SUERF
The European Money and Finance Forum

SUERF Policy Brief
No 1489, June 2026

Why Europe lags behind in high-tech sectors: The role of institutional and regulatory quality

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Keywords: Institutional quality, regulation, innovation, high-tech sectors, AI, investment, EU, competitiveness

JEL codes: E02, O38, L51, C23

Abstract

Europe's persistent productivity gap vis-à-vis the United States is closely linked to lower private investment in high-tech and innovative sectors. This policy brief highlights the role of institutional and regulatory quality in explaining that gap. The findings show that better governance, more flexible labour markets and lower administrative burdens significantly increase the share of private investment directed towards high-tech and artificial intelligence (AI)-intensive sectors. Convergence of EU countries' institutional frameworks towards the EU frontier could raise high-tech investment shares by up to 50%, thereby helping to narrow Europe's innovation gap with the US by a similar extent and strengthening long-term productivity growth.

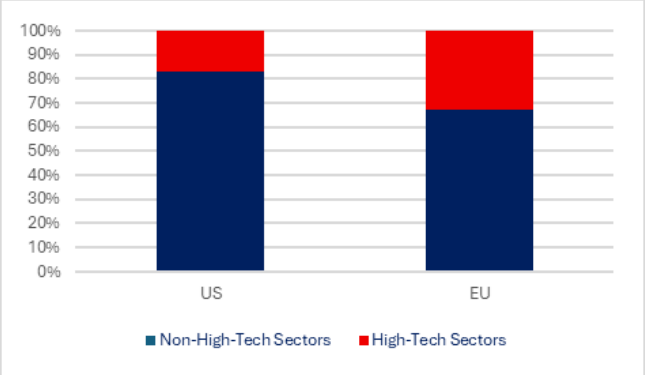
Disclaimer: This policy brief is based on ECB Working Paper No. 3185: "Why is Europe Lagging Behind in High-Tech Sectors? The Role of Institutional and Regulatory Quality". The views expressed are those of the authors and do not necessarily reflect those of the European Central Bank.

Introduction

Since the mid-1990s, productivity growth in the European Union has lagged behind that of the United States. A key driver of this divergence is Europe's lower share of investment in high-tech and innovative sectors, as highlighted by Draghi (2024). While the US has increasingly specialised in cutting-edge sectors such as information and communication technologies (ICT), artificial intelligence, and biotechnology, European economies remain more focused on traditional mid-tech industries. In 2021, approximately 17 % of market sector gross fixed capital formation in EU countries was concentrated in sectors classified as high-tech by Eurostat, while the corresponding share in the United States was nearly double, reaching 33 % (Figure 1).

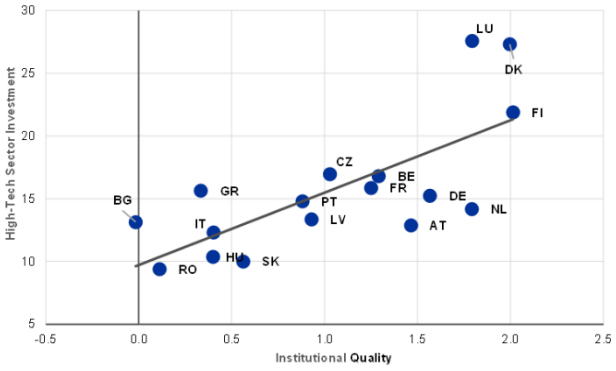
This difference in investment composition matters for growth. High-tech sectors generate stronger productivity spillovers, faster innovation cycles, and larger long-term gains. In contrast, mid-tech sectors tend to deliver more incremental improvements and are increasingly exposed to competition from China (Fuest et al. 2024).

Figure 1. High-tech private-sector investment shares in the EU and US, 2021
(percent of total investment)



Source: Bothner et al. (2026) using EU KLEMS data on gross fixed capital formation at 2-digit NACE industry level.
Notes: High-tech sectors include NACE sectors C20-C21 (chemicals and pharmaceuticals), C26 (Manufacturing of computers) and J (Media and information and communication technology). The EU high-tech sector investment share is based on the 17 EU countries for which data on gross fixed capital formation is available for these three NACE codes in the EU KLEMS dataset.

Figure 2. Institutional quality and high-tech private-sector investment, 2021
(x-axis: score, y-axis: percent of total investment)



Sources: Bothner et al. (2026) based on data from EU KLEMS and Worldwide Governance Indicators.
Notes: High-tech sector investment is defined based on the Eurostat high-tech aggregation by NACE Rev. 2 at 2-digit level. A sector is classified as high-tech if it is either classified as a high-technology manufacturing sector or as a high-tech knowledge-intensive service sector. Institutional quality is the average of the four institutional delivery indicators (the rule of law, control of corruption, regulatory quality, and government effectiveness) of the Worldwide Governance Indicators.

This policy brief argues that differences in institutional and regulatory quality are a key factor behind Europe's lag in high-tech investment. Strong governance, alongside efficient labour and product market regulations, is essential to support investment in innovative, high-tech and AI-intensive sectors. These sectors are characterised by high uncertainty, frequent trial-and-error, and strong scaling requirements, making them particularly sensitive to the costs of adjustment and failure (Coatanlem and Coste 2025). Inefficient regulatory and institutional frameworks raise these costs and thereby discourage investment.

In particular, rigid labour markets increase the cost of restructuring and scaling projects up or down, and high administrative burdens slow firm entry, weaken competition and hamper firm expansion. Weak governance raises uncertainty and reduces investor confidence. Taken together, these factors disproportionately discourage investment in innovative sectors compared to more stable, less risky, traditional industries. Consistent with this mechanism, unconditional correlations show that countries with more effective governance and less restrictive regulatory

environments allocate a larger share of investment to high-tech sectors (Figure 2), underlining the importance of institutional and regulatory quality for Europe's innovation and productivity performance.

What we study

Our analysis covers 25 EU countries over the period 2004–2019 (extended to 2023 for the AI-related analysis). It examines how institutional and regulatory conditions affect the allocation of private investment across sectors with different levels of innovativeness.

We focus on three key dimensions of institutional and regulatory quality. These indicators can be broadly interpreted as determinants of firms' start-up and rescaling costs which strongly determine firms' profitability in disruptively innovative sectors (Coatanlem and Coste 2025):

- **Institutional delivery**, capturing governance quality (rule of law, corruption control, government effectiveness, regulatory quality) based on the Worldwide Governance Indicators (WGI).
- **Labour market regulation**, measured by the OECD employment protection legislation (EPL) on the stringency of labour market regulations on collective and individual permanent dismissals.
- **Business regulation**, proxied by the World Bank Starting a Business Score, which assesses the administrative burden placed on entrepreneurs when establishing a business.

The analysis links these institutional and regulatory indicators to investment in sectors with different degrees of innovativeness. The sectors are classified in terms of their level of technological advancement and innovativeness using three different approaches:

- High-tech sector classification based on the Eurostat taxonomy. A sector is considered high-tech if it is either classified as a high-technology manufacturing sector or as a high-tech knowledge-intensive service sector.
- Patent intensity based on US patent data matched to sector classifications as a proxy for innovation output.
- AI intensity, capturing sectors with greater exposure to and use of artificial intelligence, relying on the taxonomy developed by Calvino et al. (2024).

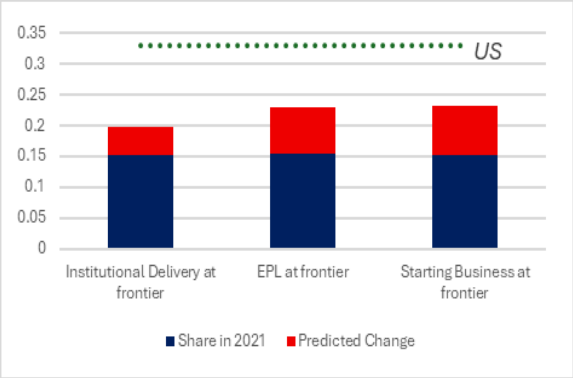
The empirical framework assesses how improvements in institutions differentially affect investment in innovative versus non-innovative sectors.

Institutions and regulations shape investment in high-tech sectors

The results show a clear and robust relationship: better institutional and regulatory quality is associated with higher investment shares in high-tech sectors. The magnitude of the effect is economically meaningful. Raising each EU country's Institutional Delivery Index to the EU frontier would increase the high-tech sector investment share by 4.6 percentage points. Similarly, aligning each country's EPL index and Starting a business score with their respective EU frontiers is estimated to raise the high-tech sector investment share by 7.6 and 7.9 percentage points, respectively. This suggests that institutions play an important allocative role in directing market investment toward more productive and innovative activities, in addition to any broader effect they may have on overall investment levels.

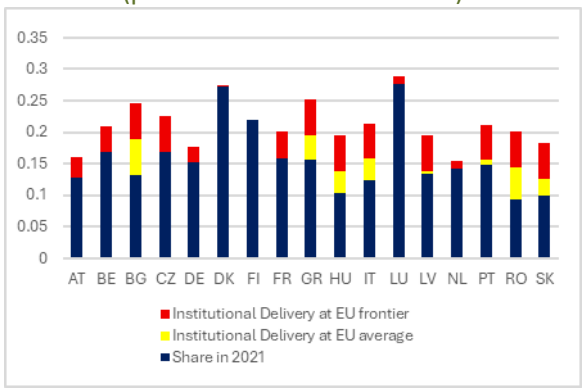
A comparison to the investment shares of high-tech sectors in EU countries puts this into perspective: In 2021, investment in high-tech sectors accounted for 15.1% of total market sector investment across 17 EU countries. The estimated increases associated with raising each country's institutional indicators to the frontier are substantial, corresponding to roughly a rise of 30% to 50% compared to current levels (Figures 3 and 4).

Figure 3. EU high-tech sectors' private investment share under alternative catch-up scenarios
(percent of total investment)



Source: Bothner et al. (2026).
Notes: High-tech sector investment is defined based on the Eurostat high-tech aggregation by NACE Rev. 2 at 2-digit level. A sector is classified as high-tech if it is either classified as a high-technology manufacturing sector or as a high-tech knowledge-intensive service sector. Institutional quality is the average of the four institutional delivery indicators (the rule of law, control of corruption, regulatory quality, and government effectiveness) of the Worldwide Governance Indicators. Data refer to 17 EU countries for which data were available. Dotted horizontal line shows high-tech sector investment shares in the US.

Figure 4. High-tech private-sector investment share by EU country
(percent of total investment)



Sources: Bothner et al. (2026).
Notes: Simulation of the effects for high-tech investment share of raising each EU country's institutional indicators to the EU frontier, based on the estimated marginal effects in Bothner et al. (2025). Results are not available for remaining EU countries.

The positive impact of the institutional and regulatory framework is also evident under alternative measures of innovation. Our findings suggest that better governance and simpler business regulations significantly increase investment in AI-intensive sectors. Raising institutional quality to the EU frontier could increase AI-intensive investment shares by 2 to 7 percentage points, which represents an increase of between 8% and 27%. Similarly, patent-intensive sectors receive disproportionately more investment when institutional quality improves, indicating that governance improvements particularly benefit sectors closer to the technological frontier.

Conclusions

Institutional and regulatory frameworks play an important role in the allocation of investment to different sectors in Europe. Aligning institutional frameworks with those of best-performing EU countries could substantially help direct more private funds into high-tech activities and narrow the respective gap with the United States.

Improving the rule of law, reducing corruption, and enhancing government effectiveness could significantly boost investment in high-tech sectors compared to traditional industries. Simplifying procedures for starting and running businesses can lower entry barriers and encourage competition, innovation-driven entrepreneurship and risk-taking. More adaptable labour markets and less cumbersome administrative procedures could reduce the cost of failure, restructuring and rapid scaling up, which is crucial for high-risk innovation, enhancing productivity and long-term growth.

These reforms are particularly important in the context of increasingly complex EU and national regulatory frameworks. Legislation on anti-money laundering, sustainability reporting, due diligence, data protection, online content, AI, and digital services has addressed the need to protect fundamental rights in a modern, digitalised society but has also added to the cumulative regulatory burden, particularly and often disproportionately for small and medium-sized enterprises.

Structural reforms aimed at strengthening governance and reducing regulatory frictions should therefore be at the core of Europe's competitiveness strategy, complementing policies to deepen the Single Market and advance the Savings and Investment Union. At the EU level, relevant initiatives, aligned with the European Commission's Competitiveness Compass, include the ongoing simplification "Omnibus" packages and the proposal for a 28th corporate law regime. At the national level, several EU countries provide useful benchmarks. Denmark, Finland, Sweden and the Netherlands are among Europe's innovation leaders, while being characterised by sound institutions, transparent governance mechanisms and relatively high levels of public sector integrity and trust. Drawing lessons from such best practices could help other EU countries overcome reform barriers and strengthen their position in high-tech sectors, boosting overall productivity and living standards.

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