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Cost of Failure, Disruptive Innovation and Targeted Flexicurity:

more evidence supporting targeted reforms

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Cost of Failure, Disruptive Innovation and Targeted Flexicurity: more evidence supporting targeted reforms

Yann Coatanlem[1] & Oliver Coste[2]

Executive Summary[3]

This paper expands earlier work[4] by assembling a larger cross-country sample (250 plans) to measure restructuring costs borne by large firms and to assess links with business R&D in disruptive sectors (tech/biotech).

We estimate employee-related restructuring costs (in months of average salary) using public annual reports, SEC filings, and Eurofound sources. We confirm a wide transatlantic gap, e.g., Germany at 31 months vs the United States at 7 months. We identify outliers with low costs (2 to 3 months) within Europe: Denmark and Switzerland.

High restructuring costs due to Employment Protection Laws, combined with the high level of failure characteristic of disruptive innovation, make investment in tech and biotech essentially unprofitable. Therefore, European companies tend to specialize in marginal innovation, as confirmed by academic literature going back to the late 90s.

Consistent with this, we show a strong negative correlation between restructuring costs and business R&D intensity in tech and biotech, ranging from 0.1% in Italy to 3% of GDP in Switzerland. We provide a stylized model of the firm with a Monte Carlo simulation (using 20 years of revenue dynamics for 4,200 firms) demonstrating that disruptive sectors display volatile revenue profiles and that high restructuring costs depress profitability in such sectors while having limited impact in mature industries.

Because public disclosures often aggregate costs and omit country-level details, we outline why new firm-level surveys are essential to inform policy.

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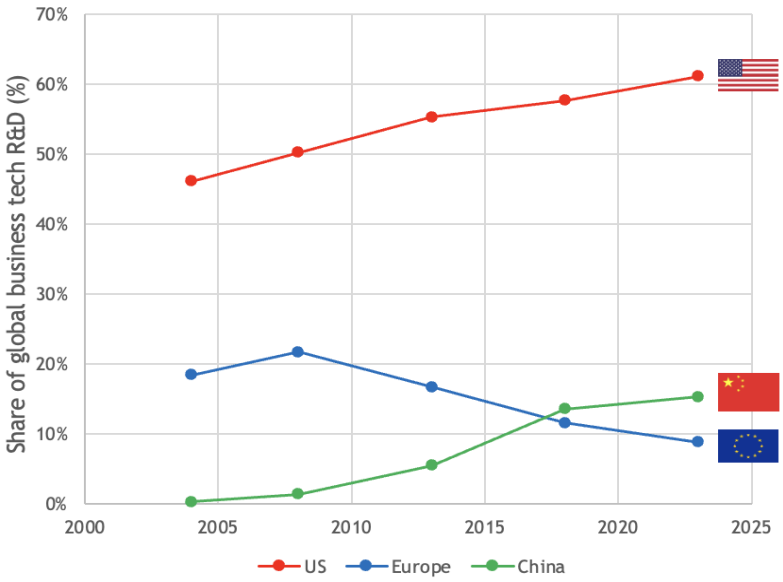
[1] Club Praxis
[2] Foundation for the Economic Study of Disruptive Innovation
[3] The authors are grateful to the Foundation for the Economic Study of Disruptive Innovation (fesdi.org) and the Fonds pour l'Etude Economique de l'Innovation de Rupture (feeir.org), their donors (in particular Pascal Lamy, Louis Gallois, Henri Seydoux, The Search Foundation, Basile Verhulst, le Comité Nord Est des Conseillers du Commerce Extérieur, l'Acrefeu) and their Board Members Bertrand Mabille and Frederic Rozé, who made this research possible. They are grateful to Daniel Gros, Giorgio Presidente and Pietro Galeone, whose questions lead to this investigations of companies' annual reports, to Antonin Bergeaud for an in-depth analysis of DGFiP corporate tax, to European Commissioner Ekaterina Zaharieva, Andreas Schwarz, Marc Lemaitre, Bernard Magenhann, Olivier Guersent, Mario Nava, Pauline Rouch, Anthony Whelan, Andras Inotai, Jochen Brodersen, Erik Kanton from the European Commission, Thomas Jarzombek, federal State Secretary in Germany, Levin Holle, Dominic Ponattu, Jakob von Weizsaecker, Moritz Schularick, Clemens Fuest, Nicola Fuchs-Schuendeln, Benjamin Schoefer, Tito Boeri, Etienne Wasmer and Marc Onetto for their very fruitful contributions.
[4] (Coatanlem & Coste, Cost of Failure and Competitiveness in Disruptive Innovation, 2024)

We conclude with recommendations for targeted EPL reforms, focused on high earners only, which will preserve social protection while restoring agility critical for disruptive innovation, productivity and growth.

1. Introduction

In his report on the future of European Competitiveness,[5] former Italian Prime Minister Mario Draghi attributed most of the productivity gap between Europe and the United States to the fact that there is much more disruptive innovation in the United States in the fast-growing tech sector. Indeed, Europe's presence in the tech sector has steadily eroded over the past 20 years, a trend reflected in its share of global business tech R&D, which has dropped from 22% to just 9%.

Share of global business tech R&D (in percentage)



Source: Authors' graph based on European Commission data[6]

Mario Draghi adds that, "if we exclude the tech sector, EU productivity growth over the past 20 years would be broadly at par with the US." So, the question becomes: how can Europe be successful in so many industry sectors, yet so lagging in tech?

Following the recommendations of the authors, he identified cost of failure as a first order issue: "EU companies face higher restructuring costs compared to their US peers, which places them in a position of huge disadvantage in highly innovative sectors characterised by the winner-takes-most dynamics." Cost of failure matters much more when the rate of failure is high.

[5] (Draghi, 2024), Part B, page 244
[6] (European Commission, 2024)

As noted by Martin Wolf in the Financial Times[7] mentioning our findings,[8] "new and dynamic companies have to be able to adjust their costs quickly in the light of market developments. Thus, note the authors, the costs of restructuring, largely the result of employment protection regulation, are fundamental."

Our analysis of restructuring costs was also presented by the EIC Forum working group on Innovation Policy.[9] In its Competitiveness Compass of 29 January 2025, the European Commission recognized cost of failure as a key factor in the "closing the innovation gap" pilar of its plan: "lower growth prospects for EU start-ups and higher costs of failure weaken their attractiveness in the eyes of investors. As a result, many seek funding in the US and relocate there to benefit from a larger market and customer base."[10]

The Commission is therefore intending to introduce a 28th legal regime that will address this issue through reforms of labor laws, and "will simplify applicable rules and reduce the cost of failure, including any relevant aspects of corporate law, insolvency, labor and tax law."[11] In that context, our research was also mentioned by the European Parliament.[12]

Since 2023, the authors have drawn attention to the cost of failure and have called for robust surveys to gather company-level data on restructuring expenses. Economists, think tanks, public administrations, and policymakers appeared largely unaware of the significant gap in restructuring costs between many European countries and the rest of the world.

In its Communication of 28 May 2025, the European Commission acknowledged the need for an in-depth analysis of this newly proposed explanation for Europe's innovation gap: "The Commission will launch a study to assess the extent to which corporate restructuring is organized and regulated at EU and Member State levels creates obstacles for startups, scaleups and innovative companies for business adaptation and innovation in different sectors of the economy, based on firm-level data (2026). This study will support the implementation of the Quality Jobs Roadmap and the Fair Labor Mobility package." [13]

However, to better prepare the groundwork for such a new study, and to support their hypothesis with more robust findings (so far based on business experience[14] and anecdotal evidence[15]), the authors chose to collect data on restructuring costs from the financial reports of hundreds of publicly listed companies. This approach also aimed to test the limitations of analyses relying solely on public databases.

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[7] (Wolf, 2024)
[8] (Coatanlem & Coste, Cost of Failure and Competitiveness in Disruptive Innovation, 2024)
[9] (EIC Forum, 2024), page 8
[10] (European Commission, 2025)
[11] Ibid.
[12] (European Parliament, 2025)
[13] (European Commission, 2025)
[14] (Coste, 2024)
[15] (Coatanlem Y. , 2024)

The paper is organized as follows. Section 2 summarizes our empirical findings. Section 3 discusses causality from different perspectives and proposes a simple model of the firm validated by Monte-Carlo simulation. Section 4 assesses robustness issues and section 5 explains why new firm-level surveys are necessary. Finally, section 6 presents possible public policy responses.

2. New empirical findings on cost of failure

2.1 Data sources & methodology

In this new round of investigation, we analysed about 250 restructuring plans of listed companies, with headquarters in the United States and in about 10 European countries. Restructuring plans are typically conducted across several regions.

For information about costs of restructuring plans, ex ante or ex post, we use annual financial reports of companies listed in Europe, and SEC Form 10-K for American companies. In some countries like France, complementary reports, such as the *Universal Registration Document*, can provide country-specific information related to the parent company.

Indeed, listed companies are required under IFRS or US GAAP accounting standards to report restructuring costs in their financial statements to shareholders. However, they often make it difficult to analyze them in relation to a specific social plan in a given country:

- Restructuring costs are typically reported on a global basis, with no breakdown by country.
- They may cover not only employee-related expenses (such as severance payments), but also costs associated with asset write-offs, such as equipment or facilities, and impairments of goodwill.
- Most financial reports do not provide information on the number of employees dismissed or on the average salaries of those affected.
- Moreover, companies have an incentive to slightly overstate restructuring costs, within the limits permitted by auditors, in order to present more favorable operating results.

As our objective is to document business experience in a way that is useful to economists and policymakers, we adopted a rigorous methodology designed to extract unbiased information on restructuring plans by country. For an exhaustive source of restructuring announcements in the European Union, we use the *Eurofound Restructuring Monitor*,[16] which compiles data over the past 22 years. This database was established by the European Commission (DG

[16] https://www.eurofound.europa.eu/en/resources/european-restructuring-monitor

Employment) in response to the political outcry triggered by Renault's 1997 decision to close its Vilvoorde plant near Brussels.[17] It compiles information on most restructuring announcements, including the number of employees dismissed, the country where the dismissals occur, the company involved, the timing of the process, and, in many cases, the outcome of negotiations with local trade unions.

The primary source of information for the Eurofound database is primarily the national or local press, which reports details disclosed by companies to employee representative bodies—such as the Betriebsrat in Germany or the Comité d'Entreprise in France—in accordance with national Employment Protection Legislation.

As a result, the database generally provides reliable data on the number of layoffs in the specific country where the announcement is made, as this information is mandated under national law.

In contrast, data on layoffs per country in other parts of the world is less frequently available, given that such disclosure is generally not required in many countries outside Europe. In the United States, listed companies are required by the SEC to disclose material events, including large layoffs: estimates of costs involved are mandatory, and the numbers of affected employees must be notified under the Worker Adjustment and Retraining Act of 1988 (the "WARN Act") for large layoffs,[18] whether they are recorded under a specific Form 8-K item[19] or under more general items. But usually, layoffs are only provided globally, not by country or region.

To avoid selection bias in the choice of companies investigated, we systematically analyzed all restructuring plans involving more than 100 layoffs, starting with the most recent cases prior to 31 December 2024, ensuring access to the corresponding annual reports, and working backward in time.

Restructuring plans involving fewer than 100 layoffs were excluded, as our study focuses on the cost of failure faced by large corporate groups investing substantial resources in high-risk technological R&D, where project or business failure may lead to the dismissal of hundreds or even thousands, or tens of thousands of employees.

To understand why we focus on large groups and large restructuring plans, while disruptive innovation is usually seen as coming from startup companies, our previous work[20] explains in detail the rationale: over 80% of tech R&D in the United States is carried out by companies of more than 1,000 employees, less than 20% by startups; moreover, the financing of startups

[17] Pure coincidence, one of the authors was the industrial advisor of the left-wing French Prime minister Lionel Jospin at the time of this highly sensitive restructuring plan and was involved in the discussions with Renault (partly owned by the French State) and with the Belgian authorities.
[18] (Federal Reserve Board, 2024). See also: https://www.warntracker.com
[19] Typically, under Form 8-K 7.01, 8.01 or 2.05.
[20] (Coatanlem & Coste, 2024)

in Europe of strongly impacted by the poorer profitability of European VC funds, stemming from the cost of failure within large groups.

We have also excluded privately held companies, as they either do not publish annual reports, or their financial statements are not audited with the same level of scrutiny as those of publicly listed firms.

We have examined the annual report of each listed company that has announced a restructuring plan. For example, if a company announced a restructuring plan in Germany in June 2023, it would be required to disclose the associated restructuring costs in its 2023 annual report, usually published in the first quarter of 2024.

We have excluded companies that had announced restructuring plans spanning multiple countries—such as Italy, France, China, Brazil, and Mexico—when only aggregate worldwide restructuring costs were disclosed, making it impossible to isolate the costs attributable to each country.

Conversely, we retained companies that had announced multi-country restructuring plans where it was possible to determine that the vast majority of layoffs occurred in a single country.

We aimed to determine whether the restructuring costs disclosed in annual reports related solely to employee dismissals or also included other elements, such as asset write-offs or goodwill impairments.

In some cases, the financial reports provided explicit breakdowns; in others, distinctions could be inferred from supplementary disclosures—for instance, cash components of restructuring costs typically pertain to employee dismissals, while non-cash components are more often linked to asset-related charges.

Factory closures offer another example: such events usually trigger significant asset write-downs, raising doubts about the validity of total restructuring costs when no further detail is provided. Accordingly, we excluded companies for which we could not identify credible figures specifically related to employee-related restructuring costs.

In favorable cases, we were able to link a restructuring plan announced in a specific country to the corresponding restructuring costs. For example, Infineon announced 500 layoffs in Germany on 8 May 2024, with no or minimal layoffs in other countries during that year. The company reported €140 million in restructuring costs related to this plan. From this, we calculated the restructuring cost per laid-off employee—€140 million divided by 500 jobs—resulting in an average cost of €280,000 per employee.

We sought to compare the restructuring cost per laid-off employee with the company's average gross salary. In Europe, listed companies are required to disclose total personnel costs—broken down into gross salaries and employer social contributions—as well as the average or final number of employees during the fiscal year. This allows for the accurate

calculation of the average gross salary per employee. For example, in 2024, Infineon reported an average gross salary of €67,000 per employee.

We were then able to express restructuring costs in terms of months of gross salary—for instance, in the case of Infineon, €280,000 per laid-off employee divided by an average gross salary of €67,000 yields a ratio of approximately 50 months.

Analyzing restructuring costs in terms of months of salary is useful for two main reasons. First, it reflects common practice among large corporations, where HR and Finance departments routinely estimate restructuring costs in a given country using this metric. It is a standardized approach that remains valid regardless of the specific salary levels of the employees concerned, and it also plays a role in investment decisions, as discussed in a previous paper.[21] Second, this method enables cross-country comparisons of restructuring costs, even when absolute salary levels differ significantly. As such, it provides a meaningful basis for assessing the economic impact of Employment Protection Law in each country.

Ideally, distinguishing between different categories of employees is highly desirable, because we are mostly interested in personnel that contribute directly to disruptive innovation, such as engineers and researchers.

Unfortunately, this information is rarely available, and when provided it generally applies to the entire firm. For instance, Stellantis gives a breakdown of all its employees between "blue collars" and "white collars" in its 2021 annual report.[22]

2.2 New results on restructuring costs

The full set of calculations—including our assumptions, areas of uncertainty, and methodological limitations—is provided on this webpages. The detailed analysis per company, the sources of information about restructuring plans and the extracts from the annual reports are presented on this webpage.

a. Germany

We analyzed 30 restructuring plans of listed companies in Germany between 2020 and 2024.

Several cases provided particularly robust data. Infineon's May 2024 plan involved 500 layoffs in Germany, with a reported cost per employee equivalent to 50 months of average salary. Similarly, Goodyear disclosed precise figures for its March 2025 restructuring involving 1,500 layoffs in Germany, corresponding to 33 months of salary. ThyssenKrupp reported 1,591 layoffs—primarily in Germany—at a cost of 36 months of salary. ProSiebenSat.1's July 2023 plan covered 400 layoffs, with an associated cost of 24 months of salary.

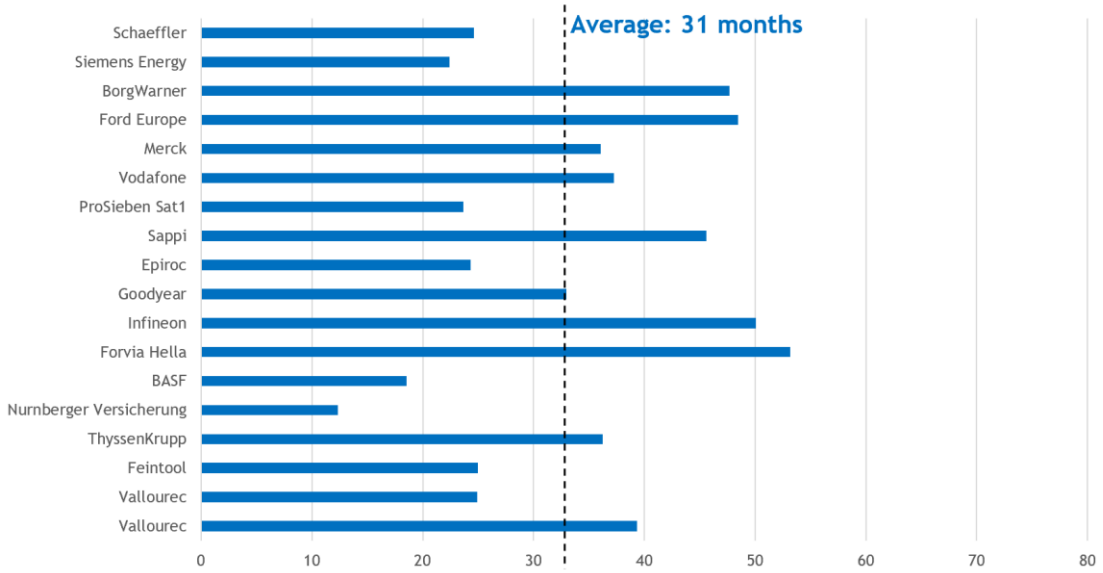
[21] (Coatanlem & Coste, 2024)
[22] (Stellantis, 2022), p. 228

Other cases required more cautious interpretation. For example, SAP announced a major restructuring plan in December 2024 involving 10,000 layoffs globally, of which 3,479 were in Germany. The company reported an average global restructuring cost of 34 months of salary.

However, considering that approximately two-thirds of SAP's workforce is based in the United States and Asia—where restructuring costs are typically around 6 months of salary—we estimate that the German portion may amount to approximately 59 months. Given the uncertainty around our estimates, we did not include SAP in the German sample.

We identified 18 cases that we found credible enough to represent the actual cost of a restructuring plan in Germany. We then computed a weighted average across all credible German cases, weighting each restructuring plan by the number of layoffs specifically in the country. The resulting weighted average is 31 months of gross salary.

Cost of Failure in Germany (in months of average employee compensation)



Source: authors' calculations, based on companies' financial reports and Eurofound

b. France

Using the same methodology, we analyzed 17 restructuring plans announced in France by listed companies, between 2020 and 2024.

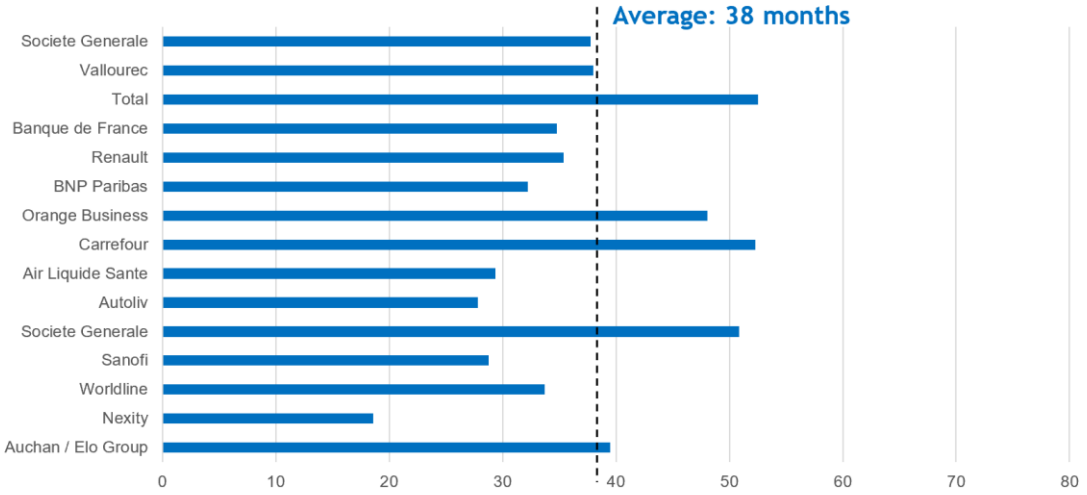
Several cases provided particularly clear and reliable data. For instance, Orange Business announced in March 2023 the dismissal of 650 employees in France, with a total restructuring cost of €176 million.

This corresponds to 48 months of average salary at Orange (noting that the average salary at Orange Business may be higher than at Orange Group overall). In February 2023, BNP Paribas

disclosed a plan affecting 921 employees in France, with associated costs of €182 million—equivalent to 32 months of average salary. Similarly, Total announced a restructuring plan in November 2020 involving 1,400 layoffs in France, with costs amounting to €364 million, or 53 months of salary.

Out of the 17 cases reviewed, 15 were considered sufficiently reliable to be included in our quantitative analysis. Based on these cases, we calculated a weighted average—accounting for the number of layoffs in each plan—of 38 months of gross salary for restructuring costs in France.

Cost of Failure in France (in months of average employee compensation)



Source: authors' calculations, based on companies' financial reports and Eurofound

c. Italy

We analyzed 19 restructuring plans in Italy carried out by listed companies between February 2015 and December 2024. Note that we had to extend our historical scope further back in time in order to identify a sufficient number of cases that met our credibility criteria.

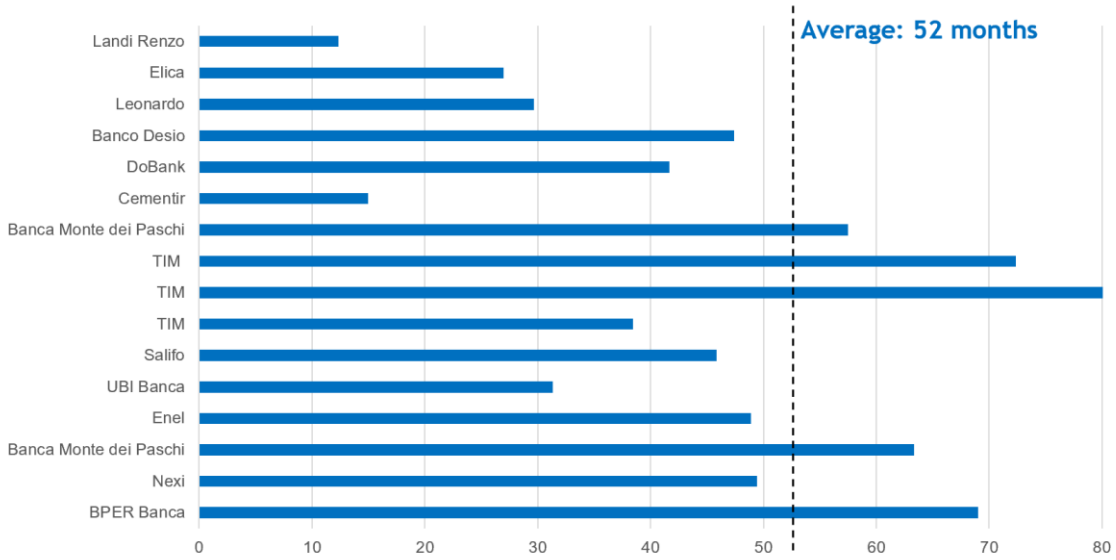
Many of the cases analyzed involve Italian banks, insurance companies, and former public utilities. In these sectors, longstanding institutional practices and strong union influence may contribute to higher restructuring costs than those typically observed in other parts of the economy.

For example, the restructuring plans announced by Telecom Italia Mobile in 2018, 2021 and 2023 have respective costs of 38, 90 and 72 months of gross salary. The plans announced by Banca Monte Dei Paschi in 2017 and 2022 have costs of 57 and 63 months of gross salary. Conversely, the relatively low results observed at Cementir (15 months of salary) and Landi Renzo (12 months) may be explained by a significant proportion of temporary workers among

the laid-off employees. As noted earlier, only company-level surveys could provide a fully representative view of the costs across different contract types and industries.

Based on the 16 cases we deemed sufficiently robust, we calculated a weighted average of 52 months of gross salary for restructuring costs in Italy. This is significantly higher than the 24 to 30 months typically observed in our business experience and may reflect both structural and sector-specific factors.

Cost of Failure in Italy (in months of average employee compensation)



Source: authors' calculations, based on companies' financial reports and Eurofound

d. Spain

We analyzed 15 restructuring plans in Spain. Like in Italy, we found high discrepancies between companies, based on their sector.

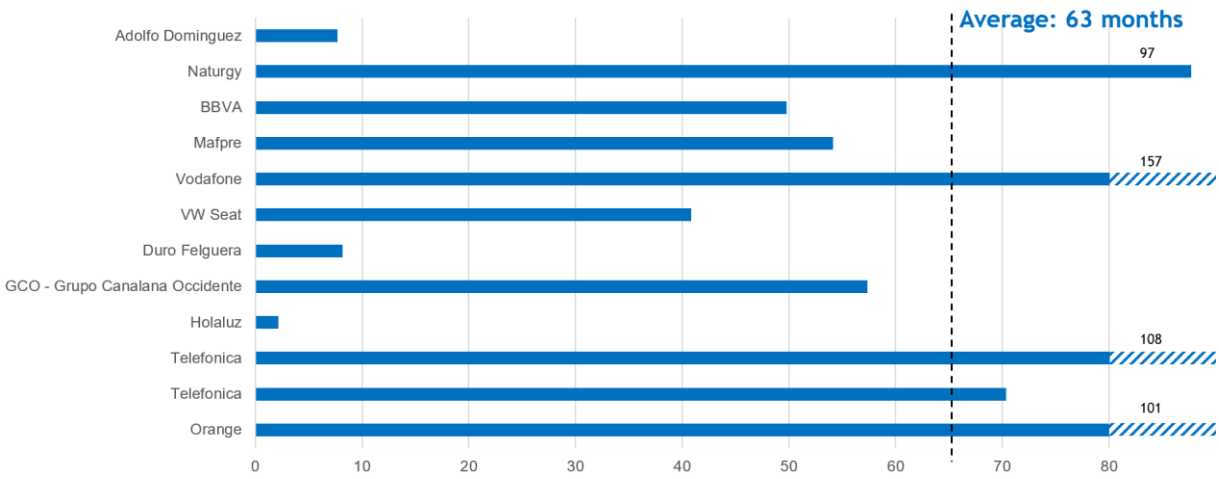
In the telecom sector, Telefonica carried out two plans at costs of 70 and 108 months of gross salary, Orange a plan at a cost of 101 months, Vodafone a plan at a cost of 157 months of gross salary. Banks and utilities like BBVA (50 months) and Naturgy (97 months) also pay very high restructuring costs.

On the other hand, smaller companies like Holaluz (2 months), Duro Felguera (8 months) and Adolfo Dominguez (8 months) are in a situation to carry out restructuring plans at much lower costs.

Only company-level surveys could confirm such findings and would enable to connect the restructuring costs with the Spanish Employment Protection Laws or to other sector- or company- specific rules.

Based on 12 restructuring plans which we considered credible enough, the weighted average restructuring cost is 63 months in Spain.

Cost of Failure in Spain (in months of average employee compensation)



Source: authors' calculations, based on companies' financial reports and Eurofound

e. The Netherlands

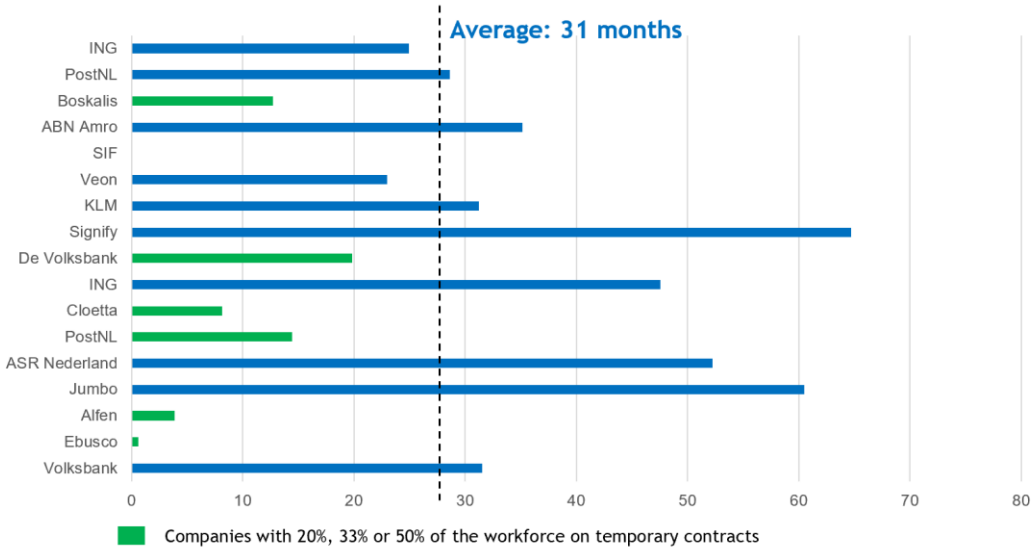
We analyzed 22 restructuring plans in the Netherlands announced between October 2016 and December 2024.

The results displayed a wide range—from as low as 0.6 months of salary at Ebusco to as high as 52 months at ASR Nederland. This variation is largely attributable to the significant prevalence of temporary employment contracts in the Dutch labor market, where approximately one-third of the workforce is employed under temporary arrangements. For example, Alfen, which had a workforce consisting of 20% temporary employees, initiated a restructuring plan that reduced headcount by 15%. It is likely that temporary employees were dismissed first, incurring very low costs and resulting in an overall restructuring cost of just 3.9 months of salary.

By contrast, companies such as Jumbo and ASR Nederland reported restructuring costs of 60 and 52 months of salary, respectively. This is likely to be due to a lower reliance on temporary staff and a higher share of long-term employees, who benefit from more protective dismissal procedures.

Based on the 17 cases deemed sufficiently credible, we calculated a weighted average restructuring cost of 31 months of gross salary in the Netherlands.

Cost of Failure in the Netherlands (in months of average employee compensation)



Source: authors' calculations, based on companies' financial reports and Eurofound

f. United Kingdom

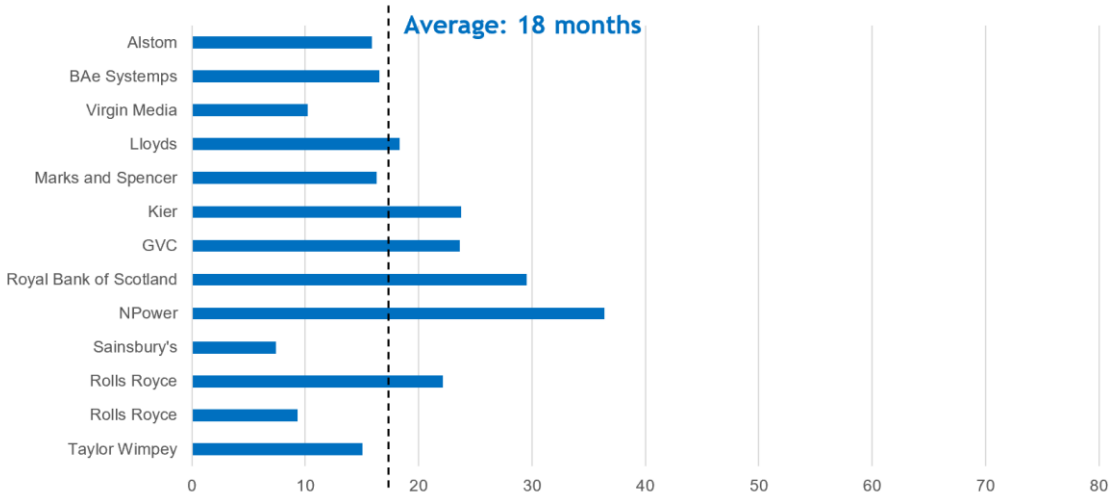
Due to the Brexit, the Eurofound database ceased compiling British restructuring cases in 2021. As a result, we analyzed 19 restructuring plans in the United Kingdom reported by listed companies between 2017 and 2020.

Several cases offered particularly solid and transparent data. For example, in 2019, Kier Group announced a restructuring plan involving 650 employees, with associated costs of £56 million—equivalent to 24 months of average salary. In 2018, Lloyds Banking Group launched a restructuring plan affecting 8,850 employees, reporting costs of £622 million, or approximately 18 months of salary.

Based on the 13 cases we considered plausible, we calculated a weighted average restructuring cost of 18 months of gross salary in the UK.

Contrary to the enduring image of a deregulated labor market, large-scale restructuring in the UK remains subject to substantial procedural obligations and financial consequences. While restructuring costs are lower than in major continental European economies, they are still significantly higher than in most countries around the world.

Cost of Failure in the United Kingdom (in months of average employee compensation)



Source: authors' calculations, based on companies' financial reports and Eurofound

g. Sweden

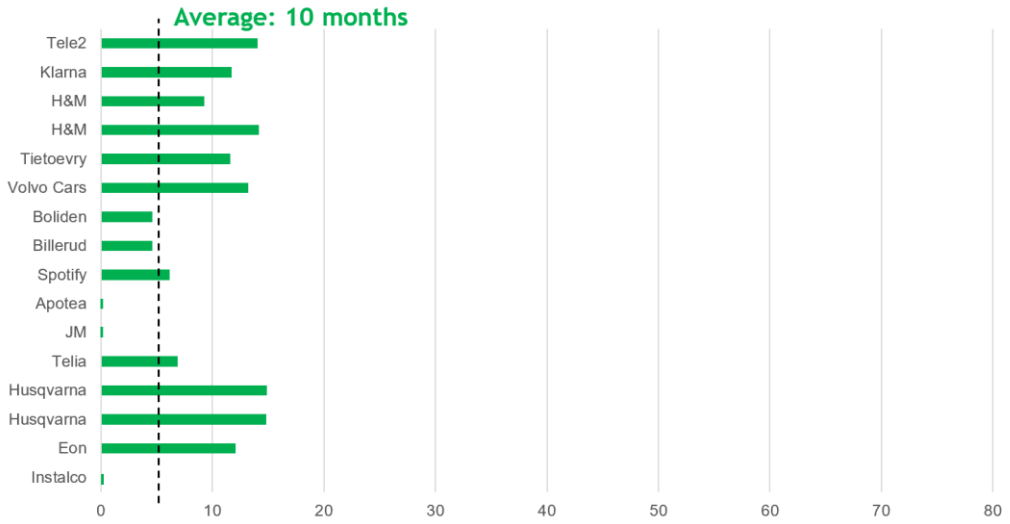
We examined 21 restructuring plans in Sweden, covering the period from May 2019 to December 2024.

Several cases offered particularly transparent and reliable data. For instance, Tele2 announced a restructuring plan in May 2019 involving 681 layoffs in Sweden, with a cost of 417 million SEK—equivalent to 14 months of average salary. In May 2022, Klarna announced 700 layoffs in Sweden at a cost of 500 million SEK, corresponding to 12 months of salary.

Other cases raised interpretive questions. Boliden, for example, announced 190 layoffs in June 2023 at a reported cost of 55 million SEK, but this amount included asset write-offs. The true employee-related component of the cost is therefore lower than the calculated 5 months. In addition, companies such as Instalco, JM, and Apotea reported restructuring plans involving over 100 employees each, but did not disclose any associated restructuring costs. This may indicate that most of the affected workers were employed under temporary contracts. We included these cases with an assumed cost of 0 months—though this assumption remains open to debate.

Based on the 16 cases we deemed credible, we calculated a weighted average restructuring cost of 10 months of gross salary in Sweden.

Cost of Failure in Sweden (in months of average employee compensation)



Source: authors' calculations, based on companies' financial reports and Eurofound

h. Denmark

We analyzed 15 restructuring plans in Denmark, spanning the period from September 2015 to December 2024.

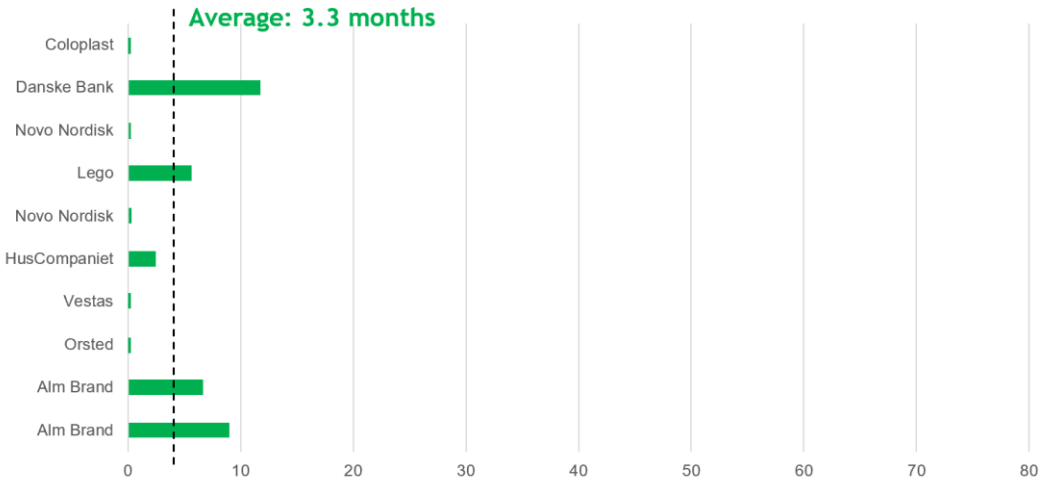
Some cases are very solid. Alm Brand announced 105 layoffs in Denmark in November 2023 for a cost of 50 million DKK, which corresponds to 6.7 months of salary. HusCompagniet announced 147 layoffs in Denmark in August 2022 for a cost of 18 million DKK, which corresponds to 2.5 months of salary.

Interestingly, Novo Nordisk—later widely known for its blockbuster obesity treatment—launched two major restructuring plans involving 1,300 employees in 2018 and 1,000 employees in 2016, but did not report any restructuring costs in the corresponding annual reports. The same applies to restructuring plans announced by Ørsted, Vestas, and Coloplast. This is surprising, given that accounting rules require companies to disclose restructuring costs to shareholders. As such, it should not be possible for management to simply report costs related to restructuring plans as operating expenses.

The relatively high frequency of such cases in Denmark—whereas we identified only one such case in the United States—makes them noteworthy. For this reason, we included them in our weighted average.

We identified 10 cases as credible enough and calculated a weighted average of 3.3 months of salary in Denmark.

Cost of Failure in Denmark (in months of average employee compensation)



Source: authors' calculations, based on companies' financial reports and Eurofound

i. Switzerland

As Switzerland is not a member of the European Union, the Eurofound database does not provide a systematic listing of restructuring plans in the country. We therefore had to conduct manual research—primarily using online searches—to identify relevant cases. This proved challenging, as it was difficult to find listed companies that had carried out significant restructuring plans located exclusively or predominantly in Switzerland.

While major Swiss multinationals such as Novartis, Nestlé, and Roche have implemented large-scale restructuring efforts, most of these plans have consistently been global in scope, with no publicly available breakdown of costs specific to their operations in Switzerland. As such, they could not be included in our analysis.

Over the period from 1999 to 2024, we were able to identify only a limited number of cases that were clearly relevant to restructuring activities taking place specifically in Switzerland.

UBS acquired Credit Suisse in 2023 and initiated two major restructuring plans—one affecting 18,000 employees in 2023 and another 13,000 in 2024. In both cases, Switzerland accounted for at least one-third of the impacted workforce. The restructuring costs reported in the corresponding annual reports amounted to just 1.1 and 1.7 months of salary, respectively.

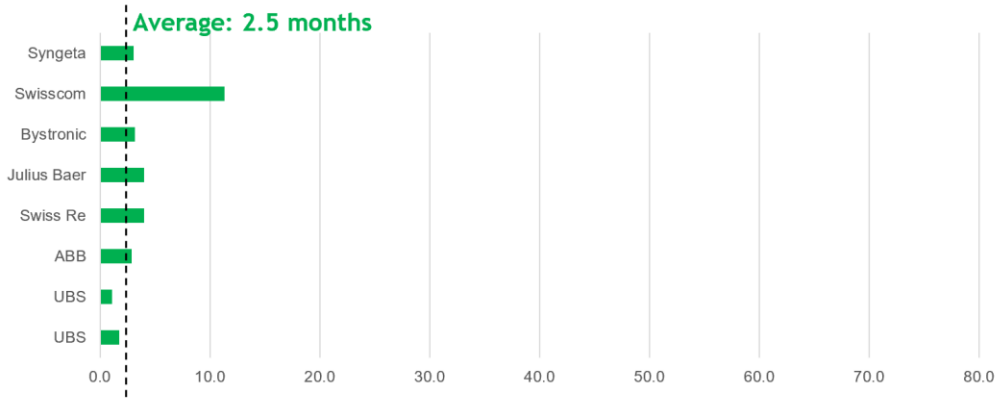
Given the financial nature of the activities involved, it is likely that the other affected countries included the UK and the USA—jurisdictions where restructuring costs are typically lower than in Germany or France but still generally fall within a range of 6 to 20 months of salary. As such, reporting worldwide averages of less than 2 months while Switzerland alone represents at least one-third of the layoffs is both intriguing and highly relevant to our analysis.

ABB is a company headquartered in both Switzerland and Sweden. It carried out a restructuring plan in 2001 involving 2,300 layoffs at a reported cost of 59 million CHF, corresponding to 2.9 months of salary. Although no breakdown was available regarding the countries affected by the restructuring, it is reasonable to assume that Switzerland and Sweden represented significant portions of the layoffs. We therefore considered this finding relevant to our analysis.

A similar case is the restructuring plan launched by SwissRe in 2026, involving 1,700 layoffs and reported costs of 153 million CHF—equivalent to 4 months of salary. Again, while the geographic breakdown is not disclosed, it is likely that a substantial portion of the layoffs occurred in Switzerland, given the company's identity as a Swiss insurance group. As such, we included this case in our study.

Based on this very limited sample—identified over a 25-year period—we calculated a weighted average of 2.5 months of salary. While this result must be interpreted with caution due to the limited data and lack of geographic precision, the figure is nonetheless striking when compared to the significantly higher costs observed in neighboring countries such as Germany, France, or Italy. It clearly warrants further investigation through company-level surveys and a deeper analysis of Swiss labor law.

Cost of Failure in Switzerland (in months of average employee compensation)



Source: authors' calculations, based on companies' financial reports and press reports

I. The United States

As with Switzerland and the UK post-Brexit, the Eurofound database does not cover the United States. However, we identified alternative public databases—such as *Warntracker*[23]—that provide information on large-scale restructuring plans. Using these sources, we selected 25

[23] https://www.warntracker.com/company/flsmidth#google_vignette

major restructuring plans carried out in the U.S. or worldwide by U.S.-based companies between November 2022 and December 2024.

A final difference lies in the availability of salary data. Unlike in Europe, average salaries are not disclosed in the annual reports of U.S. companies. However, SEC regulations require U.S.-listed companies to disclose the ratio between the CEO's total compensation and that of the median employee in their Form DEF 14A. In parallel, official statistics from the U.S. Social Security Administration indicate that, over the past 10 years, the median compensation in the U.S. has consistently ranged between 65% and 68% of the average compensation.[24] Assuming that the companies we investigated follow a similar pattern, we estimated average compensation by multiplying the disclosed median compensation by 1.5.

Based on this methodology, we applied the same approach used for European countries to calculate restructuring costs in terms of months of compensation. The word compensation includes base salaries, bonus and share based compensations like stock options, and is the closest equivalent to the average salaries disclosed by listed companies in Europe, where bonuses and stock options play a much more limited role.

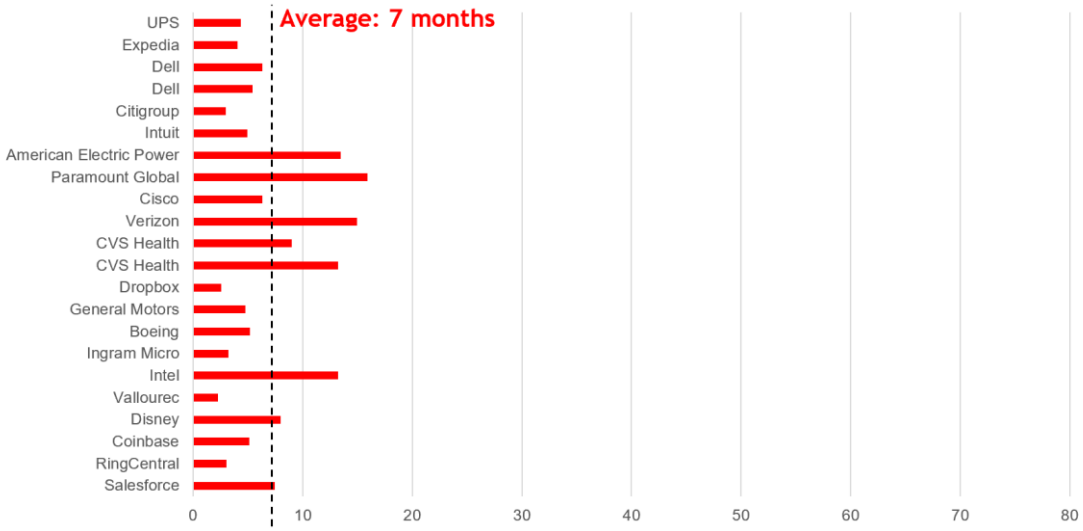
Some cases are particularly robust. American Electric Power, a utility operating exclusively in the United States, announced a restructuring plan involving 1,000 layoffs in July 2024, with reported costs of $212 million. Given an estimated average compensation of $188,000, this corresponds to 13 months of compensation.

Dropbox, with 80% of its workforce in the US, announced in October 2024 a plan involving 528 employees, for a cost of $47m and an average compensation of $420,000, resulting in 3 months of compensation. Salesforce announced in March 2023 a restructuring plan affecting 7,995 employees, with total costs of $1224 million and an average compensation of $248,000, resulting in 7 months of compensation. With more than 51% of its workforce based in the U.S., this figure is relevant for our U.S. estimates.

Based on the 22 cases we considered plausible, we calculated a weighted average of 7 months of salary for restructuring costs in the United States.

[24] https://www.ssa.gov/oact/cola/central.html

Cost of Failure in the United States (in months of average employee compensation)



Source: authors' calculations based on annual reports and SEC filings

As in European countries, there are significant variations in restructuring costs across U.S. companies. This should not come as a surprise. Companies such as Verizon (15 months) and Paramount (16 months) have been in existence for over a century and have maintained relatively stable workforces over decades. This results in high average seniority among employees and a strong presence of trade unions—both of which contribute to elevated restructuring costs. For such companies, it is not unusual for restructuring costs to reach an average of 12 months of salary per dismissed employee.

On the other hand, tech companies such as Salesforce, Dropbox, and RingCentral have been in existence for less than 20 years and have experienced rapid growth over the past decade. This has resulted in a younger workforce with relatively low seniority and minimal union presence. These companies also tend to offer significantly higher compensations, reflecting a workforce composed largely of engineers and software developers operating in a highly favorable job market. For such companies, restructuring costs are typically around 3 to 5 months.

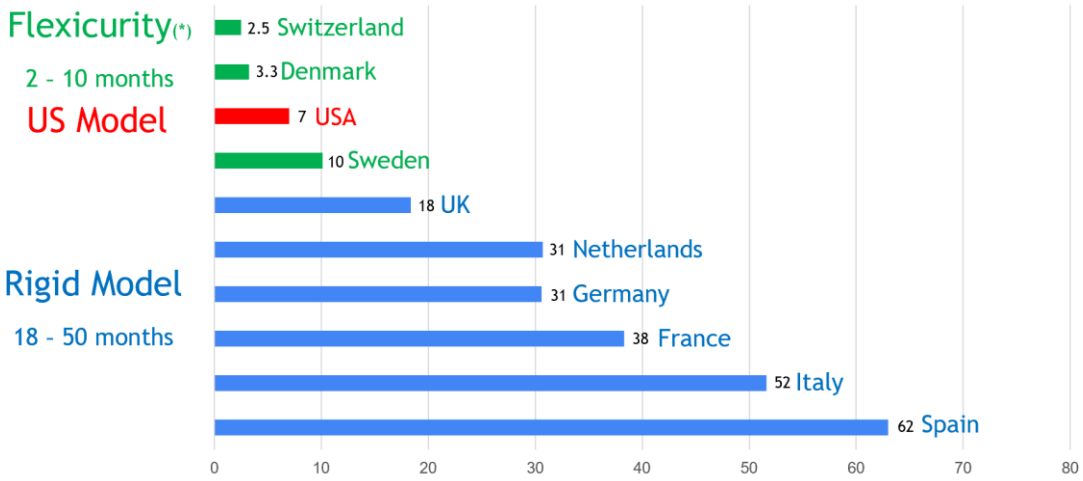
g. Summary of findings

Our calculations reveal three distinct categories of countries based on the average cost of restructuring:

- European countries with rigid Employment Protection Legislation (EPL)—such as Germany, France, Italy, the Netherlands, and even the United Kingdom—where restructuring costs typically exceed 18 months of salary.

- European countries with more flexible EPLs, notably Sweden, Denmark, and Switzerland, where restructuring costs are generally below 10 months of salary. These countries often follow the "flexicurity" model, which combines labor market flexibility with strong social protections.
- The United States, which operates under a fundamentally different system, with average restructuring costs of around 7 months of salary, and closer to 3 - 5 months in the tech sector.

Cost of Failure by Country (in months of average employee compensation)



Source: authors' calculations based in companies' financial reports, Eurofound and public information

As discussed above, these calculations are based solely on publicly available information, which limits their precision compared to company-level surveys that would capture the actual costs incurred for a specific country and workforce. In several cases, the estimates also exceed what the authors have experienced in practice.

However, the significant disparities observed between the three categories of countries cannot be attributed to methodological limitations alone. They reflect deep-rooted differences in Employment Protection Legislation, which influence multiple dimensions of restructuring—such as the timeline of implementation, the financial losses incurred during delays, the level of severance pay, the reliance on voluntary departure packages, strategies to minimize litigation risks, and the risk of losing top-performing employees during the process.

In the microeconomic model used in our previous paper,[25] we showed how the cost of failure could choke the profitability of tech investments by large groups in Europe and could massively lower the profitability of venture capital funds. These models were based on lower figures: 24 months in France or Italy, 30 months in Germany. Today's findings fully confirm

[25] (Coatanlem & Coste, 2024)

the huge gap between large European countries and the USA and support the idea that the cost of failure is likely to be a first-order issue for Europe's innovation gap.

But these findings also reveal an important insight: Sweden, Denmark, and Switzerland are European countries that combine very high levels of social protection with very low costs of failure. We will explain later in this paper how these social models function and why they are relevant to the policy solutions we recommend. At this stage, we turn our attention to the possible correlation between the cost of failure and the R&D intensity in disruptive innovation in each country.

2.3 Correlation between cost of failure and R&D Investment

An obvious question arises from the above findings: is there a correlation between the cost of failure and the level of disruptive innovation, as suggested in our previous publications?

Defining disruptive innovation, however, is not straightforward. Some examples are unambiguous: semiconductors, smartphones, and generative AI clearly represent disruptive innovations, while internal combustion engine vehicles have constituted a mature industry for over a century. Beyond these clear cases, though, it becomes more difficult to distinguish between sectors driven by disruptive innovation and those characterized by incremental progress.

To continue to rely on solid R&D data per company, per country and per industrial sector in the European Commission's *Industrial R&D Investment Scoreboard*,[26] with historic figures well over 2 decades, we analyzed the 39 categories used by the European Commission.[27] Within this list, 2 sectors appear to meet the criteria of disruptive innovation: tech (Software and Computer Services, Technology Hardware & Equipment, Fixed Line Telecommunications, Mobile Telecommunications) and biotech (Pharmaceuticals & Biotechnology). The other sectors regroup companies that were often founded during the 2nd industrial revolution or earlier, therefore more illustrative of incremental innovation in the 21st century.

We therefore chose to use the tech and biotech sectors as representatives of industries driven by disruptive innovation, while categorizing all others as primarily driven by incremental innovation. This classification, of course, warrants further investigation and remains subject to rapid change. For example, the rise of electric vehicles may prove disruptive to the traditional automotive industry, and the urgency of the energy transition may foster disruptive innovations in energy generation that should eventually be reclassified as such.

To assess the level of innovation in tech and biotech across countries, we also relied on data from the European Commission's annual Industrial R&D Investment Scoreboard. The 2024

[26] (European Commission, 2024)
[27] See Appendix 1

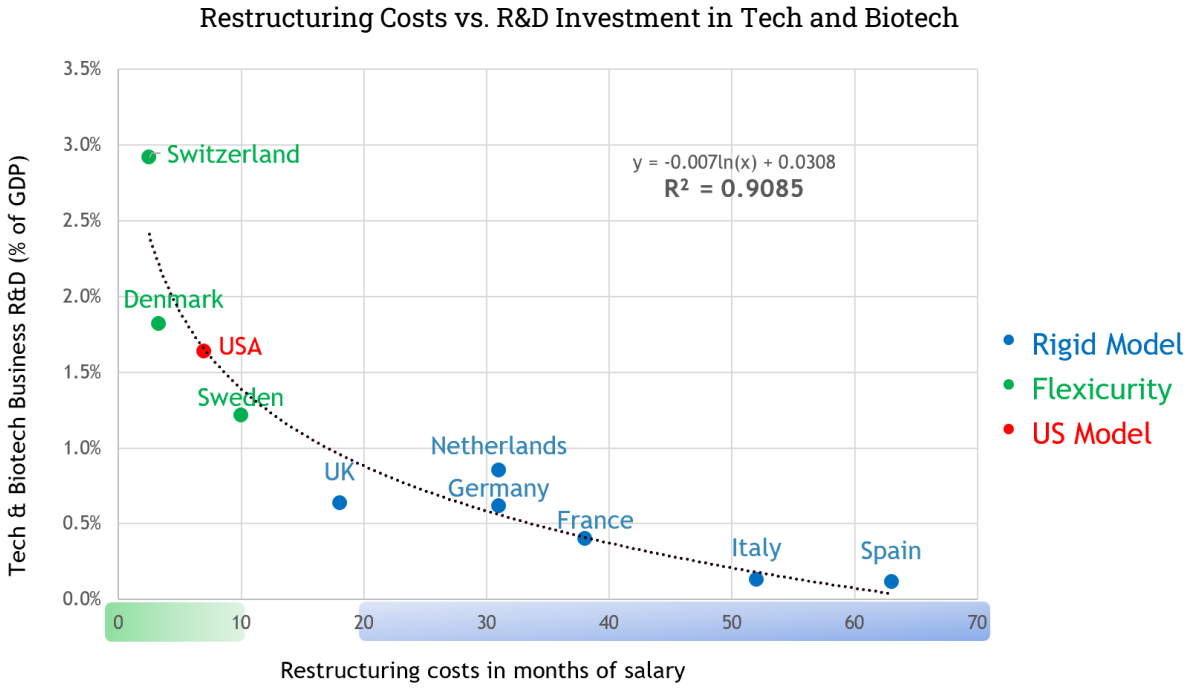
edition provides a database of 2,000 companies, specifying for each the country of origin, the industry sector, and R&D investment levels.

As always, there are limitations to using this type of data. First, R&D expenditures reported for Swiss companies, for example, do not necessarily reflect R&D conducted within Switzerland. Companies like Roche and Novartis, while Swiss in origin, have substantial R&D operations in countries such as the United States and Japan. Thus, the Swiss figures in the European Commission database represent R&D carried out *by* Swiss companies, not necessarily *in* Switzerland. That said, a quick review of the world's largest firms suggests that, in most cases, there is a strong correlation between a company's nationality and the location of its R&D activities. For instance, Volkswagen and BMW conduct the bulk of their R&D in Germany, just as Microsoft and Google concentrate theirs in the United States.

Secondly, some companies are recorded by the European Commission as being headquartered in one country, while their primary R&D and industrial activities take place in another country. To improve the geographical accuracy of our analysis, we made a few manual adjustments. For instance, Airbus is listed as a Dutch company, but we attributed its R&D to France (though one could argue it should be split among France, Germany, and Spain). Similarly, STMicroelectronics is recorded as based in the Netherlands, but we assigned its R&D to Italy (acknowledging that a split between Italy and France might be more precise). Spotify, listed under Luxembourg, was reassigned to Sweden for the purposes of R&D location.

The full list of companies, along with their R&D expenditures, country and industry classifications, is available here, allowing anyone to verify the validity of our classifications and adjustments.

We calculated the R&D intensity in tech and biotech by dividing the total amount of R&D invested by tech and biotech companies of a given country by that country's GDP. We created a graph plotting the average restructuring costs per country, as identified in section 2.3, on the x-axis, and the R&D intensity in tech and biotech on the y-axis. The results are as follows:



Source: authors' calculations, based on companies' financial report and (European Commission, 2024)

The correlation is clear: higher restructuring costs are associated with lower levels of innovation in tech and biotech. A logarithmic trend line yields an R^2 value of 0.93, indicating a strong correlation despite the limited sample size. Naturally, correlation does not imply causation.

Beyond the striking correlation, several important observations emerge:

- European countries with strong traditional industrial bases—such as Germany and the Netherlands—tend to underperform in tech and biotech compared to countries like Denmark, Sweden, and Switzerland. A dominant legacy industrial sector does not appear to encourage leadership in disruptive innovation.
- Country size, often cited as a key enabler of disruptive innovation and used to explain the lead of the U.S. and China over a fragmented European market, does not seem to be a decisive factor. In fact, the best-performing countries in our analysis are among the smallest.
- Most encouragingly for Europe, the findings reveal that countries with highly protective social models can match—or even outperform—the United States in disruptive innovation. This is a critical insight for our policy proposals. Denmark (2.9%) and Switzerland (1.8%) exceed the U.S. (1.6%) in R&D intensity focused on disruptive innovation, with Sweden close behind at 1.2%. It indicates that other commonly cited explanations for Europe's innovation gap—such as market fragmentation, innovation culture, access to capital, defense spending, public support, or competition policy—may play a much smaller role than often assumed. After all, these factors do not differ

fundamentally between Germany, Switzerland, and Denmark. In short, reducing the cost of failure may not only be necessary, as we argued in previous publications—it could also be sufficient to close the innovation gap.

- Building on this point, if the observed correlation indeed reflected a causal relationship, reducing the cost of failure from over 30 months to around 3 months could raise the tech and biotech R&D intensity of Europe's largest economies from 0.5% to 2% of GDP. With the EU's GDP reaching approximately €20 trillion in 2023, this shift would represent an additional €300 billion per year in R&D investment—remarkably close to the current R&D gap between the U.S. and Europe (estimated at €260 billion in 2023). This would be very promising news.

The poor performance of Europe's largest economies in disruptive innovation is evident in their R&D intensity in tech and biotech: around 0.5% of GDP—0.6% in Germany and the UK, 0.4% in France, and just 0.1% in Italy or Spain. Professionals working in tech regularly encounter successful non-U.S. global players from countries like Israel (e.g., NICE, Wix), Taiwan (TSMC, MediaTek), or South Korea (Samsung, LG Electronics), which all operate at a global scale. We therefore extended our analysis to examine the same indicators for these countries. The results are striking: tech and biotech R&D intensity reaches 1.9% of GDP in South Korea and 3.4% in Taiwan.

Data for Israel are harder to isolate, as many leading Israeli tech firms are listed in the U.S. and therefore recorded as American in the European Commission's database. Nevertheless, the cases of South Korea and Taiwan highlight how far behind Germany, France, and the UK have fallen in fields that are vital to their long-term economic prospects. They also challenge the often-cited claim that Europe's lag in tech is mainly due to the fragmentation of its technology and capital markets.

These analyses help define clear objectives for European countries: their private R&D investment in tech and biotech should reach—within the next 10 years—levels comparable to those of the United States, i.e., at least 1.5% of GDP.

2.4 How long does it take to restructure and to rehire?

While the information provided by companies is in general sporadic, pre-announced or actual length of restructuring can be very reflective of the lack of agility of many European companies.

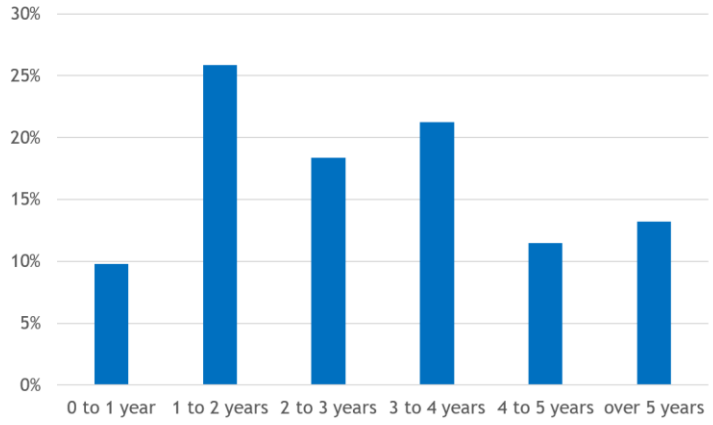
2.4.1 Ex-ante data

Leveraging the extensive database of Eurofound, we looked at all restructuring plans that took place in Germany in the last 10 years, systematically analysing plans involving more than roughly 500 employees. We chose Germany because of its importance in the European

economy, but also because its companies tend to indicate a "foreseen end date" much more frequently than in other countries.

The results are staggering: companies anticipate that it will take them in average 4.3 years to complete their restructuring.[28] In a few cases, the duration forecasted can exceed 10 years:

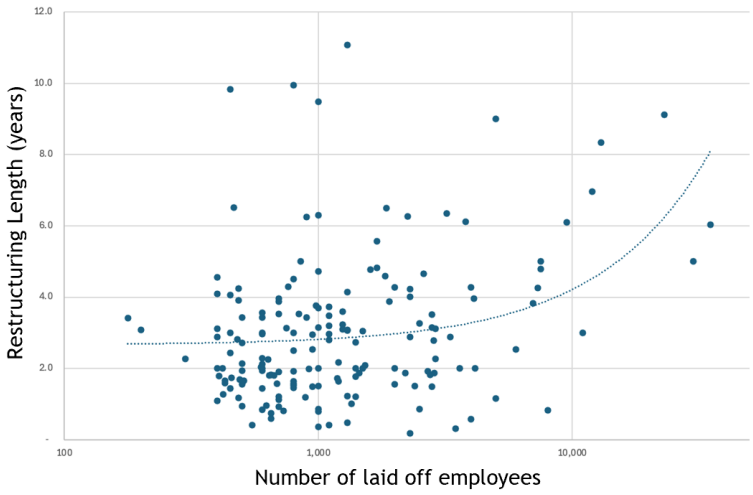
Distribution of foreseen restructuring length (in years)



Source: Eurofound / authors

And unsurprisingly, restructuring duration tends to increase with its size, i.e. the number of employees targeted:

Restructuring length vs. size (logarithmic scale)



Source: Eurofound / authors

[28] We used a sample of about 170 restructuring plans. We computed a weighted average based on size of layoffs.

In sharp contrast with what prevails in the United States, where such plans are implemented within a few weeks or a few months, a restructuring plan of more than 10,000 employees is anticipated to take at least 3 years. Even for a few hundred employees, companies sometimes announce a 10-year plan. Restructuring is expected to last less than a year in only 11% of cases.

For restructuring plans involving approximately 1,000 employees, the range of possible durations is very wide, with most plans forecasted between 1 to 5 years. Restructuring can be quick when it targets temporary employees, also when the company is ready to offer early retirement, generous severance packages or active help in finding alternative jobs. For instance, in a plan announced on December 10, 2024, and expected to be completed by March 2025, SAP cut 3,479 employees in Germany and was able to find 2,800 volunteers for early retirement and 600 people opting for the voluntary leave scheme.[29]

Restructuring can take a long time when particularly stringent agreements were negotiated with the "works council"[30] and unions. For instance, it is not rare to find situations where non-voluntary dismissals are ruled out for several years - sometimes with some conditionality on specific business conditions. In 2016, Volkswagen negotiated with its works council 23,000 layoffs in Germany, under the condition that compulsory redundancies would be ruled out until 2025.[31]

In other cases, firms choose a very lengthy process although they could pursue a more aggressive course of action: for example, in January 2023, Salzgitter AG, a steel producer, announced a plan to reduce its workforce by 500 to 800 employees over a 10-year period, committing to only using early retirement options.

The firm expected that 30% of its employees will have retired by 2030, yet its restructuring plan was only targeting 3% of its employees, suggesting it could be executed faster.[32] It is possible that the main goal of this conservative approach is to preserve the goodwill of the works council by presenting a resolution "as socially acceptable as possible" (this language appears in many corporate announcements), but that in fact the restructuring will actually be completed much earlier.

The long-term approach to social dialog is well exemplified by a restructuring plan presented by Opel in January 2020: "the job reduction will be staggered in 3 phases and will offer remaining employees protection against dismissal: 1. Opel will cut 2,100 jobs by the end of 2021 - in return employees are protected against dismissals until 2025; 2. In 2022 Opel will undergo a further reduction of 1,000 jobs which will result in an extension of the protection against dismissal until 2027; 3. In 2023, Opel plans to cut a further 1,000 jobs which will prolong the protection against dismissal until 2029."

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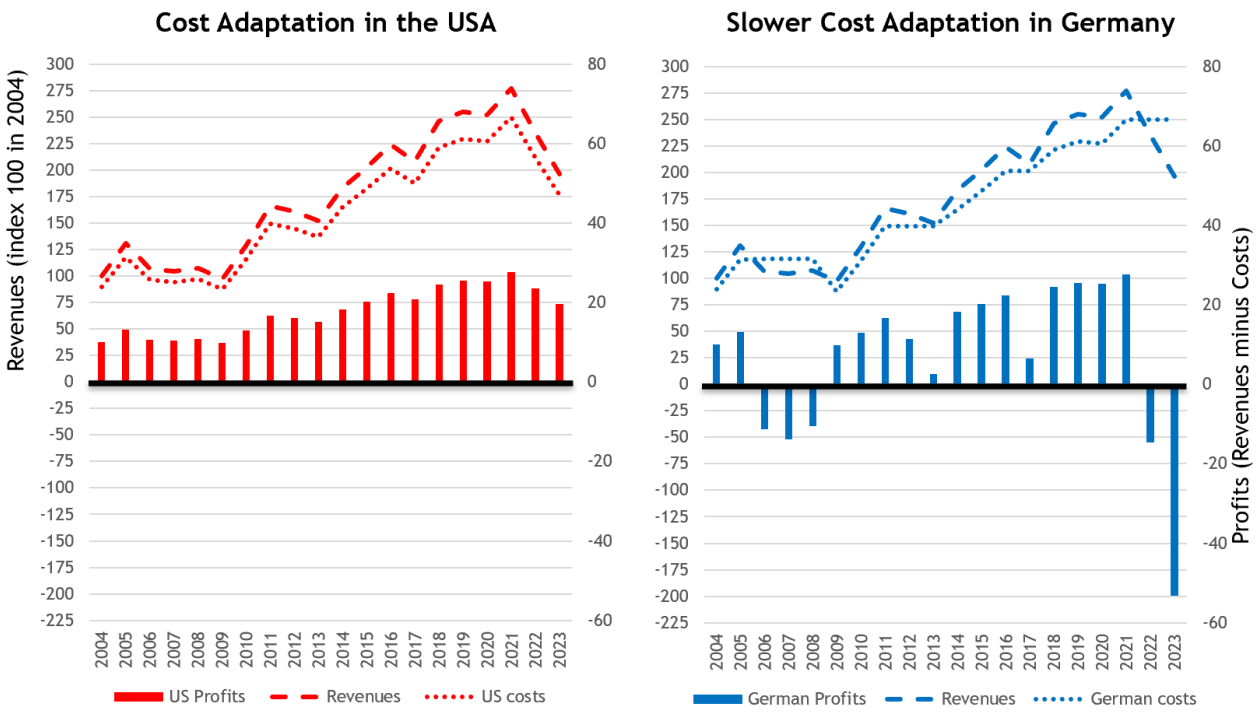
[29] https://apps.eurofound.europa.eu/restructuring-events/detail/202203
[30] In Germany, a body elected by employees to be its representative in negotiations with management.
[31] https://apps.eurofound.europa.eu/restructuring-events/detail/89125
[32] https://apps.eurofound.europa.eu/restructuring-events/detail/108234

Announcing a long restructuring process gives confidence to unions that agreements will be respected and that the plan is credible. But when more dismissal conditions are added along the way, the proverbial can is just kicked down the road and it becomes harder and harder to restructure fast. In the case of Opel we can see that the trade-off is particularly harsh: to cut 3% of the workforce over one year, the company has to forgo involuntary terminations for another 2 years.

Duration of restructuring has major impacts on the cost structure, and therefore on profitability. This effect is intensified in industries with volatile revenues, such as experienced in tech. If we take the example of the revenues of Intel, once the long-term leader in chipsets, over 2004 – 2023, we can illustrate graphically the theoretical impact on a 3-year process in reducing costs in Germany while it is quasi-immediate in the USA. We show the impact on profitability with the assumption that all costs, not only those related to employees, take 3 years to adapt in Germany:

Impact of restructuring length on profitability



Source: authors' calculations

The logical consequence for business managers in Germany is to avoid risks of rapid decline by avoiding situations of high growth. It's like a car with poor brakes: the driver's natural reaction is to drive prudently.

In France, the duration of restructuring announced by companies tends to be smaller: 2.2 years in average over the last 10 years, although the average size of restructuring is also smaller in the Eurofound sample we used: 852 employees vs. 2,227 in Germany. For plans involving more

than 3,500 employees, French companies forecast a completion time of 3.1 years vs. 4.5 years in Germany.

The differences are bigger than those we observe on restructuring costs: this may be due to contrasting social dialog practices, it could also come from different communication strategies, perhaps delaying official statements until plans are fully fleshed out. For instance, the 2022 Meta restructuring plan for France only seems to have been officially announced in January 2024, more than 13 months after the U.S.[33]

In any case, there is no real benchmark in France, or any country in Europe, of the type of restructuring plans that large tech companies would need to put in place in order to tackle technological shocks and changes of strategy, such as the two rounds of layoffs operated by Meta in 2022 and 2023 on 25% of its workforce and 20,000 employees. For example, most of the 10,000 layoffs announced in March 2023 were carried out by May of that year.

One can speculate that variability of length of time comes especially from predicting natural attrition, including retirement – indeed most companies claim they favour this mode of downsizing. When restructuring concerns a small percentage of employees, it can easily be absorbed by voluntary departures. The company just needs to provide a credible time window, which can obviously vary based on the age distribution of its employees.

The wide variety of restructuring duration may also suggest that employment protection law (EPL) is somehow less critical than social dialog or culture. Yet, EPL is key in providing the negotiation framework between companies and unions. As we will see below, Denmark is a good example of a successful social reform that gives more than adequate protection to workers, without compromising the ability of businesses to make fast changes in the context of high-risk innovation.

It is important to note that throughout this paper we use the term EPL in the rather broader sense of Labor Market Institutions, institutions that can include administrations and courts of justice, but also all social dialog organizations, starting with work councils. The stability (or lack thereof) of this institutional framework creates a culture of conflict resolution that can be more or less smooth. But in our view, EPL and culture are very much interconnected. It is therefore vain to oppose them, and as the 2024 Nobel Laureates have abundantly demonstrated, institutions tend to trump culture, geography and wealth.[34]

2.4.2 Ex-post actual durations

Measuring actual total durations of restructuring plans is always preferable, but in practice they tend to be much more difficult to estimate. Information is typically only available as a side comment in annual reports, but when available, they can be very valuable.

[33] (Meta, 2025), Note 3 p. 182.
[34] (Acemoglu, Johnson, & Robinson, 2002)

For instance, it took more than 4 years for Thyssenkrupp in Germany to restructure some of its activities and lay off 13,000 employees. Indeed, the decision was made in 2019 / 2020, and in its annual report for 2023/24, published on September 30, 2024, the firm states that the firm "had completed more than 95% of the planned job reductions."[35]

We have another very interesting example with Nokia. In its 20-F form for 2020, published in March 2021, the firm says that, with regards to two restructuring plans "made by the Group on April 6, 2016 and October 25, 2018", "the majority of the restructuring cash outflows is expected to occur over the next two years."[36] We can infer from this that the 2016 plan, involving more than 12,000 employees, will take, at least, between 4 to 6 years to be completed.

Even restructuring causing mostly voluntary departures and re-skilling measures can take a significant amount of time: a plan announced by SAP in Q4 2023 will only be completed in Q2 2025.[37]

We found quite extreme examples of restructuring costs: for instance, Telefonica Spain let go 2,700 employees in 2021 at a cost of more than 9 years of salary! But this plan, negotiated with the largest trade unions, was aimed at employees 55 years or older and with a seniority of more than 15 years. In this case, the execution of the plan can be relatively quick because it is mostly based on voluntary early retirement departures, but it is very expensive because it is calibrated on generous corporate pension schemes, typically defined-benefit based ones, available to older employees. These conditions would not prevail for more recent employees, but throughout Europe it is not clear how long these sort of restructuring costs with pension premium will last.

To fully assess the impact of timing, it is important to consider, not just how long it takes to restructure, but how fast the decision to restructure can be taken – although there is certainly a strong correlation between the two corporate actions. In the United States, the responsiveness of tech companies to a technological shock such as the unexpected success of ChatGPT is quite staggering. OpenAI released ChatGPT to the public on 30 November 2022. This breakthrough AI solution reached 1 million users within five days and 100 million users within two months — taking even the most seasoned stakeholders in Silicon Valley by surprise. The industry's reaction unfolded within weeks:

- On 18 January 2023, Microsoft announced 10,000 layoffs, representing 5% of its workforce. The restructuring plan was completed by end of March 2023.[38]

[35] (Thyssenkrupp, 2024), p. 99
[36] (Nokia, 2021), p. 198
[37] (SAP, 2025), p. 3: "*Restructuring payouts amounted to €2.5 billion for the full-year 2024 and €0.3 billion for the first quarter 2025. Approximately €0.4 billion is expected to be paid out in the remainder of 2025*."
[38] (Microsoft, 2023) p. 41 - the third quarter of fiscal year 2023 ends on March 31, 2023.

- On 20 January 2023, Google followed with 12,000 layoffs, or 6% of its workforce. The U.S. based employees were notified individually (by email) on the same day.[39]
- On 14 March 2023, Meta announced 10,000 additional layoffs — a second round following the 11,000 job cuts announced on 9 November 2022 — bringing the total reduction to approximately 25% of its workforce. Most of the restructuring plan was completed by May 2023.[40]

This kind of technological shock is by no means unique. It is a recurring pattern in the tech industry—seen with the advent of cloud computing, smartphones, social networks, e-commerce, mobile phones and the internet.

2.4.3 The ability to rehire quickly

Agility in laying off also means agility in hiring. U.S. tech companies did not cut tens of thousands of engineering jobs to scale back investment—quite the opposite. These workforce reductions were aimed at reallocating resources to accelerate innovation where most promising. They immediately began hiring thousands of AI engineers and invested heavily in AI computing capacity. Meta provides a striking example: after reducing its workforce by 25% in just six months, as seen before, the company hired approximately 10,000 engineers and ramped up its investment in AI supercomputers from around $1 billion in 2022[41] to $20 billion in 2023, $37 billion in 2024, and a projected $65 billion in 2025.[42] Microsoft and Google are committing even larger sums to AI infrastructure.

This agility in shifting direction in response to a technological shock is further illustrated by the following example:[43] "TurboTax-parent Intuit said on Wednesday it will let go of about 1,800 employees, or 10% of its workforce, as it looks to focus on its AI-powered tax preparation software and other financial products. The company, which has invested heavily in providing generative AI-powered accounting and tax preparation tools for small and medium businesses in the past few years, expects to close two of its sites in Edmonton, Canada, and Boise, Idaho. Intuit will rehire 1,800 new people primarily in engineering, product and customer-facing roles, CEO Sasan Goodarzi said in a note to employees."

In practice, European Employment Protection Law (EPL) often makes such strategic shifts nearly impossible. In many European countries, EPL rules (or jurisprudence of courts) prohibit the hiring of "similar" competencies during a certain period after the completion of the restructuring plan: In France, hiring similar competencies is forbidden for 1 year. In Italy, dismissed employees have a priority right during the six months following the dismissal if

[39] https://blog.google/inside-google/message-ceo/january-update/
[40] (Meta, 2024) p. 104
[41] Authors' estimates
[42] Public announcements of 350 000 GPUs in 2023, and in USD for 2024 and 2025.
[43] https://www.cnbc.com/2024/07/10/intuit-to-cut-about-1800-jobs-plans-to-rehire-in-key-areas.html

the company intends to hire workers. In Finland, the duration of the reemployment obligation is six months, up to 7 months in Germany, 1 year in Luxembourg, 26 weeks in the Netherlands, 1 year in Norway, 15 months in Poland, all under certain conditions.[44]

For a tech company, the ability to pivot from metaverse engineers to AI engineers may be critical. But from a legal perspective, a European regulator may interpret these roles as "similar," making the recruitment of AI talent during a restructuring process a legally risky—and potentially challengeable—decision.

In Europe, to avoid the legal risks associated with EPL, companies typically impose hiring freezes during and after restructuring plans—often lasting over two years in total. In the tech sector, launching an R&D project two or three years after your competitors is equivalent to starting a Formula 1 race 30 minutes behind the other drivers. Who would risk billions of dollars under such conditions?

In the tech sector, cycles are short, and responding to technological shocks requires agility measured in weeks—even when it involves thousands or tens of thousands of employees. In most European countries, however, EPL imposes timeframes that stretch over several years—durations fundamentally incompatible with the pace and demands of tech-driven businesses.

Addressing the high cost and slow timeframes of restructuring in many European countries appears to be a necessary first step toward closing the innovation gap. However, the strong statistical relationship we've established in section 2.3 between restructuring costs and disruptive innovation is only a correlation. We now need to examine whether causality can be asserted.

3. Causality

3.1 The curse of productivity and profitability

What are the criteria under which a company will decide rationally to pursue high risk innovation? We will present both a productivity approach and a profitability approach.

A model proposed by Bartelsman et al.,[45] and calibrated to a variety of sources including the EUKLEMS productivity database,[46] gives evidence that failure costs may harm productivity and innovation. The model assumes that productivity shocks are driven by a Poisson process

[44] https://apps.eurofound.europa.eu/legislationdb/reemployment-obligation-after-restructuring

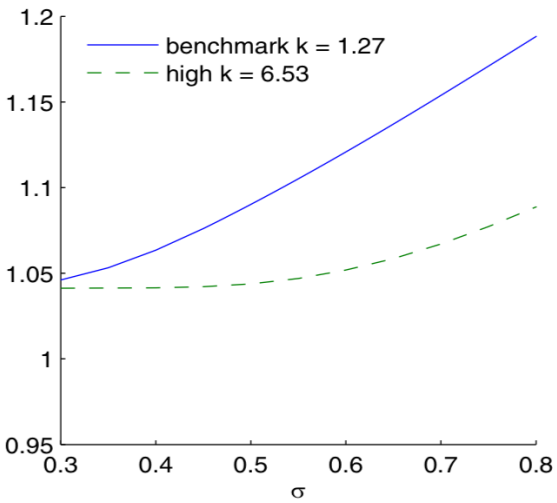
[45] (Bartelsman, Gautier, & Wind, 2016)

[46] https://economy-finance.ec.europa.eu/economic-research-and-databases/economic-databases/eu-klems-capital-labour-energy-materials-and-service_en

with intensity □, and that shocks follow a normal distribution with mean □ and standard deviation □. Country based employee level restructuring costs are set to a single parameter k. Model parameter are calibrated to match the ex post observed cross-sectional distribution of country productivity.

A firm can choose to operate in one of two states: "risky", corresponding to disruptive innovation, which has a high chance of failure and a very small chance of a very high payoff, and "safe", corresponding to anything else – including marginal innovation. The model shows that in sectors with low risk (□), productivity is not very sensitive to the cost of restructuring (k). On the other hand, for sectors with high levels of innovation (high □), the productivity gap can be quite significant between low costs and high costs countries:

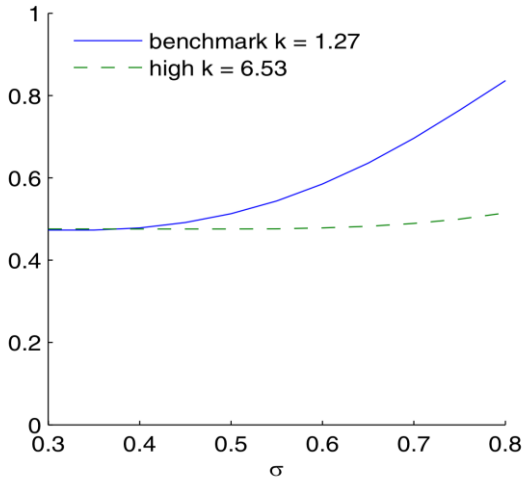
Productivity as a function of risk



Source: Bartelsman et al.

This productivity gap of roughly 10% is typically in line with what we observe empirically between the United States and the European Union in the early 2000s, which is when the model was calibrated. It is now above 20%. Similarly, the model can explain that in countries with high restructuring costs, the share of risky activities in employment does not rise in response to an increase in risk opportunities – that occurs for instance as a result of innovation and start-ups creation:

Share of employment in high-risk sectors



Source: Bartelsman et al.

These dynamics at play explain why the European tech has been significantly lagging the United States, and why in particular private sector tech R&D investment is more than 5 times higher in the United States. It simply doesn't make sense for European companies to invest in sectors of the economy where they would have a significant competitive disadvantage.

As a logical consequence, firms under strict EPL avoid disruptive innovation and specialize in marginal innovation, as also demonstrated in (Saint-Paul, 2002), (Nickell & Lavard, 1998), (Samaniego, 2006), (Bozkaya & Kerr, 2014), (Berdugo & Hadad, 2008), (McGowan, Andrews, Criscuolo, & Nicoletti, 2015),47 and (Cette & Lopez, 2018) among others.

The second approach to explain why most European companies are disincentivized from investing in high-risk innovation, is simply to look at the microeconomic investment decision at a firm level. First, we must observe empirically that restructuring costs are for the most part country dependent, although layoffs can also be determined at an industry or at a firm level. A company will therefore make a restructuring decision mostly based on the EPLs of the countries in which it operates. Second, when facing an investment opportunity, a company will evaluate a certain number of business scenarios and assign them with probability weights.

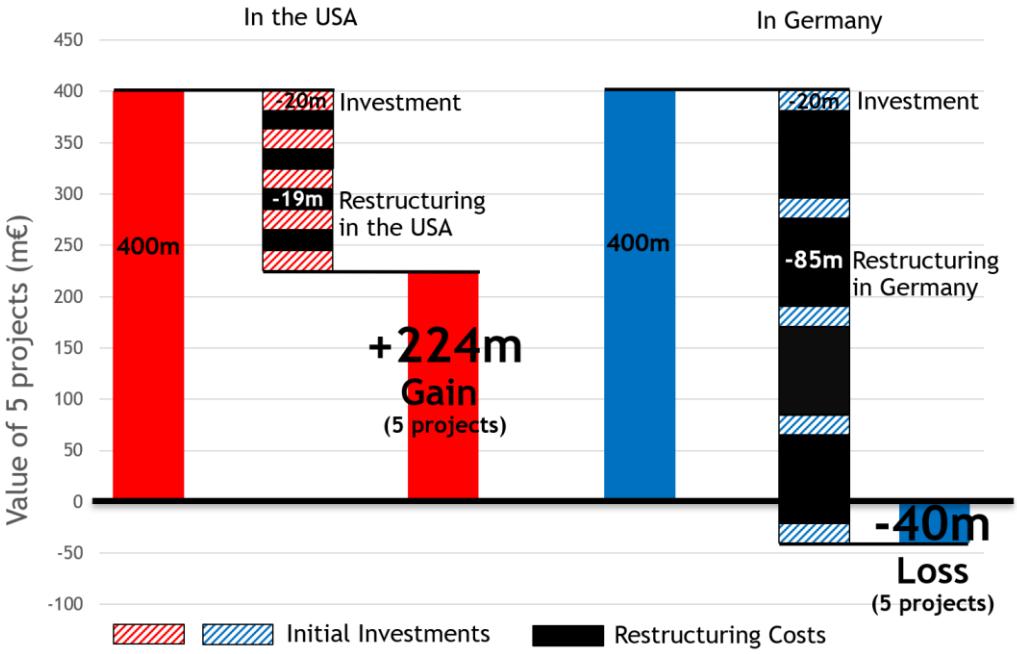
Let's illustrate this point in a simplified project finance modeling framework. Let's consider a set of software projects that each requires an initial 20m investment in R&D and can each generate a 100m revenue business delivering 20% EBIDTA. As seen in section 2, restructuring costs equal 7 months of compensation in the United States and 31 months in Germany. Personnel expenses typically amount to 40% of revenues in the software industry.[48] Therefore,

[47] In section 4.3 of this OECD report.
[48] This is based on averaging all the cases studied in section 2.

the restructuring costs of a software business amount to 40% x 7 / 12 x 80%[49] = 19% of revenues in the U.S. and 40% x 31 / 12 x 82% = 85% in Germany. If the market values a successful software activity at 400% of revenues (assuming 20 times an EBITDA of 20% of revenues), a large U.S. company can experience a high level of failure and still be profitable: if 80% of projects fail, the expected value of 5 projects is 400 – 5 x 20 – 4 x 19 = 224m, still positive. In Germany, the expected value would be 400 – 5 x 20 – 4 x 85 = – 40m. Over a large number of disruptive software projects, the German company is sure to lose money.

The following chart illustrates the expected value of 5 software projects with 80% failure rates, showing the impact of restructuring costs experienced in Germany and in the United States:

Expected Value of Software Projects with 80% failure rates, United States vs. Germany



Source: authors' calculations

The consequence of this is that restructuring costs in Germany prevent companies from launching projects with less than 50% chances of failure. In the USA, companies can still make money with projects with 80% chances of failure. As discussed above, disruptive innovation appears in a world of high rates of failures. It explains why so few disruptive innovations in tech have appeared in Germany, France or Italy.

Put differently, once confirmed that average restructuring costs are significantly higher in Europe than in the United States, there is a rate of failure above which tech projects become uneconomical. Since the rate of failure of disruptive innovation is very high, most tech

[49] Compensations / Personnel Expenses are 82% in Germany and are estimated 80% in the USA.

projects become unprofitable and European companies make the rational decision to avoid them and pursue marginal rather than disruptive innovation. This is financial logic that doesn't require further causality analysis.

And because European firms are disincentivized to invest in high-risk ventures, they also forgo the high returns associated with these activities. Empirically, we showed in a previous study that indeed European companies tend to specialize in industries outside the high-tech sector, and that the ex-post return on invested capital (ROIC) is significantly higher in the United States than in Europe, for both large companies and VC funds.[50]

While it is widely accepted that tech rate of failure is much higher than in other industries, we still need to discuss its magnitude.

3.2 What can we say about the rate of failure at the technological frontier?

"We have to realize that most things we start in Research fail, and that's actually a good thing" says the chief scientist of Nvidia.[51] Not only do innovative companies acknowledge the existence of risk, but they also embrace it because it provides great opportunities as long as you can recover quickly from your failures in the face of constant crosswinds and significant changes of paradigm.

For instance, Jensen Huang, the CEO of Nvidia, recognized at the beginning of 2025 that the amount of computation power needed in AI for that year was 100 times what was predicted by the industry a year earlier,[52] a massive miscalculation that still creates challenges and failures.

Can we be more precise about the failure rate of an "average" project close to the technological frontier? First, we need a proxy, an actual industry sector representative of disruptive innovation: not surprisingly, we will choose high-tech and AI.

At some level, the question of measuring the failure rate of innovation is tantamount to asking what is the percentage of good ideas among top scientists? It is also the percentage of R&D failure in applying a scientific idea. Then there is the ultimate failure of not finding a market for a product.

Each of these components is very difficult to isolate and quantify. We will use two different approaches: industry surveys and studies on the one hand, and financial analysis on the other hand.

The Rand Corporation has recently organized surveys among businesses and has concluded that the failure rate of AI projects stands at 80%.[53] The BCG considers that more than two-thirds

[50] (Coatanlem & Coste, 2024)
[51] https://finance.yahoo.com/news/the-secret-to-nvidias-research-success-failing-often-and-quickly-000023982.html
[52] Keynote speech at the 20215 GPU Technology Conference
[53] (Ryseff, Bruhl, & Newberry, 2024)

of large scale tech programs (presumably not all high-tech) fail in the sense that they are not "expected to be delivered on time, within budget, or within their defined scope."[54]

Other sources point in the same direction, but these estimates are partly satisfying because they have more to do with rates of integration of new technologies than rates of putting an innovative product on the market. More convincing are studies on the success rate of products brought to market by companies with a high level of innovation, such as the "Magnificent Seven". One study suggests that 51.5% of Google's product launches have been terminated,[55] another shows that for 5 successful new products at Meta in 2022, 5 failed.[56] And these are only products that made it to the market place, presumably other products failed at various stages of the development process, moving up the actual failure rate closer to 80%.[57]

What about other businesses, outside innovation? Failure rate of product development (from concept to well established position in the market place) has been estimated empirically over different periods at 35% by (Crawford, 1987), 39% by the Product Development and Management Association in 2012.[58] Based on these estimates,[59] we would conclude there is a ratio of roughly two between the failure rates of disruptive products and average products.

Let's now look at the financial analysis approach, and in particular at the historical volatility of individual stocks. For instance, the annualized historical volatility of a highly innovative company like NVIDIA stands at 53% in the last 5 years, compared to only 18% for Berkshire Hathaway, a more *blue-chip* company. Making the crude assumption that "failure" is triggered by a stock drop of say 10% - that would supposedly incentivize the company to restructure some key products-, and assuming also that the stock follows lognormal dynamics, the probability of failure is more than 9 times higher for NVIDIA than for Berkshire Hathaway, so significantly higher.

This approach poses several methodological issues, however. First, in order to compute an estimate across the entire market, and in addition to the rather simplistic assumptions already made, we would have to define various time-varying industry and sector weights, which is subjective undertaking.

Second, it is rather difficult to establish a generic relationship between innovation failure and market perceptions, precisely because disruption is not directly observed by the market: a lot of Nvidia's research initiatives may fail, yet the company seems to deliver enough mature products to justify its spectacular stock rise.

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[54] https://www.bcg.com/publications/2024/most-large-scale-tech-programs-fail-how-to-succeed
[55] https://brandwell.ai/blog/killed-by-google-statistics/
[56] https://www.analyticsinsight.net/artificial-intelligence/major-successes-and-failures-of-meta-ai-projects-in-2022
[57] https://hbr.org/2023/11/how-corporate-purpose-leads-to-innovation
[58] (Markham & Lee, 2013)
[59] For a rich discussion of various sources and the persistence of myths on product development failures, see https://www.linkedin.com/pulse/myths-innovation-failure-rates-dana-autenrieth/

So, while there is no satisfactory answer as to the exact level of the failure rate, it is clear that disruptive innovation triggers the need for fast restructuring of products, processes and employees in order to meet a constantly changing (and often unpredictable) market environment.

Because of the difficulties in measuring key factors in the success of a given tech project, we now turn to a model of the restructuring decision at a firm level.

3.3 Monte-Carlo simulation of corporate profitability based on 20 years of global firm-level data

In this section, we design a simplified model of a firm that allows for periodic restructuring of the labor force over a 5-year period. We then run a Monte-Carlo simulation based on firm level data obtained from the European Commission Industrial R&D Investment Scoreboard data[60] over the last 20 years.

Disruptive sectors are not only characterized by much higher R&D intensity than mature ones, but also by much higher revenue volatility. We show that large differences in restructuring costs between countries can generate large and unsustainable gaps in profitability in disruptive sectors while gaps remain small and viable in mature sectors.

3.3.1 A stylized model of the firm

Choosing an a priori distribution of annual revenues (for instance a jump-diffusion model) can be challenging because of the sheer dimensionality of equity models, with a myriad of firm specific parameters to calibrate. We prefer to use directly the historical distribution of actual annual revenue variations at a firm level.

Our Monte-Carlo simulation is therefore taking paths on overlapping consecutive 5-year series of annual revenues. At each time step, we assume that any revenue drop below a certain threshold triggers an "exceptional" restructuring plan and that the company headcount is cut in proportion to the revenues reduction rate (more on this assumption later). At times when this criterion is not met, we make the assumption that a certain percentage of the workforce will be let go in order to hire employees with more relevant skills ("normal" restructuring) in the tech industry.[61] Indeed, restructuring plans do not only happen when revenues decline.

[60] (European Commission, 2024)

[61] This requirement of "normal" restructuring in the tech industry to adapt the workforce to changing technologies is documented in detail in (Coste, 2024) A very recent example is SAP's attempts to lay off 2% of its workforce per year while hiring AI specialists: https://www.handelsblatt.com/technik/it-internet/softwarehersteller-kontinuierlicher-stellenabbau-bei-sap-beunruhigt-die-belegschaft/100150433.html

They also happen when companies are faced with technological changes that require immediate adaptation, such as Meta laying off 25% of its employees when ChatGPT was released in November 2022, while revenues were stable.

The net income X is then computed according to the following formula:

$$\text{If } \frac{\Delta R_i(t)}{R_i(t)} \geq \tau,\ X_i(t) = R_i(t) - PC_i(t) - RC^E_i(t) - OC_i(t) \qquad (1)$$

else

$$X_i(t) = R_i(t) - PC_i(t) - RC^R_i(t) - OC_i(t) \qquad (2)$$

with:

$R_i(t)$ represents the revenues of the firm reported for the period [t-1 ; t] and on Monte-Carlo path i

$\Delta R_i(t) = R_i(t) - R_i(t-1)$

$PC_i(t)$ are the personnel expenses for the period [t-1 ; t]

$RC^E_i(t)$ are the "exceptional" restructuring costs for the period [t-1 ; t]

$RC^R_i(t)$ are the "normal" restructuring costs for the period [t-1 ; t]

$OC_i(t)$ are the other costs incurred by the firm over the same period

$X_i(t)$ represents the net income at time t and on path i

For each firm, the ratio *H* of personnel expenses to revenues, is supposed to be constant at an industry sector level *IS:*

$$PC_i(t) / R_i(t) = H^{IS} \qquad (3)$$

We further assume that, in the absence of restructuring, $X_i(t) / R_i(t)$ is a constant net profit margin NPM_0 (we will use a level of 10% in the simulation). It follows from this that the other costs $OC_i(t)$ can be implied from equation (2) with $RC^R_i(t) = 0$.

We ignore any level of cost stickiness that can be interpreted as an internalization of future costs in the restructuring decision. Rather, we assume that any reduction in revenues is impacting personnel costs proportionally, as it would typically happen in countries with low cost stickiness - i.e. less strict EPL. The goal here is to assess the profitability differential of the same firm in different EPL regimes and keeping anything else the same - including restructuring strategy.

Hence, the restructuring costs can be decomposed as follows:

$$RC^{E}_{i}(t) = \square\ R_i(t) \times H^{IS} \times Q^{C} \times K^{C} - A \times PC_i(t) \times Q^{C} \times K^{C}$$

$$RC^{E}_{i}(t) = [\square\ R_i(t) - A \times R_i(t)] \times H^{IS} \times Q^{C} \times K^{C} \quad (4)$$

$$RC^{R}_{i}(t) = I_{IS} \times HC_cut \times PC_i(t) \times Q^{C} \times K^{C}$$

$$RC^{R}_{i}(t) = I_{IS} \times HC_cut \times R_i(t) \times H^{IS} \times Q^{C} \times K^{C} \quad (5)$$

Where A is a net attrition level (that will absorb part of the restructured jobs without any cost), Q^C is a country level ratio between salaries and personnel expenses, and K^C represents restructuring costs at a country level, as calibrated in section 2. HC_cut is the headcount rebalancing in normal times, in addition to net attrition, which we only apply in the tech industry (Technology Hardware & Equipment, Software & Computer Services), using indicator function I_{IS}. Consequently, for each time on each path, the net profit margin $P_i(t)$ can be written as:

$$P_i(t) = X_i(t) / R_i(t) = NPM_0 - RC^{E/R}_{i}(t) / R_i(t) \quad (6)$$

3.3.2 Extracting corporate data from the European Commission Scoreboards

Since 2004, the European Commission's Industrial R&D Investment Scoreboard has reported the revenues, R&D expenses, profits, and number of employees of the world's leading companies. The sample of surveyed companies is constructed on the basis of R&D expenditures, which makes it particularly well suited for our analysis of innovation patterns. We compiled revenue data for more than 4,200 companies over the period 2004–2023, with each firm classified by country and by industrial sector.[62] To avoid a selection bias in favor of winners, we took the list of companies present in the Scoreboards in 2004, 2015 and 2024. This classification allows us to conduct volatility analyses both by country and by sector, following the sector definitions established by the European Commission, which has been mostly constant over the last 20 years.

We then chose a few sectors that would be representative of disruptive innovation and others that would exhibit marginal innovation. In particular, we examined whether there are differences in revenue volatility between mature and disruptive industries. Indeed, disruptive innovation reshapes markets, driving rapid growth for winning technologies while precipitating the decline of those that fall behind.

A well-known example is the launch of the iPhone, which led to the collapse of Nokia's handset business within just five years (until then the world leader with 50% market share), and a boost in revenues for Apple (a newcomer in this field) and Samsung.

[62] The full data is available on this link.

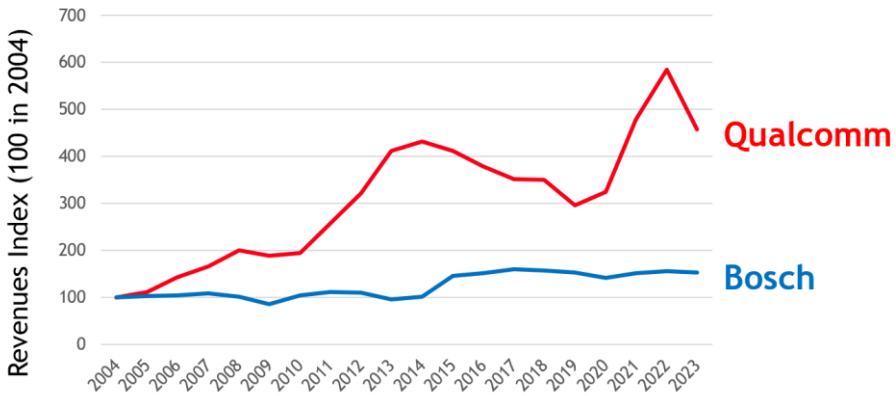
Such rapid transformations are common in the tech industry. They can also be found in the cloud surge or the AI boom. But until recently, they had not taken place in the automotive or aeronautics industries since the 1950s. For this reason, we chose to measure revenue volatility across a broad set of companies and to compare results by industrial sector.

From a business perspective, the critical measure is the year-on-year growth or decline in revenues. A 5% increase typically allows a company to maintain a stable workforce. By contrast, a 30% surge requires rapid hiring, which can be risky when visibility beyond the short term is limited. On the downside, a 5% revenue decline may not necessitate major adjustments, but a 20% drop almost inevitably forces significant restructuring.

For instance, Bosch, a leading German subcontractor of the car industry, recorded a revenue volatility of 9% over 19 years, with 14 years of growth averaging 10% and 5 years of decline averaging 8%.

By contrast, Qualcomm, a leading US subcontractor of the tech industry, showed a revenue volatility of 16% over the same period, with 12 years of growth averaging 21% and 7 years of decline averaging 9%.[63] The graph illustrates that Qualcomm's higher revenue volatility led to significant restructuring measures,[64] whereas Bosch spared such brutal adjustments—at least until 2023.

Revenues Indexes of Bosch and Qualcomm, base 100 in 2004



Source: European Commission Scoreboards, authors' calculations

Drawing on data from the 4,200 companies available, we calculated the revenue volatility of the 39 sectors defined by the European Commission (see Appendix 1): it reveals wide discrepancies across sectors, ranging from 7% in Insurance to 29% in Pharmaceuticals &

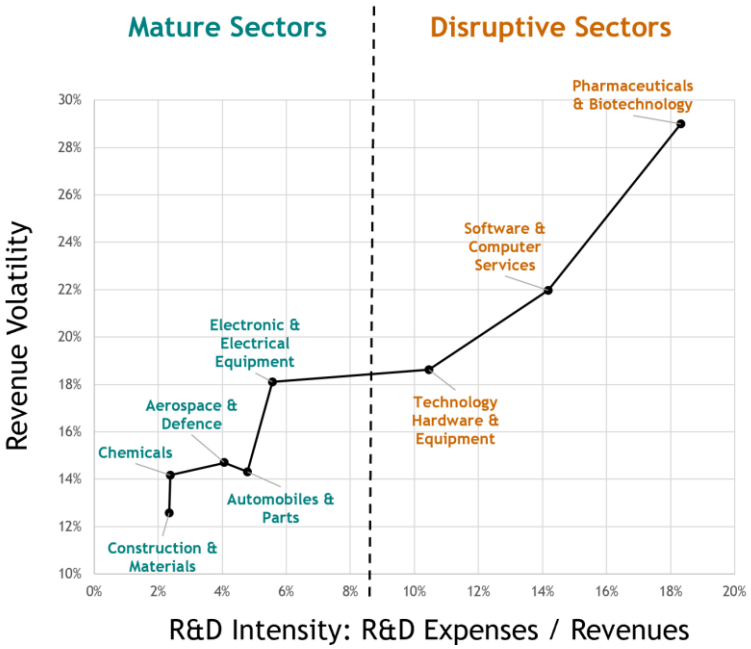
[63] Revenues are corrected for inflation and foreign exchange, in constant euros and dollars respectively
[64] https://www.cnbc.com/2023/10/12/qualcomm-to-cut-roughly-1258-jobs-in-california.html

Biotechnology.[65] However, not all sectors are equally relevant for an analysis of innovation. In industries such as Oil & Gas or Mining, volatility is largely driven by factors unrelated to innovation, namely geopolitical developments (wars in the Gulf and Ukraine, OPEC decisions, etc.), while its R&D-to-revenue ratio is very low at 0.4%.

We therefore focused on eight industrial sectors, selected primarily for their economic significance, measured by total revenues exceeding €1 trillion. Oil & Gas was, while Aerospace & Defense was added in light of its importance for both R&D and international relations (see Appendix 2). A striking gap in R&D intensity emerges. Three sectors devote more than 10% of revenues to R&D: Pharmaceuticals & Biotechnology, Software & Computer Services, and Technology Hardware & Equipment. These correspond to the tech and biotech industries identified in section 2.4 as undergoing disruptive innovation.

They stand in sharp contrast to the remaining sectors—Automotive, Aerospace & Defense, Electronics & Electrical Equipment, Chemicals, and Construction & Materials — which we classify as mature and primarily driven by incremental innovation. These mature industries, most of which originated in the late 19th or early 20th century, now allocate only 2–6% of revenues to R&D.[66]

Revenue volatility and R&D Intensity of major industrial sectors



Source: European Commission Scoreboards, authors calculations

[65] Revenues of the European Commission Scoreboards are expressed in euros. In principle, volatilities need to be adjusted for inflation (by looking at real data) and foreign exchange (by measuring volatility in the domestic economy). We've only made these adjustments for the countries used in the Monte-Carlo simulation – Germany and the United States. We also checked that the worldwide volatility of sectors was similar to what we measured in the USA when corrected of inflation and foreign exchange, validating the choice of sectors.
[66] The 2024 R&D data per sector is available on this link.

The graph above also illustrates the markedly higher volatility of disruptive sectors. Automotive, Aerospace & Defense, Chemicals, and Construction & Materials all show volatility levels below 15%, whereas Technology Hardware stands at 19%, Software at 22%, and Biotechnology at 29%. The key insight is clear: disruptive sectors are inherently more volatile. This pattern is consistently observable across individual countries (see Appendix 3).

Once we've made a choice of industry sectors, we must ensure that historical data are consistent, first by adjusting for inflation, second, by mitigating the impact of exchange rates. We further reduced the set of companies to Germany and the United States to simplify the analysis, while staying relevant to compare companies in the euro area with companies in the United States.[67]

Personnel Expenses are a mandatory element of annual reports in Europe, but not in the rest of the world. We gathered data of 68 listed companies in the 8 selector sectors, comparing solid results in Europe with calculations made for U.S. companies in section 2. We could find sufficient and consistent data for the following 4 sectors:[68]

	Personnel Expenses / Revenues
Pharmaceuticals & Biotechnology	26%
Software & Computer Services	40%
Technology Hardware & Equipment	31%
Automobiles & Parts	15%

We also use a constant salary to personnel costs ratio per country, calibrated from data generated in section 2. That ratio is set to 82% in Germany and 80% in the United States. Also calibrated in section 2, is the cost of restructuring: we are using 31 months of salary in Germany and 7 months in the United States.

3.3.3 Simulation results

The Monte-Carlo simulation based on the model dynamics above is run on 5-year overlapping periods over 200 U.S. companies for Pharmaceuticals & Biotechnology, 300 U.S. companies for Software & Computer Services, 200 U.S. companies for Technology Hardware & Equipment.

The idea behind simulating American companies in a German EPL environment is twofold: first, provide more apple-to-apple comparisons, second benefit from a rich set of growth scenarios in the best performing economy. We made an exception for the Automobiles & Parts

[67] The data, corrected for foreign exchange and inflation for the United States and Germany only, is available on this link.
[68] The data is available on this link.

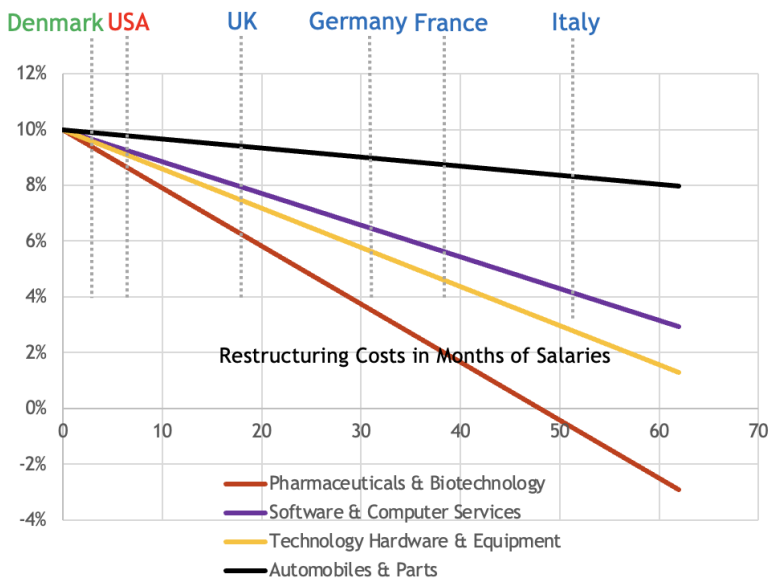
sector and included 70 companies from the U.S. and Germany – because they are more comparable.

The following table summarizes the results and shows how restructuring affects profitability at a country and industry level, with an "exceptional" restructuring threshold of -10%, a "regular" restructuring rate of 3% (only for Software & Computer Services and Technology Hardware & Equipment),[69] and a staff attrition rate of 5% (again, that will mitigate restructuring costs):

Profitability after restructuring Threshold = -10% / 5% attrition / 3% cut	**German-based restructuring**	**US-based restructuring**	**Differences**
Pharmaceuticals & Biotechnology	3.5%	8.6%	5.0%
Software & Computer Services	6.5%	9.2%	2.8%
Technology Hardware & Equipment	5.6%	9.0%	3.4%
Automobiles & Parts	9.0%	9.8%	0.8%

Further, we looked at the sensitivity of the results to restructuring costs. Not surprisingly, the more innovative and riskier the industry sector, the more sensitive the profitability. For the Auto industry, where personnel costs are a small fraction of revenues, the net profit margin is not very sensitive to restructuring costs, while in riskier businesses like in the pharma industry or in human capital heavy like in tech, the sensitivity is much stronger.

Sensitivity of Net Profit Margin to Restructuring Costs



[69] We made the assumption (conservative in this context) that in the biotech industry, adaptation can take place with "exceptional" restructuring only, given the fact that revenue drops are very sharp (at an average rate of 35%) and very frequent (41% of the years surveyed here).

Interestingly, the sensitivity of the results to the "exceptional" restructuring threshold is fairly limited: for Pharmaceuticals & Biotechnology, a change of threshold from 5% to 30% only increases the net profit margin by 0.5%.

A small profitability gap between Germany and the United States, such as the one observed in the auto industry, is manageable, as other factors—such as exchange rates, labor costs, or tax regimes—may exert a comparable influence and offset this competitive disadvantage for German firms.

By contrast, a 3-5% profitability gap is unsustainable over the long term. It directly affects company valuation: a U.S. pharmaceutical firm generating an average 8.6% profitability would be valued 2.5 times higher than its German competitor at 3.5%, making fundraising and acquisitions far easier. Alternatively, if the German company reduces its R&D to match the profitability of its US competitors, it will invest 13% of revenues in R&D vs 18% in the U.S. (the worldwide average). Who can compete against companies investing 40% more in R&D every year?

Interestingly, this 3% profitability gap that we explain here by restructuring costs corresponds exactly to the findings on the gap in profitability between U.S. and European companies, as mentioned in our previous paper.[70]

3.3.4 Impact of restructuring costs on growth

Not only does the cost of failure impact the profitability of a firm trying to innovate, it also acts as a *cap on growth,* which generates additional negative effects of profitability in some innovative sectors.

Focusing on the 8 critical sectors mentioned above, we compared the revenue profiles in the USA and in Germany. The results (Appendix 4) are stunning: German companies systematically miss the high growth rates of disruptive industries.

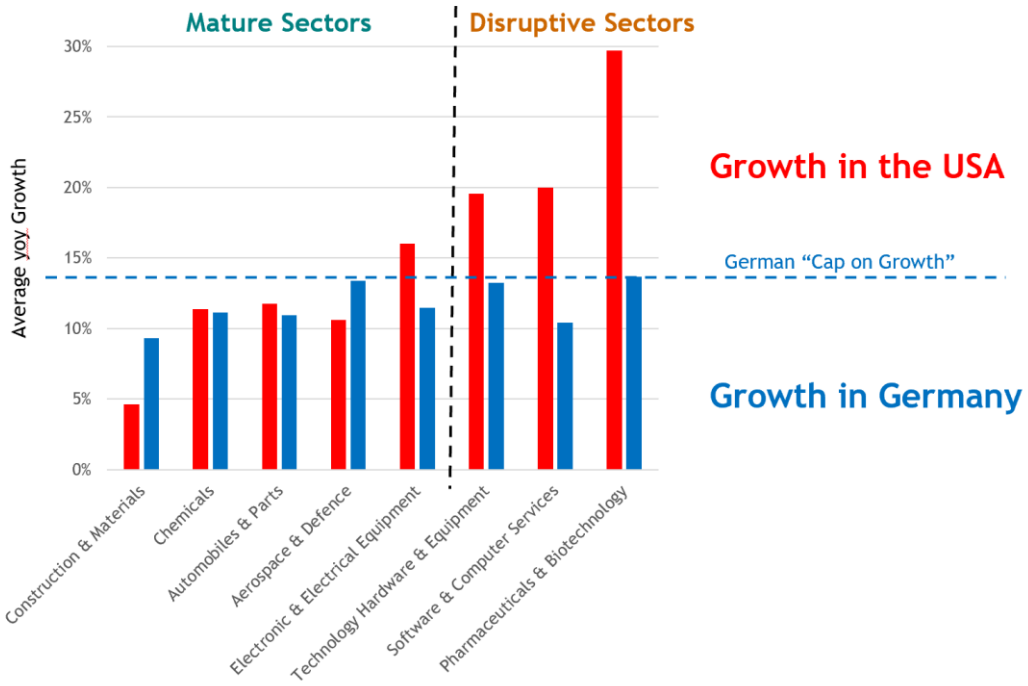
In the Biotech sector, US companies experience a staggering 30% average growth rate in growing years, while German companies experience 14% only. In the Software sector, the figures are 20% in the USA and 10% in Germany. In mature industries like Aerospace, Automotive or Chemicals, the growth rates are much more limited in both countries, at around 11 – 13%, so that German companies have equivalent revenue profiles to their American competitors.

German companies behave like racing cars with poor brakes: they hesitate to accelerate. As they take years to adapt to technological changes or revenue decline, they do not accelerate in times of growth because they can anticipate the high costs associated with changing course. In contrast, on the safe roads of automotive or chemicals, they drive at the same speed

[70] (Coatanlem & Coste, 2024)

as American ones (around 10% per year). On the winding roads or tech or biotech, they drive at half the speed of their American competitors.

Average growth rates in years of growth per sector



Source: European Commission Scoreboards, authors' calculations

This gap in growth has specific effects on the software sector. What is remarkable in this industry is that there are almost no production costs: once a piece of software is written, it can be produced in millions of copies at no cost. Consequently, size matters most and we observe winner-takes-all situations for each segment of this sector. The prudent behavior of German companies in times of growth has therefore a major impact in their sizes: based on the revenue profiles we found in this sector, we calculated that American companies will grow 5 times more than German ones in 20 years, just because of the lower growth rates German companies must follow.

In the software sector where you mostly have fixed costs, the larger companies will generate much higher profitability than smaller ones. In 2023, the actual average profitability of U.S. Software companies was 23% of revenues, while German Software companies generated 2% of profitability.

So, in effect, the profitability discrepancy predicted by our model is amplified in real life by the gap in growth and by the high concentration of performance in the software industry.

3.3.5 Conclusion

In summary, we have shown in this model that high restructuring costs—such as those in Germany, France, and Italy—undermine the profitability of companies in disruptive sectors to the point of non-viability, while leaving mature, incrementally innovative industries largely unaffected.

We can claim a strong causal relationship to the extent we have isolated one key contributing factor (restructuring costs) to the profitability of high-tech companies, therefore to the viability of disruptive innovation, while at the same time providing a realistic calibration of other market variables over a large industry sample.

The profitability differences computed here are in the same region as observed in a previous paper for large companies and start-ups alike.[71]

Note that convergence is not assessed in a traditional way in this study. First, since the paths are not independent, one cannot use the standard error estimate based on the Central Limit Theorem. We could in principle use a bootstrapping method, i.e. randomly replace some historical data and matching key moments of the distribution and compute the resulting standard error.

This work should certainly be extended. Quite a few assumptions had to be made on certain firm level factors, typically around data not publicly available. The variability of these factors will have at least second order effects on our results. Hence, the need for more research and new surveys, as detailed in section 5.

4. Limitations and robustness analysis

4.1 Limitations of using firm-level public filings

While we are using firm-wide official data provided to regulators, there are several reasons why our restructuring cost estimates may be inaccurate.

a. Uncertainty regarding the ex-post restructuring costs

In most cases, we relied on the restructuring costs reported in the annual financial statements corresponding to the year in which the restructuring plan was initiated. However, actual costs may differ from these initial estimates, particularly once negotiations with trade unions are concluded—often in the following fiscal year. While some companies disclose revised figures

[71] (Coatanlem & Coste, 2024)

in subsequent annual reports, these adjustments are frequently aggregated with other restructuring-related expenses, making it difficult to isolate the final cost of a specific plan. As a result, the ex-post accuracy of our cost estimates may be limited.

Moreover, it is common practice for company management to adjust the level of provisions based on strategic or reporting considerations.

For example, provisions may be increased during the early years of a CEO's tenure and subsequently released to create the appearance of improved profitability later in their mandate. Such discretionary behavior—though within the bounds of accounting standards—can distort the timing and magnitude of reported restructuring costs. As a result, these managerial practices may affect the reliability of the cost estimates used in our analysis.

Lastly, as previously noted, managers have a natural incentive to classify a broader range of expenses as restructuring costs than may be strictly necessary, as doing so allows for a more favorable presentation of operational profitability.

This practice is widespread across countries and may lead to an overestimation of actual restructuring costs in our analysis. However, this effect is likely to remain limited, as financial auditors monitor such practices and review the associated calculations before publication. While targeted company surveys could improve the accuracy of the data, they would not fully eliminate the underlying biases identified in this study.

b. Uncertainty regarding the salary levels of dismissed employees

Our methodology assumes that the average salary of dismissed employees is equal to the company-wide average salary.

This assumption may be misleading for several reasons. First, the employees affected by restructuring may be significantly more senior than the overall workforce, with correspondingly higher salaries. In such cases, expressing restructuring costs in terms of average company salaries may overstate the true cost relative to the actual salaries of the dismissed employees. Second, the average salaries in the country where the layoffs occurred may differ substantially from the global average used in our calculations, especially for multinational firms.

Unfortunately, publicly available documents do not provide salary data at the level of the dismissed population or by country. Overcoming this limitation would require targeted surveys and access to confidential internal company information—something only possible through cooperation with the firms themselves.

c. Uncertainty regarding the actual number of dismissed employees

The figures used in our analysis are often based on public announcements made by companies at the outset of the restructuring process. However, subsequent negotiations with trade unions may lead to a reduction in the number of dismissals. In many cases, the Eurofound database provides updated information on the outcomes of such negotiations, which we incorporate into our analysis whenever available.

Nevertheless, in some instances, the final number of dismissed employees is not made public. As a result, our calculations may rely on inflated estimates, which would lead to an underestimation of restructuring costs expressed in months of salary. As with salary data, fully reliable figures could only be obtained through direct surveys of the companies involved, granting access to confidential internal information.

d. Uncertainty regarding the seniority of dismissed employees

In all countries—including the United States—severance pay is closely linked to the employee's seniority within the company. In Europe, a commonly used rule of thumb is one month of severance per year of seniority, often capped at around 12 months.

As a result, even if this only accounts for severance pays, and not for the total of restructuring costs faced by companies (see section 5), restructuring costs are likely to be lower in younger companies that have expanded their workforce in the previous five years, compared to more established firms where average employee seniority may reach 20 years or more.

Once again, publicly available sources do not provide sufficient detail to assess the seniority of dismissed employees. This lack of information limits our ability to correlate restructuring costs with tenure levels and may explain significant cost differences observed between companies within the same country. Only targeted company surveys would allow economists and policymakers to analyze the role of employee seniority in shaping the cost of restructuring.

e. Bias in the selection of companies

As outlined above, we applied a rigorous and systematic process in selecting the companies included in our analysis. Nonetheless, the methodological constraints we faced may have resulted in a sample that is not fully representative of the broader economy in each country. For example, in the case of Italy, we had to go back ten years to identify a sufficient number of listed companies that disclosed restructuring data specific to Italy.

This led to an overrepresentation of certain sectors—such as banking, insurance, and former state-owned utilities like Enel and Telecom Italia Mobile—because these companies maintain a strong domestic footprint and their restructuring efforts primarily target Italian employees. One can argue that restructuring costs are higher in banks and insurance companies, and

more generous in former State-owned utilities, with strong unions, than it would be in average companies.

Therefore, the selection of companies may have led us to overestimate the actual restructuring costs for a representative company in Italy. The same applies to Spain.

The authors were indeed surprised by the high level of restructuring costs observed in their findings for Italy. Based on their professional experience, restructuring plans in Italy typically involved costs equivalent to 24 to 30 months of gross salary—making the observed average appear unexpectedly high.

The most effective way to assess whether this figure reflects a structural reality or a case of overestimation would be to conduct targeted surveys of multinational companies that have implemented significant restructuring plans in Italy.

f. Uncertainty regarding the nature of employment contracts

The Eurofound database does not provide detailed information on the contractual status of the employees affected by restructuring plans. For example, a reported layoff of 500 employees may include a mix of 100 temporary workers, 30 external contractors, and only 370 permanent employees. Since the dismissal of temporary staff and contractors is typically faster and significantly less costly than that of long-term employees, such variations can distort average restructuring cost estimates.

This limitation is particularly evident in the Netherlands, where labor laws allow companies to hire an unlimited number of temporary employees and maintain them under such contracts for up to three years. By contrast, Germany, France, and Italy impose stricter limits on the use of temporary contracts. This legal divergence helps explain the wide variation in our Dutch findings: companies with a high proportion of temporary staff (in some cases up to 50% of their workforce) reported restructuring costs ranging from 0 to 20 months of salary, whereas companies with predominantly permanent staff reported costs between 25 and 50 months.

Again, only direct surveys of companies could provide accurate information on the nature of the contracts of dismissed employees and allow for a reliable assessment of restructuring costs by contract type.

4.2 Robustness analysis

Several factors help to partially mitigate the impact of the limitations inherent to using publicly available data. First, a significant number of companies provided restructuring cost data that was both detailed and country-specific, including the number of dismissed employees. These cases yielded solid, consistent results that typically align with our national averages.

Second, despite the many variables that could affect cost estimates—such as employee seniority, the share of temporary or contract workers, and industry-specific practices (e.g., in banking or under union agreements)—we observed a high degree of internal consistency in the results within each country, in the sense of a large cluster of companies close to the country average.

Most compellingly, the differences between countries are too large to be explained by methodological biases alone. For example, while average restructuring costs are around three to five months of salary in Denmark and Switzerland, they exceed 30 months in Germany and France.

Many of the potential biases—such as the managerial tendency to overstate restructuring costs—exist across all countries, including the United States. These shared factors cannot account for the stark gap between the U.S. and countries like Germany, France, or Italy.

And when faced with these potential biases, we can in many cases compute some conservative estimates. For instance, while the breakdown of restructuring provisions and charges between countries or regions of operation are usually not disclosed (although in some cases, that information can be inferred from various comment sections), over-representing the nationality of the firm headquarters in the cost calculation (so assuming for instance that 100% of laid off employees of a German company are based in Germany, when in fact a significant amount will be based in lower-cost countries) will in general be conservative for countries with strict EPL - we would underestimate costs.

Schaeffler is an interesting example: in November 2024, they announced 4700 layoffs, thereof 2800 in Germany. The worldwide restructuring cost average is at 25 months, but the German cost is likely to be higher.

Similarly, in situations when layoffs include a large number of temporary workers or voluntary departures, estimates of restructuring costs are likely to be conservative, i.e. underestimated, for countries with strict EPL.

To get a better sense of the materiality of potential estimation errors, it can be very useful to look at examples where information is very granular. The French company Vallourec is remarkable in that regard, and even provides valuable international benchmarking, since detailed data is available for France, Germany and the United States.

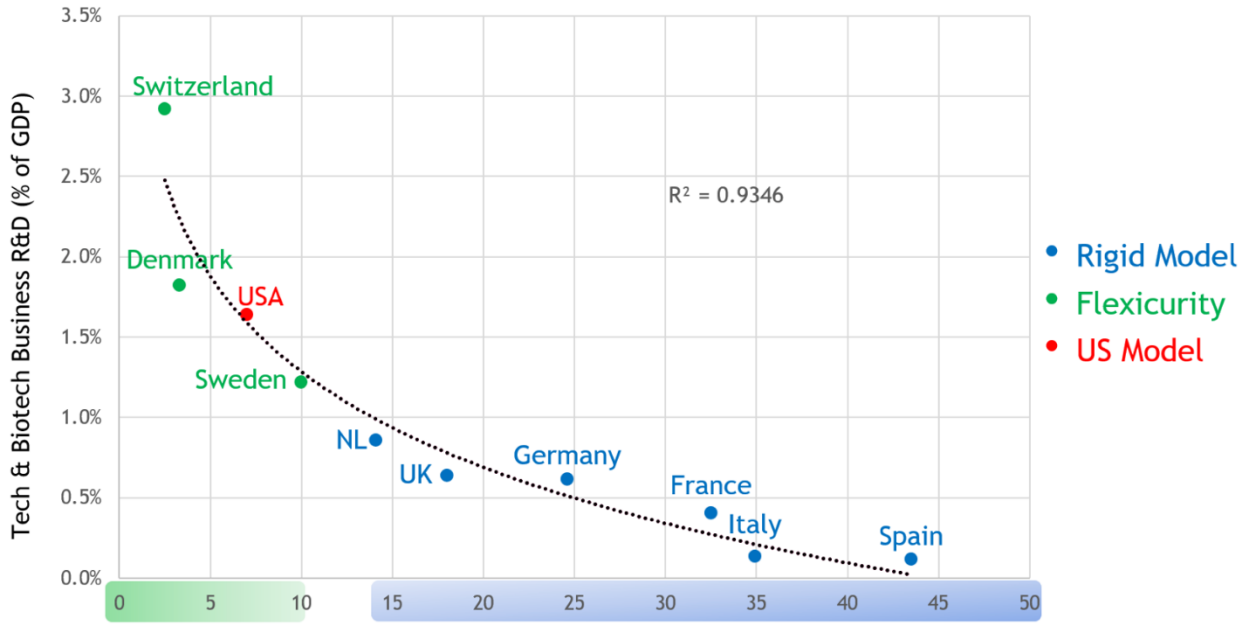
The Vallourec annual report (Universal Registration Document for 2020) provides the exact number of people laid off in France (364) as well as a corresponding charge of 61 million euros (based on negotiations still ongoing at the end of 2020, though). From there, we can calculate an average restructuring cost of 168,000 euros per employee. We also have the number of employees for France and can infer salary expenses. We can therefore compute the ratio average restructuring cost / average salary, equivalent to 38 months of employee average salary. So, for the most part there is little uncertainty on this restructuring cost, except on the distribution of salaries of employees dismissed (higher paid employees would mean lower

ratio), rarely available from public data, and on the contribution of social taxes on total personnel expenses (we don't know directly the percentage of French salaries in total salary expenses).

Similarly, for Vallourec, we can compute a cost of 39 months (in 2020) and 25 months (in 2022) of average salary in Germany, and only 2.3 months in the United States. Interestingly, the cost estimates for France and Germany are close to the average cost for those countries. This suggests than our sample is large enough to eliminate a significant part of estimation biases.

Additionally, beyond calibration errors, we need to address any bias stemming from the selection of firms in our country-level samples. For instance, specific industry sectors exhibit idiosyncratic costs like telecom operators, utilities or banks in Italy, Spain, the Netherlands and France, with either former monopoly status or sector specific historic social conditions. Because of the limited number of relevant cases we could find, such sectors could be overrepresented in these countries, resulting in the overestimation of restructuring costs in some cases. To mitigate that effect, we simply take a low percentile (30th percentile) of the cost distribution for high-cost countries - and keep the average cost for low-cost countries. As shown below, costs are still significant on the one hand, and on the other hand, the strong correlation between R&D tech intensity and restructuring costs observed earlier still holds:

Restructuring costs normalized by average salaries (30th percentile for high-cost countries)



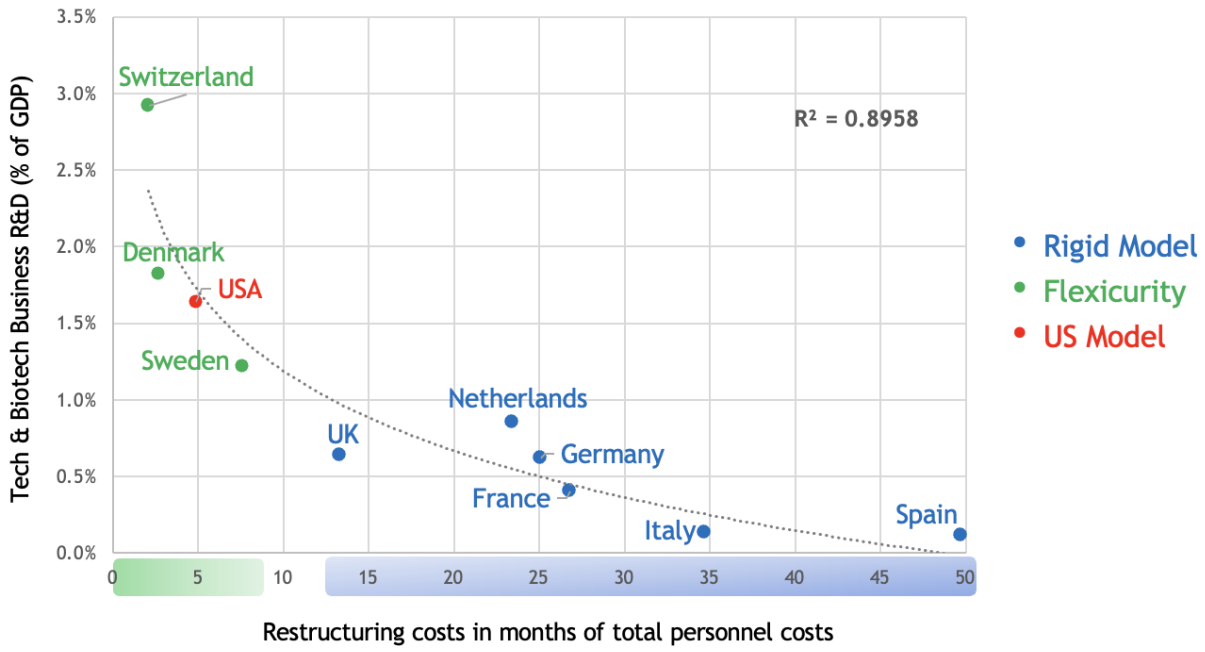
Source: authors' calculations, based on companies' financial report and (European Commission, 2024)

4.3 Normalizing restructuring costs by total employee cost

So far, we have used average salaries of companies as a way to normalize restructuring costs and therefore make them comparable between industries and countries. The reason is that this is the usual methodology in large groups to calculate severance pay and restructuring costs related to human capital. In addition, salaries tend to be easier to obtain than total cost of employees to the company, which include social security and other charges (e.g. retirement related). Note for instance that personnel costs are not mandatory in American annual reports.

Fortunately, the impact of accounting only for salaries doesn't seem to change the relative picture portrayed above. Using publicly available personnel costs for European companies and numbers from the U.S. bureau of Labor Statistics for American companies,[72] we show that the relative costs between Europe and the United States don't change significantly and that the relationship between R&D investment and restructuring costs still holds:

Restructuring costs normalized by average personnel costs



Source: authors' calculations, based on companies' financial report and (European Commission, 2024)

[72] We use the ratio reported by the U.S. Bureau of Labor Statistics between total employer costs and salaries: 1.42 as of Q2 2025 for the Private Sector. See: https://www.bls.gov/news.release/ecec.nr0.htm#:~:text=According%20to%20the%20U.S.%20Bureau%20of%20Labor,per%20hour%20*%20**State%20and%20local%20government**

5. Why do we need new industry surveys?

As we have seen, the precise restructuring costs that companies in European countries encounter are not always well documented or granular enough in publicly available documents. We approached companies of various sizes, as well as major consulting firms, to request access to such data.

All declined to share information in writing, although many CEOs privately confirmed the accuracy of our general cost estimates. The high sensitivity of company-level restructuring data clearly explains this reluctance.

De Volksbank explains in its 2024 annual report that because of its ongoing transformation program, "a more detailed component breakdown [of restructuring provisions] is not provided considering the sensitivities of the ongoing negotiations".[73]

Additionally, we can probably not rely on fiscal data collected by governments (usually not public). At least in France, we have established that no accurate information on personnel restructuring costs can be extracted in a useful manner.[74]

While the OECD has developed qualitative indicators of Employment Protection at a macro level, both European and national institutions lack quantitative data on the costs incurred by companies during business declines or project abandonment, particularly when they must engage in collective dismissals.

Such costs are recorded by listed companies as "restructuring costs" in their annual reports. They usually include both costs directly related to Employment Protection Laws (such as severance pay) and costs indirectly related (such as operational losses during the negotiation phases, training programs negotiated with unions or reindustrialization measures negotiated with governments). They also include unrelated costs, such as asset write-offs or impairment of goodwill.

Moreover, these reports typically present an aggregated view at the worldwide level and do not provide details per country. Yet, quantitative data at country level is critical for analyzing the impact of national employment protection laws on innovation and investment.

In the absence of public granular information, it is therefore necessary to conduct surveys on the restructuring costs incurred by companies on a per-country basis, both within Europe and in other major economic regions. This is to facilitate comparative analyses within the European Union and between the EU and the rest of the world.

[73] (De Volksbank, 2024)

[74] We are grateful to DGFiP staff for helping us navigate the databases containing corporate tax data and to Antonin Bergeaud for his in-depth analysis of restructuring data and their limitations.

Given the confidential and sensitive nature of country-specific restructuring costs, stemming from complex negotiations and specific situations, the institutions gathering data will need to ensure that all collected information remains strictly confidential and that only aggregated data derived from a sufficiently large number of companies is disclosed, in such a way that no specific company's data can be identified.

Here is a possible questionnaire:

1. Over the past 5 years, has your company initiated any restructuring plans that involved 'collective dismissals' as defined by employment protection laws in Europe?
2. If yes, in which EU countries were these restructuring plans launched?
3. If the restructuring plans also involved collective dismissals outside the European Union, did they include any of the following countries: the UK, Switzerland, the USA, China, Japan?
4. For each of the EU countries and non-EU countries listed above where restructuring plans took place, for each year, and for each restructuring plan, please provide the following information:
    a. The total number of permanent employees laid off (excluding those on temporary or short-term contracts) under the restructuring plan initiated in that year (even if the actual departures were spread over several years).
    b. The duration of that plan, from the announcement to the departure of all laid-off employees.
    c. The average annual personnel expenses for the permanently laid-off employees.
    d. The corresponding restructuring costs. They should include costs directly related to employment protection laws (such as severance pays) and costs indirectly related to employment protection laws (such as operational losses during the negotiation phases, or the measures of training or reindustrialization agreed upon in the negotiation).
    e. To the extent possible, differentiate between distinct categories of employees for each of the responses to questions a, b, c, and d, ideally for the top 10% per gross salary vs. the bottom 90%. Alternatively for blue-collar/white-collar employees, or between functions such as R&D, Marketing and Sales, General and Administration, or Operations. Our focus is indeed to document the restructuring costs relative to populations involved in innovation, such as white collars or R&D departments.
5. If you sum all the employee-related restructuring costs from the details provided above at a worldwide level for each year, do these amounts approximately correspond to the restructuring costs reported in your annual reports? If not, could you elaborate on the causes of any restructuring costs that are not related to employee matters, such as impairment, lease termination or asset write-offs?

6. Public policy response

6.1. A simple reform of targeted flexicurity

This paper provides plenty of evidence that innovative companies are prevented from responding swiftly to market shifts: they have to bear the burden of protecting their employees instead of focusing on their business. And when productivity is stagnant across Europe, with salaries much lower than in more dynamic economies, the concept of protection is all relative.

Gösta Rehn, who inspired the Rehn-Meidner model that prevailed in Sweden in the 1960s and early 1970s, called excessive labor protection "security under shells", and promoted "security of wings", that gave workers maximum freedom and better odds of a flourishing career. The goal of the European Pillar of Social Rights is precisely a "strong social Europe that is fair, inclusive and full of opportunity."[75] Yet one of the key conditions of opportunity is to increase productivity. The challenge here is to quickly redeploy the most qualified workers towards the most innovative and productive companies.

To favour productivity-enhancing reallocation of resources, while minimizing the costs supported by companies and employees, we need to find the right trade-off between corporate flexibility and the welfare of workers.

Denmark's flexicurity model is wildly credited for achieving a good compromise: it provides generous unemployment benefits (up to two years after losing their job at roughly 90% of last salary),[76] government-run education and retraining programs as well as efficient counselling services, while at the same time enabling firms to restructure their activities without excessive costs for dismissing employees.

The key characteristic of flexicurity is that there is no second-guessing of the business reasons for restructuring by courts nor by governments, and in practice litigation is rare. Cases brought up to the Danish Labor Court, to ordinary courts of law or to industrial arbitration, concern disputes of breaches of collective agreements on wages and working conditions, not reasons for restructuring.

There is however a process to be followed, but it is not imposing serious constraints. By law, that process includes documentation of the decision to terminate employee positions, proper notice period (typically based on the length of employment), notification to employee representatives and the Regional Labour Market Council, written letters of termination and notification meeting with the employee.

Other requirements may apply under specific collective bargaining agreements, which cover around 80% of employees. And this efficient process can accommodate all existing EU

[75] https://employment-social-affairs.ec.europa.eu/policies-and-activities/european-pillar-social-rights-building-fairer-and-more-inclusive-european-union_en
[76] https://lifeindenmark.borger.dk/working/work-rights/unemployment-benefits

employment law directives, on a range of important social issues such as working time, annual leave, maternity and other parenthood-related leave, and non-discrimination.

It is sometimes argued that *culture* is more important than formal EPL. Certainly, Denmark has a long tradition of pragmatic social dialog, that can be traced as far back as 1899. But culture doesn't operate in a vacuum: the Danish framework of negotiations between employers and trade unions was enabled by the *Labour Market Constitution* of 1899 and the *Basic Agreement* of 1960.

Collective bargaining agreements are mostly free of government interference, but they have to follow all statutory requirements. Ineffective laws create bad cultures, and conversely improving labour laws will change all the managerial preventions against risk taking and disruptive innovation. But it will clearly not happen overnight.

Outside the European Union, Switzerland provides an example of very flexible EPL, in fact ranked number 1 by IMD (just in front of Denmark),[77] and number 2 by the World Economic Forum (after Hong Kong).[78] Like in Denmark, firms cannot be refused to implement freely their restructuring plans by the administration nor by courts, and they are not even required to provide a reason for their action: "Freedom of termination is an important principle in Swiss labor law. Entering into and terminating employment relationships is a matter of free will for both the employer and the employee. However, this freedom has an important limitation: termination may not be given for abusive reasons." [79]

The list of potentially abusive grounds for termination is strictly limited. This stands in stark contrast to the legal frameworks in Germany, Italy, and France, where collective dismissals must be justified by the company's economic situation. In these countries, laid-off employees can challenge the employer's business decisions, and courts have the authority to determine whether the economic conditions used to justify the dismissals were indeed met.

The absence of disclosure of the economic motives for the restructuring plan which prevails in Switzerland would probably not be consistent with current European directives, although a degree of transparency over the employer's economic rationale, such as in Denmark, is a relatively light constraint.

The mandatory notice periods are relatively short (one month during the first year of employment, two months between the second and ninth year of employment, three months beyond nine years of employment), and in most cases there is no mandatory severance pay. However, like in Denmark, this very flexible system is combined with a generous social safety net and associated with a very low unemployment rate.[80]

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[77] (IMD, 2024)
[78] (World Economic Forum, 2019)
[79] https://www.seco.admin.ch/seco/fr/home/Arbeit/Personenfreizugigkeit_Arbeitsbeziehungen/Arbeitsrecht/FAQ_zum_privaten_Arbeitsrecht/kuendigung.html
[80] Unemployment rate was 2.9% in March 2025

The conclusion of all this is that solutions exist that do not threaten the European social model. We suggested in Commentaire that the Danish flexicurity model would be a very good starting point:[81] we could transpose that model in other European countries, but only for top earners. Basically, current EPLs would be reformed for salaries above a high threshold, for instance the top 10%. This is because the employees targeted by large restructuring plans in innovative companies are typically highly qualified, highly paid and rarely unemployed.

That is a win-win situation: indeed, this type of targeted flexicurity would not create, by definition, any downside for most workers, yet it would vastly improve the agility of European companies in innovative ventures, therefore increase European competitiveness and prosperity.

There is a strong rationale for making this new disposition applicable to all industries, and not just those at the technology frontier: apart from the fact it would make it legally more enforceable (it is very doubtful high courts would accept any discrimination on the basis of job classification by sector), it would also guarantee the agility of the entire ecosystem, including clients and suppliers. This is turn will facilitate the emergence of a vibrant domestic market that is currently missing in Europe.

We think that detailed technicalities of a European-wide targeted flexicurity should be country-specific (such as the precise steps of the Danish process explained above), but that the key guiding principles should be that (i) neither courts nor public administration should be in a position to refuse or delay the plans that a company deems necessary for its performance or survival, and that (ii) codetermination should not create unnecessary burdens. Let's elaborate on these two important aspects of flexicurity.

In a few European countries, governments can assert themselves directly in the restructuring process and make administrative approval mandatory: that is the case in the Netherlands and France for instance. In Italy, the Ministry of Labor is involved in cases where the management of the firm cannot reach an agreement with its works council.[82] But government pressure can also be more insidious, when the announcement of large restructuring plans trigger public rebuke from officials. Labor laws can also require that various steps be taken to "protect" the very people targeted by the restructuring.

In France, any company deciding to reduce its workforce for economic reasons above a very low threshold (for layoffs of more than 10 employees in companies employing more than 50 people) must put in place a Plan de sauvegarde de l'emploi (Job protection plan), whose goal is "to prevent or limit the number of economic redundancies" – that is to reverse part of the restructuring plan.[83]

[81] (Coatanlem & Coste, 2023)
[82] https://eplex.ilo.org/en/procedures-for-collective-dismissal
[83] https://www.service-public.fr/particuliers/vosdroits/F2811?lang=en

Measures must include the reclassification of employees, "actions promoting the resumption of all or part of the activities with a view to preventing the closure of one or more establishments", the "creation of new activities by the company", "training, validation of experience acquired (VAE) or retraining measures to facilitate the internal or external reclassification of employees to equivalent posts", steps "to reduce or adjust working time and measures to reduce overtime worked on a regular basis", etc. The Plan can be refused by the administration (Dreets), in which case negotiations with the works council (Comité Social et Économique) must restart from scratch.

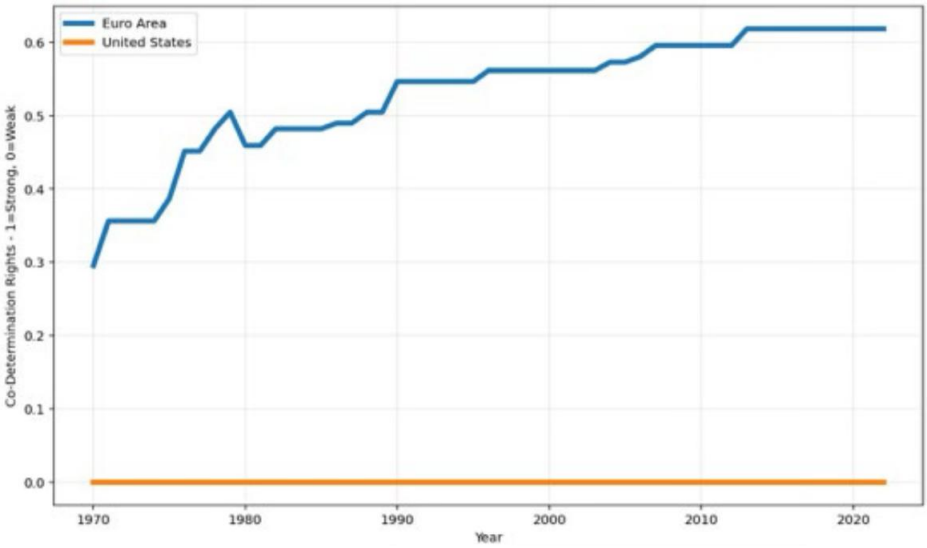
All these requirements in our view put an excessive burden on firms, by adding significant delays and making it hard for them to justify the rationale of their economic decision. The Denmark approach seems much more efficient at giving companies maximum flexibility to adapt quickly to the challenges they face in a fast-moving technology environment.

Even if government agencies are not directly involved, the law may impose procedural constraints on dismissal and give significant power to *codetermination*. Codetermination can be broadly defined as the involvement of workers in corporate decision making and can take two main forms: instances of workers representatives and participation of workers to corporate boards.[84] In Germany, half the Supervisory Board (*Aufsichtsrat*) is mandated to be representative of the workers. In Switzerland, there is no provision for board-level codetermination, but there is information and consultation rights of enterprise committees above a certain size.

It seems that overall, in Europe, codetermination has increased significantly since the emergence of mass unemployment in the mid-1970s:

[84] (Center for Business Research, University of Cambridge, 2023)

Codetermination Rights: Eurozone vs. United States



Source: Schoeffer (2015)[85] / CBR[86]

At the level of the European Union, Directive 2009/38/EC[87] was in force until now but was certainly not constraining enough to prevent Denmark from enjoying a successful flexicurity model.

As the EU has just agreed[88] on a new directive amending Directive 2009/38/EC,[89] we will have to see how some of the requirements will be transposed into national laws. In particular Annex I/(1)/(a) states that the information that must be provided to works councils includes "the situation and probable trend of employment, investments, and substantial changes concerning organisation, anticipation of change and management of restructuring processes including those linked to the green and digital transitions, introduction of new working methods or production processes, transfers of production, mergers, cut-backs or closures of undertakings, establishments or important parts thereof, and collective redundancies".

Furthermore, 'the consultation shall be conducted in such a way that the employees' representatives can meet with the central management or any more appropriate level of management.

The employees' representatives shall be entitled to a reasoned written response to any opinion they might express prior to the adoption of the decision on the measures in question, provided their opinion was expressed within a reasonable time." (Annex I/(1)/(b)). In principle, such a

[85] (Schoefer, 2025)
[86] (Center for Business Research, University of Cambridge, 2023)
[87] That pertains to the ability of works councils to receive information from management.
[88] As a result of the *trilogue* between European Parliament, Commission and Council on May 21, 2025.
[89] https://data.consilium.europa.eu/doc/document/ST-10437-2024-INIT/en/pdf

legislation should still be consistent with flexicurity and simply increases transparency and collaboration between the workforce and management.

What is not clear is what would happen if the works council disagreed ultimately with the written responses provided by management. Also, how do we define "in-depth assessment" of the possible impact of corporate action (Article 9/2)? And how long would this process take, especially if we consider that "the operating expenses of the European Works Council shall include reasonable costs of legal experts"? (Annex I/(5)/(a)). There is a non-trivial risk here that some member states could increase the burden of codetermination even further.

As we noted before,[90] the bilateral conventions between European member states and the International Labor Organization don't seem to prevent the implementation of a flexicurity system.

Finally, the risk of higher courts rebuking any inequality of treatment between workers (in our case the top 10% or so and the rest of the workforce) seems relatively low, considering that a typical jurisprudence is that a certain level of inequality can be tolerated as long as there is a superior common good.

6.2 Transition and Implementation considerations

A transition plan for the targeted flexicurity we propose would certainly be needed, like for any significant structural reform. Indeed, not all high earners are young, flexible and mobile engineers capable of getting a new job whenever and wherever they want: a certain proportion will in fact be in the category of senior employees near the end of their career.

It is important to note that even if the law cannot provide them with as much protection as before, private contracts could, via collective conventions, firm level agreements or even contractual work contract. But this institutional reorganisation will take time.

Another element of transition is the impact on social systems, namely unemployment benefits, and their financing. The fear is that the costs currently borne by companies would be transferred to social systems, increasing public expenses at a time of strong limitations on public spending. We expect the overall impacts on social systems to be limited.

First, a large part of the restructuring costs comes from the operational losses encountered by companies during the negotiation phases (see section 2.4). These costs are pure economic inefficiencies: maintaining salaries, offices, labs, security, subcontractors while revenues decline have nothing to do with social protection and would not be transferred to social systems if restructuring timetables would be accelerated.

Second, reducing severance pays for high earners should not increase the unemployment benefits that will be paid to laid off employees. Most of the time, high earners, with solid

[90] (Coatanlem & Coste, 2023)

qualifications and strong adaptability, find a new job within months, much faster than the usual coverage by unemployment benefits (18 to 24 months in most countries). And accelerating the actual departure of high earners should not change the costs of their unemployment coverage.

Having said that, unemployment benefits are particularly generous in Denmark: 90% of previous salary, up to roughly 21,000 euros per month, for a period of up to two years within a three-year timeframe. In contrast, in Germany, the monthly ceiling is set to 60 or 67% of approximately 8,000 euros of gross earnings, with benefits duration between 6 and 12 months before the age of 50 and increasing gradually after up to two years.

If unemployment increases in the short term, it will be limited to high earners with skills that cannot be easily adapted. But, as we have shown in this paper, EPL reform can bring immediate boost in R&D investment, reducing unemployment overall, and can generate significant economic growth in the medium-term, therefore providing additional tax revenues that could be allocated to increasing social benefits if needed.

The European Commission has announced its intention to propose a legislative text known as the "28th regime," aimed at reducing the cost of failure by adapting labor laws.[91] There are both advantages and drawbacks to such EU-wide legislation compared to reforms undertaken at the national level.

Labor laws are politically sensitive across all European countries. They require highly delicate political debates at the national level and embody complex compromises among key stakeholders—namely political parties, trade unions, and employers' associations. Such reforms can provoke widespread strikes and demonstrations,[92] lead to referendums,[93] or even determine the outcome of general elections.[94] As a result, the most logical and appropriate setting for meaningful political debate on labor law reform remains the national context.

Moreover, proposing European legislation on labor laws would encounter an additional layer of opposition for institutional reasons: most political parties would resist such reforms simply because they would shift authority from national capitals to the EU level.

At present, it is difficult to envision how consensus could be built within national governments around targeted flexicurity measures introduced through European legislation. That said, one cannot rule out the possibility that political conditions may evolve in the coming years.

[91] (European Commission, 2025)
[92] See the attempt to introduce a "Contrat Premiere Embauche" in France in 2006, with over 1 million demonstrators.
[93] See the referendum of 8 and 9 June 2025 in Italy about labor law reforms (2015 Jobs Act)
[94] See the impact of the Harz IV reforms on the general elections in Germany on 18 September 2005

Yet, the technical advantages of EU-wide legislation are significant. An EU regulation would establish a single set of rules for the dismissal of top earners across all 27 Member States, offering companies legal certainty within a large and integrated labor market.

It would also provide long-term visibility on those rules, shielding companies from the risk that national elections might bring new majorities and lead to revisions of labor laws just a few years later. Indeed, companies considering investments of tens of billions in tech R&D will require the assurance that labor regulations will remain stable over a 5- to 10-year horizon—an assurance that national laws rarely offer.

The choice of appropriate legislation will therefore depend on how political conditions evolve across most Member States. As of today, the topic has not even entered public debate. Public opinion remains strongly opposed to any reform aimed at increasing labor market flexibility, as demonstrated by the results of the recent Italian referendum. [95]

The first step is to initiate a political discussion in each European country on the link between Employment Protection Legislation (EPL) and the innovation gap, and to reassure the public that the necessary reforms would be limited to top earners—leaving 90% of the workforce unaffected.

Ironically, flexicurity has had more success in Europe to attract top talent among City bankers from London.

In 2019, the German Parliament passed the Act on Tax-Related Provisions Regarding the UK Withdrawal from the EU (Brexit-StBG/Steuerbegleitgesetz), so that high-paid "material risk takers" in "significant financial institutions" could be dismissed through applications for termination not having to be substantiated.

The draft bill of 2024 (ZuFinG II) broadens the scope to all high-earner "material risk takers" across the entire financial industry - in all credit institutions, investment firms, capital management companies, and the entire insurance sector. France has also considered introducing a similar legislation and has already made the dismissal of top bankers less expensive, by instituting a limit based on the social security annual cap,[96] although costs are still significantly higher than in Germany or in the UK.

These legislations are relevant because, like in our proposal, they have a scope limited to the top percentiles of earners. In any case, if they can fit in the legal and constitutional frameworks of Germany and France, there is a good chance they can be extended to the rest of Europe.

[95] 89% of the voters favored a more rigid system. However, the turnout was around 30%.
[96] https://www.legifrance.gouv.fr/codes/article_lc/LEGIARTI000049720702 / Article L511-84-1

6.3 Targeted flexicurity does not threaten the European Social Model

Our findings show that European countries such as Denmark and Switzerland have successfully combined a highly protective social model with the flexibility companies need to foster innovation. This calls for a closer examination of the specific characteristics of such a model—and a comparison with the social framework in the United States.

To simplify, most European social systems rest on four fundamental pillars:

- Free access to education, including university-level studies. By contrast, higher education in the United States can cost between $100,000 and $300,000, making it unaffordable for a significant share of the population.
- Universal healthcare coverage, ensuring access to medical care for all. In comparison, a substantial portion of the U.S. population lacks consistent access to doctors and hospitals.
- Robust public pension systems, which protect retirees from falling into poverty. In the U.S., many older citizens must rely on personal savings or continue working into old age to sustain themselves.
- Comprehensive unemployment benefits, offering income security for one to two years after job loss—typically enough time to find new employment. In the U.S., unemployment benefits are generally shorter and vary widely by state.

The two European countries we identified—those with both low restructuring costs and high levels of disruptive innovation—fully uphold the same fundamental social pillars as their neighbors.

They provide universal access to education, healthcare, pensions, and unemployment benefits. In other words, they are not outliers to the European social model; they are exemplary embodiments of it. This stands in stark contrast to the deregulated "wild west" often associated with the United States. The key difference between these countries and Europe's larger economies lies in one specific area: Employment Protection Legislation. This contrast can be illustrated as follows:

Targeted Flexicurity, a solution leveraging the European Social Model

Social Pillars	USA	Europe	DK CH	New	
Free Education	✗	✓	✓	✓	
Free Healthcare	✗	✓	✓	✓	
Pensions Systems	✗	✓	✓	✓	
Unemployment Benefits	✗	✓	✓	✓	
Empl. Protection Laws	✗	✓	✗	✓ 90%	✗ 10%

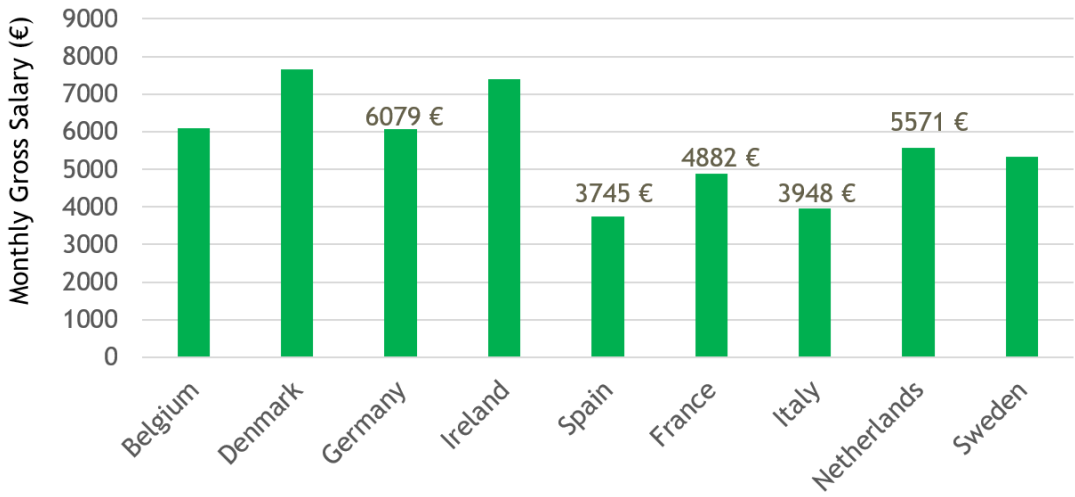
Limited Reform

Source: authors

The proposed reform fully preserves the four core pillars of the European social model. It introduces only a targeted adjustment, inspired by practices already in place in other European countries, and applies solely to approximately the top 10% of earners—those least exposed to the risks of long-term unemployment and best equipped to secure new opportunities after being laid off.

To make this more concrete, we identified the salary thresholds that separate the top 10% of earners from the remaining 90% of the population. These thresholds vary by country, reflecting differences in income distribution and cost of living:

Minimum gross monthly earnings received by the top 10% of employees



Source: Eurostat[97]

[97] https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Earnings_statistics#Distribution_of_earnings Data on distribution of earnings, as well as corresponding median gross monthly earnings refers to all employees (including apprentices) working in enterprises with 10 employees or more and which operate in all

In Germany, for example, our proposed reform would apply only to employees earning more than €6,079 in gross monthly salary. This means that 90% of the German workforce—those earning below this threshold—would retain their existing employment protections in full. Conversely, most employees working in R&D for large corporations earn above this threshold and would therefore fall under the scope of the proposed changes, which include more flexible dismissal procedures and reduced severance payments.

Our analysis suggests that such reforms would restore the profitability of R&D activities in the tech sector and other high-risk industries, thereby attracting significantly greater investment—from both large corporations and venture capital funds.

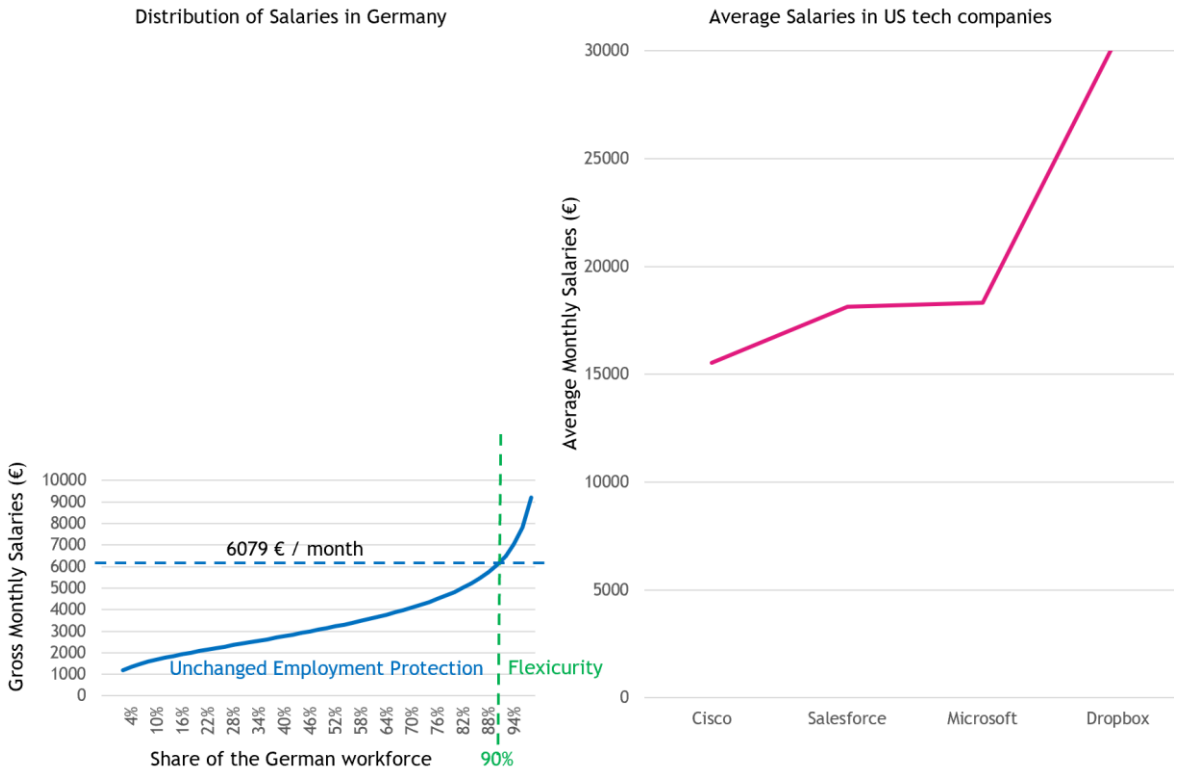
The most likely outcome would be a substantial inflow of capital, accompanied by a marked rise in salaries for engineers and other R&D professionals. This is illustrated by the considerably higher average monthly compensations in the U.S. tech sector: €18,333 at Microsoft, €15,520 at Cisco, €30,700 at Dropbox, and €18,159 at Salesforce.[98]

The following graph illustrates the discrepancy between the top 10% salaries in Germany and the average salaries in the US tech industry. It shows that targeting the reforms of EPLs to roughly the top 10% would be sufficient to attract investment in tech. It also shows that Europe has a major competitive advantage in terms of salary levels as compared to the US for tech investors…

sectors of the economy except agriculture, forestry and fishing (NACE Rev. 2 section A) and public administration and defense; compulsory social security (NACE Rev. 2 section O).

[98] Authors' calculations, see Webpage with restructuring costs

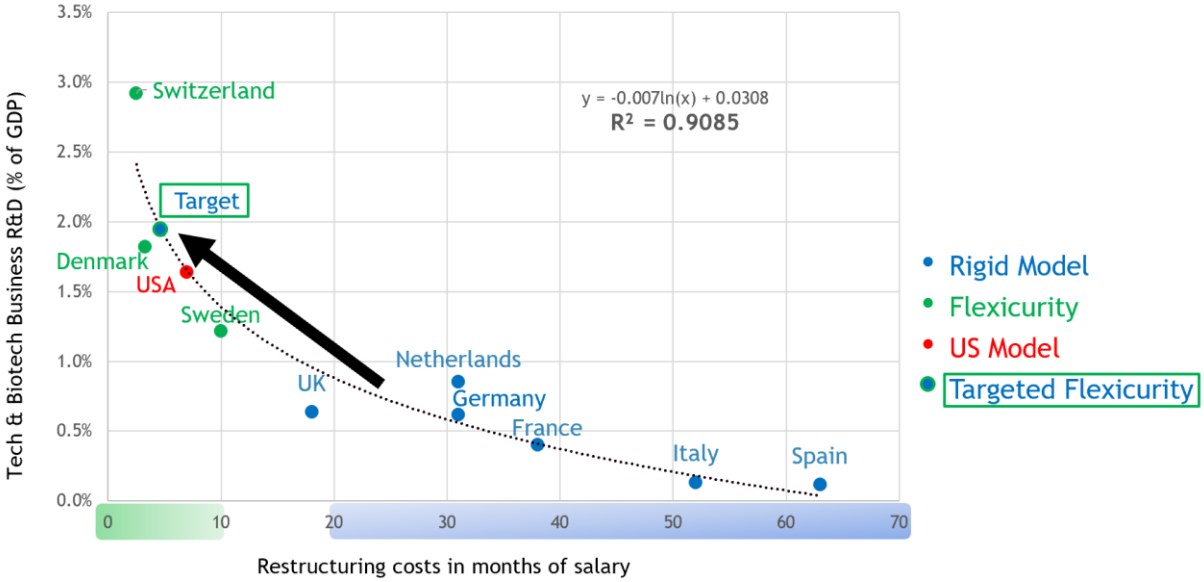
Salaries in Germany compared to American tech salaries



Source: Eurostat, author's calculations

In summary, we estimate that European countries can close their gap in disruptive innovation by implementing targeted flexicurity without endangering the European social model. Taking the example of Germany, we show that reducing restructuring costs from 31 months of salaries today to 3 months should boost R&D in tech and biotech from 0.6% of GDP today to Denmark's and U.S. levels, above 1.5%. The same applies to the UK, France, Italy or the Netherlands.

Expected impact of targeted flexicurity on German R&D in tech and biotech



Source: authors' calculations[99]

6.4. Macroeconomic impact and social justice

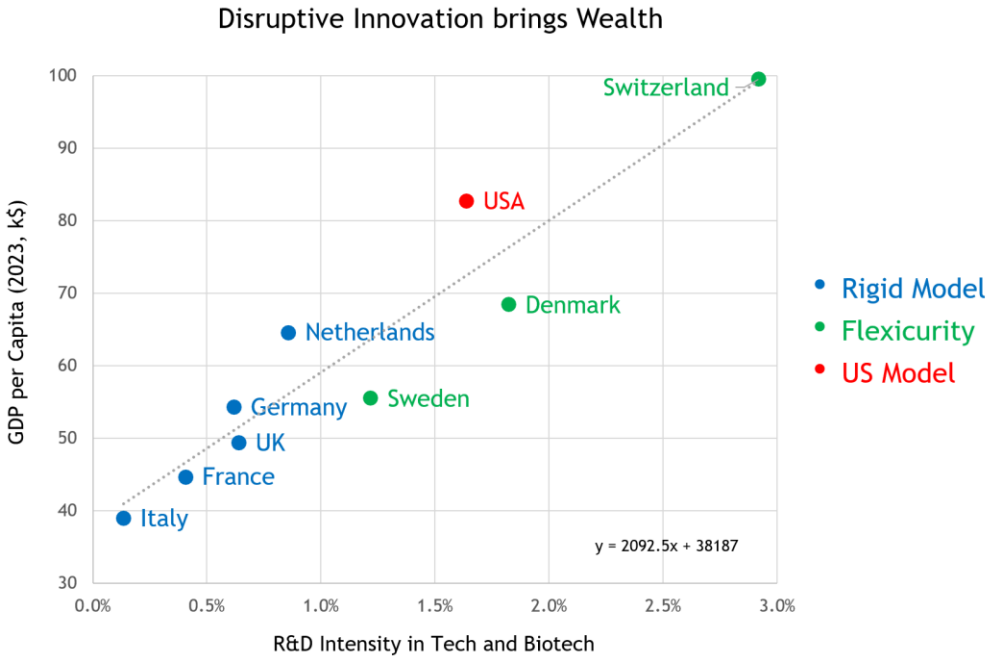
The European Central Bank and the Draghi report both highlight that Europe's underinvestment in technology largely explains its relative productivity decline—estimated at 20% compared to the United States over the past 30 years.

In the medium term, productivity trends closely mirror GDP per capita, meaning that Europe's innovation gap is directly linked to a 20% shortfall in GDP per capita relative to the U.S. This assumption can now be tested using our recent data on European countries that have successfully sustained high levels of disruptive innovation.

Using Germany as a benchmark, we immediately observe that the *flexicurity* countries have significantly higher GDP per capita levels: 86% higher in Switzerland and 29% higher in Denmark.[100]

The innovation lag in disruptive sectors has been the cause of a growing gap in growth and wealth between Europe and the United States in the last few decades. The correlation between disruptive innovation, productivity and wealth (measured in GDP per capita) appears very strong, as shown on the graph below:

[99] See Section 2
[100] Source: https://data.worldbank.org/indicator/NY.GDP.PCAP.CD



Source: Scoreboards, World Bank, authors calculations

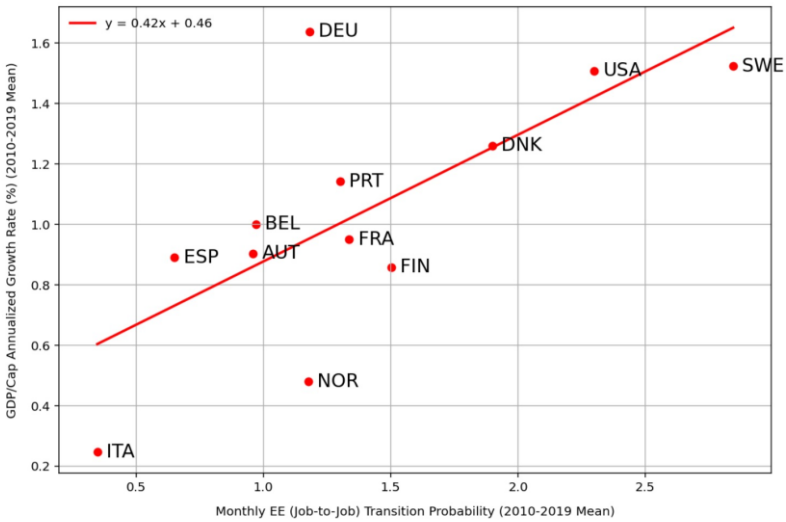
This graph illustrates Mario Draghi's main conclusions on the relation between tech and growth: "Across different metrics, a wide gap in GDP has opened up between the EU and the US, driven mainly by a more pronounced slowdown in productivity growth in Europe. Europe's households have paid the price in foregone living standards. On a per capita basis, real disposable income has grown almost twice as much in the US as in the EU since 2000. [...] Technological change is accelerating rapidly. Europe largely missed out on the digital revolution led by the internet and the productivity gains it brought: in fact, the productivity gap between the EU and the US is largely explained by the tech sector. The EU is weak in the emerging technologies that will drive future growth." [101]

But the graph also shows that European countries with flexicurity have managed to maintain investment into disruptive innovation and have therefore provided higher standards of living to their households.

As highlighted by the ECB, growth is also a function of workers' mobility, itself related to the level of EPL flexibility:

[101] (Draghi, 2024)

Job-to-job transition rates vs. GDP per capita growth



Source: Schoefer (2025)[102]

If our proposed reform were to raise R&D investment in disruptive innovation to the levels seen in Sweden or Denmark—around 1.5% of GDP—and created a productivity boost, we could hope to close the GDP gap. If the European Union could, over time, increase its GDP by about 35%, salaries would jump up significantly as well, by almost the same amount,[103] resulting in renewed prosperity for the European middleclass.

Similarly, a 20% increase in GDP would translate into approximately €400 billion in additional annual tax revenues for Germany and €300 billion for France—enough to sustainably fund their education, pension, and healthcare systems, not mention reduce taxes.

This brings us to a second important perspective when evaluating the macroeconomic impact of our proposed reform: its effect on social cohesion and social justice. European countries have a strong political demand for equity, which sets them apart from the United States.

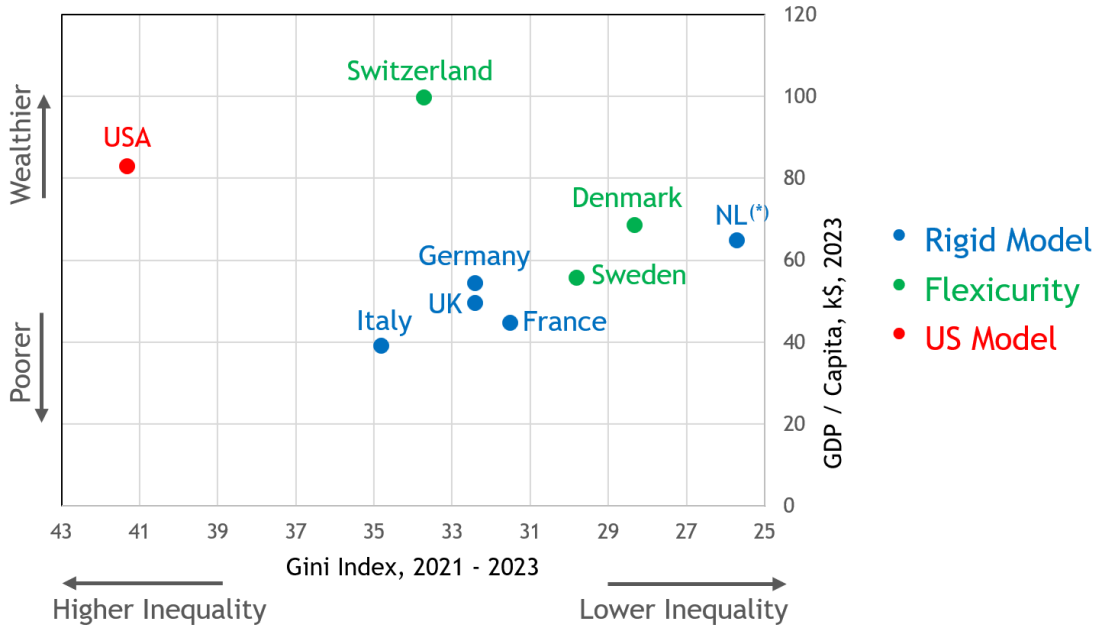
It is well documented that inequalities in multiple dimensions, including income, wealth and mobility are much higher in the United States. For example, the United States has a Gini coefficient of 0.40 in disposable income,[104] significantly higher than in most European countries, which generally fall between 0.20 and 0.35.[105]

[102] (Schoefer, 2025)
[103] In reality, such a regime shift couldn't happen without a change in the share of labor in GDP. Currently, the labor share of GDP is about 63% in Germany, lower in the U.S. (60%) and in Denmark (58%), higher in Switzerland (68%) – source: https://ourworldindata.org/grapher/labor-share-of-gdp
[104] A Gini coefficient of 0 means complete equality, a coefficient of 1 complete inequality.
[105] (OECD, 2024)

It is therefore legitimate to ask whether the reform we propose would lead to greater inequality, as observed in the United States. This concern is often the main objection raised when such reforms are discussed, as any policy perceived to increase inequality would be widely rejected across European societies.

This is precisely why the following chart is particularly revealing: it plots GDP per capita on the vertical axis—as a proxy for standard of living—and the Gini coefficient of disposable income on the horizontal axis—as a proxy for social cohesion. Denmark, with a Gini coefficient of 0.28, exemplifies a country that combines high level of redistribution with robust collective social protection.

GDP per Capita and Gini Index[106]



Source: World Bank

Note: Netherlands has a dual system: 2/3 of employees have rigid contracts, 1/3 temporary contracts

What the chart shows is that the flexicurity countries combine higher standards of living and higher social justice. Far from bringing Europe closer to America, the suggested reform would lead towards European social models that provide more social justice than the current German, French or Italian systems.

We are not asserting causality here, nor attempting to draw an artificial link between flexicurity and social justice. But we offer plenty of evidence that greater disruptive

[106] The World Bank defines its *Gini Index* as the Gini coefficient on disposable income or consumption

innovation leads to higher productivity, which drives economic growth, delivers higher salaries and can generate additional tax revenues.

How revenues are taxed and redistributed remains a national choice. Switzerland, for instance, reflects a collective preference for greater overall wealth and a level of social justice comparable to that of Germany. Denmark, by contrast, prioritizes slightly less wealth in exchange for even greater social justice—yet it still outperforms Germany and France on both counts.

We expect that, leveraging the flexicurity model proven in Denmark, Sweden or Switzerland, the other European countries will both become wealthier and provide better social justice.

Conclusion

Innovation advances through abrupt transitions, and success depends on rapid redeployment of capital and talent.

Our cross-country measures of restructuring costs, together with a calibrated firm model, indicate that high EPL-related restructuring costs make investment in disruptive innovation such as tech and biotech systematically less attractive, even as they matter little in mature industries. This institutional friction helps explain Europe's current innovation lag.

Exactly forty years ago, Herbert Giersch, the German economist who coined the term "Eurosclerosis", was already observing that, "in the final analysis, Europe's weakness is not technological but institutional".[107]

Closer to us, the importance of institutions has been abundantly emphasized by Acemoglu, Johnson & Robinson,[108] among many others. Do we want institutions that essentially divert capital from high risk and high reward industries, and prioritize underperforming industries? Or do we want proactive institutions that boost creative destruction for highly qualified and well-paid populations? To the extent that European Employment Protection Laws are providing the wrong type of protection for top earners and are preventing the kind of swift corporate turnovers needed to promote disruptive innovation, we need to change them.

A focused remedy is targeted flexicurity: retain existing protections for 90% of workers but modernize rules for the top earners to enable faster hiring, separation, and redeployment, paired with strong unemployment benefits and active labor policies. In settings we study, systems that approximate this design achieve both stronger growth and robust social cohesion. It would bring the major impact on innovation that Europe needs to avoid the "slow agony" predicted by Mario Draghi.

Europe's choice, then, is not between protection and innovation, but among institutional designs that differentially shape the costs of adjustment. Implementing targeted flexicurity would position European firms to capture the current AI and robotics wave while upholding the continent's commitment to social justice.

Discussions on this important topic have started at the European Commission as part of the ongoing project on the 28th regime. Debates are also needed at the national levels; large scale firm-level surveys are vital, and more academic work is required. Time for action!

[107] (Giersch, 1985)
[108] (Acemoglu, Johnson, & Robinson, 2002)

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Appendix 1: volatility analysis per sector

Sector	Volatility
Pharmaceuticals & Biotechnology	29%
Alternative Energy	25%
Real Estate Investment & Services	25%
Life insurance	24%
Financial Services	24%
General Retailers	23%
Oil & Gas	22%
Software & Computer Services	22%
Mining	21%
Travel & Leisure	21%
Technology Hardware & Equipment	19%
Electronic & Electrical Equipment	18%
Industrial Metals & Mining	17%
Leisure Goods	17%
Health Care Equipment & Services	17%
Mobile Telecommunications	17%
Industrial Engineering	15%
Industrial Transportation	15%
Automobiles & Parts	15%
Media	14%
Electricity	14%
Aerospace & Defence	14%
Chemicals	14%
General Industrials	14%
Equity Investment Instruments	14%
Support Services	14%
Personal Goods	13%
Construction & Materials	13%
Gas, Water & Multiutilities	13%
Banks	12%
Transport	12%
Forestry & Paper	12%
Beverages	11%
Food Producers	11%
Tobacco	11%
Food & Drug Retailers	11%
Household Goods & Home Construction	11%
Fixed Line Telecommunications	9%
Nonlife Insurance	7%
Grand Total	19%

Appendix 2: Revenues and R&D per sector

Sectors	R&D (meuros)	Revenues (meuros)	R&D / Revenues
Automobiles & Parts	185,302	3,867,148	5%
Oil & Gas Producers	13,177	3,185,357	0.4%
Technology Hardware & Equipment	199,470	1,908,140	10%
Software & Computer Services	241,350	1,702,272	14%
Electronic & Electrical Equipment	87,839	1,578,369	6%
Construction & Materials	32,940	1,404,719	2%
Pharmaceuticals & Biotechnology	231,791	1,265,511	18%
Chemicals	24,893	1,048,641	2%
Industrial Metals & Mining	11,634	661,611	2%
Industrial Engineering	21,547	659,277	3%
Health Care Equipment & Services	26,292	649,451	4%
General Industrials	20,239	643,806	3%
Food Producers	8,005	541,840	1%
Personal Goods	7,239	532,783	1%
Aerospace & Defence	20,702	509,063	4%
Banks	14,668	501,715	3%
Electricity	4,320	472,378	1%
Fixed Line Telecommunications	6,094	398,057	2%
Household Goods & Home Construction	9,272	313,493	3%
Leisure Goods	20,374	311,378	7%
Mobile Telecommunications	12,152	278,263	4%
Mining	3,009	268,231	1%
Gas, Water & Multiutilities	1,873	268,077	1%
General Retailers	11,817	210,495	6%
Travel & Leisure	7,725	203,830	4%
Beverages	1,866	185,416	1%
Support Services	6,120	152,102	4%
Food & Drug Retailers	2,814	117,607	2%
Financial Services	5,555	106,864	5%
Tobacco	1,602	103,295	2%
Industrial Transportation	2,324	86,857	3%
Real Estate Investment & Services	2,850	82,106	3%
Alternative Energy	2,875	74,555	4%
Media	5,345	72,276	7%
Oil Equipment, Services & Distribution	1,513	68,514	2%
Forestry & Paper	717	37,808	2%
Nonlife Insurance	138	3,681	4%
Total	1,257,442	24,474,988	5%

Appendix 3: Revenue Volatility per sector in main countries

	Revenue Volatility	Number of Companies
All countries		
Pharmaceuticals & Biotechnology	29%	674
Software & Computer Services	22%	565
Technology Hardware & Equipment	19%	468
Electronic & Electrical Equipment	18%	366
Automobiles & Parts	15%	276
Aerospace & Defence	14%	77
Chemicals	14%	197
Construction & Materials	13%	111
USA		
Pharmaceuticals & Biotechnology	36%	350
Software & Computer Services	24%	300
Technology Hardware & Equipment	21%	192
Electronic & Electrical Equipment	19%	75
Aerospace & Defence	17%	26
Automobiles & Parts	17%	46
Chemicals	15%	49
Construction & Materials	11%	9
Germany		
Technology Hardware & Equipment	16%	7
Pharmaceuticals & Biotechnology	15%	23
Aerospace & Defence	15%	3
Electronic & Electrical Equipment	15%	16
Chemicals	13%	13
Software & Computer Services	11%	20
Automobiles & Parts	10%	29
Construction & Materials	9%	4
China		
Pharmaceuticals & Biotechnology	27%	62
Electronic & Electrical Equipment	24%	96
Chemicals	23%	30
Software & Computer Services	23%	80
Automobiles & Parts	20%	54
Technology Hardware & Equipment	20%	70
Construction & Materials	17%	38
Aerospace & Defence	13%	8

Japan

Aerospace & Defence	14%	1
Pharmaceuticals & Biotechnology	14%	42
Electronic & Electrical Equipment	12%	49
Technology Hardware & Equipment	12%	29
Automobiles & Parts	11%	58
Chemicals	11%	45
Software & Computer Services	10%	12
Construction & Materials	10%	20

Appendix 4: revenue profiles in Germany and in the USA

Sectors		Growth	Decline	Decline Ratio
Pharmaceuticals & Biotechnology	USA	30%	-35%	41%
	Germany	14%	-14%	34%
Software & Computer Services	USA	20%	-9%	25%
	Germany	10%	-8%	32%
Technology Hardware & Equipment	USA	20%	-12%	44%
	Germany	13%	-17%	31%
Electronic & Electrical Equipment	USA	16%	-11%	38%
	Germany	11%	-12%	27%
Aerospace & Defence	USA	11%	-11%	35%
	Germany	13%	-4%	21%
Automobiles & Parts	USA	12%	-12%	44%
	Germany	11%	-9%	32%
Chemicals	USA	11%	-10%	43%
	Germany	11%	-12%	38%
Construction & Materials	USA	5%	-6%	41%
	Germany	9%	-9%	31%

Authors

Yann Coatanlem is an economist and entrepreneur.

A co-founder of GlassView, the inventors of Neuro-Powered Media™, he was previously head of several research departments at Salomon Brothers and Citigroup. He is currently the Chief Executive Officer of DataCore Innovations LLC, a Fin Tech start-up specialized in "antifragile" investment strategies.

Member of the board of the Paris School of Economics, he is the co-author of "Capitalism against Inequalities" (PUF, 2022), that received the "Prix Turgot" in 2023 and the "Prix Louis Marin" of the French Academy for Social Sciences *("l'Académie des sciences morales et politiques")*. In 2018, he received from the same Academy the Special Prize of the Political Economy, Statistics and Finance section for his book "The government of citizens" (PUF, 2017), as well as for the work he has accomplished at the Club Praxis, the think tank of which he is president, and that promotes the use of Big Data in policy making, in particular in revamping the tax and welfare system.

Yann Coatanlem was part of a Commission of economists appointed in 2016 by the "*Académie des sciences morales et politiques*", along with Olivier Blanchard and Thomas Philippon, to make recommendations on the teaching of Economics in High School. He is also a French Trade Advisor and head of an economic mission on France attractiveness in collaboration with Business France and the French Embassies in the United States, Canada and Mexico.

He graduated from ENSIMAG and HEC Paris. He is a recipient of the French National Order of Merit and of the Gold Medal of *La Renaissance Française*.

More at https://fr.wikipedia.org/wiki/Yann_Coatanlem

Oliver Coste is an entrepreneur and a corporate executive of the tech industry.

After working at the European Commission (DG Competition, then Cabinet of Commissioner de Silguy), he joined the office of the French Prime Minister Lionel Jospin, where he worked namely on the transformation of Airbus into an integrated company. He worked for Alcatel-Lucent where he managed several activities with pan-European or worldwide presence and created a mobile television business which acquired customers in Europe, the USA and India. He co-founded and managed a video chat startup for e-commerce, which was adopted by Microsoft and IBM in the USA and by SoftBank in Japan. He led an Atos division in the US, acquiring a major public safety 9-1-1 contract with the state of California. He advised a leading West Coast integrator designing, building and managing AI supercomputers for Meta and other players in Gen AI. Throughout all these experiences, he had to cope with both rapid growth and rapid decline of tech activities.

Oliver Coste is the co-founder and President of the Foundation for the Economic Study of Disruptive Innovation (fesdi.org) and of the Fonds pour l'Etude Economique de l'Innovation de Rupture (feeir.org).

He has lived in New York since 2014. He published "Europe, Tech and War" in 2023 (Strasser Prize by France's Académie des Sciences Morales et Politiques). He authored "La double surprise des télécoms" in Commentaire in Spring 2012, co-authored "Tech : quand l'Europe s'éveillera" in Commentaire in December 2023 and "Cost of failure and competitiveness in disruptive innovation" by Bocconi University in September 2024.

He graduated from Ecole Polytechnique and Corps des Mines.

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Any errors are the fault of the authors.

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