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FUNDING IDEAS, NOT COMPANIES

RETHINKING EU INNOVATION POLICY FROM THE BOTTOM UP

A REPORT BY

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ABSTRACT

Competitiveness has returned to the top of the EU agenda, with the EU Competitiveness Compass highlighting the need for innovation-driven growth. But European industry has fallen behind in innovation by specializing in mid-tech industries, now increasingly subject to Chinese competition.

Since the start of Horizon 2020, the EU budget has provided about €100 billion to support research and innovation. But this seems to have had little impact.

A large proportion of Horizon funding has gone to a small number of big corporations with modest innovation and growth performance. Another sizable share goes to SMEs that are part of wider corporate groups.

Moreover, the lion’s share of Horizon funding has gone to collaborative programs, with detailed guidelines on research topics and expected outcomes, typically involving broad-based consortia with more than 20 participants. Yet our analysis suggests that bottom-up programs undertaken by individual recipients yield better results, but only if the recipients are independent SMEs.

Any new Framework Program should thus focus on funding ideas, not companies. They key is not more money, but rather leaving space for disruptive innovation by encouraging bottom-up initiatives, especially by small independent companies.

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RECOMMENDED CITATION

Instead of supporting bold ideas from small innovators, a significant portion of Horizon's budget is allocated to large firms in mature industries. Another substantial share goes to consultancies that specialize in managing collaborative projects—often involving unwieldy consortia—that fail to deliver lasting competitive advantages for their participants. The study shows that single-recipient grants to small, independent firms yield better long-term outcomes. To escape the "Middle Technology Trap," Europe must fund new ideas, not incumbents.

HOW TO CITE THIS REPORT

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CONTENTS

Executive Summary

This report examines the track record of EU support for R&D over the past ten years. The backdrop is an EU industrial landscape largely anchored in mid-tech sectors. Notably, the five largest R&D spenders in the EU are all in the automotive industry. Over the past two decades, the share of EU firms in high-tech sectors has dropped by half—from 22% to just 11%.

Given this context, the success of the Horizon program should be evaluated based on whether it has effectively fostered the innovation-driven growth envisioned in the EU's Competitiveness Compass.

KEY FINDINGS:

- **Funding allocation skewed toward low-growth firms**
  More than half of Horizon program funding goes to mid-tech firms and consultancies with limited innovation and growth potential.
- **Dominance of large corporate groups**
  Many beneficiaries are repeat recipients—some involved in up to 200 projects—typically belonging to wide corporate groups. These entities receive funding for research close to their corporate interests.
- **Collaborative instruments: Limited impact**
  Most Horizon funding (60-80%) is directed to collaborative instruments involving sizable international consortia with detailed top-down research agendas. However, there is no evidence that these collaborations improve recipients' long-term growth or innovation outcomes. Some positive effects are observed during the grant period (about three years), but they do not persist beyond the funding horizon.
- **Collaborative instruments: Research programs dominated by Member States**
  The work programs for these collaborative instruments are elaborated by big program committees in which national, often corporate interests dominate. This leads to programs that seek incremental, rather than radical innovation.
- **Early-stage innovation support seems ineffective**
  Grants targeting early-stage innovation often go to large corporate entities rather than small independent firms. For these large firms it is difficult to measure the impact of relatively small grants.

- **Single-entity, SME-targeted instruments show the most promise**
  Funding programs like the SME Instrument and European Innovation Council (EIC) Accelerator show significant and lasting positive effects—but only for small, independent firms (i.e. SMEs that do not belong to wider groups). These companies are also more likely to file high-tech patents.
- **Limited reach of effective funding**
  Only roughly 20% of funding reaches independent innovators in the sample; the figure drops to 7.5% when focusing on SME recipients. Additionally, the strongest growth effects are observed in consultancy and support service sectors, not in IT or manufacturing.

KEY RECOMMENDATIONS:

1. **Refocus Horizon funding**
   Reallocate resources from collaborative instruments to SME-targeted programs—especially those supporting early-stage, high-potential innovation—within Pillar 3 of Horizon Europe (under the EIC).
2. **Support independent innovators**
   Prioritize funding for small, independent companies that do not belong to corporate groups. Impose limits on repeated participation and restrict funding to consultancy firms.
3. **Encourage novelty and bottom-up innovation**
   Promote open and flexible calls to allow space for novel and diverse ideas, following the EIC's "Challenge" approach.

1. INTRODUCTION AND KEY MESSAGES

1. INTRODUCTION AND KEY MESSAGES

Competitiveness has returned to the top of the EU agenda. The European Commission has launched its Competitiveness Compass in January 2025, which proposes a "*new competitiveness model based on innovation-led productivity* " and "*a new focus on raising R&D spending* " (European Commission, 2024a). All the same, R&D is a means, not an end: what ultimately matters is whether it boosts long-run growth.

The Draghi Report (Draghi, 2024) and others (Fuest et al., 2024) have emphasized that the European competitiveness gap with the United States is mainly due to underinvestment in high-tech industries with high growth potential.

For instance, Europe has clearly missed the AI bus.[1] High-tech in general, and software in particular, have long been relatively underdeveloped in Europe, where industry has specialized in mid-tech sectors, mostly manufacturing (Fuest et al., 2024).[2]

The AI-related boom in both software and hardware, like data centers and advanced chips to train frontier large language models has grown so large that it is driving the out-performance of the US economy.[3] This is not an accident, but the result of a wider and longer-term development. Today's dominance of US firms in high-tech is based on decades of higher investment in R&D (Figure 1.1).[4] Therefore, one cannot expect that simply increasing public spending on R&D will close the competitiveness gap.

Nor can one expect a sudden surge in private spending on high-tech R&D from Europe's (small) high-tech sector. Relative to their sales, European high-tech companies invest as much in R&D as US-based ones. But their size in terms of turnover is simply too small to justify much more R&D expenditure. This suggests that restoring competitiveness will require patience.

The EU should prepare for a marathon, instead of a sprint. Doing so requires a combination of improved framework conditions for new companies in high-tech (risky) industries, combined with steady public sector support for R&D focused on potentially disruptive ideas, rather than financing incremental innovation by large incumbents.

So far, a large proportion of funding from Horizon and previous framework programs has gone to a restricted number of big corporations.[5] Yet their revenues have grown less than most comparator groups, and they have not produced any radical innovation.

Moreover, the lion's share of Horizon funding has been provided through

[1] This is not necessarily the case in terms of scientific publications (Veugelers, 2024), but surely is in terms of sales, R&D spending and patents.

[2] Currently, these sectors are also exposed to the vagaries of Trump's tariff threats.

[3] An open question is whether AI adoption, rather than development, should be subsidized in Europe (Box 1).

[4] See Box 2 for a definition of "high-tech" sector.

[5] Examples are companies such as Airbus, Thales and Siemens.

programs that are quite specific about the expected outcomes, and mandate collaboration among entities from all regions of the European Union, resulting in consortia with more than 20 participants. Our analysis, however, suggests that single-recipient programs targeting small independent companies are the only ones boosting recipients' competitiveness.

EU innovation policy thus needs a fundamental reform. Any new Framework Program should focus on funding promising new ideas, not companies. Future framework programs should also be less prescriptive and abandon the implicit requirement to form wide-ranging consortia for the sole purpose of increasing the chance of winning a grant.

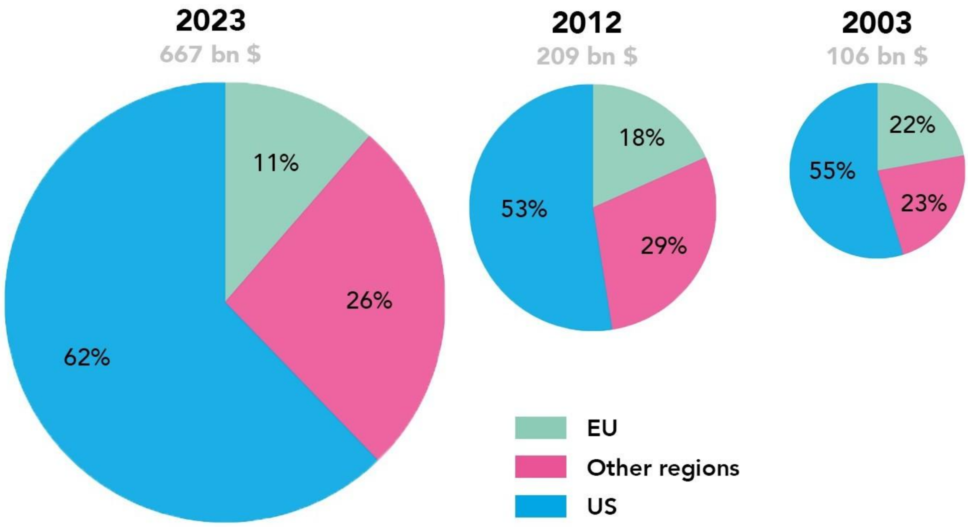
The relatively modest sums available to Horizon can still play a pivotal role in transforming a great idea into a unicorn. Tech giants like Google and Amazon did not originate from the R&D labs of large corporations, but from visionary individuals or small teams operating outside big corporate structures. Large firms can also produce radical innovation—think of Google's Deep-Mind, which thanks to AlphaFold solved the protein folding problem (Jumper et al., 2021). But they do not need public support as they are not financially constrained. On the contrary, attracting investment is harder for small independent companies, especially when private equity markets are not well developed, as is the case in the EU (Arampatzi et al., 2025).

In spite of the limited budget relative to the sums spent by national governments to support R&D, Horizon is more important than commonly thought. In Europe, publicly-funded R&D is mostly performed by national governments or major institutions. Even when public support is made available for third-parties outside of governmental organizations, the projects financed are pre-defined in negotiations at the top and prescriptive in the expected outcomes. This leaves little space for creativity and radically new ideas.[6] In this vein, Horizon could become an crucial source of funding for breakthrough ideas by independent innovators and small companies.

Enabling innovators to implement their best ideas and helping them reach the commercialization phase would create profitable investment opportunities for private investors, thereby contributing to the development of the European high-tech ecosystem.

[6] There are some exemptions, like the newly created agency for radical innovation in Germany, SprinD.

Figure 1.1: Share of global high-tech R&D expenditure by region (top 2,500 global companies)



Notes: The size of each pie is proportional to the total global R&D expenditure.
Source: Authors' calculations based on the EU Industrial R&D Scoreboard (2024).

1.1 PURPOSE AND APPROACH OF THE REPORT

Against this background, this report examines the track record of EU-funded support for research and innovation over the last ten years, from the start of Horizon 2020—the 8th Framework Program—in 2014 to the currently available data of its successor, Horizon Europe. The goal of the report is to identify ways to improve the allocation of EU-funded R&D to help boost long-run growth and competitiveness in the EU.

The analysis is based on a novel firm-level dataset linking EU-level R&D grants to balance sheet information of the recipient companies, which we call IEP-COMPET (Gros et al., 2025).

Our focus is not on the success of Horizon programs in terms of research output, but rather to what extent Horizon funding has fostered the growth of the funding recipients. We thus concentrate on private companies, receiving roughly 30% of the framework programs' budget—or more than €30 billion over the period of observation. IEP-COMPET covers two thirds of these sums and provides information on the ownership and performance of the funding recipients.

We use the long-run revenue growth of firms (i.e. growth after the end of the project financing) as the main proxy of competitiveness. We also examine patenting activities by companies. But we do not analyze separately the impact of R&D grants on innovation and scientific advances for research institutions or non-profit organizations, which are clearly important and instrumental to long-run growth. Still, the beneficial impact of patents should ultimately show up in higher growth rates for the patent holders. Furthermore, within a given sector, revenues, investment and profits tend to grow together. In this sense, one can consider revenue growth in the long run as a sufficient statistic.[7]

The analysis is carried out along two interconnected dimensions. The first is budget allocation, which we examine for different types of funding instruments, as well as by recipient characteristics, such as main activities, size, and ownership structure.

The second dimension of analysis is more granular and ambitious, as it attempts to assess whether the grants are effective in boosting firms' long-run growth, using revenue and patent-based measures.[8]

1.2 MAIN FINDINGS

The main findings can be summarized as follows. More than half of the budget for Horizon programs is granted to firms operating in mid-tech industries with limited growth potential.

A significant proportion of funding is directed toward consultancy firms or companies providing support services—such as legal, administrative, or general business advisory services. While these firms may play a useful role in supporting the broader business ecosystem, they are typically not the primary drivers of productivity gains, innovation or competitiveness. By contrast, manufacturing companies and, even more so, digital services firms—such as those developing software, AI, or advanced technological solutions—tend to generate higher long-term economic value by creating scalable products, fostering innovation, and enabling structural transformation within the economy. This could be assessed within existing guidelines (OECD, 2019).

Over half of the budget is granted to companies that are regular "customers" of Horizon, participating in up to 200 projects over the period of observation. And despite the emphasis placed by the European Commission on scaling up small to medium-sized enterprises (SMEs), the participating firms typically belong to wider corporate groups. This prompts questions about the very essence of the public support, which would best serve its purpose by being allocated to financially constrained firms.

[7] The advantage of using revenue growth as the main proxy for competitiveness rather than patent or scientific publications is that revenue is easily measurable and it is not clear how to map patents and papers onto long-run growth.

[8] Other legitimate firm-level proxies for competitiveness could be used, such as value added, total factor productivity (TFP), employment, or assets. However, in the data sources we use, intermediate inputs consumption is rarely available, which prevents us from constructing value added. Estimating TFP requires several methodological choices and in the presence of market power it is not clear how it relates to long-run growth; the value of assets depends heavily on the accounting rules used by reporting firms, which can vary across countries. Finally, using employment is problematic when firms have few of no employees. Nevertheless, none of our conclusions are altered if we use employment as a proxy for competitiveness.

Most of Horizon funding goes to instruments mandating collaboration across firms in different countries.[9] These consortia typically involve more than 20 participants.

We do not find evidence that these programs increase recipients' long-run growth.[10] We do find temporary positive effects, but these are limited to the duration of the grant period—three years on average.

The lack of a positive correlation between funding from collaborative programs and participants' revenue growth does not seem to be due to coordination frictions. A more likely explanation is that the research topics promoted by program calls are the result of bargaining between the European Commission, Member States, and the business sector, rather than being based on scientific insights. While policymakers and business leaders might have better strategic vision, they are probably unfit to design calls eliciting breakthrough ideas.

Funding directed to projects at early stages of development seems ineffective, as it is not correlated with recipients' long-run growth. This is regrettable, given the key role that early-stage innovation could play in fostering the European high-tech ecosystem (Fuest et al., 2024) and competitiveness more broadly. In addition, recipients of early-stage grants tend to be relatively large and often belong to wider corporate groups, instead of being small independent entities.

The only instruments that have had a measurable lasting positive impact are those that target SMEs—notably the SME Instrument in Horizon 2020 and its successor, the European Innovation Council (EIC) Accelerator. The positive effect is driven by independent companies that do not belong to corporate groups.[11] These companies are also more likely to start patenting technologies that are considered high-tech by the European Commission.

Unfortunately, the funding accessible to independent innovators in Horizon programs accounts for only 35% of all funding in our dataset.[12] What is more, the positive impact on long-run revenue is mostly driven by SMEs in support and services activities, not in IT or manufacturing. It is thus not clear how much they can contribute to the EU's long-run growth.

[9] Collaborative instruments have accounted for 80% of the funding in the last two framework programs. In the sample used in this report, they account for 60% of the total. See section 3.2 for details on the sample restrictions imposed for the analysis.

[10] Well-known econometric issues prevent a causal interpretation of some results presented in the report. Nonetheless, we believe that the estimated correlations can still be informative.

[11] Our data allows us to give a causal interpretation of the estimates concerning SME instruments. See Appendix B.

[12] The share falls to 12% if we consider all funding by the last two framework programs.

We conclude that future EU support for research and innovation, such as the 10th Framework Program, could be much more effective if reallocated from collaborative programs toward instruments targeting small and independent companies with a clear potential impact on long-run growth and prosperity.

BOX 1

Should AI *Adoption* Be Subsidized?

Pillar 2 of Horizon Europe, which focuses on Global Challenges and European Indus- trial Competitiveness," includes numerous calls aimed at the *adoption* and integration of AI technologies across various sectors such as health, mobility, energy, and manufacturing.

AI—particularly general purpose technologies (GPTs) like generative AI—have the potential (still unproven) to transform multiple sectors and dramatically boost productivity. But are public sector subsidies necessary or even useful to speed up adoption of AI?

There are few spillover effects from any individual firms adopting AI technology. Adoption can thus be left to the market. Firms failing to adopt such foundational technologies (e.g. electricity or the internet) are naturally outcompeted and leave the market. If AI delivers clear, measurable advantages, then market forces alone should compel adoption, making subsidies redundant or even inefficient.

In this light, propping up firms that are unable or unwilling to integrate AI may distort competition and waste public resources that could be better spent on foundational research or regulation. Facilitating the exit of firms that do not make the necessary changes would be much more important.

2. ANATOMY OF THE EU COMPETITIVENESS GAP

This chapter traces the EU competitiveness or growth gap back to its industrial structure, which differs from other large economies such as the United States and China.

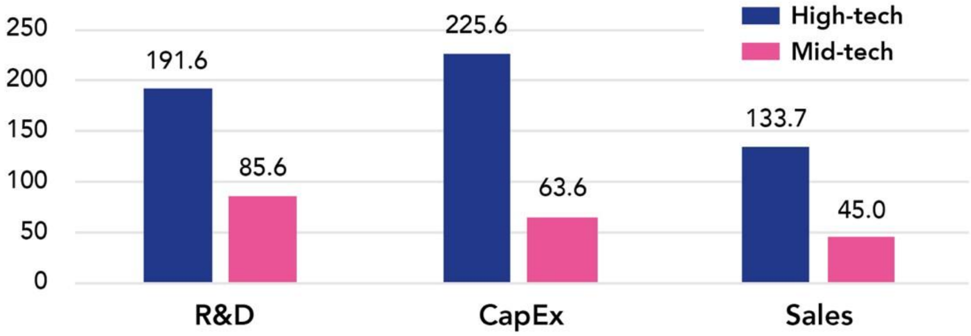
The central issue is that, unlike in the United States, R&D-intensive industries like software development and biotechnology are small in Europe, where firms instead specialize in traditional industries based on mature technologies.

The greater incidence of traditional industries in the European Union generates little incentive for radical innovation. For instance, the so-called hidden champions of the German economy consist of medium-sized manufacturers that often dominate the global market for niche products, such as special machinery. But the growth potential for these products is limited given that manufacturing output has been near stagnant in both the EU and the US (and indeed most OECD countries). Moreover, they operate in mature industries where it is difficult to maintain technological leadership over the long term. The same applies to the German and European chip industry (e.g. Infineon, STMicro) that produces mostly semiconductors for the automotive industry where the electronic components must be robust and last a long time. The higher-priced-cutting-edge logic chips required in Smartphones and other electronic appliances are produced mainly in Asia, while the software—which now accounts for a large share of the chip's value—comes primarily from the US (Gros et al., 2024).

A higher weight of high-tech industries translates into higher growth for the simple reason that firms in R&D intensive industries tend to grow faster and are major drivers of productivity growth (e.g. André and Gal, 2024; Crouzet and Eberly, 2019; Roth, 2022). This can be seen in Figure 2.1, which is based on data from the EU Industrial R&D Scoreboard.[13] The figure compares the long-run growth of high-tech and mid-tech industries globally (see Box 2 about the definition of high-tech sector). It follows that in order to boost competitiveness, one has to set the conditions for innovative, R&D-intensive firms to thrive and grow. Over the last decade, the sales of R&D intensive sectors have grown (in nominal terms) by over 130% (a compound rate of almost 9%) whereas those of mid-tech sectors have grown only by 45%, more or less in line with the increase in nominal GDP over the same ten-year period. Moreover, investment in high-tech industries has increased even more dramatically, both in terms of investment in intangibles (R&D) and in terms of real assets (Capex).

[13] The data are based on the financial statements of the 2,500 largest companies in terms of R&D spending globally, accounting for 80-90% of the world total. This makes the data broadly representative. The data can be found at: https://iri.jrc.ec.europa.eu/scoreboard/2022-eu-industrial-rd-investment-scoreboard.

Figure 2.1: High-tech grow more than mid-tech industries (Growth rates in %, 2012-2022)



Notes: See Box 2 about the definition of high-tech sector

Source: Authors' calculations based on EU Industrial R&D Scoreboard (2024)

2.1 THE MIDDLE TECHNOLOGY TRAP

The differences in growth rates in Figure 2.1 explain most of the transatlantic growth gap, as the high-tech sectors carry significantly more weight in the United States.

Differences in industrial composition are the ultimate reason for the gap in R&D investment. This is illustrated in Figure 2.2. The composition of business R&D (BERD) in Europe versus the US illustrates how the European corporate sector specializes in mid-tech industries—mostly automotive. Fuest et al. (2024) call this pattern the "middle technology trap": companies in mid-tech industries make up almost 50% of European BERD (34% alone from the automotive industry), which compares to only 10% in the US.

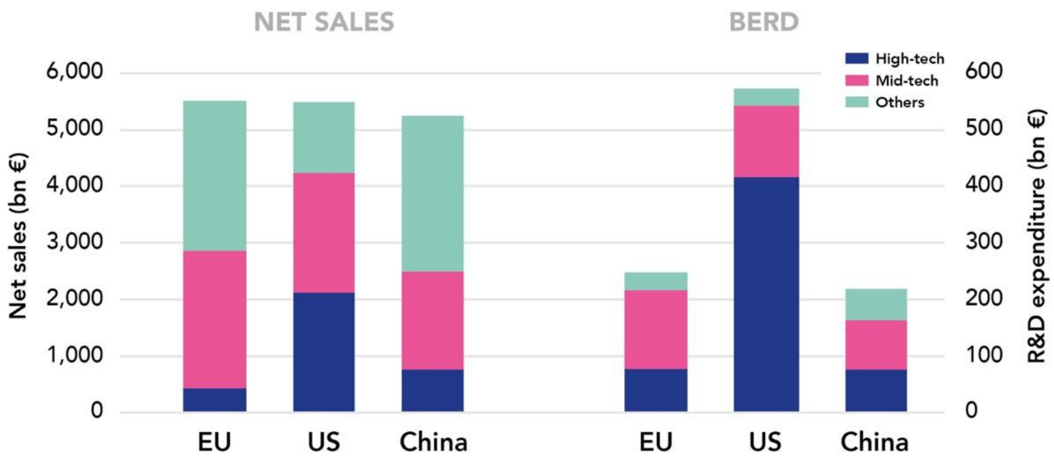
2.1.1 Is the US the Right Benchmark?

Figure 2.2 also shows that the European Union is much more similar to China than the United States, in both size and industrial composition. Most economic analyses of the European Union take the United States as a benchmark. However, such comparison is more aspirational than realistic.

The largest R&D spenders in the European Union are in the auto industry, while in China and especially the United States, the top companies are in the computer & software industries.

Moreover, the EU industry remains persistently dominated by automotive producers, while US and China moved from mid-tech industries—such as automotive, pharmaceutical and telecommunications—to computers and software. The much greater dynamism of the Chinese economy and the sheer size of its high-tech industry suggest that the European Union's closest global competitor might be China, rather than the United States.

Figure 2.2: BERD & net sales by technology intensity 2023 (Top 2,500 global companies)



Source: Authors' calculations based on EU Industrial R&D Scoreboard (2024).

2.1.2 A Rather Intangible Gap

Another side of the same coin is the transatlantic difference in capital accumulation (Schnabel, 2024). Gros et al. (2024) show that the investment-to-GDP ratio in tangible capital assets is comparable between the EU and the United States. The real gap lies in intangible assets—i.e. Intellectual Property Products (Online Appendix A1)—as previously illustrated.

2.1.3 Decomposing Aggregate R&D Intensity

The transatlantic gap in intangible investment is not due to EU firms in high-tech sectors underinvesting. As mentioned above, EU firms in high-tech (and also mid-tech) sectors have a very similar R&D intensity to those in the US. This pattern holds more broadly. Firms in mid-tech sectors, such as automotive, tend to spend a very similar percentage of their revenues on R&D (about 6 percent) almost everywhere.

The key role of industry composition in explaining the transatlantic gap in intangible investment can be shown more systematically through a decomposition of aggregate R&D intensity in the EU and US.[14] The details of this calculation are presented in Appendix Table A1 which shows that most of the aggregate difference in R&D intensity is due to the smaller share of high-tech sales in the EU compared to the United States.

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[14] We use the standard shift-share formula: $$\Delta I = \underbrace{\sum_j \sigma_j^{US}(I_j^{US} - I_j^{EU})}_{\text{Industry Effect}} + \underbrace{\sum_j (\sigma_j^{US} - \sigma_j^{EU}) I_j^{EU}}_{\text{Composition Effect}},$$

where ΔI is the difference in overall R&D intensity (R&D over sales) between the US and EU; I_j^{US}, I_j^{EU} is R&D intensity in industry j, and $\sigma_j^{US}, \sigma_j^{EU}$ are respectively the sales shares of industry j in total sales for the US and EU. We use the granular industry definition by icb4-name, provided in the EU Scoreboard.

If one takes the average value of the years 2021-2023, about 93% of the transatlantic difference in R&D intensity is attributable to differences in industry composition, with the remaining 7% due to higher R&D intensity in the US within the respective industries. In particular, the overall R&D intensity of firms in the EU Scoreboard sample is about 4.5% in the EU and about 9% in the US. This 4.5 percentage point gap can be decomposed into a composition effect of 4.2 percentage points and an industry effect of 0.3 percentage points.

Companies in traditional industries spend relatively little on R&D per unit of sale and therefore cannot be expected to generate breakthrough innovation. The key issue is thus how the European Union can incentivize private investment in high-tech industries and promote the reallocation of economic activity from traditional to innovative industries.

2.1.4 Worse Than a Trap?

Twenty years ago, the 5 biggest R&D spenders in the EU came from 4 different industries, with only two companies from the automotive sector (Figure 2.3). In 2003, the 5 biggest R&D spenders in the US were also diversified, with 2 companies from the automotive sector.

In the meantime, there has been specialization on both sides of the Atlantic. European firms specialized in the automotive sector, the industry for all the top five R&D spenders in the EU. The few European high-tech hopes of the past (Nokia and Sanofi) have thus lost importance over the last two decades.

On the US side, one also observes specialization. Today, all the 5 five biggest R&D spenders in the US are in high-tech industries, 4 of them are among the so-called "hyperscalers".

The evolution over time seems thus worse than a "middle tech trap". It is as if Europe were on a gradual downward trajectory, losing contact with the technology frontier. This matches the evidence in Figure 1.1, showing that the share of high-tech R&D in the European Union shrunk by half between 2003 and 2023.

Another way to appreciate the relative decline is the fact that in 2003, the average R&D intensity of the five companies in Figure 2.3 was 7%, higher than the equivalent number for the US (the biggest five companies were at 5.7%). By 2023, the R&D intensity in the EU had fallen (to 6%), whereas it doubled in the US to nearly 14%—twice the EU value.

Figure 2.3: Top 5 R&D spenders in the last decades in US and EU

Region	2003	2013	2023
US	Ford	Microsoft	Alphabet
	Pfizer	Intel	Meta
	GM	Johnson & Johnson	Apple
	IBM	Alphabet	Microsoft
	Johnson & Johnson	Merck	Intel
EU	Mercedes-Benz	VW	VW
	Siemens	Mercedes-Benz	Mercedes-Benz
	VW	BMW	BMW
	Sanofi	Sanofi	Bosch
	Nokia	Bosch	Stellantis

Source: EU Industrial R&D Scoreboard (2024).

2.2 CAN HORIZON GRANTS CROWD IN PRIVATE INVESTMENT?

This section estimates the returns to scale of capital investment in a panel of international firms, distinguishing between high-tech and traditional sectors, as well as capital expenditure (Capex) and R&D.[15] The results are shown in Figure 2.4. Panel (a) presents estimates for the European Union, while Panel (b) refers to the United States.

The figure reveals that the revenue elasticity of R&D in the European Union is low—both relative to the United States and relative to the revenue elasticity of tangible capital.[16]

According to the estimates in Panel (a), a 10% increase in R&D spending in high-tech industries increases revenues by roughly 1%. Grants from the European Commission typically account for around 7% of firms' revenue, and therefore, on their own, cannot generate a substantial impact.

The key implication of these findings is that the relatively low returns to R&D—both relative to traditional industries and the United States—are unlikely to crowd in private investment. As a result, investment is more likely to flow either to traditional industries or to high-return environments such as the United States.

[15] The analysis is based on the 2024 Industrial Scoreboard (Nindl et al., 2023).

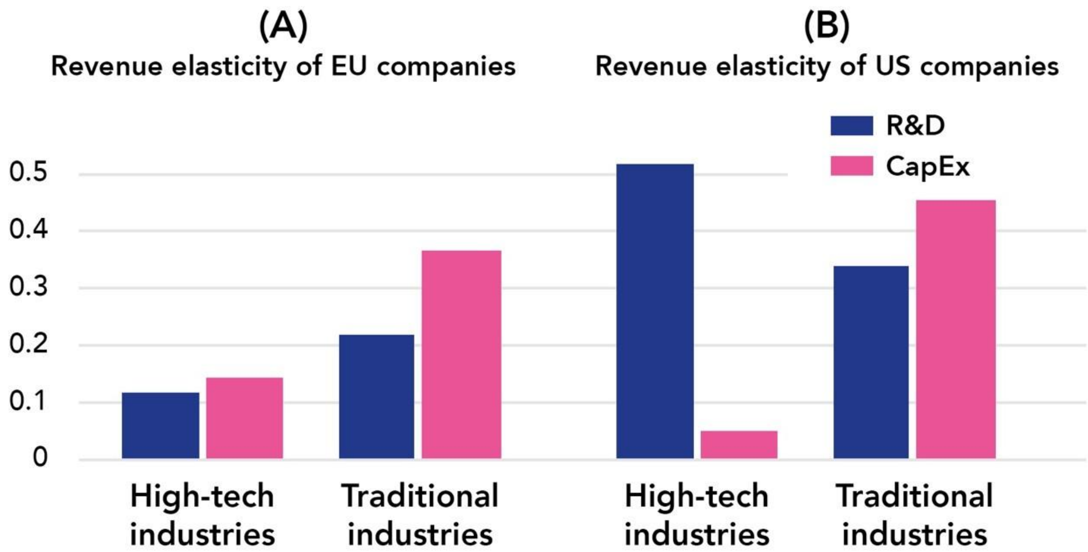
[16] These findings are consistent with previous evidence based on different approaches (Cinceras and Veugelers, 2014; Ortega-Agiles et al., 2014; Moncada-Paternò-Castello et al., 2010).

Box 2
Defining the "High-Tech" Sector

There are several ways to define the high-tech sector. Some are based on industry codes. For example, the European Commission defines the high-tech sector in terms of NACE Rev. 2 3-digit level industry codes (The glossary to the Eurostat classification can be accessed here).

In line with the approach taken by the OECD (Galindo-Rueda and Verger, 2016), this report adopts a definition based on R&D intensity, i.e. the ratio of R&D expenditure to sales. Industries in which enterprises spend more than 10% of their revenues on R&D are classified as high-tech. Those with a R&D intensity between 3% and 10% are classified as mid-tech. This metric results in a sector classification broadly similar to those based on industry codes. One notable difference is that the aerospace (& defense) sector is not classified as high-tech under this approach, since its average R&D intensity is only about 5-6%.

Figure 2.4: Mean Elasticities by Sector and Region: Capex and R&D



Source: Authors' calculations based on EU Industrial R&D Scoreboard (2024)

3. ALLOCATION OF HORIZON FUNDING TO INNOVATION

This chapter describes the data used in the analysis and examines the allocation of Horizon funding by type of beneficiary and funding instrument.

3.1 THE UNDERRATED POTENTIAL OF EU FRAMEWORK PROGRAMS

Figure 3.1 presents Eurostat data on R&D by financing source and sector of performance. In 2020, the last year with complete information, publicly funded R&D amounted to almost €100 billion—ten times more than the average annual Horizon spending, which is roughly €10 billion. Thus, one would not expect EU-level funding alone to change the trajectory of EU industry.

However, two often overlooked points merit attention. First, a large share of national government R&D funding is performed by governmental institutes and large organizations.[17]

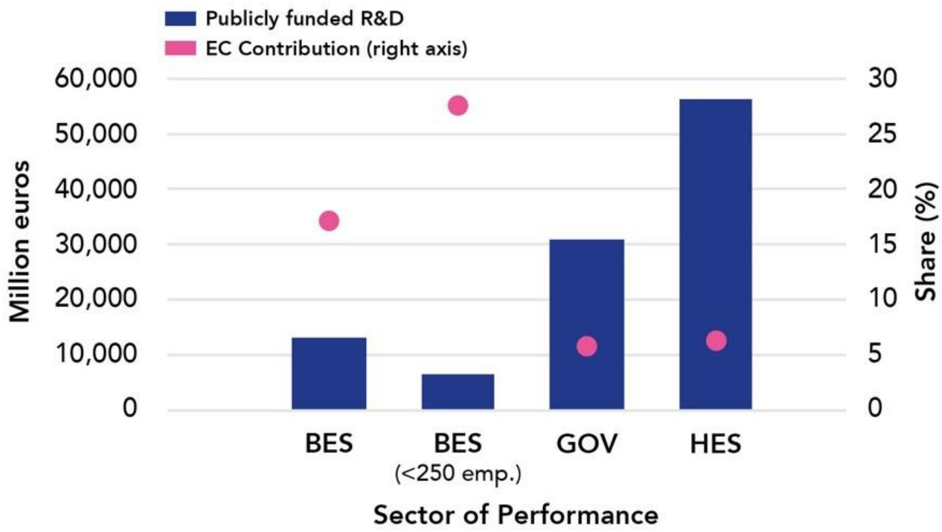
This funding does not flow to independent entities—businesses in particular—and is therefore unlikely to support bottom-up projects aimed at boosting competitiveness. Indeed, Figure 3.1 shows that publicly funded R&D performed by private companies accounts for roughly €13 billion. About 17% of this, or €2.2 billion, is provided by the European Commission, mostly through Horizon funding.[18]

Second, only part of publicly funded R&D carried out by businesses is performed by SMEs. Eurostat data suggest that in 2021, only €4.7 billion of government-funded R&D went to SMEs. European Commission (2024b) reports that between 2021 and 2023, Horizon gave to SMEs €5.33 billion in grants, or €1.8 billion per year. Therefore, Horizon funding accounts for almost 30% of publicly funded R&D to SMEs, a significant share. It is thus by targeting the smallest enterprises that EU funding could make the most significant impact. This implies that bottom-up projects from enterprises rely much more on Horizon funding than commonly thought.

[17] For instance, in Germany the Max Planck Society for the Advancement of Science, Fraunhofer, and Helmholtz are examples of research-performing institutions that absorb a large part of national support to research and innovation. Examples for France are Centre National de la Recherche Scientifique and Commissariat à l'Énergie Atomique et aux Énergies Alternatives; for Italy, Consiglio Nazionale delle Ricerche, and for Spain Consejo Superior de Investigaciones Científicas.

[18] Appendix Figure A2 shows a breakdown by country. Horizon provides more than 20% of all public R&D performed by the business sector in 11 EU27 countries, and more than 30% for several of them, mostly widening countries.

Figure 3.1: Horizon contribution to publicly funded R&D



Source: Authors' calculations based on CORDIS and Eurostat
https://ec.europa.eu/eurostat/databrowser/view/rd_e_berdsize_custom_16366141/default/table?lang=en.

3.2 DATA

The analysis is based on two main data sources: (i) CORDIS, an official database maintained by the European Commission with information on the universe of EU-funded R&D grants, and (ii) Bureau van Dijk's ORBIS, a firm-level dataset providing financial and balance sheet data on companies.[19] From these two sources, we construct IEP-COMPET, a novel dataset linking European Commission funding between 2014 and 2024 to the financial performance of recipient firms. Details on the dataset's construction are presented in Gros et al. (2025).

[19] CORDIS can be accessed at https://cordis.europa.eu/. ORBIS is a proprietary dataset, which we access using Bocconi University's license.

AGGREGATE STATISTICS

This section first examines the universe of EU grants and then focuses on IEP-COMPET, which allows us to observe key characteristics of recipients, such as ownership, activities, size and performance.

3.2.1 Results from CORDIS

The total amount in grants from Horizon 2020 through the current Framework Program, Horizon Europe, amounts to €110 billion. Of this, €30 billion were awarded to private companies, with the remainder allocated to research institutions and non-profit organizations. Our analysis focuses on private companies.

Many funded companies participate in multiple projects—on average 22, with a maximum of 237 projects per company.

Table 3.1 shows the top 20 corporate groups by total funding (in million euro) received from the 6th framework program to the current one. Groups such as Airbus, Thales and Siemens have absorbed a large share of EU-funded grants since 2002. This constitutes another form of path dependency similar to that in Table 2.3.

We identify these companies in the Industrial Scoreboard (Nindl et al., 2023) and calculate their aggregate sales growth between 2012 and 2023, which is roughly 30% or 2.4% per year. This is close to the growth rate of aggregate GDP in the European Union, and much less than the growth of both high-tech and mid-tech industries from Figure 2.1. Thus, these calculations cast doubts on the efficiency of Horizon funding when focusing on its main beneficiaries.

Table 3.1: Top 20 Companies by Funding in EU Framework Programs (FP6, FP7, H2020, HE)

Rank	FP6		FP7		H2020		HE	
	Company	**Funding**	**Company**	**Funding**	**Company**	**Funding**	**Company**	**Funding**
1	Airbus	103	Airbus	221	Airbus	234	Airbus	158
2	Thales	81	Thales	137	Thales	185	Safran	101
3	Siemens	58	STMicroelectronics	113	Leonardo	118	Thales	67
4	Philips	49	Safran	86	Infineon	109	Rina	51
5	Telekom	40	Rolls-Royce	85	IBM	108	siemens	44
6	Daimler	32	IBM	80	STMicroelectronic	92	Infineon	42
7	Rolls-Royce	27	SAP	75	Atos	82	MTU	41
8	SAP	27	Philips	71	siemens	68	Ariane group	41
9	Alenia (later acquired by Leonardo)	24	Infineon	61	Indra Sistemas	66	CODASIP GMBH	40
10	MTU	19	siemens	56	Bosch	63	Netcompany-	38
11	STMicroelectronics	18	Atos	54	INGEGNERIA INFORMATICA SPA	62	Indra Sistemas	36
12	SNECMA SA	18	Telefonica	47	TWI	53	Leonardo	35
13	Eurocopter	18	INGEG	34	Safran	52	GE Avio	33
14	Alcatel	17	Volvo	34	Philips	50	INGEGNERIA	30
15	Nokia	17	ARTTIC	32	Bull SAS	50	F65 Network Ireland	29
16	DASSAULT AVIATION	15	Rina	32	AVL	45	OSPEDALE SAN	24
17	Ericsson	15	ACCIONA SA	31	MTU	45	Telefonica	23
18	Atos	15	MTU	31	GE Avio	44	Rolls-Royce	23
19	Infineon	14	INGEGNERIA INFORMATICA SPA	30	ASML	43	Novamont	23
20	D'APPOLONIA SPA	13	DASSAULT	28	Rina	43	AVL	22

Source: Horizon Dashboard (see the link here)

3.2.2 From CORDIS to IEP-COMPET

To obtain information on recipients, we match CORDIS data to ORBIS to create the IEP-COMPET dataset. We are able to match two-thirds of the universe of grants disbursed by the Commission.

Approximately 30% of firms in the single-project sample do not receive any grant. In roughly 70% of these cases, this happens because the firm participates as "third party", "partner", or "coordinator". Their involvement is based on specific agreements made within the project—such as subcontracting or providing specific services—but they typically do not receive funding directly from the European Commission through the grant agreement. In the remaining cases, companies are actual participants in a funding instrument but do not receive financial support. This might be because some calls involve prizes, tender contracts, or equity investments, which are not reported in CORDIS. To avoid confounding effects from unobserved non-grant funding and to allow a clean comparison between recipients and other participants, we only keep companies that receive grants at some point.

IEP-COMPET contains 20,693 companies participating in 17,541 projects. The total sums disbursed in grants amount to €19.6 billion.[20]

As mentioned, several firms participate in multiple projects. This complicates analyzing the impact of the grants, because it is impossible to determine which specific grant might have influenced changes in firm performance. For this reason, in what follows we focus on companies that participate only once in a single project.

We end up with an unbalanced panel of 11,876 single-project companies in 18 NACE 1-digit industries, observed on average for 9.6 years. The total sums disbursed in grants in the sample amount to €4.02 billion—roughly 20% of the full IEP-COMPET dataset, which includes multi-project firms.

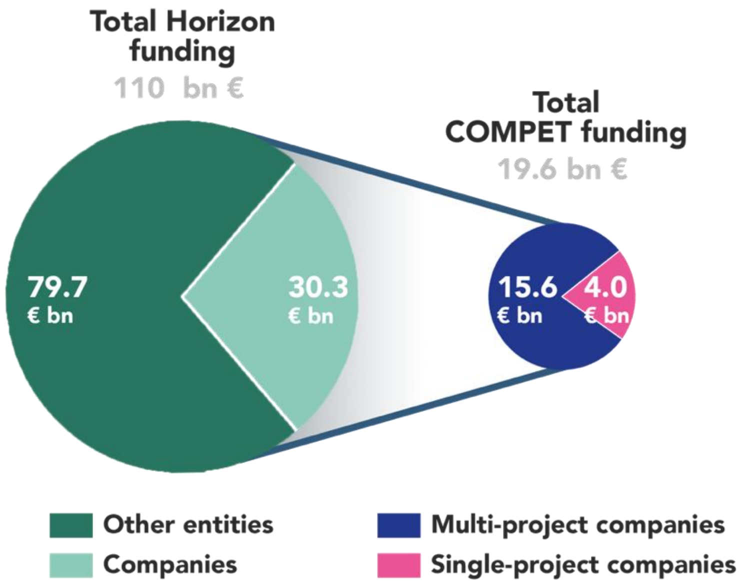
Figure 3.2 graphically presents the total sums disbursed by Horizon 2020 and Horizon Europe, the share that goes to companies, the amounts matched in COMPET, and the breakdown between multi and single-project firms—the latter constituting our analysis sample.

Table 3.2 presents the summary statistics of key quantities for the single- and multi-project firm samples.

Panel (a) presents statistics for the single-project firm sample. The average revenue is around €70 million, while the median is only €2 million. The average grant is around €300,000, while the median is roughly half. On average, grants account for 46% of annual revenues, although the median is just 7%.

[20] Gros et al. (2025) reports slightly different figures because they consider firms irrespective of whether they receive funding.

Figure 3.2: From CORDIS to IEP-COMPET



Source: CORDIS and IEP-COMPET (Gros et al., 2025)

Panel (b) of the table presents statistics for firms with multiple projects. These tend to be much larger, with average revenues of €600 million—almost an order of magnitude larger than those of single-project firms. On average, multi-project firms have 1,300 employees, compared to fewer than 200 for single-project firms.

The average grant amount per project is similar for both groups. However, for multi-project firms, grants represent only 18% of annual revenue, compared to 46% for single-project firms.

While most beneficiaries are SMEs, their share differs by group: 89% of single-project are SMEs, compared to 75% for multi-project firms. Thus, multi-project firms are more likely to be large enterprises.

Finally, Panel (c) presents the same statistics for the full IEP-COMPET sample. Notwithstanding the differences emphasized so far, the revenue and employment distributions of both single- and multi-project firms are highly skewed, with means far exceeding median values. The ratio of the mean to the median is 35 for single-project and 98 for multi-project, suggesting that a small number of very large firms are heavily involved in multiple projects.

3.4 RECIPIENTS' CHARACTERISTICS

This section presents statistics on Horizon funding by key characteristics of the grant recipients.

3.4.1 Technological Intensity

Figure 3.3 presents the breakdown by technological intensity using the same definition of the previous chapter. Horizon funding broadly reflects industrial composition, with 42% of grant recipients operating in high-tech industries.[21] While this is not surprising, it is nonetheless concerning, as companies in mid-tech industries are significantly less likely to develop breakthrough technologies.

Table 3.2: Summary Statistics

Variable†	Obs	Mean	Median	Std. Dev.	Min	Max
COMPET dataset — Single-project firms						
SME (%)	7,347	89	100	32	0	100
Revenue ('000)	9,014	69,792	1,948	301,483	0	2,994,000
Employees	10,980	168	13	746	0	8,512
Grant ('000)	11,345	339.8	170.1	507.1	10.0	2,500.0
Grant/revenue (%)	7,659	46	7	76	0	238
COMPET dataset — Multi-project firms						
SME (%)	5,946	75	100	43	0	100
Revenue ('000)	7,000	593,972	5,630	3,724,987	1	77,319,933
Employees	8,332	1,281	28	9,347	1	293,000
Grant ('000)	8,801	383.4	281.3	374.5	13.5	2,820.5
Grant/revenue (%)	6,443	18	4	24	0	65
COMPET dataset — All firms						
SME (%)	13,293	83	100	38	0	100
Revenue ('000)	16,014	327,506	3,094	2,760,895	1	77,319,933
Employees	19,312	729	17	7,306	1	293,000
Grant ('000)	20,146	360.1	228.0	460.6	13.5	2,820.5
Grant/revenue (%)	14,102	20	5	25	0	65

† All variables are winsored at the 1st and 99th percentiles. Summary statistics based on firm-level year averages over all years.

Source*:* IEP−COMPET (Gros et al., 2025)

3.4.2 Ownership Status

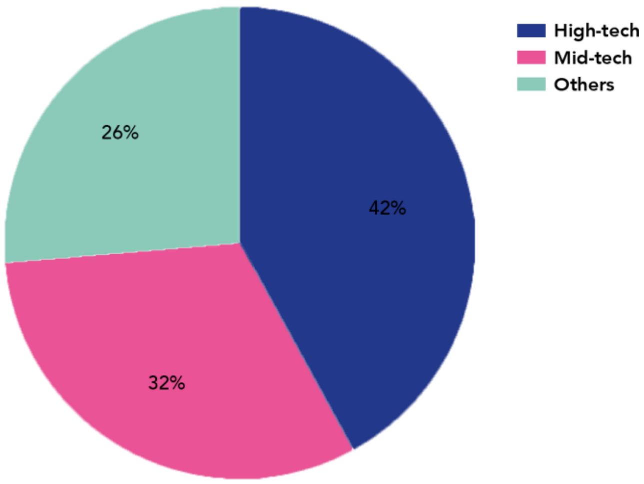
An often-overlooked aspect of Horizon funding recipients is their ownership status. Specifically, our data allow us to distinguish between four types of

[21] Similar proportions are found for the full sample including multi-project firms.

ownership status: (i) global ultimate owners (GUOs), (ii) controlled subsidiaries, (iii) independent companies (but potentially operating multiple branches), and (iv) single-location companies—i.e. firms that are independent and have only one physical location. For the purposes of analysis, we group together controlled subsidiaries and GUOs and label them as "corporate group", or "group companies", while independent and single-location firms are grouped as "independent companies".

Figure 3.4 shows that despite the European Commission' emphasis on funding SMEs, more than 60% of SME recipient belong to corporate groups. Given that these corporations are typically not financially constrained, this finding casts doubt on the effectiveness—and perhaps the rationale—of public support directed toward such firms. Moreover, Table 3.5 shows that controlled subsidiaries (regardless of size) account for more than €2 billion in grants, or over half of the total funding disbursed. This is especially concerning given that Appendix Figure A7 shows that controlled subsidiaries are less likely to operate in high-tech industries compared to other firms.

Figure 3.3: Horizon funding by technological intensity



Source: IEP-COMPET (Gros et al., 2025)

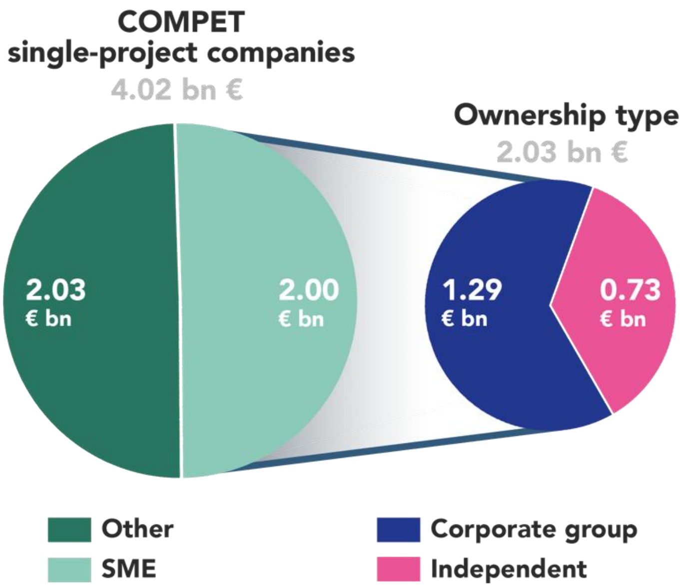
Appendix Table A2 presents patent statistics by ownership type. The greatest propensity to patent is observed among GUOs and controlled subsidiaries, which tend to be much larger than independent companies and single-location firms. One concerning fact, however, is that group companies tend to operate in mid-tech industries, and therefore their innovations are unlikely to involve advanced technologies. As shown in Appendix Figure A4, half of the patents filed by group companies originate by firms in mid-tech industries. On the contrary, more than half of the patents from independent companies are filed by firms in high-tech industries and are thus more likely to involve advanced technologies.

3.4.3 Sector of Activity

Table 3.3 presents the distribution of companies and funding into NACE 1-digit industries. In our sample, roughly one third of companies operate in manufacturing (NACE C), one third in professional and scientific services (NACE M), roughly 20% in information and communication services (NACE J), and around 10% in utilities, construction and transport (NACE D-E-F-H). For analytical purposes, we group the latter under the label "energy".

Appendix Figure A5 presents aggregate Horizon funding using a breakdown by the most represented industries and their technological intensity. High-tech recipients are similarly represented in the IT and professional services sectors, each receiving roughly €600 million in total funding. In manufacturing, the total funding for high-tech companies is less than €400 million.

Figure 3.4: SMEs and ownership among single-project COMPET companies



Source: IEP-COMPET (Gros et al., 2025)

The residual category of technological intensity—labeled "Other"—receives one-third of the total Horizon funding. This group includes industries such as construction, utilities and finance, where the technological level is difficult to classify, as well as support services and consultancy firms (mainly NACE M). Appendix Figure A5 shows that these sectors absorb a large share of Horizon funding, like the share of high-tech.

Table 3.3: Summary statistics by industry

NACE sector (code + title)	# Firms	% sample	SME (%)	Avg. Revenue (million)	Grant/ revenue (%)	Sum of grants (million)	Grants (% of total)
A — Agriculture, forestry and fishing	203	1.7	94	34	41	40	1.0
B — Mining & quarrying	51	0.4	83	241	25	24	0.6
C — Manufacturing	3,248	27.3	83	88	28	1,222	30.4
D-H — Utilities, construction, transport	852	7.2	73	176	13	274	6.8
G — Wholesale & retail trade	686	5.8	91	132	34	180	4.5
I — Accommodation & food services	18	0.2	88	15	20	2	0.0
J — Information & communication	2,215	18.7	95	35	59	680	16.9
K — Financial & insurance activities	193	1.6	74	405	21	55	1.4
L — Real estate activities	62	0.5	90	64	24	15	0.4
M — Professional, scientific & tech. activities	3,659	30.8	96	20	73	1,317	32.7
N — Administrative & support services	285	2.4	86	59	45	88	2.2
O — Public administration & defence	12	0.1	86	64	60	3	0.1
P — Education	63	0.5	98	13	68	12	0.3
Q — Human health & social work services	148	1.2	78	76	48	56	1.4
R — Arts, entertainment & recreation	34	0.3	95	12	54	6	0.2
S — Other service activities	104	0.9	96	35	41	30	0.7
T — Households as employers	1	0.0	100	1	42	0	0.0
NA — Not available	60	0.5	96	29	108	17	0.4

Source: IEP-COMPET (Gros et al., 2025)

3.5 FUNDING INSTRUMENTS

We structure the analysis around three broad categories of funding instruments: (i) collaborative, (ii) SME-targeting, and (iii) instruments dedicated to early-stage innovation, characterized by low Technology Readiness Level (TRL).

3.5.1 Collaborative Instruments

Collaborative instruments mandate collaboration across at least three independent legal entities, each established in a different EU Member State or Associated Country.

Table 3.4 presents summary statistics by funding instrument type. In our sample, collaborative projects disbursed a total of €2.36 billion—accounting for 59% of all grants—and involved 7,317 companies. [22]

Collaborative instruments fall into two thematic areas: Industrial Leadership and Societal Challenges. The former is explicitly designed to enhance the competitiveness of European industry. The latter funds projects in seven thematic areas: Health, demographic change, and well-being; Food security, sustainable agriculture, and bioeconomy; Secure, clean, and efficient energy; Smart, green, and integrated transport; Climate action, environment, resource efficiency, and raw material; Europe in a changing world (Inclusive, innovative, and reflective societies); Secure societies (Protecting freedom and security of Europe and its citizens).

Although, eligibility rules mandate a minimum of three participants from different participating countries, in practice, consortia tend to be much larger—averaging around 20 participants, with the median size being similar to the mean. In some cases, the number of consortium members exceeds one hundred.

This large scale is partly driven by evaluation criteria that favor geographic and institutional diversity, aiming to reflect the entire EU region. Companies participating in collaborative projects are large on average, with over 1,500 employees. However, the size distribution of participants is highly skewed to the right, with a median size of only 40 employees—indicating that a small number of very large firms participate alongside many smaller ones. The average grant per company is around €400,000 and the average project duration is roughly 3.5 years.

At the intersection of these broad programs there are the Joint Undertakings (JUs)—independent legal entities that combine financial contributions from both businesses and the European Union, and operate under their own governance structures.

JUs aim to bridge the gap between public and private sector research through public-private partnerships (PPPs) in emerging areas such as smart networks, global health, and digital technologies. Projects funded by JUs account for 9% of all grants disbursed in our sample. Not all JU participants are firms; around one-third are universities or research institutions. Firms participating in JUs tend to be large. Examples of Joint Undertakings are provided in Box 3.

3.5.2 Early-Stage Innovation

Supporting early-stage projects is crucial for deep tech development, as groundbreaking innovations often arise from high-risk, high-reward ideas that require time, resources, and experimentation to mature.

At these early stages, technologies typically operate at low Technology Readiness Levels (TRLs), where fundamental scientific principles are still being explored and validated. Such ideas are at high risk not to be undertaken due to the uncertainty

[22] The share increases to 80% when considering the whole Horizon budget.

and long development timelines, which tend to deter private investment. By nurturing these projects early on, Horizon funding could create a pipeline of disruptive technologies (Fuest et al., 2024).

CORDIS does not provide information on the TRL for funded projects.[23] Therefore, to identify them we rely on a different approach. We define "early-stage" companies as those receiving grants under Pillar 1 Excellent Science of both Horizon 2020 and Horizon Europe, as well as recipients of Horizon Europe EIC's Pathfinder and Transition programs.

Pillar 1 funds basic research and includes the following sub-programs: European Research Council (ERC), Marie Skłodowska-Curie Actions (MSCA), and Research Infrastructures.

The Pathfinder and Transition funding instruments fall under the European Innovation Council (EIC) and are explicitly designed to support breakthrough innovations at the earliest stages of development. Pathfinder typically targets projects at TRL 1–4, while Transition supports projects at TRL of 5–6.

Appendix Figure A6 presents the size distribution of the companies (in log-revenue) in the dataset. Participants in SME instruments are the smallest, followed by early-stage and then collaborative projects and JUs.

Appendix Figure A3 presents a breakdown by funding instrument and firms' technological intensity. Collaborative instruments have the lowest incidence of high-tech recipients, at just 32%, with most recipients operating in mid-tech and other industries. In contrast, 56% of recipient firms in SME Instruments and 58% in early-stage-targeting instruments are in high-tech industries.

3.5.3 SME Instruments

The principal mechanism for supporting SMEs under Horizon 2020 (2014–2020) was the SME Instrument, designed to support highly innovative small and medium-sized enterprises. This instrument offered staged support: Phase 1 for feasibility studies, Phase 2 for development and demonstration, and Phase 3 for commercialization support (mainly through business coaching and networking). Funding under the SME Instrument was predominantly grant-based.

Under Horizon 2020, Fast Track to Innovation (FTI), was designed to accelerate the market uptake of innovative technologies and solutions. Operating from 2018 to 2020, FTI provided funding to consortia aiming to bring their innovations to market within three years. Unlike SME instrument, this instrument mandated consortia comprising 3 to 5 legal entities from at least three different EU Member States or Horizon 2020 associated countries. While open to various organizations, FTI emphasized the participation of industry partners, including startups and SMEs.

[23] TLR ranges from 1 to 9, with TRL 1 being basic research and TRL 9 representing a fully mature technology proven in operational environments.

Grants of up to €3 million were available, covering up to 70% of eligible costs for for-profit entities and 100% for non-profit entities. The total FTI budget from 2018 to 2020 was approximately €300 million.

Projects were expected to achieve market readiness within 36 months from their start date.

Box 3

Chips and European High Performance Computing Joint Undertakings—Leading Examples of Joint Undertakings

CHIPS

The Chips Joint Undertaking is one of the longest-standing JUs, evolved from ARTEMIS and ENIAC under FP7. These earlier initiatives focused on embedded systems and nanoelectronics, respectively, and emphasized industry-specific applications. Their merger into ECSEL under Horizon 2020 marked the shift to a tripartite governance model involving industry, the EU, and Member States. ECSEL expanded the focus to large-scale, cross-sectoral projects with higher TRLs.

Under Horizon Europe, ECSEL became the Key Digital Technologies (KDT) JU and was later renamed the Chips JU following the 2022 Chips Act. This transition marked a strategic shift toward reinforcing Europe's technological sovereignty in semiconductors. While maintaining links to downstream industries, Chips JU shifted focus toward strategic innovation lines in micro- and nanoelectronics. Between 2021 and 2024, KDT and Chips JU funded 50 projects with combined public investment of €4.6 billion, expecting matched contributions from industry. However, a 2025 report of the European Court of Auditors noted that the targets of the Chips Act remained largely aspirational and that the Commission could not provide sufficient information to evaluate the effectiveness of the Chips JU. Moreover, there appeared to be limited coordination between the Chips JU and Important Projects of Common European Interest (IPCEIs) in this area.

SUPERCOMPUTERS

Launched in 2018 and gaining autonomy in 2020, the European High-Performance Computing (EHPC) JU aims to enhance Europe's position in high-performance and quantum computing. Unlike most JUs, it has a dual mandate: funding innovation and deploying infrastructure. This two-step structure reflects political urgency and the scale of investment required to compete with global players like the US and China.

Building on earlier initiatives such as PRACE, GEANT, and the cPPP on HPC, the EHPC JU adopted a tripartite governance model involving the EU, Member States, and industrial/scientific advisory groups—the latter playing a more consultative role. Beyond research funding, the EHPC JU also oversees large-scale procurement and infrastructure provision. Between 2020–2023, EHPC JU funded 40 projects worth €571 million. In 2024, its scope expanded to include artificial intelligence, notably through support for EU "AI factories." However, the practical relevance of this step appears limited. No major private-sector operators currently use EU supercomputers to train AI models, as clusters of NVIDIA GPUs—largely concentrated in the US—remain significantly more efficient for this task. It is therefore doubtful whether these "AI factories" will make a material difference in global AI competitiveness.

In 2021, the EIC was launched under the Horizon Europe framework, effectively replacing and expanding the SME Instrument. Its flagship funding tool, the EIC Accelerator, took over the role of its predecessor and now offers both grants (up to €2.5 million) and optional equity investments (up to €15 million) through the EIC Fund.

Table 3.4: Summary statistics by funding instrument

Funding instrument	# Firms	% sample	SME (%)	Duration (years)	Avg. Revenue (million)	Grant/ revenue (%)	Sum of grants (million)	Grants (% of total sample grants)
Cumulative	11,877	100	89	3.0	70	46.3	4,021	100
Collaborative	7,317	62	84	3.8	98	36.4	2,355	59
→ Industrial Leadership	2,133	18	85	3.5	98	31.5	569	14
→ Societal Challenges	3,597	30	83	4.0	100	37.4	1,173	29
Joint Undertakings (JU)	1,043	9	82	3.8	104	24.3	363	9
SME Instruments	3,128	26	99	1.1	10	70.4	1,447	36
Early-stage (Low TRL)	959	8	91	4.1	52	50.7	219	5

Source: IEP-COMPET (Gros et al., 2025)

Table 3.5: Summary statistics by ownership status

Entity Type	# Firms	% sample	SME (%)	Avg. Revenue (million)	Grant/ revenue (%)	Sum of grants (million)	Grants (% of total)
Global Ultimate Owners	1,022	8.6	87	133	37	403	10.0
Controlled Subsidiaries	6,317	53.2	83	101	31	2,167	53.9
Independent Companies	2,502	21.1	99	6	72	884	22.0
Single Location Firms	2,045	17.2	97	11	75	565	14.1

Source: IEP-COMPET (Gros et al., 2025)

4. DO HORIZON GRANTS BOOST GROWTH AND COMPETITIVENESS?

This chapter examines how EU-funded support to innovation relates to the performance of beneficiary firms. The focus is not on innovation *per se*, but rather on its intended purpose—boosting competitiveness.

The primary approach compares firm revenue before and after receiving grants from the European Commission (EC). The guiding principle is straightforward: if the grant is effective, it should be associated with a positive change in revenue (relative to the pre-grant period). A key challenge in this empirical analysis is that the allocation of R&D grants is not random. For instance, it is possible that only the most promising or successful firms apply for and receive grants—firms whose revenues may have grown even in the absence of public support. Our approach to addressing this important issue is explained in Appendix B.

4.1 REVENUE GROWTH: HORIZON GRANTEES *VS.* INDUSTRIAL SCOREBOARD

To motivate our systematic evaluation, we begin with a simple comparison between the average annual revenue growth of Horizon beneficiaries and that of firms listed in the Industrial Scoreboard (Nindl et al., 2023).

The Industrial Scoreboard is a firm-level panel dataset based on the financial accounts of the 2,500 largest companies globally in terms of R&D-spending. These companies can be considered among the most successful and therefore constitute a reasonable benchmark. However, because the Scoreboard is over-representative of large firms, we construct a more appropriate comparison group by selecting the smallest 1,000 companies in the European Union.

Table 4.1: Revenue growth for Horizon beneficiaries *vs.* Industrial Scoreboard firms

	Mean Revenue Growth	Median Revenue Growth
Cumulative	11.3%	6.3%
Collaborative	9.5%	5.9%
→ Industrial Leadership	7.1%	5.6%
→ Societal Challenges	8.3%	5.3%
Joint Undertakings	10.6%	6.3%
SME Instrument	15.4%	7.6%
Low TRL	9.7%	5.8%
Scoreboard (1,000 smallest)	10.5%	7.8%

Source: Authors' calculations based on Industrial Scoreboard (2024) and IEP-COMPET (Gros et al., 2025)

Table 4.1 reports mean and median annual revenue growth rates of Horizon grant recipients and compares them to firms in the Industrial Scoreboard.[24] The table provides two key insights. First, the average cumulative growth of beneficiaries—11.3%—is almost double the median of 6.3%. Therefore, the double-digit growth rates are not representative of the actual impact that Horizon beneficiaries can have on the aggregate economy.

Second, the average and median growth rates of Horizon recipients tend to be lower or comparable to those of Scoreboard firms. This is true for participants in all funding instruments except the SME Instrument, where the average growth is higher than in the benchmark and median is similar.

Clearly, the growth rates in Table 4.1 account for growth before and after receiving Horizon grants, and therefore they are only indicative. Moreover, unobserved shocks may have affected Horizon beneficiaries and Scoreboard firms differently across instruments and over time. For these reasons, the next sections present a more systematic evaluation.

4.2 ECONOMETRIC RESULTS: OVERALL ESTIMATES

Box 4 presents our estimation approach, which is detailed in Appendix B.

Figure 4.1 presents point estimates and 95% confidence intervals from Appendix Equation (B.1), based on our sample of single-project firms.

Firms that receive Horizon funding experience an initial significant increase in revenue, around 10% larger relative to the year preceding the reception of the grant. However, the impact lasts for only three years, similar to the three average years of programs' duration (Table 3.4). At lag 3, the coefficient is zero. Further lags present negative point estimates, although the coefficients are not statistically significant.[25]

The hump-shaped pattern might reflect different, non-mutually exclusive factors. For instance, grants might be recorded as operating income. This accounting practice can artificially inflate reported revenues during the grant period. As a result, firms may exhibit a temporary hump-shaped pattern in revenue, with a peak during the years they receive support and a decline afterward—not necessarily reflecting changes in performance, but rather the timing and accounting of funding.

The hump-shaped pattern might be an example of the *Sport Illustrated cover jinx* (Box 5). The European Commission might select beneficiaries based on their

[24] We calculate growth rates by taking the log-ratio of the current to previous-year value of the variable.

[25] Appendix Figure A9 shows that the pattern is very similar for log-employment, although we avoid using such outcome variable because for firms with a small number of employees growth rates might be misleading. Going from 1 to 2 employees would constitute a 100% growth rate. These cases can increase the average growth substantially, but the contribution to the aggregate economic activity—or the "competitiveness" of the European Union is clearly marginal.

short-run performance—i.e. pick winners—with little information on the true strength of companies. This is especially the case when projects involve large consortia, where careful screening is very costly, as discussed further below.

More difficult to interpret are the negative—although not statistically significant—point estimates for the subsequent periods. We do not necessarily give a causal interpretation to our estimates. They might reflect self-selection by low-productivity, declining firms using Horizon funding as a "last resort".

Another possible explanation for the return to below the mean is the "distraction effect" of Malmendier and Tate (2009).

We are agnostic about the causes of that pattern and limit ourselves to observing that it does not support the idea that Horizon grants boost average long-run growth of the recipients.

Box 4

Summary of Estimation Approach

Our approach is estimating different versions of the following event study regression:

$$Y_{it} = \alpha_i + \gamma_t + \sum_{k=-T}^{T} \beta_k D_{ik} + \mathbf{BX}_{it} + \epsilon_{it}$$

where Yit is the outcome variable of firm i at time t. The indicator function Dik captures the time to/from the grant, and Bk is the associated coefficient, which is the parameter of interest. ϵit denotes the error term.

The parameter T denotes the length of the pre/post treatment period and is chosen to be the largest possible depending on data availability.

Year fixed effects are denoted by yt, which allows to purge the estimates of the impact of confounding shocks, such as the COVID-19 pandemic.

The vector $\mathbf{X}it$ can include time-varying firm-level controls, with the associated vector of coefficients **B**.

Given that firms receive grants at different times, we estimate use the estimator of Sun and Abraham (2021).

In all specifications, we apply inverse probability weighting, which assigns each subject a weight equal to the inverse probability of receiving the grant, given their observed characteristics.

4.3 PROPENSITY TO PATENT

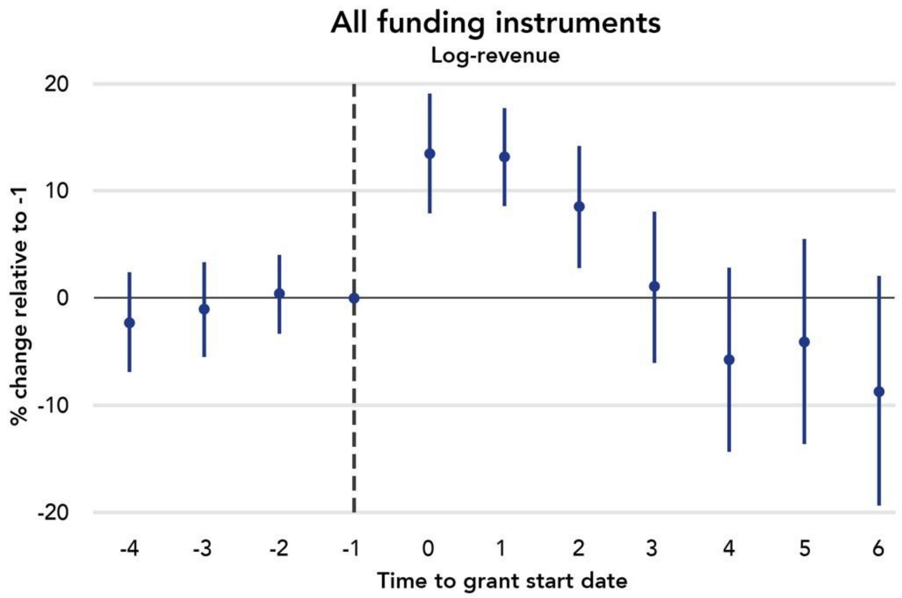
Using the same methodological approach as in the previous section, we examine the propensity of firms to file patents after receiving EU grants.[26] We use two different measures of innovation activity: (i) the number of patents, and (ii) a dummy variable equal to 1 from the very first year a company applies for a patent.

Appendix Figure A10 presents the estimates. The number of patents is not significantly affected by the receipt of the grant. However, on average, grants have a positive and significant impact on the probability of becoming a patenting company.

4.3.1 Patents and Ownership Status

Appendix Figure A11 presents estimates distinguishing between firms belonging to corporate groups and independent companies. In Panel (a), we use the number of patents as the dependent variable, while in Panel (b), we use the probability of patenting for the first time.

Figure 4.1: Overall estimates



Source: Authors' calculations based on IEP-COMPET (Gros et al., 2025).

[26] Following the established practice in the innovation literature, we group patent applications that relate to the same invention into patent families. For brevity, we refer to patent families as *patents* throughout the report.

The results in Appendix Figure A11 suggest that the positive average effect on the probability of patenting for the first time is fully driven by independent companies. No impact is detected for firms in corporate groups.

4.3.2 Focusing on High-Tech Patents

Next, we focus on high-tech patents. A key difficulty here is deciding what type of patents can be deemed high-tech. While our baseline strategy is based on the industry in which the firm operates, patents are classified using the International Patent Classification (IPC) nomenclature. We rely on a classification from the European Commission, which follows the criteria established in the Trilateral Statistical Report. According to this classification, the following technical fields are defined as high-tech: computer and automated business equipment; micro-organism and genetic engineering; aviation; communications technology; semiconductors and lasers. For the purpose of our analysis, we additionally classify biotechnology patents as high-tech.[27]

The results are presented in Appendix Figure A12. For companies belonging to corporate groups and operating in mid-tech sectors, the grants have a positive and significant long-term impact on the probability of filing a high-tech patent. For independent companies in high-tech sectors, Horizon grants increase the long-run propensity to file high-tech patents. However, this is not the case for independent firms in mid-tech sectors.

Box 5

Sports Illustrated cover jinx

The Sports Illustrated cover jinx is a popular sports superstition suggesting that athletes or teams featured on the cover of *Sports Illustrated* magazine are doomed to experience bad luck, underperformance, or injury shortly afterward. First noted in the 1950s, the phenomenon has become part of sports lore, fueled by a series of high-profile examples in which cover stars suffered dramatic setbacks soon after their appearance.

While largely anecdotal, the idea plays into the psychology of expectations and the pressure that comes with fame. Critics of the jinx argue it is just regression to the mean—athletes typically appear on the cover after peak performances, and statistically, their performance often declines afterward. Still, the legend persists among fans, with each new "jinx" incident further fueling the myth.

Example SI cover athlete

[27] The mapping can be accessed here.

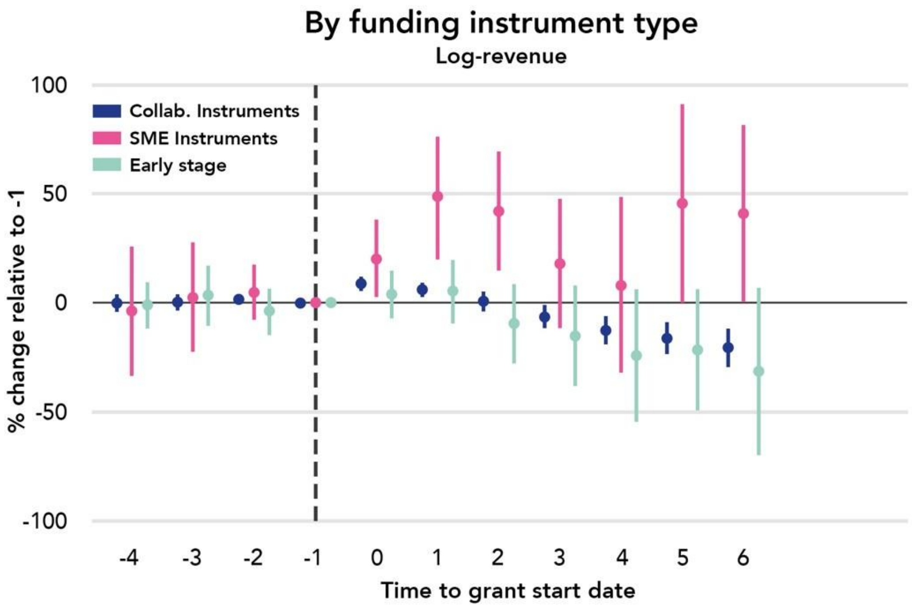
4.4 DIFFERENCES BY FUNDING INSTRUMENTS

Figure 4.2 presents the results by funding instrument. A positive and persistent impact of the grant on firm revenues is detected only for participants in SME-targeting programs. For these firms, the grant is associated with a 50% increase in revenues.

In contrast, grants by collaborative instruments are associated with an initial boost in revenue, followed by a subsequent decline, mirroring the baseline estimates in Figure 4.1. This is unsurprising, given that collaborative instruments account for more than 60% of the sample. We examine collaborative instruments in more detail in Section 4.4.1.

Funding to early-stage projects shows no clear impact on performance upon receipt of the grant and is associated with negative long-run estimates, although these are not statistically significant. This finding is concerning, as early-stage funding is often seen as a critical driver of innovation (Fuest et al., 2024).

Figure 4.2



Source: Authors' calculations based on IEP-COMPET (Gros et al., 2025)

The evidence so far casts doubt on the effectiveness of collaborative and early-stage funding instruments in boosting competitiveness—at least when measured by revenue growth.

Appendix Figure A8 shows the share of total patents by firms' technological intensity, across the three main funding instruments. The figure indicates that half of the patents from companies in collaborative instruments originate from companies in mid-tech industries. In contrast, the distribution of patents among recipients of SME instruments is relatively balanced across all technological levels, with a slightly higher contribution from high-tech firms. Notably, roughly 70% of patents filed by firms receiving early-stage innovation funding come from firms in high-tech industries.

4.4.1 Collaborative Instruments

Collaborative instruments absorb half of Horizon Europe funding—roughly €50 billion—and account for 60% of the total grants disbursed in our sample. Therefore, the lack of a positive correlation between grants and the revenues of recipients is particularly concerning, as it suggests a significant degree of inefficiency. While it is possible that collaborative instruments generate innovation and externalities, these do not appear to translate into increased company revenue.

Appendix Figure A13 presents a breakdown of collaborative instruments by sub-program, distinguishing between Industrial Leadership, Societal Challenges and Joint Undertakings. The estimates suggest that the negative long-run effects associated to collaborative instruments in Appendix Figure A13 are not driven by any specific sub-program.

Appendix Figure A15 presents a breakdown by industry of participants. Here, we find that the hump-shaped patterns are driven by firms in IT and professional services, while firms in manufacturing and energy show no significant short-run impact and negative long-run coefficients.

Appendix Figure A14 presents results for SMEs and large firms separately. For large firms, there is no significant long-run effect. The hump-shaped pattern is entirely driven by SMEs, intuitively more prone to failure than large firms.

Fuest et al. (2024) discuss the administrative burdens associated with applying for and managing Horizon grants. The evidence in Appendix Figure A14 suggests that there may be substantial administrative and project management costs for participants of collaborative projects, presumably more costly for smaller firms.

The large size of the consortia in collaborative projects may be a key aspect. For instance, the difficulty of screening applications from consortia with more than 20 participants might explain the negative long-run estimates. Screening costs can affect not only the coordinators of large projects, who must select the participants, but also the application evaluators. Appendix Figure A16 shows that evaluators of collaborative projects tend to have fewer citations and lower H-indices than those evaluating under Pillar 1: Excellent Science, indicating somewhat lower academic credentials.

However, Appendix Figure A17 presents a breakdown by consortium size, using the median of 17 as a threshold. Whether the consortium size is above or below the median does not significantly affect the estimated impact. This may be due to a threshold effect, whereby monitoring costs increase more than linearly with the number of participants (Duso et al., 2010). Thus, screening and collaboration costs may rise quickly with the number of participants, but plateau well below reaching the median size of 17.

4.4.2 Zoom on Joint Undertakings

Under Horizon Europe, Joint Undertakings account for approximately 20% of the total budget. In our sample of single-project firms, however, they are severely unrepresented, accounting for less than 10% of the funding. JU participants tend to be involved in multiple projects and are mostly large firms.

Joint Undertakings have the potential to play a very important role, because they are intended to create spillovers from EU-funded research and crowd in private investment, which the EU critically needs (Chapter 2). Moreover, these instruments are supposed to target low-TRL projects, which are essential to breakthrough innovation (Fuest et al., 2024).

In its opinion on Horizon Europe, the European Economic and Social Committee (EECS) shows supports for Joint Undertakings. However, it points to several limitations: "*(4.10) The EESC calls for an exact explanation of the procedure to set up the work programme for each JU and to have it included in part I of the Regulation. Clearly, a situation where JUs are funding research programmes that companies would have performed anyway should be avoided*".

This section sheds light on some criticalities that might explain the apparent ineffectiveness of the JUs, focusing on their governance.

The governing board of each JU nominates the executive director, who is responsible for preparing drafts of the calls for proposals. These drafts are then adopted or amended by the governing board. The inclusion of Member States in the governing boards is compulsory, whereas scientific advisory boards are optional.

Appendix Table A4 shows that, while the scholarly credentials of the scientific advisory boards are respectable, two JUs—including the largest one—do not have scientific advisory boards. This raise concerns that mainly non-scientists may be responsible for designing calls for innovation projects.

Proposals submitted in response to a given call follow the standard Horizon Europe project selection procedure, which relies on independent experts. However, the allocation of proposals to independent experts is done by Commission officials. Experts are expected to reach a common position, including scores and comments, and are monitored by a Commission official who chairs the ranking process of competing proposals by the expert panel. Experts must adhere to a code of conduct focused on conflict of interests, and all members of JUs should therefore be excluded from participating as experts. However, there is evidence that JU websites advertise vacancies for expert roles (Appendix Figure A18), which clearly raises concerns about potential conflicts of interests.

4.5 SUPPORT TO SMES

We now turn to a closer examination of the funding instruments targeting SMEs.

In this part of the analysis, we go beyond the correlations presented so far by using a control group composed of companies that were ranked by the Commission close to the acceptance threshold but did not receive funding. These firms were awarded the so-called "Seal of Excellence"—a certificate attesting that the proposal was of high quality but could not be financed due to budget constraints.[28] These firms should provide a valid control group, allowing us to make some inference about causality. The details of our approach are provided in Appendix B2.

The results are presented in Figure 4.3. We find a positive, persistent and significant causal effect of receiving a grant. There are no signs of significant pre-trends, which supports the validity of the parallel trend assumption required for a causal interpretation of the estimates. This confirms that the Seal of Excellence awardees constitute a reasonable control group.

The magnitude of the estimates is large and statistically significant. Revenues jump by about 50%. Part of this initial boost is partially corrected over time, but a significant impact remains even three years after the end of the project.

In sum, we find causal evidence that grants to SMEs effectively boost the long-run performance of beneficiaries.

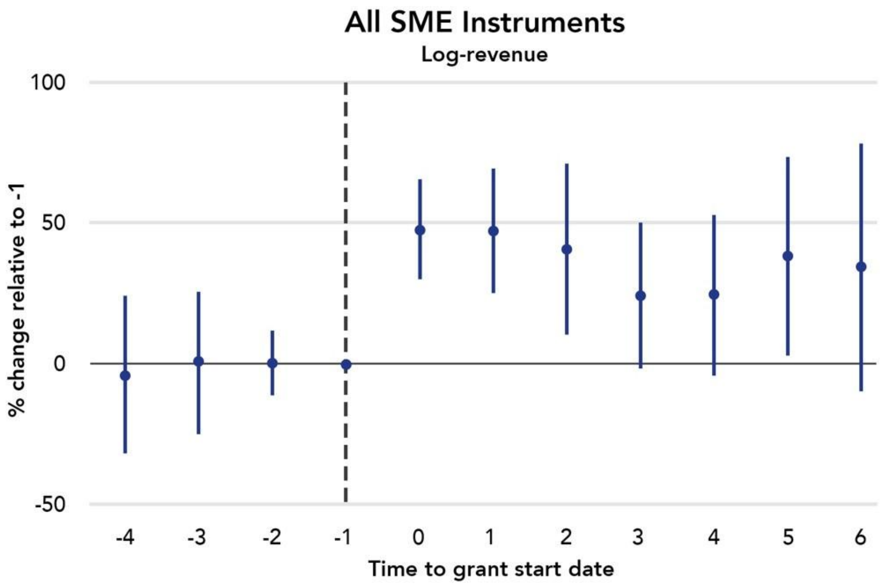
4.5.1 Impact by Ownership Type

Next, we distinguish between controlled and independent SMEs. The results are presented in Figure 4.4. The estimates suggest that the positive long-term effect is driven by the latter category. This is concerning, since controlled subsidiaries account for 40% of the funding allocated through SME-targeting instruments (Appendix Table A4).

More broadly, of the €19.6 billion in IEP-COMPET, accounting for two-thirds of the budget for companies from Horizon 2020 and Horizon Europe, only €1.48 billion or 7.5% are given to independent firms participating in SME-targeting funding instruments. Therefore, our analysis suggests that less than 8% of the budget is allocated effectively.

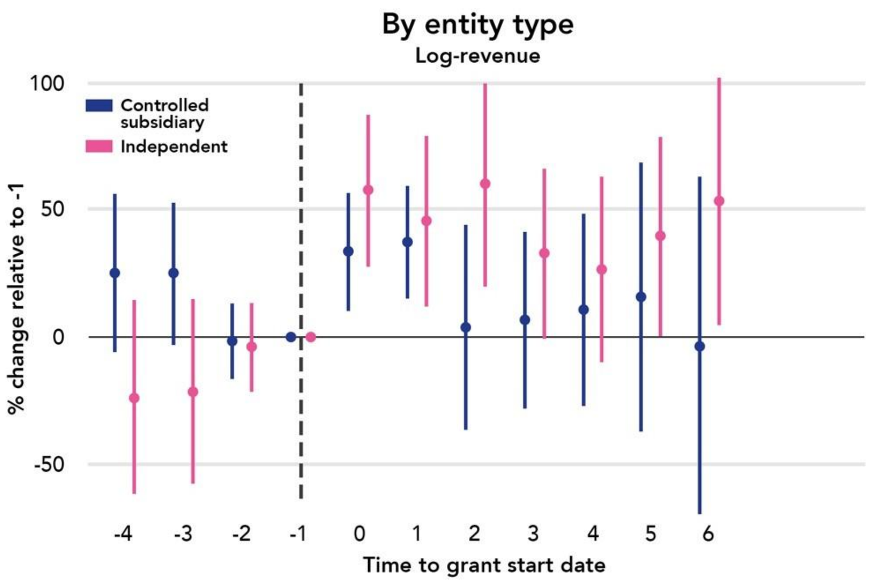
[28] A similar approached is used by Santoleri et al. (2022).

Figure 4.3: SME instruments



Source: Authors' calculations based on IEP-COMPET (Gros et al., 2025)

Figure 4.4: SME instruments



Source: Authors' calculations based on IEP-COMPET (Gros et al., 2025)

Box 6

SMEs are often thought as small, self-standing companies run by an owner struggling with financing but with a potentially path-breaking idea.

To be considered a SME by the European Commission – and thus being able to participate in a SME instrument – a firm must have (a) have fewer than 250 employees, (b) turnover ≤ €50m or balance sheet total ≤ €43m, and (c) not be owned 25%+ by a non-SME, unless this is a public investment corporation, venture capital company, business angel up to €1.25m, university or non-profit research centre, institutional investor (including regional development funds), or a small autonomous local authority.

If a company owns more than 25% of the SME, then its turnover, balance sheet total, and employees are partly or fully consolidated on a pro-rata basis. Thus, the official definition of SME adopted by the European Commission considers groups of SMEs with interlocking shareholdings to be still an SME. This creates complex and opaque corporate governance structures that are very different from the typical owner-operator view.

The ORBIS database allows one to distinguish between 'free standing' or independent SMEs, i.e. those with a unique dominant shareholder, from those that are part of a wider group with interlocking shareholdings. Figure 4.4. shows that grants fail to improve the performance of SMEs that operate as controlled subsidiaries.

There are two possible, not mutually exclusive, explanations. The first is that if the external shareholders have enough resources, the controlled subsidiary is unlikely to be credit constrained. In this case, a relatively small grant cannot be expected to have a significant impact.

Second, governance may play a role. When decision-making power is dispersed across multiple entities, coordination becomes more complex, which can reduce the effectiveness of strategic initiatives—including those supported by grants.

The median revenue of controlled subsidiaries in our sample is just €1m. Therefore, there could be many shareholding entities with decision power consistent with the Commission's requirement of having less than €50m consolidated revenue to qualify as an SME.

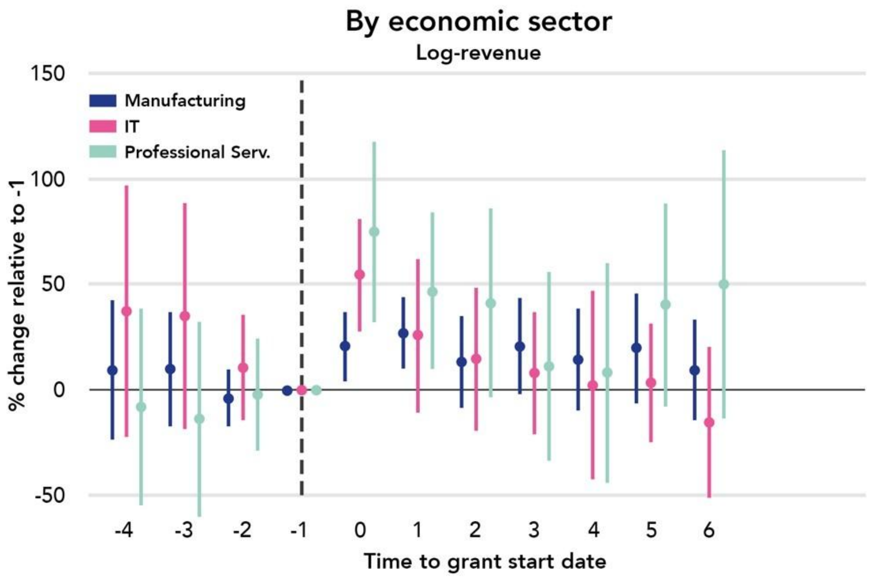
The dispersed-governance hypothesis is consistent with the lack of a positive impact of the grant in collaborative projects (Section 4.4.1), where decision-making is distributed across at least three (but typically more than twenty) consortia members.

4.5.2 Impact by Sector of Activity

Figure 4.5 breaks down the impact by the most represented industries.[29]

The bulk of the positive effect is driven by companies in professional and scientific services (NACE 1-digit industry M), rather than by companies in manufacturing or IT. This is concerning, given the emphasis the European Commission places on boosting competitiveness.

Figure 4.5: SME instruments by industry



Source: Authors' calculations based on IEP-COMPET (Gros et al., 2025)

4.6 TOP-DOWN *VS.* BOTTOM-UP CALL PROPOSALS

Fuest et al. (2024) discuss the advantages of top-down versus bottom-up approaches. They emphasize that while mission-oriented calls facilitate accountability and alignments with social needs, they may miss key research opportunities; and if politically determined, they may reflect special interests rather than scientific value.

Against this background, this section asks whether the difference in the design of the calls for proposals in collaborative *versus* SME-targeting instruments can explain the differences in performance presented in the previous sections.

[29] There are not enough observations for SMEs in the energy sector.

4.6.1 On *Comitology* and The Annual Work Program of Collaborative Instruments

The annual work programs, that contain the detailed calls for proposal, take the form of so-called Implementing Acts by the Commission. The adoption of the Work Program by the Commission follows the *Comitology* procedure. Under this procedure, the Commission first presents a draft proposal while soliciting comments from stakeholders (research institutions, industry, civil society, etc.). In turn, the stakeholder consultations influence the drafting of the proposed work program, although they have no formal, legally binding role.

Once the Commission has drafted the proposal, it is discussed in so-called "program committees". For the collaborative projects in Pillar 2 of Horizon Europe, for instance, there are six program committees, each corresponding to a thematic cluster (Section 3.5.1).

The program committees are mainly composed of representatives from Member States (often more than one per country). Under Comitology rules, the Commission must adopt an act if it has the support of a qualified majority (15 out of 27 Member States, representing at least 65% of the population).

The Commission amends its draft program following the discussion in the relevant committees. When a compromise has been reached, the committee approves the latest version, which is then formally adopted by the Commission and published. In practice, there are very few dissenting votes in these committees.[30]

4.6.2 Top-Down Design and Incremental Innovation

To illustrate the nature of the calls for collaborative projects we use the call "Design-to-cost batteries" as a specific example of green transition technology that addresses the challenge of energy storage when supply from renewable sources is intermittent.[31]

The detailed nature of the call is apparent from the technology it imposes. It is open only for projects that improve one of the two given existing technologies: lithium or sodium-ion batteries. The call is very specific about gravimetric and volumetric energy density of the desired battery, as well as charging duration, cost competitiveness and comparability to electric vehicles battery cells. Moreover, the batteries are expected to be manufactured with one among four existing production processes.

While certainly useful for the green transition, this is a clear example of

[30] Over the last 3 years, there was never more than one vote against. See https://ec.europa.eu/transparency/comitology-register/screen/committees.

[31] The 2025 Work Program of Horizon contains a number of calls for specific aspects of battery technology and usage. Here we focus on call proposals under Cluster 5 HORIZON-CL5-2025-02-D2-01/D2-06, that can be accessed at https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/wp-call/2025/wp-8-climate-energy-and-mobility_horizon-2025_en.pdf.

incremental innovation.[32] Thus, although some top-down element is unavoidable, narrowing down the choice of technologies and approaches can lead to financing mainly incremental improvements of existing technologies.

4.6.3 Who Benefits from Incremental Innovation?

Following up on the previous example, one may suspect that battery manufacturers are already working on these narrowly defined technical issues. In turn, the technical issues that the call aims to address might reflect known production bottlenecks of incumbent firms, rather than radical innovations.

This is even more likely given that the detailed requirements for the call are determined by committees composed of representatives from Member States, who may tend to protect the interests of national champions. This might also explain why the largest recipients of Horizon funding are large companies from the bigger Member States, often participating in more than one hundred projects and receiving EU contributions totaling hundreds of millions of euros, as shown above.

4.6.4 Towards a "Challenge" Approach

The adoption of the Work Program for the EIC—and for SME-targeting instruments in particular—follows a similar process as for collaborative programs, but the call proposals are much less detailed.

As an example of technological field like the one discussed above, we consider "Breakthrough innovations for future mobility".[33] This is still an example of a thematic call (as opposed to "Open" calls), but it imposes very little limitations on the approach to be used.

While the call proposals for collaborative projects impose specific technical requirements, the EIC thematic call starts from a description of the problem and a presentation of the state of the art.

The outcomes expected by the EIC are very general, such as "*support the scaling up of technologies that materially reduce mobility-related emissions*". The requirements are limited to aligning with the overarching EU goals e.g. "*This Challenge contributes to the strategic autonomy to the EU, the objectives of the European Green Deal, the Sustainable and Smart Mobility Strategy and the NetZero Industry Act, which seeks to foster the EU's net-zero technology industrial base...*".

Our positive results for single recipient, SME-targeting funding instruments suggest that bottom-up or only "light-touch" top-down calls represent the most efficient approach.

[32] The other five calls under this heading are also rather detailed in terms of the expected results.

[33] The call can be found in the EIC Work Programme 2025 at https://eic.ec.europa.eu/eic-funding-opportunities/eic-accelerator/eic-accelerator-challenges-2025_en.

4.7 CONSULTANCY AND SUPPORT SERVICES-RELATED BENEFICIARIES

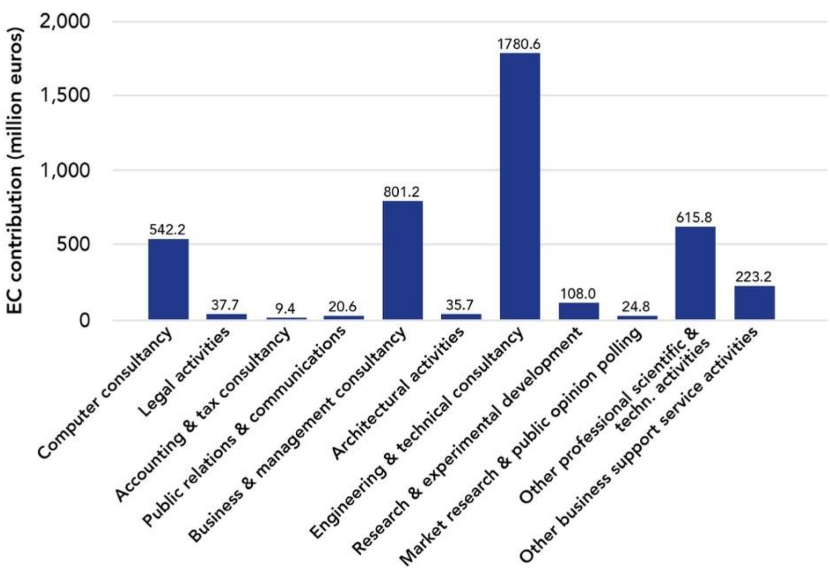
Figure 4.6 shows that approximately €4 billion, or 15% of all Horizon funding to companies, goes to consultancy and support services-related companies. In some projects, these companies serve as non-funded participants or have a third-party or coordination role. However, Appendix Figure A19 shows that in many cases, they are funded.

This type of companies has a comparative advantage in administrative aspects, such as drafting proposals, following the application process, and coordinating activities among members of large consortia.

In our sample, 10 of the top 50 companies by EU grant contribution in industry NACE M, "Professional, scientific and technical activities", are consulting firms specialized in obtaining EU funding.[34] These firms support clients in European projects through proposal development, contract preparation with the European Commission, and administrative management.[35]

While these companies may have an indirect effect on innovation and competitiveness, their services are largely transactional and do not generate new technologies, scalable products, or productivity-enhancing processes. Therefore, it would be better to streamline the grant application process—which is currently slow and bureaucratic (Fuest et al., 2024)—rather than allocating scarce public resources to fund these companies.

Figure 4.6: Consultancy companies



Source: Authors' calculations based on IEP-COMPET (Gros et al., 2025)

[34] Examples include companies like Zabala Innovation Consulting SA, Euroquality SAS, Warrant Hub SPA, Ciaotech SRL, Arttic Innovation GmBh, and PNO Innovation.

[35] Appendix Figure A20 presents an infographic from the company Warrant Hub describing their services.

4.8 EQUITY INVESTMENTS AND NON-EUROPEAN COMMISSION FUNDING

This part of the analysis examines equity investments and the interaction between European Commission's grants and funding from sources other than the European Commission. Since CORDIS only provides information on grants by the European Commission, we rely on Crunchbase to collect this information (see Gros et al., 2025).[36]

The results are presented in Table 4.2.[37] In column 1, we report the estimated coefficient for the EC grant only. The coefficient is positive and significant, implying that companies have 23% higher revenue after receiving the EC grants. This is broadly consistent with the average coefficients of the long-run effect shown in Figure 4.3.

Next, we turn to equity investment and blended finance. Currently, the European Commission makes equity investment under the EIC Accelerator, but it also did so in the past through other instruments such as the European Investment Bank, the European Investment Fund, and the European Defence Fund. The data does not allow to discern which EC body delivers the equity investment, nor whether the equity investment is formally linked to the grant. Therefore, we infer blended finance when, in the same year, a company receives both a grant and equity investment—that is, by constructing an indicator variable for the reception of EU-funded equity and interacting it with the EC grant indicator described above.

In column 2, the coefficient for equity investment is not statistically significant. However, in column 3, when we interact it with the grant, we find that the EC equity coefficient becomes large and significant, while the interaction coefficient is negative and significant. This means that when grants and equity are provided jointly—i.e. blended finance—they are less effective than when provided individually.

When the European Commission provides blended finance—typically a mix of grant and equity support—it plays a direct role in selecting the recipients, as seen in programs like the EIC Accelerator, where companies apply directly to the Commission and are evaluated by expert panels. In contrast, when the Commission provides equity-only investment (without a grant component), it usually does so indirectly through specialized venture capital funds or financial intermediaries, such as those supported under InvestEU or via the European Investment Fund (EIF). In these cases, it is the VC fund managers, not the Commission, who make the investment decisions and select the companies to be financed. This suggests that the European Commission might not have the competences to make equity investment and therefore should limit its function to assigning grants.

[36] Appendix Table A5 presents summary statistics for the COMPET-Crunchbase matched dataset.

[37] For this analysis we turn to static Two-Way Fixed Effect regressions. We construct absorbing states using dummy variables equal to 1 from the year receiving funding on, so to mimic as close as possible the event study design used in the previous analyses.

Finally, column 4 includes indicator variables for non-EC grants, non-EC equity, and a dummy equal to 1 if the company has been acquired by another entity.[38]

The coefficient for the EC grant remains significant and of very similar size, which reassures us that the effects discussed so far are not driven by funding from non-EC sources. The same pattern of column 3 applies to EC blended finance. The non-EC equity dummy is also positive and significant, but its magnitude is much smaller than the coefficient for EC-funded equity investment.

The size of the COMPET-Crunchbase matched dataset is small, so these results should be interpreted with caution. However, the evidence in Table 4.2 cast doubts on the effectiveness of EC funding in the form of blended finance.

Table 4.2: Blended finance and non-EC funding.

	(1) Log-revenue	(2) Log-revenue	(3) Log-revenue	(4) Log-revenue
EC grant (log)	0.23***	0.23***	0.23***	0.21**
	(0.08)	(0.08)	(0.08)	(0.10)
EU equity (log)		0.55	2.09***	1.92***
		(0.60)	(0.11)	(0.14)
EC grant x EU equity			-1.88***	-1.80***
			(0.31)	(0.33)
Non-EC grant (log)				-0.03
				(0.12)
Non-EU equity (log)				0.68**
				(0.27)
Non-EC acquisition (dummy)				0.09
				(0.20)
Observations	3,167	3,167	3,167	3,167
R-squared	0.89	0.89	0.89	0.90
Firm FE	yes	yes	yes	yes
Year FE	yes	yes	yes	yes

Source: Authors' calculations based on IEP-COMPET (Gros et al., 2025)

[38] The European Commission does not acquire firms, therefore we omit the acquisition dummy for the European Commission.

4.9 EXISTING EVALUATIONS OF EU-FUNDED SUPPORT

Systematic evaluations of EU-funded programs supporting innovation are comparatively scarce.[39]

Some studies evaluate the impact of grants from the European Research Council (ERC) (e.g. Nagar et al., 2023; Ghirelli et al., 2023). However, the success of ERC grants is measured in terms of scientific publications and patents, which, unlike revenues, are harder to map directly to competitiveness.

Santoleri et al. (2022) examine Horizon 2020's SME Instrument—an EU program analogous to the US SBIR. Using a Regression Discontinuity Design, they find that grants have a positive impact on recipients' short-run performance. However, they have at most two periods of post-grant observations, limiting their ability to examine long-run changes in performance. Our estimates focusing on the SME instruments are fully consistent with their short-run findings.

Mitra and Niakaros (2023) attempts an evaluation of Horizon 2020 grants as a whole, without distinguishing between specific funding instruments or between single- and multi-project firms. They find results similar to ours, with only temporary effects on revenues lasting for the average duration of the program.

Unlike Santoleri et al. (2022) and Mitra and Niakaros (2023), who rely on confidential data from the European Commission's CORDA platform—including information on both successful and unsuccessful applicants—our analysis is based on the publicly available CORDIS database, which includes information only on successful applicants. While the absence of rejected applicants limits our ability to construct counterfactuals, our findings are broadly consistent with theirs.

Whereas Santoleri et al. (2022) focus specifically on the SME Instrument, both Mitra and Niakaros (2023) and Mulier and Samarin (2021) assess Horizon 2020 grants at a more aggregate level, without distinguishing between individual funding instruments. Their analyses rely on considerably smaller samples—approximately 10% the size of ours. Nonetheless, they find hump-shaped patterns that closely resemble those found in our study.

[39] The academic literature evaluating the effectiveness of public R&D subsidy programs is larger for the United States than for Europe. In the US, researchers have scrutinized key programs such as the Small Business Innovation Research (SBIR) initiative (Bloom et al., 2019; Howell, 2017; Howell et al., 2021), ARPA-E (Goldstein and Kearney, 2018), and funding by the National Institutes of Health (NIH) (Azoulay et al., 2019; Jacob and Lefgren, 2011). Pallante et al. (2021) examines the crowding-in effects of military R&D funding.

5. CONCLUSIONS AND RECOMMENDATIONS

Our analysis reveals that a large share of EU support for innovation is absorbed by companies that specialize in obtaining Horizon grants, often subsidiaries of large corporations, participating in dozens and in some cases as many as 200 projects. Horizon grants have become a regular source of financing for these companies, rather than an opportunity to fund innovative ideas.

Moreover, because large corporations are unlikely to be financially constrained, many of the projects financed by Horizon grants might have been undertaken anyway, even in absence of public support.

Most of Horizon's budget is allocated to funding instruments mandating collaboration across entities in different EU countries. If collaboration produces beneficial spillovers, they should show up in participants' performance. However, we do not find evidence that collaborative grants boost recipients' long-run growth.

By contrast, grants from funding instruments that target SMEs and do not impose collaboration in extensive consortia are associated with significant and persistent boosts in beneficiaries' revenue, but only if recipients are small independent companies that do not belong to corporate groups.

Furthermore, the detailed work programs of Horizon are determined in a lengthy and convoluted process dominated by Member State delegates sitting in big program committees. This process leads to detailed calls for proposals that reflect compromises of national interests, which in turn are heavily influenced by national champions.
We conclude that the most effective part of Horizon are the programs that fund small and independent companies, leaving more room for novel ideas.

In sum, based on our analysis, we recommend the following actionable steps to increase the effectiveness of the next EU Framework Program for innovation:

1. Redirect resources from collaborative funding instruments toward support for early-stage innovation and instruments targeting SMEs. This can be done within the current structure of Horizon programs, by shifting resources from Pillar 2 of Horizon Europe on "Global Challenges and European Industrial Competitiveness" to Pillar 3 on "Innovative Europe", under the European Innovation Council (EIC).

2. Target independent companies that do not belong to corporate groups and impose a limit on the number of projects for which the same entity can receive funding, especially consulting firms.

3. Leave more room for novelty and creativity by funding bottom-up innovation, relying more on "open calls" or thematic ones with flexibility for different approaches (as in the "Challenge" approach of the EIC).

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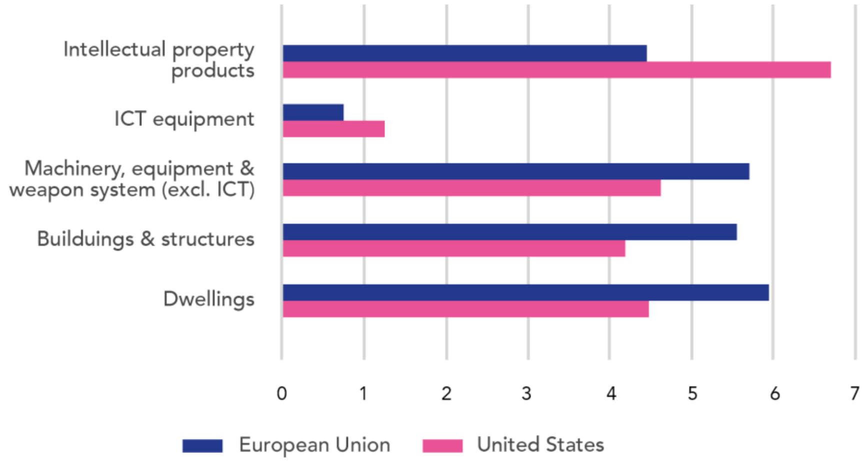
APPENDIX A
FIGURES AND TABLES APPENDIX

Figure A1: Breakdown of GFCF (%GDP) in its main components



Notes: Data extracted on 16 May 2024 17:15 UTC (GMT).

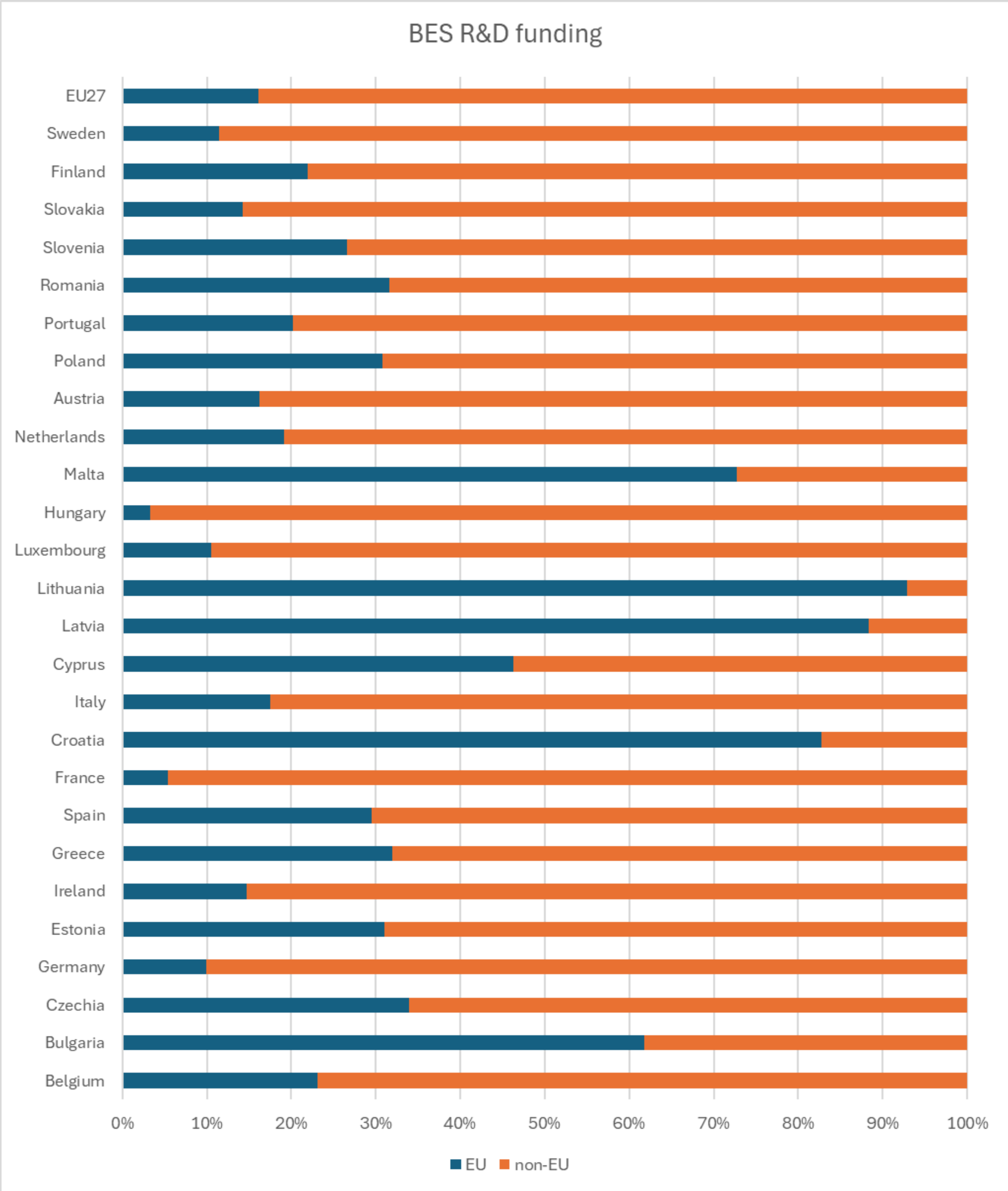
Source: OECD (2024) & Gros et al. (2024)

Table A1: Decomposition of Aggregate R&D Intensity

Industry *j*	I_j^{EU}	I_j^{US}	σ_j^{EU}	σ_j^{EU}	**Industry Effect**	**Composition Effect**
Automobiles & Parts	5.8	6.0	25.6	8.0	0.02	-1.02
Electrical Components & Equipment	5.5	3.5	3.7	1.0	-0.02	-0.15
Pharmaceuticals	14.1	16.6	4.9	7.8	0.19	0.42
Telecommunications Equipment	17.9	14.3	1.1	2.8	-0.10	0.29
General Industrials	4.4	2.7	1.5	2.8	-0.05	0.05
Aerospace & Defence	5.3	3.5	3.2	4.8	-0.09	0.09
Chemicals	1.9	2.1	6.2	2.8	0.01	-0.06
Semiconductors	13.7	16.4	1.6	5.7	0.16	0.56
Software	21.0	16.8	1.0	9.6	-0.41	1.80
Fixed Line Telecommunications	1.5	1.0	5.0	2.2	-0.01	-0.04
Commercial Vehicles & Trucks	4.1	3.2	3.1	3.6	-0.03	0.02
Tires	5.2	2.5	1.6	0.3	-0.01	-0.07
Oil & Gas Producers	0.3	0.2	9.7	10.3	-0.01	0.00
Computer Hardware	10.2	6.1	0.2	10.5	-0.43	1.05
Industrial Machinery	3.4	2.6	4.8	1.7	-0.01	-0.11
Gas, Water & Multiutilities	0.3	3.6	5.3	0.1	0.00	-0.02
Electricity	0.5	NA	7.5	0.0	0.00	-0.04
Electronic Equipment	8.6	6.5	0.7	2.8	-0.06	0.18
Health Care Equipment & Services	4.6	2.8	1.8	8.3	-0.14	0.30
Industrial Metals & Mining	0.6	NA	4.1	0.0	0.00	-0.02
Industrial Transportation	0.4	3.1	1.9	0.1	0.00	-0.01
Medical Equipment	7.5	5.1	1.0	0.8	-0.02	-0.01
Biotechnology	21.5	40.4	0.6	2.3	0.44	0.37
Computer Services	7.4	15.9	1.3	9.8	0.83	0.63
Nonferrous Metals	1.2	NA	0.6	0.0	0.00	-0.01
Diversified Industrials	3.0	7.8	0.3	0.2	0.07	0.00
Oil Equipment, Services & Distribution	1.3	2.1	0.2	0.8	0.07	0.01
Electronic Office Equipment	8.8	4.1	0.0	0.1	-0.01	0.01
Alternative Energy	2.9	4.1	0.5	0.1	0.00	-0.01
Mobile Telecommunications	0.6	9.2	0.1	0.2	0.02	0.00
Specialty Chemicals	2.7	6.2	0.4	0.5	0.02	0.00
Alternative Fuels	2.6	10.2	0.1	0.0	0.00	0.00
Health Care Providers	14.9	19.3	0.0	0.1	0.02	0.01
Total	**4.4**	**9.0**	**1.0**	**1.0**	**0.33**	**4.20**

Source: Author's calculations based on EU Industrial R&D Scoreboard (2024).

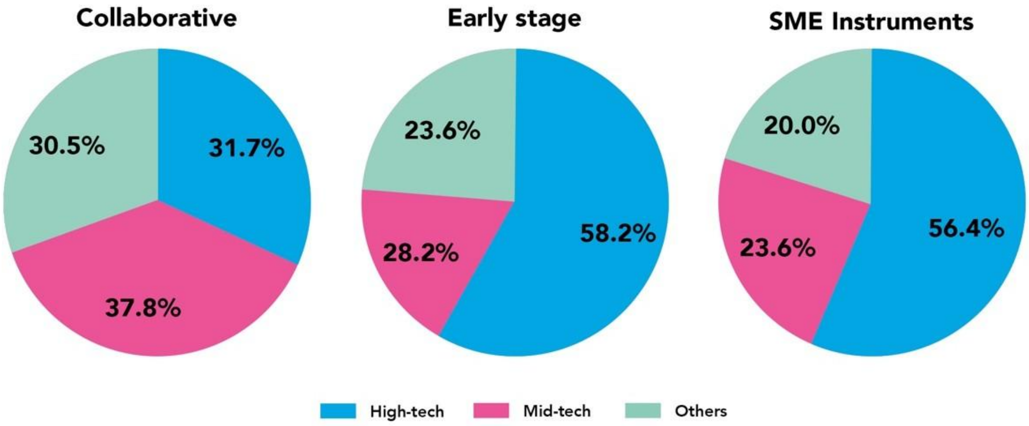
Figure A2: Horizon contribution to publicly funded R&D, by country



Source: Eurostat

https://ec.europa.eu/eurostat/databrowser/view/rd_e_berdsize custom_16366141/default/table?lang=en.

Figure A3: Horizon funding by ownership status and technological intensity



Source: IEP-COMPET (Gros et al., 2025)

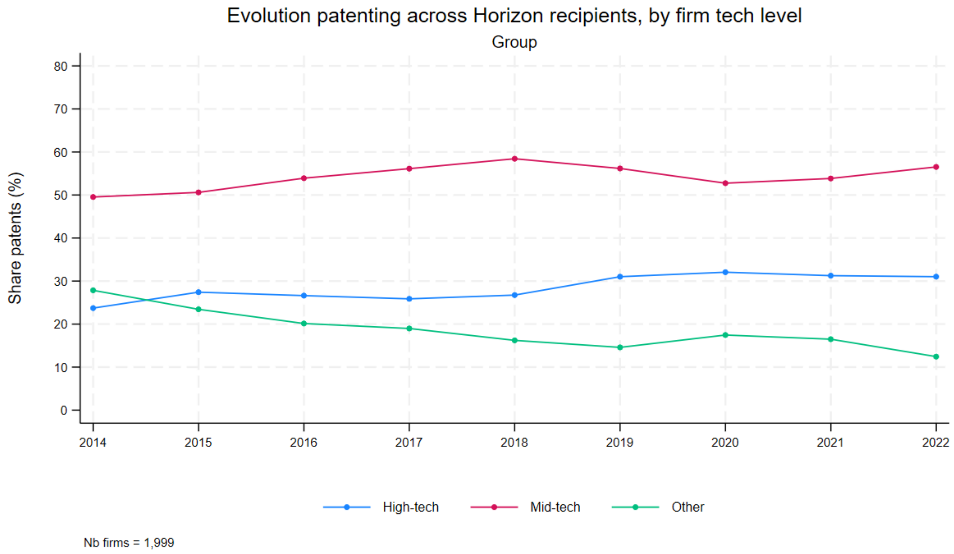
Table A2: Patent summary statistics by ownership type

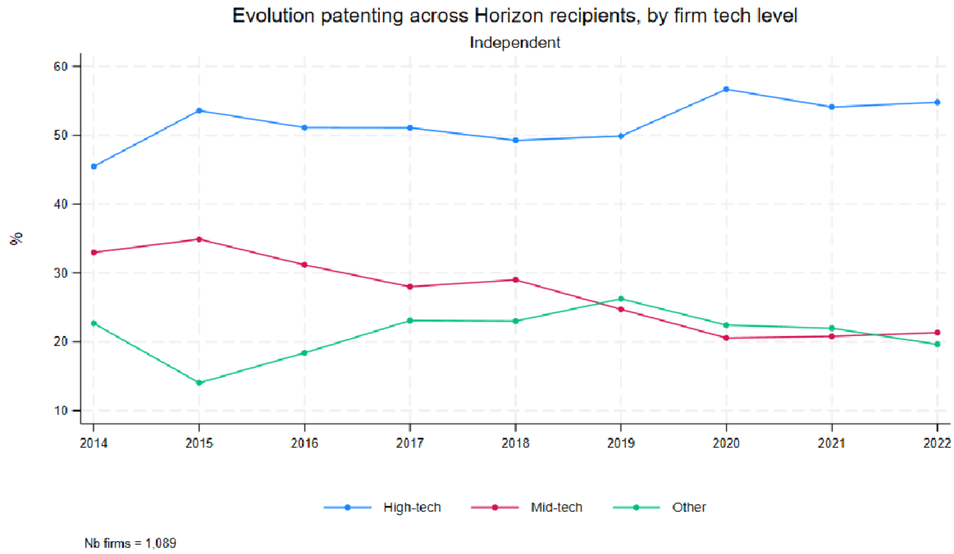
	N	Mean	Median	SD	Min	Max
Controlled Subsidiaries	9,392	8.10	2	32.52	1	1,199
Global Ultimate Owners	1,971	8.97	2	33.10	1	392
Independent Companies	2,258	2.78	2	4.10	1	87
Single Location Firms	1,405	2.42	1	3.90	1	110
Total	15,026	6.88	2	28.54	1	1,199

Notes: This table presents summary statistics for annual patent counts of single grant recipients, by firm ownership type. We include firm-year observations with at least one patent filed during 2005-2022.

Source: IEP-COMPET (Gros et al., 2025)

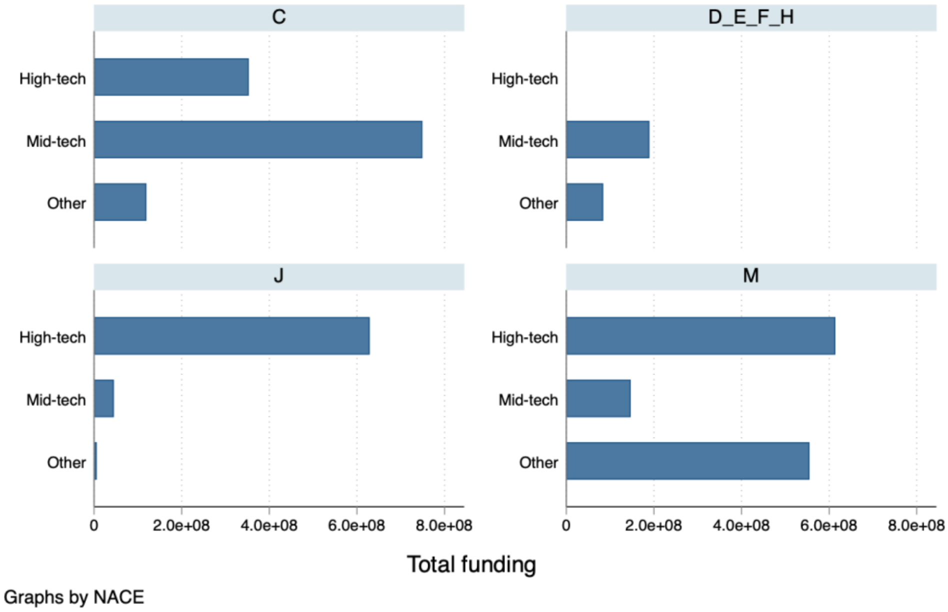
Figure A4: Share of patents by ownership status and firms' technological intensity





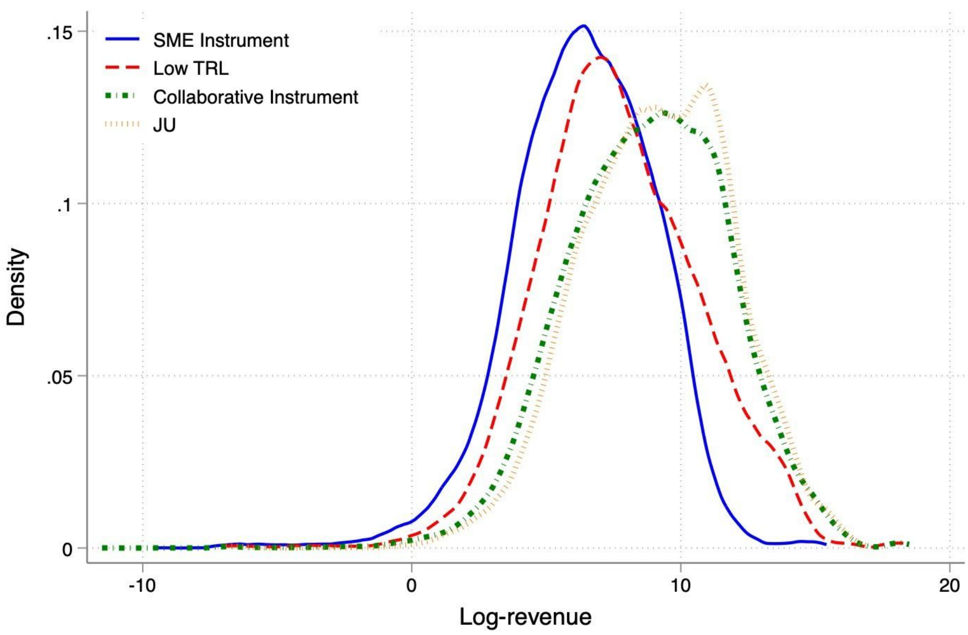
Source: IEP-COMPET (Gros et al., 2025)

Figure A5: Horizon funding by industry and technological intensity



Source: IEP-COMPET (Gros et al., 2025)

Figure A6: Size distribution by funding instrument (log-revenue)

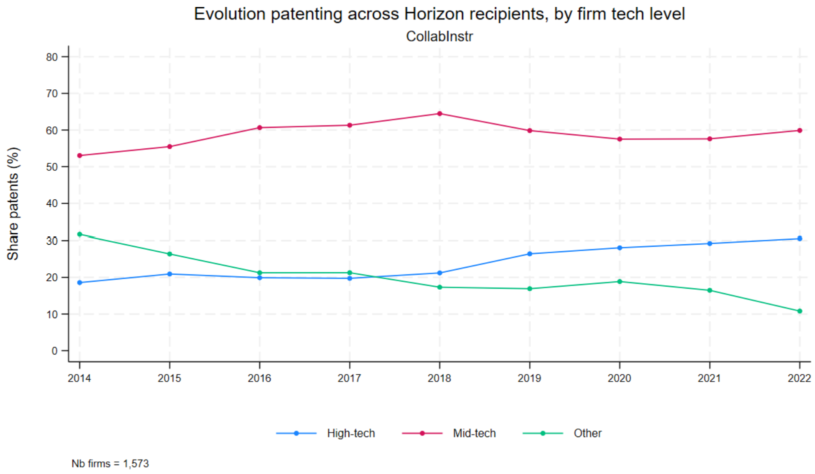


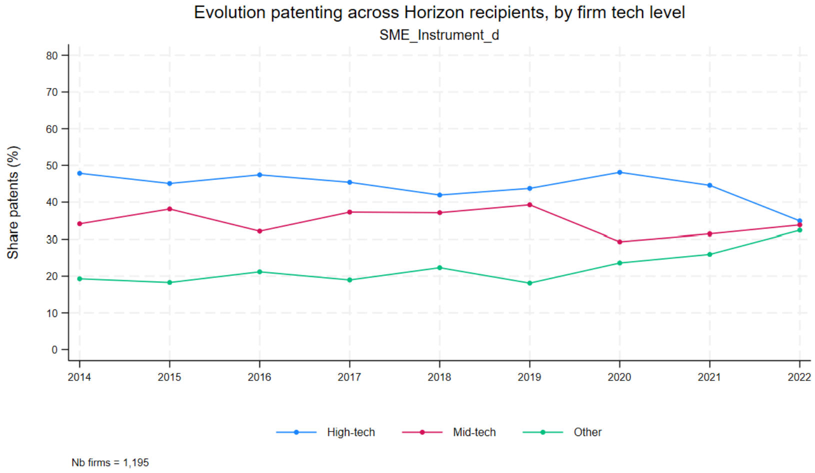
Source: IEP-COMPET (Gros et al., 2025)

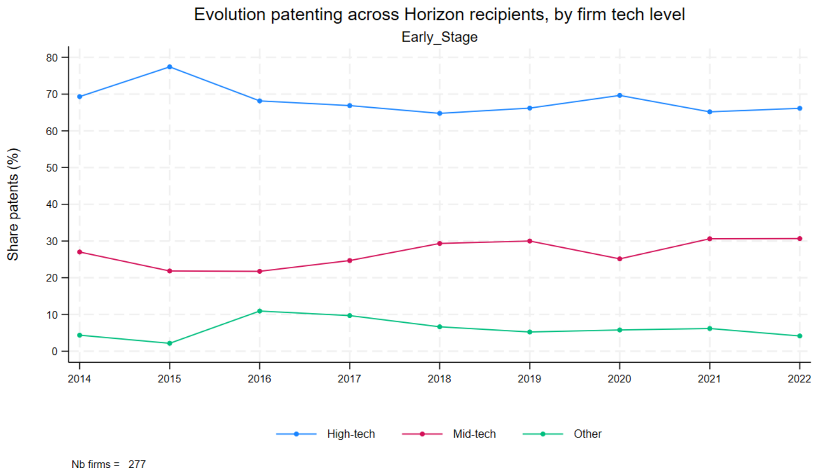
Figure A7: Horizon funding by funding instrument and tech. intensity

Source: IEP-COMPET (Gros et al., 2025)

Figure A8: Share of patents by funding instrument and firms' technological intensity







Source: IEP-COMPET (Gros et al., 2025)

Table A3: Firm statistics by funding instrument and ownership status

Entity Type	# Firms	% sample	SME (%)	Avg. Revenue (million)	Grant/ revenue (%)	Sum of grants (million)	Grants (% of total program grants)
Collaborative							
Controlled Subsidiaries	4,408	60.2	78.5	128	24.5	1,506	64
Independent Company	1,263	17.3	97.4	10	62.6	369	16
Single Location Firms	1,065	14.6	96.3	19	67.8	285	12
Global Ultimate Owners	591	8.1	80.5	186	25.9	194	8
Early Stage							
Controlled Subsidiaries	478	49.8	86.2	72	33.4	109	50
Independent Company	231	24.1	100.0	3	73.3	52	24
Single Location Firms	179	18.7	97.4	5	87.1	43	20
Global Ultimate Owners	70	7.3	85.7	184	21.4	14	6
SME Instrument							
Controlled Subsidiaries	1,293	41.3	97.8	16	54.2	552	38
Independent Company	822	26.3	100.0	2	86.9	463	32
Single Location Firms	732	23.4	99.1	2	83.8	237	16
Global Ultimate Owners	282	9.0	98.4	22	66.0	194	13

Source: IEP-COMPET (Gros et al., 2025)

Table A4: Summary of JU metrics (Only Average Metrics; Contributions in Billion €)

JU	EC contrib. (B€)	H-index (mean)	Citations (mean)	PhD (share)	Academic (share)
CBE	1.0	25.2	3,708	100%	77%
Clean Hydrogen	1.0	45.8	13,530	100%	44%
EU-Rail	0.6	20.5	2,228	100%	75%
IHI	1.2	21.9	4,557	76%	29%
Clean Aviation	1.7	22.8	2,565	80%	47%
Global Health EDCTP3	0.8	39.3	6,495	100%	77%
SESAR 3	0.6	20.5	2,150	89%	56%
EuroHPC	3.08	23.2	4,181	92%	50%
SNS	0.9	–	–	–	–
Chips (KDT)	4.18	–	–	–	–

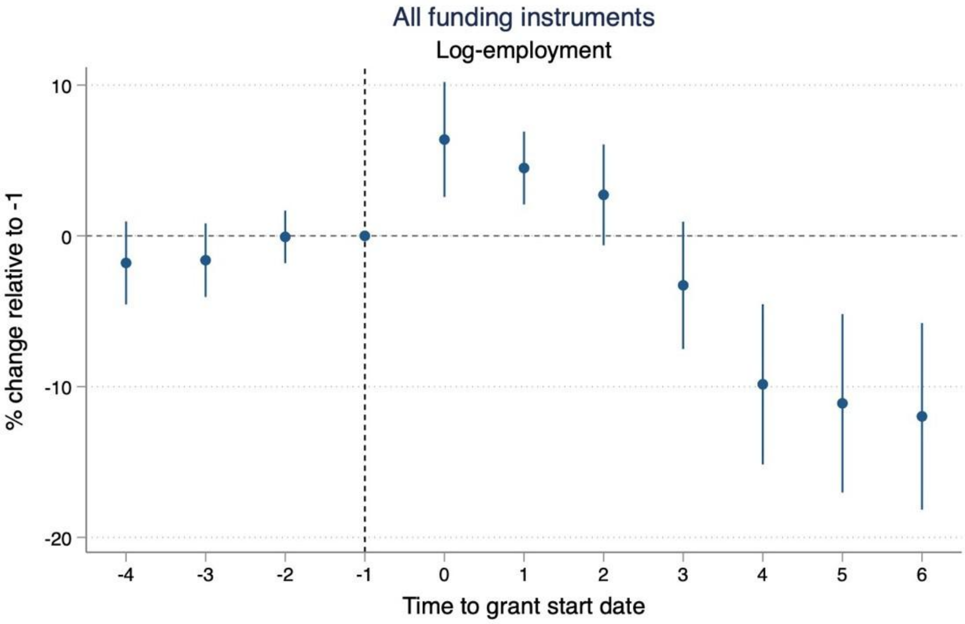
Source: Authors' calculations based on publicly available web information.

Table A5: COMPET-Crunchbase sample: summary statistics

Variable	Obs	Mean	Median	Std. Dev.	Min	Max
COMPET-Crunchbase						
EC grant ('000)	1,552	3,730	1,400	17,702	50	169,000
EC equity ('000)	146	9,676	8,700	7,934	40	30,000
Non-EC grant ('000)	2,996	1,504	155	3,172	19	20,000
Non-EC equity ('000)	5,479	77,002	4,000	302,814	50	2,096,303
Non-EC acquisition‡	105,503	0.05	0	0.22	0	1

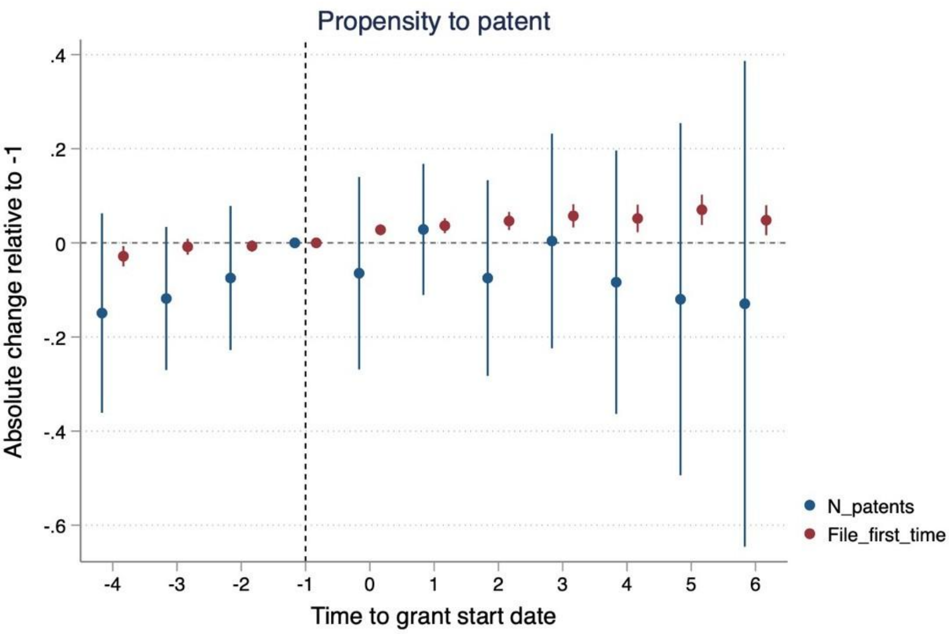
Source: IEP-COMPET (Gros et al., 2025)

Figure A9: Overall estimates – Employment



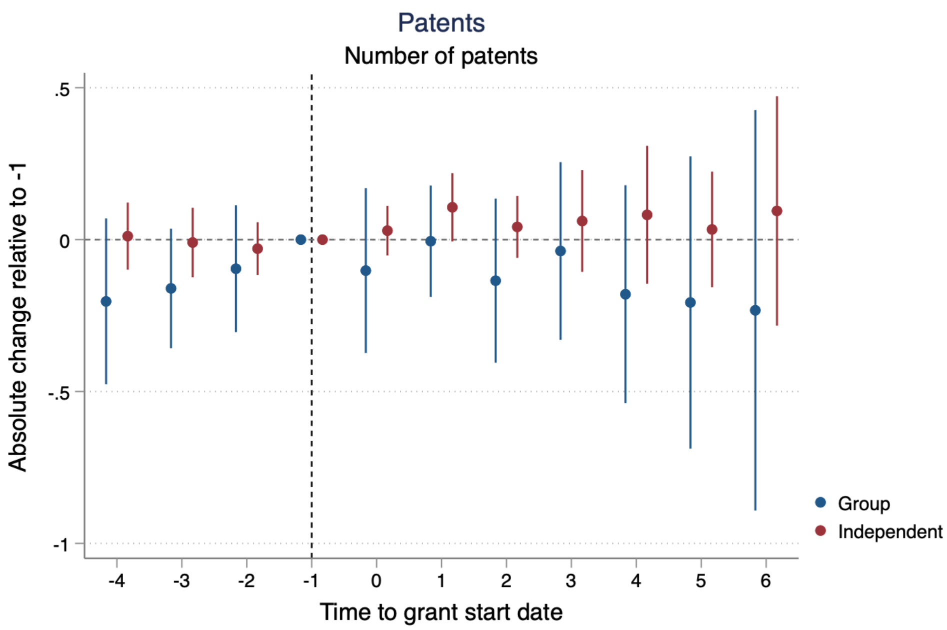
Source: Authors' calculations based on IEP-COMPET (Gros et al., 2025)

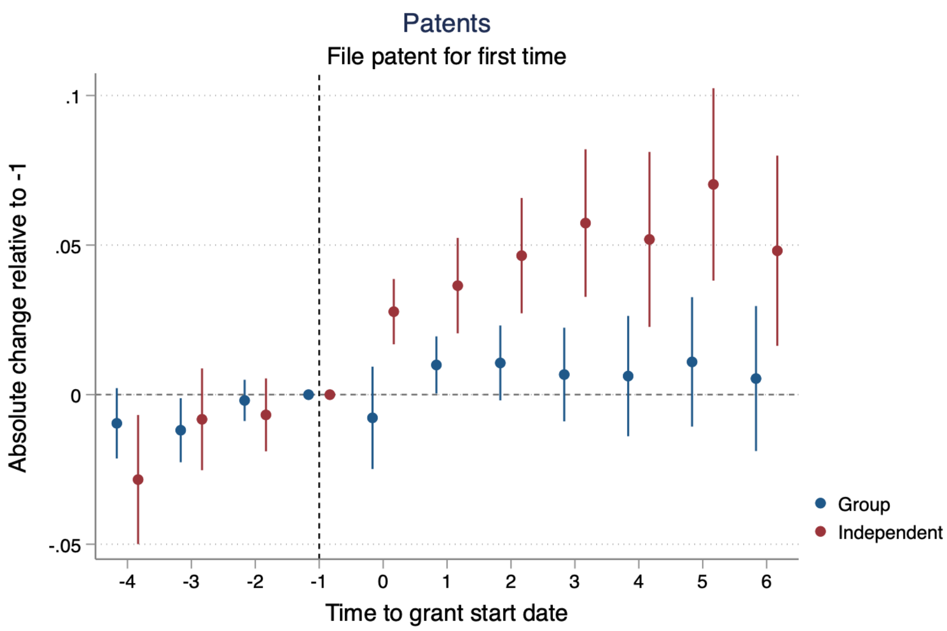
Figure A10: Overall estimates – Patenting Activity



Source: Authors' calculations based on IEP-COMPET (Gros et al., 2025)

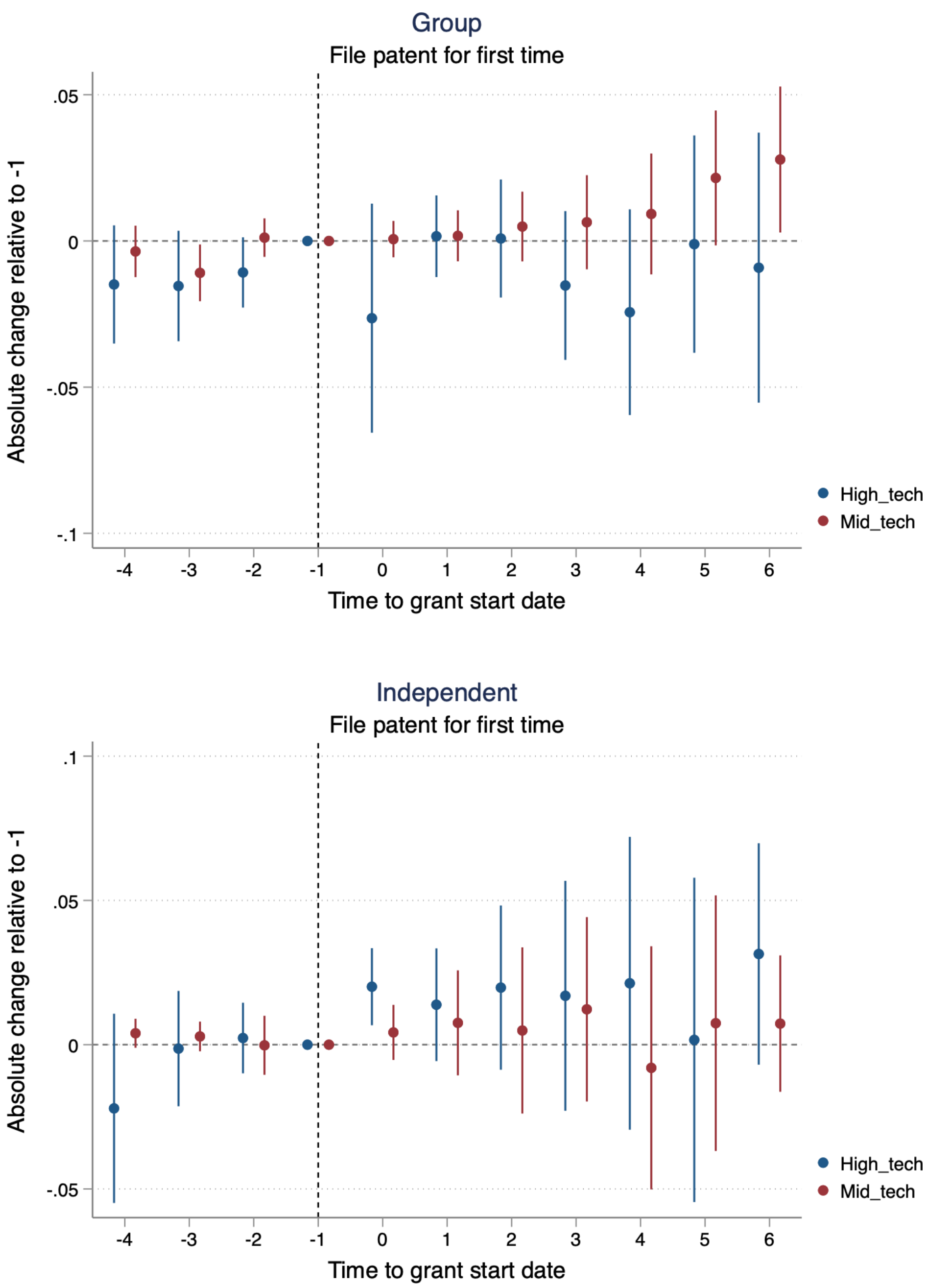
Figure A11: Patenting activity and firms' ownership status





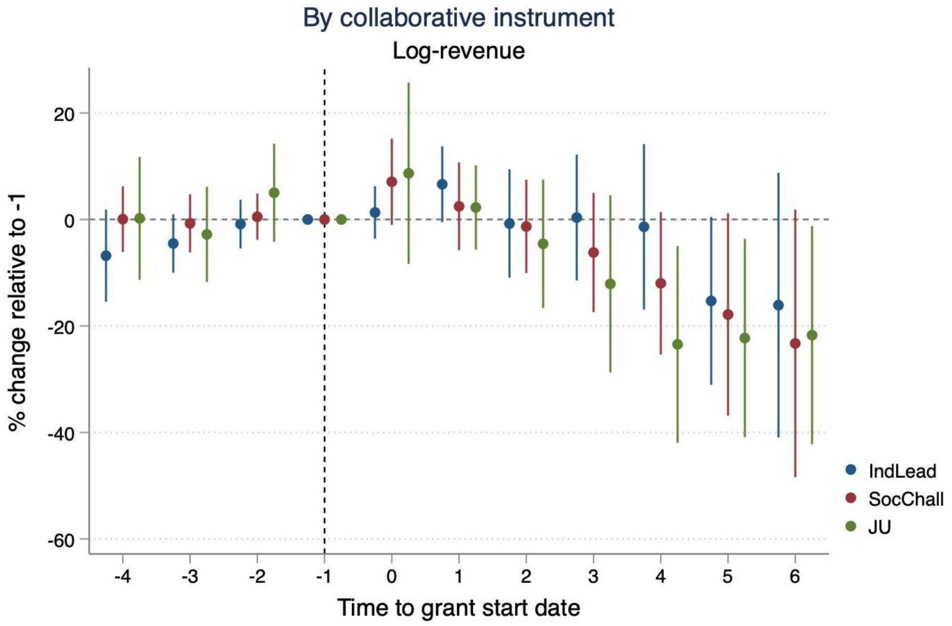
Source: Authors' calculations based on IEP-COMPET (Gros et al., 2025)

Figure A12: High-tech patents by patenting firms with different technological intensity and ownership status



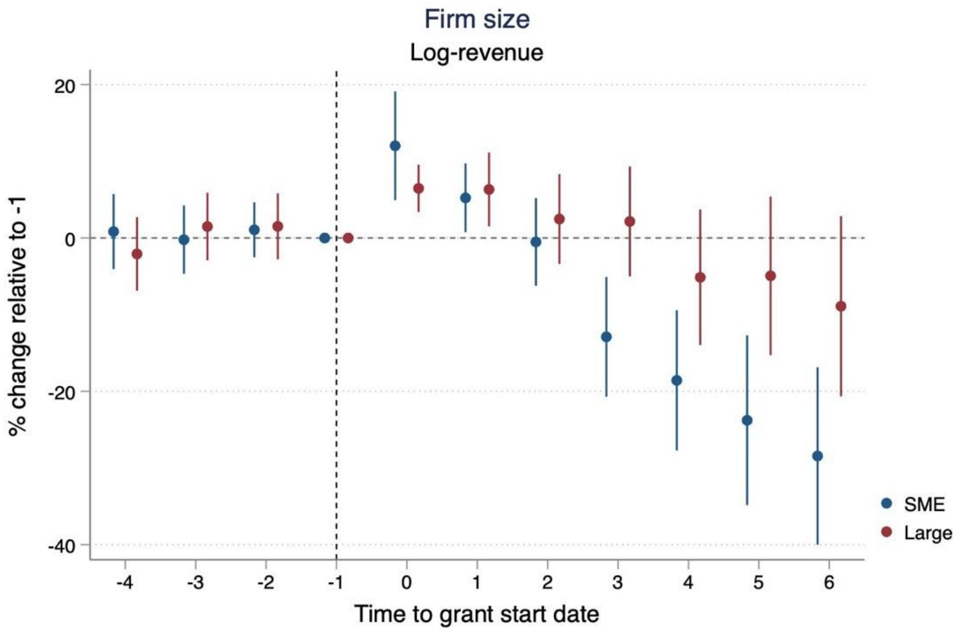
Source: Authors' calculations based on IEP-COMPET (Gros et al., 2025)

Figure A13: Overall estimates, by collaborative instrument



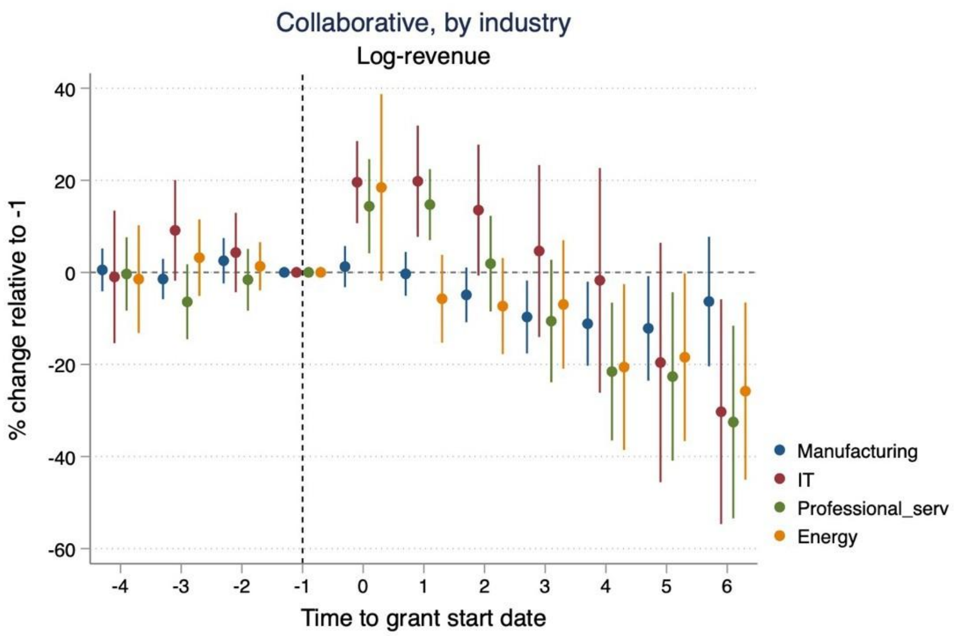
Source: Authors' calculations based on IEP-COMPET (Gros et al., 2025)

Figure A14: Overall estimates, by firm size



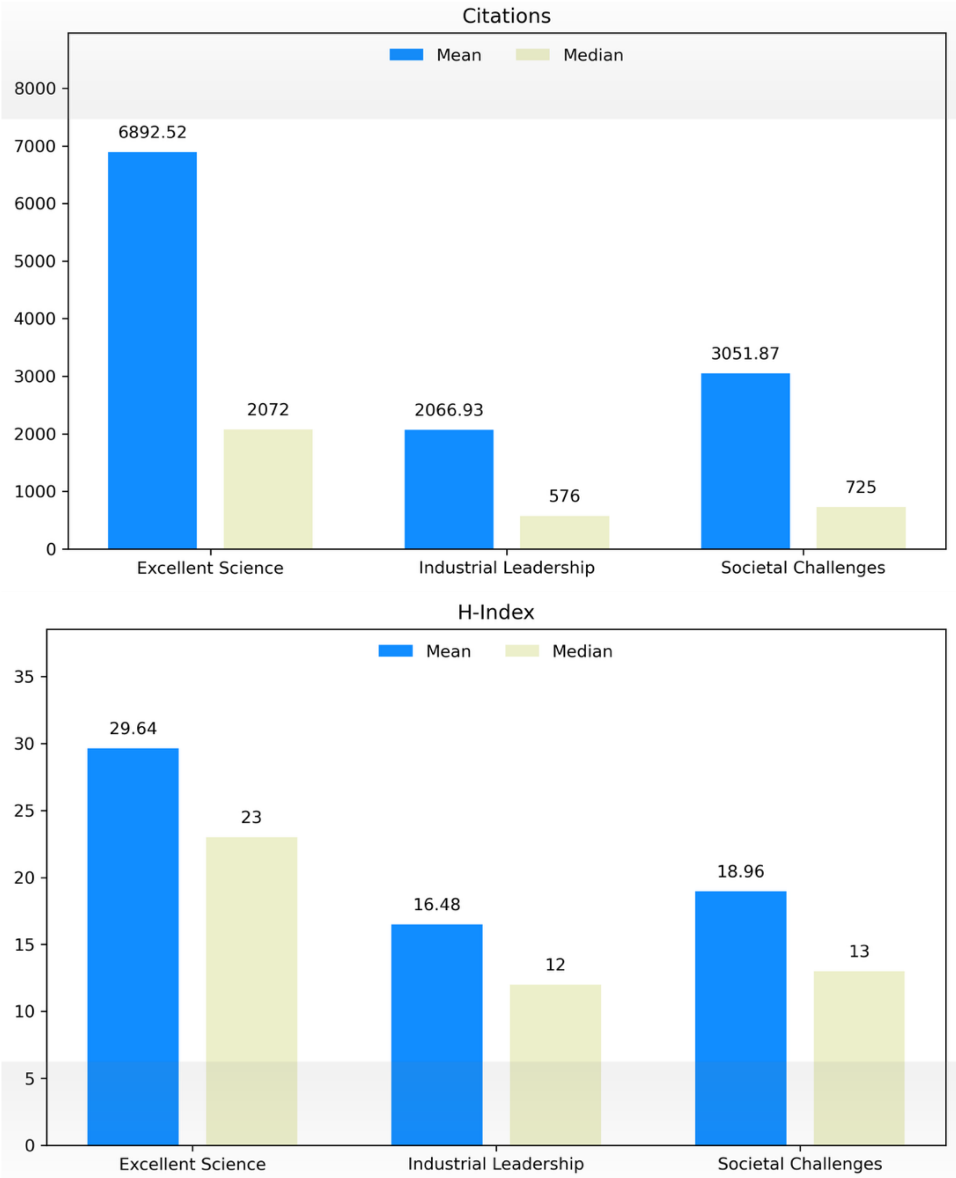
Source: Authors' calculations based on IEP-COMPET (Gros et al., 2025)

Figure A15: Overall estimates, by collaborative instrument and by industry



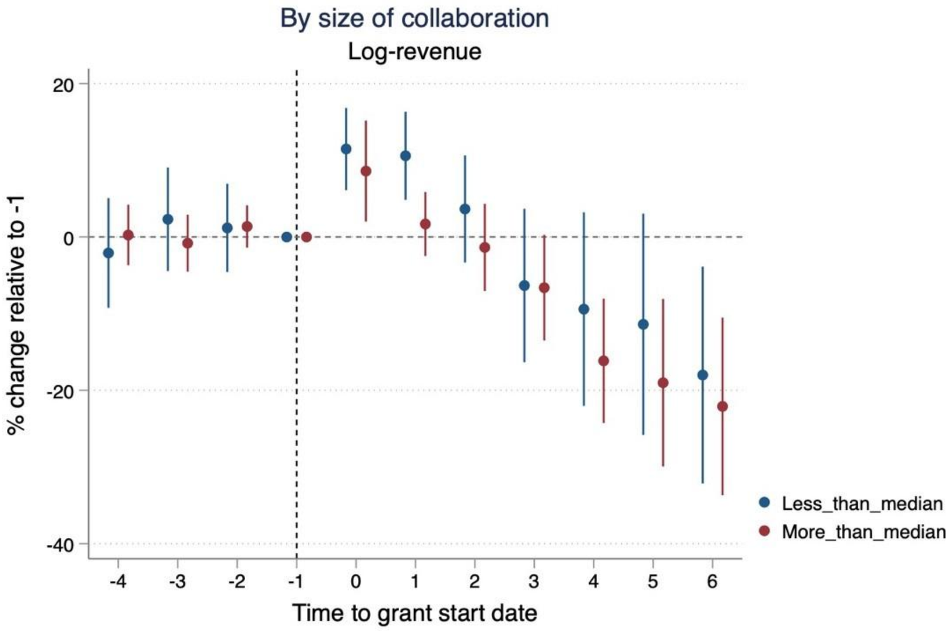
Source: Authors' calculations based on IEP-COMPET (Gros et al., 2025)

Figure A16: Quality of Horizon Projects' Evaluators



Source: Authors' calculations based on Web of Science (2025).

Figure A17: Overall estimates, by size of consortia



Source: Authors' calculations based on IEP-COMPET (Gros et al., 2025)

Figure A18: Website of Circular Bio-Based Joint Undertaking

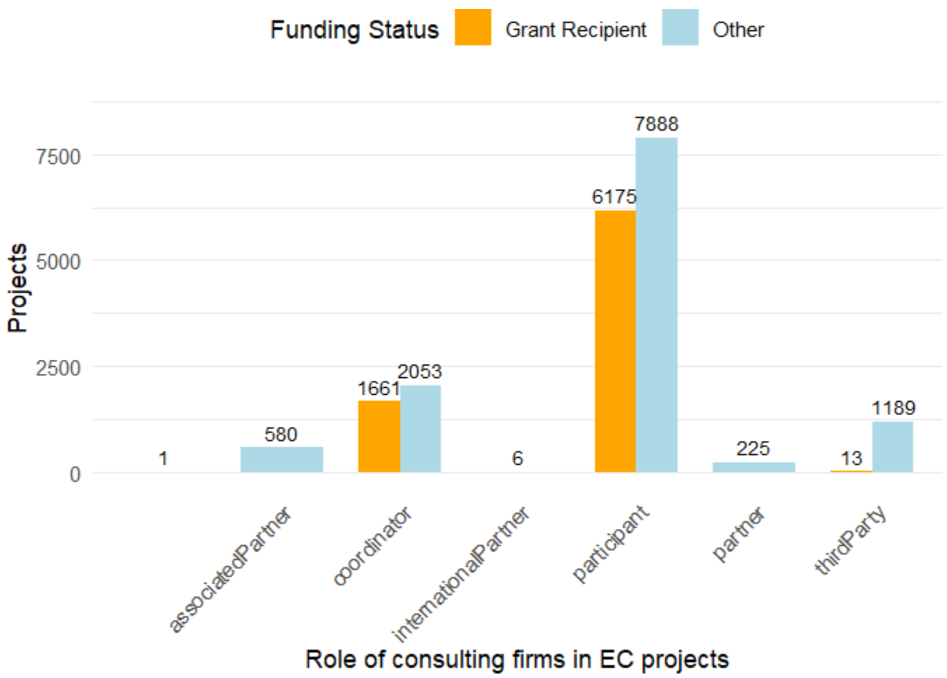
Apply as an expert

Are you an expert in the circular bio-based industries fields but are not planning to submit a proposal? Consider applying as an evaluator to help CBE JU select the best proposals in future calls:

- Create or update your expert profile via the European Commission's Funding & tenders portal
- E-mail experts [at] cbe.europa.eu by the end of May 2025, mentioning your expert profile number (format EX20XX1234567).

Notes: Page accessed on 9/4/2025. See https://www.cbe.europa.eu/call-proposals-2023-2#:~:text=Apply%20as%20an%20expert,-Are%20you%20an&text=Consider%20applying%20as%20an%20evaluator,profile%20number%20(format%20EX20XX1234567).

Figure A19: Consultancy companies funding recipients



Source: Authors' calculations based on IEP-COMPET (Gros et al., 2025)

Figure A20: Services offered by Warrant Hub

Notes: See https://www.warranthub.it/

APPENDIX B
ECONOMETRICS APPENDIX

B1 Estimation Approach

Our approach is estimating different versions of the following event study regression:

$$Y_{it} = \alpha_i + \gamma_t + \sum_{k=-T}^{T} \beta_k D_{ik} + \mathbf{BX}_{it} + \epsilon_{it}, \tag{B.1}$$

where Y_{it} is the outcome variable of firm i at time t. The indicator function D_{ik} captures the time to/from the grant and β_k is the associated coefficient, which is what needs to be estimated. ϵ_{it} denotes the error term.

The parameter T denotes the length of the pre/post treatment period and is chosen to be the largest possible depending on data availability. In order to avoid picking T arbitrarily, we use the earliest pre-treatment and latest post-treatment periods such that 90% of the companies fall within this interval. For instance, if 5% of companies are observed for at least five periods before getting the grant and 5% for six periods after, we use the interval [-4,6].

In (B.1), γ_t denotes year fixed effects. The inclusions of γ_t allows to purge the estimates from the impact of shocks, such as the COVID-19 pandemic.[40]

The vector $\mathbf{X}_{it}$ can include time-varying firm-level controls and the associate vector of coefficients $\mathbf{B}$.

Given that firms receive grants at different times, we estimate (B.1) using the estimator of Sun and Abraham (2021), which is designed for situations in which the treatment time is staggered across units. We adjust the estimator depending on the setup. When all firms are treated, i.e. there are no never-treated units, we use the last cohort of treated firms as the control group. When instead there are firms that are never treated, we use them as control units.

[40] We also experiment with industry-year effects, but the results are not sensitive to their inclusion.

B2 Endogeneity Concerns

The key identification issue is that the treatment, i.e. receiving a grant, is not randomly assigned across firms. For instance, the European Commission might target companies based on their performance, which would invalidate the estimates; firms in the last-treated cohort might be fundamentally different from those receiving the grant earlier, as those that are never treated. All such issues might result in a violation of the parallel trend assumption.

Part of these issues could be alleviated by the inclusion of firm fixed effect, which purges the estimates from firm-specific time-invariant characteristics. However, that would not be enough to address time-varying sources of bias. Therefore, we implement two different strategies depending on the specification.

The first strategy is applying inverse probability weighting, which assigns each subject a weight equal to the inverse of the probability of receiving the treatment they actually received, given their observed characteristics, i.e. revenue, employment, total assets, as well as the NACE 1-digit level sector in which they operate, and the year in which they receive the grant. To estimate such probabilities, we use a logistic regression.

B2.1 Seal of Excellence

The second strategy leverages a sample of firms that applied to specific funding programs, were considered eligible by the evaluators, but ended up not receiving the funding due to budgetary reasons. Such firms are awarded by the Commission a quality label named "Seal of Excellence".[41] We retrieve the list of awardees from Dealroom (Demolin et al., 2025), which compiled a non-exhaustive list of 814 firms that have received the Seal.[42] The Seal of Excellence can be awarded to SMEs applying to specific programs, and therefore we use this strategy when evaluating such programs.

[41] See https://research-and-innovation.ec.europa.eu/funding/funding-opportunities/ seal-excellence_en.

[42] See Gros et al. (2025) for more details on the procedure.