The entrepreneur and its circumstances: from cradle to frontier

Fernando Alexandre[†] Hélder Costa[†] Miguel Portela[†*]

[†]NIPE/Universidade do Minho
[*]IZA, Bonn

II Workshop Avaliação de Políticas Públicas

November 25^{th}, 2022

Acknowledgements

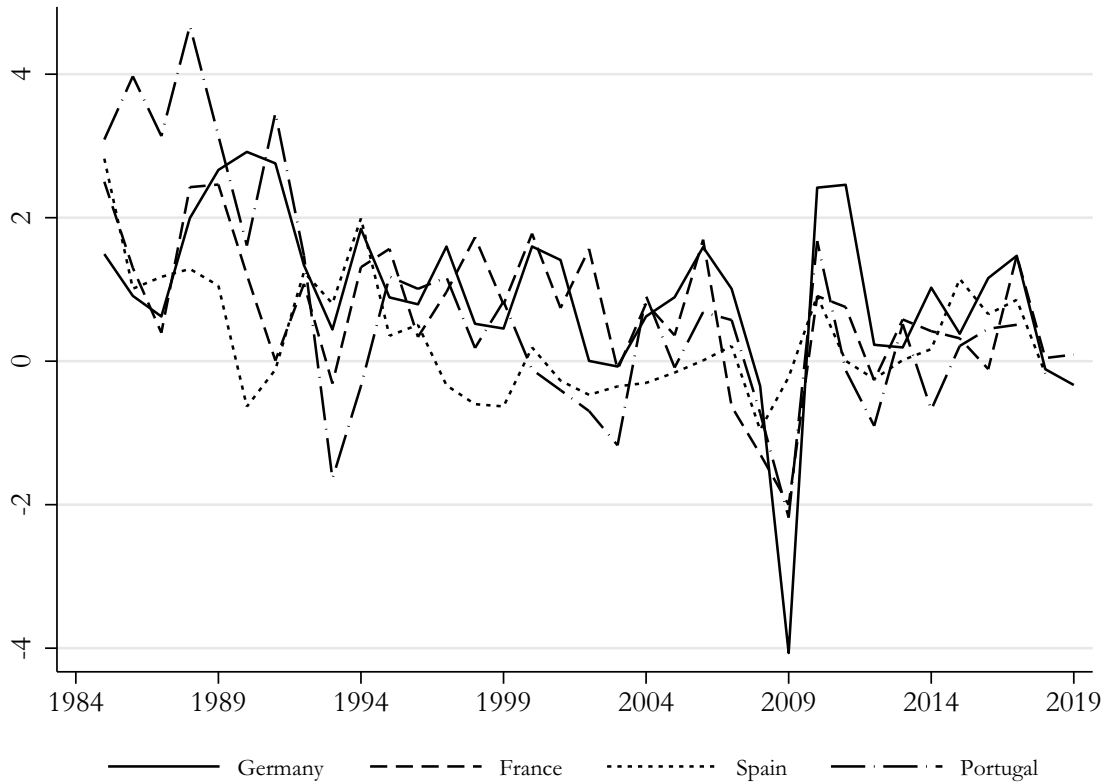
The authors acknowledge the funding by National Funds of the FCT - Portuguese Foundation for Science and Technology, projects UIDB/03182/2020 and PTDC/EGE-ECO/29822/2017 ("It's All About Productivity: contributions to the understanding of the sluggish performance of the Portuguese economy") and from Fundação Francisco Manuel dos Santos. Hélder Costa acknowledges the funding by FCT, scholarship 2020.04643.BD.

Outline

1. Productivity growth: the entrepreneur and its circumstances
2. Business context: product, labour and financial markets
3. Data and empirical strategy
    1. Data
    2. Entry, exit and productivity growth
    3. Growing to the frontier
4. Key takeaways

1. Productivity growth: the entrepreneur and its circumstances

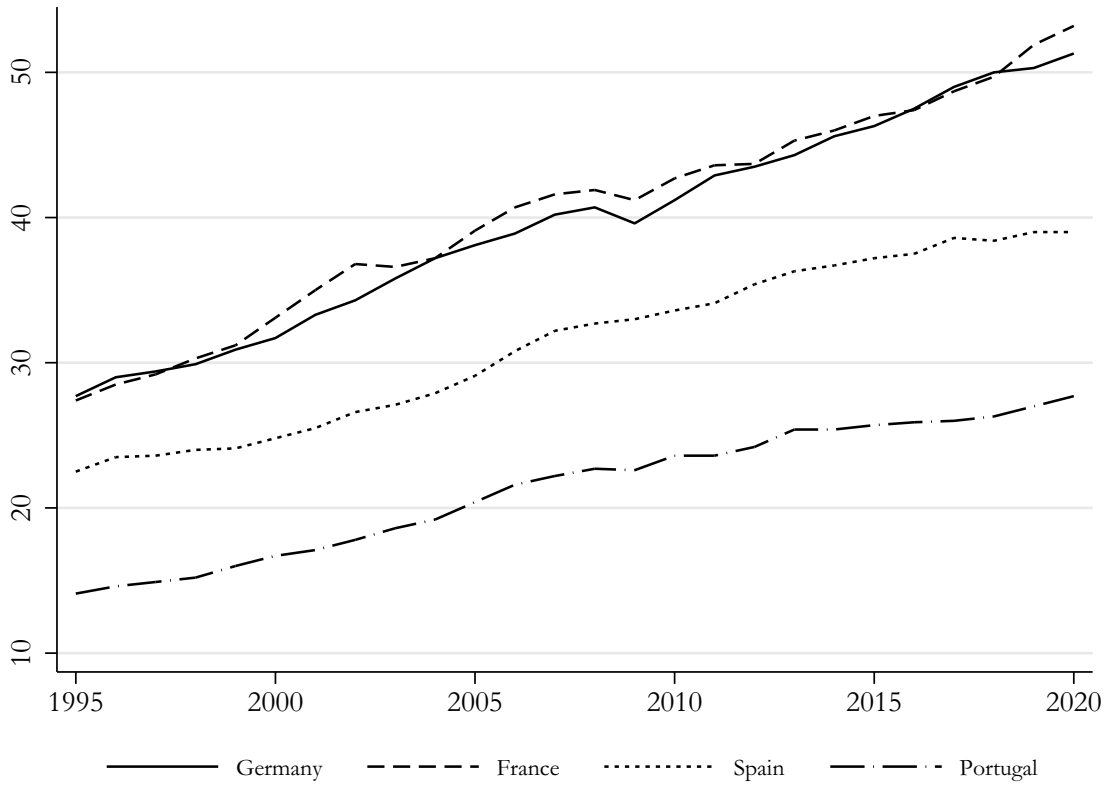
Figure 1: Multifactor productivity, annual growth rate (%), 1985 – 2019



Source: Own computations using data from OECD.

1. Productivity growth: the entrepreneur and its circumstances

Figure 2: Labor productivity, € PPS, 1995 – 2019



Source: Own computations using data from Eurostat.

1. Productivity growth: frontier firms and the rest

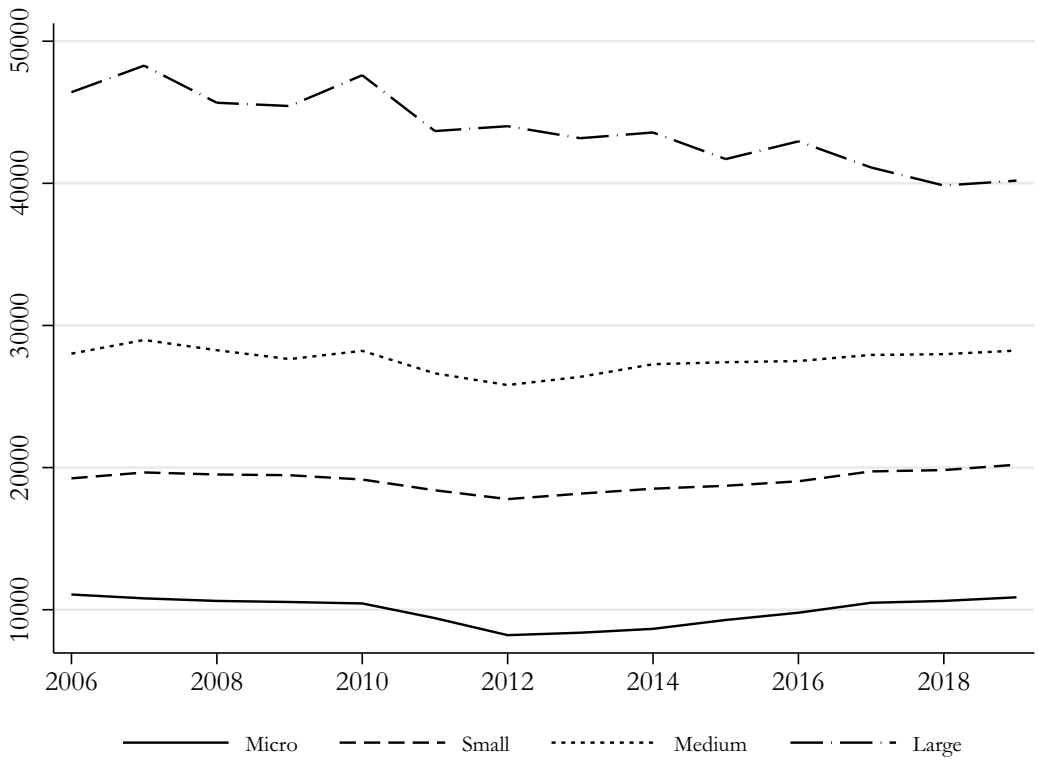
Table 1: Labour productivity in Portugal and in European countries: frontier versus non-frontier firms (th €), 2018

	Average labour productivity	
	All sizes	SMEs
Frontier: PT	115	72
Frontier: EU	193	134
Non-frontier: PT	22	21
Non-frontier: EU	46	44

Source: Own computations using data from Orbis.

1. Productivity growth: the entrepreneur and its circumstances

Figure 3: Real labor productivity by firm size, €, 2006 – 2019



Source: Own computations using data from SCIE, Statistics Portugal.

1. Productivity growth: the entrepreneur and its circumstances

Table 2: SMEs and large-sized firms in the manufacturing sector, 2019

	Non-frontier SME	Frontier SME	Large
Average age of the firm	23	26	37
Average productivity (unweighted) (th €)	19	69	61
Average employment	32	39	428
Average assets (th €)	2350	8901	100194
Average turnover (th €)	2140	8358	119670
Average exports (th €)	772	3104	63695
Share of firms graduated workers	8%	22%	19%
Share of firms with graduated managers	35%	66%	96%
Average hourly wage (€)	6	9	9
Average price of exports (€)	188	399	373
Profitability (EBITDA/total assets)	-10%	12%	4%
Leverage	95%	48%	58%
Foreign owned (>50%)	3%	14%	40%
Number of firms	9835	1375	452
Share in total employment	48.2%	8.1%	29.6%
Share in total VA	30.7%	15.0%	45.4%
Share in total exports	18.0%	10.1%	68.1%

Source: Own computations using data from SCIE.

1. Productivity growth: the entrepreneur and its circumstances

Table 3: Transition matrix across size and frontier classes from 2006, 2010 and 2014 to 2019

	2006		2010		2014	
	F. SME	Large	F. SME	Large	F. SME	Large
Micro	117	0	118	0	124	0
N-F. SME	301	88	338	86	352	76
F. SME	258	36	339	28	440	19
Large	4	242	4	286	3	325

Source: Own calculations with firm-level data from the SCIE (Statistics Portugal)

Only a small percentage of SME scale up and grow (e.g., EBI, 2019).

Outline

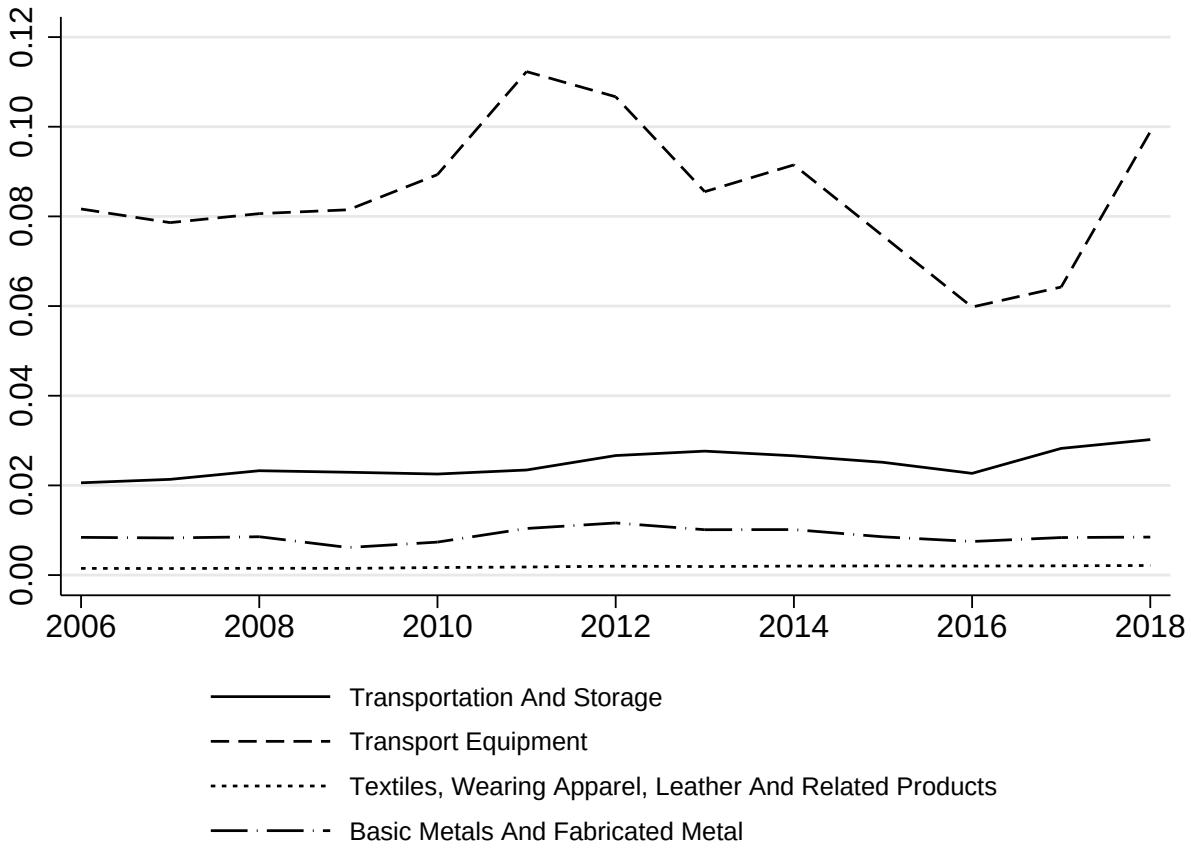
1. Productivity growth: the entrepreneur and its circumstances
2. Business context: product, labour and financial markets
3. Data and empirical strategy
    1. Data
    2. Entry, exit and productivity growth
    3. Growing to the frontier
4. Key takeaways

2. Business context: product, labour and financial markets

- Firms' performance is conditional on the business environment: product and labour market institutions, infrastructures, skills, technology, finance, participation in global value chains (e.g., OECD, 2020)
- The business environment, which reflects institutional and political features, is crucial for productivity growth (Decker et al., 2017; Decker et al., 2020).
- This paper evaluates the role of product, labour and credit markets on the efficiency of resource allocation, productivity growth and firms' growth.

- Does product market competition foster innovation and productivity growth?
- The Schumpeter (1943) argument: rents may incentivize innovation and competition may be detrimental for productivity growth.
- There is evidence that more intense competition is associated with higher productivity growth (e.g., Blundell et al., 1995 and 1999; Aghion et al., 2021): new entry and competition is necessary to get entrepreneurs out of bed in the morning.

Figure 4: Herfindahl–Hirschman Index



2. Business context: product, labour and financial markets

Labour market

- Dismissal and hiring regulations are an important determinant of firm adaptability to changes in markets and technologies.
- Evidence suggests that strict dismissal regulation reduces the scope for the reallocation of workers from low- to high-productivity firms (e.g., OECD, 2020; Andrews and Cingano, 2014; Bravo-Biosca, Criscuolo and Menon, 2016).
- Blanchard and Portugal (2017) emphasize the importance of enhancing micro flexibility in the Portuguese labour market to foster the reallocation of workers to high-growth sectors.
- To assess the role of labour market institutions on the efficiency of resource allocation, productivity growth and firms' growth, we propose a novel index of labour market flexibility, built on firm-level data.

$$\text{Flex}_{st} = \prod_{j=1}^{6} \left\{ 0.5 + \frac{\exp\left(f_{j,st}\right)}{1 + \exp\left(f_{j,st}\right)} \right\}$$

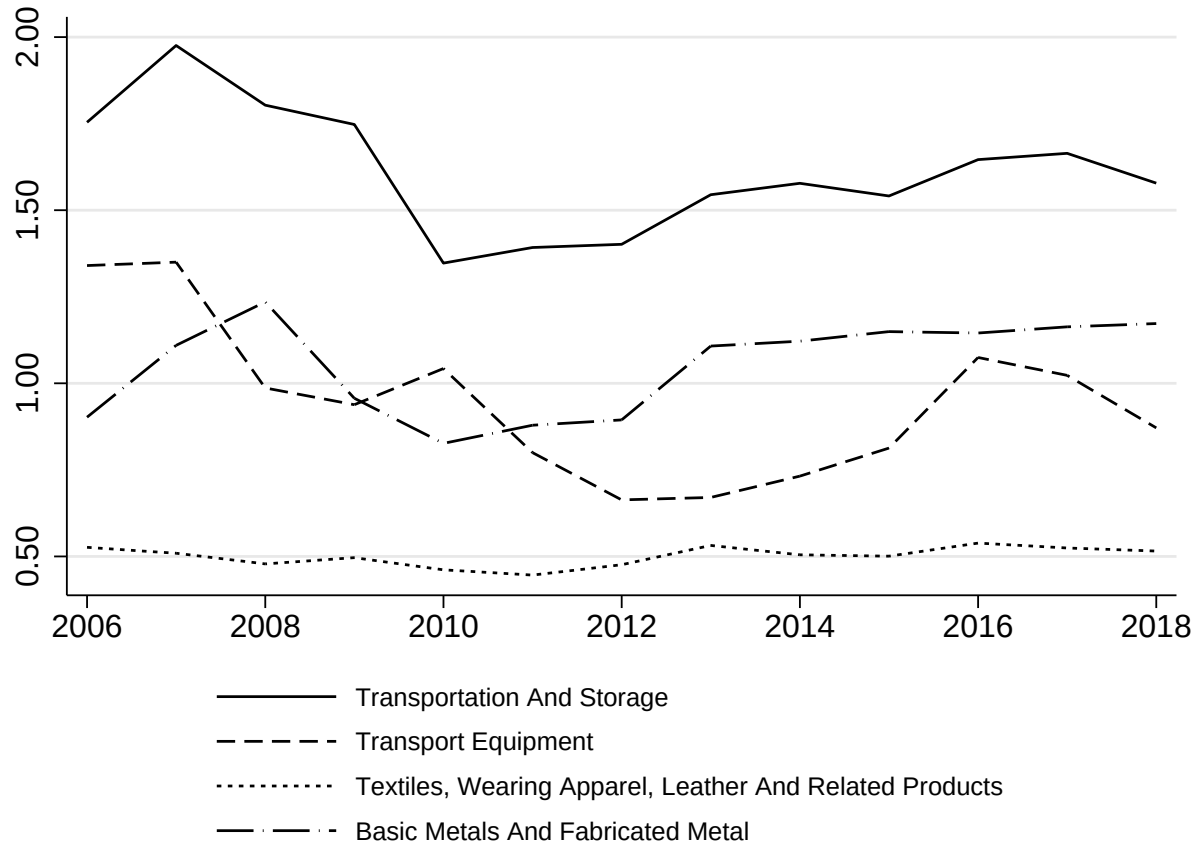
where

$$f_{j,st} = \frac{Z_{j,st} - \bar{Z}_{j,t}}{\sigma_{Z_{j,t}}},$$

$Z_{j,st}$ denotes one of the following labour market flexibility dimensions for sector s and time t:

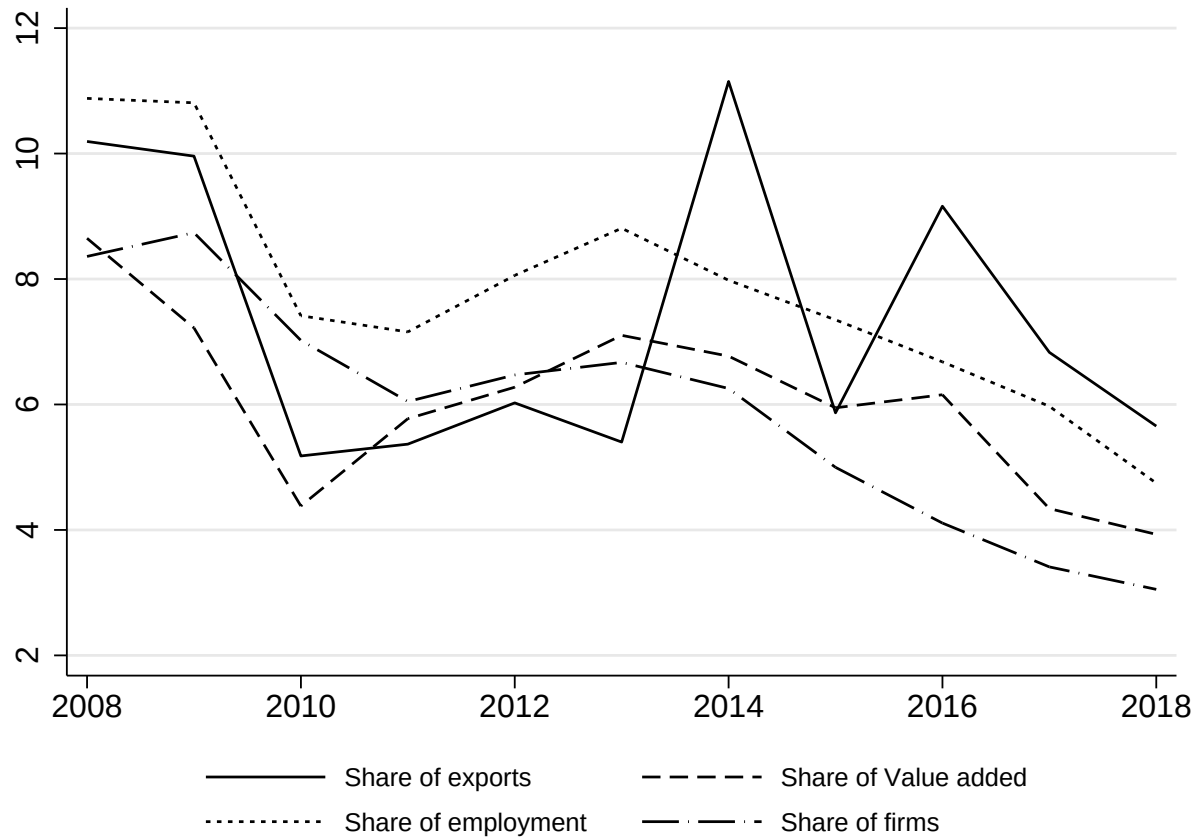
- Z_1: share of workers not covered by a collective agreement
- Z_2: share of workers with a fixed term contract
- Z_3: share of overtime hours of work
- Z_4: within sector/year Kaitz index (inverse)
- Z_5: wage cushion defined as the ratio of agregate irregular components of wages to total base wages
- Z_6: average tenure (inverse)

Figure 5: Labour market flexibility index



- Efficient financial markets and credit availability are crucial for firms' investment, for the adoption of new technologies and, therefore, for productivity growth.
- Zombie firms have been associated with high leverage and weaker economic performance (e.g., Caballero et al., 2008).
- The survival of zombie firms congests markets, hampers the growth of more productive firms and create barriers to the entry of new firms (e.g., Andrews et al., 2017; Gouveia and Osterhold, 2018).

Figure 6: Share of financially distressed firms in the whole economy (%)



Outline

1. Productivity growth: the entrepreneur and its circumstances
2. Business context: product, labour and financial markets
3. Data and empirical strategy
    1. Data
    2. Entry, exit and productivity
    3. Growing to the frontier
4. Key takeaways

3. Data and empirical strategy

To evaluate the role of the business context and of entrepreneurs' characteristics on the efficiency of resource allocation, productivity growth and firms' growth we estimate two sets of models:

1. A sector level model to evaluate the impact of entry and exit on resource allocation efficiency and productivity growth.
2. A firm level model to estimate the impact of managers' education and of the business context on the dynamics of the firms' position in the sector's employment and productivity distributions.

3.1 Data

- Integrated Business Accounts System (SCIE — Sistema de Contas Integradas das Empresas)

  The SCIE contains firm-level administrative data, including balance sheet and other accounting data, information on turnover, value-added, labour costs, total costs, leverage, debt, total assets, number of employees and value of exports. These data are available on a yearly basis for the population of firms in the private sector, from 2006 to 2019 (about 400 thousand firms per year).

- Firms' personnel records (QP — Quadros de Pessoal)

  The QP database is a linked employer-employee dataset, available between 1985 and 2019, gathered through a mandatory annual survey. It provides data on all workers in all Portuguese firms (excluding the public sector) with, at least, one wage earner (about three million workers each year). The available data include information on workers' formal education, age, gender, occupation, monthly wage (distinguishing between base wage, regular and irregular components), hours of work (regular and overtime), and the type of labour contract.

- Data sets from these two sources can be merged at the level of the firm as they use the same (anonymised) firm identifier.

3.2 Entry, exit and productivity

- An institutional environment that promotes business dynamism, i.e., the entry of innovative firms and the exit of inefficient firms, and accelerates the reallocation of resources between innovators and incumbents, is crucial for productivity growth (e.g., Decker et al. 2020; Philippon, 2019; Foster et al., 2019).

- When market distortions deter the most productive firms from growing and the least productive firms from exiting the economy, we should observe a rise in productivity dispersion and a decline in productivity (e.g., Foster et al., 2019; Syverson, 2011; Hsieh and Klenow, 2009; Restuccia and Rogerson, 2008; Haltiwanger et al., 2001).

Figure 7: Entry rate per sector for the whole economy (%)

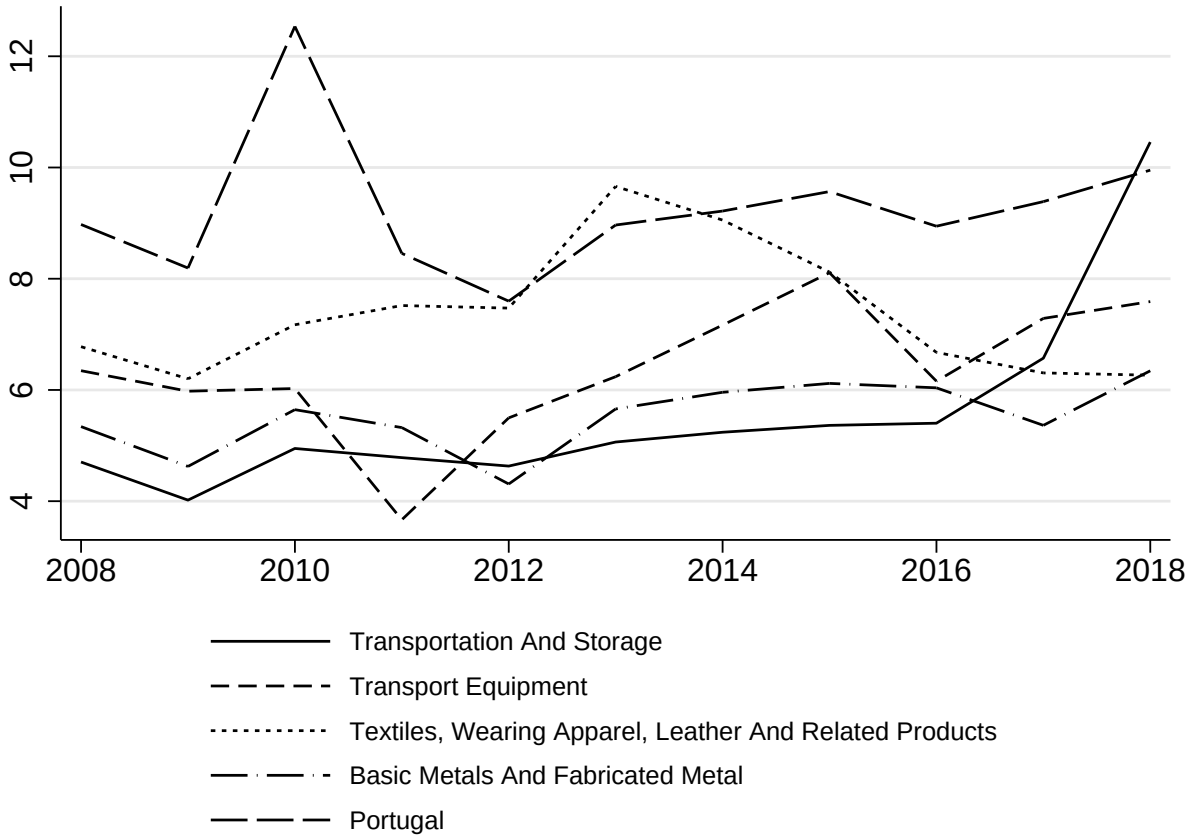
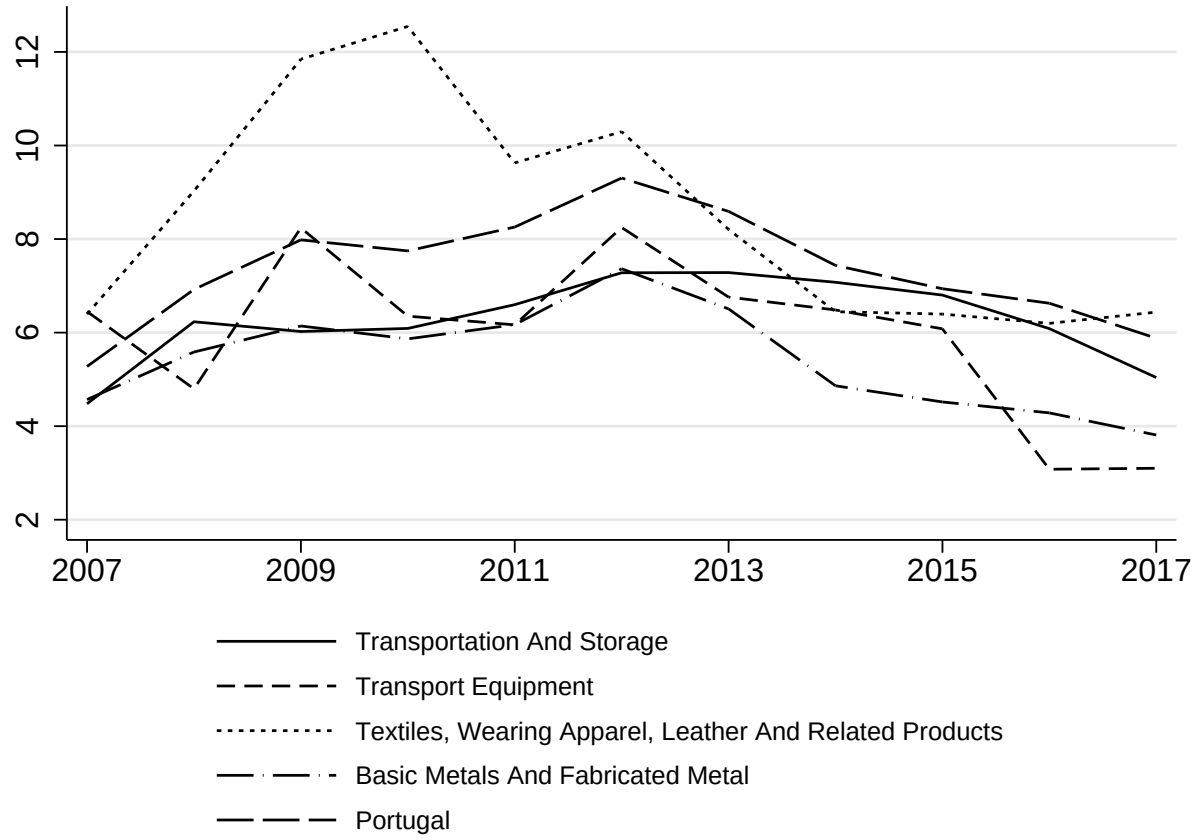


Figure 8: Exit rate per sector for the whole economy (%)



$$y_{st} = \sum_{k=1}^{r} \beta_k F_{s,t-k} + \lambda_s + \eta_t + \varepsilon_{st} \quad (1)$$

- y_{st} stands either for within sector/year productivity dispersion or productivity growth.
- F_{st} stands for the rate of entry or the rate of exit of firms in sector s and in year t
- λ_s stands for sectors' fixed effect, η_t stands for time effects and ε_{st} is a white noise error-term.
- r indicates the number of lags used in each model.

Table 4: Regression analysis by Sector/Year – Entry and Exit

	Dispersion	Growth	Dispersion	Growth
Entry_{t-1}	-0.0023***	0.0006**		
	(0.0009)	(0.0002)		
Entry_{t-2}	-0.0013**	0.0000		
	(0.0006)	(0.0001)		
Exit_{t-1}			0.0101	0.0021
			(0.0098)	(0.0014)
Exit_{t-2}				-0.0023*
				(0.0013)
N	1340	1340	1608	1474

Notes. The dependent variable in odd columns is productivity dispersion, measured by the coefficient of productivity variation, while in even columns is productivity growth, measured by the variation in log productivity. The models are estimated by fixed-effects. Standard errors in parentheses, clustered at the sector level. Significance levels: *, 10%; **, 5%; ***, 1%. The sample covers the period 2006 – 2019.

$$y_{st} = \sum_{k=1}^{r} \left[\beta_k \overline{M}_{st} F_{s,t-k} + \delta_k \underline{M}_{st} F_{s,t-k} \right] + \lambda_s + \eta_t + \varepsilon_{st} \qquad (2)$$

- $\overline{M}_{\text{st}}$ and $\underline{M}_{\text{st}}$ are dummy variables that classify sectors as being high or low, respectively, in terms of labour market flexibility (FLEX), market concentration (HHI) and financial distress (FDF)

Table 5: Regression analysis by Sector/Year – Entry

	Flex		HHI		FDF	
	Dispersion	Growth	Dispersion	Growth	Dispersion	Growth
High_{t-1}	-0.0024***	0.0006**	-0.0002	0.0014	-0.0059	0.0011
	(0.0007)	(0.0002)	(0.0062)	(0.0017)	(0.0075)	(0.0007)
High_{t-2}	-0.0011*	-0.00003	0.0043	0.0001	0.0082	0.0006
	(0.0006)	(0.0001)	(0.0065)	(0.0008)	(0.0087)	(0.0006)
Low_{t-1}	0.0049	0.0005	-0.0028***	0.0005***	-0.0024**	0.0006**
	(0.0070)	(0.0006)	(0.0003)	(0.0001)	(0.0010)	(0.0002)
Low_{t-2}	-0.0124	0.0013*	-0.0018***	-0.00002	-0.0014**	0.00001
	(0.0097)	(0.0008)	(0.0002)	(0.0001)	(0.0006)	(0.0001)

Notes. The dependent variable in odd columns is productivity dispersion, measured by the coefficient of productivity variation, while in even columns is productivity growth, measured by the variation in log productivity. The models are estimated by fixed-effects. Standard errors in parentheses, clustered at the sector level. Significance levels: *, 10%; **, 5%; ***, 1%. The sample underlying the estimations has 1340 observations corresponding to 134 sectors and covers the period 2006 – 2019.
Source: own computations using data from QP and SCIE.

Table 6: Regression analysis by Sector/Year – Entry

	Flex		HHI		FDF	
	Dispersion	Growth	Dispersion	Growth	Dispersion	Growth
$High_{t-1}$	-0.0024***	0.0006**	-0.0002	0.0014	-0.0059	0.0011
	(0.0007)	(0.0002)	(0.0062)	(0.0017)	(0.0075)	(0.0007)
$High_{t-2}$	-0.0011*	-0.00003	0.0043	0.0001	0.0082	0.0006
	(0.0006)	(0.0001)	(0.0065)	(0.0008)	(0.0087)	(0.0006)
Low_{t-1}	0.0049	0.0005	-0.0028***	0.0005***	-0.0024**	0.0006**
	(0.0070)	(0.0006)	(0.0003)	(0.0001)	(0.0010)	(0.0002)
Low_{t-2}	-0.0124	0.0013*	-0.0018***	-0.00002	-0.0014**	0.00001
	(0.0097)	(0.0008)	(0.0002)	(0.0001)	(0.0006)	(0.0001)

Notes. The dependent variable in odd columns is productivity dispersion, measured by the coefficient of productivity variation, while in even columns is productivity growth, measured by the variation in log productivity. The models are estimated by fixed-effects. Standard errors in parentheses, clustered at the sector level. Significance levels: *, 10%; **, 5%; ***, 1%. The sample underlying the estimations has 1340 observations corresponding to 134 sectors and covers the period 2006 – 2019.
Source: own computations using data from QP and SCIE.

Table 7: Regression analysis by Sector/Year – Entry

	Flex		HHI		FDF	
	Dispersion	Growth	Dispersion	Growth	Dispersion	Growth
High_{t-1}	-0.0024***	0.0006**	-0.0002	0.0014	-0.0059	0.0011
	(0.0007)	(0.0002)	(0.0062)	(0.0017)	(0.0075)	(0.0007)
High_{t-2}	-0.0011*	-0.00003	0.0043	0.0001	0.0082	0.0006
	(0.0006)	(0.0001)	(0.0065)	(0.0008)	(0.0087)	(0.0006)
Low_{t-1}	0.0049	0.0005	-0.0028***	0.0005***	-0.0024**	0.0006**
	(0.0070)	(0.0006)	(0.0003)	(0.0001)	(0.0010)	(0.0002)
Low_{t-2}	-0.0124	0.0013*	-0.0018***	-0.00002	-0.0014**	0.00001
	(0.0097)	(0.0008)	(0.0002)	(0.0001)	(0.0006)	(0.0001)

Notes. The dependent variable in odd columns is productivity dispersion, measured by the coefficient of productivity variation, while in even columns is productivity growth, measured by the variation in log productivity. The models are estimated by fixed-effects. Standard errors in parentheses, clustered at the sector level. Significance levels: *, 10%; **, 5%; ***, 1%. The sample underlying the estimations has 1340 observations corresponding to 134 sectors and covers the period 2006 – 2019.
Source: own computations using data from QP and SCIE.

Table 8: Regression analysis by Sector/Year — Exit

	Flex		HHI		FDF	
	Dispersion	Growth	Dispersion	Growth	Dispersion	Growth
High_{t-1}	0.0154	0.0026*	0.0116	0.0017	0.0115	0.0025*
	(0.0128)	(0.0013)	(0.0102)	(0.0014)	(0.0114)	(0.0014)
High_{t-2}		-0.0034**		-0.0023*		-0.0014
		(0.0015)		(0.0014)		(0.0014)
Low_{t-1}	0.0007	0.0009	0.0032	0.0042***	0.0088	0.0017
	(0.0051)	(0.0018)	(0.0101)	(0.0016)	(0.0087)	(0.0015)
Low_{t-2}		0.0001		-0.0020		-0.0032**
		(0.0014)		(0.0013)		(0.0013)

Notes. The dependent variable in odd columns is productivity dispersion, measured by the coefficient of productivity variation, while in even columns is productivity growth, measured by the variation in log productivity. The models are estimated by fixed-effects. Standard errors in parentheses, clustered at the sector level. Significance levels: *, 10%; **, 5%; ***, 1%. The sample underlying the estimations has 1608 observations for odd columns and 1608 for even columns, corresponding to 134 sectors and covers the period 2006 – 2019.
Source: own computations using data from QP and SCIE.

Table 9: Regression analysis by Sector/Year — Exit

	Flex		HHI		FDF	
	Dispersion	Growth	Dispersion	Growth	Dispersion	Growth
$High_{t-1}$	0.0154	0.0026*	0.0116	0.0017	0.0115	0.0025*
	(0.0128)	(0.0013)	(0.0102)	(0.0014)	(0.0114)	(0.0014)
$High_{t-2}$		-0.0034**		-0.0023*		-0.0014
		(0.0015)		(0.0014)		(0.0014)
Low_{t-1}	0.0007	0.0009	0.0032	0.0042***	0.0088	0.0017
	(0.0051)	(0.0018)	(0.0101)	(0.0016)	(0.0087)	(0.0015)
Low_{t-2}		0.0001		-0.0020		-0.0032**
		(0.0014)		(0.0015)		(0.0013)

Notes. The dependent variable in odd columns is productivity dispersion, measured by the coefficient of productivity variation, while in even columns is productivity growth, measured by the variation in log productivity. The models are estimated by fixed-effects. Standard errors in parentheses, clustered at the sector level. Significance levels: *, 10%; **, 5%; ***, 1%. The sample underlying the estimations has 1608 observations for odd columns and 1608 for even columns, corresponding to 134 sectors and covers the period 2006 – 2019.
Source: own computations using data from QP and SCIE.

- A higher rate of entry seems to contribute to a more efficient allocation of resources and to productivity growth.
- The impact of entry on resource allocation efficiency seems to be more effective in sectors with higher labour market flexibility, higher product market competition and with a lower share of zombie firms.
- The impact of entry on productivity growth seems to be more effective in sectors with higher product market competition and with a lower share of zombie firms.
- We do not find significant impacts of firms exit rate on sectoral productivity dispersion and productivity growth. These results suggest that exit mechanisms have not been very efficient.

3.3 Growing to the frontier

Econometric specification # 2

$$\Delta y_{i,s,t} = \alpha y_{i,s,t-1} + \sum_{k=1}^{2} \beta_k^1 \text{ManEduc}_{i,t-k} + \beta_2 \text{Flex}_{s,\ t-1} + \beta_3 \text{HHI}_{s,t-1} + \beta_4 \text{ShZombies}_{s,t-1} + \mu_i + \gamma_t + \varepsilon_{i,s,t} \quad (3)$$

- $y_{i,s,t}$ stands for firm i, in sector$s$, at time t, employment or productivity.
- The dependent variables are transformed into intervals of 5% percentiles.
- Δ represents the firms' transition across the intervals of 5% percentiles between $t-1$ and t.
- μ represents firms' fixed effect; γ represents time dummies; and ε is the error term.

Table 10: Regression analysis: the entrepreneur and the business context

	Employment	Productivity
Educ, t-1	0.0052*	0.0138***
	(0.0030)	(0.0049)
Educ, t-2	0.0074***	0.0094*
	(0.0028)	(0.0048)
Flex, t-1	-0.0105	-0.0378
	(0.0331)	(0.0556)
HHI, t-1	-0.0170	-0.4839***
	(0.0714)	(0.1204)
SZomb., t-1	-0.0143***	-0.0116**
	(0.0030)	(0.0049)

Notes. Standard errors in parentheses. Significance levels: 10%, * ; 5%, **; 1%, ***

The number of observations is 939,194.

- Managers' education seems to have a positive and statistically significant effect on firms' upward transition over the sector's employment and productivity distributions.

- The estimates show that firms in sectors with lower product competition face barriers to improve their position in employment and productivity distributions.

- Our econometric results show that a higher share of zombie firms have a detrimental effect on firms' progress in the sector employment and productivity distributions.

- Finally, our measure of labour market flexibility does not affect the progress of firms in the sector employment and productivity distributions.

Outline

1. Productivity growth: the entrepreneur and its circumstances
2. Business context: product, labour and financial markets
3. Data and empirical strategy
    1. Data
    2. Entry, exit and productivity
    3. Growing to the frontier
4. Key takeaways

4. Key takeaways

- Managers' education is an important determinant of firms' growth and productivity performance.
- The impact of the entry of new firms on resource allocation efficiency and productivity growth depends on the efficiency of product, labour and credit markets.
- Product market competition and efficient credit markets are crucial for firms' growth and their dynamics in the sector productivity distribution.
- The prevalence of zombie firms have been hampering firms' growth and their progression in the productivity distribution.
- The exit of firms does not seem to improve resource allocation efficiency and productivity growth, which may indicate inefficient exit mechanisms.