Labor Force Growth and Firm Dynamics in Europe

Elena Casanovas*

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Abstract

Firm entry has declined in Europe in parallel with the United States. For the U.S., Hopenhayn, Neira, and Singhania (2022) attribute the decline to slower labor force growth. I show that the same explanation holds in Europe. Using a new dataset on firm dynamics for twelve European economies, I compute the entry rate that labor force growth implies from firm age profiles of size and survival, which pin down firm entry without solving a structural model. The predicted entry rate tracks the data in Europe as closely as in the United States, with a root mean squared error of 0.7 percentage points for the EU aggregate against 1.6 for the U.S., suggesting that firm creation in Europe responds to the same demographic forces. Unless its labor force grows faster, Europe's entry rate is likely to stay near its historical low.

JEL codes: E24, J11, L26, M13. **Keywords:** firm entry, business dynamism, labor force growth, firm dynamics, Europe.

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1 Introduction

Business dynamism, the pace at which firms enter, grow and exit, is often thought of as one of the signs of the health of an economy. In the United States it has been declining since the 1980s, and a large literature has documented this fall and debated its causes and consequences (Decker et al., 2016; Pugsley and Şahin, 2019). Of the explanations proposed, some are on the production side: scale economies and a rise of fixed costs that favor top firms (Hsieh and Rossi-Hansberg, 2023), regulations that harm entry and growth for small firms (Gutiérrez and Philippon, 2019), or a decrease in the diffusion of knowledge (Akcigit and Ates, 2023). Others are demographic: older workers move less between jobs and start fewer firms (Engbom, 2019); older consumers are less likely to try new products, which makes entry harder (Bornstein, 2021); and, with slower labor force growth, fewer workers are left for new firms to hire (Karahan et al., 2024; Hopenhayn et al., 2022; Peters and Walsh, 2021). The origin of the decline matters for policy. Production-side explanations tend to identify frictions that policy can remove. The demographic explanation instead interprets the decline in dynamism as a natural consequence of slower population growth, which may not call for policy intervention.

A similar decline has taken place in Europe. OECD reports document falling entry rates in the large European economies since the early 2000s (Criscuolo et al., 2014; Calvino et al., 2020), and single-country studies find the same trend for Belgium, Germany and the UK (Bijnens and Konings, 2020; Deutsche Bundesbank, 2024; Lui et al., 2020). At the same time, productivity in Europe has fallen behind that of the United States. A view that is gaining traction, inspired by the Draghi report and by a nascent academic literature in this area, is that Europe's firms are underperforming relative to their U.S. counterparts (Draghi, 2024). Under this perspective, declining business dynamism is one more symptom of Europe's economic weakness: firms do not enter, grow and compete as well as their U.S. counterparts. Whether this hypothesis holds for firm entry can be checked: is entry in Europe falling for the same reasons as in the United States, or for reasons that are specific to Europe?

I test the demographic explanation of Hopenhayn et al. (2022), HNS henceforth. In their model prices adjust so that, in equilibrium, incumbents hire and exit independently of the labor force. Entry is therefore the only margin that absorbs labor force growth: when there are fewer workers available, fewer firms are born. With this as its only time-varying input, their model reproduces the rise and fall of U.S. entry since the 1950s. The exercise can be repeated for other countries: the labor force, its main input, is observed for every economy, the remaining inputs can be measured from firm statistics; and the predicted entry rate can be compared with the measured one. I apply their framework to Europe using Eurostat firm dynamics data that I harmonize for this purpose. If the entry rate predicted for each European economy tracks the observed one, firm entry responds to the same forces on both sides of the Atlantic and the explanation that HNS establish for the U.S. holds more generally. If it does not, something specific to Europe may be at play.

Part of the reason why this is an open question is that firm dynamics data for Europe are fragmented: no single public source covers all employer firms, recording entry, exit and size, for many countries over a long period. In the U.S., most of the research in this area uses the Business Dynamics Statistics (BDS), a public dataset from the Census Bureau with firm entry, exit and size by age for every employer firm since 1978. Europe has no clear equivalent, and most of what we know comes from sources that

cover only part of the firms, countries or years.

For this paper I harmonize Eurostat's business demography data to be comparable with the BDS, and use them to test whether entry in Europe follows labor force growth as HNS find for the United States. The dataset parallels the BDS for Europe: for twelve European economies and an EU aggregate, it measures employer firms, their entry, exit and size, and firm size and survival by age, with the BDS definitions, so that Europe and the U.S. can be compared directly. Eurostat publishes the underlying data in the Business Demography Statistics. Turning them into BDS-comparable series involves counting only firms with paid employees and measuring their size in paid employees, linking the tables Eurostat has published in different periods into one series per economy, filling any remaining gaps with national statistics, and aggregating the twelve economies into one EU series. In Section 2 I explain how I transform them into a dataset that is comparable with the U.S. data.

With these data I compute, for each European economy, the entry rate that the HNS model predicts from the labor force. Doing so requires no structural model: in Section 4.2 I show that the entry prediction depends on the firm distribution only through two age profiles, firm size and survival by age. Given the labor force path and the two profiles, entry follows as an accounting identity. The dataset allows me to measure these profiles, so the exercise can be applied to every European economy without calibrating a structural model. The resulting entry rate is then compared with the data to assess how much of the European decline in entry rates is explained by trends in labor force growth. Therefore, in running this exercise I obtain results on two fronts: in the empirical trends the dataset reveals, and in the entry prediction for Europe. I summarize them below.

On the empirical side, the firm dynamics data for Europe reveal three facts. First, Europe has no entrepreneurship deficit: entry and exit rates in the large European economies are close to the U.S. ones, around 10% a year. Second, European entry and exit rates have declined during the last decades in parallel to the U.S., so the European decline is comparable to the phenomenon HNS explain for the United States. Third, European firms are smaller at every age: they are born smaller and the gap does not close with age. This size gap is within sectors, hence not driven by sector composition. That is, European firms are not smaller because they concentrate in low-productivity sectors such as hospitality; instead, their entrants are smaller in every sector. These findings are consistent with Bartelsman et al. (2005) and Criscuolo et al. (2014), who documented similar trends in firm size and entry and exit rates across countries for the 1990s and 2000s. Section 3 describes these empirical facts in detail.

On the prediction side, explaining European entry with the labor force alone, as HNS do for the United States, yields three results. First, the mechanism also holds in Europe: given each economy's labor force path, the predicted entry rate matches the observed one about as well as in the U.S. The root mean squared error of the prediction is 1.55 percentage points for the U.S., 0.68 for the EU aggregate, and below 2 points in nine of the twelve economies. Second, adjusting the labor input for the labor that private firms do not use, accounting for unemployment, public sector workers, and part-time employment, raises the correlation between predicted and observed entry to the U.S. level or above in half of the economies and in the EU aggregate, without increasing the error. Third, the prediction underperforms the most in the economies the 2008 crisis hit hardest, such as Spain and Italy. In these countries, the crisis shifted the firm profiles. In the model these depend on firms' costs and

productivity, not on the labor force, so with the labor force as the only moving input they stay fixed over time. Since the crisis shifted them, the labor force alone cannot account for entry. Taken together, the results argue against a European exceptionalism in firm creation: Europe creates firms at U.S. rates, and its entry rate responds to labor force growth the same way the U.S. one does. These results are discussed in Section 5.

In addition, extending the model prediction into the future, I project European dynamism under three scenarios for the labor force. I find that if the EU labor force keeps growing at its current pace, entry is likely to stay close to its historical low for the foreseeable future. If it grows at a faster pace, the pace of the 2014–19 recovery, entry will return to its historical maximum. If, however, firms scale up faster than the labor force grows, entry will fall, because growing firms absorb the workers that would otherwise have been employed by entrants. Closing the firm-size gap with the United States and sustaining entry are therefore in tension: policies that scale up European firms are likely to lower entry unless labor force growth rises substantially. Section 6 presents these projections.

The contribution of this paper is threefold. First, it harmonizes Eurostat's business demography tables, completed with national statistics, into a dataset of employer firms, their entry, exit and average size, and their size and survival by age up to age five, for twelve European economies and an EU aggregate, following the BDS definitions so that Europe and the U.S. can be compared directly. Second, it shows that the demographic explanation of the U.S. decline in entry holds in Europe, which argues against European exceptionalism in the drivers of firm creation. It also projects this demographic explanation into the future and shows that European dynamism is at risk of stagnating at a historical low unless trends in labor force growth dramatically change. Third, methodologically, it argues that the HNS framework can be easily extended to multiple countries because it does not require solving their structural model. I show that the model results can be produced with an accounting identity calibrated with observable data. This paper speaks to the debate on European competitiveness and the quality of European firms, showing that firm creation in Europe is at the levels of the U.S. and responds to the same forces, but there is a size gap between European and U.S. firms that is present at birth, does not close with age, and is not explained by sector composition.

The rest of the paper is organized as follows. Section 2 explains how the dataset is assembled and documents its comparability with the BDS. Section 3 presents the main empirical facts the data reveal. Section 4 presents the HNS framework and proves that the structural model can be bypassed using firm age profiles for size and survival. Section 5 runs the test in the twelve economies, introduces the labor-market wedge and measures the error between the prediction and the data. Section 6 projects entry twenty years into the future under three different labor force scenarios, and Section 7 concludes.

2 Data: a European firm-dynamics dataset

This section presents a European firm-dynamics dataset for twelve economies and an EU aggregate, assembled from public Eurostat tables and national sources, and harmonized with the BDS definitions. It includes the following variables: firms, employment, entry, exit and average firm size year by year, and firm size and survival by year and age, for each economy.

2.1 The U.S. Business Dynamics Statistics

The Business Dynamics Statistics (BDS) report firm entry, exit, employment and size for every U.S. employer firm since 1978, by age, sector, size class and state. They are the leading source for the study of firm dynamics, used to document the decline of dynamism in the U.S. (Decker et al., 2016), its link to population aging (Karahan et al., 2024; Hopenhayn et al., 2022; Engbom, 2019; Bornstein, 2021; Peters and Walsh, 2021), to firm demographics (Pugsley and Şahin, 2019), the role of young firms in job creation (Haltiwanger et al., 2013), the scars that recessions leave on the firm cohorts born in them (Sedláček and Sterk, 2017), and the debate on the causes behind the decline of business dynamism (Akcigit and Ates, 2023), among others.

The U.S. Census Bureau builds the BDS from the Longitudinal Business Database, a register of every nonfarm private establishment with paid employees. A firm is thus included in the data if it has at least one paid employee, and its size is measured as the number of its paid employees. Therefore, a dataset that is comparable to the BDS needs to have the following characteristics: (a) cover every employer firm in the nonfarm private economy; (b) include firms, employees, births and deaths, and entry and exit rates, year by year and by firm age; (c) count all firms with employees, which excludes firms without payroll, in particular unincorporated self-employed workers without employees; (d) count the number of paid employees, so owners are counted only if they pay themselves a wage; (e) consider that a firm is born in the first year it records employment and dies the last year it does; (f) measure entry and exit rates dividing each flow by the average of the two yearly stocks they connect, as in Davis et al. (1996).

The available European datasets have only some of these characteristics. CompNet harmonizes firm-level data across most EU countries, but its main sample covers firms with twenty employees or more and so cannot measure entry and exit (Biondi et al., 2023); the OECD's DynEmp harmonizes business demography across countries, but covers 2000 to 2015 and leaves out Germany and the UK from its main sample (Calvino et al., 2020); single-country administrative data cover every firm over long periods, but one country at a time (Bijnens and Konings, 2020); and datasets of listed firms and funded start-ups, such as Compustat, Orbis and Crunchbase, give firm-level details, but only for firms at the top of the sales distribution (Becker et al., 2026; Reichardt and Reis, 2026). None of them provides a long series of entry, exit and size that covers every employer with a firm definition comparable to the BDS.

2.2 A BDS for Europe from Eurostat

Eurostat, the statistical office of the European Union, publishes data on the demography of firms in every member state. The data are harmonized and aggregated, and come originally from national statistical institutes. Like the BDS, the data come from administrative sources, not from surveys: business registers, tax records, social-security records and company registers. They are also public.

Eurostat publishes business demography in several groups of tables, with different disaggregations and time coverage. No single one of them follows the BDS definitions over a long period of time, but they can be combined to reconstruct them. The groups of tables are: (a) legal-form tables (1997 to

2020), which disaggregate the data by the legal form of the firm, into sole proprietors, partnerships and limited liability companies; (b) size-class tables (2008 to 2020), which disaggregate the data by the size class of the firm, into firms with zero, one to four, five to nine, and ten or more employees; (c) employer tables by legal form and by size class, which, like the BDS, count only firms with at least one employee, and disaggregate the data by the same three legal forms and by the same size classes, except the 0-employee class. They exist from 2012 in most economies, and earlier in five (2004 in Austria, 2007 in the Netherlands, 2008 in France, Italy and Spain), and run to 2020. Finally, there are (d) two tables introduced in 2021, a legal-form table and an employer table by size class, with a wider sector coverage and with more recent years.

Eurostat covers the business economy of the EU member states, Norway, Switzerland and, until 2019, the United Kingdom. It reports active firms, births, deaths and the survivors of each birth cohort up to age five, each with its employment. The employer tables count employer firms, and the size-class tables report firms without employees as a separate class; the legal-form tables, the longest, count all firms. Every table reports both persons employed and paid employees. The employer tables date births and deaths by the first and last year with a paid employee, as the BDS does; the other tables date them by activity. Together, these tables allow the construction of variables harmonized with the BDS.

The dataset draws on seven Eurostat tables, one main table per period (Table 1). Before 2008, starting in 1997 in the earliest case, only the legal-form tables exist, and they mix firms with and without employees. The firms without employees are removed using the share of employers in each legal form, which the employer tables show from 2012 and which is stable over time. The adjustment is large: employers are a minority of sole proprietors, about half of partnerships and, in most economies, 60 to 80% of limited liability companies. Employees need no such adjustment, since firms without employees have none; where the legal-form tables report only persons employed, the owners are netted out (Appendix A.1). From 2008 until the employer tables begin, the size-class table reports firms without employees as a separate class, which I remove from the counts to obtain BDS-like measures of firms, births, deaths and employees. From 2012 to 2020 every variable comes from the employer table by size class, which is directly comparable to the BDS. From 2021, the data come from the 2021 version of the employer table by size class for the ten economies it covers. National registers are used to complement Eurostat, extending the series back in three economies (BE, ES and NO) and continuing them where Eurostat stops in three others (UK, IE and CH) (Table 1). In all cases, entry and exit rates are computed with the BDS denominator, and any breaks in the series are corrected as described below.

Years	Main Eurostat table	Auxiliary sources
1997–2007	All-firm table by legal form	Employer table by legal form; national registers for France, Spain, Belgium and Norway
2008–2011	Employer table by size class	All-firm table by size class; Belgian register
2012–2020	Employer table by size class	Belgian and Dutch registers; UK and Irish registers from 2019
2021–2023	Employer table by size class, 2021 version	National registers for the UK, Switzerland, Spain, Belgium, Ireland and Norway

Table 1: *Eurostat tables behind the dataset, by period.*

Notes: Eurostat's names and codes in Table A1; national registers in Table A3.

Firm size and survival by age come from the size-class tables, which also report, for each birth cohort, the firms still active and their persons employed (employees plus owners) at ages one to five. Survival is computed as the share of a cohort still alive at each age, and firm size the employees per survivor, netting out the owners which are measured on employer births. These series start in 2008, or in 2012 where only the employer table counts employer firms, and are checked for stability across cohorts; the BDS reports the same objects by single year of age to five and in age bands beyond. Appendix A.1 gives the sources by economy.

Two kinds of breaks remain within a table after the linking, and both are corrected. The first is a reclassification: in some years, firms without employees are classified as employer firms due to legal re-definitions, which artificially inflates the stock and the births without any new firm. These years show up as a jump in the employer tables that the all-firm tables do not share, concentrated in partnerships and sole proprietorships (Germany in 2014, Poland in 2015 to 2017). The second is a change of source or method, which Eurostat flags. I avoid these years when linking two tables. Every series is then checked against the stock-flow identity, which guarantees that in each year the number of firms equals last year's firms plus births minus deaths. In the published tables the residual of the identity allows me to identify the breaks above (Table A5). Appendix A.1 documents the corrections economy by economy (Tables A3 and A4).

National sources are used to fill the gaps left by Eurostat. The United Kingdom stops in 2018 and Switzerland in 2020, but data are available in the ONS's business demography and in the Federal Statistical Office's enterprise statistics, respectively. Norway, Spain and Belgium have short Eurostat series, which can be extended using their national employer registers: Statistics Norway's employer tables from 2002, Spain's DIRCE from 1998, and Belgium's DynaM from 2007. Ireland's register changes in 2019 to one built from payroll records, with many more firms; the series keeps the level of the old register and follows the growth of the new one. In every case the national series uses the employer-firm definition and is chained to the Eurostat level in the overlapping years, so the definitions are unchanged; Appendix A.1 gives the details by country.

In addition to the country by country data, I create an EU aggregate: a single series for the twelve countries taken together, interpreted as one economy, in the same way the U.S. is a union of fifty heterogeneous states. It runs from 2005 to 2023 for entry and exit and from 2004 for firm size (Table 2),

and it is the series the paper uses whenever Europe is set against the U.S. as a whole. It is constructed by chain-linking the twelve economies into one series, so that countries entering or leaving the panel do not create artificial oscillations: the level moves only with the yearly changes of the countries that report data in both years, not with changes in the composition of the panel. The level of each series is anchored to the first year in which all countries report data (2014). Hence, entry and exit rates evolve according to changes of the individual country rates, weighted by the number of firms in each country. Counts and average firm size are reported only in years when the entire panel is available, so that they do not change mechanically when countries enter or exit the panel.

	Years
EU aggregate	2005–2023
United Kingdom	1998–2024
Spain	1999–2024
Italy	2002–2024
France	2004–2023
Germany	2005–2023

Table 2: *Years covered by the series, EU aggregate and the five largest economies.*

Notes: years of the entry rate; the exit rate and firm size by economy in Table A6.

This EU aggregate covers the firm dynamics series: firms, entry and exit rates, and average firm size. All other inputs of the analysis, the labor force, the age profiles and the components of the labor-market adjustment, are aggregated with the same principle: each country weighted by its size in the variable. Labor-force growth is the average of country growth rates, weighted by labor force (Section 5.1); firm size and survival by age, on which the EU profiles are fitted, are firm-weighted averages of the country values at each age (Section 4.3); and unemployment and public employment are the sums of the individual countries, and hours per worker an employment-weighted average (Section 5.3).

Figures 1 to 3 illustrate the effect of the harmonization for the EU aggregate and the six largest economies. They show entry rates and average firm size as they are published in Eurostat along with the version I build for the dataset. The series in the Eurostat tables tend to be considerably shorter than in the dataset. The all-firm table, which is the longest, includes firms without employees, which makes it not comparable with the U.S. data. In addition, the employer tables, which remove 0-worker firms, show the breaks described above. The dataset follows the employer tables where they exist and extends them with the other tables and the national sources. The remaining economies are in Figures A3 and A4, in Appendix A.2.

In two cases the dataset I build follows none of the published Eurostat lines, Belgium's entry rate and the Dutch firm size. Belgium's entry rate (Figure A3) is the inflow implied by the stock-flow identity, which says that the stock of firms should be equal to last period's firms, plus entry, minus exit. Exits here are measured as the stopping-employer rate of DynaM, the national employer register, times the stock. I do not use Eurostat's births and deaths for Belgium because they count only a fraction of the firms that gain or lose their last employee: births are about 4% of the stock in Eurostat and 11% in

DynaM. I keep Eurostat's stock of firms and replace its births and deaths for two reasons. First, the definition. The employer tables date births and deaths by the first and last year with a paid employee, so most employer entry and exit comes from firms that cross the one-employee threshold after they start or before they close. Belgium's employer table instead dates both by the start and the end of activity, which leaves these crossings out. Second, the stock-flow identity: Belgium's residual is the largest of the twelve economies (Table A5).

The Dutch firm size (Figure 3) counts the directors on payroll as employees and the director-only companies as employer firms, as the BDS does, using CBS's legal-form tables. This adds many one-person firms and lowers the average from 20 to 16.

The other visible feature of the figures is the distance between the all-firm table and the dataset. The gap is there both in the years before the employer tables begin, where the dataset is built from the all-firm table, and where the dataset is the employer table itself. The reason is that the all-firm table includes the firms without employees: the self-employed without staff and companies without employees. These firms are a large share of all firms, have their own birth rate and add no employees. As a result, the entry rate and firm size of the all-firm table are on a different level and follow their own trend.

France is the clearest example: between 2004 and 2020 its all-firm average size falls from 6.9 to 3.8 persons while employer firms and their employees do not change, because the number of firms without employees doubles, after the micro-entrepreneur regime of 2009, and so do all-firm births. Belgium, Norway and the Netherlands show the same pattern, with the increase in companies without employees in the first two and in the self-employed in the third. Germany is the opposite case: sole proprietors without employees fall while employer firms rise, so the all-firm size rises faster than the employer size.

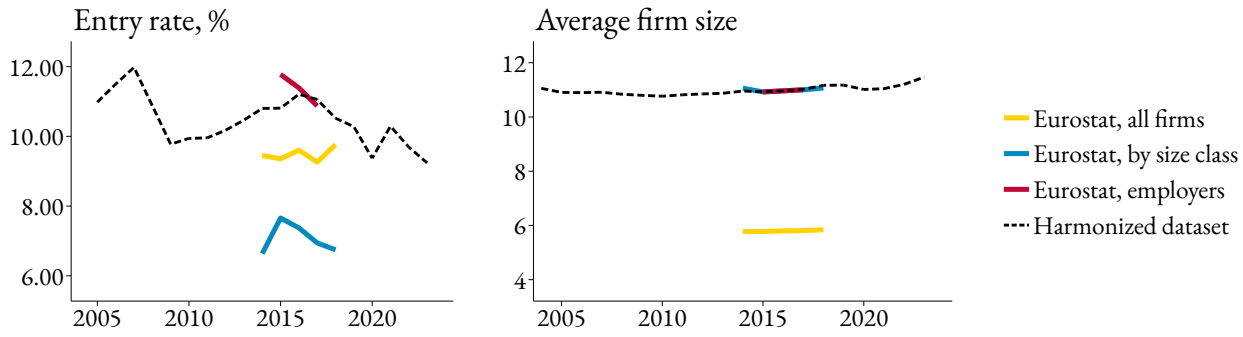


Figure 1: *Entry rate and average firm size in the harmonized dataset against the published Eurostat series, EU aggregate. The all-firm tables include firms with 0 employees; the size-class table is shown for firms with 1+ employees; the employer table counts only firms with at least one paid employee. The harmonized dataset aggregates the series of the twelve individual economies. Source: Eurostat.*

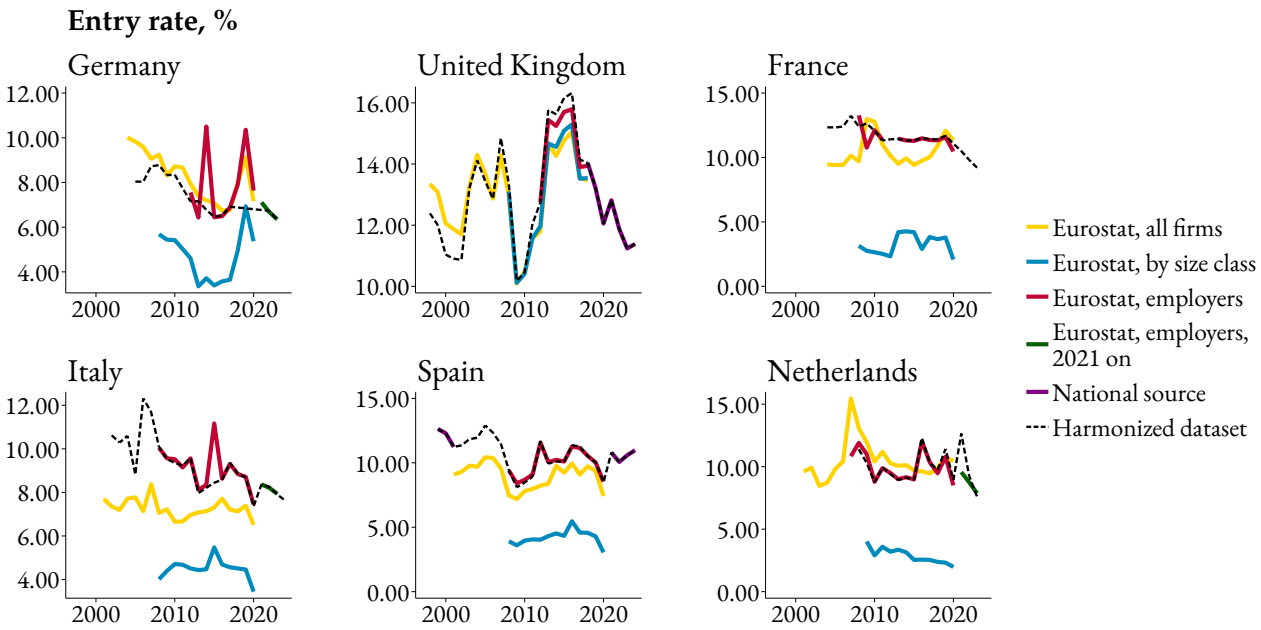


Figure 2: *Entry rate in the harmonized dataset against the published Eurostat series, six largest European economies. The all-firm tables include firms with 0 employees; the size-class table is shown for firms with 1+ employees; the employer table counts only firms with at least one paid employee. In the years no Eurostat table covers, the dataset follows the national sources, shown chained to the Eurostat level. The remaining economies are in Figure A3. Sources: Eurostat and national statistical offices.*

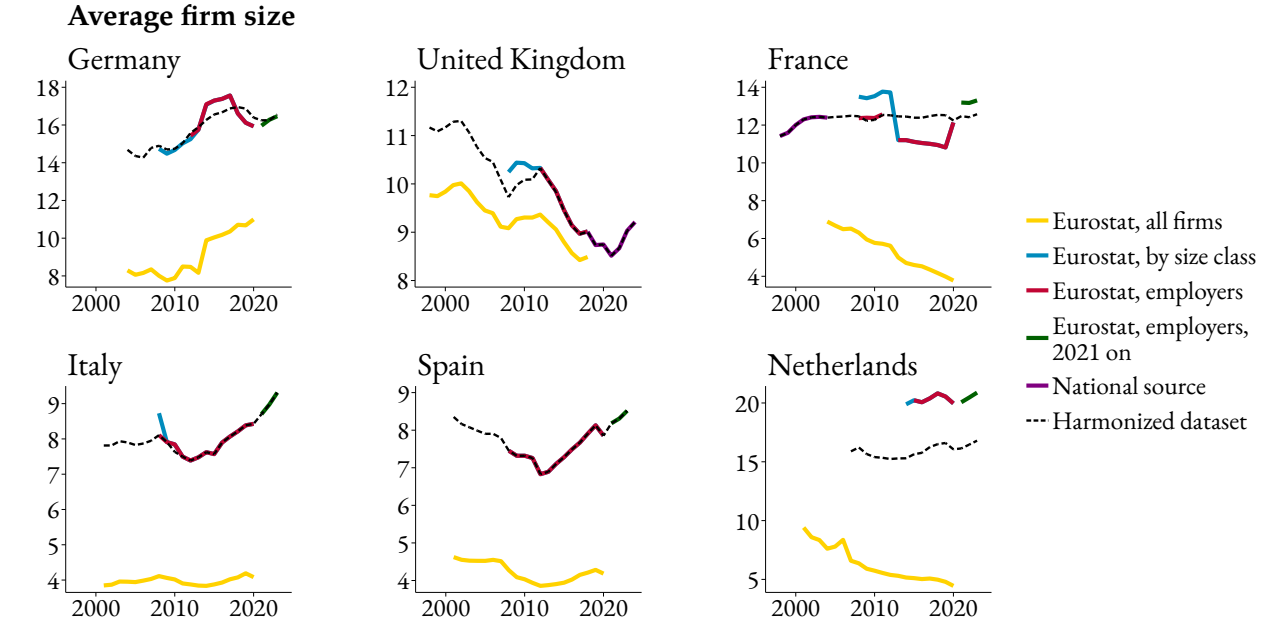


Figure 3: *Average firm size in the harmonized dataset against the published Eurostat series, six largest European economies. The all-firm tables include firms with 0 employees; the size-class table is shown for firms with 1+ employees; the employer table counts only firms with at least one paid employee. The all-firm tables report persons employed, owners included, and the other tables paid employees. The remaining economies are in Figure A4. Sources: Eurostat and national statistical offices.*

2.3 Comparability with the BDS

The dataset follows the BDS definitions wherever the Eurostat tables allow it.[1] Still, three differences cannot be removed. First, Eurostat counts enterprises and the BDS counts firms. The difference between the two units is small, and affects only a subset of all subsidiaries, the "autonomous" subsidiaries. An autonomous subsidiary is an acquired firm that keeps its autonomy. They are a small share of acquisitions, which in turn are a small share of the firm population. In the BDS such subsidiaries are counted as part of the acquirer, while in Eurostat they are counted as separate enterprises. Hence, a firm acquired by another that remains under the effective control of the acquirer is counted as part of the acquirer in the U.S. and as a separate firm in Europe.

Europe therefore counts slightly more firms than the BDS would, and its entry and exit rates and average firm size are slightly under-measured relative to the U.S. The difference barely moves the aggregates: closing just one worker of the size gap between European and U.S. firms would require that 8.3% of European firms were in fact autonomous subsidiaries of another firm. In the four economies where Eurostat's enterprise-group statistics allow me to quantify them, all subsidiaries, autonomous or not, are between 1 and 9% of employer firms, and foreign-controlled firms under 1 to 6% in the ten economies that report them. Autonomous subsidiaries are a subset of both, so this definitional discrepancy is very far from explaining the difference in firm size.

Second, the reference period differs: a firm is in year t in Eurostat if it is active at any point in that year, while in the BDS it is in year t if it has employees in March of that year. Eurostat therefore counts more firms: a firm born in April that dies the following February is a birth and a death in Eurostat but never appears in the BDS. Few firms live for less than a year, and the overcount is small: at most, the European stock of firms is 1 to 3% above what a March count would give (Table A2). This gap is constant over time, so it does not affect the measured trends.

Third, the sector coverage differs. Eurostat's business demography covers the business economy: industry, construction, trade and market services. It leaves out education, health, arts and other personal services, which in Europe are largely provided by the public sector. The BDS includes them, because in the United States they comprise a large number of private firms, such as hospitals, clinics and schools. The Eurostat tables do cover these sectors, but only from 2021, so the dataset leaves them out. The years from 2021 allow me to measure the bias from the difference in coverage: in Europe these sectors hold 14% of employer firms, and leaving them out raises the aggregate entry rate by only 0.2 points and average firm size by 0.1 employees. In contrast, in the U.S. they are 27% of employer firms, and leaving them out would raise the entry rate by half a point and average firm size by almost one employee. The difference in sector coverage therefore, if anything, understates U.S. entry and the firm size gap.[2]

The three differences that remain are small and do not affect the trends. In addition, my argument

[1] As explained in Section 2.1, the definitions cover four aspects: the firm unit (firms with at least one paid employee), the measure of employment (paid employees), the timing of births and deaths (the first and the last year with a paid employee), and the denominators of the entry and exit rates.

[2] Shares and effects for 2021: NACE sections P to S, in the ten economies the 2021 tables cover (not the UK and Switzerland), and in the BDS.

is on the evolution of business dynamism and the forces behind it, which makes the level differences largely irrelevant.

3 Europe in the data: no entrepreneurship deficit, smaller firms

This section summarizes the three facts that stand out from the European firm dynamics dataset. First, European firms enter and exit at rates close to the U.S. ones. Second, entry has declined in parallel in Europe and the United States. Third, European firms are smaller than their U.S. counterparts at entry and at every age.

3.1 Entry and exit: no entrepreneurship deficit

Europe has no entrepreneurship deficit. Figure 4 shows entry and exit rates for the U.S. and the EU aggregate, and for the five largest European economies. Both rates are close to 10% per year in Europe and in the United States, with Europe being slightly above the U.S. The two rates have declined over time, so the decline in entry that HNS document for the United States is also present in Europe. Across countries, most large European economies are near the U.S. level. Spain, Belgium and Ireland are the exceptions, having lower rates, and are discussed further in Section 5. The remaining economies are presented in Appendix A.2. These numbers are consistent with Bartelsman et al. (2005), who find similar entry and exit rates across OECD countries on harmonized firm-level data for the early 1990s.

3.2 Firm size

European firms are smaller than U.S. firms. They are born smaller and remain smaller as they age. The left panel of Figure 5 shows average firm size in the U.S. and the EU aggregate: U.S. firms are larger, about 24 workers per firm against 11 in Europe in 2021, and the gap does not shrink over time. The right panel shows firm size by age. European firms are born smaller and grow with age at a pace similar to U.S. firms, so the gap is present upon entry and does not close over a firm's life-cycle.

This size gap is not explained by sector composition: both European firms and new entrants are in sectors at least as high in value added as U.S. ones, and U.S. entrants are larger in every sector, as reported in Appendix A.9. The differences with the BDS do not account for the gap either: as Section 2.3 shows, each effect is a fraction of an employee, while the size gap is thirteen employees. In addition, these size differences are not only present at the firm level, but also at the establishment level (see Appendix A.9).

Bartelsman et al. (2005) and Criscuolo et al. (2014) also find that established European firms are smaller than U.S. ones,[3] and this is currently read as evidence that Europe has trouble scaling up its firms

[3]Both find the reverse for entrants: U.S. start-ups are smaller than those of several European economies, and the gap in favor of the U.S. opens through faster post-entry growth (Bartelsman et al., 2005 on 1989–94 data, Criscuolo et al., 2014 on 2001–11). Bartelsman et al. (2005) count firms registered without employees among entrants, which the dataset used here excludes, since it covers only firms with at least one paid employee.

(Becker et al., 2026; Reichardt and Reis, 2026; Draghi, 2024). This paper does not explain the gap but rather documents it and takes firm size as an input.

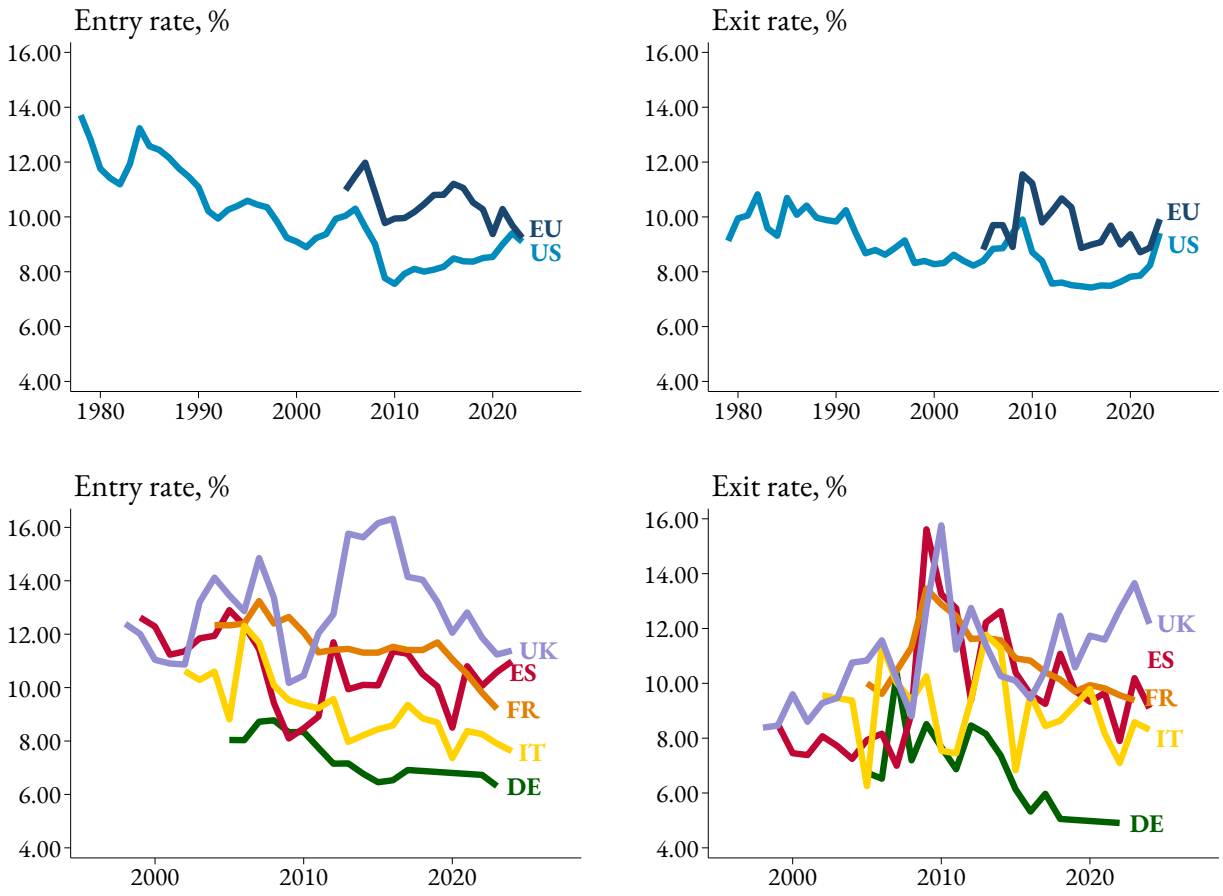


Figure 4: *Firm entry and exit rates in Europe and the U.S., percent. Top row: U.S. and EU; bottom row: the five largest European economies. The remaining economies are in Figure A1. Sources: BDS and Eurostat.*

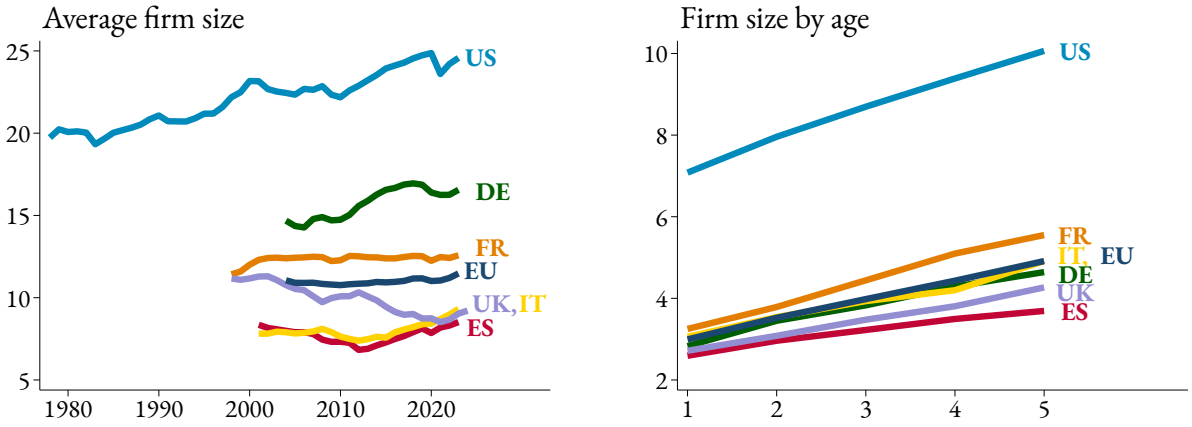


Figure 5: *Average firm size and firm size by age, U.S., EU and the five largest European economies. Firm size is measured as the number of employees. The remaining economies are in Figure A2. Sources: BDS and Eurostat.*

4 Framework: age profiles as sufficient statistics

4.1 The HNS model

This section presents the model of Hopenhayn et al. (2022) and the result that this paper uses: in equilibrium, the entry path depends on the firm side of the economy only through firm survival and average size by age. I present the version of their model with perfect competition, which is the entry and exit model of Hopenhayn (1992) with a labor force that changes over time.[4]

Environment. Time is discrete. A representative household supplies N_t units of labor inelastically in period t and owns the firms. The path of the labor force, $\{N_t\}$, is exogenous. Labor is the numeraire, so the wage is one. There is a single homogeneous good, and p_t denotes its price in units of labor. The household is risk neutral and discounts the future at rate β, so the interest rate is constant.

Technology. There is a continuum of firms that differ in their productivity z. A firm with productivity z that employs n workers produces $z\,n^\alpha$, with $0 < \alpha < 1$, and pays a fixed operating cost of f units of labor per period. Productivity is persistent and follows a Markov process with conditional distribution $F(z'|z)$.

Entry and exit. There is an unlimited number of potential entrants, which are identical. A potential entrant that pays the entry cost of f_e units of labor becomes an entrant and draws its initial productivity from a distribution G, which is the same in every period. Entry is free, so any number of potential entrants can become entrants by paying the entry cost. Each firm, entrant or incumbent, can exit, and it does so when its productivity is low. Exit is permanent and has a value of zero.

Timing. Each period has three stages. First, potential entrants decide whether to pay the entry cost. Second, firms draw their productivity, entrants from G and incumbents from $F(z'|z)$, where z is their productivity in the previous period. Third, each firm decides whether to operate or to exit, and the firms that operate hire labor and produce. Exit therefore takes place before production, so an entrant can exit without ever producing.

The firm's problem. A firm takes the price as given and chooses employment to maximize its profits,

$$\pi(z, p_t) = \max_{n \geq 0} \; p_t\, z\, n^\alpha - n - f.$$

Its optimal employment is $n(z, p_t) = (\alpha\, p_t\, z)^{1/(1-\alpha)}$. Profits and employment are increasing in the firm's productivity and in the price. Given a path of prices, the value of a firm with productivity z at the start of period t is

$$v_t(z) = \max\big\{0,\; \pi(z, p_t) + \beta\, E\big[v_{t+1}(z') \,\big|\, z\big]\big\},$$

where zero is the value of exit. The value of operating is increasing in productivity, so the firm exits when its productivity is below a threshold $z_t^\star$, at which the value of operating equals zero, the value

[4] HNS show that the results hold in a wider class of models, which includes monopolistic competition with constant and with variable markups.

of exit.[5] The expected value of entry, net of the entry cost, is

$$v_t^e = \int v_t(z)\, dG(z) - f_e.$$

Aggregation. Let $\psi_t(z)$ be the mass of firms in operation in period t with productivity z, and let m_t be the mass of entrants. The firms of period $t+1$ are the entrants whose draw is above the exit threshold $z_{t+1}^\star$ and the firms of period t whose new productivity is above it. For $z' \geq z_{t+1}^\star$,

$$\psi_{t+1}(z') = m_{t+1}\, g(z') + \int \phi(z'|z)\, \psi_t(z)\, dz,$$

where g and ϕ are the densities of G and F. Labor is used to produce, to cover the operating cost and to pay the entry cost, so the labor market clears when

$$N_t = \int \left[n(z, p_t) + f \right] \psi_t(z)\, dz + m_t\, f_e.$$

Definition 1 (Equilibrium). Given a path of the labor force $\{N_t\}$ and an initial distribution of firms ψ_0, an equilibrium is a path of prices $\{p_t\}$, exit thresholds $\{z_t^\star\}$, masses of entrants $\{m_t\}$ and distributions of firms $\{\psi_t\}$ such that:

1. *Firm optimum.* Firms employ $n(z, p_t)$ workers and exit when their productivity is below $z_t^\star$, the threshold at which the value of operating is zero.

2. *Free entry.* The expected value of entry, net of the entry cost, is not positive, $v_t^e \leq 0$, and it is zero when there is entry, $m_t > 0$.

3. *Law of motion.* Starting from ψ_0, the distribution of firms ψ_t evolves according to the law of motion.

4. *Market clearing.* The labor market clears in every period.

By Walras' law, the goods market clears when the labor market clears.

Assumptions and equilibrium outcomes. The model assumes that there is free entry. As a consequence, in equilibrium incumbents do not respond to the labor force. This is because an incumbent's employment $n(z, p_t)$ and exit decision depend only on its productivity and on the price, and free entry keeps the price constant, so entry is the only margin that adjusts to the labor force. Potential entrants enter until the expected value of entry equals its cost, and HNS show that, when entry is positive in every period, this condition holds at a constant price $p^\star$, which solves $\int v(z)\, dG(z) = f_e$, whatever the path of the labor force.[6] The exit threshold $z^\star$ and the employment of each firm, $n(z, p^\star)$, are therefore constant too.

[5] Profits at the threshold can be negative, since a firm accepts a loss in the current period when its expected future value is large enough to compensate for it.

[6] HNS show that such an equilibrium exists and is unique when the labor force does not fall and the employment of a cohort falls with its age. Several European labor forces fall in some years, so I verify directly that predicted entry remains positive in every economy and year of the baseline of Section 5.

4.2 From productivity to age: the sufficient-statistic approach

The market clearing condition determines entry, and computing it requires ψ_t, the distribution of firms over productivity, and hence the productivity process, the technology and the costs. HNS show that the same condition can be written in terms of two statistics by firm age, the share of firms that survive and their average size, which are observed in the data. This section presents their result, which I then apply directly from the data, without estimating the model.

To write the condition by age, follow a cohort as it ages at the price $p^\star$. Let $\mu_a(z)$ be the mass of firms of age a with productivity z, per entrant of their cohort. For $z' \geq z^\star$,

$$\mu_0(z') = g(z'), \qquad \mu_a(z') = \int \phi(z'|z)\, \mu_{a-1}(z)\, dz.$$

Two statistics summarize the cohort at each age,

$$S(a) = \int \mu_a(z)\, dz, \qquad e(a) = \frac{1}{S(a)} \int \left[n(z, p^\star) + f \right] \mu_a(z)\, dz.$$

The first is the share of the cohort still in operation at age a, and the second is the average employment of the firms that remain. I call $S(a)$ the survival profile and $e(a)$ the size profile. Finally, let $c_e \equiv f_e + S(0)\, e(0)$ be the labor that an entrant absorbs in its first period, the entry cost plus its expected first payroll.

Proposition 1 (Age profiles as sufficient statistics). Consider an equilibrium with positive entry in every period, in which the initial firms are the survivors of cohorts that entered at the price $p^\star$. Then:

1. The survival and size profiles, $S(a)$ and $e(a)$, depend on age alone, and are independent of time and of the path of the labor force.

2. The mass of entrants is
$$m_t = \frac{N_t - \sum_{a \geq 1} m_{t-a}\, S(a)\, e(a)}{c_e}.$$

3. Given the path of the labor force, two economies with the same profiles $S(a)$ and $e(a)$, the same c_e and the same initial number of firms of each age have the same path of entry, whatever their productivity process and technology.

Proof. Part 1. The masses μ_a are built from g, ϕ and $z^\star$, and employment $n(z, p^\star)$ depends only on z. Hence $S(a)$ and $e(a)$ are functions of a alone.

Part 2. Suppose that the firms of period t are the survivors of past cohorts, $\psi_t = \sum_{a \geq 0} m_{t-a}\, \mu_a$, which holds in the initial period by assumption. The law of motion then gives

$$\psi_{t+1}(z') = m_{t+1}\, g(z') + \sum_{a \geq 0} m_{t-a} \int \phi(z'|z)\, \mu_a(z)\, dz = \sum_{a \geq 0} m_{t+1-a}\, \mu_a(z'),$$

so the same holds in every period. Substituting into the labor market condition,

$$N_t = \sum_{a \geq 0} m_{t-a} \int \left[n(z, p^\star) + f \right] \mu_a(z)\, dz + m_t\, f_e = \sum_{a \geq 1} m_{t-a}\, S(a)\, e(a) + m_t\, c_e,$$

and solving for m_t gives the expression.

Part 3. The expression for m_t involves only N_t, $S(a)$, $e(a)$, c_e and past entry, so iterating it forward from the initial number of firms of each age determines the path $\{m_t\}$. ■

I refer to the expression in the second part as the identity,[7] since it states that every worker is employed either by a firm born before t or by an entrant,

$$N_t \;=\; \underbrace{\sum_{a\geq 1} m_{t-a}\, S(a)\, e(a)}_{\substack{\text{labor absorbed}\\ \text{by incumbents, } L_t^I}} \;+\; \underbrace{m_t\, c_e}_{\substack{\text{labor absorbed}\\ \text{by entrants, } L_t^E}} \quad .$$

In the first term, each cohort of incumbents contributes its remaining firms, $m_{t-a}\, S(a)$, times their average size, $e(a)$, and the second term is the rest of the labor force. Given the labor force and past entry, the identity determines entry in period t, and iterating it forward yields entry in every period.

The profiles are equilibrium outcomes of the model, and also what business demography statistics report: the share of a birth cohort still active at each age and the employees per surviving firm.[8] By the proposition, they are sufficient statistics for the productivity process, the selection of firms and the technology when predicting entry. The data record them only for the cohorts born in the years covered but, since the profiles are time-invariant, I use them for every cohort. Section 5.6 examines the economies in which profile stability fails.

HNS note that, in principle, the identity can be iterated forward without the model. They do not do so because the BDS does not assign an age to firms born before 1978, and they estimate the structural model to fill this gap. I instead measure the profiles in the data, as explained in Section 4.3, which allows me to apply the framework in Europe without taking a stance on each country's productivity process.

To check numerically that the identity reproduces the model, I compare two entry paths. The first is that of HNS's estimated model, computed on the distribution of firms over productivity. The second is that of the identity evaluated at the profiles that the same model implies. Given the same labor force, the two are identical up to numerical error. Figure 6 draws them on top of each other.

The firm size and survival profiles by age are therefore sufficient statistics for the entry prediction, and HNS's mechanism can be tested in any economy in which both are observed.

4.3 Measurement: profiles and entry cost

Calculating firm entry with the identity requires firm size and survival rates by age, for every age a firm can reach. However, the data are available only for young firms: for the U.S., the BDS reports

[7] The first two parts of the proposition are Corollaries 1 and 2 of HNS, who call the second the dynamic entry equation. The third part follows from the second and is the basis of this paper, since it means that the entry path that their model predicts can be computed from the survival and size profiles, without estimating the model. I thank Vincent Sterk for pointing this out to me.

[8] In the data an entrant is a firm observed in operation, so the profiles are measured per operating entrant. This rescales m_t, $S(a)$ and c_e by $S(0)$ and leaves the identity unchanged.

size and exit rates year by year up to age five in each cohort, and in five-year bands up to age 25. For Europe, Eurostat reports size and survival at ages one to five.

To cover the missing ages, I fit a curve to each profile through the measured ages and extend it to age 100. Beyond the ages for which there are data, the curves are disciplined so that they reproduce two aggregates in each economy: average firm size and the average exit rate, which are observed in the data. The functional forms of the curves are chosen to minimize the fit error at the ages with data, with the fewest assumptions about the ages that are not observed.

The size profile is linear in age, allowing for a change of slope at age five,

$$e(a) \;=\; c_0 \;+\; c_1 \min(a, 5) \;+\; g \;\max(a - 5,\, 0).$$

In Europe, this is because the line from ages one to five is fitted to the data by age, while the slope past age five, g, cannot be read from data by age and hence is chosen so that the profile, weighted by survival, reproduces aggregate average firm size. In the U.S., since data by age exist up to age 25, the slope is fitted with more data points, and these show that firm size keeps rising at a nearly constant pace past age five, so a line is the right shape, and that the two slopes are nearly equal, so the change of slope at five is small. The BDS data for firms over 25 years old, which are not used for the fit, serve as an out-of-sample check, and the extended line stays close to the measured size of these firms. In Europe, the slope implied by average firm size is close to the slope at young ages in the EU aggregate and in most economies. In both cases, the profile has three parameters: the size at entry, c_0, the slope up to age five, c_1, and the slope past age five, g.

The survival profile is built from the probability of exit by age. Based on the shape of the U.S. data, which are available up to age 25, I assume that the probability of exit falls with age toward a long-run value. The initial probability, the long-run probability and the rate of decline are all fitted, the first two to the ages with data and the long-run value to the aggregate exit rate. Writing $h(a)$ for the

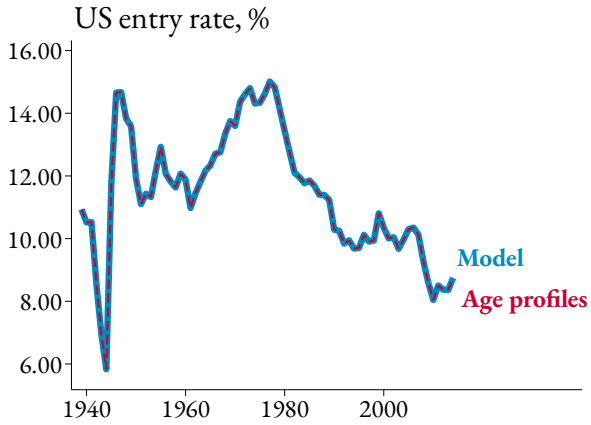


Figure 6: *Entry rate in the U.S. from the full structural model of Hopenhayn et al. (2022), compared with the reduced-form replication using the firm size and survival age profiles described in Section 4.2. The match is exact. Source: HNS.*

probability of exit at age a, the functional form is:

$$h(a) \;=\; h_\infty \;+\; (h_1 - h_\infty)\, e^{-k(a-1)}, \qquad S(a) \;=\; S_1 \exp\Big(- \int_1^a h(s)\, ds \Big).$$

Survival to age a is hence the product of the probabilities of not exiting up to that age. The profile has four parameters: first-year survival, S_1, the initial and long-run probabilities of exit, h_1 and h_∞, and the rate at which one transitions into the other, k.

In total, there are seven parameters to fit for each economy. I fit them with nonlinear least squares, so that the curves pass as close as possible to the by-age points and to the aggregate exit rate, and reproduce aggregate firm size exactly. In Europe, the survival parameters are fitted first and the size parameters then follow in closed form; in the U.S., all seven are fitted jointly, since having more data means that the line is overidentified. In every economy the fitted profiles are within 1% of the average level at a typical age (Appendix A.3, Figures A7 to A9). The fitted profiles confirm the facts of Section 3 by age: U.S. firms are larger at every age and grow from a higher start, survival is similar when young, and more U.S. firms reach old age (Figures A5 and A6).

The third input is the entry cost, the labor a new firm absorbs upon entry, which determines how many entrants the residual labor supports. In the HNS model, it is estimated so that the model matches the U.S. entry rate. To bring their estimate to economies where entrants are of a different size, I express the entry cost relative to the entrant's size at age one, $c_e = \kappa\, e(1)$, where $e(1)$ is the fitted number of employees at age one and κ is a scaling factor that measures the entry cost relative to the entrant's age-one employment.

For the U.S., I take $\kappa = 6.4$, as it is the value implied by HNS's estimates. For each European economy, I scale κ by the ratio of its World Bank Starting a Business score to the U.S. one, expressed as a cost of starting a firm. This captures how much harder it is to register a new firm in each economy than in the U.S., so that κ is higher where the procedures, time and fees of starting a business are more burdensome. For instance, κ is 6.0 in Norway and 6.4 in the UK, close to the U.S., against 11.7 in Germany and 14.1 in Poland. That is, a new firm absorbs in its first year about six times its age-one employment in the U.S., the UK and Norway, and twice that in Germany and Poland.

Alternatively, to avoid borrowing the U.S. value from HNS, c_e can be identified from the data: in the stationary distribution of Section 4.2, the number of firms per worker depends only on the profiles and on c_e, so c_e can be solved from the observed firm count. This is explained in Appendix A.8, where I compare the two and show that the differences in predicted entry rates are very small.

The last input is the initial firm-age distribution, how many firms of each age exist at time $t = 0$. I take this distribution from the fitted profiles: since the profiles do not change over time, an economy whose labor force has been constant settles into a stationary age distribution. In it, the number of firms by age follows the survival profile, $m_0\, S(a)$, with the level m_0 pinned by market clearing at the first value of the labor force, $m_0\,[c_e + \sum_{a \geq 1} S(a)\, e(a)] = N_0$. This is also how HNS start their exercise: they assume the U.S. was in a steady state in 1940 and iterate the identity forward on the labor force path from there.

5 Labor force growth and firm entry in Europe

This section tests whether changes in the labor force explain firm entry in Europe, as they do in the United States. For twelve European economies and an EU aggregate, I compute the entry rate that each economy's labor force path implies, given its firm size and survival profiles and its entry cost, and compare it with the entry rate in the data.

5.1 Setup

I perform this analysis on twelve European countries, Germany, the UK, France, Italy, Spain, the Netherlands, Switzerland, Poland, Belgium, Ireland, Norway and Austria, plus an EU aggregate; in addition to the U.S., which is run with the same inputs and reproduces the entry path of HNS. In every economy the identity is iterated forward from the first year of the labor force series, between 1947 and 1960, and compared with the entry data where they exist, from between 1998 and 2014 depending on the economy to 2020 or 2022 (Table A7). The identity returns the number of entrants and, through the survival profile, the stock of firms. The entry rate is the ratio of the two, with the denominator of Section 2.1, so that the predicted and the measured rates are defined in the same way.

The labor force path I input is defined as the number of people in a country who are aged 15 or over and are either employed or unemployed. In the baseline application of the identity, I consider that all the labor force is employed by the firms in the private sector. In Section 5.3, I relax this assumption and consider that there is a part of the labor force that is not absorbed by the private sector firms. The labor force series come from the ILO and the OECD for Europe, and from the Census Bureau and the BLS for the U.S. Appendix A.5 documents the sources, their coverage and the breaks corrected, economy by economy.

Figure 7 shows labor force growth in the U.S. and Europe, and in the five largest European economies, which is the series used in this exercise. In contrast to the U.S., Europe's post-WWII labor force boom is much more modest. Still, some economies have episodes of fast labor force growth, such as Spain's immigration boom of the 2000s or Ireland's 1990–2008 expansion. In the episodes for which there are entry data, the entry rate visibly rises and falls with the labor force (Figure A13). This is the co-movement the rest of the section quantifies.

Entry rates are therefore an outcome of the exercise, and neither their levels nor their movements are targeted. Instead, different inputs discipline the level and the movement of the prediction. The entry rate level is pinned down by the inputs that stay constant: the firm age profiles, which are fitted to average firm size and the average exit rate, and the entry cost, which is borrowed from HNS but rescaled by the World Bank's cost of starting a business, as described in Section 4.3. The movement in the entry rate comes from the labor force path. A close match with measured entry can therefore be interpreted as evidence in favor of the HNS framework.

5.2 The U.S. reference

Judging how well the identity performs in Europe requires a benchmark. HNS show that the entry rate predicted by their model, which the identity reproduces exactly, tracks the decline in U.S. entry rates well. I therefore repeat their exercise, measure its error, and use it as the reference for each European economy.

The left panel of Figure 8 shows the entry rate in the data and as predicted by the identity for the U.S., as in the HNS paper (solid lines), extended from 2014 to 2022 with the latest BDS release (dashed lines). Both in the data and in the prediction the entry rate rises from the mid-1950s until the beginning of the 1980s, as the baby boom cohorts enter the labor force, and declines from the 1980s on. In a typical year, the predicted entry rate is about one percentage point away from the observed one.

The input of the exercise is the full labor force, without any correction for the private sector's labor force absorption. Since unemployment, public sector employment and hours supplied per worker are stable over the sample, the exercise does not require corrections on this front. This is not always the case in Europe, which motivates the correction that follows.

5.3 The labor-market wedge

The baseline application of the identity assumes that all the labor force is absorbed by private sector firms. Entry is therefore calculated from the residual labor force that is not employed by incumbent private sector firms. However, if the share of the labor force that becomes private sector employment declined over time, measured entry would fall, while the identity would predict no decline since measured labor force would not move (see Appendix A.6 for more details). Therefore, a potentially improved version of the identity is one in which the labor force input is a better approximation of the workers absorbed by the private sector.

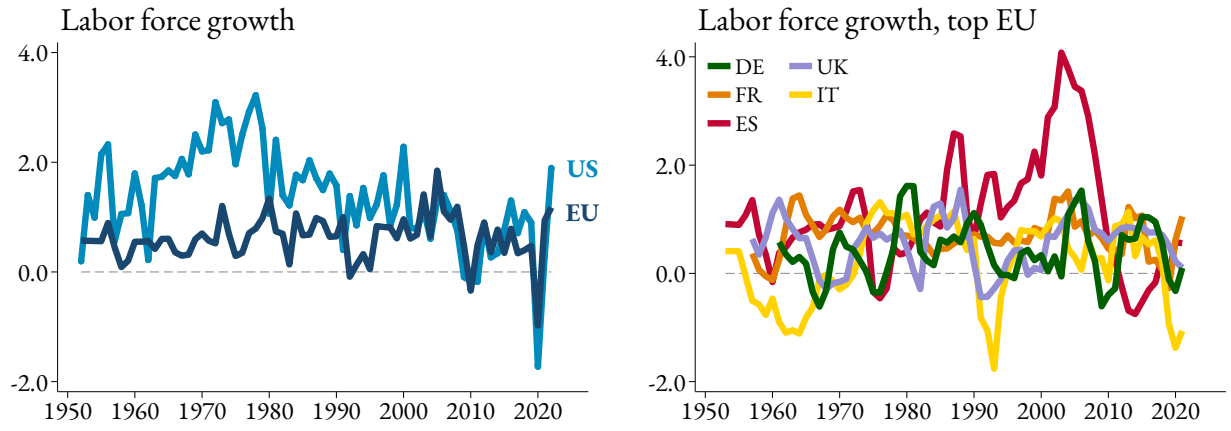


Figure 7: *Labor-force growth per year, percent. Left: U.S. and the EU; right: the five largest European economies, three-year moving averages. The remaining economies are in Figure A10. Sources: U.S. Census, BLS, OECD and ILO.*

The labor force is not fully absorbed by private sector firms along three margins: the unemployed, who are in the labor force but work for no firm; public sector employees, who work for the government; and part-time workers, who are absorbed only for the hours they supply. I correct the labor force input for these three margins, combining them into a single series, which measures the share of the labor force that private sector firms use. I call the gap between the full labor force and this net input the labor-market wedge. The labor force input I use therefore becomes:

$$N_t^{\text{net}} = (N_t - U_t - P_t)\, h_t = (1 - u_t - p_t)\, h_t\, N_t = \phi_t\, N_t,$$

where U_t and P_t are the number of unemployed workers and of public sector employees, u_t and p_t their shares of the labor force, and h_t private sector hours per worker. N_t^{net} measures the labor available to private sector firms in units of full-time workers; ϕ_t is the share of the labor force that private sector firms use.

The wedge is more relevant for Europe than for the U.S. because, as Figure 9 shows, all three margins are more volatile and shift over time in Europe. Hours per worker is the clearest case: part-time work is more common in Europe and has risen over time, in particular in the Netherlands, Germany, Austria and the UK, where hours per worker have fallen while the labor force has grown, whereas in the U.S. the share of part-time workers is lower and stable. The three corrections are measured directly from the data, not chosen to reduce the error of the identity, and they change only its labor force input, leaving the firm side, the size and survival profiles and the entry cost, as in the baseline.

Unemployment, public employment and hours per worker come from standard data sources. Unemployment comes from the ILO. Public employment is the number of people employed by the general government, from ILOSTAT and, for the UK, from the ONS. Hours per worker come from the EU Labour Force Survey for the European countries and from the BLS for the U.S., and are measured over private sector activities, so that public sector part-time stays out of the average. Appendix A.5 documents the construction of the three series.

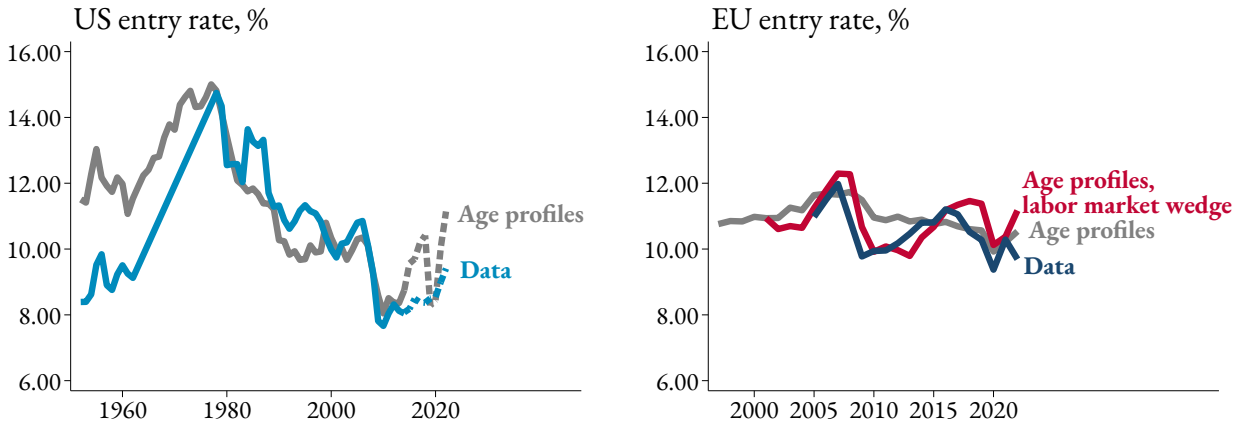


Figure 8: *Entry rate, percent. Left: the U.S. data as in Hopenhayn et al. (2022), extended with the BDS after 2014 (dashed); age profiles entry rate as in Figure 6, exact replication of the HNS results, extended past 2014 (dashed). Right: equivalent series for the EU, plus a labor market wedge-adjusted one. The EU dataset is described in Section 2. The entry rate computed from the age profiles is described in Section 4.3; the same computation with the labor market wedge is described in Section 5.3. Sources: HNS, BDS and Eurostat.*

5.4 Results in Europe

For each of the twelve European economies and the EU aggregate, I run the identity twice: once with the full labor force N_t as the input, the baseline, and once with the labor force net of the wedge, N_t^{net}. Both runs use the same firm age profiles, entry cost and initial firm-age distribution, so that the only difference between them is the labor input.

The right panel of Figure 8 shows the results for the EU aggregate: the entry rate in the data (blue), the prediction with the full labor force as the input (gray), and the prediction with the labor force net of the wedge (red). With the full labor force, the identity captures well the level of the entry rate and its decline, from 11.1% in 2005 to 9.7% in 2022. However, it does not capture the fluctuations between these two points. With the net labor force, the predicted entry rate tracks the data closely: it drops in the 2008 crisis, recovers afterwards, and drops again with COVID. In these periods, unemployment rose and hours per worker fell while the number of people in the labor force did not, so the labor available to firms was less than the labor force indicated.

Figure 10 shows the same exercise for the six largest European economies, with the same three lines. With the full labor force, the level is close to the data in most cases, and the co-movement less so, in particular in recessions. With the net labor force, the level stays as close to the data as before, and the co-movement improves substantially in almost all economies. The results for the remaining economies are in Figure A12, in Appendix A.4; their fit is comparable to that of the large economies, with a few exceptions.

5.5 The fit in Europe and in the U.S.

The predictions for Europe track the data about as well as the U.S. prediction does. I measure the fit with two scores, the root mean squared error (RMSE) of the predicted entry rate against the data and the correlation between the two. Each economy is scored twice, with the full labor force and with

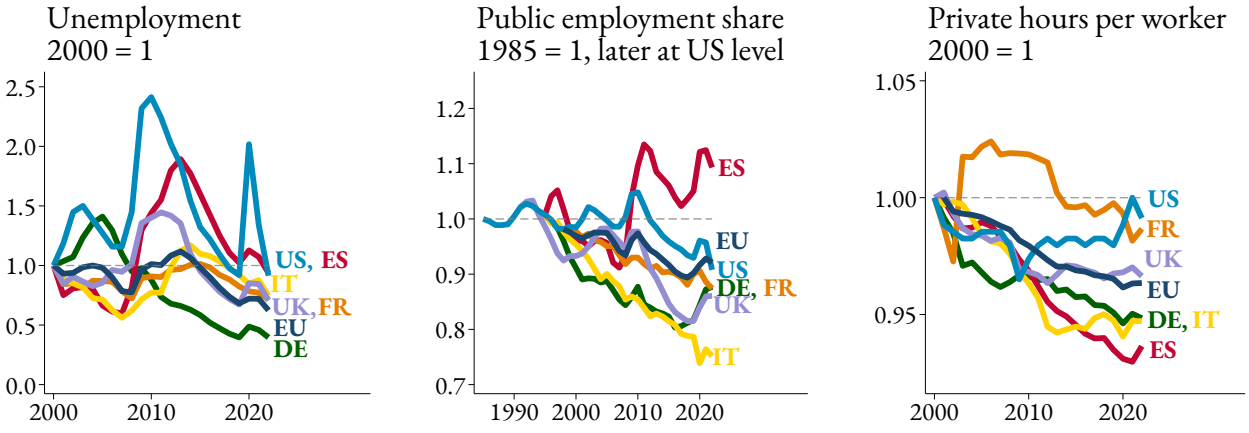


Figure 9: *Series behind the labor-market wedge, normalized. Unemployment and private hours per worker, 2000 = 1; public employment share, U.S. 1985 = 1, other economies rescaled to the U.S. The remaining economies are in Figure A11. Sources: ILO, ONS, EU Labour Force Survey and BLS.*

the labor force net of the wedge, against its own entry data over its own time window, and I compare each score to the U.S. score. Table A7 in Appendix A.4 collects both scores, for both predictions, by economy.

First, I measure the level of the error with the RMSE of the predicted entry rate against the data, in percentage points. For economy i,

$$\text{RMSE}_i = \sqrt{\frac{1}{T_i} \sum_{t \in W_i} \left(\hat{r}_{it} - r_{it}\right)^2},$$

where $\hat{r}_{it}$ is the predicted entry rate, r_{it} the entry rate in the data, and W_i the T_i years with entry data.

Figure 11 shows the RMSE of each economy, with the full labor force (gray) and with the wedge (red). For reference, the RMSE of the U.S. is 1.55 percentage points. The error for the EU as a whole is 0.68 points, less than half that of the U.S. Of the twelve European economies, nine have an RMSE below 2 points, close to or below that of the U.S. The exceptions are Ireland, whose error falls below 2 points with the wedge, and Italy and Spain, which are covered in Section 5.6.

With the wedge, the adjustment reduces the RMSE in six of the thirteen economies (Ireland, the UK,

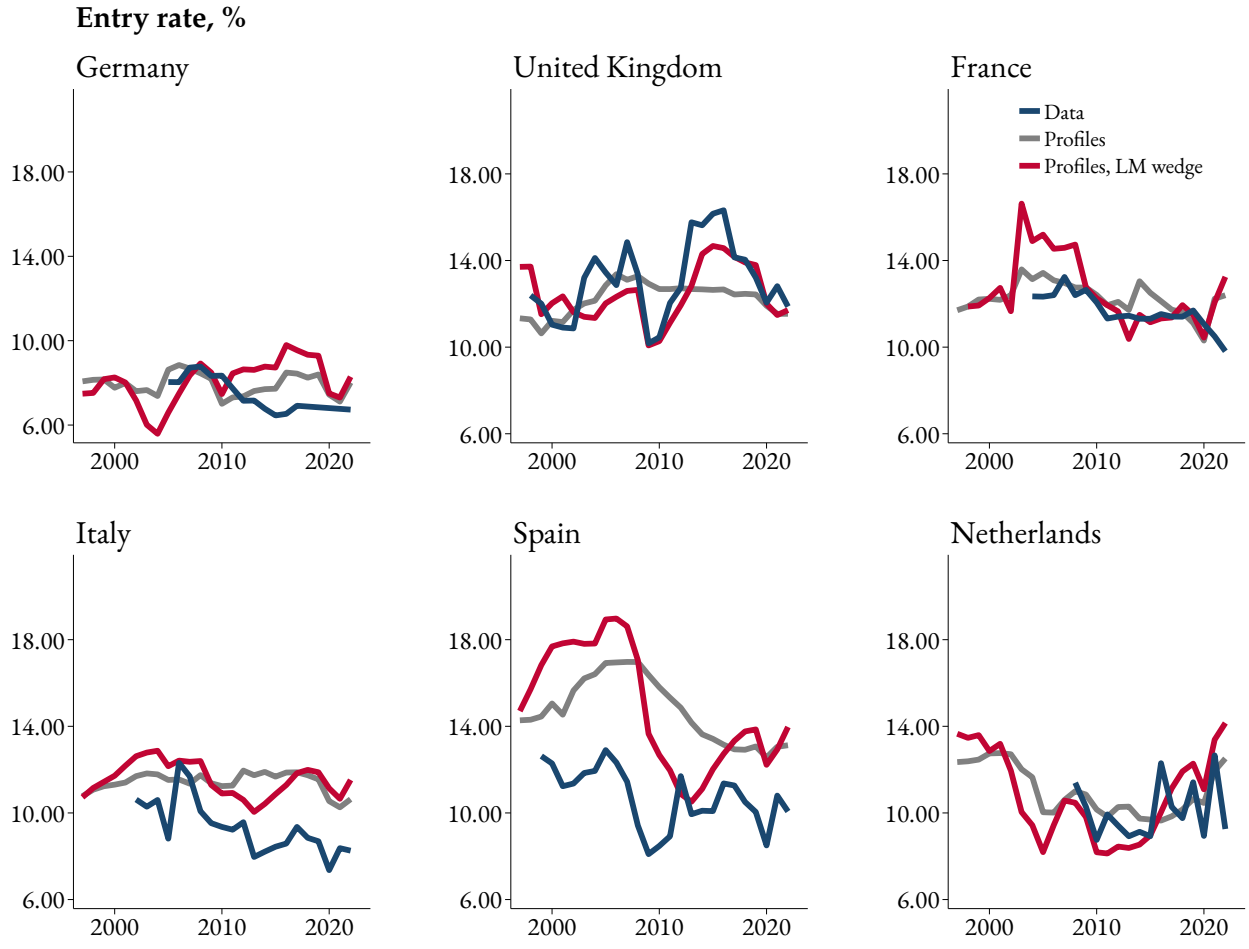


Figure 10: *Entry rate, percent. Economy-by-economy equivalent of the right panel of Figure 8, for the six largest European economies. The remaining economies are in Figure A12. Source: Eurostat.*

Switzerland, Austria, Norway and Belgium), leaves two of them unchanged (Italy and the EU aggregate), and worsens the fit in Germany, France, the Netherlands, Spain and Poland. The worsening tends to be small, between 0.2 and 0.7 points, and the improvements larger, up to 1.1 points in Ireland, so that on average the correction reduces the RMSE across the twelve economies from 1.94 to 1.88 percentage points (Figure 12, left panel).

The European fit is also obtained on a more demanding period: while the U.S. is scored on a long series that is generally stable, the twenty years of European data contain both the 2008 crisis and COVID.

However, the real gains are in the correlation between the predicted entry path and the data, the second score, which is represented on the right panel of Figure 12. It shows how most dots fall in the upper half of the graph, meaning that the correlation is improved. In particular, the average correlation increases from 0.17 to 0.38 with the wedge adjustment. For reference, the correlation of the U.S. is 0.60. The only economy in which the correlation falls is Germany, where labor freed by the wedge was absorbed by incumbent firms instead of entrants, as I explain in Section 5.6.

Taken together, these results indicate that the labor-market wedge leaves the level of the error where it was and raises the correlation between predicted and observed entry, that is, how closely the prediction follows the movements of the entry rate. This is the margin that matters the most for the rest of the paper, since it will allow me to predict how entry rates react to labor force forecasts, which I explore in Section 6.

5.6 Beyond the labor-market wedge: the remaining entry gaps

The identity holds two things fixed: the share of the labor force that firms absorb, which the wedge of Section 5.3 accounts for, and the firm age profiles, that is, how firms grow and survive as they age.

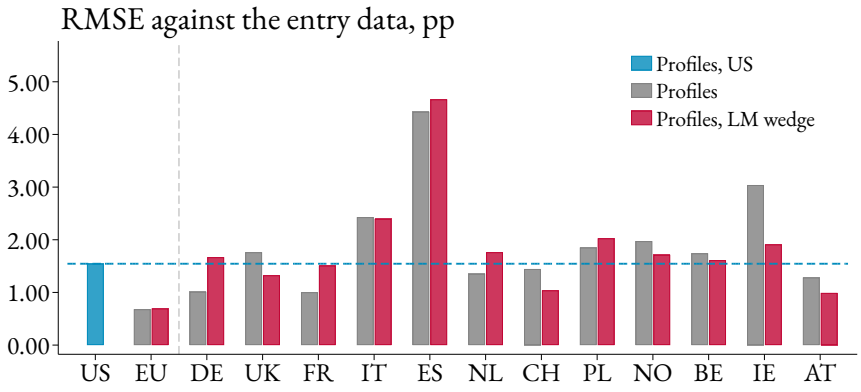


Figure 11: *Root mean squared error (RMSE) of the predicted entry rate against the data, in percentage points, as defined in Section 5.5. For the U.S., this is the error of the HNS results. For the European economies, the gray bar shows the error of the "plain" entry rate prediction, and the red bar that of the one adjusted for the labor market wedge (adjustment described in Section 5.3). Each economy is scored on its own entry window, the U.S. on 1952–2022. Sources: HNS, BDS and Eurostat.*

The gaps that remain are cases in which the profiles moved: the labor force was still absorbed by firms, but not by entrants. I discuss the two largest cases, Spain and Italy, where the labor went back to refilling the jobs the crisis destroyed, and Germany, where it went to incumbents. The milder cases, Belgium, France and the Netherlands, are discussed in Appendix A.4.

Spain and Italy

Spain and Italy are the main economies with high RMSEs, 4.4 and 2.4 points, respectively, against the 1.55 points of the U.S. and the 0.68 points of the EU as a whole. In both cases, the identity predicts more entry than the data show, that is, these economies have lower business dynamism than what their demographic conditions seem to allow them. However, the correlation is in line with the rest of the economies, and it improves significantly with the wedge: from 0.22 to 0.61 in Spain and from 0.31 to 0.68 in Italy, against an average correlation of 0.17 across the twelve and of 0.60 in the U.S.

This indicates that the issue is a level gap, which is driven by firm age profiles that shift across cohorts. Spain and Italy are also two of the economies the 2008 crisis hit hardest, which impacted the firms' growth and exit profiles: incumbents reduced their employment and exited, and the firms born in those years started smaller and died sooner. When the labor force recovered, part of it went back to filling the jobs the crisis had destroyed, so entry stayed below what the demographic conditions implied. Belgium shows the same pattern in a milder form (Appendix A.4).

Figure 13 shows the crisis in these margins. Italy saw the size of its young firms fall, from 6 employees at age 3 for the 2005 cohort to 4 for the 2010 one, along with a sharp decrease in their survival, from 0.71 to 0.64 between the 2010 and 2012 cohorts. Spain experienced a spike in the exit rate, from 9% to 16% at the height of the crisis: more incumbents left the economy and stopped their normal life-cycle hiring. In the recovery, from 2014 to 2019, average firm size grew by 2.8% a year in Spain and 1.9% in Italy while the labor force was flat, so the labor the wedge freed went to existing firms and entry only

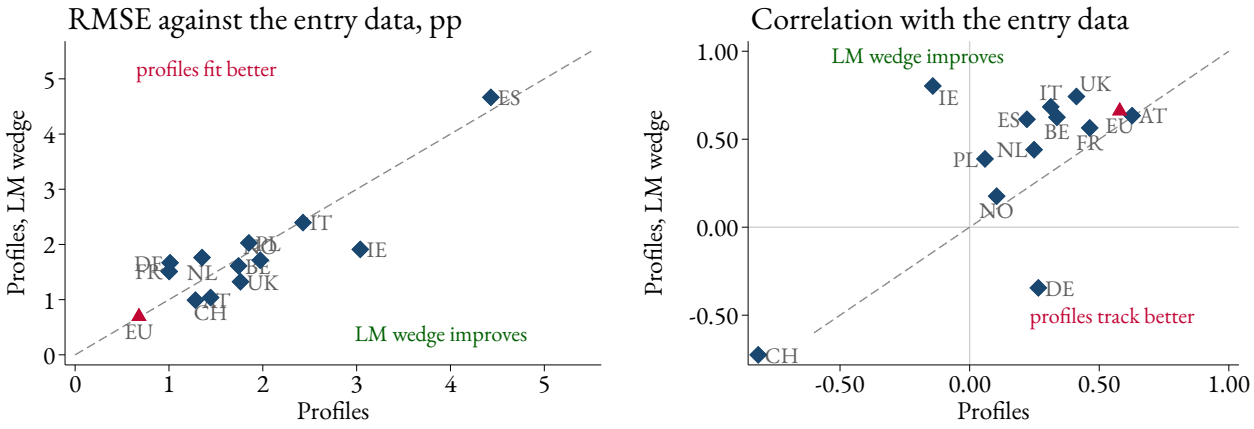


Figure 12: *Effect of the labor-market wedge adjustment. Left: RMSE with and without the labor-market wedge; economies below the 45-degree diagonal have a lower error with the wedge. Right: correlation with and without the labor-market wedge; economies above the diagonal have a higher correlation with the wedge. The numbers are in Table A7. Source: Eurostat.*

replaced exits. The identity, with its profiles fixed, does not allow for such growth, and in those years it overpredicts entry by 2.2 points a year in Spain and 2.7 in Italy.

Germany

Germany is the economy in which the wedge raises the RMSE the most, and the only one in which the correction flips the sign of the correlation, from $+0.27$ to -0.34, despite being one of the countries where part-time employment is more relevant. This is because entry was not the margin that adjusted in the presence of changes to the labor force in Germany. After 2005, the unemployment rate fell from 11.2% to 3.1%, so the net labor force grew by 16% while the labor force grew by 7%, against 11% and 9% in the EU (Figure 14). With this input, the identity predicts rising entry, almost three points over the period, while the entry rate in the data fell from 8% to 6.8%. This is what turns the correlation negative. The labor absorbed went to incumbents instead: average firm size rose from 14.4 to 16.9, while in the EU it stayed flat. France and the Netherlands show a milder version: with the net labor force the prediction moves with the data, which raises the correlation, but it is more volatile than the data, which raises the RMSE (Appendix A.4).

Overall, the identity, given each economy's labor force path, matches the entry rate in nine of the twelve economies and in the EU aggregate about as well as it does in the U.S. The labor-market wedge, measured from the data, improves the correlation between prediction and data in almost all economies. In the economies in which the prediction is less accurate, the assumption that the profiles are stable fails to hold: they shift across cohorts in Spain and Italy, and in Germany incumbents grow beyond what their size profile implies.

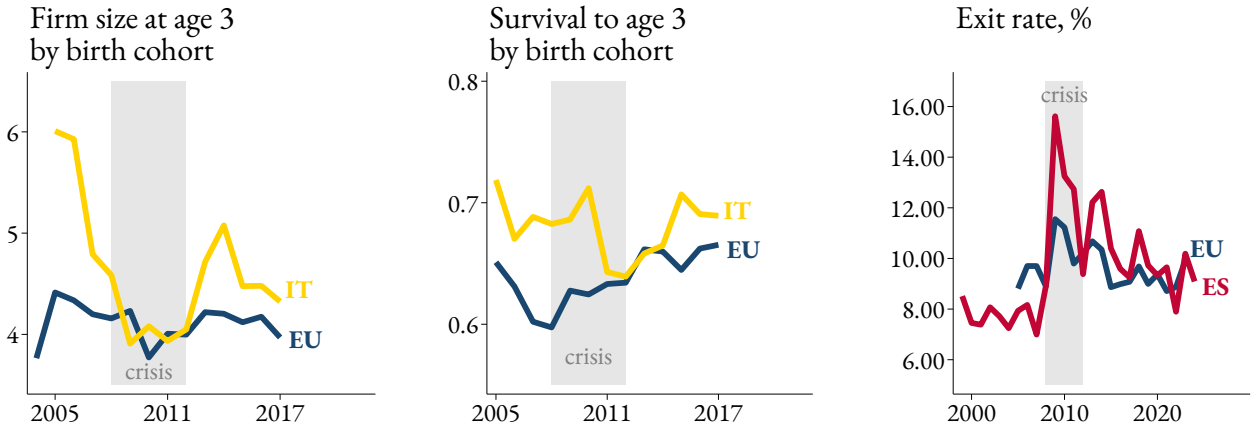


Figure 13: *Diagnosis of why the identity over-predicts the entry rate in Spain and Italy. Left: firm size at age 3 by birth cohort, Italy; center: survival to age 3 by birth cohort, Italy; right: the exit rate, Spain. Left and center: the EU is shown for reference. The band marks 2008–12. Source: Eurostat.*

6 Projections: three scenarios for the labor force and firm size

This section examines what different future paths of labor force growth imply for business dynamism in Europe. In particular, I iterate the wedge-adjusted identity forward for twenty years past the data and compare the entry rates that different scenarios predict.

6.1 The projection exercise

I use the wedge-adjusted identity of Section 5.4, which tracks the EU entry rate most closely, and iterate it forward from 2021 to 2042 with the labor force, and in the third case firm size, as the varying inputs. All other inputs stay fixed. The firm age profiles are the average profiles from Section 4.3, the entry cost is also the one from Section 4.3, and the three components of the wedge of Section 5.3, the unemployment share, the public-employment share and hours per worker, stay fixed at their value in the year I start the projection. With the wedge held constant, the net labor force in hours grows at the same rate as the labor force.

I consider three cases, each changing one input relative to the previous one: first, I take the growth rate of the labor force at its current pace (Section 6.2); second, I take the same variable at the pace of 2014–19, a recovery period in which the labor force grew faster (Section 6.3); third, I take the same, faster, labor force growth rate, but consider its effects on entry when firms are also growing in size (Section 6.4). Table 3 summarizes the three cases.

To understand the results, Appendix A.7 derives how entry responds to the growth of each input: it rises with labor-force growth and with the exit rate, and falls, crucially, with firm size growth.

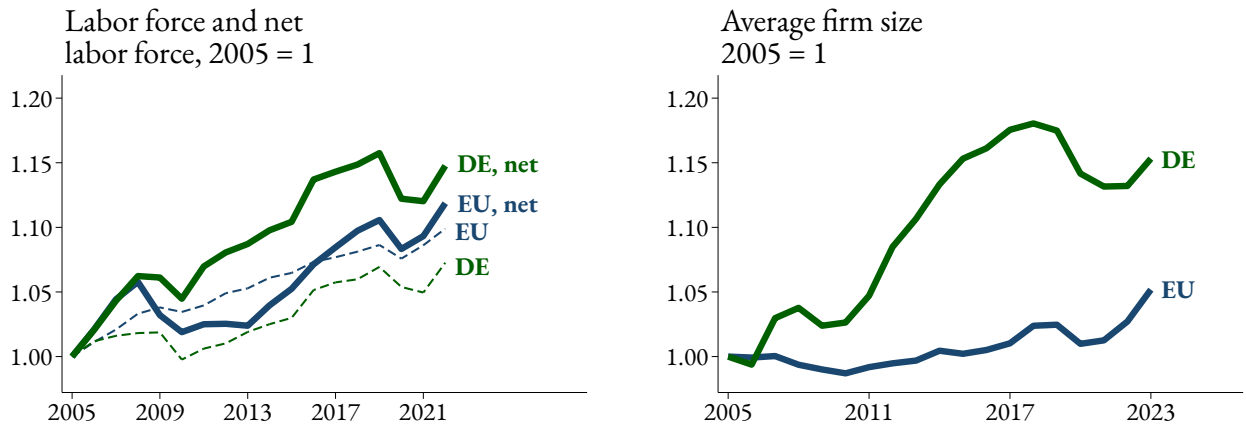


Figure 14: *The German case: the wedge adds labor that went to incumbents. Left: labor force (dashed) and labor force net of the wedge (solid), 2005 = 1, Germany and the EU aggregate. Right: average firm size, 2005 = 1, Germany and the EU aggregate. Sources: Eurostat, ILO and OECD.*

Scenario	Net labor force growth, g_N	Firm size growth, $g_{\bar{e}}$	Change in the entry rate
1. The labor force keeps growing at the current pace	0.56%	0%	+0.2 pp
2. The labor force grows at the recovery's pace	1.24%	0%	+1.7 pp
3. Firms scale up	1.24%	1.5%	−1.2 pp

Table 3: *The three projection scenarios, EU aggregate, 2021 to 2042.*

Notes: projections with the wedge-adjusted identity; growth rates per year.

6.2 Scenario 1: the labor force keeps growing at the current pace

The first scenario projects entry under the labor force growth Europe has had in the recent past, with all other inputs fixed. I let the labor force grow at the pace of the last 16 years, 2005–21, $g_N = 0.56\%$ a year. The result is an entry rate that does not move: 10.3% in 2021, 10.5% in 2042.

Figure 15 shows the path of the labor force and the entry rate it implies, which remains close to its historical low. At this pace, the labor force grows in parallel to the labor that incumbents demand, as per the profiles. As a result, the share of the labor force left for entrants remains stable, and so does the entry rate.

This pace is faster than what population projections imply. According to Eurostat's EUROPOP2023 projections, the net labor force is flat or falling over the next twenty years: between -0.2% and 0.1% per year depending on migration levels. Under those paths the entry rate falls to between 8.2% and 9.1% by 2042. The first scenario is therefore an upper bound on what Europe can expect if labor force trends do not dramatically change.

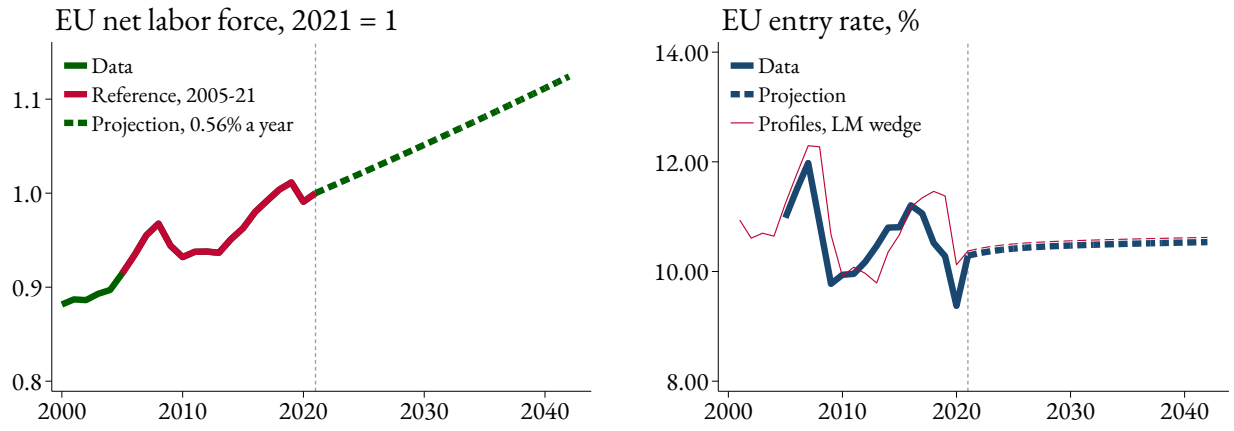


Figure 15: *Scenario 1: projection of the EU labor force past 2021 and the resulting firm entry rate under the framework of Hopenhayn et al. (2022). Left: the EU net labor force in hours (2021 = 1), data to 2021 and projection after 2021 (dashed); the projected growth rate is that of the reference period in red, 2005–21. Right: entry rate in the data, entry rate of the HNS framework with the labor-market wedge (Section 5.3), and the projected entry rate (dashed). Sources: Eurostat, ILO and OECD.*

6.3 Scenario 2: the labor force grows at the recovery's pace

The second scenario projects entry under faster labor force growth, with all other inputs fixed. I let the labor force grow at the pace of the 2014–19 recovery, $g_N = 1.24\%$ a year, twice the rate of the first scenario. The result is an entry rate that rises from 10.3% to 12.0% by 2042, its historical maximum.

Figure 16 shows the two paths side by side, both for labor force growth (left panel) and projected entry rate (right panel). Most of the rise takes place in the first ten years. Since the profiles and the wedge are the same as in the first scenario, the entire difference comes from labor-force growth: a faster growing labor force brings more workers for entrants once the incumbent firms have hired what their profiles dictate.

This pace of labor force growth is, however, faster than anything Europe has sustained: the net labor force has grown at 1.24% a year only in five-year recoveries, 2003–08 and 2014–19.

6.4 Scenario 3: firms scale up

The third scenario projects entry under the labor force growth of the recovery, with firms growing in size at the same time. I keep $g_N = 1.24\%$ a year from the second scenario and add firm growth of $g_{\bar{e}} = 1.5\%$ a year at every age for twenty years, a shift of the EU size profile; survival and the entry cost are unchanged. The result is an entry rate that falls, from 10.3% in 2021 to 9.1% in 2042, against 12.0% with the same labor force and no firm growth.

This is not a particularly fast rate of firm growth: in twenty years the average EU firm would go from 11 to 15 workers, three tenths of the way to the U.S. firm size of 24, and closing the gap in twenty years would take 3.8% a year, far above anything observed in the data. It is also slower than what the

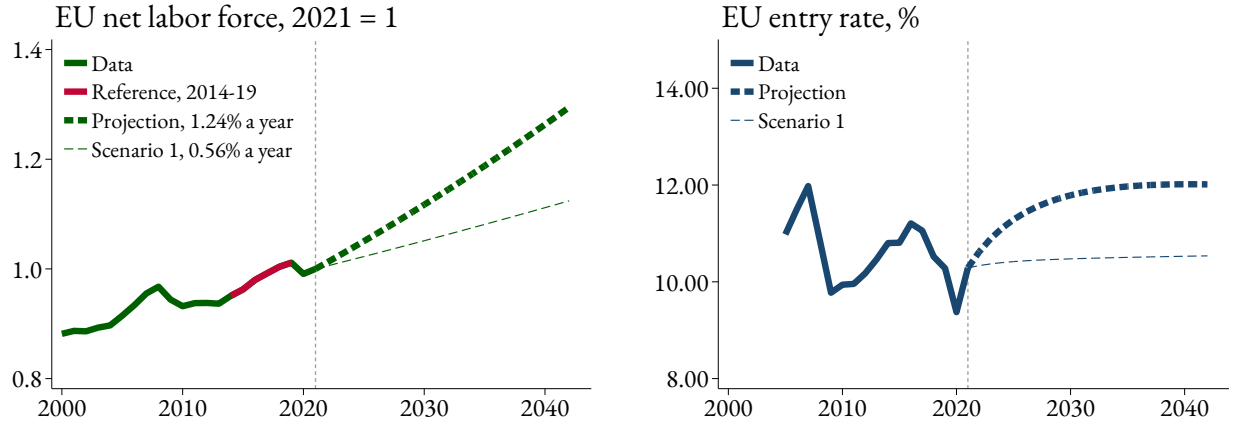


Figure 16: *Scenario 2: projection of the EU labor force past 2021 at the pace of the 2014–19 recovery, and the resulting firm entry rate under the HNS framework. Left: the EU net labor force in hours (2021 = 1), data to 2021 and projections after 2021. Two projections: the thick dashed line grows at the pace of the 2014–19 recovery, the reference period in red; the thin dashed line is the projection of scenario 1 (Figure 15), at the 2005–21 pace. Right: the entry rate in the data and the two projected entry rates (dashed), the thick line is for this scenario, the thin line shows scenario 1 (Figure 15). Sources: Eurostat, ILO and OECD.*

EU authorities call for when discussing sub-scale firms in Europe (Draghi, 2024). Figure 17 shows the measured and projected net labor force (left panel), average firm size (middle panel), and entry rate (right panel). Entry falls because growing firms absorb the labor that entrants would otherwise take.

Even with the labor force growth of the recovery, which Europe has never sustained for twenty years, it takes little firm growth to undo its effect on entry. Europe's smaller firms are compatible with U.S. levels of business dynamism as long as they do not scale faster than the labor force; policies directed to scaling firms up may unintentionally harm business dynamism.

7 Conclusion

This paper argues that the decline in business dynamism experienced in Europe during the last two decades can be explained by demographic factors. The rate of growth of the labor force in Europe has declined since the early 2000s, which has translated into increasingly lower rates of business formation during these last two decades.

This is the argument that Hopenhayn et al. (2022) make for the U.S., where they show that it explains the decline in business dynamism since the 1980s. I find that it applies in Europe as well, and it does so particularly well once I account for the fraction of the labor force that is not absorbed by the private sector, excluding unemployment and public sector employment and adjusting for hours worked, which tend to oscillate more in Europe than in the U.S.

Therefore, firm formation in Europe is driven by the same factors as in the United States, and has declined for comparable reasons: a slowdown in the rate of growth of workers available in the labor force. In addition, the rate of entry of new firms in Europe is similar to the U.S.: despite European firms being smaller, Europe presents no deficit in entrepreneurship. These results speak to the debate

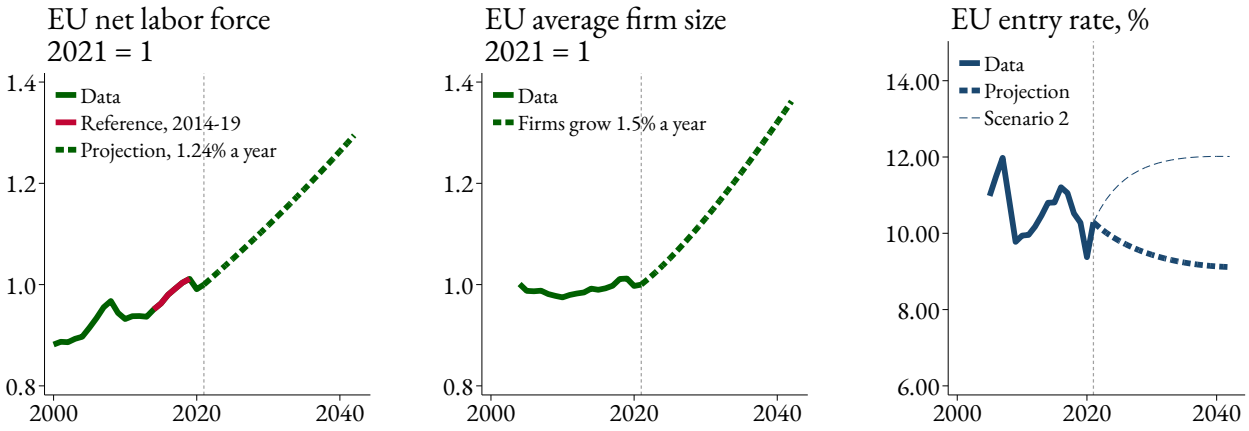


Figure 17: *Scenario 3: scenario 2's labor force plus firms scaling up at the same time, and the resulting firm entry rate. Left: the EU net labor force in hours (2021 = 1), as in scenario 2. Center: EU average firm size (2021 = 1), data to 2021 and projection after 2021 (dashed), growing 1.5% a year at every age. At this firm growth rate, the size gap with the U.S. would close in about fifty years. Right: the entry rate in the data and the projected entry rate (dashed), with scenario 2 as the thin line. Sources: Eurostat, ILO and OECD.*

on European business dynamism, which is marked by the observation that in many metrics, such as productivity and GDP growth, Europe is falling behind the United States. In business dynamism, the contrast with the U.S. is however more nuanced.

The paper concludes with a projection of European firm entry under different labor force growth scenarios. I find that, at the current rate of labor force growth, Europe's entry rate is likely to stay near its historical low. To recover fully to pre-2008 levels, the labor force should grow at rates near its historical maximum. In addition, this relationship between labor force growth and entry rate strongly depends on firm sizes. If the EU moves in the direction of closing the firm-size gap with the U.S., entry rates may be negatively affected, as growing firms absorb workers that would have otherwise given rise to new firms.

It remains to be explained why European firms are born smaller and remain smaller throughout their lifecycle, a fact this paper takes as given and leaves for future work to answer. This size gap is present at entry in every sector of the economy, and so it is not due to Europe's firms being in lower value added industries. Factors like financial frictions, regulation, selection, and entrepreneurial skill are natural candidates.

Appendix

A.1. The Eurostat tables and the BDS conventions

Table	Eurostat title	Unit; employment	Sectors	Years	Variables taken
BD_9A_L_FORM	Business demography by legal form (until 2007, NACE Rev. 1.1)	all enterprises; persons employed and employees	NACE Rev. 1, C to K	1997–2007	firms, births, deaths, employment, by legal form (history)
BD_9AC_L_FORM_R2	Business demography by legal form and NACE Rev. 2 activity (2004–2020)	all enterprises; persons employed and employees	NACE Rev. 2, B to N	2004–2020	the same, by legal form; legal-form artifact detection
BD_9EG_L_FORM_R2	Employer business demography by legal form and NACE Rev. 2 activity (2004–2020)	employers (1+); persons employed and employees	NACE Rev. 2, B to N	2012–2020	employer firms, births, deaths by legal form
BD_L_FORM	Business demography by legal form and NACE Rev. 2 activity	all enterprises; persons employed and employees	NACE Rev. 2, B to S	2021–2024	all-firm reference (firms, births, deaths by legal form) after 2020
BD_9BD_SZ_CL_R2	Business demography by size class and NACE Rev. 2 activity (2004–2020)	all enterprises, size class 0 dropped; persons employed and employees, survivors in persons employed only	NACE Rev. 2, B to N	2008–2020	employer stock, births, deaths, employment; survivors and their employment at ages one to five
BD_9FH_SZ_CL_R2	Employer business demography by size class and NACE Rev. 2 activity (2004–2020)	employers (1+); persons employed and employees, survivors in persons employed only	NACE Rev. 2, B to N	2012–2020	employer births, deaths, survival by age; employees
BD_SALGE1_SIZE	Employer business demography by size class and NACE Rev. 2 activity	employers (1+); persons employed and employees, survivors in persons employed only	NACE Rev. 2, B to S	2021–2023 (Ireland from 2019)	stock, births, deaths and employees after 2020

Table A1: *The seven Eurostat business demography tables used in the construction, with Eurostat's titles. Tables on NACE B to S are reduced to B to N; the two most recent tables are not published for the UK and Switzerland.*

Convention	BDS	European panel	Match
Firm unit	one or more paid employees on the March-12 payroll	one or more paid employees (Eurostat's GE1 universe)	yes
Self-employed without staff	out (Nonemployer Statistics)	out (size class 0 dropped)	yes
Owner-officers on the payroll	counted as employees	counted as employees	yes
Employment	paid employees (Form 941)	salaried employees; persons employed less the measured proprietor gap where salaried employees are not published	yes
Birth and death	first and last year with employment	first and last year with one or more employees	yes
Stock-flow identity	$\text{firms}_t = \text{firms}_{t-1} + \text{entry}_t - \text{exit}_{t-1}$	same, imposed in construction	yes
Rate denominator	average of the two stocks the flow connects	same; Eurostat publishes current-stock rates	yes
Latest year of exits	$t-1$	$t-2$, deaths confirmed after two years	timing only
Reference instant	March 12	any activity in year t	no; 1 to 3% of levels
Active population	employment on March 12	any activity in year t	no; small, offsets across entry and exit
Firm definition	firm, common control	enterprise, autonomous unit	no; autonomous subsidiaries stay separate

Table A2: *BDS conventions and their counterpart in the European panel. The last column states whether the two coincide.*

	Years	Tables linked	Flow from identity	National sources
DE	2004–2023	9FH, SALGE1; entry before 2012 on 9BD	exit	none
UK	1997–2024	9BD, 9FH; to 1997 on the legal-form tables	exit	ONS business demography from 2019, on rates; employees from the Business Population Estimates
FR	1998–2023	9FH, SALGE1; rates to 2004 on the legal-form tables, partnerships and companies only	exit	URSSAF employer register: firm count before 2008; employees from 1998, market sectors, at their 2008–11 ratio to Eurostat's
IT	2001–2024	9FH, SALGE1; on the legal-form tables before 2008	exit	none
ES	1998–2024	9FH, SALGE1; on the legal-form tables 2001–07	exit	INE's DIRCE, employer firms as total less firms without employees: stock and entry chained back to 1998 and forward to 2024 on registrations and deregistrations, growth rates only
NL	2007–2023	9FH, SALGE1; not extended (births shift in 2006)	residual split	CBS legal-form tables, size level
CH	2013–2024	9BD (equal to 9FH); entry from 9FH 2014–17	exit	FSO business demography from 2021: enterprises and births with two or more jobs, and their employment; STATENT in 2024, growth rates only
PL	2004–2023	9BD, 9FH, SALGE1; on the legal-form tables before 2008	entry	none
BE	2007–2023	9BD, 9FH, SALGE1; not extended on the legal-form tables (register reorganized in 2009)	entry	DynaM stopping-employer rate for exits (Eurostat deaths omit exits by decline); stock chained back to 2007 on the DynaM employer count
IE	2008–2023	SALGE1 from 2019, 9BD and 9FH before	entry, to 2018	Revenue payroll records from 2019: employer stock, all-firm birth rate for entry, cessation rate for exit, chained to 2018
NO	2002–2023	9BD (equal to 9FH); entry and exit from 9FH, 2008–11 on 9BD ratios	exit; stock before 2008	Statistics Norway: entry and exit 2002–07 at fixed ratios to its employer births and deaths; from 2021 the stock on SALGE1 growth, entry on its employer births and employees on its employer enterprises, growth rates only
AT	2004–2023	9FH, SALGE1; on the legal-form tables before 2005	exit	none

Table A3: *Sources by economy. 9BD, 9FH and SALGE1 abbreviate the size-class tables of Table A1, in order of preference; "legal-form tables" are the all-enterprise tables used to extend the series backward. The fourth column is the flow derived from the stock-flow identity.*

	Breaks corrected
DE	2014 reclassification: stock 2012–13 shifted to the post-break level, before 2012 parallel to 9BD, entry 2012–14 parallel to all-enterprise births. 2018–21 change of basis: stock and entry rate log-linear between 2017 and 2022.
UK	none.
FR	2009 and 2020 vintage breaks interpolated in stock and entry; exit interpolated 2020–22.
IT	2010 stock replaced by the average of its of adjacent years; 2015 birth spike (ASIA register revision) replaced by the average of its of adjacent years.
ES	births 2022–23 using the all-legal-form births, 2024 by DIRCE registrations.
NL	stock before 2010 projected backwards with the identity from the 2010 level; the identity residual divided equally between entry and exit; size re-based on CBS legal-form tables, directors on payroll data.
CH	2018 stock, an outlier, interpolated.
PL	2009 stock spike replaced by the mean of its neighbors; 2015–17 sole-proprietor reclassification reversed at the 2012–14 employer share; exits before 2020 scaled to SALGE1 (ratio 2.2).
BE	2008 Eurostat stock not used (too sparse to anchor), 2007–08 on the DynaM employer count; limited-liability stock 2016–18 interpolated (Eurostat breaks 2009, 2018); 2022 dip replaced by the mean of its neighbors.
IE	2008 stock trimmed (coverage drop 2008–09).
NO	2008 stock re-extrapolated from 2009–13; 2019–20 stock decline trimmed toward the 9FH flows.
AT	sole-proprietor stock 2006–13 linear between 2005 and 2014 (pre-2014 classification); 2021–23 stock lowered so that exit rates equal SALGE1's.

Table A4: *Breaks corrected by economy. Years of the published series; "neighbors" are the adjacent years.*

			Residual, % of stock		EFD less published, mean absolute			
	EFD years	Published	mean	mean abs.	stock, %	years over 1%	entry rate, pp	exit rate, pp
DE	2009–2022	9BD, 2009–20	-0.61	2.46	4.2	10	1.56	2.82†
UK	2009–2018	9BD, 2008–18	-0.06	0.52	0.0	0	0.28	1.02†
FR	2009–2023	9BD, 2008–20	-0.18	2.81	1.8	3	1.50	2.23†
IT	2009–2024	9FH, 2008–20	-0.53	0.98	0.2	1	0.22	0.85†
ES	2009–2024	9FH, 2008–20	-0.30	0.55	0.0	0	0.00	0.64†
NL	2008–2023	9FH, 2007–20	0.70	0.93	1.1	3	0.25†	0.25†
CH	2014–2023	9BD, 2013–20	0.36	0.42	0.1	0	0.03	0.30†
PL	2009–2023	9BD, 2008–20	-0.57	3.35	1.8	4	4.21†	2.75
BE	2008–2023	9BD, 2008–20	-2.75	2.89	1.0	6	6.07†	8.96
IE	2009–2022	9BD, 2008–20	0.96	2.79	8.3	6	1.74†	0.36
NO	2003–2023	9BD, 2008–20	-2.22	2.22	1.4	6	1.78	2.57†
AT	2005–2023	9FH, 2004–20	-0.75	1.01	2.6	9	0.17	0.98†
Mean			-0.50	1.74	1.9	4.0	1.48	1.98

Table A5: *The corrections in numbers. "EFD years" are the years of the series on the employer tables, before the backward extension; "Published" is the employer table with more complete years (9FH, or 9BD less size class 0) and its years. The first group of columns is the stock-flow residual of that table as published, $(firms_t - firms_{t-1} - births_t + deaths_{t-1})/firms_{t-1}$; a negative mean means the published deaths fall short of the exits the stock implies. The second group is the mean absolute distance between the EFD series and the published employer series (9BD less size class 0, 9FH where published, SALGE1 after) over their overlap: stock in percent, years in which the stock differs by more than 1%, entry and exit rates in percentage points; † marks the flow derived from the identity (Table A3), whose distance is the residual the identity absorbs.*

The tables above are read as follows. Before 2008 no table excludes firms without employees, so the series are extended backward on the legal-form tables, which start in 1997 but count all firms. Within each legal form, the count of firms, births and deaths is multiplied by the share of employers in that legal form, measured in the employer tables from 2012 on and held fixed, since it is stable over the years in which both tables exist. In France the reference count is partnerships and companies only, because most sole proprietors registered after 2009 are auto-entrepreneurs without employees, whose employer share does not extend backward. Where a table reports persons employed but not employees, the owners are netted out: the gap between persons employed and employees per firm is measured in the tables and years that publish both, and subtracted. The same gap, measured on employer births, is subtracted from the survivors' persons employed to obtain firm size by age, since the size-class tables report the survivors of each cohort and their employment at ages one to five in persons employed only. For each economy, the by-age series come from the size-class tables of Table A3: 9BD, from 2008, or 9FH, from 2012, where only the employer table counts employer firms.

Two kinds of breaks occur within a table, independently of the linking. The first is a reclassification of firms without employees into the employer class, which inflates the stock of employer firms and makes the birth rate spike. A year is flagged when three criteria hold: the entry rate jumps in the employer table by size class but not in the all-firm tables by legal form, the stock of firms jumps in the same year, and the jump is located in partnerships and sole proprietorships. In a flagged year the affected legal-form series is rebuilt from the years around the break, after it in Germany in 2014 and before it in Poland in 2015 to 2017, with the growth rate of the tables that do not show the break. The second kind are the years Eurostat flags as a change of source or method, which are not used to link two tables. Every series is then checked against the stock-flow identity: in the published tables, where the residual shows the breaks above, and in the constructed series, where it holds by construction whenever one flow is derived from it (Table A5). Table A4 lists the corrections by economy.

National sources complete the Eurostat series in the economies listed in the last column of Table A3. Whenever both a national series and Eurostat data exist, they are compared over the years in which they overlap, and since the levels differ, only its growth rates are used. The UK is not in Eurostat after 2018 and Switzerland after 2020, and so I use the ONS business demography and STATENT instead. Norway's series is extended back to 2002 using Statistics Norway's employer births and deaths, and forward from 2021 using its employer stock. Spain's series are extended back to 1998 and forward to 2024 using the registrations and deregistrations of INE's DIRCE, and Belgium's back to 2007 on the DynaM employer count. Belgium's exits also come from DynaM, since Eurostat's deaths omit the firms that exit by losing their last employee. Ireland changes in 2019 to a register built from payroll records, which includes many more firms. In order to avoid an artificial increase in the stock of firms following this accounting change, the series keeps the level of the old register and uses only the growth of the new one. In Figures 2 to 3 and A3 to A4, the national sources have their own color only in the years that no Eurostat table covers, as a line or, when it is a single year, as a dot. In the other years in which the dataset uses a national source, the figures show the dataset against the Eurostat tables that it replaces.

A.2. The remaining economies: data

	Entry rate	Exit rate	Firm size
EU aggregate	2005–2023	2005–2023	2004–2023
Germany	2005–2023	2005–2022	2004–2023
United Kingdom	1998–2024	1998–2024	1998–2024
France	2004–2023	2005–2023†	1998–2023
Italy	2002–2024	2002–2024	2001–2023
Spain	1999–2024	1999–2024	2001–2023
Netherlands	2008–2023	2008–2023	2007–2023
Switzerland	2014–2023	2014–2023	2013–2024
Poland	2005–2023	2005–2023	2004–2023
Belgium	2008–2023	2008–2023	2007–2023
Ireland	2009–2023	2009–2022	2008–2023†
Norway	2003–2023	2003–2023	2003–2023
Austria	2005–2023	2005–2023	2004–2023

Table A6: *Span of the resulting series, all economies: first and last year of the entry rate, the exit rate and average firm size. A dagger marks a span with a missing year inside it.*

The figures of Section 3 show the U.S., the EU aggregate and the five largest European economies. The seven other economies in the dataset, the Netherlands, Switzerland, Poland, Belgium, Ireland, Norway and Austria, follow here in that order, with the same colors throughout the appendix.

Figures A3 and A4 show the Eurostat tables as published against the dataset, as Figures 2 and 3 do for the six largest economies.

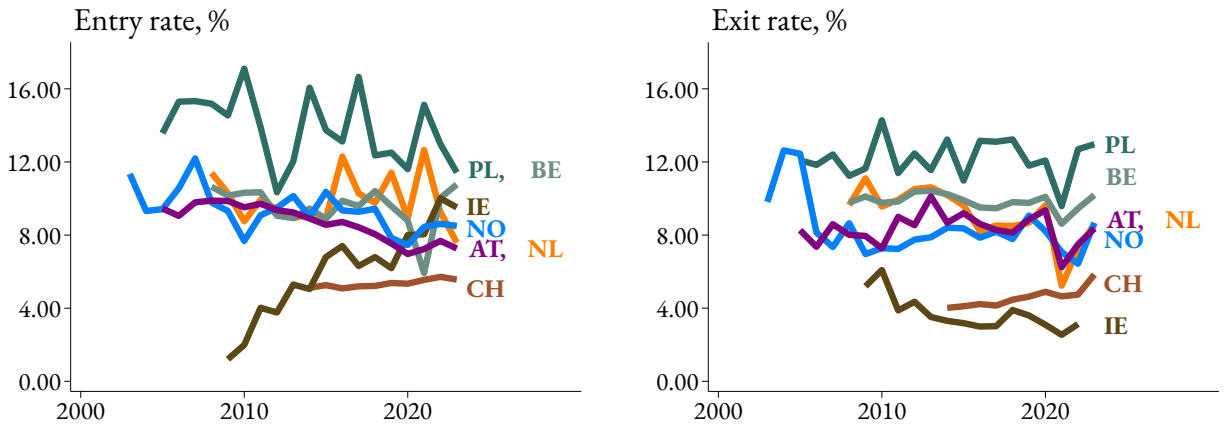


Figure A1: *Firm entry and exit rates, percent, the seven remaining economies. Left: entry rate; right: exit rate. The U.S., the EU and the five largest European economies are in Figure 4. The Swiss, Belgian, Irish and Norwegian series are chained on the national sources of Section 2.2. Source: Eurostat.*

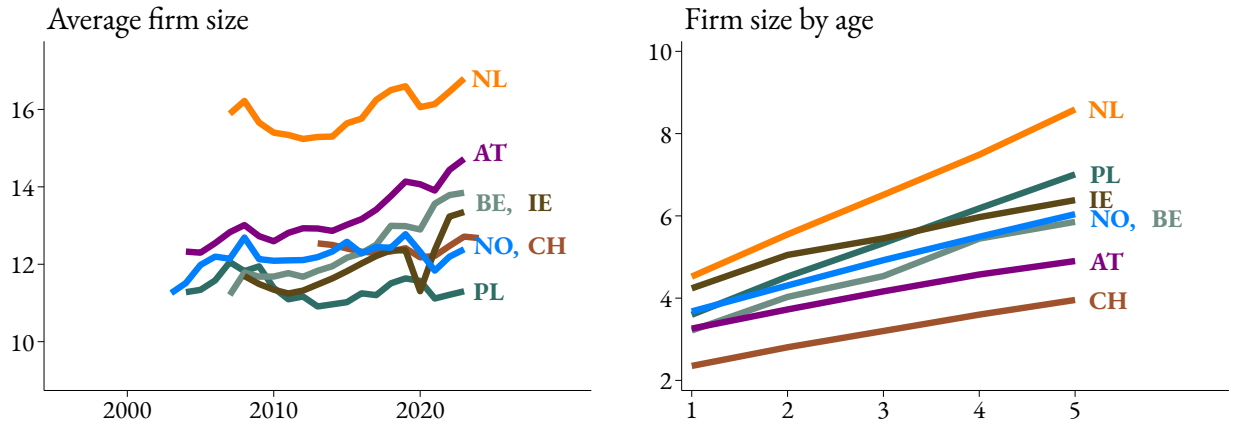


Figure A2: *Average firm size and firm size by age, the seven remaining economies. Left: average firm size; right: firm size by age. The U.S., the EU and the five largest European economies are in Figure 5. The Swiss series continues on the FSO after 2020 and the Norwegian on Statistics Norway; the Irish series is chained to its 2018 level from 2019. Source: Eurostat.*

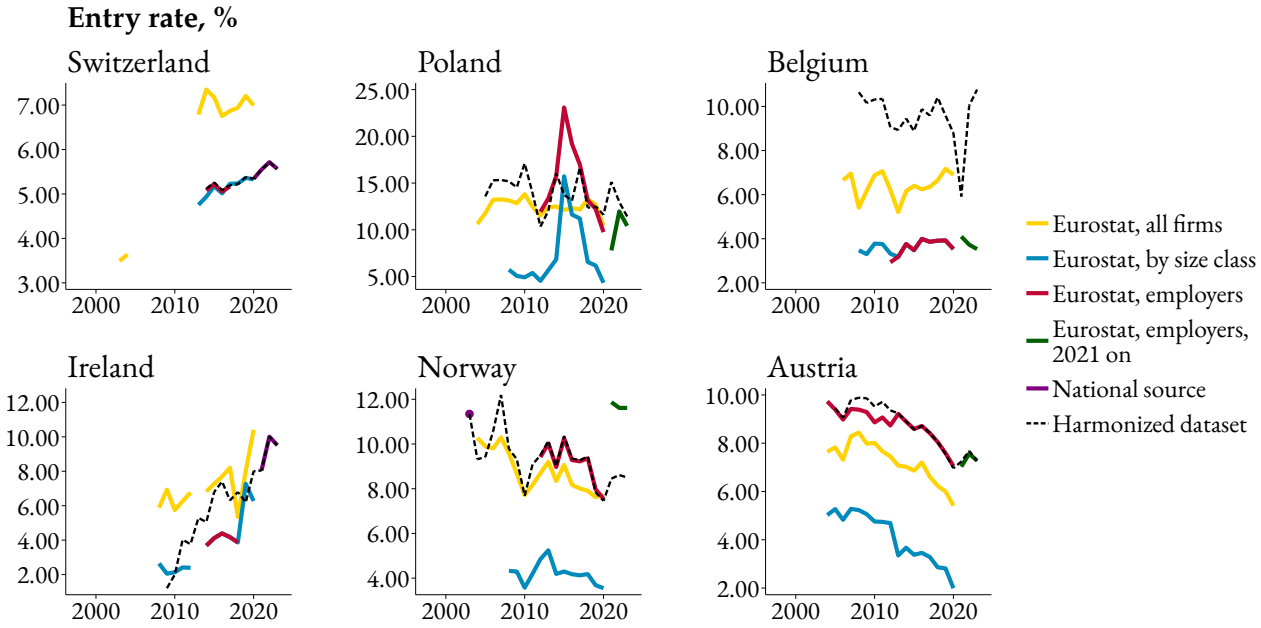


Figure A3: *Entry rate in the harmonized dataset against the published Eurostat series, six remaining economies. The all-firm tables include firms with 0 employees; the size-class table is shown for firms with 1+ employees; the employer table counts only firms with at least one paid employee. In the years no Eurostat table covers, the dataset follows the national sources, shown chained to the Eurostat level, and as a dot when it is a single year. Ireland's 2021 table starts in 2019, on the new payroll-based register. The six largest economies are in Figure 2. Sources: Eurostat and national statistical offices.*

A.3. Fitted profiles

This appendix shows the size and survival profiles of Section 4.3 for every economy: the fitted curves, their fit against the by-age data they are drawn through, and the fit error by economy, in the two groups of economies of Appendix A.2.

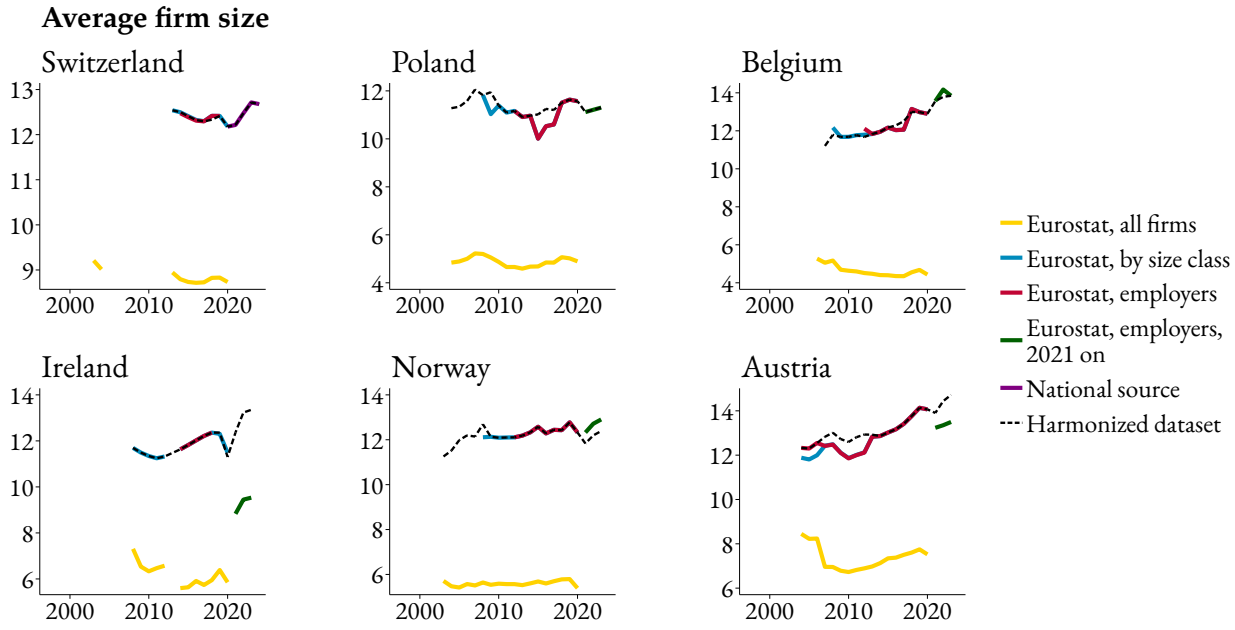


Figure A4: *Average firm size in the harmonized dataset against the published Eurostat series, six remaining economies. The all-firm tables include firms with 0 employees; the size-class table is shown for firms with 1+ employees; the employer table counts only firms with at least one paid employee. The all-firm tables report persons employed, owners included, and the other tables paid employees. The six largest economies are in Figure 3. Sources: Eurostat and national statistical offices.*

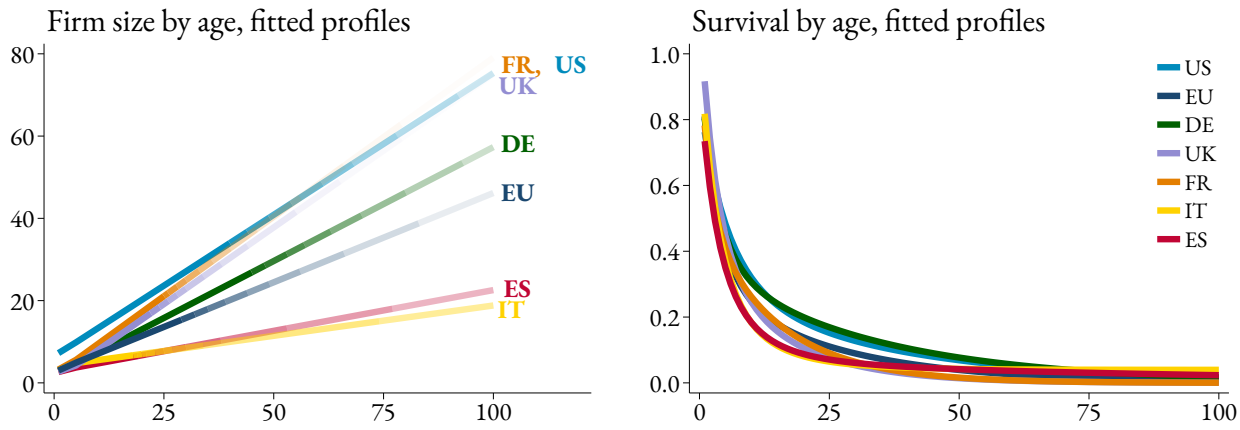


Figure A5: *Fitted firm age profiles, U.S., EU and the five largest European economies. Left: the size profile, average employment of a cohort's survivors at each age; right: the survival profile, the share of a cohort still alive at each age. The profiles are estimated as described in Section 4.3. The remaining economies are in Figure A6. Sources: BDS and Eurostat.*

A.4. The remaining economies: results

This appendix shows the figures of Section 5 for the remaining economies, in the order of Appendix A.2: the labor force input, the series behind the wedge, and the identity against the data. The economy-by-economy discussion of the gaps that Section 5.6 leaves out follows the figures.

	Window	RMSE, pp		Correlation	
		Profiles	Profiles, LM wedge	Profiles	Profiles, LM wedge
US	1952–2022	1.55		0.60	
EU	2005–2022	0.68	0.69	0.58	0.66
DE	2005–2022	1.01	1.67	0.27	-0.34
UK	1998–2022	1.76	1.32	0.41	0.74
FR	2004–2022	1.00	1.51	0.46	0.56
IT	2002–2022	2.43	2.40	0.31	0.68
ES	1999–2022	4.43	4.66	0.22	0.61
NL	2008–2022	1.35	1.76	0.25	0.44
CH	2014–2020	1.44	1.04	-0.82	-0.73
PL	2005–2022	1.85	2.03	0.06	0.39
BE	2008–2022	1.74	1.61	0.34	0.63
IE	2009–2022	3.04	1.91	-0.14	0.80
NO	2003–2020	1.97	1.71	0.10	0.18
AT	2005–2022	1.28	0.99	0.63	0.63
Mean, twelve European		1.94	1.88	0.17	0.38

Table A7: *Fit of the age profiles to the entry rate, by economy.*

Notes: RMSE in percentage points and correlation against the entry data, on each economy's window. For the U.S., the prediction of Hopenhayn et al. (2022).

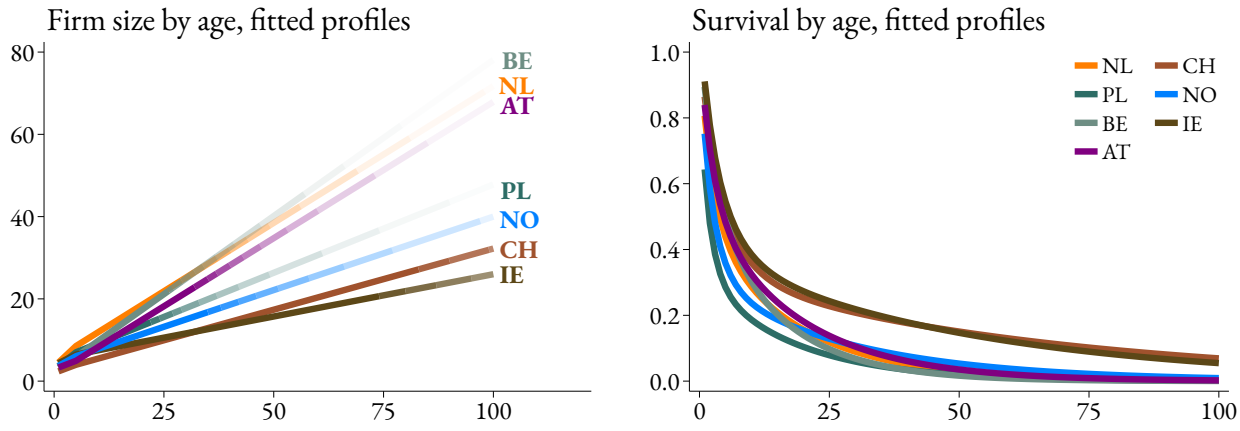


Figure A6: *Fitted firm age profiles, the seven remaining economies. Left: the size profile; right: the survival profile. The U.S., the EU and the five largest European economies are in Figure A5. Source: Eurostat.*

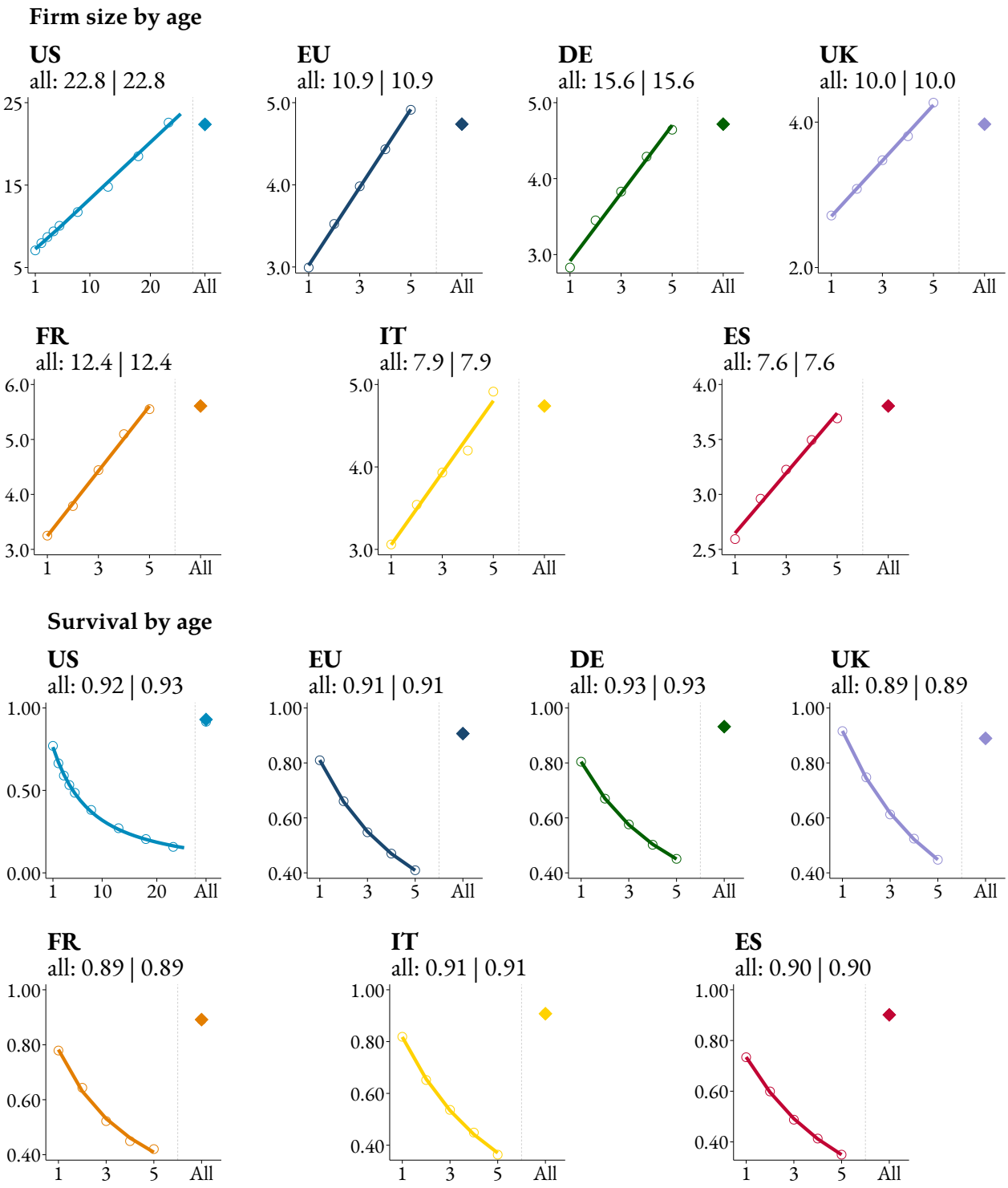


Figure A7: *Fit of the age profiles to the by-age data, U.S., EU and the five largest European economies. Top: the size profile; bottom: the survival profile; lines are the fitted profiles of Figure A5 and circles the data. The "All" column compares the average over all firms, data (circle) against fit (diamond). The remaining economies are in Figure A8. Sources: BDS and Eurostat.*

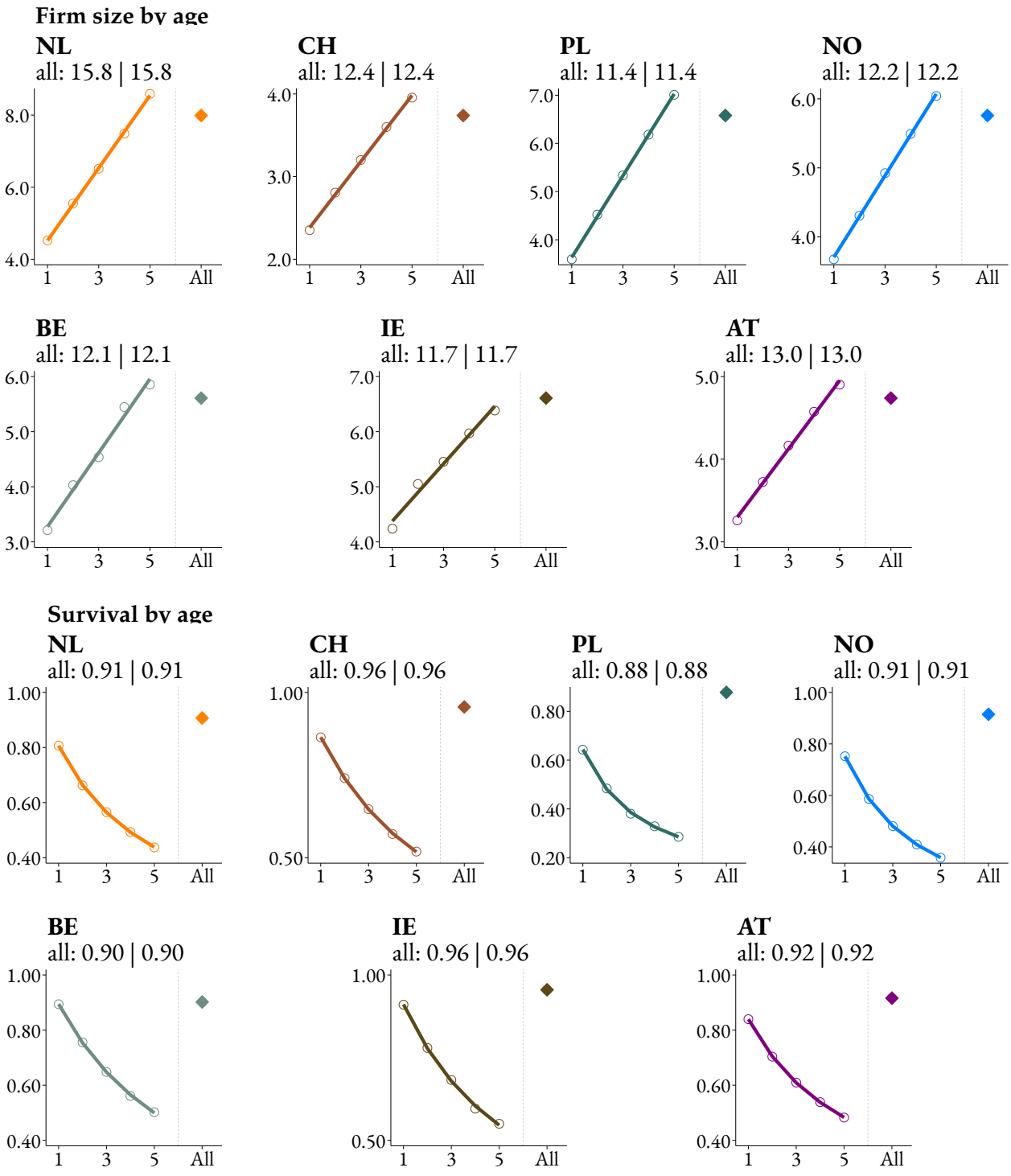


Figure A8: *Fit of the age profiles to the by-age data, the seven remaining economies. Top: the size profile; bottom: the survival profile; lines are the fitted profiles of Figure A6 and circles the data. The U.S., the EU and the five largest European economies are in Figure A7. Source: Eurostat.*

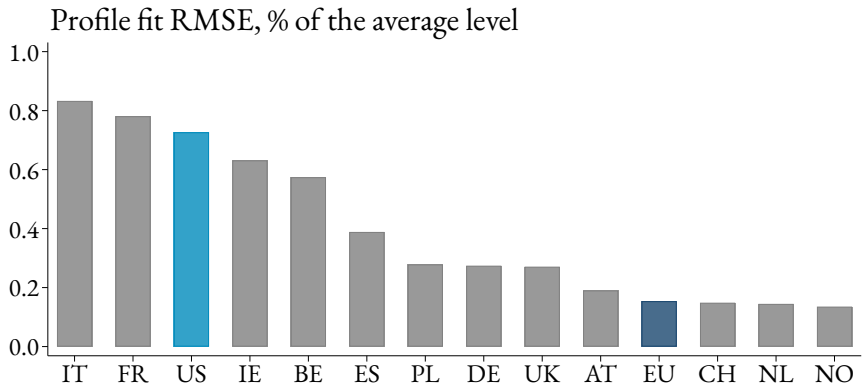


Figure A9: *Fit error of the age profiles by economy, percent of the average level. The error is the root mean squared error of the joint size and survival fit of Section 4.3, so that 1 is a miss of 1% of the level at a typical age. Sources: BDS and Eurostat.*

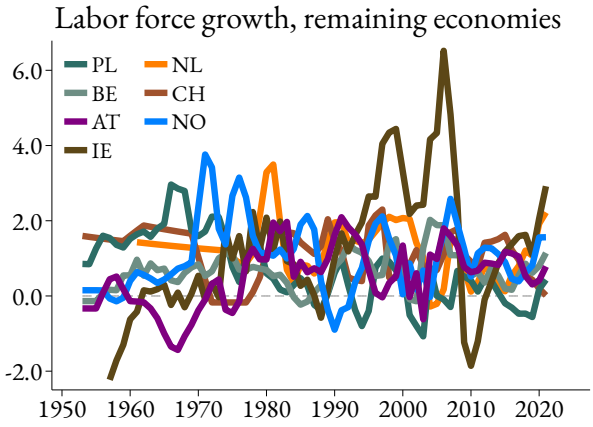


Figure A10: *Labor-force growth per year, percent, three-year moving averages, the seven remaining economies. The U.S., the EU and the five largest European economies are in Figure 7. Sources: OECD and ILO.*

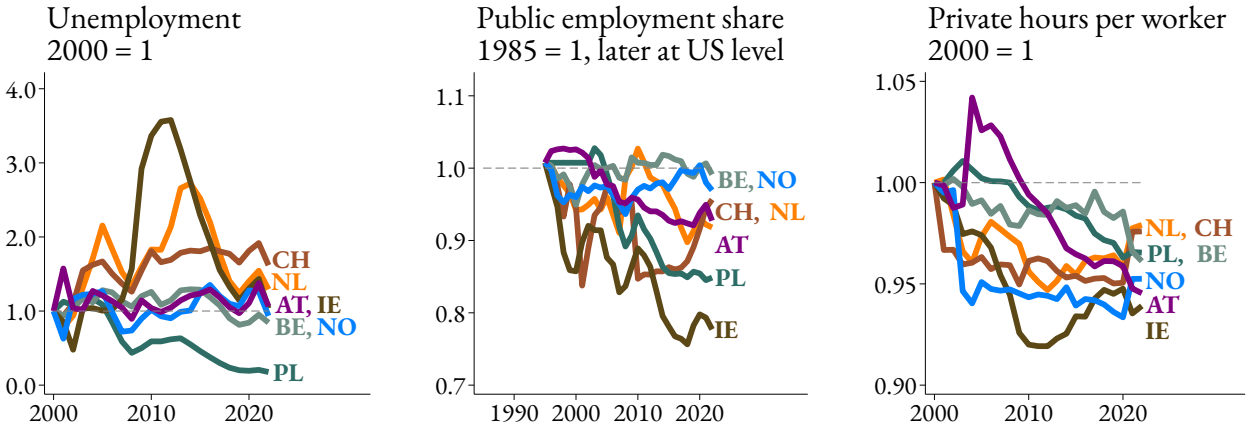


Figure A11: *Series behind the labor-market wedge, normalized, the seven remaining economies. Left: unemployment, 2000 = 1; center: public employment share, rescaled to the U.S. as in Figure 9; right: private hours per worker, 2000 = 1. The U.S., the EU and the five largest European economies are in Figure 9. Sources: ILO and EU Labour Force Survey.*

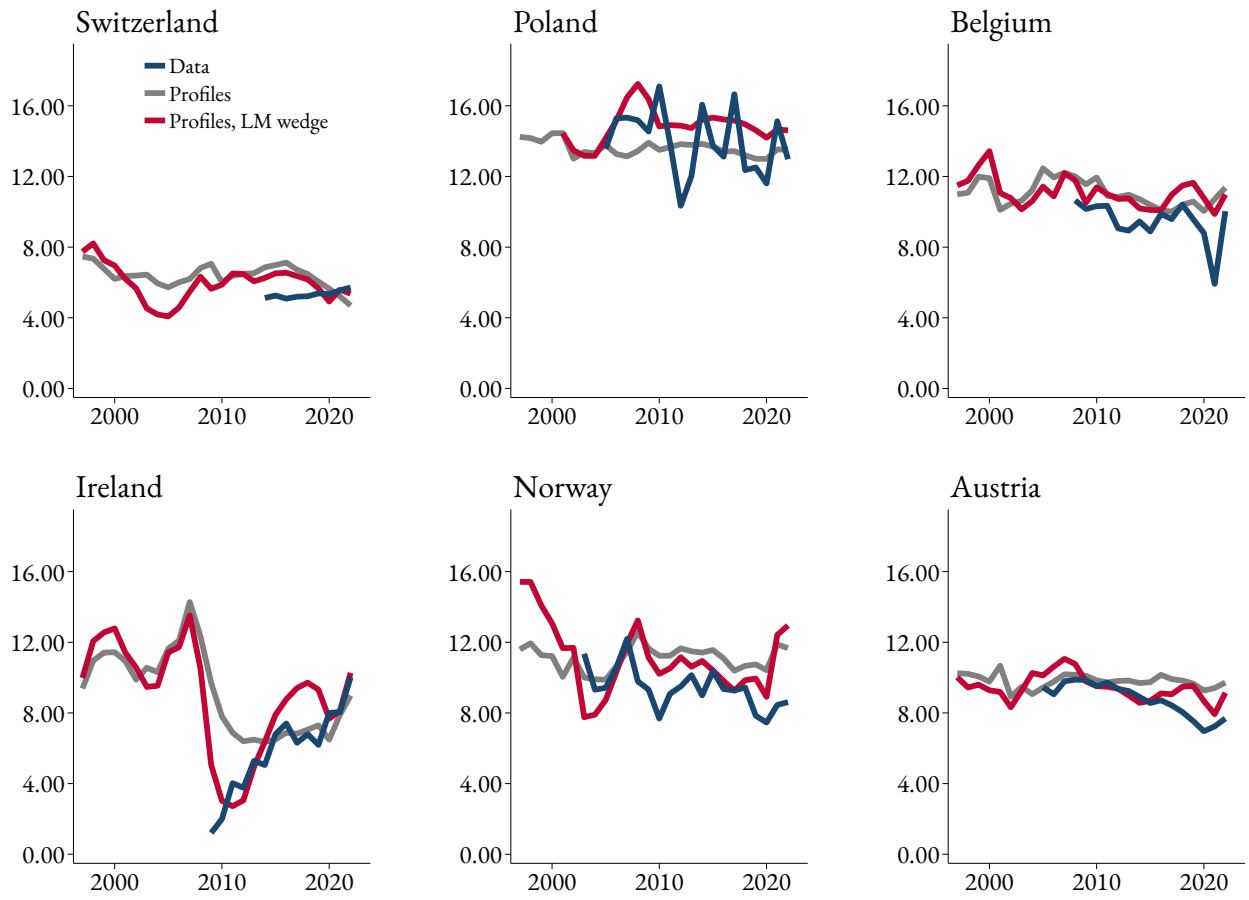


Figure A12: *Entry rate, percent. Economy-by-economy equivalent of the right panel of Figure 8, for the six remaining economies. The six largest European economies are in Figure 10. The axis starts at zero, where the Irish and Belgian series lie. Source: Eurostat.*

The remaining gaps, economy by economy

This section collects the milder gaps that Section 5.6 does not discuss, with the scores of Table A7. The UK, Norway and Austria are not discussed: the wedge lowers their RMSE to near or below the U.S. one and raises or holds their correlation.

Belgium. Belgium presents a lower RMSE than Spain and Italy, 1.7 points, but shares a characteristic with them: the identity predicts more entry than the data show. The correlation is in line with the rest of the economies, and it improves with the wedge, from 0.34 to 0.63. Belgium's young firms shrank in the same way as Italy's, from 5.2 employees per firm for the 2008 cohort to 3.6 for the 2011 one, so the margin is the same: firm size and survival shifting across cohorts while the identity holds them fixed.

France and the Netherlands. France and the Netherlands are milder cases of the German entry over-prediction: the RMSE rises from 1.0 to 1.5 points in France and from 1.4 to 1.8 in the Netherlands, but the correlation improves in both, from $+0.46$ to $+0.56$ and from $+0.25$ to $+0.44$. Contrary to Germany, the correction moves the prediction in the right direction and only the level is off. In France the wedge frees labor from the share of the labor force in unemployment or public employment falling, from 31% to 29% over 2004–2008 and from 31% to 28% over 2016–2022. Entry, however, falls over the whole sample, and so does the exit rate, from 13.5% in 2009 to 9.4% in 2023, with average firm size flat at 12.4. Fewer incumbent firms exit, so fewer entrants replace them. The identity holds the exit rate fixed and cannot reproduce the observed data.

A.5. The labor force: coverage and episodes

	Years	Annual from	Sources
US	1947–2023		U.S. Census / BLS
EU	1947–2022	1960	aggregate of the 12 economies below, labor-force weighted
DE	1960–2022		OECD ALFS (West) + GESIS (DDR) to 1982; ILO from 1983
UK	1956–2026		OECD ALFS to 1989; ILO and ONS from 1990
FR	1956–2022		OECD ALFS to 1989; ILO from 1990
IT	1951–2022	1956	ILO to 1955; OECD ALFS to 1989; ILO from 1990
ES	1950–2022	1956	ILO to 1955; OECD ALFS to 1989; ILO from 1990
NL	1960–2022	1975	ILO to 1974; OECD ALFS to 1989; ILO from 1990
CH	1950–2022	1990	ILO throughout
PL	1950–2022	1955	ILO to 1954; OECD ALFS to 1989; ILO from 1990
BE	1947–2022	1956	ILO to 1955; OECD ALFS to 1989; ILO from 1990
IE	1956–2022		OECD ALFS to 1989; ILO from 1990
NO	1947–2022	1956	ILO to 1955; OECD ALFS to 1989; ILO from 1990
AT	1951–2022	1956	ILO to 1955; OECD ALFS to 1989; ILO from 1990

Table A8: *Labor-force coverage and sources by economy. Before the "annual from" year the series is interpolated between censuses; a blank means annual throughout.*

The European series come from the ILO from 1990 and from the OECD's Annual Labour Force Statistics before that; for Germany before reunification, the labor force is the sum of West Germany and the

DDR. The U.S. series comes from the Census Bureau and the BLS. In the few years without annual data, the series is interpolated between the years that have it.

Table A8 lists the sources behind each labor force series and the years they cover. The published series have level breaks: in the year of a new census or of a change in the survey, the count jumps by 2 to 12%. There are two types of breaks. The first comes from a redesign of the labor force survey or from new population weights after a census. Since the labor force and employment are estimated from the same survey, the ILO employment series has the same break in these cases, so the two series remain consistent and I leave them as published. The second type does not appear in the employment series. These breaks occur in two cases. The first is in the years before the surveys begin, when the series is based on censuses. The second is in 1990, when the source changes from the OECD to the ILO. I correct them in two steps. First, in the years of each break, I replace the growth rate with the average growth of the two years before and the two years after. Second, I recalculate the levels of all earlier years with the corrected growth rates. The years after the break are not modified, so the most recent part of the series is the published one. Table A9 lists the windows. The Austrian 1991 figure is a one-year outlier at the seam, and its level is interpolated between 1990 and 1992.

	Years	Growth	Origin
AT	1964	-4.6	
	1991	$+4.1$, then -0.1	one-year outlier at the OECD-to-ILO seam; interpolated
BE	1970	-2.6	1970 census
CH	1980	$+3.9$	census year in the census-interpolated history
FR	1990–91	$+8.1$, -4.3	1990 census rebasing, on both sources
NL	1987	$+12.1$	start of the Dutch Labour Force Survey (EBB)
PL	1982	-2.5	

Table A9: *Breaks bridged in the labor force series. Growth is the published change in the break years, in percent; the origin is the statistical event behind it where documented.*

The three series behind the labor-market wedge of Section 5.3 are built as follows. Unemployment is the ILO headcount. Public employment is general government employment from ILOSTAT, and from the ONS for the UK; where the ILOSTAT series changes source, in Austria (1997, 2001 and 2005), France (2007), Ireland (2008) and the Netherlands (2018), the two segments are spliced at their ratio in the overlap, and Poland's share before 2002 is held at its 2002 value. Hours per worker are usual weekly hours per employee from the EU Labour Force Survey, and from the BLS for the U.S., averaged over the private-dominated activities with each activity weighted by its share of employment, so that public sector part-time stays largely out of the average. The LFS classifies workers by activity rather than by employer, so some public employees remain in the average: measured in the Spanish data and bounded in the UK data, about 3% of employment in these activities is public sector work, a weight at which even large changes in public hours would move the average by a few tenths of a percent.

A.6. The identity is homogeneous of degree one in the labor force

The identity of Section 4.2 determines entry from the labor force path, the age profiles, the entry cost and an initial age distribution. The identity is homogeneous of degree one in the labor force. With the

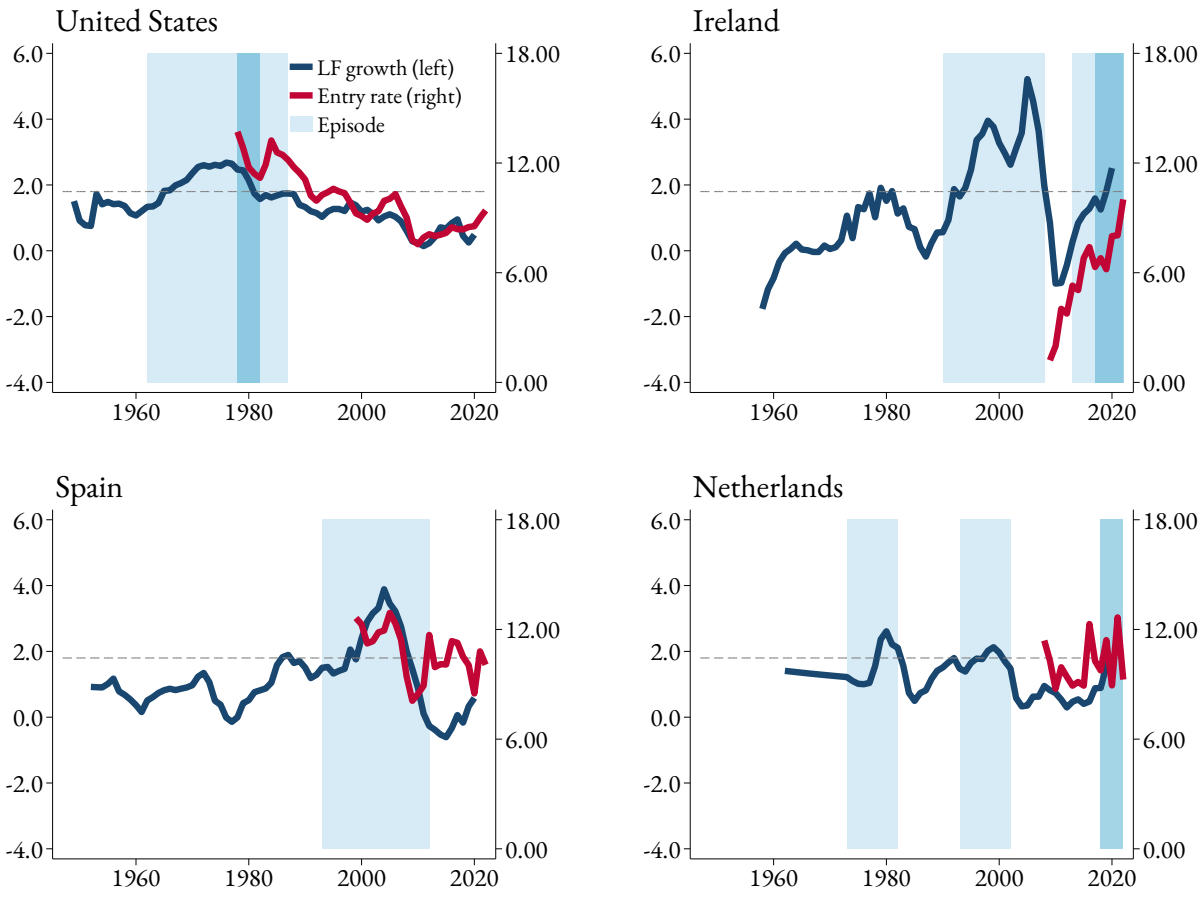


Figure A13: *Episodes of fast labor-force growth and the entry rate, percent, the four economies whose episodes overlap the entry data. Each panel: five-year moving average of labor-force growth (left axis) and entry rate (right axis); bands mark episodes of growth above 1.8% a year (dashed line). Sources: BDS, Eurostat, OECD and ILO.*

profiles and the entry cost fixed, if the labor force series $\{N_t\}$ is multiplied by a constant $\lambda > 0$, entry and the number of firms are also scaled by λ. As a result, the entry rate does not change. Formally, let $\{m_t\}$ be the entry path that the identity

$$m_t = \frac{1}{c_e}\Big[N_t - \sum_{a\geq 1} m_{t-a}\, S(a)\, e(a)\Big]$$

generates from the labor force path $\{N_t\}$ and the initial cohorts $\{m_{1-a}\}_{a\geq 1}$, and let $\{m'_t\}$ be the path it generates from $\{\lambda N_t\}$. I show that $m'_t = \lambda m_t$ in every year by induction on t. The initial cohorts satisfy this by construction, because they come from the stationary age distribution of Section 4.3. In that distribution, the number of firms of age a is proportional to $S(a)$, and its level is set so that the labor market clears at the first value of the labor force, N_1. Each initial cohort is therefore proportional to N_1, so multiplying N_1 by λ multiplies every m_{1-a} by λ. For the induction step, suppose that $m'_\tau = \lambda m_\tau$ in every year $\tau < t$. Then

$$m'_t = \frac{1}{c_e}\Big[\lambda N_t - \sum_{a\geq 1} \lambda m_{t-a}\, S(a)\, e(a)\Big] = \lambda m_t,$$

so the whole entry path scales with λ. The stock of firms, $\sum_{a\geq 0} m_{t-a} S(a)$, is a sum of the cohorts, so it scales with λ too. The entry rate is entry divided by the average number of firms in two consecutive years. Since both are multiplied by λ, the entry rate is the same in every year.

For this reason, the labor-market wedge of Section 5.3 affects the predicted entry rate only through its changes over time, and not through its level. Writing the labor available to firms as $\phi_t N_t$, a constant $\phi_t = \phi$ rescales the path, so it delivers the same entry rate as the labor force itself, and the levels of unemployment, public employment and hours per worker are irrelevant for the fit. In the U.S. the three components are stable over the sample, so the uncorrected labor force gives the same prediction as the corrected one; in Europe they move, and the correction has something to correct.

A.7. How entry responds to the growth of each input

The identity of Section 4.2, with the corrected labor input of Section 5.3, reads

$$\phi_t\, N_t \;=\; c_e\, m_t \;+\; \sum_{a\geq 1} m_{t-a}\, S(a)\, e(a).$$

The sum is the employment of incumbent firms, the product of their number F_t and their average size $\bar{e}_t$, and the entry-cost term is small, so

$$\phi_t\, N_t \;\approx\; \bar{e}_t\, F_t \qquad \Longrightarrow \qquad g_{F,t} \;=\; g_{N,t} \;+\; g_{\phi,t} \;-\; g_{\bar{e},t}.$$

The stock of firms evolves as $F_t = F_{t-1} - \text{exits}_t + m_t$; dividing by F_t,

$$\frac{m_t}{F_t} \;=\; \frac{F_t - F_{t-1}}{F_t} \;+\; \frac{\text{exits}_t}{F_t} \;\approx\; g_{F,t} \;+\; x_t.$$

Substituting $g_{F,t}$ from the first step gives the entry rate as a function of the growth of each input,

$$\frac{m_t}{F_t} \;\approx\; g_{N,t} \;+\; g_{\phi,t} \;-\; g_{\bar{e},t} \;+\; x_t.$$

Only growth rates and the exit rate enter: the levels cancel, as the homogeneity of Appendix A.6 requires. Entry rises with labor-force growth, with the growth of the share of the labor force that firms absorb and with the exit rate, and falls with firm size growth, which is the reading Section 6.1 uses for the three scenarios.

A.8. The entry cost from the data

The baseline entry cost of Section 4.3 borrows $\kappa = 6.4$ from HNS. In this appendix, I show that the exercise does not require this value, since the entry cost can be measured in the data. To do so, I measure c_e from the number of firms per worker, compare it with the baseline, and show how κ affects the predicted entry rate. My conclusions hold regardless of which of the two values is used. In the stationary distribution of Section 4.2, firms of age a are proportional to $S(a)$ and the labor force is absorbed by entrants and incumbents, so

$$\frac{\text{firms}_t}{N_t} \;=\; \frac{\sum_{a\geq 0} S(a)}{c_e + \sum_{a\geq 1} S(a)\, e(a)},$$

which depends only on the profiles and on c_e, and falls with c_e: a costlier entry means fewer firms for a given labor force. I solve this equation for c_e, using the number of firms per worker in the first year in which both series are available.

Table A10 compares the two values of the entry cost. The cost measured in the data is much larger: κ is between 27 and 64 in Europe and 14 in the U.S., against 6 to 14 in the baseline. However, the predicted entry rates fit the data almost equally well. The average RMSE of the twelve European economies is 1.99 points with the measured cost and 1.94 points in the baseline, and it changes by less than half a point in every economy. My conclusions therefore do not depend on this choice. I keep the HNS value so that the U.S. benchmark of Section 5.2 coincides with HNS's exercise.

The fit is similar under both values because κ changes how much entry responds to the labor force, and not the level of the entry rate. On a balanced growth path the level of entry is set by survival alone: with the labor force growing at rate g, firms of age a are $m_t\, S(a)/(1+g)^a$ and the entry rate is $1/\sum_{a\geq 0} S(a)\,(1+g)^{-a}$, in which c_e does not appear. c_e only scales the response to a change in the labor force, $\Delta N_t/c_e$ new firms, so entry responds less when κ is higher.

	Year	κ, WB	κ, firms/worker	RMSE, WB	RMSE, firms/worker
US	1978	6.4	14.1	0.88	0.72
EU	2013	9.2	40.2	0.68	0.74
DE	2008	11.7	64.0	1.01	1.05
UK	2008	6.4	27.3	1.71	1.79
FR	2008	6.0	35.8	1.00	0.94
IT	2008	10.4	33.2	2.43	2.23
ES	2008	13.4	28.1	4.43	4.13
NL	2007	7.5	29.7	1.35	1.49
CH	2013	8.8	53.1	1.32	1.65
PL	2008	14.1	35.4	1.85	1.77
BE	2007	8.0	42.7	1.74	1.84
IE	2008	6.2	50.2	3.04	3.29
NO	2002	6.0	31.4	2.14	2.24
AT	2004	11.7	34.0	1.28	1.45
Mean, twelve European				1.94	1.99

Table A10: *The entry cost from the ratio of Hopenhayn et al. (2022) (World Bank column, the baseline of Section 4.3) and from firms per worker, which solves the stationary ratio for c_e in the first year with a firm count and a labor force. RMSE in percentage points on each economy's entry window from that year.*

A.9. Sector composition and the unit of analysis

This appendix checks that the firm-size gap of Section 3.2 is not a matter of sector composition or of the unit of analysis. Figure A14 compares the distribution of firms and entrants across sectors in the U.S. and the EU, with sectors ranked by value added per worker, and the value added per worker of the sector of the average firm and the average entrant in each economy. European firms and entrants are in sectors at least as high in value added as U.S. ones. Figure A15 shows that U.S. entrants are larger than EU entrants in every sector, so the gap is within sectors. Figure A16 measures average size on the establishment as well as on the firm, since Eurostat counts enterprises and the BDS counts firms: the gap is of the same order on both units, about 23 against 4 to 12 employees per firm and 17 against 4 to 10 per establishment.

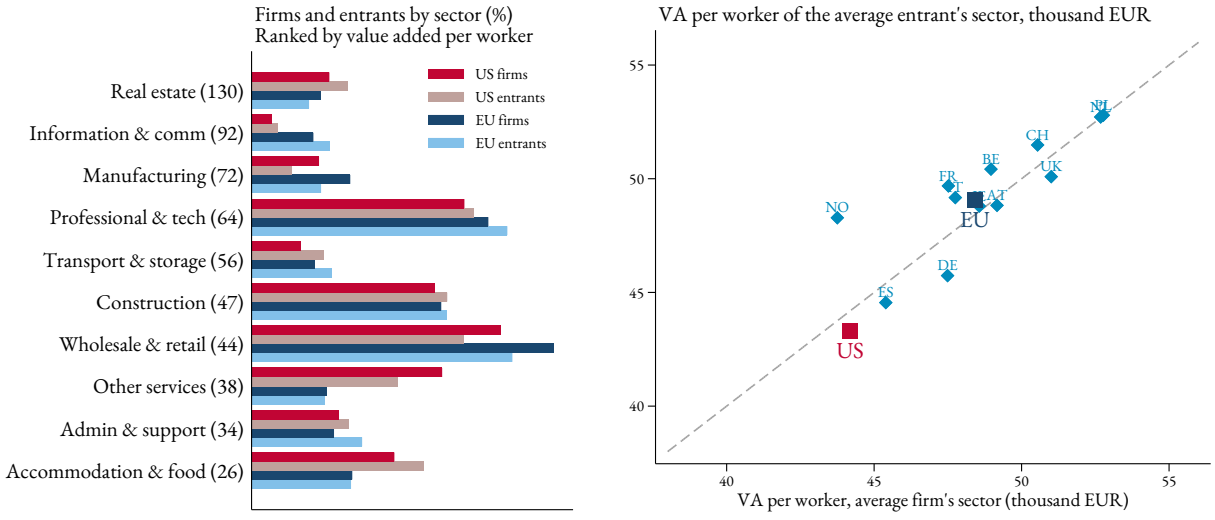


Figure A14: *Sector composition of firms and entrants, U.S. and EU. Left: share of firms and entrants by sector, ranked by value added per worker; right: value added per worker of the average firm's and the average entrant's sector, thousand EUR, by economy. Sources: BDS and Eurostat.*

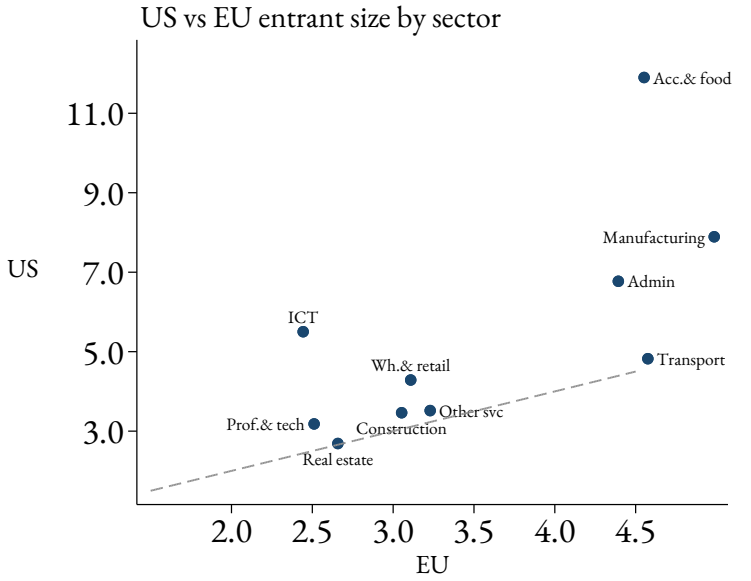


Figure A15: *Entrant size by sector, employees, U.S. against EU, one point per sector. The dashed line is the 45-degree line, so sectors above it have larger entrants in the U.S. Sources: BDS and Eurostat.*

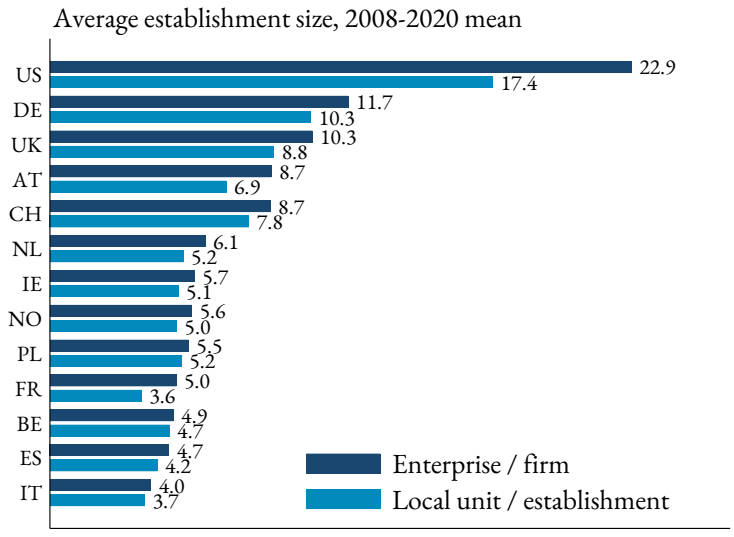


Figure A16: *Average size by unit of analysis: the firm or enterprise against the establishment or local unit, employees, 2008–2020 mean, by economy. Sources: BDS, Eurostat and the Swiss FSO.*

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