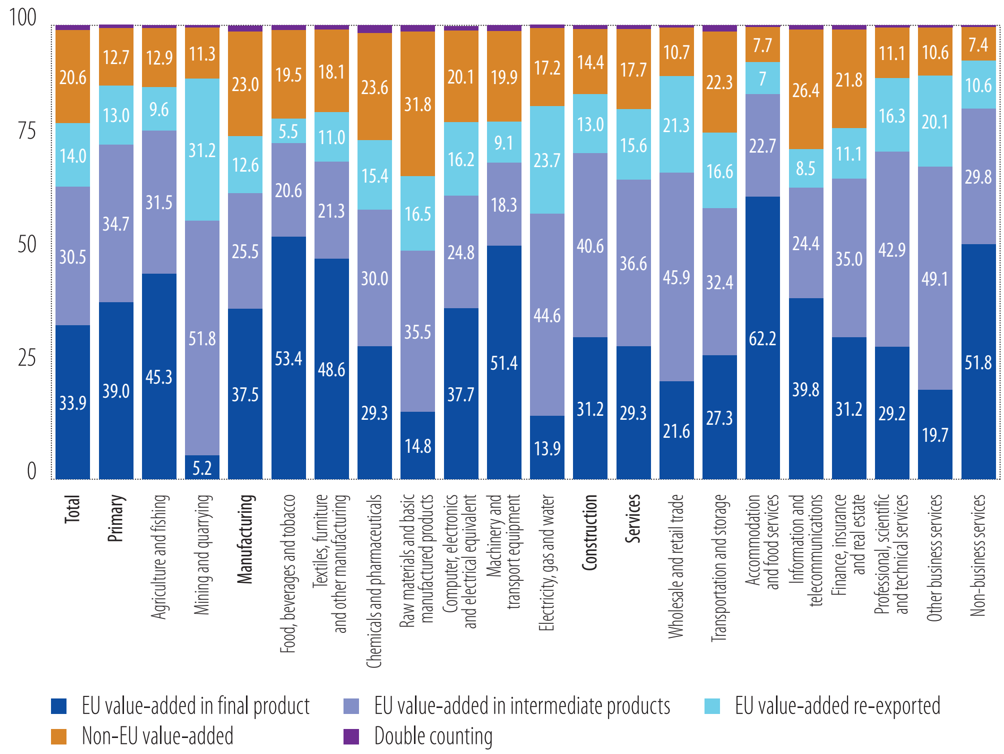
Figure 14
US reciprocal and effective tariff rates (in %)

Source: *EIB staff calculations based on the Budget Lab at Yale University and the Center for Global Development.*
Note: *The latest data available were for November 2025.*

EU exports of intermediate inputs are somewhat less exposed. From a global value chain perspective, it is also important to consider the value added in exports and the role of intermediate inputs. Analysing value added in gross exports for the European Union (Figure 15) shows that, for each €100 of gross exports, an average of €78 are domestic value added (with differences by sector). This average is similar to the United States or China, but the breakdown paints a different picture. Almost two-thirds of the value added in EU exports is directly absorbed in immediate partner countries (34% as final goods directly absorbed by the immediate partner, and 31% as intermediate inputs used in the immediate partner's final production). Only 14% (12.6% in manufacturing) are EU inputs reexported to third countries (forward global value chains), compared to 16% for China and 25% for the United States (Figure 13b). The European Union's relatively lower exposure to forward global value chains, compared to China or the United States, implies that it is less exposed to longer, and therefore riskier, value chains.

Figure 15

Breakdown of value added in EU gross exports (in %)**, by sector**



Source: *EIB staff calculations based on Eurostat's FIGARO (2025) input-output tables.*

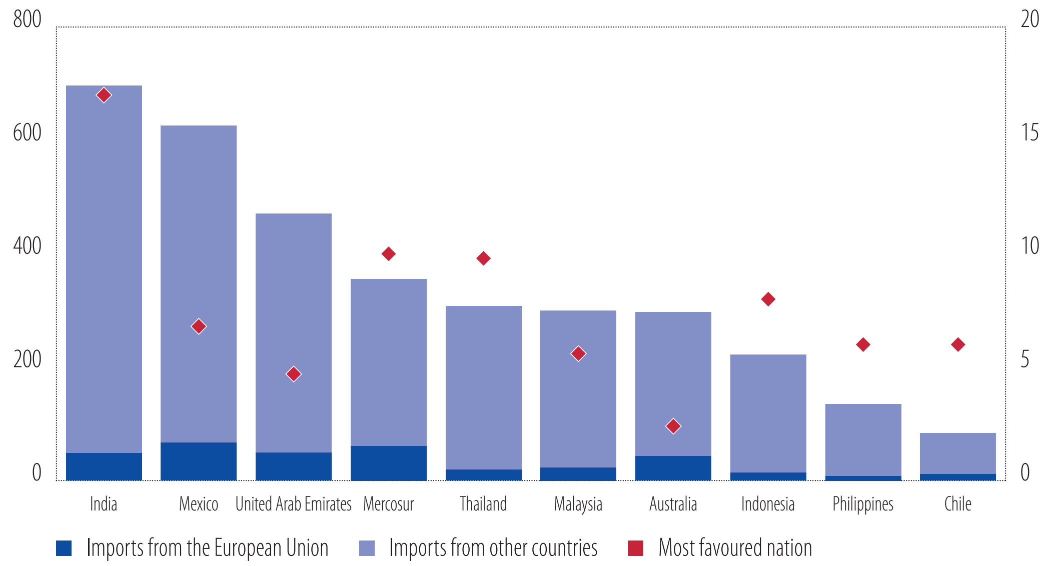
Tariffs on EU products affect US consumers more than US exporters. Analysing the European Union's bilateral exports to the United States shows a similar percentage of value added, but with 6% of supplies re-exported. This indicates that US tariffs on EU products affect US consumers relatively more (via final goods, or inputs for final goods) than US exporters (via inputs to produce US exports). Moreover, some EU exports are not easy to substitute. The United States imports a number of EU products with few alternative providers, mostly chemicals, pharmaceuticals and ships, but also less strategic products like wine or champagne.

The consequences of the shock generated by the new tariffs and the substantial threat to the system of rules-based global trade is difficult to assess. Initially, the main reaction was to export merchandise to the United States quickly before the tariffs kicked in (frontloading). However, given the cross-sectoral and cross-country ramifications of the tariffs, this shock is likely to induce long-term structural changes. In the short run, it is essential to evaluate the extent to which tariffs are passed through to US consumers and the implications. From an EU perspective, it is necessary to assess the direct impact of US tariffs on EU goods, and to evaluate whether Chinese exports are being rerouted to alternative destinations, including the European Union. This requires trade balance data, as well as import and export price indicators. Regarding the trade balance, the European Union's monthly goods surplus with the United States averaged €13.5 billion from January 2021 to June 2024. It rose to €27 billion in the first three months of 2025 (reflecting front-loading) and then fell to around €14 billion from April to October. As for the European Union's monthly goods deficit with China, it has averaged €31 billion from January to October 2025 – well above the €26 billion average recorded between 2021 and the first half of 2024. However, this level is similar to what has been observed since the second half of 2024 and may simply reflect the appreciation of the euro.

The evolution of unit values provides insights into the pricing behaviour of firms. It is useful to examine whether euro-denominated export prices from the European Union to the United States are declining, which would indicate that EU firms were absorbing part of the tariff into their margins. It is also important to look at whether import unit values from China are falling as Chinese firms attempt to reroute their exports. Regarding China, import unit values (in euros) have been declining year-on-year since May 2025. However, a similar decline occurred in the second half of 2024, suggesting that the trend is only partly related to the rerouting of trade. The decrease is likely driven by two additional factors: the appreciation of the euro against the US dollar (with unit values expressed in dollars falling less sharply), and the persistently negative producer prices recorded in China since 2022. As for EU export prices to the United States, they increased significantly in the early months of 2025 due to increased demand from front-loading, before levelling off over the summer. Consistent with the trade balance dynamics, export prices edged up again in September. By contrast, import prices expressed in dollars have remained more stable. Overall, there is scare evidence that EU businesses are absorbing tariffs by reducing their export prices to the United States, or that Chinese firms are cutting prices to reroute exports to the European Union.

Figure 16

Imports and most favoured nation tariffs of potential EU trade partners (left axis: $ billion; right axis: most-favoured nation tariff, in %)



Source: EIB staff calculations based on the United Nation's Comtrade database and WTO data.

The European Union's proactive approach to trade agreements has been crucial for diversifying both risk and demand. The US tariffs show the risk of concentrating exports on one country and the need for alternative markets. A trade agreement between the European Union and the United States helped reduce uncertainty but has not fully eliminated it. The European Union is actively pursuing trade agreements with several countries, including Australia, Chile, India, Indonesia, Malaysia, Latin America (Mercosur), Mexico, the Philippines and Thailand. In 2024, these countries imported $3.5 trillion from the rest of the world, of which $343 billion came from the European Union (10%). The EU-Mercosur agreement was signed in early 2026, and other trade agreements are well advanced (like with India, Chile or Mexico) or in some cases are pending ratification. Others are still being negotiated. The potential to increase exports to these countries depends not only on the size of the country and the previous tariff structure (Figure 16), but also on the type of agreement signed. Additionally, some of these agreements (Mercosur is a good example) can have important geopolitical implications, reinforcing the European Union's role as a credible political and economic partner in a complicated global environment.

EU trade agreements under negotiation could increase EU exports by $66 billion (€61 billion, or 0.3% of EU GDP). Simulations using a gravity model (Box B) suggest that the largest potential gain in exports would be for exports to India ($19.1 billion), Mercosur countries ($13billion) and Mexico ($8.2 billion), followed by Indonesia ($5.5 billion) and Australia ($5.3 billion).

Box B

Using a gravity model to estimate the benefits of EU trade agreements

Trade agreements can serve to increase EU exports, helping to compensate for the adverse effect of the hike in US tariffs. The potential effects can be seen using a trade gravity model.

Gravity models trace back to the works of Tinbergen (1962) and are traditionally used to analyse international trade. The models find that bilateral trade flows tend to increase with the economic size of trading partners and decrease with geographical distance and other forms of transaction costs. In this box, a gravity model is used to estimate the potential of trade agreements to raise EU exports to other parts of the world.

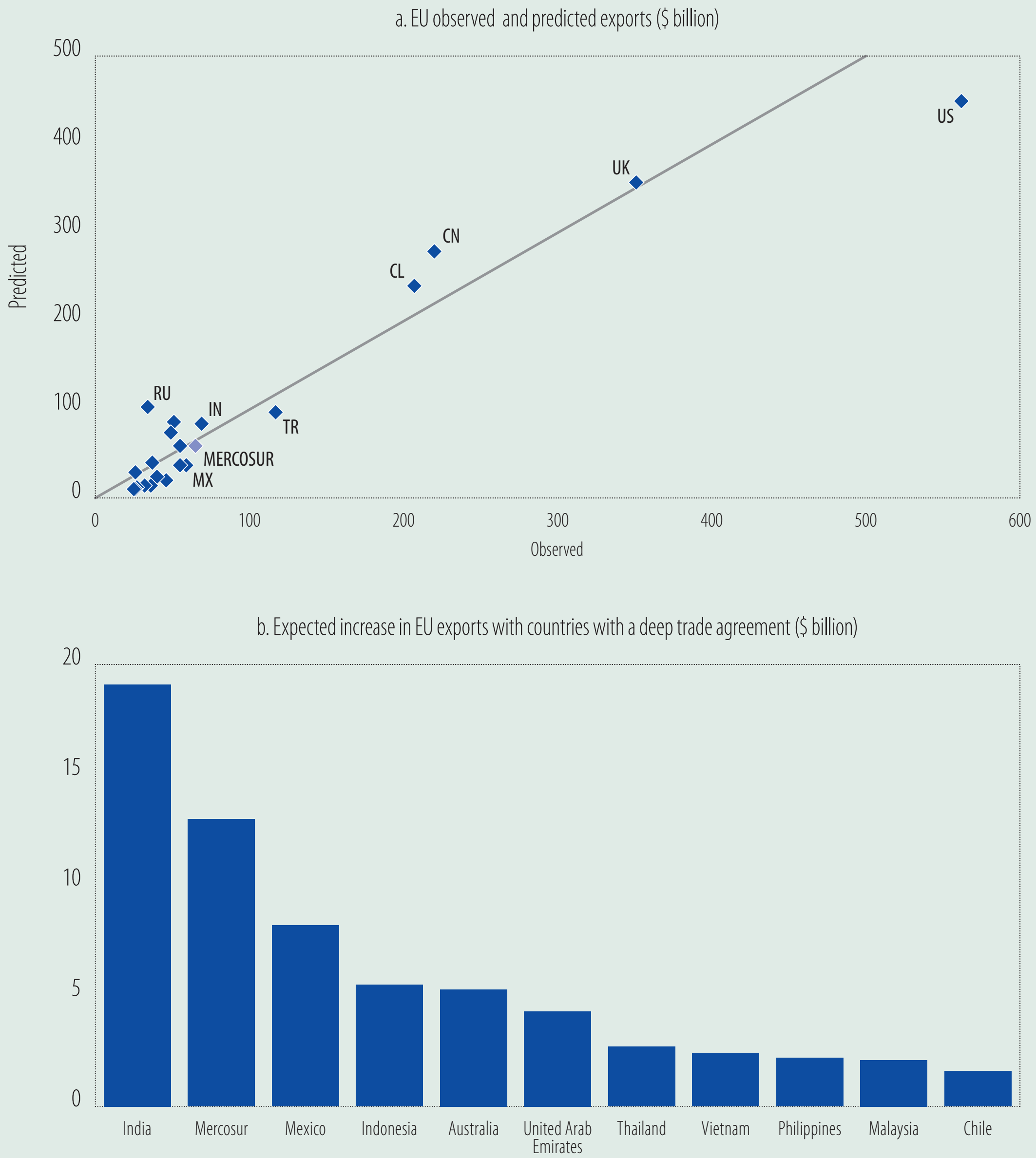
The regression model attempts to explain bilateral exports of goods from EU countries in 2024 with the following independent variables: harmonic bilateral distance (population-weighted distance), GDP of the exporting and importing countries, cultural and historical connections (captured by a common official language dummy), and the presence of a deep trade agreement in place for five or more years (also using a dummy).

The European Union is considered to have deep trade agreements (agreements that substantially increase trade) with countries in the European Economic Area, Switzerland and Türkiye (customs union). Its agreements with Canada, Japan, Moldova, Singapore, South Korea and Ukraine are also considered to be deep because they include key trade-enhancing clauses, according to the Deep Trade Agreements database (Hofmann et al., 2017) and the Design of Trade Agreements database (Dür et al., 2014). The EU-UK free trade agreement – although theoretically a deep trade agreement – has been excluded, because it effectively implies a restriction on trade flows compared to the United Kingdom's previous status as a full EU member, and would distort results. Export flows are estimated by EU country and then aggregated.[5]

The results show that all explanatory variables enter the equation with the right sign and are statistically significant at the 99.9% level. The coefficient for distance is -0.70, suggesting that greater distance is associated with lower export volumes. Economic growth of exporters and importers are positively associated with export flows, and have elasticities of approximately 0.96 and 0.85, respectively. A common official language corresponds to a 59% average increase in exports. Interestingly, deep trade agreements, defined as those including regulatory cooperation and investment facilitation in addition to tariff reductions, are estimated to raise exports by one-fifth (22%), all other things being equal.

5 As Santos Silva and Tenreyro (2006) show that log-linearised models estimated by ordinary least squares (OLS) can produce biased elasticity estimates, we employ Poisson Pseudo Maximum Likelihood estimation, more suitable for addressing heteroskedasticity and zero trade flows – both frequent features in trade data. Fixed effects are discarded to avoid collinearity due to trade agreements being shared among EU members trading partners.

Figure B.1
Results of a gravity model for EU exports



Source: *EIB staff calculations.*

The model accounts for a very large portion of trade flow variation, with an R-squared of 0.81 and a Pseudo-R-squared of 0.90. When the model's predictions are compared to actual export levels, observed EU exports fall below model expectations for several countries, including China, the United Kingdom and Russia, while exceeding predicted values with countries like the United States (probably due to historically low tariffs there).

Considering free trade agreements currently under negotiation (or pending ratification), the largest potential gain in exports is projected from the deal with India (an estimated $19.1 billion), followed by Mercosur countries ($13 billion) and Mexico ($8.2 billion). Indonesia ($5.5 billion) and

Australia ($5.3 billion) also see notable increases. Other markets like the United Arab Emirates, Thailand, Vietnam, the Philippines, Malaysia and Chile are expected to generate moderate positive effects ranging from $1.6 billion to $4.3 billion. Overall, the 11 free trade agreements have the potential to increase bilateral exports to these partner nations by 20.6%. Currently, these nations represent 12.5% of all extra-EU exports. This represents $66.4 billion of additional exports, or 2.6% of total exports beyond the European Union.

To improve resilience, the European Union is also strengthening global ties. For that reason, it is relevant to map the European Union's global economic and strategic interests or strategic engagement. To complement the analysis of Europe's evolving trade landscape, Box C investigates the European Union's broader strategic engagement.

Box C

Europe in the new world order: Drivers of EU strategic engagement

EU companies' trade relations with different parts of the world have undergone significant changes in recent years – with this evolution accelerating in recent months due to the impact of tariff-related disruptions. Are EU ties weakening or strengthening in various places? Are EU companies realigning their trade relationships in line with the European Union's broader strategic engagement efforts?

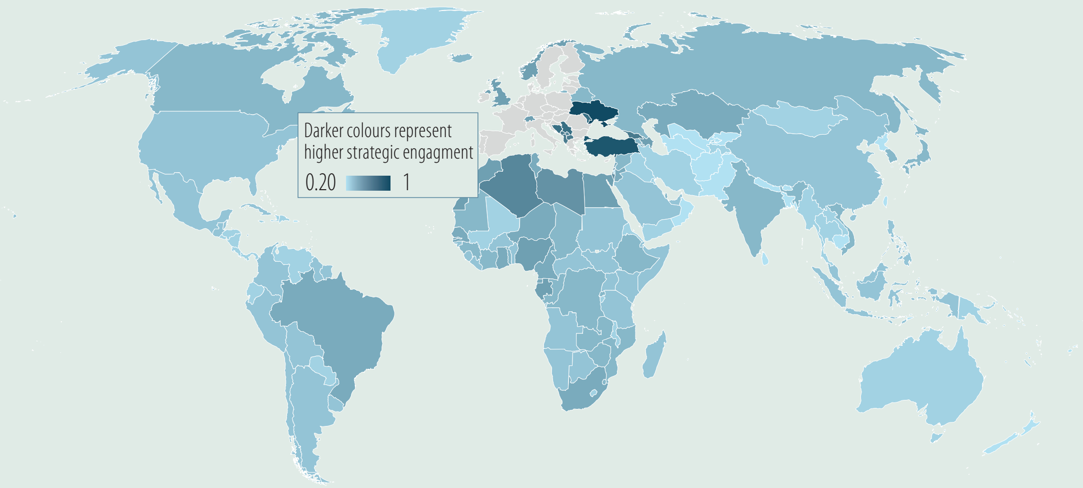
EU strategic engagement can refer to links and relationships that are considered essential for the European Union's long-term prosperity, sovereignty, security, and international influence. Assessing EU strategic engagement is highly subjective. First, the definition itself spans several areas – geopolitics, security, energy, and economics (Vimont, 2016). It is also difficult to quantify strategic engagement.

To assess the relevance of EU strategic engagement in economic terms, we have considered various dimensions for each country. These include existing trade links; the depth of trade agreements (Breinlich et al., 2021; Fontagné et al., 2023; Dür et al. 2014); investment links (foreign direct investment); the relevance for EU energy security, through the supply of oil and gas; the importance of critical raw materials in the supply chain; geographic location along EU-African strategic corridors (European Commission, 2025b); Global Gateway country prioritisation (focusing on digital, climate and energy, transport, health, and education and research); and political alignment (Khan, 2020), among others. Other qualitative, geopolitical dimensions are assessed on a case-by-case basis. A dimension is flagged if is exceeds a certain threshold. The number of flags, out of the total number of available flags, produces a 0-1 index that signals the overall strategic relevance of individual countries for the European Union.

Assessed across the above components, EU strategic engagement turns out to be broader, on average, in EU candidate countries (including Ukraine and the Eastern Candidate Countries as well as the the Western Balkans). These are followed by the regions of the Middle East and North Africa, sub-Saharan Africa, Latin America and Asia, although EU strategic engagement varies substantially by country (especially for large continents like Africa, Latin America and Asia).

The European Union as a whole is the most significant trading partner, on average, in most regions in the world. Over the years, the European Union has mainly focused on the same trading partners (Marchini and Popov, 2025). Still, the overall relevance of EU trade – here, a country's trade with the European Union as a percentage of its total trade, considering exports and imports – is evolving across regions and countries (including towards some whose international relations are increasingly misaligned).

Figure C.1
EU Strategic Engagement Index



Source: *EIB Economics Department.*
Note: *The EU Strategic Engagement Index (0 = very low; 1 = very high) is a composite indicator based on the following variables: Relevance of trade with the European Union: (Import and export from EU) / (Import and export country total). Depth of trade agreements with the European Union: Comprehensiveness of a trade agreement in terms of the policy areas it covers and the extent to which it reduces barriers to trade beyond tariffs. Relevance of EU foreign direct investors: (Foreign direct investor stock from EU countries)/(country's total foreign direct investment). Energy security: Countries that export a significant share of oil or gas and liquified natural gas to the European Union. Critical raw materials: Countries that already supply a significant share of one or more critical raw materials to the European Union, and countries that are global critical raw materials suppliers but do not yet supply the European Union. Strategic EU-Africa corridors: Countries included in the the EU-African strategic corridors. Global Gateway: Selected in Global Gateway priority sectors. Political alignment: Countries that vote in accordance with the EU27 countries the majority of the time in the United Nations General Assembly. Other: Countries with a relevant strategic interest for the European Union that is not captured by the above data (critical pipelines or shipping routes, space cooperation, defence and security, etc.) – based on expert judgement.*

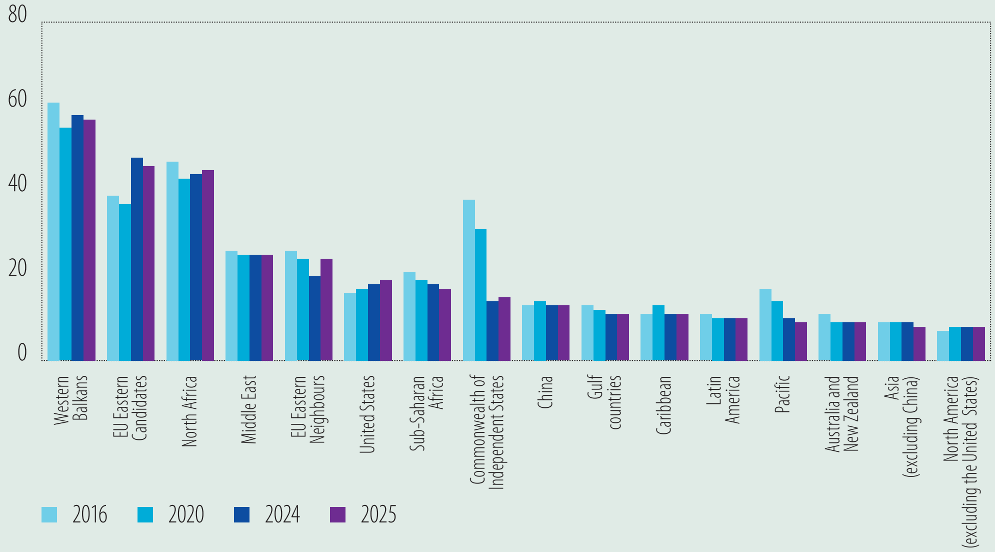
The relevance of EU trade is the highest in the Western Balkans, the Eastern Candidate Countries (Ukraine, Moldova and Georgia), and North Africa (above 40%). It is around 20% in the Middle East and some Eastern Neighbourhood countries. And it is below 10% in Asia (excluding China), North America (excluding the United States), Australia and the Pacific Islands countries. From 2016 to 2024, The relevance of trade with the European Union increased in the Eastern European candidate countries. It eroded slightly in sub-Saharan Africa, the Gulf countries and Asia (despite the increase in Japan and South Korea). It only decreased sharply in other countries in the Commonwealth of Independent States, affected by the deteriorating relationship with Russia, and in the Pacific Islands countries. It remained relatively stable in the other areas.

In 2025, the tariff shock prompted some EU companies to reorient trade – although the resulting change is more modest than expected, and the direction of change does not always align with EU strategic engagement. In the first seven months of 2025, EU firms lost some of their share in trade with certain highly strategic candidate countries, such as North Macedonia, Kosovo[6] and Ukraine. In the Middle East and North Africa, EU companies are losing trade share in Morocco, Lebanon and (even more relevant) Algeria. EU business is also losing some trade share in certain sub-Saharan African countries that are highly strategic for the European Union. On the other side, EU trade is now more relevant in some Middle East countries (Tunisia and Libya), Armenia and various sub-Saharan African countries.

6 This designation is without prejudice to positions on status and it is in line with UNSCR 1244/1999 and the ICJ Opinion on the Kosovo declaration of independence.

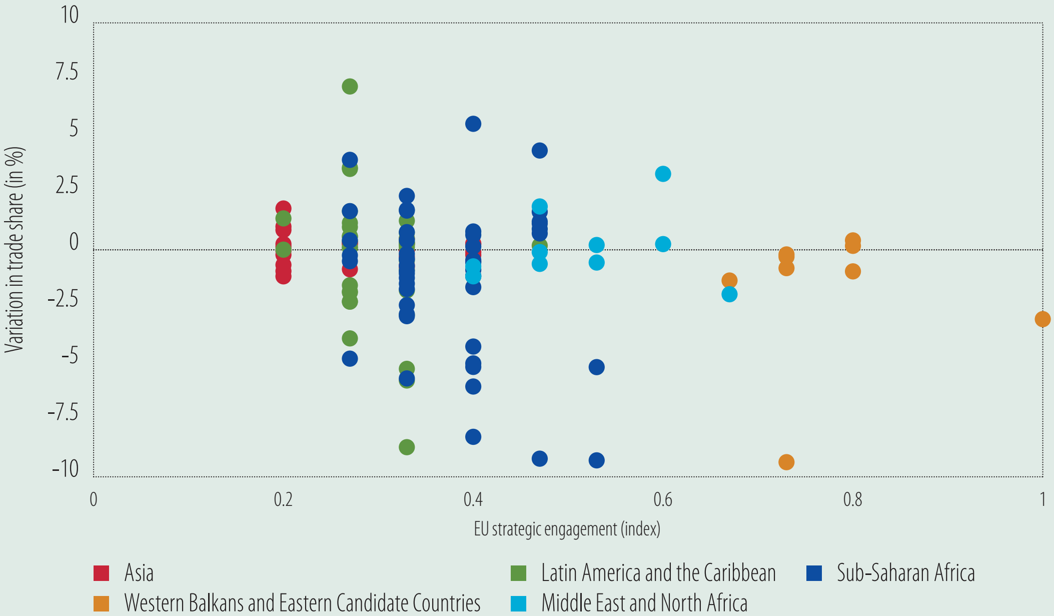
There is therefore room to increase support for EU business with respect to countries in which EU strategic engagement is high. That support could take the form of trade agreements, EU support for local investment, foreign direct investment, or additional funding for trade finance, for example.

Figure C.2
Change in EU trade relevance (in %)



Source: *Comtrade, EIB staff calculations.*
Note: *The relevance of EU goods trade is defined as (country's import + export the European Union)/(country's total import + export). Weighted average. Eastern Candidate Countries are Ukraine, Moldova and Georgia. The 2025 figures are for the first seven months of the year only.*

Figure C.3
EU trade relevance and strategic engagement (change from 2024 to the first seven months of 2025 in each region's share of trade)



Source: *Comtrade, EIB staff calculations.*
Note: *The relevance of EU goods trade is defined as (country's import + export the European Union)/(country's total import + export). Weighted average. Eastern Candidate Countries are Ukraine, Moldova and Georgia.*

Funding and investment in a multipolar global financial system

The financial system is increasingly multipolar, and geopolitical risks are growing. Global imbalances have re-emerged: the US deficit is widening, China's surplus is rising, and the European Union continues to act as a net lender to the rest of the world. Excess European savings still flow disproportionately into the deep and liquid US financial markets, reflecting persistent friction that holds back domestic investment in the European Union. At the same time, geopolitics and fragmentation are already playing a growing role in shaping links throughout the financial world, which is influencing bilateral relationships, strategies to manage reserves – including increased attention to gold – and banks' cross-border claims.

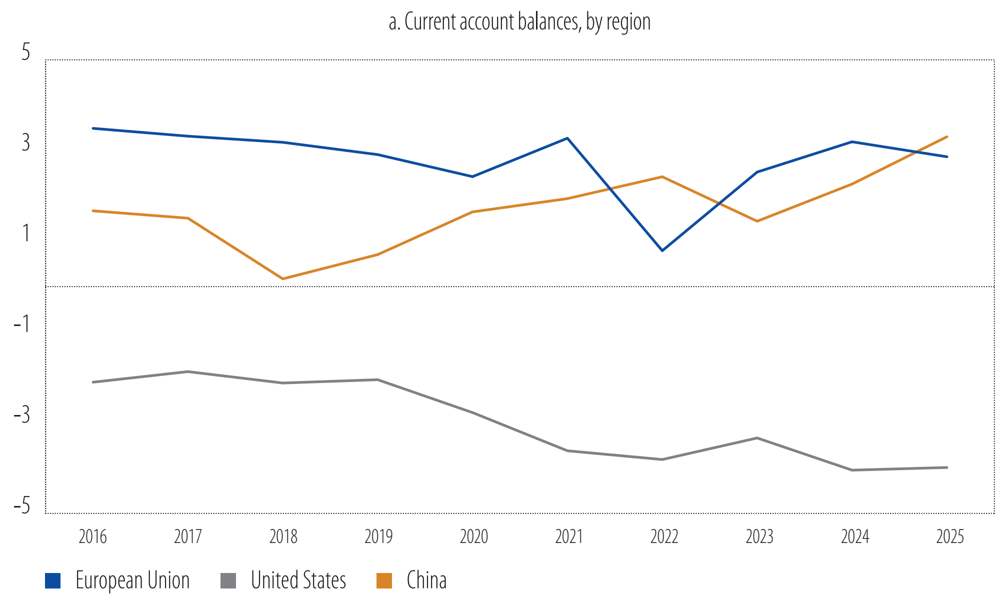
Against this backdrop, Europe's strategic response centres on building deeper and more integrated capital markets, advancing the savings and investments union, and implementing complementary policies to better mobilise household savings and long-term capital for growth, while carefully assessing the implications of digital finance for funding conditions and monetary sovereignty.

The European Union continues to build up net foreign assets

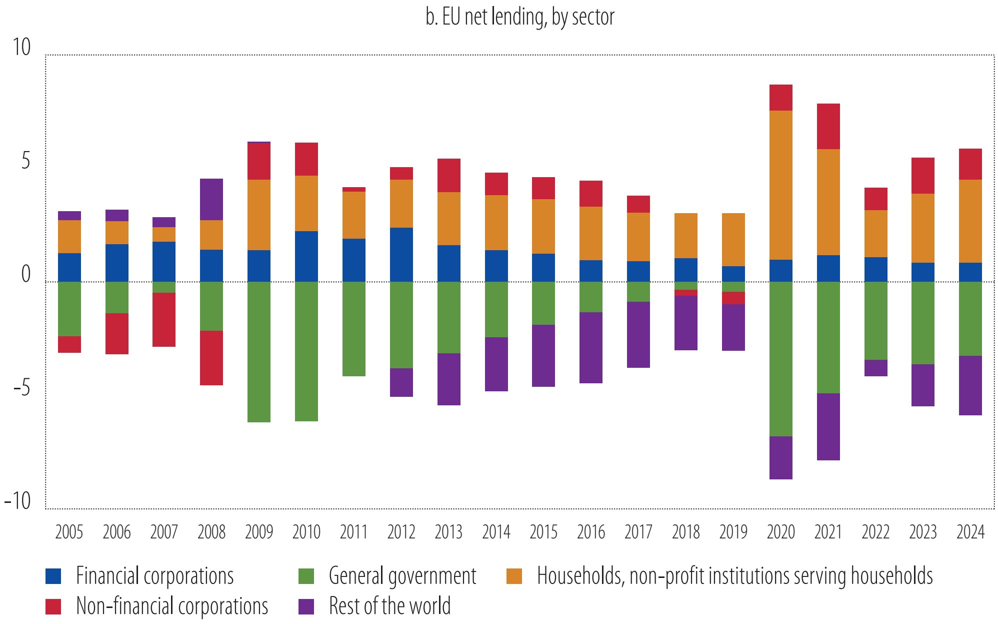
Current account imbalances continue to grow between the United States and China, but remain stable for the European Union, reflecting diverging macroeconomic trajectories across major economies. The United States' current account deficit widened from 2% in 2019 to around 4% of US GDP in 2025, while surpluses in China more than quadrupled, from 0.7% to 3.3% of Chinese GDP. In the European Union, by contrast, the current account surplus remained broadly stable, at just under 3% of EU GDP. No large euro area country was in deficit as of 2025 (with France, Spain and Italy all in surplus).

Figure 17

Current account surpluses and EU net lending (% GDP)



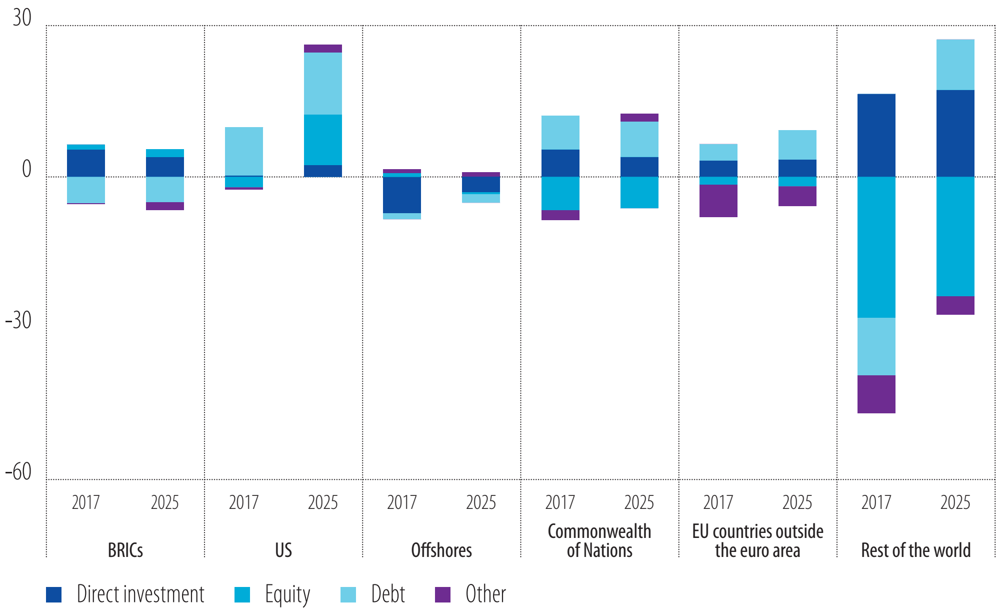
Source: *IMF.*



Source: *Eurostat.*

Figure 18

Euro area net financial positions (% GDP)**, 2017 vs. 2025**



Source: *EIB staff calculations based on ECB data.*
Note: *BRICs refer to Brazil, China, Egypt, Ethiopia, India, Indonesia, Iran, the Russian Federation, Saudi Arabia, South Africa and the United Arab Emirates.*

These shifts were driven primarily by changes in investment. In the United States, a surge in corporate investment – particularly in artificial intelligence (AI) and digital infrastructure – and higher government deficits widened the current account deficit. In China, investment rates declined, reflecting a continued correction in the real estate sector. In the European Union, as discussed above, overall investment relative to GDP was broadly unchanged due to the sluggish recovery in European housing markets, cautious corporate investment, and some push in public investment.

In the European Union, the legacy of the pandemic remains visible in savings and investment patterns. Household savings have stabilised at around 15% of gross disposable income – roughly 3 percentage points above pre-pandemic levels. Non-financial firms were net borrowers for a few years before the pandemic, when the economy was growing strongly. These firms have since shifted back to their usual state as net lenders, with a savings rate of 2.5% of value added in 2024. In other words, businesses have excess savings that they are not investing, which points to difficulty they have in finding investment opportunities for those savings. Meanwhile, the general government sector has remained a significant net borrower, with a deficit of around 3.5% of GDP. On balance, the European Union remains a net lender to the rest of the world, with a current account surplus of just under 3% in 2025.

A substantial share of the European Union's excess savings continues to flow into the United States, building up large net asset positions. The flipside of the European Union's current account surplus is the increasing foreign assets it holds, specifically vis-à-vis the United States. From 2017 to 2025, euro area residents' net assets held in the United States more than doubled, reaching an estimated 25% of euro area GDP (Figure 18). By September 2025, euro area investors held $5.3 trillion in US equities and $2.1 trillion in US corporate bonds. In contrast, US investors held just $3.7 trillion in euro area equities and $587 billion in euro area corporate bonds. This asymmetry arguably reflects not only the bigger size of the US economy (US GDP is 1.5 times EU GDP), but also the relative size, depth, integration and perceived growth potential of US financial markets compared to those in the euro area.

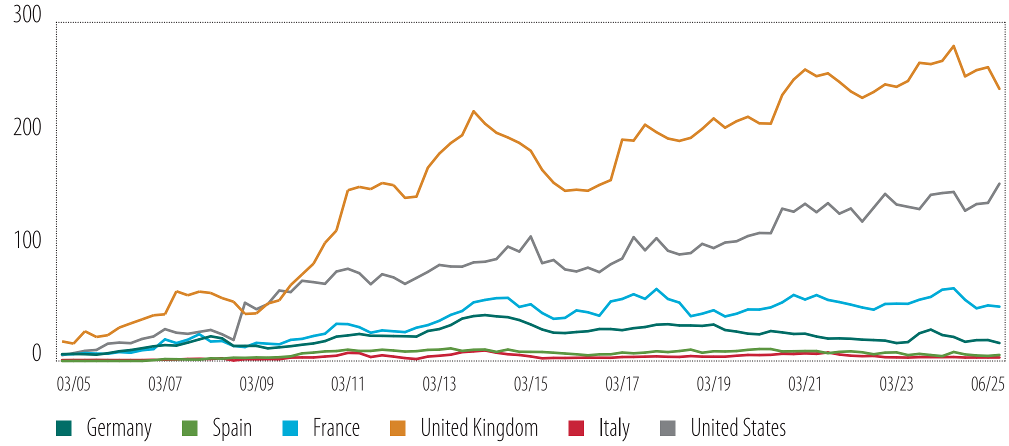
Geopolitics increasingly influences investment decisions

While macroeconomic fundamentals continue to drive global imbalances, investors are increasingly taking geopolitics, legal certainty and institutional trust into consideration when placing their money. Recent cases of sanctions, concerns about legal enforcement and market access are influencing investors' decisions. These effects are difficult to pin down exactly, because available data generally attribute assets held indirectly via financial centres to the financial centres themselves, rather than the ultimate owner. In other words, an investor that holds government debt under custody in a financial centre like Luxembourg, Ireland or Hong Kong would not appear in the statistics as the ultimate holder (Centre for Economic Policy Research (CEPR), 2025).

Although detailed breakdowns of foreign holdings in the euro area are not publicly available, Beck et al. (2025) observe a distinct divergence since Russia's invasion of Ukraine. Countries politically close to China have substantially reduced their share of US Treasuries, whereas their holdings of euro area government debt have declined only marginally.

In the case of foreign bank exposures to China, geopolitical influences are starting to become visible. During the 2000s and early 2010s, banks headquartered in the United States and the European Union rapidly expanded their foreign claims on China, in line with deepening trade links, China's growing role in global value chains, and the gradual opening of its financial system, supported by WTO membership in 2001 (Figure 19). From the mid-2010s onwards, however, this expansion slowed markedly and, in some cases, reversed despite the continued growth of Chinese manufacturing, the country's attractiveness as a destination for foreign direct investment, continued (if gradual) liberalisation, and the doubling of the balance sheet of its domestic banks. Part of this shift reflects persistent regulatory obstacles and increased domestic competition. For example, rapid deployment of fintech increased competition from local banks (Gorjón, 2018). More recently, a weaker local economy, changes in the regulatory environment, and rising US-China strategic tensions may have played a role (Financial Times, 2024).

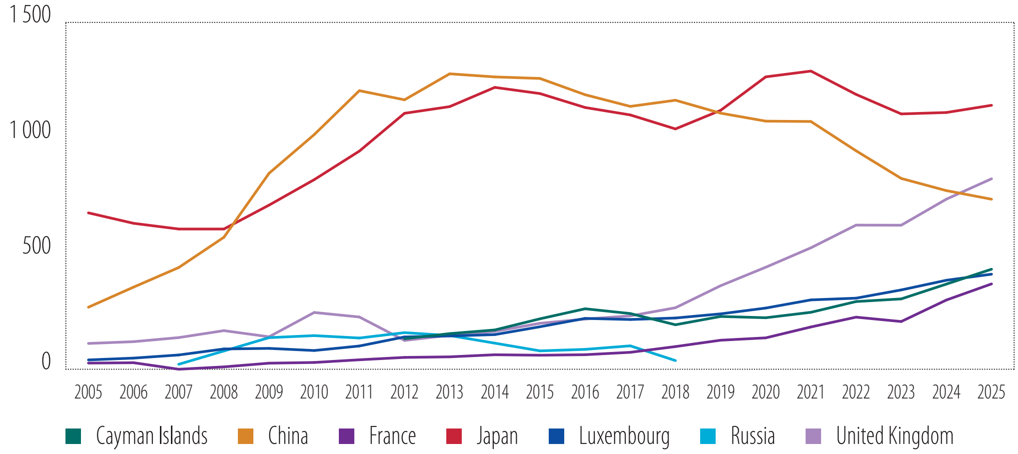
Figure 19
Cross-border banking claims in China ($ billion)**, by creditor country**



Source: *Bank for International Settlements consolidated banking statistics and the Treasury International Capital System of the US Department of the Treasury*
Note: *The chart excludes holdings via custodians in third countries, such as Luxembourg or the Cayman Islands, which are counted as the third country's holdings in the Treasury International Capital data.*

Geopolitical alignment is arguably more evident in foreign investment in US Treasuries. Asian countries, and to a lesser extent the European Union, have increased the assets they hold in the United States in recent years. Some of this shift may be due to geopolitical considerations. Clearer evidence of the importance of such considerations emerges from China's holdings of US Treasury securities. China remains one of the largest individual foreign holders of US government debt, but has substantially scaled back its holdings since the early 2010s (Figure 20). Over the same period, total foreign ownership of US Treasuries has continued to increase, with a growing share held through allied countries and major international financial centres like the United Kingdom, Luxembourg, Belgium and the Cayman Islands. While some of these positions reflect custodial and portfolio management practices, the overall pattern points to a gradual redistribution of exposure.

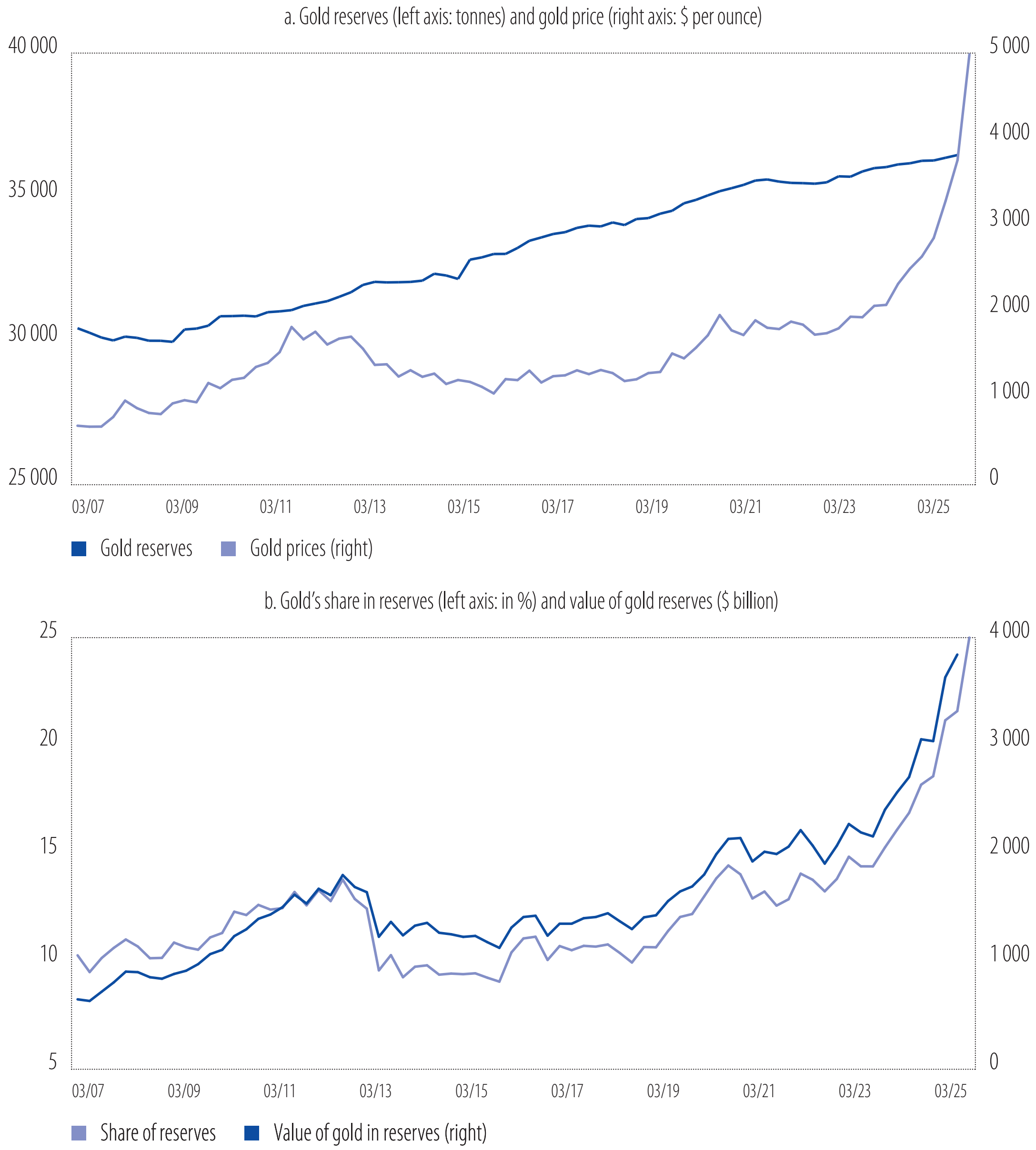
Figure 20
Holdings of US Treasury securities ($ billion)**, by creditor country**



Source: *Bank for International Settlements consolidated banking statistics and the Treasury International Capital System of the US Department of the Treasury.*
Note: *The chart excludes holdings via custodians in third countries, such as Luxembourg or the Cayman Islands, which are counted as the third country's holdings in the Treasury International Capital data.*

Geopolitical considerations may also be behind the increased demand for gold as a reserve asset. Gold has traditionally served as a hedge against uncertainty – especially political uncertainty, which is difficult to protect against. It also has the advantage of not being dependent on a particular jurisdiction (in contrast to holdings of government securities), making investments in gold arguably more immune to sanctions. The share of gold in total reserves increased from 15% at the end of 2024, to close to 25% in September 2025. Over the same period, gold prices doubled.

Figure 21
Gold reserves



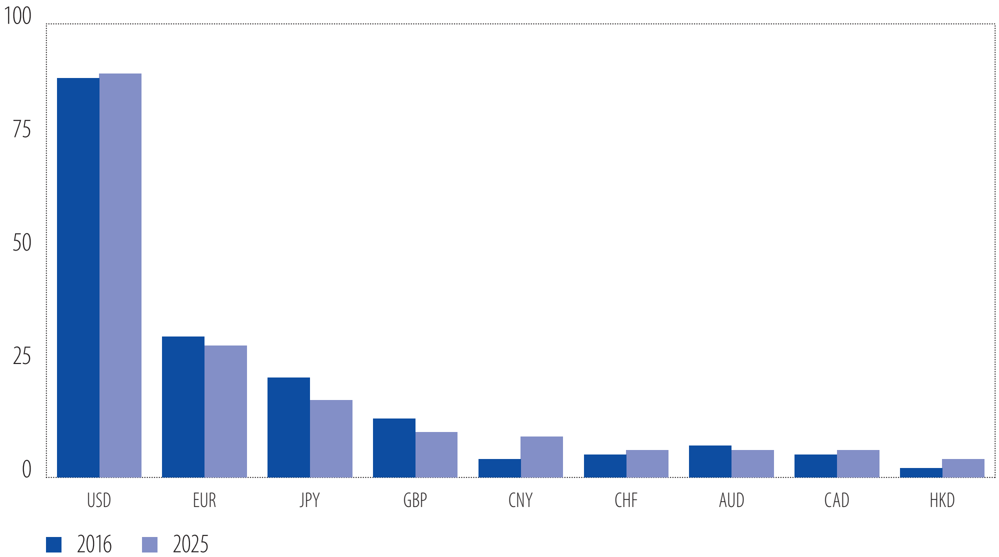
Source: *EIB staff calculations based on the World Gold Council and Bloomberg data.*
Note: *The data for gold reserves was collected at the end of September 2025 and prices in December 2025.*

The euro is very gradually increasing its international role

One element of the increasing importance of geopolitical factors in the choice of investment destinations and assets is the choice of currency for international transactions. A stronger global role for the euro, underpinned by Europe's geopolitical weight, would bring tangible benefits. It would reduce the real economy's exposure to global financial shocks, bring funding costs down, and reduce exposure to exchange rates or volatile interest rates. Greater use of the euro in trade and finance would increase predictability for firms, support investment and reduce the cost of issuing euro-denominated debt.

So far, the US dollar remains the dominant currency, but others are gaining relevance. The dollar's share of foreign exchange turnover has remained broadly unchanged since 2016, at close to 90% (Figure 22), with other traditional currencies like the euro, Japanese yen or British pound losing some ground. On the other hand, other currencies like the Chinese renminbi, Swiss franc, and Canadian and Hong Kong dollars are gaining ground, although they are still a relatively small share of all transactions. The dollar also remains the most relevant currency for trade invoicing, with an even higher share in trade invoicing beyond the European Union (31% in 2025).

Figure 22
Foreign exchange turnover (in %)**, by currency**



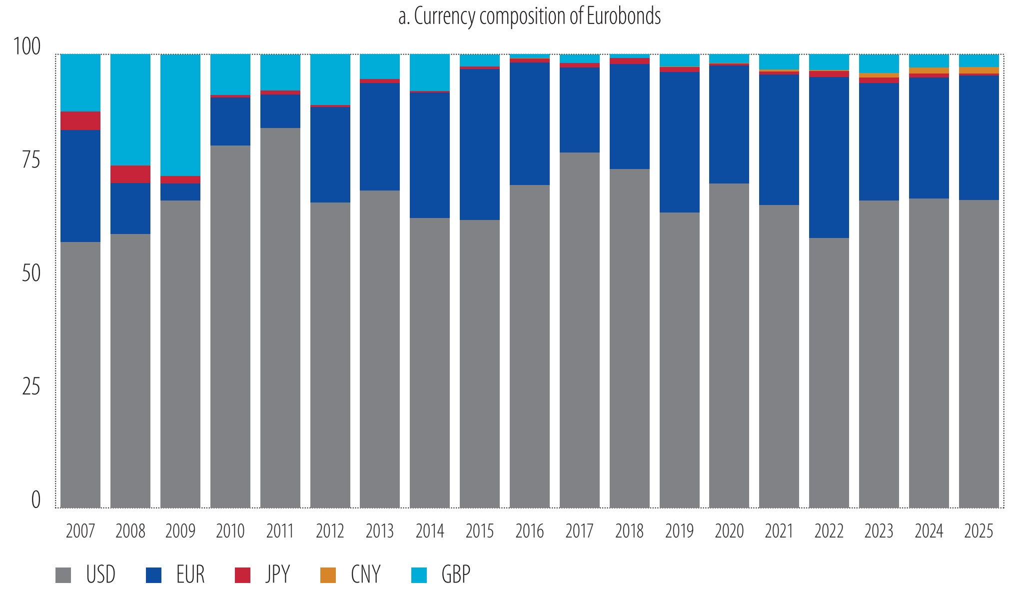
Source: EIB calculations based on Bank for International Settlements statistics.
Note: Because two currencies are involved in each transaction, the sum of the percentage shares of individual currencies totals 200% instead of 100%. The data were collected in June 2025.

Gradually, the euro is being used more for debt issuance and investments in foreign exchange reserves. In 2025, dollar-denominated bonds continued to dominate the global Eurobond market, making up about two-thirds of total issuance, despite having declined slightly compared to the period immediately following the global financial crisis (Figure 23). The euro is the second most used currency (now at 28%), broadly the same as in the last five years, but up from an average of 20% in the 2007-2019 period. Notably, the share of issuance in British pounds has declined substantially compared to a decade ago, while issuance in Chinese renminbi has begun to grow consistently, even if it reached only 1.3% in 2025. The currency composition of foreign exchange reserves has also moved slightly in favour of the euro. The euro's share of total currency reserves has risen slightly since 2016, from 19.4% to 21.1% in the second quarter of 2025. Meanwhile, the dollar has declined from its high of 65.2% in the second quarter of 2016, but still accounted for 56% of total reserves as of the second quarter of 2025.

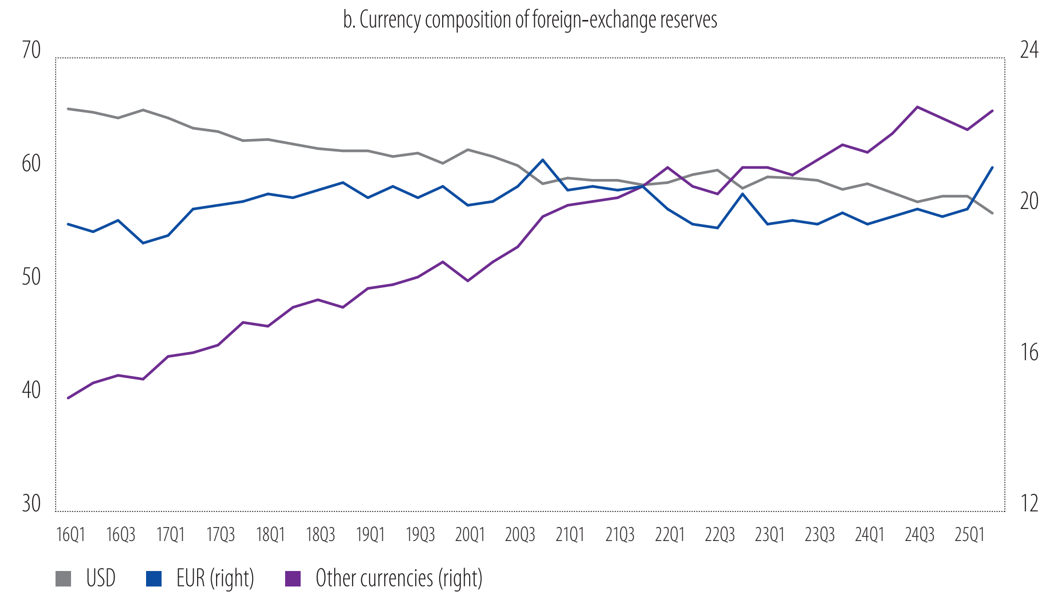
Investors are slowly shifting away from US assets, as financial markets react to changes in the US geopolitical position. US tariff announcements in April 2025 and the geopolitical tensions around Greenland in January 2026 negatively affected how investors viewed US assets. This has cast doubts about the dollar's role as a reserve currency and US treasury bonds as safe assets. US treasury bonds saw a sharp decline in demand, resulting in a rise in yields (Figure 24), even as risk perceptions increased. Similarly, tariffs and the Greenland tensions caused the US dollar to slide significantly against other currencies. However, in both episodes, these market reactions were relatively short lived and demand for US assets recovered. Bond yields declined afterward, although not to the same levels as before and foreign demand pushed US equity indices up to all-time highs.

Figure 23

Foreign exchange reserves (% of total)**, by currency**

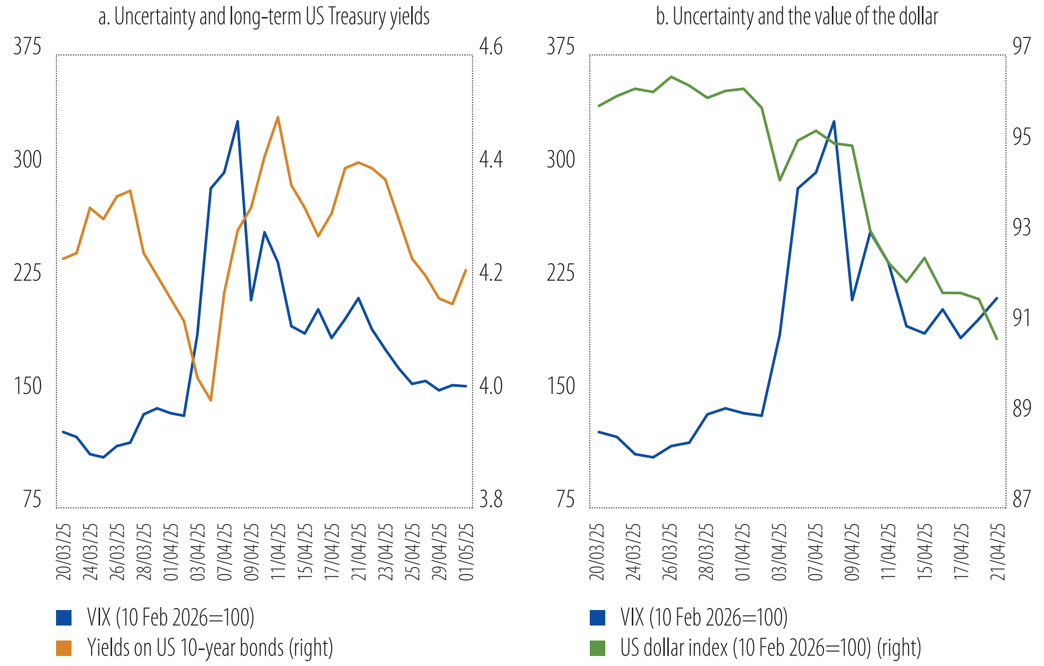


Source: *EIB staff calculations based on Bloomberg data.*



Source: *EIB staff calculations based on IMF Currency Composition of Official Foreign Exchange Reserves data.*
Note: *Data were collected in June 2025.*

Figure 24
US market reaction to policy announcements

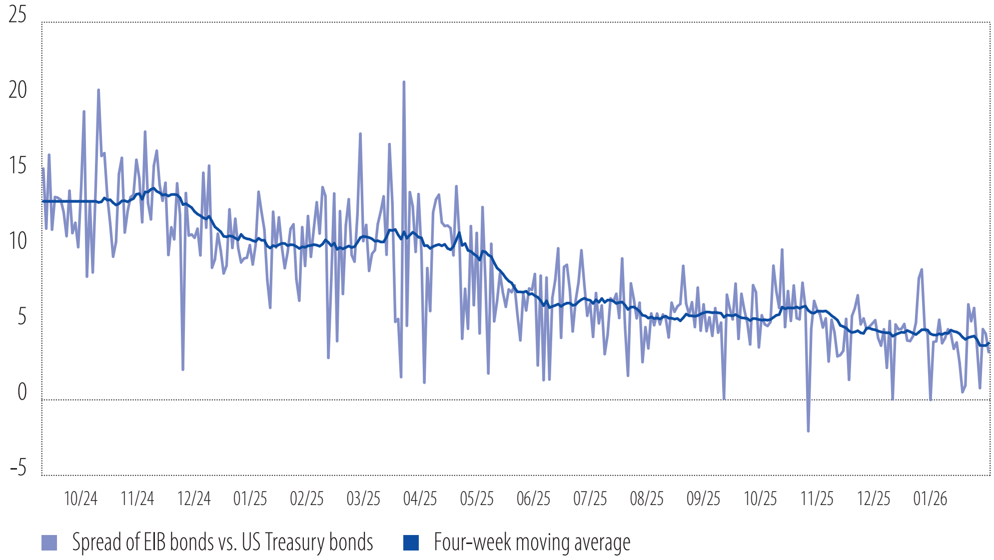


Source: *EIB staff calculations based on Bloomberg data.*
Note: *Risk perceptions are measured by the implied stock volatility Index (VIX).*

Investors are also increasingly limiting their exposure to not only the US dollar, but also – to the extent possible – American domestic risks. Currency hedging of dollar exposures is at an all-time high, and has become progressively more expensive, which could weigh on the future relative attractiveness of US assets. At the same time, the yield spread between US Treasuries and highly rated non-US issuers borrowing in US dollars has narrowed, indicating that investors are seeking dollar assets that allow them to reduce exposure to US political and fiscal risks without fully exiting dollar markets. For example, yields on the US dollar bonds issued by the European Investment Bank – which can be viewed as a proxy for European dollar-based issuance – are now only around 4 basis points above US Treasuries, down from more than 10 basis points a year ago, despite considerably lower liquidity (Figure 25). Even more strikingly, dollar-denominated bonds issued recently by China are trading at yields around 50 basis points below those on comparable US Treasuries.

Taken together, these shifts suggest that investors are keen to continue diversifying their asset holdings across a wider range of jurisdictions and currencies. As the international monetary system becomes more multipolar, this creates scope for the euro to assume a stronger role – but only if Europe succeeds in expanding the scale, liquidity and integration of its financial markets. More fundamentally, Europe needs to revive investment and growth prospects that generate returns and ensure a sustained supply of high-quality, euro-denominated assets.

Figure 25
Spread of dollar-denominated bonds issued by the EIB compared with US Treasuries
(in basis points), **10-year yields**



Source: *EIB staff calculations based on Bloomberg data.*

Europe's strategic response: Reform, openness and resilience

The savings and investments union can unlock the European Union's full potential, by channelling household savings more productively, increasing institutional investor participation in innovation finance, encouraging more equity and risk finance, and promoting more cross-border and international use of the euro.

The conditions for domestic investment must be improved to increase their attractiveness and reduce the capital outflows, which amount to 3% of EU GDP investment being invested abroad each year (IMF, 2025b). The nature of investment barriers is well known – skilled staff shortages, high energy costs, uncertainty, regulatory and political obstacles and, last but not least, limited financing, especially for risky investments (EIB, 2025).

Further integration of EU financial markets would improve investment conditions by making finance more available to European companies. More attractive financial markets, a better environment for investment and higher economic growth would also encourage greater use of the euro internationally. Joint issuance of euro-denominated government debt securities, while hotly debated, could increase the availability of euro-denominated assets. That would enable global investors who want to shift their portfolios out of the United States to do so, should concerns about rule of law and investor protection worsen in the United States.[7]

Progress towards the savings and investments union would help to support Europe's growth and productivity. Despite Europe's strong innovation capacity, abundant savings and wealth of innovative firms, its financial markets remain shallow and fragmented, with heavy reliance on bank lending and limited access to equity and risk capital. Addressing these structural weaknesses could enable Europe to meet its substantial investment needs, support innovation, and provide better savings opportunities for

7 According to Bank of Italy (2025), the issuance of liquid Eurobonds could translate into a reduction of 40 basis points on the overall cost of funding in the euro area.

households and firms. Advancing the savings and investments union could make capital more readily available for fast-growing EU firms that want to scale up and boost investment, growth, and innovation. Deeper, more integrated capital markets would make it easier for firms to issue equity, which is a key enabler of productivity and competitiveness.

Europe already has massive savings that could be leveraged to better support growth. The European Union has an abundance of savings. Yet, these are often invested in safe, low-yield instruments because investors face barriers investing in alternative financial products or lack the incentive to do so. Europe is also held back by a culture of risk aversion. A whopping €12 trillion of EU household assets remain in cash and deposits.

The European market for initial public offerings remains weak. Initial public offerings (IPOs) in the European Union averaged $8.6 billion and 70 deals annually over 2023-2025, far below the 2013-2022 average of almost $30 billion and 180 deals annually. In contrast, the US market rebounded in 2025, with a total IPO volume of $68 billion. EU follow-on equity issuance and convertibles decreased slightly in 2025, to $92 billion, while the US market remained stable at $294 billion. European bond issuance was resilient. EU firms issued about $780 billion in new bonds (below $940 billion in 2024), while US corporate bond issuance surged to $1.68 trillion in 2025, driven by the US tech sector (particularly AI).

The European securitisation market (much weaker than in the United States) remains well below the highs reached before the global financial crisis in 2008-2009, even if it is gradually recovering. Private equity and venture capital show slight improvements. These investments marginally increased in 2025, but remain well below their peaks, although venture debt continues to be an important source of financing (Atomico, 2025). Fundraising and exit market conditions have been improving gradually, but are still considered challenging (European Investment Fund (EIF), 2025).

Household savings are not currently allocated very productively. The European Union has one of the highest saving rates in the world, but despite that, the €12 trillion of household financial assets provide little capital for firms. In the last decade, annual returns on European pension assets averaged 2.04%, well below returns of 10-year venture capital funds, 7.67% (EIF, 2026).

Institutional investor participation is limited. EU pension funds and insurance companies manage €13.4 trillion, yet only 11% of GDP is directly invested in equity markets, compared to 36% in the United States. Just 4% of pension assets go to private equity, venture capital and infrastructure, compared to 11% in the United States (Invest Europe, 2024).

Little capital is available for riskier investments, like young or fast-growing companies. Most European firms raise funds by issuing bonds, The combined capitalisation of EU stock markets amounts to 69.5% of GDP, compared to 184.5% in the United States. Venture capital is far smaller, particularly at later stages, where the funding gap is estimated at €80 billion per year. According to the European Investment Fund (EIF), over 50% of late-stage investment in European tech comes from outside the European Union. US funds provide 42% of venture capital investment in AI and data software in the European Union.

Europe has a wealth of innovative tech companies, but they struggle to scale. The past decade saw Europe's tech companies more than triple their share of GDP, climbing from 4% to 15% over 2016-2025 (Atomico, 2025). The European Union has the potential to further strengthen its competitive position in areas where there is strong technical know-how thanks to its extensive manufacturing knowledge base, such as electric motors, compressors for heat pumps, silicon wafers for semiconductors and chips, or high-voltage cables. However, it still has few unicorns compared to the United States or China. 14% of EU scaleups relocate abroad to find better financing opportunities or a larger consumer market. And 33% of EU scaleups prefer to list abroad, primarily in the United States (EIB, 2024).

How to marshal Europe's significant savings for investment

Pan-European initiatives to harmonise financial markets and mobilise private savings are key to Europe's success:

- Pan-European financial instruments attract investors and strengthen the international role of the euro. Securitisation could unlock financing for companies and households.
- The EU securitisation market (€540 billion) is dwarfed by the US one ($14 trillion), with annual issuance just one-sixth of US levels (€244 billion vs. €1.5 trillion in 2024).
- Easing financing constraints for innovative companies can improve their growth prospects. Institutional investors can play a pivotal role in bridging the innovation finance gap. Raising the share of pension fund investments in alternative assets to 11% (the level in the United States) could mobilise up to €248 billion. For insurers, doubling the share of investments in alternative assets could unlock between €180 billion and €200 billion, far exceeding the €40 billion invested in EU venture capital in 2025. The Capital Requirements Regulation guidance and the amendment to the Solvency II framework could be used to significantly reduce capital requirements for equity holdings. Moreover, EU-wide initiatives such as TechEU and the European Tech Champions Initiative (ETCI) 2.0 can play a pivotal role in mobilising private capital and closing the innovation finance gap.
- Promoting cross-border investment facilitates access to larger, higher-quality investments with better geographical diversification. Market-level tools like cross-border syndication and co-investment platforms, enhanced company data transparency and comparability, and additional legal protections can help further increase cross-border investment (EIF, 2025).
- Simplifying and integrating EU regulation and completing the single market would lower financing costs for companies and help retain European champions. The European Union has over 30 major stock exchanges – ten of which had fewer than five IPOs between 2013 and 2023. Regulatory reforms to better integrate Europe's capital markets, like the 28th Regime, could help companies, foundations and investors operate EU-wide, meaning they could reap the economies of scale of a market of 450 million people.

The EIB Group is actively improving the integration of financial markets across borders. EIB Group instruments demonstrate what can be achieved. The EIB Group is a leading issuer of safe euro-denominated assets and a pioneer in green bonds, with over €130 billion issued since 2007, including €27.8 billion in green and sustainability bonds in 2025. The EIB has a track record in the securitisation market, opening new markets and supporting small originators. It invested €47 billion in 21 different countries between 2013 and 2025. EIB Group financial instruments deliver tangible impacts in terms of corporate performance, innovation and EU competitiveness. TechEU, introduced in 2025, is the EIB Group's largest ever innovation financing initiative, deploying €70 billion in equity and quasi-equity, debt and guarantees over three years, from 2025 to 2027, to mobilise €250 billion in investment for innovation across the European Union. While the European Tech Champions Initiative is a €3.9 billion pan-European programme supporting large venture capital funds, to relieve the financing constraints of European scaleups and deliver tomorrow's tech champions.

Digital innovations – including cryptocurrencies, stablecoins and central bank digital currencies – are poised to reshape the international financial system, and may eventually influence the composition of global reserve assets. Box D explores these developments in depth, assessing both the opportunities and risks they present for Europe's financial stability and monetary sovereignty, and the euro's international role. As digital finance evolves, understanding its implications will be crucial for the European Union's resilience and strategic positioning in the global economy.

Box D

Digital innovations and the international financial system

Digital innovation is reshaping the international financial system by integrating cryptocurrencies and digital assets into global finance. These innovations offer benefits like faster asset transfers, higher transparency and availability, and lower transaction costs. However, privately issued stablecoins and other types of digital assets can also pose significant risks to financial stability and monetary sovereignty (especially in Europe), such as the reliance on non-EU credit card and cross-border payment systems. The Eurosystem (the ECB and national central banks in the euro area) has a key role to play in payment systems, guaranteeing smooth operations for consumers and businesses, and responding to new trends and opportunities and the challenges and risks that these may entail (Papsdorf and Themejian, 2024).

Since Bitcoin's introduction in 2009, thousands of crypto-assets have emerged, with Bitcoin, Ethereum and Solana being the most valued. Ethereum's 2015 blockchain innovation allowed for decentralised applications. Despite their volatility and limited use as traditional money, crypto-assets also serve as stores of value, and are used for cross-border transactions in about 90 countries. Central banks and regulators also take various approaches to the balance sheet treatment of this asset class, and commercial banks assume various roles in the adjacent processes (Maher, 2025).

Stablecoins are cryptocurrencies designed to minimise volatility by pegging their value to stable assets, mainly the US dollar. They function similarly to money market funds, with reserves to back issued tokens. Leading stablecoins, Tether's USDT and Circle's USDC account for about 85% of the market and are primarily dollar-backed, while euro-backed stablecoins represent about 0.2%. Stablecoins were originally created to facilitate entry to/exit from crypto-asset (cryptocurrency) markets but are increasingly used for direct cross-border payments.

The global market capitalisation of crypto-assets was around \$2.8 trillion in January 2026. Stablecoins have increased about tenfold since 2021 (currently around \$300 billion), with dollar-backed stablecoins dominating, around 98%. Despite robust, double-digit growth in 2025 spurred by the rising value of the euro against the dollar, the total capitalisation of euro-backed stablecoins is about \$700 million (with Circle's EURC leading the growth). A further boost to the market will be given by the introduction of quivalis (Scope Ratings, 2025) in the second half of 2026 as an initiative of 11 large European commercial banks.

The European Union adopted the Markets in Crypto-Assets Regulation in April 2023 (effective since December 2024), harmonising virtual asset regulation across EU members. The regulation provides legal certainty for cryptocurrencies, security tokens and stablecoins. Some banks have listed stablecoins under the regulation, and US banks are exploring loans backed by crypto-assets, despite regulatory capital restrictions.

In the United States, the regulatory framework is built largely on the GENIUS Act, approved in July 2025, and the CLARITY Act that is expected to pass in the Senate during the first half of 2026. This federal framework allows banks and fintech companies to issue stablecoins (with 1:1 backing by dollars or short-term US Treasury bills, monthly reserve disclosures and federal oversight). The last piece of legislation, the Anti-CBDC Surveillance Act, will further frame the operations of digital finance if approved by the US Senate. An order allowing crypto-investments in retirement plans, and Treasury support for stablecoins as a demand source for US government debt, complement the framework.

Many central banks have responded with plans to create digital currencies. These central bank digital currencies represent digital fiat currencies issued and backed by central banks, available both in retail (public) and wholesale (interbank) form. The advantages of central bank digital currencies include real-time transactions, reduced costs, more transparency and better monetary policy transmission. The main concerns include a decline in the volume of private deposits at commercial banks (banking disintermediation), privacy issues and cybersecurity risks. As of summer 2025, 88 out of 137 surveyed central banks were exploring these currencies, even as US legislation banned any possibility of them.

The ECB's digital euro strategy aims to create a universal, non-interest-bearing payment method distributed via banks and accepted by merchants. It aims to improve monetary policy transmission and reduce dependence on US payment systems. After finishing the preparatory period in October 2025, the ECB aims to issue the "retail" digital euro as late as "during 2029" (with a pilot in 2027), while the "wholesale" digital euro will start with an earlier pilot in the third quarter of 2026.

Conclusion and policy implications

Europe spent 2025 dealing with increased geopolitical risks, higher tariffs and shifting in global alliances. Global shocks are becoming more frequent. Europe's population is aging, and productivity gains are essential to maintain living standards. Meeting these challenges will require far greater levels of investment.

Public investment must remain a priority even as governments consolidate their finances. EU funds, such as the Recovery and Resilience Facility and the seven-year EU budget, the Multiannual Financial Framework, can help ensure that capital is deployed efficiently across EU countries.

Corporate investment can be stimulated by enabling firms to diversify risks and to exploit new business opportunities. This includes reducing exposure to supply chain disruptions, widening access to markets and finance, and creating a more predictable policy environment.

The EU single market should be better leveraged. A deeper single market offers firms a stable source of demand, broader financing options and more room to scale up.

Trade with other countries needs to be facilitated. The conclusion and ratification of trade agreements helps companies to exploit scale and to diversify demand and supply chains, as well as mitigate the impact of protectionism from other countries and trade diversion. Reviving and reinforcing the multilateral, rules-based trading system remains essential for long-term stability.

Strategic dependencies must be addressed. Economic security can be reinforced by diversifying suppliers and stockpiling strategic inputs (like critical raw materials), as well as ensuring that key services remain free from threat (payment systems, software, cloud services, etc.). Mitigating geopolitical uncertainty lowers risks for companies and stimulates their investment. Common standards and tools like long-term purchase agreements could help scale up the production of strategic inputs within the EU single market.

Europe's financial resilience and the international role of the euro should be reinforced through reforms and strategic engagement. A stronger international role for the euro will improve Europe's ability to resist global financial shocks, increase autonomy and, by lowering risk, reduce funding costs. In addition to a strong real economy, this requires continued progress on capital market integration, and the completion of the savings and investments union.

Europe's influence in global financial systems needs to be enhanced. By strengthening the international role of the euro and deepening capital markets, Europe can offer a credible alternative for global investors and strengthen its position in a multipolar world. Advancing digital finance, including the digital euro, and supporting international regulatory cooperation will further underpin Europe's strategic autonomy and attractiveness.

References

Atomico (2025). State of European Tech 2025. Available at: https://www.stateofeuropeantech.com/#chapters

Baldwin, R., Freeman, R., & Theodorakopoulos, A. (2024). Deconstructing deglobalisation: The Future of Trade is in Intermediate Services. *Asian Economic Policy Review,* 19(1), 18-37. https://doi.org/10.1111/aepr.12440

Bank of Italy (2025). Eurobond: come sfruttarne al meglio il potenziale?, Occasional Papers No 937. Available at: https://www.bancaditalia.it/pubblicazioni/qef/2025-0937/QEF_937_25.pdf

Beck, R., Burian, V., Georgiadis, G., & McQuade, P. (2025). Geopolitics and foreign holdings of euro area government debt. In: The international role of the euro – Special Feature. European Central Bank. Available at: https://www.ecb.europa.eu/press/other-publications/ire/article/html/ecb.ireart202506_01~a8b7241329.en.html

Breinlich, H., Corradi, V., Rocha, N., Ruta, M., Santos Silva, J. M. C., & Zylkin, T. (2021). Using machine learning to assess the impact of deep trade agreements. VoxEU Column. Available at: https://cepr.org/voxeu/columns/using-machine-learning-assess-impact-deep-trade-agreements

Centre for Economic Policy Research (CEPR) (2013). Reducing Transatlantic Barriers to Trade and Investment: An Economic Assessment. Final Project Report for the European Commission. Available at: https://cepr.org/publications/books-and-reports/reducing-transatlantic-barriers-trade-and-investment-economic

Centre for Economic Policy Research (CEPR) (2025). Geneva Reports on the World Economy Geneva 28: Geopolitical Tensions and International Fragmentation: Evidence and Implications. Available at: https://cepr.org/publications/books-and-reports/geneva-28-geopolitical-tensions-and-international-fragmentation

Draghi, M. (2024). The future of European competitiveness – A competitiveness strategy for Europe. https://doi.org/10.2872/9356120

Dür, A., Baccini, L., & Elsig, M. (2014). The design of international trade agreements: Introducing a new dataset. *Review of International Organizations*, 9(3), 353-375. Version 2.3 (2025). https://doi.org/10.1007/s11558-013-9179-8

European Banking Association (EBA) (2025). Risk Assessment Report, June. Available at: https://www.eba.europa.eu/publications-and-media/publications/risk-assessment-report-june-2025

European Central Bank (ECB) (2025). Financial Stability Review, November. Available at: https://www.ecb.europa.eu/press/financial-stability-publications/fsr/html/ecb.fsr202511~263b5810d4.en.html#toc2

European Commission (2023). Study on the Critical Raw Materials for the EU 2023. https://doi.org/10.2873/725585

European Commission (2025a). European Economic Forecast Autumn 2025. European Economy, Institutional Paper 327, November 2025. https://doi.org/10.2765/2173364

European Commission (2025b). Strategic corridors to improve Europe – Africa Connectivity.

European Investment Bank (EIB) (2024). The scale-up gap. Financial market constraints holding back innovative firms in the European Union. https://doi.org/10.2867/382579

European Investment Bank (EIB) (2025). EIB Investment Survey 2025. https://doi.org/10.2867/4791610

European Investment Fund (EIF) (2025). EIF VC/PE Barometer Survey, Q4 2025. Available at: https://www.eif.org/files/publications/eif-vc-pe-barometer-2025-q4.pdf

European Investment Fund (EIF) (2026). TrackVC. Available at: https://engage.eif.org/trackvc/

Eurostat and Joint Research Centre (2025). FIGARO EU inter-country supply, use and input-output tables (2025 edition). https://doi.org/10.2785/008780

Federal Reserve Bank of New York (2025). Global Supply Chain Pressure Index (November 2025). Available at: https://www.newyorkfed.org/research/policy/gscpi

Financial Times (2024). Global investment banks cut jobs in China retreat. Available at: https://www.ft.com/content/d2a4e808-a091-4a05-b14d-fe710decf30e

Fontagné , L., Rocha, N., Ruta, M., & Santon, G. (2023). The Economic Impact of Deepening Trade Agreements. *The World Bank Economic Review*, 37(3), 2023, 366-388. https://doi.org/10.1093/wber/lhad005

Gorjón, S. (2018). The growth of the FinTech industry in China: a singular case. BdE Bulletin 4/2018. Available at: https://www.bde.es/f/webbde/SES/Secciones/Publicaciones/InformesBoletinesRevistas/ArticulosAnaliticos/2018/T4/descargar/Files/beaa1804-art29e.pdf

Hofmann, C., Osnago, A., & Ruta, M. (2017). Horizontal Depth: A New Database on the Content of Preferential Trade Agreements. Policy Research working paper, No. WPS 7981. Washington, DC, World Bank Group. Available at: https://documents.worldbank.org/en/publication/documents-reports/documentdetail/700771487791538589/horizontal-depth-a-new-database-on-the-content-of-preferential-trade-agreements

International Monetary Fund (IMF) (2025a). Global Financial Stability Report, October. Available at: https://www.imf.org/en/publications/gfsr/issues/2025/10/14/global-financial-stability-report-october-2025

International Monetary Fund (IMF) (2025b). External Sector Report. Available at: https://www.imf.org/en/publications/esr/issues/2025/07/22/external-sector-report-2025

Invest Europe (2024). Private Equity Activity Report 2024. Brussels: Invest Europe. Available at: https://www.investeurope.eu/media/aywhjtsp/20250508_invest-europe_pe-activity-data-2024-report.pdf

Khan, M. Z. I. (2020). Is voting patterns at the United Nations General Assembly (UNGA) a useful way to understand a country's policy inclinations: Bangladesh's voting records at the UNGA. *SAGE Open*, 10(4). https://doi.org/10.1177/2158244020961117

Li, J., Liu, Y., & Zhou, Y. (2023). Assessing the Impact of WTO Accession on China's Economic Growth: A Synthetic Control Approach. In: Gao H, Raess D, Zeng K, eds. *China and the WTO: A Twenty-Year Assessment*. Cambridge University Press, pp. 73-88. https://doi/org/10.1017/9781009291804.007

Maher, D. (2025). Digital Assets Insights. Tokenised deposits key to PBOC's digital RMB plan. HSBC Global Investment Research. HSBC.

Marchini, C., & Popov, A. (2025). Trading with dictators? A historical review of the EU's business partners, The ECB Blog. Available at: https://www.ecb.europa.eu/press/blog/date/2025/html/ecb.blog20250708~58da29dc14.en.html

Papsdorf, P., & Themejian, K. (2024). The Eurosystem policy response to developments in retail payments. ECB Economic Bulletin No. 1/2024, February, pp. 74-87. Available at: https://www.ecb.europa.eu/press/economic-bulletin/articles/2024/html/ecb.ebart202401_01~fa4af77e87.en.html

Santos Silva, J. M. C., & Tenreyro, S. (2006). The Log of Gravity. *The Review of Economics and Statistics*, 88(4), 641-658. https://doi.org/10.1162/rest.88.4.641

Scope Ratings (2025). Europe's digital finance transformation takes shape. Scope Ratings, London & Berlin, Financial Institutions Research, October 21. Available at: https://www.scoperatings.com/ScopeRatingsApi/api/downloadstudy?id=55324df5-3715-49a9-b936-e08a19fc9753

Tinbergen, J. (1962). *Shaping the World Economy: Suggestions for an International Economic Policy*. The Twentieth Century Fund, New York.

Vandermerwe, S., & Rada, J. (1988). Servitization of business: Adding value by adding services. *European Management Journal*, 6(4), 314-324. https://doi.org/10.1016/0263-2373(88)90033-3

Vimont, P. (2016). The Strategic Interests of the European Union, Fondation Robert Schuman, Policy Papers, European issues n°404, September 2016. Available at: https://www.robert-schuman.eu/en/european-issues/0404-the-european-union-s-strategic-interests

World Trade Organization (WTO) (2024). Overview of developments in the international trading environment. Available at: https://d3ipxbzibstf0l.cloudfront.net/reports/62-report.pdf

World Trade Organization (WTO) (2025a). Overview of developments in the international trading environment. Available at: https://docs.wto.org/dol2fe/Pages/SS/directdoc.aspx?filename=Q:/WT/TPR/OV28.pdf&Open=True

World Trade Organization (WTO) (2025b). Global Trade Outlook and Statistics (Update: October 2025). Available at: https://www.wto.org/english/news_e/news25_e/stat_07oct25_e.pdf

Xing, Y., & Detert, N. C. (2010). How the iPhone Widens the United States Trade Deficit with the People's Republic of China. ADBI Working Paper No. 257. https://doi.org/10.2139/ssrn.1729085

Chapter 2

Government investment in a time of increased defence spending

Backed by the Recovery and Resilience Facility and other EU funds, government investment in the European Union has grown faster than gross domestic product (GDP). In 2024 and the first half of 2025, government investment increased in nominal and real terms. While investment rates rose in most EU members, there were significant regional differences, with Western and Northern Europe maintaining higher, more stable levels than Southern Europe or Central and Eastern Europe.

The Recovery and Resilience Facility has been central to sustaining and increasing public investment. By August 2025, €362 billion had been disbursed under the facility. The performance-based design of the Recovery and Resilience Facility (RRF) has driven both reforms and investments, boosting GDP and supporting structural change across EU members. Its focus on climate, digital technologies and infrastructure supported an overall shift in public investment towards these priorities. With the facility set to expire in 2026, countries are focusing on accelerating implementation and preparing for the transition to new EU instruments developed to support investment.

Defence spending has surged in response to heightened geopolitical tensions. EU countries increased current and capital spending to meet new North Atlantic Treaty Organization (NATO) targets. This shift has required fiscal flexibility, such as the activation of escape clauses that allow countries to surpass expenditure targets, and the development of common funding instruments like the Security Action for Europe (SAFE) initiative. While defence spending aims to strengthen defence capabilities and bolster national security, such expenditure can also benefit the wider economy. The magnitude of the multiplier effect depends on the composition of the expenditure and the extent to which procurement and production are sourced within the European Union. Coordinating this spending among EU members enhances the overall effect.

In times of tight government finances worldwide, slow growth and frequent disruptions, sustaining public investment requires rethinking public spending and leveraging private capital. The European Union and its members have a strong record of effectively mobilising resources through public-private partnerships and financing initiatives supported by the European Union. Financial instruments have been successful in attracting private-sector investment to key policy areas, supporting and enhancing public investment activities. Furthermore, coordinated efforts at the EU level help maximise the overall impact of these strategies.

Introduction

Governments in the European Union face a challenging policy environment. The legacy of under-investment in public infrastructure and services in the years following the global financial crisis of 2008 has left many countries with significant investment shortfalls, just as new and urgent demands have emerged. High public debt levels – a result of past crises and extraordinary fiscal intervention – constrain fiscal space at a time when investment needs are rapidly increasing. The imperative to address heightened security threats, mitigate and adapt to climate change, accelerate the digital transformation and respond to the pressures of an ageing population all require substantial and sustained public investment. These demands are not only larger in scale than in previous decades, but also more complex, often requiring coordinated action across sectors and borders.

EU governments have committed to putting public debt on a sustainable trajectory. However, it is important to ensure that commitment does not have the effect of reducing future investment. Government investment brings high, long-lasting returns, boosting short-term economic activity and long-term growth. Those returns are enhanced by better deploying that investment and more coordinated efforts at the EU level. Well-chosen and efficiently executed public investment improves government finances over time by raising potential GDP and lowering the debt-to-GDP ratio. Maintaining strong, coordinated government investment is not merely compatible with fiscal sustainability – it is essential to achieving it, especially as the European Union seeks to remain competitive, resilient and inclusive in the face of mounting challenges.

This chapter has three sections. The first section outlines recent developments in government investment, the implementation of RRF plans, and their effect on investment and fiscal policy. The second section analyses the surge in government spending on security and defence and its effects on fiscal sustainability. It contains three boxes with further analysis. Box A outlines Germany's recent spending plans and their cross-border spillover effects. Box B provides more numbers on European sourcing of military goods. Box C analyses the macroeconomic payoffs of defence spending. The third section discusses how governments can spur investment despite constrained public finances. It contains three boxes. Box D analyses the effects of government investment on private investment. Box E discusses the effects of state aid on research and development (R&D) spending. Box F illustrates the benefits of joint procurement with examples. The chapter concludes with policy implications.

Government investment powers on, supported by the Recovery and Resilience Facility

General government investment continues to expand faster than GDP. Government investment has remained resilient in the first two years since the European Union's fiscal rules were revised. Infrastructure investment has remained solid, at relatively high levels supported by the Recovery and Resilience Facility.

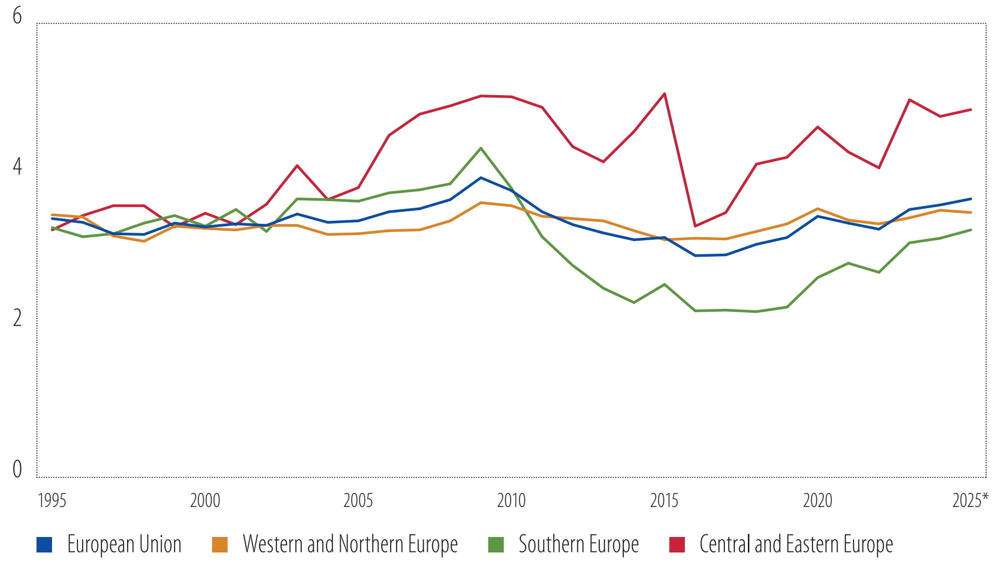
General government investment continues to grow solidly

Government investment in the European Union increased for the third year in a row in 2025.[1] Nominal investment outpaced nominal GDP growth in most EU members, raising investment rates across the European Union (Figure 1). The exceptions were mainly Central and Eastern Europe. The final

1 The investment rate in this chapter refers to the ratio of government gross fixed capital formation to GDP. Investment and gross fixed capital formation are used interchangeably, as are public investment and government investment.

payment deadline under the long-term EU budget, the 2014-2020 Multiannual Financial Framework, in December 2023 led to a surge in investment activity in that year. This created a high base effect for 2024, resulting in slower growth as investment returned to more sustainable levels. The EIB Investment Report 2024/2025 (European Investment Bank (EIB), 2025) confirms that the investment spike in 2023 was driven by accelerated disbursements linked to the EU budget, rather than underlying trends. The EU government investment rate continued to increase in the first half of 2025.

Figure 1
Gross fixed capital formation of the general government (% GDP)



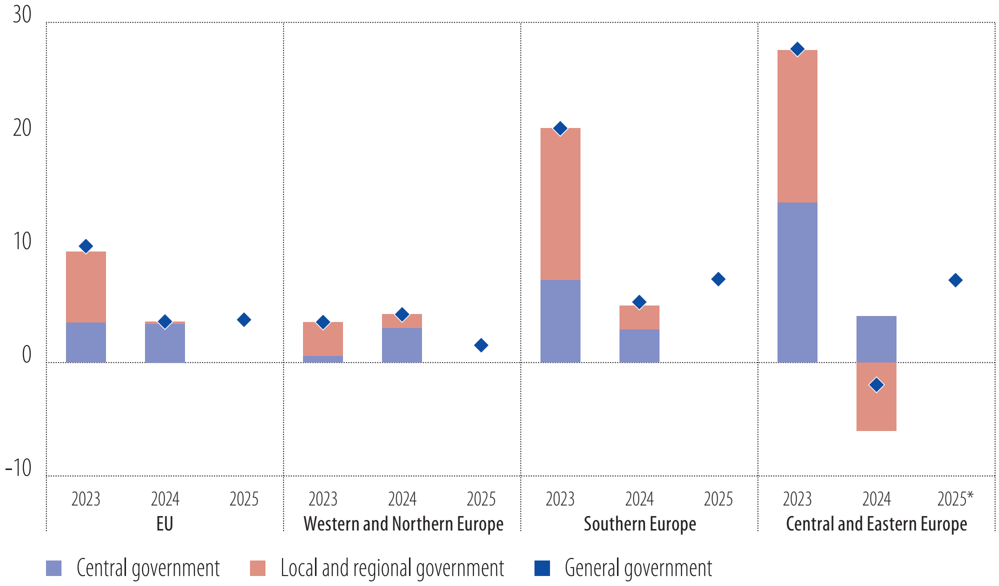
Source: *Eurostat and EIB staff calculations.*
Note: *Western and Northern Europe includes Austria, Belgium, Denmark, Finland, France, Germany, Luxembourg, the Netherlands and Sweden. Southern Europe includes Cyprus, Greece, Italy, Spain, Malta and Portugal. Central and Eastern Europe includes Bulgaria, Croatia, Czechia, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia and Slovenia. *Data for 2025 were only available for the first half of the year.*

Real government investment continued to grow faster than real GDP in 2024 and 2025. Real government investment increased by 3.6% in 2024 relative to 2023, well above real GDP growth of 1% (that is, government investment adjusted for inflation with an investment-specific price deflator). This was slower, however, than the 10% growth seen in 2023 and the 28% increase in Central and Eastern Europe. Central government investment drove the increase, while local and regional governments contributed less due to deadlines related to investment from the European Union's long-term budget in cohesion policy and regional development. This was particularly evident in Central and Eastern Europe (Figure 2). Government investment continued to outpace GDP growth in 2025. In the first half of 2025, real government investment grew by 3.8% compared to the same period in 2024, far faster than the 1.4% rate of real GDP growth. Southern Europe saw a 7.4% increase, and Central and Eastern Europe rebounded with 7.3% growth. Western and Northern Europe recorded a 1.5% increase, in line with GDP growth.

Investment grants have fallen from their peak but still exceed pre-pandemic levels. In 2024, government investment grants declined to about 1.1% of GDP. This decline comes after a surge in 2022 fuelled by public money used to address the energy crisis, which itself was roughly one-third lower than in 2023 (Figure 3). The main reduction occurred in Southern Europe, where grants fell by 2 percentage points of GDP, lowering the EU total despite steady levels elsewhere. Overall, government investment grants remain well above pre-pandemic averages, illustrating the policy shift to supporting investment through incentives.

Figure 2

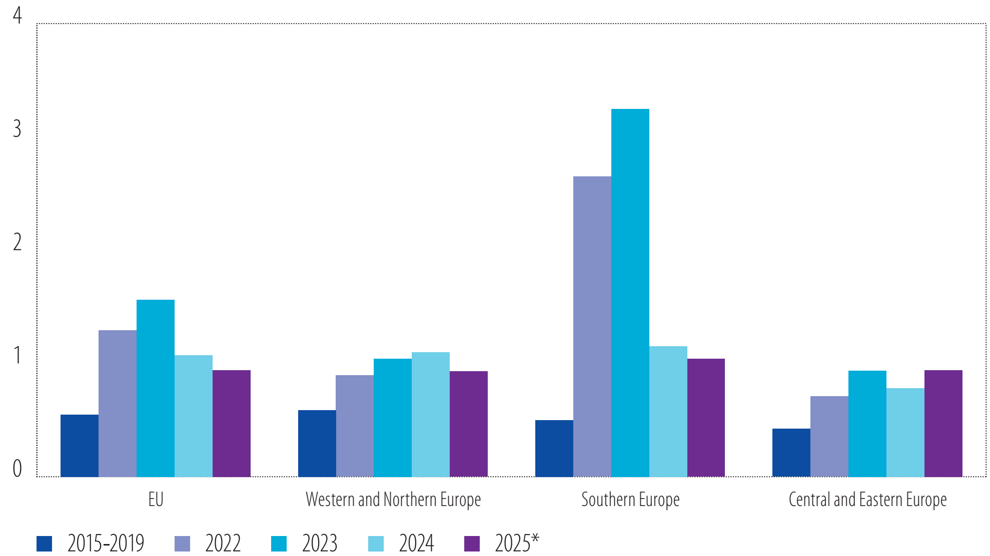
Real government investment (% change from prior year)



Source: *Eurostat and EIB staff calculations.*
Note: *Western and Northern Europe includes Austria, Belgium, Denmark, Finland, France, Germany, Luxembourg, the Netherlands and Sweden. Southern Europe includes Cyprus, Greece, Italy, Spain, Malta and Portugal. Central and Eastern Europe includes Bulgaria, Croatia, Czechia, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia and Slovenia. *Data for 2025 were only available for the first half of the year. Data for sub-national government investment were not available for all countries.*

Figure 3

Investment grants by the general government (% GDP)

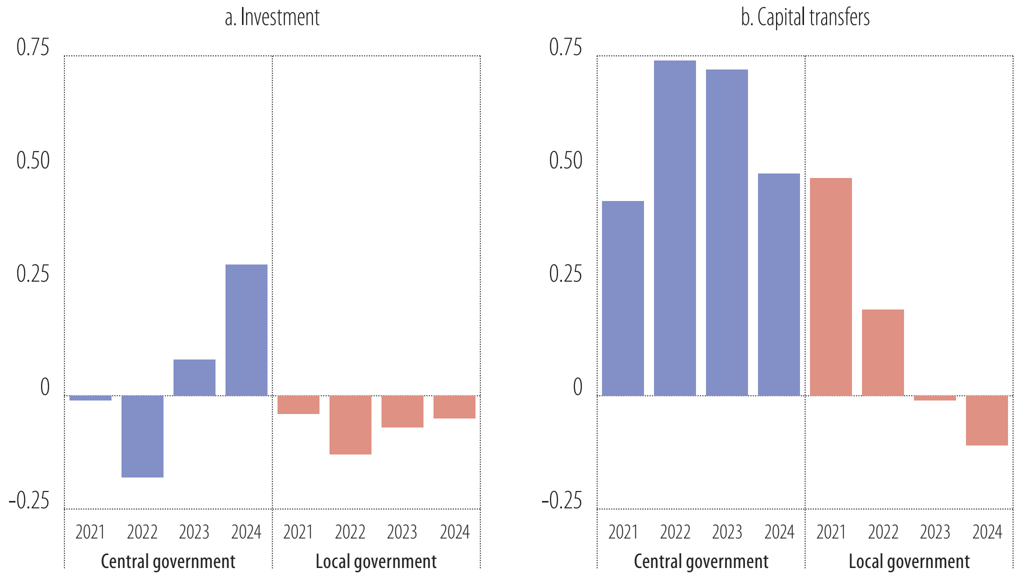


Source: *Eurostat and EIB staff calculations.*
Note: *Western and Northern Europe includes Austria, Belgium, Denmark, Finland, France, Germany, Luxembourg, the Netherlands and Sweden. Southern Europe includes Cyprus, Greece, Italy, Spain, Malta and Portugal. Central and Eastern Europe includes Bulgaria, Croatia, Czechia, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia and Slovenia. *Data for 2025 are for the first half of 2025 only.*

RRF funding supported investment, particularly by central governments, and helped mobilise private capital through investment grants. Over the past three years, RRF support has primarily boosted central government capital expenditure, while regional and local government investments have relied more on EU cohesion funds. Although official reporting on the split of facility financing between central and local government is not available, statistical correlations show that central government investment rates are increasingly associated with government investment (Figure 4a, left panel) financed by the Recovery and Resilience Facility.[2] In contrast, regional and local government investment rates remain largely unrelated to facility financing (Figure 4a, right panel), mostly backed by EU cohesion funds. The connection between RRF capital transfers and investment grants highlights the growing role of financial instruments in incentivising private investment, although this effect has diminished for regional and local governments since 2023 (Figure 4b, right panel). This result is also obtained in conditional correlations, controlling for country-specific and time varying factors like economic development and inflation.

Figure 4

How RRF funds influence government capital expenditure (correlation coefficients)**, by level of government**



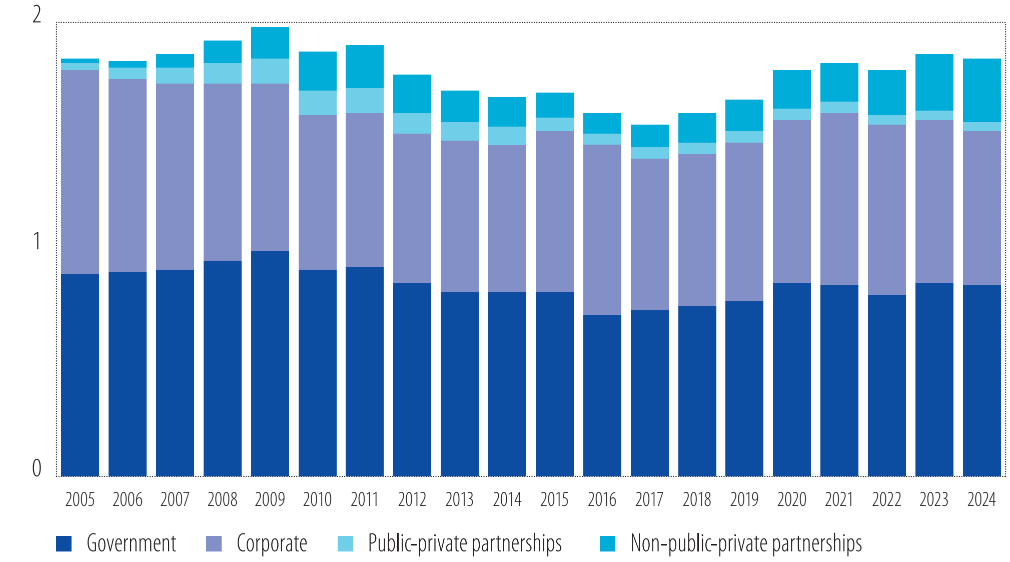
Source: Eurostat and EIB staff calculations.
Note: Cross-country correlation coefficients between the use of RRF funds and the respective items in government capital expenditure – gross fixed capital formation (investment) or capital transfers – all in percent of GDP.

Infrastructure investment is steady and relatively high

Infrastructure investment remains a cornerstone of long-term growth. Infrastructure services are essential for economic and social development, and enable the green and digital transitions. In 2024, infrastructure investment in the European Union remained broadly stable at 1.82% of GDP (Figure 5). Government investment accounted for 0.84%, while corporate investment contributed 0.68%. Public-private partnerships represented a small but growing share, reaching nearly 0.04% of GDP, and non-public-private partnership project finance rose to 0.28%. These figures confirm that governments and the corporate sector remain the main sources of infrastructure finance, with project finance playing a modest but increasing role.

2 In Chapter 2 of EIB (2024) we show that in 2022, governments traded off investment for subsidies to mitigate the strength of the energy price shock, following the price shock on the gas markets.

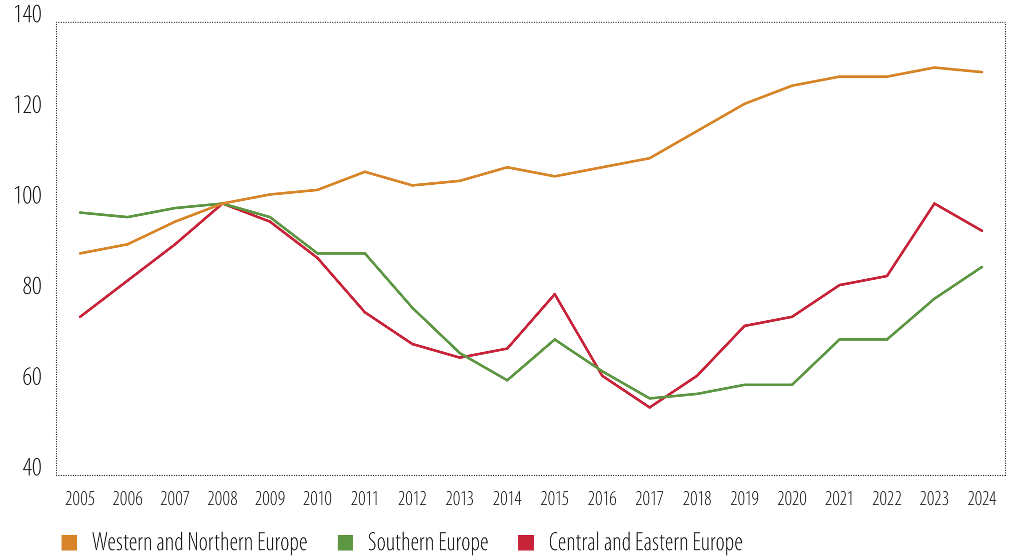
Figure 5
Infrastructure finance in the European Union (% GDP)**, by institutional sector**



Source: *Eurostat, IJGlobal, European PPP Expertise Centre (EPEC), EIB staff calculations.*

Regional disparities in infrastructure investment persist. Western and Northern Europe maintain the highest and most stable levels of infrastructure investment, with an index value close to 129 in 2024 (relative to a 2008 baseline of 100; see Figure 6). Southern Europe and Central and Eastern Europe show greater volatility and lower investment levels. Southern Europe's index is around 86, still below pre-crisis levels, while Central and Eastern Europe partially rebound to approximately 94. These differences highlight persistent investment gaps between more and less developed regions, with implications for cohesion and long-term growth. Targeted policy action is needed to reduce these disparities.

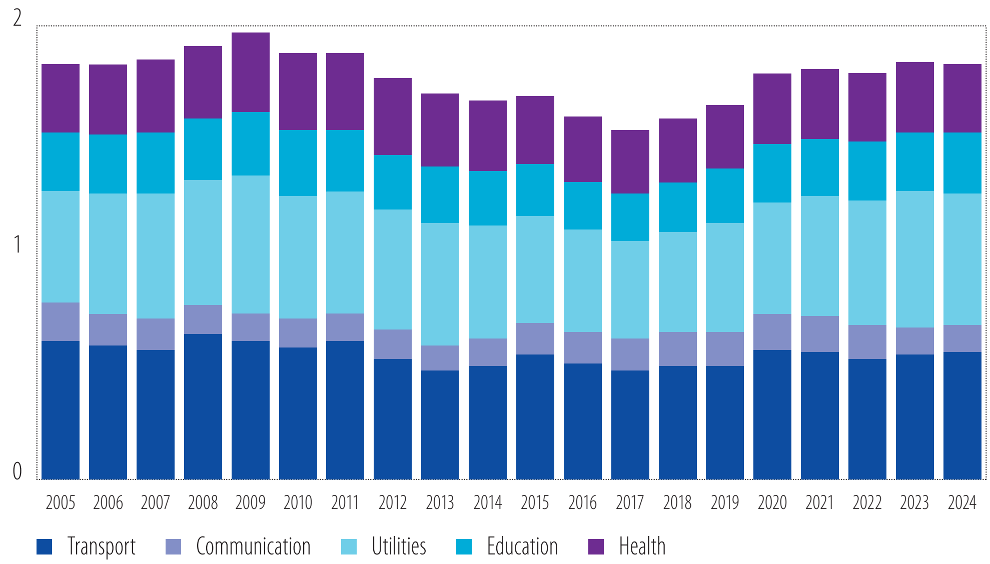
Figure 6
Infrastructure investment in the European Union (index, 2008=100)**, by region**



Source: *Eurostat, IJGlobal, EPEC, EIB staff calculations.*

Transport and utilities dominate infrastructure spending. The latest data indicate that transport accounts for 0.56% of GDP, and utilities for 0.58%. Together, they form the largest share of infrastructure investment (Figure 7). Education represents 0.27% of GDP and health 0.30%, reflecting their continued importance. Investment in utilities and health has gradually increased, signalling a shift towards essential services and resilience. Communications remain stable at around 0.12% of GDP.[3] These trends confirm the European Union's commitment to balanced and inclusive development through sustained investment in social infrastructure.

Figure 7
Infrastructure finance in the European Union (% GDP)**, by sector**



Source: Eurostat, IJGlobal, EPEC, EIB staff calculations.

Using the Recovery and Resilience Facility to further accelerate investment

The Recovery and Resilience Facility has been instrumental in keeping public policy focused on economic transformation. As the flagship of NextGenerationEU, the European Union's post-pandemic recovery instrument, the Recovery and Resilience Facility was designed to address country-specific recommendations from the European Semester – the European Union's annual coordination framework for economic, fiscal, employment and social policies – and help EU countries recover from the pandemic while preparing for the green and digital transitions. Despite a challenging environment marked by multiple crises, deployment of the facility has been particularly agile, with national Recovery and Resilience Plans redirected towards emerging priorities. By August 2025, €362 billion had been disbursed, covering 2 586 of the 6 985 national milestones and targets laid out in initial RRF plans, with 44% of allocations still pending. Even in countries which have benefited less from the Recovery and Resilience Facility, national initiatives have been deployed to finance transformative investment.

RRF financing accelerates EU government investment. Combining Eurostat data up to 2024 with information from the European Semester Country Reports (which include tables detailing the facility's contribution) makes it possible to assess the Recovery and Resilience Facility's role in supporting public investment (as reflected in gross fixed capital formation) and private investment (via capital transfers

3 Communication infrastructure also covers cloud and AI infrastructure. For more detailed trends on the EU's digital transformation and uptake of artificial intelligence, see Chapter 5.

recorded under capital expenditure). While the facility plays a relatively minor role in Western and Northern European countries, it is a key driver of investment in Southern as well as Central and Eastern European countries. The Recovery and Resilience Facility helped sustain high levels of investment overall in the European Union, and its impact will likely increase further in 2025-2026 (Table 1).

Table 1
RRF-financed spending: Investment and total capital expenditure (% GDP)

		2020	2021	2022	2023	2024	2025	2026
Western and Northern Europe	Capital transfers	0.01	0.10	0.11	0.08	0.06	0.08	0.05
	Gross fixed capital formation	0.01	0.02	0.03	0.03	0.02	0.01	0.00
Southern Europe	Capital transfers	0.02	0.19	0.50	0.79	0.63	0.91	1.64
	Gross fixed capital formation	0.02	0.06	0.12	0.26	0.36	0.58	1.18
Central and Eastern Europe	Capital transfers	0.01	0.02	0.08	0.17	0.39	0.96	0.90
	Gross fixed capital formation	0.01	0.02	0.04	0.10	0.27	0.32	0.23
Total European Union	Capital transfers	0.01	0.12	0.20	0.26	0.24	0.39	0.54
	Gross fixed capital formation	0.01	0.03	0.05	0.10	0.13	0.18	0.32

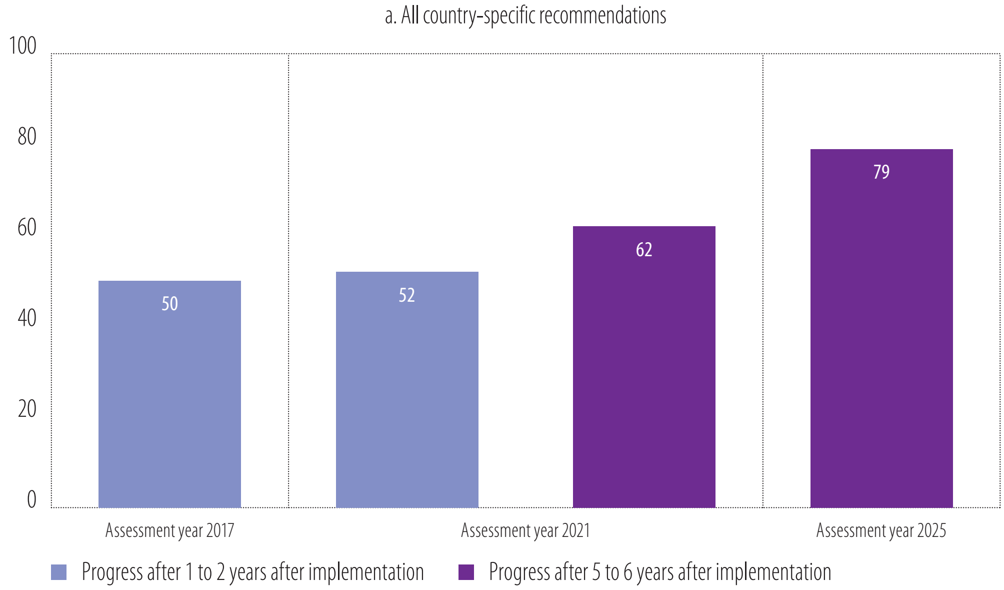
Source: Eurostat and EU members' medium-term plans.

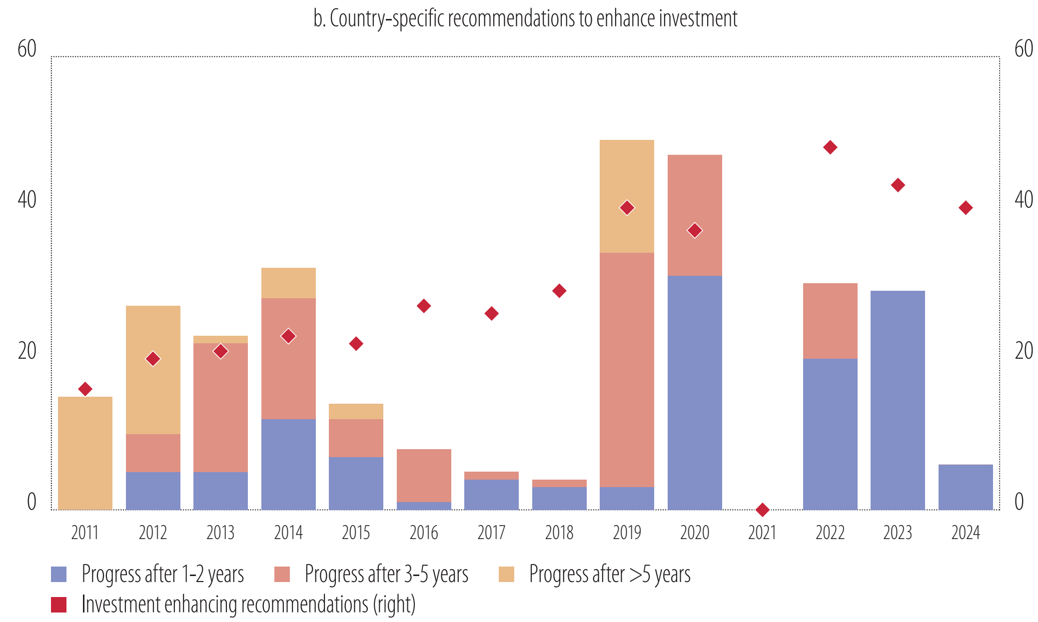
The Recovery and Resilience Facility's performance-based model has strengthened reforms and investment by linking funding to results. Examples include increased employment from labour market reforms, upgraded curricula and better digital access in education, improved healthcare access with reduced waiting times, and more investment in renewables and energy efficiency for climate. About two-thirds of planned reforms in the 27 national Recovery and Resilience Plans have been completed, making the investment environment more predictable and supportive of innovation. The implementation rate for country-specific recommendations rose from 52% to 79%. Figure 8 and Figure 9, which show this jump and highlight advances across finance, the business environment, and labour markets, illustrate the significant pickup in reform momentum across EU members.[4]

4 Country-specific recommendations are tailored policy guidance from the European Commission to each EU member, outlining actions for economic, fiscal, and social policies, especially concerning challenges like competitiveness, public finances, or unemployment, as part of the annual European Semester coordination cycle. These recommendations, adopted by the Council of the European Union, guide national budget and reform plans, focusing on areas needing improvement for sustainable growth and stability.

Figure 8

Progress on country-specific reforms before and during the Recovery and Resilience Facility



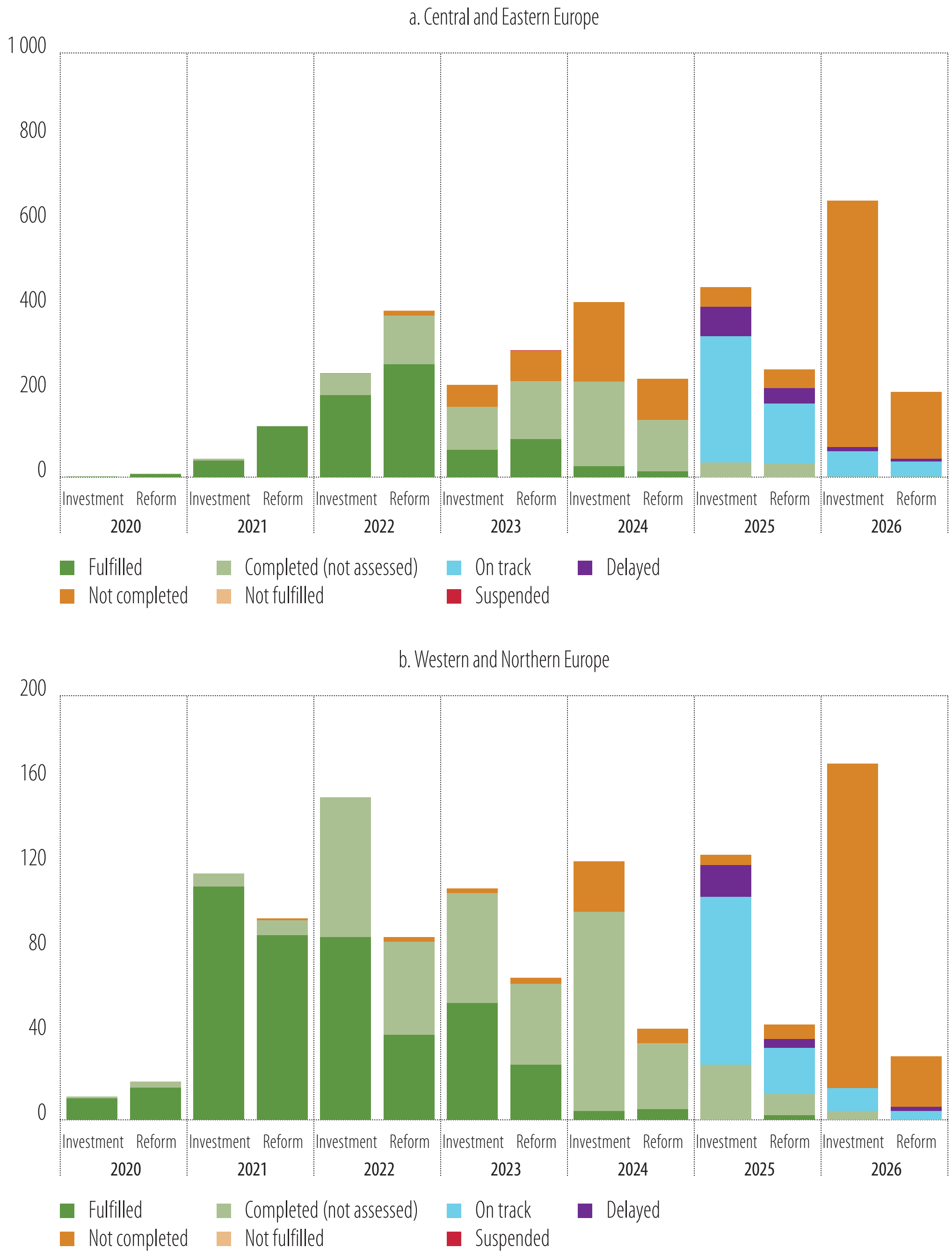


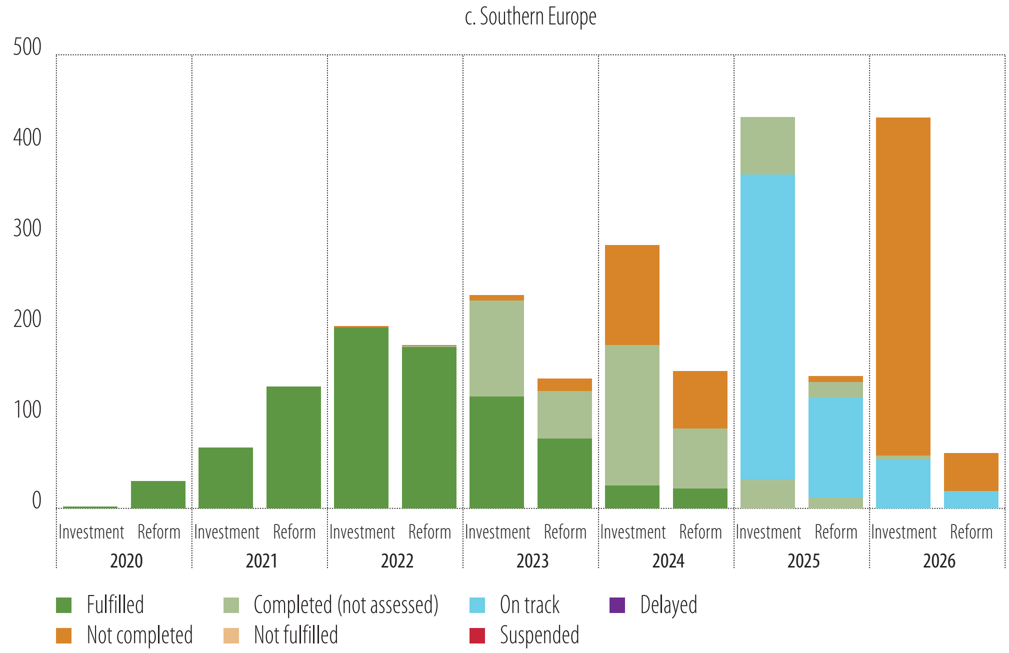
Source: *European Commission and EIB staff calculations.*

Note: *For panel B, country-specific recommendations are classified as implemented once they are determined to have made substantial progress, or at full implementation. Investment-enhancing recommendations are associated with at least one of the following policy areas: taxation policy; business environment, including policies for small and medium-sized firms; renewable energy; energy infrastructure and networks; transport; research and innovation; digital connectivity; infrastructure and market functioning; access to finance and growth financing (including the capital markets union); private-sector debt and insolvency framework; financial services and financial stability; public procurement and concessions; reducing the tax burden on labour; and broadening tax bases. Years denote when country-specific recommendations appeared, while progress refers to assessments one to two years, two to five years, or five or more years following the introduction of a given recommendation.*

Figure 9

Implementation of investments and reforms (number of measures)**, by region**





Source: Bi-annual reporting and the RRF Scoreboard, EIB staff calculations.

The Recovery and Resilience Facility was an opportunity to develop cross-border projects, but that potential has not been fully realised. Over half of the national plans contained measures for green cross-border initiatives (worth €271 billion in total), notably in hydrogen and rail interoperability (European Commission, 2022a). Most plans also supported cross-border digital projects, totalling €5 billion, in areas such as microelectronics and cloud technologies.

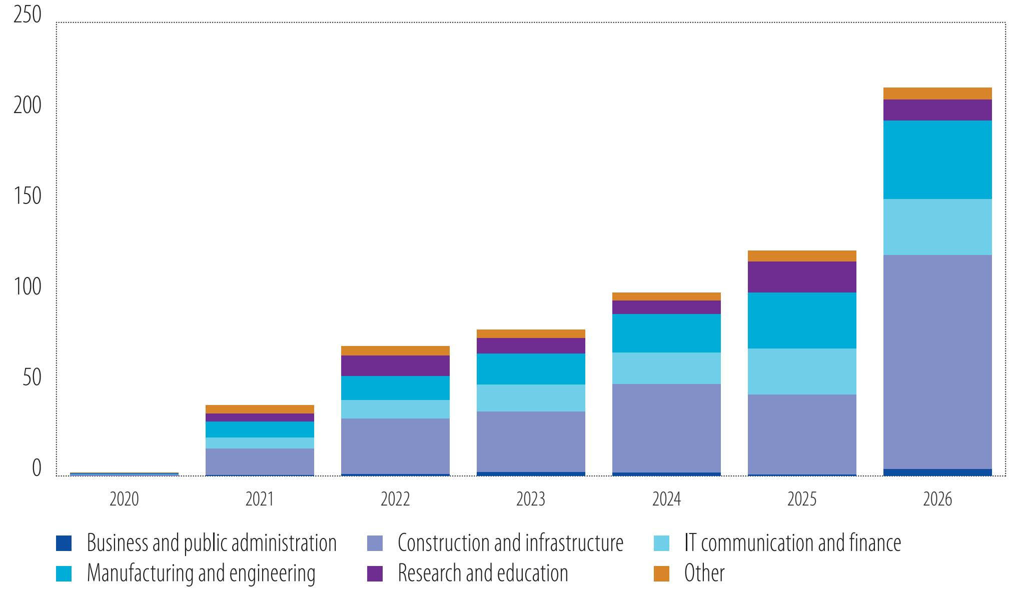
Important projects that have a common European Interest play a critical role in strengthening EU competitiveness, resilience and innovation.[5] The European Commission has been approving such projects, which may be initiated by four or more EU members, in growing numbers since 2018. But implementation remains slow, with many investments, such as machinery purchases and scaled-up production, expected only towards the end of the funding period. Success takes strong multilevel coordination, consistent engagement with EU countries, and overcoming obstacles like lengthy notification processes and antitrust constraints on joint technological development. External factors, including the war in Ukraine and rising material costs, have further slowed progress, limiting opportunities for cross-border projects. With urgent needs in strategic areas like transforming the energy system, cross-border and projects that span multiple countries remain more relevant than ever.

RRF investments are boosting demand across key sectors. Using AI tools to classify Recovery and Resilience Plans by NACE Rev. 2 sectors, the European Commission finds that construction and infrastructure benefit most, followed by manufacturing, IT and communications, finance, and education (Figure 10).[6] More than one-third of investments will support these sectors in 2026.

5 Important Projects of Common European Interest were developed in several waves (European Committee of the Regions, 2025). The first wave contained ad hoc projects in microelectronics and batteries, while the second wave focused on areas like hydrogen, microelectronics and cloud infrastructure. The second wave was developed in parallel with the Recovery and Resilience Facility, building on lessons learned and enabling a broader range of EU members (particularly in Central and Eastern Europe) to engage.

6 NACE Rev. 2 refers to the statistical classification of economic activities in the European Union. Developed by Eurostat, it provides a harmonised framework for collecting and presenting economic data across sectors. The classification is used for compiling statistics on employment, production and investment, and supports policy analysis and decision-making at the EU and national levels.

Figure 10
Cost of RRF investments (€ billion)**, in selected sectors**



Source: *European Commission data and EIB staff calculations.*

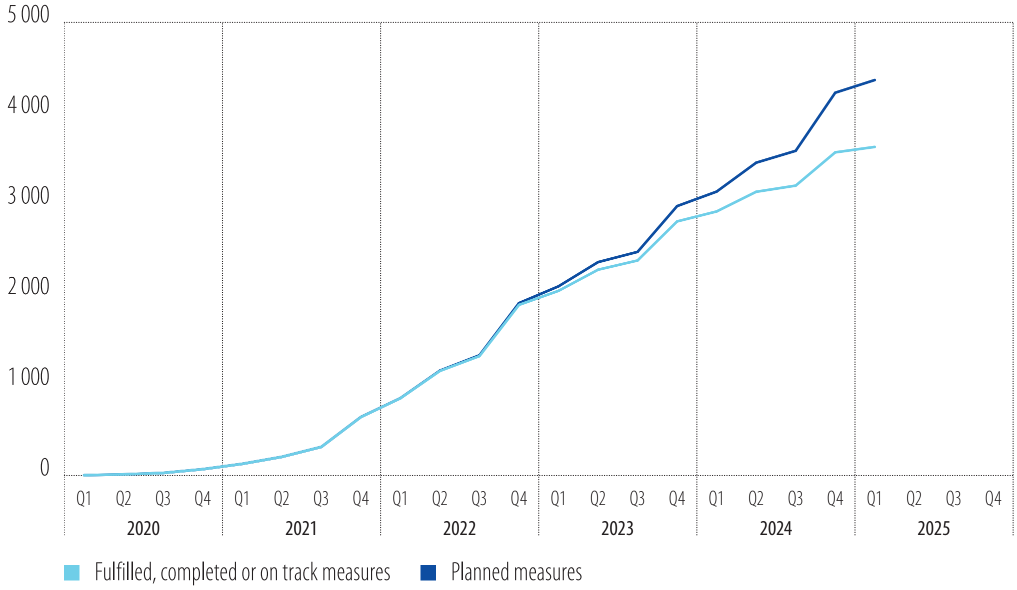
Grant disbursement is progressing faster than loans. By August 2025, €221 billion in grants (62% of the total planned) had been disbursed, compared to €141 billion in loans (49%). EU countries have prioritised grants, with many loan components added later through amendments to Recovery and Resilience Plans. Six countries – Denmark, Estonia, France, Italy, Germany and Malta – have received over 65% of their allocations, while Bulgaria and Hungary remain below 30%.

Implementation must accelerate to meet the deadline in August 2026. As of 30 April 2025, 49.5% of milestones and targets due by the first quarter of 2025 (the most recent data) had been met, with another 33.7% completed but not yet assessed (Figure 11). This leaves 17% uncompleted, with delays of up to three years in some cases. Bulgaria, Hungary and Romania face the largest gaps, with over 85% of their milestones and targets still pending. Twelve other countries have been advised to increase their pace.

The facility helped shift the composition of public investment spending towards climate and digital priorities. Thematic focus under the facility and the long-term EU budget, the Multiannual Financial Framework, is driving this change. Although the data available have some limitations, it is still possible to form an approximate view of the shares of public investment related to climate and digital themes up to 2023. For this purpose, we use the Classification of the Functions of Government categories of environmental protection and fuel and energy – while acknowledging that these include items that are not strictly climate-related and also omit some relevant spending. For digital investment, we rely on data on investment in digital assets from the statistics on investment in different assets provided by public administrations.

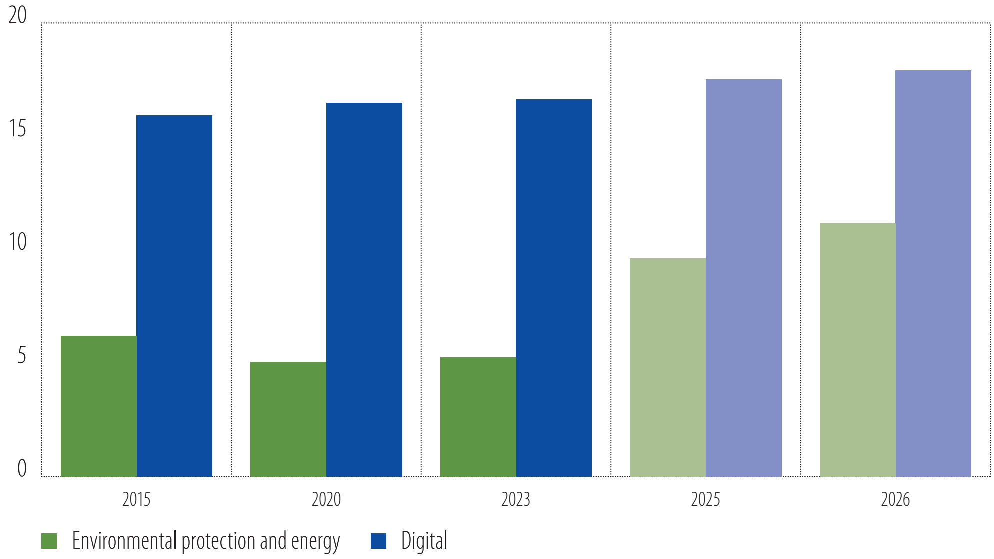
While it has declined in recent years, climate investment still accounted for 5.3% of total government investment in 2023 (€32 billion). Digital investment, by contrast, increased from 14% to around 16.6% of total public investment (€101 billion in 2023), with most of the growth occurring from 2008 to 2016. When these figures are combined with thematic allocations from the facility and the EU budget, the shift in priorities becomes evident. By 2026, the share of government investment in digitalisation is expected to rise from 16% in 2023 to 18%, while climate-related investment is projected to double from 5% to 10% (Figure 12). Progress on country-specific recommendations related to these areas is also strong, with 94% of digital and 77% of green recommendations from 2019 to 2020 showing at least some progress.

Figure 11
Number of measures planned vs. realised



Source: *RRF bi-annual reporting and RRF Scoreboard, EIB staff calculations.*
Note: *Data were only available through the first quarter of 2025.*

Figure 12
Government investment in climate vs. digitalisation, including the EU budget and the Recovery and Resilience Facility (share of government investment in percent)**, 2025-2026**



Source: *Eurostat national accounts and government finance statistics, EIB staff calculations.*

The remaining RRF resources can be redirected to ensure that funds are effectively absorbed and maximise impact before the end of August 2026. Regulation governing the facility allows EU members to adjust plans or transfer resources to other programmes if projects cannot be completed on time. Options include scaling up successful measures, reducing oversubscribed ones, or reallocating funds to InvestEU, national promotional banks, or EU flagship programmes such as defence and satellite communications. The European Commission's guidance explicitly supports these approaches, as well as continuing projects beyond 2026 using national or other EU funds so that investments in green and digital priorities remain on track even after the RRF window closes (European Commission, 2025d).

Countries with large allocations, such as Italy, Spain and Poland, are already using financial instruments and loan facilities to accelerate delivery. Others like France and Germany – having relied solely on grants – are encouraged to scale up existing measures and to work with national promotional banks to provide equity for companies. In addition, using financial instruments to encourage private investment, including additional contributions to InvestEU by EU members, are emerging as a key lever to crowd in private capital and reduce risk. Spain and Greece have already activated sizeable InvestEU transfers, while Poland has opted for EIF guarantees. Beyond financial instruments, EU members may voluntarily channel RRF resources to strategic EU programmes such as the European Defence Industry Programme, and satellite initiatives like IRIS,[2] Galileo and Copernicus. While these contributions remain optional and were unquantified as of November 2025, they offer a legally compliant way to preserve funds and strengthen Europe's industrial and technological resilience.

The bonds issued by the European Union in connection with the Recovery and Resilience Facility and loans from a programme to spur defence spending are innovative solutions, with implications for future interest expenditure. The European Union is issuing debt on an unprecedented scale for these initiatives. Repayments of RRF loans will start in 2028 and continue until 2058, following schedules agreed with the European Commission. Bonds issued under the other programme, called Security Action for Europe (SAFE), have very long maturities (up to 45 years, with a 10-year grace period). To approximate the total financial benefit associated with these loans and bonds, we multiply the amounts borrowed by each country with the spread between EU bond yields and national euro-denominated bond yields. We also found that, when comparing yields for two different points on the yield curve – five years and ten years – the estimated savings are of similar magnitude. Using this approach, total annual savings for all countries combined are estimated to be in the range of €1.9 to €2 billion. The largest beneficiaries are Italy, due to the size of its RRF loans, and the non-euro Eastern EU countries, which have higher borrowing costs. An additional advantage, though difficult to quantify, is that these countries can seldom raise debt with such long maturities in euro-denominated markets. As pointed out in the first chapter of this report, if these bonds were to assume the characteristics of a euro safe asset, the associated yield advantage could amount to up to 40 basis points, further increasing the savings for countries.

Lessons learned from deploying the Recovery and Resilience facility can inform the design of future EU instruments. The facility has served as an effective EU crisis response tool by providing grants and low-cost loans to EU countries, linking them to the achievement of reforms and investments. This approach has helped sustain public investment and drive structural change. The facility has shifted the composition of public spending towards common EU policy priorities like climate action and digitalisation, with a simultaneous boost in investment across many EU countries in those areas. However, the instrument has only partially fostered cross-border projects, leaving untapped potential for the provision of European public goods. Overall, continued effort to build administrative capacity and technical support at the national and regional level, simplified procedures, and mechanisms to foster multi-country projects are necessary for larger transformation programmes.

Defence spending and fiscal constraints

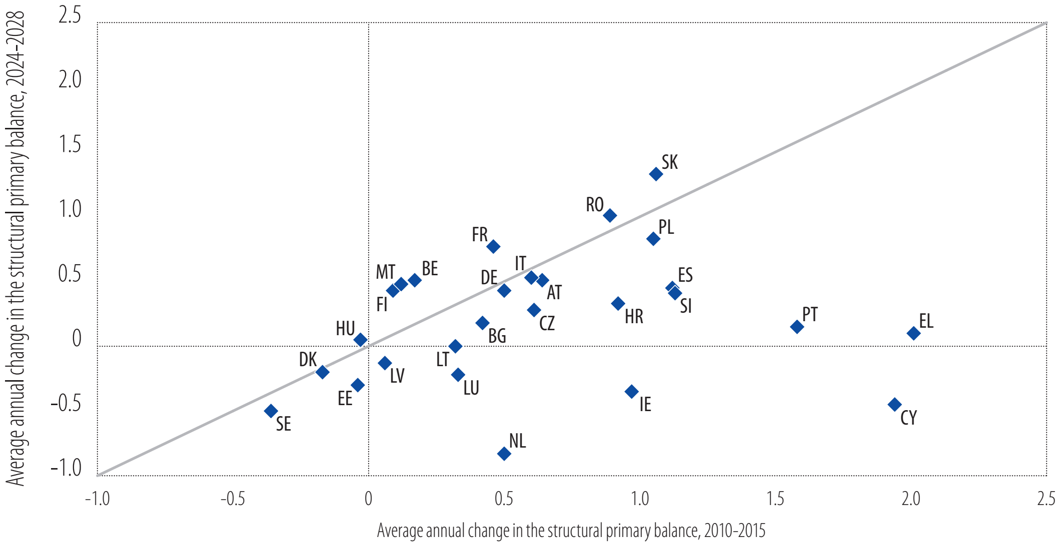
Pressure to increase spending on defence is reshaping fiscal policy across the European Union. The reform of the Stability and Growth Pact in 2024 requires EU countries to prepare medium-term fiscal structural plans aligned with the revised rules. These plans include varying degrees of fiscal tightening while aiming to maintain relatively high levels of government investment. In response to heightened security risks, 16 EU members have invoked an escape clause that allows them to spend more on defence without infringing fiscal rules. This flexibility is intended to offset the negative macroeconomic effects of government efforts to reduce spending and debt and will likely alter the composition of public investment. Furthermore, EU instruments provide flexibility and options to increase defence spending.

Two years in, medium-term fiscal-structural plans remain on track

EU countries' efforts to address their debt vary widely. On average, the EU structural primary balance is projected to improve by 0.4 percentage points of GDP per year. While some countries expect their fiscal positions to deteriorate, most are targeting adjustments comparable to those made during Europe's sovereign debt crisis, which began in 2009 (Figure 13). Six countries are planning even larger consolidations. In contrast, four are aiming for much smaller adjustments than those implemented during the previous crisis, reflecting the benefits of having placed their public finances on a more sustainable footing in that period.

Figure 13

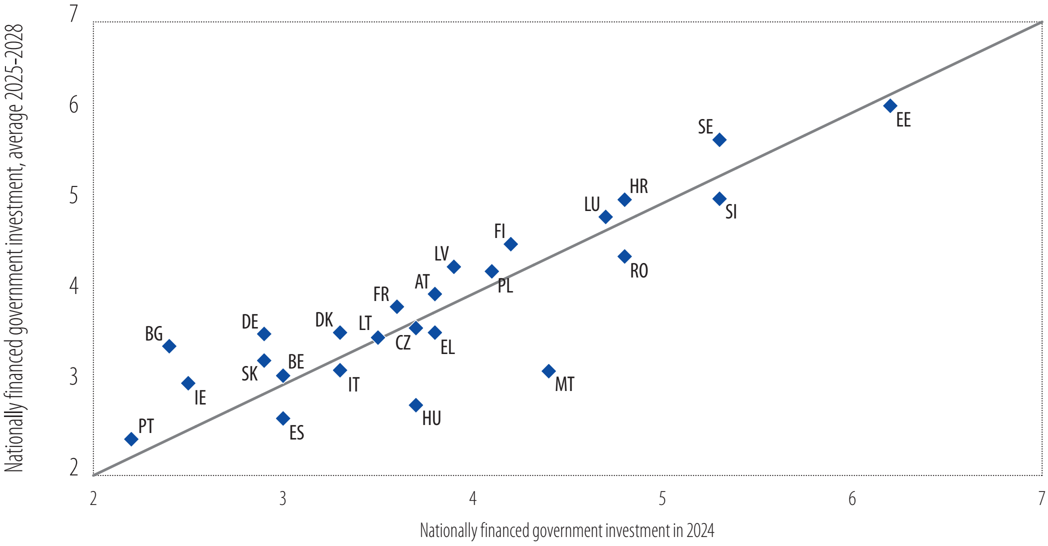
Fiscal adjustment projected in countries' medium-term fiscal-structural plans vs. fiscal consolidation during and after Europe's sovereign debt crisis (% GDP)



Source: *Eurostat, national medium-term fiscal-structural plans, European Commission and EIB staff calculations.*
Note: *The adjustment in 2010-2015 is calculated as the difference between the structural primary balance in 2015 and 2010 in percent of GDP. Most countries are putting in place adjustment plans over four years, until 2028. Some countries have a longer time frame of seven years, until 2031, provided that they meet certain criteria. For 2024-2028, or 2031 for the countries with seven years of adjustment period, the adjustment is calculated as the difference between the projected structural primary balance in 2028 (2031) and that of 2024.*

Governments intend to sustain investment levels despite consolidating their finances. During the last period of fiscal consolidation, government investment in the European Union fell by 1 percentage point of GDP, and by 2.1 percentage points in Southern Europe – equivalent to half of total government investment in countries in that region. This decline reduced public capital and private investment. In contrast, current plans are more optimistic. Except for Hungary and Malta, most countries aim to maintain investment rates close to post-pandemic highs, which are among the highest in the past three decades (Figure 14).

Figure 14
Projected investment financed by individual countries (% GDP)



Source: *Eurostat, national medium-term fiscal-structural plans, European Commission and EIB staff calculations.*

The first reviews of fiscal plans show cautious optimism. The first annual progress reports submitted by EU countries align broadly with the European Commission's 2025 Spring Forecast. The European Commission's assessment indicates that countries are making progress improving their finances, although further improvements are needed (European Commission, 2025b).

EU countries are more optimistic about growth and inflation. Some projected a firmer rebound in real GDP, particularly among Central and Eastern European economies, and anticipated a faster decline in inflation towards the European Central Bank's 2% target. While these differences appear modest at the aggregate level, they matter for debt sustainability analysis. Higher growth and higher inflation assumptions reduce projected debt-to-GDP ratios and lend credibility to a country's financial path, even when underlying adjustment efforts are limited. This optimism can mask vulnerabilities, as overly favourable assumptions may lead to unchecked increases in government debt and fiscal risks, creating pressure for countries to correct their efforts if actual outcomes fall short.

Box A
Germany's fiscal plans and their impact on the rest of Europe

In the spring of 2025, the German government announced a significant increase in spending, with a €500 billion increase in infrastructure spending over 12 years and €300-400 billion in military spending. These measures, enabled by a more flexible approach to debt and new fiscal rules, were designed to bolster Germany's economic growth and address structural challenges while raising defence capabilities. This box provides an analysis of the likely effects on German GDP, the environment for private investment and the spillover impacts on the European Union. It concludes that the composition of fiscal spending has a significant effect on GDP and spillover effects for other countries.

Key elements of the fiscal package

The fiscal package consists of two major components: infrastructure investment and defence spending. It aims to finance additional infrastructure investment over 12 years through a

€500 billion fund, focused on upgrading transport networks, and possibly digital and energy systems. If, as intended, all the spending is additional to investment that would have taken place anyway, this new spending would increase annual public civilian investment by one-third, raising it from 2.6% to 3.6% of GDP – just above the EU average of 3.2%. Implementation will take time due to planning and capacity constraints, particularly in construction, which also suffers from a lack of skilled labour. Defence spending is set to rise by €300 to €400 billion cumulatively over ten years, with all defence spending above 1% of GDP exempt from debt limits. The spending is intended to modernise the armed forces, replenish stocks and invest in new weapon systems.

Economic impact on Germany

Academic literature suggests that a 1% increase in fiscal spending typically expands GDP by 0.6% to 1.5% during the years it takes place, depending on the economic environment and the composition of the spending (Antolin-Diaz and Surico, 2022). Without the new measures, German GDP growth was projected to be 0.2% in 2025, 0.8% in 2026, and 0.9% in 2027, with potential growth of only 0.4% to 0.6% annually through 2030.[7] The infrastructure package as designed could add 0.2 to 0.4 percentage points to growth in 2026 and 0.4 to 0.8 points in 2027, with a sustained annual boost to real GDP growth of 0.3 to 0.6 points over the medium term. Improved infrastructure is expected to reduce barriers for private firms, especially in transport and digital sectors, which are frequently cited as obstacles to investment in Germany. Removing such barriers can increase company investment rates by about 1 percentage point.

However, the composition of additional spending matters. Several leading institutions (Deutsche Bundesbank, 2025; German Council of Economic Experts, 2025; Ifo Institute, 2025) argue that the infrastructure package may not represent entirely new investment. If some funding simply replaces existing spending or enables higher current expenditure, the GDP impact would likely be stronger in the short term but weaker in the medium term.

Applying the same multipliers, military spending could add 0.1 to 0.3 points in 2026 and 0.3-0.6 in 2027, with a medium-term effect of 0.1 to 0.3 points annually. Here again the composition of spending matters (see also Chapter 2). The greater the share of imported investment goods – for example, of US-produced fighter jets – the lower the impact on German GDP. In addition, the medium-term impact is larger for investments from which the civilian economy also benefits, such as investments in R&D for dual use goods.

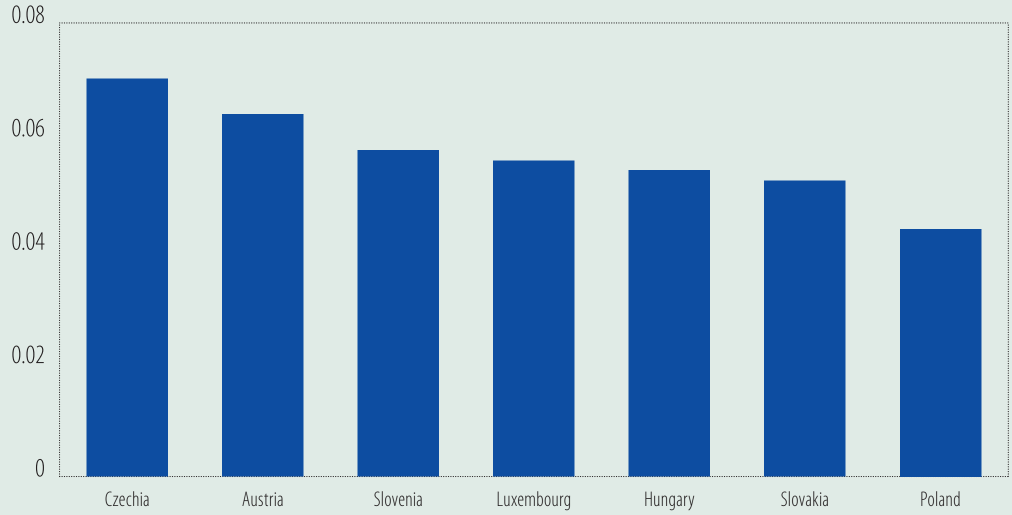
Spillover effects on the European Union

Most of the infrastructure spending will be concentrated in the relatively closed construction sector, which imports few goods. Only about one-third of the spending will benefit the more open manufacturing sector. As a result, the spillovers to the rest of the European Union of the infrastructure package as designed are likely to be around 0.05% of GDP for countries supplying goods, with second-round income effects potentially doubling this figure. The new spending is expected to grow overall EU GDP (excluding Germany) 0.03 to 0.07 percentage points in 2026 and 0.07 to 0.14 in 2027. If the implementation of the package effectively leads to more current spending, the spillovers would shift towards countries from which Germany imports consumption goods, such as China. Defence spending has a higher import content, especially in weapons and ammunition, and is more likely to benefit EU partners and US suppliers.

7 The lower bound is given by Bundesbank's estimate of potential growth during 2024-27, with the qualification that "as long as concrete supply-side measures are not in sight, a revival of potential growth is unlikely." The upper bound is taken from a recent report by Fitch.

Figure A.1

Effect on GDP of planned increase in German public civilian infrastructure spending through direct trade links (% GDP of country exporting to Germany)**, estimates**



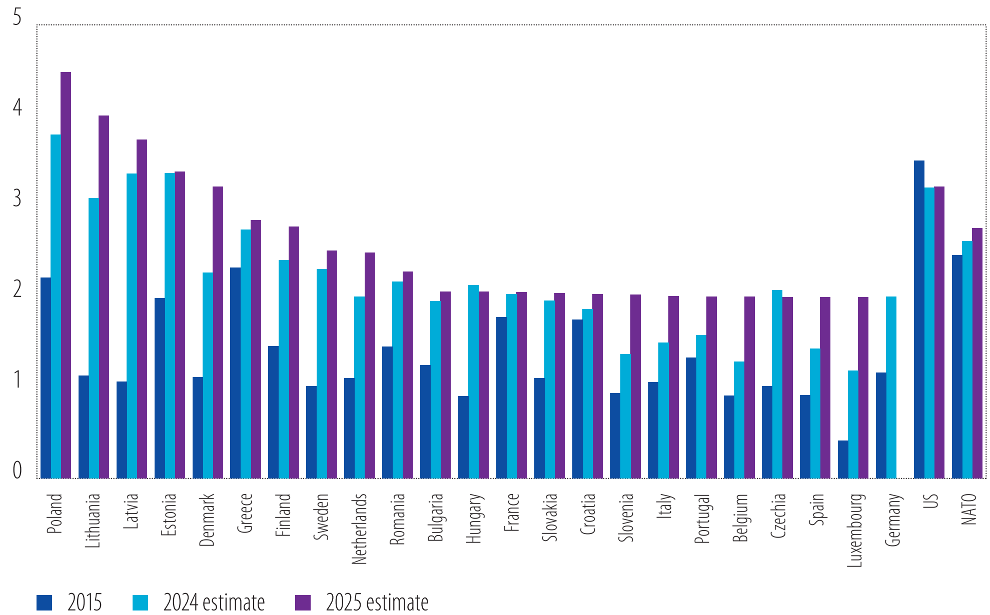
Source: *EIB staff calculations based on Eurostat.*
Note: *We assume that spending consists of 60% construction, 30% equipment and 10% vehicles. For these sectors, we take the share of value added originating from the country providing supplies to Germany. For example, the German equipment sectors source 0.6% of their value added from Czechia, vehicles 1.1%, and construction 0.5%. Multiplying these shares by the total additional spending likely to fall on these sectors gives the total direct demand stimulus for Czechia (excluding indirect spillovers in demand, which we deal with separately). For most omitted EU countries, the estimated direct trade impact is around 0.02% to 0.03% of the supplying country's GDP.*

Addressing defence and security challenges

The priority being given to increasing security and defence spending now means that countries will need to consolidate their finances later. The substantial increase in defence and security spending was not initially budgeted in countries' medium-term plans. Consequently, 16 EU members took the opportunity to request a national escape clause permitting them to spend up to 1.5% of GDP more than laid out in their medium-term plans, provided that the excess qualifies as security and defence spending. While the increase in spending will not affect compliance with the fiscal rules in the next four years, countries should take steps to remain on a sustainable debt path afterwards, which could lead them to tighten their finances later on.

Defence spending in Europe has risen sharply in response to growing geopolitical tensions. Public defence spending has increased significantly, particularly among countries on the European Union's eastern flank, due to emerging threats and geopolitical tensions. Investment in security and defence is critical to safeguarding Europe's autonomy, resilience and ability to protect its people and values. In 2024, total defence spending by the 27 EU members reached €343 billion, a 19% increase compared to 2023, raising defence expenditure to 1.9% of GDP (European Defence Agency (EDA), 2025). All European NATO allies are expected to meet the 2% target by 2025, while several Eastern European countries – including Poland, Estonia, Latvia and Lithuania – are projected to approach or exceed 3.5% of GDP in defence spending (Figure 15), reflecting heightened security concerns in the region.[8] Western European countries, including Germany, France and Italy, have recorded more moderate increases, remaining below the levels observed in Eastern Europe.

Figure 15
Defence spending in the European Union compared with NATO and the United States (% GDP)



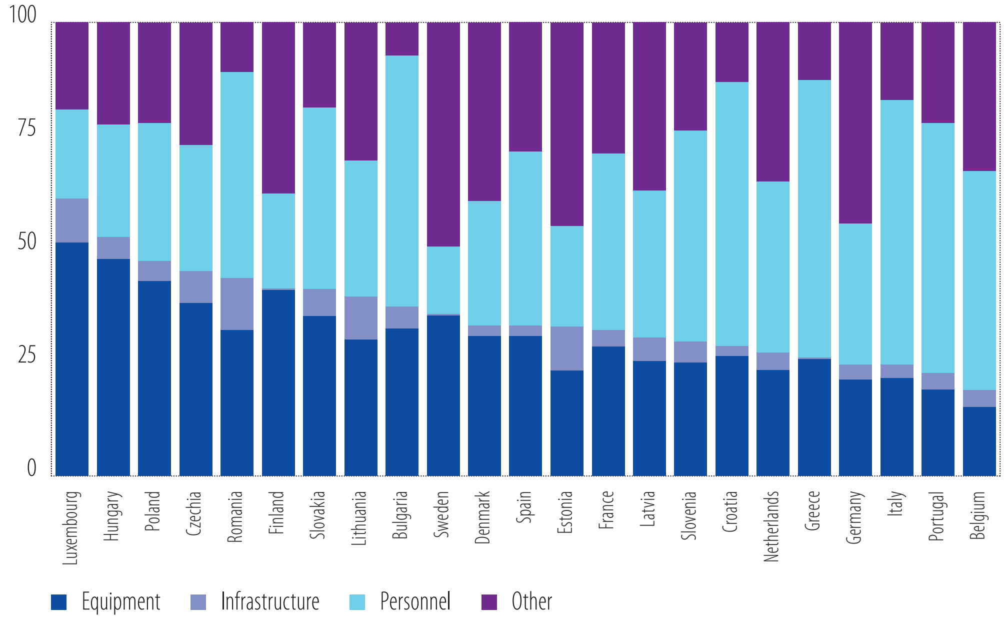
Source: EIB staff calculations based on NATO.
Note: Defence expenditure data for 2024 and 2025 are preliminary, as of August 2025. Each NATO member's ministry of defence reports current and estimated future defence expenditure according to the agreed definitions. The amounts represent payments by a national government that have been, or will be, made during the fiscal year to meet the needs of its armed forces, those of allies or those of the alliance. In the figures, NATO also uses economic and demographic information available from the Directorate-General for Economic and Financial Affairs of the European Commission, the International Monetary Fund (IMF) and the Organisation for Economic Co-operation and Development (OECD).

Defence spending by EU members has traditionally been geared towards current spending, particularly personnel costs. In more than half of European NATO allies, employee compensation accounts for the largest share of public defence spending, exceeding 50% in five countries: Greece, Italy, Croatia, Bulgaria and Portugal (Figure 16). However, the composition of defence spending varies widely. Countries such as Luxembourg, Hungary, Poland and Finland allocate over 40% of their defence budgets to equipment, while Italy, Portugal and Croatia continue to prioritise personnel costs.[9] Infrastructure spending remains limited in most countries, with the notable exceptions of Romania (11.5%) and Estonia, Lithuania and Luxembourg (each just below 10%). Sweden, Estonia and Germany devote a significant share of resources to operational and maintenance expenses, grouped under the category "Other" in Figure 16. These differences reflect diverse strategic priorities and legacy structures, underscoring the need for tailored investment approaches to strengthen European defence capabilities.

8 NATO members approved a new defence investment plan, including ambitious new capability targets, at the NATO Summit in June 2025. The pledge calls for allies to reach 5% of GDP annual spending on defence by 2035. Specifically, allies will devote 3.5% of GDP per year to core defence spending, as well as 1.5% of GDP to defence and security-related investment, including in military-related (civilian) infrastructure (roads, bridges, etc.) and resilience (cyber security, etc.).

9 NATO allies have put forward a reference level of a 20% share of total defence expenditure for equipment and military R&D.

Figure 16
Composition of defence spending (% of total)**, by category**



Source: *EIB staff calculations based on NATO.*
Note: *The military spending data is for 2024. Personnel spending includes military and civilian expenditure and pensions. Equipment spending includes major equipment expenditure and R&D devoted to major equipment. Infrastructure spending includes NATO common infrastructure and national military construction. Other spending includes operations and maintenance expenditure, other R&D expenditure, and expenditure not allocated to the above-mentioned categories.*

The recent surge in defence spending has been accompanied by an unprecedented peak in EU-level defence investment, reflecting a strategic shift towards developing capabilities. Building a secure and resilient future requires targeted investment that addresses current and emerging capability needs through a range of channels, including infrastructure expansion, research and development and strengthening strategic technologies and manufacturing capacity. This includes tackling hybrid threats across key domains such as space, artificial intelligence, and the protection of critical infrastructure in energy, communications and public services. In 2024, EU members invested a record €106 billion in defence – including research, development, procurement of equipment as well as inventory expansion – surpassing the €100 billion threshold for the first time and accounting for 31% of total defence expenditure (Figure 17). 24 countries allocated 20% or more of their defence budgets to investment, up from 20 in 2023.[10]

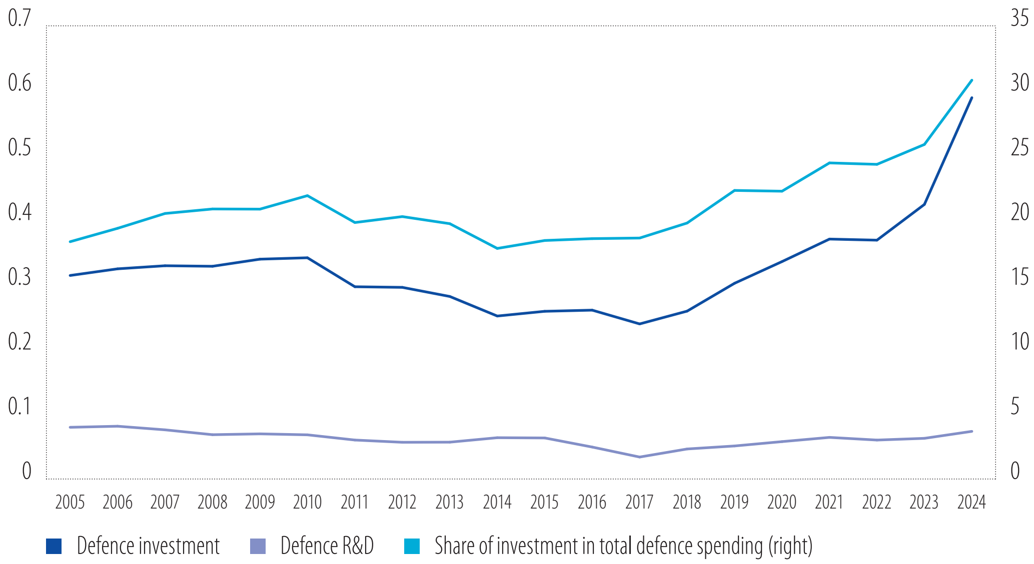
Defence R&D budgets in the European Union remain fragmented and limited in magnitude compared to global peers. Currently, Europe's R&D defence spending is essentially the sum of national R&D defence budgets, with limited pooling of resources or joint programming (Draghi, 2024; European Defence Agency, 2025). In 2024, defence R&D accounted for 0.07% of GDP (Figure 17), representing a much smaller share of spending than in the United States (about 0.4% of GDP).[11] Without greater coordination, this imbalance could limit the medium-term productivity gains that defence-related innovation might bring to the broader European economy. For example, fragmentation constrains the ability to finance large-scale, high-impact projects and undermines economies of scale. Nevertheless,

10 EU Member States have collectively set a 20% benchmark for defence investment. The benchmark is voluntary, in the sense that translating it into national targets is optional and no timeline is imposed, but it is an important guideline for European defence policy.

11 In 2023, public defence R&D investment in the United States was still estimated to be ten times higher than in the European Union (Centrone and Fernandes, 2024) and in the euro area (Erken et al., 2025).

a slight upward trend is noticeable in recent data, with R&D spending reaching €13 billion in 2024 and projected to increase to €17 billion in 2025 (EDA, 2025). In addition, total EU collaborative research and technology spending is growing, too, increasing by 4.6% in 2024 to €520 million (EDA, 2025). Recent evidence also indicates that venture capital flows into European deep tech defence, security and resilience startups and scaleups are at an all-time high, surpassing €4.8 billion in 2024 (Dealroom, 2025), indicating renewed private-sector momentum and an opportunity to complement public investment with market-driven innovation.

Figure 17
EU defence investment spending (left axis: % GDP; right axis: % of total defence spending)



Source: *EIB staff calculations based on the European Defence Agency, which receives the data from the ministries of defence of the 27 EU countries.*

Note: *Defence equipment refers to military hardware and associated services for countries armed forces, including ammunition and missiles, as well as more complex systems like drones, cyber systems and military mobility infrastructure. Defence equipment is defined by its entire lifecycle, from initial study and design to manufacturing, modification, operation and final disposal. Defence investment thus encompasses spending on the procurement of defence equipment and spending on defence equipment R&D.*

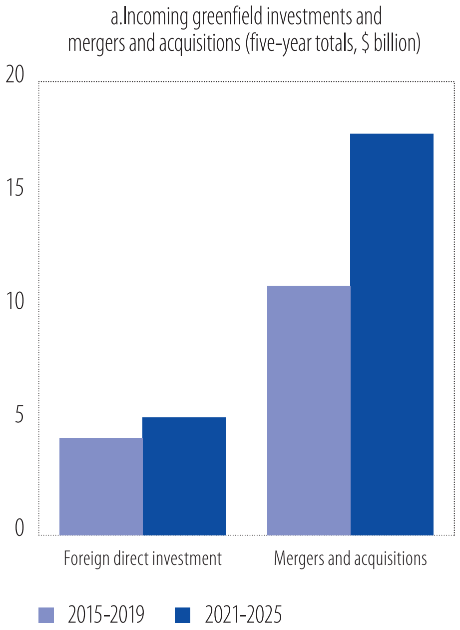
Private cross-border investment in EU defence industries has also surged since the Russian invasion of Ukraine. This increase reflects growing investor confidence, driven by heightened demand and long-term policy commitments to European security. Cross-border greenfield foreign direct investment and mergers and acquisitions in defence-related sectors have accelerated (Figure 18). The rise in cross-border investment flowing into the European Union is particularly notable for mergers and acquisitions, which have grown by 60% since 2021, compared with the five years preceding the COVID-19 pandemic. Public support has played a catalytic role in mobilising private capital. The sharp increase in private cross-border investment in EU defence and security activities highlights the importance of targeted public measures in reinforcing the European Union's industrial base and strengthening the resilience of its defence ecosystem.

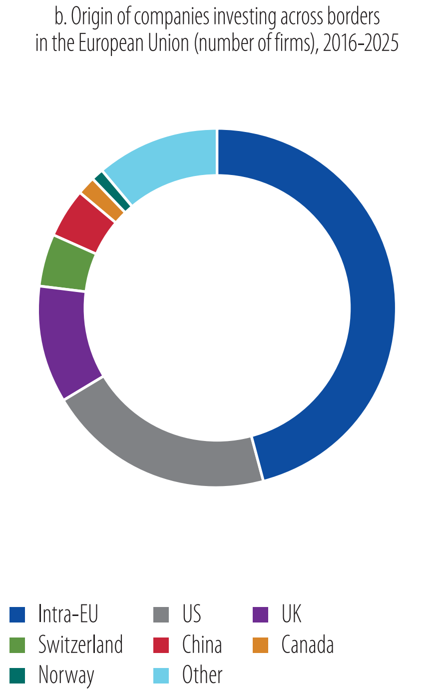
EU investors dominate cross-border investment in the European Union, but US investors dominate in scale. From 2016 to 2025, EU investors accounted for nearly half (46%) of all companies investing across borders within the European Union.[12] Among non-EU investors, the United States leads, with

12 For its imports of arms and ammunition, the European Union already sources half of its purchases (52%) internally. Widening the scope beyond arms and ammunition to include tanks, aircraft, warships and other related equipment, the share drops to 45%. Importantly, the European Union remains reliant on international partners for major weapons and critical systems. See Box B for further detail.

21% of companies investing in the EU defence sector through greenfield foreign direct investment and mergers and acquisitions. The United Kingdom follows American firms with 11%. Scaling investors' shares for their market size, as proxied by their operating revenue, the intra-EU share drops to 22% and is surpassed by the United States (51%). This suggests that although US companies investing across borders within the European Union are not more numerous than their European counterparts, they tend to be substantially larger.

Figure 18
Cross-border investments





Source: *EIB staff calculations based on Moody's data on cross-border investments.*
Note: *Data cover greenfield foreign direct investment and mergers and acquisitions. More specifically, it covers 395 companies involved in 266 foreign-direct investment projects and 252 merger and acquisition deals in the European Union with a business description featuring keywords in the field of security and defence, or with related NACE sector codes (for example, 304 in manufacture of military fighting vehicles, 8 422 in defence activities).*

Public spending must be complemented by private investment to ensure a lasting impact. While governments have committed substantial resources, the ability to translate these commitments into real capabilities depends on the private sector's role in expanding manufacturing capacity and driving technological innovation. Defence contractors face severe capacity constraints, with order backlogs currently estimated at three to four times their annual revenues – underscoring the urgency of scaling up Europe's defence industrial base. At the same time, European defence industries remain vulnerable to supply chain chokepoints, particularly in critical raw materials and specialised components, much of which still comes from non-EU suppliers (see Box B). Addressing these structural weaknesses is essential to meet rising demand and strengthen Europe's defence readiness.

Box B

Sourcing military goods

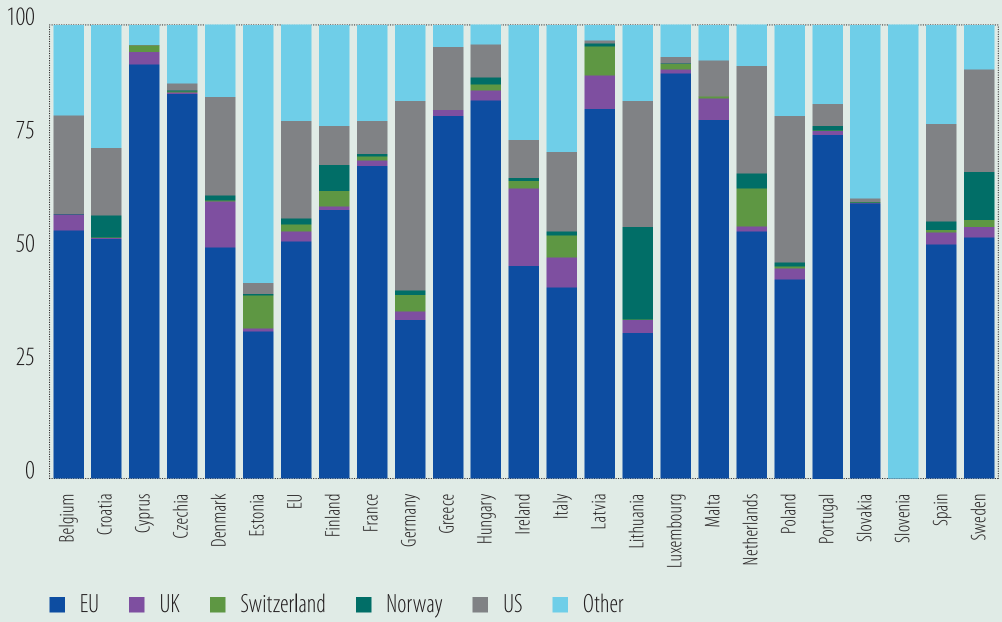
While arms and ammunition are largely sourced locally, the European Union remains reliant on international partners for major weapons and critical systems. For example, it still relies on the United States for critical systems such as missile defence, aircraft engines and drones (where European alternatives are often less technologically developed or uncompetitive). Rebalancing EU dependence on external suppliers will benefit strategic autonomy and heighten the macroeconomic impact of public defence spending (see Box C).

Total arms sales by the United States to the European Union, including under the US Foreign Military Sales programme, have been increasing (Mejino Lopez and Wolff, 2024). The upward trend does not necessarily imply a corresponding jump in the European Union's military reliance on the United States, however, as the increase is following an overall jump in spending since Russia's invasion of Ukraine.

The distribution of imports of arms and ammunition illustrates that European countries already purchase half (52%) of arms and ammunition within the European Union (Figure B.1).[13] Another 22% of EU arms and ammunition imports came from the United States. Import shares differ substantially in different countries. Importantly, arms and ammunition imports are only a small fraction of all military equipment spending – making up just 13% of security and defence imports, for example.

Figure B.1

Import shares by partner country (in %) **– arms and ammunition**



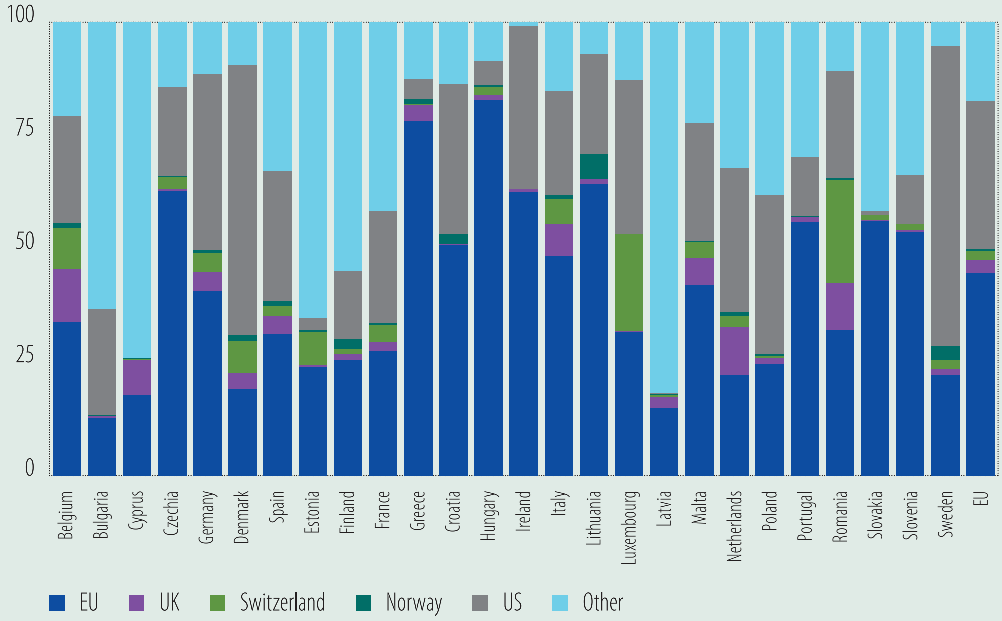
Source: *EIB staff calculations based on UN Comtrade.*
Note: *Covers imports of arms and ammunition (HS code 93) in 2023. While this breakdown based on UN Comtrade is frequently used, these data may not always capture all military imports. Similarly, producers with European production sites might not be EU companies.*

13 Bruegel also complemented such analysis with data reported by the French and Spanish national defence agencies, covering military imports up to 2022 and 2021 respectively, reaching a similar conclusion for these countries.

Broadening the scope beyond arms and ammunition to also include imports of military equipment, a higher reliance on international partners, in particular the United States, emerges. When also accounting for purchases of tanks and other armoured fighting vehicles, military aircraft, warships, explosives and optical precision devices (Figure B.2), the intra-EU share drops to 45% and the role of the United States rises 11 percentage points (33%). In addition, the share of purchases of major conventional weapons by European NATO members from the United States rose from 52% to 64%, with imports more than doubling from 2015-2019 to 2020-2024 (George et al., 2025).[14]

Figure B.2

Import shares by partner country (%) – arms, tanks, military aircraft, warships, explosives and other devices



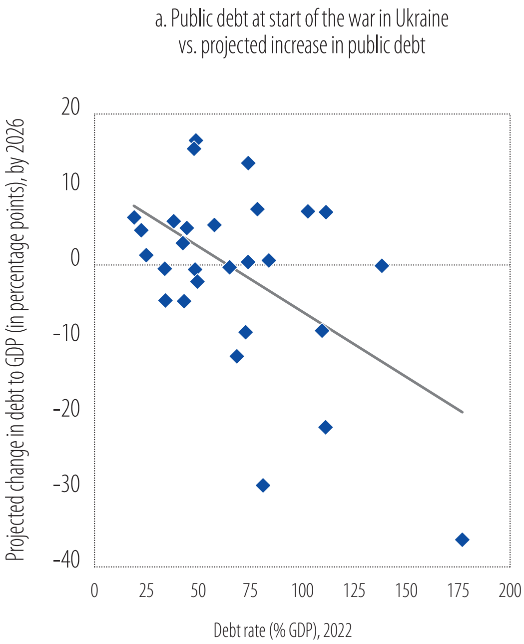
Source: *EIB staff calculations based on UN Comtrade.*
Note: *Covers imports of explosives (HS code 36), tanks and other armoured fighting vehicles (motorised, whether or not fitted with weapons), and parts of such vehicles (8710); military aircraft (880220-880240), spacecraft (880250-880260); vessels and warships (890610); binoculars and other optical telescopes (9005); navigational instruments and appliances (9014); surveying instruments and appliances (9015); and arms and ammunition (93) in 2023. While this breakdown based on UN Comtrade statistics is frequently used, these data may not always capture all military imports. Similarly, producers with European production sites might still be non-EU companies.*

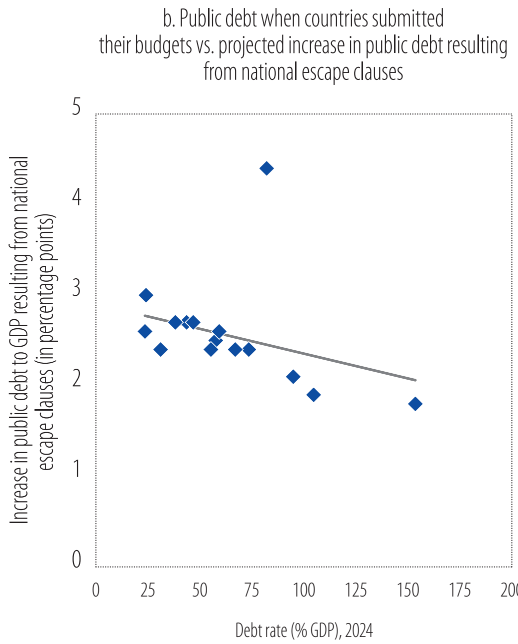
14 The strong arms-supply relationship between the United States and European NATO states is also visible in the large number of pending deliveries. These included a total of 472 combat aircraft and 150 combat helicopters on order with the United States as of the end of 2024 (George et al., 2025).

Fiscal constraints and their impact on defence spending

Limited government finances are constraining defence spending. Heightened security risks have prompted an increase in European public defence expenditure, but limited fiscal space continues to challenge governments' ability to respond effectively to shocks, support investment and maintain macroeconomic stability. Fiscal space – defined as the capacity to spend without compromising debt sustainability – is particularly important in the current European context. Countries with lower debt are better positioned to respond. EU members with lower public debt-to-GDP ratios are projected to have better conditions to meet spending needs by 2026 (Figure 19a). A similar pattern emerges in the projected increases in public debt following the activation of the national escape clause – a temporary, country-specific loosening of EU fiscal rules. Among the countries that requested permission to deviate from spending plans, those with lower initial debt are expected to make greater use of the budgetary flexibility offered by the national escape clause (Figure 19b).

Figure 19
Public debt – current levels vs. expected change





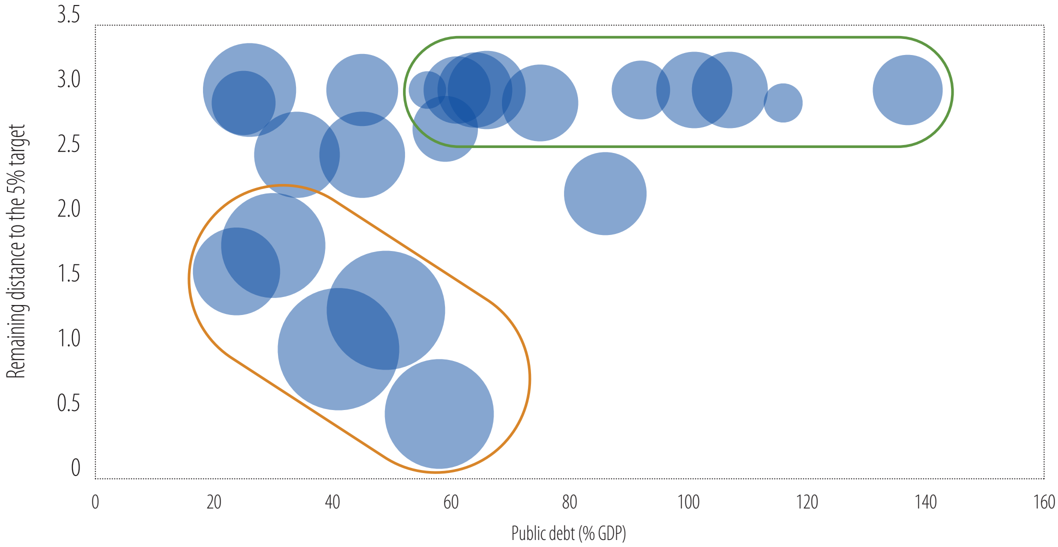
Source: *EIB staff calculations based on the European Commission's 2025 Autumn Forecasts.*

Source: *EIB staff calculations based on the Council of the European Union and the European Commission.*
Note: *Data follow the indicative projections run by the European Commission, which assume a linear uptake of the full increase in government expenditure by 2028 allowed under the national escape clause. Data was not available for all 27 EU countries.*

Defence spending increases are shaped by countries' exposure to threats and the state of their public finances. Recent changes in public defence budgets appear to reflect geopolitical risk and existing debt levels. Several Eastern European and Nordic countries – including Poland, Lithuania, Latvia, Estonia and Denmark – have substantially increased defence spending, as illustrated by the larger bubbles in Figure 20. These countries are geographically closer to areas of heightened tension and tend to have lower public debt, enabling greater fiscal flexibility. Countries with higher debt levels show more restrained spending. Italy, France, Belgium, Spain, Portugal and Hungary have registered more modest increases in defence budgets and remain further from the 5% defence spending target. This pattern suggests that fiscal constraints may limit the ability of some EU members to respond to rising security needs. Moreover, where fiscal limits are binding, higher allocations to defence may crowd out expenditure on other vital public services, such as healthcare, education or infrastructure, thereby intensifying policy trade-offs for national governments.

Figure 20

Public debt (% GDP) **vs. the remaining distance to the 5% target** (in percentage points) **and the increase in public defence spending** (bubble size indicates % GDP)



Source: *EIB staff calculations based on NATO and AMECO, the annual macro-economic database of the European Commission's Directorate-General for Economic and Financial Affairs.*

Note: *Projected debt level in 2025. Remaining distance to the 5% defence spending target issued by NATO in 2025. Defence spending increases, comparing spending levels in 2025 with those in 2015. Each bubble represents a country, and its size shows the change in public defence spending as a percent of GDP. The orange and green lines show the ranges that contain most countries.*

Policy initiatives broaden fiscal leeway for EU countries

Temporary EU measures aim to ease budgetary constraints on defence spending. As part of efforts to strengthen its defence readiness and strategic autonomy, the European Union has introduced several initiatives to help EU members increase defence spending in the face of budgetary constraints.[15,16] Achieving the 3.5% of GDP spending target set out by NATO allies would require EU public defence spending to rise another €464 billion per year, from €343 billion in 2024 to €807 billion by 2034. By supporting coordinated investment and offering flexible fiscal rules, these initiatives also help limit the trade-offs between prioritising defence and maintaining public investment in other strategic areas, such as climate, digitalisation and social infrastructure.

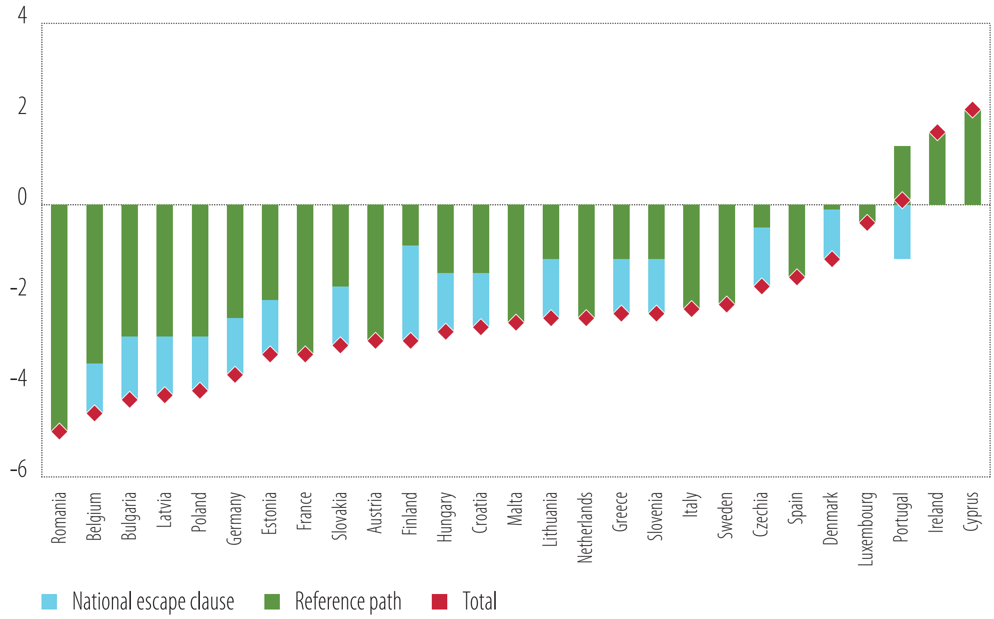
The national escape clause provides temporary fiscal headroom. Activating this clause of the Stability and Growth Pact could mobilise up to 1.5% of GDP in extra spending on defence. The clause

15 In the White Paper for European Defence, the European Union committed to ramping up industrial production capacity, enhancing the resilience of defence value chains, building a true EU-wide market for defence equipment, simplifying and harmonising rules, fostering disruptive innovation through R&D, and developing talent and skills in the defence sector. It also identified priority capability areas for spending, such as air and missile defence, artillery systems, drones, military mobility, and cyber and electronic warfare.

16 In the ReArm Europe Plan, the European Commission identified five pillars. In addition to the national escape clause and SAFE loans, existing EU instruments (see the mid-term review of the 2021-2027 Cohesion policy funding) are being made more flexible to allow greater defence investment, and the European Investment Bank will double its annual investment to support defence projects to €2 billion. The plan also seeks to mobilise additional private capital through the savings and investments union.

has been officially activated for 16 countries. High-debt countries such as France and Italy declined to use the clause, as the flexibility only applies for four years. Spending made possible by the clause will count towards fiscal benchmarks after 2028, potentially triggering market concerns. By 2028, nine countries are projected to have budget deficits that exceed 3% of GDP, six of which have activated the clause (Figure 21). Activation of the clause by 16 EU countries is expected to support €115 billion in new defence pending – or 1.26% of GDP for those countries – by 2028.

Figure 21
Budget balance as a share of GDP (in %), **for 2028**



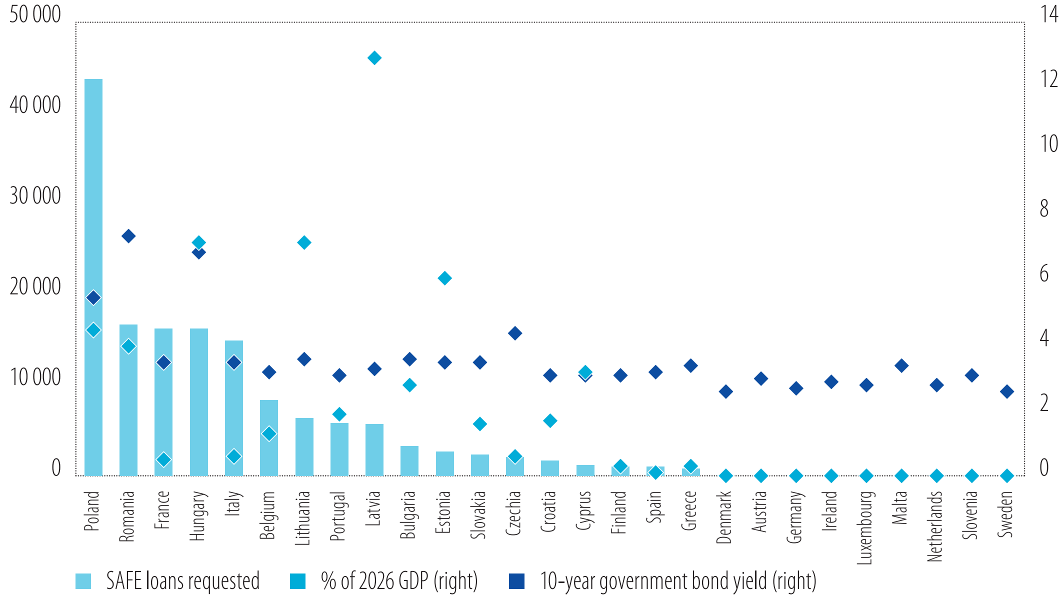
Source: *EIB staff calculations based on the Council of the European Union and the European Commission.*
Note: *Data follow the indicative projections run by the European Commission, which assume a linear uptake of the full increase in government expenditure by 2028 of the fiscal space allowed under the national escape clause. The reference path is based on the net expenditure growth path set by recommendations of the Council of the European Union. The flexibility under the clause is capped at 1.5% of GDP, compared to the net expenditure path set out in the EU members medium-term plans, or to the corrective path under the Excessive Deficit Procedure. The flexibility is available for a period of four years, from 2025 through 2028.*

Fiscal pressures are set to intensify across the European Union in the medium term, challenging the balance between defence and other strategic investment priorities. The Recovery and Resilience Facility, which has underpinned much of the post-pandemic investment effort, will expire in 2026, gradually removing a key source of EU-level support. At the same time, many EU members continue to grapple with high debt ratios – often well above the 60% of GDP benchmark – and deficits that are projected to remain sizeable under current plans (Figure 21). Once the national escape clause expires in 2028, concerns over fiscal sustainability are likely to trigger a return to stricter budgetary discipline, requiring substantial consolidation in several countries. Against this backdrop, meeting ambitious defence spending targets while still pursuing other strategic investments will be challenging. A common, coordinated approach – through instruments such as joint procurement – will be essential to maximise efficiency, avoid duplication, and limit the crowding-out of other critical investment areas (see also Box F).

The SAFE instrument supports joint procurement through long-term loans. A second measure introduced as part of [Readiness 2030] (formerly the ReArm Europe Plan) is the [Security Action for Europe (SAFE)] instrument, which aims to disburse €150 billion in loans to EU members to support joint defence procurement.[17] 19 members have opted in, with nearly one-third of the total lending amount allocated to Poland (Figure 22). Loan uptake is highest among fiscally constrained countries and those on the European Union's eastern flank. The largest allocations were requested by countries with relatively high public debt levels (like France, Hungary and Italy), those facing military threats more directly (like Poland and the Baltic countries), and those with large projected medium-term budget deficits (like Romania and Bulgaria). With a 45-year repayment timeframe, the SAFE loans reduce the borrowing costs for EU members whose long-term interest rates are most affected by fiscal pressure. Estimates suggest that countries requesting SAFE loans could annually save a total of €1.5 billion in interest expenditure.[18]

Figure 22

SAFE loans (left axis: € million; right axis: % GDP) **and long-term government bond yields** (right axis: in %)



Source: *EIB staff calculations based on the European Commission.*

Note: *Tentative allocations per EU member. Governments need to finalise their requests for SAFE financial assistance by presenting their 2026 draft budgetary plans by mid-October 2025 and submitting their defence industry investment plans by the end of November, detailing planned spending and compliance with EU fiscal governance and SAFE eligibility rules. The Council of the European Union will then make the final allocation decision. A positive decision could allow pre-financing of up to 15% of the total, which could become available as early as 2026.*

Joint defence procurement delivers economic, strategic and industrial benefits. A common and coordinated EU defence procurement policy offers significant economic advantages. By pooling demand across EU members, joint procurement reduces duplication and leverages economies of scale, lowering unit costs and improving value for money. It also enhances interoperability among European armed forces, which is critical for operational effectiveness and helps reduce costly fragmentation. Coordinated procurement strengthens Europe's defence industrial base by providing larger, more predictable contracts that encourage investment in production capacity and innovation, including for dual-use technologies such as unmanned aerial vehicles. This approach also mitigates supply chain vulnerabilities, fosters cross-border industrial collaboration and maximises the domestic economic impact of defence spending – creating jobs, boosting competitiveness and reducing reliance on non-European suppliers (see Box F).

17 Joining forces can bring substantial gains. The cost of non-Europe in defence spending has been estimated to be at least €3 billion annually for defence equipment procurement, and up to €820 million for research on emerging disruptive technologies (Centrone and Fernandes, 2024).

18 To approximate the total financial benefit associated with these loans, the borrowed amounts of each country are multiplied by the spread between EU bond yields and national euro-denominated bond yields.

Defence spending as a driver of economic growth and innovation

Productive defence investment can boost economic growth, improving government finances over the long term. Prioritising defence investment can stimulate economic activity, enhance the capacity of EU economies to accommodate higher defence spending, and ensure that public resources are used efficiently. Military spending stimulates economic activity. Estimates suggest that increasing European defence spending by 1.5% of GDP from 2024 to 2028 – in line with the core NATO spending target of 3.5% of GDP – would raise real GDP by 0.5% above the baseline by 2028 (European Commission, 2025e).[19]

The macroeconomic impact of increased defence spending will depend heavily on how investment is designed and implemented. Fiscal multipliers vary across studies (see Box C for recent EU evidence), reflecting assumptions on the design and implementation of the spending increase. Defence multipliers are highest and most persistent for capital-intensive purchases. Doubling the share of productive spending – namely on R&D and infrastructure – in EU defence budgets could almost double the GDP gain by the mid-2030s (European Commission, 2025e). The timing also matters. A gradual ramp-up allows supply capacity to adjust, whereas a sudden spike may encounter bottlenecks, leading to inflation rather than real growth (see, for example, the discussion around Germany in Box A). Similarly, the stage of the business cycle is key for stimulus to be effective. In periods of economic slack, additional demand can translate into new production and employment.

The impacts of defence investment are amplified as they spill across to other EU countries. Public investment not only supports domestic growth, it also contributes to broader economic resilience. Defence spending in one country can generate economic spillovers in others, particularly when the spending involves a high degree of imports from within the European Union (see also Box A).[20] Government investment typically relies more on imports, which increases the likelihood of cross-border spillovers.[21] For example, an increase in government investment in France both increases French GDP and leads to a similarly positive gain in the rest of the big five economies (Germany, Spain, Italy and the Netherlands) (European Central Bank (ECB), 2025). In the same vein, doubling the import content of Germany's defence expenditure from 2% to 4% could double the short-term GDP impact of the spending increase for the rest of the euro area (ECB, 2025).

Coordinated investment programmes across the European Union enhance these spillover effects. Coordinated efforts that exploit each country's strengths and rely on joint procurement boosts the impact defence spending has on other EU countries, especially for smaller and more integrated economies. Coordinated initiatives like the European Union's Readiness 2030 and the SAFE loans aim to promote co-financed investments in European defence firms and infrastructure and to harmonise standards. Joint R&D and integrated supply chains could amplify GDP gains and distribute benefits more evenly across the European Union.

Defence spending can strengthen long-term productivity. Beyond the immediate demand effects, military spending can enhance productivity through learning-by-doing and research and development. The Draghi report (Draghi, 2024) identifies R&D spending as one of the three key levers for addressing Europe's lagging productivity. Military spending can have sizeable effects on long-run growth when it shifts the composition of public spending towards R&D, fuelling innovation and private investment as well as productivity over a longer period. For example, a temporary increase in military spending of

19 A further increase of 1.5% of GDP in spending on broader defence-related initiatives (foreseen for the "civilian share" of the target) is projected to raise EU real GDP only moderately, by about 0.5% above the baseline scenario (no policy change) by 2035 (European Commission, 2025f).

20 Consequently, Member States with strong defence industries and research ecosystems – such as France, Germany, Italy and Sweden – are likely to benefit most from innovation spillovers, while those that mainly import defence goods may see fewer productivity dividends.

21 Government consumption in European countries rely mostly on domestic production, with an import share of only around 10%. By contrast, government investment has a much higher import share of around 30%. These import shares are based on historical averages and reflect the entire set of sectoral components (both private and public).

1% of GDP could raise long-run productivity by 0.25% to 0.3% (Antolin-Diaz and Surico, 2022; Ilzetski, 2025), mostly due to the R&D component of the public spending. Defence-related R&D has historically delivered high returns and spillovers to civilian sectors, with breakthrough technologies like the internet and GPS originating from military programmes.

An increase in public defence R&D spending can also spur private R&D, especially when coordinated efficiently across countries. Government-financed defence R&D not only supports broader productivity gains, but also crowds in private R&D and ripples through other international markets. A 10% increase in public R&D leads to a 5-6% rise in privately funded R&D (Moretti et al., 2025). These innovations frequently extend well beyond defence, benefiting sectors like healthcare, aerospace and telecommunications. Moreover, increases in government-funded R&D in one country and industry tend to raise private R&D in the same sector across borders.[22] According to Calò et al. (2025), the degree of crowding-in varies depending on how innovative each country is. This result reflects the strength of innovation and the environment it operates in, including aspects like the quality of the government policies, education systems, infrastructure and the initial level of public spending on R&D for defence. Highly innovative countries, for example, display stronger crowding-in effects than less innovative ones, highlighting the need to factor in these differences when designing a common policy.

Box C

How EU defence spending pays off for the broader economy

The European Commission's Readiness 2030 initiative signals a renewed commitment to strengthening Europe's collective defence capacity by scaling up public military spending by €800 billion over the next five years. While the overriding objective is to strengthen Europe's security against prevailing threats, this goal must be pursued in an economically sustainable manner, given its fiscal implications.

It is therefore important to evaluate the macroeconomic implications of defence spending, to help design the way forward. This box summarises new EU-wide evidence on defence spending multipliers and translates it into actionable guidance for programme design, implementation, timing and coordination.[23]

A comprehensive methodological approach to assessing fiscal multipliers for EU defence

One of the primary questions when evaluating the economic impact of defence spending is the size of its fiscal multiplier – that is, how many euros of GDP are generated for every euro spent on defence outlays – and the persistence of these effects over time. To this end, García-Serrador et al. (2025) estimate the dynamic cumulative fiscal multiplier of total defence spending through local projections, but also by breaking down its components: capital expenditure, intermediate consumption and personnel costs, which account for nearly 99% of total defence spending.[24] They also test if defence outlays deliver a significantly different economic return compared to non-defence spending.

22 The European Commission cautions that only a small portion of the current defence budgets directly enhances productivity, limiting the long-term impact if spending is not reoriented towards high-tech capabilities.

23 García-Serrador et al. (2025) analyse the 27 EU countries over the period 1995-2023 on an annual frequency, drawing upon data from Eurostat's Classification of the Functions of Government on defence spending, the European System of Accounts 2010 framework on expenditure components, and standard macroeconomic variables.

24 The composition effects of expenditure are estimated using similar regression specifications, while controlling for potential complementarities and substitutabilities among different spending components.

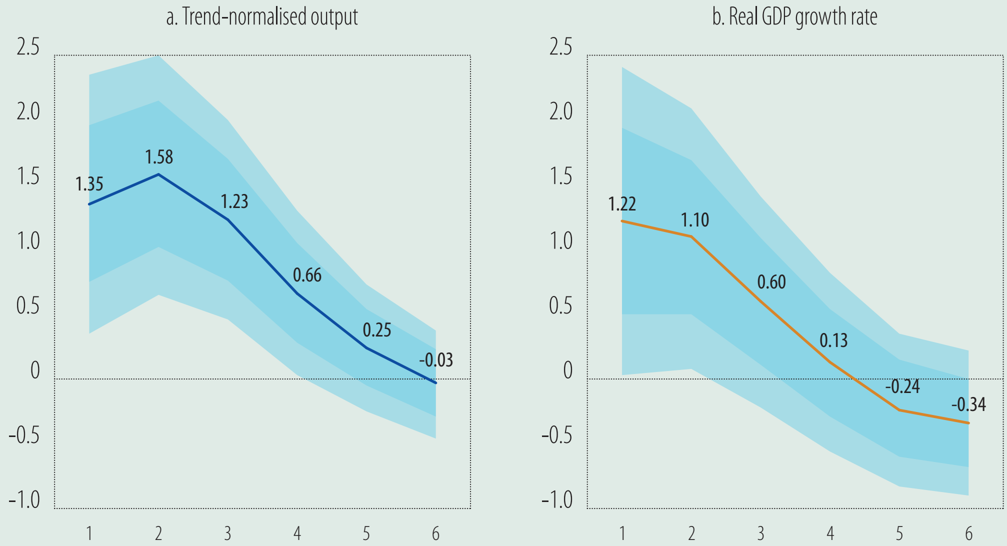
This box also examines how these multipliers vary depending on the business cycle, the country's fiscal position, and the share of defence spending allocated to imports. To do so, García-Serrador et al. (2025) examine how factors, like economic growth or the level of public debt, affect defence multipliers. They look at the overall impact of multipliers on the distribution of economic output, via quantile local projections. They also examine the extent to which the fiscal space[25] and the import reliance[26] shape the size, sign and dynamics of the macroeconomic impact[27] via smooth-transition local projections. Thus, this box builds upon existing studies on the macroeconomic impact of defence spending within the European Union (ECB, 2025; European Commission, 2025e).

Transient and component-specific macroeconomic payoffs from defence expenditure

The empirical evidence suggests that the macroeconomic return of total defence expenditure exceeds unity, albeit in a transitory manner. As illustrated in Figure C.1, a discretionary increase in defence spending equivalent to 1% of trend GDP raises output by approximately 1.4% within the first year, peaks at around 1.6% in the second year, and progressively comes down to zero by the sixth year. Consistent with these results, labour market responses mirror the output effects. Unemployment declines following defence shocks, with effects persisting longer than those on output. Moreover, the impact on real GDP growth comes early and is transitory – capturing the impact of defence-related fiscal shocks not only on the business cycle, but also in a broader measure, encompassing non-cyclical components of output.

Figure C.1

Yearly cumulative impact of a 1% increase in defence spending on GDP (in %)



Source: *García-Serrador et al. (2025) based on Eurostat's Classification of the Functions of Government on defence spending.*
Note: *Estimated cumulative fiscal multipliers via local projections, with 68% (darker blue) and 90% (light blue) confidence bands. The number refer to years after the 1% increase in defence spending. The defence spending shock is accrual-based total defence spending from Eurostat's Classification of the Functions of Government, which has been detrended by GDP. Panel A shows the cumulative fiscal multiplier using trend-normalised real GDP as the dependent variable, and panel B shows the results for using real GDP growth rate as the shocked variable.*

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25 Fiscal space is measured with the debt snowball effect, which considers the public debt stock relative to GDP and the sustainability of public finances.

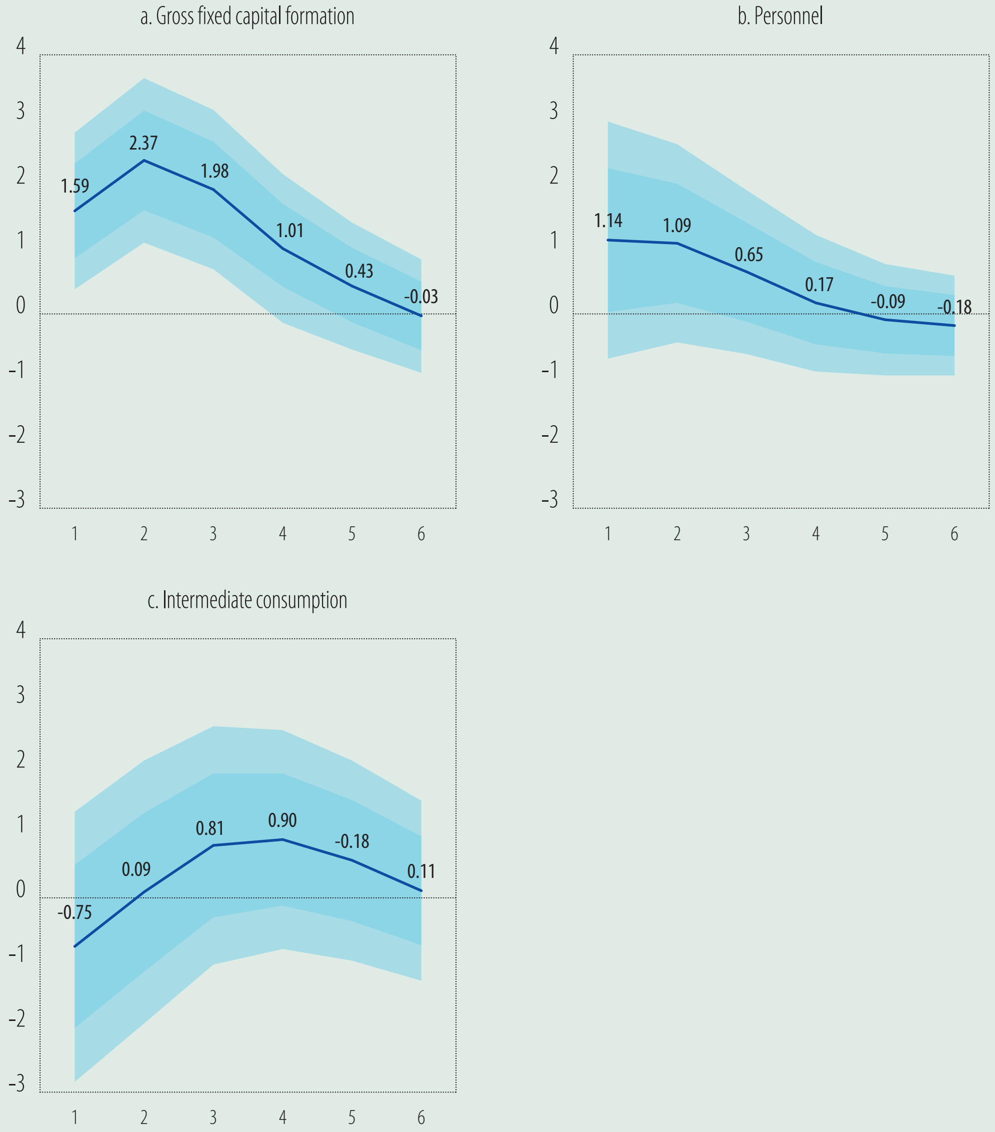
26 The import reliance is measured by the ratio of the value of total military imports of a country relative to its total defence spending.

27 Robustness checks presented in the paper assess the effects of using accrual- vs. cash-basis data, explore alternative approaches to output detrending, employ instrumental-variable estimations to mitigate potential endogeneity concerns, and analyse the fiscal impacts on the labour market, among others.

This transience hides differences in the fiscal multipliers of defence spending components. As shown in Figure C.2, spending composition is crucial: Capital-intensive procurement is the main driver of the aggregate effect, with defence investment yielding cumulative output multipliers of up to about 2.4% after two years, while the impact of personnel and intermediate consumption are smaller, and fade beyond the short term. Moreover, defence spending does not appear to influence long-run trend growth, as enduring gains depend predominantly on defence-related R&D.

Figure C.2

Yearly composition effects of changes in EU defense spending (% GDP)



Source: *García-Serrador et al. (2025) based on Eurostat's classificiation of the functions of government, (COFOG).*
Note: *Estimated cumulative fiscal multipliers via local projections, with 68% (darker blue) and 90% (light blue) confidence bands. The number refers to years after the 1% increase in defense spending. The estimated regressions control for spending components that can be complementary or easily substituted. Panel A shows the cumulative fiscal multiplier of normalised gross fixed capital formation utilised as the fiscal shock. Panel B shows this for personnel expenditure, and panel C for intermediate consumption.*

The short-term edge of capital-intensive defence investment

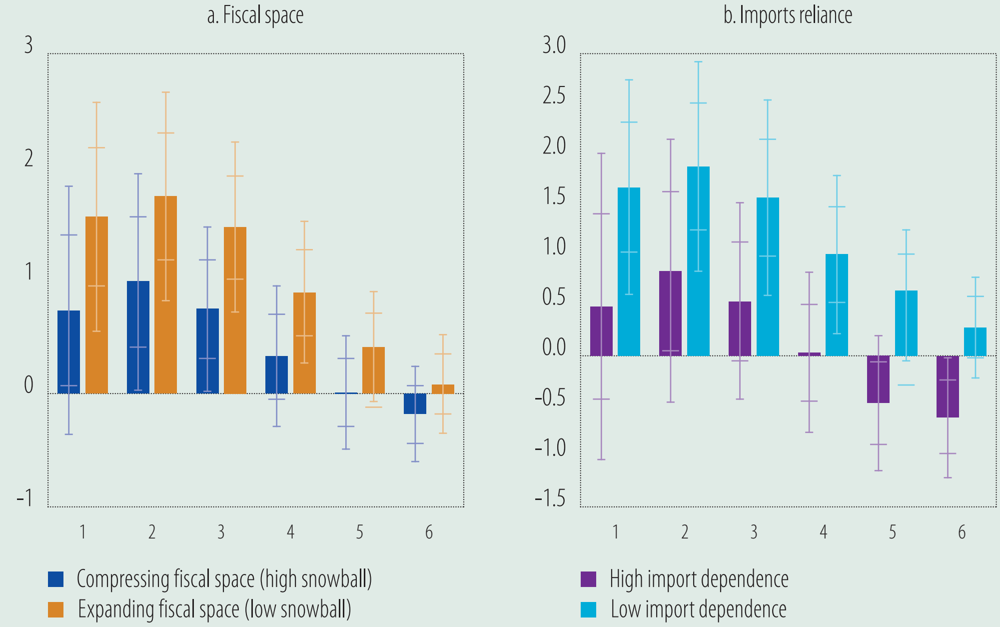
Referencing the classic guns vs. butter analogy, defence-related multipliers are found to be statistically higher than those of non-defence outlays when expenditure is capital-intensive, although this advantage remains limited to the short term. When alternative expenditure classifications are employed, the differences cease to be statistically significant. Large, capital-intensive procurement contracts tend to stimulate production and employment rapidly throughout supply chains, amplifying the output response more effectively than comparable non-defence spending.

When and why defence spending delivers higher returns

The economic payoff of defence spending depends on the state of the economy. During deep downturns – at the lower end of the detrended output distribution – fiscal multipliers reach about 1.75 by the second year, while in expansions they fall towards 0.75, or even zero. These results are comparable with the median multiplier (1.1-1.4). As shown in of Figure C.3a, fiscal space also matters: When ample (meaning the snowball effect is low or negative), multipliers exceed 1.5 in the first two years, but under tight fiscal conditions they drop below unity and fade more quickly. Figure C.3b highlights the role of import reliance: Low dependence supports multipliers above 1.5, whereas high import content pushes them below one and into negative territory by the sixth year. When limited fiscal space coincides with high external dependence, the macroeconomic return becomes negligible or even negative.

Figure C.3

The size of defence mulitpliers depends on countries' fiscal space and their reliance on imports, by years after the change



Source: *García-Serrador et al. (2025) based on Eurostat (COFOG) and UN Comtrade.*
Note: *Estimated state-dependent cumulative fiscal multipliers via smooth-transition local projections (vertical bars), with the coloured lines representing 68% and 90% confidence bands. Panel A shows that multipliers are different depending on a country's fiscal space, which is determined by whether its debt is increasing or slowly decreasing. Dark blue bars indicate the dynamic multiplier under compressed fiscal space, and orange bars under expanded fiscal space. Panel B shows that multipliers are different depending on the country's reliance on imports for military goods. The purple (light blue) bars reflect the economic return of defence spending when import reliance is high (low).*

Turning defence budgets into growth: Lessons for EU policy
While strategic geopolitical considerations tend to shape short-run procurement choices, capital-intensive procurement tends to generate greater domestic value added, particularly when investment targets platforms, infrastructure and equipment embedded in European value chains. Public spending programmes should, as much as possible, be planned for periods when the economy is weak, because bringing forward purchases during downturns gives a stronger boost to growth. Sound medium-term fiscal plans would enable governments to keep enough room in the budget to pump up investment when borrowing costs are low.

Limiting imports is also important, so that more of the money spent supports jobs and production in Europe. Advancing the European Defence Industrial Strategy through joint procurement, interoperability standards, and coordinated industrial policy can strengthen European value chains. Finally, linking national programmes – such as Germany's Bundeswehr Special Fund – to EU-level initiatives would keep more spending within Europe, share capacity risks, and reinforce both macroeconomic impact and strategic autonomy.

R&D spending and cross-country spillovers
Given the historically low levels of defence spending in Europe, its impact on R&D is excluded from this analysis. Nevertheless, its very absence, together with the effects identified, offers valuable insights for economic policymaking. Increasing the relative weight of such expenditure could yield long-term and persistent economic effects, as it fosters knowledge generation and diffusion across industries, thereby producing an enduring impact on economic activity. Moreover, the potential spillovers that may result from the increase in defence spending are beyond the scope of this box, but are likely to be significant, given the strong trade linkages within the European Union, the varying degrees of fiscal space, and the differences in cyclical positions across countries.

Final remarks
Defence outlays can deliver meaningful short-run support for the broader economy – especially when they focus on capital expenditure, timed to downturns, backed by strong government finances and anchored in EU supply chains. However, technology and R&D-focused spending may support growth beyond the short run. Choices that are coordinated across the European Union and take these parameters into consideration will expand the impact of defence spending, ensuring it not only buys security, but (sustained) growth as well.

Sustaining government investment in the medium term

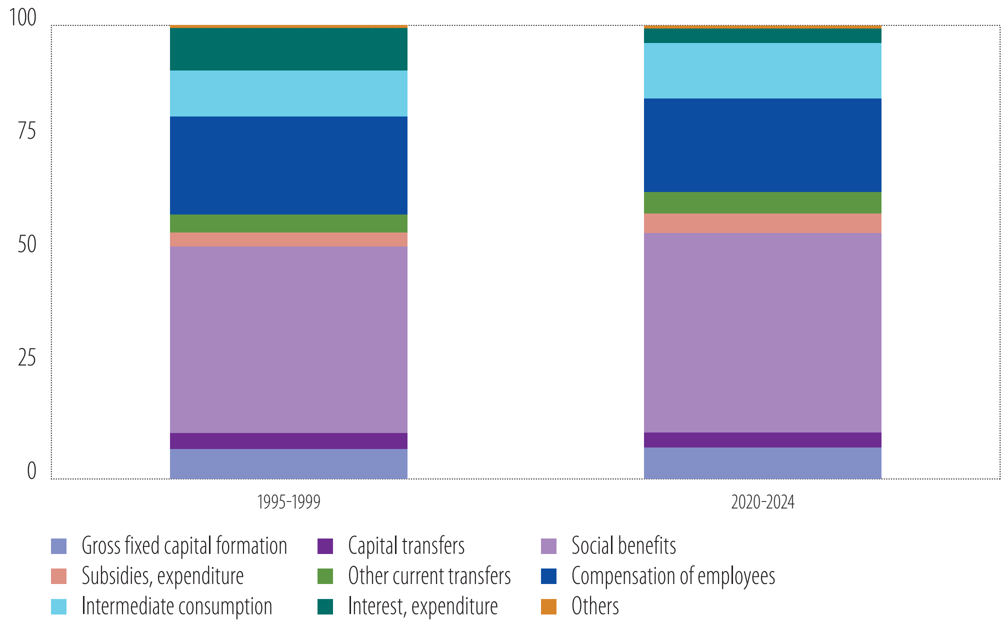
To sustain government investment, fiscal discipline needs to be balanced against strategic needs. EU governments face mounting pressure to invest in the climate transition, digitalisation and defence while ensuring their debt remains sustainable. With limited fiscal space, they must adopt strategies that reallocate spending from lower-return consumption to productive investment, mobilise private capital and leverage EU-backed financial instruments.

Rebalancing towards public investment pays off

Rebalancing public expenditure towards investment supports growth and fiscal sustainability. European economies already have high tax-to-GDP ratios, leaving little room for further revenue increases without harming competitiveness. Shifting the composition of public spending to a more growth-friendly path is more effective than raising taxes (Alesina et al., 2019; and Beetsma et al., 2021). Evidence shows that well-targeted investment yields higher, more durable returns than current spending, helping expand fiscal space over time.

The large decline in the amount of money governments have spent on interest payments in the last 25 years has been offset by increases in current spending. Interest expenditure as a share of total expenditure in EU members has declined by 6.3 percentage points compared to the second half of the 1990s, as interest rates on government debt have fallen significantly. Nearly 80% of this large decline has been consumed by an increase in the shares of social benefits (2.9 percentage points), subsidies (1.1 percentage points) and other current transfers (0.8 percentage points). The share of investment has risen marginally, but has been almost fully offset by a reduced share of capital transfers (Figure 23), leaving the share of total government capital expenditure broadly unchanged. The share of intermediate consumption has also risen significantly (2.2 percentage points), while the share of employee compensation has declined (1.1 percentage points). These changes illustrate the prioritisation of social expenditure, subsidies and transfers compared to government capital expenditure over the past 25 years.

Figure 23
Components of government spending in the European Union (% of total expenditure)



Source: *Eurostat and EIB staff calculations.*
Note: *Government expenditure items are calculated as the share of total expenditure of the general government averaged over five years.*

Government investment delivers stronger and longer-lasting economic benefits than other public spending. Fiscal policy is often assessed using the fiscal multiplier – the ratio of the change in output, or GDP, to the change in a policy instrument, such as a tax rate or expenditure item. Multipliers vary by instrument and over time, with short-term effects typically stronger during recessions. Most government spending pumps up aggregate output in the short term, but investment yields higher and more persistent returns than consumption (Gechert, 2015). This is because investment not only stimulates demand, but also builds public capital that encourages private activity and investment (see Box D). Unlike consumption, investment creates assets that continue to deliver value for many years. Infrastructure, education, health and research and development raise productivity and potential GDP. Higher growth improves the debt-to-GDP ratio and strengthens revenues, reinforcing fiscal sustainability.

Public investment strengthens fiscal sustainability through growth and debt reduction. Well-targeted public investment supports long-term economic activity and improves the debt trajectory through two reinforcing mechanisms. First, higher GDP growth reduces the relative weight of existing debt. As the economy expands – driven by a rise in short-term demand and long-term productivity gains – the debt-to-GDP ratio improves, making the same nominal debt stock less burdensome. Second, stronger growth expands government revenues and primary balances. As economic activity increases, tax receipts rise automatically, strengthening the primary balance and slowing or reversing debt accumulation.

Governments can improve outcomes by reallocating spending from consumption to investment. Five principles can be applied to guide this reallocation. First, reduce current spending that has a limited impact, such as poorly targeted subsidies and transfers (Gechert, 2015). Second, prioritise projects with high social returns and spillovers, such as transport infrastructure, energy grids, digital connectivity and human capital (Bom and Ligthart, 2014). Third, strengthen how public investment is managed through rigorous appraisal, transparent procurement and robust evaluation (European Commission, 2022b). Evidence shows that better institutional quality raises value for money and shields investment from pro-cyclical cuts (International Monetary Fund (IMF), 2025; EIB, 2025). Fourth, sequence projects to maximise the absorption of funds and avoid bottlenecks, pushing out shovel-ready investments while preparing complex ones (IMF, 2020). Fifth, safeguard maintenance and complementary spending to preserve the quality and productivity of public assets.

Rebalancing expenditure can improve debt trajectories without breaching fiscal targets. EU governments have committed to net expenditure growth paths[28] in their medium-term structural fiscal plans. Shifting that spending from consumption to investment, without exceeding the expenditure targets, can lower debt-to-GDP ratios by up to 3 percentage points over five years, especially in high-debt countries (Ciaffi et al., 2024; Auerbach and Gorodnichenko, 2017).

Mobilising private capital is essential to meet Europe's investment needs. From defence to improving the resilience of supply chains to the green transition, the European Union faces complex challenges that require substantial investment from public and private sources. In a context of fiscal consolidation and competing priorities, public spending must be directed to where it delivers the greatest impact – supporting the development of new sectors and safeguarding strategic ones. The Draghi report (Draghi, 2024) underscores that closing Europe's investment gap will require significantly more private capital, especially in strategic areas like innovation, infrastructure and defence. Governments can leverage financial instruments, the EU state aid framework, public-private partnerships and concessions to incentivise private capital.

28 Net-expenditure growth paths are sequences of annual targets for government expenditure growth rates, net of certain items like interest expenditure.

Box D

How government investment affects private investment

This box analyses the effects of public investment on private investment. The European Union needs to invest significantly in key areas, such as climate, digitalisation, innovation and security and defence, in the coming years. Creating conditions that encourage private investment in these areas will be crucial.

Public investment interacts with the economic cycle in complex ways. Its primary aim is to enhance the public capital stock, which provides services to society and the economy, such as railways, schools and hospitals. This investment typically goes forward regardless of the economic cycle. However, governments may also increase investment during difficult periods to support economic recovery. For example, the Recovery and Resilience Facility was meant to support the recovery of EU countries after the COVID-19 pandemic (in this case the causal link goes from public investments to the economic cycle). When the economy grows and tax revenues rise, governments have more resources to invest. When that happens, public investments positively affect the economic cycle, and the causal link goes the other way, from the economic cycle to public investment.

To study the causal link between public and private investment, we use a database of country specific recommendations the European Commission has issued during the European Semester since 2011.[29] The dataset contains references to country, year, and policy area, and the European Commission's assessment of implementation. These recommendations include advice on budget measures and are independent of the economic cycle. They show when a country tightened its budget, kept it neutral or expanded it. This information enables us to construct a robust instrument to identify causal links between public and private investment, as a categorical variable, assuming three possible values: contractionary, expansionary and neutral. Out of 203 country-year observations, 100 were contractionary (assuming the value of 1 in our variable), 50 expansionary (-1) and 53 neutral (0).

To create a sufficiently long and balanced panel for time series analysis, we complemented this information with the change in countries' cyclically adjusted primary balance from the International Monetary Fund's World Economic Outlook data. The fiscal policy dummy variable that we built using the European Commission's dataset begins from 2011 and contains missing values afterwards.

Where data are unavailable, we assign 1 if the primary balance change is positive, and -1 if it is negative. (We consider changes between -0.2% and + 0.2% to be neutral.)[30]

We then use vector autoregression (VAR) to measure how public investment affects private investment. We use data from all 27 EU members (2001-2024, 675 observations), giving us a balanced panel that includes information on GDP, public investment and private investment growth rates.

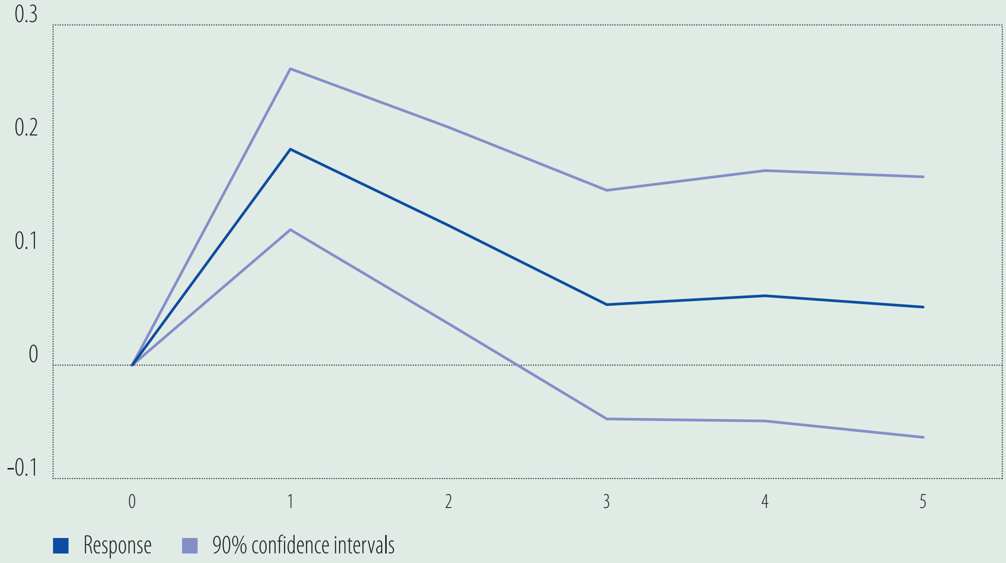
The VAR model uses the constructed dummy indicator to identify public investment shocks and help disentangle the causal link from public investment to private investment. We find that the shock has a positive effect on private investment. A 1% change in public investment results in a 0.2% rise in private investment in the first period and declines thereafter (Figure D.1).

29 The country-specific recommendations database is the main tool for recording and monitoring progress with the implementation of recommendations. All recommendations adopted in the context of the European Semester since 2011 are registered in the database, along with assessment by the European Commission on the progress of their implementation over time.

30 Where both sources are available, they show a positive correlation: of 203 common observations, 102 are identical, 54 differ by one step, and 47 point in opposite directions.

Figure D.1

Response of private investment (in %) **to a 1% increase in public investment, by years after the shock**



Source: EIB staff calculations using Eurostat and other European Commission data.

We also find that public investment supports private investment more broadly than just the specific impact on individual sectors. This result confirms the multifaceted role of public investment. Previous analyses at the regional and country level, and in specific policy areas, have shown similar effects.[31]

Public-private partnerships are a complex but useful tool

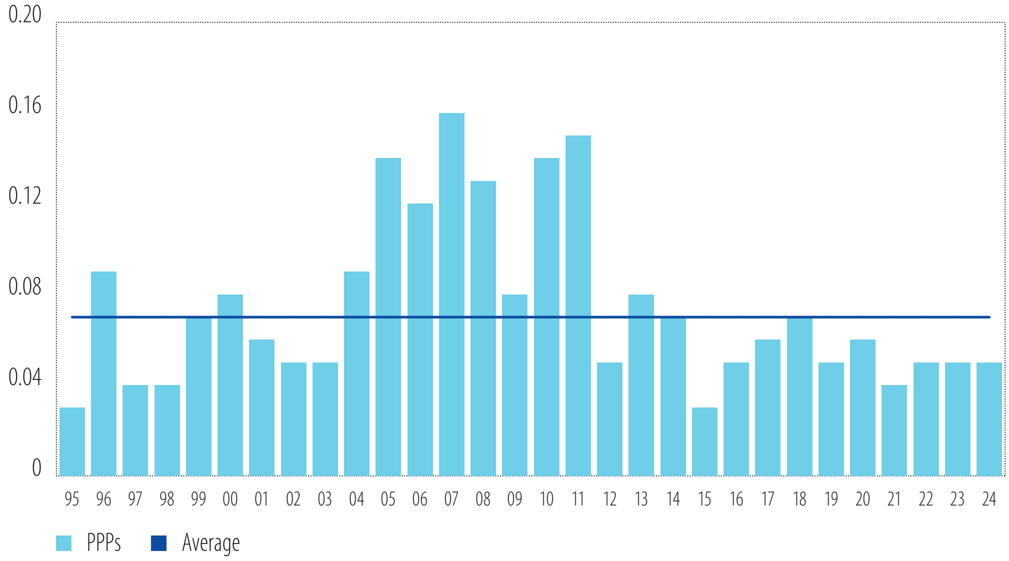
Public-private partnerships have evolved into a strategic tool for public investment. Public-private partnerships (PPP) emerged in the early 1990s to finance countries' infrastructure needs amid fiscal constraints. The United Kingdom led the initial wave with its Private Finance Initiative, becoming the largest PPP market in Europe. By the early 2000s, the model had spread across Western Europe, with Portugal, Ireland and Greece adopting similar frameworks, while Spain, France and Germany developed their own approaches (albeit with relatively fewer projects) (Blanc-Brude et al., 2007).

The European PPP market expanded rapidly before the global financial crisis, but has since fallen back to steadier levels since the exuberance of the late 2000s. The value of closed (signed) PPP deals in the European Union peaked in 2007, before falling sharply during the 2008-2009 crisis and settling back to earlier levels (Figure 24). Since then (over the past decade), PPP activity has remained steady. The focus has shifted somewhat towards smaller local government projects, greater diversity across countries and sectors, and more balance between payment models (where the government pays for the service or the user pays), as well as the use of banking and institutional debt financing markets. The longer-term fiscal obligations of this project delivery tool are also better understood today than in the earlier years in some markets. The United Kingdom's dominance waned as other countries increased activity. Today, these partnerships account for around 0.05% of EU GDP spent on government

31 In EIB (2023) "The effect of local government investment on private investment and growth"; in EIB (2024) "Illustrating the effect of public investment on firm investment"; and in EIB (2025) "Interactions between institutional quality and public R&D spending to support private investment."

infrastructure investment. While not all infrastructure can or should be delivered via these partnerships, there is scope to expand their role.

Figure 24
Public-private partnerships (% GDP)**, by year of financial close**



Source: *European PPP Expertise Centre (EPEC), national accounts, Eurostat and EIB staff calculations.*
Note: *The year of the financial close represents the year the contract was signed.*

Public-private partnerships offer efficiency gains through integrated delivery and risk sharing. A PPP is a long-term contract between a government and a private partner, typically for infrastructure. Unlike traditional procurement, PPPs bundle design, construction and operation, granting the private partner control rights and incentives to innovate design and construction, and to exploit synergies between the three stages. Crucially, the contract defines how risks are shared between public and private entities, recognising that different risks are best managed by either the public or the private party separately, not just a single party (see, for instance, Välilä (2020) on the theory of PPPs and for evidence with a focus on transport infrastructure).

These partnerships must be assessed as a form of public intervention. The choice between PPPs and traditional procurement should be made in a two-stage process. First, projects must pass a rigorous cost-benefit analysis to confirm their socioeconomic viability, as with any public investment decision. Second, suitable procurement methods should be put in place and all costs incurred during the life of the project should be compared with other ways of delivering the project, keeping in mind the impact on risk. Recent advances in infrastructure finance allow for market-consistent discounting using indices for unlisted infrastructure equity and debt, improving credibility and transparency (Amenc et al., 2022; Blanc-Brude et al., 2023). Importantly, PPPs provide public authorities with alternative ways of delivering investment and that should be carefully considered.

Public-private partnerships introduce fiscal risks that must be carefully managed. While these partnerships can protect priority investment when government finances are strained, they may also create deferred liabilities and contingent risks. Long-term obligations can reduce future public investment, especially if not transparently disclosed or budgeted. Guarantees and revenue risk-sharing mechanisms can also expose governments to shocks, such as a drop-off in demand for the public service or refinancing risks. PPPs also entail higher transaction costs, and require strong oversight of the PPP contract, which can span 25 to 30 years.

PPP commitments should be embedded in any analysis of a country's debt sustainability to guard against fiscal risks. Governments should disclose future service payments and guarantees over 20 to 30 years, and stress-test them under scenarios including refinancing shocks, interest rate volatility and demand risk. Tools like the IMF's Public-Private Partnerships Fiscal Risk Assessment Model and fiscal risk frameworks help model PPP obligations alongside sovereign debt, ensuring they remain affordable.

In summary, these partnerships can provide governments with another option for the procurement and delivery of public infrastructure and services. If applied correctly and to the right projects, they can improve delivery over the whole project lifecycle. At the same time, they can ease pressure on government investment if implemented correctly – although this should not be the sole reason for forming these partnerships. Thus, while these partnerships are not a substitute for sound fiscal management, they can play a valuable role in public investment and project delivery. By adhering to the key policy recommendations outlined here, governments can harness PPPs to deliver value for money and manage fiscal risks effectively.

Financial instruments and policy support

The European Union is becoming more flexible in supporting strategic sectors and industrial policies. In recent years, the debate around a comprehensive EU industrial policy has gained traction. With limited fiscal space at the EU and national levels, policies must be effective and aligned with European priorities to maximise impact through coordination, efficiency and long-term planning. Evidence also shows that uncoordinated subsidies can distort resource allocation and harm productivity (EIB, 2025). The shift from a restrictive rule set for state aid and national support for specific sectors, to a more flexible framework that allows for targeted exemptions, is gaining momentum. Notable examples include the growing use of, and recent revisions to, the General Block Exemption Regulation and the framework for Important Projects of Common European Interest. Given the complexity of the framework, reviewing the latest data helps clarify its evolving direction.

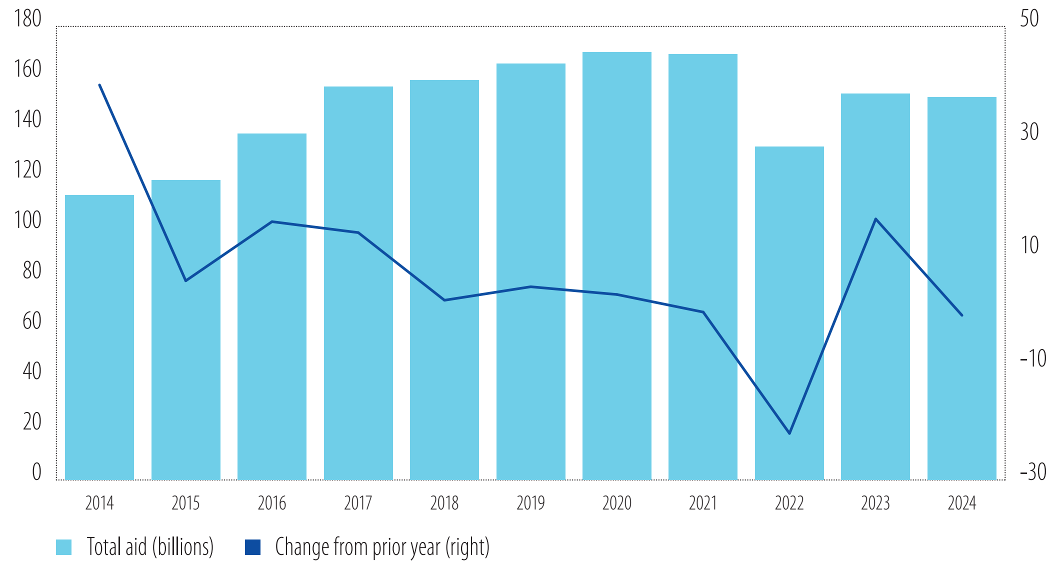
Overall, policy support authorised by state aid rules has increased as a response to a period marked by crises – in a sense compressing the share of non-crisis-related policy support. Policy support means the measures authorised as suitable in the context of the state aid framework (Figure 25). Total state aid in 2024 fell compared to 2023, driven by a continued drop in crisis-related measures introduced in response to the COVID-19 pandemic and the Russian invasion of Ukraine. Overall, state aid accounted for 0.94% of EU GDP, with non-crisis aid at 0.85%, well below levels in key international peers. For example, China's industrial policy costs are estimated at over 4% of GDP (García-Macia et al., 2025). However, state aid must be carefully targeted to avoid inefficiencies: Matching global spending levels without clearly identifying the market failures being addressed does not make economic sense. Research has shown that poorly designed support can reduce total factor productivity (Dökmeci et al., 2026; García-Macia et al., 2025).

The composition of non-crisis state aid instruments remains broadly stable. Direct grants and the mixed category of grants or interest rate subsidies[32] continue to dominate (representing 58.3% of the total in 2024). Recently, the residual category "others" that combines "subsidised services" and the original classification "other" from the European Commission's scoreboard have gained ground, reaching 18.1% of the total. Tax advantages represent 17.5% of total aid. Financial instruments such as loans, guarantees and equity interventions still play a minor role in overall expenditure.[33]

32 Grants/interest rate subsidies is a label officially used by EU members when reporting to the European Commission. Available data and European Commission estimates suggest that most of the amounts under this category are, in fact, direct grants.

33 Reported aid reflects the economic advantage received by the beneficiary. For grants, this typically corresponds to the full budget expenditure. In contrast, for financial instruments like loans, the aid amount reflects the difference between the interest rate paid by the beneficiary and the market rate. As a result, even a small increase in aid through financial instruments can mobilise a much larger volume of support than the amount officially reported.

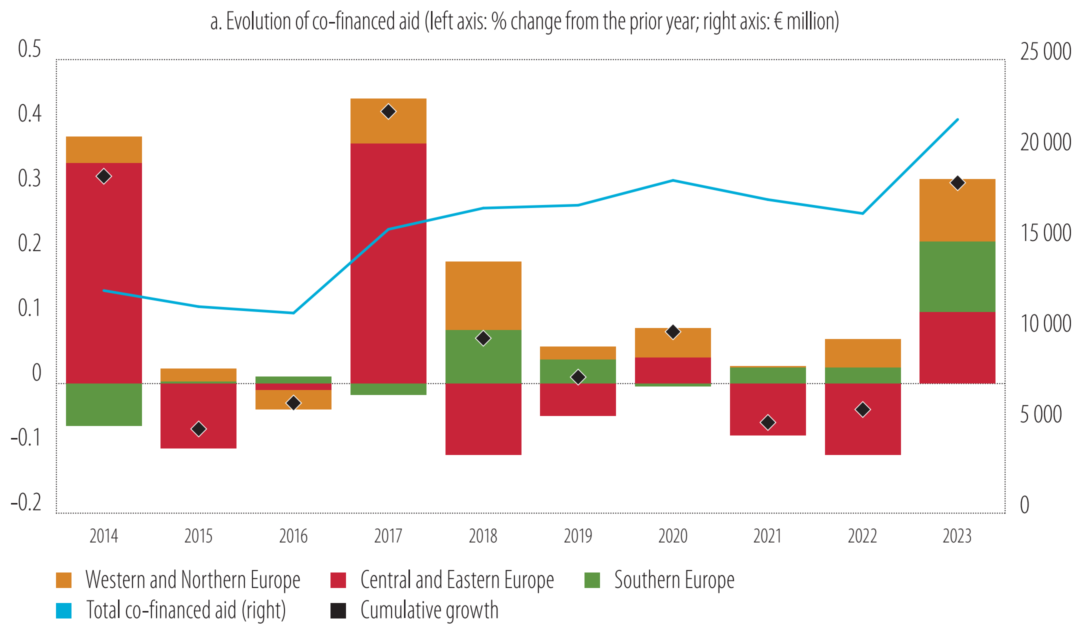
Figure 25
Total non-crisis state aid (left axis: € billion adjusted for inflation; right axis: % change)

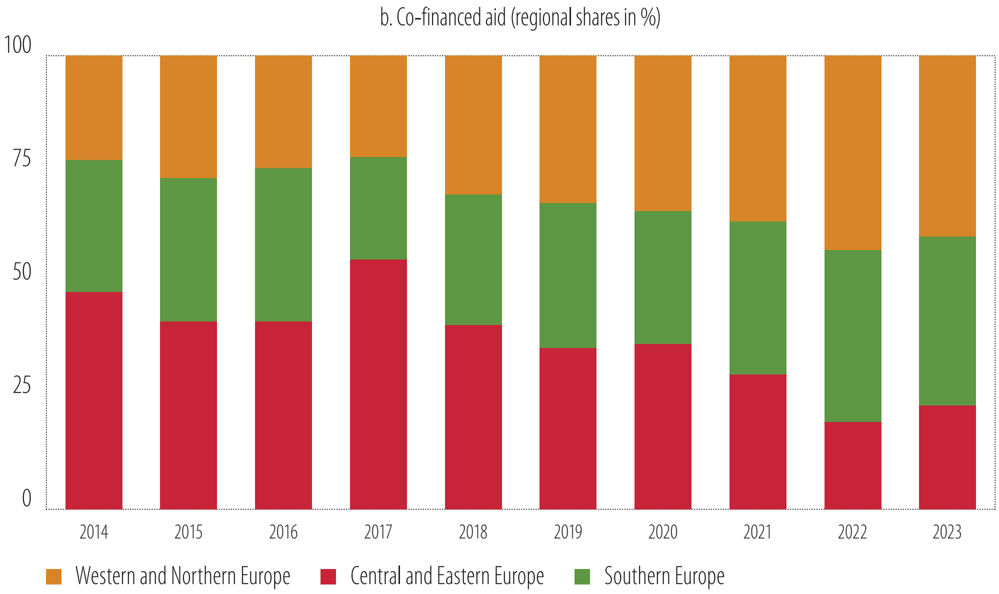


Source: *State aid Scoreboard 2024 (European Commission) and EIB staff calculations.*

EU co-financed policy support is growing (Figure 26). The figures reflect the full amount disbursed, including both the EU-financed component and national contributions. After several years of moderate or negative growth, co-financed aid increased across all three EU regions. Over time, the geographical distribution of co-financed aid has shifted, with an increasing role played by the countries in Western and Northern Europe and in Southern Europe.

Figure 26
Co-financed state aid in the European Union

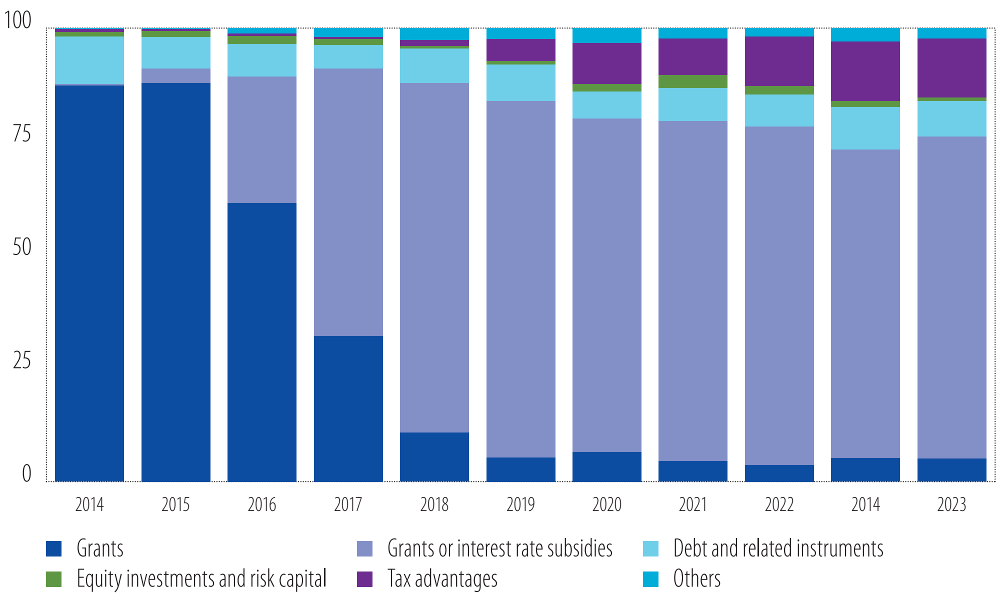




Source: *European Commission data and EIB staff calculations.*
Note: *The latest data available were for 2023.*

The composition of co-financed aid has remained stable, with tax advantages gaining a higher share. Most co-financed aid continues to be disbursed through direct grants and interest rate subsidies (Figure 27). However, the share of tax advantages has increased in recent years, almost entirely driven by Italy, where measures were introduced to support investment under the country's Transition 4.0 plan. Recent empirical evidence shows that this policy boosted investment rates, particularly among small and medium-sized enterprises. Stronger effects were observed among early adopters (Banca d'Italia, et al. 2024).

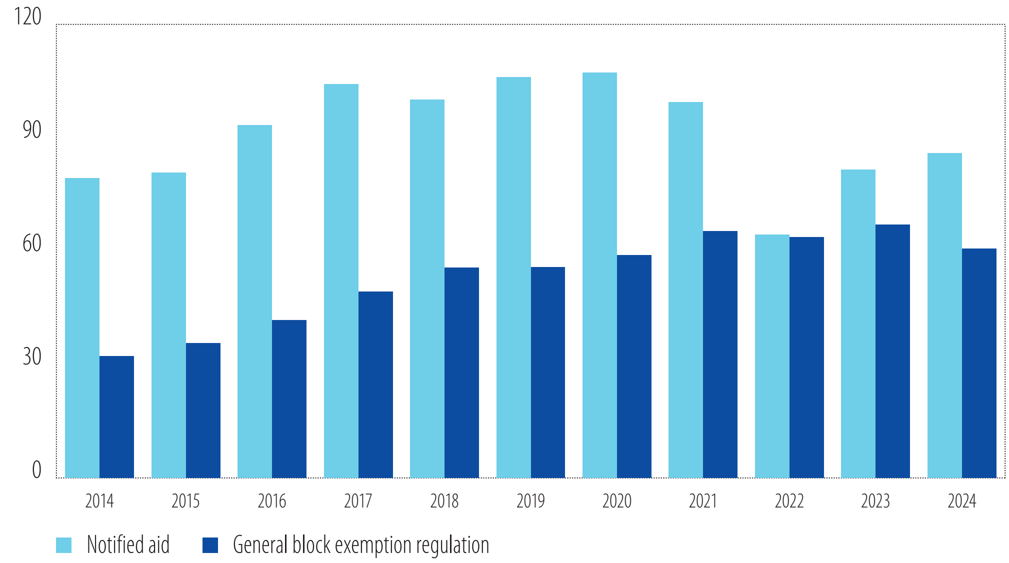
Figure 27
Co-financed aid (% of total)**, by instrument**



Source: *European Commission data and EIB staff calculations.*
Note: *The latest data available were for 2023.*

Regulatory changes are expanding the scope of targeted aid measures. Beyond the rise in co-financed aid, there has been a steady increase in the use of state aid measures streamlined under the categories in the General Block Exemption Regulation, defined by the European Commission. In 2024, 95% of all new non-crisis measures fell under that regulation. At the same time, notified aid declined sharply in 2022, followed increases in 2023 and 2024 (still below 2021 levels) (Figure 28). Despite the measures covered by the General Block Exemption Regulation account for most outstanding cases, their size tends to be smaller than that of notified aid. This reflects the admissibility thresholds which limit the volume of support that can be granted under the exemption. One of the main drawbacks of notified aid is the requirement for prior notification before disbursement, which can lead to longer approval times and greater uncertainty in the outcome.

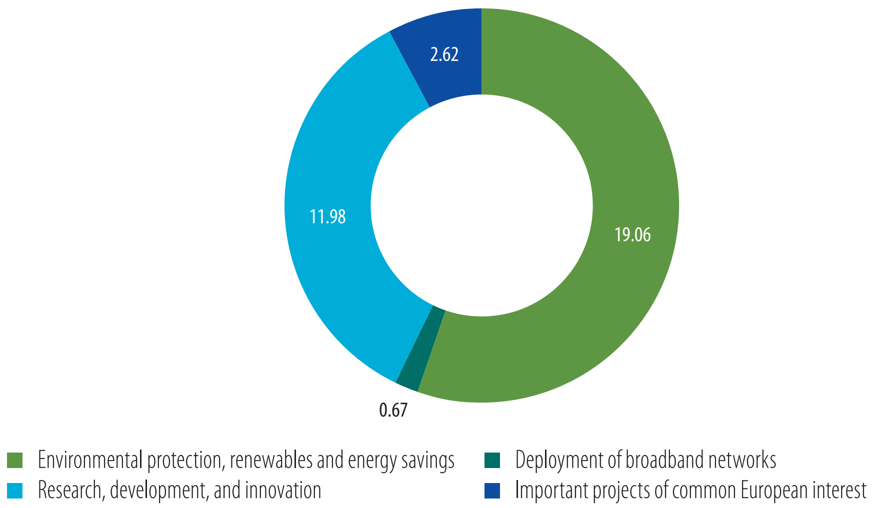
Figure 28
Total non-crisis aid (€ billion, adjusted for inflation)**, by type**



Source: *State aid Scoreboard 2024 (European Commission) and EIB staff calculations.*

Streamlined aid under the General Block Exemption Regulation and the framework for Important Projects of Common European Interest enables faster implementation and stronger EU coordination. The growing use of instruments like the General Block Exemption Regulation and Important Projects of Common European Interest reflects a shift towards coordinated development in areas including green technology, research and innovation, and strategic autonomy (Figure 29). The aid provided under the General Block Exemption Regulation has been refined to accommodate greater flexibility with measures like the Climate, Environmental Protection and Energy Guidelines in 2022 and the Research Development and Innovation Framework in 2023. Expenditure on Important Projects of Common European Interest continued to rise in 2024, with that year alone accounting for 33.5% of total spending between 2019 and 2024.

Figure 29
Non-crisis aid in selected areas (€ billion)**, in 2024**



Source: *State aid Scoreboard 2025 (European Commission) and EIB staff calculations.*

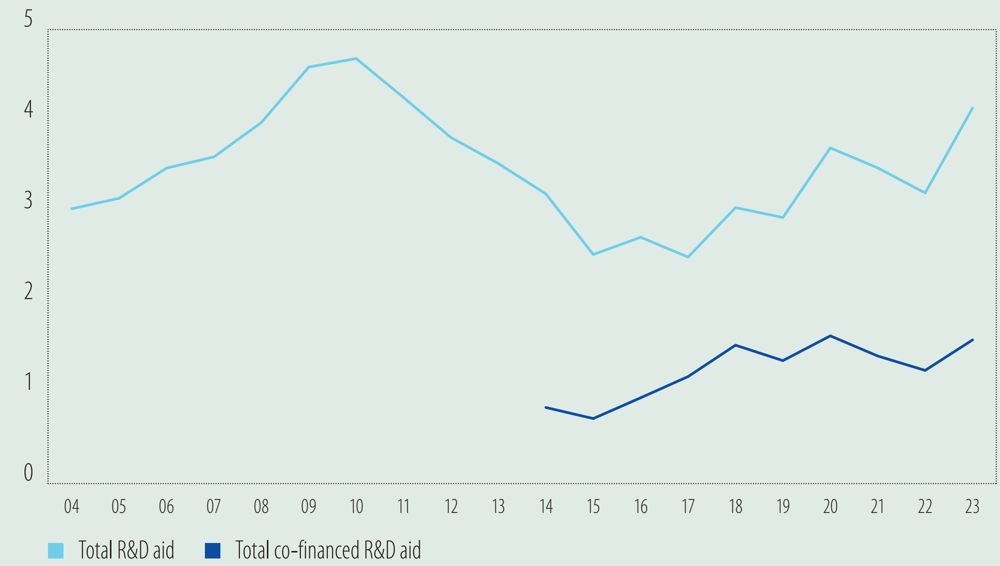
Targeted and co-financed state aid is more effective at stimulating investment. Box E shows that expenditure in the areas of research, development and innovation responds more strongly to aid that is co-financed. In 2023, targeted support for research, development and innovation accounted for 8.5% of total state aid, of which 37.9% was co-financed. The responsiveness of private R&D expenditure to changes in state aid is higher when the aid involved co-financing by the European Union, although the aggregate effects remain modest.

EU-level state aid coordination and targeted aid are vital tools when governments consolidate their finances. Recent data show that both trends are gaining momentum, but there is an urgent need to consolidate the aid framework to improve integration, increase efficiency and balance industrial policy against the risk of fragmenting the single market. Poorly planned state aid can undermine the single market. However, when guided by clear objectives and coordinated with structural reforms, state aid is a valuable tool for addressing market failures.

Box E
The effect of state aid on research and development expenditure

State aid in the field of research, development and innovation (RDI) has been increasing in recent years, although it is still a very small part of total expenditure. In 2023, RDI aid rose by 33% compared to 2022, continuing a bumpy upward trend after falling to a low point in 2015. Part of the total aid for RDI consists of co-financed measures. Co-financed aid refers to the total amount of state aid that is at least partially funded by the European Union, combined with a nationally funded component included in the overall sum. Co-financed aid for RDI is growing, but remains limited, with a ratio of less than 2% of overall R&D expenditure (Figure E.1).

Figure E.1
State aid support for R&D as a share of total R&D expenditure (in %)



Source: *European Commission data, State Aid Scoreboard 2024, Eurostat data, EIB staff calculations.*

We analyse the relationship between total R&D expenditure and state aid for R&D at the macro level, distinguishing between total policy support and EU-co-financed policy support. This complements the micro-level analysis presented in the EIB Investment Report 2024-2025, which showed that uncoordinated aid can lead to efficiency losses (EIB, 2025).

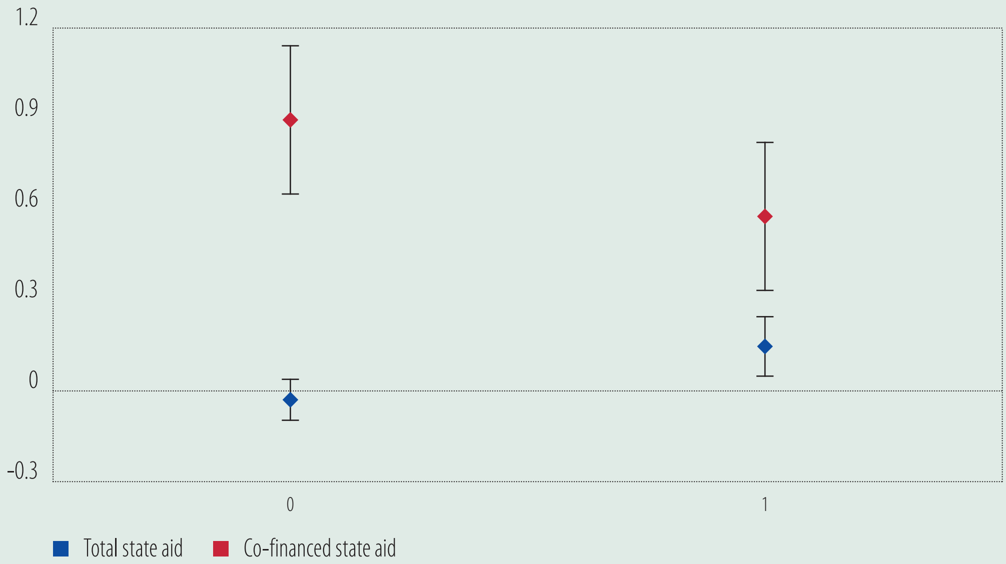
We find that EU co-financed policy support for RDI has a more pronounced and positive impact on total R&D expenditure than the overall support that is accepted under the state aid rules. The effect of co-financed support over two years is substantially greater, while total aid shows little or no significant influence. We use data from the European Commission's 2024 State Aid Scoreboard and Eurostat figures on total R&D expenditure. R&D expenditure includes spending by business enterprises, government, higher education institutions and private non-profit organisations. Data on co-financed aid were provided by the European Commission and compiled by aggregating individual measures under the RDI objective, excluding crisis-related interventions. This series begins in 2013.

The econometric framework is based on a dynamic panel regression using the Arellano and Bond (1991) generalised method of moments estimator. Growth in total R&D expenditure is regressed annually for each country on its lagged value, as well as on contemporaneous and lagged growth in the state aid variables. This approach allows us to estimate the effect of growth in state aid, both total and co-financed, on the growth of total R&D expenditure. The dataset is unbalanced due to a small number of missing observations. Moreover, country-level aid varies significantly from year to year, while remaining relatively small compared to total R&D expenditure.

The results show a small but statistically significant contemporaneous impact of EU co-financed aid growth on total R&D growth (Figure E.2). The effect of total state aid is not statistically significant, with a slightly negative point estimate. Both effects are significant and positive with a one-year lag, and the point estimate for co-financed aid is nearly four times larger than for total aid. Overall, the cumulative two-year impact of co-financed aid is substantially greater than the effect of total aid on R&D expenditure. These findings are consistent with firm-level evidence indicating that targeted aid is more effective (EIB, 2025).

Figure E.2

Impact of total and co-financed state aid on R&D spending (a coefficient)



Source: *EIB staff calculations.*

Note: *The coefficients represent the growth impact of a 100% increase in total or co-financed state aid growth during the same year, and one year after the disbursement. The black lines represent 95% confidence intervals reported around the point estimates. The samples cover two distinct time periods: for total aid, the series begins in 2004 (the 2003 level is used to figure the growth rate), while for co-financed aid it begins in 2014 (2013 level). Reducing the sample size of the total aid series does not alter the narrative of the results.*

Box F

Joint and centralised procurement can improve efficiency

Joint procurement can enhance the effectiveness of public spending and strengthen the EU single market (Nicoli and Beetsma, 2024). Under Directive 2014/24/EU, joint procurement means the collaborative acquisition of goods, services or works by two or more contracting authorities acting together in a single procedure. It can be organised through various institutional arrangements, including – but not limited to – procurement by a centralised purchasing body.

Potential benefits of joint procurement include economies of scale, stronger buyer power, and reduced administrative costs compared with fully decentralised procurement. Wider publicity and standardised specifications can attract more bidders, while joint schemes can facilitate coordinated responses to crises. However, these advantages come with trade-offs. Governance complexity can slow decisions, and large aggregated contracts may favour big suppliers, risking market concentration and limiting the participation of small and medium companies unless tenders are divided into lots or allow subcontracting. Excessive standardisation can also limit procurers' ability to meet specific requirements. Effective joint procurement must therefore balance aggregation benefits against the need for flexibility, competition and market diversity, in line with the wider institutional and market context (Organisation for Economic Co-operation and Development (OECD), 2011).

Joint procurement has featured prominently in recent EU crisis responses. During the COVID-19 pandemic, the 2020 EU Vaccines Strategy pooled demand from across EU countries and used advance purchase agreements to secure supply (see European Commission (2020) for details).

By November 2021, the European Commission had signed contracts worth €71 billion for up to 4.6 billion vaccine doses, sharing development risks and funding production capacity through the Emergency Support Instrument (European Court of Auditors, 2022). In defence, the mandate of the European Defence Agency explicitly includes aggregating demand for joint procurement; a notable example is the agency-led common purchase of 155 mm ammunition begun in 2023. Across vaccines and defence, these instruments also serve industrial-policy aims, strengthening EU production capacity, the European defence technological and industrial base, and EU strategic autonomy (Draghi, 2024).

Setup

We analyse the impact of joint procurement – specifically procurement by a central authority – on EU public procurement outcomes using EU platform Tender Electronic Daily data for 2018-2023. The two outcome variables are number of bidders, and time between notice publication and contract award. Explanatory variables include procurement type (goods, services and works), contracting authority location and year of publication.

The analysis is conducted at the contract-notice level with matched award data. Multiple lots per notice are collapsed into a single observation to avoid overweighting multi-lot procedures; the number of bids is measured as the average per lot. Of over 700 000 matched notices, 40 000 involved joint procurement, of which only 127 were conducted jointly by multiple EU Member States. Given this limited sample, results focus on joint procurement overall, without isolating multi-state cases.

Findings

Joint procurement significantly increases the likelihood of receiving multiple bids, particularly in Central and Eastern Europe, where single-bid procedures have historically been more common (Figure F.1). The effect is strongest in sectors where the European Union has prioritised joint procurement: health goods (+6.7 percentage points), security, firefighting, police and defence equipment (+7.8 percentage points), and raw materials (+9.0 percentage points). The impact is smaller, though still positive, for fuel and energy (+3.4 percentage points).[34]

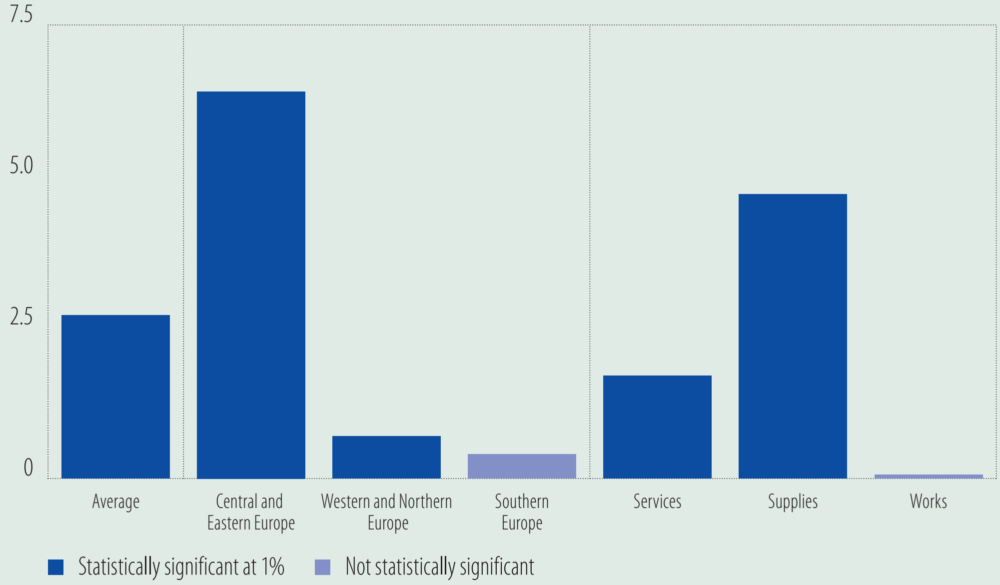
However, joint procurement generally takes longer to conclude. On average, it takes 13% longer than decentralised procurement, and rises to 17% in Central and Eastern Europe (Table F.1). If conducted by a centralised authority, the delay is considerably smaller, and not significant. This points to the importance of coordination costs for bidder selection when there is no central authority conducting the procurement.

Overall, joint procurement can enhance competition and efficiency in public procurement, especially in regions where single-bid procedures are prevalent. However, it may entail longer procedures, unless managed by a centralised authority.

34 The results by type of good or service procured are available upon request at Infodesk@eib.org. They were obtained in a regression similar to the one reported in Table 1: The dummy indicating joint procurement was interacted only with the type of good or service procured, controlling for the location of the contracting authority and the year of procurement.

Figure F.1

Impact of joint procurement on the probability of attracting multiple bidders (predictive margins, in percentage points) **by region and contract type**



Source: *EIB staff calculations.*
Note: *Logit regression, 715 000 observations, 2018-2023, standard errors clustered by country. Dependent variable: a dummy indicating whether the call for tender received more than one bidder. Independent variables: an indicator of whether the procurement was joint, interacted with the type of contract and the region in which the contracting authority is based, controlling for the type of good or service procured (14 categories) and the year of procurement. Procurement for framework agreements and by authorities in non-EU countries are excluded.*

Table F.1

Impact of joint procurement on time between publication of notice and contract award (predictive margins)**, by region and contract type**

Category	Centralised procurement	Joint procurement
Average	-1%	13%***
Central and Eastern Europe	3%	17%***
Western and Northern Europe	-3%	18%***
Southern Europe	-5%	-10%
Services	-2%	9%
Supplies	4%	20%***
Works	-11%	30%***

Source: *EIB staff calculations.*
Note: *Ordinary Least Squares regression, 707 000 observations, standard errors clustered by country. Dependent variable: logarithm of the time between the publication of the notice and the contract award. Independent variables: an indicator of whether the procurement was joint (but not centralised), centralised or decentralised, interacted with the type of contract and the region in which the contracting authority is based, controlling for the type of good or service procured (14 categories) and the year of procurement. Procurement for framework agreements and by authorities in non-EU countries are excluded. Changes without stars are not significant. *** statistically significant at the 1% level.*

Conclusion and policy implications

EU governments face challenges as they strive to balance strong finances in the long term with the urgent need for sustained public investment. EU economic growth in the short and medium term is expected to be low, and accompanied by high debt levels globally, which make debt refinancing more expensive. This limits the ability of governments to properly address future economic shocks, possibly breeding social discontent. The legacy of under-investment and the emergence of new priorities – climate change, digitalisation, demographic shifts and security threats – add an extra layer that further complicates the EU policy environment.

Government investment has remained resilient since the European Union's fiscal rules were overhauled. Recent evidence shows that government investment in the European Union has remained resilient, supported by instruments like the Recovery and Resilience Facility and other EU funds. Notably, government investment rates have continued to outpace GDP growth since the COVID-19 pandemic, and real investment has increased even as fiscal consolidation efforts have continued to intensify.

Maintaining focus on government investment involves difficult trade-offs in the medium term. The expiration of the Recovery and Resilience Facility in 2026 will gradually remove a key source of EU-level support, as many EU members continue to grapple with elevated debt-to-GDP ratios and persistent deficits. The need to increase defence and security spending in response to geopolitical tensions further intensifies fiscal pressures, and could crowd out other vital investments if not carefully managed. The composition of public investment is also changing, with a greater focus on climate and digital objectives. This shift requires careful project selection, efficient implementation, and strong public investment management to maximise returns. Temporary EU measures – such as the national escape clause, the SAFE instrument and joint defence procurement – help to ease this pressure.

Europe has an opportunity to coordinate defence initiatives, which would optimise the effectiveness and impact of resources allocated. Defence investment can stimulate economic growth and improve fiscal sustainability when targeted towards capital-intensive purchases like R&D and infrastructure. Defence-related R&D has high returns and spillovers to civilian sectors, fostering innovation and private investment. Increasing the share of R&D in defence budgets is a key lever for addressing Europe's productivity challenges. Coordinated EU investment programmes can enhance spillover effects and distribute benefits more evenly (Box F). Coordinated procurement also provides defence contractors with larger, more predictable contracts, encouraging investment in production capacity and innovation. Ultimately, the effectiveness of public defence spending co-depends on strengthening the defence capabilities of Europe's industrial base.

Sustaining high rates of government investment is compatible with fiscal sustainability, and instrumental to achieving it. Well-chosen and efficiently executed public investment yields higher, more lasting returns than other forms of public spending, supporting short-term economic activity and long-term growth potential. The evidence shows that government investment can expand fiscal space over time by raising potential GDP and improving the debt-to-GDP ratio. This is particularly important as the European Union seeks to remain competitive, resilient and inclusive in the face of mounting challenges, and has several implications for policy:

1. **Prioritise high-return investments.** Governments should focus on projects with high social rates of return and positive spillovers, such as infrastructure, digitalisation, climate adaptation and human capital. Rigorous appraisal and transparent procurement processes are essential to ensure value for money and to shield investment from cyclical cuts.
2. **Rebalance spending to prioritise investment and maximise the impact.** Reallocating fiscal expenditure from current spending with a small impact, such as poorly targeted subsidies and transfers, towards higher-return investment can raise growth and expand future fiscal space. This approach is more growth-friendly than increasing already high tax burdens.

3. **Strengthen how public investment is managed.** Improving administrative capacity, sequencing projects in a way that allows for funds to be absorbed quickly and efficiently and safeguarding maintenance budgets are critical for maximising the impact of public investment. Evidence shows that governments can achieve significantly more value for their spending by adopting best practices in investment management.
4. **Leverage private capital and EU financial instruments.** Public-private partnerships (PPPs) and financial instruments can mobilise private-sector resources towards critical policy goals. They must be managed carefully to avoid hidden liabilities and fiscal risks. Embedding PPP commitments in debt sustainability analysis, and ensuring transparency, are vital for long-term fiscal health.
5. **Enhance EU-level coordination.** The evolving state aid framework and targeted co-financed aid are increasingly important tools for mobilising private investment and supporting strategic sectors. Coordination at the EU level can help avoid market fragmentation and maximise the effectiveness of public support.
6. **Safeguard fiscal space for strategic priorities.** As fiscal pressures intensify, it is crucial to maintain flexibility for strategic investments in the climate, digital and security domains. Joint procurement and coordinated investment programmes can amplify the effects that spill over to other EU countries and distribute benefits more evenly.

References

Alesina, A., Favero, C. A., & Giavazzi, F. (2019). *Austerity: When it works and when it doesn't*. Princeton University Press.

Amenc, N., Blanc-Brude, F., Gupta, A., & Whittaker, T. (2022). An infrastructure investment primer: From valuation to allocation and manager selection. *Journal of Portfolio Management,* 48(9). https://doi.org/10.3905/jpm.2022.1.412

Antolin-Diaz, J., & Surico, P. (2022). The Long-Run Effects of Government Spending, CEPR Discussion Paper 17433. https://doi.org/10.1257/aer.20231278

Arellano, M., & Bond, S. (1991). Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations. *The Review of Economic Studies*, 58(2), 277-297. https://doi.org/10.2307/2297968

Auerbach, A., & Gorodnichenko, Y. (2017). Fiscal stimulus and fiscal sustainability. https://doi.org/10.3386/w23789

Banca d'Italia, Ministero dell'Economia e delle Finanze, Ministero delle Imprese e del Made in Italy. (2024). Gli incentivi in investimenti 4.0: una valutazione dell'impatto della misura. Available at: https://www.bancaditalia.it/pubblicazioni/altri-rapporti/2024-mef/Gli_incentivi_in_investimenti_4.0.pdf

Beetsma, R., Furtuna, O., Giuliodori, M., & Mumtaz, H. (2021). Revenue- versus spending-based fiscal consolidation announcements: Multipliers and follow-up. *Journal of International Economics*, 133. https://doi.org/10.1016/j.jinteco.2021.103455

Blanc-Brude, F., Goldsmith, H., & Välilä, T. (2007). Public-Private partnerships in Europe: an update. EIB Economic and Financial Reports 2007/03. Luxembourg: European Investment Bank. Available at: https://www.eib.org/en/publications/efr-2007-v03

Blanc-Brude, F., Hasan, M., & Whittaker, T. (2023). Mark-to-market indices and valuation models for unlisted infrastructure equity and debt. EDHECinfra Research Insights.

Bom, P. R., & Ligthart, J. E. (2014). What have we learned from three decades of research on the productivity of public capital? *Journal of Economic Surveys,* 28(5), 889-916. https://doi.org/10.1111/joes.12037

Calò, S., Kramer, R., & Tomasone, F. (2025). The impact of public defence R&D spending on private R&D spending. Quarterly Report on the Euro Area, 24(3), European Commission. https://doi.org/10.2765/9403518

Centrone, M., & Fernandes, M. (2024). Improving the quality of European defence spending: Cost of non-Europe report, European Parliamentary Research Service, November 2024. https://doi.org/10.2861/2105737

Ciaffi, G., Deleidi, M., & Capriati, M. (2024). Government spending, multipliers, and public debt sustainability: An empirical assessment for OECD countries. *Economia Politica,* 41, 521-542. https://doi.org/10.1007/s40888-024-00335-0

Dealroom (2025). Defence, Security and Resilience in Europe: The state of startups and venture capital, Dealroom.co and NIF, February 2025. Available at: https://dealroom.co/uploaded/2025/02/NIF-report-Defence-Security-and-Resilience-2025-1739358861.pdf?x63517

Deleidi, M., Iafrate, F., & Levrero, E. S. (2020). Public investment fiscal multipliers: An empirical assessment for European countries. *Structural Change and Economic Dynamics,* 52, 354-365.

Dökmeci, T., Schanz, J., Brasili, A., & Tueske, A. (2026). Effectiveness of State Aid on Firm Performance: Evidence from the EU. https://doi.org/10.2139/ssrn.6136968

Draghi, M. (2024). *The future of European competitiveness*. European Commission. https://doi.org/10.2872/9356120

Erken, H., van Es, F., de Groot, E., & de Jong, L. (2025). Europe in the new NATO era: Economic consequences of 3.5% and 5% defence spending scenarios. Research Note, RaboResearch Global Economics & Markets, June 2025.

European Central Bank (ECB) (2025). Macroeconomic impacts of higher defence spending: a model-based assessment, ECB Economic Bulletin, Issue 6/2025. Available at: https://www.ecb.europa.eu/press/economic-bulletin/articles/2025/html/ecb.ebart202506_01~d41c118e13.en.html

European Commission (2020). EU Strategy for COVID19 Vaccines. COM(2020) 245 final. Brussels, 17 June 2020. EUR-Lex - 52020DC0245 - EN - EUR-Lex. Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex:52020DC0245

European Commission (2022a). Report from the Commission to the European Parliament and the Council on the implementation of the Recovery and Resilience Facility. EUR-Lex. Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex:52022DC0383

European Commission (2022b). New evidence on the quality of public investment management in the EU. Publications Office. https://doi.org/10.2765/716129

European Commission (2025a). Economic impacts of the recovery and resilience facility: New insights at sectoral level and the case of Germany. Publications Office. https://doi.org/10.2765/4285022

European Commission (2025b). Report on public finances in EMU 2024. Publications Office. https://doi/org/10.2765/3883793

European Commission (2025c). Report from the Commission to the European Parlament and the Council on the implementation of the Recovery and Resilience Facility. Available at: https://commission.europa.eu/document/download/81dd7c71-7b75-4b2a-8323-fb7b4326fa16_en?filename=COM_2025_637_1_EN_ACT_part1_v4.pdf

European Commission (2025d). Communication from the Commission to the European Parliament and the Council: NextGeneration EU – The road to 2026. Available at: https://commission.europa.eu/document/download/ad5f00c9-4101-41a0-9d8f-e78f06c0c7ed_en?filename=COM_2025_310_1_EN_ACT_part1_v8.pdf

European Commission (2025e). The economic impact of higher defence spending, *Spring 2025 Economic Forecast*, May 2025. Available at: https://economy-finance.ec.europa.eu/economic-forecast-and-surveys/economic-forecasts/spring-2025-economic-forecast-moderate-growth-amid-global-economic-uncertainty/economic-impact-higher-defence-spending_en

European Commission (2025f). 2026 European Macroeconomic Report. Instiitiutional Paper 328, November 2025. https://doi/org/10.2765/3120433

European Committee of the Regions (2025). Experiences of regional authorities with the Important Projects of Common European Interest (IPCEI) and suggestions for improvement. European Union. https://doi.org/10.2863/0208386

European Court of Auditors (2022). EU COVID19 vaccine procurement – Sufficient doses secured after initial challenges, but performance of the process not sufficiently assessed. Special Report 19/2022. Available at: https://www.eca.europa.eu/Lists/ECADocuments/SR22_19/SR_EU_COVID_vaccine_procurement_EN.pdf

European Defence Agency (EDA) (2025). Defence Data 2024-2025. https://doi/org/10.2836/3936681

European Investment Bank (EIB) (2022). Investment report 2021-2022: Recovery as a springboard for change. European Investment Bank. https://doi.org/10.2867/82061

European Investment Bank (EIB) (2023). Investment report 2022-2023: Resilience and renewal in Europe. European Investment Bank. https://doi.org/10.2867/307689

European Investment Bank (EIB) (2024). Investment report 2023-2024: Transforming for competitiveness. European Investment Bank. https://doi.org/10.2867/29813

European Investment Bank (EIB) (2025). EIB Investment Report: Innovation, integration and simplification in Europe. European Investment Bank. https://doi.org/10.2867/8065730

García-Macia, D., Kothari, S., & Tao, Y. (2025). Industrial policy in China: Quantification and impact on misallocation (IMF Working Paper No. 2025/155). International Monetary Fund. https://doi.org/10.5089/9798229017855.00

García-Serrador, A., Sarasa-Flores, D., & Ulloa, C. (2025). Buy Guns or Buy Roses?: EU Defence Spending Fiscal Multipliers, BBVA Research Working Paper 25/06. http://dx.doi.org/10.2139/ssrn.5338966

Gechert, S. (2015, July). What fiscal policy is most effective? A meta-regression analysis. *Oxford Economic Papers*, 67, 553-580. https://doi.org/10.1093/oep/gpv027

George, M., Djokic, K., Hussain, Z., Wezeman, P. D., & Wezeman, S. T. (2025). Trends in Internal Arms Transfers – 2024, SIPRI, March 2025. https://doi.org/10.55163/XXSZ9056

Ilzetzki, E. (2025). Guns and growth: The economic consequences of defense buildups, Kiel Report, No. 2, Kiel Institute for the World Economy (IfW Kiel). Available at: https://www.kielinstitut.de/publications/guns-and-growth-the-economic-consequences-of-defense-buildups-17920/

International Monetary Fund (IMF) (2020). Fiscal Monitor: Policies for the Recovery. Available at: https://www.imf.org/en/publications/fm/issues/2020/09/30/october-2020-fiscal-monitor

International Monetary Fund (IMF) (2025). Fiscal Monitor: Spending Smarter: How Efficient and Well-Allocated Public Spending Can Boost Economic Growth. Washington, D.C.: IMF. Available at: https://www.imf.org/en/publications/fm/issues/2025/10/07/fiscal-monitor-october-2025

Mejino Lopez, J., & Wolff, G. B. (2024). What role do imports play in European defence?, Bruegel, July 2024. Available at: https://www.bruegel.org/analysis/what-role-do-imports-play-european-defence

Moretti, E., Steinwender, C. & Van Reenen, J. (2025). The Intellectual Spoils of War? Defense R&D, Productivity, and International Spillovers, *The Review of Economics and Statistics*, 107(1), 14-27. https://doi.org/10.1162/rest_a_01293

Nicoli, F., & Beetsma, R. (2024). Joint public procurement as a tool for European Union industrial policy. Bruegel Policy Brief No. 18/2024. Bruegel. Available at: https://www.bruegel.org/policy-brief/joint-public-procurement-tool-european-union-industrial-policy

Organisation for Economic Co-operation and Development (OECD) (2011). Centralised Purchasing Systems in the European Union. SIGMA Paper No. 47. Paris: OECD Publishing. Available at: https://www.sigmaweb.org/content/dam/sigma/en/publications/reports/2011/04/centralised-purchasing-systems-in-the-european-union_g17a1f31/5kgkgqv703xw-en.pdf

Välilä, T. (2020). An overview of economic theory and evidence of public-private partnerships in the procurement of (transport) infrastructure. *Utilities Policy*, 62(100995). https://doi.org/10.1016/j.jup.2019.100995

Chapter 3

Accelerating firms' investment amid uncertainty

Corporate investment has been resilient, but has fallen short of what the European Union needs. Investment was surprisingly resilient in 2025, despite multiple shocks, such as a sharp escalation of global trade tensions and large increase in US import tariffs, volatility in commodity prices and rising uncertainty. Nevertheless, in absolute terms, EU real corporate investment fell short of the amount needed to address industrial challenges, such as deploying new technologies, advancing innovation, decarbonisation and improving the resilience of supply chains. Corporate balance sheets and financing conditions did not constrain investment, but they certainly affected where companies invested. Firms prioritised replacing existing assets over expanding capacity or spending to innovate. Uncertainty has particularly affected investment in intangible assets, which slowed just when it needed to accelerate.

Industrial policies have been particularly effective at supporting investment, especially when they are designed for the whole European Union and drafted to meet specific policy objectives. Policy support played an important role in anchoring corporate investment in difficult times. Public intervention remains far above levels seen before the COVID-19 pandemic. The focus has shifted, however, from the broad-based support provided by grants during the pandemic to more targeted and coordinated measures that support specific policy aims, such as innovation, digitalisation and the green transition. Analysis shows that targeted and well-coordinated support at the EU level provides a steadiness that firms need to invest in projects that improve long-term productivity. The quality of the business environment also influences whether policy support is effective. The impact of policy support is amplified for firms that face lower regulatory barriers.

Going forward, the best way to spur corporate investment is to better integrate the EU single market and create new businesses opportunities. For this to happen, trade barriers between EU countries need to be eliminated or at least lowered. Market fragmentation – caused by differing regulations and standards in EU countries – is cited by 60% of EU firms as weighing on exports within the European Union. Reducing that fragmentation and the bureaucracy associated with it would stimulate trade. According to EIB estimates, progress in better integrating the EU markets for goods alone accounts for one-seventh of the increase in EU gross domestic product (GDP) since 1980, and for a quarter of the investment rise. Fragmentation reduces economies of scale for firms operating across borders and ultimately hinders corporate investment – especially in intangible assets. Furthermore, in the current geopolitical context, the EU single market helps enhance resilience to shock and address concerns about economic security.

Introduction

While EU corporate investment remained surprisingly resilient in 2025, it fell short of the significant investment needs laid out in the Draghi (2024) and Letta (2024) reports. Policy support provided an anchor for private investment, particularly measures that were targeted and coordinated at the EU level.

Going forward, EU firms need to invest heavily to remain competitive in a fast-changing global landscape. Exploiting the full potential of the European single market, creating a more friendly business environment and effectively targeting EU support will be critical.

This chapter contains three sections and two boxes.

The first section highlights the resilience of corporate investment in the European Union amid heightened uncertainty and rising global polarisation. Geopolitical tensions, fragmented multilateralism and divergent strategic interests are reshaping the macroeconomic and investment environment. The section shows that corporate balance sheets, vulnerabilities and external financial conditions did not impede investment, but rather that economic uncertainty caused firms to pull back on investments in innovation, intangible assets and expansion. The section analyses funding sources – from bank lending and securities for small and medium enterprises (SMEs) to private equity, venture capital, scaleup financing and broader equity markets. It includes a box summarising findings from the European Investment Fund (EIF) Venture Capital Survey 2025.

The second section evaluates the effectiveness of public policies in fostering corporate investment and innovation. It shows that targeted and well-coordinated measures are more effective, particularly in a supportive business environment. The section distinguishes between types of policy support and explores the broader way they affect productivity and investment.

The third section analyses the potential of the EU single market. It shows how the single market can be leveraged to create business opportunities, unlocking firms' investment and reducing dependency on foreign suppliers. A frictionless single market supports capital expenditure, eases trade tensions and makes firms more resilient. The section also elaborates on the role of simplification, showing that smart regulation and leaner bureaucratic processes can catalyse stronger investment at relatively low costs. This section contains a second box that looks at the impact of foreign ownership in the European Union, distinguishing between firms bought by companies from other EU countries and those purchased by companies beyond the European Union. It shows that foreign ownership helps overcome financial bottlenecks and enables knowledge transfer, laying the foundation for greater investment, particularly in digitalisation and innovation. Ownership by firms within the European Union (which is more prevalent) results in improving productivity, while global foreign ownership better supports innovation and digitalisation.

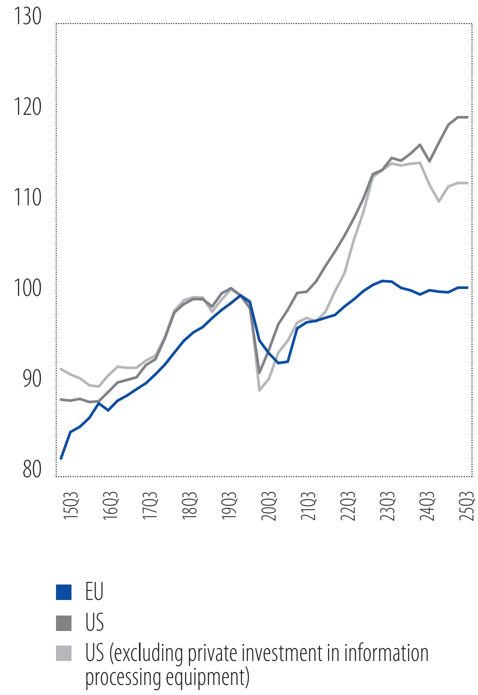
Corporate investment is insufficient to meet Europe's needs

Corporate investment has withstood major headwinds, but remains broadly unchanged since late 2023, widening the gap with the United States. Figure 1 tracks real corporate investment from 2015 onwards for the European Union and the United States. Despite headwinds like the energy crisis and tighter monetary policy, investment in the European Union held up better than expected (European Investment Bank (EIB), 2024). Since late 2023, corporate investment has remained broadly unchanged, regardless of continued shocks. However, the gap with the United States has widened. By mid-2025, real corporate investment in the European Union was only 1% higher than the level before the COVID-19 pandemic, compared with a 21% increase in the United States.

The surge in US investment reflects strong spending in technology and sectors related to artificial intelligence. In the United States, real private investment in information processing equipment rose by 26% year-on-year in the third quarter of 2025. Within this category, computers and peripheral equipment (hardware such as monitors, printers, modems, etc.), which together account for about one-third of total private fixed investment in information processing equipment, increased 46% over the same period. This growth far outpaced overall real corporate capital expenditure, which expanded by 2.6% year-on-year. Excluding private fixed investment in information processing equipment, real US corporate capital spending fell by 2.2% in the third quarter of 2025 compared with the third quarter of 2024, although it remained 12% above the level at the end of 2019.

Figure 1

Real corporate investment (index, 2019Q4=100)

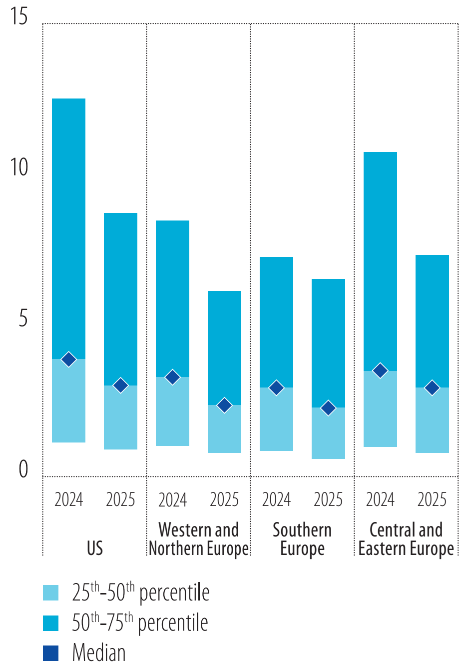


Source: *EIB staff calculations based on Eurostat and US Bureau of Economic Analysis retrieved from Federal Reserve Economic Data (FRED), Federal Reserve Bank of St. Louis.*

Note: *EU data exclude Ireland. All figures were adjusted using the implicit price index for gross fixed capital formation for the European Union and the United States. Private investment in information processing equipment was deflated using the price index for information processing equipment investment. Quarterly data are presented as four-quarter moving averages. The latest available figures were for the third quarter of 2025 for aggregated US and EU data.*

Figure 2

Rate of investment (% of turnover)



Source: *EIB staff calculations based on EIBIS 2024-2025.*

Investment intensity is softening on both sides of the Atlantic. Investment intensity relative to turnover has weakened across the United States and key European regions. Figure 2 shows the median, 25th and 75th percentiles of the distribution of investment intensity relative to turnover for firms in the United States and three EU regions, based on data from the EIB Investment Survey (EIBIS) for 2024 and 2025. The data point to a decline in investment intensity in the United States, Western and Northern Europe, and Central and Eastern Europe, while Southern Europe shows a broadly similar trend compared with 2024.

Higher investment in information and communication technologies is linked to overall stronger corporate investment after the pandemic. Figure 3 shows the correlation between changes in real corporate investment from the fourth quarter of 2019 to the second quarter of 2025, and the share of investment allocated to information and communication equipment, software and databases over the past decade. We use a shorter period for corporate investment to capture recent dynamics, and the last decade for information and communications technology investment to point out structural differences that evolve slowly. The analysis covers most EU countries and the United States. The most resilient countries were generally those with higher investment in information and communication technologies relative to total capital expenditure. Corporate investment tends to recover more strongly in countries where technology-related investment has been higher historically, consistent with the ongoing shift towards a digital and knowledge-intensive economy. Firms in the United States allocated over 17% of their total capital spending to information and communication equipment, software and databases, and investment overall has grown more strongly since the COVID-19 pandemic. Similarly, EU countries like Sweden, Denmark and Greece, which also have a higher share of this investment, have showed more resilience than those with lower shares, including Germany and Hungary.

The rise of the knowledge-intensive economy and artificial intelligence increases the importance of investment in information and communication technologies, and in research and development. As the economy increasingly shifts toward digital and knowledge-intensive production – driven by artificial intelligence (AI) – information and communication equipment and research and development have taken a central role.[1] The Organisation for Economic Co-operation and Development (OECD) (2025) further highlights that real investment in information and communication technologies, software and data has surpassed other asset classes in most advanced economies. In the United States, AI-related capital expenditure – particularly in software and computing – has significantly boosted GDP growth and strengthened corporate investment. As discussed in Chapter 5, AI and technology-related investment contributed almost as much to real GDP growth in the first half of 2025 as overall growth in output, largely reflecting capital spending on computers, peripheral equipment (such as monitors and printers), and software.[2]

Corporate profitability in Europe is lower than in the United States. Figure 4 presents the share of firms reporting profits above 10% of turnover across different EU regions and the United States. EIBIS data show that the share of firms with profit margins above 10% is 10 percentage points higher in the United States than in Western and Northern Europe, and 5 to 7 percentage points higher than in Southern and Central and Eastern Europe. The latest EIBIS data for 2025 also show an increase in the share of US firms reporting large profits compared with the previous year, while profitability among EU firms remained broadly stable across all regions, with a slight increase in Southern Europe. Overall, US firms report higher profitability than their EU counterparts, meaning that higher corporate investment in the United States is accompanied by stronger profitability.

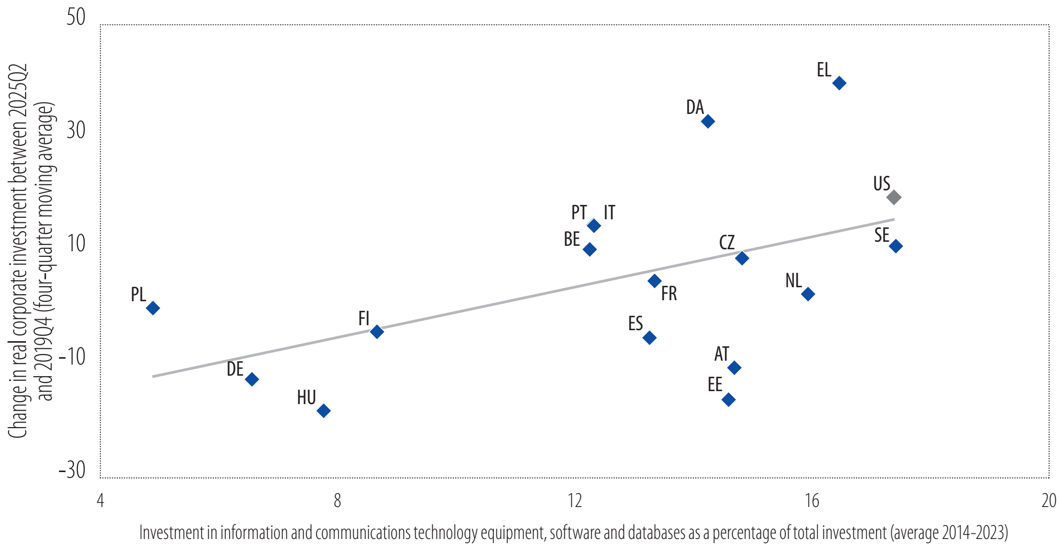
Higher corporate profits are associated with a greater tendency to invest. Figure 5 illustrates the relationship between profitability, past investment and expected investment plans, based on firm data obtained from the EIBIS. Highly profitable firms – those with profit margins above 10% – are associated with a higher likelihood of increasing investment – roughly 7 percentage points higher. Firms with lower but still positive profit margins (below 10%) also show a stronger investment tendency, with a 2.7 percentage point increase compared with firms that break even. By contrast, firms with very high past investment rates, or those that perceive their recent investment levels as excessive, are significantly less likely to invest further.

1 Corrado et al. (2021) show that investment in knowledge-based intangible assets, and in complementary tangible ones like hardware (servers, networking equipment and cloud infrastructure, etc.), is key to enhancing firm productivity and innovation.

2 While investment in data centres has shown notable strength in the United States, it is still only a small share of total investment. For more details, see Bank of America Institute (2025).

Figure 3

Investment in information and communications technology and real corporate investment growth (in %)



Source: *EIB staff calculations based on the Organisation for Economic Co-operation and Development (OECD) Structural Analysis (STAN) database, FRED and Eurostat.*

Note: *Investment in information and communications technology equipment, software and databases are calculated for all industries. Data for Germany (DE), Denmark (DK) and Portugal (PT) were available only until 2022. Real corporate investment data for Greece (EL) were available only until the first quarter of 2025.*

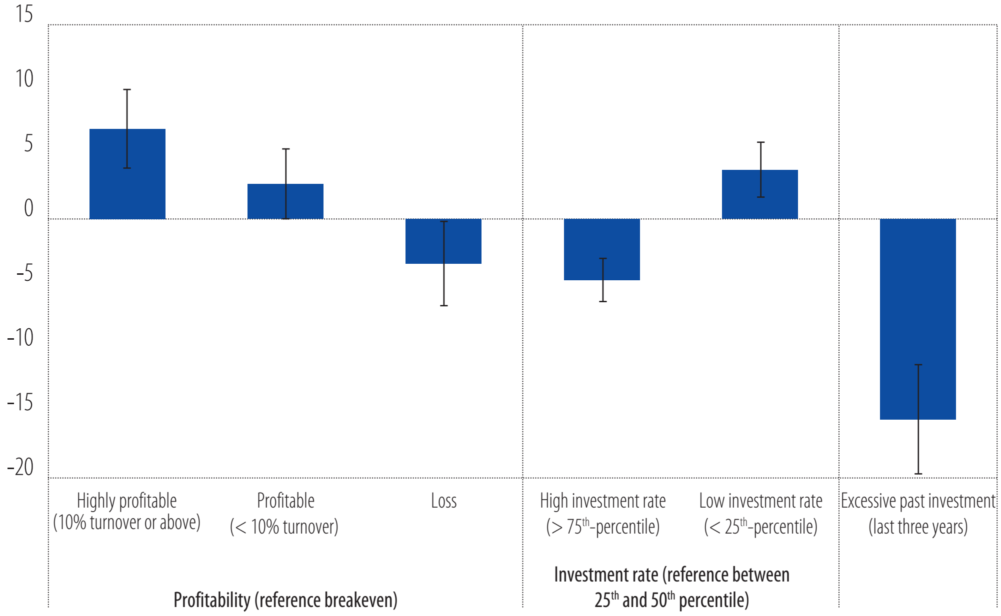
Figure 4

Firms (in %) **with profits over 10% of turnover**

Source: *EIB staff calculations based on EIBIS 2024-2025.*

Figure 5

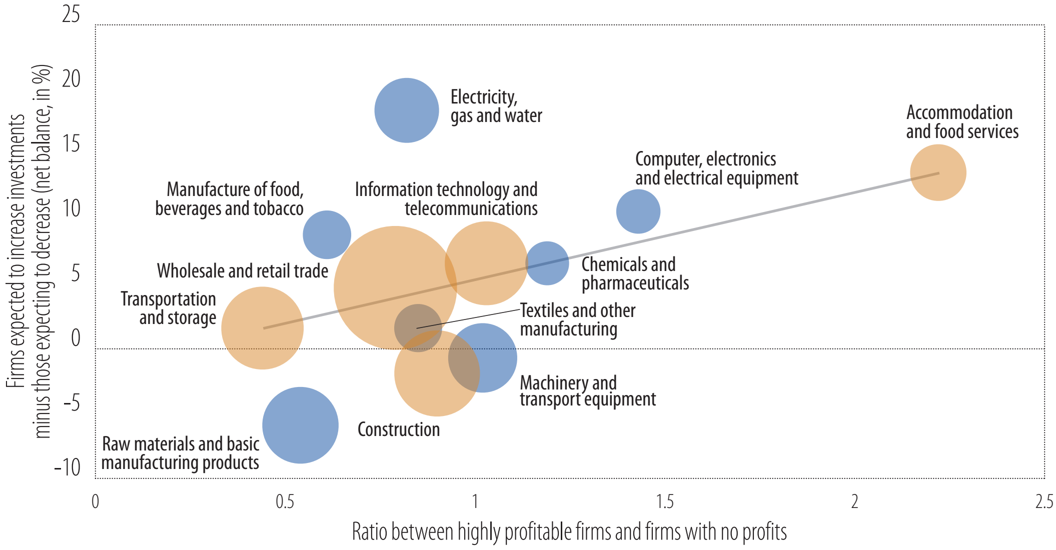
Profitability and the impact of past investment on expected investment (probability of increasing investment next year, in percentage points)



Source: *EIB staff calculations based on EIBIS 2018-2025.*
Note: *The black lines represent 90% confidence intervals.*

Figure 6

Expected investment and profits, by sector



Source: *EIB staff calculations based on EIBIS 2025 and Eurostat.*
Note: *The the bubble size indicates each sector's share of total gross value added. Firms with no profits are those breaking even or losing money, while highly profitable firms are those earning profits equivalent to at least 10% of turnover. Blue indicates the manufacturing sectors while orange color the service sectors.*

Profitability also spurs investment in different sectors. Sectors with a higher share of profitable firms tend to report stronger investment plans. Figure 6 maps corporate profitability across 12 sectors, alongside the net balance of companies expecting to increase rather than reduce investment in 2025. The size of each bubble indicates the sector's share of total gross value added. A positive correlation emerges between profitability and expected investment in specific sectors. In Europe, firms in the computer, electronics, and information and communications technology sector report higher profitability and have a greater share of firms that plan to increase investment. The accommodation and food sector is still recovering from the COVID-19 pandemic, with solid profitability and investment. In contrast, firms in the raw materials and basic manufacturing sector are the least profitable and have the highest share of firms that expect to reduce investment. This is in part a result of the energy crisis.

Stronger balance sheets and improved financial conditions are stabilising the investment outlook

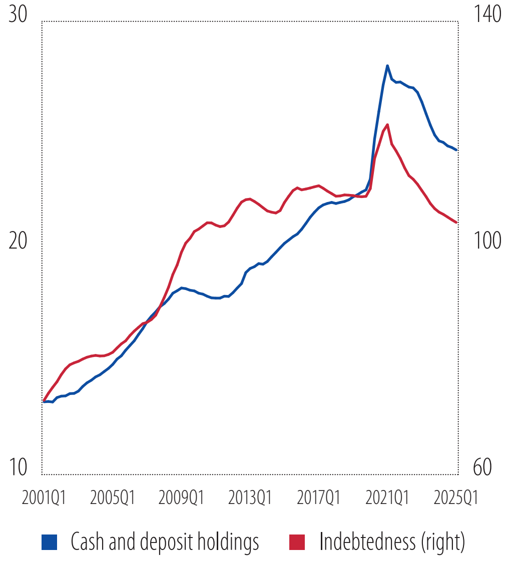
European firms continue to deleverage and reduce their cash holdings. Figure 7 shows the evolution of two important ratios indicative of firms' balance sheet strength since the beginning of 2000. First, the aggregate value of total cash and liquid assets held by non-financial firms relative to GDP. Second, the corporate indebtedness ratio, measured as non-financial firms' total loans and debt securities consolidated at the sector level, divided by GDP. Indebtedness rose sharply during the pandemic, as firms took advantage of government guarantee programmes to secure financing in an uncertain environment. Since peaking at around 122% of GDP in the first half of 2021, corporate indebtedness has steadily declined, reaching 105% in the first quarter of 2025 – below the pre-COVID-19 level and the lowest share since 2010. Liquid asset holdings also increased during the COVID-19 crisis, rising by more than 5 percentage points in the euro area. As firms repaid their debt, cash holdings started to fall in early 2021, dropping from 28% of GDP in the first quarter to 24% a year later, in the first quarter of 2025. By mid-2025, cash holdings were back on their pre-pandemic trend.

Borrowing costs and net interest expenses are falling as monetary policy loosens. Figure 8 shows the composite cost of bank borrowing for companies in major euro area economies since 2009. When monetary policy tightened from late 2022 to the end of 2023, interest rates on new corporate loans rose in line with the 450-basis-point increase in European Central Bank (ECB) policy rates. Since the start of 2024, borrowing costs have declined by around 175 basis points, reflecting looser monetary policy. This decline has been broadly shared across major euro area economies, with monetary policy transmitted similarly across countries. During both episodes, the sharp moves unfolded smoothly and symmetrically across EU countries.

Net interest expenses continue to decline, further easing pressure on corporate profits. The grey line in Figure 8 shows the share of net interest expenses of non-financial firms relative to their gross operating surplus in the euro area. As firms also receive interest income – for example, from intra-group trade credit – expenses must be netted out to assess the impact on profits. Net interest expenses rose from less than 1% of corporate gross profit to 3.5% in the first quarter of 2024, before declining to around 2.5% in the first quarter of 2025 (similar to levels recorded in 2015-2016, and well below the recent high of 10% reached in 2008 during the global financial crisis). This delayed response reflects firms' increased use of fixed-rate financing when interest rates were at historic lows (EIB, 2025b).

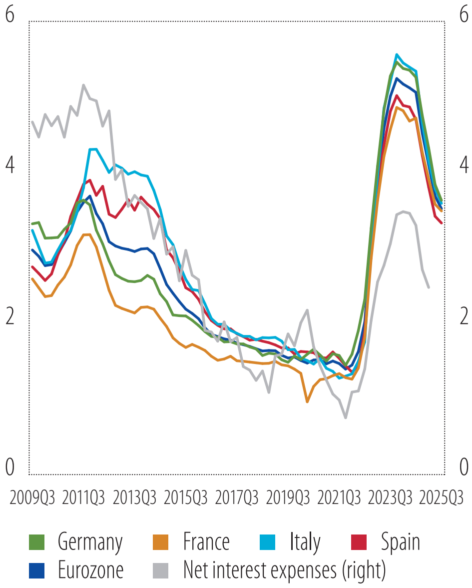
Profitability and cash reserves have not constrained investment. Yet, corporate investment in the European Union has remained insufficient since the global financial crisis, and firms have shifted from net borrowers to net lenders. Rising corporate savings, driven by strong profits, lower taxes and reduced interest expenses, have not translated into higher investment. In contrast, non-financial firms in the United States remain net borrowers, showing greater resilience and stronger investment rates. The declining ratio of net investment to sales suggests that firms are allocating less of their earnings and borrowed funds to productive investment while continuing to expect high returns.

Figure 7
Cash and deposit holdings compared with the indebtedness of non-financial firms (% GDP)



Source: *EIB staff calculations based on Eurostat.*
Note: *Data refer to non-financial firms in the euro area and are presented as a four-quarter moving average. Debt comprises loans and debt securities, such as corporate bonds. Cash and deposit holdings include transferable and other deposits. The latest available figures are for the first quarter of 2025.*

Figure 8
Cost of bank borrowing (left axis: in %) **and corporate net interest expenses** (right axis: % of gross operating surplus)

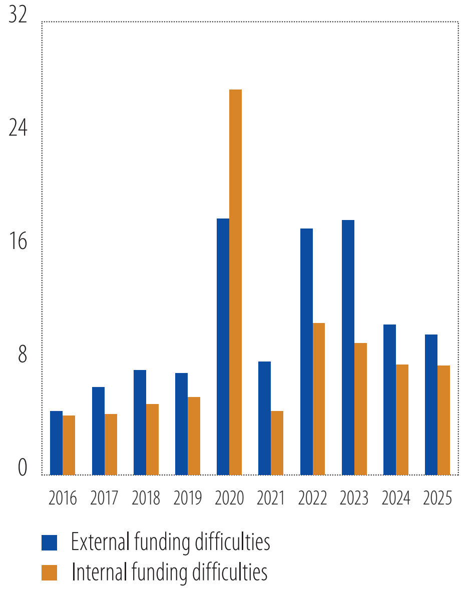


Source: *EIB staff calculations based on the European Central Bank (ECB) and Eurostat.*
Note: *The latest available figures are for the third quarter of 2025 for bank cost of borrowing, and the first quarter of 2025 for net interest expenses. Net interest expenses are calculated for non-financial firms in the euro area.*

Firms continue to face financing challenges, although access to external finance improved marginally. Following the approach of Ferrando and Pál (2024), two indicators are calculated – internal and external funding difficulties – while accounting for the financial viability of firms. To exclude the impact of unviable zombie firms, which are less likely to invest, only firms that have been profitable for three consecutive years are considered. The external funding difficulties indicator captures the share of profitable firms that need a loan, but are discouraged from applying, do not receive one or receive less than needed, as well as those reporting a deterioration in external financing conditions. The internal funding difficulties indicator reflects the share of profitable firms reporting worsening internal financing conditions, which can be caused by losses or a general reduction in retained earnings. Figure 9 shows significant variation in both indicators over time. The ratios rose during the COVID-19 crisis, the energy crisis and during monetary policy tightening. Since 2024, the share of firms facing financing difficulties has shrunk, but it remains above levels before the COVID-19 crisis.

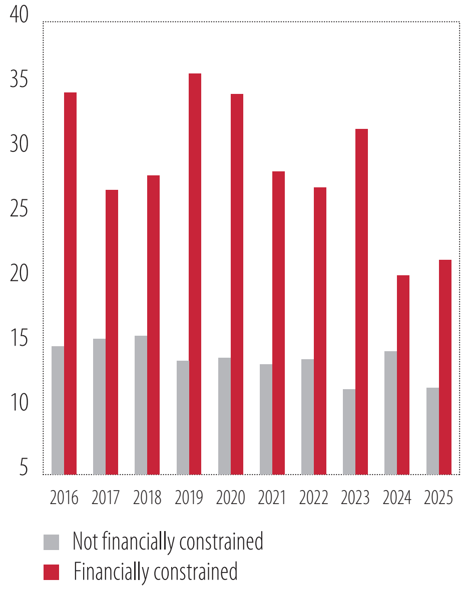
Access to finance matters for mobilising the significant investment Europe needs. Figure 10 shows the share of firms reporting an investment gap, defined as firms that believe they invested too little over the past three years. It distinguishes firms that are financially constrained, defined as those that need external financing, but are rejected, discouraged from applying, receive too little financing or are offered financing that is too expensive. The figure shows that being financially constrained raised the probability of under-investing. Between 2016 and 2023, financially constrained firms were, on average, 15 percentage points more likely to report lower capital spending than they considered appropriate, compared to non-constrained firms. This gap re-widened in 2025 to 10 percentage points, from around 6 percentage points in 2024.

Figure 9
Firms (in %) **facing internal or external financing difficulties**



Source: *EIB staff calculations based on EIBIS 2016-2025.*
Note: *See Ferrando and Pál (2024).*

Figure 10
Investment gap by external financing constraints (% of firms)

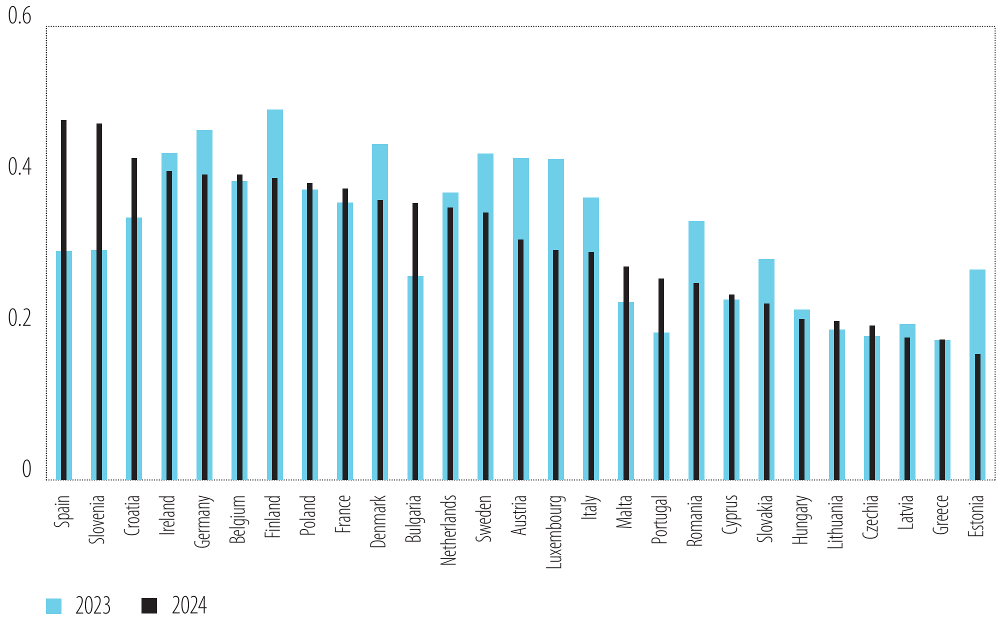


Source: *EIB staff calculations based on EIBIS 2016-2025.*
Note: *An investment gap is understood to exist when firms report having invested too little over the last three years. Financially constrained firms are those that need external financing but were rejected, discouraged from applying, received too little financing, or were offered financing that was too expensive.*

Small and medium firms' ability to start up, grow and succeed is closely linked to the financing environment they face. The EIF SME Access to Finance Index is a composite indicator that measures the ease of SME financing across EU countries, capturing both debt (loan) and equity finance conditions. In general, financing conditions improved in 2024 in many countries thanks to the post-pandemic economic recovery and ongoing policy support, but some traditionally strong markets saw a slight deterioration, underlining that challenges persist even in advanced economies (Figure 11). The top three countries (Spain, Slovenia and Croatia) demonstrated improvements across both loan and equity markets. On the debt side, fewer small and medium-sized enterprises (SMEs) reported being discouraged from applying for bank loans, leading to more frequent use of available instruments. Additionally, the interest rate spread (measured as the difference between loans under €250 000 and those over €1 million for floating-rate loans with short interest rate periods) declined in all top three countries, further improving access conditions for SMEs. On the equity side, Spain led the index this year, driven primarily by a noteworthy increase in initial public offering (IPO) activity, with venture capital investment rising as well.

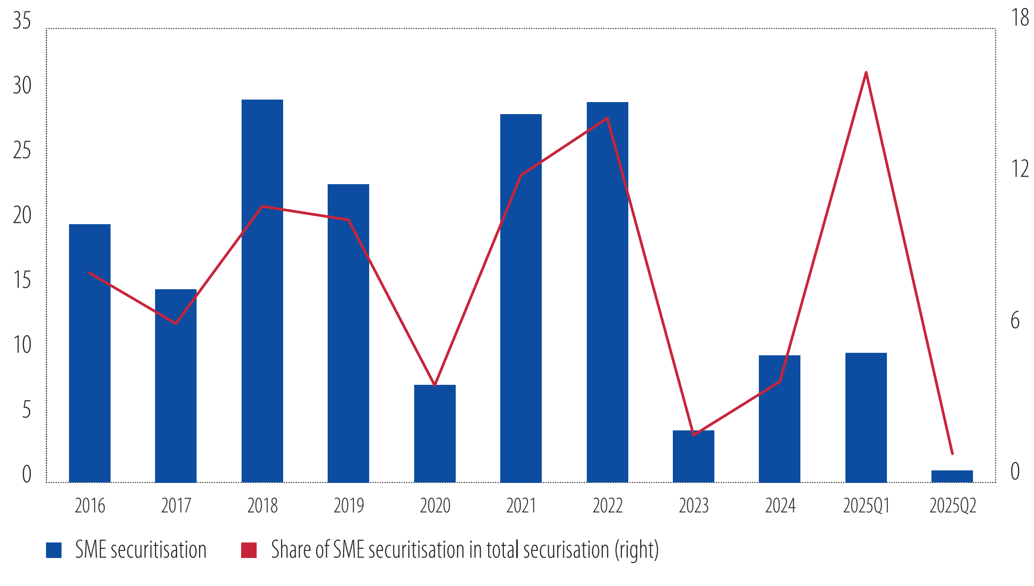
The European securitisation market continues to recover gradually. In 2024, total issuance rose to €245 billion, a 14.8% increase from 2023, with €144 billion placed with investors. Despite these gains, market activity remains well below pre-crisis highs and still below the US market, which reported €1.6 trillion in issuance during the same period. SME securitisation issuance has also seen limited progress. After issuance fell to €4 billion in 2023, it rose modestly to €9.8 billion in 2024 (Figure 12). Data for the first quarter of 2025 show issuance steady at €10 billion, with the share of SME securitisation in total securitisation reaching 16.2% – the highest level in a decade. While SME securitisation offers scalable and efficient funding solutions, especially when complemented by public guarantees for risk-absorbing mezzanine tranches, the market remains underdeveloped in Europe.

Figure 11
Access to finance index for small and medium firms



Source: *EIF Market Assessment & Research.*
Note: *August 2025 update.*

Figure 12
SME securitisation issuance in the European Union (left axis: volume in € billion; right axis: % of total securitisation)

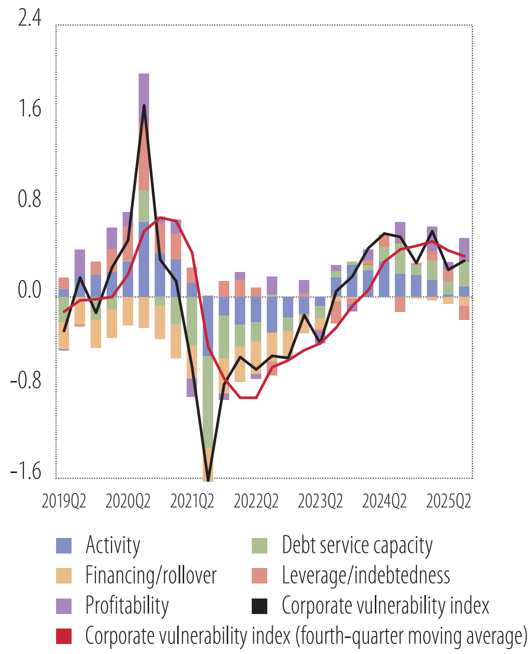


Source: *EIF staff calculations based on data from the Association for Financial Markets in Europe.*
Note: *Firms in the European Union only.*

Corporate vulnerability is abating as borrowing costs decline and firms deleverage. Figure 13 presents a synthetic corporate vulnerability index, based on more than 20 indicators related to firms' aggregate performance and balance sheet structure. The index has five components: activity, profitability, financing and debt rollover, debt servicing, and leverage. Vulnerability in the euro area rose sharply during the pandemic, mainly due to increased leverage and slower activity. When monetary policy tightened from the summer of 2022 until the autumn of 2023, firm vulnerabilities rose. The uptick in the indicator persisted until the end of 2024, alongside rising debt servicing costs. The corporate vulnerability index peaked in the fourth quarter of 2024 but remained well below the highs recorded during the recent crisis, the COVID-19 pandemic in 2020 or the global financial crisis in 2008. It started to decline in early 2025. However, differences exist among sectors. Manufacturing firms are more vulnerable than those in services and parts of retail trade, partly a result of US tariffs, the appreciation of the euro and more intense import competition (European Central Bank (ECB), 2025).

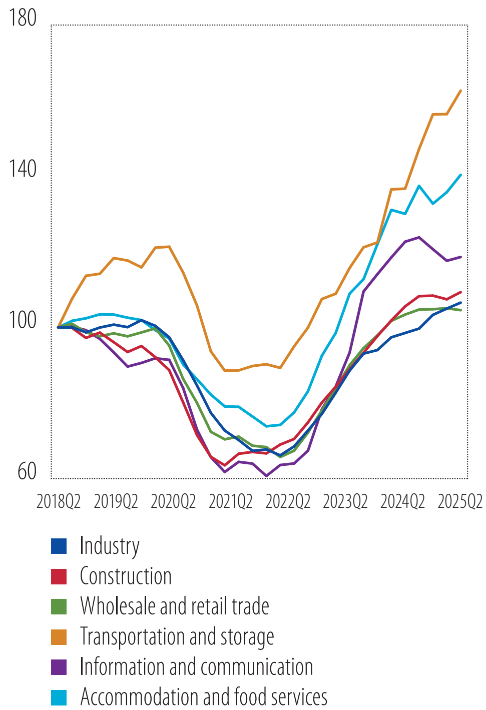
Bankruptcy trends have followed the trend of corporate vulnerability. Figure 14 shows the number of firms ceasing operations across various sectors, compared to the first quarter of 2018. Bankruptcies have increased in most sectors, with the transportation and storage sector and the accommodation sector seeing an increase of around 60% and food services rising about 40%. Bankruptcies also rose modestly in information and communications technology, peaking in the second half of 2024 before declining. The increase has been slower in the industrial sector, while the construction and wholesale and retail sectors have seen bankruptcies plateau since late 2024, remaining at levels comparable to those recorded before the COVID-19 pandemic.

Figure 13
Corporate vulnerability index in the euro area (z-scores)**, by component**



Source: *EIB staff calculations based on Eurostat and the ECB.*
Note: *The corporate vulnerability indicator is obtained as a weighted average of more than 20 indicators related to EU firms' performance and balance sheet structure. It is constructed using z-scores and calculated from the first quarter of 2000 to the second quarter of 2025, when the latest data was available. Positive values mean an increase in vulnerability. We follow similar approach to that in Gardó et al. (2020).*

Figure 14
Firms ceasing to operate
(index, 2018Q1=100)



Source: *EIB calculations based on Eurostat.*
Note: *The latest available figures are for the second quarter of 2025.*

Uncertainty affects the composition of investment, penalising intangibles, innovation and capacity expansion

Firms report uncertainty as one of three main structural obstacles limiting investment. Figure 15 depicts how uncertainty has evolved as an investment barrier since the inception of the EIBIS in 2016. In EIBIS 2025, 83% of EU firms reported uncertainty as an obstacle to investment, an increase from 2024. That level is just below the peak recorded during the COVID-19 crisis in 2020. In addition to conflicts in Ukraine and Gaza, the rise likely reflects the reaction to policies initiated by the new US administration, whether regarding the trade policy or the Federal Reserve's independence. To some extent, it also reflects political developments in major EU countries, the fiscal package in Germany (European Commission, 2025) and government stability in France. The result has been a more pronounced rise in the share of firms reporting major uncertainty, as depicted in Figure 15.

Reducing uncertainty would improve corporate investment. The EIBIS identifies uncertainty as a major barrier to investment across most EU economies, a view supported by empirical research. Ebeke and Siminitzs (2018) analyse trade uncertainty in the euro area, and find that an increase of one standard deviation in trade uncertainty reduces the investment-to-GDP ratio by an average of 0.8 percentage points over five quarters – an impact that can rise to 1.6 percentage points in highly indebted countries. Similarly, Kolev and Randall (2024) analysed EIBIS data matched with the Moody's Orbis database and found that the net fixed asset growth[3] for firms reporting major uncertainty are 2.5 percentage points lower than firms not reporting uncertainty. OECD (2025) also highlights macroeconomic and policy uncertainty as factors that discourage companies from investing and cause them to stock up on cash. The study found that uncertainty contributed one-quarter of the decline in investment compared to the trend before the global financial crisis.

Uncertainty and risks affect investment differently, depending on the type of assets, with the impact tripling for intangibles such as intellectual property. We estimate the response function of intangible investment, and machinery and equipment investment, to two types of shock: an uncertainty shock and a risk shock, associated with cyclical developments and firms' financial vulnerabilities. We use country estimates of firms' vulnerability indicator, used and depicted at the EU level in Figure 13, to dissociate a risk shock from the uncertainty shock.[4] Figure 16 shows the responses (to both types of shock) of two types of assets: machinery and equipment and intellectual property products. Following each shock, both types of investment decline, with a stronger reaction to a policy uncertainty. Investment in intellectual property products is three times more reactive, especially to an uncertainty shock.

Data from firms confirm that elevated uncertainty skews the type of investment carried out by firms, affecting intangible investment the most. Figure 17 reports the results of projecting investment-to-fixed asset ratios at the firm level onto a set of control variables and uncertainty, either as a minor or major obstacle. In our sample, the average investment-to-fixed asset ratio[5] was 27%. The intangible figures taken from the EIBIS capture innovation-related intangibles (R&D, software, IT and data related) and competence/organisation-related intangibles (training and process improvements). A rise in uncertainty lowers this ratio by 5 percentage points in the long run. Tangible and intangible investments are affected relatively similarly. Tangible investment declined by 1.8 percentage points, while intangible slid 2 percentage points. Given that the share of intangible investment is half that of

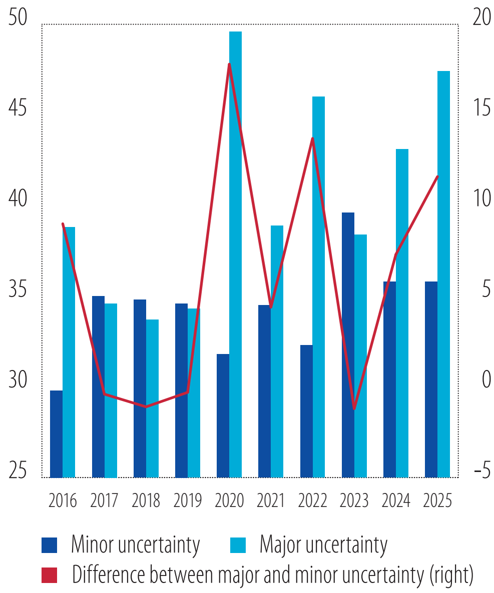
3 Net fixed asset growth is calculated as net investment in fixed assets relative to the stock of fixed assets in the preceding period, based on firms' balance sheet data in Moody's Orbis database.

4 The estimates are based on a panel vector autoregression (PVAR) model of the main EU economies, estimated with Bayesian techniques. The model comprises the corporate vulnerability indicator, the spread between the cost of bank borrowing and the 10-year sovereign bond yield, the economic policy uncertainty indicator as compiled by the International Monetary Fund (IMF) and the two types of investment: in machinery and equipment, and in intellectual property products. The identification is based on sign restrictions, as explained in the main text.

5 Both the total amount of investment and the value of fixed assets were reported directly by firms through the EIBIS. Depreciation is not accounted for in these measures. The figures might differ from net investment rate derived from Orbis data, where investment is proxied by the growth of net fixed assets.

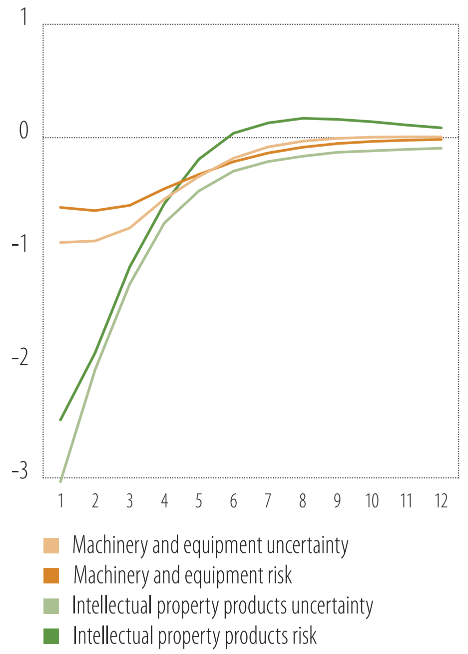
tangible (9% and 18%, respectively), the relative effect is higher. Moreover, the bulk of the drag comes from major uncertainty. Replacement investment is affected negatively, but much less than expansion and new products. Expansion investment is the most affected, with a share reduced by more than 1.5 percentage points in the long run, out of an average of 7%. Here again, most of the impact comes from the transition from minor to major uncertainty.

Figure 15
Firms (in %) **reporting major and minor uncertainty concerns**



Source: *EIB staff calculations based on EIBIS 2016-2025.*

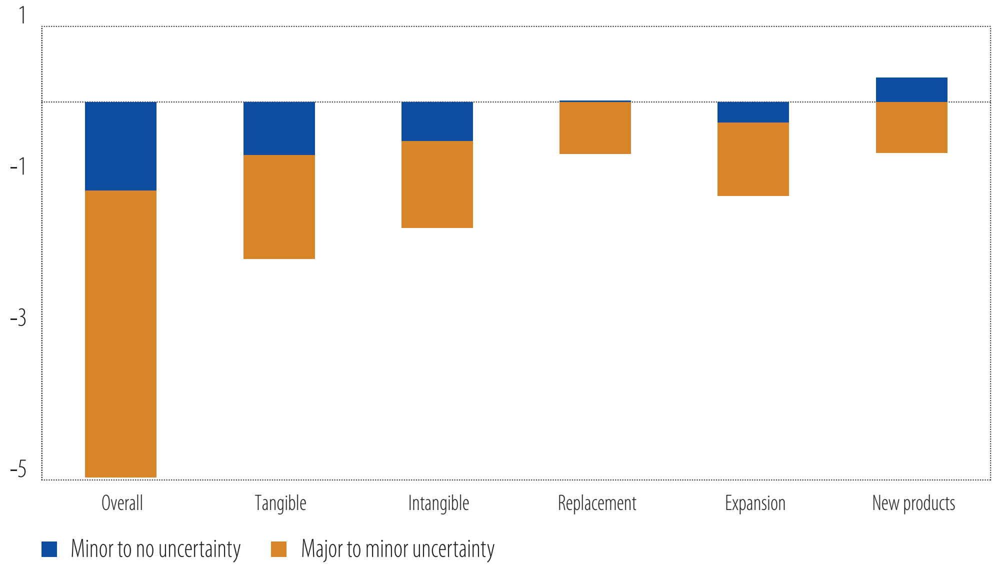
Figure 16
Uneven effect of uncertainty shock (percentage-point deviation from the baseline)**, by type of investment**



Source: *EIB staff calculations based on Eurostat and the ECB.*
Note: *Reponses to a policy uncertainty shock and to cyclical risk shock. Estimate based on a panel vector autoregression (PVAR) model of the main EU economies, estimated with Bayesian techniques. Identification based on sign restrictions.*

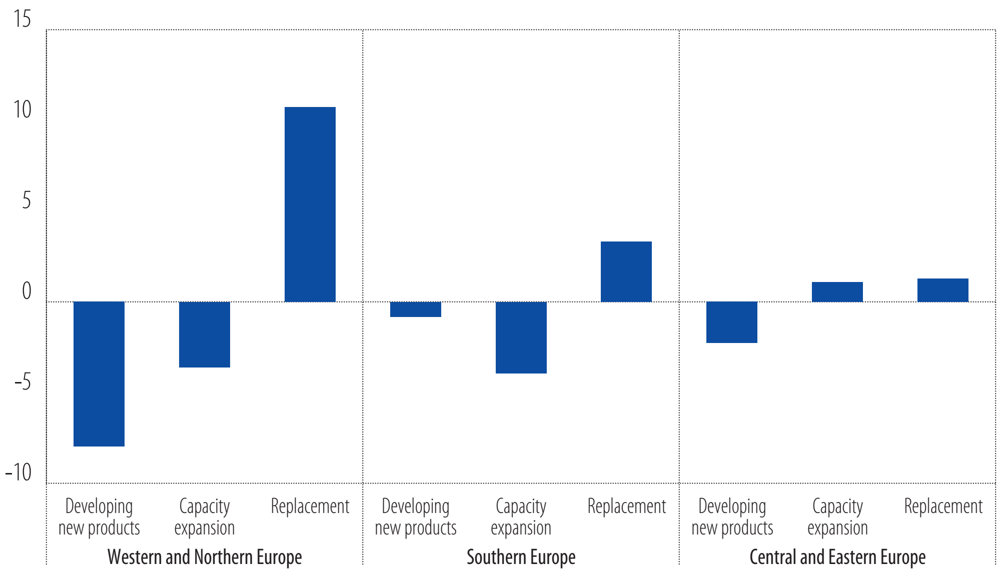
Firms increasingly expect to replace their productive capacity, but are not planning to develop new products or raise capacity as much. For the coming years, EIBIS data indicate lower investment in new products and capacity expansion. Figure 18 shows the expected mix of future investment – replacement, capacity expansion and new products – across the three main EU regions, as a deviation from the historical average. For the three regions, the share of replacement investment is expected to rise. This comes mostly at the expense of developing new products – especially in Western and Northern Europe, where replacement rises 11 percentage points while developing new products drops 8 percentage points. The change, albeit of a lower magnitude, is mostly compensated by lower investment in capacity expansion in Southern Europe (4 percentage points less). The EIF Venture Capital survey also emphasises the negative impact of uncertainty on venture capital activity in the European Union (Box A).

Figure 17
Long-run impact of uncertainty on different investment-to-fixed asset ratios (in %)



Source: *EIB staff calculations based on EIBIS 2016-2025.*
Note: *The chart shows the results of a regression of investment intensity on uncertainty, controlling for the first lag in investment intensity, a cyclical component, a structural financial component, and firms' future expectations for demand. Standard errors are clustered at the firm level, 95% confidence interval.*

Figure 18
Future investment priorities (change between 2025 and the 2022-2024 average, % of firms)



Source: *EIB staff calculations based on EIBIS 2022-2025.*

Box A

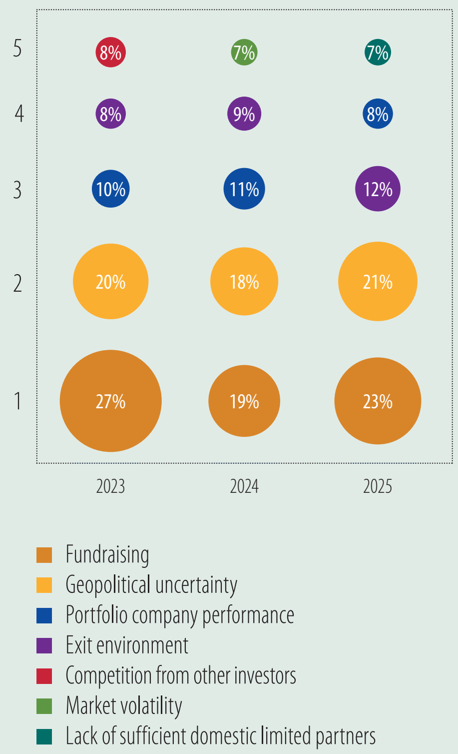
Optimism returns among managers of venture capital funds

European companies and investors are faced with challenging market conditions, characterised by unprecedented uncertainty and heightened volatility.

The annual European Investment Fund (EIF) Equity Survey is the largest regular survey of the general partners managing venture capital funds in Europe. In the 2025 survey, 1 201 venture capital and private equity mid-market fund managers contributed their insights. The results show that fund mangers were more optimistic in the third quarter of 2025 than they had been in the first half of the year, which was plagued by heightened uncertainty and market volatility triggered by shifts in global and US priorities and policies. Despite improved expectations in the second half of the year, the fundraising environment remained difficult, and exit opportunities limited.

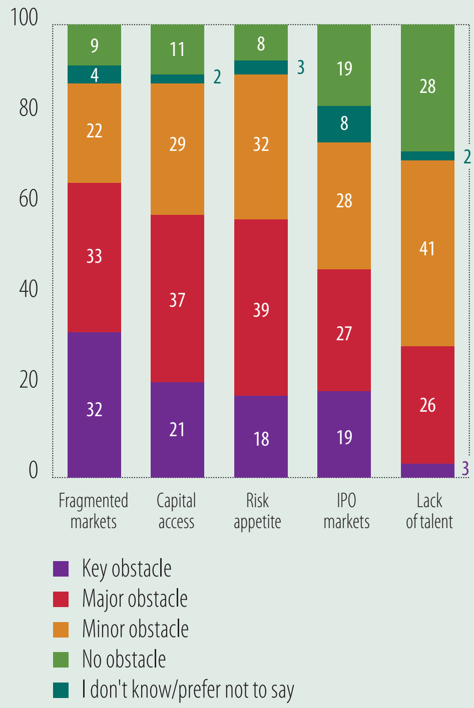
Geopolitical uncertainty bogged down investment in growth capital for private equity fund managers. The environment was also hard on fundraising, portfolio company performance and exit options (Figure A.1). The share of private equity respondents citing fundraising and uncertainty as a challenge even increased compared to the 2024 survey, showing how the challenging market conditions are posing problems for long-term investment in fast-growing European companies.

Figure A.1
Top-five challenges for investors in high-growth firms



Source: EIF Equity survey 2025.

Figure A.2
Obstacles to scaling up EU firms
(% of responses)



Source: EIF Equity survey 2025.

For startup investors, fundraising and the availability of scale-up finance for portfolio companies were the first and second most frequently stated challenges. The obstacles to scaling up in the European Union mainly stem from its fragmented markets, access to capital, and a lower investor appetite for risk. Almost half of respondents cited initial public offering markets as a major obstacle, while slightly less than one-third cited lack of talent (Figure A.2).

In follow-up survey questions, fund managers elaborated on how regional fragmentation in the European Union creates a competitive disadvantage. With no single EU stock exchange or harmonised equity landscape, its markets are shallower than US markets, with fewer initial public offerings and mergers and acquisitions. At the same time, regulatory fragmentation often makes it easier for companies to expand to the United States than across EU borders. These factors are echoed in the challenges voiced by non-EU fund managers when investing in the European Union. Consequently, fund managers called for regulatory simplification and harmonisation, more transparency, and larger-scale investment vehicles to address challenges such as the small size of investment requested and small fund size.

In line with these results, venture capital and private equity market conditions are generally evaluated more positively for the United States than for the European Union. Still, Europe has potential for growth, and more than half of the fund managers surveyed confirmed having increased, or intending to increase, their exposure to EU venture capital. The strengths of the EU market lie in its innovation and technology environment, its attractive investment opportunities, founders' ambition, and access to talent. By contrast, challenging tax regimes, attitude to risk, a weak exit environment, difficult access to (scaleup) capital and market fragmentation impede the full flourishing of these comparative advantages.

Maximising the impact of policy support for businesses

The pandemic and the energy crisis ushered in a surge in policy support and a global revival of industrial policies. Government support put in place to address those difficult periods enabled firms to continue adopting digital technologies, strengthen their supply chains and invest in climate change mitigation and adaptation measures (EIB, 2025b). This section draws lessons from these episodes. It evaluates the effectiveness of public policies in fostering corporate investment and innovation, and considers their potential spillover effects. It distinguishes between types of policy support and shows that policy support is more effective when it is targeted and designed at the EU level.

Overview of financial support for corporate investment

In the European Union, public policy support has increased since the COVID-19 and energy crises. The renewed focus on industrial policy has enabled governments to expand public investment, including by providing investment grants to incentivise corporate spending. Recent spending trends reflect this shift. As illustrated in Figure 19, the relative size of policy support has varied over time; however, since 2020, there has been a notable increase across the European Union and within EU countries. It averaged 0.5% of GDP during the period from 2002 to 2025. It declined from a high of 0.7% in the beginning of the 2000s to a low of 0.4%, before rebounding at the beginning of the COVID-19 pandemic.

At macro level, policy support differs between countries, but the recent rise has spanned the European Union. Figure 19 also shows broad dispersion in aggregate investment support[6] allocations

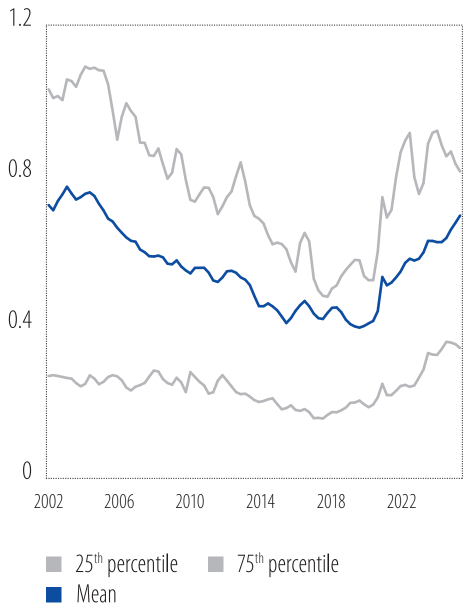
6 We use aggregate investment grants recorded in the integrated national accounts, representing transfers from the public sector to the corporate sector. Other instruments, such as guarantees or risk-sharing mechanisms, are not included in these statistics.

across the 16 EU countries considered (those for which data coverage is not too sparse). The interquartile range varies from 0.7 percentage points of GDP in the beginning of the period, in 2002, to a low of 0.3 percentage points of GDP during the COVID-19 period. As illustrated in Figure 19, there has been a notable increase in the relative share of policy support for corporate investment across Europe since 2020. Figure 21 indicates that – owing to the very large common shock faced by EU countries – coordination on policy actions rose sharply around the pandemic.

Interestingly, five years after the pandemic, policy support for corporate investment remains well above pre-pandemic levels. Except for Estonia, every country in the sample shows a clear post-2020 ramp-up in policy support allotments. That surge, and the heightened cross-country correlations concentrated around 2020, reflects the common, large recession triggered by the lockdown of most European economies and the massive fiscal response to mitigate its effects. Coordination has since loosened, but many economies have stayed on broadly similar growth paths.

Figure 19

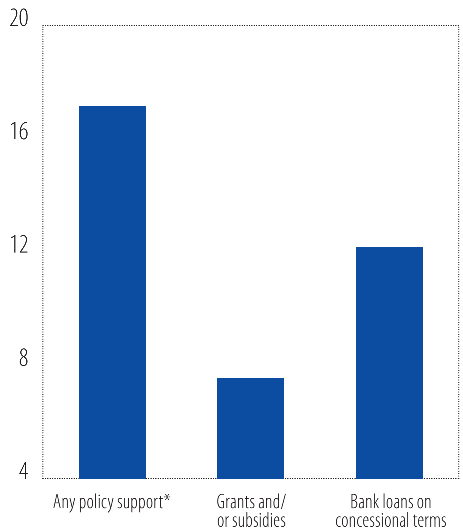
Government policy support for corporate investment (% GDP)



Source: *EIB staff calculations based on Eurostat.*

Figure 20

Share of EU firms receiving government support (% of investing firms, average 2022-2025)



Source: *EIB staff calculations based on EIBIS 2022-2025.*
Note: *The chart includes all firms that invested in the last financial year (excluding don't know/refuse). *Any policy support includes either grants/subsidies or bank finance with concessional terms. The question on bank loans on concessional terms was not asked in EIBIS 2023.*

Looking at firm-level data, 17% of EU firms report receiving policy support in the form of grants, subsidies or loans on favourable conditions. As shown in Figure 20, which consolidates EIBIS data from 2022 to 2025, an average of 17% of EU firms report receiving policy support in the form of grants, subsidies or bank loans on favourable terms. The share of firms receiving grants is 7.5%. EU firms are more likely to benefit from concessional bank loans, whether through lower interest rates or extended grace periods. Approximately 12% of EU firms report receiving such loans.

Aggregate data on government policy support show that coordination of policy support intervention across countries increases during crises. Figure 21 indicates that the pair-wise correlation of grant share in GDP (a measure of policy support intensity in each country) is much lower than the correlation of GDP growth. For most of the period analysed, grant allotment was indeed largely country-specific, with very low correlation of grant intensity across countries. Periodic increases in coordination occur mainly during recessionary episodes like the eurozone sovereign debt crisis, the COVID-19 pandemic and the energy crisis.

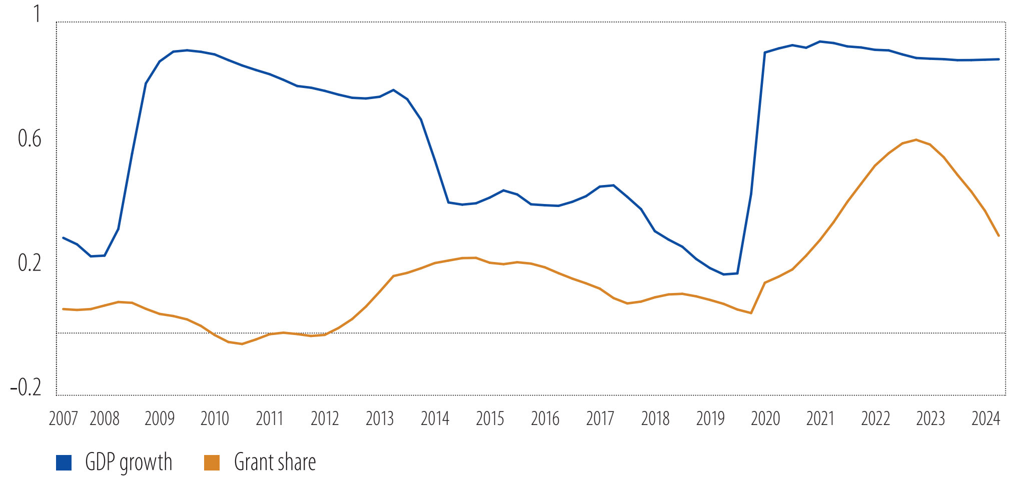
Targeting and coordination matter

Different types of policy support have different impacts. Official macro-level statistics that reflect the aggregate level of policy support available over a long period of time for individual countries do not distinguish between different types of policy support. Generic policy support mostly aimed at supporting investment is likely to have a very different impact on the real economy than transformative policy support (targeted to long-term objectives). Unfortunately, because these two types of support are aggregated in national accounts statistics, they cannot be observed separately from these data. In the following analysis, we therefore rely on econometric techniques based on the co-movements of additional aggregates, to disentangle the two types of policy support. From macroeconomic data, we distinguish general demand support policies from support policies that target higher productivity growth. In the absence of detailed country-level macro-statistics over long periods, the analysis sheds light on how the design of support influences its impact, and the specific channels through which impact materialises.

We separate generic from transformative policy support based on the long-term impact on productivity. To distinguish the two types of support, we rely on sign and impact restrictions applied to impulse responses. In the short term, both types of policy support raise fiscal expenditure (grants), business investment and output.[7] Generic support has no long-run impact on productivity, while transformative support permanently raises it. Figure 22 shows that a sharp change in transformative policy support leads to a 1% simultaneous increase in output.

Figure 21

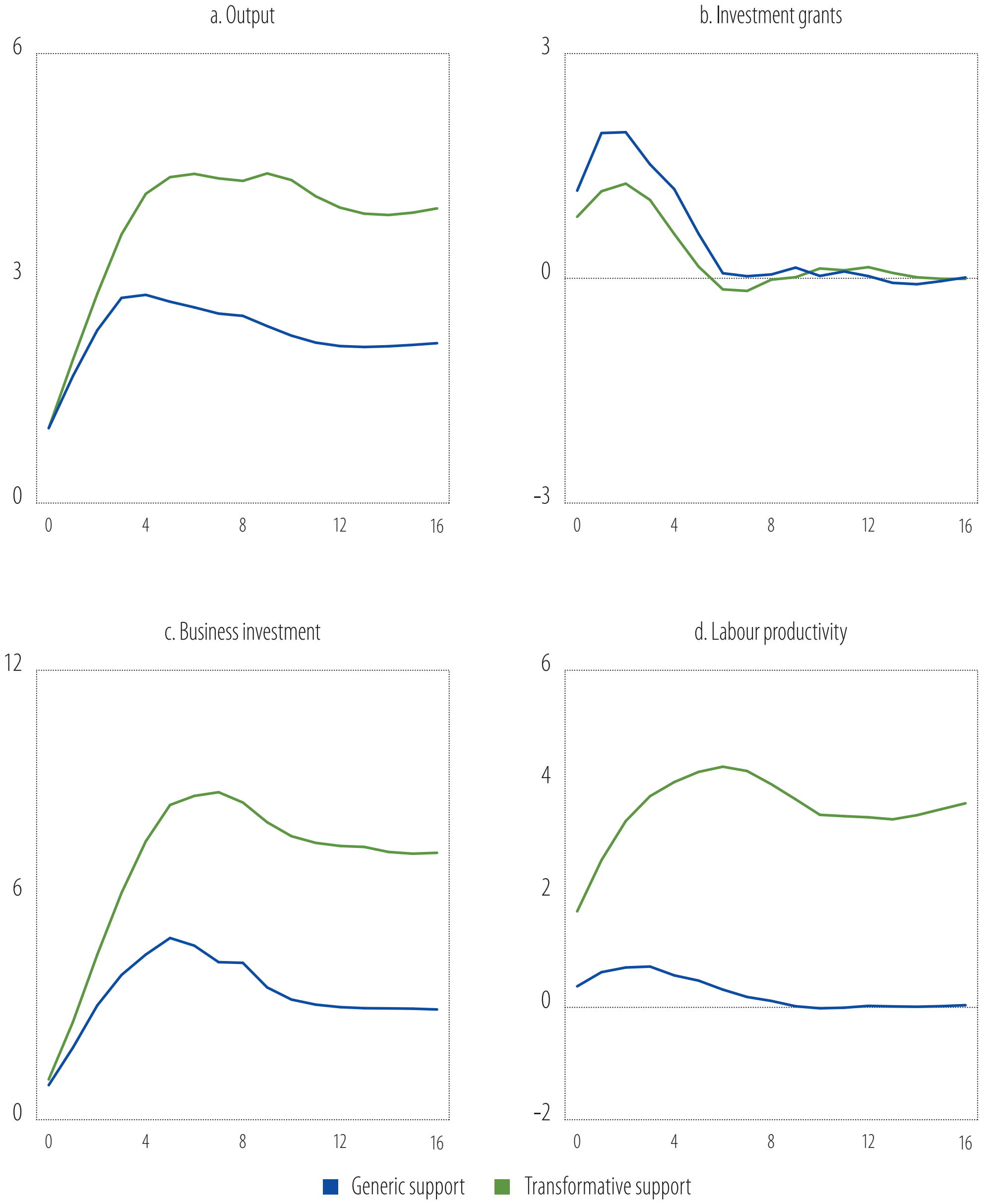
Average pair-wise correlation of aggregate policy support and GDP growth (four-year moving average, in percentage points)



Source: EIB staff calculations based on Eurostat.

7 For more technical details, see Horvath et al. (2026).

Figure 22
Median impulse responses to increases in each type of policy support (percentage point deviation from the baseline)



Source: *EIB staff calculations based on Eurostat.*
Note: *Dispersion of Bayesian vector autoregression estimated responses across 12 EU economies.*

Both types of policy support have similar effects in the short term – except on productivity. We find that spending 1% of GDP on both support measures raises real GDP by an equal amount – 1 percentage point – in the short term (Figure 22). While transformative policy support triggers a rise in productivity very quickly, in the short term, both types of policy support look like a demand shock. The difference in the impact on productivity widens over time, however. It is accompanied by an increasing difference in investment and real GDP and a positive, long-lasting effect on productivity.

Transformative policy support raises real output much more than generic policy support in the long term. As shown in Figure 22, both types of policy support raise real output permanently. However, the long-run increase in output is markedly higher (around the impact on GDP) when it results from transformative policy support. Moreover, in the long run, corporate investment responds positively to both types of policy shock, but the response is much stronger for transformative policy support. Overall, transformative support has twice the effect on real GDP in the long run, owing to the bigger reaction of investment (8 percentage points for transformative support vs. 4 percentage points for generic support) and significant, elevated impact on productivity.

Investment reactions vary for different asset types. To further investigate why growth resulting from transformative policy support is higher, we estimate a second model, replacing the single overall investment aggregate with two of its sub-components: investment in machinery and equipment, and investment in intellectual property products. This breakdown allows us to analyse the ripple effect of policy support more deeply. We first examine the properties of each series for 19 EU economies. The cross-country evidence that motivates this split are clearly seen in Figure 24. Intellectual property products grow faster on average, exhibit lower cross-country variance, and are markedly more positively correlated with productivity than machinery and equipment.

Each type of policy support propagates differently across asset types. Taken together, the evidence reported in Figure 23 makes intellectual property a natural candidate for transmitting the persistent effects of different types of policy support on innovation and productivity. On the one hand, transformative policy support aimed at raising long-term productivity primarily relies on spending on research and development, software, patents and other types of intellectual property. On the other hand, generic support that mainly boosts conventional capital formation is more likely to raise machinery and equipment spending, and to operate through demand and short- to medium-term channels. Guided by this evidence, we impose additional restrictions on each investment aggregate, conditioning the long-term response of intellectual property products to be positive for transformative policy support and the long-term response of machinery and equipment to be positive for generic policy support. The short-term responses are assumed to be identical, with both types of support raising real output when they are allotted.

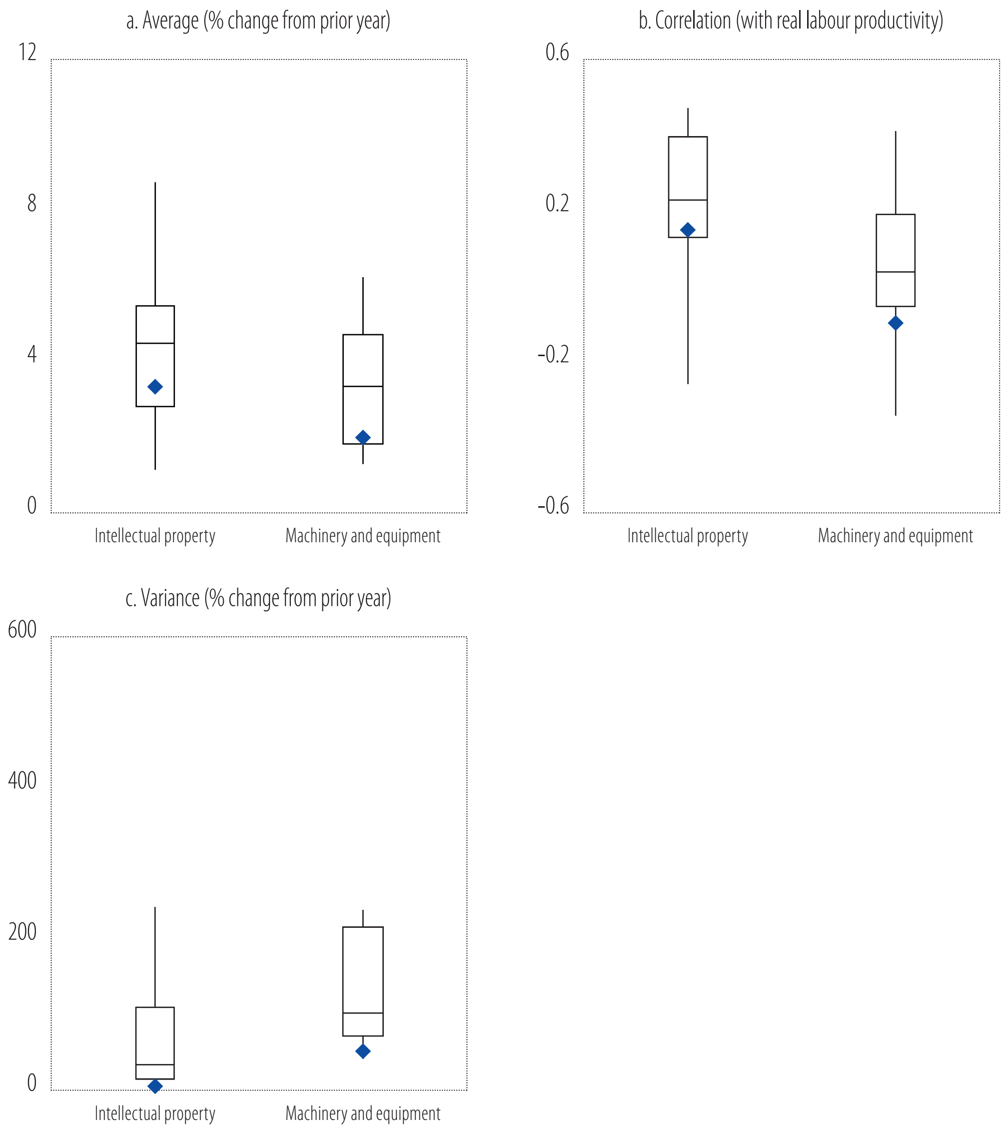
While it raises investment in machinery and equipment beyond the short term, transformative policy support mostly fosters investment in intellectual property. Figure 24 shows the results obtained from the extended model, using the breakdown of corporate investment across main asset types. Transformative policy support is more effective, especially in the long term, because it mainly encourages investments in assets associated with higher productivity and intellectual property. The impact is self-sustained and grows over time, well after the support has been deployed. Nonetheless, transformative policy support also raises investment in machinery and equipment, with a sizeable short-term impact that fades over time. Conversely, generic support policies have almost zero impact on investment in intellectual property products and are more likely to replenish the capital stock of machinery and equipment. The impact is mostly concentrated around when the policy is put in place, and does not significantly increase thereafter.

Firm-level data indicate a more intensive use of targeted policy support.[8] Unlike the aggregate data, which do not differentiate between targeted and non-targeted policy support, the EIBIS asks firms whether the support they received was targeted. The results show that a significant share of policy support is targeted, particularly when it takes the form of grants or subsidies. Figure 25 presents the share of firms receiving targeted support across three main EU regions. In EIBIS 2025, more than 60% of firms in each region reported receiving targeted support, with a modest increase from the previous year – especially in Western and Northern Europe. These figures are higher than in the United

8 Policy support in EIBIS is either in the form of (i) grants or subsidies or (ii) bank loans offered on concessional terms. Other instruments, such as guarantees or risk-sharing mechanisms, are not considered due to data limitations.

States, where only around 40% of firms reported receiving targeted support.[9] In both regions, the most common targeted areas are innovation and digitalisation, as well as green and climate-related investment. However, EU firms receive policy support that is more targeted and greener than in the United States.

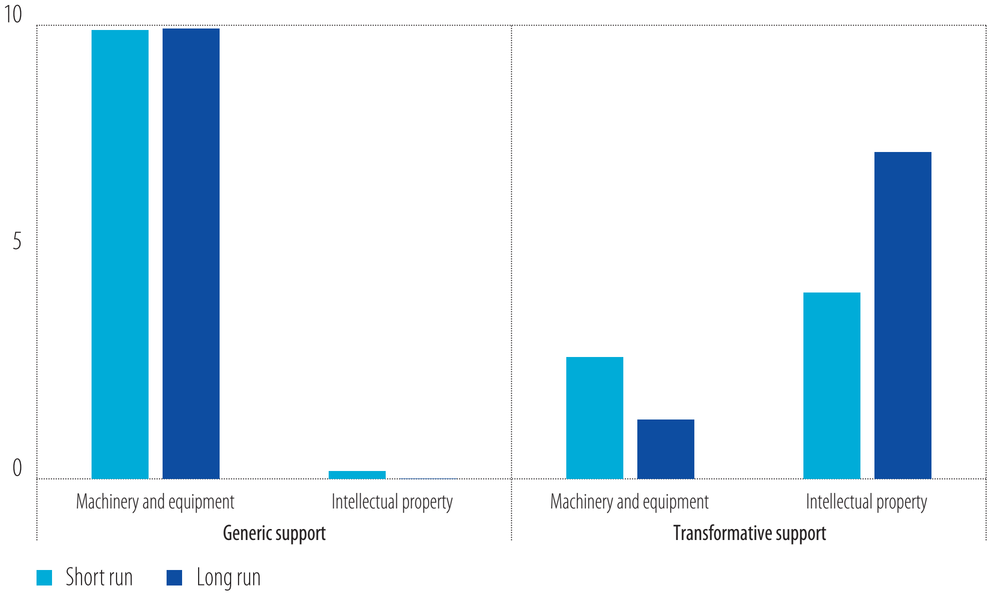
Figure 23
Investment in machinery and equipment and intellectual property



Source: *EIB staff calculations based on Eurostat.*
Note: *The box respresents the 50% confidence interval. The black vertical lines represent the 75% confidence interval. The blue diamond is the weighted average (by GDP share). The horizontal line is the median.*

9 For more details, see EIB (2025a).

Figure 24
Impact of generic and transformative policy support across investment types (percentage point deviation from the baseline)



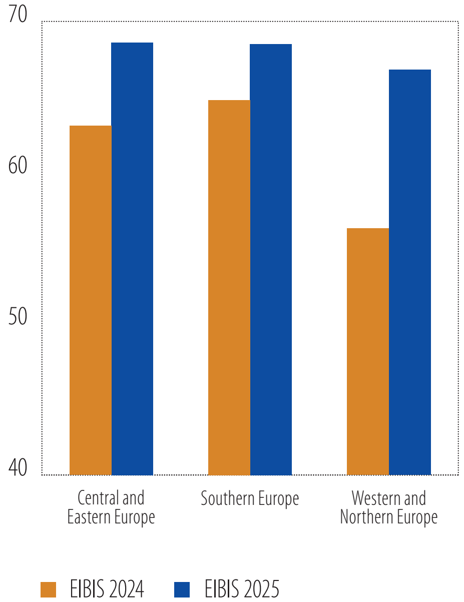
Source: *EIB staff calculations based on Eurostat.*
Note: *Median responses estimated from Bayesian vector autoregression across 12 EU economies. Short-term (long-term) is defined as less (or more) than five years after the support was given.*

Targeted innovation support pushes up intangible investment, especially in high-tech sectors. Estimates suggest that policy support – whether in the form of grants, subsidies or bank loans on concessional terms – targeted at innovation has a strong positive effect on intangible investment, particularly among high-tech firms. Using EIBIS data matched with Moody's Orbis database, we apply propensity score matching to compare firms that received policy support with similar firms that did not. The analysis shows that firms receiving support targeted for innovation and digitalisation invested 2 percentage points more in intangible assets than comparable firms in mid-tech and other sectors, like basic industries and services. Among high-tech firms, the effect was even stronger, with a 9 percentage point increase in intangible investment (see Figure 26). Interestingly, firms that received untargeted support also increased their intangible investment, but the difference was not statistically significant compared to non-recipients.

Coordinated policy support is essential to avoiding a misallocation of resources. While targeted support can address market failures and strengthen resilience – for example, by encouraging companies to move production back to their home country or region – it may also reduce economic efficiency if poorly designed. Evidence from the literature suggests that misaligned support can crowd out resources from more productive firms, ultimately lowering overall productivity (International Monetary Fund (IMF), 2025; Altomonte and Presidente, 2024; Brandão-Marques and Toprak, 2024; Hodge et al., 2024; Restuccia and Rogerson, 2008; Hsieh and Klenow, 2009). Poorly targeted and uncoordinated support risks wasting scarce public resources without delivering the intended outcomes.

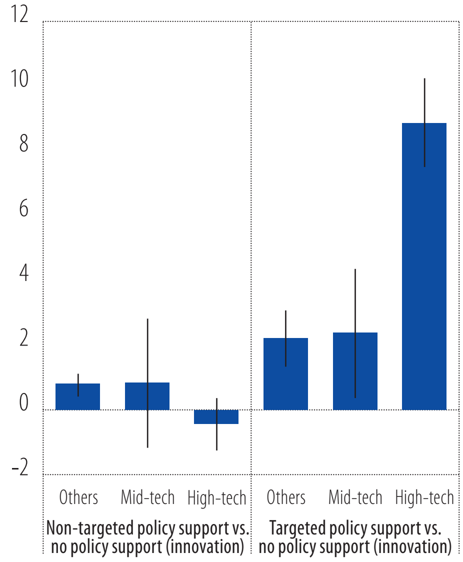
Policy support accounts for a non-negligible share of corporate investment, with wide variation between sectors and countries. EIBIS data show that a significant portion of capital investment by EU firms is financed through direct grants and subsidies. On average (unweighted), around 2.1% of total investment by non-financial firms in the European Union from 2016 to 2025 was supported by public funding. Firms in the utilities sector received the largest share, averaging nearly 7.5% of their total capital spending – more than three times the EU average (Figure 27). This was followed by firms in the information and communication technology sector, and those in basic manufacturing and raw materials, which financed approximately 3% of their investment through grants and 2.5% through subsidies. By contrast, firms in wholesale and retail trade received the lowest share of support.

Figure 25
Share of firms (in %) **receiving targeted policy support**



Source: *EIB staff calculations based on EIBIS 2024-2025.*
Note: *The chart includes all firms that invested in the last financial year and received policy support (excluding don't know/refuse to answer). Policy support includes either grants/subsidies or bank finance on concessional terms.*

Figure 26
Impact of targeted vs. non-targeted policy support on intangible investment (change in intangible investment divided by total assets, in percentage points)



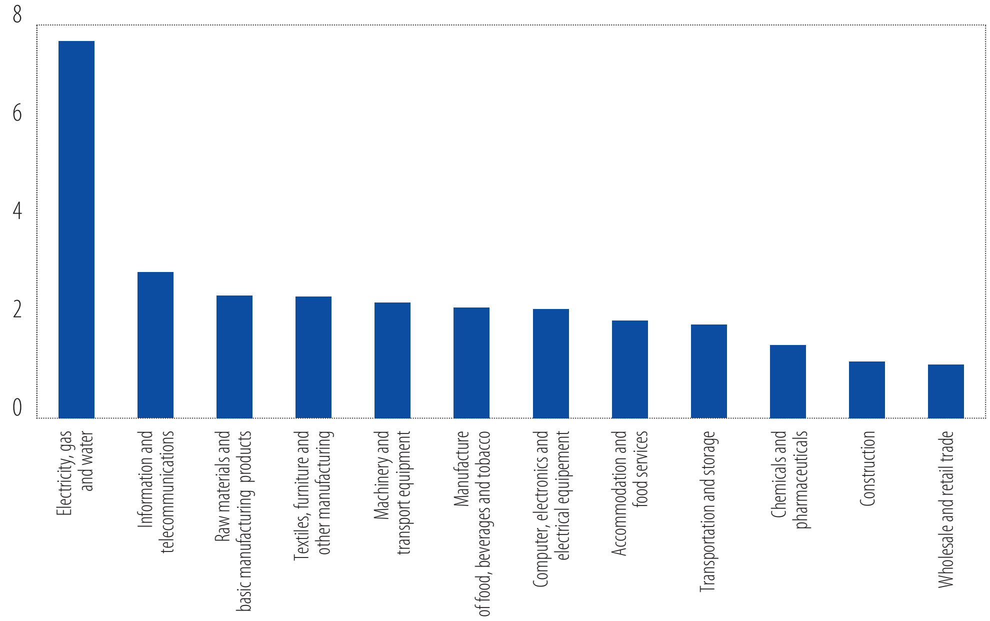
Source: *EIB staff calculations based on EIBIS data matched with the Orbis database for 2022-2025.*
Note: *EU sample only. A matched sample was constructed for the treated (policy support recipients) and control groups (non-recipients) using propensity score matching with three-nearest neighbours. Policy support includes grants/subsidies and bank loans on concessional terms. The black lines represent 90% confidence intervals. Tech classification follows Fuest et al. (2024): high-tech (aerospace, alternative energy, biotech, software, etc.), mid-tech (automobiles, chemicals, telecoms, etc.) and others (construction, media, other services, utilities, etc.).*

Beyond sectoral differences, there is also considerable variation among EU countries, even within the same sectors. We follow Altomonte and Presidente (2024) to estimate the distortion introduced by grant allotment. The authors base their framework on Hsieh and Klenow (2009), where differences in marginal productivity of capital across sectors reflect distortions from the competitive equilibrium where marginal productivity in the same sector is equal. The estimates assume a constant interest rate of 5% and an elasticity of substitution of 3 across products in a country-sector pair. Sector-level wages and investment subsidy data are taken from EIBIS 2016-2024.[10] The regressions based on EIBIS data reveal that the chemical and pharmaceutical sector shows the highest level of cross-country variance in grant allocation, followed by computers, electronics and electrical equipment. The construction sector exhibits the least variation across EU members.

10 Capital elasticity is calculated as the average across EIBIS sectors – manufacturing (NACE C), services (NACE G/I), construction (NACE F), and other (NACE D/E/H/J) – using a Cobb-Douglas production function with EU KLEMS data. EU KLEMS is an industry level, growth and productivity research project. It stands for EU level analysis of capital (K), labour (L), energy (E), materials (M) and service (S) inputs.

Figure 27

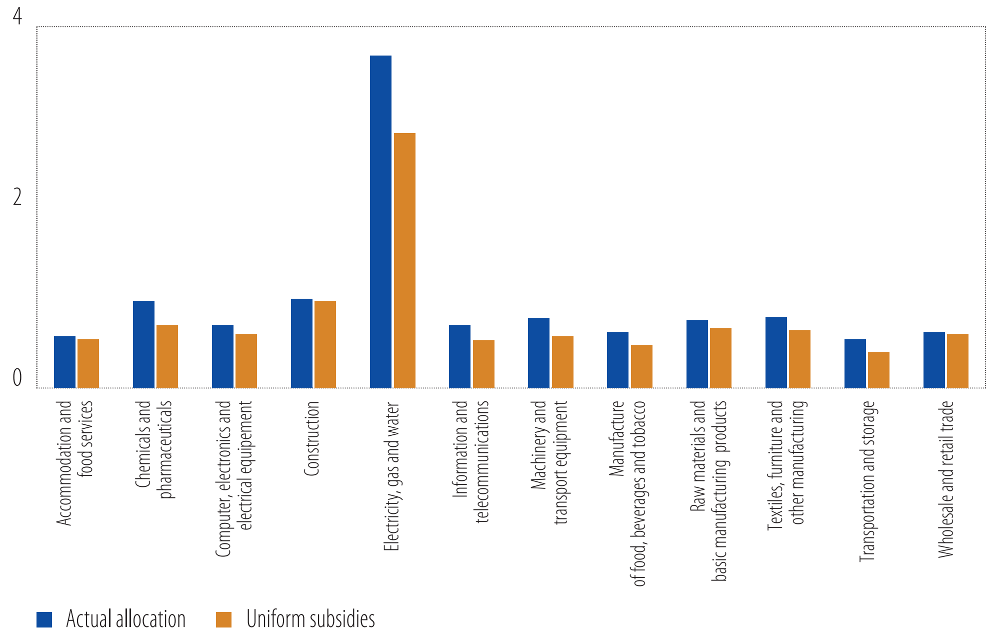
Share of investment financed by grants and subsidies (% of total investment, average 2016-2025)**, by sector**



Source: *EIB staff calculations based on EIBIS 2016-2025.*
Note: *The chart includes all EU firms that invested in the last financial year (excluding don't know/refuse). No weighting is applied. The question on the amount received by grants/subsidies was not asked in the EIBIS 2024.*

Figure 28

Total factor productivity decline (in %) **resulting from uncoordinated subsidies**



Source: *EIB staff calculations based on EIBIS 2016-2024, the EU KLEMS research project and Altomonte and Presidente (2024).*
Note: *Following Altomonte and Presidente (2024), and based on the framework by Hsieh and Klenow (2009).*

Better coordinating policy support could deliver substantial productivity gains, especially in the utilities and chemicals and pharmaceuticals sectors. Figure 28 shows the estimated productivity loss arising from different cost and subsidy structures relative to a baseline scenario of an ideal single market with no differences in marginal costs or subsidies. The orange bar illustrates the loss caused by varying costs but uniform subsidy rates across EU countries within the sector, while the blue bar represents the loss under actual allocation, where both costs and subsidies differ. The findings indicate that in the utilities sector, misallocation accounts for up to 3% of productivity loss compared to the ideal scenario – three times higher than for most other sectors, which average around 1%. This is unsurprising given that utilities receive the highest share of grants and subsidies in the European Union (Figure 27). Moreover, while most sectors show minor differences between actual and uniform subsidy scenarios, subsidy dispersion explains nearly one-third of the loss in utilities and in chemicals and pharmaceuticals. These findings highlight that productivity could be significantly improved if policy support was more coordinated, which in turn strengthens the case for EU resources and the role of the European Investment Bank (EIB) in promoting harmonised policy instruments across EU members.

A supportive business environment magnifies the impact of policy support

The country results differ widely, with large differences in the ways firm respond to changes in policies. To investigate the source of these variations, we turn to the EIBIS and use questions on long-term investment barriers regarding access to finance, business regulation and uncertainty. We then split the sample depending on whether investment barriers faced by the country were above or below average. In countries where investment barriers are higher, investment response tends to be lower, with the reverse also being the case.

An effective business environment enhances the impact of policy support. Policy support enhances productivity most effectively in environments with less uncertainty, easier access to finance and where firms report less frequently that regulation is an investment barrier. The same, although less pronounced, difference also appears for generic policies to support investment. When investigating how different countries respond to transformative policies, we also find that countries with lower reported investment barriers not only tend to have higher levels of investment, but also reap higher productivity gains from well-targeted policy support in the long run.

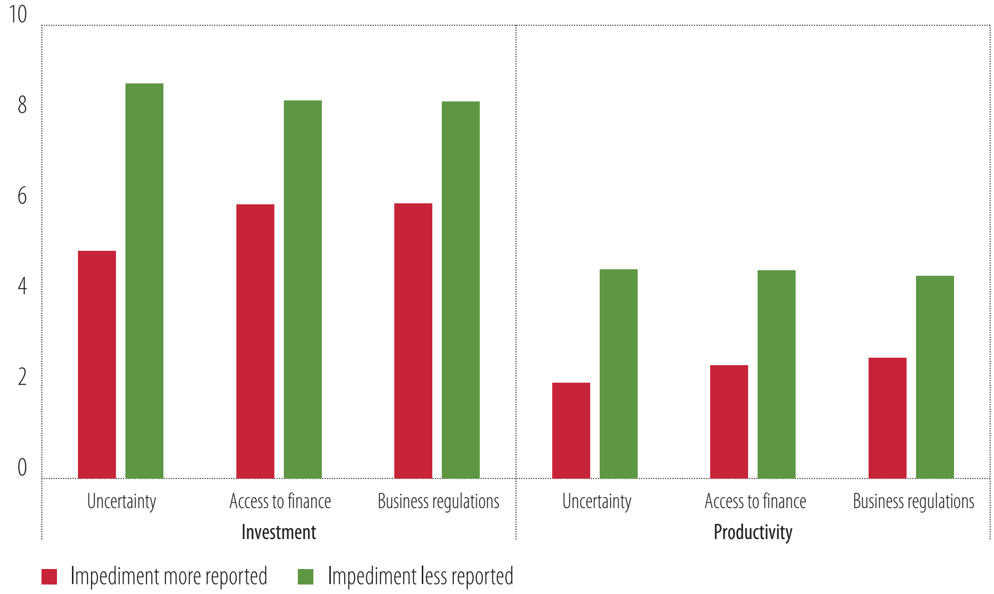
Survey results confirm that the impact of policy support varies according to how firms perceive their environment. We use EIBIS questions on long-term barriers to investment to focus on the role of uncertainty and business regulation. We again split the sample by whether countries report investment barriers that are above or below average. In an environment with less uncertainty, with easier access to finance and in which business regulation is less reported as an obstacle to investment, the impact of transformative policy support is amplified by 35% to 60% – and the effect on productivity is even higher. The same effect also appears for the impact of generic policy support for investment, but less so.

Investment barriers weaken policy effectiveness, limiting short-term and long-term gains. Figure 29 reports the long-term impact of productivity-enhancing policies (defined as the accumulated impact 20 quarters after allocation), aggregated across EIBIS factors. The findings indicate that higher investment barriers do, in fact, lead to a lower investment response, even for transformative policy support. These lower investments also lead to markedly lower productivity gains in the long run. Countries in the low-barrier group show productivity improvements almost twice as large. Long-term barriers to investment spill over to the short run (albeit to a lesser extent), as generic policy support appears less effective at raising investment when uncertainty is high and access to finance low.

Combining policy support with measures that reduce uncertainty – such as simpler regulation, better contract enforcement and improved access to finance (through risk-sharing instruments or other methods) – will likely increase the payoff of targeted policy support programmes in the long term. Rising uncertainty reduces investment by similar magnitudes in the short and long run, but the macroeconomic cost is larger for generic policy support. The short-term investment gains associated with generic policies rarely translate into productivity improvements, whereas investments garnered from transformative policy support generate substantially larger productivity gains.

Figure 29

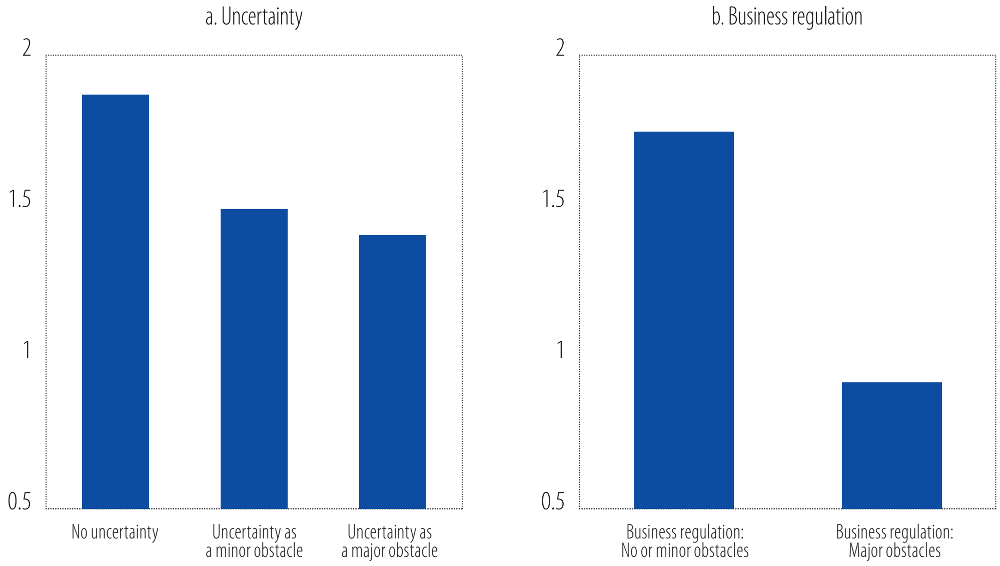
Estimated responses of business investment and labour productivity to transformative policy support (percentage point deviation from the baseline)



Source: *EIB staff calculations based on Eurostat and the EIBIS 2016-2025.*
Note: *Dispersion of Bayesian vector autoregression estimated responses (five years) across 12 EU economies. Countries are allocated to either group (obstacle more or less reported) based on how many firms reported the obstacle as a major one compared to the EU median.*

Firms operating in better environments benefit more from policy support. Further analysis using matched data on firms surveyed by EIBIS and Orbis confirms the importance of a supportive business environment for effective policy support. Comparing firms that received support with similar firms that do not, we find that firms that operate in favourable conditions, with low uncertainty and effective regulation, benefit most. Figure 30 shows the effect of policy support on intangible investment across different levels and types of investment barriers. On average, firms receiving public support invest 1.9 percentage points more in intangible assets relative to total assets than non-recipient firms – if they face no uncertainty. When uncertainty is present, even as a minor obstacle, the impact falls by nearly one-quarter, to 1.5 percentage points. Firms facing major uncertainty show a similar reduction. When taking business regulation into account, the impact of policy support is reduced by two-thirds. Firms facing no, or minor, regulatory obstacles invest 1.75 percentage points more in intangible assets, compared with just 0.9 percentage points for those facing major regulatory barriers. The IMF (2025) also highlights the importance of public policies that improve the overall business environment and institutional capacity in successfully implementing industrial strategies.

Figure 30
Impact of policy support on intangible investment (in percentage points)



Source: *EIB staff calculations based on matched EIBIS-Orbis data for 2022-2025.*
Note: *EU sample only. A matched sample was constructed for the treated (policy support recipients) and control groups (non-recipients) using propensity score matching with three-nearest neighbours. Policy support includes grants/subsidies and bank loans on concessional terms.*

The untapped potential of the EU single market

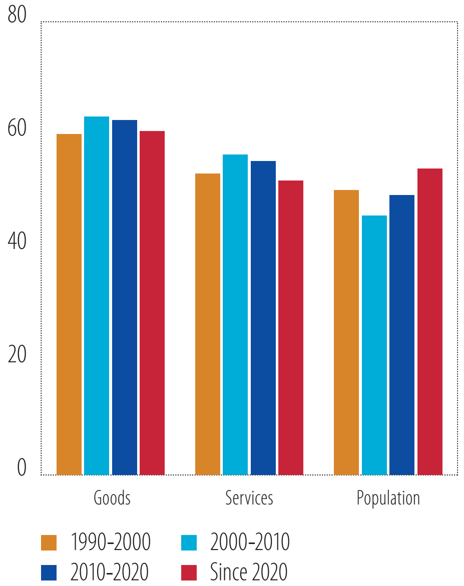
Improving business opportunities is the best way to unleash the substantial investment Europe needs, and many of those opportunities lie in tapping the latent potential of the single market. While EU market integration has delivered substantial benefits in the past, progress has slowed since the global financial crisis.

This section looks at the history of the single market and its current state. It illustrates the benefits of reducing single market barriers: an increase in demand and business opportunities, resilience to geopolitical risks and economic security. The section also examines the cost of regulatory burden and how it weighs on investment across sectors, comparing firms operating outside and within the European Union as well as domestic markets. Overall, it shows that substantial benefits of the single market remain untapped.

The history of the single market

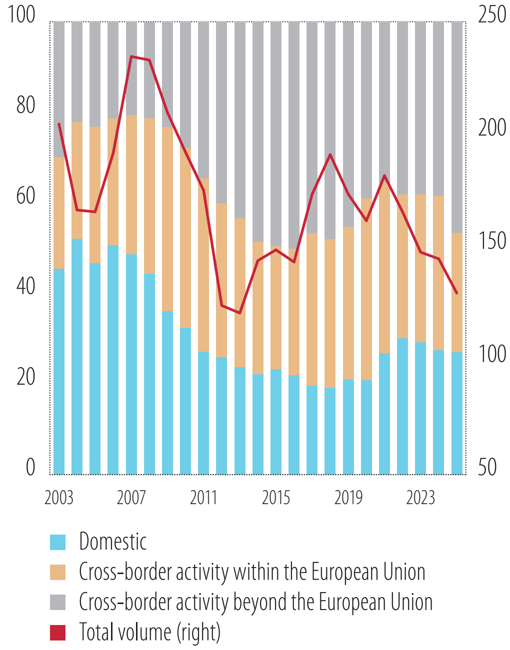
EU integration advanced quickly at first, but has stalled since the global financial crisis. As integration is multifaceted, we present several indicators for single market integration. Figure 31 and Figure 32 give a bird's-eye view of EU single market integration over time, showing the evolution of key components: intra-EU trade in goods, external trade in services, intra-EU migration, and cross-border mergers and acquisitions to illustrate the evolution of cross-border capital flows. (The period chosen reflects data availability.) It becomes apparent that, following a rapid surge, three of the four dimensions of integration have stalled in recent years, even though migration has increased significantly.

Figure 31
Integration indicators (share of intra-EU trade and migration, in %)



Source: *EIB staff calculations based on United Nations Comtrade and OECD data; UN Department of Economic and Social Affairs; IMF Direct Investment Positions by Counterpart Economy dataset.*
Note: *The share of all migrating EU residents who migrate to another EU country.*

Figure 32
Mergers and acquisitions (left axis: % of total value; right axis: $ billion)



Source: *EIB staff calculation based on Bloomberg.*
Note: *The data are reported as a five-year moving average. The latest data available were for September 2025.*

The charts above give a broad overview, but they are not without limitations, as the indicators are affected by internal dynamics. For instance, the share of intra-EU trade tends to decrease when economic activity in Europe grows at a rate below that in the rest of the world. To address the endogeneity issue, the literature proposes several methodologies to clean the indicators and produce a true structural measure of integration. For example, Fontagné and Yotov (2025) propose and construct novel measures of the effectiveness and potential of the single market, combining estimation with granular data and simulation with a New Quantitative Trade Model. Here, in line with the empirical literature, we estimate two gravity model-based indicators, for goods and services separately.[11]

11 Data for bilateral trade flows in goods come from UN Comtrade, data for services from the Organisation for Economic Co-operation and Development (OECD). Coefficients estimated with a standard gravity model of trade in a Poisson pseudo-Maximum Likelihood regression. In the regression, trade flows are regressed on dummies that decompose trade flows within the European Union, between the European Union and the rest of the world, and flows between other countries in the rest of the world. The regression includes controls for trade treaties like membership in the General Agreement on Tariffs and Trade, the World Trade Organization, and the Free Trade Agreement, as well as dummies for the European Economic Area, EU-Switzerland, EU-Türkiye, dyadic country fixed effects, and importer and exporter time varying fixed effects, as indicated in the literature. The share is the share of bilateral trade flow between two countries as a percentage of the total exports of the exporting country (for example, the bilateral export of France to Italy in year t over France's total exports in year t). The level of the coefficients is meaningless, but the slope can be compared. Note that since UN Comtrade also counts re-exports of goods in intra-EU trade, its use may lead to an overestimation of the level of integration. See Cerdeiro and Rotunno (2026) for more details.

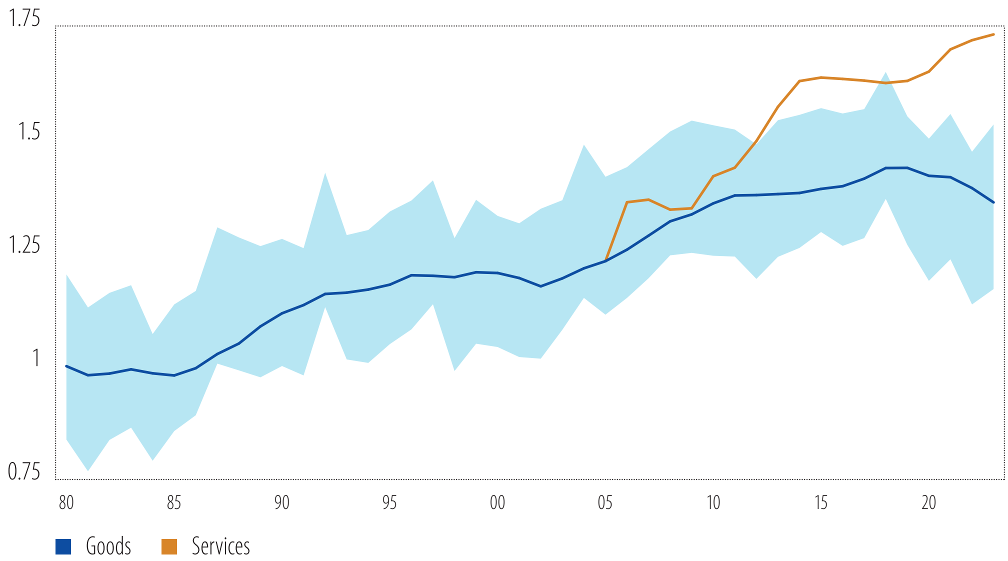
Benefits of enhanced real integration

EU integration has steadily increased since 1980. Figure 33 depicts a steady rise in integration: for goods, from about 0.4 to about 0.8 between the early 1980s and very recently. Services integration growth, plotted since 2005, has been even stronger – likely a result of the lower initial level, and thus higher potential, but also to major regulatory changes like the Services (Bolkestein) Directive implemented as of 2009,[12] or the Digital Services Act and Digital Markets Act of 2022.

Deeper integration offers substantial rewards. Better integration of the goods market accounted for one-seventh of the increase in real GDP since 1980, and a quarter of the increase in investment. Deeper integration boosts business investment and labour productivity, as shown in Figure 34. The change in the indicator for goods is used in local linear projections for GDP, business investment and labour productivity. The local linear projections are obtained by using the change in the integration coefficient for the goods market as a shock variable that affects EU policy variables in cumulative growth rates. The dependent variable is transformed into logs, which provides a better interpretation of the coefficient on the local linear projections.[13] Between 1980 and 2023, the integration indicator rose from 1 to 1.36. Based on estimated long-term response (0.6 for investment and 0.4 for real GDP, per 0.01-unit increase in the indicator), we can calculate the contribution of integration over the period. Our estimates suggest that stronger integration resulted in approximately 14% higher real GDP, and around 22% more corporate investment. Over the same period, real GDP rose by 108% and business investment by 95%. Thus, deeper EU integration since 1980 is estimated to have contributed about one-seventh of the expansion of real GDP, and one-quarter of the expansion of real investment.[14]

Figure 33

Estimated EU integration indicators for goods and services (index)



Source: *EIB staff calculations based on bilateral trade flows in goods from UN Comtrade.*
Note: *Five-year moving average. The blue zone represents the 95% confidence interval. Estimates following the methodology of Head and Mayer (2021).*

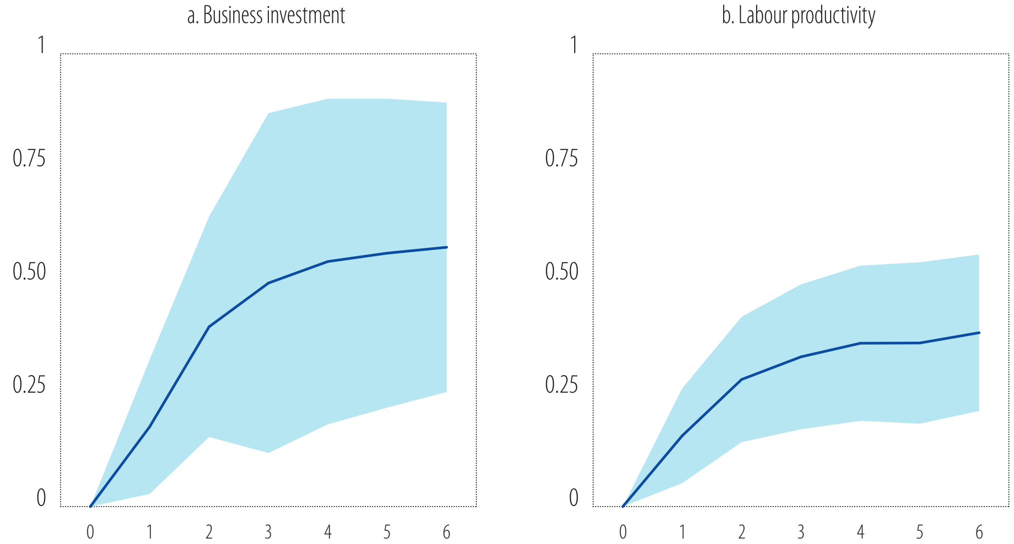
12 The Services in the Internal Market Directive 2006/123/EC aims to create a single market for services within the European Union, removing barriers that hinder businesses (especially small and medium-sized enterprises) from offering services across borders.

13 The projection model incorporates a linear time trend and the first lag of both the dependent variable and the integration indicator. To remove the level shifts due to EU enlargements over the period, the explained variable is a synthetic level, obtained by cumulating annual growth rates for EU countries, weighted by the size of individual EU members.

14 The estimate is based on euro area aggregates as back cast in the AWM database (European Central Bank (ECB), 2025; Méjean and Rousseaux, 2024).

Figure 34

Response to change in the integration coefficient for goods trade (percentage-point deviation from the baseline)



Source: *EIB staff calculations based on Penn World Tables, the European Commission's annual macro-economic (AMECO) database and IMF data.*

Note: *The blue zone represents the 95% confidence interval. Estimated response per 0.01 increase in the goods integration indicator depicted in Figure 33.*

The EU single market can help countries and businesses better weather global trade shocks. Overall, since the 1990s, intra-EU imports have evolved similarly to extra-EU imports (the two leftmost blocks of bars in Figure 31) (Harasztosi et al., 2026). However, recent crises have brought to light EU dependencies on specific products, such as natural gas or critical raw materials. The EU single market could be leveraged to reduce such dependencies. Fontagné and Yotov (2024) show that the cost associated ensuring that Europe's economy operates with a level of independence from foreign suppliers can be offset by deeper, comparatively more modest, integration efforts within the EU single market. Bernasconi et al. (2025) show that a modest 2% reduction in goods and services barriers within the single market could, in the long run, fully offset the projected GDP impact of higher US tariffs and push up intra-EU trade by about 3%.

Dependencies have been defined for about 9% of the products the European Union imports. In Figure 35, we implement the European Commission definition of dependencies (European Commission, 2021). To be understood to cause a dependency, a specific product must meet three criteria:[15] (1) high dependence on extra-EU suppliers, proxied by the share of extra-EU imports in total EU imports; (2) high concentration of extra-EU imports; (3) low potential for diverting trade, evaluated by comparing extra-EU imports to EU exports. As indicated in Figure 35, out of 5 381 products, 378 are classified as strategic dependencies. These products account for 8.6% of goods imported from beyond the European Union.

15 This methodology uses a bottom-up quantitative mapping of external trade flows to identify products within the most sensitive ecosystems where the European Union is highly dependent on imports from third countries. For more details, see European Commission (2021): (1) More than half of EU import demand is met by non-EU suppliers; (2) the Herfindahl-Hirschman Index of extra-EU imports exceeds 0.4; and (3) extra-EU imports exceed total EU exports. In our estimations, we use CEPII-BACI trade data from 2015 until 2019, averaging over five years.

Products for which the European Union has dependencies can be further divided in three groups, depending on the relevance and strength of the supply chain within the European Union. We follow Méjean and Rousseaux (2024), matching several production and trade databases to analyse EU dependencies (European Commission, 2021[16]).[17] The results are reported in Figure 35. We focus on the 378 products for which the EU has dependencies: 60% (228) are goods for which half of the EU demand is imported from suppliers outside the European Union, while 40% are goods for which the European Union can still supply at least 50% of its needs within the single market. In the group of imports from within the European Union, half of the goods use inputs that are subject to dependencies.[18] Given the above, we can divide goods with EU dependencies into three groups: (1) those without intra-EU supply chains; (2) those with sufficient intra-EU supply chains but with vulnerable inputs; (3) those with sufficient intra-EU supply chains and without vulnerable inputs.

Since the pandemic and repeated shocks to supply chains, trade within the European Union and the single market have provided resilience for products with established intra-EU supply chains, even when those supply chains depend on vulnerable inputs. We focus on the relative evolution in intra-EU vs. extra-EU imports of products for which the European Union has dependencies. For each type of product with dependencies, we estimate simple import equations to control for several factors (such as demand and price). We then isolate the remaining component resulting from a structural shift. Intra-EU imports increased rapidly for products that the European Union could produce in sufficient quantities and for which there were no input dependencies. They also increased (less dramatically) for products for which the European Union already had a sizeable supply chain, even one dependent on vulnerable inputs. Where there was no sizeable intra-EU supply chain to start with, the single market failed to provide an alternative. Imports from within the European Union could not offset extra-EU ones. These results are depicted in Figure 36.

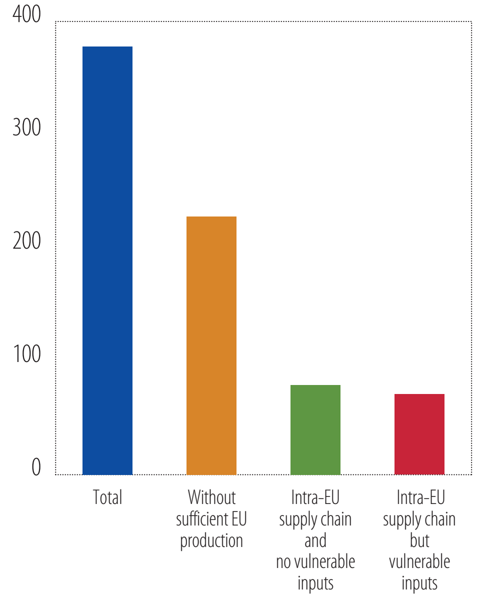
Better integration lets the European Union respond more effectively, helping it remain competitive and withstand external shocks. Beyond the growth opportunities offered by deeper integration, the EU single market can also help reduce dependencies on foreign suppliers. Intra-EU trade in strategically dependent products has proven more resilient than extra-EU trade, especially when domestic suppliers can produce sufficient supplies, highlighting the single market's role in reducing external dependencies and strengthening supply chains. Moreover, as shown in Box B, cross-border ownership can address financial bottlenecks and lead to knowledge transfer, preparing the ground for more investment, especially in digitalisation and innovation. Empirical analysis shows that foreign-owned firms are more productive, and more innovative. For EU firms with owners from outside their home country, these positive effects are similar, and independent of whether the owner comes from within the European Union or beyond it.

16 This methodology uses a bottom-up quantitative mapping of external trade flows to identify products in the most sensitive ecosystems, where the European Union is highly dependent on imports from third countries. For details, see European Commission (2021).

17 We use the BACI database from CEPII, as well as the Comext and Prodcom databases from Eurostat. For technical details, see Harasztosi et al. (2026).

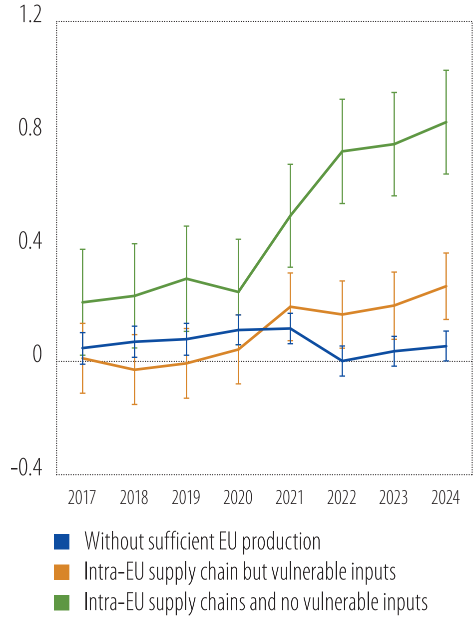
18 We use the AIPNET database developed by Fetzer et al. (2024) to isolate goods that rely on inputs of vulnerable products from those with dependencies but well-developed production.

Figure 35
Estimated number of dependencies and substitution options (number of products)



Source: *EIB staff calculations based on the CEPII BACI, European Commission Prodcom and the AI-generated Production Network databases. The initial pool covered by the BACI database contains 5 381 products.*

Figure 36
Changes in the evolution of imports from within and beyond the European Union for dependent and non-dependent products
(estimated coefficient, in percentage points)



Source: *EIB staff calculations based on Comext.*
Note: *Estimated coefficients and 90% confidence intervals are represented as vertical bars.*

Box B
The EU single market and the impact of firm ownership

This box examines the characteristics and relative performance of foreign-owned firms (from within or beyond the European Union) vs. domestically owned firms. It highlights how cross-border ownership can help overcome financial constraints and increase knowledge transfer, laying the foundation for more investment – particularly in digitalisation and innovation.

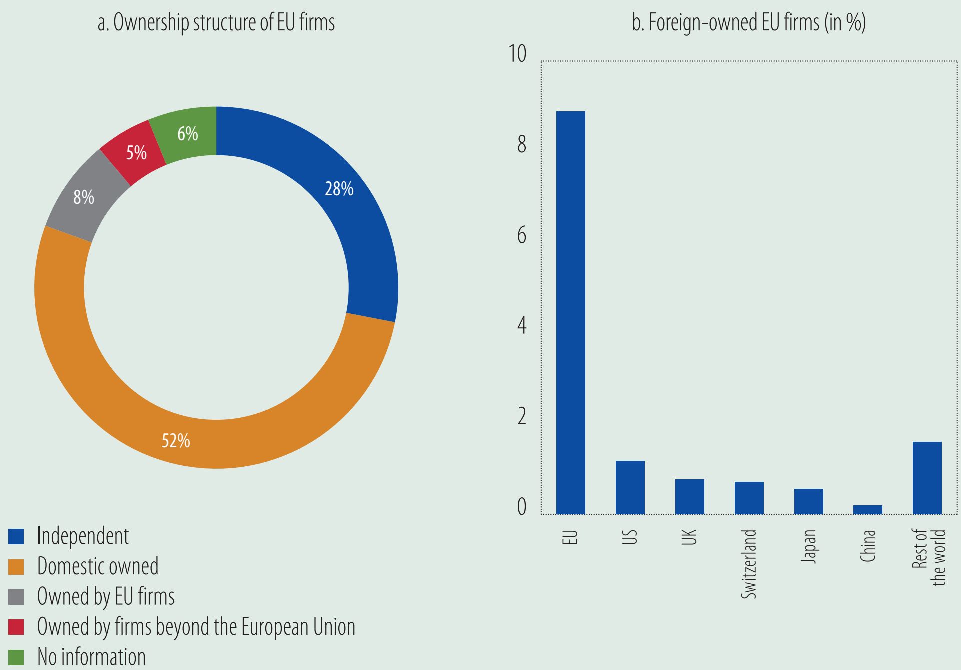
Drawing on three waves of the EIBIS survey (covering some 26 000 firms) combined with Orbis ownership data, we identify the ownership structure of about 94% of survey participants. As shown in Figure B.1, panel a, around 30% of firms are independent and owned by natural persons (foreign or domestic), while the rest are owned in majority by another corporation: roughly 56% by domestic companies, and about 14% by foreign entities.

Foreign-owned companies are predominantly owned by firms in other EU countries (Figure B.1, panel b): We identify 2 115 firms with EU-based owners, and about 1 600 firms owned by entities beyond the European Union. Of the firms owned by entities beyond the European Union, 278 are owned by US firms, 182 by UK firms, 133 by Japanese firms and 46 by Chinese companies.

Estimates suggest that foreign-owned firms are significantly more productive (Figure B.2, panel a). Compared to domestic firms (whether independent or controlled subsidiaries), foreign-owned subsidiaries are about 35% to 40% more productive, for labour and total factor productivity. This finding is in line with economic literature – see, for example, Helpman et al. (2004), Javorcik (2004) or Fons-Rosen et al. (2021). Moreover, estimates suggest a similar premium for foreign owners coming from inside or beyond the European Union.

Foreign-owned firms are more likely to innovate and to use digital technologies, a finding consistent with that of Guadalupe et al. (2012). When it comes to innovation, surveyed firms owned by companies beyond the European Union were more likely to report that their innovation was new – to the relevant country, and especially to the world. There was a 3 percentage point probability increase in innovation being new to the world, almost double the baseline probability. EU firms that are owned by companies outside the European Union are about 8 percentage points more likely to report making use of digital technologies, including big data and AI technologies (Figure B.2, panels b and c).

Figure B.1
Ownership structure and location of foreign-owned EU firms

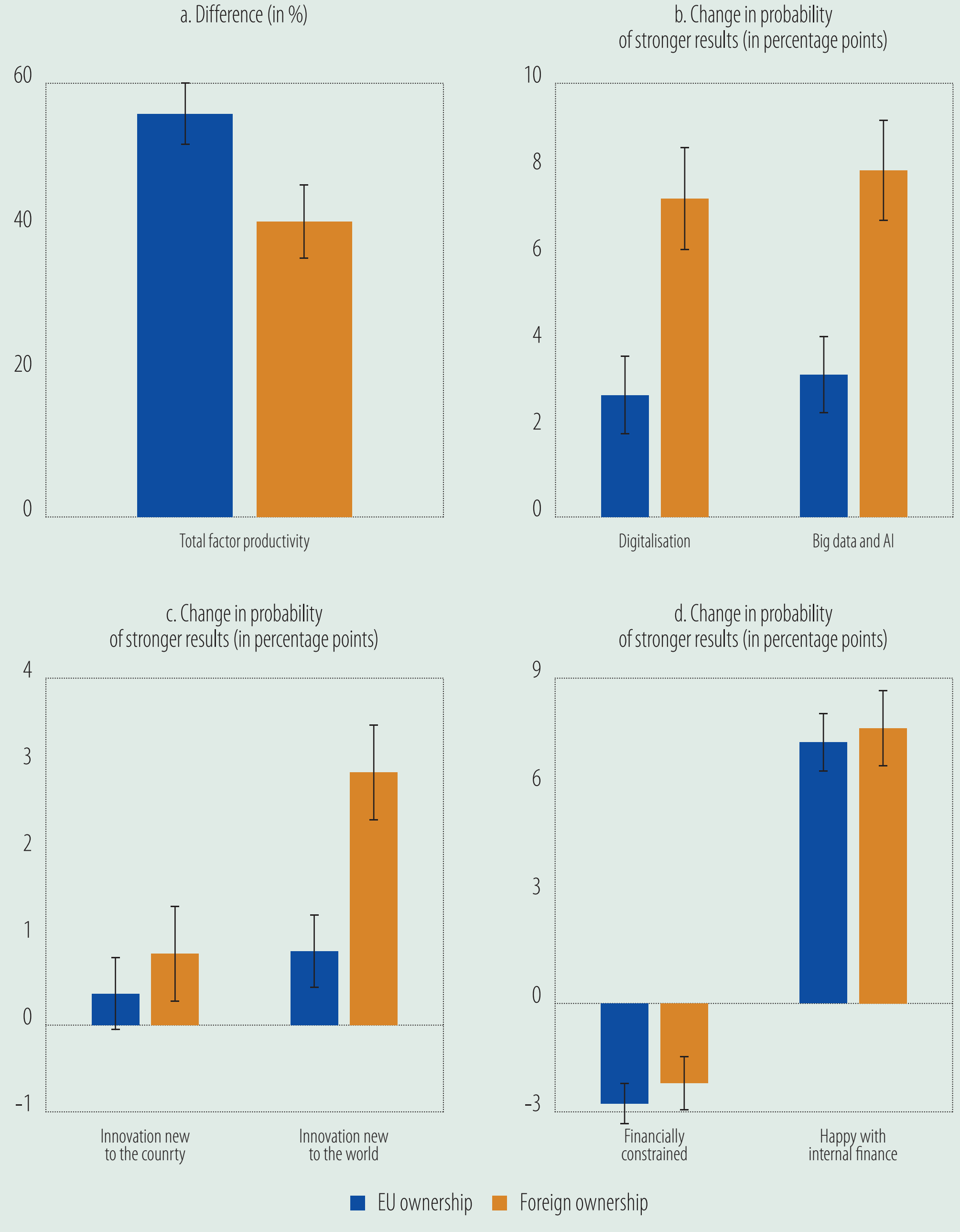


Source: EIB staff calculations based on EIBIS 2023-2025.

Easier access to finance may help explain these positive outcomes. Estimates show that, regardless of where the owner is from, foreign-owned firms face fewer financial constraints (Figure B.2, panel d). In EIBIS 2025, they are about 2 percentage points less likely to be financially constrained – one-third less than the EU average (around 6%). In line with this result, foreign-owned firms are also estimated to be 7.5 percentage points more likely to happily rely on internal financing than the EU average, which was 35% for EIBIS 2025. These findings suggest that foreign-owned firms have an easier time obtaining funding from investors abroad, often at lower cost, or benefit more from their parent company.

When distinguishing between ownership within and beyond the European Union, some interesting differences emerge. The impact on firm innovation and adoption of digital technologies and AI is more pronounced with extra-EU ownership, while intra-EU foreign ownership has a slightly bigger impact on productivity. Ultimately, both types of foreign ownership benefit EU firms.

Figure B.2
Characteristics of foreign-owned firms



Source: *EIB staff calculations based on EIBIS and Orbis data for 2016-2025.*
Note: *Estimated coefficients compare foreign-owned firms to domestic firms (domestically owned or independent) and control for survey wave, country, sector and firm size. Panel a results are obtained by applying the formula 100*(exp(b)-1) to the coefficient from log-level regressions.*

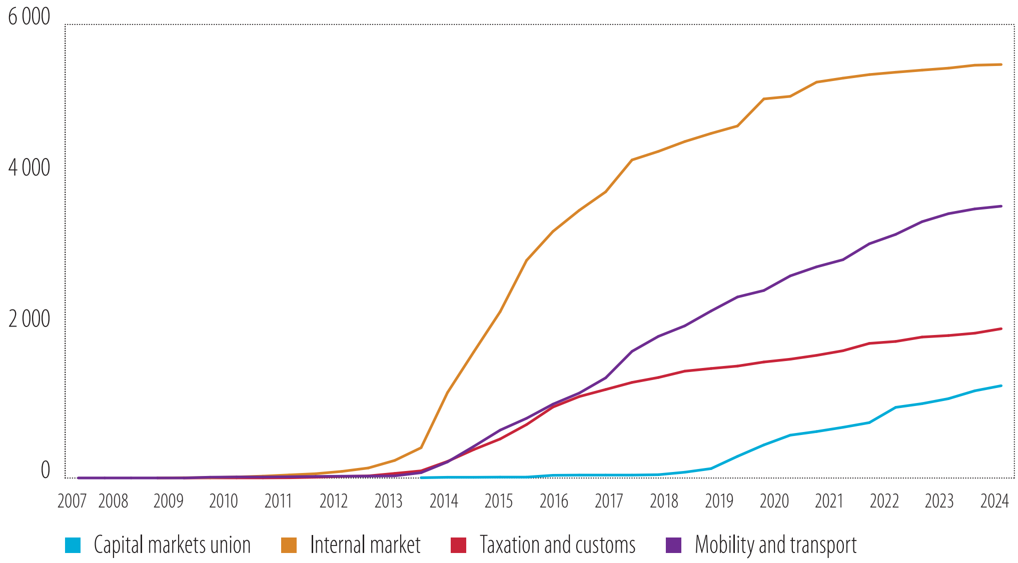
The cost of regulatory barriers and fragmentation in the EU single market

Regulatory fragmentation and competition remain key challenges in the European Union. We use a dataset on infringement cases compiled by the European Commission (data taken in July 2025). For each infringement case opened, the dataset records the opening date when the formal notice was sent to the country, as well as the closing date and the policy area the case covers. From this, we compile the average case duration at different points in time. Internal market and competition account for the largest share of EU infringement cases, with a recent increase in cases about the capital markets union (Figure 37).

The average duration of active infringement cases, which reflect persistent fragmentation, has tripled over the past two decades, rising from around one year to three years (Figure 38). Internal market and competition issues account for the largest share of EU infringement cases. The length of the infringement cases varies substantially across policy area, from a low of about a year for climate action, to a high of six years for budget issues. But, as shown in Figure 38, the increase in the time taken to resolve infringement cases spans all policy areas. That uncertainty is likely to delay firms' decisions. As the infringement process lengthens, so does the wait-and-see period. This prolonged uncertainty delays investment decisions and adds uncertainty to the business environment.

Figure 37

EU infringement cases (cumulative number)**, by policy area**



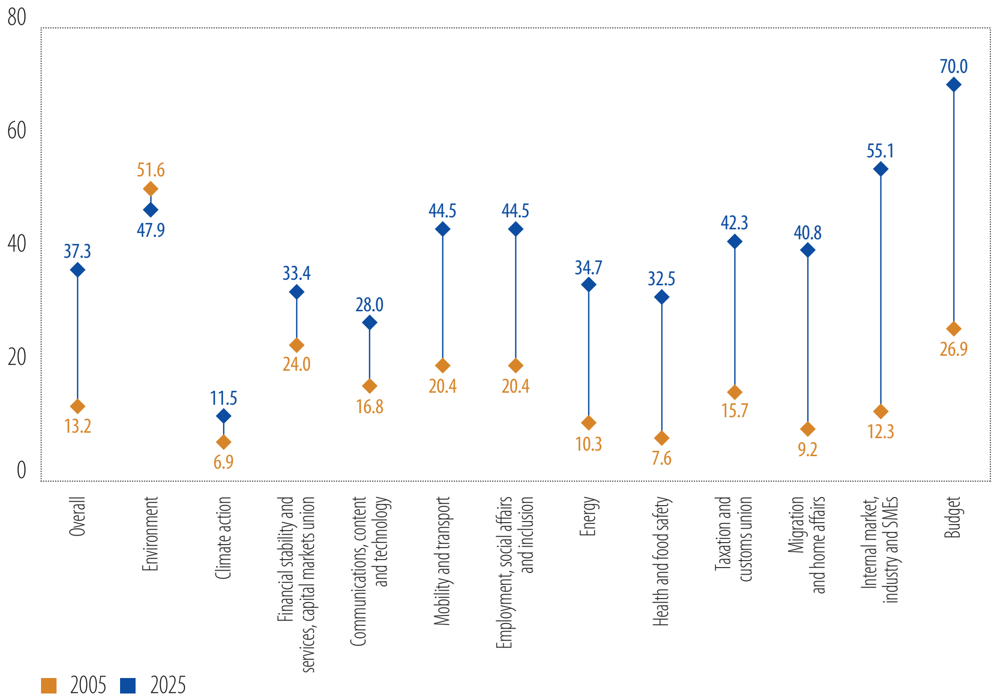
Source: *EIB staff calculations based on European Commission data.*
Note: *Number of infringement cases notified to EU members in a given year, as of July 2025. The number of cases by country/policy area over time is calculated from the year the case was opened.*

Bureaucratic costs add to the burden on EU firms. In addition to fragmentation, the cost of bureaucracy in Europe is substantial. EIBIS data show that over 85% of EU firms report needing to employ staff for regulatory compliance, and around 13% of firms had more than 10% of their workforce devoted to compliance activities in 2024-2025. The estimated cost of bureaucracy alone amounted to 1.1% to 1.2% of firms' turnover during this period. For comparison, energy costs represented around 3.8% to 4% of turnover on average among firms surveyed in EIBIS 2024-2025.

Regulatory burdens vary significantly across sectors. EIBIS data reveal that firms in the information and communication technology sector – for which the European Union has considerable dependencies, but which has been a key source of productivity gains over the past decade – face the highest compliance costs, estimated at 1.9% of turnover in 2024-2025. Surprisingly, firms in construction, accommodation and food services, and utilities also face substantial bureaucratic costs, averaging 1.5% to 1.7% of turnover. The lowest compliance costs are reported by firms in machinery and transport equipment, and in the manufacture of food, beverages and tobacco (Figure 39).

Figure 38

Average duration of infringement cases (in months)**, by policy area**

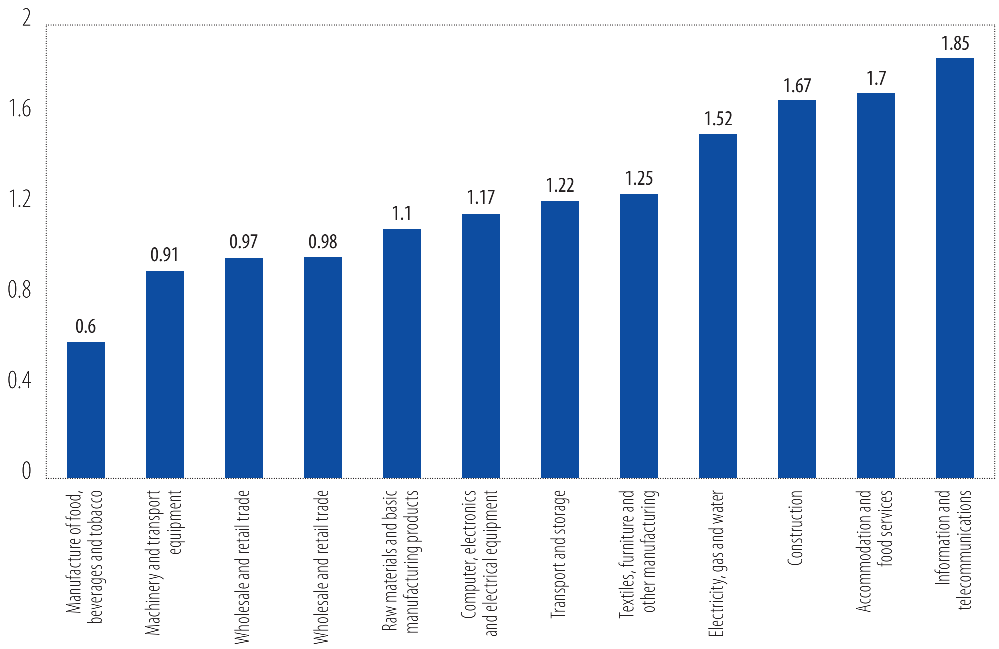


Source: *EIB staff calculations based on European Commission data.*
Note: *Three-year moving average. The overall average rises from 13 to 37 months. Policy areas are ordered from smallest to largest (left to right) in terms of net absolute change, excluding overall. Climate action cases are from 2010 (no closed cases prior to that). Cases active as of July 2025 are excluded.*

Digital and regulatory barriers drive up bureaucracy costs, suggesting the importance of modernising private services and expanding firms' access to digital infrastructure. Bureaucracy costs also reflect the hidden barriers firms face in areas like digital infrastructure, business regulation (for example, licensing and permits), and labour market rules. Regression results using firm-level EIBIS data show that, after controlling for firm characteristics and sector, firms reporting major digital infrastructure obstacles face an increase in bureaucracy costs of 0.25 percentage points, compared to those with minor or no obstacles (Figure 40). Given that the average cost of bureaucracy in Europe is around 1.1% of turnover, this increase represents a roughly 20% rise in compliance costs. Similar results are found for firms facing major obstacles in labour market regulation and business regulation, with an estimated increase of 0.15 percentage points – or around 12% – in bureaucracy costs compared to firms facing minor or no barriers (Figure 40). This finding highlights the substantial benefits of modernising public services and expanding firms' access to digital infrastructure, which can significantly reduce the cost of regulatory burdens.

Fragmentation within the single market dampens investment. To assess the untapped potential of the EU single market, the EIBIS asks firms whether their key product is subject to varying requirements, standards or consumer protection rules across EU countries. A significant share – above 60% – of EU exporters report that they must comply with different standards and consumer protection rules between EU members (EIB, 2025a). Further firm-level analysis shows that, on average, exporters facing fragmented regulations invest 3 percentage points less (investment as a share of total fixed assets) in the long run than those not facing such fragmentation (Figure 41). Given the average investment rate of 27%, this amounts to an 11% reduction in total investment. The impact is even greater for intangible assets, where the investment rate declines by more than 2 percentage points compared to the average rate of 9% – a decline of more than 20%. Fragmentation also appears to affect firms' capital spending on replacing existing assets.

Figure 39
Cost of bureaucracy (% of turnover)**, by sector**



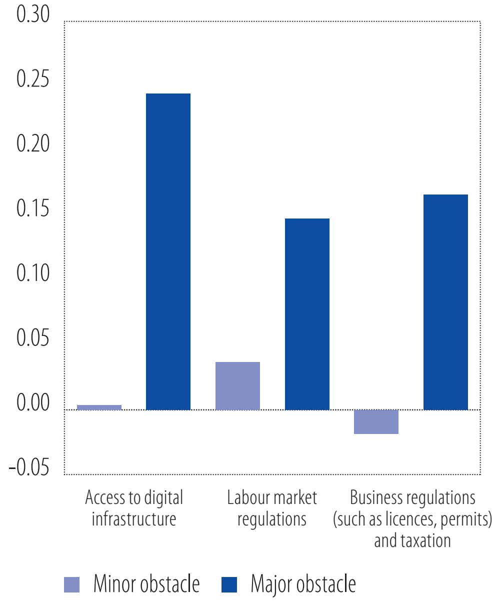
Source: EIB staff calculations based on EIBIS 2024-2025.
Note: EU sample only. The weighted added-value of firms is used for each sector.

Persistent barriers undermine the benefits of the single market. Regulatory fragmentation and bureaucratic costs remain major obstacles. Over 60% of EU exporters report different standards and consumer protection rules in different EU members, which reduces investment – particularly in intangible assets – and limits economies of scale. EIBIS data show that firms facing fragmented regulations invest 3 percentage points less relative to total assets, and an intangible investment is hit particularly hard. Bureaucracy adds a further burden. More than 85% of EU firms employ staff for regulatory compliance, and 13% devote over one-tenth of their workforce to it. Compliance costs average 1.1% to 1.2% of turnover for all firms, and 1.8% for small and medium-sized firms.[19] In comparison, small and medium-sized firms spend 3.9% of turnover on energy, on average. Among sectors, firms in the information and communications technology sector face the highest burden. Regulatory and digital infrastructure barriers significantly increase these costs, underscoring the need for modernised public services and streamlined regulation.

19 These costs show little change since 2024 when they were 2% of turnover for small and medium-sized firms. Due to an update of sample weights in 2025, estimations for 2024 have been slightly revised.

Figure 40

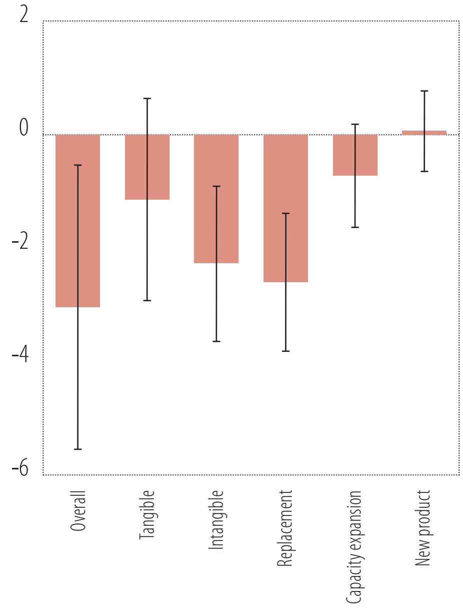
Implied cost of obstacles in digital infrastructure and business regulation (in percentage points)**, relative to turnover**



Source: *EIB staff calculations based on EIBIS 2024-2025.*
Note: *Light bars indicate results that are not significant at the 90% level. Measures a discrete change from a base level of no obstacles.*

Figure 41

Investment reaction of EU exporting firms facing different regulatory requirements across countries (in percentage points)



Source: *EIB staff calculations based on EIBIS.*
Note: *The chart represents EU exporters only. Regression of investment-to-fixed asset ratios on fragmentation dummy controlling for the first lag of investment ratios, a cyclical component, a structural financial component, firms' future demand expectations, and uncertainty. Standard errors are clustered at the firm level. The black lines represent 90% confidence intervals.*

Conclusion and policy implications

EU corporate investment resisted multiple shocks, but it is failing to meet the level of investment Europe needs to cope with rapid technological advancement. Real investment levels in Europe have barely changed since 2023. This stability reflects relatively sound company finances, the impact of the still high levels of public support and continued monetary accommodation. However, business investment is considerably stronger in the United States, driven by investment in artificial intelligence and technology. This divergence risks putting EU firms at a competitive disadvantage. EIBIS data suggest that the composition of investment will shift, with firms spending less on capacity expansion and innovation. At the same time, higher uncertainty affects innovation, intangible investment and capacity expansion.

Corporate investment will only accelerate if business opportunities improve. Extending and deepening the single market is essential to achieving this. Since 1980, EU single market integration in goods trade has fuelled one-seventh of the GDP and a quarter of the investment increase. The single market also supports the resilience and development of supply chains. A supportive business environment further amplifies the effectiveness of policy measures aimed at firms. Europe now has an opportunity to redefine its global role and build a more competitive economic foundation. Overall, enhancing the business environment and advancing the integration of the single market would boost investment and improve conditions for firms. European policymakers are already addressing these challenges by rethinking regulation and developing better processes.

Coordinated policies across EU members and at the EU level – along with well-targeted initiatives – improve impact. Policy measures and industrial policies are increasingly being used to support investment amid high levels of uncertainty. To raise long-term productivity, policy support should be more targeted and less focused on short-term demand. Instruments that reduce uncertainty and improve access to long-term finance, such as guarantees, risk-sharing mechanisms, and long-term funding at favourable rates, can help unlock new investment. Additional tools, including securitisation and venture financing, can mobilise new sources of capital and foster innovation.

Europe has an opportunity to define its global role by deepening market integration and creating a more supportive business environment. Achieving this will require coordinated action, targeted investment policies, and efficient deployment of resources under the next EU budget cycle. These steps can help accelerate corporate growth, strengthen competitiveness, and ensure Europe remains at the forefront of technological progress.

References

Altomonte, C., & Presidente, G. (2024). EU Industrial Policy, Misallocation, and Productivity. Working Paper.

Bank of America Institute (2025). Economic shifts in the age of AI. Bank of America on 22 October 2025. Available at: https://institute.bankofamerica.com/content/dam/economic-insights/ai-impact-on-economy.pdf

Bernasconi, R., Cordemans, N., Gunnella, V., Pongetti, G. and Quaglietti, L. (2025). What is the untapped potential of the EU Single Market? Economic Bulletin, Issue 8, ECB. Available at: https://www.ecb.europa.eu/press/economic-bulletin/articles/2026/html/ecb.ebart202508_01~2e71d52829.en.html

Brandão-Marques, L. & Toprak, H.H. (2024). A Bitter Aftertaste: How State Aid Affects Recipient Firms and Their Competitors in Europe. IMF Working Paper No. 24/250. Available at: https://doi.org/10.5089/9798400295706.001

Cerdeiro, A. D. and Rotunno, L. (2026). EU barriers to scaling up: The case of fragmented product markets. CEPR VoxEU, February 2026. Available at: https://cepr.org/voxeu/columns/eu-barriers-scaling-case-fragmented-product-markets

Corrado, C., Criscuolo, C., Haskel, J., Himbert, A., & Jona-Lasinio, C. (2021). New evidence on intangibles, diffusion and productivity. Paris: OECD Science, Technology and Industry Working Papers 2021/10. https://doi.org/10.1787/de0378f3-en

Draghi, M. (2024). The Future of European Competitiveness (Part A and B). Luxembourg: European Commission. Available at: https://commission.europa.eu/topics/competitiveness/draghi-report_en

Ebeke, C., & Siminitzs, J. (2018). Trade uncertainty and investment in the euro area. IMF Working Paper No. 128/281. Available at: https://www.imf.org/-/media/files/publications/wp/2018/wp18281.pdf

European Central Bank (ECB) (2025). Financial Stability Review, November 2025. European Central Bank. Available at: https://www.ecb.europa.eu/press/financial-stability-publications/fsr/html/ecb.fsr202511~263b5810d4.en.html

European Commission (2021). Strategic dependencies and capacities. Updating the 2020 New Industrial Strategy: Building a stronger Single Market for Europe's recovery. Brussels: European Commission - Commission Staff Working Document - SWD(2021) 352 final. Available at: https://commission.europa.eu/system/files/2021-05/swd-strategic-dependencies-capacities_en.pdf

European Commission. (2025). Mid-Term Fiscal Sustainability Package (MTFSP). Brussels: European Commission. URL: https://economy-finance.ec.europa.eu/document/download/07601136-78f2-41dc-a188-4a5127acdb9c_en?filename=2025-08-19_MTFSP_Final_EN_BF_a.pdf

European Investment Bank (EIB) (2022). Investment Report 2021/2022. Recovery as a springboard for change. Luxembourg: European Investment Bank. https://doi.org/10.2867/82061

European Investment Bank (EIB) (2024). Investment Report 2023/2024: Transforming for competitiveness. Luxembourg: European Investment Bank. https://doi.org/10.2867/29813

European Investment Bank (EIB) (2025a). EIB Investment Survey 2025 - European Union overview. Luxembourg: European Investment Bank. https://doi.org/10.2867/4791610

European Investment Bank (EIB) (2025b). Investment Report 2024/2025: Innovation, Integration and Simplification in Europe. Luxembourg: European Investment Bank. https://doi.org/10.2867/8065730

Ferrando, A., & Pál, R. (2024). Do financing conditions pose a threat to the performance, growth and transformation of SMEs? Luxembourg: European Investment Bank Working Paper. https://doi.org/10.2867/1358340

Fetzer, T., Lambert, P., Feld, B., & Garg, P. (2024). AI-Generated Production Networks: Measurement and Applications to Global Trade. Warwick Economics Research Papers no. 1528. Available at: https://warwick.ac.uk/fac/soc/economics/research/workingpapers/2024/twerp_1528-_fetzer.pdf

Fons-Rosen, C., Kalemli-Ozcan, S., Sorensen, B. E., Villegas-Sanchez, C., & Volosovych, V. (2021). Quantifying productivity gains from foreign investment. *Journal of International Economics*, 131, 103450. https://doi.org/10.1016/j.jinteco.2021.103456

Fontagné, L., & Yotov, Y. V. (2024). Reassessing the impact of the Single Market and its ability to help build strategic autonomy. European Commission, Single Market economics papers. https://doi.org/10.2873/500810

Fontagné, L., & Yotov, Y. V. (2025). The Low-Hanging Fruit of the Single European Market: New Methods and Measures. European Commission, Single Market economics papers.

Fuest, C., Gros, D., Mengel, P. L., Presidente, G., & Tirole, J. (2024). EU Innovation Policy: How to Escape the Middle Technology Trap. Institute for European Policymaking at Bocconi University, Report by the European Policy Analysis Group. Available at: https://iep.unibocconi.eu/publications/reports/eu-innovation-policy-how-escape-middle-technology-trap

Gardó, S., Klaus, B., Tujula, M., & Wendelborn, J. (2020). Assessing corporate vulnerabilities in the euro area. European Central Bank, Financial Stability Review, November 2020. Available at: https://www.ecb.europa.eu/press/financial-stability-publications/fsr/focus/2020/html/ecb.fsrbox202011_01~afc02db8d6.en.html

Guadalupe, M., Kuzmina, O., & Thomas, C. (2012). Innovation and Foreign Ownership. *American Economic Review,* 102(7), 3594-3627. https://doi.org/10.1257/aer.102.7.3594

Harasztosi, P., Maurin, L., & Rousseaux, P. (2026). How EU corporates leverage on the common market to reduce trade vulnerabilities. EIB working paper (forthcoming).

Head, K., & Mayer, T. (2021). The United States of Europe: A Gravity Model Evaluation of the Four Freedoms. *Journal of Economic Perspectives*, 35(2), 23-48. https://doi.org/10.1257/jep.35.2.23

Helpman, E., Melitz, M., & Yeaple, S. R. (2004). Export versus FDI with heterogeneous firms. *American Economic Review*, 94(1), 300-316. https://doi.org/10.1257/000282804322970814

Hodge, A., Piazza, R., Hasanov, F., Li, X., Vaziri, M., Weller, A., Wong, Y.C. (2024). Industrial Policy in Europe: A Single Market Perspective. IMF Working Paper No. 24/249. Available at: https://doi.org/10.5089/9798400295690.001

Horvath, G., Kolev, A., & Maurin, L. (2026). How does grant design shape investment, output, and productivity in Europe?", forthcoming EIB Working Paper Series.

Hsieh, C., & Klenow, P. J. (2009). Misallocation and Manufacturing TFP in China and India. The Quarterly *Journal of Economics*, 124(4), 1403-1448. https://doi.org/10.1162/qjec.2009.124.4.1403

International Monetary Fund (IMF) (2025). World Economic Outlook October 2025: Global Economy in Flux, Prospects Remain Dim. Washington, DC: International Monetary Fund. Available at: https://www.imf.org/en/publications/weo/issues/2025/10/14/world-economic-outlook-october-2025

Javorcik, B. S. (2004). Does foreign direct investment increase the productivity of domestic firms? In search of spillovers through backward linkages. *American Economic Review*, 94(3), 605-627. https://doi.org/10.1257/0002828041464605

Kolev, A., & Randall, T. (2024). The effect of uncertainty on investment: Evidence from EU survey data. Luxembourg: EIB Working Paper 2024/02. https://doi.org/10.2867/723130

Letta, E. (2024). Much more than a market – Speed, Security, Solidarity. Empowering the Single Market to deliver a sustainable future and prosperity for all EU Citizens. April 2024. Available at: https://www.consilium.europa.eu/media/ny3j24sm/much-more-than-a-market-report-by-enrico-letta.pdf

Méjean, I., & Rousseaux, P. (2024). Identifying European trade dependencies. London, UK: CEPR Press: Europe's economic security: in collaboration with Bruegel. Available at: https://www.isabellemejean.com/MejeanRousseaux_ITCEI.pdf

Organisation for Economic Co-operation and Development. (2025). OECD Economic Outlook: Tackling Uncertainty, Reviving Growth, Volume 2025 Issue 1. Paris: OECD Publishing. https://doi.org/10.1787/83363382-en

Restuccia, D., & Rogerson, R. (2008). Policy distortions and aggregate productivity with heterogeneous establishments. *Review of Economic Dynamics*, 11(4), 707-720. https://doi.org/10.1016/j.red.2008.05.002

Chapter 4

Maximising the impact of policy instruments

The European Union has a strong track record of leveraging limited public funds to support its policy goals and economic transformation. The European Fund for Strategic Investments, InvestEU and the activities of the European Investment Bank Group (EIB Group), both with its own resources and under mandates, show how public money can attract large-scale investment, address market failures and achieve strategic policy priorities.

Financial instruments such as loans, guarantees, equity investments and risk-sharing tools play an essential role in increasing the impact of limited public funds. They allow EU budgetary resources to mobilise several times their amount in private and institutional financing, amplifying the reach and effectiveness of public action.

Impact analyses show that these financial instruments deliver clear benefits for firms, innovation and EU competitiveness. EIB Group experience confirms that public support targeting small and medium-sized enterprises, mid-cap firms and innovative high-growth businesses raises productivity, encourages additional financing and reduces the misallocation of capital. These effects are strongest for smaller, younger and more financially constrained companies, and for firms in less developed regions. Public support for innovative firms also boosts their growth, revenue, intangible assets and exit opportunities, while helping to build markets and reduce uncertainty.

EU-wide programmes that mobilise institutional investors, such as TechEU and the European Tech Champions Initiative 2.0, are vital to closing the innovation finance gap and advancing the savings and investments union. Despite strong research capabilities and entrepreneurial talent, innovative firms in the European Union still struggle to access late-stage growth capital, especially when compared to global peers. By tapping into the large resources held by pension funds and insurance companies, these programmes can direct long-term investment towards innovative, fast-growing companies and support their scaleup.

Delivering European public goods depends on stronger productivity in key sectors and on removing long-standing non-financial barriers. Higher productivity in the construction sector, for example, is essential to improve the delivery of infrastructure, housing and the green transition. Yet regulatory complexity, skills shortages and the slow adoption of new technologies continue to limit efficiency and increase costs. Tackling these hurdles will help ensure that public investment delivers tangible outcomes for residents and supports Europe's long-term competitiveness.

Addressing capacity gaps is also critical to maximise the impact of EU investment in public goods. Evidence from across the European Union shows that standardised technology, modular construction, centralised governance and competitive procurement at the EU level can deliver public infrastructure more cost-effectively. Strengthening capacity and simplifying administrative processes will help reduce project costs and completion times, enabling public funds to deliver the greatest possible value for people and business.

Introduction

Policymakers across advanced economies are intensifying efforts to secure stronger and more sustainable growth. Investment is central to this goal. It underpins Europe's long-term prosperity and drives job creation, innovation and competitiveness. As the region works to stay on track with the green and digital transitions, the need for effective investment becomes even more important. With the European Union preparing the next Multiannual Financial Framework, and many EU countries facing tighter public finances, understanding how to maximise impact is a growing priority.

This chapter presents examples of programmes that have successfully supported investment, drawing on the experience of the EIB Group and analysis of Group data. It reviews the instruments and policies that help meet investment objectives and mobilise private capital, with a focus on achieving the strongest possible impact. The chapter discusses how different financial tools can make the best use of public resources, attract co-financing and support firms' growth and innovation. It also highlights the important role of advisory services, capacity building and innovation in delivering major infrastructure projects and public goods.

The chapter has three parts. The first explains how financial instruments can increase the impact of public funds and attract private co-investment. The second reviews evidence on the design, targeting and results of instruments supported by the EIB Group, and their role in helping firms grow, innovate, create jobs and support regional development. The final part explores how advisory services, stronger capacity and more efficient governance can improve the delivery and impact of investment, especially for complex infrastructure projects. Three boxes offer further insight into the approaches discussed: Box A outlines the successes of the European Fund for Strategic Investments and of InvestEU; Box B reviews recent national initiatives that support innovative firms; and Box C presents a case study on how Madrid planned, financed and implemented its ambitious metro extension project.

The chapter provides an economy-wide perspective on actions that could strengthen progress on the EU policy agenda. As Europe's competitive position has weakened, several industries have emerged as critical to ensuring equitable and sustainable growth. The other chapters in this report look at sectors with a broad and far-reaching influence on Europe's competitiveness.

Leveraging public resources to boost investment

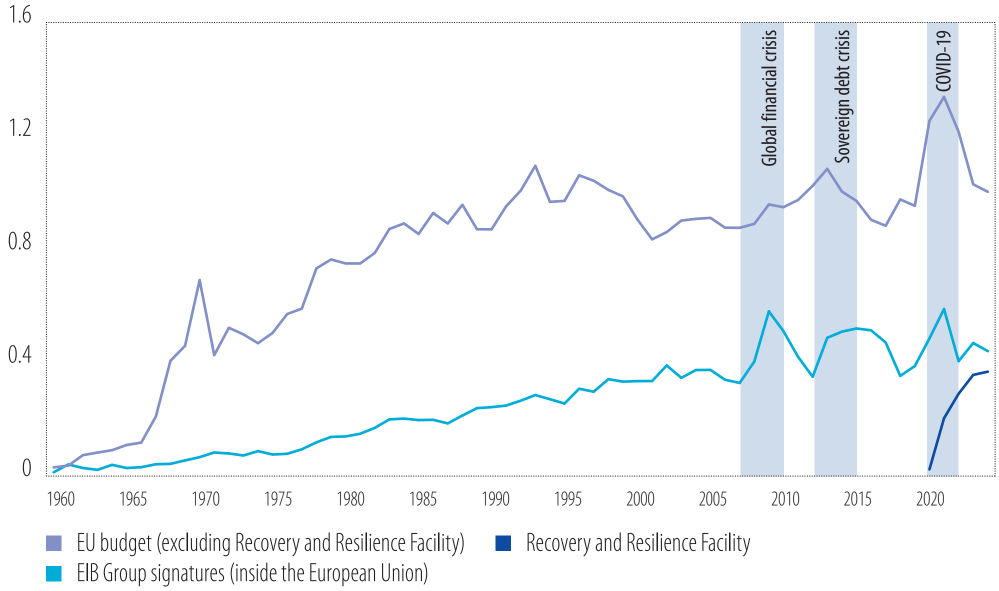
Financial instruments: A key tool for the European Union

Financial instruments include lending, guarantees, equity investments and risk-sharing tools backed by public resources. They help public funding go further.[1] Unlike grants, they use budgetary resources to attract additional financing from capital markets and other partners. When well designed, these instruments can address market failures, reduce perceived risks and improve access to finance for sectors or projects that are important for EU policy goals but underserved by the market. Their value lies in their ability to mobilise savings and channel them into productive investments at scale, creating a multiplier effect that extends beyond the initial public contribution. This approach makes public funds more efficient and supports sustainable investment environments that advance long-term goals such as competitiveness, innovation and the climate transition.

1 Financial instruments are tools that public authorities use to support projects through the market. They include loans, guarantees, equity investments and risk-sharing facilities. They differ from grants because they work through financial institutions and aim to mobilise private investment.

The EIB Group is an example of how public resources can support large-scale investment. Since its foundation, the Group has acted as the European Union's financing arm and the main implementing partner for EU-funded financial instruments and budgetary guarantees (Figure 1). The EIB's financial strength rests on its paid-in capital and accumulated reserves. Paid-in capital is provided by EU members and has increased over time with EU enlargement and periodic capital increases, including a €10 billion increase in 2012. It stood at €22 billion in 2024. The EIB's reserves are built up from operational surpluses retained to support additional investment on behalf of EU countries and reached €58 billion in 2024. Together, these resources enable the Bank to maintain strong access to capital markets and to provide lending in support of strategic investments across the European Union.

Figure 1
EIB Group signatures, EU budget, and Recovery and Resilience Facility resources (% EU GDP)



Source: *EIB staff calculations.*
Note: *Data are shown as a percentage of EU GDP, where the European Union consists of six countries to 1973; nine countries to 1981; ten countries to 1986; 12 countries to 1995; 15 countries to 2004; 25 countries to 2007; 27 countries to 2013; 28 countries to 2020 and 27 from then on.*

The success of the European Fund for Strategic Investments and InvestEU also shows how public guarantees, combined with the expertise of implementing partners like the EIB Group, can mobilise investment at scale. The European Fund for Strategic Investments (EFSI) was established in 2015 under the Juncker Plan, a flagship EU initiative to revive investment following the 2008 financial crisis. Backed by an EU budget guarantee, the initiative significantly expanded the EIB Group's capacity to take risk, enabling it to finance projects that would otherwise have been considered too risky (see Box A for details). This marked a turning point in deployment, showing how limited public resources, when combined with EIB expertise, can unlock large volumes of private investment and close the post-crisis investment gap.

The macroeconomic significance of the European Fund for Strategic Investments is reflected in its substantial contribution to investment across the European Union. At its peak, investment supported by the initiative approached 3% of the European Union's gross fixed capital formation, highlighting its central role in sustaining capital expenditure during a period of subdued private investment. Between 2014 and 2022, investment supported by the initiative is estimated to have accounted for around 13% of the total increase in the European Union's net capital stock, underlining its effectiveness in stimulating productive capacity.

Building on the success of the European Fund for Strategic Investments, InvestEU was created as during the 2021-2027 EU budget period as a single framework bringing together EU-level financial instruments. InvestEU is implemented through selected financial partners, including national promotional banks and international financial institutions. The EIB Group is the main partner, accounting for 89% of total InvestEU deployments in October 2025 – well above the 75% initially foreseen. (See Box A for more details.)

EU-level instruments help safeguard the single market and deliver diversification benefits that strengthen risk management. Deploying financial instruments at the European level offers two key advantages. First, it helps prevent distortions to competition within the single market by applying uniform rules and pooling resources across EU countries, in line with EU financial regulation and state aid principles. Second, EU-wide instruments help overcome home bias and support the creation of portfolios that are diversified across countries and sectors. For investors, diversification reduces concentration risk – particularly important for higher-risk activities such as venture capital – and increases resilience compared to portfolios focused on a single national market. The EIB's pan-European portfolio, for example, provides a risk-return profile that reduces the level of provisioning required by the European Commission against potential losses. This efficiency strengthens the case for assigning the EIB Group a central role in implementing EU mandates.

Over time, however, EU mandates have grown in number and complexity, and greater consolidation and simplification could increase the impact of existing budgetary resources. As an example, the EIB Group currently implements more than 130 EU mandates. In addition, it manages a large number of mandates from EU members. The European Investment Fund (EIF), for instance, manages well over 200 active mandates, more than half of which are from local authorities and national promotional institutions. Through these mandates, the EIB Group provides – directly or through intermediaries – loans, guarantees, equity and quasi-equity to small and medium-sized enterprises, companies and projects, and delivers high-quality technical and advisory services funded by grants. At the same time, this fragmentation and complexity increase the administrative, regulatory and reporting burdens, reducing the efficiency and effectiveness with which EU resources are deployed.

The European Union's push for simplification therefore provides an opportunity to use EU resources more dynamically and to mobilise additional financing in priority policy areas, without increasing pressure on the EU budget. Under the Omnibus II proposal, for example, the European Commission plans to make more efficient use of existing resources – such as surpluses and reflows from legacy instruments – thereby freeing up capacity to increase the InvestEU guarantee by €2.5 billion. This higher guarantee is expected to mobilise €25 billion in additional public and private investment. A further €25 billion will be mobilised through the enhanced guarantee capacity achieved by combining InvestEU support with legacy instruments managed by the EIB and the EIF.

Understanding how financial instruments mobilise resources

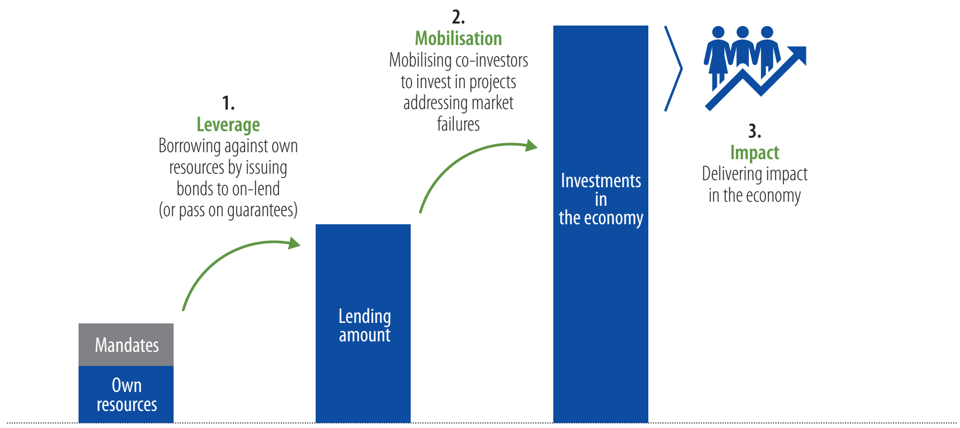
The overall effect of deploying public resources through financial instruments depends on three elements: leverage, the mobilisation of co-financing and the impact of supported investment on economic activity, the environment and human well-being (Figure 2).

Leverage refers to the ability to amplify public resources by issuing bonds and creating lending capacity. It links a lender's financing activity to its own capital or equity base. Backed by its capital and, where applicable, by guarantees provided by the European Commission, the EIB raises funds on capital markets by issuing bonds. These funds are then used for on-lending, equity investments or guarantees for final beneficiaries. This mechanism is central to the EIB Group's lending model, enabling it to leverage its capital and support EU policy-aligned projects, including higher-risk operations, while preserving its triple-A rating.

The level of leverage depends on the composition of the portfolio. Key factors include the type of financial product (loans, equity or guarantees), geographic and sectoral distribution, thematic focus and the degree of risk taken, including counter-party risk. Higher-risk operations, for example, require more capital backing than standard lending operations and therefore reduce the overall leverage ratio. This reflects prudent risk management practices aimed at safeguarding financial sustainability while delivering policy objectives. To mitigate risk, regulators require banks to hold a buffer of liquid assets to absorb losses, reduce the likelihood of insolvency and maintain confidence in the banking system. Minimum capital requirements are generally calibrated to the riskiness of banks' assets and their perceived systemic importance, as set out by financial regulators such as the Basel Committee on Banking Supervision.

Figure 2

From public resources to impact – schematic overview



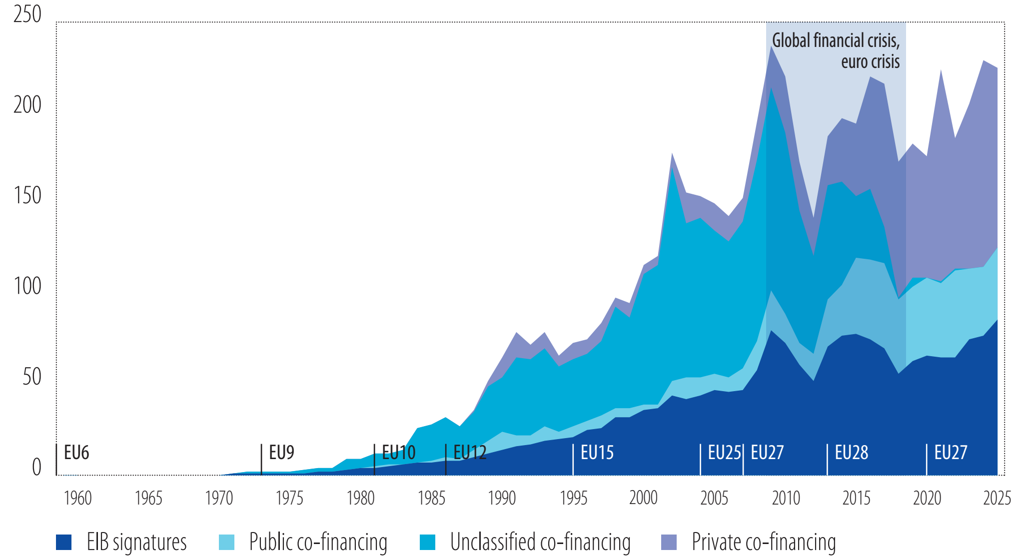
Source: *EIB.*

The mobilisation of co-financing refers to crowding in private and institutional investors that provide additional funding alongside public resources. Public financing plays a crucial role in attracting other investors by acting as an anchor and signalling confidence in a project. This is achieved through risk sharing, sound project structuring that supports financial viability, and technical and advisory support that improves project quality and execution. More broadly, pooling investments into diversified portfolios across sectors and regions strengthens investments' risk-return profile, further facilitating the participation of co-investors. Financial instruments backed by public resources can also offer features such as longer maturities, more favourable pricing or advisory services, which are often unavailable from the market alone.

Mobilisation patterns vary by instrument and reflect their design and objectives. Equity instruments, for example, typically show strong crowding-in effects because they absorb higher levels of risk, encouraging other investors to participate. Similarly, specialised products such as venture debt can be particularly effective in mobilising additional investment as they address market gaps where financing options are scarce.

The mobilisation of private sector co-investors in EIB operations has increased over time. Co-financing for EIB-supported projects comes from both private investors and other public institutions. While both sources are important, mobilising private capital is especially important at a time of limited public resources. A project's ability to attract private co-financers depends on factors such as expected returns, risk characteristics and investment structure, including repayment structure. Overall, EIB Group activity has shown a strong upward trend in the share of private co-financing since around 2012 (Figure 3). Continued efforts in financial structuring with a shift towards a more private sector-oriented portfolio under the European Fund for Strategic Investments and InvestEU, as well as broader macroeconomic developments, are likely to reinforce this trend further.

Figure 3
EIB lending and co-financing (€ billion)**, by source**



Source: *EIB.*

The term impact refers to the extent to which investments deliver measurable economic, social and environmental benefits. Impact can take many forms: from increasing the supply of housing, electricity generation capacity or jobs, to supporting the growth of small firms and strengthening overall economic resilience. Additionality – that is, addressing market failures and gaps – helps ensure that public intervention delivers genuine impact without crowding out private activity. To maintain a strong focus on impact and additionality, institutions have developed comprehensive frameworks to assess the results of their operations. Three commonly used approaches are project-level monitoring of results, in-depth impact assessments (often based on econometric analysis) of specific programmes or instruments, and macroeconomic modelling.

The ultimate economic, social and environmental impact of an investment depends on the project design and the broader economic context. For example, macroeconomic conditions influence the short-term impact of investments on growth and employment, which tend to be larger during downturns or periods of high unemployment. Long-term effects on competitiveness, economic growth, the environment and people's lives depend to a large extent on investment choices, project design and the surrounding economic and regulatory context. The net impact of an investment on GDP may be smaller than the total volume of financing, as investment raises productive capacity and thereby increases annual economic output over time. On average, one euro of EIB support for investment is estimated to increase GDP by around €0.6 (EIB staff calculations based on the EIB-RHOMOLO model; see European Investment Bank (EIB) (2022a) for details). At the same time, it is important to remember that impact also covers environmental and social effects that are not reflected in traditional measures of economic output. For example, an urban public transport project may reduce future emissions, improve human health and safety, and save people time, in addition to its medium- and long-term effects on GDP.

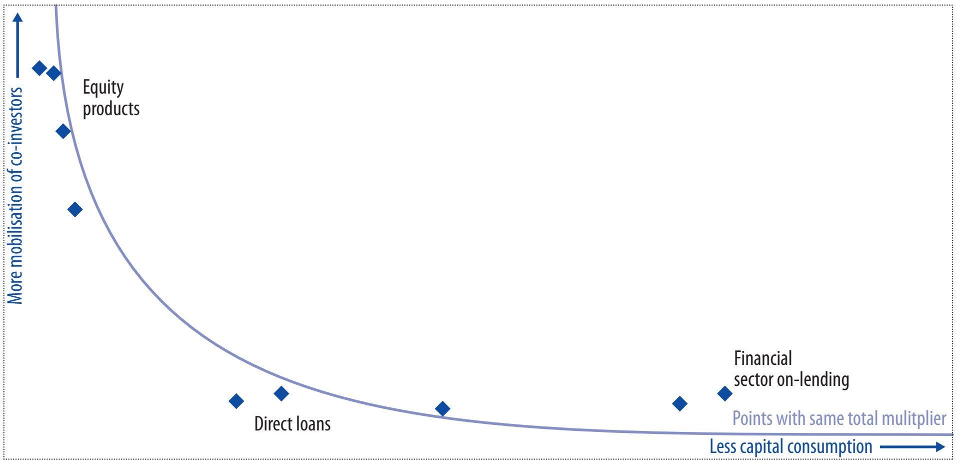
Maximising the effectiveness of financial instruments

Maximising impact is not as simple as choosing less risky high-impact operations or focusing on specific sectors. There are many trade-offs, and the interaction of different factors matters. For example, a strong focus on riskier operations, such as cutting-edge innovation that could yield high impact, may reduce lending volumes and increase financial risk. Economic and social impact can be achieved in different ways: directly, as with energy-efficient housing, or indirectly, as with investments in education or basic enabling infrastructure that supports competitiveness. Indirect impact can be high but may use resources differently and limit flexibility. In composing a portfolio, these trade-offs influence financial soundness, lending capacity and the overall impact generated from public resources.

A financial instrument's effectiveness depends on how it combines capital consumption, mobilisation of co-financing, and the degree of impact achieved by the investment it finances. Together, capital consumption and mobilisation determine how much investment is supported for each euro of public resources deployed as capital or a public guarantee. Project selection, design and quality – shaped by the technical expertise and due diligence of lending institutions – also play a role in maximising impact.

Optimal use of public resources requires understanding the trade-off between capital consumption and the mobilisation of co-financing by the instrument. In general, riskier instruments consume more capital, reducing leverage, but tend to mobilise more co-financing. Neither riskier nor less risky instruments are inherently a better use of public funds (Figure 4).

Figure 4
Trade-offs between capital consumption and mobilisation



Source: *EIB.*

Optimal use of public resources also requires balancing the total multiplier – from the capital or guarantees used to the amount of investment supported – and impact. A project may have low capital consumption and strong mobilisation, generating a high total multiplier, but still deliver little economic or social benefits per euro invested. Conversely, a project with high capital consumption and lower mobilisation of co-investors may still be worthwhile if the impact per euro of investment is high. As a general rule, riskier operations require more public support but often deliver more transformative results, such as in innovation, large-scale cross-border infrastructure or support for small and medium-sized enterprises during periods of financial uncertainty. Projects that yield low impact and low financial mobilisation should be avoided.

Public financial instruments remain a key tool for supporting investment and achieving strategic objectives in the European Union. By maximising leverage and mobilisation, simplifying mandates, ensuring additionality, aligning with policy goals and strengthening impact assessment, the European Union can increase the value generated by every euro of public money.

Financial and non-financial additionality are central to the efficient use of public resources. Public financial instruments should target market failures and underserved segments rather than replace private investment. This includes generating larger ticket sizes, longer maturities, higher risk-taking and non-financial benefits such as signalling, market-building and technical support.

Maximising impact begins with the design of financial instruments. The European Fund for Strategic Investments and InvestEU show how public guarantees, combined with the expertise of partners like the EIB Group, can mobilise investment at scale. These programmes can serve as models for future initiatives, with lessons learned informing new instruments and policy windows.

Box A

Success stories: European Fund for Strategic Investments and InvestEU

The strategic use of financial instruments is clear in flagship programmes like the European Fund for Strategic Investments (EFSI) and InvestEU, which have transformed the way EU budgetary resources support growth, innovation and resilience. These programmes show how public guarantees, combined with the expertise of implementing partners like the EIB Group, can mobilise investment at scale and help build sustainable markets.

EFSI was established in 2015 as part of the Juncker Plan to revive investment in the wake of the global financial crisis. Backed by an EU budget guarantee, it significantly expanded the EIB Group's capacity to take risk and supported financing for higher-risk projects without affecting the Bank's financial health or credit rating (EIB, 2021a). With €33.5 billion in funding, the EIB Group approved €96.8 billion of financing and mobilised over €500 billion in investments by the end of 2022 (EIB, 2022b).

EFSI delivered financial additionality and non-financial benefits. Operations had to address market failures or sub-optimal investment situations and show that financing could not be secured at the same scale or speed without EFSI support. Independent assessments by the EFSI Investment Committee confirmed that the programme delivered better financing terms, more funding and longer maturities, as well as non-financial benefits such as signalling effects, reputational gains and technical advice (EIB, 2021a).

The programme acted as a powerful catalyst for private investment. About 69% of the investment mobilised came from private sources, equal to almost four times the EU guarantee amount. By increasing the Group's risk-bearing capacity, EFSI attracted institutional investors and supported higher-risk operations, including equity investments and innovative projects.

Beyond mobilising capital, the programme helped develop markets by strengthening intermediaries' operational capabilities and fostering new financing structures. It focused on regions and sectors with the largest investment gaps, including cohesion regions and countries most affected by the crisis. The initiative supported more than 1.46 million small and medium-sized enterprises and financed strategic areas such as infrastructure, innovation and energy transition. Modelling using the RHOMOLO framework estimated that EFSI-supported operations would create 2.1 million jobs and raise EU GDP by 2.4% by 2025 compared with the baseline, with positive effects expected to continue until 2040 (EIB, 2021b).

Building on EFSI's success, InvestEU was introduced for 2021-2027 to bring EU-level financial instruments together under one framework. At its core is an EU budget guarantee of €26.2 billion, supported by contributions from implementing partners such as the EIB Group. This guarantee is expected to mobilise at least €372 billion of investment between 2021 and 2028, with every euro of the EU guarantee supporting €14.20 of investment (for the methodology, see European Commission, 2022).

InvestEU simplifies access to finance and makes investment in European companies and projects more efficient and flexible. It focuses on four policy windows: sustainable infrastructure, research and innovation, small and medium-sized firms and social investment. As with EFSI, InvestEU supports additionality, crowds in private capital and contributes to market-building, while aligning investments with EU priorities such as the Green Deal and the digital transition. (Read more about Europe's digital transformation in Chapter 5 and about securing Europe's green and competitive future in Chapter 6.)

Together, EFSI and InvestEU illustrate how well-designed financial instruments can improve the delivery of public policy. They make public resources go further, mobilise private investment at scale and support the development of sustainable markets, helping EU funds act as a strong multiplier for growth and resilience.

Public financial instruments to support competitiveness

For EU competitiveness to improve, firms must be empowered to invest, innovate and lead in strategic sectors. Small firms and mid-caps are the backbone of the EU economy, accounting for 99.8% of all businesses, around 66% of employment, and more than half of EU value added (European Commission, 2025a). Small and medium-sized businesses alone generate some €4 trillion in value added and are key drivers of innovation, filing one-third of patent applications in Europe. Mid-caps contribute over 17% of employment and 21% of turnover in the EU business sector and represent more than half of the value added in manufacturing (EIB, 2024b). Their agility and capacity to innovate make them essential for Europe's competitiveness and resilience. However, small firms and mid-caps face structural challenges, including disproportionate regulatory burdens and limited access to finance, which can constrain growth and competitiveness. Targeted policies and simpler regulation can help address these issues and strengthen Europe's industrial sectors and global position.

Strengthening European small firms and mid-caps through targeted solutions

Public financial instruments play a key role in alleviating structural market failures by matching the funding needs and risk profiles of small and medium-sized firms and mid-caps. Governments and international financial institutions, including the EIB Group, offer lending programmes to ease credit constraints, support productivity and capital investment, and attract private investment. Support for businesses makes up around 43% of the Group's activity, with about 83% of Bank lending and more than 85% of EIF financing directed to small and medium-sized firms (EIB, 2024a).

Intermediated lending and guarantee schemes, for instance, reduce credit risk for lenders and improve access to affordable financing, enabling firms to invest and manage liquidity pressures during downturns. Securitisation also supports financial intermediation by allowing banks to transfer and manage credit risk and maintain lending capacity. Grants, subsidies and tax incentives promote strategic objectives, including the green and digital transitions, while equity and quasi-equity instruments provide patient capital – or long-term investment – for high-growth and innovative firms. By mobilising private investment alongside public resources, these instruments help reduce market gaps and reinforce Europe's competitiveness and resilience in line with EU policy goals.

Intermediated lending programmes, including those supported by the EIB, have shown strong positive effects on firm growth, investment, employment, innovation and regional development across the European Union. They improve access to affordable finance, reduce credit risk for lenders and strengthen firms' capacity to invest, even in periods of economic stress. These programmes also boost productivity and the growth of Europe's most dynamic business segments. On average, firms receiving EIB intermediated lending record 5.4% higher employment growth over three years after receiving a loan (Sinnott et al., 2023). Earlier analyses of EIB intermediated lending (Gereben et al., 2019; Amamou et al., 2023; Barbera et al., 2022) also show that EIB support increases employment, revenues, profitability and investment. Compared with similar firms, beneficiaries also see a 6% increase in total assets, a 15.3% increase in investment in tangible fixed assets (reaching 21.5% after three years), and a moderate but significant rise in leverage (1.9 to 2.5 percentage points) (Sinnott et al., 2023). Firms also report gains in earnings (4.7%), productivity (5.3%) and innovation capacity, including higher patent filings and a 13.3% rise in intangible fixed assets compared to peers.

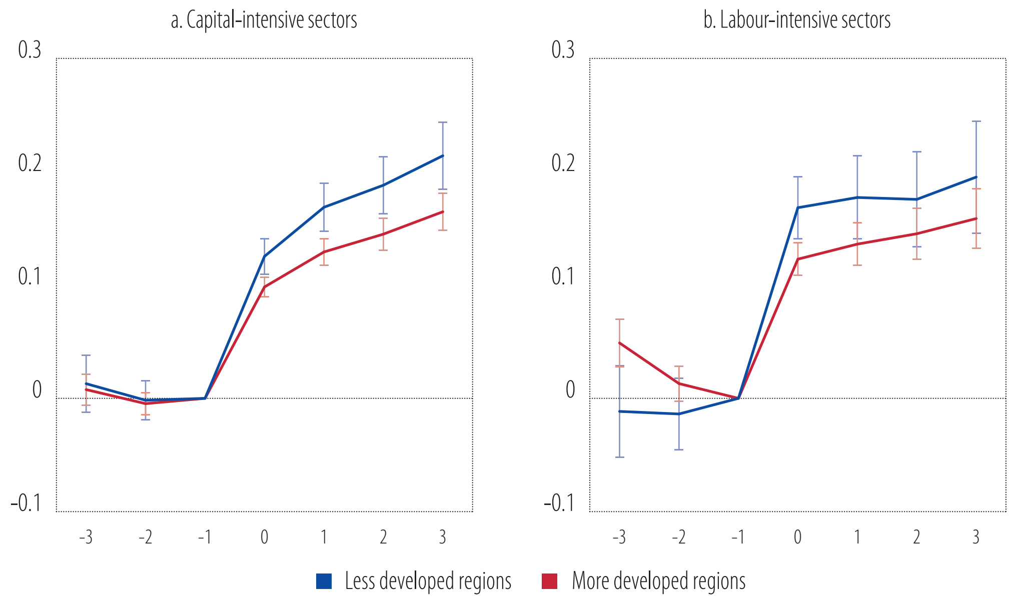
Public loan guarantees, including those administered by the EIF, have a strong positive effect on firm performance across Europe. Guaranteed loans improve firms' sales, asset growth and employment (Asdrubali and Signore, 2015; Bertoni et al., 2019). Pan-European analyses (Brault and Signore, 2019) show that guaranteed loans drive growth in assets (by 7% to over 35%), sales (by 6% to 35%) and employment (by 8% to 30%), while lowering the probability of default by 4% to 5%. Evidence from France (Bertoni et al., 2023) indicates that these effects persist for up to a decade, with most growth coming from organic expansion rather than acquisition. Recent analyses (Bertoni et al., 2025a; 2025b) of EIF loan guarantee beneficiaries in several EU countries find that these firms consistently outperform similar firms in assets, sales, employment, and intangible and tangible fixed assets, and also have higher survival rates. Even relatively small guaranteed loans yield significant benefits, with credit uptake amplifying the gains. Studies of non-EIB guarantee schemes (Zecchini and Ventura, 2009; Lelarge et al., 2010) confirm that guarantees increase credit availability and support investment and firm growth, particularly for microenterprises (Garcia-Tabuenca and Crespo-Espert, 2010; Martín-García and Morán Santor, 2021) and for guarantees tied to intangible investment (Kotamäki, 2025). Effects also vary across regions (Briozzo and Cardone-Riportella, 2016). Additional research finds positive effects on firms' employment (Bonfim et al., 2023; Barrot et al., 2024) and profitability (Gai et al., 2023). Public guarantees can also have complementary effects (Wilcox and Yasuda, 2019), enabling banks to expand lending beyond the guaranteed loans.

Smaller, younger and more financially constrained businesses gain the most from public financial support, whether through intermediated loans or guarantees. Microenterprises and young small and medium-sized firms show the strongest improvements in employment and investment (Asdrubali and Signore, 2015; Bertoni et al., 2019; Sinnott et al., 2023). Public loan guarantees also reduce bankruptcy rates, with the largest effects for firms that are financially constrained, smaller or younger (Bertoni et al., 2019, 2025a). Similarly, financially constrained and younger firms receiving EIB loans grow more quickly and increase investment after receiving support (Sinnott et al., 2023). Because smaller firms tend to face more limited access to finance, separate evidence shows that financially constrained beneficiaries experience faster growth when they receive an EIB-supported intermediated loan. These effects are also stronger at times of funding stress, particularly after financial downturns when banks reduce lending (Amamou et al., 2023).

Firms in less developed regions – especially those close to their borrowing limits – benefit particularly strongly from EIB support. Beneficiaries in these regions record greater improvements in employment, growth, investment, earnings and productivity compared with beneficiaries in more advanced regions (Gatti and van der Wielen, 2026). Sectoral evidence shows that capital-intensive firms experience larger gains in tangible fixed assets, while labour-intensive firms see bigger increases in employment (Figure 5). The positive effects of EIB lending are especially pronounced in capital-intensive sectors in less developed regions. For labour-intensive industries, regional differences are less marked. Overall, the evidence suggests that EIB lending is most effective where financing constraints are greatest, enabling firms operating close to their borrowing limits to make substantial investments and expand employment. This highlights the importance of intermediated lending in reducing structural financing gaps and supporting growth where it is needed most.

Figure 5

Impact on investment following an intermediated loan (% increase relative to firms in the control group)**, by region and sector**



Source: *Gatti and van der Wielen, 2026.*
Note: *Coefficients are normalised to the year prior to loan allocation (t=-1) and can be interpreted as the cumulative effect of the loan relative to this baseline. The vertical lines represent 95% confidence intervals. Capital-intensive sectors in panel (a) include mining and quarrying; real estate activities; electricity; gas; steam and air conditioning supply; water supply; sewerage, waste management and remediation activities; and manufacturing. Labour-intensive sectors in panel (b) include professional, scientific and technical activities; construction, accommodation and food service activities; and human health and social work activities.*

Policy instruments are effective when they are additional. According to emerging evidence from 245 000 beneficiaries from the Bank's intermediated lending programme, EIB financing is additional to other sources of financing for firms and contributes to economic growth. Gatti and van der Wielen (2026) show that the EIB's intermediated lending to small firms between 2015 and 2020 generated an average of €0.50 of additional debt for every euro lent – suggesting that funds are being channelled towards potentially untapped local credit markets. The study also highlights the role of EIB intermediated lending in supporting investment, employment and profitability, with potential spillovers to firms that are not direct beneficiaries.

Export credit agencies effectively promote trade and competitiveness, particularly for smaller firms facing liquidity constraints. Export credit agencies are government-backed institutions that provide loans, guarantees and insurance to domestic exporters and their foreign buyers, mitigating commercial and political risks and facilitating access to finance where private markets fall short. For small and medium-sized firms and mid-caps, export credit agencies are particularly valuable in enabling entry into new markets and supporting internationalisation. Export credit guarantees protect exporters from information gaps (for example, when exporters face uncertainty about a buyer's ability to pay, because this information is private) and enable firms – especially small firms – to expand exports beyond the European Union (Agarwal et al., 2023). The EIB Group offers guarantees to export credit agencies to reduce financial risks, which helps ensure that European firms can access competitive financing for export-oriented projects. Under InvestEU, for example, national export credit agencies can get an EIF-backed guarantee for small firms and mid-caps exporting goods and services to Ukraine. Trade is further supported through the EIB Group's risk-sharing operations – especially counter-guarantees – with global financial intermediaries exposed to European export credit agency-backed loans. Empirical studies confirm the effectiveness of support from these agencies in sustaining exports and firm growth (Benmelech and Monteiro, 2023; Matray et al., 2024).

Targeted support reduces capital misallocation, improves economic resilience and amplifies the impact of limited public resources. Positive effects on growth, investment and employment are especially pronounced for smaller, younger and more financially constrained enterprises, and for firms in less developed regions. Well-designed public lending programmes also create wider benefits beyond direct beneficiaries, by supporting growth and investment in local economies. This highlights the importance of tailoring support to the specific needs of different regions and sectors.

Assessing and monitoring the impact of interventions helps ensure that public resources are used where they generate the highest marginal benefit. Clear targets, regular monitoring, impact assessments and evaluations enable policymakers and financial institutions to track not only immediate outputs – such as the volume of lending or number of firms supported – but also the longer-term outcomes, including improvements in productivity, innovation and regional development. Transparent reporting strengthens accountability and public trust, and supports knowledge-sharing and the spread of good practice across EU countries. A strong impact assessment framework also underpins evidence-based policymaking, ensuring that support measures remain relevant, effective and aligned with changing EU priorities.

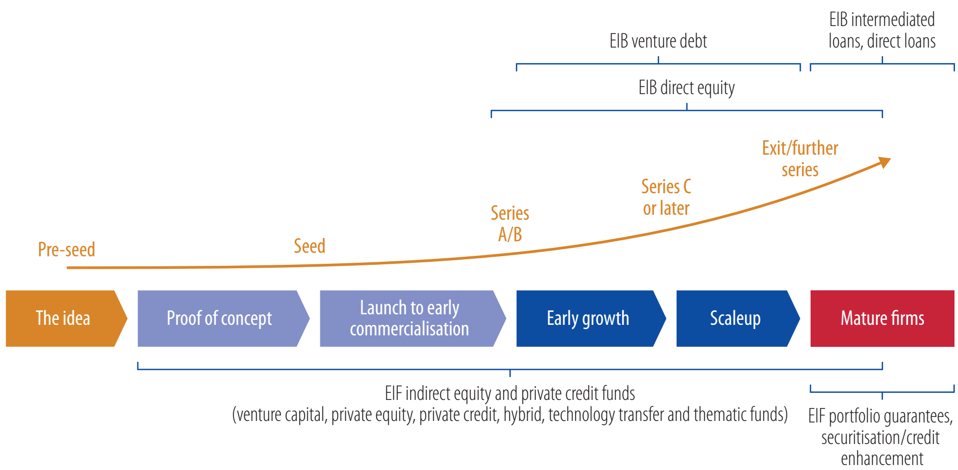
Securing financing for high-growth, innovative firms

Innovative, high-growth companies are pivotal to Europe's economic dynamism, productivity and global competitiveness. Although definitions of what constitutes high-growth, innovative firms vary (Vértesy et al., 2017), evidence shows that these companies generate substantial employment (Henrekson and Johansson, 2010; European Union Intellectual Property Office (EUIPO), 2019) and innovation (Organisation for Economic Co-operation and Development (OECD), 2010). They drive technological progress, create jobs and support industrial renewal by spreading knowledge across value chains. They make an outsized contribution to productivity growth and are central to the green and digital transitions. European scaleups, for example, are on average 128% more productive than other European companies (Fratto et al., 2024). Targeted financing and regulatory reforms can help Europe unlock higher growth, accelerate structural change and support long-term prosperity.

Europe continues to face a major financing gap that limits the ability of startups to innovate, grow and scale. Global spending on research and development has increased rapidly over the past two decades, but Europe invests less in R&D than the United States. Between 2014 and 2023, R&D investment in the European Union was 1 percentage point of GDP lower than in the United States, mainly because of much higher investment in the US technology sector. Mario Draghi's report on European competitiveness underscores that closing the innovation gap and enabling scaleup is essential to prevent Europe from falling behind global peers, warning that without decisive action the European Union risks a "slow agony" (Draghi, 2024). Europe has strong scaleup potential, but limited access to finance continues to constrain high-growth, innovative firms. The annual funding gap for EU startups compared to the United States is estimated at €120 billion, including an €80 billion gap for scaleups. The European Commission's competitiveness compass highlights the need to close this gap, including through the TechEU programme to support disruptive innovation. While the funding gap cannot be bridged by public resources alone, public support plays an important role in mobilising private investment.

High-growth, innovative companies follow a distinct financing path over their lifecycle (Figure 6), shaped by their changing risk profiles and capital needs. At the seed and pre-seed stage, when firms focus on concept development and early research, financing often comes from founders' savings, family and friends, and business angels, supported by public grants that reduce early-stage risk. As firms enter the start-up and early growth phases, equity from venture capital becomes critical, often complemented by venture debt to bridge gaps that arise because banks are reluctant to lend against intangible assets and high uncertainty. At the scaleup stage, financing needs increase significantly and require larger equity rounds and growth capital. In the maturity and exit phase, access to deep, integrated capital markets becomes essential for initial public offerings or strategic acquisitions. This highlights the importance of regulatory reforms that strengthen Europe's equity environment. This phased approach ensures that financing instruments match firms' growth stages, mitigating market failures and supporting innovation-driven competitiveness.

Figure 6
Stages of firm growth



Source: EIB.

Public resources help alleviate funding constraints for high-growth firms by unlocking patient capital and accelerating scaleup. National and supranational institutions, including the EIB Group, can support innovation by addressing the financing gaps created by information asymmetries, intangible assets and innovative firms' high-risk profiles. In addition to grants and subsidies, governments and public institutions can offer venture capital programmes, co-investment schemes with private investors, private equity, and risk-sharing instruments that mobilise private capital while mitigating downside risks. In 2024, the EIF provided €7.2 billion in equity, including almost €3.5 billion to venture capital funds, maintaining its position as the largest single investor in the European Union. Recent public initiatives such as the European Tech Champions Initiative aim to reduce the structural late-stage equity gap. Box B outlines recent national initiatives to support innovative firms. These measures seek to attract private investment, accelerate scaleup, and ensure that promising firms can access patient capital. EU-wide approaches also help innovative firms across all EU members access venture capital, strengthening the European market for innovation while offering investors geographical diversification.

Public venture capital strengthens startup performance and innovation, especially when it attracts private investment. In Europe, public venture capital has been shown to help companies secure private funds by playing screening firms and signalling quality to private investors (Leleux and Surlemont, 2003; Guerini and Quas, 2016). Venture capital investments supported by the EIF have a strong positive effect on startup performance. Five years after investment, beneficiary firms have capitalisation levels up to twice those of comparable unsupported firms. Their revenues are 19% to 97% higher and their job creation rates are double (Pavlova and Signore, 2019). Lower mid-market financing supported by the EIF also significantly improves company growth, especially in total assets, intangible assets and employment cost (Bertoni et al., 2025c).[2]

Analysis of the EU venture capital market confirms that venture capital drives short-term growth, particularly for innovative companies. Venture capital-backed cleantech firms, for example, outperform other comparable firms in employment and asset growth, with average post-investment increases of 8.3% in total assets and 7.7% in employment (Ambrois et al., 2025). Innovation also improves, with patenting rates rising by 10 percentage points among EIF-supported firms (Pavlova and Signore, 2021). However, co-investments between public and private venture capital funds are essential to boost innovation (Bertoni and Tykvová, 2015; Pierrakis and Saridakis, 2017; Berger et al., 2024).[3]

Public venture capital schemes are most successful when working with private investors. Joint investments help governments reduce frictions, improve capital allocation and address information gaps that arise when public funds target high-growth, innovative firms (Lerner et al., 2021; Köppl et al., 2025).[4] Evidence also shows a clear link between joint public-private funding and successful exits. Cumming et al. (2017) report stronger exit outcomes for firms backed jointly by independent and governmental venture capital investors than for firms supported by only one. Analysis of EIF-supported indirect venture capital investments also shows that EIF-backed startups are significantly more likely to be acquired and to go public than comparable unsupported firms (Pavlova and Signore, 2021).

This evidence highlights the need for a comprehensive, coordinated approach to financial support. Policy should mobilise both public and private capital, support firms throughout their growth cycle and strengthen the environment for exits. Instruments should be tailored to each stage of development, with particular attention to the late-stage equity gap and supporting scaleups, where European firms face the greatest challenges compared to global peers. The EIB Group's ongoing efforts, including the creation of the TechEU programme, are important steps in this direction.

Policy should also focus on stronger coordination between national and pan-European initiatives, and on further developing the savings and investments union to support cross-border investment and exits. National and EU-level support for innovative finance has increased, but the landscape remains fragmented, with risks of overlap and inefficiency. The EIB Group is responding by developing the pan-European TechEU programme, a flagship initiative to mobilise €250 billion by 2027 for innovation finance, with strong support for exits and scaleups. It is also strengthening the exit environment through an "exit toolbox," a set of advisory and financial instruments that help firms prepare for initial public offerings or strategic sales.

2 The EIF's lower mid-market private equity activity provides growth-phase companies with equity and hybrid debt-equity finance through local or pan-European private equity funds. These funds aim to support company growth, management professionalisation, internal process improvements, family succession, etc. Lower mid-market investments can also act as a key exit route for early-stage venture capital-backed companies, often through institutional buyouts.

3 Beyond Europe, the evidence on social returns is more mixed. In Canada, Brander et al. (2010) find little evidence of innovation benefits, reporting no significant increase in patenting or employment growth among government-backed firms. By contrast, recent studies on China suggest that government venture capital can promote innovation despite delivering lower financial returns (Ge et al., 2024; Zhang et al., 2024).

4 See Kraemer-Eis et al. (2023) for a more extensive literature review on the topic.

Box B

National support for venture capital and innovative companies

EU countries have recently increased their efforts to fund innovative firms and scaleups (Table B.1). Across Europe, government agencies' commitments to venture capital investment have grown nearly sixfold since 2007. Government-backed venture capital activity remains above pre-pandemic levels, as governments have allocated resources to support innovative companies, including through the Recovery and Resilience Facility, and worked with the EIF. Over the past five years, several new public entities providing direct or indirect support to innovative companies have been created (in the Netherlands and Poland) or have expanded their activities (in Italy, Denmark and Sweden).

A significant share of national funding is now dedicated to scaleups and larger innovative companies. The shift is visible in the creation of specialised funds, such as Spain's Fond-ICO Next Tech, and in higher ticket sizes, as those provided under Germany's Zukunftsfonds.

Nevertheless, overall funding remains insufficient, especially for later-stage development and cross-border growth. The scale of national support varies widely. Countries such as Spain, France, Denmark and Ireland are more active, while others rely mainly on traditional bank lending. Existing national programmes do not meet the sizeable financing needs of high-growth companies, particularly for larger ticket sizes, later-stage investment and expansion across borders.

A pan-European approach, supported by EU instruments and stronger coordination among national initiatives, is essential to build an EU-wide environment in which every innovative firm can access the finance it needs, especially in the scaleup phase.

Table B.1

National funding on innovative finance support (€ million)

	Annual flows*				Public capital deployed**			
	Total	Equity	Direct lending	Venture capital funds	Total	Equity	Direct lending	Venture capital funds
Belgium	**366**	132	134	100	**1 231**	306	205	719
Denmark	**858**	112	536	210		500		1 300
Finland	**283**	63		220				84
France	**1 916**	572	400	944	**15 648**	5 132	3 661	6 854
Germany					**9 883**	1 654	1 216	7 013
Ireland	**788**	70		718				
Italy	**337**	214		123	**1 900**			
Netherlands	**236**	135	36	65	**959**	364	110	485
Poland	**196**	47		149				
Spain	**2 884**	192	84	2 609	**8 541**	795	301	7 445
Sweden	**115**	40		75				53

Source: *EIB staff estimates based on national funds' annual reports and public reporting.*
Note: **Data refer to the latest year available and differ across countries. **Public capital deployed reflects the amount invested since programme start, so time periods differ.*

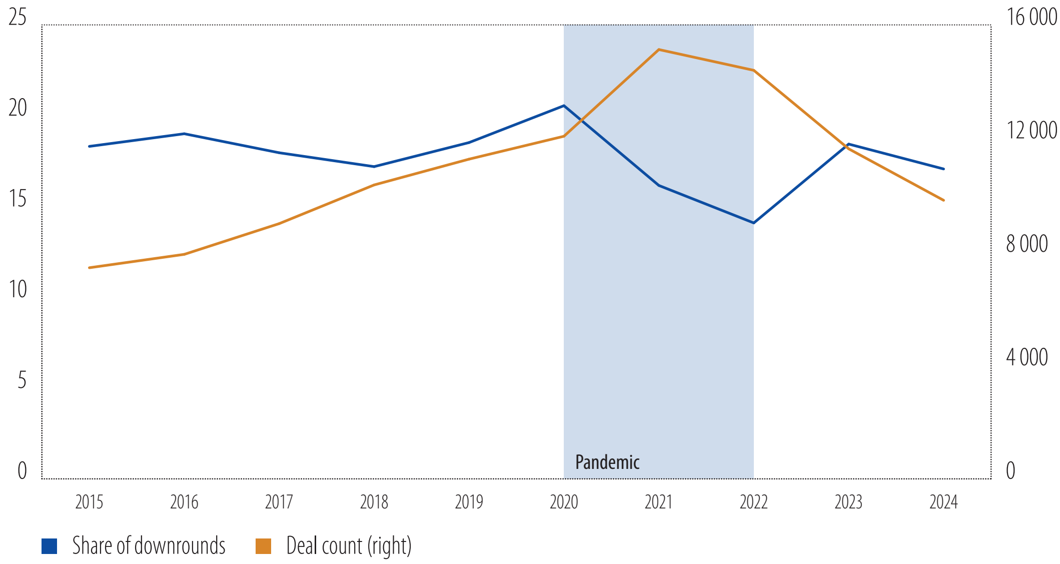
Using venture debt to prevent capital dilution

Venture debt has become an alternative to equity financing. It gives innovative firms access to capital while avoiding funding rounds that reduce ownership. Venture debt is a flexible, long-term financing instrument designed for fast-growing, innovative firms. It bridges funding gaps between equity rounds or ahead of an initial public offering, extending cash runways without diluting ownership.

The benefits of avoiding dilution vary over the business cycle. Cyclical conditions, especially the cost of capital, shape how attractive venture debt is compared to equity. During periods of strong growth and buoyant valuations, issuing equity may be less diluting. In downturns or when valuations fall, preserving ownership becomes more valuable. As macro-financial conditions tighten, venture debt offers a countercyclical way to lower valuation risk and sustain investment in innovation.

The financing environment for innovative firms in Europe has changed significantly since the post-pandemic boom of 2021. Rising inflation and interest rates have shifted investor behaviour, increasing the cost of equity and pushing valuations down. Global venture capital volumes peaked in 2021 and have declined sharply since then, showing that this retrenchment is worldwide. Figure 7 shows the rise in down-rounds – funding rounds where valuations decrease – between 2021 and 2023, and their link to overall venture capital activity. The correction has affected all sectors, but life sciences and e-commerce were hit hardest (Figure 8). The median time between venture capital rounds has also increased, especially for later-stage firms, reflecting a shortage of capital compared to the liquidity seen during the pandemic recovery.

Figure 7
Financing rounds with a drop in company valuation from the previous round (% of total)

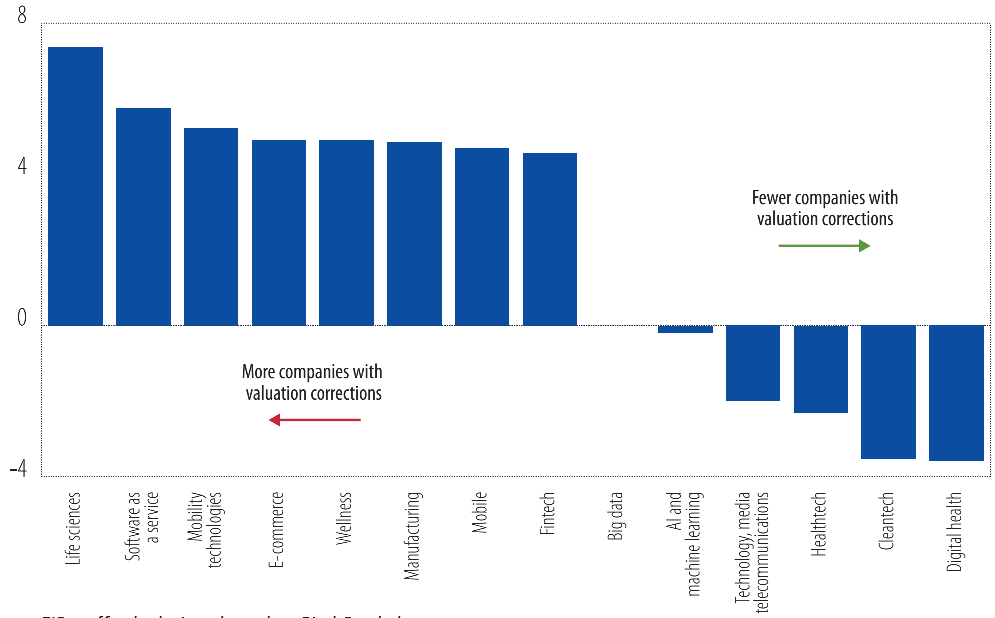


Source: *EIB staff calculations based on PitchBook data.*
Note: *EU data only.*

As equity became more expensive, venture debt grew in importance. With higher interest rates and investors demanding stronger fundamentals, many high-growth firms faced major constraints in raising equity without accepting significant valuation cuts. Venture debt offered a non-diluting alternative, enabling companies to continue to grow while limiting dilution. Figure 9 shows this shift: The share of venture debt relative to the venture capital market increased sharply, reaching 42% in 2024, more than double previous levels. This trend coincided with a sharp rise in the European Central Bank (ECB) deposit facility rate, which moved from negative levels to above 3.7%. In the data, a 1 percentage point increase in the ECB rate is associated with a 3.5 percentage point increase in venture debt relative to venture capital.

Figure 8

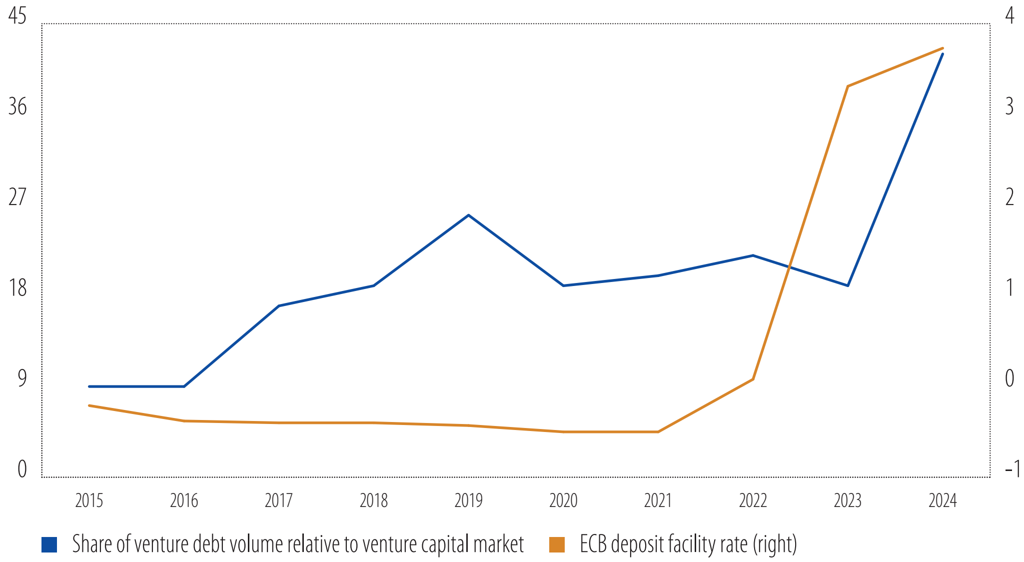
Valuation corrections in later-stage venture capital for key EU sectors (percentage point difference in share of down-rounds from 2021 to 2023)



Source: *EIB staff calculations based on PitchBook data.*

Figure 9

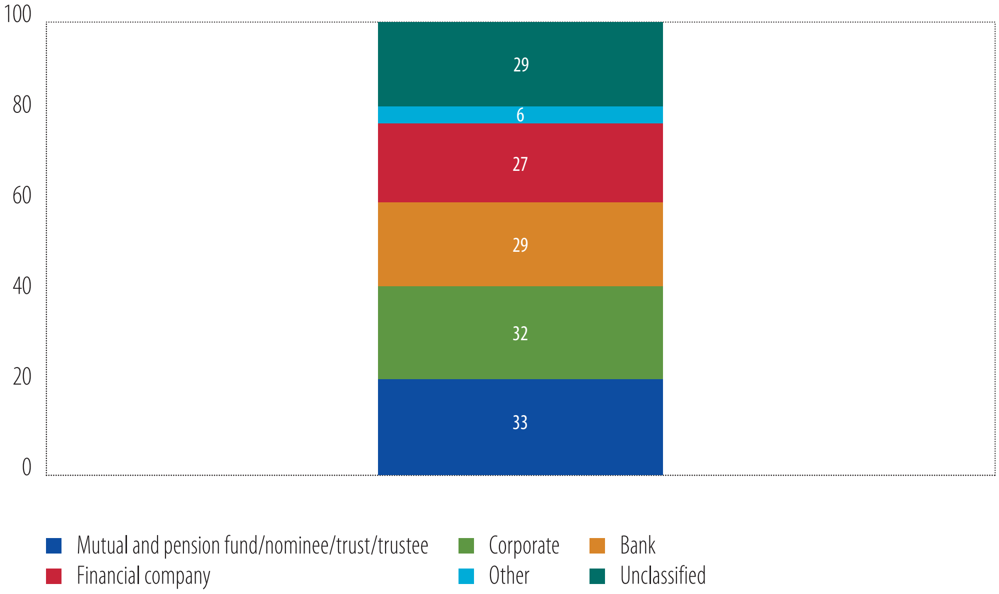
European venture debt volumes relative to venture capital volumes (in %)



Source: *EIB staff calculations based on PitchBook and ECB data.*

By late 2023, many new providers of venture debt – including credit funds and major banks – entered the market, replacing specialised lenders that had withdrawn. Venture debt providers now include institutional investors, corporates, banks and public authorities (Figure 10), reflecting the expanding role of this asset class in Europe's innovation ecosystem.

Figure 10
Venture debt deals (in %) **2023-2024, by lender**



Source: EIB staff calculations based on PitchBook and Orbis data.

The recent downturn underscores the importance of flexible financing tools for innovative firms. These firms have high risk profiles and large capital needs, making them particularly sensitive to shifts in macroeconomic conditions that can rapidly affect investor sentiment and liquidity. Policy frameworks must therefore provide strong support during downturns. Venture debt and guarantees have proven effective, offering alternative sources of funding and helping limit equity dilution during periods of stress. The EIB played a central stabilising role. In 2024, the Bank signed €1 billion in venture debt operations. Continued development of these countercyclical policy tools, together with efforts to deepen secondary markets and improve exit opportunities, is essential to protect Europe's innovation capacity.

Venture debt as a quality signal to accelerate subsequent financing rounds

The EIB provides about 30% of all venture debt financing in the European Union, making it a key player in building a market that private lenders have historically underserved. Since introducing venture debt in 2015, the Bank has deployed more than €8.4 billion across 323 transactions, with average annual signatures of €1 billion. Its signalling effect – based on rigorous due diligence and alignment with EU policy goals – helps attract private capital and reduce information gaps, especially in high-risk sectors such as deep tech, life sciences and clean technologies.[5] By leveraging its scale and credibility, the EIB not only fills structural financing gaps but helps make venture debt a standard growth tool, strengthening Europe's innovation sector and competitiveness.

Venture debt helps firms raise follow-on financing more quickly, demonstrating the Bank's role in signalling firm quality in an opaque market. A new assessment of the impact of venture debt shows that about three in five beneficiaries secure at least one additional financing round within five years

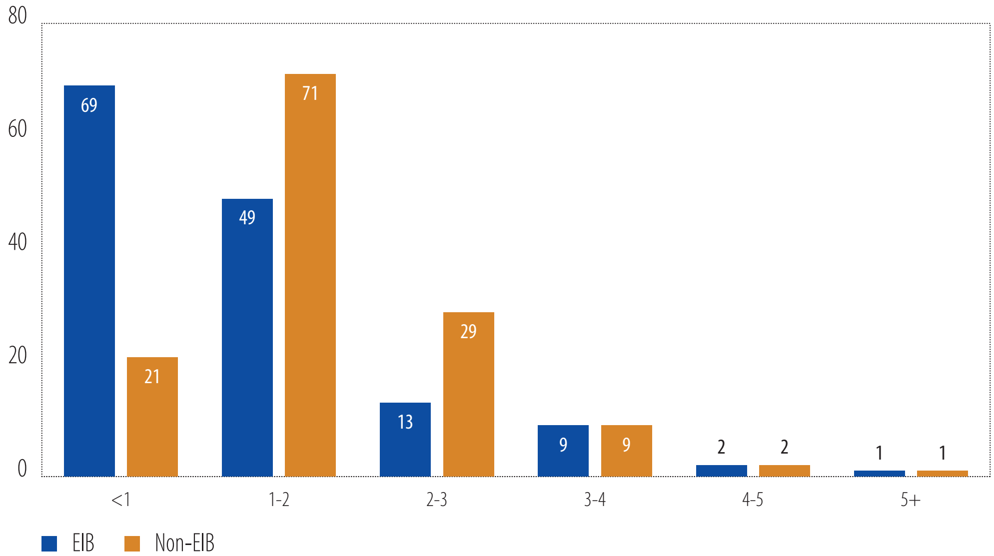
5 The EIB has supported some of Europe's largest venture debt deals, including Northvolt (€5 billion), Stegra/H2 Green Steel (€4.2 billion) and Verkor, all strategic projects advancing Europe's green and digital transitions.

of receiving support.[6] Although the share is similar for non-beneficiaries, firms backed by the Bank achieve this more quickly. Figure 11 shows the number of firms securing a first financing round (venture capital or private equity) in the years after a venture debt signature. One year after signature, 30% of EIB beneficiaries have secured at least one round of financing – a rate 20 percentage points higher than comparable firms without EIB venture debt.[7]

EIB venture debt beneficiaries also raise larger follow-on rounds. Firms receiving venture debt from the Bank close larger financing rounds than similar firms without Bank support. Figure 12 shows the distribution of deal sizes: While both groups raise rounds of up to €20 million, EIB beneficiaries are more likely to secure larger rounds, especially above about €20 million.

Figure 11

First financing round after venture debt signature (x-axis: years since signature; y-axis: number of firms)



Source: *EIB staff calculations based on EIB internal data and PitchBook data.*
Note: *Financing rounds include venture capital or private equity deals. The EIB sample includes 234 firms receiving EIB venture debt. The comparative group of 234 non-beneficiaries was constructed using propensity score matching based on sector, venture debt size and firm age, from a sample of 4 129 firms.*

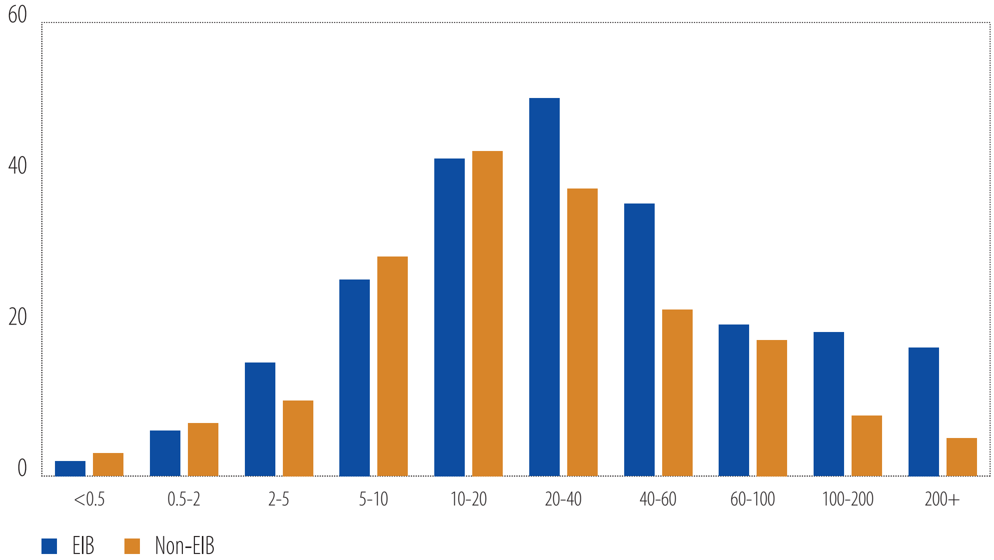
Venture debt from the Bank signals creditworthiness, helping firms access significantly more debt than their peers. Beneficiaries raise about 1.5 times more additional debt than non-beneficiaries in the years following a venture debt signature. Figure 13 presents a counterfactual analysis showing the difference in the amount of debt raised before and after signature. While the two groups exhibit similar debt patterns before receiving venture debt, EIB-backed firms raise substantially more debt as early as one year after signature.

6 As the EIB's venture debt product matured over 2025, ongoing research is updating earlier findings from Gatti et al. (2022), extending the sample and relying on a longer time horizon.

7 Out of 234 firms that received EIB venture debt, 71 firms received at least one additional financing round one year after the signature, while only 24 of the comparable firms that did not receive EIB venture debt received at least one additional financing round after one year.

Figure 12

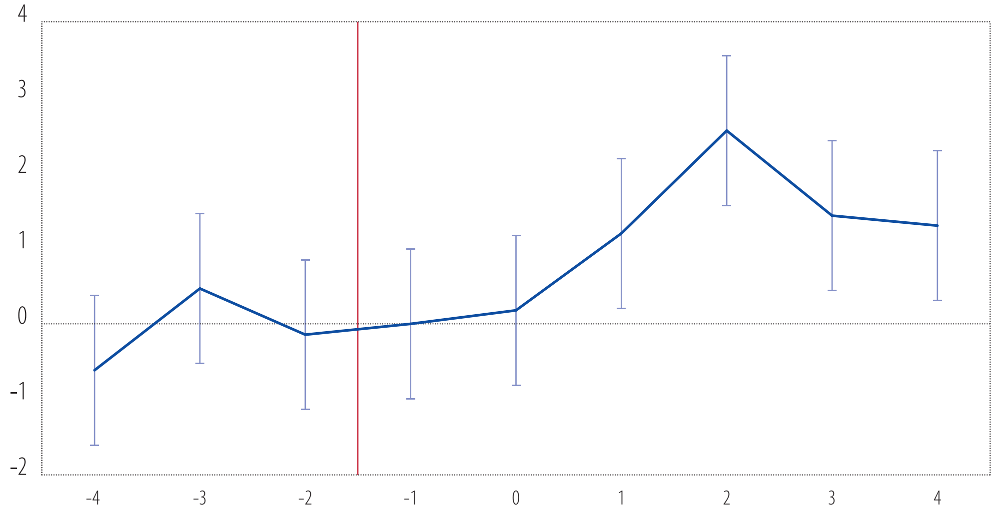
Deal size distribution for additional financing (x-axis: deal ticket sizes in € million; y-axis: number of deals)



Source: *EIB staff calculations based on EIB internal data and PitchBook data.*
Note: *Financing rounds include venture capital and private equity deals. The EIB sample includes 234 firms receiving EIB venture debt. The comparative group of 234 non-beneficiaries was constructed using propensity score matching based on sector, venture debt size and firm age, from a sample of 4 129 firms.*

Figure 13

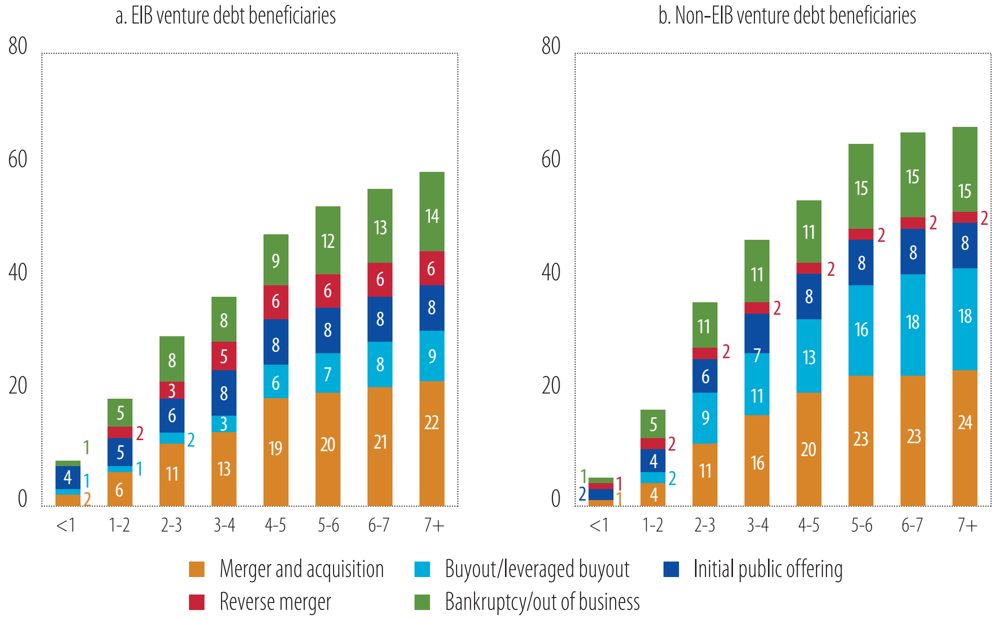
Impact of receiving EIB venture debt on additional debt financing (cumulative change in debt)**, by year before/after receiving venture debt loan**



Source: *EIB staff calculations based on EIB internal data and Orbis data.*
Note: *The control group was constructed using propensity score matching on the following financial variables from a sample of 3 651 EU-based firms: number of employees, total assets, fixed assets and long-term debt before receiving the loan. Coefficients are normalised to the year before loan allocation (t=-1) and show the cumulative effect relative to this baseline. The vertical lines represent 95% confidence intervals.*

Nearly one in five firms achieves a successful exit after receiving venture debt from the Bank. Seven years after signing, 19% of beneficiaries achieve a positive exit, such as an initial public offering, merger, acquisition or buyout. Although the initial aim of venture debt was to bring firms from a financing round to an initial public offering, only about 3% of firms achieve this type of exit (Figure 14a). Comparable firms receiving venture debt from other lenders show similar patterns, suggesting a general slowdown in initial public offerings. Figure 14b shows that beneficiaries from other lenders (not the EIB) are more likely to exit through a merger, acquisition or buyout, but less likely to exit through a reverse merger.

Figure 14
Exits, by exit type and time since venture debt signature



Source: *EIB staff calculations based on EIB internal data and PitchBook data.*
Note: *The EIB sample includes 234 firms receiving EIB venture debt. The comparative group of 234 non-beneficiaries was constructed using propensity score matching on sector, venture debt size and firm age, from a sample of 4 129 firms.*

Public support – including co-investment schemes and risk-sharing instruments – crowds in private capital and accelerates the growth of innovative firms. The EIB Group – directly through EIB venture debt and through EIF indirect equity – plays a catalytic role by providing patient capital and signalling firm quality to the market. Building on this track record, the TechEU programme aims to unlock further financing for European innovation.

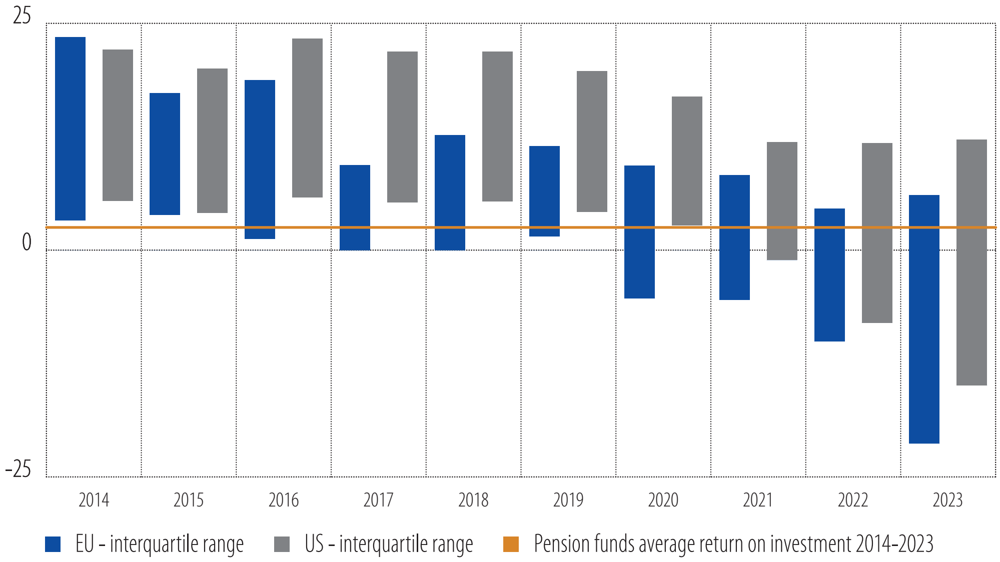
Unlocking institutional capital for innovation

Europe's long-term competitiveness and technological sovereignty depend on its ability to finance innovation domestically. Despite world-class research and talent, European startups and, in particular, scaleups continue to face a sizeable funding gap. Ten years after creation, they have raised only half as much capital as comparable firms in the United States (Fratto et al., 2024).

Institutional investors can help close this gap. Currently, only 0.024% of European pension fund assets are invested in venture capital, far below the share allocated by US pension funds (European Capital Markets Institute, 2024). Countries with large, domestically focused institutional investors, such as the Nordic members, tend to have more dynamic venture capital markets. Even small shifts in asset allocation could unlock hundreds of billions of euros for innovation. Pension funds invest only 4% of their assets in private equity, venture capital and infrastructure combined (InvestEurope, 2024). Raising that share to the US level of 11% could mobilise up to €248 billion. For insurers, doubling the current allocation could unlock €180 billion to €200 billion, compared with €40 billion invested in European venture capital in 2025.

Venture capital and other alternative assets provide diversification and can deliver higher returns, which is important in light of demographic pressures on welfare systems. These assets can therefore help institutional investors meet long-term obligations while supporting economic growth. Over the past decade, European venture capital funds have outperformed average pension fund returns and delivered results comparable with US venture capital funds (Figure 15; see also InvestEurope (2025) for an alternative analysis with different country groupings, reaching similar conclusions).

Figure 15
Venture capital fund returns (internal rate of return, in %)



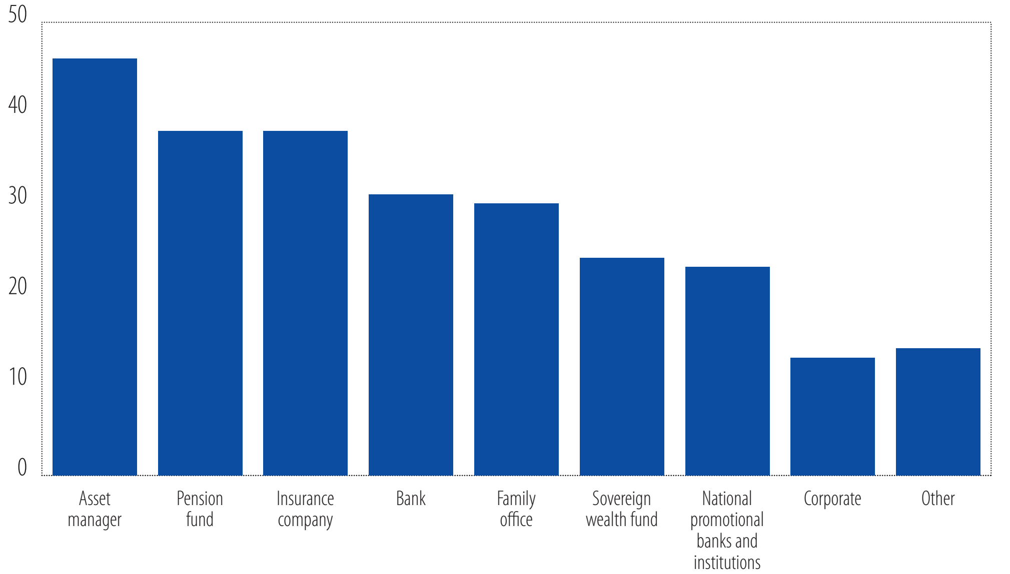
Source: EIB staff calculations based on TrackVC, Efront Insight and the Organisation for Economic Co-operation and Development (OECD).
Note: Fund vintage refers to the year of the fund's first investment. EU data are for the first quarter of 2025 and US data are for the fourth quarter of 2024. The chart compares internal rates of return for venture capital funds with returns on investment for pension funds. These are different profitability metrics and should be compared with caution. Average pension fund returns use annual nominal pension fund assets as weights and include only EU members with complete data series. The interquartile range measures the difference between the 75th and 25th percentiles.

A fund-of-funds structure provides a risk-return profile and commitment size more suitable for institutional investors. By broadening geographical and sectoral exposure, funds of funds can reduce the risks associated with individual venture capital funds. Pension funds and insurance companies also tend to make large commitments (Figure 16). Large venture capital funds and funds of funds can accommodate these commitments, making them more attractive investment options. Yet between 2013 and 2025, the European Union had only 14 venture capital funds larger than $1 billion, compared with 164 in the United States (Fratto et al., 2024). Supporting this segment of the venture capital market by introducing policy instruments that promote suitable investment opportunities could therefore encourage greater participation by institutional investors.

Funds of funds also align risk-return profiles with the strategic goals of institutional investors. The ongoing fundraising for these initiatives reflects their growing appeal. Instruments like the European Tech Champions Initiative 2.0 simplify due diligence and provide a track record, helping attract large-scale investors. When reputable public institutions promote funds of funds, they send a positive signal that can encourage institutional investors to invest in the underlying venture capital funds.

Institutional investors' participation remains limited due to regulatory and structural barriers and knowledge gaps. Fragmented national rules discourage cross-border investment. At the same time, the illiquidity, complexity and small sizes of many venture capital funds do not match institutional investors' preferences for scale and stability. Many pension funds and insurers also lack the expertise to assess venture capital investments, increasing due diligence costs. Limited transparency on fund performance further raises perceived risks.

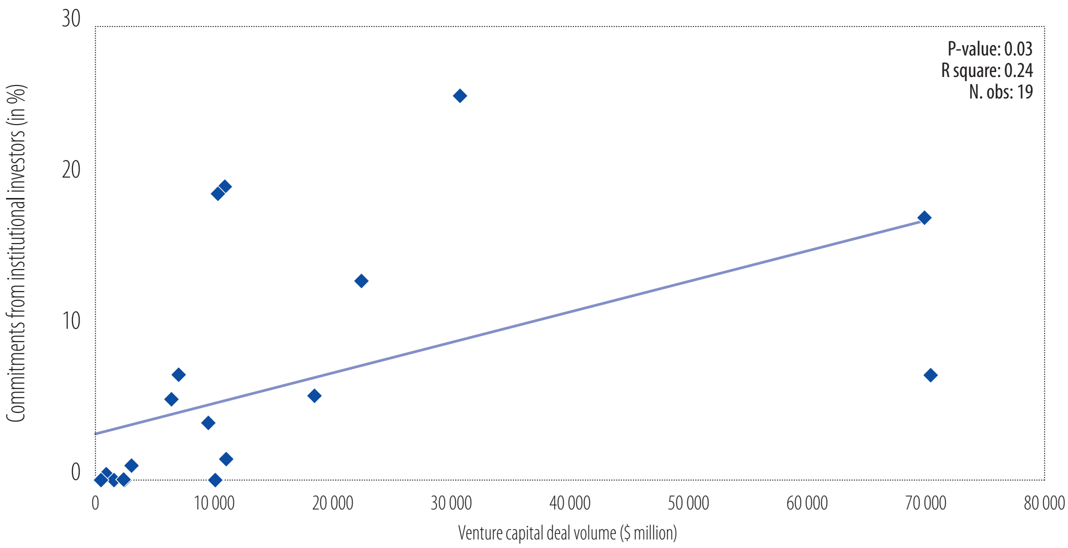
Figure 16
Average commitment size (€ million)**, by investor type**



Source: *European Commission (2025b).*
Note: *Averages for 2022-2025.*

Institutional investor participation is strongly correlated with the size of the venture capital market (Figure 17). Pension funds and insurance companies rely on deeper markets, and their participation, in turn, helps deepen those markets. Countries with high domestic and foreign institutional investor involvement, such as Germany, Sweden and the Netherlands, tend to have stronger venture capital environments; others face bottlenecks.

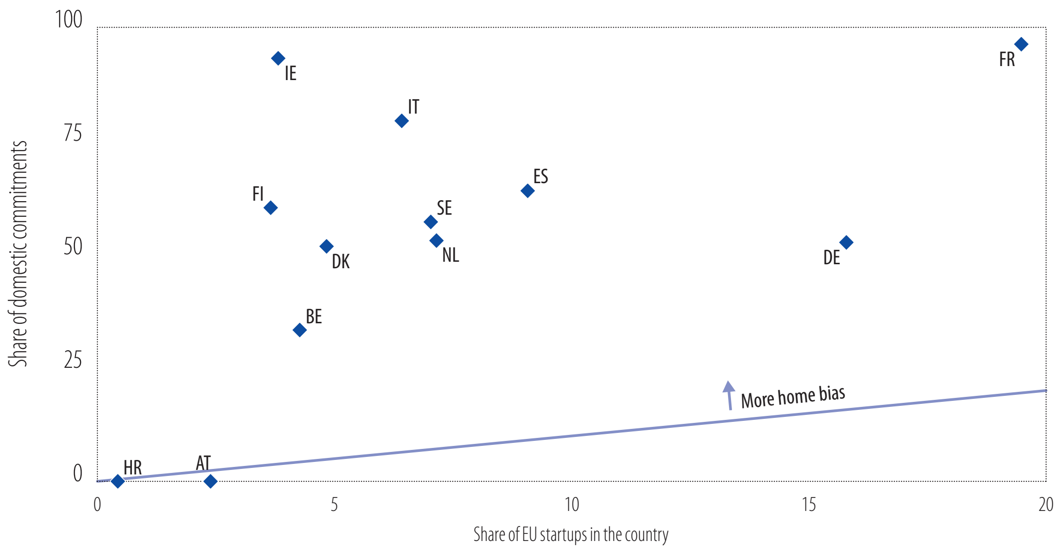
Figure 17
Venture capital commitments from institutional investors and deal volume



Source: *EIB staff calculations based on PitchBook and InvestEurope data.*
Note: *The sample includes all EU countries.*

Institutional investors in Europe also tend to favour domestic venture capital funds. Fragmented rules and a lack of harmonisation discourage cross-border investments (Figure 18). This home bias persists even in equity investments, limiting opportunities for risk-sharing and scale. When investors do look abroad, they often favour well-developed markets, particularly the United States.

Figure 18
Share of domestic pension fund commitments and EU startups (in %)



Source: *EIB staff calculations based on PitchBook and InvestEurope data.*

Several European countries have introduced successful initiatives to mobilise institutional capital for innovation. In France, the Tibi Initiative has mobilised €15 billion from insurers and pension funds in five years, focusing on late-stage venture capital. In Germany, Wachstumsfonds (€1 billion) and the WIN Initiative (€12 billion) support innovation and startups, with more flexible rules for small insurers. In the United Kingdom, the Mansion House reforms commit major pension providers to allocate 10% of assets to infrastructure, property and private equity by 2030. Italy recently approved tax exemptions for pension funds investing in venture capital. These national initiatives enable faster action and better tailoring to national priorities. In the long run, however, a unified European system will be essential to achieve the industrial capacity and economic scale needed for firms to compete globally.

Pan-European initiatives like the European Tech Champions Initiative 2.0 also enable greater geographical diversification, which can encourage institutional investors to take part. Large companies show a strong home bias in equity and alternative assets, driven by market frictions and public incentives. This limits investment in these asset classes and increases exposure to country-specific risk. The geographical fragmentation of current national support programmes can be a barrier. Pan-European initiatives can bring the scale and geographical diversification needed to further scale institutional investors' participation.

Supporting the exit of venture-backed companies and improving transparency on fund performance can also boost investor confidence. Supporting EU exits for startups and scaleups could improve financial returns for early-stage investors, increase liquidity and help retain strategic technologies in Europe. Better reporting on fund performance, as promoted by the EIF's TrackVC initiative, can reduce information gaps and strengthen trust.

Ongoing regulatory reforms can further unlock institutional investment. The review of Solvency II aims to simplify regulation and reporting, release capital for investment in alternative assets and grant preferential treatment for long-term equity investments. These changes would align insurance regulation more closely with banking rules and encourage greater participation in private equity and venture capital. The consultation continues, with new provisions expected to take effect in 2027.

Supporting deeper and more liquid capital markets can increase returns for investors at all stages of a firm's growth. Better integration of European capital markets encourages greater participation by institutional investors, providing more liquidity for listed companies and improving financial prospects for unlisted companies preparing for an initial public offering. Progress in the savings and investments union is expected to generate a virtuous cycle by attracting more institutional investors and strengthening the development of a pan-European venture capital landscape.

Improving financial literacy can also encourage a more positive attitude towards risk and reduce the demand for products with guaranteed benefits. The European Commission's financial literacy strategy, announced in September 2025, provides a common framework. By equipping households with the skills to assess risk and investment horizons, these policies may reduce the liabilities under guarantee and allow pension funds and insurers to allocate more capital to higher-risk investments such as equity and alternative assets.

Removing non-financial barriers to efficiency

Non-financial investment barriers also weaken Europe's competitiveness. While financial constraints and gaps in market development often dominate the discussions, fragmented rules, shortages of skilled workers and inadequate digital infrastructure can be just as harmful. They delay project completion, increase costs and prevent firms from reaching their potential. Removing these barriers speeds up the delivery of essential social infrastructure, such as affordable housing and modern health facilities. It also accelerates the green and digital transitions, reduces strategic dependencies and ensures investment delivers real benefits for people and businesses.

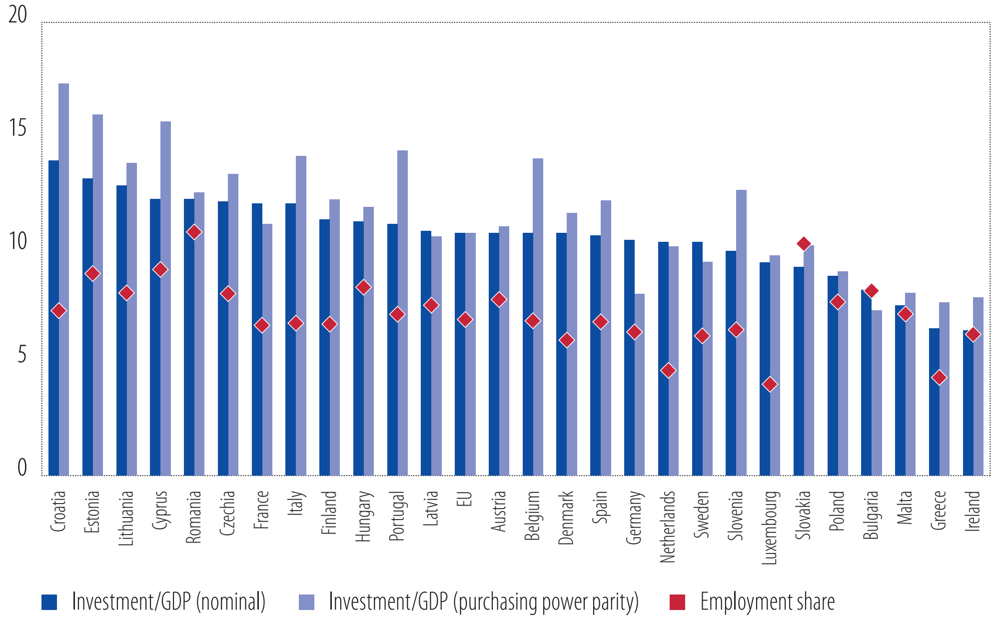
The Bank helps address these barriers through its work on infrastructure projects. Beyond financing, it supports coordination across the European Union to reduce duplication and inefficiency. Its in-house experts provide skill development programmes and technical assistance and encourage integrated planning, standardisation and the use of best practices.

This section focuses on the construction sector and on urban rail projects. Both show how key enablers shape competitiveness at the European and local levels. A strong and efficient construction sector is central to public investment, while urban rail projects illustrate where delivery can fall short and where improvements can be made.

Construction: Removing barriers to deliver key infrastructure

Construction is a major pillar of the EU economy and a cornerstone of project implementation in Europe. An efficient construction sector ensures timely, cost-effective delivery of infrastructure and housing projects – visible investment that benefits people and businesses. In 2024, construction investment accounted for 10.7% of EU GDP (Figure 19), representing nearly half of all investment activity (with total gross fixed capital formation at 21.2% of GDP). The sector provides jobs for 13.8 million people, or about 6% of the EU workforce. Activity is concentrated in the largest EU members – Germany, France, Italy and Spain – which together generate 63% of EU construction investment and 54% of sector employment. This concentration also makes the sector strategically important for driving economic growth and stability across the European Union.

Figure 19
Construction as a share of EU national economies (in %)



Source: *EIB staff calculations based on Eurostat.*
Note: *Construction sector investment is measured as gross fixed capital formation relative to GDP. The employment share refers to employment in the construction sector relative to total employment in each Member State.*

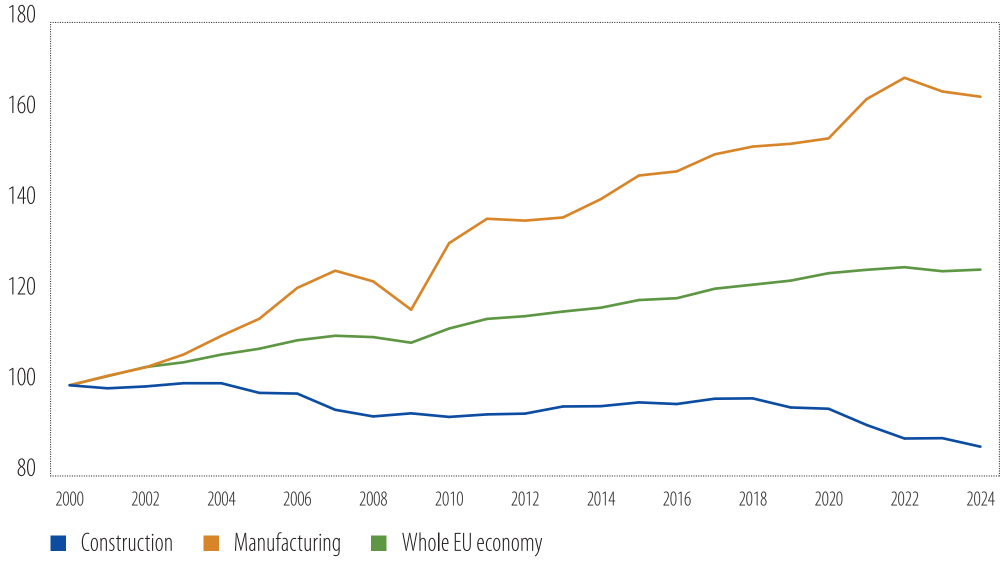
Despite its size and public support, construction faces deep-rooted structural and cyclical challenges that have led to a persistent fall in productivity. Labour productivity has dropped about 15% since 2000, despite the sector's critical role in the green transition and wider economic growth (Figure 20)[8]. Increasingly complex regulation, demographic ageing, labour shortages and slow digitalisation limit the sector's ability to deliver projects efficiently and on budget. Construction is highly sensitive to macroeconomic shocks and financing conditions, including interest rates, which discourage investments in new technologies and skills.[9] The high share of small firms (about 90%) also limits productivity gains because they lack scale.

Regulation and skill shortages are key drivers of these productivity challenges. Data from the EIB Investment Survey (EIBIS) show that labour market rules, shortages of skilled workers and burdensome business regulation significantly constrain productivity in the construction sector (Figure 21). Analysis linking EIBIS and the EIB Municipalities Survey also shows that local skill shortages significantly reduce the likelihood that firms will invest, particularly in the construction sector. Construction projects rely heavily on municipal administrative and technical capacity, including permitting, planning and regulatory approvals. Any shortage in these functions can quickly lead to delays, reductions in project scope or costly changes. These barriers limit firms' ability to improve processes and adopt new practices, slowing project delivery and raising costs. The availability of digital infrastructure does not appear to influence productivity outcomes, suggesting that technology alone cannot offset regulatory and workforce challenges. Policy reforms and targeted training remain essential to help firms address skill shortages and reduce regulatory bottlenecks.

8 Goolsbee and Syverson (2023) show that the productivity decline is not only an EU phenomenon. The comparatively stronger productivity slowdown in the United States cannot be simply explained with measurement issues but rather with frictions that clog channels for productivity growth observed in other sectors in the US economy.

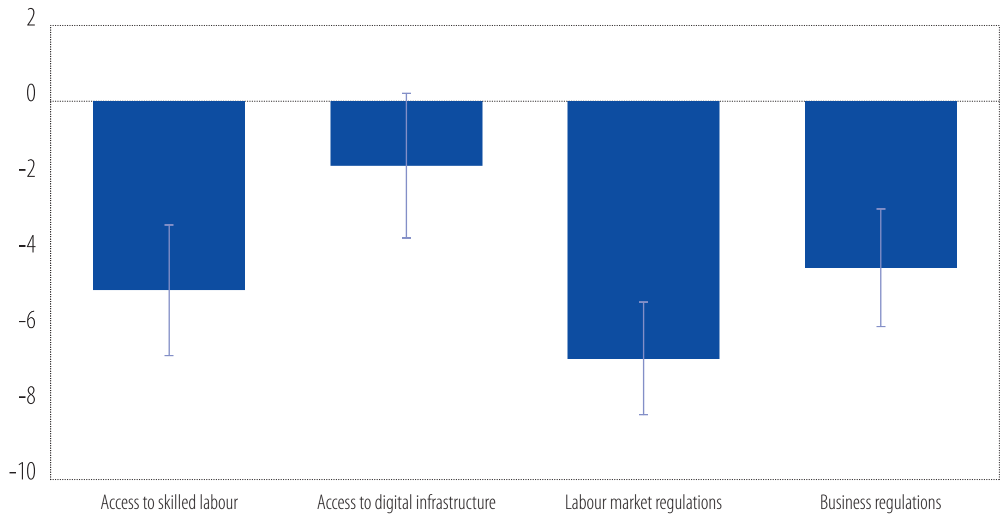
9 A drop in residential investment can be considered an early warning indicator for incoming recessions (Leamer, 2015).

Figure 20
Labour productivity in EU construction over time (index, 2000=100)



Source: *EIB staff calculations based on Eurostat.*
Note: *Real labour productivity per hour worked.*

Figure 21
Barriers to labour productivity in construction (productivity difference, in %)



Source: *EIB staff calculations based on EIBIS 2016-2025.*
Note: *Estimates are based on pooled ordinary least squares (OLS) regressions. All regressions control for country, sector, wave and firm age (younger than ten years old) with robust standard errors. Similar results are also obtained when labour productivity is replaced with total factor productivity as the dependent variable. The vertical lines represent 95% confidence intervals.*

Labour shortages and skill mismatches continue to limit productivity and innovation. Demand for construction workers has outpaced supply for many years. Demographic ageing, limited training opportunities and the perception of construction work as physically demanding – and unstable since the 2008 crisis – discourage new entrants.[10] Women represent only about 15% of the workforce, mostly in administrative roles, leaving a large, untapped talent pool. The sector has also remained highly labour-intensive, with little structural change over time (Organisation for Economic Co-operation and Development (OECD), 2024). Wage growth has favoured skilled labour and managers, but this has not made the sector more attractive for workers in high demand.[11] Although there has been a gradual shift of skilled labour towards larger, growing firms,[12] persistent skill mismatches, particularly in specialised areas, compound these challenges. Shortages in skilled labour also slow investment, innovation and productivity improvements (Ugurlu et al., forthcoming).

Reliance on domestic markets and localised supply chains drives cost volatility in construction and limits economies of scale. Construction depends heavily on inputs from non-competitive markets such as steel and cement, making cost control difficult. Steel prices are set globally and can fluctuate sharply (they doubled during the COVID-19 pandemic), even though most European steel comes from recycled scrap.[13] Cement is usually sold locally and tends to be more expensive in markets with few suppliers. Because transport costs are high, cement is rarely traded across borders. These factors reinforce the productivity gap and slow progress on climate goals.

Fragmentation of the EU single market limits firms' ability to scale and adds regulatory costs. National rules and complex approval processes restrict the free movement of construction goods and services, reduce productivity and discourage investment in innovation. According to the EIBIS, more than 75% of EU construction firms report having to comply with different rules and standards across countries, and almost one in five firms employ over 10% of their staff to manage cross-border regulation (more than in any other sector). Only around 5% of large public construction tenders are awarded to foreign firms, and larger, more complex infrastructure projects increasingly attract only a single bidder (European Court of Auditors (ECA), 2023).[14] Harmonising national regulatory standards would help facilitate intra-EU trade in construction services, which currently stands at only 1% of such services exchanged among Member States, although it is rising gradually.[15] Integrating regulations across EU countries would increase competition for key architectural, legal and engineering services, driving faster and larger-scale delivery of construction projects.

Innovation and digital technologies can significantly increase efficiency in the construction sector. Technologies like building information modelling (BIM),[16] cloud computing and 3D printing can improve collaboration, strengthen project management and optimise resources (Table 1). Targeted support can increase and broaden adoption of innovative technologies. For example, the HousingTechEU initiative supports mid-cap and large companies in developing advanced construction materials, machinery and engineering solutions that improve quality and reduce costs. By encouraging innovation, the initiative aims to strengthen EU competitiveness and help create affordable, high-quality housing.

10 According to Cedefop's skill forecast, the construction sector requires over 4 million new workers until 2035 due to retirement to keep up with demand. The analysis of EIBIS data shows a persistent gap between skill shortages and training offered at the firm level, with a difference of more than 15 percentage points in 2025.

11 Average wages from the Labour Costs Survey (Eurostat, 2025) reveal a growing premium for full-time employees of larger civil engineering firms (more than ten employees) compared with peers in larger residential construction firms across Europe, impacting labour market dynamics within the sector.

12 Based on OECD PIAAC 2023 data, this effect has been estimated at an EU average of around 6% in favour of firms in the construction sector expanding over the past 12 months.

13 In the European Union, the global scrap input rate in recent years is estimated to be 55% to 60%, though significant disparities exist across EU members (Maury et al., 2025).

14 The share of single bidders in construction tenders shows a clear divide across the European Union: Countries with large, complex infrastructure projects tend to attract fewer bids from bigger firms, while those focused on smaller, less complex works generally see more competition and a higher number of bidders (European Court of Auditors (ECA), 2023).

15 A 10% reduction in non-tariff barriers to trade in construction services would increase EU gross value added by about 0.5% (Dorn et al., 2024).

16 Building information modelling (BIM) is an approach that involves creating and managing digital representations of the physical and functional characteristics of buildings or other physical assets and facilities.

Table 1
Digital technologies in the construction sector

Technology	Stage of development	EU strengths and weaknesses	Impact on construction	Barriers to investment
Prefab	Heterogeneous adoption (Sweden is a good example), but not yet mainstream in execution.	EU performs well in R&D, but scaleup remains limited.	Reduces construction time and waste; improves quality control; lowers labour needs; enhances sustainability.	High equipment costs; lack of standardisation; fragmented regulation across EU markets; skill gaps.
3D printing	Early stage; used mainly in niche, small-scale applications like facade elements and small structures; pilot projects for entire buildings.	Strong EU research capabilities; rapid growth expected.	Enables customisation; reduces waste, construction costs and time; accelerates prototyping and component production.	High equipment costs; technical limitations; shortage of skilled operators; limited regulatory frameworks.
Robotics	Infancy stage; rarely used in construction; mostly in experimental or pilot phases.	Strong EU R&D, but limited integration into construction workflows.	Reduces errors; improves safety; allows automation of repetitive tasks.	High equipment costs; technical limitations; shortage of skilled workers; lack of interoperability.
AI	Early stage, but potential for rapid development.	Very low adoption.	Enhances project oversight and monitoring; reduces delays, errors and waste; improves resource allocation.	High equipment costs; shortage of skilled workers; technical limitations.
Building information modelling (BIM)	Most developed and widely used digital technology.	Adoption in the European Union still moderate and limited to large and complex projects: 29% of European construction companies use 3D BIM; only 6% use 4D BIM.	Lower costs and construction time; reduces errors; strengthens collaboration among stakeholders.	High cost of software and training, shortage of skilled workers; limited demand from project promoters.

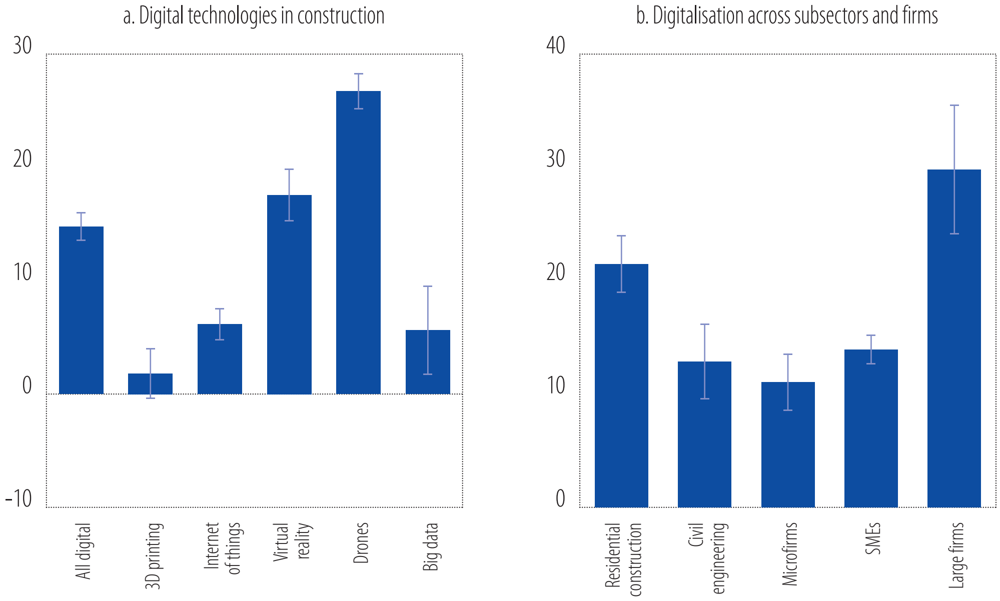
Source: *European Construction Sector Observatory (2019a, 2019b, 2021); McKinsey (2018); Kelly (2024); Li et al. (2025); Royal Institution of Chartered Surveyors (RICS) (2025).*

Digitalisation boosts productivity, particularly in residential construction and among large firms. Construction companies that use digital technologies such as the internet of things, virtual reality and drones report consistent productivity gains (Figure 22). These technologies support real-time monitoring, immersive design visualisation and safer worksites, which strengthen efficiency and coordination across projects. Residential construction benefits most from digitalisation because processes are more repetitive and standardised. Civil engineering projects, which are often more complex and tailored, see smaller gains. Larger firms are also leading this transformation. They use economies of scale to integrate advanced technologies into daily operations, achieving measurable improvements in project delivery and cost control.

Although digital technologies offer significant benefits for the construction sector, adoption remains gradual and uneven across regions and firm sizes. While overall adoption of at least one digital tool has hovered below 30% since 2019, the share of firms using several advanced technologies has nearly doubled to 20%, mainly among larger firms (Figure 23). However, use often focuses on specific functions such as cost estimation or safety monitoring, while important areas like carbon footprint analysis remain less developed. Larger firms increasingly integrate digital tools into their core processes, whereas smaller firms often fall behind because of limited resources and lower digital readiness. High upfront costs, skill shortages, fragmented supply chains and inconsistent client demand widen this gap. Overcoming these challenges will require coordinated efforts to improve interoperability, expand workforce training and promote more comprehensive, data-driven approaches to digitalisation.

Figure 22

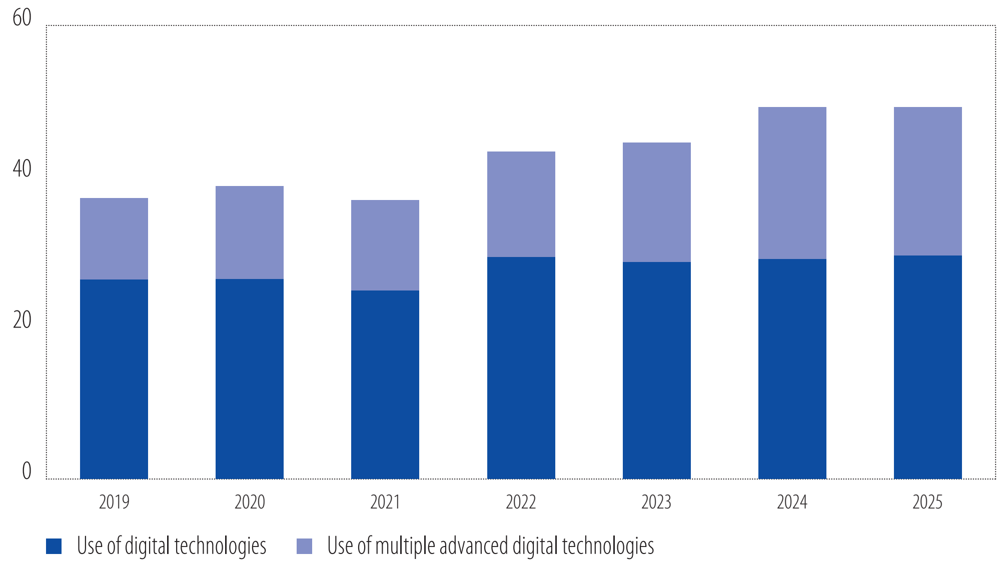
Impact of digital technologies on productivity of construction firms
(productivity difference, in %)



Source: *EIB staff calculations based on EIBIS 2019-2025.*
Note: *Estimates are based on pooled OLS regressions. All regressions control for country, sector, wave and firm age (younger than ten years old) with robust standard errors. The vertical lines represent 95% confidence intervals.*

Figure 23

Digital adoption in the construction sector over time (% of firms)



Source: *EIB staff calculations based on EIBIS 2019-2025.*

Digital technologies are used mainly in the pre-construction phase, with architects and design professionals leading their adoption. Tools such as building information modelling are becoming standard practice across Europe and are sometimes required for public projects, as in Germany. In 2025, awareness of building information modelling among architects was about 92%, with 45% using it in practice. Among contractors, awareness was 47%, but adoption only around 10%. Some countries, like the Netherlands and Spain, are further ahead, with some 80% and 25% of contractors, respectively, using building information modelling. Other countries, like France and Italy, show moderate awareness, low interest and minimal uptake (Hoogenboom, 2025). This gap reflects a wider trend. Although digitalisation has transformed design processes and made significant inroads into the construction sector, firms remain slow to integrate advanced technologies, resulting in fragmented digital supply chains.

Improving digitalisation, particularly across the supply chain, would help address fragmented communication, inefficiencies and rising costs in the construction sector. Existing technologies like building information modelling, cloud-based platforms and digital procurement systems can improve collaboration, reduce delays and optimise the use of resources, leading to cost savings and sustainability gains (Sawhney and Knight, 2024). However, adoption remains uneven due to high upfront costs, skills gaps and regulatory fragmentation, creating a digital divide, especially between small and large firms (Turk, 2023). Strategic investment in digital tools, including AI, combined with targeted training and more standardised approaches, would support productivity improvements, more efficient procurement and reduced waste across the construction lifecycle.

Skill development is increasingly important as firms face persistent worker shortages and changing technological demands. Regulation can support this shift by easing the movement of workers and recognising qualifications obtained in other countries. Training programmes reflect the needs of the sector and should be supported by appropriate incentives. Positive trends are already visible: Across the European Union, skills are gradually moving from declining to expanding firms, which helps raise productivity and support technology adoption. Policies that strengthen training and lifelong learning systems, improve working conditions and offer clearer career paths can help the sector address capacity gaps, stimulate innovation and ensure that workers benefit from the transition.

Standardising and streamlining regulatory frameworks across EU members would reduce administrative complexity and accelerate construction activity. More efficient permitting processes can also help improve local sector performance. While direct policies such as urban planning remain important, indirect measures – including monetary, environmental, energy and tax policies – often have greater influence on construction dynamics through their interlinkages. Simplifying approval and tendering procedures, increasing the availability of cross-border liability insurance and aligning building regulations, permitting process and land-use rules would help address cross-country disparities, shorten processing time, reduce costs and create a level playing field for EU firms (Cousin et al., 2025). Simplifying the rules on mutual recognition of professional qualifications and protected professions would also ease current limits on professional mobility. In addition, integrating green objectives into land-use and zoning requirements would ensure that regulatory reforms support sustainability goals without weakening environmental standards.

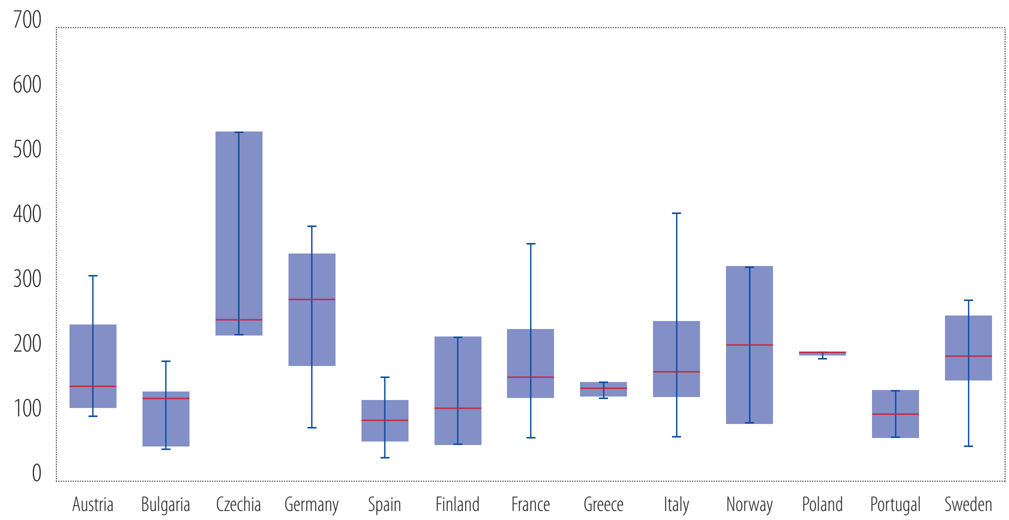
Efficient infrastructure investments: Lessons from EU urban rail construction

The efficient and timely delivery of infrastructure projects is a key factor for Europe's competitiveness. Modern infrastructure supports connectivity, productivity and resilience across the economy. Well-executed projects accelerate the deployment of transport networks, energy grids or digital systems, reduce strategic dependencies and help businesses operate at lower costs and with greater efficiency. In contrast, delays and cost overruns put pressure on public budgets, undermine trust in public administration, slow the green and digital transitions, and ultimately hamper sustainable growth. Timely, cost-effective delivery therefore turns infrastructure into the backbone of competitive, long-term prosperity.

Urban rail projects are at particularly high risk of delays and cost overruns. They are often large-scale, complex undertakings that take many years to complete. Delivery is challenging, with risks ranging from weak procurement and poor design choices to multiple administrative and regulatory procedures. Such projects often exceed initial cost estimates by wide margins – about 45% on average – because of regulatory delays, complex designs, procurement issues or construction problems (Flyvbjerg, 2007). These challenges have contributed to a global pattern of rising cost escalation,[17] which in turn discourages new investment. Understanding which factors enable effective delivery is increasingly important, but inconsistent reporting, standards and cost definitions across jurisdictions make cross-country comparison difficult. This analysis draws on a mix of sources, including publicly available cost and procurement data and internal EIB information.

Rail infrastructure, especially metro systems, plays a central role in urban mobility across the European Union. Europe accounts for 21% of the world's cities with metro systems, 14% of the global metro network by length and 16% of global ridership. At the end of 2023, 42 urban areas in Europe operated at least one metro line. Passenger numbers in the European Union have recovered strongly since the COVID-19 pandemic, reflecting the continued importance of metros as efficient and sustainable urban transport solutions. European metro networks – which began with the world's first line in London in 1863 – continue to expand and evolve, supporting mobility and quality of life across the continent (UITP Statistics Brief, May 2025).

Figure 24
Cost per kilometre across EU countries ($ million)



Source: *EIB staff calculations based on Transit Costs Project data (Levy et al., 2025).*
Note: *The graph illustrates the distribution of the cost per kilometre across EU countries. The vertical lines mark the minimum and maximum cost per kilometre by country. The lilac bars mark the first to third quartile, and the red lines represent the median. The graph includes Transit Costs Project data on EU countries with two or more transit lines constructed between 1984 and 2024. US dollar amounts are in 2023 price terms.*

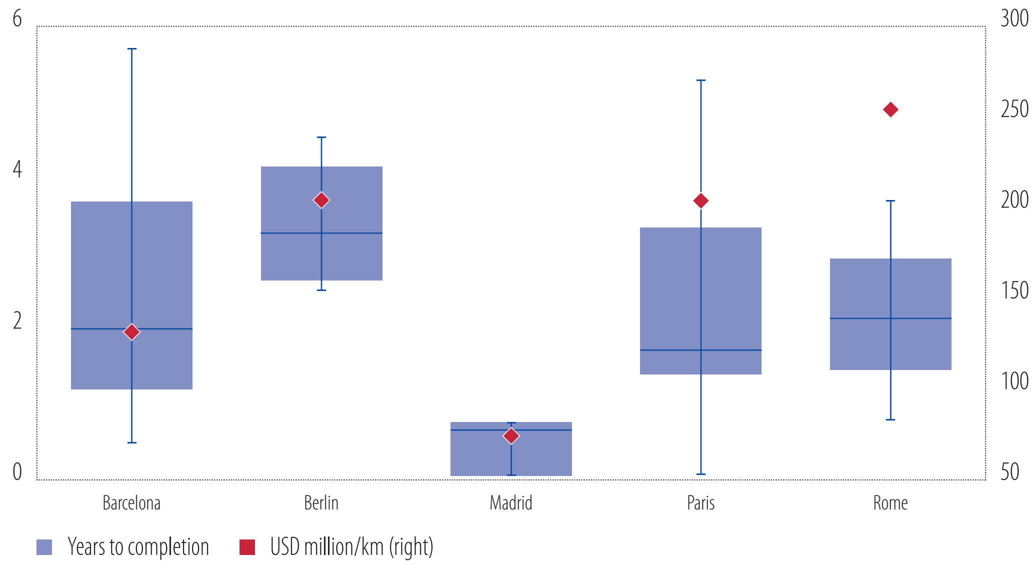
17 Mok et al. (2025), for instance, show that construction costs for urban transit projects in Canada increased far beyond the rate of inflation throughout the last two decades.

Urban rail investment helps improve quality of life. Despite major improvements in European public transport services, many urban areas still face high levels of congestion, air and noise pollution and unacceptable accident rates. Cities that invest in high-capacity, reliable, safe and energy-efficient transport systems often see a shift in travel behaviour, leading to reduced traffic, lower emissions and better living conditions. However, investment in urban public transport is resource-intensive. Securing funding is challenging, and ensuring its efficient use is equally demanding.

Although urban rail projects are generally comparable in technical terms, construction costs vary widely across the European Union. Figure 24 shows the distribution of construction costs for selected metro lines based on a sample of projects from the Transit Costs Project (Levy et al., 2025), covering years between 1984 and 2024.[18] The data indicate that countries like Spain and Portugal build at significantly lower costs than others, including Germany and Czechia. This section examines which factors support cost-effective metro line and urban rail construction, while recognising intrinsic characteristics such as geological conditions.

Figure 25

Metro line completion time (left axis: in years) **and costs** (right axis: $ million per km)



Source: *EIB staff calculations based on Transit Costs Project data (Levy et al., 2025).*
Note: *The figure shows average cost per kilometre and the distribution of completion times for metro lines. The vertical lines mark the minimum and maximum cost per kilometre by city. The lilac bars mark the first to third quartile, and the horizontal lines represent the median. The figure includes EU cities with four or more transit lines under construction between 1984 and 2024. The data cover a sample of lines with available information. Completion time is defined as the difference between the reported start and end years of construction in the Transit Costs Project data. Cost figures are shown in US dollars in 2023 price terms.*

Streamlined governance improves project delivery and is closely linked to lower costs. Although urban rail projects are inherently long term, their administrative processes – including planning, compliance with environmental standards and securing financing – can cause delays and increase overall costs, particularly when governance is unclear or inefficient. Projects in cities with multiple layers of administrative involvement, for example, are more prone to delays than those where governance and decision-making are more streamlined and concentrated. Governance structures that balance responsibilities between local and national institutions are therefore important for improving cost-efficiency, while also ensuring transparency and independence. Figure 25 shows the distribution of completion times – measured in years per kilometre – for metro lines across EU cities. While the

18 The Transit Costs Project data are publicly available and comprise a sample of urban rail projects worldwide.

median construction time for one kilometre of metro line is around two years, Madrid achieved greater efficiency, with average construction times around two-thirds shorter. Part of this success reflects Madrid's centralised governance: The Community of Madrid was able to plan, finance and implement metro projects with a high degree of autonomy (see Box C). In contrast, cities like Berlin (where governance is fragmented across the municipality, the regional transit alliance and the federal government) had completion times around 50% longer. Longer implementation periods are also associated with higher average completion costs, measured as cost per kilometre.

Box C

Case study: Madrid's metro network extension from 1995 to 2007

Madrid's metro network underwent an unprecedented transformation between 1995 and 2007, more than doubling in size, from 114 kilometres to 279 kilometres, and becoming the fourth largest in the world. This success relied on a comprehensive strategy that combined legal, institutional, political, financial and technical decision-making. Broad public consensus helped remove traditional obstacles and enabled a fast, efficient and economically sustainable expansion of the city's transport infrastructure.

Institutional framework: Coordinated and unified administration

The first pillar of success was the creation of a strong institutional framework in the 1980s that improved coordination between administrations and centralised decision-makers. After gaining regional powers, the Community of Madrid introduced new urban transport legislation, including the creation of the Madrid Regional Transport Consortium through Law 5/1985. The consortium brings together the Community of Madrid, the Madrid City Council and other municipalities in the region. Since 1986, it has owned and managed the Madrid metro.

The consortium integrated planning and management for metro, bus and commuter rail services under a single authority. This allowed all decisions across the network to be coordinated, and removed administrative duplication. Strong political commitment by the regional government was essential, as it was able to combine decision-making powers with financial autonomy and directly plan, approve, finance and implement metro extensions. The consortium also worked with the Madrid City Council to ensure quick licencing and land transfers. A clear example is the 1997 General Urban Development Plan, in which the city council reserved land for new transport infrastructure and aligned urban growth plans with metro expansion. This anticipation helped facilitate later extension phases.

Innovative financing: Agreements, public companies and private participation

The second pillar of success was a flexible and innovative financing system. In the early 1990s, metro extensions were funded through agreements between the Community of Madrid and the government. However, from 1995 onwards, a planned expansion of almost 60 kilometres in four years required new approaches, because of limits on regional borrowing and state transfers. The regional government delegated financial responsibility to Arpegio, a public company for industrial land and urban development owned by the Community of Madrid. Arpegio had substantial assets and reserves, which it used as collateral to secure loans and provide immediate liquidity.

Additional financing came from the increase in land value near new stations, owned by Arpegio or the regional government, which benefited from the metro expansion. Public-private partnerships were also used. A joint venture was created, for example, to extend Line 9, build the infrastructure and operate the service for 30 years. In 1999, the creation of MINTRA (Madrid Transport Infrastructure) provided a specialised public entity to manage subsequent expansion phases (1999-2003 and 2003-2007). MINTRA could borrow independently of the regional balance sheet, which helped speed up implementation and spread costs over time. This approach allowed construction to progress rapidly and kept Madrid competitive in terms of costs per kilometre.

Streamlining procedures: Regulations, licences and social consensus
Administrative simplification helped reduce construction times. The Community of Madrid introduced regulatory reforms that allowed simplified environmental assessments in urban areas. These reforms were finally incorporated into Law 2/2002, reducing the time required for environmental impact assessments in urban areas from several years to a few months. The approval process was unified within the regional administration, eliminating the need for multiple review stages. Strong political and social support made faster procedures possible: The Madrid City Council granted building permits and traffic diversions on an accelerated basis, and residents accepted exceptional measures like night-time construction and temporary street closures in exchange for shorter disruption periods. These coordinated reforms shortened the pre-construction phases, allowed work to advance continuously and helped keep tight construction schedules.

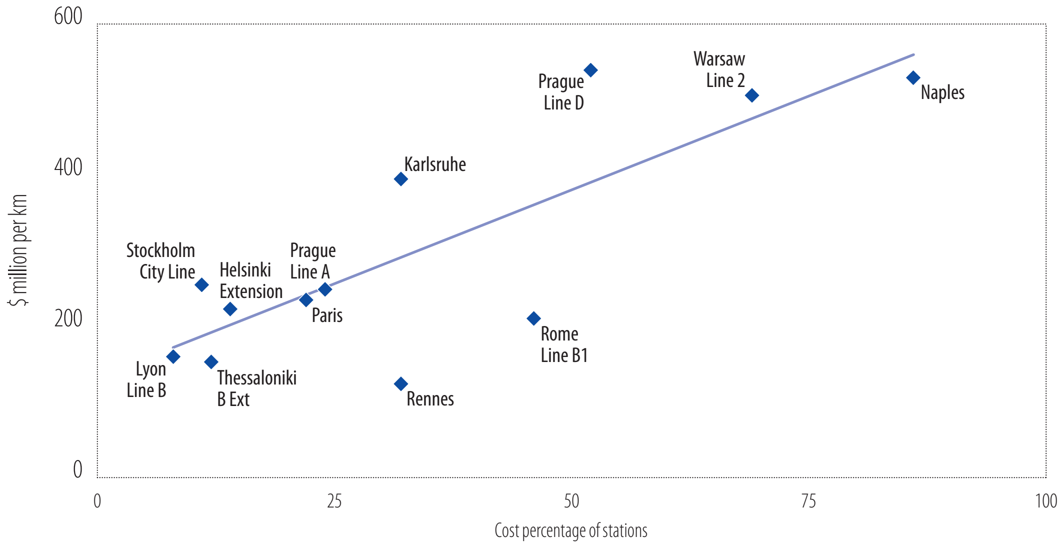
Efficient execution: Professionalisation, standardisation and cost control
Professional execution, technical standardisation and cost control were all key factors. MINTRA and Metro de Madrid developed the basic designs in-house and supervised works with their own staff, creating institutional experience and continuity. When awarding contracts, technical quality and financial soundness were prioritised to avoid risky bids and ensure compliance with deadlines and fixed costs. The decision to standardise stations – using repetitive, functional designs with fixed-length platforms and simple finishes – made it possible to reuse plans and construction methods, improving efficiency and reducing unit costs.

Madrid was able to amortise investments in tunnel boring machines and specialised equipment by building many kilometres of tunnel in short periods. At times, up to ten machines were used simultaneously on 24-hour shifts, tripling the annual pace of excavation and allowing work to progress on several fronts in parallel. Extensive use of tunnel boring machines, careful planning of open-air sections and flexible working hours all helped further shorten construction periods and lower final costs.

Standardised station design consistently reduces costs. Signature architecture and bespoke stations are among the main drivers of overspending. While distinctive stations can be visually appealing, their main purpose is to be functional, bright and easy to navigate for daily passengers. Stations also benefit from economies of scale, as each metro line requires several of them. Replicating the same modular design across multiple stations on a line generates consistent savings. Figure 26 shows a positive correlation between a proxy for bespoke costs – measured as the share of station costs in total construction costs – and the cost per kilometre of metro line across EU cities. Lines in cities such as Lyon, Stockholm and Thessaloniki, which devoted a smaller share of costs to stations, achieved lower overall construction costs. In contrast, cities that prioritised architectural design, such as Naples, experienced higher costs.

Experience and capacity building reduce costs over time, potentially because of learning effects. Metro projects are complex and require a wide range of skills, from technicians to project managers and procurement officers. A lack of skilled staff can significantly increase costs, particularly during planning and design, which are especially vulnerable to cost escalation (Eliasson, 2025). For this reason, local authorities investing in metro infrastructure often commit resources to strengthening institutional capacity and developing staff who can be redeployed in future projects. Learning effects become visible when looking at average construction costs as the cumulative length of metro lines increases. Figure 27 shows that as cities build more kilometres of metro lines, the average cost per kilometre falls, possibly reflecting these learning effects.

Figure 26
Modular station design vs. overall costs

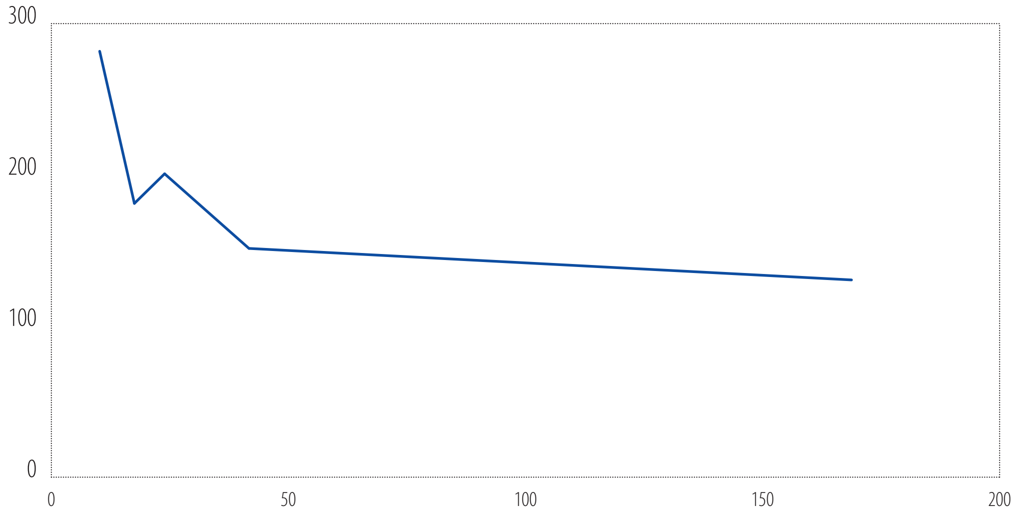


Source: *EIB staff calculations based on EIB data and Transit Costs Project data (Levy et al., 2025).*
Note: *The station cost share refers to data from projects co-financed by the EIB and is defined as the cost of stations at appraisal relative to total costs. Cost figures from Transit Costs Project Data are shown in US dollars in 2023 prices.*

Good procurement practices and appropriate risk management also help reduce costs. Because of their scale and complexity, metro lines are usually awarded through public tenders, which have a major impact on total costs. While public procurement aims to ensure that contracts are awarded in a competitive and transparent manner, tendering strategies vary across authorities, balancing cost, technical merit and time to completion differently. For example, under Spanish procurement law (Law 13/1995), which allows greater flexibility, MINTRA prioritised value for money over lowest cost. In its scoring system, 20% of the points were assigned to project time, 50% to technical merit and 30% to cost. Other countries, such as Sweden, France and the United Kingdom, place more weight on cost in their evaluation.

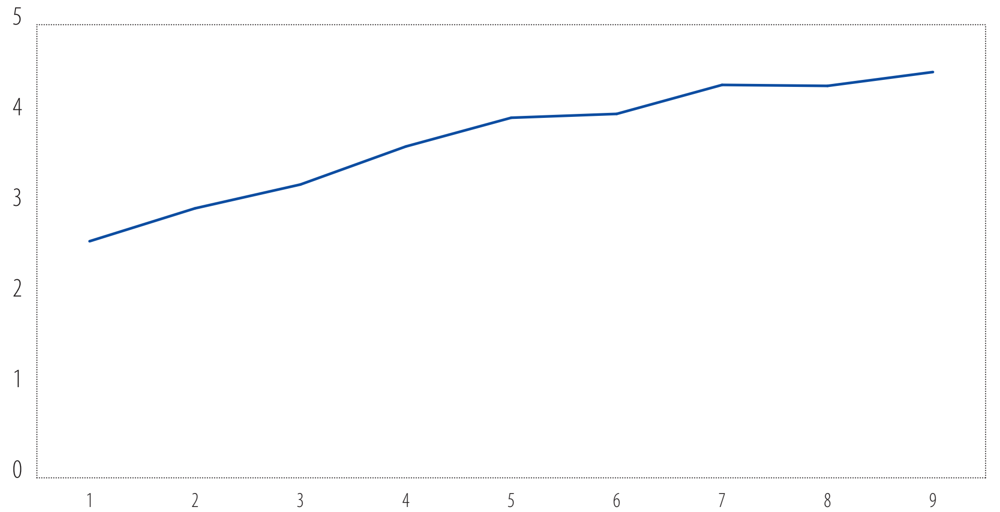
Skill development and organisational learning improve tender quality and help reduce costs. While there is no clear evidence of a single optimal tendering strategy for metro lines, experience in public procurement enables authorities to refine contract design. The number of bids per tender is an important indicator of tender quality because higher competition is often associated with lower cost. Figure 28 shows that the number of bids per tender increases as municipalities gain experience issuing tenders over time. This positive trend highlights how capacity improvements within public administrations, particularly through repeated procurement of similar works, can strengthen competition and reduce costs.

Figure 27
Average cost ($ million per km) **of metro lines constructed, by cumulative kilometres**



Source: *EIB staff calculations based on Transit Costs Project data (Levy et al., 2025).*
Note: *The graph shows the average cost per kilometre for different cumulative lengths of metro line built within a city. For example, the average cost per kilometre for the first 25 km is around $200 million. This falls to $150 million for the first 50 km, suggesting that the second 25 km were less costly to build.*

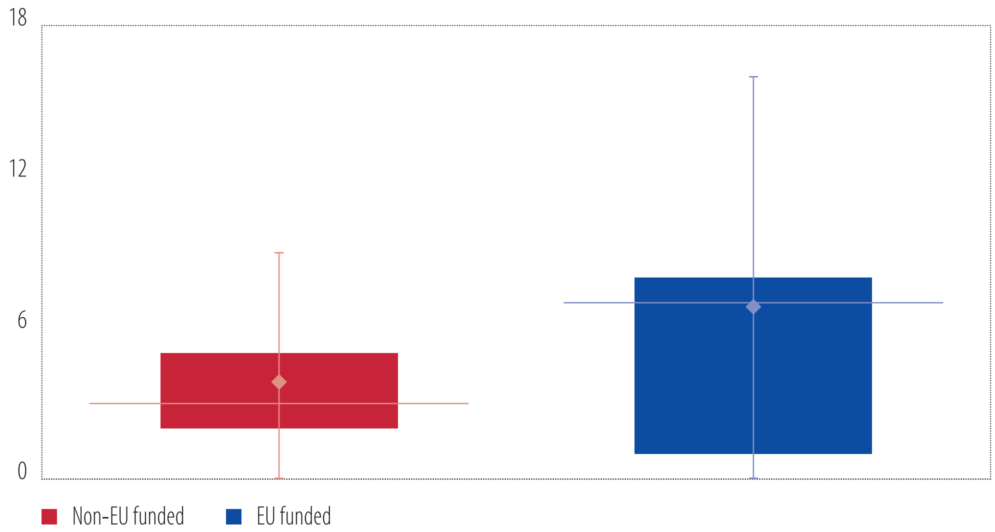
Figure 28
Average number of bids per tender in relation to the cumulative number of tenders (x-axis)



Source: *EIB staff calculations based on Opentender data.*
Note: *Bids are urban transport tenders with 45 as the first two digits of their Common Procurement Vocabulary code, for a subset of cities included in the transit data: Athens, Thessaloniki, Milan, Naples, Rome, Warsaw, Stockholm, Barcelona, Madrid, Karlsruhe, Sofia, Helsinki, Lyon and Paris. The graph shows the average number of bids across cities for different numbers of tenders issued. For example, the first tender in a city attracts 2.5 bids on average. The average rises to four bids for the first five tenders, suggesting that the additional four tenders attracted more bidders.*

EU funding increases competition and strengthens the quality of public procurement. EU support contributes to better tender outcomes by providing technical assistance to local authorities. Tenders supported by EU funding attract more bidders: Figure 29 shows that EU-funded tenders have a higher average number of bids and a wider distribution of bids, leading to more competitive procurement processes. EU funding therefore helps ensure that public contracts are awarded transparently and efficiently, improving value for money and quality of infrastructure delivery across EU countries.[19]

Figure 29
Bids per tender (average number and distribution)**, by EU funding status**



Source: EIB staff calculations based on Opentender data.
Note: Bids are urban transport tenders with 45 as the first two digits of their Common Procurement Vocabulary code, for a subset of cities included in the transit data: Athens, Thessaloniki, Milan, Naples, Rome, Warsaw, Stockholm, Barcelona, Madrid, Karlsruhe, Sofia, Helsinki, Lyon, Prague and Paris. The vertical lines mark the minimum and maximum number of bids per tender. The coloured bars mark the first to third quartile, the horizontal lines represent the median, and the dots represent the average.

Developing capable public institutions with clear governance structures has strong potential to reduce the cost of urban rail projects. Public administrations must have adequate resources and technical staff to manage procurement and oversee contractors effectively. Strong administrative capacity also enables the use of more sophisticated assessment models in planning and design, helping authorities evaluate bidders more accurately and apply lessons from earlier projects and best practices.

Procurement strategies need to prioritise quality and flexibility over lowest-cost bidding while ensuring that tenders attract enough bidders. Robust technical scoring systems and itemised cost structures can reduce friction during design changes and help prevent inflated prices. Dividing large contracts into smaller segments increases competition and limits the impact of disputes on the overall project timelines. New regulatory approaches based on balanced risk allocation between the public sector and contractors, combined with benefit-based remuneration models, can encourage innovation and cost-effectiveness while protecting public interests and money.

Standardisation and modular construction help improve cost outcomes. Smart design choices and proven construction techniques, combined with digital tools that improve planning accuracy and lifecycle management, reduce project complexity and lower procurement risk. Integrating green and resilient design features early in the process can align projects with sustainability goals without necessarily increasing costs.

19 Earlier evidence also illustrates that EU co-funding of public projects through the European Structural and Investment Funds has a significant positive impact on the uptake of green public procurement practices (Nicolas et al., 2025).

EU-wide coordination of strategic infrastructure projects also helps reduce costs. Harmonised technical standards ensure that components such as signalling systems or track gauges are compatible across countries, avoiding costly redesigns or retrofits. Joint funding mechanisms spread financial risk and generate economies of scale in procurement. Coordinated planning also prevents delays caused by fragmented decision-making. This integrated approach ensures that resources are used more effectively, accelerating delivery and lowering overall expenditure.

Conclusion and policy implications

This is a pivotal time for Europe. The European Union must accelerate investment despite limited public sector resources, rising concerns over sovereign debt globally, low potential growth and the likelihood of more frequent shocks. Mobilising private sector investment to advance EU-wide policy goals is therefore essential. The evidence presented in this chapter shows that well-designed public financial instruments – combined with targeted capacity development, strong governance and simpler procedures – can deliver major improvements in investment, productivity and competitiveness across the European Union.

Looking ahead, the challenge will be to use public resources efficiently, mobilise institutional capital at scale and ensure that support mechanisms remain flexible and responsive to the changing needs. By fostering a more dynamic, inclusive and resilient investment environment, the European Union can better use its collective resources to drive sustainable growth and achieve its strategic ambitions.

The path forward will require:

- **Maximising the impact of EU mandates.** The EIB Group has demonstrated a strong capacity to implement complex EU mandates, leverage public resources and mobilise co-financing. Reducing mandate fragmentation – including across mandates from local authorities – would make these resources even more effective.

- **Harnessing financial instruments to boost EU competitiveness.** EIB Group financial instruments have a proven, measurable impact on firm growth, innovation and resilience, helping to address market failures.

- **Mobilising institutional investors through pan-European initiatives.** The Group has a key role in designing and scaling pan-European programmes such as TechEU and the European Tech Champions Initiative 2.0. These initiatives are essential for closing the innovation finance gap, unlocking long-term capital from institutional investors and advancing the savings and investments union.

- **Fostering capacity development in delivering large infrastructure projects, including housing.** Building on its long-standing expertise, the EIB Group can reduce project costs and completion times by providing advisory services, improving project design and procurement and encouraging the use of digital technologies and best practices.

- **Removing persistent barriers – regulatory, structural or skills-related – that constrain the delivery of public goods.** EIB Group advisory and knowledge-sharing activities strengthen institutional capacity and promote innovation in project delivery across the European Union.

As the European Union prepares for the next Multiannual Financial Framework, a forward-looking approach – grounded in evidence, impact and cooperation – will help ensure that every euro invested delivers the highest possible value. In doing so, Europe can secure its place as a global leader in innovation, sustainability and shared prosperity.

References

Agarwal, N., Chan, J. M.L., Lodefalk, M., Tang, A., Tano, S., & Wang, Z. (2023). Mitigating information frictions in trade: Evidence from export credit guarantees, *Journal of International Economics*, 145(C). https://doi.org/10.1016/j.jinteco.2023.103831

Amamou, R, Gereben, Á., & Wolski, M. (2023). Assessing the impact of the EIB's intermediated lending to SMEs during funding shocks, *Small Business Economics*, 60(3): 975-1007. https://doi.org/10.1007/s11187-022-00620-x

Ambrois, M., Croce, A., & Ughetto, E. (2025). Greening the future: how venture capital nurtures cleantech companies' growth in Europe, *Small Business Economics*, 65(1): 191-229. https://doi.org/10.1007/s11187-024-00988-y

Asdrubali, P. & Signore, S. (2015). The Economic Impact of EU Guarantees on Credit to SMEs. Evidence from CESEE countries. European Economy Discussion Paper 002, European Commission. https://doi.org/10.2765/893611

Barbera, A., Gereben, Á., & Wolski, M. (2022). Estimating conditional treatment effects of EIB lending to SMEs in Europe, EIB Working Papers 2022/03, European Investment Bank. https://doi.org/10.2867/571551

Barrot, J.-N., Martin, T., Sauvagnat, J., & Vallée, B. (2024). The Labor Market Effects of Loan Guarantee Programs, *The Review of Financial Studies*, 37(8): 2315-2354. https://doi.org/10.1093/rfs/hhae014

Benmelech, E. & Monteiro, J. (2023). Who Benefits From The Export-Import Bank Aid? NBER Working Papers 31562, National Bureau of Economic Research. https://doi.org/10.3386/w31562

Berger, M., Dechezleprêtre, A., & Fadic, M. (2024). What is the role of Government Venture Capital for innovation-driven entrepreneurship? OECD Science, Technology and Industry Working Papers 2024/10, Organisation for Economic Co-operation and Development. https://dx.doi.org/10.1787/6430069e-en

Bertoni, F., Brault, J., Colombo, M. G., Quas, A., & Signore, S. (2019). Econometric study on the impact of EU loan guarantee financial instruments on growth and jobs of SMEs. EIF Working Paper 2019/54, EIF Research & Market Analysis, February 2019. Available at: https://www.econstor.eu/bitstream/10419/192972/1/1048634280.pdf

Bertoni, F., Colombo, M. G., & Quas, A. (2023). The long-term effects of loan guarantees on SME performance, *Journal of Corporate Finance*, 80(C). https://doi.org/10.1016/j.jcorpfin.2023.102408

Bertoni, F., Colombo, M. G., & Quas, A. (2025a). Economic impact assessment of the COSME Loan Guarantee Facility: evidence from Greece, Poland, Spain and Romania. EIF Working Paper 2025/103, EIF Impact Assessment, April 2025. Available at: https://www.econstor.eu/bitstream/10419/328255/1/1937973298.pdf

Bertoni, F., Colombo, M. G., & Quas, A. (2025b). Economic impact assessment of the COSME Loan Guarantee Facility: evidence from Belgium, France and Italy. EIF Working Paper 2025/107, EIF Impact Assessment, June 2025. Available at: https://www.econstor.eu/bitstream/10419/328250/1/1937859258.pdf

Bertoni, F., Colombo, M. G., Montanaro, B., Quas, A., & Tenca, F. (2025c). Assessing the economic impact of EIF-supported equity financing: the case of Lower-Mid Market. EIF Working Paper 2025/105, EIF Impact Assessment, October 2025. Available at: https://www.econstor.eu/bitstream/10419/328254/1/1937972690.pdf

Bertoni, F. & Tykvová, T. (2015). Does governmental venture capital spur invention and innovation? Evidence from young European biotech companies, *Research Policy*, 44(4): 925-935. https://doi.org/10.1016/j.respol.2015.02.002

Bonfim, D., Custódio, C., & Raposo, C. (2023). Supporting small firms through recessions and recoveries, *Journal of Financial Economics*, 147(3): 658-688. https://doi.org/10.1016/j.jfineco.2023.01.004

Brander, J. A., Egan, E., & Hellmann, T. F. (2010). Government Sponsored versus Private Venture Capital: Canadian Evidence, NBER Chapters, *International Differences in Entrepreneurship*, 275-320, National Bureau of Economic Research. Available at: http://www.nber.org/chapters/c8226.pdf

Brault, J. & Signore, S. (2019). The real effects of EU loan guarantee schemes for SMEs: A pan-European assessment. EIF Working Paper 2019/56, EIF Research & Market Analysis, June 2019. Available at: https://www.eif.org/files/records/EIF_Working_Paper_2019_56.pdf

Briozzo, A. & Cardone-Riportella, C. (2016). Spanish SMEs' Subsidized and Guaranteed Credit during Economic Crisis: A Regional Perspective, *Regional Studies*, 50(3): 496-512. https://doi.org/10.1080/00343404.2014.926318

Cousin, G., Frayne, Ch., Martins, V. D., & Vašíček, B. (2025). Housing in the European Union: Market Developments, Underlying Drivers, and Policies, Directorate-General for Economic and Financial Affairs Discussion Paper 228, European Commission. https://doi.org/10.2765/3521352

Cumming, D. J., Grilli, L., & Murtinu, S. (2017). Governmental and independent venture capital investments in Europe: A firm-level performance analysis, *Journal of Corporate Finance*, 42(C): 439-459. https://doi.org/10.1016/j.jcorpfin.2014.10.016

Dorn, F., Flach, L., & Gourevich, I. (2024). Building a Stronger Single Market: Potential for Deeper Integration of the Services Sector within the EU, EconPol Policy Report 52, ifo Institute, Munich. Available at: https://www.ifo.de/en/econpol/publications/2024/working-paper/building-stronger-single-market-potential-deeper-integration

Draghi, M. (2024). The future of European competitiveness – A competitiveness strategy for Europe. European Commission. https://doi/org.10.2872/9356120

Eliasson, J. (2025). Cost overruns of infrastructure projects – distributions, causes and remedies, *Transportation Research Part A*, Vol. 198. https://doi.org/10.1016/j.tra.2025.104532

European Capital Markets Institute (2024). Closing the gaping hole in the capital market for EU start-ups – the role of pension funds, ECMI Commentary no 90. Available at: https://cdn.ceps.eu/wp-content/uploads/2024/08/No-90-Closing-the-gaping-hole-in-the-capital-market-for-EU-start-ups-%E2%80%93-the-role-of-pension-funds.pdf

European Commission (2022). InvestEU Leverage and Multiplier Effect Calculation Methodology. Available at: https://investeu.europa.eu/document/download/21e274de-9e54-4909-8db5-05760d72f16d_en

European Commission (2025a). Annual Report on European SMEs 2024/2025, SME performance review. https://doi.org/10.2760/7714438

European Commission (2025b). Study of barriers to, and drivers of, the scaling-up of funds investing in innovative and growth companies, September 2025. https://doi.org/10.2874/0565970

European Construction Sector Observatory (2019a). Integrating digital innovations in the construction sector: The case of 3d Printing and Drones in constructions, Trend Paper Series, March 2019. Available at: https://ec.europa.eu/docsroom/documents/34517

European Construction Sector Observatory (2019b). Building Information Modelling in the EU construction sector, Trend Paper Series, March 2019. Available at: https://ec.europa.eu/docsroom/documents/34518

European Construction Sector Observatory (2021). Digitalisation in the construction sector, Analytical Report, April 2021. Available at: https://ec.europa.eu/docsroom/documents/45547

European Court of Auditors (ECA) (2023). Public Procurement in EU – less competition in awarding contracts for works, goods and services in the ten years up to 2021, ECA Special Report 28, November 2023. Available at: https://www.eca.europa.eu/en/publications?ref=SR-2023-28

European Investment Bank (EIB) (2021a). Evaluation of the European Fund for Strategic Investments. Thematic report, June 2021. https://doi.org/10.2867/073747

European Investment Bank (EIB) (2021b). Macroeconomic Impact of the European Fund for Strategic Investments: Complementary section to the evaluation of the European Fund for Strategic Investments 2021. https://doi.org/10.2867/476132

European Investment Bank (EIB) (2022a). Assessing the macroeconomic impact of the EIB Group – 2022 update. https://doi.org/10.2867/43250

European Investment Bank (EIB) (2022b). 2-22 EFSI report From the European Investment Bank to the European Parliament and the Council on 2022 EIB Group Financing and Investment Operations under EFSI. Available at: https://www.eib.org/files/publications/strategies/2022-efsi-report-to-the-ep-and-council.pdf

European Investment Bank (EIB) (2024a). EIB Group support for EU businesses: Evidence of impact in addressing market failures. https://doi.org/10.2867/20363

European Investment Bank (EIB) (2024b). Hidden champions, missed opportunities: Mid-caps' crucial role in Europe's economic transition. https://doi.org/10.2867/575876

European Union Intellectual Property Office (EUIPO) (2019). High-growth firms and intellectual property rights IPR profile of high-potential SMEs in Europe, May 2019. Available at: https://euipo.europa.eu/tunnel-web/secure/webdav/guest/document_library/observatory/documents/reports/2019_High-growth_firms_and_intellectual_property_rights/2019_High-growth_firms_and_intellectual_property_rights.pdf

Eurostat (2025). Labour costs survey – NACE Rev. 2 activity (database). November 2025. Available at: https://ec.europa.eu/eurostat/databrowser/explore/all/popul?lang=en&subtheme=labour.lc.lcs.lcs_r2&display=list&sort=category&extractionId=lc_ncost_r2

Flyvbjerg, B. (2007). Cost overruns and demand shortfalls in urban rail and other infrastructure, *Transportation Planning and Technology,* 30(1): 9-20.

Fratto, C., Gatti, M., Kivernyk, A., Sinnott, E., & van der Wielen, W. (2024). The scale-up gap: Financial market constraints holding back innovative firms in the European Union, European Investment Bank. https://doi.org/10.2867/382579

Gai, L., Arcuri, M. C., & Ielasi, F. (2023). How does government-backed finance affect SMEs' crisis predictors? *Small Business Economics*, 61(3): 1205-1229. https://doi.org/10.1007/s11187-023-00733-x

Garcia-Tabuenca, A., & Crespo-Espert, J. (2010). Credit guarantees and SME efficiency, *Small Business Economics*, 35(1): 113-128. https://doi.org/10.1007/s11187-008-9148-4

Gatti, M., Schich, S., van der Wielen, W., & Sinnott, E. (2022). Impact assessment of EIB venture debt, EIB Impact study, June 2022. https://doi.org/10.2867/032612

Gatti, M. & van der Wielen, W. (2026). Public Financial Support and Access to Finance: Evidence from EIB Lending to Businesses, *Journal of Financial Services Research*, forthcoming. https://doi.org/10.1007/s10693-026-00462-8

Ge, G., Xue, J., & Zhang, Q. (2024). Industrial policy and governmental venture capital: Evidence from China, *Journal of Corporate Finance*, 84(C). https://doi.org/10.1016/j.jcorpfin.2023.102532

Gereben, Á., Rop, A., Petriček, M., & Winkler, A. (2019). The impact of international financial institutions on small and medium enterprises: the case of EIB lending in Central and Eastern Europe, EIB Working Paper 2019/09, European Investment Bank. https://doi.org/10.13140/RG.2.2.21013.06887

Goolsbee, A., Syverson, Ch. (2023). The Strange and Awful Path of Productivity in the U.S. Construction Sector. NBER, Cambridge, MA, *Working Paper No. 30845*, January 2023, Rev. February 2023. Available at: https://www.nber.org/system/files/working_papers/w30845/w30845.pdf

Guerini, M. & Quas, A. (2016). Governmental venture capital in Europe: Screening and certification, *Journal of Business Venturing*, 31(2): 175-195. https://doi.org/10.1016/j.jbusvent.2015.10.001

Henrekson, M. & Johansson, D. (2010). Gazelles as job creators: a survey and interpretation of the evidence, *Small Business Economics*, 35(2): 227-244. https://doi.org/10.1007/s11187-009-9172-z

Hoogenboom, D. (2025). BIM in Construction – What the Numbers Really Say, USP Research. Available at: https://www.usp-research.com/insights/blogs/bim-in-construction-what-the-numbers-really-say/

InvestEurope (2024). Delivering the European transition. Our 12 priorities for a more competitive union.

InvestEurope (2025). The Performance of European Private Equity Benchmark Report 2024. Available at: https://www.investeurope.eu/research/performance-data/

Kelly, E. (2024). Construction robots: Here come the builder bots, Sifted Reports. Available at: https://leonard.vinci.com/wp-content/uploads/2024/12/Robots-in-Construction-1.pdf

Köppl, S., Köppl-Turyna, M., & Christopoulos, D. (2025). The performance of government-backed venture capital investments, *Research Policy*, 54(8). https://doi.org/10.1016/j.respol.2025.105270

Kotamäki, M. (2025). Purpose matters: Impact of public loan guarantees on business growth, *Economics Letters*, 254(C). https://doi.org/10.1016/j.econlet.2025.112455

Kraemer-Eis, H., Botsari, A., Gvetadze, S., Lang, F., & Torfs, W. (2023). The European Small Business Finance Outlook 2023, EIF Working Paper Series 2023/96, European Investment Fund. Available at: https://www.eif.org/news_centre/publications/EIF_Working_Paper_2023_96.htm

Leamer, E. (2015), Housing Really Is the Business Cycle: What Survives the Lessons of 2008-09? *Journal of Money, Credit and Banking*, 47(S1): 43-50. https://doi.org/10.1111/jmcb.12189

Lelarge, C., Sraer, D., & Thesmar, D. (2010). Entrepreneurship and Credit Constraints: Evidence from a French Loan Guarantee Program, NBER Chapters, in: International Differences in Entrepreneurship, pages 243-273, National Bureau of Economic Research. Available at: https://www.bnsp.insee.fr/ark:/12148/bc6p06zr07z/f1.pdf

Leleux, B. & Surlemont, B. (2003). Public versus private venture capital: seeding or crowding out? A pan-European analysis, *Journal of Business Venturing*, 18(1): 81-104. https://doi.org/10.1016/S0883-9026(01)00078-7

Lerner, J., Bernstein, S., Dev, A., & Bai, J. (2021). The government as an (effective) venture capitalist, VOXEU CEPR. May 2021. Available at: https://cepr.org/voxeu/columns/government-effective-venture-capitalist

Levy, A., Goldwyn, E., Ensari, E., & Chitti, M. (2025). Construction costs of urban rail projects worldwide. Dataset. https://doi.org/10.58153/nw3ws-qq709

Li, S., Lan, T., Nguyen, H.-X., & Tran, P. (2025). Frontiers in construction 3D printing: self-monitoring, multi-robot, drone-assisted processes, *Progress in Additive Manufacturing*, 10: 2001-2030. https://doi.org/10.1007/s40964-024-00794-8

Martín-García, R. & Morán Santor, J. (2021). Public guarantees: a countercyclical instrument for SME growth. Evidence from the Spanish Region of Madrid, *Small Business Economics*, 56(1): 427-449. https://doi.org/10.1007/s11187-019-00214-0

Matray, A., Müller, K., Xu, C., & Kabir, P. (2024). EXIM's Exit: The Real Effects of Trade Financing by Export Credit Agencies, NBER Working Papers 32019, National Bureau of Economic Research. Available at: https://www.nber.org/system/files/working_papers/w32019/w32019.pdf

Maury, T., Torres de Matos, C., & Mathieux, F. (2025). Analysis of the EU steel supply chain – characterisation and use of EU steel scrap in relation to global trade dimensions, European Commission, Ispra. Available at: https://publications.jrc.ec.europa.eu/repository/handle/JRC143881

McKinsey (2018). Artificial intelligence: Construction technology's next frontier, McKinsey and Company. Available at: https://www.mckinsey.com/capabilities/operations/our-insights/artificial-intelligence-construction-technologys-next-frontier

Mok, J., Chitti, M., & Shalaby, A. (2025). Understanding the drivers of transit construction costs in Canada: a comparative study, University of Toronto's School of Cities in collaboration with the Canadian Urban Institute and the State of Canada's Cities Summit. Available at: https://schoolofcities.utoronto.ca/wp-content/uploads/2025/04/Understanding-the-Drivers-of-Transit-Construction-Costs-in-Canada_Feb-2025_FINAL.pdf

Nicolas, R., Titl, V., & Schotanus, F. (2025). European funds and green public procurement, *Ecological Economics*, 227(C). https://doi.org/10.1016/j.ecolecon.2024.108400

Organisation for Economic Co-operation and Development (OECD) (2010). High-Growth Enterprises: What Governments Can Do to Make a Difference, OECD Studies on SMEs and Entrepreneurship, Organisation for Economic Co-operation and Development. http://dx.doi.org/10.1787/9789264048782-en

Organisation for Economic Co-operation and Development (OECD) (2024). Programme for the International Assessment of Adult Competencies (PIAAC, 1st Cycle and 2nd Cycle). Paris: OECD Publishing. Available at: https://www.oecd.org/en/about/programmes/piaac.html

Pavlova, E. & Signore, S. (2019). The European venture capital landscape: an EIF perspective. Volume

V: The economic impact of VC investments supported by the EIF, EIF Working Paper Series 2019/55, European Investment Fund. Available at: http://www.eif.org/news_centre/publications/EIF_Working_Paper_2019_55.htm

Pavlova, E. & Signore, S. (2021). The European venture capital landscape: An EIF perspective. Volume VI: The impact of VC on the exit and innovation outcomes of EIF-backed start-ups, EIF Working Paper Series 2021/70, European Investment Fund. Available at: https://www.eif.org/news_centre/publications/EIF_Working_Paper_2021_70.htm

Pierrakis, Y. & Saridakis, G. (2017). Do publicly backed venture capital investments promote innovation? Differences between privately and publicly backed funds in the UK venture capital market, *Journal of Business Venturing Insights*, 7(C): 55-64. https://doi.org/10.1016/j.jbvi.2017.02.002

Royal Institution of Chartered Surveyors (RICS) (2025). RICS artificial intelligence in construction report 2025. Available at: https://www.rics.org/news-insights/artificial-intelligence-in-construction-report

Sawhney, A. & Knight, A. (2024). Digitalisation in construction report 2024, Royal Institute of Chartered Surveyors (RICS). Available at: https://www.rics.org/content/dam/ricsglobal/documents/research/Digitalisation-in-construction-report-2024.pdf

Sinnott, E., Gatti, M., & van der Wielen, W. (2023). Impact assessment of the EIB's intermediated lending to businesses, EIB Impact study, European Investment Bank. May 2023. https://doi.org/10.2867/676116

Turk, Z. (2023). Structured analysis of ICT adoption in the European construction industry, International *Journal of Construction Management*, 23(5): 756-762. https://doi.org/10.1080/15623599.2021.1925396

Ugurlu, E., Aboobaker, A., & Stemmer, M. A. (forthcoming). Labour shortages and investment: Evidence from firms.

UITP Advanced Public Transport (2025). Global metro figures 2024, Statistics Brief, May 2025.

Vértesy, D., Del Sorbo, M., & Damioli, G. (2017). High-growth, innovative enterprises in Europe, JRC Technical Reports, European Commission.

Wilcox, J. A. & Yasuda, Y. (2019). Government guarantees of loans to small businesses: Effects on banks' risk-taking and non-guaranteed lending, *Journal of Financial Intermediation*, 37(C): 45-57. https://doi.org/10.1016/j.jfi.2018.05.003

Zhang, J., Fan, Y., & Liu, Y. (2024). The effects of government venture capital: New evidence from China based on a two-sided matching structural model, *Journal of Corporate Finance*, 84(C). https://doi.org/10.1016/j.jcorpfin.2023.102521

Zecchini, S. & Ventura, M. (2009). The impact of public guarantees on credit to SMEs, *Small Business Economics*, 32(2): 191-206. https://doi.org/10.1007/s11187-007-9077-7

PART 2

BOOSTING THE COMPETITIVENESS OF THE EUROPEAN ECONOMY

The adoption of big data and AI contributed

~**12%** to **EU productivity growth from 2019** to **2025.**

Renewable energy provided

about **HALF** **of Europe's electricity in 2024,**

with solar power generation

SURPASSING coal for the first time.

In 2025, **41%** **of firms saw energy costs as an obstacle to investment,**

compared with **60%** in 2022.

Every €1 of capital or guarantees allocated by the **EIB Group supports €15 of investment** in the real economy.

Housing affordability is a concern

for **51%**

of people living in **cities.**
Addressing housing shortages in critical cities could improve mobility and raise EU GDP

by **1.7%**

Large-scale investment programmes require a productive construction sector to deliver results, **but labour productivity in the EU construction sector has declined 15%** since 2000.

Chapter 5

Europe's competitive edge in digital transformation and artificial intelligence

The global race for leadership in digital technologies and artificial intelligence is reshaping economic competitiveness. The United States remains at the forefront of digital innovation, supported by strong private investment in digital technologies, deep capital markets, a vibrant startup culture and access to global talent, with US tech companies leading in areas such as cloud computing, artificial intelligence (AI) and digital platforms. China has also developed its own digital environment, becoming a major global player in key digital technologies over the past two decades by pursuing a strategy that strengthens its comparative advantage in mid-tech and high-tech industrial sectors and challenges established competitors. The European Union has been catching up by investing heavily in digital infrastructure, but it remains reliant on imported technologies. Nevertheless, with its strong industrial base and growing share of firms adopting digital technologies, Europe is well positioned to capture large productivity gains from technology diffusion.

Assessing AI's global macroeconomic impact and its implications depends on various interconnected factors, including financial market risks and technological dependence in a geopolitically polarised environment. The AI capital expenditure boom made a strong contribution to economic growth in the United States in 2025. This highly concentrated investment is associated with a handful of global tech giants, stretched valuations and financial market risks, all of which could be compared with the dot-com bubble of the late 1990s. At the same time, AI is distinct from prior digital technologies as it can generate substantial productivity gains and has already fundamentally transformed business models of companies around the world.

The AI dividend is already beginning to materialise in the European Union, with the benefits being derived from industrial deployment. Firm-level evidence from the EIB Investment Survey (EIBIS) shows that AI adoption led to an annual increase in aggregate productivity of 0.34 percentage points in the European Union from 2019 to 2025. There is evidence that the effect on productivity is particularly large in high-tech manufacturing. AI helps firms operate more efficiently, optimise processes and enhance competitiveness. As digital technologies continue to spread across sectors, even greater productivity gains may be realised with the development and adoption of new innovations, including generative AI.

The European economy's ability to adjust and transform depends on a supportive operating environment. While larger firms currently capture the bulk of the benefits of AI adoption, small and medium-sized enterprises also stand to make productivity gains. However, adoption rates remain lower among these firms, which underscores the need for enabling conditions and targeted support for broad-based digital transformation. Strengthening EU research and innovation is essential for long-term competitiveness. Policy should prioritise stronger support for private research and development (R&D) investments, such as targeted incentives for cutting-edge innovation, and conducive business and labour market regulations. The quality and reliability of critical infrastructure, including access to high-speed connectivity, are key to spreading technology use. Governments and municipalities must also advance their own digital transformation. For many regions, this requires a coherent approach to digital governance that responds to the needs of individuals and businesses. Striking the right balance is particularly important, as there is a risk that the digital divide between tech-savvy and less digitalised companies will widen over time.

In the global digital race, data are increasingly seen as a strategic asset stemming from their role in powering advanced AI models, driving productivity and underpinning digital sovereignty. Data have now become a key factor in production – much like labour, capital or energy – and like other production factors, must be protected from security threats, including cyberattacks, espionage and geopolitical risks. The European Union's approach focuses not only on high standards for data security and privacy, but also on the need to foster a vibrant digital market and invest in digital infrastructure. Recent efforts (such as the Digital Omnibus and AI Omnibus packages) aim to simplify and harmonise complex data rules in different EU countries, striking the right balance between protection and usability. By streamlining data sharing, clarifying legal responsibilities and reducing compliance costs – especially for startups and small and medium-sized enterprises – these frameworks will foster a single European data market that promotes innovation while safeguarding fundamental rights.

Introduction

As the digital era progresses, global competitive dynamics are changing fast. The United States remains at the forefront of digital innovation, supported by strong private investment in digital technologies, deep capital markets, a vibrant startup culture and access to global talent. US tech companies dominate areas such as cloud computing, AI and digital platforms, while China has developed its own digital systems. The European Union has been catching up by investing heavily in digital infrastructure, but it remains reliant on imported technologies, including software developed by US companies. Nonetheless, with its strong industrial base and growing share of digital adopters, Europe is well positioned to capture substantial productivity gains from technology diffusion.

Assessing AI's global macroeconomic impact and its implications depends on various interconnected factors, including financial market risks and technology dependency in a geopolitically polarised environment. This chapter explores Europe's standing in the AI era and the challenges and opportunities it faces. The first section assesses the position of the leading global players in the global digital landscape. The second section discusses the impact of advanced digital technologies and AI on firm performance and competitiveness, highlighting the opportunities for the European Union as an industrial power. The final section discusses enablers and policies needed to maximise the returns from AI adoption across the European Union. The chapter also includes four boxes, which provide further analysis: Box A compares the recent performance of the US stock market with the dot-com bubble; Box B discusses hyperscalers (large data centres providing cloud computing and data storage resources to businesses) and supply chain integration; Box C explores the causal link between AI adoption and productivity; and Box D presents the AI Factories initiative, Europe's path to AI sovereignty and innovation.

Digital investment, AI and global market dynamics

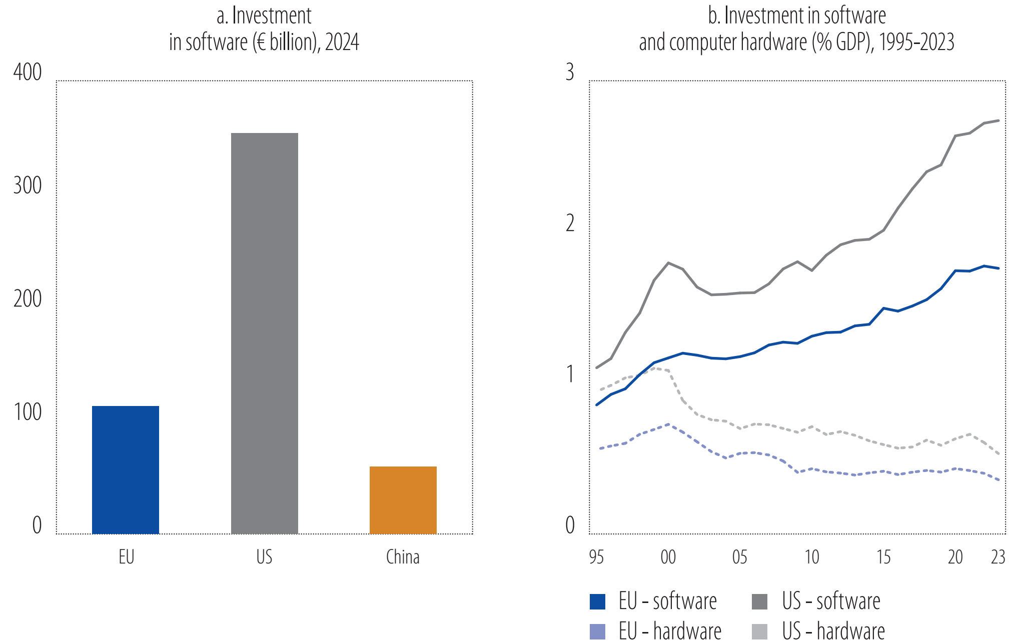
This section assesses the position of leading players in the global digital landscape. It analyses the recent surge in software and hardware investment, highlighting AI's role as a source of economic growth, while also pointing to the related financial market risks, especially in the United States. The analysis shows that Europe is accelerating its investments in digital infrastructure – including data centres and computing power – which will increase its ability to develop new digital technologies. However, this strategy remains dependent on the availability of risk capital, especially in the early stages of technological development and scaling up.

Investment in information and communications technology is transforming the economy

Investment in information and communications technology (ICT) has become a key driver of economic growth and competitiveness in advanced economies. In the European Union, investment in the sector has accelerated in recent years, reflecting robust demand for digital infrastructure, cloud computing and AI. The sector accounted for 5.5% of the European Union's gross value added and 3.5% of total employment in 2024, up from 5% and 3%, respectively, in 2019.

Software investment is shaping global digital capacity, with the United States maintaining its leading position. In 2024, more than €350 billion was invested in software in the United States, compared to €110 billion in the European Union and €60 billion in China (Figure 1a). Germany is ranked third among individual countries, with approximately €20 billion invested in 2024. Software has become one of the fastest-growing intangible assets, driving both technological and organisational innovation. It enhances productivity and competitiveness and generates wider macroeconomic gains by improving process efficiency and higher-quality decision-making (Bonakdarpour et al., 2025). Accelerating investment in software development in Europe is key to strengthening digital sovereignty and supporting the development of AI and cloud computing (European Commission, 2024).

Figure 1
Investment in software and hardware



Source: *EIB staff calculations based on the S&P Global Market Intelligence Database and the World Intellectual Property Organization (WIPO) Global Innovation Index.*
Note: *US dollar values converted into euros based on the exchange rate at the end of 2024.*

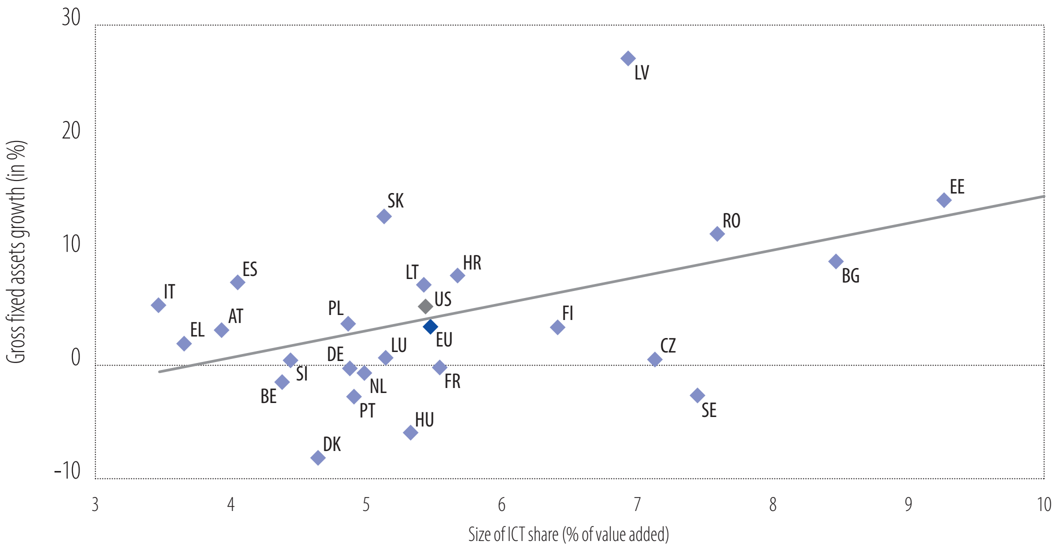
Source: *EIB staff calculations based on Eurostat and the Organisation for Economic Co-operation and Development (OECD).*

Despite steady growth in software investment in the European Union over the past three decades, the gap with the United States has widened. In 2023, software spending represented about 1.8% of GDP in the European Union and 2.7% in the United States (Figure 1b), with this difference more than doubling since the global financial crisis (0.98 percentage points in 2023 vs. 0.48 percentage points in 2008). By contrast, EU spending on computer hardware has remained stable at around 0.4% to 0.5% of GDP over the past two decades, and the gap relative to the United States is much smaller than for investment in software and databases.

The surge in software investment is reshaping the information and communications technology sector and beyond. It is acting as a transformative force across all sectors of the economy. EU countries with a higher share of the sector in value added tend to experience stronger overall investment growth (Figure 2), as digital technologies support capital formation, innovation and the modernisation of traditional industries.

Figure 2

Size of the information, communications and technology sector in 2024 and investment growth in the first half of 2025, by country



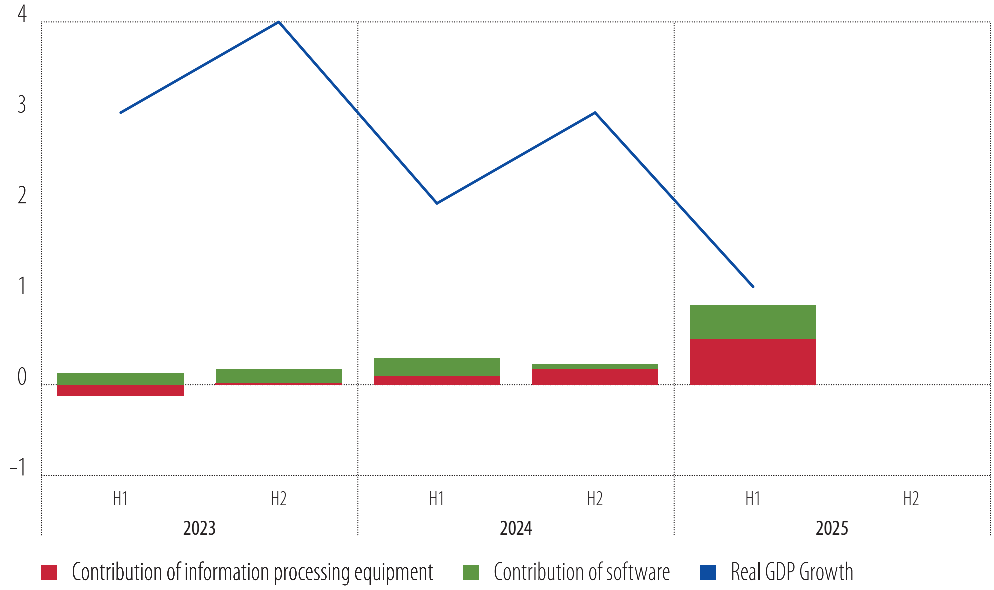
Source: *EIB staff calculations based on Eurostat and U.S. Bureau of Economic Analysis data.*
Note: *For EU countries, the annualised growth rate for gross fixed capital formation (total fixed assets) is based on billions of 2020 euros, seasonally and calendar adjusted. For the United States, the annualised growth rate for gross private domestic investment is based on billions of 2017 dollars, seasonally adjusted. The share of the information, communications and technology (ICT) sector is calculated using value added in 2024. This figure excludes Cyprus, Malta and Ireland.*

The United States recently experienced an unprecedented increase in investment in information and communications technology. Real spending on information processing equipment (IPE) and software in the United States in the first two quarters of 2025 was nearly double that seen in the same period in 2017. The rise in investment in IPE and software is now evident at the macroeconomic level, contributing to most of US real GDP growth in the first half of 2025 (Figure 3). Much of this surge is driven by large-scale investment in emerging technologies such as AI, cloud computing, advanced semiconductors and cybersecurity infrastructure.

Global stock markets have become increasingly dependent on the performance of the information and communications technology sector. Heightened market concentration and greater sensitivity to technology cycle fluctuations pose potential macroeconomic risks. From 2016 to 2025, the share of the sector in total market capitalisation doubled in both the United States and China, reaching 45% and 22% of the main stock market indices in 2025, respectively (Figure 4a). This rapid expansion has been driven by sustained investment in software, semiconductors and data centre capacity amid the global generative AI race. During the same period, the weight of the information, communications and technology sector in the main European stock market indices remained relatively stable, at around 9%. This implies that European markets are less exposed to the risks of sector-specific shocks and the volatility that can arise when valuations are heavily concentrated in fast-growing technology segments.

Figure 3

Contribution of information processing equipment and software investment to real GDP growth in the United States (annual growth rate in %)**, 2023-2025**

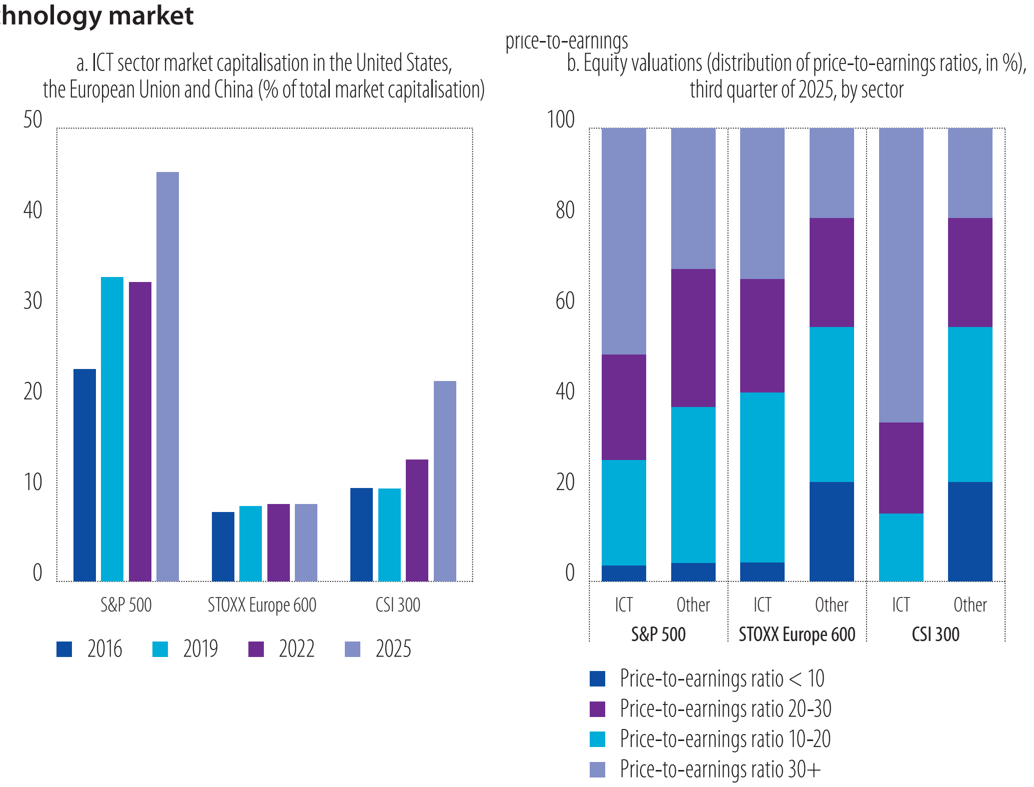


Source: *EIB staff calculations based on U.S. Bureau of Economic Analysis data.*
Note: *Contribution is calculated from the investment expenditure of the sector. The annualised growth rate is based on billions of 2017 dollars, seasonally adjusted.*

Sector valuation risks have been growing rapidly, especially in the United States and China. Roughly half of information, communications and technology firms in the United States and two-thirds of these firms in China have price-to-earnings ratios of 30 or above, compared to one-third for information, communications and technology firms in the European Union, suggesting a somewhat lower concentration of risk (Figure 4b). Nonetheless, even in Europe, the average price-to-earnings ratio is still much larger in this sector than in more traditional industries. Recent quarterly financial results for global technology companies have shown solid revenue growth, strong cash positions and sustained demand for data centre capacity. Their high market valuations reflect high future profitability expectations. However, they also lead to a risk environment that is increasingly sensitive to changes in interest rates, regulatory uncertainty and the pace at which AI-related investments translate into productivity gains. The high price-to-earnings ratios in the information, communications and technology sector imply that any deterioration in growth expectations, disappointing earnings from technology firms or shifts in investor sentiment could trigger severe price adjustments (European Central Bank (ECB), 2025; International Monetary Fund (IMF), 2025). While they are currently less exposed, EU firms are also vulnerable due to the global interconnectedness of tech markets, reliance on export demand and potential volatility spillovers from US and Chinese equity markets. Box A discusses recent developments in US equity markets and compares them to the dot-com bubble at the end of the 1990s.

Figure 4

Market capitalisation and equity valuations in the information and communications technology market



Source: *EIB staff calculations based on Bloomberg.*
Note: *2025 capitalisation is based on data until 26 November 2025. The ICT sector share is constructed as the total capitalisation of information communication and technology services indices.*

Source: *EIB staff calculations based on LSEG Workspace.*
Note: *The price-to-earnings (P/E) ratio reflects the company's stock price relative to its diluted earnings per share for common shares, excluding extraordinary items. The ICT sector is tagged based on Global Industry Classification Standard (GICS) sectoral classification.*

Box A

Comparing the recent performance of the US stock market with the dot-com bubble

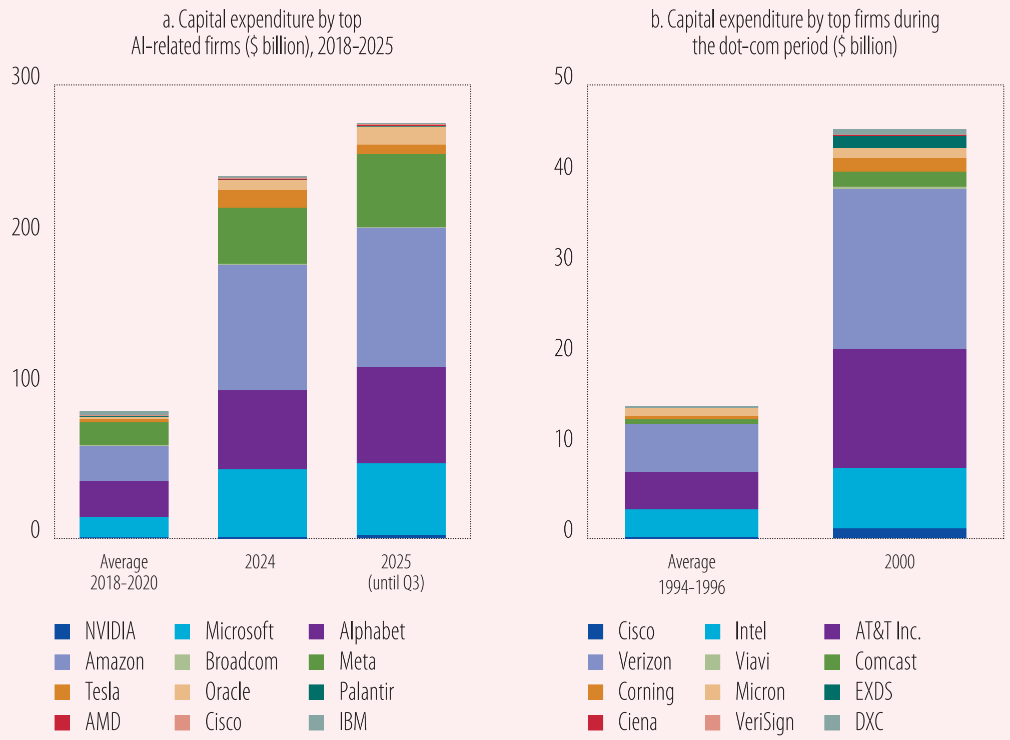
Global equity markets are still heavily driven by the technology sector, with valuations and concentration at record highs. In the United States, information technology companies represent more than 30% of total market capitalisation at the end of 2025, and communication services companies more than 10%, highlighting their dominant role in the market. Their share price performance has also been strong. Technology stocks have risen by about 23% and communication services stocks by 32%, compared with 16% for the overall market in 2025. The US information, communications and technology sector accounts for approximately 10% of total global market capitalisation, underscoring its systemic importance beyond national boundaries.

Within the United States, the largest five companies (all information, communications and technology companies) now comprise 22% of total market capitalisation, marking the highest level of concentration ever recorded. This degree of concentration amplifies market vulnerability, as stock market performance is heavily reliant on a small cohort of firms. This highlights both the strength and the fragility of the current cycle, where a narrow base and very high valuations could magnify the impact of a market correction.

The recent acceleration in technology investment mirrors the dynamics observed during the dot-com bubble in the late 1990s. In the past five years, average annual investment by the top 12 American AI-related companies by market capitalisation has nearly tripled, reaching $275 billion in the first three quarters of 2025, up from less than $85 billion in 2018-2020 (Figure A.1a). The surge is highly concentrated, with the top four firms accounting for over $250 billion of capital expenditure during this period. The levels are similar to the patterns observed during the dot-com period, when capital expenditure by the top US internet firms tripled between 1994-1996 and 2000 (Figure A.1b).[1] In relative terms, the capital expenditure-to-revenue ratio among top US firms is approaching the levels observed during the dot-com bubble, raising concerns as to whether the very large investments will yield proportional productivity gains.

Figure A.1

Comparing capital expenditure by top AI firms in recent years with that of top firms in the dot-com period



Source: *EIB staff calculations based on Capital IQ.*
Note: *AI-related firms were identified using company topic tags: artificial intelligence, generative AI, machine learning, data centre technology, data centres and facilities, and cloud infrastructure. The top 12 firms are ranked by total market capitalisation as of 24 November 2025.*

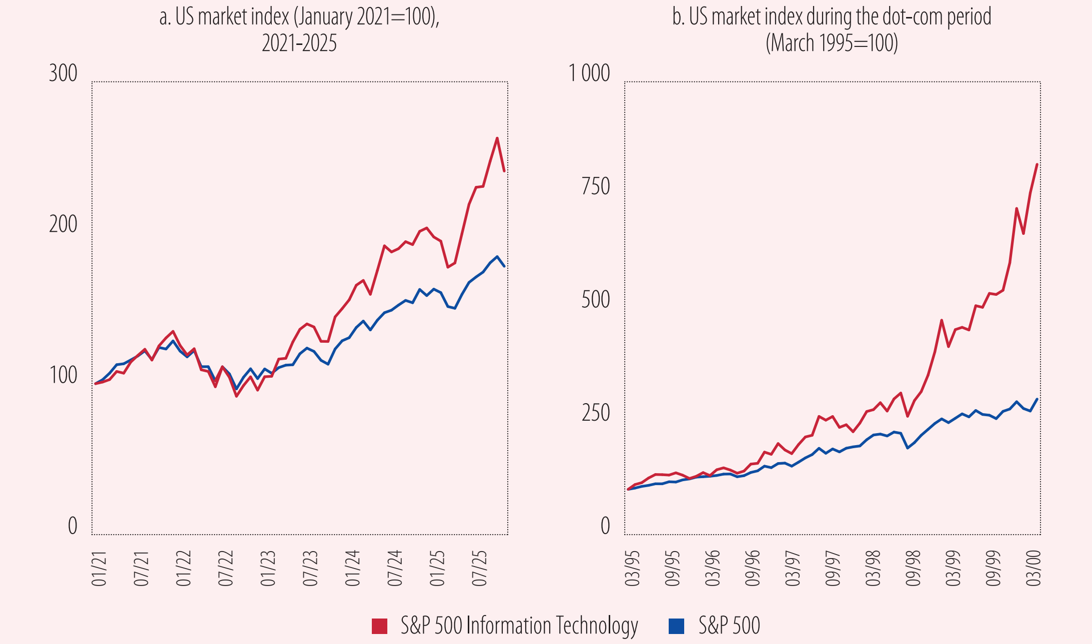
Source: *EIB staff calculations based on Capital IQ.*
Note: *Dot-com era firms were identified using topic tags: network backbone, optical infrastructure, data centre technology, and data centres and facilities. The top 12 firms are ranked by total market capitalisation as of 31 March 2000, the peak of the dot-com bubble.*

1 During the period of the dot-com bubble, some firms, such as EXDS and Crown Castle, recorded very large increases in capital expenditure (700 to over 1 000 times), despite their relatively small share of total capital expenditure in the United States at the time.

Nevertheless, the current surge in equity valuations remains below the peak seen during the dot-com period. Figure A.2a shows the evolution of the overall S&P 500 index and the S&P 500 Information Technology index from January 2021 to November 2025. Figure A.2b shows the same two indices from March 1995 to March 2000 (the dot-com peak). The S&P 500 index rose roughly threefold during the dot-com era compared with a twofold increase in the current period. By contrast, the information technology sector surged almost eightfold during the dot-com bubble, compared with only 2.4 times over the past five years.

Figure A.2

Comparing the US market index in recent years with the market index in the dot-com period



Source: *EIB staff calculations based on Capital IQ.*
Note: *The latest data point is November 2025.*

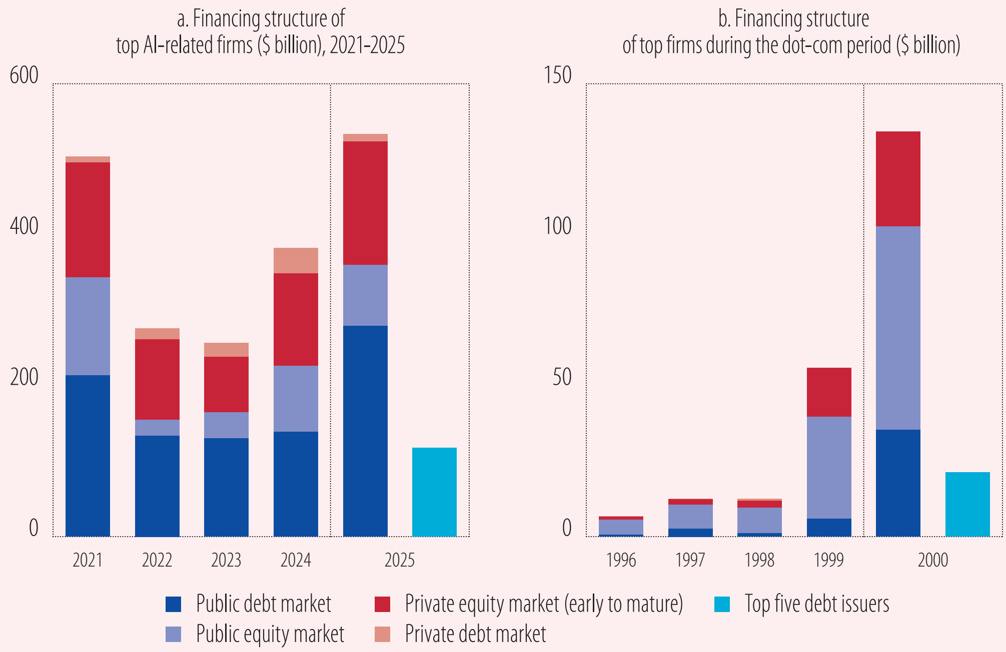
Source: *EIB staff calculations based on Capital IQ.*
Note: *The series stop in March 2000, the peak of the dot-com bubble.*

Unlike during the dot-com bubble, the current AI-related investment surge is increasingly financed through debt. AI-related firms rely heavily on debt capital markets, issuing about $280 billion in 2025, up from $138 billion in 2024 and $130 billion in 2023 (Figure A3.a). Debt raised through capital markets now accounts for roughly half of total sector financing. Some data centres and AI projects are funded through increasingly complex credit structures, often off balance sheet. By contrast, during the peak of the dot-com bubble in 2000, debt issuance represented only a quarter of total financing (Figure A3.b), even though the increase in equity finance grew much faster than today. This growing leverage through debt issuance could amplify systemic risk, as any market correction would affect credit markets and broader financial conditions.

Even a correction smaller than that seen during the dot-com bubble could have a significant impact on economic activity. US households now have the highest equity exposure on record. According to recent estimates, an equity correction in line with the early 2000s could reduce US household wealth by the equivalent of 70% of 2024 US GDP, more than double the reduction registered in 2001-2002 (Gopinath, 2025). Such a decline in household wealth could reduce US household consumption by $500 billion or close to 2% of GDP, even without taking into account the impact on corporate investment. In this context, given their substantial exposure to US equities, European investors would not remain immune to a repricing of AI-related US stocks, reducing financial wealth and dampening consumption and investment in the European Union as well. The US economic policy space is more limited than in the past. Monetary policy offers little cushion against equity-driven wealth effects, while fiscal flexibility to support the tech sector is constrained by record-high levels of government debt.

Figure A.3

Comparing the financing structure of top AI firms in recent years with that of top firms in the dot-com period



Source: *EIB staff calculations based on Capital IQ.*
Note: *2025 data is until 3 December 2025. AI-related firms were identified using company topic tags: artificial intelligence, generative AI, machine learning, data centre technology, data centres and facilities, and cloud infrastructure. Top five debt issuers in 2025 are ranked by total issuance value based on completion date.*

Source: *EIB staff calculations based on Capital IQ.*
Note: *Dot-com era firms were identified using topic tags: network backbone, optical infrastructure, data centre technology, and data centres and facilities. Top five debt issuers in 2000, ranked by total debt issuance value based on completion date.*

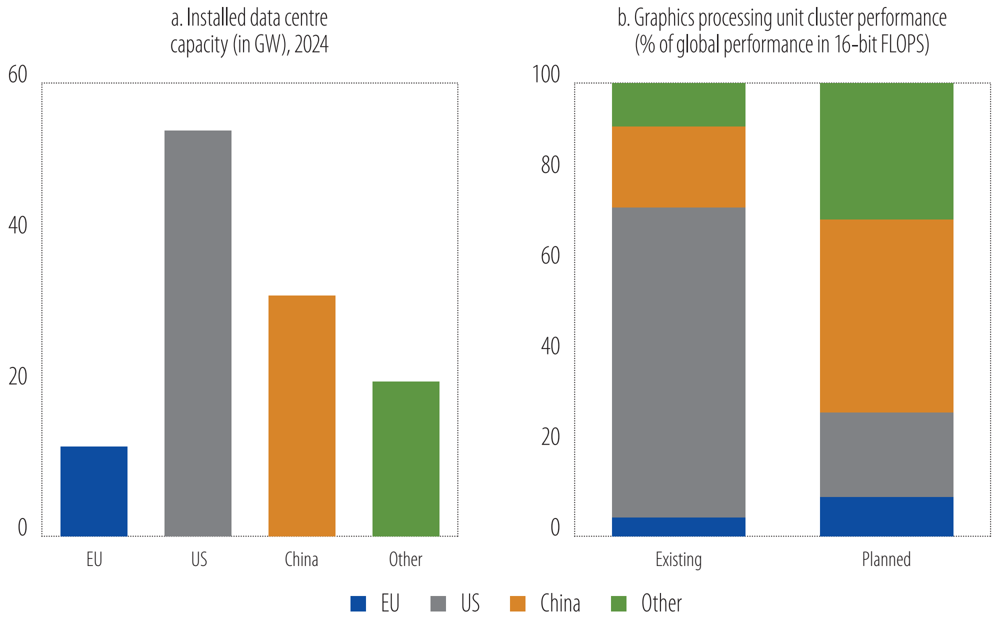
Europe is investing in digital infrastructure to power AI and cloud services

The European Union is strengthening its digital backbone to accelerate the adoption of AI and cloud technologies. With more than 2 250 edge data centres in 2024 (small facilities physically close to end users that process data locally), the European Union hosts one of the largest data networks in the world, supporting cloud services, AI applications and digital innovation. This represents an increase of more than 1 000 edge nodes compared with 2023.

Europe's data centres have a joint capacity of nearly 12 GW, although this remains below levels in the United States and China (Figure 5a). Many EU countries also rank among the fastest globally for broadband and mobile connectivity, which is essential for widespread digital adoption in households and industries. Coverage of very high-capacity networks reached 82.5% in 2024, rising by 4.9% compared with the previous year, while fibre networks covered 69.2% of households, an annual increase of 8.4% (European Commission, 2025a). The continued expansion of data centre capacity indicates that Europe is building the infrastructure needed to harness AI benefits. The EU Cloud and AI Development Act aims to triple data centre capacity in the next five to seven years. Achieving this ambitious target will require sustained investment and measures to simplify permitting; improve access to land, finance and energy; and incentivise large investments in energy-efficient cloud and edge capacity.

Figure 5

Data centre capacity and AI computing power



Source: EIB staff calculations based on the International Energy Agency's Energy and AI Observatory.

Source: Pilz et al. (2025).
Note: Performance refers to the computational speed of a processor or cluster measured in floating-point operations per second (FLOPS), using 16-bit precision. Planned investment excludes the projects that are deemed unlikely to materialise. China includes Hong Kong.

Europe is investing to close the gap in AI computing capacity. According to data on graphics processing unit (GPU) clusters, the European Union accounts for around 4% of existing global AI computing power (as of November 2025), compared with nearly 70% in the United States and 18% in China (Figure 5b). Training frontier AI models requires a large and growing amount of power for graphics processing units, servers, and cooling and other equipment. From 2019 to 2025, the computational performance of leading supercomputers doubled roughly every nine months, driven by the use of more and better AI chips (Pilz et al., 2025). This shows that competing in the global AI race will continue to require sustained investment to increase computing power in the European Union.

Europe must leverage the power of its single market to accelerate adoption of European data solutions. The supply chain needs to become more resilient to ensure that digital technologies developed in the European Union are widely adopted within the single market. Unlike the United States and China, which benefit from strong domestic digital environments for cloud and hyperscale providers, the European Union must further capitalise on its internal market for home-grown digital platforms and services. Box B explores the supply chain integration of hyperscalers, which are large-scale data centres providing cloud computing and data storage resources to businesses. This twin strategy – building robust semiconductor value chains and investing in software development in Europe, while driving widespread adoption of European data solutions – will be critical to reducing dependency, safeguarding digital sovereignty and securing long-term competitiveness.

Box B

Hyperscalers and supply chain integration

The cloud infrastructure market is expanding rapidly and remains highly concentrated among a few providers. In the third quarter of 2025, the global market size for cloud services amounted to $107 billion, up 57% compared with the same quarter in 2023 (Synergy Research Group, 2025). The cloud computing sector is dominated by large providers commonly known as hyperscalers – mainly US firms such as Amazon, Microsoft and Google – which together accounted for more than half of corporate cloud infrastructure spending in that period. A few Chinese and European firms are also active, although their services are often more limited compared to US hyperscalers. Table B.1 lists leading hyperscalers in the United States, China and the European Union.

Table B.1

Leading hyperscaler companies

Company name	Country	Company name	Joint procurement
Alphabet	US	Alibaba	China
Amazon	US	Baidu	China
Apple	US	Huawei	China
IBM	US	Tencent	China
Meta Platforms	US	Deutsche Telekom	EU
Microsoft	US	OVH	EU
Oracle	US	Orange	EU

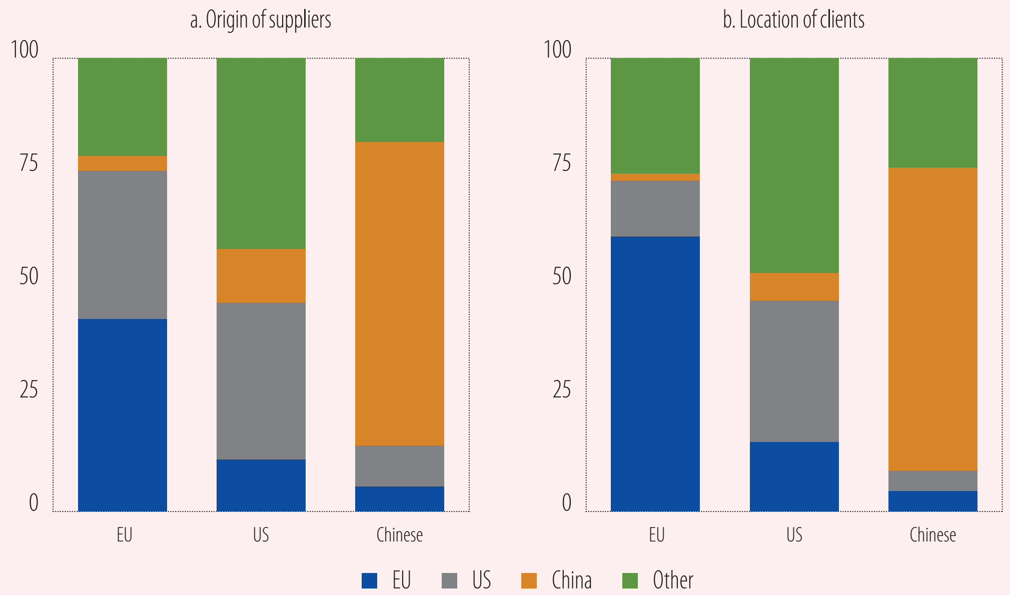
Source: FactSet.

There are structural differences in how major players across the United States, the European Union and China organise their supply and customer networks. Our analysis explores supply chain integration among leading hyperscalers, focusing on upstream (suppliers) and downstream (clients). It uses data on ultimate owners because cloud infrastructure services are often provided by subsidiaries or by large firms with multiple business lines.[2] Supplier and customer relationships are identified based on disclosed contracts from 2020 to 2025, collected in the FactSet Supply Chain Relationships database. The connections reveal the degree of vertical integration within each bloc and the extent of cross-border dependencies and market reach. Understanding these patterns provides insights into the strategic positioning and resilience of hyperscalers in a rapidly evolving global market.

Figure B.1a shows the country of origin of the main suppliers of the 14 leading hyperscalers in our analysis. Figure B.1b displays the country of the main customers of the 14 leading hyperscalers. Looking at the suppliers' value chain, Chinese hyperscalers appear to be more vertically integrated than US and EU hyperscalers: 67% of their suppliers are Chinese companies. For EU hyperscalers, 42% of suppliers are from the European Union and 33% from the United States, highlighting foreign dependencies and risks to digital sovereignty. US hyperscalers source 35% of their inputs domestically but also import from several countries other than China and the European Union, suggesting that US technology supply chains are more diversified.

2 Cloud services are sometimes intertwined with broader company operations and sometimes delivered via subsidiaries. For example, while Amazon delivers cloud services through wholly owned subsidiaries such as Amazon Web Services, Microsoft does not operate a separate legal entity for cloud services. Instead, Microsoft Azure is a cloud platform developed within the company.

Figure B.1
Location of suppliers and main customers of leading hyperscalers (in %)



Source: *EIB staff calculations based on the FactSet Supply Chain Relationships database.*
Note: *The shares are calculated based on the country of origin of the contract counterparty, covering all supplier contracts from 2020 to 2025: 4 753 contracts in the United States, 500 in the European Union and 1 042 in China.*

Source: *EIB staff calculations based on the FactSet Supply Chain Relationships database.*
Note: *The shares are calculated based on the country of origin of the contract counterparty, covering all client contracts from 2020 to 2025: 10 198 contracts in the United States, 122 in the European Union and 1 554 in China.*

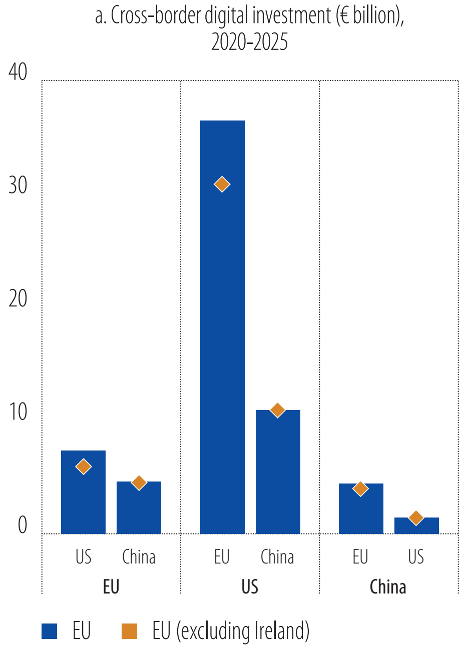
On the customer side, US and Chinese hyperscalers differ significantly in market reach. US hyperscalers serve mainly international clients, with only 31% of their customers based in the United States. By contrast, Chinese hyperscalers focus on their domestic market, where 67% of their customers are Chinese companies. EU hyperscalers are also concentrated at home, with about 61% of their customers located in the European Union. This indicates that EU hyperscalers have limited global reach: Only 12% of their customers are in the United States and 22% in other countries, each accounting for no more than 5% of the total client base.

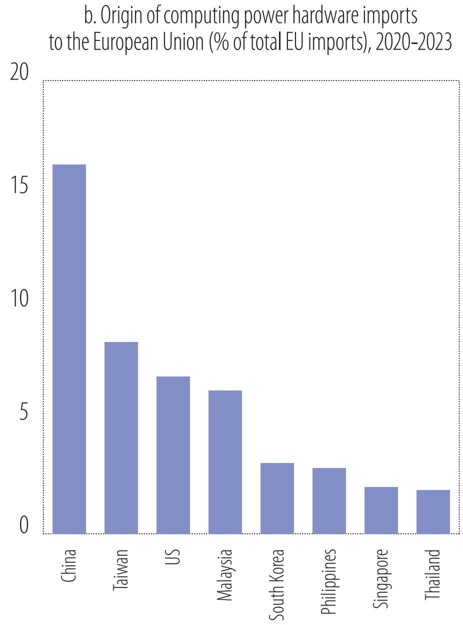
European hyperscalers source a large share of their suppliers within the European Union, showing Europe's ability to build strong digital chains and customer networks. However, there is untapped potential to integrate and standardise digital services across EU countries and to reduce barriers to cross-border data flows. By leveraging the internal market, the European Union can strengthen digital sovereignty, support domestic providers and ensure that European businesses benefit from scale, innovation and competitive pricing in cloud services. To deliver AI services based on European hardware and software, Europe also needs equipment manufacturers capable of producing leading-edge AI devices, which is not yet the case. This approach would reduce external dependencies and reinforce Europe's position in the global digital economy. At the same time, EU hyperscalers must invest to remain competitive internationally and diversify their customer base beyond the European Union.

US companies invested more than €30 billion in EU information, communications and technology infrastructure and data centres from 2020 to 2025. This figure excludes Ireland, where many large US tech firms have their European headquarters and where US investment exceeded €5 billion in the same period. These substantial cross-border inflows have accelerated the rollout of digital infrastructure but also increased Europe's structural reliance on US technologies. In contrast, investments by EU and Chinese firms in US tech and information and communications assets remain relatively limited (Figure 6a). For the European Union, this creates two key vulnerabilities. First, dependence on US firms may constrain Europe's strategic autonomy in critical software and cloud computing. Second, sudden shifts in US corporate strategy, regulation or geopolitics could expose the EU tech sector to external decisions beyond its control, potentially undermining the European Union's ability to shape its own digital future.

Figure 6

Cross-border digital investment and origin of hardware imports to the European Union





Source: *EIB staff calculations based on the Orbis Crossborder Investment database.*
Note: *Cross-border investment projects within business areas linked to ICT infrastructure, data centres and software. China includes Hong Kong and Macao.*

Source: *EIB staff calculations based on BACI.*
Note: *Computing power is an aggregate of data-processing units, electronic integrated circuits, processors, memories, other electronic integrated circuits, parts for data-processing machines and other automatic data machines.*

Global digital infrastructure depends heavily on Asian hardware supply chains. In 2024, the EU market share in global manufacturing capacity of semiconductors was 10.5%, implying that the hardware underpinning Europe's digital infrastructure is predominantly imported from East Asia. The global market for computing components – including semiconductors, processors and server hardware – is concentrated in a few economies, with China accounting for about 16% of total EU computing power imports, followed by Taiwan (8%) and the United States (7%) (Figure 6b).

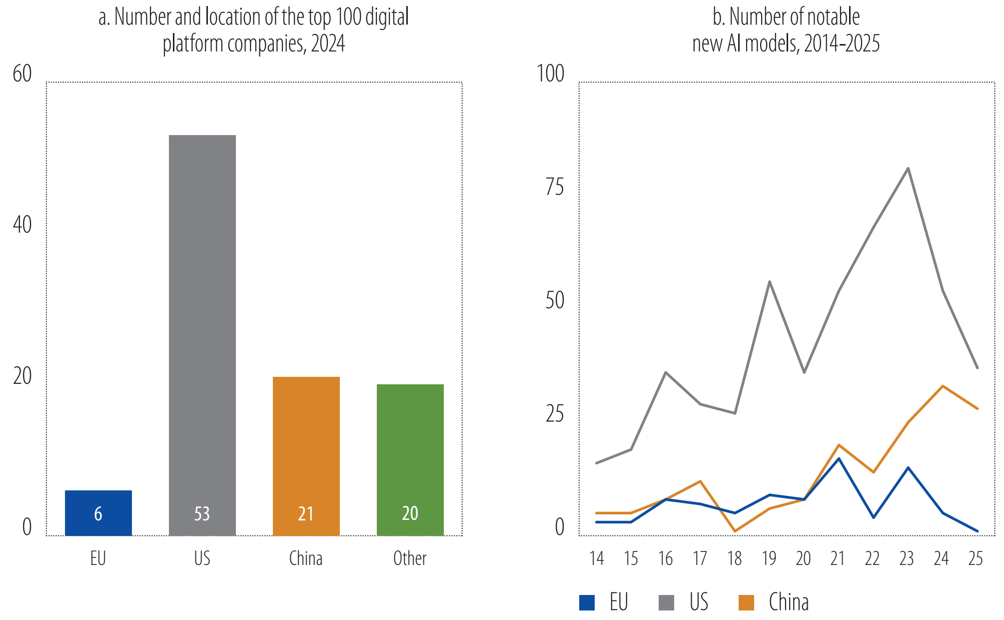
The high concentration in hardware production exposes Europe to risks derived from global supply chain disruptions and geopolitical tensions. This highlights the importance of investing to improve security of supply and reduce structural dependencies, with manufacturing performed either within the European Union or by reliable partners. The semiconductor industry is very capital-intensive and made up of a relatively small number of large players. In 2023, the European Union adopted the European Chips Act – which is heavily dependent on private investment expanding manufacturing capacity – as an element of its industrial policy, with the goal of addressing microchip shortages following the COVID-19 pandemic and strengthening technological leadership (European Commission, 2023). However, the funding associated with the chips act is unlikely to be sufficient to meet the ambitious target of doubling the EU market share in global semiconductor production and reaching 20% by 2030 (European Court of Auditors, 2025).

Most leading digital platforms used in the European Union are owned by US companies. Digital platform service providers are geographically concentrated, with US firms dominating the EU market, while Chinese firms serve China's domestic market. They operate across a wide range of sectors, including e-commerce, social media, fintech, enterprise software and travel and delivery services.

Only a few EU companies rank among the top 100 digital platforms (Figure 7a). The top US platforms include companies such as Alphabet (the parent company of Google), Amazon, Apple, Meta (the parent company of Facebook, Instagram and WhatsApp) and Microsoft – often referred to as members of the magnificent seven, a group of companies that also includes graphics processing unit developer NVIDIA and electric car manufacturer Tesla. The top two digital platforms in the European Union are SAP and Spotify, while the top three platforms in Asia are the Chinese companies Alibaba, ByteDance (the parent company of TikTok) and Tencent.

Figure 7

Top 100 digital platform companies and notable new AI models



Source: *Schmidt and Hosseini (2025).*
Note: *The country or region associated with a digital platform is based on the location of its corporate headquarters.*

Source: *Epoch AI (2025).*
Note: *Notable AI models refer to large-scale AI systems that have achieved significant technical, scientific or commercial impact. Countries or regions are assigned based on the contributing organisations. One model can be developed by multiple organisations, therefore some models can be assigned to multiple countries. China includes Hong Kong.*

This reliance on digital platforms based outside the European Union creates dependencies and risks for economic security, for example in cloud services. Despite its economic strength, the European Union faces challenges in scaling and expanding EU platforms. Key obstacles include limited investment in disruptive innovation, market fragmentation and different national regulatory systems, which place strong emphasis on data protection and consumer rights. Meanwhile, substantial resources have enabled US platforms to consolidate their dominance in EU markets.

Europe is home to many world-renowned research institutions, yet only a handful of emerging large language model champions are based in the European Union. The United States effectively kickstarted the global AI race with the development of landmark foundation models such as ChatGPT (OpenAI), Gemini (Google DeepMind), Claude (Anthropic) and LLaMA (Meta). It continues to release more notable AI models each year than any other region (Figure 7b), supported by well-developed venture capital markets, strong links between academia and industry and unmatched access to computing infrastructure. The open-source nature of many large language models has led to rapid global diffusion (Cottier et al., 2024). China has rapidly scaled up its AI capabilities through coordinated public and private investment, focusing on large language models (such as DeepSeek), multimodal systems and industrial applications. In contrast, Europe's AI sector remains more fragmented, with fewer firms possessing the data, computing resources and financing needed to train and deploy models at a global scale. However, several European organisations – such as Mistral in France and DeepL in Germany – are gaining international recognition for cutting-edge research and innovative approaches, highlighting the region's growing potential to shape the next wave of AI development.

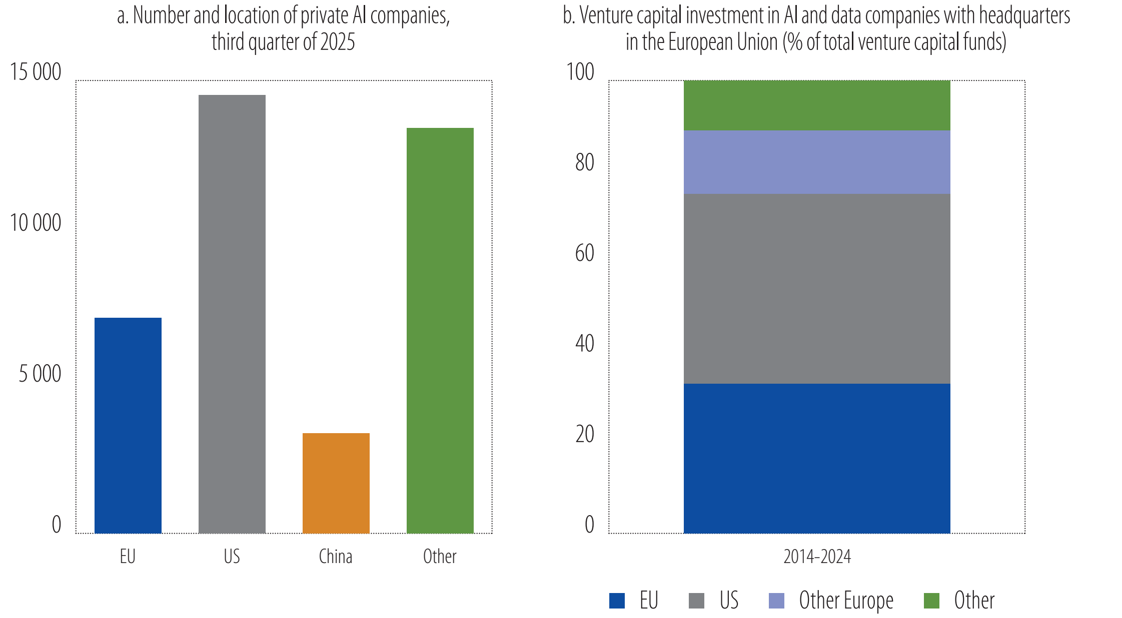
Strengthening Europe's capital markets for AI growth

A large number of AI companies are based in the European Union, reflecting a dynamic startup environment and growing entrepreneurial activity. While the United States has the largest pool of AI-linked private firms (Figure 8a), the European Union is home to more than 7 000 companies actively participating in the global AI market. EU startups tend to focus on applied AI solutions, industrial applications and specialised areas where Europe has comparative strengths, such as manufacturing, healthcare and regulatory compliance.

Financing for early-stage AI innovation in the European Union relies heavily on US venture capital. Over the past decade, EU-based AI companies have received a total of $210 billion in investment, 15% of which came from venture capital, including seed funding and angel investment. Notably, 42% of this venture capital funding originated in the United States, followed by 33% from the European Union, 14% from the United Kingdom, Switzerland or Norway, and 11% from the rest of the world (Figure 8b).[3] This underscores Europe's structural reliance on foreign investors to finance the growth of innovative early-stage and scaleup companies working on cutting-edge AI technologies. While the European Union has a growing base of AI startups, bridging the gap from financing private innovation to large-scale, globally competitive firms remains a challenge.

3 No AI or data company with its headquarters in the European Union has received direct venture capital funding from China in the last decade.

Figure 8
Private AI companies and venture capital investment in European AI and data companies



Source: *EIB staff calculations based on S&P Capital IQ.*
Note: *The sample consists of 38 438 privately owned companies, classified as AI topic by S&P Capital IQ.*

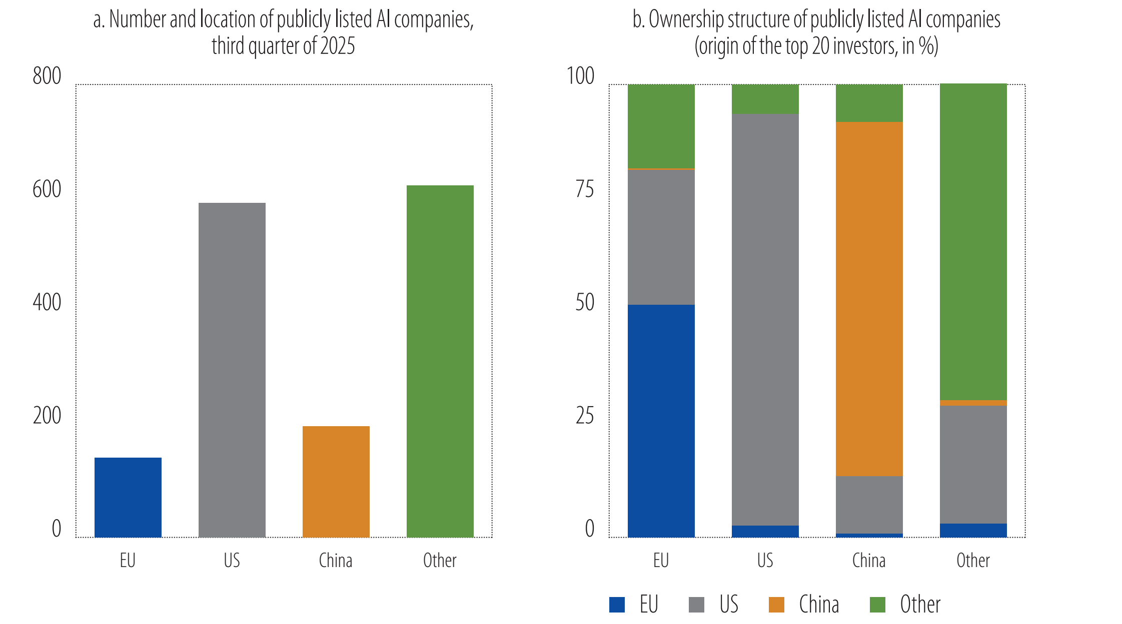
Source: *EIB staff calculations based on Pitchbook.*
Note: *Aggregate data over 2014-2024. Other Europe includes Norway, Switzerland and the United Kingdom.*

The European Union has fewer publicly listed AI firms than the United States and China. Private AI companies in Europe often struggle to scale up and enter public markets. Access to EU capital markets is limited, partially because of smaller domestic investor pools, regulatory fragmentation among EU countries and a lower appetite for risk in emerging technologies. By contrast, US companies benefit from a dynamic innovation environment and a large pool of mature companies. Publicly listed US AI firms (Figure 9a) drive research, marketing and deployment, supported by well-developed capital markets, strong investor oversight and the visibility associated with financing US technology companies.

The equity ownership of publicly listed AI firms highlights Europe's reliance on foreign capital. Domestic investors hold only half of the equity in EU-listed AI firms, while nearly one-third is owned by US investors (Figure 9b). This contrasts sharply with the United States and China, where financing of domestic AI firms shows a strong home bias. Foreign capital can help European companies scale up despite limited domestic markets, but it also exposes the European Union to external financial conditions and investor priorities. This dependence may constrain Europe's strategic autonomy in AI development and long-term innovation planning.

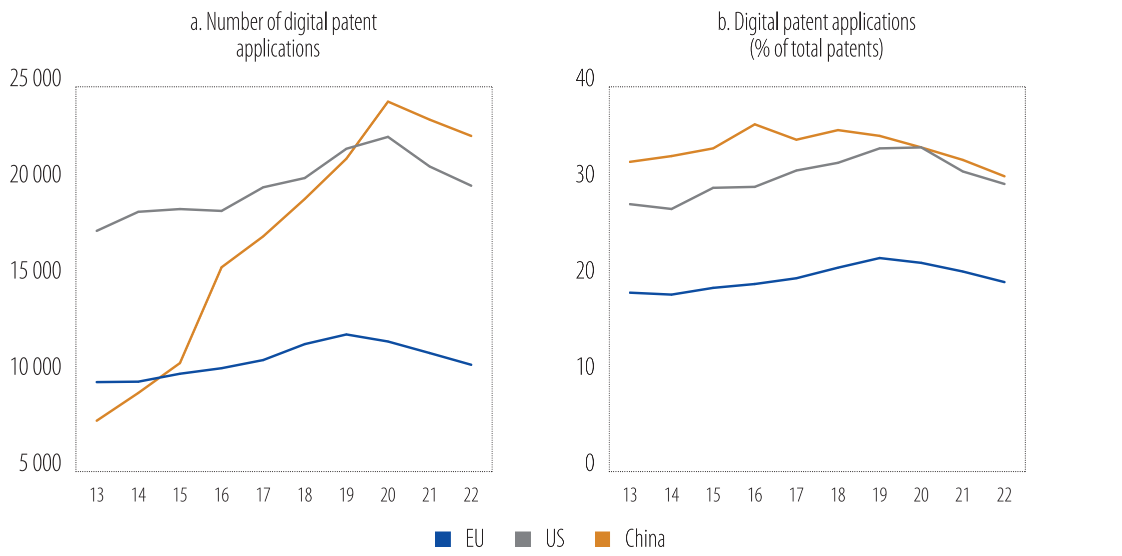
Patent applications reflect China's growing role in digital technology development. The number of new patent applications for digital technologies has been rising faster in China than in the United States and the European Union (Figure 10a). However, the outlook for innovation remains uncertain, with early signs that growth in filings under the Patent Cooperation Treaty (PCT) may be slowing (World Intellectual Property Organization (WIPO), 2025). The share of digital patents is higher in China and the United States, suggesting a stronger focus on digital innovation compared with the European Union (Figure 10b). Europe needs to reinforce and protect its ability to innovate in digital technologies to remain globally competitive.

Figure 9
Publicly listed AI companies, by location and ownership structure



Source:	*EIB staff calculations based on S&P capital IQ and LSEG Workspace.*	*Source:*	*EIB staff calculations based on S&P capital IQ and LSEG Workspace.*
Note:	*The sample consists of 1 550 public companies, classified as AI topic by S&P Capital IQ.*	*Note:*	*The sample consists of 1 550 public companies, classified as AI topic by S&P Capital IQ. Regional ownership shares are based on outstanding shares of top 20 direct investors and weighted by total assets.*

Figure 10
Digital patent applications, 2013-2022

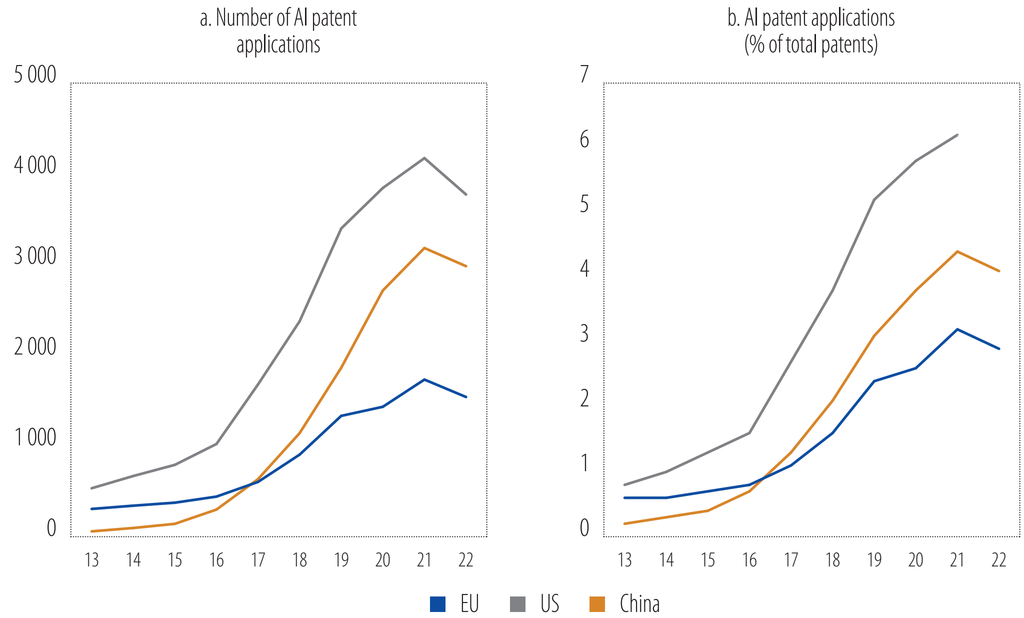


Source: *EIB staff calculations based on PCT patents (PATSTAT) in collaboration with the Expertise Centre for Research and Development Monitoring (ECOOM) at KU Leuven University.*
Note: *The digital patent classification is based on European Patent Office (EPO) (2017).*

AI-related patent applications suggest that the European Union has been falling behind in this area of innovation, particularly in recent years. The number of AI patents has grown very rapidly in the United States and China (Figure 11a), while the share of AI patents in the European Union has also increased, showing a relative focus on these technologies (Figure 11b). Patent data can act as an additional measure of technological leadership in AI, but not all AI developments can be patented, as many are purely software-based. Some leading AI researchers in the United States originally come from Europe, and could be encouraged to return through EU initiatives that promote a research environment based on European values, such as the new European AI in Science Strategy, financed primarily by Horizon Europe (European Commission, 2025b).

Figure 11

AI patent applications, 2013-2022



Source: *EIB staff calculations based on PCT patents (PATSTAT) in collaboration with ECOOM, KU Leuven.*
Note: *AI patents are a subdomain of the digital patent classification.*

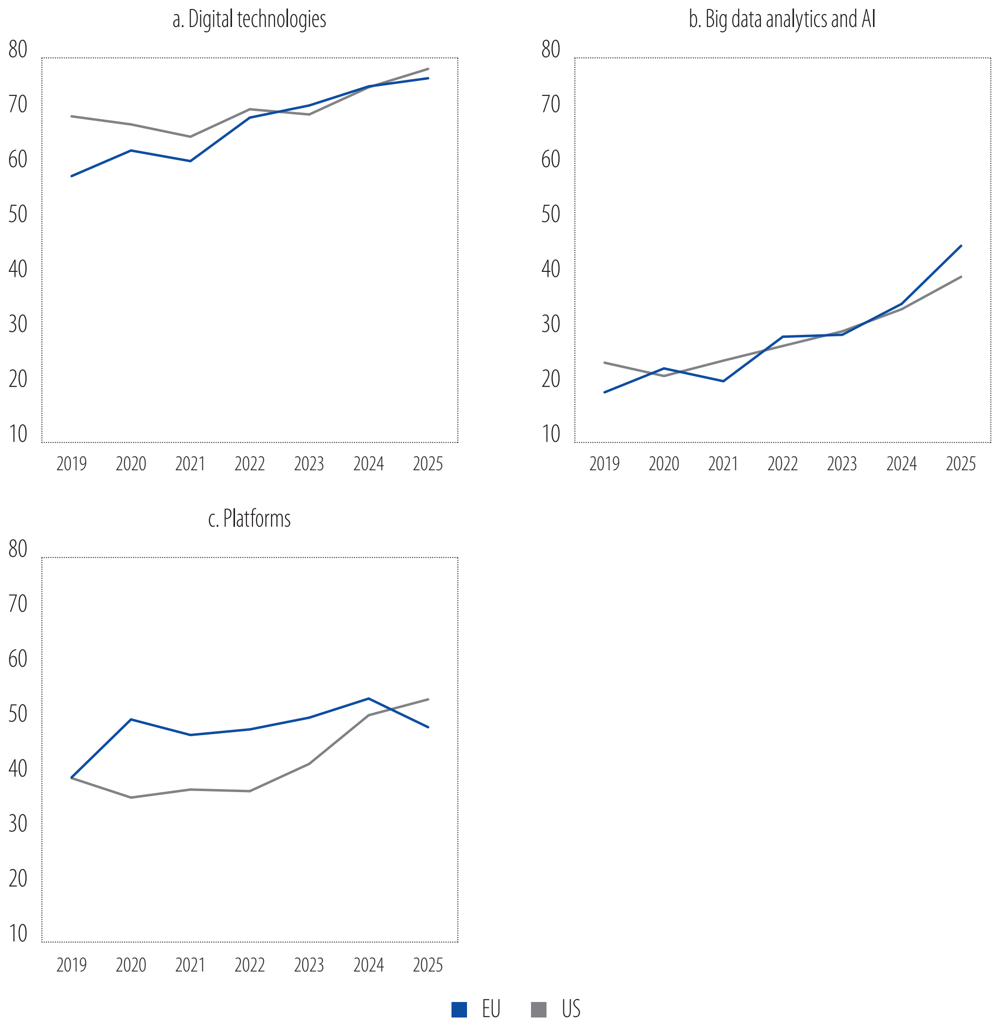
The impact of digital adoption on productivity

This section provides new evidence on the productivity effect of AI, taking a firm-level view of the adoption of digital technologies using data from the EIBIS. The section shows that EU firms are raising their digital profiles but would benefit from more consistent integration of digital technologies (including generative AI) into their business models. It also stresses that the productivity benefits of AI adoption in the European Union are substantial, notably in high-tech manufacturing, but also among smaller firms.

Digital transformation in Europe is picking up

EU firms are accelerating the adoption of digital technologies. To strengthen Europe's competitiveness, cutting-edge innovation must go hand in hand with wider deployment of tools such as big data analytics and AI, digital platforms, 3D printing, advanced robotics, drones, the internet of things and augmented or virtual reality.[4] The latest results from the EIBIS show that EU firms have reached similar levels of digitalisation as their US counterparts. In 2025, 76% of EU companies used digital technologies in their operations, compared with 78% of firms in the United States (Figure 12a).[5] For example, 46% of EU firms used big data analytics and AI, compared with 40% in the United States (Figure 12b). The share of firms using these technologies has grown rapidly over the past five years. Adoption of digital platforms is also comparable: 49% of EU firms and 54% US firms reported using them in 2025 (Figure 12c).

Figure 12
Use of digital technologies, big data analytics and AI, and platforms (% of firms)



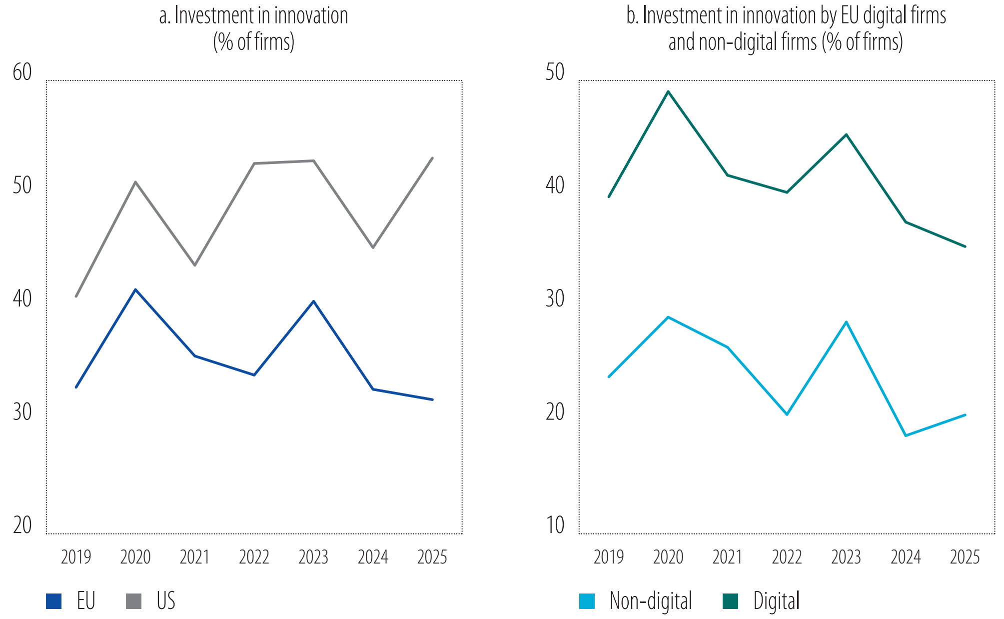
Source: *EIB staff calculations based on EIBIS 2019-2025.*
Note: *Firms are weighted by value added. The range of digital technologies surveyed in the EIBIS varies by sector. See footnote 5 for details.*
Question: *To what extent, if at all, are each of the following digital technologies used within your business? Please say if you do not use the technology within your business.*

4 In the EIBIS, big data analytics and AI refer to technologies that automate tasks and provide insights that augment human decision-making. Digital platforms are online services such as Amazon, Alibaba or eBay used to interact with customers, create digital communities and sell products and services. 3D printing (also known as additive manufacturing) means creating objects layer by layer from digital models. Advanced robotics are highly autonomous, flexible and programmable robots. Drones are unmanned and remote-controlled aerial vehicles. The internet of things involves electronic devices that communicate automatically with each other without human assistance. Augmented or virtual reality presents information integrated with real-world objects using head-mounted displays.

5 Throughout the chapter, firms in the EIBIS are classified as digital if they use at least one advanced digital technology. The range of digital technologies surveyed in the EIBIS varies by sector: Manufacturing includes 3D printing, advanced robotics, the internet of things, big data analytics and AI; services include virtual reality, platforms, the internet of things, big data analytics and AI; construction includes 3D printing, drones, virtual reality and the internet of things; infrastructure includes 3D printing, platforms, the internet of things, big data analytics and AI.

Figure 13

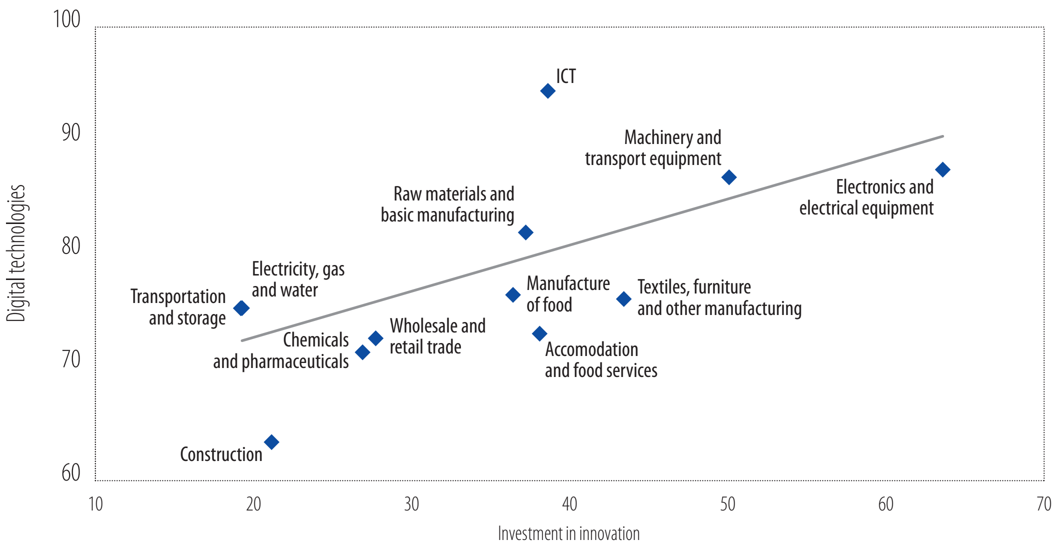
Investment in innovation by EU and US firms and digital vs. non-digital firms, 2019-2025



Source: *EIB staff calculations based on EIBIS 2019-2025.*
Note: *Firms are weighted by value added.*
Question: *Did you invest in the last financial year in developing or introducing new products, processes or services? To what extent, if at all, are each of the following digital technologies used within your business? Please say if you do not use the technology within your business.*

Figure 14

EU firms' investment in innovation and use of digital technologies (% of firms) **for 2025, by sector**



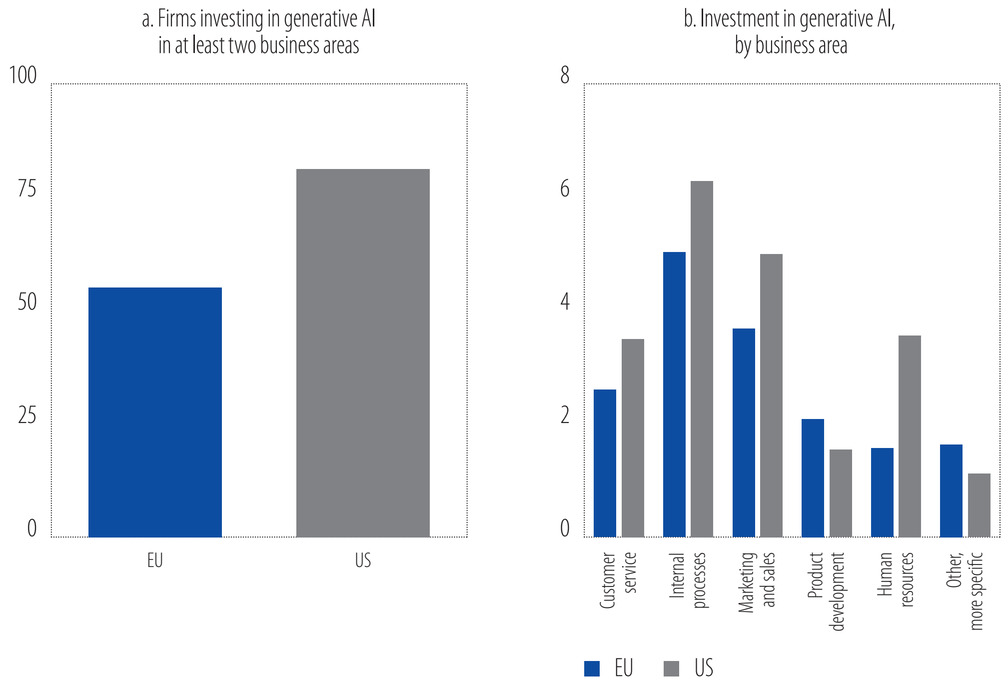
Source: *EIB staff calculations based on EIBIS 2025.*
Note: *Firms are weighted by value added. The range of digital technologies surveyed in the EIBIS varies by sector. See footnote 5 for details.*
Question: *Did you invest in the last financial year in developing or introducing new products, processes or services? To what extent, if at all, are each of the following digital technologies used within your business? Please say if you do not use the technology within your business.*

Corporate investment in innovation remains lower in the European Union than in the United States. A smaller share of EU firms invest in developing new products, processes or services compared to their US counterparts (Figure 13a). This innovation gap has widened over time and is evident across all sectors, including manufacturing, and across firms of all sizes. Evidence from the EIBIS supports the findings of the European Innovation Scoreboard 2025 (European Commission, 2025c) and data from the Organisation for Economic Co-operation and Development (OECD), which shows that the United States performs better than the European Union on several R&D and innovation indicators. The recent slowdown in innovation is also apparent in related measures, such as patent applications (WIPO, 2025).

Firms that use digital technologies tend to invest more in innovation (Figure 13b). Innovation and digitalisation also vary by sector. Industries with a higher share of firms using digital technologies – such as high-tech manufacturing areas, including electronics and electrical equipment – are generally more innovative (Figure 14). This suggests that digitalisation is changing how new products and services are developed (Cockburn et al., 2019; Acemoglu et al., 2022; Babina et al., 2024). A pattern similar to that shown in Figure 13 emerges when the share of innovative firms is compared to the share of firms that use big data analytics and AI. These findings are consistent with recent studies analysing AI intensity across sectors (Calvino et al., 2024).

Figure 15

Investment in generative AI (% of firms using big data analytics and AI)



Source: *EIB staff calculations based on EIBIS 2025.*
Note: *The figures are based on firms that report using big data analytics and AI. Firms are weighted by value added.*
Question: *I would like to ask about your company's systematic use of generative AI tools to improve processes. These are tools like ChatGPT, Bard or Copilot that can create new content, like text, images or codes. Does your company invest in these kinds of tools in any of the following areas?*

While the share of EU and US firms investing in generative AI is broadly similar, the scope of applications differs. European firms tend to adopt generative AI technologies more narrowly: Only 55% of EU companies invest in at least two application areas, compared with 81% of US firms (Figure 15a). This suggests that, although adoption is increasing, EU businesses are less likely to integrate generative AI across multiple functions, which may limit potential productivity and innovation gains.

Generative AI deployment in the European Union remains concentrated in core business domains, such as product development and more specific applications. EU firms invest less in generative AI than US firms in areas including human resources, marketing and sales, customer service and internal operations (Figure 15b). In contrast, US firms tend to pursue a wider portfolio of applications, leveraging generative AI not only to improve efficiency, but also to drive innovation. This suggests that EU companies may prioritise selected use cases or face resource, skill or organisational constraints in scaling generative AI solutions. The narrower scope of applications could restrict their ability to capture the full productivity, competitive and revenue benefits of generative AI.

AI adoption increases the productivity of EU firms

Firm size plays a key role in the adoption of digital technologies. Around 85% of EU firms with more than 250 employees use digital technologies, compared with about 54% of EU firms with fewer than ten employees (Figure 16a). This gap is likely to slow Europe's digital transformation, as businesses in the region are on average smaller than those in the United States (Revoltella et al., 2020). The difference in adoption rates between small and large firms is particularly pronounced for big data analytics and AI, suggesting that these technologies involve significant integration costs and that larger firms are better positioned to adopt them (Acemoglu et al., 2022). Evidence from the EIBIS on differences in AI use across sectors and firm sizes is consistent with other surveys on the adoption of AI in companies (Eurostat, 2025).

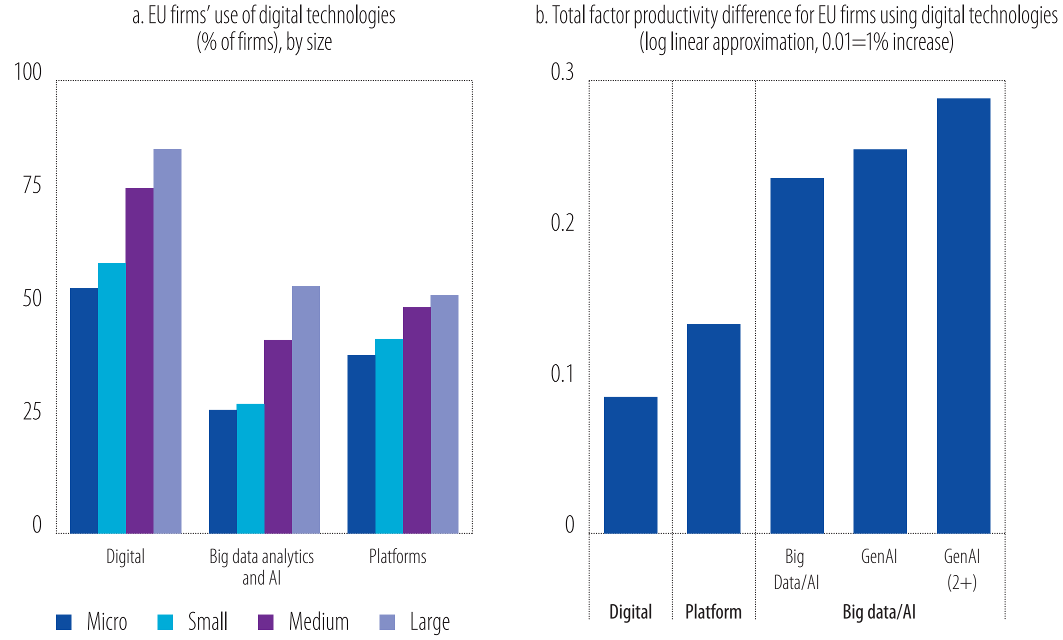
Firms that adopt digital technologies tend to be more productive. Companies using big data analytics and AI show significantly higher total factor productivity, reflecting more efficient use of inputs and improved decision-making. Beyond basic adoption, investment in generative AI is closely linked to productivity (Brynjolfsson et al., 2025). Firms investing in only one generative AI application area report roughly 25% higher total factor productivity than firms that do not invest in generative AI, while those deploying generative AI across two or more areas achieve nearly 30% higher total factor productivity (Figure 16b).

AI technologies have the potential to raise firm productivity in the European Union. The adoption of big data analytics and AI is associated with higher productivity levels, unlike other digital technologies (Figure 17a).[6] The productivity gains from AI adoption are greater among large companies but remain positive and significant among small and medium-sized firms. Controlling for a wide range of factors, Aldasoro et al. (2026) developed a methodology to isolate the direct effect of digital adoption on labour productivity and find similar results, as discussed in Box C.

Although the European Union is not a global leader in AI technology development, its strong industrial base means that the potential benefits of adopting and adapting AI to business needs are substantial. EU firms – particularly in manufacturing – can use AI to optimise processes, improve quality control, reduce downtime and strengthen supply chain management. Productivity gains from big data and AI adoption are greater in high-tech manufacturing, where digital transformation complements capital-intensive production and structured operational processes (Figure 17b). This demonstrates that Europe's industrial environment and technological capabilities enable EU companies to capture the productivity benefits of AI and reinforce their position in global value chains, even without leading in cutting-edge AI research.

6 The estimates in Figures 17a and 17b show the within-firm effect of adopting digital technologies between 2019 and 2025, based on panel regressions with firm fixed effects. They differ from those reported in Figure 16b, which compare total factor productivity levels between firms using digital technologies and firms not using them, controlling for age, size and country-sector-year fixed effects.

Figure 16
EU firms' use of digital technologies and impact on productivity



Source: EIB staff calculations based on EIBIS 2025.
Note: Firms are weighted by value added.
Question: To what extent, if at all, are each of the following digital technologies used within your business? Please say if you do not use the technology within your business.

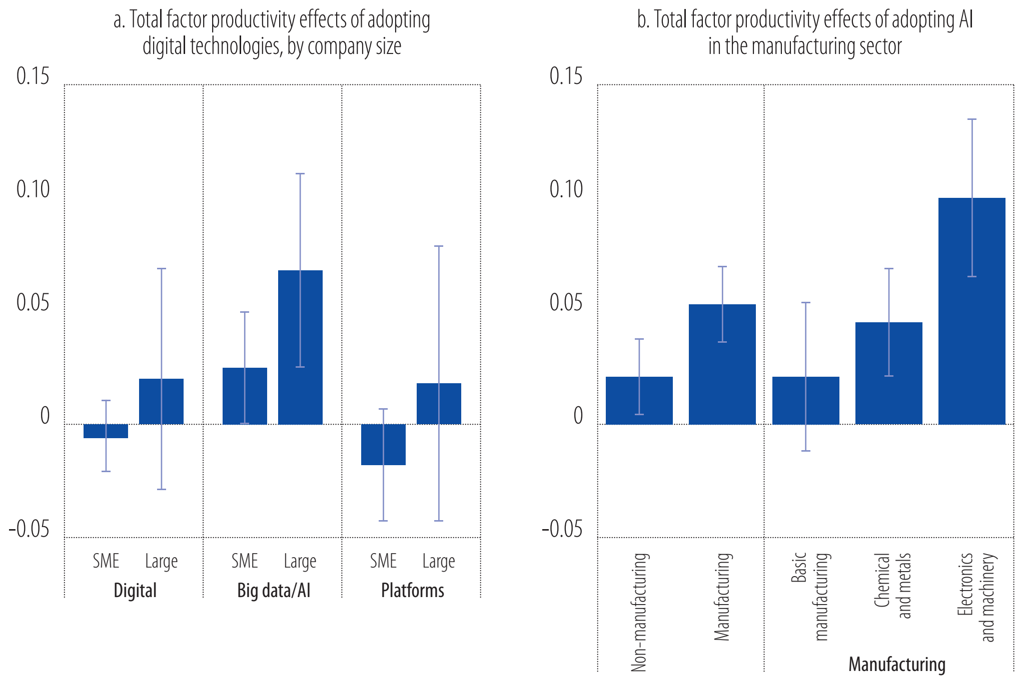
Source: EIB staff calculations based on EIBIS 2025.
Note: Firms that do not use big data analytics and AI were not asked about generative AI. It is assumed that they do not invest in generative AI. Ordinary least squares (OLS) regression estimates are used, controlling for age, size and the interaction of country, sector and year fixed effects. Total factor productivity is calculated as the residual from a Cobb-Douglas production function, using turnover as output, the number of employees as labour input, and total fixed assets as capital input. GenAI: generative AI; GenAI (2+): generative AI used in two applications/areas or more.

AI adoption contributed to an estimated annual increase of 0.34 percentage points to EU aggregate productivity growth from 2019 to 2025. These results are consistent with other macroeconomic estimates for European countries reported in the literature (Filippucci et al., 2025). For example, Bergeaud (2024) predicts an annual total factor productivity increase of 0.3 percentage points for the euro area, while Misch et al. (2025) predict an increase of 0.2 percentage points for Europe (including all 27 EU countries, Iceland, Norway, Switzerland and the United Kingdom). Our approach calculates the annual macroeconomic impact of the rollout of big data analytics and AI on total factor productivity from 2019 to 2025 using weighted firm-level panel regressions. We then use the estimated coefficients to construct a counterfactual path of aggregate total factor productivity, assuming no AI adoption by EU firms over this period. The realised average total factor productivity growth was 0.34 percentage points higher than the growth rate under the counterfactual scenario of no adoption, suggesting that the rollout of big data and AI accounted for some 12% of aggregate total factor productivity gains between 2019 and 2025.

Aggregate productivity gains from digitalisation are closely linked to how efficiently labour and capital are allocated within sectors. In our calculation, we estimate the effect of adopting various digital technologies on the misallocation of resources by analysing within-sector dispersion in marginal products, following the framework of Hsieh and Klenow (2009) applied to EIBIS data by Gorodnichenko et al. (2025). The marginal product of labour measures the additional output produced by one more unit of labour, while the marginal product of capital reflects the output generated by an additional unit of capital. When firms operating in the same sector use similar technologies and have unconstrained access to resources, wide dispersion in either marginal product of labour or marginal product of capital signals that labour or capital is not flowing to the firms that could use these inputs most efficiently. We assess how digitalisation relates to the misallocation by correlating the standard deviations of the marginal products across sectors with digital technology adoption rates by country, sector and year.

Figure 17

Impact of adopting digital technologies on productivity (log linear approximation, 0.01=1% increase)

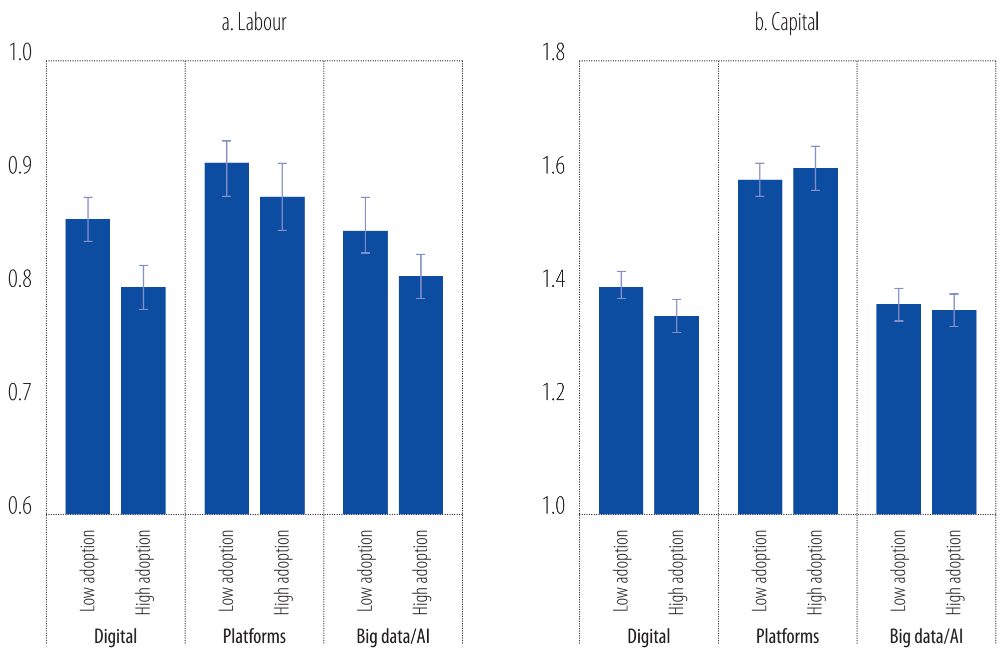


Source: *EIB staff calculations based on EIBIS 2019-2025.*
Note: *Firm-level panel regression estimates with fixed effects based on firms that adopted digital technologies during 2019-2025. The violet lines show 95% confidence intervals based on robust standard errors. Firm-level total factor productivity is calculated as the residual from a Cobb-Douglas production function, using turnover as output, the number of employees as labour input, and total fixed assets as capital input. In Figure 17b, non-manufacturing includes firms in services and infrastructure.*

Digital adoption is strongly associated with more efficient labour allocation. Sectors with high uptake of digital technologies – including platforms and big data and AI – display systematically lower dispersion in the marginal product of labour, indicating that digitally advanced sectors align labour inputs more closely with productive capacity (Figure 18a). This finding is consistent with the view that digital tools reduce information frictions, enhance managerial decision-making and improve monitoring, coordination and task assignment. While digital adoption is negatively linked to marginal product of capital dispersion, it seems that this is not driven by platforms or big data and AI but by other digital technologies – for example, 3D printing, advanced robotics or the internet of things (Figure 18b). This likely reflects the nature of the capital adjustment, with investment decisions facing higher adjustment costs, tighter financing constraints and longer planning horizons than labour, making capital reallocation slower and less responsive to the immediate efficiency gains associated with digital technologies.

Figure 18

Dispersion of the marginal product of labour and capital (standard deviation within the sector)



Source: *EIB staff calculations based on EIBIS 2019-2025.*
Note: *Predictive margins are derived from partial correlations computed on data aggregated for the country, sector and year using value-added weights. The margins compare the first quartile (low adoption) and the third quartile (high adoption) of sector adoption rates of digital technologies for 2019-2025. The violet lines show 95% confidence intervals based on standard errors clustered at country-wave level. The marginal product of labour is calculated as the share of total turnover per unit of labour. The marginal product of capital is calculated as the share of total turnover per unit of total fixed assets.*

Box C

Exploring the causal link between AI adoption and productivity

AI is widely seen as a transformative force for the economy, but measuring its impact on productivity is complex. While some projections anticipate major productivity gains, others argue that adoption barriers could significantly limit efficiency gains.

Acemoglu (2024), for example, predicts only a 0.07% increase in annual total factor productivity over the next decade in the United States. His study estimates the macroeconomic impact of AI by aggregating worker-level productivity gains and making assumptions regarding AI adoption and capabilities based on the degree of exposure of individual tasks to AI in each occupation (Eloundou et al., 2024; Svanberg et al., 2023).

Filippucci et al. (2025) build on this approach by considering potential sectoral spillovers. They find that productivity gains vary widely across Group of Seven (G7) economies, reflecting differences in the pace of current and expected AI adoption and the sectoral composition of national economies. They predict an increase in annual labour productivity growth of 0.4 to 1.3 percentage points in the United States, depending on adoption speed, and 0.2 to 1.2 percentage points for three EU economies (France, Germany and Italy). The predicted gains are higher in the United States because sectors most exposed to AI (such as information, communications and technology services, telecom, publishing and media, finance and professional services) account for a larger share of value added.

The estimates of Filippucci et al. (2025) are substantially higher than those of Acemoglu (2024) but align with those of Bergeaud (2024), who predicts a 0.3 percentage point annual increase in total factor productivity growth for the euro area, and Misch et al. (2025), who estimate 0.2 percentage points for Europe. Micro-level field experiments also report significant short-term productivity improvements: Noy and Zhang (2023) and Brynjolfsson et al. (2025) find gains of 14% to 40% in writing and customer service tasks, while Gambacorta et al. (2024) report increases of more than 50% in coding.

Recent studies by Babina et al. (2024) and Bonney et al. (2024) show strong AI adoption among US firms, particularly large innovators in knowledge-intensive sectors. However, robust evidence on firm-level effects outside the United States remains scarce. Europe's position is both central and paradoxical. It has world-leading researchers, influential privacy regulations and a strong industrial base, yet faces a persistent innovation gap in AI development – reflected in a growing patent shortfall compared with the United States and China (European Investment Bank (EIB), 2025a).

Understanding how AI affects European firms is therefore essential for policymakers seeking to harness its benefits while managing associated risks. One of the main challenges for researchers is determining whether AI truly makes firms more productive, or whether already successful firms are simply more likely to adopt AI.

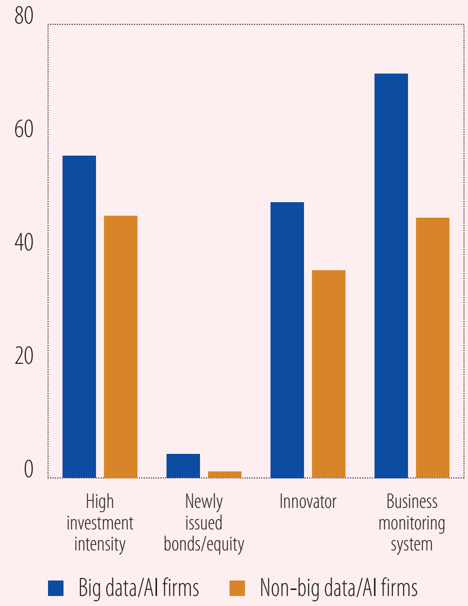
To address this issue, Aldasoro et al. (2026) propose a strategy to isolate variation in AI adoption that is independent of the firm's own decisions. Instead of comparing firms within the European Union – where more productive firms are also more likely to adopt AI – they match EU firms with similar firms in the United States based on observable characteristics. Because US firms operate in a different financial and regulatory environment, their AI adoption decisions are less likely to be influenced by the same local factors as their European peers. The AI adoption levels of the matched US firms can be used as exogenous proxies to estimate the productivity effects of AI among EU firms.

The matching approach is based on key factors that distinguish AI adopters from non-adopters. Analysis of EIBIS data on the financial characteristics of firms (Figure C.1) reveals notable differences in four areas: capital intensity (57% of AI adopters have high investment intensity, compared to 46% of non-adopters), issuance of new bonds and equity, innovation activity and the use of formal business monitoring systems. These four dimensions are used as the main matching variables in a stratified propensity score matching exercise. For each EU firm within a given sector and size class, a synthetic binary proxy is built based on the average AI adoption rate of the five US firms with the most similar propensity scores for the four variables (for more details, see Aldasoro et al., 2026).

Accounting also for factors like investment dynamics, profitability, financial leverage and asset base, Aldasoro et al. (2026) estimate that firms using AI have, on average, 2.8% higher labour productivity than non-adopters (Table C.1). However, when the United States-matched adoption rates are used as an exogeneous proxy for AI adoption, the estimated productivity gains rise to 4.1%. This increase highlights how endogenous adoption patterns – where more productive firms are more likely to adopt AI – can understate the true benefits. After isolating exogenous variation via US benchmarking, the net effect remains positive and significant. The result is economically plausible, reflecting incremental gains from task automation and cognitive augmentation, and aligns with mid-range macroeconomic projections (Misch et al., 2025), rather than with optimistic productivity boom scenarios (Baily et al., 2023).

Figure C.1

Characteristics of firms using AI and firms not using AI (% of firms)

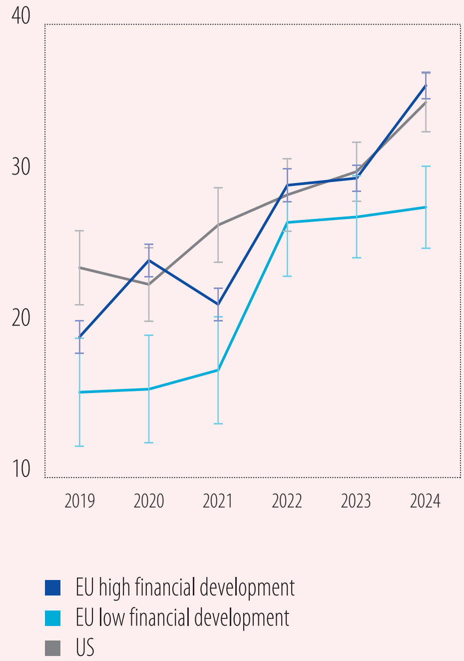


Source: *Aldasoro et al. (2026), based on EIBIS 2019-2024.*

Note: *High investment intensity firms are those with investment per employee above the country-sector-year average. Innovators are firms that developed or introduced new products, processes or services that are new to the company, the country or the global market. Business monitoring systems refer to firms using a formal strategic business monitoring system that compares current performance against a set of strategic key performance indicators. Firms are weighted by value added.*

Figure C.2

AI adoption, by financial development score (% of firms)



Source: *Source: Aldasoro et al. (2026), based on EIBIS 2019-2024.*

Note: *Average reported AI adoption by country groups, controlling for sector fixed effects. The level of financial development is based on the total stock market capitalisation and global integration. The vertical lines represent 95% confidence intervals.*

Productivity gains seem to be concentrated among larger firms, with small and medium-sized firms benefiting relatively little. This stratification validates concerns that AI could widen income gaps (Cornelli et al., 2023; Cazzaniga et al., 2024), particularly given Europe's industrial structure, dominated by smaller firms. Moreover, firms that invest in complementary areas – like software, data infrastructure and employee training – achieve much higher returns from AI.

AI adoption may not automatically lead to productivity gains. Benefits materialise only when AI is embedded in a supportive environment that includes sufficient scale, robust digital infrastructure and skilled staff. These factors are interdependent: Scale determines firms' ability to invest in complementary assets, redesign workflows and provide training. Crucially, this capacity to grow is shaped by the financial environment.

Evidence from European economies shows that firms in countries with more developed capital markets are significantly more likely to adopt big data and AI (Figure C.2). Without a conducive financial environment, firms cannot grow to the size needed to maximise the benefits of AI. Without scale, they cannot afford the complementary investments, and without those investments, AI remains underutilised, offering little improvement in productivity.

Table C.1
Effects of AI on labour productivity in the European Union (log linear approximation, 0.01=1% increase)

	Labour productivity (log) AI adoption (reported)	**Labour productivity (log)** AI adoption (instrumented from US firms)
AI adoption	0.028***	0.041***
	(0.011)	(0.019)
Investment (lag)	0.009*	0.009***
	(0.005)	(0.003)
Profitability (lag)	0.590***	0.618***
	(0.038)	(0.019)
Financial leverage (lag)	-0.178***	-0.151***
	(0.025)	(0.012)
Total assets (lag)	0.386***	0.386***
	(0.006)	(0.002)
Sample size	35 684	30 228
R-squared	0.519	0.526

Source: *Aldasoro et al. (2026), based on EIBIS 2019-2024.*
Note: *The dependent variable is labour productivity, calculated as the log of turnover per employee as reported in the EIBIS. AI adoption (actual) refers to the EIBIS-reported AI implementation status. AI adoption (US-matched) is the AI implementation status derived from similar firms in the United States. Investment is expressed as the annual change in total fixed assets. Profitability is the earnings before interest and taxes to total assets. Financial leverage is the ratio of loans and long-term debt to total assets. These control variables come from Orbis and lagged by one year. The regressions also control for size and the interaction of country, sector and year fixed effects. Standard errors clustered at the country-sector-year level in the left-hand column and bootstrap standard errors in the right-hand column are reported in the parentheses. Statistical significance: *** p-value<0.01, ** p-value<0.05, * p-value<0.1.*

Digital adoption enablers and constraints

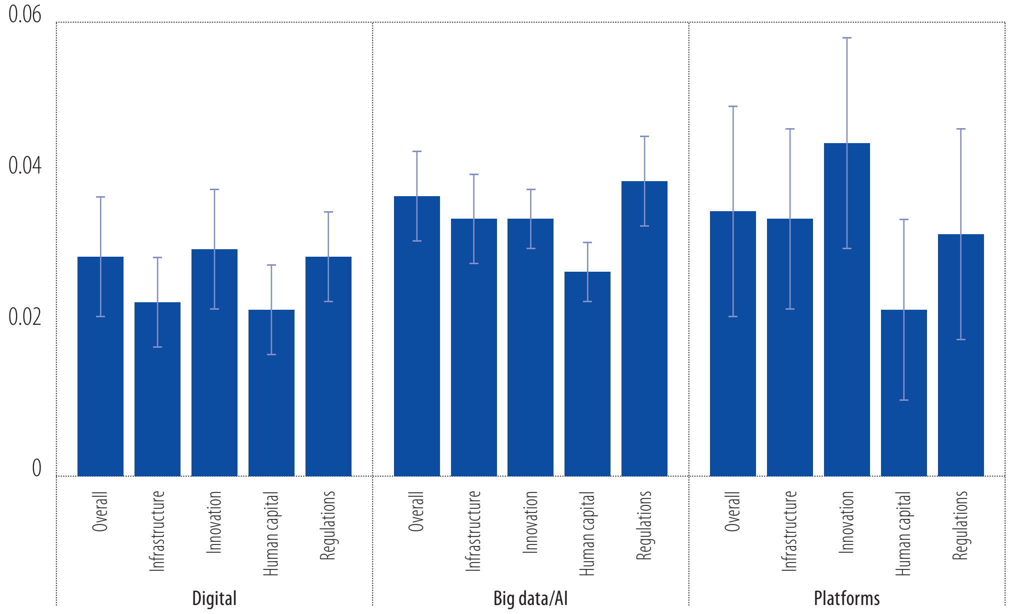
This section discusses the environment shaping firms' investment decisions. It looks at the factors that enable digital transformation, focusing on the role of the financial environment and the potential impact of policy support initiatives at the European level to accelerate digital adoption while safeguarding digital sovereignty and economic security.

The role of the business environment and policy support in enabling digital adoption

National efforts to prepare for the digital transformation pay off. Cazzaniga et al. (2024) assess countries' readiness for AI, drawing on a broad set of macro-structural indicators. Their analysis covers digital infrastructure, human resources and labour market policies, innovation and economic integration, and regulation and ethics. Countries with higher AI preparedness scores tend to have a higher share of firms using digital technologies (Figure 19). A supportive innovation environment and an adequate regulatory landscape stand out as the most prominent enablers of digital adoption.

A coordinated policy approach is essential to address infrastructure gaps, strengthen the innovation environment, improve digital skills and regulate efficiently (European Commission, 2025a; Organisation for Economic Co-operation and Development (OECD), 2025).

Figure 19
Country AI preparedness factors and digital adoption (marginal effects, 0.01=1 percentage point increase)



Source: *EIB staff calculations based on EIBIS 2019-2025 and Cazzaniga et al. (2024).*
Note: *OLS regression estimates controlling for age, company size and the interaction of country, sector and year fixed effects. The AI preparedness index varies across countries and is standardised to unit variance. The violet lines represent 95% confidence intervals based on standard errors clustered at the interaction of sector and year fixed effects.*

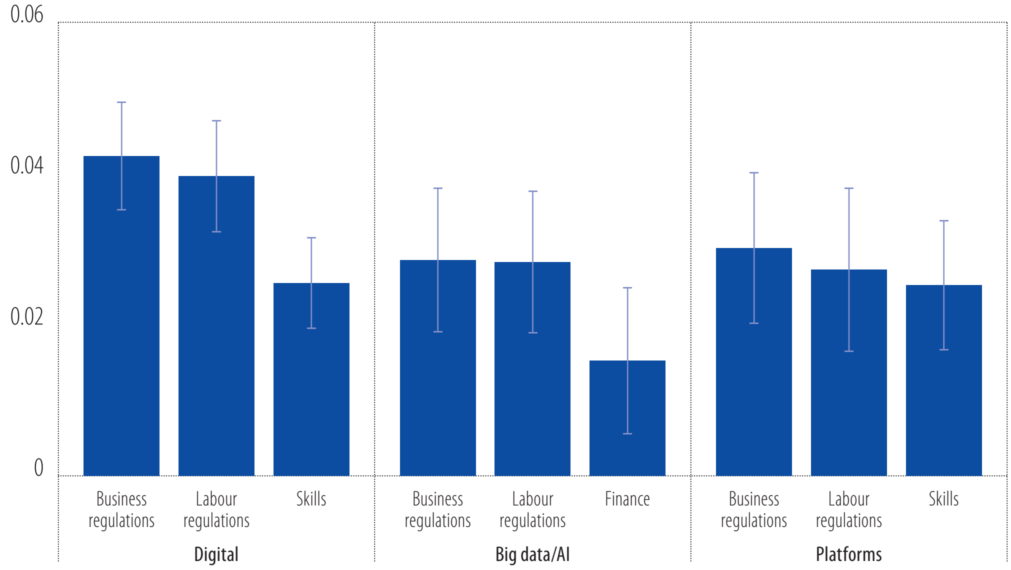
Firms using digital technologies report that regulatory constraints and skill shortages hinder investment. Compared with non-digital firms, digital adopters more often cite business regulations, labour market rules and difficulty finding staff with the right skills as major obstacles (Figure 20). Complex regulations and limited access to talent – particularly technical and digital skills – pose significant challenges in a fast-changing technological environment and can discourage firms from committing substantial resources to investment in digital technologies. For firms using big data analytics and AI, access to finance is more likely to be perceived as a major obstacle.

R&D tax incentives can help unlock the adoption of digital technologies. Firms are more likely to adopt digital technologies in countries with higher R&D tax subsidies (Figure 21a). A 1 percentage point increase in the generosity of R&D tax relief per unit of R&D is associated with a 0.2 percentage point increase in the use of digital technologies and a 0.15 percentage point increase in the use of big data analytics and AI.

Policy support for innovation and digitalisation – such as targeted grants or loans on favourable terms – can accelerate adoption. On average, firms receiving financial support are 5 to 7 percentage points more likely to adopt digital technologies than those without access to such measures (Figure 21b). The effect is stronger when the support is explicitly designed to support innovation or digitalisation, particularly for big data analytics and AI. These findings highlight the importance of well-designed policy interventions that not only improve access to finance but also align funding mechanisms with strategic priorities.

Figure 20

Major obstacles to investment and digital adoption (marginal effects, 0.01=1 percentage point increase)



Source: *EIB staff calculations based on EIBIS 2019-2025.*
Note: *Linear probability regression estimates controlling for age, size and the interaction of country, sector and year fixed effects. The chart shows the three obstacles with the largest differences between adopters and non-adopters for each digital technology. The violet lines show 95% confidence intervals based on standard errors clustered at the interaction of country, sector and year fixed effects.*

Table 1

Targeted support and digital adoption by finance constrained firms (marginal effects, 0.01=1 percentage point increase)

	Digital	Big data/AI	Platforms
Targeted support for innovation or digitalisation	0.065***	0.117***	0.109***
	(0.020)	(0.027)	(0.037)
Finance constrained	-0.020	-0.041	-0.136
	(0.056)	(0.060)	(0.087)
Targeted support x Finance constrained	0.176**	0.199*	0.269**
	(0.087)	(0.106)	(0.133)
Sample size	2 934	2 424	1 398
R-squared	0.262	0.304	0.281

Source: *EIB staff calculations based on EIBIS 2024-2025.*
Note: *OLS regression estimates controlling for age, size and the interaction of country, sector and year fixed effects. Standard errors clustered at the country-sector-year level are reported in parentheses. Statistical significance: *** p-value<0.01, ** p-value<0.05, * p-value<0.1.*

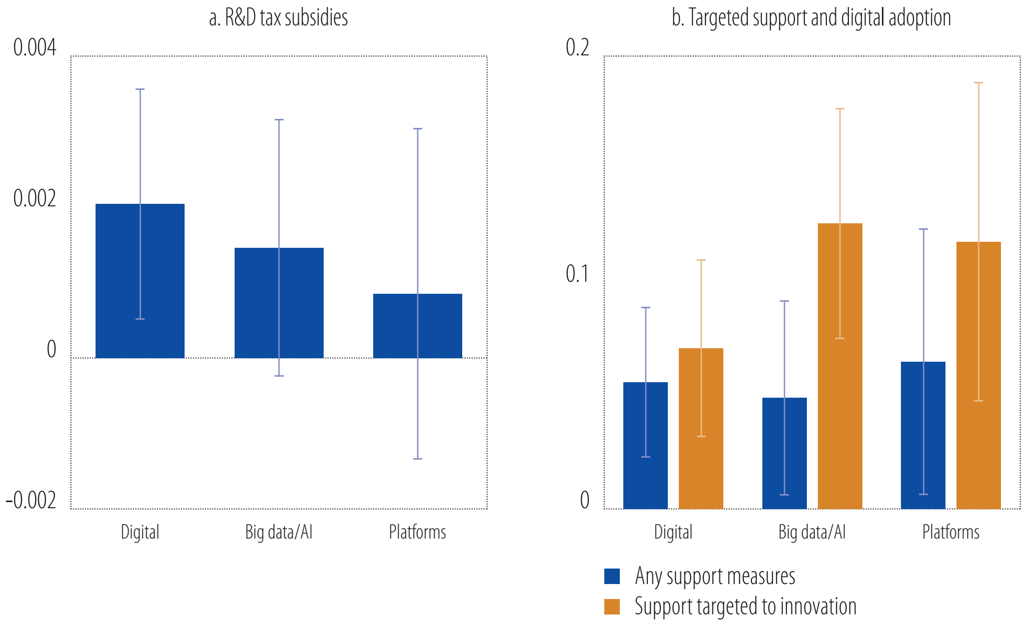
Financially constrained firms benefit most from targeted measures supporting innovation and digitalisation. Targeted financial policy support increases digital adoption by around 6 percentage points, on average. The effect is substantially larger for financially constrained firms, where the likelihood of adoption nearly triples (Table 1).[7] This underscores the importance of easing liquidity and

7 A firm is considered financially constrained if it falls into any of the following categories: (i) it was rejected when applying for external financing; (ii) it was quantity constrained, meaning it was dissatisfied with the amount or terms of the financing received from its most recent application; (iii) it was price constrained, having chosen not to apply because it expected external financing to be too costly; or (iv) it was discouraged from seeking external financing, believing that its application would be unsuccessful.

investment bottlenecks for firms that could benefit from digital adoption. The effects are particularly strong for big data analytics and AI, or platform technologies. These results suggest that well-designed, targeted support can play a critical role in helping firms overcome capital constraints and accelerate technology diffusion.

Figure 21

Impact of tax subsidies and targeted support on digital adoption (marginal effects, 0.01=1 percentage point increase)



Source: *EIB staff calculations based on EIBIS 2019-2025 and OECD 2018-2024.*
Note: *OLS regression estimates controlling for age, size and the interaction of country, sector and year fixed effects. The implied R&D tax subsidy rate measures the reduction in the user cost of R&D capital for which firms with defined characteristics (firm size, profitability) are in principle entitled. The violet lines represent 95% confidence intervals based on standard errors clustered at the interaction of country, sector and year fixed effects.*

Source: *EIB calculations based on EIBIS 2024-2025.*
Note: *OLS regression estimates controlling for age, size and the interaction of country, sector and year fixed effects. Targeted support is defined as support to innovation or digitalisation. The vertical lines represent 95% confidence intervals based on standard errors clustered at the interaction of country, sector and year fixed effects.*

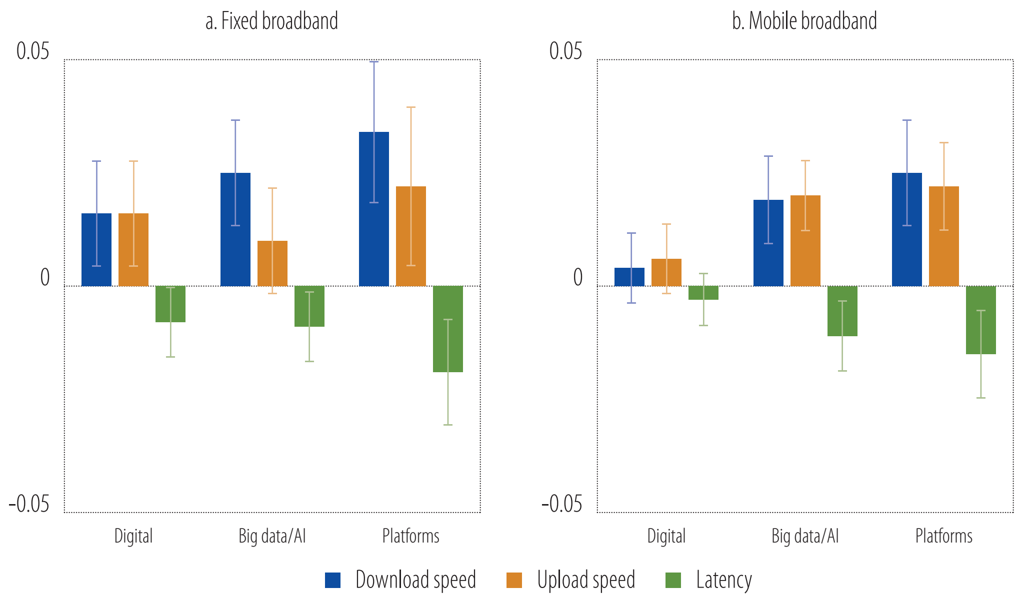
The role of digital infrastructure and digital public services

High-quality digital infrastructure is a critical prerequisite for the adoption and diffusion of digital technologies to different firms and regions. Indicators such as download speed, upload speed and latency strongly influence how broadly digital tools can be deployed within an economy. A one standard deviation increase in download speed between different regions within a country is associated with a 1 percentage point increase in the use of digital technologies, a 2 percentage point increase in the use of big data analytics and AI, and a 3 percentage point increase in the use of digital platforms (Figure 22a). Mobile internet quality is also a key determinant of technology adoption, particularly for resource-intensive applications such as big data analytics and AI and platform technologies (Figure 22b). Faster, more reliable mobile connections enable firms to access cloud computing resources, deploy AI models and integrate digital platforms into business processes – capabilities that would otherwise be constrained by slow connectivity.

To address these challenges, the European Commission proposed a Digital Networks Act to replace the European Electronic Communication Code, aiming to boost secure fixed and wireless high-speed broadband (European Parliamentary Research Service, 2025). The initiative seeks to stimulate investment in very high-capacity networks (fibre and 5G) and set new spectrum rules for mobile connectivity (satellites and 6G).

Figure 22

Impact of the quality of fixed and mobile broadband networks on digital adoption
(marginal effects, 0.01=1 percentage point increase)



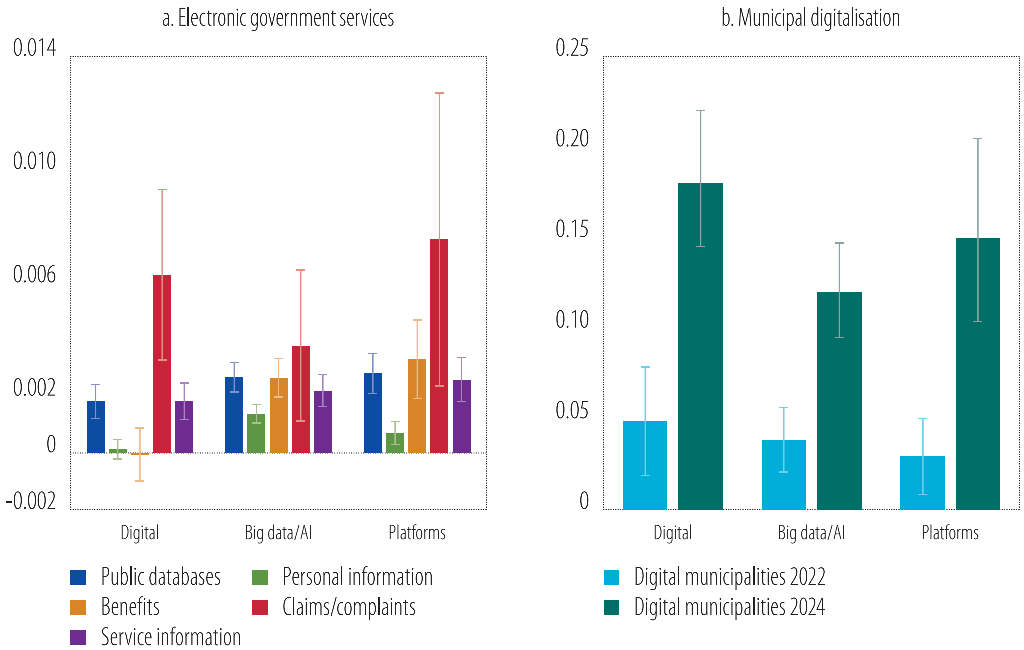
Source: *EIB staff calculations based on EIBIS 2020-2025 and Ookla 2019-2024.*
Note: *OLS regression estimates controlling for age, size and the interaction of country, sector and year fixed effects. Ookla data on internet speed merged to the EIBIS at NUTS 3 level, or NUTS 2 if NUTS 3 is not available. NUTS refers to the Nomenclature of Territorial Units for Statistics, which is used to reference the administrative divisions of countries for statistical purposes. Ookla value on internet speed vary across NUTS regions and are standardised to unit variance. The vertical lines show 95% confidence intervals based on standard errors clustered at the interaction of country, sector and year fixed effects.*

Digitalisation of the public sector plays a key role in promoting the diffusion of digital technologies in the private sector. Countries with higher engagement in e-government services tend to have a higher share of firms using digital technologies, particularly big data analytics, AI and platforms (Figures 23a). For example, a 1 percentage point increase in the use of various public online services – such as accessing public databases and personal information, requesting benefits, making claims and obtaining information about public services – is associated with a 0.14 to 0.38 percentage point higher probability of using big data analytics and AI and a 0.07 to 0.75 percentage point higher probability of using digital platforms.

Local digital public services also support private sector digitalisation. Public sector digital initiatives matter not only at the national level, but also in day-to-day interactions between people and government, including local governments and municipalities. According to the results of the EIB Municipalities Survey, the digitalisation of local governments can support firms' digital adoption, and this relationship strengthened from 2022 to 2024 (Figure 23b). In countries where at least 50% of municipalities were considered digital in 2024, the likelihood of firms being digital was nearly 20 percentage points higher than in countries below this threshold. For the private sector to fully benefit from digital technologies, local governments and municipalities need to advance digitalisation, adopting a coherent approach to digital governance that considers the needs of individuals and businesses.

Figure 23

Impact of electronic government services and municipal digitalisation on digital adoption



Source: *EIB staff calculations based on EIBIS 2022 and 2024 and Eurostat e-government indicators 2022 and 2024.*

Note: *OLS regression estimates controlling for age, size and the interaction of sector and year fixed effects. E-government services vary across countries and include the share of individuals who, in the last 12 months, used the internet to access public databases or registers (Public databases), access personal information (Personal information), request benefits or entitlements (Benefits), make other requests, claims or complaints (Claims or complaints) or obtain information about services, benefits, entitlements, laws or opening hours (Service information). The vertical lines represent 95% confidence intervals based on standard errors clustered at the interaction of sector and year fixed effects.*

Source: *EIB staff calculations based on EIBIS 2022 and 2024 and EIB Municipalities Survey 2022 and 2024.*

Note: *OLS regression estimates controlling for age, size and the interaction of sector and year fixed effects. The digital municipalities index varies by country and includes EU countries with at least 50% of municipalities or cities defined as digital (surveyed municipalities or cities that used at least three digital technologies). For methodological details, see EIB (2023), EIB (2025a) and EIB (2025b). The vertical lines represent 95% confidence intervals based on standard errors clustered at the interaction of sector and year fixed effects.*

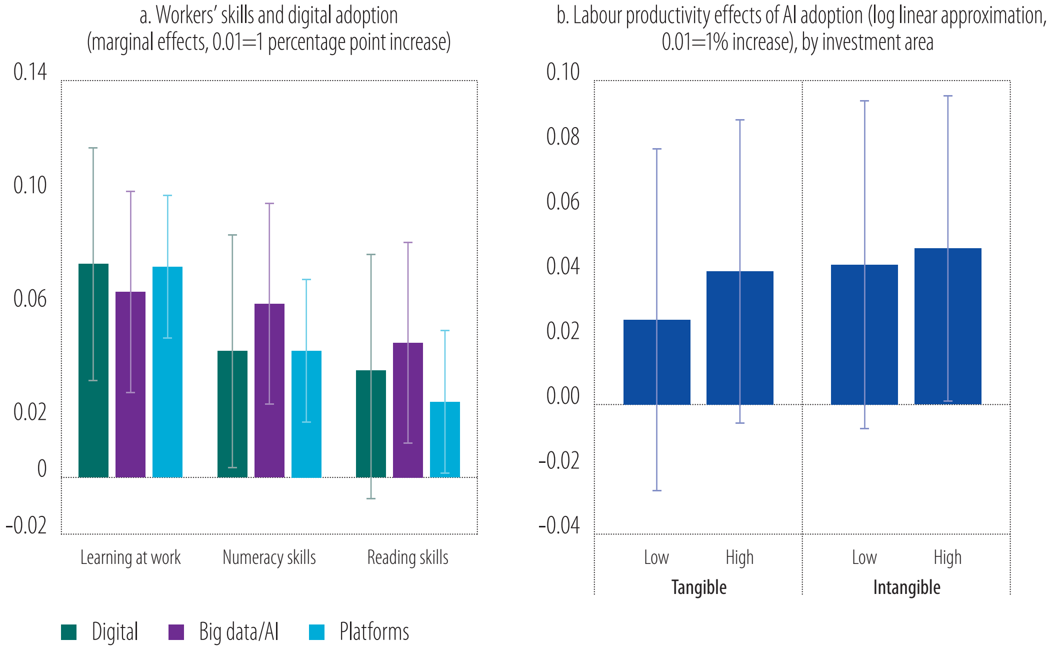
The benefits of digital adoption are enhanced by workers' digital skills

Skills and workplace learning are key to the digital transformation. Continuous skill development – keeping pace with evolving job roles and workplace processes – is critical for digitalisation in general and for adopting AI technologies in particular. Data from the OECD Programme for the International Assessment of Adult Competencies (PIAAC) and firm-level responses from the EIBIS (Figure 24a) show that a one standard deviation increase in learning-at-work scores is associated with a 7.5 percentage point higher share of digital firms. A similar increase in sectoral numeracy skill scores corresponds to a 4.5 percentage point higher share of digital firms. This implies that digital adoption is more common in sectors with stronger basic skills and more frequent learning activities.

Continuous learning is essential for successful digital adoption. Sectors where employees engage more often in workplace learning tend to have more digital firms. As digitalisation reshapes job roles and processes, regular upskilling and reskilling help workers and firms adjust to new technological demands. For firms, investing in workforce learning ensures that staff can operate new technologies effectively, adjust internal processes and maintain productivity during periods of change. Without ongoing skill development, companies risk slower technology adoption, reduced efficiency or underutilisation of digital tools, limiting the potential benefits of digital transformation.

Figure 24

The impact of workers' skills on digital adoption, and AI on labour productivity



Source: *EIB staff calculations based on EIBIS 2019-2025 and PIAAC 2023.*

Note: *OLS regression estimates controlling for age, size and the interaction of sector and year fixed effects. PIAAC scores vary across countries and are standardised to unit variance. The vertical lines represent 95% confidence intervals based on standard errors clustered at the interaction of sector and year fixed effects.*

Source: *Aldasoro et al. (2026), based on EIBIS 2019-2024.*

Note: *Labour productivity is calculated as the log of turnover per employee as reported in the EIBIS. AI adoption refers to the implementation status derived from similar firms in the United States (see Aldasoro et al., 2026). Regressions control for total investment, profitability, financial leverage and asset base, as well as age, size and the interaction of country, sector and year fixed effects. Investment shares are based on reported investment in specific categories relative to total assets, with low and high scores determined by the 25th and 75th percentiles, respectively. The violet lines represent 95% confidence intervals based on standard errors clustered at the the interaction of country, sector and year fixed effects.*

Firms' investment decisions shape how effectively companies benefit from digital technologies. Firms that invest more in intangible assets (such as software, databases or employee training) report higher productivity gains from big data and AI (Figure 24b). Investment in employee training, in particular, is associated with larger increases in labour productivity for firms using these technologies (Aldasoro et al., 2026). Brynjolfsson et al. (2021) argue that the largest productivity gains from past general-purpose technologies (such as steam engines, electricity and IT) typically arise from complementary investments rather than from the technologies themselves. While the benefits of AI may materialise faster than with past innovations, realising its full potential will still require time and significant adjustments to the economy.

A regulatory framework on data and AI that supports competitiveness and digital sovereignty

As the digital economy matures, data is rapidly emerging as a critical production factor, comparable to labour, capital and energy. The ability to collect, manage and use high-quality data is a key driver of innovation, productivity and competitiveness. For the European Union, treating data as a strategic asset is essential to develop advanced AI, strengthen digital sovereignty and ensure that European firms can compete globally. However, data can only deliver its full potential if it is accessible, interoperable and secure, enabling firms across the European Union to innovate and scale. Achieving this requires not only investment in digital infrastructure and skills, but also a cohesive approach to data governance that recognises data as a core economic resource (Martens, 2025).

EU competitiveness in digital and AI innovation depends on access to high-quality data and the infrastructure needed to share and use it securely at scale. As generative AI and large language models become mainstream, EU firms need large volumes of diverse, high-quality data and significant computing infrastructure to drive innovation. For example, the size of datasets used to train large language models and the computing power required doubles approximately every six months (Epoch AI, 2025). Yet the pace of AI development is outstripping the speed at which regulatory frameworks can adapt, creating a risk that rigid or fragmented rules could constrain innovation and limit Europe's global competitiveness. Overly restrictive legal frameworks may discourage innovation and the deployment of cutting-edge technologies.

Simplifying data rules will help unlock innovation, especially for startups and small and medium-sized firms. Following the 2020 European strategy for data, the European Union introduced landmark regulations building on pre-existing rules – the Data Governance Act, the Data Act and various sector-specific laws such as the European Health Data Space Regulation. These initiatives address specific issues, such as data-sharing mechanisms and localisation requirements. However, the interplay between the General Data Protection Regulation and sectoral laws, combined with uneven implementation across EU countries, has created a fragmented regulatory landscape and legal uncertainty (including for public authorities). This raises compliance costs, especially for smaller firms, and may limit their capacity to grow.

A robust regulatory landscape must balance innovation with security, privacy and fair competition. Recent initiatives such as the Digital and AI Omnibus packages aim to simplify and harmonise the complex landscape of data rules in different EU countries (European Commission, 2025d). By streamlining data sharing, clarifying legal responsibilities and reducing compliance costs (especially for startups and small and medium-sized firms), these frameworks are designed to create a single European data market. At the same time, they safeguard fundamental rights and promote trusted data flows within the European Union and internationally. For example, the General Data Protection Regulation governs international transfers of EU residents' personal data, ensuring such transfers occur only when strong legal safeguards guarantee equivalent protection beyond the European Union. In addition, the EU Cybersecurity Act strengthens data security by establishing EU-wide certification schemes for digital products, services and cloud infrastructure, ensuring that systems processing EU data meet stringent security standards and reducing reliance on non-EU providers. This adds a layer of security and strategic control, reinforcing Europe's ability to manage critical data resources.

Setting high standards for data security and privacy while fostering the development of a vibrant digital market and investing in digital infrastructure are essential elements of an effective European digital policy. Regulations that enable open, competitive data markets and encourage data sharing across sectors and borders will be an asset. National AI infrastructure programmes and the European High Performance Computing Joint Undertaking (discussed in Box D) exemplify this approach. By investing heavily in computing power and data centres, Europe aims to reduce its digital dependencies and boost its graphics processing unit performance by nearly one-third. These national and European Union-wide investment programmes, supported by adaptable regulation, are key to empowering both large enterprises and small firms to innovate in line with technological change, ensuring that data becomes a strong production factor for Europe's digital future.

Box D

AI Factories: Europe's path to AI sovereignty and innovation

The European Union and participating members of the European High Performance Computing (EuroHPC) Joint Undertaking have committed over €2.6 billion to the AI Factories initiative. This programme will create a continent-wide network of 19 AI Factories and 13 AI Factory Antennas by 2026. It aims to make world-class computing power widely accessible while safeguarding Europe's technological sovereignty and promoting ethical and sustainable AI development.

AI Factories are specialised supercomputing facilities equipped with hardware, software and expert support services designed to enable the development, training and deployment of advanced AI systems. AI Factory Antennas complement these facilities by giving national AI communities secure remote access to supercomputing resources and providing smaller-scale infrastructure for testing and validation.

European researchers have excelled in AI theory and ethics, but Europe has faced challenges in scaling practical applications (European Parliamentary Research Service, 2020; Hoffmann and Nursky, 2021; EIB, 2025a). Training a single advanced AI model can cost millions of euros in cloud computing expenses, creating a barrier that has concentrated AI development among a few large technology firms in the United States and China.

The AI Factories initiative addresses this strategic gap by providing computational resources at subsidised or no cost, enabling European researchers, startups and industry to compete at the forefront of technology. Beyond hardware access, the programme promotes cross-border collaboration and ensures AI development reflects European values of transparency, accountability and human dignity. It helps Europe retain intellectual property, maintain data sovereignty and develop AI systems aligned with EU priorities.

The impact is already evident. Three EuroHPC supercomputers rank among the world's top ten (Table D.1): JUPITER in Germany (fourth place, Europe's first exascale system), LUMI in Finland (ninth place) and Leonardo in Italy (tenth place). By November 2025, seven operational AI Factories were supporting users developing competitive AI products, publishing breakthrough research and implementing industrial innovations in sectors ranging from healthcare to manufacturing and from climate science to cybersecurity. Twelve additional facilities are under development to complete the network, while 13 AI Factory Antennas ensure that countries without capacity to host major supercomputing facilities can still provide their AI communities with world-class access.

This strategic rollout will ensure that by 2026, nearly every EU country will be covered, either by hosting a facility or participating as a formal consortium partner, with only Croatia yet to announce its direct participation. The network also extends beyond EU borders to include key European partners, creating a pan-European environment where researchers, startups, small and medium-sized firms and public sector organisations can access the computational resources needed to compete globally in AI technology.

Table D.1
Top ten supercomputers

Rank	System	Country	Site or company	Maximum performance (PetaFLOPS)
1	El Capitan	United States	Lawrence Livermore National Laboratory	1 742
2	Frontier	United States	Oak Ridge National Laboratory	1 353
3	Aurora	United States	Argonne National Laboratory	1 012
4	JUPITER	Germany	EuroHPC, Jülich Supercomputing Centre	793
5	Eagle	United States	Microsoft Azure	561
6	HPC6	Italy	Eni	478
7	Fugaku	Japan	RIKEN Center for Computational Science	442
8	Alps	Switzerland	Swiss National Supercomputing Centre	435
9	LUMI	Finland	EuroHPC, CSC	380
10	Leonardo	Italy	EuroHPC, CINECA	241

Source: *top500.org*
Note: *A petaFLOPS is a unit of measurement for computing performance, representing one quadrillion (10^{15}) floating-point operations per second.*

Strategic sector focus and applications

AI Factories specialise in different areas to support Europe's most critical sectors. Industrial manufacturing and industry 4.0 applications are central, with a focus on smart factories, predictive maintenance, supply chain optimisation and digital twins.

In healthcare and life sciences, AI supports drug discovery and development, personalised medicine, medical imaging diagnostics and clinical trial optimisation. Climate and environmental applications build on Europe's leadership in sustainability, including climate modelling, meteorology and high-resolution scenario analysis, renewable energy optimisation and extreme weather prediction.

Language technologies have a uniquely European focus, with large language models developed in multiple languages to ensure access to AI capabilities beyond English. Cybersecurity, digital security, defence and AI safety are also priorities across several facilities. Other sectors include gaming and interactive entertainment, tourism and cultural heritage, public services and smart cities, and specialised support for small and medium-sized firms. This diversity ensures that European AI capabilities are comprehensive, rather than concentrated in a few domains.

Pan-European innovation through cross-border cooperation

Pooling resources and coordinating specialisation across the AI Factories network achieves scale efficiency that individual EU countries cannot match. It also maintains diverse sectoral expertise that no single facility could sustain, maximising return on the collective €2.6 billion investment.

This cooperation addresses Europe's historically fragmented research landscape where national initiatives operated in isolation. Fragmentation prevented economies of scale (cost advantages from larger operations) and economies of scope (efficiency gained from producing complementary capabilities within clusters) (Teece, 1980; Saxenian, 1996; Porter, 1998; Shapiro and Varian, 1998). This lack of scale has widely been recognised as a major impediment to EU competitiveness (Draghi, 2024).

Sustainability leadership

European AI Factories show that environmental responsibility and technological excellence can reinforce each other. For example, the LUMI facility in Finland operates entirely on hydroelectric power, achieving near-zero net carbon emissions while ranking ninth globally in computational power. Its district heating system captures waste heat to warm the entire city of Kajaani, reducing heating costs for 20 000 residents. Advanced cooling technologies and energy optimisation systems are deployed across the network, while facilities use next-generation graphics processing units offering better performance per watt.

Economic impact: Making access widely available and creating value

AI Factories will help transform the economics of AI in Europe by ensuring broad access. Startups receive allocations with simplified application processes, and small and medium-sized firms can integrate AI without prohibitive investments. Manufacturers can implement predictive maintenance, logistics companies optimise routing and developers enhance products – all using factory resources at minimal cost.

Public sector organisations can also use these resources to improve public services, from healthcare systems optimising patient care to municipalities developing smart city solutions. Academic institutions accelerate research in multiple disciplines, while individual researchers have access to computational power previously available only to a few specialised laboratories.

The role of the EIB Group

The European Union's effort to spur development of AI gigafactories is supported by the EIB Group, which, together with the European Commission, has pledged to pool resources to accelerate Europe's capacity for advanced computing and AI. This collaboration includes advisory support through the InvestEU Advisory Hub, with a focus on improving the bankability of investment proposals. By doing so, the EIB Group helps turn innovative concepts into viable projects that can attract funding and deliver tangible results.

Conclusion and policy implications

Global competition is changing fast as digital technologies – from advanced robotics to AI – reshape industrial structures, value chains and countries' strategic positions. In this interconnected environment, traditional sources of advantage are increasingly complemented or overtaken by capabilities in digital innovation, data infrastructure and technological innovation.

The European Union is harnessing the potential of new technologies, especially in industrial applications, but it is also becoming increasingly dependent on external providers for cutting-edge AI models and digital platforms. While Europe is not leading in AI technology development, its strong industrial base positions it well to benefit from AI adoption. Early productivity gains are already visible for firms adopting digital technologies and AI. Large companies are investing heavily, but greater benefits will come from accelerating AI adoption among small and medium-sized firms and public authorities, spreading innovation and productivity more widely.

Resilient digital infrastructure is essential for Europe's successful adoption of advanced technologies. Achieving this requires strengthening all layers of AI-enabling connectivity and computing capacity. Continued deployment of fibre and mobile networks with full 5G – and, in time, 6G – capabilities, complemented by more robust satellite communications, will be crucial to ensuring universal, high-quality connectivity. Equally important is sustained investment in computing power through modern, energy-efficient data centres, high-performance computing facilities and emerging quantum technologies. Together, these assets provide the processing backbone needed for advanced AI, industrial innovation and cutting-edge research, while reinforcing Europe's digital resilience, competitiveness and strategic autonomy.

Financing is also vital for the successful rollout of digital technologies. Targeted measures such as grants, loans and tax incentives for digital adoption can stimulate investment, especially for firms facing financial constraints. This support is particularly important for smaller firms, which often struggle to access finance but can achieve significant productivity gains, contributing to broader economic growth.

The new digital and AI era presents opportunities and challenges for Europe. As innovation accelerates, the European Union continues to invest to remain a global player, while leveraging its scale and market opportunities to build resilience against external dependencies. A long-term strategy should combine effective regulation measures to strengthen research and innovation. Priorities include boosting public and private R&D investment; fostering cooperation between academia, industry and public institutions; and creating incentives for high-risk, high-reward innovation. Simplifying regulations on data and AI will help smaller firms to innovate, grow and compete in global markets. Scaling up cross-border research initiatives – such as Horizon Europe – will accelerate breakthroughs in AI, robotics and digital manufacturing. Cultivating a pipeline of skilled talent through education, training and international cooperation is equally vital to ensure that Europe remains a hub for cutting-edge research and a magnet for global talent.

In the current geopolitical landscape, the digitalisation challenge needs to be addressed with pan-European initiatives. A unified approach enables Europe to mobilise the scale required to compete globally in AI and digital technologies. Coordinated investment in frontier computer infrastructure – integrating high-performance computing, AI accelerators, energy systems, cooling and secure data environments – allows EU countries to share fixed costs, improve utilisation and reduce costs for training and inference. Similarly, EU-wide data spaces can transform fragmented national datasets into a strategic collective asset, providing the breadth and diversity needed for training next-generation AI models while ensuring compliance with European governance standards. By pooling resources, demand and regulatory frameworks, the European Union can act as a multiplier, accelerating innovation and strengthening its competitive position relative to the United States and China – notably in areas aligned with societal priorities such as healthcare, energy efficiency and sustainable mobility.

A pan-European approach is also indispensable for strengthening digital security and fostering a resilient innovation base. Cyberthreats and digital vulnerabilities are inherently cross-border, and Europe's interconnected economies mean that weaknesses in one EU country can quickly propagate across the European Union. Common cybersecurity frameworks and integrated capabilities help reduce systemic risk, protect critical infrastructure and bolster Europe's strategic autonomy by supporting the emergence of trusted EU-based solutions. At the same time, EU-level venture capital instruments ensure that funding is channelled efficiently into priority areas such as AI and deep tech, reducing fragmentation and enabling firms to scale across borders. By aggregating resources, these instruments expand the availability of risk capital, attract private investment and support innovative companies throughout their growth cycle – addressing Europe's longstanding difficulty in financing high-potential technology firms.

References

Acemoglu, D. (2024). The simple macroeconomics of AI. *Economic Policy*, 40(121), 13-58. https://doi.org/10.1093/epolic/eiae042

Acemoglu, D., Anderson, G., Beede, D., Buffington, C., Childress, E., Dinlersoz, E., Foster, L., Goldschlag, N., Haltiwanger, J., Kroff, Z., Restrepo, P., & Zolas, N. (2022). Automation and the workforce: A firm-level view from the 2019 Annual Business Survey. NBER Working Paper No. 30659. https://doi.org/10.3386/w30659

Aldasoro, I., Gambacorta, L., Pal, R., Revoltella, D., Weiss, C., & Wolski, M. (2026). AI adoption, productivity and employment: Evidence for European firms. EIB Working Paper No. 2026/02. https://doi.org/10.2867/1772538

Babina, T., Fedyk, A., He, A., & Hodson, J. (2024). Artificial intelligence, firm growth, and product innovation. *Journal of Financial Economics*, 151, 103745. https://doi.org/10.1016/j.jfineco.2023.103745

Baily, M. N., Brynjolfsson, E., & Korinek, A. (2023). Machines of mind: The case for an AI-powered productivity boom. Brookings, 10 May 2023. Available at: https://www.brookings.edu/articles/machines-of-mind-the-case-for-an-ai-powered-productivity-boom/

Bergeaud, A. (2024). The past, present and future of European productivity. Paper presented at the ECB Forum on Central Banking, Sintra, July 2024. European Central Bank. Available at: https://www.ecb.europa.eu/pub/pdf/sintra/ecb.forumcentbankpub2024_Bergeaud_paper.en.pdf

Bonakdarpour, M., Campbell, K., Bonaglia, D., Rousseau, C., & Wunsch Vincent, S. (2025). Global Software Spending Surges to Close to USD 700 Billion in 2024, up 50% From 2020; the United States Extends its Lead. World Intellectual Property Organization, Innovation Insights Blog, 2 June 2025. Available at: https://www.wipo.int/en/web/global-innovation-index/w/blogs/2025/global-software-spending

Bonney, K., Breaux, C., Buffington, C., Dinlersoz, E., Foster, L. S., Goldschlag, N., Haltiwanger, J. C., Kroff, Z., & Savage, K. (2024). Tracking firm use of AI in real time: A snapshot from the Business Trends and Outlook Survey. NBER Working Paper No. 32319. https://doi.org/10.3386/w32319

Brynjolfsson, E., Li, D., & Raymond, L. (2025). Generative AI at work. *Quarterly Journal of Economics*, 140(2), 889-942. https://doi.org/10.1093/qje/qjae044

Brynjolfsson, E., Rock, D., & Syverson, C. (2021). The productivity J-curve: How intangibles complement general purpose technologies. *American Economic Journal: Macroeconomics*, 13(1), 333-372. https://doi.org/10.1257/mac.20180386

Calvino, F., Dernis, H., Samek, L., & Ughi, A. (2024). A sectoral taxonomy of AI intensity. OECD Artificial Intelligence Paper No. 30. https://doi.org/10.1787/1f6377b5-en

Cazzaniga, M., Jaumotte, F., Li, L., Melina, G., Panton, A. J., Pizzinelli, C., Rockall, E. J., & Mendes Tavares, M. (2024). Gen-AI: Artificial intelligence and the future of work. IMF Staff Discussion Note No. 2024/001. https://doi.org/10.5089/9798400262548.006

Cockburn, I.M., Henderson, R., & Stern, S. (2019). The impact of artificial intelligence on innovation: An exploratory analysis. In Agrawal, A., Gans, J. S., & Goldfarb, A. (eds.), *The Economics of Artificial Intelligence: An Agenda*, 115-146, University of Chicago Press. Available at: https://www.nber.org/books-and-chapters/economics-artificial-intelligence-agenda

Cornelli, G., Frost, J., & Mishra, S. (2023). Artificial intelligence, services globalisation and income inequality. BIS Working Paper No. 1135. Available at: https://www.bis.org/publ/work1135.htm

Cottier, B., You, J., Martemianova, N., & Owen, D. (2024), How far behind are open models? epoch.ai. Retrieved on 1 December 2025. Available at: https://epoch.ai/blog/open-models-report

Draghi, M. (2024). The future of European competitiveness: A competitiveness strategy for Europe. Publications Office of the European Union. https://doi.org/10.2872/9356120

Eloundou, T., Manning, S., Mishkin, P., & Rock, D. (2024). GPTs are GPTs: Labor market impact potential of LLMs. *Science*, 384(6702), 1306-1308. https://doi.org/10.1126/science.adj0998

Epoch AI (2025). Data on AI Models. epoch.ai. Retrieved on 3 November 2025. Available at: https://epoch.ai/data/ai-models

European Central Bank (ECB) (2025). Financial Stability Review, November 2025. Available at: https://www.ecb.europa.eu/press/financial-stability-publications/fsr/html/ecb.fsr202511~263b5810d4.en.html

European Commission (2023). The European Chips Act. Regulation (EU) 2023/1781 of the European Parliament and of the Council of 13 September 2023 establishing a framework of measures for strengthening Europe's semiconductor ecosystem and amending Regulation (EU) 2021/694 (Chips Act). Available at: https://digital-strategy.ec.europa.eu/en/policies/european-chips-act

European Commission (2024). Science, research and innovation performance of the EU: A competitive Europe for a sustainable future. Directorate-General for Research and Innovation. Publications Office of the European Union. https://doi.org/10.2777/965670

European Commission (2025a). State of the Digital Decade 2025: Keep building the EU's sovereignty and digital future. COM(2025) 290 final. Available at: https://digital-strategy.ec.europa.eu/en/library/state-digital-decade-2025-report

European Commission (2025b). A European Strategy for Artificial Intelligence in Science Paving the way for the Resource for AI Science in Europe (RAISE). COM(2025) 724 final. Available at: https://research-and-innovation.ec.europa.eu/research-area/industrial-research-and-innovation/artificial-intelligence-ai-science_en

European Commission (2025c). European Innovation Scoreboard 2025. Directorate-General for Research and Innovation. Publications Office of the European Union. https://doi.org/10.2777/3239776

European Commission (2025d). Data Union Strategy: Unlocking data for AI. COM(2025) 835 final. Available at: https://digital-strategy.ec.europa.eu/en/library/data-union-strategy-unlocking-data-ai

European Court of Auditors (2025). The EU's strategy for microchips – Reasonable progress in its implementation but the Chips Act is very unlikely to be sufficient to reach the overly ambitious Digital Decade target. Special Report 12/2025. Available at: https://www.eca.europa.eu/en/publications?ref=sr-2025-12#fn-1

European Investment Bank (EIB) (2023). The state of local infrastructure investment in Europe – EIB Municipalities Survey 2022-2023. https://doi.org/10.2867/84744

European Investment Bank (EIB) (2025a). EIB Investment Report 2024/2025: Innovation, integration and simplification in Europe. https://doi.org/10.2867/8065730

European Investment Bank (EIB) (2025b). The state of local infrastructure investment in Europe – EIB Municipalities Survey 2024-2025. https://doi.org/10.2867/3529559

European Parliamentary Research Service (2020). European framework on ethical aspects of artificial intelligence, robotics and related technologies. European Parliament. https://doi.org/10.2861/94107

European Parliamentary Research Service (2025). Digital Networks Act. Briefing PE 772.864, May 2025. European Parliament. Available at: https://www.europarl.europa.eu/thinktank/en/document/EPRS_BRI(2025)772864

European Patent Office (EPO) (2017). Patents and the Fourth Industrial Revolution: The inventions behind digital transformation. Available at: https://link.epo.org/web/fourth_industrial_revolution_2017__en.pdf

Eurostat (2025). Use of artificial intelligence in enterprises. Statistics explained, January 2025. Available at: https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Use_of_artificial_intelligence_in_enterprises

Filippucci, F., Gal, P., Laengle, K, & Schief, M. (2025). Macroeconomic productivity gains from Artificial Intelligence in G7 economies. OECD Artificial Intelligence Paper No. 41. https://doi.org/10.1787/a5319ab5-en

Gambacorta, L., Qiu, H., Rees, D., & Shan, S. (2024). Generative AI and labour productivity: A field experiment on coding. BIS Working Paper No. 1208. Available at: https://www.bis.org/publ/work1208.htm

Gopinath, G. (2025). A meltdown like no other? *The Economist*, 15 October 2025. Available at: https://www.economist.com/by-invitation/2025/10/15/gita-gopinath-on-the-crash-that-could-torch-35trn-of-wealth

Gorodnichenko, Y., Revoltella, D., Svjenar, J., & Weiss, C. (2025). Resource misallocation in European firms: The Role of constraints, firm characteristics and managerial decisions. *American Economic Journal: Macroeconomics*, forthcoming. https://doi.org/10.3386/w24444

Hoffmann, M., & Nurski, L. (2021). What is holding back artificial intelligence adoption in Europe? Bruegel Policy Contribution No. 24/2021. Available at: https://www.bruegel.org/policy-brief/what-holding-back-artificial-intelligence-adoption-europe

Hsieh, C.-T., & Klenow, P. J. (2009). Misallocation and manufacturing TFP in China and India. *Quarterly Journal of Economics*, 124(4), 1403-1448. https://doi.org/10.1162/qjec.2009.124.4.1403

International Monetary Fund (IMF) (2025). Global Financial Stability Report, October 2025: Shifting ground beneath the calm. International Monetary Fund. https://doi.org/10.5089/9798229023184.082

Martens, B. (2025). Using data as a production factor: Policy ideas for a new EU data strategy. Bruegel Policy Brief No. 01/2025. Available at: https://www.bruegel.org/policy-brief/using-data-production-factor-policy-ideas-new-eu-data-strategy

Misch, F., Park, B., Pizzinelli, C., & Sher, G. (2025). AI and productivity in Europe. IMF Working Paper No. 25/67. https://doi.org/10.5089/9798229006057.001

Noy, S., & Zhang, W. (2023). Experimental evidence on the productivity effects of generative artificial intelligence. *Science*, 381(6654), 187-192. https://doi.org/10.1126/science.adh2586

Organisation for Economic Co-operation and Development (OECD) (2025). The adoption of Artificial Intelligence in firms: New evidence for policymaking. OECD Publishing. https://doi.org/10.1787/f9ef33c3-en

Pilz, K., Rahman, R., Sanders, J., & Heim, L. (2025). GPU clusters. epoch.ai. Retrieved on 3 November 2025. Available at: https://epoch.ai/data/gpu-clusters

Porter, M.E. (1998). Clusters and the new economics of competition. *Harvard Business Review*, 76(6), 77-90. Available at: https://hbr.org/1998/11/clusters-and-the-new-economics-of-competition

Revoltella, D., Rückert, D., & Weiss, C. (2020). Adoption of digital technologies by firms in Europe and the US: Evidence from the EIB Investment Survey. VoxEU.org, 18 March 2020. Available at: https://cepr.org/voxeu/columns/adoption-digital-technologies-firms-europe-and-us-evidence-eib-investment-survey

Saxenian, A. (1996). *Regional advantage: Culture and competition in Silicon Valley and Route 128*. Harvard University Press. Available at: https://www.hup.harvard.edu/books/9780674753402

Schmidt, H., & Hosseini, H. (2025). Künstliche Intelligenz treibt den Wert der Plattformen auf neue Höchststände. Frankfurter Allgemeine Zeitung, 2 January 2025. Available at: https://www.faz.net/pro/digitalwirtschaft/plattformen/kuenstliche-intelligenz-treibt-den-wert-der-plattformen-auf-neue-hoechststaende-110203874.html

Shapiro, C., & Varian, H.R. (1998). *Information rules: A strategic guide to the network economy*. Harvard Business Review Press. https://hbsp.harvard.edu/product/863X-HBK-ENG

Svanberg, M.S., Li, W., Fleming, M., Goehring, B., & Thompson, N. (2023). Beyond AI exposure: Which tasks are cost-effective to automate with computer vision? Unpublished manuscript. Available at: https://futuretech.mit.edu/news/beyond-ai-exposure-which-tasks-are-cost-effective-to-automate-with-computer-vision

Synergy Research Group (2025). Cloud market share trends – Big Three together hold 63% while Oracle and the neoclouds inch higher. 19 November 2025. Available at: https://www.srgresearch.com/articles/cloud-market-share-trends-big-three-together-hold-63-while-oracle-and-the-neoclouds-inch-higher

Teece, D.J. (1980). Economies of scope and the scope of the enterprise. *Journal of Economic Behavior & Organization*, 1(3), 223-247. https://doi.org/10.1016/0167-2681(80)90002-5

World Intellectual Property Organization (WIPO) (2025). Global Innovation Index 2025: Innovations at Crossroads. World Intellectual Property Organization. https://doi.org/10.34667/tind.58864

Chapter 6

Securing Europe's green and competitive future

Europe's energy system is shifting quickly towards renewable energy, but bottlenecks are emerging. The continued rise of renewable electricity, which already produces around two-thirds of power generated in the European Union, will remain the backbone of the transition. Renewable energy is delivering major gains: lower fuel imports, stronger energy security and reduced greenhouse gas emissions. These benefits will grow as wind and solar continue to expand and as the European Union completes the phase-out of Russian gas by 2027.

Energy systems will be under pressure in the coming years, however. Grid bottlenecks, the slow expansion of interconnections and limited storage capacity and flexibility will become more problematic as renewable deployment accelerates. Without faster investment in transmission and distribution networks, Europe risks longer waits to connect new projects to existing networks and more frequent limits on how much energy new projects can produce, which weaken incentives for new clean energy projects. Electrification must also speed up, while transport, heating and industry need to expand the switch to clean electricity to cut fossil fuel use. Meeting the European Union's energy efficiency and climate targets for 2030 will require a major push to renovate buildings, modernise industrial production (electrification) and reduce energy used for heating by deploying more heat pumps.

Energy costs will remain central to Europe's competitiveness and investments. Even if gas markets stabilise, electricity prices are likely to stay structurally higher than in competing global economies unless system costs fall and volatility is better managed. Stronger cross-border electricity trade, more flexible demand and improved market design – including wider use of long-term contracts – will be needed to keep prices predictable and affordable. Analysis shows that lower structural energy costs would help firms strengthen their ability to finance investment internally, especially in industries exposed to competition from abroad.

Financing needs across the energy system will continue to rise. Clean energy investment (excluding transport infrastructure) already exceeds €400 billion a year but remains below what is required for grids, storage, efficiency and low-carbon technologies. Temporary EU instruments (such as InvestEU or the Recovery and Resilience Facility) accelerated progress, but long-term needs call for better and more stable tools that span the European Union, stronger risk-sharing mechanisms and continued leadership from public-sector financial institutions. The European Investment Bank (EIB) will retain its central role, providing loans, guarantees and blended-finance instruments that crowd in private capital. Emerging business models, such as providing energy as a service, energy service companies, leasing and pay-as-you-go solutions will also help address challenges new projects face.

Global cleantech markets will offer new opportunities while also intensifying competitive pressure. China and Europe are driving most of the surge in global cleantech demand, benefiting from large and predictable internal markets. However, intensifying competition means that continuous innovation is needed to maintain market share. China has progressively developed a strong innovation and industrial competitive advantage in solar panels, batteries and key raw material transformation, while Europe retains strong industrial capacity in areas such as wind power and electric vehicles. To continue to take advantage of the potential of fast-growing cleantech industries, Europe needs a strategic approach that taps the strength of its internal market, boosts innovation and scales cutting-edge technologies. Diversified supply chains, global partnerships and strategic alliances are also key to a balanced approach that matches effectiveness, economic security, industrial competitiveness and cutting-edge technological leadership.

Introduction

Europe is transitioning quickly to clean energy, which brings important benefits, such as lower fuel imports, stronger energy security and fewer emissions. Electricity will become the dominant source of energy, but electricity prices are likely to remain higher than in other major economies. EU countries need to invest heavily to remake their energy systems and better integrate, store and deploy renewable energy, reducing their reliance on natural gas for a stable energy supply. The energy system also needs investment to keep up with rising demand and new technologies. At the same time, China and Europe are increasing demand for clean technologies, which creates strong competition and means Europe must keep innovating to stay competitive.

This chapter consists of two main sections. The first reviews recent developments in Europe's energy market, including the growth of renewables, reduced fossil fuel imports and improved energy security. It looks at bottlenecks in EU energy infrastructure and considers policy options for closing investment gaps and upgrading this infrastructure to amplify the benefits of the transition. Box A analyses data centre energy demand, while Box B outlines how lower energy prices can bolster competitiveness. The second section explores the opportunities created by the expansion of clean technologies, highlighting Europe's progress and untapped potential in green innovation and global cleantech while assessing the risk of new dependencies. Box C outlines the EIB's role in supporting green investment. Box D studies the fragmentation of cleantech supply chains, and Box E puts the spotlight on the democratic credentials of the European Union's critical raw material supply partners.

Accelerating the transformation of the European energy system

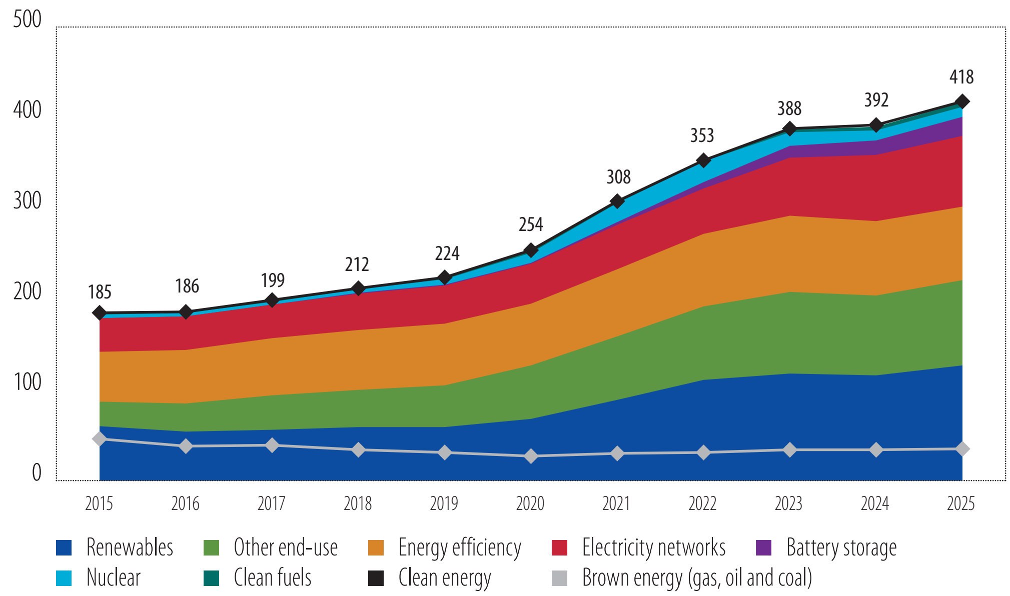
This section discusses the recent progress and challenges in the European energy market, showing that the transition to a low-carbon future is already delivering major benefits for the economy and people of the European Union. It stresses that Europe's energy system is changing, with strong momentum in renewable investment, rapid growth in wind and solar, falling fossil fuel imports and improved energy security. Bottlenecks are emerging, however. The section argues that Europe now needs to pair the further acceleration of renewable deployment with major sustained investment to upgrade transmission and distribution grids, expand storage, modernise infrastructure and streamline permitting. At the same time, electrification and efficiency efforts must be enhanced.

EU firms continue to face structurally higher electricity and gas prices than global competitors. To bring down those costs, the energy transition needs to move more quickly. At the same time, innovative financial models must be developed to better spread out upfront costs and unlock private capital, enabling renewable deployment, electrification and lower energy costs to advance together.

The EU energy system is undergoing a rapid transformation

Europe's clean energy investment has risen strongly since 2020, laying the foundation for a decisive shift in the energy system. Investment expenditure (excluding transport) increased from €185 billion in 2015 to €418 billion (Figure 1) in 2025 (International Energy Agency (IEA), 2025a). The surge was supported by major policy reforms pushed through after the 2022 energy crisis, which highlighted Europe's exposure to imported fuels and strengthened political support for renewables and efficiency. Fossil fuel investment declined from €46 billion in 2015 to €27 billion in 2020, with only a modest rebound in short-term gas activities. By the mid-2020s, the European Union was investing more than ten times as much in clean energy as it was in fossil fuels, signalling a clear strategic shift.

Figure 1
Total EU energy investment (€ billion)



Source: EIB staff calculations based on International Energy Agency (IEA) (2025a).

Strong clean energy investment goes hand in hand with the rapid deployment of renewable energy across Europe, accelerating the shift to a cleaner and more secure system. From 2021 to 2024, the European Union added 144 GW of solar photovoltaic capacity (up 90%) and 43 GW of wind power capacity (up 23%) (Figure 2). This surge led to renewables providing about half of Europe's electricity in 2024 and early 2025 – a remarkable achievement that showcases the payoff of strong investment (Figure 3). Wind power has already overtaken natural gas as the European Union's second-largest power source (after nuclear), and solar generation (11% of EU electricity in 2024) surpassed coal for the first time. This rapid clean electricity growth – spurred by policies like the European Green Deal – has slashed power-sector carbon emissions and enhanced energy security.[1]

The surge in domestically produced clean energy has strengthened energy security and delivered substantial savings on fuel imports. A simple calculation shows that at the time of the energy shock, high levels of wind and solar electricity generation helped protect European firms and consumers by limiting imports, with renewable energy replacing an estimated €71 billion in fuel import costs in 2022 and an additional €29 billion in 2023.[2] The renewable contribution to energy production shielded people and businesses against expensive natural gas imports needed for energy generation (Figure 4). Notably, wind power delivered the largest cumulative savings (€115 billion avoided fuel import costs since 2010), with hydro, other renewables and solar also contributing strongly (Figure 5). This is a clear illustration of how investing in domestic clean energy yields economic dividends through of lower operating costs (fuel) and an improved trade balance.

1 In 2023, the European Union led a global pledge – endorsed by all countries at COP28 – to triple renewable capacity by 2030.
2 These estimated savings do not take into account the investment cost of renewables.

Figure 2
Installed capacity in Europe (in GW)

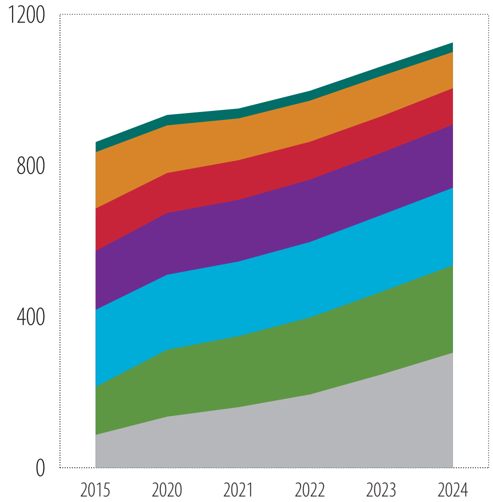
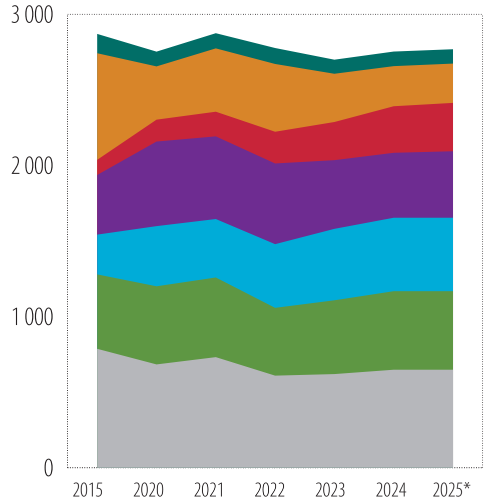


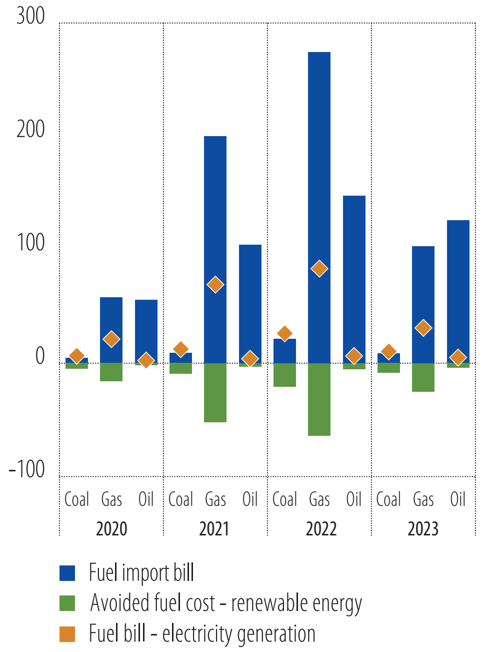
Figure 3
Electricity generation in Europe (in TWh)



Source: *EIB staff calculations based on Eurostat and Ember (2025).*

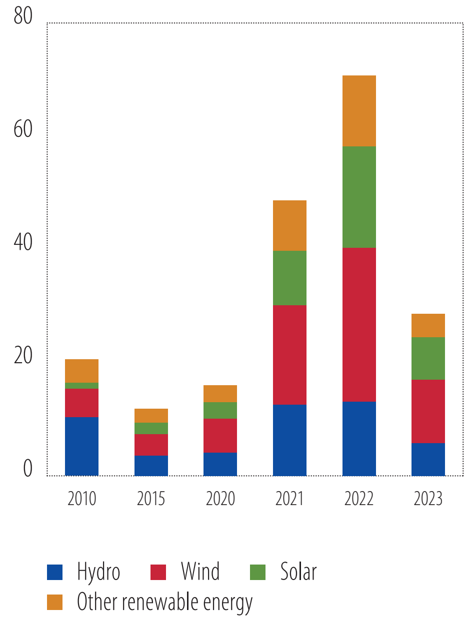
Source: *EIB staff calculations based on Eurostat and Ember (2025).*
Note: *Figures for 2025 are estimates, calculated using data available up to September 2025.*

Figure 4
Estimated fuel cost (€ billion)



Source: *EIB staff calculations based on Eurostat and Bloomberg.*
Note: *The EU energy import bill is calculated using price-volume estimation methodology, which combines volumes from Eurostat energy data with average prices of these commodities on wholesale markets in the European Union (European Commission, 2014).*

Figure 5
Estimated avoided fuel import cost (€ billion)

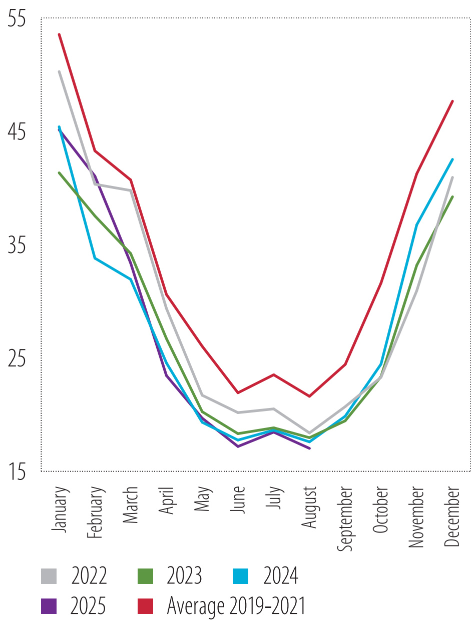


Source: *EIB staff calculations based on Eurostat and Bloomberg.*
Note: *The EU energy import bill is calculated using price-volume estimation methodology, which combines volumes taken from Eurostat energy data with average prices of these commodities on wholesale markets in the European Union (European Commission, 2014).*

Europe has sharply reduced its dependence on Russian gas by cutting demand and diversifying supply, with full bans on Russian imports scheduled for the end of 2027. From August 2022 to August 2025, gas demand fell by 227 billion cubic metres (about 19%), owing to weaker industrial activity, mild winters and efficiency measures (Figure 6). Russia's share of the EU gas supply dropped from 45% in 2021 to under 12% by August 2025, replaced mainly by imports from Norway and the United States (Figure 7). Fast-tracked liquid natural gas terminals and floating regasification units increased capacity by about 20%, allowing Europe to substitute much of the gas transported via Russian pipelines. Liquid natural gas imports reached a record 76 million tonnes in 2024, meaning this form of gas made up roughly half of Europe's gas supply, with volumes remaining high in early 2025 (Figure 8). Gas storage levels reached 90% of capacity by August in 2023 and 2024, strengthening energy security even as 2025 levels remained lower but stable (Gas Infrastructure Europe, 2025).

Figure 6

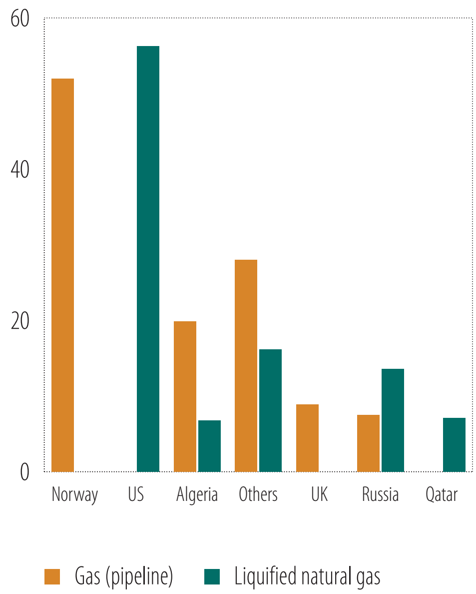
Monthly natural gas demand in the European Union (billion cubic metres)



Source: EIB staff calculations based on Eurostat.

Figure 7

Europe's main gas trading partners in the second quarter of 2025 (in %)

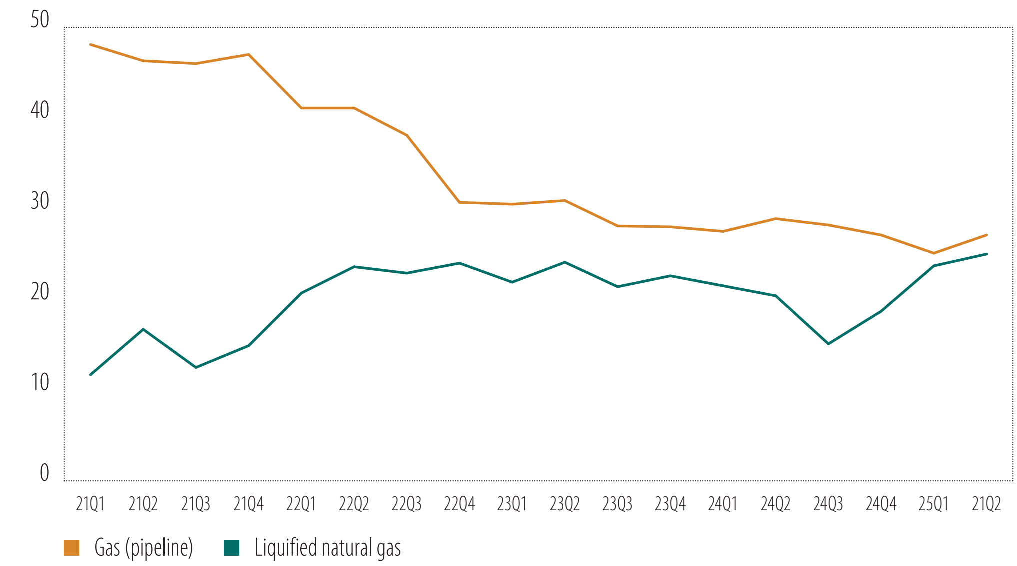


Source: EIB staff calculations based on Eurostat.

Efficiency gains have decoupled energy use from economic growth, locking in long-term competitiveness benefits. In recent decades, and especially since 2019, investments, regulations and changes in behaviour have helped reduce primary and final energy consumption intensities in the EU economy. This means Europe now produces more economic output with less energy (Figure 9). The 2022 energy crisis further accelerated this trend and achieved efficiency gains (such as upgraded equipment or changes to habits) that have been locked in for the long term. By 2024, Europe's total energy use was significantly lower than pre-2020 forecasts had anticipated and below 2005 levels (European Environment Agency (EEA), 2024), showing that energy was being used more efficiently.

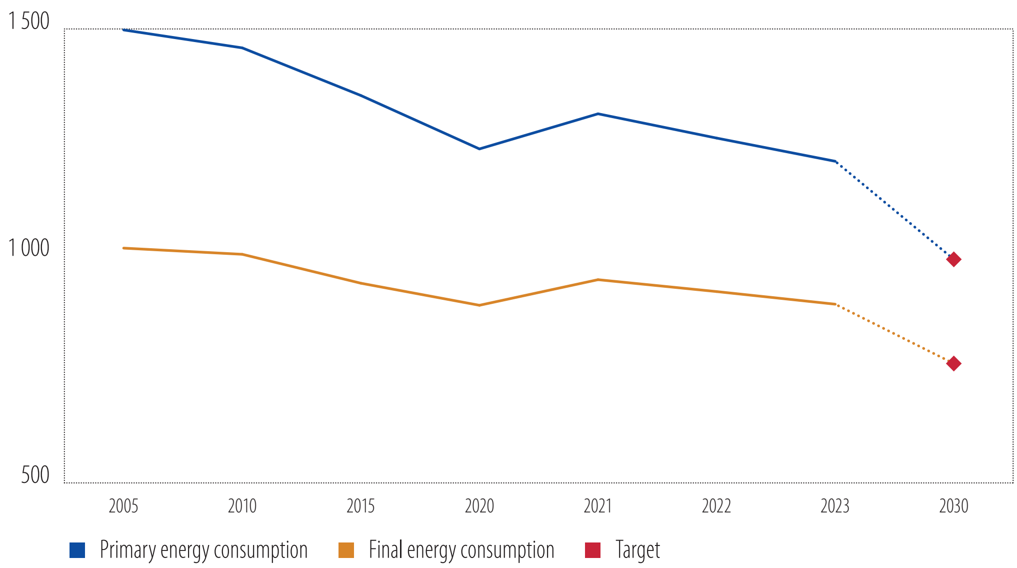
Greenhouse gas emissions also continued to fall across the European Union in 2024. Provisional data from the European Environment Agency suggest that emissions were about 2.5% lower than in 2023 and around 37% below 1990 levels (Figure 10). Most of the progress comes from the energy transition, including less coal use, more renewables and gradual improvements in energy efficiency. Sector trends are mixed, with the energy supply rapidly decarbonising, while transport and parts of industry are finding it harder to transition. Current policies would bring a 47% reduction by 2030, and planned measures could raise this to about 54%, very close to the European Union's 55% target.

Figure 8
Natural gas imports to Europe (€ billion)



Source: *EIB staff calculations based on Eurostat.*
Note: *Quarterly imports.*

Figure 9
Primary and final consumption of energy (in Mtoe)



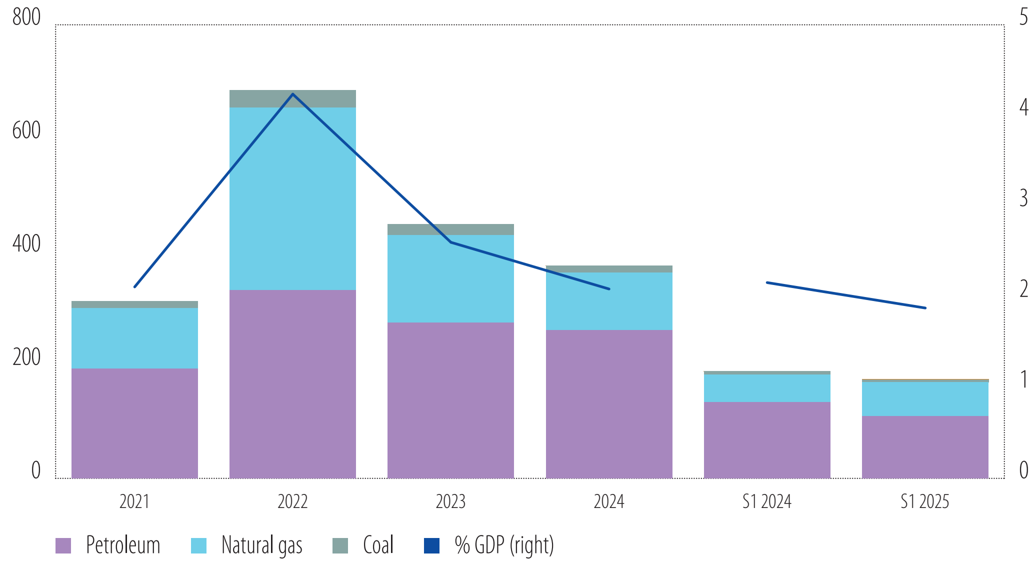
Source: *EIB staff calculations based on Eurostat*
Note: *Mtoe stands for million tonnes of oil equivalent.*

Overall, demand reduction and supply diversification have helped lower Europe's fossil fuel import bill, even if costs remain above levels before the 2022 energy crisis. The bill had surged from €312 billion in 2021 to €694 billion – about 4% of EU gross domestic product (GDP) – at the height of the energy crisis in 2022 (Figure 11). By 2024, it had fallen back to around €372 billion, or roughly 2% of GDP. This improvement reflects lower prices and reduced imports, made possible by Europe's successful efforts to cut demand and diversify suppliers. Together, these actions mean that Europe is now in a stronger position to manage future energy shocks than it was before the crisis.

Figure 10
Progress towards achieving climate targets in the European Union (in $MtCO_2e$)

Source: *European Environment Agency.*

Figure 11
Estimated EU energy import bill (left axis: € billion; right axis: % GDP)



Source: *EIB staff calculations based on Eurostat.*

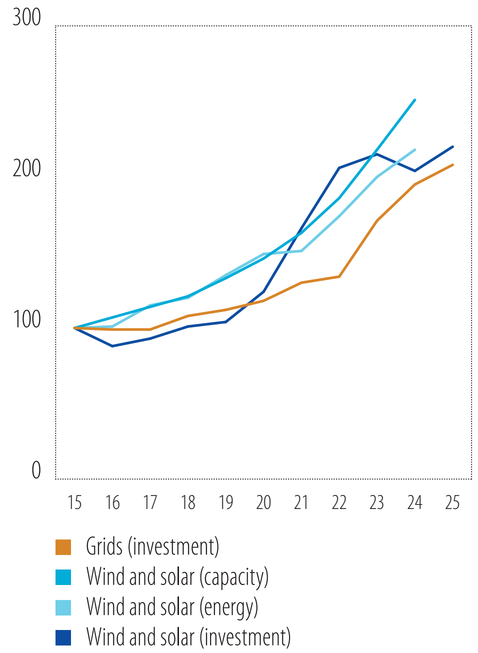
Bottlenecks emerge

Technical constraints are limiting Europe's ability to fully benefit from growing renewable capacity. Progress on large-scale storage, such as batteries and pumped hydro, remains slow, leaving surplus renewable output difficult to store or redirect. As renewable capacity expands, these system limits are becoming more visible. In parts of Europe, an oversupply of energy can push wholesale energy prices negative during certain hours. This situation is aggravated by strong solar generation, grid bottlenecks and delayed market reforms. The Agency for the Cooperation of Energy Regulators (ACER) (2025) reports that this trend is depressing capture prices for merchant solar,[3] increasing uncertainty about revenue and reinforcing the need for ways to store energy and respond better to fluctuating demand.

A major bottleneck lies in the readiness of electricity networks to integrate rapidly expanding renewable energy. Insufficient cross-border interconnectors and delays in upgrading transmission and distribution systems risk limiting the integration of renewable energy, reducing flexibility and weakening incentives for further deployment. While investment in wind and solar has surged since 2015 (accelerating again after 2020), grid investment has increased only modestly (Figure 12). As a result, networks built for centralised generation now struggle to accommodate decentralised production. Along with the expected rising electricity demand from transport, industry and heating electrification, as well as data centres (see Box A), the mismatch between supply and demand is set to become more acute.

Figure 12

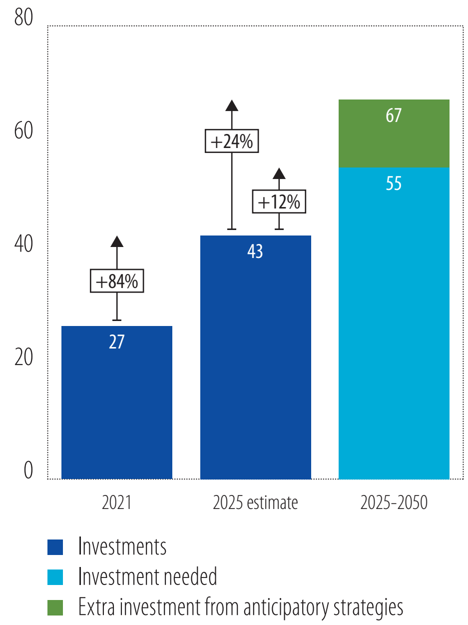
Wind and solar installed capacity, electricity generation and investment, and grid investment in the European Union (index, 2015=100), **2015-2025**



Source: EIB staff calculations based on IEA, Eurostat.

Figure 13

Annual investment of distribution system operators (€ billion)



Source: Eurelectric.

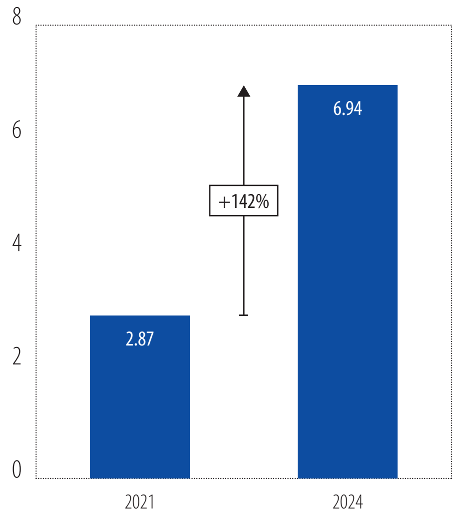
Rapid renewable growth has also exposed a widening investment gap for distribution networks. While distribution system operators have increased investment (which is expected to reach €43 billion

3 Merchant solar refers to solar farms that sell electricity at market prices, not through a fixed contract.

in 2025), current estimates indicate that it remains around 50% below what is needed to modernise and expand the grid (Figure 13). The annual investment gap is estimated to be €24 billion under current conditions, or €12 billion with strategies being put in place to address the shortfall. This shortfall risks slowing the connection of new renewable installations and consumers that also produce energy (prosumers), with connection requests more than doubling since 2021 and exceeding 450 000 in 2024 (Figure 14 and Figure 15).

Figure 14

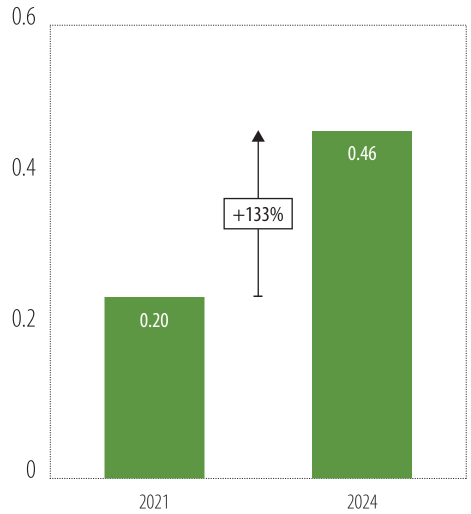
Prosumers connected to distribution system operators (in millions)



Source: *Eurelectric.*

Figure 15

Renewable connection requests to distribution system operators in selected EU countries (in millions)

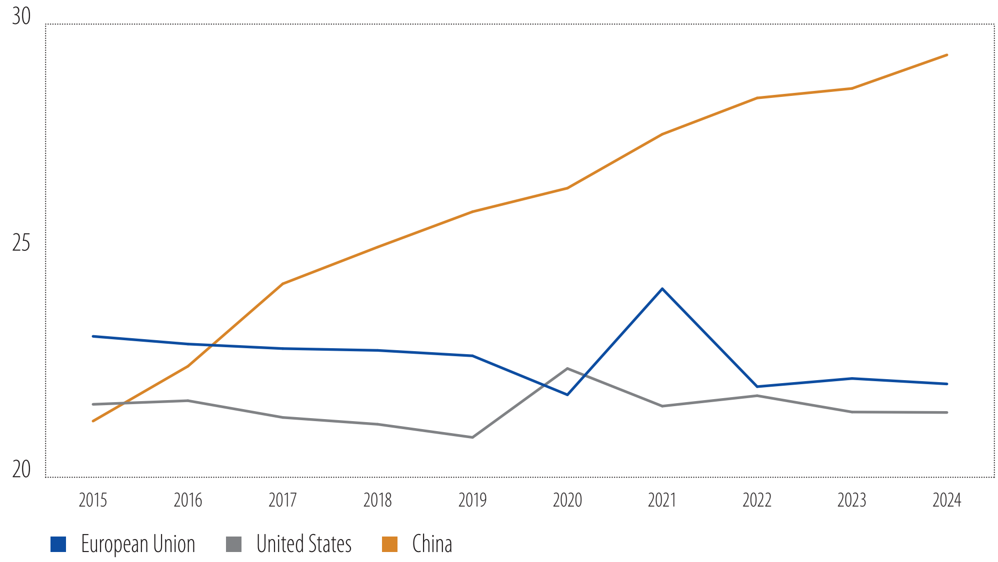


Source: *Euroelectric, distribution system operators.*
Note: *Selected countries include Bulgaria, Denmark, Finland, France, Greece, Hungary, Ireland, Italy, Poland, Portugal, Romania and Spain.*

Smaller distribution system operators face growing pressure to upgrade and digitalise their networks while already carrying high debt levels. This leaves little room on their balance sheets for the investment needed to support electrification and integrating a rising share of renewables. To meet these needs, operators will require new financing options, such as structures that lower their debt loads by taking into account future revenue and equity investments by long-term investors.[4] This is particularly true for distribution systems made up of several small operators. By contrast, large transmission system operators are generally well placed to attract capital, as their regulated assets and stable income reduce the risk inherent in transmission investments. Instead, larger operators need clearer regulatory guidance. As renewable generation expands, the variability of supply increases the need for flexible and digitalised distribution networks. Without quicker and better-targeted investment, distribution system operators risk becoming a structural bottleneck in Europe's decarbonisation efforts.

4 Evidence of this includes the €500 million Commerzbank loan and ongoing discussions with the European Commission and Copenhagen Infrastructure Partners.

Figure 16
Electrification of energy end-use in Europe, the United States and China (in %)



Source: EIB staff calculations based on IEA, Eurostat.

These system constraints are also slowing progress in electrifying end-use sectors, which is essential for making full use of Europe's growing supply of clean electricity. Despite renewables now supplying about half of EU power, the share of electricity in final energy consumption has remained close to 22% for almost a decade (Figure 16). By contrast, China's electricity share reached around 30% in 2024, up from 21% in 2015. Uptake of electric vehicles, heat pumps and industrial electrification remains slow, held back by grid bottlenecks, high upfront investment costs and uneven policy incentives. Persistently high electricity prices further weaken the case for switching from fossil fuels. Unlocking faster progress will require stronger market integration, more flexible infrastructure and reforms to pricing and market design so that clean electricity is consistently the cheapest option.

This pressure points to the need for a more integrated approach that links renewable deployment with progress on electrification, storage and sustained grid investment. The European Commission estimates that €584 billion of investments will be needed by 2030 (primarily for local distribution systems), yet current investment trends fall well short. Many planned projects face multiyear waiting periods for grid connections, undermining the security of supply and slowing the transition. In several EU countries, congestion already forces operators to curtail renewable output.

Energy efficiency investment must rise sharply if Europe is to meet its 2030 climate goals. While efficiency has improved in recent years, progress remains far too slow to deliver the 11.7% reduction in final energy consumption required under the 2023 Energy Efficiency Directive recast. National Energy and Climate Plans indicate that current efforts fall short of this ambition, and the easing of energy prices increases the risk that households and firms will scale back efficiency efforts. Achieving the 2030 target will require a large increase in investment in building renovation, industrial process upgrades and heat-pump deployment. It also calls for continued policy focus, better information – such as thorough energy audits, which help address information gaps (European Investment Bank (EIB), 2025b) – and stronger technical assistance. Instruments such as ELENA – which provides EU-funded support for the preparation of energy-efficiency and renewable-energy projects – can help public authorities and private operators develop bankable projects at scale. Targeted support for vulnerable groups through tools like the Social Climate Fund will also be essential.

Box A

Data centre demand aggravates electricity bottlenecks

The expansion of data centre capacity in the European Union presents a paradoxical energy challenge. While the growth in aggregate electricity demand across the continent remains manageable, acute localised grid constraints are creating bottlenecks in the very markets driving European digital infrastructure investment. This challenge is framed by the European Commission's target to triple EU data centre capacity within five to seven years, highlighting the urgent need to address energy constraints to safeguard digital sovereignty and technological innovation.

European data centre capacity in a global context

Global electricity consumption from data centres, artificial intelligence (AI) workloads and cryptocurrency mining is projected to double by 2026, exceeding 800 TWh a year (IEA, 2024b). However, Europe accounts for a relatively constrained share of planned new capacity. China and the United States dominate the pipeline, accounting for nearly 80% of global data centre growth until 2030 (IEA, 2024b; McKinsey & Company, 2024). Europe's current installed capacity stands at approximately 11 GW, with a three-year pipeline of 15-20 GW in various stages of planning and construction (Newmark, 2025; DC Byte, 2024). The International Energy Agency (IEA) projects total EU data centre electricity consumption will reach approximately 115 TWh by 2030 – a significant increase from the 70 TWh seen in 2022. At an aggregate European level, this growth can be absorbed by the broader electricity system, particularly given the European Union's expanding renewable generation base and interconnected transmission networks.

Local grid saturation in core data centre markets

The critical constraint for 2026 to 2028 is the extreme concentration of demand in established data centre markets – Frankfurt, London, Amsterdam, Paris and Dublin (the FLAP-D hubs) – where local grid infrastructure has reached saturation. This concentration is amplified by the expanding AI workload. Next-generation AI training facilities require graphics processing unit-dense configurations that consume three to five times more power per rack than traditional cloud computing, with single hyperscale campuses demanding electricity loads equivalent to 100 000 to 200 000 homes. This push for AI is accompanied by new EU transparency mandates. The AI Act (2024) requires providers of general-purpose AI models to document the known or estimated energy consumption of the model during training.

Table A.1

Grid constraint severity in selected EU markets

Market	Demand indicator	Practical impact
Ireland (Dublin)	Data centres are projected to consume 32% of national electricity by 2026.	There is a de facto connection moratorium until 2028 and mandatory on-site generation requirements.
Netherlands (Amsterdam)	Data centres consumed 4.6% of the Netherlands' total electricity consumption in 2024.	There have been local development restrictions since 2022, with developers redirected to alternative sites.
Germany (Frankfurt)	Data centres consumed 40% to 50% of Frankfurt regional electricity in 2024.	Grid connection queues average seven to ten years and there are transmission upgrade backlogs.
Denmark (Copenhagen)	Data centres are expected to reach 15% to 18% of national electricity demand by 2030.	Grid pressure is growing, with new facilities increasingly steered towards western Denmark.

The fundamental bottleneck is grid connection lead time. Transmission system operators cannot deliver the necessary substation capacity and connection points within the typical three-year development window for new facilities. Developers in the FLAP-D hubs face queues averaging seven to ten years for a grid connection. The severity of these constraints is illustrated in Table A.1.

Geographical redistribution of European data centres

Grid constraints are forcing a fundamental shift in European data centre site selection, with power availability now superseding traditional factors like fibre connectivity and proximity to financial centres. This validates the hypothesis that the constraint is caused by challenges with local electricity distribution, not a lack of electricity generated on the EU level.

The Nordic region is emerging as Europe's data centre powerhouse for the 2026-2028 programme. Sweden leads with over 5 GW in total pipeline projects, driven by abundant hydropower. Finland is also attracting significant AI infrastructure investment, with demand projected to reach 8% to 10% of national consumption by 2028.

In Southern Europe, Spain has emerged as a major beneficiary of FLAP-D constraints, with 3-4 GW of new projects. Data centre electricity demand there is projected to triple or quadruple from its current level of less than 2% to 6% to 8% of national demand by 2028. Portugal is positioning itself as an Atlantic gateway market, with 1 GW in new projects planned to 2028, potentially reaching 4% to 5% of national demand.

Strained electricity grids and regulatory implications

For 2026 to 2028, grid capacity – not total electricity generation – is constraining European data centre development. The inability to connected to local grids in saturated markets is delaying or cancelling an estimated 30% to 40% of planned FLAP-D projects (IEA, 2024b; McKinsey & Company, 2024), extending project timelines by three to five years due to backlogs, and forcing data centres to relocate to secondary markets, which is fundamentally altering the geography of European data centres. This creates a medium-term inefficiency where developers build in locations with abundant power but not ideal speed profiles.

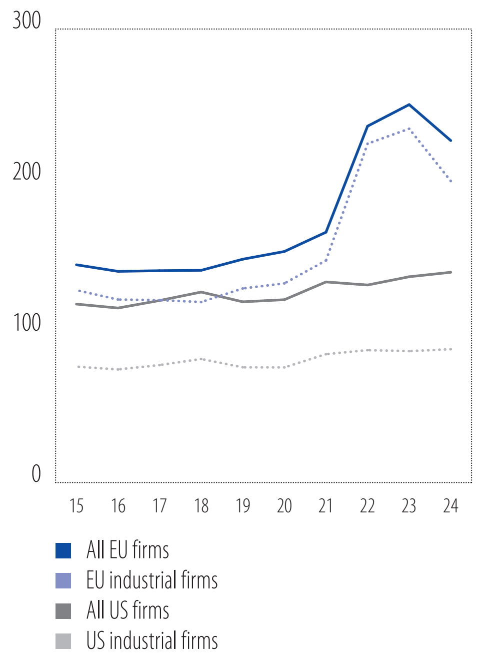
The regulatory backdrop is increasingly distinct from China and the United States, where policy tends to prioritise grid access and investment speed over mandatory sustainability rules (IEA, 2024b). In the European Union, the 2023 Energy Efficiency Directive has moved the sector from voluntary standards to mandatory compliance. This directive requires data centre operators with an installed IT power demand of at least 500 kW to annually upload key performance indicators to a European database. These reported metrics – which include power usage effectiveness, water usage effectiveness, energy reuse factor and renewable energy factor – establish a comprehensive, legally required transparency framework that creates a higher barrier to entry and a greater long-term operational burden in the European Union compared to most international markets.

A more integrated and flexible system could lower Europe's energy costs

European firms pay significantly more for electricity and natural gas than many global competitors, creating a structural disadvantage. In 2024, European retail electricity rates for businesses averaged €226 per MWh, almost double the US rate of €139 per MWh (Figure 17). EU natural gas prices were three to five times higher than in the United States (European Commission, 2025a). Even though prices eased slightly in 2025, the gap has persisted, undermining the competitiveness of firms operating in global markets.

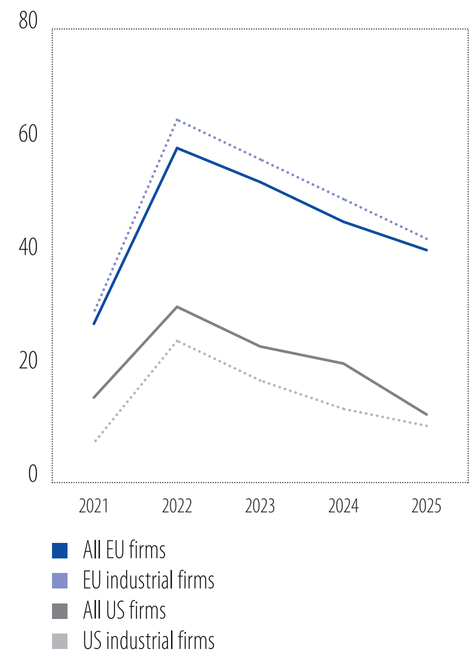
Reflecting these pressures, an increasing share of EU firms now cite energy costs as a major barrier to investment. According to the EIB Investment Survey (EIBIS), the share of companies citing high energy prices as a significant barrier to new investment surged in 2022 and has since remained high (Figure 18). This is especially true for manufacturers and other energy-intensive sectors. Europe's industrial consumers face a structural cost disadvantage, as they must devote a larger portion of their budget to energy expenses (EIB, 2025b), which squeezes profit margins and leaves less room to increase salaries or make new investments. This situation is particularly problematic for trade-exposed industries such as chemicals, steel and fertilisers, which compete on global markets and cannot easily pass on higher energy costs to customers.

Figure 17
Retail electricity prices for businesses (in €/MWh)



Source: EIB staff calculations based on IEA and Eurostat.

Figure 18
Firms citing energy costs as a major obstacle (in %)



Source: EIB staff calculations based on EIBIS 2021-2025.

Given this backdrop, reducing electricity and gas costs is key to restoring European competitiveness and supporting investment.[5] Gas prices are largely set in global markets and remain exposed to international supply and demand, whereas electricity prices are shaped mainly by local system

5 See the Climate Bank Roadmap Phase 2 2025-2030 (EIB, 2025d), which suggests that lowering these costs are crucial for EU competitiveness and inclusive prosperity, given their outsized role in final energy bills, and the EIB Energy Sector Orientation (EIB, 2025e), which defines the Bank's investment priorities for renewables, grids, storage, energy efficiency and decarbonisation, and guides energy-related financing decisions.

conditions – generation mix, network constraints, storage availability and market design. As long as these local structural issues persist, prices will remain high. Europe therefore needs cleaner generation, stronger and better-targeted infrastructure, greater electrification and more efficient market design. These elements remain central to the policy agenda because they address the underlying factors driving costs, which matters most for firms (European Commission, 2025b). Lower energy prices would not only reduce production costs but also strengthen firms' ability to finance investment internally, which would help modernise the European economy (see Box B).

Several structural factors continue to keep electricity prices high, and this same pressure is likely to persist in the years ahead. Network tariffs, capacity payments and levies now form a growing share of final bills (ACER, 2025), even as wholesale prices fall. At the same time, the transition requires major investment in grids, storage and interconnections. Slow electrification reinforces this pressure because fixed system costs are spread across a relatively stagnant customer base that is reducing consumption over time. Together, these elements prevent the cost-savings from cheaper renewable generation from being passed on to businesses. Without system upgrades, electricity prices are likely to remain high.

The problem lies in the structure of the energy system, rather than temporary market shocks. Europe must therefore turn to measures that can structurally reduce electricity prices and stabilise them over time. These measures operate through different channels, namely lowering wholesale costs, easing congestion and closing the gap in prices between countries. Europe also needs to reduce its dependency on natural gas, which sets marginal prices.

One way to bring down prices is the increase the share of electricity generated by renewable energy. That would help lower wholesale electricity prices, which in turn would reduce retail prices. Figure 19 illustrates the simultaneous effects of a 1 percentage point change to the share of renewables and fossil fuels in the energy mix on retail electricity prices (including network, taxes and levies components). It shows that an increase in the share of renewables gradually lowers firms' electricity prices, and the price remains at a lower level. This indicates that, all things being equal, the fall in the energy component (mainly the wholesale cost) brought by renewables more than offsets changes in the other tariff components. By contrast, a higher share of fossil fuel generation tends to raise prices or make them more volatile, since natural gas plants often set the price at the margin. In practical terms, policies that accelerate wind and solar deployment will help reduce the baseline power price level in Europe, easing the burden on firms.

Stronger integration of wholesale markets is also important. A more interconnected European electricity grid allows cheaper power to flow to where it is needed, preventing extreme price differences between countries. Cross-border trade in electricity smooths out local imbalances between supply and demand. For example, if one country has a wind power surplus and very low prices, it can export electricity to a neighbour facing a shortfall, thereby lowering prices in the importing market. Panel regressions show that, on average, a 10 percentage point increase in the share of traded electricity is linked to about a 2 percentage point reduction in the change in retail electricity prices and their levels. The size of the effect varies from country to country; in some cases, the impact is close to 1%, while in others it can reach up to 4% (Figure 20).

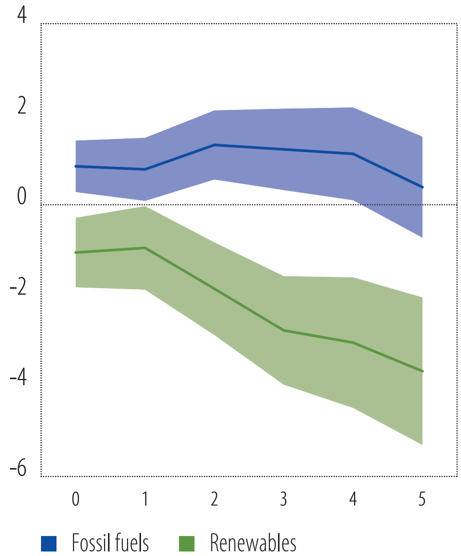
Market design improvements can further reduce costs by weakening firms' exposure to gas-linked marginal pricing. Long-term instruments such as power purchase agreements and contracts for difference[6] allow consumers and producers to lock in more predictable prices, shielding them from volatility. These reforms work best in a well-integrated system with sufficient flexibility and clearer

6 A contract for difference sets a fixed price for electricity. For example, if the agreed price is €60/MWh and the market price falls to €40, the generator receives €20 to fill the gap. If the market price rises to €80, the generator pays back €20. This keeps revenues stable and limits wholesale-price risk.

market rules. Combined with growing renewable capacity and stronger interconnections,[7] they help ensure that cheaper clean electricity is reflected in more stable and structurally lower prices.

Figure 19

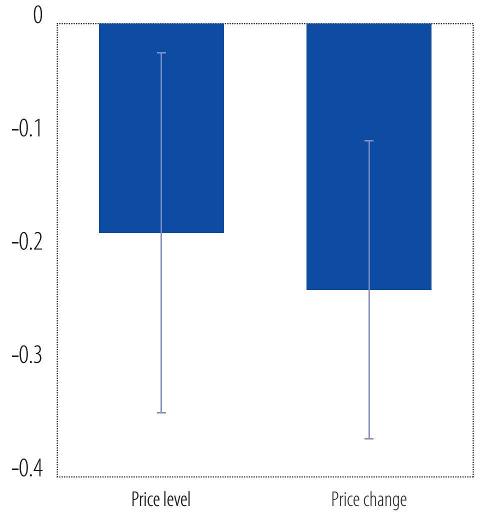
How changes in the electricity mix affect prices (x-axis: years after the change; y axis: average marginal effects)



Source: *EIB staff calculations based on Eurostat.*
Note: *The chart presents impulse response functions estimated with local linear projections to show how retail electricity prices react when the share of renewables or fossil fuels in the power mix changes. The model controls for year and country differences, includes the first lag of prices and the shock variables and clusters standard errors at the country level. A positive coefficient indicates that a rise in the respective energy source share leads to higher electricity prices, while a negative coefficient shows that it leads to lower prices, allowing a clear interpretation of how different generation sources influence retail electricity costs over time. The green and purple areas represent 90% confidence intervals.*

Figure 20

Average marginal effect of cross-border trade in electricity on price levels and changes (coefficient)

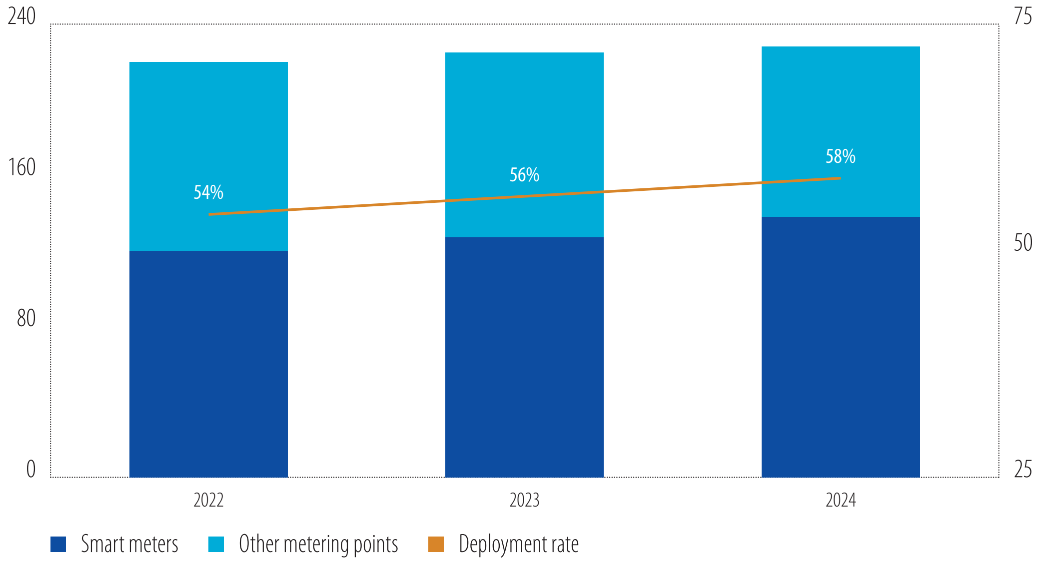


Source: *EIB staff calculations based on Eurostat.*
Note: *Country panel regression of the change or the level of electricity prices (log) on the change in the share of cross-border flows (imports) of electricity in total electricity generation. The estimation includes year, and country fixed effects, controls for clustered standard errors at country level. The vertical lines represent 90% confidence intervals.*

Right now, dynamic pricing is also necessary. Today, most consumers and firms do not face time-varying tariffs, which limits their ability to shift consumption to cheaper periods. This weakens the system's capacity to accommodate higher shares of variable renewables. Tools like smart meters could help shift demand to high-production periods, however penetration remains below the European Union's 80% target (Figure 21). This restricts participation in programmes that are trying to influence demand.

7 Effective interconnection planning remains essential because different renewable resources add different system value. ACER (2025) notes that linking two solar-heavy regions brings limited flexibility or security-of-supply benefits, whereas interconnecting wind-rich regions delivers much greater system gains.

Figure 21
Total number of metering points in selected EU countries (left axis: in millions; right axis: in %)



Source: *Eurelectric.*
Note: *Selected countries include Bulgaria, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Poland, Portugal, Romania and Spain.*

Box B

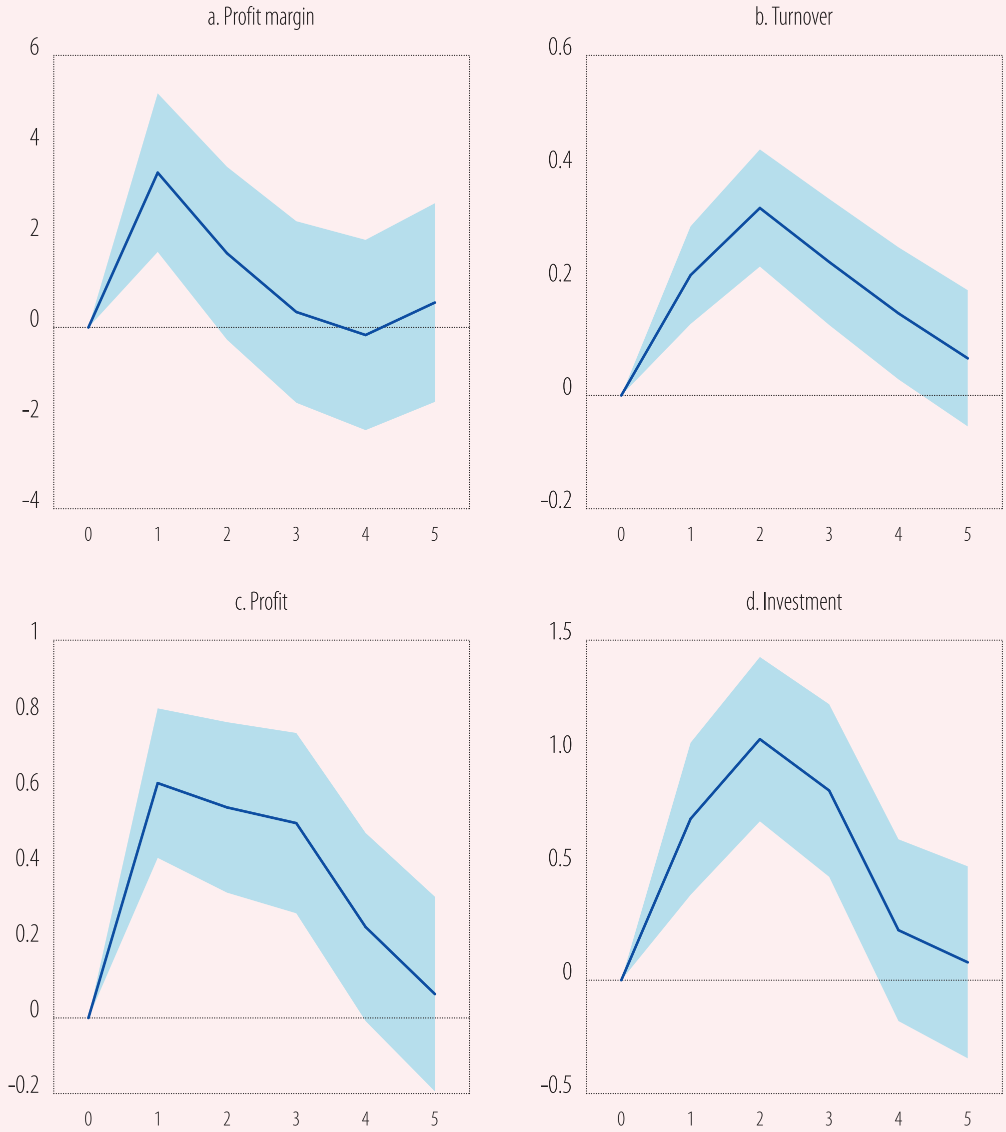
Lower energy costs support higher investment and more competitive firms

This box summarises evidence from firms on how structurally higher energy costs affect European companies, and explains why lowering energy costs is essential for competitiveness and investment. The analysis draws on the econometric analysis based on local linear projections and panel regressions from 2000 to 2023 that use company data from Moody's Orbis database as well as energy cost data from Eurostat and the Organisation for Economic Co-operation and Development (OECD). It provides a consolidated view of how energy costs shape firms' financial performance.

Lower energy costs strengthen firms' financial performance because they reduce pressure on all major production inputs – labour, capital and energy – improving how efficiently these resources are used together. When energy costs fall, the econometric analysis (Figure B.1) shows clear and lasting gains in profit margins, turnover, profits and investment, indicating that energy costs are just as important as wages and capital costs in determining whether firms can finance investment internally. By easing wages and capital costs, firms preserve cash flow, redirect resources towards productive investment and deploy labour and capital more effectively, which supports growth.

Figure B.1

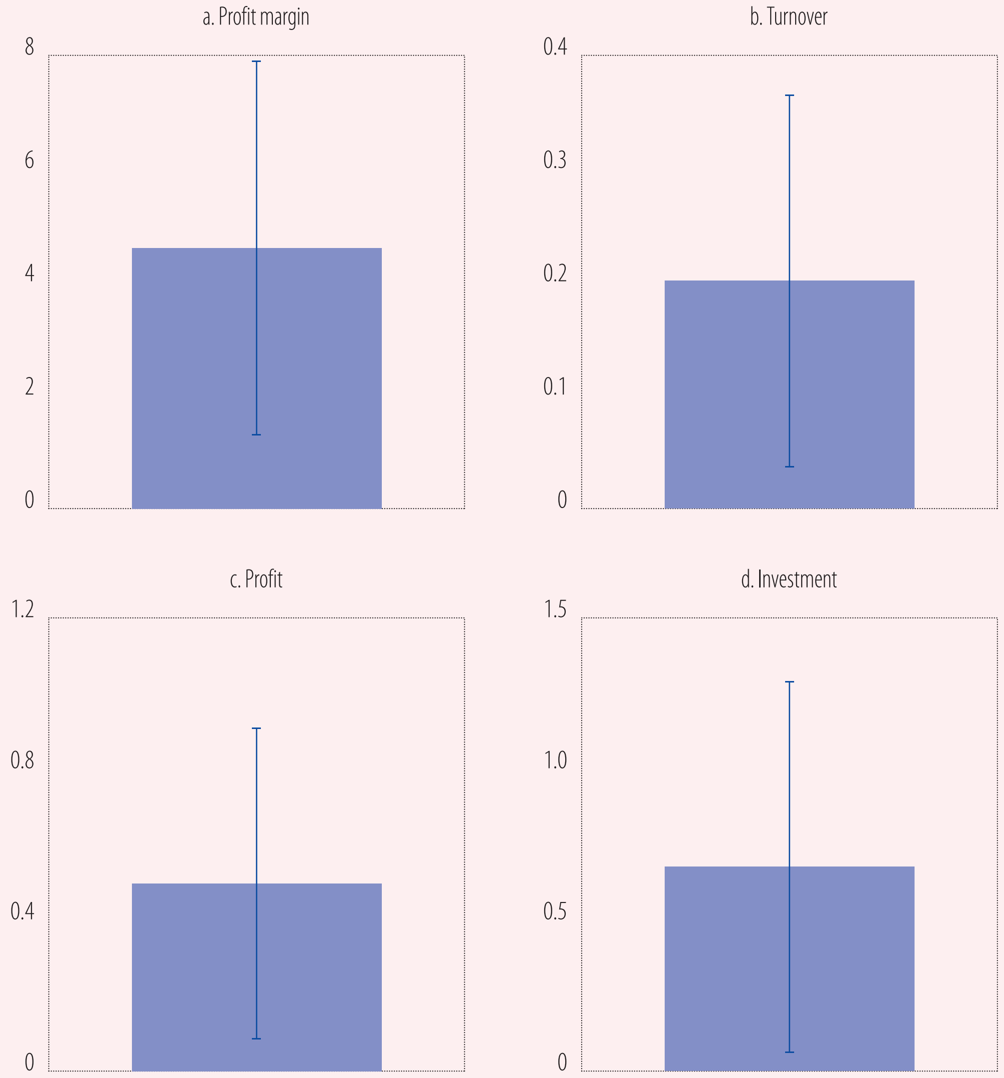
Marginal effect of reducing energy costs (in %) **on firm performance, taking into account percentage-point changes in electricity and gas costs**



Source: *EIB staff calculations based on Moody's Orbis database.*

Note: *All financial outcomes are in logs, except profit margin, which is in percent. Energy cost computed as the input from sector 35 (electricity, gas, steam and air conditioning supply) in total output based on Organisation for Economic Co-operation and Development (OECD) (Input-Output Tables, 2025). The charts show the impulse response functions produced by local linear projections from 2000 to 2023 on outcome variables representing a change in electricity and gas cost in output. The estimations include year, size and firm fixed effects, with controls for the first lag of the dependent variable. The impulse response function shows how the variable reacts over time to a one-unit change (in percentage terms), with the line indicating the estimated effect and the shaded area showing the confidence interval at 90%. When the shaded area is around zero, it means that the result is not statistically significant for this period. The marginal effect of profit margins corresponds to a 10-percentage point change in energy cost share, whereas for the remaining outcomes, this corresponds to one unit.*

Figure B.2
Average marginal effect (in percentage points) **of lower energy costs on firm performance at different levels of import dependency from non-EU countries**



Source: *EIB staff calculations based on EIBIS, OECD (Input-Output Tables, 2025) and Orbis.*
Note: *The chart shows the difference in marginal effects on financial outcomes after an energy shock, by import dependency levels (intensity) from non-EU countries in the sector they operate. The impact depends on the change in percentage points in the share of energy costs taking into consideration the import dependency from non-EU countries. Marginal effects are estimated using panel regressions, after controlling for lagged financial outcomes, firm, year and size fixed effects. The lines represent 90% confidence intervals. The marginal effect of profit margins corresponds to a 10 percentage point change in energy cost share, whereas for the remaining outcomes this corresponds to one unit.*

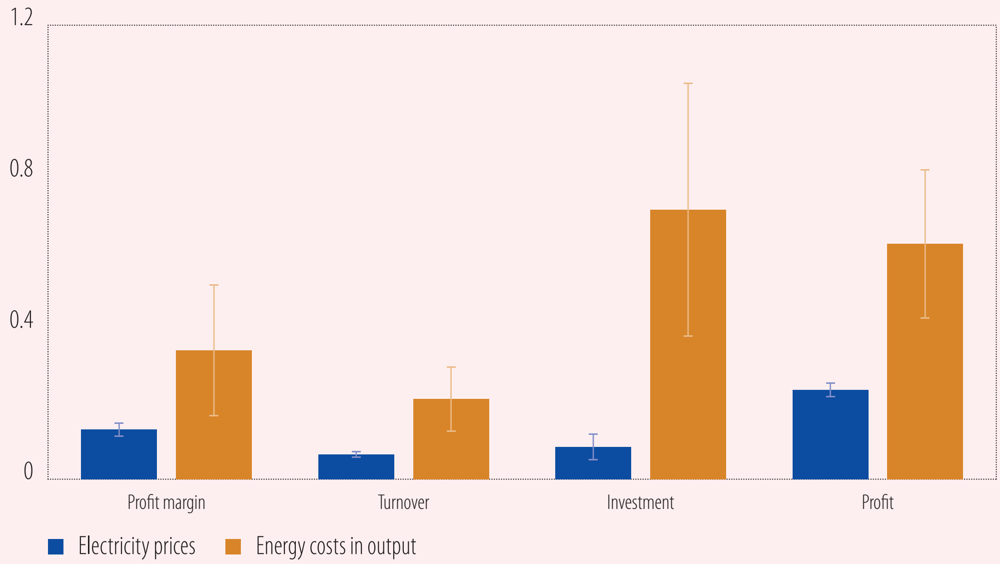
Trade-exposed firms benefit more from energy cost reductions because they face intense global competition and have limited scope for passing higher costs on to customers. The evidence (Figure B.2) shows that firms operating in industries facing significant international competition experience substantially larger improvements in margins and investment when energy costs fall. Competitive firms cannot raise prices when their costs increase, but they can fully retain the savings when energy becomes cheaper. These findings highlight why lowering energy prices is key to maintaining the viability of heavy industry and safeguarding Europe's export competitiveness.

The most reliable way for firms to reduce energy costs is to improve energy efficiency. The analysis (Figure B.3) shows that firms respond more strongly to changes in total energy costs than to movements in energy prices alone, meaning that overall energy consumption is more important to firms than prices. This is because firms cannot influence prices directly, but they can change how much energy they use. Reducing energy consumption therefore produces larger, more predictable and more sustainable gains than lower market prices.

Investments in energy efficiency reinforce these gains because firms that have already upgraded their equipment tend to perform better, especially when energy costs are high. The data indicate that firms with energy efficiency measures in place outperform on several financial indicators, and the advantage becomes stronger as the firm's energy intensity rises. This suggests that efficiency upgrades not only cut operating expenses but also make firms structurally more resilient to future price shocks, reinforcing their competitiveness over time.

Figure B.3

Average marginal effect (in percentage points) **of reducing energy costs or electricity prices on firm performance**

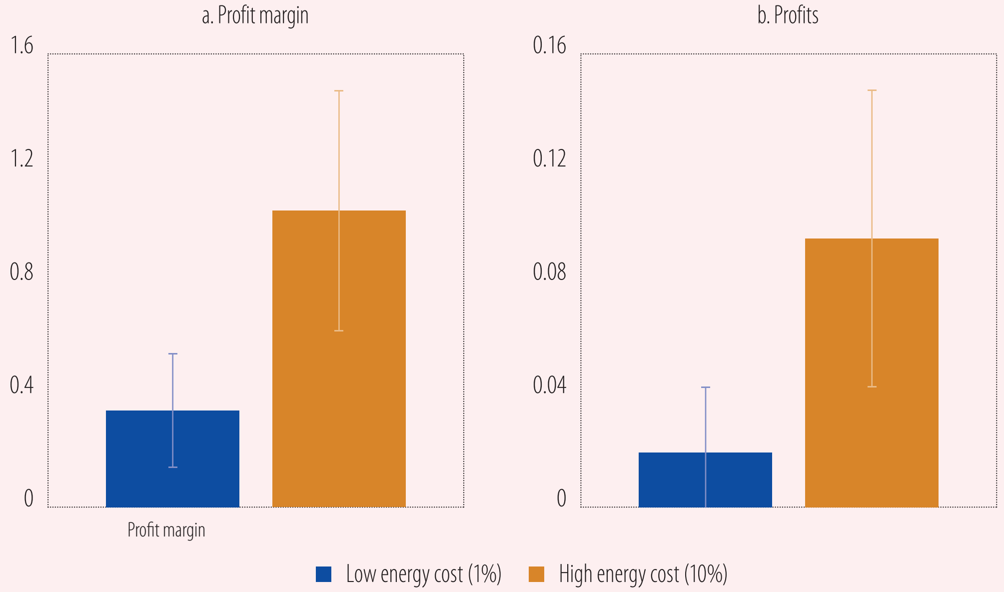


Source: *EIB staff calculations based on Eurostat.*
Note: *The chart shows the difference in marginal effects on financial outcomes after a decline in electricity prices (log) or in the electricity and gas costs as a percentage of output. Marginal effects are estimated using panel regressions for 2000 to 2023, controlling for lagged financial outcomes, firm, year and size fixed effects. The marginal effect of profit margins corresponds to a change of 10 percentage points in the energy cost share or 10% for electricity prices, whereas for the remaining outcomes corresponds to one unit. The lines represent 90% confidence intervals.*

Lowering structural energy costs is therefore key to safeguarding Europe's status as an attractive investment destination. Persistently higher energy prices risk encouraging firms to scale back operations, postpone capital expenditure or relocate energy-intensive activities to regions with cheaper energy. By contrast, firms that succeed in reducing their overall energy costs are better placed to expand production, upgrade technology and participate in global value chains. Addressing high energy costs in Europe is therefore not only vital for individual firms but also for key for sustaining jobs, supply chains and long-term economic resilience.

Figure B.4

Average marginal effect (in percentage points) **of a change in energy costs on the performance of firms investing in energy efficiency vs. those that did not invest**



Source: *EIB staff calculations based on Orbis.*

Note: *The chart shows the difference in marginal effects on financial outcomes between firms that invested in energy efficiency and those that did not, across two energy cost levels in output: low (1%) and high (10%). It illustrates the interaction between energy cost share and energy efficiency investment. The impact depends on the change in percentage points of the energy cost share. Marginal effects are estimated using panel regressions for 2000 to 2023, controlling for lagged financial outcomes, firm, year and size fixed effects. The lines represent 90% confidence intervals.*

Addressing clean investment challenges remains key

Clean energy investment must be scaled up substantially to keep Europe's transition on track. Estimates from the European Commission suggest that around €1.24 trillion of sustainable investment will be required every year until 2030 – about 7.8% of EU GDP.[8] Other sources – including the IEA, BloombergNEF and I4CE – place annual needs somewhat lower, from €800 billion to €1 trillion. Despite methodological differences, all assessments point to the need for a very significant scale-up of investment compared with historical spending.[9] Mobilising public and private finance quickly and efficiently therefore remains a central task for policymakers and industry, as underinvestment in Europe's energy infrastructure has a direct impact on the energy bills of Europeans (European Commission, 2025a).

Public funding has expanded significantly, but many instruments are temporary. The NextGenerationEU package and the REPowerEU plan channelled substantial resources to climate and energy priorities. Worth €723.8 billion for 2021-2026, the Recovery and Resilience Facility has been a major driver of green investment in many EU countries, as at least 37% of its volume must support climate measures. However, the scheduled end of the facility in 2026 will gradually remove a significant source of EU-level support just as clean investment needs continue to build. National governments have reinforced their own programmes as well as subsidies for home renovation, electric mobility and renewables, but this may not fully replace the scale of Recovery and Resilience Facility funding.

8 These investment needs are large but manageable. They are comparable to historic investment waves and are supported by falling financing costs for low-risk grid assets and strong private appetite for green infrastructure when risks are shared.

9 For more details see massive investment needs to meet EU green and digital targets, see European Central Bank.

European public financial institutions act as catalysts, de-risking projects and crowding in private capital. By deploying grants, concessional loans and guarantees on a massive scale, the public sector incentivises the financing of green projects. For example, an EIB loan or an EU guarantee for a renewable energy park can improve the risk-return profile for other investors, attracting commercial banks or developers who might otherwise find it too risky or not profitable enough. To crowd in private investors, the EIB has also scaled up its financing offer, increasing its energy-related lending from around €10 billion in 2019 to over €31 billion in 2024 (EIB, 2025f). This rapid increase reflects the EIB Climate Bank Roadmap and the REPowerEU+ programme, under which the EIB pledged to mobilise an additional €45 billion by 2027 for clean energy, aiming to mobilise over €150 billion in new green investment.[10]

Market incentives and regulatory standards have played an important role in maintaining the momentum of green investment. Carbon pricing increases the cost of high-emission activities, while stricter rules on vehicle emissions and energy efficiency requirements for buildings and appliances have stimulated demand for cleaner technologies. Governments also have supported investment through tax measures, feed-in tariffs and long-term contracts that reduce revenue risks. Competitive renewable energy auctions have provided clarity on prices and attracted a wide range of private sector players. These tools have helped align capital flows with Europe's climate objectives.

To leverage public budgets more effectively, instruments that blend different forms of finance and public-private partnerships are becoming crucial for attracting the large sums of investment needed.[11] EU guarantees or mechanisms to limit investor losses reduce risks and make projects bankable. Programmes such as InvestEU use EU resources to attract financing from commercial and development banks, while green banks and climate funds perform a similar function at a national level. By sharing policy or demand risks, these mechanisms broaden the pool of investors willing to support clean energy projects.

The next phase of the transition will require financing models that address high upfront costs while allowing firms and households to benefit from long-term energy savings. Innovative service-based models, such as energy-as-a-service contracts, energy service company schemes, pay-as-you-go models and leasing schemes for transport help households and firms spread costs over time. These structures reduce upfront spending and convert investment needs into manageable service payments. These models will play a larger role in supporting low-carbon technologies as public subsidies become more targeted and the private sector looks for ways to rapidly increase investment.

Energy service companies have already demonstrated their value in encouraging energy efficiency investments. They design, finance and implement projects – such as lighting upgrades or heating, ventilation, and air conditioning modernisation – without upfront cost for clients, recovering expenses through future energy savings. In 2023, energy service companies mobilised around $2 billion of new energy efficiency investment in Europe, led by Spain and Germany (United Nations Environment Programme Copenhagen Climate Centre and International Energy Agency, 2025). Public buildings account for most activity, although mature markets like Germany and Italy show strong potential. In several EU countries, white certificate schemes[12] are also helping to push the energy service company model by creating a stable demand for certified energy saving projects and by giving these companies an additional revenue stream. With improved regulatory frameworks and financial tools, these kinds of companies could help Europe cut its energy use significantly.

10 Some specific examples of EIB operations are reported in Box C.

11 Examples include the NeuConnect interconnector between Germany and the Netherlands (€381 million), which strengthens cross-border electricity flows; the Uzbekistan solar photovoltaic auction, which used a public-private partnership model to mobilise private investment for utility-scale solar energy (€140 million); and the Olsztyn waste-to-energy public-private partnership in Poland, which delivers renewable heat and power (€44 million).

12 White certificates are official documents that confirm a verified amount of energy savings from efficiency measures. They can be traded and are used by companies to meet energy-saving obligations.

Energy-as-a-service models are also expanding. The European market generated about $20 billion in revenue in 2024 (nearly 27% of the global total) and is projected to reach $36 billion by 2030 (Grand View Research, 2025). Services for efficiency and optimisation form the largest segment, supported by EU directives and innovation programmes. Leasing and subscription-based approaches are also advancing in mobility and household technologies, including fleet leasing of electric vehicles and emerging battery-as-a-service models that enable consumers to effectively rent charged batteries.

Pay-as-you-go energy schemes are also catching on in Europe, which is supporting investment and innovation. The pay-as-you-go format is most common in emerging markets and is not widely used within Europe. However, similar models are gaining traction in the form of leasing and subscription services for electric vehicles and home energy technologies, such as roof-top panels, heat pumps energy-efficient technologies, just to name a few. For example, over 80% of new electric vehicles purchased in the United Kingdom in early 2024 were acquired via fleet or leasing arrangements, effectively functioning as a pay-as-you-go service (Reuters, 2024). Battery-as-a-service and appliance leasing schemes are also emerging to reduce upfront costs for consumers. These models reflect a broader trend towards service-based access to clean technologies, aligning with Europe's goals for affordability, decarbonisation and inclusive energy transitions.

Building on these innovative financing models, the EIB Group and the European Commission have also developed pan-European tools that help manufacturers and smaller players to access finance and reduce investment risks. Separate packages to support wind power and to upgrade grids provide ways to de-risk investment in grid and wind equipment and manufacturing. They offer financial intermediaries counter-guarantees on advance payments and performance bonds associated with supply contracts for manufacturers' equipment. The EIB Group has also designed a scheme for power purchase agreements, providing guarantees that help companies secure long-term contracts with renewable energy suppliers. These measures strengthen confidence across the value chain and help accelerate clean energy deployment.

Box C

EIB support for green investment in the European Union

This box describes how the EIB Group supported the EU climate and environmental goals in 2025 by focusing on energy networks, clean energy and the wider shift towards a lower carbon economy. Europe continued to strengthen its response to climate change and push forward the green transition. The EIB Group helped move many of these efforts forward.

In 2025, the EIB Group provided €57 billion for green investment, representing 57% of its total financing. In total, the Group supported about €190 billion of green investment. Since 2021, it has supported roughly €740 billion of green investment, moving closer to the EU target of mobilising €1 trillion by 2030. These figures reflect the Group's role in supporting Europe's climate goals and its efforts to build a more resilient and independent energy system. Across the 27 EU members, EIB Group financing expanded renewable energy, improved energy efficiency, upgraded energy networks and supported cleaner industrial activity.

The Group invested €33 billion in clean and affordable power, helping mobilise around €108 billion for Europe's energy transition. This financing supported the modernisation of electricity grids, the development of solar and wind projects, improved district heating networks, and investment in interconnectors and guarantees for the wind power sector. Support for networks and storage reached €11.6 billion, contributing to electricity security measures across the European Union. These investments are expected to help construct or upgrade about 56 600 km of power lines, including the Bay of Biscay interconnector between France and the Iberian Peninsula, underwater connections in Italy and upgrades to local grids in Germany.

Renewable energy financing reached €9.8 billion and is expected to deliver around 19 440 MW of new electricity generation capacity, enough to power about 18 million homes. Energy efficiency investment totalled €7.9 billion, supporting improvements in buildings, industry and public services. The EIB also invested €5 billion in water projects that improve drinking water, sanitation and climate resilience measures for an estimated 32 million people.

Throughout 2025, the EIB supported a broad range of energy and climate related projects. This included grid and interconnector projects such as the electricity link between France and Spain, as well as offshore transmission infrastructure to support renewable energy. The Group also financed wind power investment in Poland and contributed to strengthening solar manufacturing in Europe. Support for clean industry continued, helping companies reduce emissions and implement technologies that enable them to decarbonise.

Cities across Europe also received support. Investments in electrified public transport in Romania and in the modernisation of district heating systems helped communities transition to more efficient and sustainable energy sources.

Under the second phase of the Climate Bank Roadmap, the Group will expand its support for industrial decarbonisation, renewable energy, nature-based solutions and electricity grids. The Energy Sector Orientation will continue to guide investment decisions for renewable energy, storage and energy efficiency. The Group will also continue supporting sustainable cities, circular economy initiatives, climate resilient infrastructure, water and sanitation, biodiversity, and green and climate adaptation projects beyond Europe through its development arm, EIB Global.

Europe's cleantech opportunities and dependencies

The global market for cleantech has grown rapidly in recent years, driven by strong demand and supportive policies and regulatory frameworks. Europe has been a frontrunner, taking advantage of its large internal market and well-developed manufacturing capacities. However, China has gradually taken the lead in many cleantech segments, particularly in solar panel and battery manufacturing. Its export-led growth model has been backed by substantial policy support, which has also contributed to the swift adoption of these technologies domestically. To remain a cleantech frontrunner, Europe needs to focus on cutting-edge innovation and on strategies to manage its dependency on foreign suppliers.

This section starts by outlining global cleantech expansion, then analyses cleantech manufacturing segments. It identifies opportunities and challenges of further consolidation for EU manufacturers, and the need to investment in innovation to bring cutting-edge technologies closer to market. Finally, the section reviews technologies that are heavily dependent on global suppliers, looking at technology components and raw materials.

Global expansion of the cleantech sector

Clean technologies are the backbone of the green transition, enabling decarbonisation and industrial competitiveness. They include renewable energy systems, energy storage, batteries, carbon capture and storage and other solutions (including green hydrogen and sustainable fuels) that decarbonise production and consumption while fostering industrial competitiveness and strategic autonomy.

Global demand for clean energy solutions is surging, driving rapid growth in EU renewable capacity and cleantech manufacturing. The deployment of renewable energy is driving industrial transformations worldwide. Global renewable power capacity grew 75% since 2019, driven by China, which accounts for 56% of total increases in installed capacity (Figure 22). EU installed power capacity rose 25% over the last decade, with a notable acceleration in the last five years. That increase is largely due to the uptake of solar photovoltaic installations, where installed capacity has increased 23% a year since 2020.

Cleantech manufacturing is emerging as a major source of activity and value creation and is progressively transforming global manufacturing. Clean energy sectors contributed over 10% of Chinese GDP in 2024, a massive industrial footprint (Myllyvirta et al., 2025). For the European Union, cleantech currently accounts for only a few percentage points of manufacturing output in most technologies, though policy targets set by the Net-Zero Industry Act aim to raise domestic production to 40% of deployment needs by 2030.

Electric mobility is progressing quickly around the world, boosting advancements in battery innovation. Global sales of electric vehicles have grown more than eightfold since 2019. A true electric vehicle revolution is unfolding in China, based on high-performing vehicles sold at competitive prices, often below that of cars with internal combustion engines. Every second car sold in China is now full electric, with China alone representing two-thirds of global electric vehicle sales (IEA, 2025d). The electrification of personal mobility is also underway in the European Union, with almost 1.5 million electric vehicles registered in 2024 (an increase of 18% annually since 2021) and dynamic sales in plug-in hybrid vehicles (Figure 22).

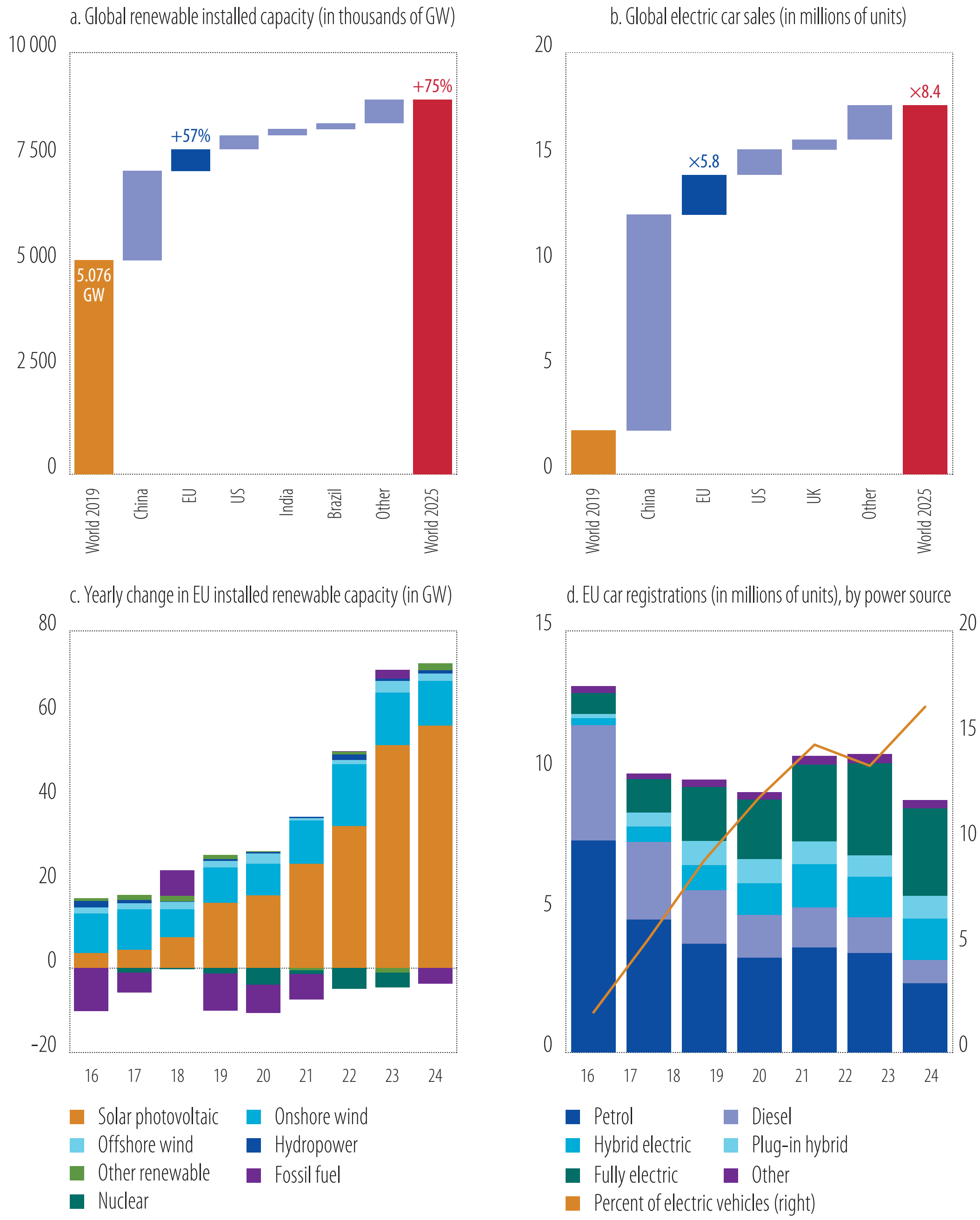
Nonetheless, an EU ban on internal combustion engines has been postponed, granting more time for the domestic industry to adapt to new competition and for electric vehicle adoption and charging infrastructure to grow.[13] Battery storage and smart grids are being deployed rapidly across the European Union, and benefit from robust policy frameworks. In the United States, the Inflation Reduction Act's tax credits for electric vehicles also pushed up sales (up 50% in 2023 alone), supported by sizeable investments in domestic manufacturing. Electric vehicle uptake slowed after the stimulus package was rolled back in early 2025. The market has also been hit by evolving US tariff policies.

With sales of €120 billion in 2024, cleantech production represents a growing share of EU manufacturing activity. The sales of major clean technologies manufactured in Europe are largely driven by increasing demand for electric vehicles – which accounted for half of all domestic cleantech production in 2024 – alongside significant contributions from car batteries and wind turbine manufacturing (Figure 23). Electric and plug-in hybrid vehicles make up two-thirds of total cleantech output. Although less significant in overall value terms, the development of heat pumps is also contributing to the EU cleantech sector.

European production of cleantech goods is largely driven by internal demand, but exports beyond the European Union are also rising. The value of cleantech exports leaving the European Union (including the full range of low-carbon power sources and electric vehicle charging stations) rose to €83 billion in 2024. When combined with batteries, imports and exports of electric vehicles and plug-in hybrid vehicles account for over one-third (€44 billion to €47 billion) of the value of cleantech products sold domestically (Figure 23). The contribution of other clean technologies (wind turbines, solar panels, heat pumps and electrolysers) to overall exports is less significant, as the bulk of EU production addresses domestic needs.

13 New conditions were introduced including a 90% carbon reduction target by 2035; offsets via low-carbon steel and synthetic fuels; extra credits for small electric vehicles; eased interim targets; corporate fleet requirements; and financial support for battery production.

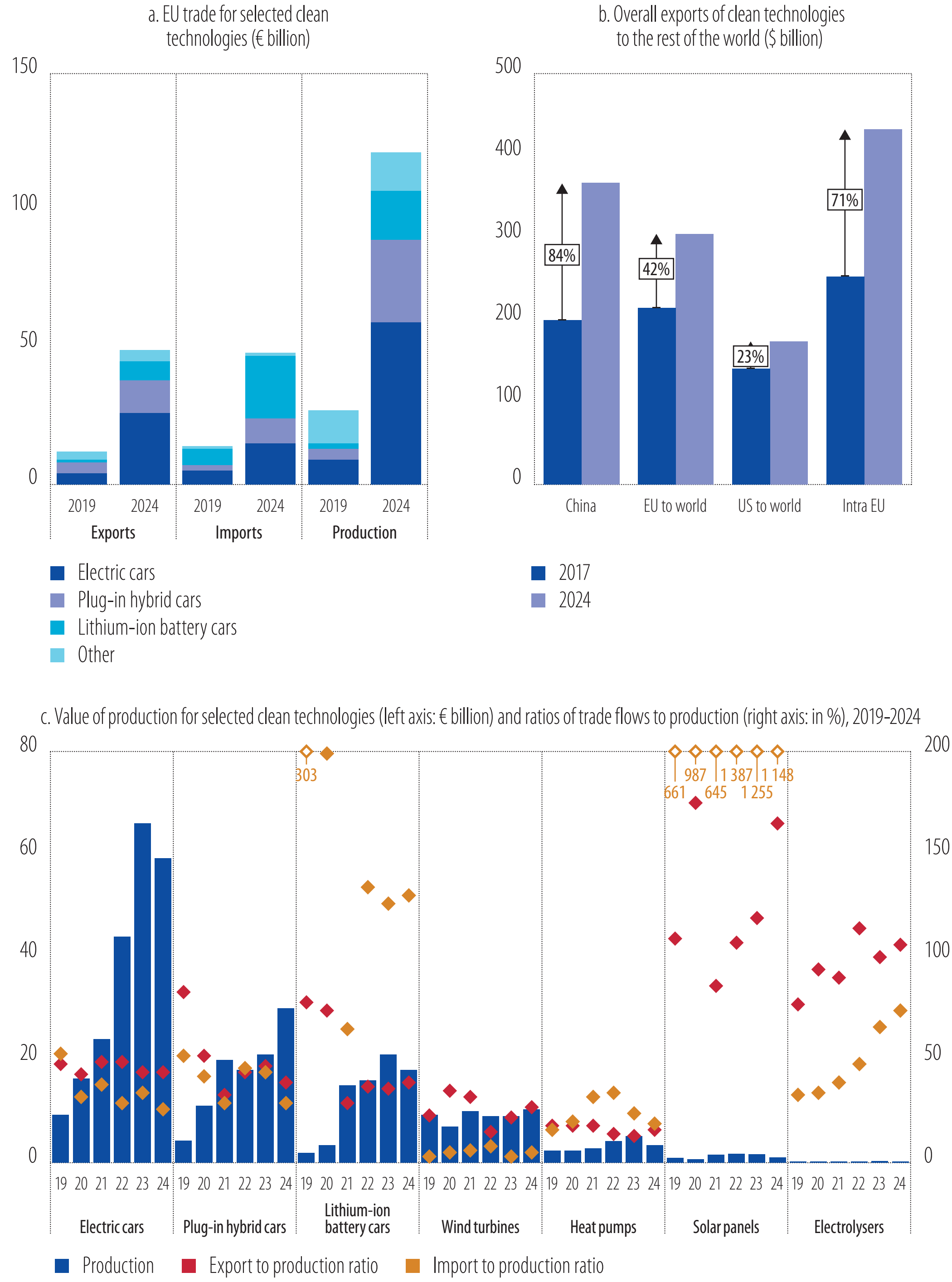
Figure 22
Deployment of renewable energy and electric vehicles



Source: *EIB staff calculations based on Eurostat, IEA, International Renewable Energy Agency, European Automobile Manufacturers Association.*
Note: *Electric vehicle sales until October 2025.*

Figure 23

EU manufacturing of clean technologies and integration within global value chains



Source: *EIB staff calculations based on Comtrade (global trade flows) and Prodcom database (EU production and trade flows).*
Note: *2025 sales until October. Panel b uses the extended list of cleantech production, according to the classification by the International Monetary Fund. For this analysis, beyond EU trade and EU domestic production are restricted to electric cars, plug-in hybrid vehicles (despite debates their round carbon footprint) and lithium-ion batteries, as well as wind turbines, solar panels, heat pumps and electrolysers. Average production value for 2019 to 2024. Export to production ratios may be above 100% due to re-exports without substantial transformation and the temporary impact of inventory management, among other factors.*

The EU automotive sector has driven cleantech deployment, but Europe remains dependent on batteries produced in other countries. Despite tangible transformations observed among EU carmakers – power operators and automotive industries draw the largest shares of investments (EU Platform on Sustainable Finance, 2025; Morningstar Sustainalytics, 2025) – electric mobility is being hindered by a widening trade deficit in battery supplies, which reached €20 billion in 2025. Domestic production for key components remains insufficient. The European Commission's Automotive Action Plan and the €1.8 billion Battery Booster package aim to address these challenges by accelerating clean mobility, digital innovation and supply chain resilience. At the same time, some large EU automotive companies have been building strategic partnerships with Chinese battery producers, often involving joint ventures.

For wind power, EU turbine manufacturers are well established globally. Geothermal technologies are thriving abroad due to robust policies in Asia, Africa and Latin America. However, they face sluggish domestic uptake in the European Union, hampered by fragmented policies and limited incentives. The heat pump sector, initially buoyed by supportive EU policies, has recently faltered due to withdrawn incentives and high electricity prices, threatening ambitious EU deployment targets. Meanwhile, the solar industry is still dominated by Chinese imports, with the European Union stockpiling panels as installation lags behind imports. Right now, the domestic supply chain is limited mainly to inverters.[14] Electrolyser manufacturing remains at an early stage with small-scale production and trade volumes, hindered by low demand for hydrogen.

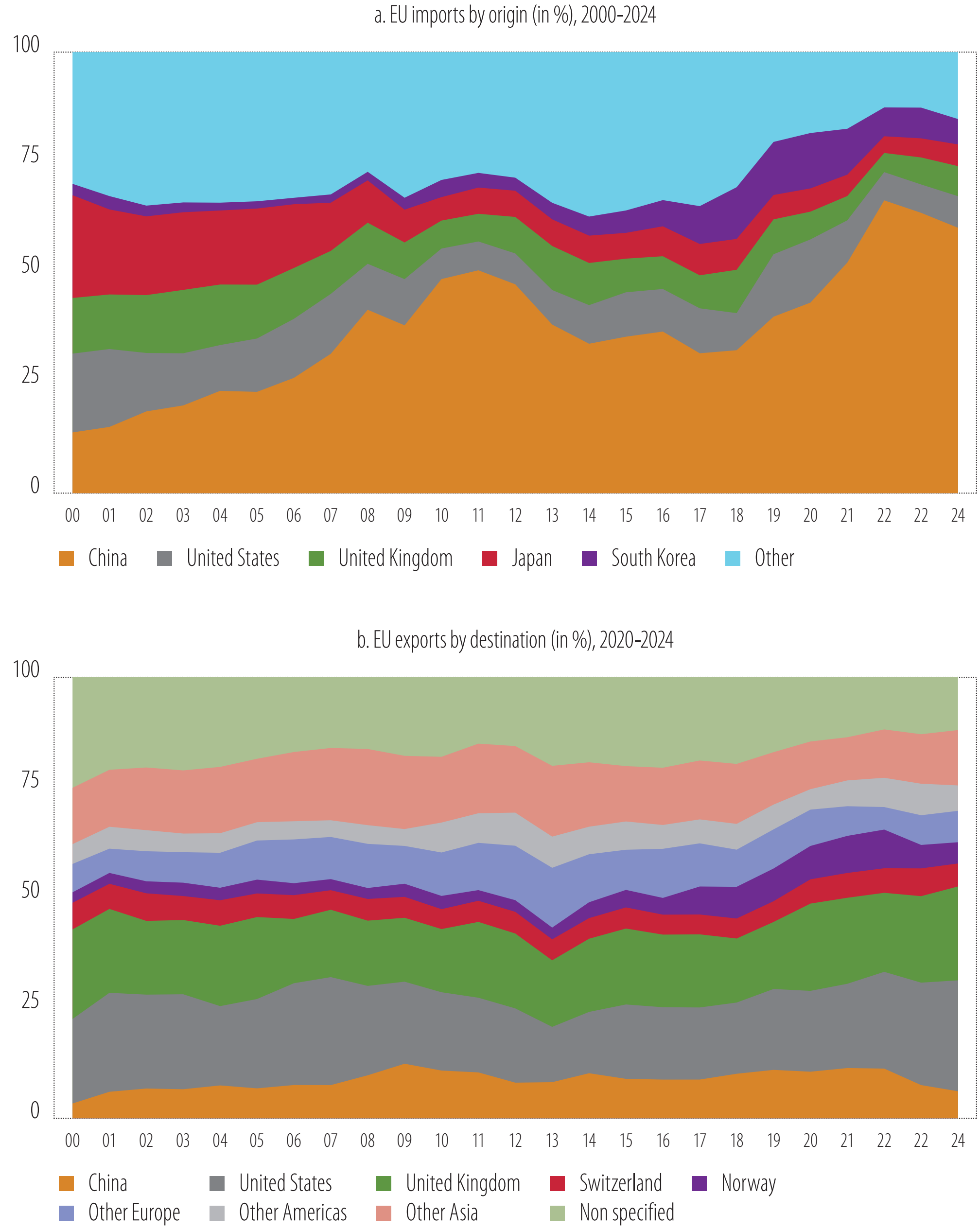
Despite the rapid expansion of EU exports, China remains the most competitive player in global markets. Cleantech goods generally have a high degree of technological complexity and are typically exported by countries with higher average per capita income. Looking at an extended list of low-carbon and environmental goods – referred to as cleantech goods – gives a better sense of their growing role in global value chains.[15] From 2017 to 2024, the value of EU cleantech exports grew 42% in nominal terms, half of China's growth rate and twice the level of US exports. Trade within the European Union grew substantially (up 71%), pointing to stronger supply chains from within the European Union (Figure 24).

China dominates on cleantech imports, providing almost two-thirds of EU needs, but domestic manufacturers are well positioned on global markets. Europe's acceleration of the green transition over the last decade has been supported largely by Chinese supplies, as only a handful of non-Chinese suppliers can meet EU import needs. Imports are largely concentrated from the United States, United Kingdom, Japan and South Korea. The global demand for EU cleantech products is robust, with a more diversified reach. In addition to the European Union itself, the main trading partners are EU neighbouring countries, which account for almost 40% of cleantech exports leaving the European Union. China is a harder market to crack. Its large manufacturing base is sufficient to meet domestic needs, leaving few opportunities for EU imports.

14 An inverter is a critical component of a solar panel converting the direct current produced by solar panels into alternating current, which is the form of electricity used in homes and on the power grid.

15 About 240 products according to the Harmonized System six-digit nomenclature. This analysis focuses on the export side of international trade, not to neglect the importance of global value chain analysis (on the contrary, all the underlying concepts of know-how implicit in global value chain literature are key), but rather because the goal here is to capture information available only at a very detailed level of product disaggregation.

Figure 24
Clean technologies trade beyond the European Union



Source: *EIB staff calculations based on Bruegel Clean Tech Tracker.*

How to grow the EU cleantech sector

A detailed look at global supply chains provides insight on how to grow cleantech in the European Union. There are clear differences between developing a product and assembling the final version. Examining cleantech components, for example, in addition to the final products gives a clearer view of how European manufacturers are positioned in global supply chains. By taking this more detailed evidence into consideration, the European Union could focus its industrial policy on technologies with stronger economic prospects, speed up the climate transition and improve its resilience and strategic autonomy.

This section delves into the following clean products and technologies: electric cars, batteries, windmills, heat pumps, solar panels and electrolysers. The competitiveness of these products on international markets is then explored, as is the existing supply chains for these clean technologies.

Cleantech goods are difficult to map, although they are often organised in tightly connected clusters. Cleantech goods cannot easily be mapped with NACE[16] sector or Harmonized System section classifications as they cover several areas. An AI-generated production network (AIPNET) can be used to delineate and analyse cleantech supply chains, mapping global production links among products to trace the supply chains of cleantech goods.[17] Cleantech goods tend to have deeper or longer production networks. This is reflected in intense cross-border interdependencies for supplies (Box D).

The supply chains of cleantech goods are more complex and need to be more interconnected. This complexity reflects ways cleantech supplies interlink. This network of connections is, on average, denser than that of other categories of goods. This implies that the average number of supplies, or inputs, required to produce a cleantech good is higher than for most other products.

Cleantech goods often contain similar components. Product networks can provide information about how similar cleantech products are. Two products are considered to be similar when they share a larger number of inputs.[18] We can isolate clusters of similar goods by constructing a proximity matrix that covers products pairs across more than 5 000 six-digit goods in the Harmonized System. Goods that serve a particular sector form specific group, as expected (products within the same NACE section naturally show proximity), but cleantech goods stand out as particularly cohesive. On average, pairs of cleantech products exhibit significantly higher proximity values than the overall product set.[19]

Box D

A deeper look at the fragmentation of cleantech supply chains

If Europe wishes to retain its leading position in cleantech manufacturing over the long term, and secure its sourcing of raw materials, it must monitor the depth and the degree of fragmentation in cleantech supply chains and identify potential problems. More fragmented supply chains optimise sourcing and reduce the risk of disruption.

The box explores the interconnected nature and geographical spread of firms participating in the global supply chain of three important cleantech products: electric vehicles, wind turbines and solar panels. The analysis draws on the FactSet database detailing global supply chains for a given good through disclosures of contractual relationships between companies. The upstream analysis identifies firms supplying components to cleantech producers, while the downstream analysis identifies companies purchasing finished products. The supply chains for these three goods are compared for the European Union, United States and China (Figure D.1).

16 Nomenclature of Economic Activities (NACE) is the European statistical classification of economic activities.

17 See Brasili and Magnini (2025) for technical details. AIPNET stands for AI-generated production network by (Fetzer et al., 2024). AIPNET operates at a highly detailed level (Harmonized System six-digit, covering over 5 000 products) and generates an approximated input network for each product.

18 The measure of proximity between two goods is the number of inputs they share (the numerator in the above ratio), normalised for the maximum number of inputs entering the production of the two goods.

19 Specifically, for all products, the mean and median proximity are 0.02 and 0, respectively (0.11 and 0.04 when excluding zero values). For cleantech goods, the corresponding figures are 0.07 and 0.01 (0.13 and 0.06 when excluding zeros).

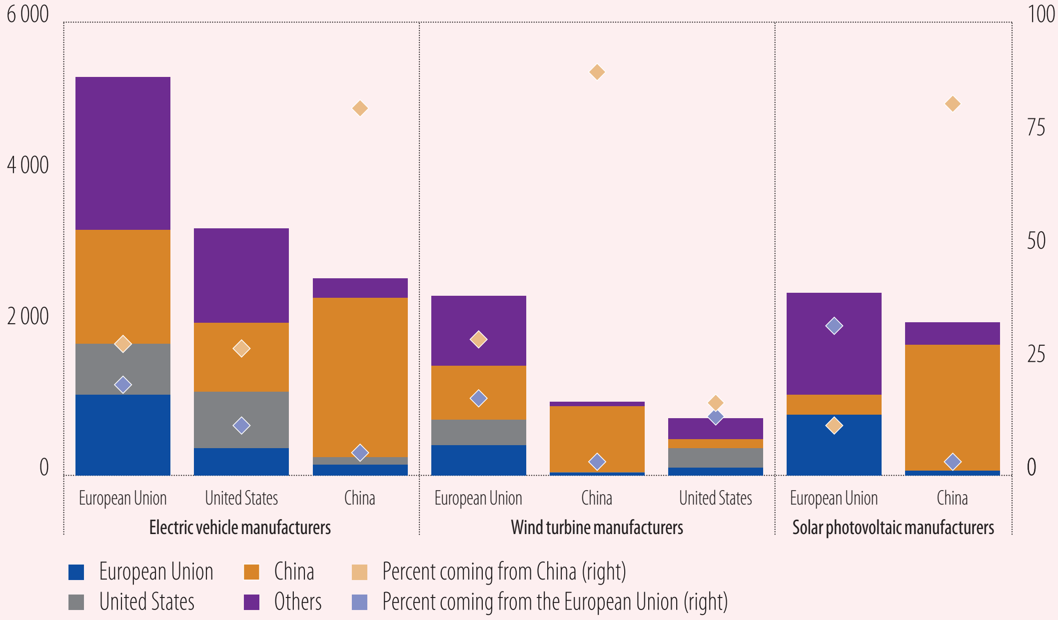
The European Union has the most geographically dispersed supply chain for electric vehicles, with 5 300 contractual agreements between EU manufacturers and their suppliers. Chinese contractors represent 29% of upstream relationships, while EU suppliers account for 20%. The US supply chain for electric vehicles is structured in a similar way, with comparable contributions from Chinese and American contractors. Chinese manufacturers rely on domestic suppliers for over 80% of their needs, with insignificant contributions from European and US firms (3% to 5%), showing a strongly integrated supply chain.

EU wind turbine supply chains are more concentrated than those for electric vehicles, with about 2 400 relationships. However, China accounts for 17% of upstream contracts for EU producers and dominates the top supplier list. EU producers often rely on domestic suppliers for final assembly, but vulnerabilities may emerge further upstream, especially for critical raw material supplies.

Solar panel manufacturing is much more concentrated, with 19 Chinese firms among the top 20 global suppliers to final producers. By contrast, 82% of upstream contracts for Chinese producers involve Chinese suppliers. With its more modest production capacities, the European Union depends on Chinese suppliers for 11% of its upstream contracts.

Figure D.1

Reliance on direct suppliers (left axis: number of contracts; right axis: % of supplies), **by company location**



Source: *EIB Staff calculations based on FACTSET Supply Chain database.*
Note: *The analysis is based on bilateral contract descriptions from 2020 to 2025. The relationship between cleantech manufacturers and their direct upstream suppliers is determined by examining contracts signed by the relevant companies during this period.*

Drawing on the product analysis, the relationship between knowledge and production capabilities in different countries becomes apparent and international trade patterns can be determined. The analysis measures the two features discussed above – links with suppliers and degrees of similarity – for all Harmonized System six-digit goods related to a well-established indicator of trade specialisation, the revealed comparative advantage.[20] A country is specialised in a particular good if its market share is above the global average (its revealed comparative advantage value is above 1). Revealed comparative advantage measures are not fixed, and rather evolve with investment, the accumulation and recombination of existing capabilities and newly acquired skills.[21]

Europe has comparative advantages and strong specialisation in certain areas but also lacks manufacturing in critical components such as batteries and solar panels. Figure 25 depicts the estimated revealed comparative advantages for the five major cleantech goods for which 55 subproducts are required. The European Union exhibits a high degree of (relative) competitiveness in many cases, with revealed comparative advantages exceeding 1 for 29 out of the 55 cleantech goods (this compares with 34 for China and 14 for the United States). Revealed comparative advantage measures are the lowest (well below 1) for some important products and technologies, such as solar panels and car batteries.[22] The European Union also relies largely on external supplies for some key components such as inverters, anode and cathode subcomponents for solar panels, separator films for batteries, or permanent magnets for wind turbines. EU manufacturers' lack of competitiveness translates into unfavourable net trade balances, which in the case of battery packs reached €20 billion in June 2025.[23]

Scaling and diversifying production would help European companies better exploit similar capabilities. Traditional metrics like revealed comparative advantage only show current strengths and areas of specialisation, not future opportunities. Two additional indicators can be used to illustrate Europe's ability to scale and diversify its production of cleantech goods. The analysis relates the revealed comparative advantage calculated for each good considered to two indicators, with a view to investigating development potential. These indicators proxy the ability to competitively produce inputs for a good or similar goods. The first indicator, the vertical potential, is the fraction of inputs of a competitively produced product (for which the country revealed comparative advantage is larger than 1), capturing the ability to scale up within existing technological pathways. The second indicator, the horizontal potential, is calculated as the number of similar products produced competitively, capturing the capacity to branch into related technologies.

Europe can leverage its existing know-how and expand its competitiveness in related technologies, but it needs to focus on innovation. Overall, Europe has room to grow exports in areas with higher vertical and horizontal potential.[24] The higher the starting point, the higher the probability of transitioning to revealed comparative advantage values above 1 in subsequent years (to increase exports of a given product). Products that start with a score for potential close to 0 have a cumulative probability to develop a competitive advantage of around 6% to 7%. This could be seen as the baseline scenario or the time trend, where randomness over the years pushes products to have revealed comparative advantages over 1, but this probability increases notably for higher values of potential (horizontal and vertical).

The European Union is underspecialised in several areas of cleantech, which represent opportunities for growth. Figure 26 summarises vertical and horizontal potential for selected cleantech products and their components in relation to their revealed comparative advantages. It shows that the European

20 A country j is considered specialised in exporting a specific good i when its share of world exports of that good exceeds its overall share of world exports across all goods. This does not necessarily imply that country j produces good i at the highest quality or lowest cost, but rather that, relative to its other exports, good i is produced more efficiently.

21 As discussed in the EIB Investment Report 2024/2025 (EIB, 2025g), the ability to shift into new technological paradigms and to acquire new production capabilities and knowledge is central to reshaping global specialisation patterns.

22 Having a revealed comparative advantage greater than 1 does not mean that the product is not exposed to potentially growing competitive pressures from other countries. This is the case for wind turbines, where the European Union maintains a very high export share, but with Chinese producers challenging this advantage.

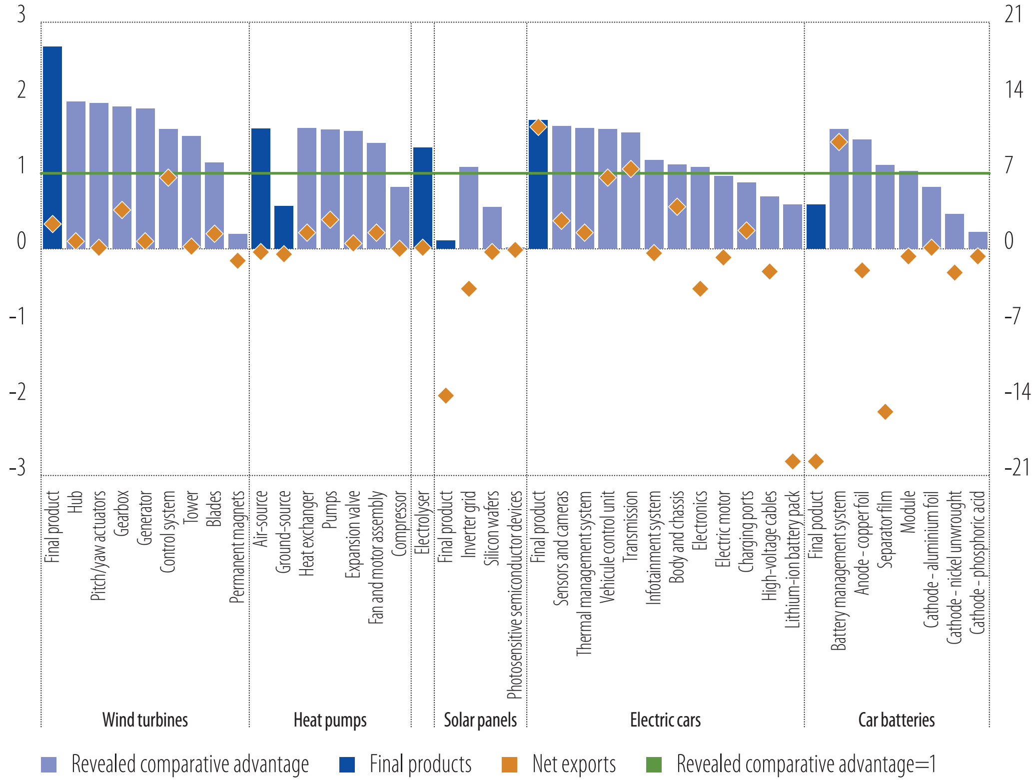
23 A separator film is critical component of car batteries, separating anode and cathode to prevent short circuits, while letting ions pass through for the battery to work.

24 See Brasili and Magnini (2025) for more details.

Union could develop these areas more. This is confirmed when comparing EU potential indicators with the median values for the 20 largest world exporters and the United States (not shown). The outlook becomes more positive the more downstream a good is in the supply chain. Horizontal potential stands out as structurally high in Europe, suggesting that the European Union's know-how could be used to improve its competitiveness of related cleantech products, including for components with insufficient comparative advantages, such as battery parts or solar cells.

Figure 25

EU revealed comparative advantages for selected cleantech products and their components (left axis: index, 2023 baseline) **and net exports beyond the European Union** (right axis; € billion)



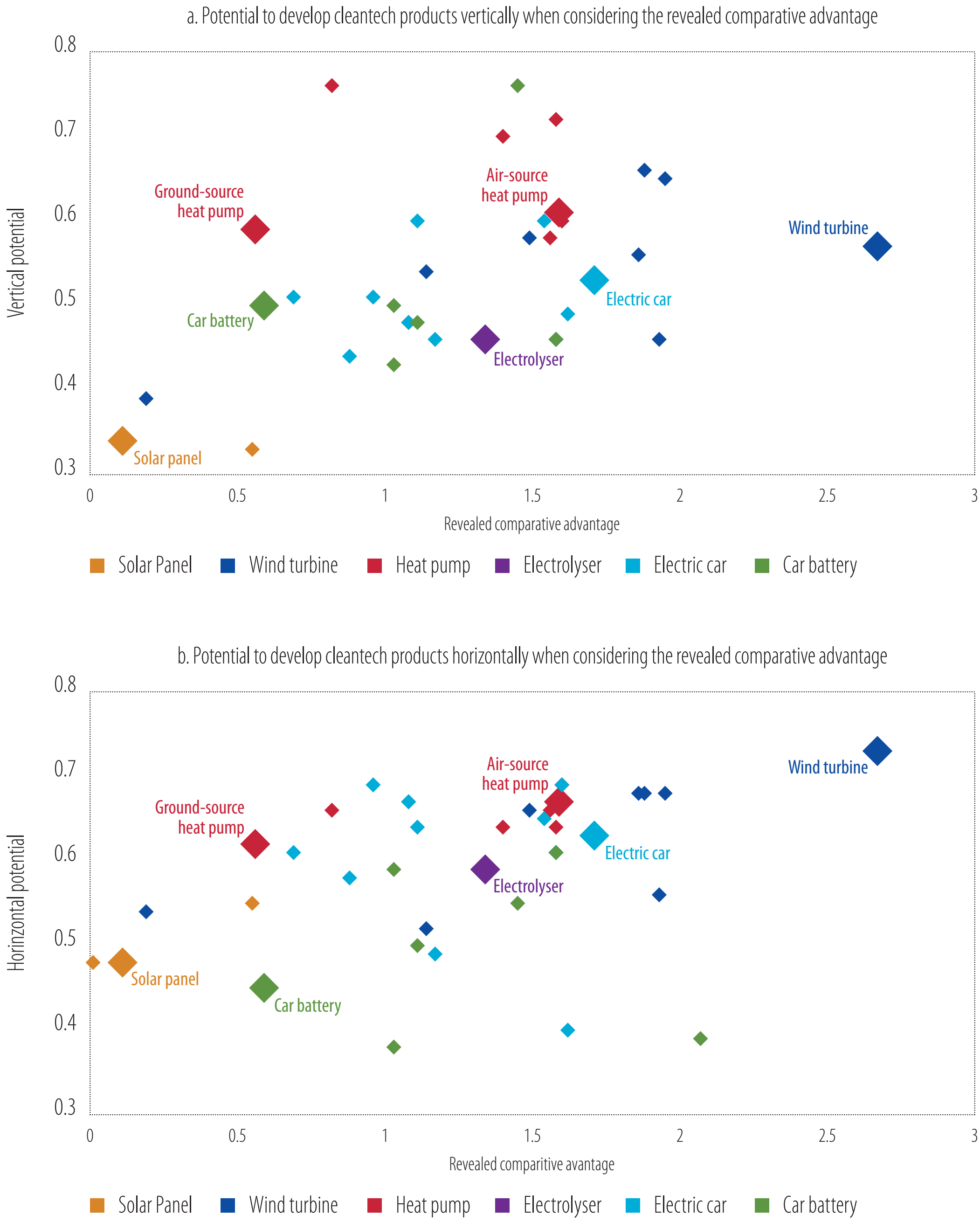
Source: *EIB staff calculations based on Comtrade with 2023 data.*
Note: *Blue bars indicate final products. Products listed to the immediate right represent main components.*

In addition to its industrial capabilities, Europe also needs to support innovative cleantech companies and aid technology transfer. While the European Union shows some strength in selected cleantech technologies, the gap with competitors in the design of other cutting-edge technologies is widening. Data on EU business dynamism – including research and development activity and the capacity of cleantech firms to raise capital – are important indicators of companies' ability to attract investors and end-users, tap into their knowledge and turn latent development potential into marketable and profitable solutions. Mixing this information with data on activities for which Europe has vertical and horizontal potential reveals some areas that can be developed.

To explore these areas, we propose a case study focusing on four products. All four currently have a revealed comparative advantage below 1 but demonstrate relatively high latent horizontal and vertical potential. The products selected are electric batteries, electric motors, charging devices and related components, and silicon wafers. The first three belong to the broader electric vehicle value chain, while silicon wafers are a critical input for photovoltaic manufacturing. By using a keyword-based classification system supported by AI tools, we identified both EU-based and global companies active in each sector. We then used the Pitchbook database to extract information on deal values and deal counts associated with these firms, implying any form of action within the scope of raising equity (mergers and acquisitions, venture capital deals or initial public offerings). The aggregate size of deals from 2020 to 2024 helps distinguish the relative importance of each market, with batteries accounting for approximately $246 billion globally, electric vehicle motors for $42 billion, charging components for $84 billion and silicon wafers for around $6 billion.

Figure 26

Horizontal and vertical potential (index)**, by clean technology**

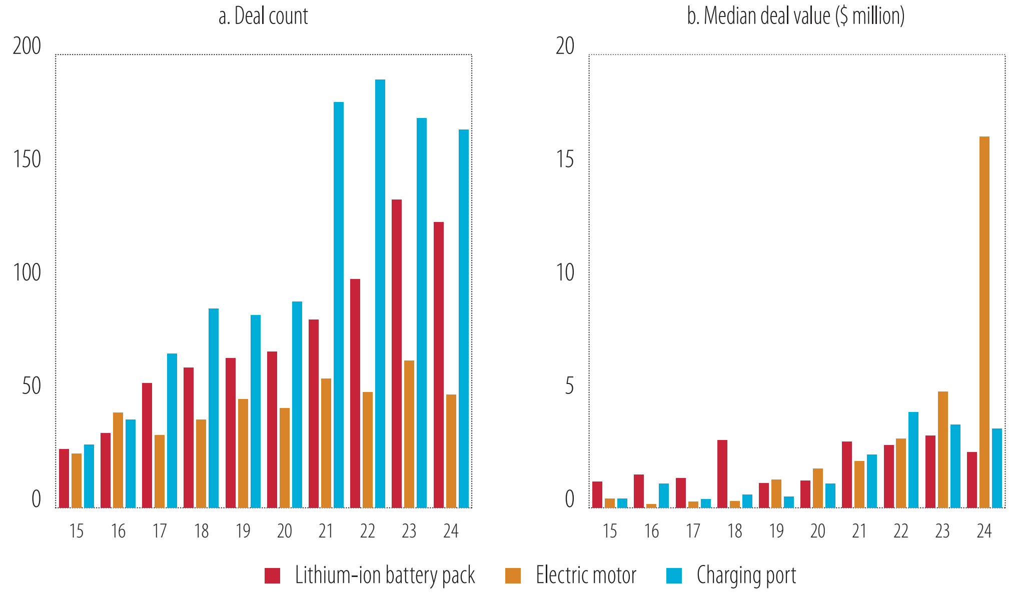


Source: *EIB staff calculations based on Comtrade.*
Note: *Big diamonds indicate final products, while small diamonds designate some of their key components.*

In Europe, deals have increased for electric vehicle batteries and motors, remained stable for charging equipment and declined for solar panel components like silicon wafers. For batteries and motors – key components of electric vehicles – there is evidence of a growing number of deals. While the competitive advantage of Chinese producers in lithium-Ion batteries is difficult to challenge, companies are researching how to produce more efficient batteries. Charging equipment and cables have a more stable pattern. Finally, the dynamics observed for the main components of products in the solar panel supply chain – such as photovoltaic cells and silicon wafers – point to a decline in business dynamism. EU entrepreneurs consider solar panels to be a mature technology, with little business upside potential at this stage. Other areas show the potential of combining strong investment in innovation with existing capabilities to improve future competitiveness or carve out promising niches.

Figure 27

Capital investment supporting EU innovation in selected electric vehicles components, 2015-2024



Source: *EIB staff calculations based on Pitchbook database.*
Note: *Pitchbook database covers initial public offerings, mergers and acquisitions and venture capital transactions. A keyword-based classification system, supported by AI tools, was used to identify both EU-based and global companies active in each product.*

Public policies can help develop the cleantech sector by providing steady demand that pushes companies to expand their knowledge and competencies. Public-sector demand or challenging requests from key customers (such as big utilities) could encourage cleantech companies to acquire the technical knowledge and skills needed to grow their business. Strategic procurement, aligned with Europe's climate ambitions, is a powerful instrument that is increasingly being used. Cutting-edge innovation is moving so quickly that building knowledge and expanding specific skills is of paramount importance.

Europe can strengthen its cleantech industry by encouraging investment in regional hubs and by helping small and medium firms play a bigger role. Anchor projects backed by foreign direct investment can help transfer technology and stimulate innovation at small and medium firms. Targeted finance and efforts to help these firms expand their capabilities would make them more attractive to cleantech manufacturers (Organisation for Economic Co-operation and Development (OECD), 2025). EU firms that recalibrate their supply chains by diversifying the companies they work with and by introducing digital tracking for inventories are more resilient to trade shocks (EIB, 2025c). Combining these approaches can transform Europe's industrial base into a competitive cleantech sector.

Sustaining investment in innovation

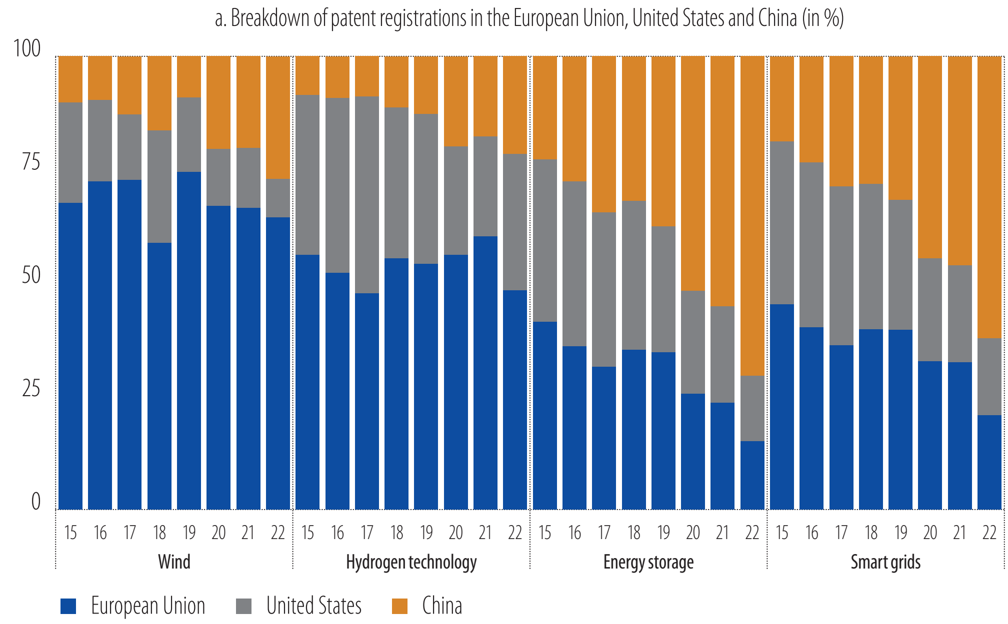
Improving Europe's cleantech innovation is crucial to maintaining competitiveness and achieving climate goals. While scaling established solutions like wind and solar energy will help, about 35% of the emissions cuts required by 2050 depend on technologies still in development or not yet viable. Investing in next-generation solutions is therefore risky but vital for decarbonising hard-to-abate sectors and meeting Europe's ambitious goal of cutting emissions 55% by 2030, compared to 1990 levels. This will require more funding, improved access to private capital and support for promising technologies.

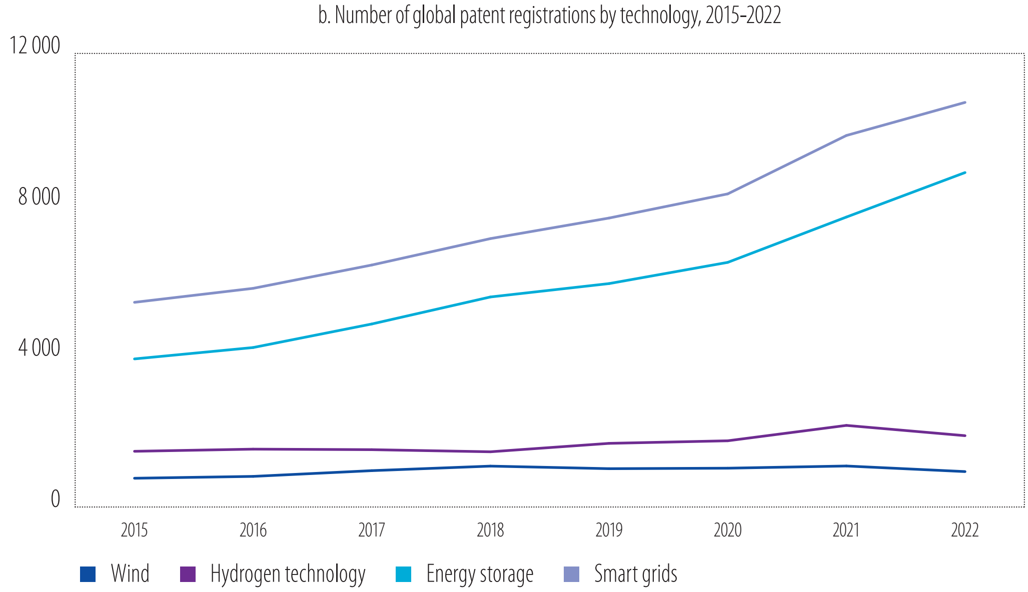
Global innovation in clean technologies is accelerating. The race to develop next-generation clean technologies is reshaping global energy systems. Patent activity worldwide reflects a strong push towards solutions that enable electrification and in-depth decarbonisation, such as smart grids, energy storage and hydrogen technologies. These innovations are critical for integrating renewable energy into existing systems, managing complex power networks and decarbonising hard-to-abate sectors. Smart grids can address some of these problems. Patent registrations for smart grids has doubled since 2015, reaching 10 700 patents in 2022 (Figure 28). Energy storage (another critical component for power systems) patents also flourished, with almost 9 000 patents registered globally by 2022, ten times more than patents for mature wind turbine applications (IEA, 2025c).

China is leading the pack in enabling technologies. China has emerged as the dominant force in global cleantech innovation, particularly in smart grids and energy storage. Since 2015, patent registrations in these areas have grown by roughly one-third annually, reaching thousands of applications and positioning China at the forefront of future energy systems. This leadership reflects a strategic focus on technologies that underpin electrification and resilience, giving China a competitive edge in shaping global standards and supply chains.

Figure 28

Patent registration, by region and technology

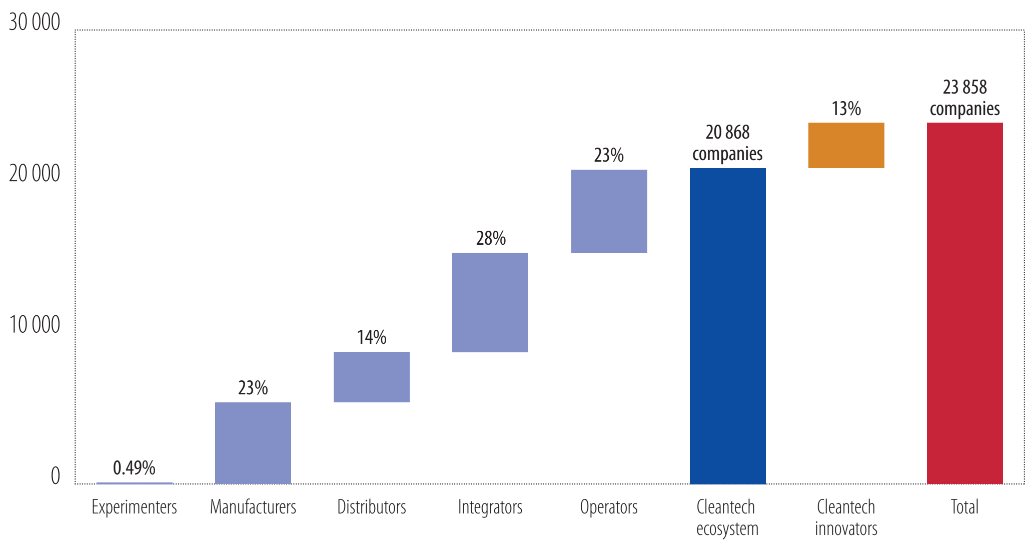




Source: *EIB staff calculations based on Patent Cooperation Treaty patents (PATSTAT) in collaboration with the Expertise Centre for Research and Development Monitoring, KU Leuven.*
Note: *Selection of clean technologies with a strong manufacturing base in Europe.*

The EU cleantech sector is mature but needs more innovative, cutting-edge companies. According to the European Investment Fund (EIF) Cleantech Survey (European Investment Fund (EIF), 2025), over 60% of European cleantech firms were founded before 2000 and 74% report high technological readiness levels, indicating that the challenge lies in deployment rather than invention (Figure 29). The sector is dominated by various groups, such as manufacturers, integrators and operators, which account for nearly 90% of firms, while only 12.5% are core cutting-edge innovators. This structural imbalance is important because different players face distinct barriers. Targeted policies that isolate and support cutting-edge innovators are key to unlocking disruptive innovation and complementing Europe's strong cleantech base.

Figure 29
Areas of cleantech activity (number of companies)



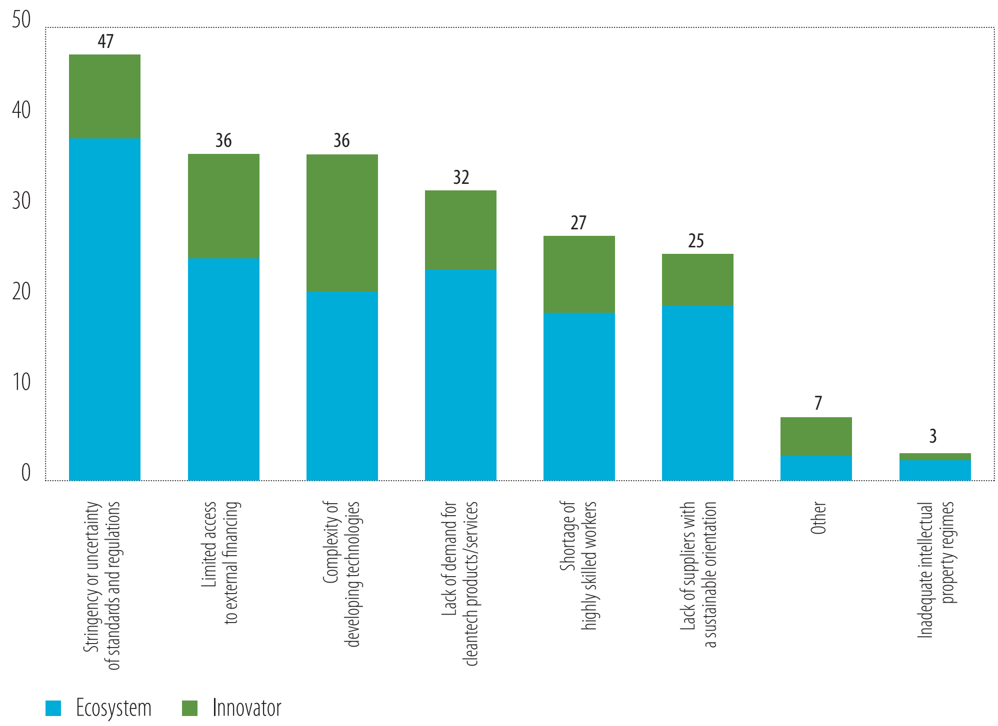
Source: *EIF (2025).*

Europe needs to scale cutting-edge solutions faster or face the risk of losing ground in the global cleantech race and compromising its strategic autonomy. Patent activity remains concentrated in mature technologies such as wind energy, where Europe holds a strong comparative advantage but achieves only incremental improvements. Progress in emerging technologies – such as green hydrogen for industry, high-temperature heat pumps, advanced electrification (such as smart grids and vehicle-to-grid, electrification of heavy-duty transport and electric arc furnaces) and carbon capture – has been slow, constrained by technical and regulatory barriers. EU initiatives like the Clean Industrial Deal, Hydrogen Strategy and Innovation Fund aim to close this gap.

The EIB Group is accelerating Europe's green transition by financing cutting-edge clean technologies and innovation across the sector. From research to large-scale manufacturing, the EIB supports corporate transformations in developing next-generation solutions spanning advanced batteries, renewable energy systems, new nuclear technologies, low-carbon gases and renewable heat and transport fuels.

Regulatory complexity, limited access to finance, insufficient demand for cleantech products and services and skill shortages remain the main barriers to scaling up. Nearly half of the firms surveyed by the EIF report that navigating complex and often fragmented regulations is the most significant challenge, as firms must comply with multiple layers of policy across different jurisdictions (Figure 30). Access to suitable finance is another major obstacle, as many cleantech businesses – particularly those outside the core innovator group – struggle to find funding options that match their risk profile and capital needs. In addition, firms highlight the difficulty of recruiting and retaining talent with the technical, legal and business expertise required to operate in this rapidly evolving field.

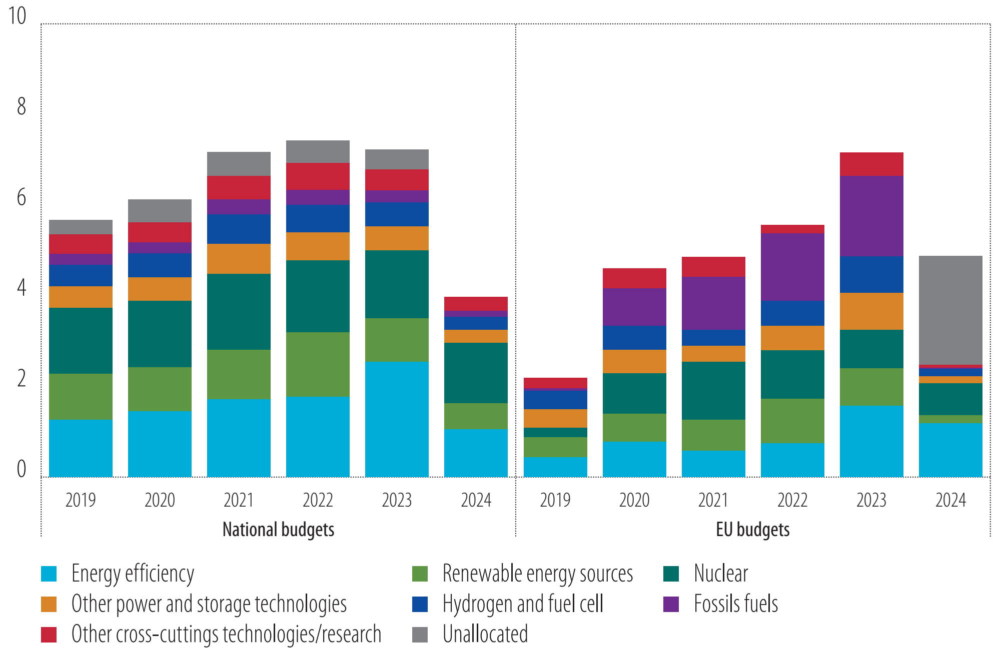
Figure 30
Main difficulties cleantech companies face (in %)



Source: *EIF (2025).*

While public support is crucial for funding innovation, the priority has often been given to mature, non-scalable technologies. The last five years have seen a rapid ramp-up in public support for energy innovation. EU countries spent about €8 billion in 2023, twice the amount spent by the United States and three times more than Japanese public spending on innovation, but less than China, which overtook the European Union to become the biggest spender on energy R&D in 2020 (IEA, 2024a). National budgets prioritised energy efficiency research – with half of the budget allocated to transport (54% for road transport alone) and 23% dedicated to the optimisation of industrial processes – over innovation related to renewable energy (Figure 31). Most individual countries support their own nuclear investments.

Figure 31
Public energy research, development and demonstration budgets (€ billion)**, 2019-2024**



Source: *EIB staff calculations based on IEA public energy research, development and demonstration budgets.*
Note: *National budgets include 20 EU countries that are also IEA members. EU budgets include provisions from Horizon 2020, Horizon Europe and Innovation Fund (small-scale project) funding programmes. The majority of fossil fuel innovation concerns carbon capture and storage technologies.*

Coordinating research could maximise returns for Europe as a whole. EU innovation funds complement national budgets, targeting more cutting-edge technologies. European Commission funds have swiftly matched national funding levels. Support for hydrogen innovation and carbon capture is driven by the Innovation Fund (which provides large-scale grants for renewable hydrogen projects) and the European Hydrogen Bank (which bridges cost gaps and stimulates market uptake) with additional R&D backing from Horizon Europe's Clean Hydrogen Partnership and planned hydrogen auctions via REPowerEU. The EIB plays a central role in sustainability and innovation financing. In 2024, it provided €38.1 billion to support climate change mitigation and €1.1 billion for research and innovation (EIB, 2025a).

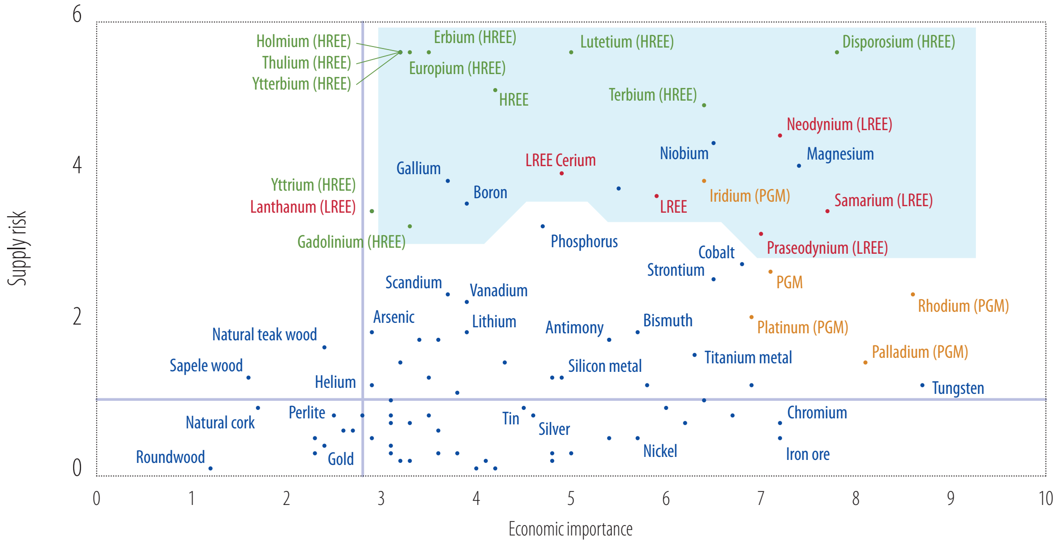
Managing critical raw material dependencies

Securing access to critical raw materials is a strategic imperative for Europe's green and digital transition. Trade in critical raw materials does not account for a large share of global trade, yet they are essential for technologies driving renewable energy (batteries, wind turbines, photovoltaic panels, etc.) and advanced sectors like robotics, semiconductors and e-mobility. These materials are also crucial for the defence and aerospace sectors. As these materials are available from a very limited number of suppliers, security of supply is a key concern.

Critical raw materials can be categorised according to their economic importance and inherent risks of supply disruption. A complex analysis can determine their economic importance, measured by end-use and value added for the relevant manufacturing sectors, as well as their supply risk profile, measured in terms of global supply concentration, governance and import reliance (once alternatives and recycling have been accounted for). According to this nomenclature, half of the 34 critical raw materials and all rare earth elements identified in 2023 by the European Union (and updated every three years) are considered strategic (Figure 32).

Figure 32

Economic importance of critical raw materials and risk of disruption for the European Union (index)



Source: *EIB staff calculations based on European Commission data.*
Note: *HREE: Heavy rare earth elements; LREE: Light rare earth elements; PGM: Platinum group metals. Rare earth elements are grouped in the light blue area. According to the EU nomenclature, a critical raw material with both a supply risk index greater than 1 and an economic importance index greater than 2.7 is considered strategic.*

Imports account for 79% of EU critical raw material supplies. Domestic production meets only 18% of demand, though 15 EU countries contribute at least one critical raw material. Spain dominates EU strontium supply (99%), France leads in hafnium (76%) and Poland is prominent in coal and copper, but most countries' contributions are limited. The European Union could further utilise lithium reserves in Portugal and France, cobalt in Finland and rare earth elements in Sweden, Norway, Finland and the Balkans.

China's stronghold on the extraction and processing of rare earth elements and other critical raw materials creates significant vulnerabilities in global supply chains. Controlling 60% to 70% of rare earth mining and over 85% of processing, China wields considerable influence over electric vehicle motors, wind turbines and electronics. Its integrated supply networks and advanced permanent magnet production reinforce this position. China is also the leading supplier for 21 of 33 key critical raw materials and provides up to 97% of EU imports of materials like magnesium and heavy rare earth elements. It refines 95% of manganese, 73% of cobalt, 70% of graphite, 67% of lithium and 63% of nickel worldwide. Although 60% of the world's cobalt comes from the Democratic Republic of the Congo, Chinese mining stakes ensure control over pricing and availability.

Beyond China's dominance, global critical raw material supply chains are generally highly concentrated, exposing the Europe's supply to significant disruption risks. Türkiye provides virtually all of the European Union's boron, while South Africa supplies 71% of its platinum group metals. Nickel and copper are sourced from a diverse group of 18-22 countries, but for materials like strontium and magnesium, the European Union depends on just two to four suppliers. Moreover, 54% of critical raw material imports originate from countries rarely aligned with EU positions at the United Nations, and 40% come from authoritarian regimes, exposing the European Union to geopolitical and ethical vulnerabilities (Box E).

EU vulnerabilities and supply gaps underscore the urgency of sourcing diversification and increasing processing capacities. The Critical Raw Materials Act sets benchmarks for domestic extraction, processing and recycling, while promoting investment in refining capacity and recycling technologies. By March 2025, the European Commission had approved 47 strategic projects worth €22.5 billion, with over half of these focused on processing lithium, cobalt, nickel and rare earth elements, backed by €2 billion of EIB financing as part of its efforts to boost investments in critical raw material supply chains. The newly introduced EU Stockpiling Strategy aims to bolster central reserves of strategic raw materials through a blend of national contributions and public-private cooperation through purchase agreements that guarantee demand to avoid supply disruptions and mitigate price volatility.

New strategic partnerships are expected to alleviate the risk of disruption. The Critical Raw Materials Act seeks to ensure no third country provides more than 65% of any material at any stage. The reliability of suppliers is vital given that a substantial portion of critical raw materials are sourced from countries that are neither closely aligned geopolitically with the European Union nor rated as robust democracies (Box E). Strategic partnerships must therefore be developed to diversify sources of supply, implemented via free trade agreements and memorandums of understanding with countries around the world such as Argentina, Australia, Canada, Chile, the Democratic Republic of Congo, Greenland, Kazakhstan, Namibia, Norway, Rwanda, Serbia, Ukraine and Zambia. Competition with the United States, Japan and China remains high.

Developing processing capacities and resource recycling presents significant opportunities to generate value and decrease the European Union's vulnerability to systemic risks. Expanding domestic recycling for copper, zinc and aluminium will require private investment. However, the recycling of other materials remains limited, largely due to the complexity arising from products not being designed for recycling and inadequate labelling.

Box E

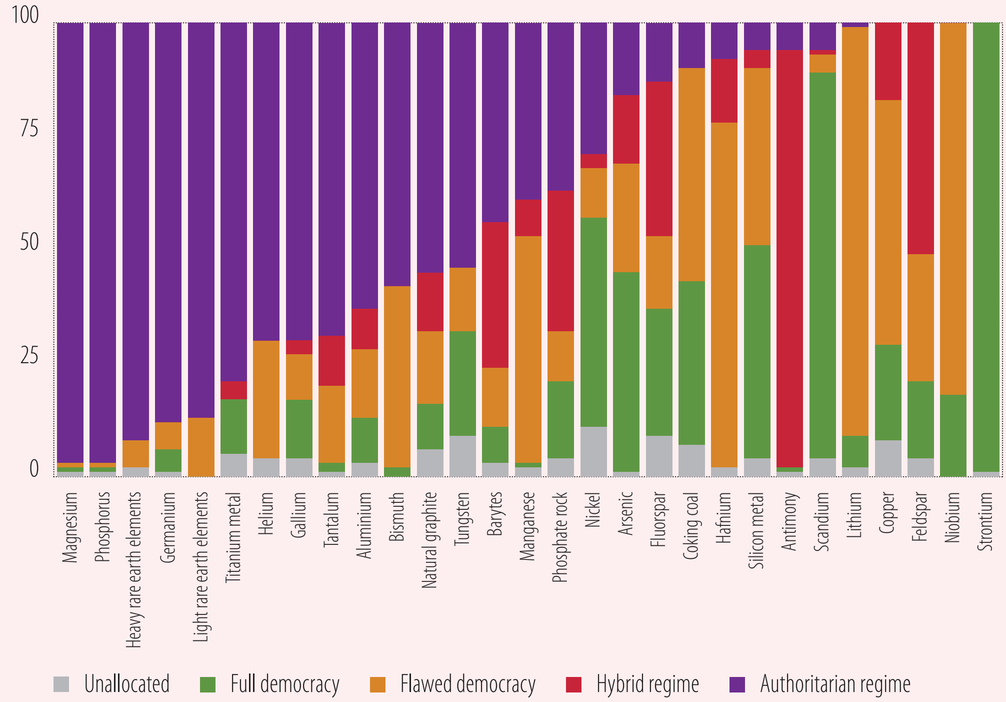
Democratic backsliding among EU trading partners

As documented by Marchini and Popov (2025), the decline in the democratic quality of EU trading partners has accelerated over the past 25 years, highlighting new trade-offs for the green transition.

Using United Nations General Assembly voting as a proxy for political alignment with the European Union (Khan, 2020) shows that 54% of critical raw materials imports come from countries rarely aligned or mostly misaligned with the European Union. According to the Economist Intelligence Unit's Democracy Index, 40% of critical raw materials originate from authoritarian regimes and 12% from hybrid regimes (Figure E.1). This dependency increases the European Union's exposure to risks of supply disruptions and other transparency issues.

Figure E.1

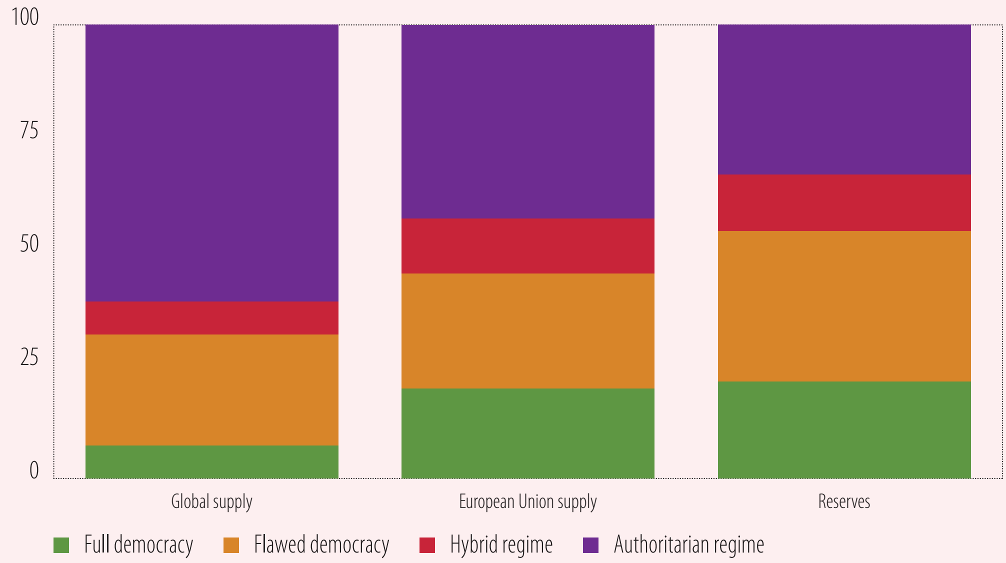
Democratic level of countries supplying critical raw materials to the European Union (in %)



Source: *EIB staff calculations using European Commission (2023) and Economist Intelligence Unit (2025).*
Note: *The democratic thresholds are defined by the Economist Intelligence Unit (2025) and based on the final score per country.*

Figure E.2

Democratic profile of countries supplying critical raw materials (in %)**, by type of supply**



Source: *EIB staff calculations using European Commission (2023) and Economist Intelligence Unit (2025) data.*

Global supply networks have not been fully tapped. Major suppliers such as India, Peru, Japan, the United States, Australia and the Democratic Republic of the Congo remain underutilised, even though some supply shares are up to 20 times higher than what is provided to the European Union (Figure E.2). With significant reserves of nickel and copper, emerging players like Indonesia and Chile could be promising partners for future diversification. In recent years, the European Union has successfully turned to nations more aligned with its core values for the supply of, for example, arsenic and scandium (United Kingdom) and silicon metal (Norway).

Conclusion and policy implications

Renewable energy is powering Europe's energy transformation, but further development is blocked by bottlenecks. Rapid growth in wind and solar – combined with lower fossil-fuel imports – has strengthened energy security and reduced exposure to external shocks. However, grid congestion, slow electrification and uneven progress in energy efficiency continue to limit the full benefits of the transition. Addressing these constraints will be essential as Europe moves toward a more electrified economy.

Grid investment is now a critical priority. Renewable deployment is outpacing network upgrades, leading to connection queues, curtailment of renewable production and delayed projects. Strengthening transmission and distribution networks, scaling up storage and improving digitalisation are central to enabling further clean power growth. Europe also needs to accelerate electrification in transport, heating and industry, especially as other jurisdictions (most notably China) advance at greater pace. Achieving the 2030 efficiency and climate goals will require more ambitious investment in building renovation, industrial modernisation and heat pump rollout.

Lower and more stable energy costs remain vital for Europe's competitiveness. Evidence shows that a higher share of renewables and increased trade in cross-border electricity can reduce prices and energy volatility. These gains are essential because firms in Europe still face electricity and gas prices above those of global competitors. Reducing this gap is one of the most direct ways to support company profits and investment, especially in sectors exposed to international trade. Reforming the design of energy markets, introducing long-term purchase contracts and bringing more flexibility to demand will help lower prices.

Europe has the potential to grow its cleantech industry, but it needs to better support innovation to remain competitive. Sustained innovation and better integration of cleantech products and individual components is important for growth and stability. Investment in cutting-edge technologies – such as green hydrogen, advanced electrification and carbon capture – can maintain Europe's cleantech leadership.

The energy transition depends on effectively managing new risks and dependencies, and on an inclusive approach. Growing reliance on global supply chains for critical raw materials and technologies calls for diversification, recycling and strategic partnerships. Addressing uneven progress in different sectors and regions and supporting vulnerable groups can help ensure that the benefits of the energy transition are widely shared.

References

Agency for the Cooperation of Energy Regulators (ACER) (2025). Annual Report on the Results of Monitoring the Internal Electricity and Natural Gas Markets. Ljubljana.

Brasili, A., & Magnini G. (2025). Product Relatedness and Latent Production Potential of Green Goods in the EU: Evidence from International Trade Flows. EIB Working Paper.

DC Byte (2024). Global Data Centres Database. Accessed December 2025.

Economist Intelligence Unit (2025). Democracy Index 2024. Available at: https://www.eiu.com/n/campaigns/democracy-index-2024/

Ember (2025). European Electricity Review 2025. London: Ember. Available at: https://ember-energy.org/latest-insights/european-electricity-review-2025/

EU Platform on Sustainable Finance (EU PSF) (2025). Platform on Sustainable Finance report: Monitoring capital flows to sustainable investments, Financing a clean and competitive transition. Available at: https://finance.ec.europa.eu/publications/platform-sustainable-finance-report-monitoring-capital-flows-sustainable-investments_en

European Central Bank (ECB) (2024). Financial Integration and Structure in the Euro Area: June 2024. Available at: https://www.ecb.europa.eu/press/fie/box/html/ecb.fiebox202406_01.en.html

European Commission (2014). Energy economic developments in Europe. Available at: https://ec.europa.eu/economy_finance/publications/european_economy/2014/energy-economic-developments-in-europe_en.htm

European Commission (2023). Study on the critical raw materials for the EU 2023: Final report. Publications Office of the European Union. https://doi.org/10.2873/725585

European Commission (2025a). Quarterly Report on European Electricity Markets – Q1 2025. Directorate-General for Energy. Brussels: European Commission. Available at: https://energy.ec.europa.eu/document/download/e4dcf254-f974-4db6-8483-e9bc77646ead_en?filename=New_Quarterly_Report_on_European_Electricity_markets_Q1_2025.pdf

European Commission (2025b). Clean industrial deal: a joint roadmap for competitiveness and decarbonisation. Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex:52025DC0085

European Environment Agency (EEA) (2024). Trends and projections in Europe 2024. https://doi.org/10.2800/7574066

European Investment Bank (EIB) (2025a). Sustainability Report 2024. https://doi.org/10.2867/4824393

European Investment Bank (EIB) (2025b). Energy Efficiency in SMEs and Mid-caps. Available at: https://www.eib.org/en/publications/online/all/eibis-energy-efficiency-report

European Investment Bank (EIB) (2025c). Shock waves from turbulent times: How EU businesses recalibrate supply chains. https://doi.org/10.2867/9717179

European Investment Bank (EIB) (2025d). Climate Bank Roadmap Phase 2. https://doi.org/10.2867/8398584

European Investment Bank (EIB) (2025e). Energy Sector Orientation. https://doi.org/10.2867/2248398

European Investment Bank (EIB) (2025f). EIB Group key figures summary. Available at: https://www.eib.org/files/events/2024-eib-key-figures-summary-en.pdf

European Investment Bank (EIB) (2025g). EIB Investment Report 2024/2025. https://doi.org/10.2867/8065730

European Investment Fund (EIF) (2025). Unlocking the Potential of Cleantech Innovation in Europe. EIF Market Assessment & Research Working Paper 2025/106. Available at: https://www.eif.org/news_centre/publications/eif-working-paper-2025-106.pdf

Fetzer, T., Lambert, P., Feld, B., & Garg, P. (2024). AI-Generated Production Networks: Measurement and Applications to Global Trade. CESifo Working Paper Series No. 11497. https://doi.org/10.2139/ssrn.5050959

Gas Infrastructure Europe (2025). Storage Database. https://www.gie.eu/transparency/databases/storage-database

Grand View Research (2025). Europe Energy as a Service Market Size & Outlook, 2030. Available at: https://www.grandviewresearch.com/horizon/outlook/energy-as-a-service-market/europe

International Energy Agency (IEA) (2024a). Energy Technology Perspectives 2024. Available at: https://www.iea.org/reports/energy-technology-perspectives-2024

International Energy Agency (IEA) (2024b). Electricity 2024: Analysis and forecast to 2026. Available at: https://www.iea.org/reports/electricity-2024

International Energy Agency (IEA) (2025a). World Energy Investment 2025. Available at: https://www.iea.org/reports/world-energy-investment-2025

International Energy Agency (IEA) (2025b). World Energy Outlook 2025. Available at: https://www.iea.org/reports/world-energy-outlook-2025

International Energy Agency (IEA) (2025c). What Next for the Global Car Industry. Available at: https://www.iea.org/reports/what-next-for-the-global-car-industry

International Energy Agency (IEA) (2025d). Global EV Outlook 2025. Available at: https://www.iea.org/reports/global-ev-outloo2k-2025

Khan, M. Z. I. (2020). Is voting patterns at the United Nations General Assembly (UNGA) a useful way to understand a country's policy inclinations: Bangladesh's voting records at the UNGA. SAGE Open, 10(4). https://doi.org/10.1177/2158244020961117

Marchini, C., & Popov, A. (2025). Trading with dictators? A historical review of the EU's business partners. The ECB Blog. Available at: https://www.ecb.europa.eu/press/blog/date/2025/html/ecb.blog20250708~58da29dc14.en.html?utm_source=blog_newsletter&utm_medium=email&utm_campaign=20250708_Trading_with_dictators%3F&utm_content=Trading_with_dictators%3F

McKinsey & Company (2024). Unlocking the European AI revolution and European Data Center Overview. Available at: https://www.mckinsey.com/industries/electric-power-and-natural-gas/our-insights/the-role-of-power-in-unlocking-the-european-ai-revolution

Morningstar Sustainalytics (2025). EU Taxonomy Reporting Review. December. Available at: https://connect.sustainalytics.com/eu-taxonomy-reporting-review

Myllyvirta, L., Qin, Q., & Qiu, C. (2025). Analysis: Clean Energy Contributed a Record 10% of China's GDP in 2024. Centre for Research on Energy and Clean Air (CREA) research for Carbon Brief, 19 February. Available at: https://www.carbonbrief.org/analysis-clean-energy-contributed-a-record-10-of-chinas-gdp-in-2024/

Newmark (2025). Data Center Site Selection Dynamics in Europe. Newmark Research, Q1. Available at: https://www.nmrk.com/insights/thought-leadership/2025-data-center-site-selection-dynamics-in-europe

Organisation for Economic Co-operation and Development (OECD) (2025). The evolution of cleantech manufacturing. Available at: https://www.oecd.org/content/dam/oecd/en/publications/reports/2025/10/the-evolution-of-cleantech-manufacturing_9f23c33d/be87b21b-en.pdf

Reuters (2024). Europe's fleets driving EV sales. Available at: https://www.reuters.com/graphics/AUTOS-EUROPE/ELECTRIC-LEASING/jnvwazrrnvw/

United Nations Environment Programme Copenhagen Climate Centre, & International Energy Agency (2025). The Global ESCO Market Report 2025. Available at: https://c2e2.unepccc.org/wp-content/uploads/sites/3/2025/05/global-esco-market-report-2025.pdf

Chapter 7

Social investment for inclusion and productivity

The European Union continues to stand out as a global leader in well-being, with steady progress in employment, equality, education and health across member countries. Rising employment rates, strong labour force participation – particularly among women and older workers – and solid wage growth have supported higher living standards. In 2025, employment rates reached a historic high of 76% of the working-age population. Income inequality continued to decline, helped by accessible education, low levels of student debt and a more balanced wealth distribution. People in high-income EU countries live five years longer on average than in the United States. These developments reflect a long-standing commitment to social cohesion, inclusive policies and strong social protection systems that aim to improve quality of life and ensure equal access to opportunities, regardless of where people live.

Investing in skills, lifelong learning and preparing young people for a rapidly changing labour market is essential for inclusion and for productivity growth and competitiveness. The spread of new technologies, especially artificial intelligence (AI), increases the urgency of investing in education and training to avoid a widening gap between the skills people have and the skills employers need. The challenges are particularly significant for people in vulnerable population groups.

Ensuring that housing is affordable has become a major priority. It can help address skill gaps for businesses, support growth and reduce inequality. About half of people in EU cities say that a lack of affordable housing is their most urgent concern. High housing costs can limit mobility, worsen skill shortages and weaken competitiveness. Our estimates suggest that addressing housing shortages could raise EU gross domestic product (GDP) by 1.7% by enabling people to move more easily, while also lowering wage inequality across the European Union by around 1.5%.

Social investment also helps reinforce trust in political institutions by strengthening the long-term resilience of societies. Perceived gaps in key social areas such as health, education or housing are strongly associated with lower trust in political parties. EU policies that channel funds to reduce regional inequalities and bridge the divide between rural and urban areas have been shown to increase trust, especially among people from middle and lower socioeconomic groups. Regional cohesion remains central to Europe’s long-term success, with strong convergence achieved in income and living standards.

Social investment is not a luxury; it is essential for competitiveness, social cohesion, inclusion and well-being. Amid competing demands on public budgets, it is important to ensure that public investment is well targeted and effective. It is also important to learn from successful uses of financial instruments as a way to mobilise private capital to support high-quality social investment.

Introduction

Europe's social model is one of its great strengths, but it is facing some pressure from several trends. These include demographic ageing, the energy transition and digitalisation, especially the rapid adoption of artificial intelligence. These pressures come at a time of low economic growth, tight fiscal constraints, greater uncertainty and the likelihood of further geopolitical and economic shocks.

In this context, it is important to underline the value of Europe's social model and the social investment that supports it. These investments are essential for people's well-being and for social cohesion, but they also matter for productivity, competitiveness and growth. Sustaining progress will require public resources to be used effectively, and private capital to be mobilised. Financial instruments and European institutions have a clear role in helping to achieve this.

This chapter has four parts. The first presents recent socioeconomic advances in the European Union, using selected indicators of well-being. The second outlines labour market trends in skills and market participation, and their contribution to the European social model and economic competitiveness. The third examines the economic effects of addressing housing shortages, including potential gains in GDP and reductions in inequality. The fourth reviews progress in regional development. The chapter also includes three boxes: Box A examines how social investment affects trust in public institutions; Box B analyses the macroeconomic impact of housing affordability in the European Union; and Box C outlines the role of the European Investment Bank Group (EIB Group) in supporting social investment.

Europe – a global leader in well-being

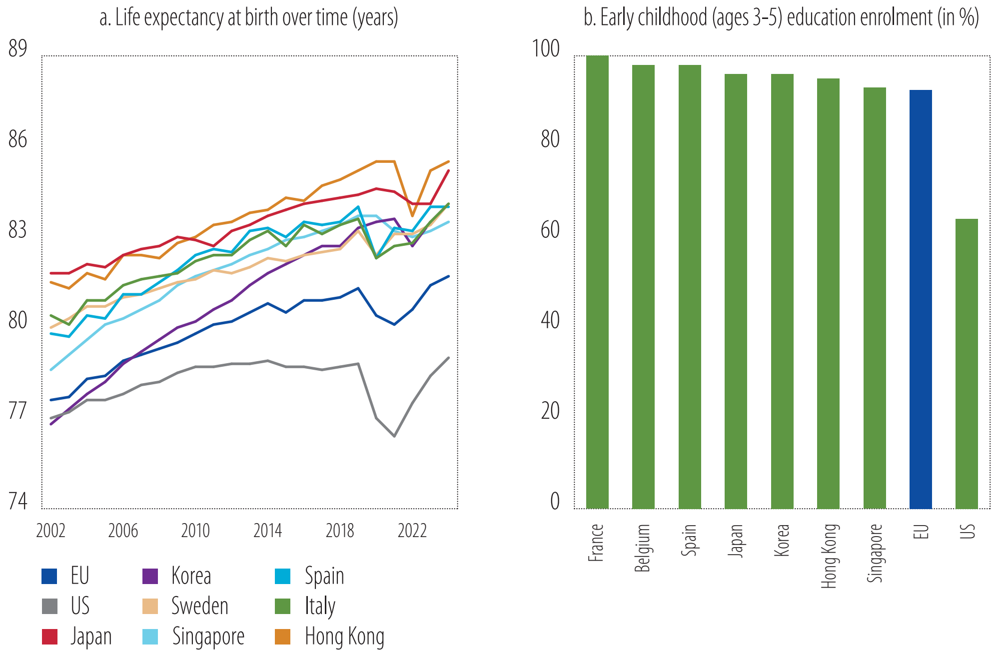
Europe is healthier, safer and more inclusive than any other world region. In 2024, average life expectancy at birth in the European Union reached 81.7 years. Many EU members, including Italy, Spain and Sweden, recorded life expectancy of 84 years or more. This is about five years higher than in the United States and well above the global average. Only Hong Kong, Japan, Korea and Singapore reach similar levels (Figure 1a). Europe's infant mortality rate is also among the lowest in the world, at 3.4 deaths per 1 000 live births. This is far below historical levels and significantly better than comparable high-income countries such as the United States, where the rate is 5.5 (Figure 1c). These outcomes highlight the strength and efficiency of Europe's healthcare and social protection systems.[1]

Europeans also live longer and healthier lives because of long-term action to reduce air pollution and protect the environment. Total greenhouse gas emissions fell by 34% from 1990 to 2024, compared with a reduction of only 7% in the United States. Europe is also one of the safest world regions. Major EU countries consistently report homicide rates below one per 100 000 people, compared with 5.9 in the United States and a global average of 5.61 reported in 2023 (US Department of Justice, 2025).

1 The United States spends significantly more on healthcare than Europe, accounting for 17.2% of GDP in 2024 compared with Europe's lower and more stable levels of around 10% of GDP (Organisation for Economic Co-operation and Development (OECD), 2025). At the same time, the US healthcare system does not deliver preventive services equitably at scale, contributing to higher death rates from smoking, obesity, opioid overdoses, road accidents and infant mortality.

Figure 1

Selected social parameters across countries and regions

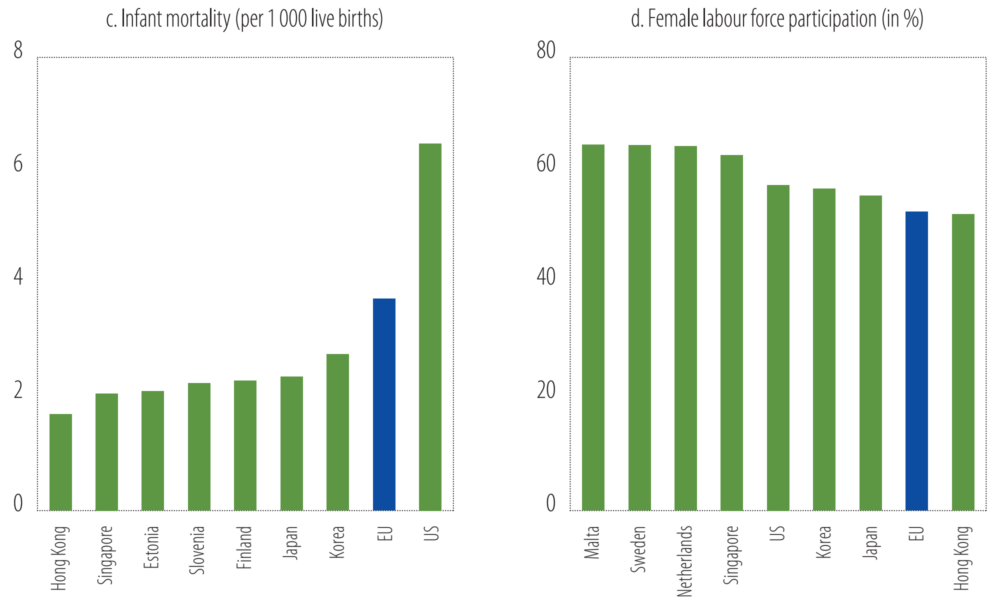


Source: *EIB staff calculations based on OECD (2026a), Eurostat (2026d), Centers for Disease Control and Prevention (CDC)/National Centre for Health Statistics (NCHS) (2026), Statistics Singapore (2026) and the World Bank (2026).*

Note: *Individual EU countries shown are the top performers for each indicator. EU average is weighted by population.*

Source: *EIB staff calculations based on OECD (2026a) and data from the Singapore Ministry for Social and Family Development (2026) and World Bank (2026).*

Note: *Individual EU countries shown are the top performers for each indicator. EU average is weighted by population.*



Source: *EIB staff calculations based on United Nations data (2026).*

Note: *Individual EU countries shown are the top performers for each indicator. EU average is weighted by population.*

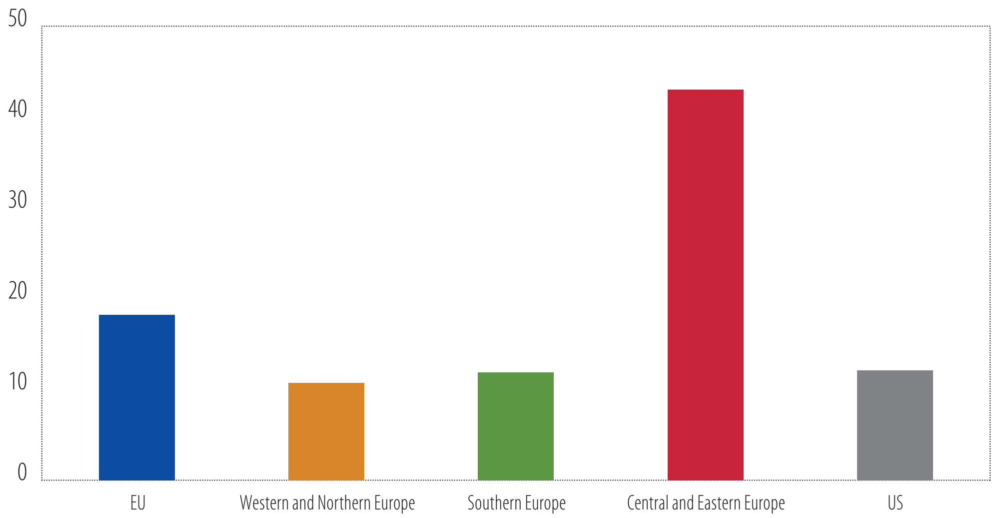
Source: *EIB staff calculations based on International Labour Organization (ILO) (2026).*

Note: *Individual EU countries shown are the top performers for each indicator. EU average is weighted by population.*

Europe has also made significant progress in improving equality of opportunity, supported by high-quality education systems. Access to early childhood, primary and secondary education is widespread and has contributed to Europe's high levels of educational attainment (Figure 1b). In 2024, 84% of young adults aged 20 to 24 had completed at least an upper secondary qualification, a key step towards further study or entering the labour market. Many EU countries also offer low-cost or tuition-free higher education with high completion rates. This keeps student debt low or non-existent in most EU countries and enables young people to begin working life with fewer financial constraints and greater stability (Organisation for Economic Co-Operation and Development (OECD), 2025). In contrast, average student debt in the United States, including private loans, is reported at about $43 333 (Hanson, 2026).

Greater equality of opportunity is also visible in Europe's income and wealth developments. Over the last ten years, gross real disposable income of households across the European Union have risen by 18%, while the number of hours required to earn these incomes has fallen. In the same period, incomes in the United States increased by about 12% (Figure 2). Central and Eastern European countries recorded the fastest progress, with real per capita household incomes rising by more than 40% (Figure 2). This rapid economic convergence process has improved living standards, supported social inclusion and strengthened connectivity, helping reduce disparities within the European Union, especially in cohesion regions. Preliminary data for 2025 suggest that gross real disposable income of households continued to rise, supported by stabilising inflation and steady wage growth, and that the gap with the wealthiest EU members continued to narrow.

Figure 2
Real gross disposable income per capita (% change)**, 2015-2024**



Source: *EIB staff calculations based on Eurostat (2026a, 2026b), European Commission (2025a), Organisation for Economic Co-Operation and Development (OECD) (2026a) and World Bank (2026).*
Note: *Estimates are based on the unadjusted gross disposable income of households and non-profit institutions serving households, deflated with the price index for household final consumption expenditure and divided by the total resident population (with original base year 2008). Bulgaria is estimated for 2024. Data for the US economy are available only up to 2023. Country groups are weighted averages based on population.*

Economic inequality has also improved, in contrast with many other regions. The Gini coefficient[2] for disposable incomes fell from 30.8 in 2015 to a historic low of 29.4 in 2024 (Figure 3). Over the same period, inequality increased in the United States from an already much higher level. Wealth data show a similar pattern. The top 1% in Europe hold around 25% of total wealth – about 10 percentage points less than in the United States. Although the bottom 50% of the population still hold only a modest share

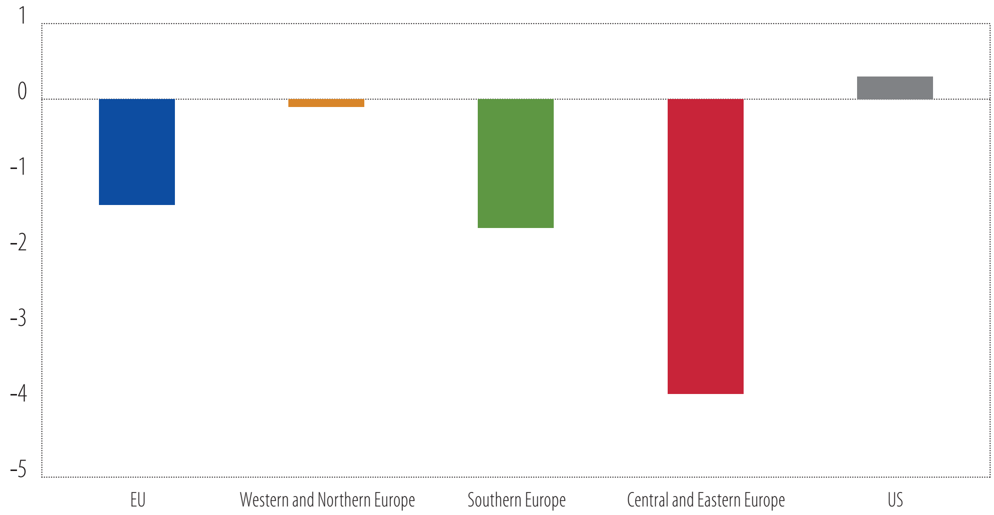
2 The Gini coefficient, also known as the Gini index, is one possible measure of statistical dispersion intended to analytically capture income or wealth inequality.

of total wealth, this share has grown slightly and is now more than three times higher than that of their US counterparts. Gender gaps have also narrowed. Women's share of labour income has risen steadily, reaching 40% (World Inequality Database, 2026).

Rising average incomes and a gradually more balanced wealth distribution have helped reduce relative poverty. From 2015 to 2024, the share of people at risk of poverty or social exclusion across EU countries fell by 3 percentage points, equivalent to more than 11 000 people. The rate of in-work poverty (when the disposable income of an employed individual (after social transfers) is less than 60% of the national median) also declined.

Figure 3

Progress in income inequality by changes in the Gini index (percentage points)**, 2015-2024**

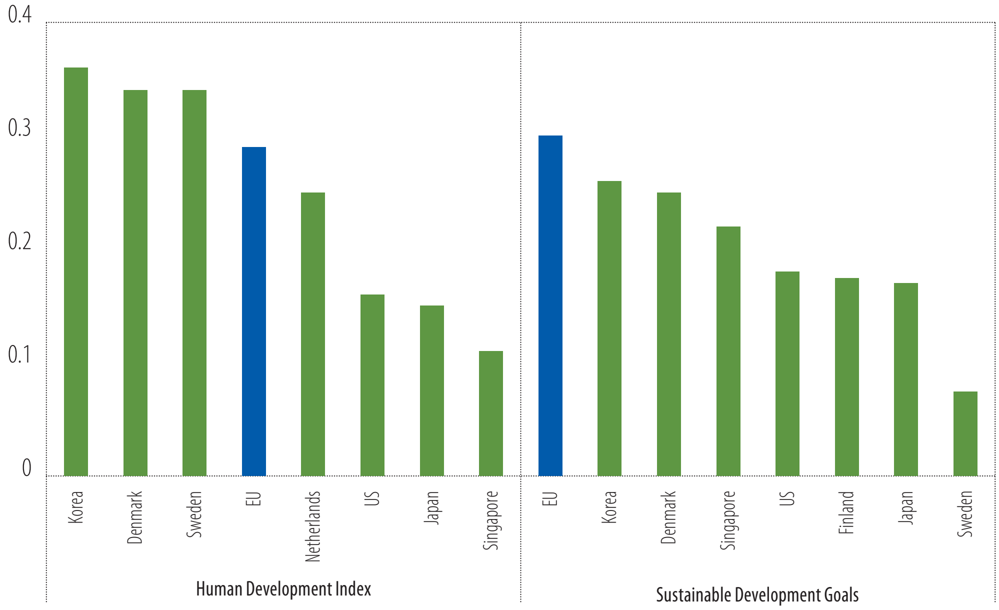


Source: *EIB staff calculations based on Eurostat (2026a, 2026b) and World Bank (2026).*
Note: *Negative values indicate improvement between 2015 and 2024. EU and regional averages are weighted by population. The US data are obtained from the World Bank and end in 2023.*

Europe's strong performance on income, wealth and social outcomes means it continues to lead global rankings in overall development. This reflects a long-standing commitment to a strong social model built on comprehensive social protection, high-quality public services and high levels of well-being. European countries dominate the top tier of the United Nations Development Programme (UNDP) Human Development Index, confirming the European Union's leadership in health, education and living standards. Europe also leads global rankings on the UN Sustainable Development Goals, with notable progress on poverty reduction, health, education, climate action and institutional resilience (Lafortune and Grayson, 2025) (Figure 4). EU members score strongly in the Better Life Index of the OECD, performing well in areas such as work-life balance, safety, civic engagement, education and environmental quality. This reflects a broad and integrated approach to well-being (OECD, 2026b).

Further progress in social development is also likely in the years ahead. Early social indicators for 2025 show that Europe continues to make gains in reducing inequality, strengthening social resilience and improving people's lives. Employment rates are expected to remain high, supported by resilient labour markets, skill shortages and ongoing investment in training for working people and activation measures to encourage unemployed people to search for jobs. As a result, nominal wage growth is projected to stay strong in 2025 and ease only slightly to 3.3% in 2026 and 3.1% in 2027. These increases reflect the delayed effects of high inflation and continued labour market tightness, remaining above pre-pandemic levels. With inflation expected to stay close to 2%, real wages should rise over the coming years (European Commission, 2025b). Rising incomes and continued social support measures are likely to reduce poverty and social exclusion further.

Figure 4
Average annual progress in social development indicators (in %), **2010-2023**



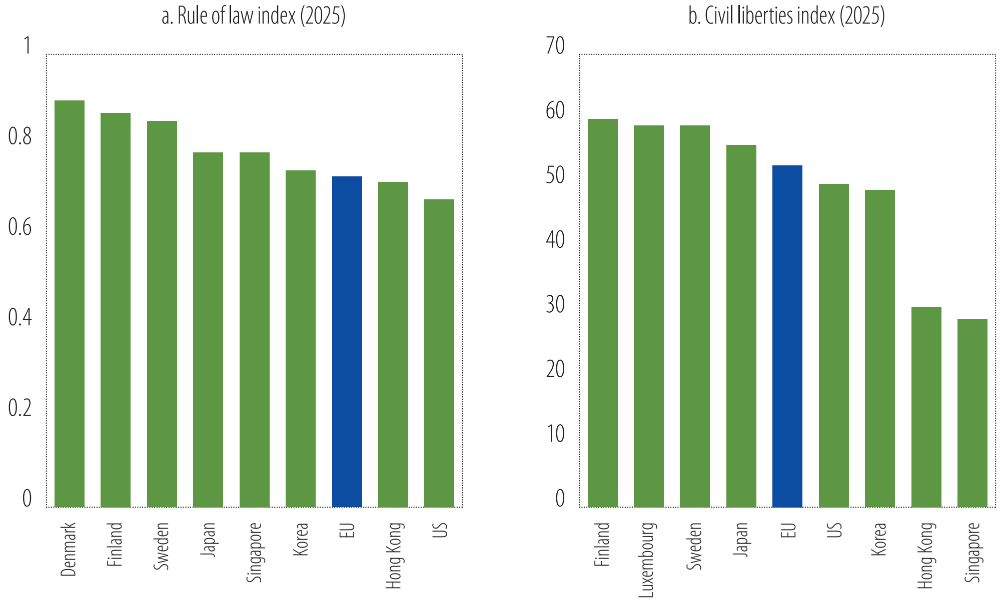
Source: *EIB staff calculations based on the United Nations Development Programme (UNDP) Human Development Index and the UN Sustainable Development Goals Index.*
Note: *Changes calculated as compound annual growth between 2010 and 2023. The three best-performing EU countries are selected based on 2023 scores. Country groups are weighted by population.*

Access to Europe's comprehensive social safety nets is also improving. Many EU members have expanded social investment and digitalised public services, making it easier for people to obtain financial support, healthcare, education, social housing and childcare services. Medium-term forecasts point to continued economic growth across most EU countries, resilient labour markets and sustained public investment. These conditions suggest that living standards are likely to continue improving for people across the European Union. Overall, Europe appears well positioned to maintain its positive performance in social outcomes and to remain a strong source of social cohesion and inclusion.

Europe is also a leading region for civil liberties and institutional resilience. It is governed by the rule of law, respect for human rights and a long tradition of democratic values. The region's post-war political architecture, built on multiple layers of accountability at the EU, national and regional levels, helps safeguard individual freedoms. Strong constitutional traditions, robust media protections and active civil societies reinforce transparency and ensure public oversight. This is evident in Europe's position among the top global performers on perceived adherence to the rule of law, along with Norway and New Zealand, as well as its high levels of freedom of speech and political and civil liberties compared with other major jurisdictions (Figure 5).

Europe has also made important progress in diversity, equity and inclusion, although results vary across countries. This progress is particularly significant at a time when some regions, such as the United States, are experiencing legal and political reversals that challenge long-standing norms. Europe is largely strengthening its diversity, equity and inclusion frameworks and expanding related policies. This resilience confirms its role as a global defender of these values at a time when they face mounting challenges elsewhere. These achievements provide a stable foundation that protects the rights of millions of people and helps set influential international standards for democratic governance and institutional integrity.

Figure 5
Rule of law and civil liberties indices across countries and regions



Source: *EIB staff calculations based on Freedom House (2025), World Justice Project (2026) and Eurostat (2026a).*
Note: *The charts show the top performing EU countries and other international comparators for each index. The rule of law index ranges from 0 to 1, and the civil liberties index ranges from 0 to 100, both increasing in performance. The EU average is weighted by population.*

Taken together, these results reaffirm Europe's position as a global benchmark for social progress. By upholding strong social norms, ensuring transparent and effective governance and maintaining broad access to fundamental rights, the region continues to set high standards for countries seeking to balance economic prosperity with human well-being. These efforts strengthen social cohesion and enable people across Europe to reach their full potential.

Box A
Social investment strengthens trust

Social investment helps strengthen trust by building lasting skills, institutions and services that support society over time. Investment in healthcare, education and housing contributes to more equal and sustainable communities and supports long-term economic and social resilience. Research shows that social policies act as a productive factor that supports growth (Morel et al., 2012), and that strong public health systems improve outcomes and support sustainable welfare systems (Goijaerts et al., 2023).

Generous and fair welfare systems also tend to foster higher political trust (Gillissen et al., 2025). However, trust depends not only on how much governments spend, but also on whether spending meets people's expectations. The quality of healthcare or the adequacy of unemployment protection, for example, strongly influence how people judge social policy. Well-designed and effective social policies are therefore a productive factor for economic development and employment growth (Morel et al., 2012).[3]

3 Social investments help build trust, but when governments do not meet people's expectations or respond slowly, trust can decline even in high-spending systems (Kumlin et al., 2024). Following Alesina and Wacziarg (2000), trust in political institutions is linked to the quality of public policy, the degree of political polarisation and the ability or willingness of political parties to deliver policies supported by the median voter. Alesina argues that globalisation may also have reduced governments' ability to implement policies that voters prefer.

We examine whether concerns about insufficient social spending, including investment, are associated with lower trust in national political parties.[4] In Eurobarometer (European Commission, 2025d), people ranked several investment-intensive social issues – such as housing and health – among the most important concerns.[5,6]

Our analysis shows that perceived shortfalls in key social areas are closely linked with lower trust in political institutions. People who identify rising prices, health, education, housing or energy supply as pressing issues – either personally or nationally – systematically report lower trust. When respondents place health, education or housing among the top two issues for their country, trust in political parties drops by 7 percentage points, 5 percentage points and 5 percentage points, respectively. In a context of rising political and social polarisation and weakening democratic values in some Member States, these declines are important. The results are based on regression analysis that controls for country, population density, age, gender, marital status, education, occupation and subjective social class.[7]

While most social investment takes place at the national level, public opinion also supports a strong role for social investment at the EU level. Using 2020 Eurobarometer data, Eick et al. (2023) studied preferences for 15 policy areas under the European Pillar of Social Rights. They distinguish between social investment policies, which develop and preserve human capital, and compensation policies, which insure against income loss. Their findings show stronger support for social investment at the EU level than for compensation policies, whereas the opposite holds at the national level. Overall, for over two decades, people have tended to place more trust in European institutions than in national institutions.

EU-level investment plays an important role in strengthening trust in European institutions. Research shows that when EU policies direct funds to reduce regional inequalities, they help close long-standing divides between rural and urban areas and increase trust in institutions, especially among people from middle- and lower-income groups (Maneuvrier-Hervieu et al., 2025).

4 There are several measures of trust in the political system, including trust in national government, parliament and the justice system. We focus on trust in the political parties because trust in parliament and government tends to vary with the political cycle, while the legal system is not directly shaped by people's preferences on public spending.

5 In 2023, investments accounted for 17% of EU public spending on housing, 8% on education and 3% on health.

6 At the time of writing, Eurobarometer (European Commission, 2025d) was the latest survey with the data available for our analysis. The relevant questions used for the analysis are: "What do you think are the two most important issues facing (OUR COUNTRY) at the moment?"; "Personally, what are the two most important issues you are facing at the moment?" (the list contains several issues beyond the ones used here, such as living conditions and unemployment); and "How much trust do you have in (NATIONAL INSTITUTION)? For each of the following institutions, do you tend to trust it or tend not to trust it?"

7 The results are similar when using pre-pandemic 2019 data. The effects of social issues on trust are substantial; however, they can be even larger for other issues. For example, respondents who view rising prices as one of the two most important national issues are 10 percentage points less likely to trust political parties.

Labour force participation and skills continue to boost social inclusion

The European labour market has been a key driver of social inclusion and economic competitiveness. Strong employment growth and historically low unemployment rates have supported this positive trend in recent years. Labour force participation has increased, especially among women and older people, and the rise in the working-age population – supported in the euro area by non-EU nationals – shows that labour demand remains high in most EU countries, even if shortages have eased slightly. Changes in the types of jobs available across sectors have also supported productivity growth. As traditional manufacturing industries, such as automotive, play a smaller role in driving growth, demand for high-skilled and well-paid jobs in expanding sectors such as information and communication technology, pharmaceuticals and, more recently, high-tech defence[8] has grown by about one-third over the past decade. This reflects the rising education levels of the working-age population (European Commission, 2025b).

However, several challenges continue to weigh on Europe's labour market. The population is ageing rapidly, key skills remain in short supply, and many firms invest too little in staff training. About 79% of companies still report a lack of skilled workers as a long-term barrier to investment, yet participation in training remains below what is needed (European Investment Bank (EIB), 2025a). Adult participation in education and skill development programmes also falls well short of the European Union's 2030 target, revealing a structural gap in lifelong learning. Demand for specialised skills – especially those needed in increasingly technology-driven workplaces – continues to outpace supply. Europe already faces an estimated shortfall of about 2 million science, technology, engineering and mathematics (STEM) professionals, a gap expected to widen further in the coming years (European Commission, 2025c).

Young people, in particular, face an increasingly challenging environment. International skill assessments of 15-year-olds under the OECD Programme for International Student Assessment reveal wide differences among some EU members. Some perform among the best globally, while others lag behind, raising concerns about basic skills and readiness for future work (OECD, 2023). Europe continues to generate talent for the economic and technological transitions ahead, supported by rising tertiary educational attainment, which reached 44% in 2024. However, enrolment in STEM subjects remains comparatively low and the allocation of skills across the labour market is not always efficient. In many cases, improvements in education have not directly translated into commensurate gains in occupational status. The growing concentration of highly skilled workers in low-productivity sectors shows that barriers to mobility, skill mismatches and wage compression still limit the effective use of people's abilities (European Commission, 2025b).

The rapid diffusion of AI will reshape the relationship between education, skills and career progression, increasing the need for complementary skills. AI can create new opportunities for workers with strong digital, analytical and creative capabilities. In a context of skill shortages, jobs requiring AI skills command wage premiums (Jaumotte et al., 2026). However, AI can also intensify mismatches by automating routine cognitive and technical tasks, particularly for workers with less knowledge or little experience (Ide and Talamàs, 2025). In today's weaker economy, unemployment among recent graduates has risen faster than among the broader population, as entry-level jobs – traditionally a key entry point into the labour market – are increasingly exposed to risk of automation and downward wage pressure. AI is also reshaping roles for mid-career workers. Developing AI-complementary skills and job-specific expertise will become central to successful labour market participation for both young and experienced workers (Stephany and Teutloff, 2023).

8 Because of geopolitical tensions and the war in Ukraine, defence spending in Europe is rising rapidly, creating a need for swift increases in production and staff (more information is available in Chapter 2). Skills in the automotive sector – such as precision manufacturing, electronics and just-in-time logistics – align closely with those needed in defence manufacturing, which leads defence companies to attract automotive employees.

Social investments have a positive impact on labour market participation and skill development by strengthening resilience and productivity. Investing in education and training across all stages of life helps people adapt to changing job requirements, lowers the risk of unemployment and increases overall workforce participation. Social investment also promotes greater inclusion and mobility, enabling people to contribute more effectively to economic growth while improving their long-term well-being.

Housing as a key lever for well-being and labour market participation

The European Union has been grappling with housing shortages in many member countries, which have driven up prices and created serious affordability challenges. Between 2016 and 2025, rents in many European cities rose by 50% to 90%. According to Eurobarometer, housing affordability has become a major concern in Europe, with 51% of city residents identifying the lack of affordable housing as the most urgent and immediate problem and young people ranking affordable housing as the top priority for EU support (European Commission, 2025d and 2025e). This issue affects people directly, and 61% of Europeans worry about being able to pay their mortgage or rent. Without a broad policy response, shortages are likely to deepen, despite ageing populations and slower household formation (Balouktsi et al., 2025). Rising prices and rents have already prevented many people from relocating for work or education and have worsened labour shortages in the most productive European regions.

Addressing housing shortages benefits not only individual well-being but also economic performance. Increasing housing supply helps people access better jobs, reduces labour costs for firms and supports more efficient labour allocation. When workers can afford to move to regions where their productivity is higher, overall productivity increases and regional economic disparities narrow. Improving housing availability in high-demand areas can also prevent the wage losses experienced by workers who are unable to relocate, supporting stronger and more inclusive economic growth. In a context where firms struggle to recruit people with the skills they need, tackling Europe's housing needs is an essential part of the competitiveness agenda.

The potential impact of reducing housing shortages on growth and inequality is substantial. Our estimates suggest that eliminating housing shortages in regions with high housing costs and high productivity would raise the European Union's GDP by 1.7% to 4.5%, depending on people's propensity to relocate (see Box B for methodological details). For individual EU countries, the benefits range from 0.4% to 7.3% of GDP. The economic gains are greater in countries where people living in high-productivity regions face particularly heavy housing cost burdens, or where regional productivity differences are greater. Addressing housing shortages would also lower wage inequality by 1.5% to 3.2%, depending on people's propensity to relocate.

Box B

The macroeconomic impact of housing affordability in the European Union

Affordable housing is not only a social priority, but also a competitiveness issue. Over the past decade, rising rents and house prices in many European cities have restricted labour mobility, worsened skill shortages and increased labour costs for firms. These frictions reduce competitiveness, hold back productivity and weigh on economic growth. This box examines these dynamics and, for the first time, quantifies the macroeconomic gains in the European Union stemming from expanding housing supply in constrained, high-productivity regions.

A unique dataset from ESPON makes it possible to perform this analysis at regional levels for nearly the entire European Union. As part of the HOUSE4ALL project, ESPON collected detailed data on rents, house prices and other housing market conditions, scraping data from online platforms (ESPON, 2025). The listed prices are adjusted for the duration each listing remains online to reflect price competitiveness.[9] We complement this dataset with data from the Annual Regional Database of the European Commission's Directorate-General for Regional and Urban Policy (ARDECO) on employment, GDP and labour compensation, and Eurostat data on the average household size, dwelling size and the share of expenditure on housing.[10] Thanks to the substantial data efforts by these organisations, this is the first analysis to provide a macroeconomic assessment of housing affordability for the European Union at this scale.

A Rosen-Roback spatial equilibrium model is calibrated with EU data to assess how housing costs shape the geographical distribution of workers, wages and output.[11] The model, based on Hsieh and Moretti (2019), assumes that workers choose locations based on wages, housing costs and local amenities. Housing supply responds to demand, depending on a measure of housing elasticity and some exogenous factors. Productivity differences across cities create strong incentives for workers to relocate. However, when housing supply is inelastic, higher demand pushes up prices. In the model, easing housing constraints in the presence of productivity heterogeneity allows house prices to adjust and workers to relocate towards the most productive cities, thereby increasing aggregate GDP.

The impact of addressing housing shortages is assessed through two different sets of counterfactual experiments: EU-wide and country-specific experiments for 23 Member States.[12] The EU-level experiments treat the European Union as a homogeneous geographical area and allow for labour mobility across countries within the European Union. The country-level experiments restrict migration to within national borders. Neither framework allows migration from beyond the European Union. In each counterfactual experiment, 10% of cities are selected and their housing costs reduced to the level of their national averages (relative to wages). In terms of the additional housing units required to generate such a reduction in housing costs, this is roughly in line with the EU-wide housing needs estimated by the Joint Research Centre (Balouktsi et al., 2025).

The counterfactual experiments allow for different levels of labour mobility. In the model with perfect labour mobility, workers move freely, and fully respond to differences in economic conditions across regions. In the model with imperfect labour mobility, location decisions also reflect personal preferences, following Kline and Moretti (2014). This second model can be interpreted as the impact of removing housing shortages over a period of around 30 years.

Interventions to address housing shortages have the largest macroeconomic impact when they target cities with high labour productivity and high housing costs. On average, labour productivity in targeted cities is 28% higher than the national average, while housing costs are 47% higher. These cities are often capitals or other high-income, high-cost urban centres.

9 ESPON data are available at the level of Local Administrative Unit (LAU). For the purpose of our analysis, we aggregate the data to NUTS 3 level. We calculate annual housing costs as 5% of the purchase price of the average housing unit. NUTS refers to the Nomenclature of Territorial Units for Statistics, or La nomenclature des unités territoriales statistiques in French. It is used to reference the administrative divisions of countries for statistical purposes.

10 We use data from the Annual Regional Database (ARDECO) on employment, GDP and labour compensation and NUTS 2-level data on average gross wages to estimate average wages at NUTS 3 level. Robustness checks on the quality of the NUTS 3-level wage estimates are available upon request. In Box B, we refer to NUTS 3 regions as "cities" for simplicity.

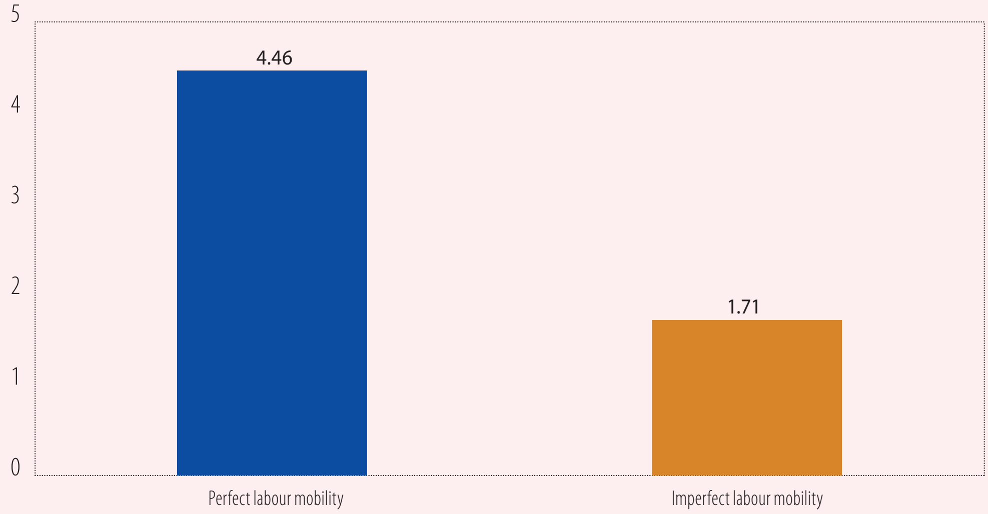
11 Parameters for factor income shares are taken from Valentinyi and Herrendorf (2008). Housing price elasticities are from Calder-Sánchez and Johannson (2011) and Bétin and Ziemann (2019), and parameters on mobility frictions come from Hsieh and Moretti (2019).

12 For the country-level analysis, we exclude Luxembourg, Malta and Cyprus, as each contains only one or two NUTS 3 regions. Because of the small number of regions, we group the Baltic countries into a single geographical area. We omit Croatia because of missing data.

Relaxing housing constraints in these cities would increase EU GDP by 1.7% to 4.5% depending on workers' propensity to relocate. Under perfect labour mobility, these housing cost reductions would raise GDP permanently by 4.5%. Under imperfect labour mobility, the impact on EU GDP would amount to 1.7% (Figure B.1). By relaxing housing constraints, workers can move more easily to cities where their labour is most productive, creating significant gains in productivity and GDP.

Figure B.1

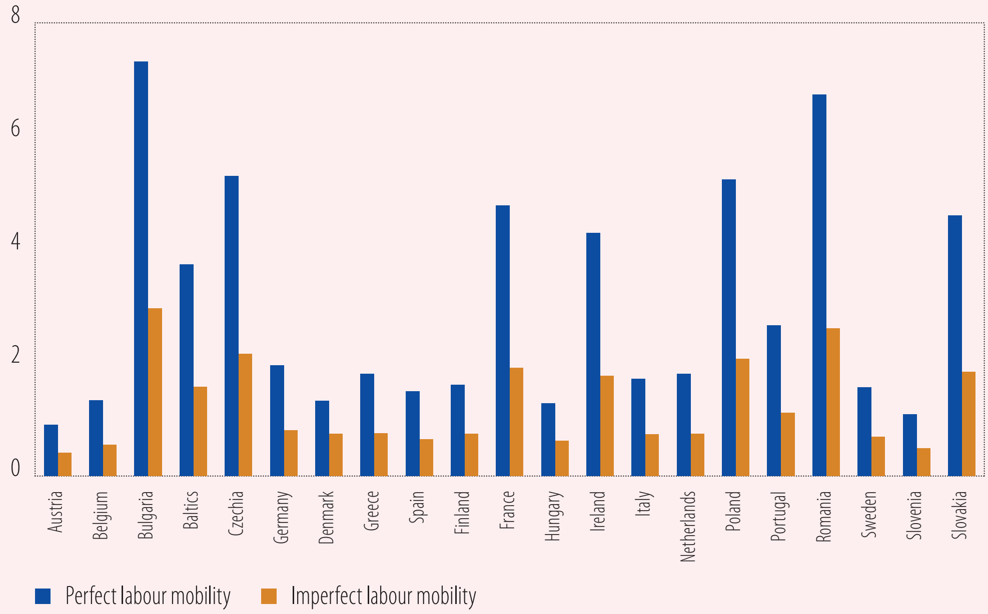
Estimated increase in EU GDP from reducing housing costs in selected productive cities to the national average, allowing for migration within the European Union (in %)



Source: *EIB staff calculations.*

Figure B.2

Estimated increase in national GDP from reducing housing costs to the national average, allowing only within-country migration (in %)



Source: *EIB staff calculations.*
Note: *Baltics include Estonia, Latvia and Lithuania.*

The macroeconomic impact is particularly large in countries with high heterogeneity in productivity and low housing affordability. In the simulations, national GDP rises by 0.9% to 7.3% under perfect labour mobility, and by 0.4% to 3% under imperfect labour mobility. Countries with the largest GDP gains tend to have stronger regional heterogeneity in labour productivity or highly concentrated populations. In these cases, spatial differences in productivity, wages and housing costs are closely intertwined. The most productive firms cluster in economically dynamic urban centres, pushing up local productivity and wages but also driving up housing costs. High housing costs then limit labour mobility and constrain the growth of firms, reinforcing misallocation.

Increasing housing stock in very productive regions also reduces income gaps between regions, and therefore national wage inequality. Expanding the housing supply eases local wage pressures in high-housing-cost regions and raises wages in other regions. Because wages in the selected regions are on average 24% above the national mean, this adjustment leads to a convergence of regional wage levels, reducing wage inequality between regions. To assess this, we combine our data with EU Statistics on Income and Living Conditions (EU-SILC) and decompose wage inequality, measured by the Theil Index,[13] into within-region and between-region components. Between-region inequality accounts for 27% of total wage inequality in the European Union. Within individual EU countries, between-region inequality represents an average of 8.6% of national wage inequality.[14] Housing policies often have distributional effects within the affected region, depending on the type of intervention. Our model does not capture these effects and assumes that within-region inequality remains unchanged when housing costs fall. For this reason, our estimates of the impact on inequality can be seen as a lower bound.

Addressing housing shortages could reduce EU-wide wage inequality by 1.5% to 3.2%, depending on workers' propensity to relocate. With perfect labour mobility, increasing housing stock at the EU level reduces total income inequality by 3.2% and between-region inequality by 11.8%, with the Theil Index falling from 0.387 to 0.375. Country-specific housing interventions reduce total wage inequality by an average of 2.3% across EU members. Even with imperfect labour mobility, we still find sizeable effects. Total wage inequality in the European Union falls by 1.5%, with an average national reduction of 1.3%. For comparison, Filauro et al. (2025) estimate that introducing a hypothetical minimum wage set at 60% of the national median income would reduce national and EU-wide income inequality by 0.9% on average.[15]

13 The Theil Index is a commonly used measure of income inequality. It compares how total income is distributed across individuals relative to perfect equality. A value of 0 means that everyone earns the same amount, while higher values indicate greater inequality.

14 We measure the share of regional wage inequality using the Theil Index, decomposed into within-region and between-region components. Total inequality is based on gross household income data from EU-SILC. Between-region inequality is calculated using our wage estimates for NUTS 3 regions. Within-region inequality is the residual difference between total inequality and between-region inequality.

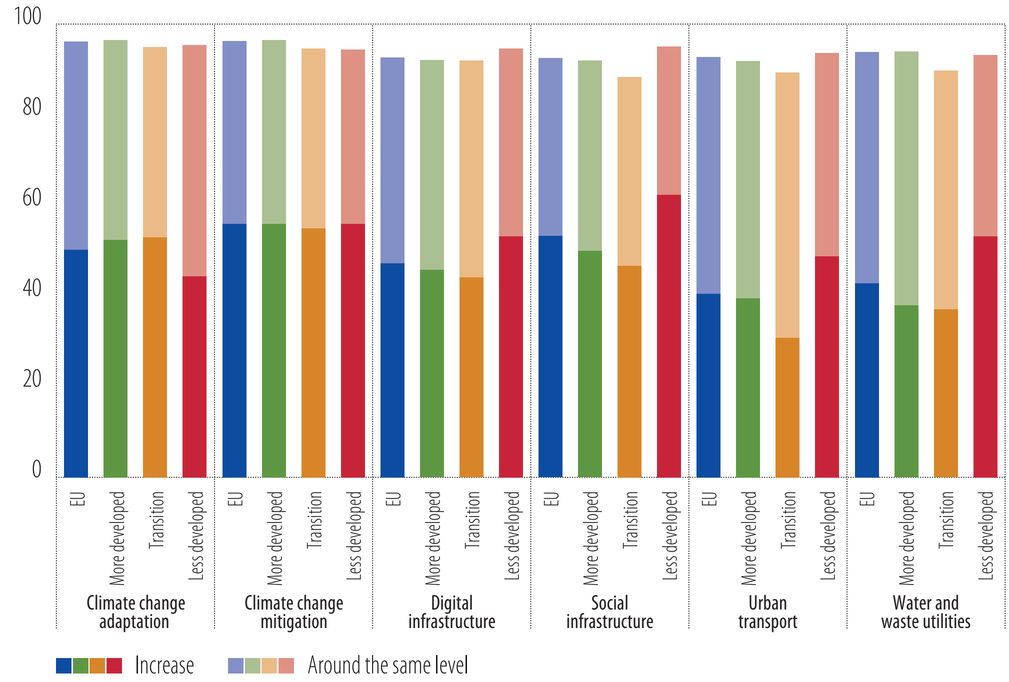
15 See Table A3 and Table A4 on gross income inequality measured by the Theil Index in Filauro et al. (2025).

Regional developments and cohesion

Social investment, including investment in social infrastructure, is essential for the continued convergence between regions in the European Union. Traditional cohesion investments in areas such as education, healthcare and transport remain vital to address long-standing needs, while new requirements such as those in digital infrastructure are becoming increasingly important.[16] Many municipalities plan to step up these investments in the coming years. According to the EIB Municipalities Survey 2024-2025 (EIB, 2025b), 53% of municipalities plan to increase spending on social infrastructure, rising to more than 62% in less developed regions (Figure 6).

Figure 6

Planned infrastructure investment by cohesion classification (% of municipalities)



Source: EIB staff calculations based on the EIB Municipalities Survey 2024-2025 (EIB, 2025b).
Note: The chart is based on the following question from the Municipalities Survey: For each of the following areas, if you compare the average annual infrastructure investment you are planning for the 2024-2028 period versus the average annual infrastructure investment recorded in 2021-2023, does your municipality expect to increase, decrease or have around the same level of spending on infrastructure investment? The remaining share of answers to 100% is "decrease" (not shown).

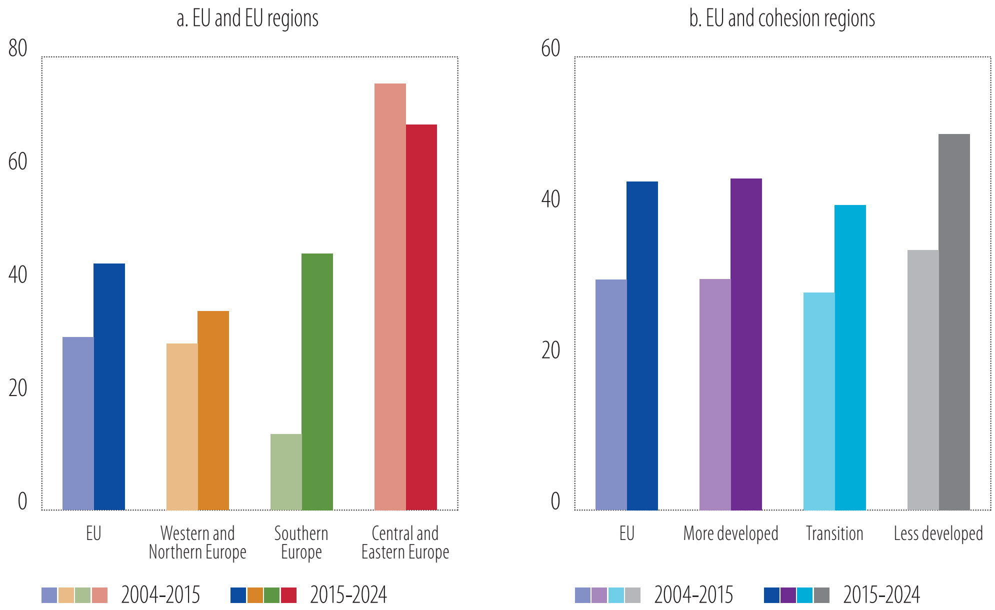
Local governments are taking a leading role in delivering social investment in response to major demographic and economic shifts across urban and rural areas. They are key to aligning housing, transport and social services to support inclusive growth. Local and regional governments carry out more than half of all public investments, and their importance has increased over time. Since 2017, they have accounted for about two-thirds of the increase in total government investment across the European Union (EIB, 2025b). Strong coordination between national and local authorities is therefore essential to maximise the impact of these investments and to avoid widening regional inequalities.

16 Evidence on the role of new digital technologies in economic growth and convergence is mixed (for example, Bakiskan and El Kaissi, 2023). However, recent research highlights the importance of investment that strengthens people's skills as a key driver of long-term income growth and economic convergence (for example, Castelló-Climent and Doménech, 2022). This aligns with earlier studies (for example, Rodríguez-Pose and Comptour, 2012) showing that investment in education at national and local levels can support faster growth and help reduce disparities between EU countries. For a broader overview of related concepts and applications in the European Union, see Eurofound (2024, 2025).

Since its creation, the European Union has been a strong example of economic convergence, helping unlock talent and growth in regions at different stages of development. In 2024, GDP per capita in the European Union was about 44% higher than in 2015 and about 87% higher than in 2004 (Figure 7). All three EU regions – Western and Northern Europe, Southern Europe, and Central and Eastern Europe – recorded significant gains after 2015. The strongest improvements were in Central and Eastern Europe, which started from lower levels but grew rapidly, and in Southern Europe, which recovered from the sovereign debt crisis.[17] Less developed regions grew faster than average, contributing to a reduction in regional disparities.

Figure 7

Growth of GDP per capita (in %)



Source: *EIB staff calculations based on Eurostat (2026a, 2026c), European Commission (2026).*
Note: *Growth rates are expressed as percentage changes for GDP per capita in purchasing power parities. EU regions and cohesion regions are weighted averages based on population.*

Tailored support for cities and metropolitan areas, combined with knowledge sharing between regions, will be essential for future localised policies. As economies become more service-oriented, the role of individual regions – and especially cities – in supporting growth and cohesion has become more important (European Committee of the Regions, 2005; European Commission, 2004). Because place-based policies are expanding, the local level now accounts for most infrastructure investment in areas such as social and transport infrastructure. These are critical to helping local economies grow, improving their competitiveness, generating positive spillovers for surrounding regions, reducing the risk of development traps and skill shortages, and addressing population ageing.

17 A slowdown in Central and Eastern Europe reflects the fact that these countries reached higher income levels in the later period, leading to a natural reduction in GDP growth rates. This pattern is consistent with the theoretical literature on economic growth (for example, Barro and Sala-i-Martin (1992); Sala-i-Martin (1996)).

Box C

The EIB Group's role

Social investment has positive long-term benefits for well-being, labour market outcomes, productivity, competitiveness and economic growth. Equal access to education, training, healthcare and affordable, sustainable housing supports a more skilled and productive population. Stronger social inclusion also reinforces trust in national and EU institutions.

In this context, the EIB Group has a central role to play. The Group has strengthened its commitment to financial and advisory support, with plans to expand lending in areas such as affordable housing, health infrastructure and education – areas that are essential for improving social outcomes and supporting inclusive growth. In 2025, financing for education and health infrastructure reached €10.3 billion, confirming the Group as the main EU financier of social infrastructure. EIB Group support for affordable housing also contributes directly to the European Union's competitiveness by easing skill shortages, supporting labour mobility and helping people access better job opportunities. Evidence shows that directing investment to regions with both housing shortages and high productivity potential delivers the greatest economic and social returns, highlighting the importance of geographically targeted action.

The Group is significantly increasing its support for affordable and sustainable housing through a new three-part strategy. This approach expands eligibility for affordable housing projects, increases financing for energy-efficient housing and promotes innovation in construction methods and materials, in close cooperation with the European Commission. In 2025, the Group provided €5.2 billion for affordable and sustainable housing, and €800 million under TechEU to help accelerate innovation in construction. From 2026 onwards, the Group plans to increase the number of housing units financed over five years and to provide advisory support to help address housing shortages. By expanding access to affordable housing, the Group helps improve labour mobility and education opportunities, easing constraints on firms and supporting more inclusive economic growth.

Targeted investment in local infrastructure, skills and regional competitiveness will remain essential to sustain and accelerate Europe's economic and social convergence. EIB Group support for cohesion regions continues to have a particularly strong economic impact. In 2025, the Group provided nearly €43 billion to less developed and transition regions, representing about half of its EU lending. The Group's cohesion operations in 2021-2024 are estimated to increase GDP in cohesion regions by up to 2.5% by 2040, with positive spillovers in more developed regions.[18] Support in cohesion regions also leads to significantly stronger job creation – about 40% higher than in more developed regions. Financing for small and medium-sized enterprises and mid-caps in cohesion regions boosts firm growth, investments, earnings and productivity, and creates 4% more jobs than comparable support in more developed regions.

18 Estimates are based on EIB-RHOMOLO, a regional model for the European Union. It is a cooperation between EIB staff and the European Commission Joint Research Centre in Seville.

Conclusion and policy implications

Europe's social model is a strength, not a weakness. The region consistently ranks at the top of global measures of social development, reflecting a long-standing commitment to strong social protection and high-quality public services. Europe is healthier, safer and more inclusive than any other global region. It has expanded equality of opportunity, supported by robust education systems, and recent years have brought improvements in income and wealth equality.

Positive labour market trends have been central to social inclusion and competitiveness. Rising employment and historically low unemployment rates in recent years have supported higher participation, especially among women and older people. Higher education levels among the working-age population have helped create more high-skilled, productive and well-paid jobs in growing sectors such as information and communication technology, pharmaceuticals and high-tech defence.

However, several structural trends will test Europe's social model. An ageing population, persistent skill shortages and low investment in training by companies all require attention. The rapid spread of AI means that the acquisition of skills complementary to AI tools and the build-up of job-specific expertise will become an important driver of labour force participation. Investment in lifelong education and training will help people adapt to changing labour demands, increase productivity and support competitiveness. Such investment will also promote social inclusion and mobility, enabling people to participate more fully in society and the economy while improving long-term well-being.

Addressing housing shortages and affordability challenges is crucial for economic growth and inclusion. Housing affordability has become a major concern for Europeans, especially in cities. High housing costs can prevent people from moving to take up employment where they would be most productive. This reinforces skill shortages and raises labour costs for firms. Our analysis shows that easing housing constraints could increase EU GDP by between 1.7% and 4.5% depending on people's willingness to relocate. Interventions to address housing shortages that focus on cities with high labour productivity and high housing costs have the largest macroeconomic impact and help reduce income differences between regions.

Maintaining Europe's social model while meeting major investment needs in defence, innovation and the energy transition will be a challenge. Mobilising more private capital through financial instruments will help bridge the gap. Social investment is not a luxury. It is essential for competitiveness, cohesion, inclusion and well-being. The potential growth benefits from targeted action, such as expanding affordable housing, underline this point. It is also vital to ensure that public investment is well targeted and effective. Drawing on best practice in the use of financial instruments can help mobilise private finance for high-quality social investment and strengthen Europe's capacity to deliver on its social goals.

References

Alesina, A., & Wacziarg, R. (2000). The economics of civic trust. In: Pharr, S. (ed), *Disaffected Democracies*. http://doi.org/10.1515/9780691186849-011

Bakiskan, A., & El Kaissi, S. (2023). Literature review of the economic impacts of broadband. CSLS Research Report 2023-06, Centre for the Study of Living Standards: Ottawa. Available at: https://csls.ca/reports/csls2023-06.pdf

Balouktsi, D., Joossens, E., Le Blanc, J., Pagano A., & Zeugner S. (2025). Housing investment needs in the EU. Joint Research Centre. Available at: https://publications.jrc.ec.europa.eu/repository/handle/JRC144703

Barro, R. J., & Sala-i-Martin, X. (1992). Convergence. *The Journal of Political Economy*, 100(2), 223-251. Available at: http://www.jstor.org/stable/2138606

Bétin, M., & Ziemann, V. (2019). How responsive are housing markets in the OECD? Regional level estimates. OECD Economics Department Working Papers, No. 1590, OECD Publishing: Paris. https://doi.org/10.1787/1342258c-en

Calder-Sánchez, A., & Johansson, Å. (2011). The Price Responsiveness of Housing Supply in OECD Countries. OECD Economics Department Working Papers, No. 837, OECD Publishing: Paris. https://doi.org/10.1787/5kgk9qhrnn33-en

Castelló-Climent, A., & Doménech, R. (2022): Converging to Convergence: The Role of Human Capital. BBVA Research, Working Paper 12/22, Madrid. https://doi.org/10.21203/rs.3.rs-2335045/v1

Centers for Disease Control and Prevention (CDC), & National Centre for Health Statistics (NCHS) (2026). FastStats – Life Expectancy. Available at: https://www.cdc.gov/nchs/fastats/life-expectancy.htm

Eick, G. M., Burgoon, B., & Busemeyer, M. R. (2023). Public preferences for social investment versus compensation policies in Social Europe. *Journal of European Social Policy*, 33(5), 555-569. https://doi.org/10.1177/09589287231212784

ESPON (2025). Access to affordable and quality housing for all people: Main report. Available at: https://www.espon.eu/sites/default/files/2025-11/espon-house4all-main-report.pdf

Eurofound (2024). Role of human capital inequalities in social cohesion and convergence. Publications Office of the European Union: Luxembourg. https://doi.org/10.2806/143041

Eurofound (2025). Narrowing the digital divide: Economic and social convergence in Europe's digital transformation. Publications Office of the European Union: Luxembourg. https://doi.org/10.2806/1764165

European Commission (2024). Ninth Report on Economic, Social and Territorial Cohesion. Directorate General for Regional and Urban Policy, Publications Office of the European Union, Luxembourg, 2024. Available at: https://ec.europa.eu/regional_policy/sources/reports/cohesion9/9CR_Report_FINAL.pdf

European Commission (2025a). AMECO dataset. European Commission, DG for Economic and Financial Affairs: Brussels. Available at: https://economy-finance.ec.europa.eu/economic-research-and-databases/economic-databases/ameco-database_en

European Commission (2025b). Labour market and wage developments in Europe – Annual review 2025. Publications Office of the European Union. https://doi.org/10.2767/1810636

European Commission (2025c). A STEM Education Strategic Plan: skills for competitiveness and innovation. Available at: https://education.ec.europa.eu/sites/default/files/2025-03/STEM-Communication-graphic-version-updated_0.pdf

European Commission (2025d). Eurobarometer, Public opinion on urban challenges and investment in cities. Available at: https://europa.eu/eurobarometer/surveys/detail/3368

European Commission (2025e). Eurobarometer, EU challenges and priorities: young Europeans' views. Available at: https://europa.eu/eurobarometer/surveys/detail/3373

European Commission (2026). Annual Regional Database (ARDECO). Directorate-General for Regional and Urban Policy: Brussels. Available at: https://territorial.ec.europa.eu/ardeco/explorer?lng=en

European Committee of the Regions (2025). The state of regions and cities. EU annual report 2025. Available at: https://cor.europa.eu/sites/default/files/2025-10/EU-annual-report-2025.pdf

European Investment Bank (EIB) (2025a). EIB Group Investment Survey 2025 – EU Overview. https://doi.org/10.2867/4791610

European Investment Bank (EIB) (2025b). The state of local infrastructure in Europe: EIB Municipalities survey 2024-2025. https://doi.org/10.2867/3529559

Eurostat (2026a). Annual National Accounts. Eurostat: Luxembourg. Available at: https://ec.europa.eu/eurostat/web/national-accounts

Eurostat (2026b). Tables on EU policy. Eurostat: Luxembourg. Available at: https://ec.europa.eu/eurostat/data/database

Eurostat (2026c). Regional statistics by NUTS. Eurostat: Luxembourg. https://ec.europa.eu/eurostat/web/nuts

Eurostat (2026d). Tables on EU policy: Life expectancy by age and sex. Eurostat: Luxembourg. Available at: https://ec.europa.eu/eurostat/databrowser/view/demo_mlexpec__custom_11055020/bookmark/table?lang=en&bookmarkId=8b3120c7-4116-4fa0-8cf0-4d1a45112c74&c=1713969318965

Filauro, S., Grünberger, K., & Narazani, E. (2025). Coordinated Minimum Wage Policies: Impacts on EU-Level Income Inequality. *The B.E. Journal of Economic Analysis & Policy*, 25(2), 209-246. https://doi.org/10.1515/bejeap-2024-0103

Freedom House (2025). Freedom in the World (dataset). Freedom House Foundation: Washington, DC. Available at: https://freedomhouse.org/report/freedom-world

Gatti, M., van der Wielen, W. Public Financial Support and Access to Finance: Evidence from EIB Lending to Businesses. J Financ Serv Res (2026). https://doi.org/10.1007/s10693-026-00462-8

Gillissen, M., Goubin, S., & Ruelens, A. (2025). Social policy and political trust: Long-term effects of welfare generosity in Europe. *Political Studies*, 1-23. https://doi.org/10.1177/00323217251340857

Goijaerts, J., van der Zwan, N., & J. Bussemaker (2023). Health and the social investment state. *Journal of European Public Policy*, 30(5), 828-848, https://doi.org/10.1080/13501763.2022.2038239

Hanson, M. (2026). Student Loan Debt Statistics. EducationData.org. Available at: https://educationdata.org/student-loan-debt-statistics

Hsieh, C. T., & Moretti, E. (2019). Housing Constraints and Spatial Misallocation. *American Economic Journal: Macroeconomics*, 11 (2), 1-39. https://doi.org/10.1257/mac.20170388

Ide, E., & Talamàs, E. (2025). Artificial Intelligence in the Knowledge Economy. *Journal of Political Economy*, 133(12). https://doi.org/10.1086/737233

International Labour Organization (ILO) (2026). Indicators and data tools. Geneva. Available at: https://ilostat.ilo.org/data/

Jaumotte, F., Kim, J., Koll, D., Li, E. Z., Li, L., Melina, G., Song, A., & Tavares, M. M. (2026). Bridging Skill Gaps for the Future: New Jobs Creation in the AI Age. Staff Discussion Note SDN2026/001. International Monetary Fund: Washington DC. Available at: https://www.imf.org/-/media/files/publications/sdn/2026/english/sdnea2026001.pdf

Kline, P., & Moretti, E. (2014). People, Places, and Public Policy: Some Simple Welfare Economics of Local Economic Development Programs. *Annual Review of Economics*, 6, 629-662. https://doi.org/10.1146/annurev-economics-080213-041024

Kumlin, S., Nemčok, M., & Van Hootegem, A. (2024). Welfare state evaluations, normative expectations, and political trust: Longitudinal evidence from Germany and Norway. *Public Management Review*. https://doi.org/10.1080/14719037.2023.2297292

Lafortune, G., & Grayson, F. (2025). Europe Sustainable Development Report 2025: SDG Priorities for the New EU Leadership. Paris: SDSN and Dublin: Dublin University Press. Available at: https://files.unsdsn.org/20250121-EU-SDR-2025_WEB.pdf

Maneuvrier-Hervieu, P., Azzollini, L., & Jeannet, A-M. (2025). Cultivating trust? The role of European Union investments in bridging rural-urban divides. *Electoral Studies*, 98. https://doi.org/10.1016/j.electstud.2025.102987

Morel, N., Palier, B., & Palme, J. (2012). Social Investment: A Paradigm in Search of a New Economic Model and Political Mobilisation. In: Morel, N., Palier, B. & Palme, J. (eds.), *Towards a Social Investment Welfare State? Ideas, Policies and Challenges*, 353-376. Bristol: Policy Press

Organisation for Economic Co-operation and Development (OECD) (2023). PISA 2022 Results (Volume I): The State of Learning and Equity in Education. OECD Publishing: Paris. https://doi.org/10.1787/53f23881-en

Organisation for Economic Co-operation and Development (OECD) (2025). Education at a Glance 2025: OECD Indicators. OECD Publishing: Paris. https://doi.org/10.1787/1c0d9c79-en

Organisation for Economic Co-operation and Development (OECD) (2026a). National Accounts at Glance. Chapter 5: Households. OECD Publishing: Paris. Available at: https://data-explorer.oecd.org/vis?lc=en&df[ds]=DisseminateFinalDMZ&df[id]=DSD_NAAG%40DF_NAAG_V&df[ag]=OECD.SDD.NAD&df[vs]=1.0

Organisation for Economic Co-operation and Development (OECD) (2026b). OECD Well-being Data Monitor. Available at: https://www.oecd.org/en/data/tools/well-being-data-monitor.html

Rodríguez-Pose, A., & Comptour, F. (2012). Do clusters generate greater innovation and growth? An analysis of European regions. *The Professional Geographer*, 64(2), 211-231. https://doi.org/10.1080/00330124.2011.583591

Sala-i-Martin, X. (1996). The classical approach to convergence analysis. *Economic Journal*, 106(437), 1019-1036. https://doi.org/10.2307/2235375

Singapore Ministry of Social and Family Development (2026). Singapore, Research reports and data. Available at: https://www.msf.gov.sg/research-data/research-reports-data

Stephany, F., & Teutloff, O. (2023). The value of skill complementarity, especially in artificial intelligence. Bruegel: Brussels. Available at: https://www.bruegel.org/analysis/value-skill-complementarity-especially-artificial-intelligence

United Nations (2026). Data Portal Population Division, New York. Available at: https://population.un.org/dataportal/home?df=19473d6e-19f9-4e1e-b92c-6b62b29a0d0b

US Department of Justice (2025). Homicide Victimization in the United States 2023. Bureau of Justice Statistics. Available at: https://bjs.ojp.gov/document/hvus23.pdf

Valentinyi, Á., & Herrendorf, B. (2008). Measuring factor income shares at the sectoral level. *Review of Economic Dynamics*, 11(4), 820-835. https://doi.org/10.1016/j.red.2008.02.003

World Bank (2026). World Development Indicators. World Bank Group: Washington DC. Available at: https://databank.worldbank.org/source/world-development-indicators

World Inequality Database (2026). Data – WID – World Inequality Database. Paris. Available at: https://wid.world/data/

World Justice Project (2026). WJP Rule of Law Index | Global Insights. Washington, DC. Available at: https://worldjusticeproject.org/rule-of-law-index/global/2025/

Data annex

The availability and quality of the data on investment are critical to supporting effective policymaking. In addition to national accounts, economists need to rely on other sources of macroeconomic data to analyse important aspects of investment, including infrastructure investment and intangible investment, and they increasingly make use of firm-level data.

This annex outlines these datasets and provides references to detailed methodological notes.

EIB Investment Survey

General module

The EIB carries out an annual survey of firms in the European Union (EIBIS General Module) with the aim of monitoring investment and investment finance activities and capturing potential barriers to investment. The survey covers approximately 12 000 companies across the European Union and slightly more than 800 firms in the United States. It is administered by telephone (in the local language) and takes an average of 25 minutes to complete. The first wave of the survey took place in 2016 and the survey completed its tenth wave in 2025, with interviews held between April and July 2025.

Using a stratified sampling methodology, the EIBIS General Module is representative for all 27 Member States of the European Union and the United States. It is representative at the level of four firm size classes (micro, small, medium and large) and four sector groupings (manufacturing, services, construction and infrastructure) for most countries.

Firms must have a minimum of five employees to be interviewed, with full-time and part-time employees counted as one and employees working less than 12 hours per week excluded. Eligible respondents are employees in senior positions with responsibility for investment decisions.

The survey is designed to build a panel of observations over time and is set up in such a way that survey data can be linked to firms' reported balance sheet and profit-and-loss data (see EIBIS-Orbis matched dataset below). Approximately 40% of the companies interviewed in each wave are companies that have already taken part in the survey in the previous wave.

The EIBIS General Module complements pre-existing information on investment activities in the European Union. It adds a firm-level dimension to the macroeconomic data available and thus facilitates a more fine-grained analysis of firm investment patterns. It also adds to existing firm-level surveys at a national level by providing full comparability of results across countries. The survey complements the European Commission investment survey by asking a much wider set of qualitative and quantitative questions on firm investment activities. It rounds out the European Central Bank/European Commission SAFE survey by focusing on the link between firm investment and investment finance decisions.

Table 1
EIBIS at a glance

27	EU Member States are all consistently represented by the survey – more specifically, non-financial enterprises with at least five employees and belonging to NACE categories C to J.
4	industry groupings and size classes determine the representativeness of the data within almost every member country.
11 990	firms in the European Union participated in the last wave of the survey.
801	US firms participated in the last wave of the survey.
43%	of all firms participating in the last wave responded in at least two consecutive waves.
83%	of firms surveyed in 2025 agreed to be contacted again for next year's survey.

The EIBIS is a very powerful instrument built according to the highest scientific standards. To guarantee top quality, every step of the survey process is executed and closely monitored by experts in the field. All steps – sampling and weighting, questionnaire development and translation, the fieldwork, and quality control and data processing – are also subject to strict controls and validation. More information on these technical aspects can be found in the technical report produced by the market research company conducting the survey (Ipsos, 2020). Table 1 presents key numbers about the EIBIS.

All aggregated data using the EIBIS General Module in this report are weighted by value added to reflect the contribution of different firms to economic output more closely. The 2025 wave uses updated weightings with the latest Eurostat statistics. More information about the survey is available at www.eib.org/eibis.

EIB Municipalities Survey 2024

In 2024, the EIB Municipalities Survey polled 1 002 municipalities in the European Union on their infrastructure investment activities and associated barriers.

The survey was administered by telephone (in the local language) among mayors, treasurers and/or municipalities' chief civil engineers. It took a median average of about 23 minutes to complete. Fieldwork took place between June and September 2024. As part of the survey, 1 002 municipalities were interviewed in all 27 Member States.

The sample frame from which municipalities were randomly selected was a comprehensive list of European municipalities. All larger municipalities (above 2 000 inhabitants) were eligible to be included in the exercise.

Regional and European Union-wide figures are weighted based on the urban population in each country to take size differences into account.

More information on the EIB Municipal Survey is available upon request by email to municipality_survey@eib.org.

EIBIS-Orbis matched dataset

This report includes analysis based on a dataset that combines firm-level information from Bureau van Dijk's Orbis with the EIBIS – the EIBIS-Orbis matched dataset. Orbis is a proprietary dataset that contains firm-level accounting information and ownership data, gathered and standardised according to a global format that makes accounting data comparable across jurisdictions. Items from the balance sheet and profit-and-loss accounts have been used to construct standard financial ratios for firms that reflect financing activity and financial health. All data were reviewed following standard cleaning procedures to eliminate outliers and inconsistencies. Negative values for fixed assets, total assets and other stock variables were removed and all ratios have been winsorised at 1%. Starting in 2024, the matching has also been updated with Orbis Intellectual Property, which features a rich dataset on the patenting activities of companies listed in Orbis.

The matched dataset complements the cross-sectional perspective of the EIBIS with time series information starting in 2000. Custom panel datasets used in several analyses in this report were constructed thanks to this dataset.

FactSet database

The FactSet Supply Chain Relationships database records links between public and large private companies worldwide and groups them into four categories: customers, suppliers, competitors and partnerships.

The information is collected from sources such as US Securities and Exchange Commission (SEC) 10-K filings, investor presentations and press releases. It is complemented with details including the start and end dates of the relationships and keywords that summarise their content.

These data are used in this publication to trace the upstream suppliers and downstream customers of individual companies or sectors. The disclosed competitor links have also been used to identify firms operating in the same sector. In addition, the keywords describing the exchanges between companies – such as the product supplied – have helped to identify producers of specific goods. To enrich the dataset with company-specific information, additional FactSet data on the entities involved in the reported relationships have been integrated, including general details such as the country of incorporation and company names.

The main limitation of the database relates to the incomplete representation of complex supply chain connections, particularly for large and diversified companies. Although the dataset is gathered systematically and treated transparently in the report's analysis, firms do not disclose all of their relationships with other entities.

AIPNET database

The AIPNET dataset comes from the work of Fetzer et al. (2024). It is an AI-generated production network at the six-digit Harmonized System code level that produces a list of all upstream and downstream linkages between products. This production network helps to extract the upstream inputs of any Harmonized System product, and it shows "what goes into what" for any Harmonized System product in Comtrade bilateral flows data. These upstream product linkages are country and time-invariant vectors.

References

Fetzer, T., Lambert, P. J., Feld, B., & Garg, P. (2024). AI-generated production networks: Measurement and applications to global trade. Available at: https://ideas.repec.org/p/ces/ceswps/_11497.html

Ipsos (2020). EIB Group survey of investment and investment finance. Technical Report, November.

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