

Universidade do Minho  
Escola de Economia e Gestão

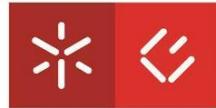
# Assessment on Financial support to Undertakings in Portugal: Subventions, Prizes, Repayable Assistance, Financial Instruments

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**Lessons from PT2020: Debate session about support to undertakings**

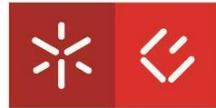
Directorate-General for Regional and Urban Policy and Cohesion and Development  
Agency

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# Outline

1. Goals of ERDF support to firms' investment
2. Databases and variables
3. Overview of the distribution of ERDF support to firms' investment
4. ERDF instruments to firms' investment: grants, repayable assistance and prizes
5. ERDF support to firms' investment and productivity
6. The impact of ERDF instruments on firms' performance
7. ERDF support to co-promotion projects
8. The impact of ERDF on municipalities' productivity growth.
9. Demand and supply of ERDF
10. Policy recommendations



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# 1. Goals of ERDF support to firms' investment

“The ERDF aims to strengthen economic and social cohesion in the European Union by correcting imbalances between its regions”. European Commission

- A key motivation behind place-based policies, by subsidizing firms in low income regions, is to promote self-sustaining economic growth, regional development and convergence, by fostering productivity and growth of SMEs.
- According to the *National Strategic Reference Framework (2007-2013)*, incentives to firms' investment should increase productivity and firms' competitiveness, improving economic specialization, regional development, and the economy's internationalisation.
- *PT2020* stresses the role of direct incentives to companies as a public policy instrument for enhancing economic dynamism, promoting research and development activities, and supporting the production of tradable goods and services.

# 1. Goals of ERDF support to firms' investment

## Issues concerning public incentives to firms' investment:

- Funding activities that firms would have undertaken anyway
- Distortion of competition and trade
- Divert resources from other areas that might lead to a net loss in aggregate productivity
- Micro and small firms are more likely to be financially constrained
- Which externalities may arise from supporting large firms?
- Which instruments are more effective in enhancing competitiveness and regional development?
- Empirical results are mixed: positive effects on employment are found, but not so often on productivity
- Public subsidies, when properly designed, should to produce externalities to the region and to the country

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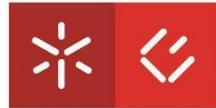
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## 2. Databases and variables

- The analysis of ERDF support to firms' investment in this report uses very richly linked employer-employee data to characterize the financial and the operational firms' performance.
- This analysis uses panel data for the period 2008-2018, for the Portuguese economy, from **two main datasets**: *Agência para o Desenvolvimento e Coesão (AD&C)* and the *Integrated Business Accounts System (SCIE, 'Sistema de Contas Integradas das Empresas', INE, 2018b)* from Statistics Portugal.
- The database of AD&C includes information for all the applications, selected and non-selected, the total amount of ERDF support, eligible and total investment, the operational program and the incentive system, both for the National Strategic Reference Framework and for PT2020 (2015-2019).
- The database of AD&C was linked to SCIE by Portugal Statistics (INE). SCIE involves all reported details on firms' balance sheet and their financial statement, required by governmental authorities yearly, and covers all non-financial firms from 2006 onwards (about 350,000 firms annually). This dataset presents very rich information at the firm level on economic and financial indicators, which allows us to obtain all the information on firms' capital structure and financial performance.
- Data on co-promotion projects was made available by *Compete*, including detailed information on the population of partnerships between firms and entities of the Scientific and Technological System.
- The availability of those databases and of members of the boards of *AD&C* and *Compete*, during the elaboration of this report, must be acknowledged.

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### 3. Overview of the distribution of ERDF support to firms' investment

- Regional distribution
- Firm size
- Industry
- Technological and exporting intensity

### 3. Overview of the distribution of ERDF support to firms' investment

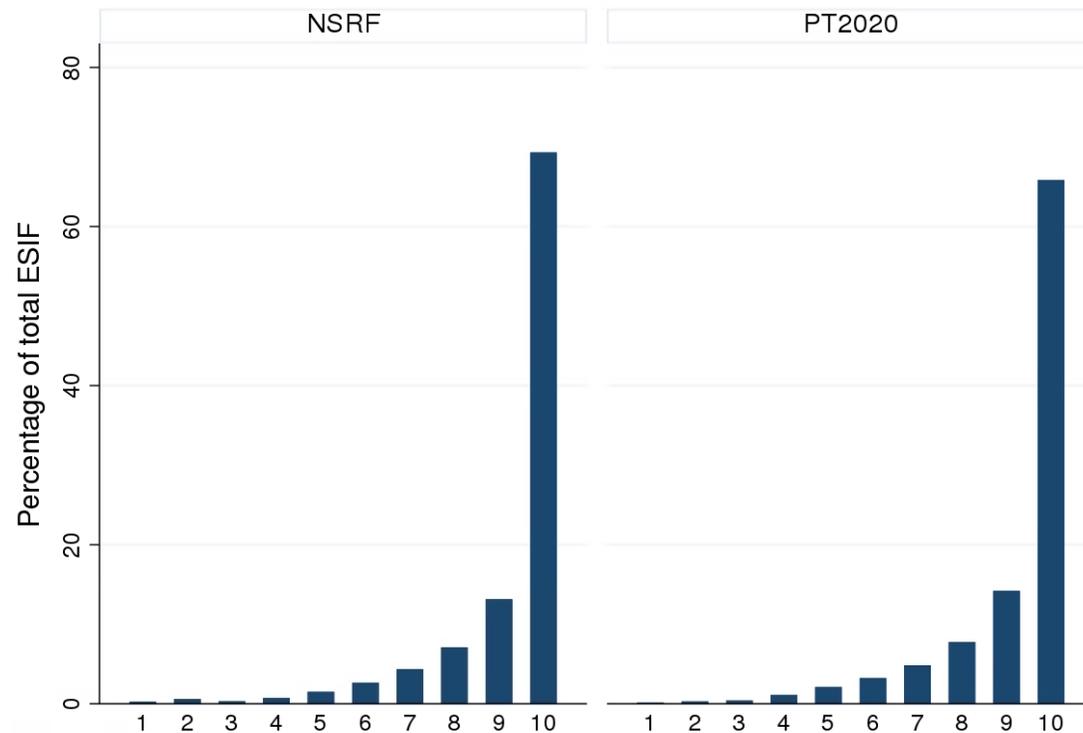
#### ERDF support to firms' investment in the NRSF and PT2020, mainland Portugal

	NRSF (2007-2013)	PT2020 (2015-2019)
Number of project applications	28,055	37,477
Number of projects funded	9,540	14,045
Number of entities funded	6,487	8,394
Total ERDF support (th €)	3,322	5,158
Average (th €)	348.2	367.2
Mode (th €)	15	15
Standard deviation (th €)	1,281	1,093
P10 (th €)	13.5	7.5
(Median) P50 (th €)	69.8	96
P90 (th €)	698.3	775
P90/P10	51.7	103.3
Total investment supported by ERDF (th €)	8,251	12,268
Average (th €)	864.8	873.4
Mode (th €)	20	20
Standard deviation (th €)	5,288	2,893
P10 (th €)	18.6	12
(Median) P50 (th €)	172.5	257
P90 (th €)	1 434	1 718

In the NRSF, 6,487 entities (including firms, entrepreneurial associations and other entities) benefitted from ERDF investment support in the context of 9,540 projects, corresponding to 3,322 million euros.

In PT2020, in the period 2015-2019, 8,394 entities benefitted from ERDF investment support in the context of 14,045 projects, corresponding to 5,158 million euros.

### 3. Overview of the distribution of ERDF support to firms' investment



There is a high concentration of ERDF support to undertakings, with 10% of the firms accounting for 69.3% and 65.9% of total ERDF support to firms' investment in NSRF and PT2020, respectively.

On the other hand, 20% of the firms accounted for 82.5% and 80.1% of total ERDF in NSRF and PT2020, respectively.

### 3. Overview of the distribution of ERDF support to firms' investment

#### ERDF by 'Operational Program' in PT2020 (2015-2019)

	No. projects	No. entities	Total Inv (€M)	Eligible Inv (€M)	ERDF (€M)
Alentejo	7%	8%	4%	4%	5%
Algarve	3%	3%	2%	2%	2%
Centro	22%	24%	12%	11%	12%
Lisboa	9%	11%	5%	5%	4%
Norte	33%	33%	17%	17%	18%
Competitiveness and Internationalization	26%	24%	60%	61%	60%
Total	100%	100%	100%	100%	100%

In PT2020, the share of the operational program *Competitiveness and Internationalization* in ERDF and total investment was 60% (69% in the NSRF). The shares of operational programs Norte and Centro in ERDF were 18% and 12%, respectively.

**This data shows that the management structure of ERDF incentives to firms' investment has been highly centralized.**

### 3. Overview of the distribution of ERDF support to firms' investment

**SI Research and Technological Development** aims at intensifying investment in R&TD, in articulation with the scientific and technological system, to increase knowledge-intensive economic activities, develop new technologies, and enhancing firms' competitiveness. In 2015-2019, it accounted for 15% of total ERDF.

**SI Entrepreneurial Innovation and Entrepreneurship** aims at strengthening investment in innovative activities, promoting the increase of tradable goods and the internationalization and structural change of the business structure, has been the main program of ERDF incentives, representing 66% of total ERDF incentives in PT2020 (2015-2019).

**SI Qualification and Internationalization of SMEs** aims to strengthen the business capacity building of SMEs through qualification for internationalization, favouring intangible competitiveness factors and exporting capacity. In 2015-2019, it represented 19% of total ERDF.

ERDF by 'Incentive system' in PT2020 (% of total)

	No. projects	No. entities	Total Inv (€M)	Eligible Inv (€M)	ERDF (€M)
SI Research & Technological Development	13%	11%	13%	12%	15%
SI Entrepreneurial Innovation & Entrepreneurship	27%	34%	66%	67%	66%
SI Qualification & Internationalization SMEs	59%	70%	21%	20%	19%
Total	100%	100%	100%	100%	100%

### 3. Overview of the distribution of ERDF support to firms' investment

ERDF by NUTs II regions in PT2020 (% of total)

	No. projects	No. firms	Total Inv	Eligible Inv	ERDF
Alentejo	9	10	10	10	10
Algarve	3	3	3	2	2
Centro	30	30	33	34	35
Lisboa	8	9	6	5	4
Norte	46	44	47	47	48
Multi regions	4	3	2	2	1
Mainland Portugal	100	100	100	100	100

**NUTs II regions, Alentejo, Centro, Norte (and Região Autónoma dos Açores) are classified as convergence regions** and account for around 95% of total ERDF support to firms' investment in the NSRF and PT2020.

In PT2020 (2015-2019), region Norte represented 48% of total ERDF incentives and region Centro 35%.

**ERDF incentives are concentrated in urban** (around 80% of total) and intermediate urban areas (about 10% of total).

### 3. Overview of the distribution of ERDF support to firms' investment

ERDF by firm size, NSRF and PT2020 (% of total)

NSRF					
	No. projects	No. firms	Total Inv	Eligible Inv	ERDF
Micro	34.2	35.6	12.4	12.3	16.6
Small	42.9	42.8	24.8	25.1	31.2
Medium	17.1	16.4	21.9	21.5	22.8
Large	5.9	5.2	40.9	41.1	29.3
Total	100	100	100	100	100
PT2020					
	No. projects	No. firms	Total Inv	Eligible Inv	ERDF
Micro	33	36.5	20.1	20.5	21.8
Small	18.1	43.3	33	32.1	35.6
Medium	18.1	16.4	27.1	27	26.7
Large	4.1	3.8	19.9	20.4	16
TOTAL	100	100	100	100	100

The Portuguese business structure has a very high share of micro and small-sized firms, accounting for around 50% and 40% of total employment and value-added, respectively.

The instruments SI Entrepreneurial Innovation and Entrepreneurship and SI Qualification and Internationalization SMEs, which accounted for 85% of total ERDF in 2015-2018, target SMEs and aim at improving their competitiveness and business capacity, namely, through innovation and internationalization.

**From NSRF to PT2020, there was an increase in the share of total ERDF incentives to micro and small-sized firms from 47.8% to 57.4%. The percentage allocated to medium-sized firms has also increased from 22.8% to 26.7%. The share of ERDF allocated to large-sized firms decreased from 29.2% to 16.0%.**

Micro and small-sized firms are more likely to be financially constrained.

On the other hand, assessing micro and small-sized firms' economic and financial condition and their prospects are more challenging to evaluate.

### 3. Overview of the distribution of ERDF support to firms' investment

ERDF by industry, PT2020 (% of total)

	No. projects	No. firms	Total Inv	Eligible Inv	ERDF
Manufacturing	52	49	73	74	73
Services	19	20	9	9	9
Tourism	6	7	8	8	8
Retail	14	15	3	3	3
Other sectors	9	9	7	6	7
TOTAL	100	100	100	100	100

Manufacturing has received the highest share of ERDF incentives, both in the NSRF (69% of total) and PT2020 (73% of total), reflecting the goal of promoting tradable goods growth.

In PT2020, in the period 2014-2019, services rank second (9%), and tourism ranks third (8%) in the shares of ERDF.

### 3. Overview of the distribution of ERDF support to firms' investment

ERDF by exporting intensity, PT2020 (% of total)

Export intensity	No. projects	Total Inv	Eligible Inv	ERDF
Non-exporter	40	37.1	36.7	39.2
Q1	3.6	1.0	1.0	1.3
Q2	5.8	3	3	3.3
Q3	12.3	6.5	6.4	6.9
Q4	38.3	52.1	52.5	49

Improving productivity and becoming more competitive in international markets are two goals of the NSRF and PT2020. The fulfilment of transforming the production profile in favour of higher value-added domains involves the change in the structure of the Portuguese economy in terms of technological and exporting intensity.

Exporters represented around 60% of firms that have received ERDF incentives in the NSRF and PT2020. Regarding exporting firms, data show that ERDF incentives for the top 25% with the highest export-to-sales ratio accounted for around 50% of ERDF in both the NSRF and the PT2020.

### 3. Overview of the distribution of ERDF support to firms' investment

ERDF by technological intensity in manufacturing, PT2020 (% of total)

Technological intensity	No. projects	Total Inv	Eligible Inv	ERDF
Low-technology	48.2	37.4	37.7	37.6
Medium-low-technology	32.1	34.7	34.2	36.2
Medium-high-technology	16.3	19.8	19.7	19
High-technology	3	8.1	8.5	7.2

ERDF incentives have been concentrated in low- and medium-low-technology sectors, which account for around 73% of incentives in the NSRF and PT2020.

On the other hand, firms in high-technology sectors accounted for only 7% of ERDF incentives to firms' investment.

### 3. Overview of the distribution of ERDF support to firms' investment

Firms supported by ERDF by productivity deciles, PT2020 (whole economy) (%)

	2015	2016	2017	2018
D1	5.3	6.7	8.5	9.6
D2	3.7	1.9	2.5	2.8
D3	3.6	3.7	3.6	3.2
D4	3.5	2.8	2.6	4.0
D5	4.9	4.3	5.0	5.7
D6	7.4	6.4	7.5	8.8
D7	12.5	9.7	11.7	10.9
D8	17.2	17.0	13.6	16.3
D9	22.3	21.8	22.7	21.5
D10	19.5	25.8	22.3	17.3

**In PT2020, in 2015, the group of the 40% most productive firms corresponded to 72% of firms supported by ERDF.** This percentage remained above 70% in 2016 and 2017 but decreased to 66% in 2018.

In 2015-2018, the group of 40% less productive firms was consistently above 15% (16% in 2015 and 20% in 2018). The share of firms in the first productivity decile, or the 10% less productive, increased from 5.3% in 2015 to 9.6% in 2018.

The analysis of the position of the firms supported by ERDF in the productivity distribution shows that the share in the top 40% most productive decreased continuously during the period of the NSRF.

The comparison between the NSRF and PT2020 shows that the percentage of firms funded by ERDF in lower productivity deciles is higher in PT2020 than in the NSRF. **This result may be explained by the higher concentration of ERDF in micro and small-sized firms in PT2020.**

### 3. Overview of the distribution of ERDF support to firms' investment

#### ERDF support to firms' investment in the RA Açores and Madeira, PT2020

	RAA	RAM
	PT2020 (2015-2019)	PT2020 (2015-2019)
Number of projects funded	1,206	2,996
Number of entities	909	1,328
Total ERDF support (M €)	212.337	127.088
Average (th €)	207.0	42.4
Mode (th €)	200	65
Standard deviation (th €)	793.7	115.5
P10 (th €)	5.9	4.9
(Median) P50 (th €)	74.0	17.8
P90 (th €)	253.8	80
P90/P10	42.7	16.5
Total investment supported by ERDF (M €)	441.549	719.159
Average (th €)	430.4	240.0
Mode (th €)	9.99	n.a.
Standard deviation (th €)	1,712.5	1,055.2
P10 (th €)	11.3	32.3
(Median) P50 (th €)	163.1	111.3
P90 (th €)	526.0	523.8

**In RA Madeira, ERDF incentives amounted to 127 million euros**, subsidizing a total investment of 719 million euros. Small-sized firms have received around 47% of the total ERDF incentives to firms' investment. The sector of accommodation, catering, and similar received approximately 30% of ERDF.

**In RA Açores, ERDF incentive to firms' investment amounted to 212 million euros**, subsidizing 442 million euros of investment. More than 50% of the ERDF incentive and total investment was allocated to micro-sized firms and the sector of accommodation, catering and similar.

Both in RA Açores (13% of total) and RA Madeira (9.4% of total), the manufacturing industry has received a small share of ERDF incentives to firms' investment.



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## 4. ERDF instruments: grants, repayable assistance and prizes

ERDF by technological intensity, PT2020 (% of total)

	Grants	Repayable Assistance
Number of projects	11,862	2,279
Number of firms	7,599	2,149
Total ERDF support (M€)	2,119	3,086
Average (th €)	178.7	1,354
Mode (th €)	15	n.a.
Standard deviation (th €)	567.5	2,076
P10 (th €)	7.5	161.7
P50 (th €)	69.9	704.0
P90 (th €)	385.1	3,138.7
P90/P10	51.3	19.4
Total investment supported ERDF (M €)	5,780	7,058
Average (th €)	487.3	3,097
Mode (th €)	20	n.a.
Standard deviation (th €)	1,601	6197
P10 (th €)	10.3	318.5
P50 (th €)	189.6	1,370.7
P90 (th €)	942.5	6,202.8
P90/P10	91.5	38.4

Source: Own computations with data from Agência para o Desenvolvimento e Coesão

**In PT2020, 11,862 projects (83.9%) received ERDF in the form of grants, and 2,279 projects (16.1%) received ERDF in the form of repayable assistance.**

**However, grants and repayable assistance accounted for 41% and 59% of total ERDF, respectively, which is very similar to the distribution in the NSRF.**

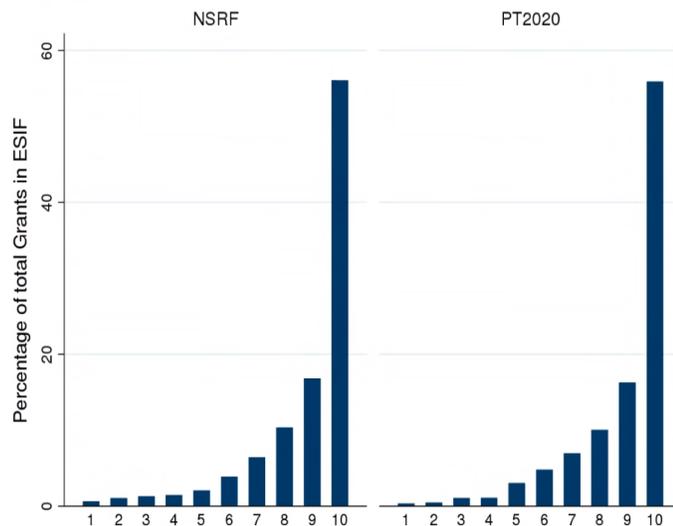
The average and median ERDF incentive are much lower for grants (178.7 and 69.9 thousand euros, respectively) than for repayable assistance (1,354 and 704.0 thousand euros, respectively).

**Firms receiving repayable assistance have a better financial condition – higher financial autonomy, more profitable, less leveraged, and higher liquidity – than firms receiving grants, both in the NSRF and PT2020. Those firms are also larger in terms of assets and employment and have higher labour productivity than firms receiving grants.**

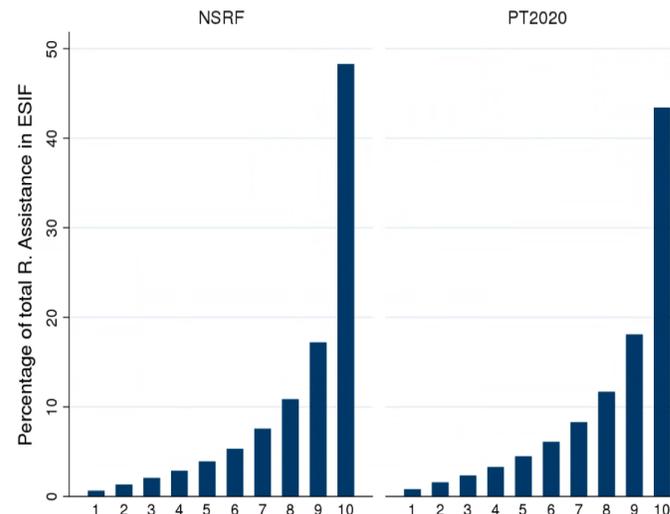
In the NSRF, almost all of the projects that received ERDF support in the form of repayable assistance have also received support in **prizes**: 1,809 projects (97% of total projects with repayable assistance). **Prizes awarded to projects correspond to 59% of the ERDF support in the form of repayable assistance.**

## 4. ERDF instruments: grants, repayable assistance and prizes

ERDF grants distribution in NSRF and PT2020



ERDF repayable assistance distribution in NSRF and PT2020



The distribution of ERDF grants is very similar in the NSRF and PT2020, showing a high concentration: the group of the 20% of firms with the highest amount of grants account for 72.9% and 72.2%, respectively.

**The distribution of repayable assistance is less concentrated than grants.** The 20% of firms with the highest amount of repayable assistance represent 65.5% and 61.5% of total repayable assistance in the NSRF and PT2020.

## 4. ERDF instruments: grants, repayable assistance and prizes

Grants and repayable assistance by firm size, PT2020 (% of total)

	Grants	Repayable Assistance
Micro	25.1	32.9
Small	33.4	26.8
Medium	25.9	28.1
Large	15.6	12.2
Total	100	100

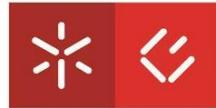
**Small-sized firms received the highest percentage of grants in PT2020, 33%** (34% in the NSRF).

**The highest percentage of repayable assistance was allocated to micro-sized firms, 33%.**

**‘Manufacturing’** received around 50% of total grants, both in the NSRF and PT2020, and an even higher share of ERDF in the form of repayable assistance: 81.5% in PT2020.

ERDF support to ‘Accommodation and food services activities’ is mainly in the form of repayable assistance, accounting for 8.2 in PT2020.

ERDF support to ‘Information and communication’ and ‘Professional, Scientific and Technical Activities’ sectors was mainly in the form of grants, accounting, respectively, for 14% and 13.7% in PT2020.

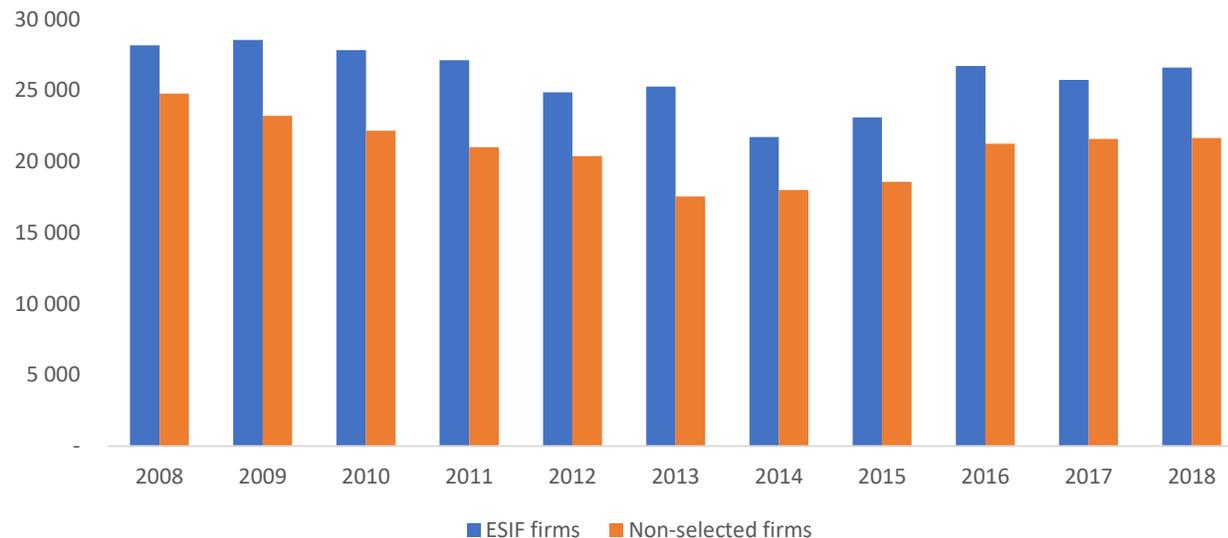


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## 5. ERDF support to firms' investment and productivity

Median productivity: ERDF firms vs Non-selected, 2008-2018 (€)



The Figure shows that the median productivity of firms' funded by ERDF was significantly higher than the productivity of non-selected firms.

In the NSRF, the productivity of firms supported by ERDF was 14% higher in 2008, and 44% higher in 2013, relative to non-selected firms.

In PT2020, the productivity of firms supported by ERDF was 19% higher in 2017, and 26% higher in 2016, relative to non-selected firms.

## 5. ERDF support to firms' investment and productivity

Transition across productivity deciles between  $t$  and  $t+3$  in NSRF and PT2020 (% of total firms)

	Move to higher deciles	Remain in the same decile	Move to lower deciles
2008	36.8	44.9	18.3
2009	36.9	41.7	21.5
2010	34.0	42.1	24.0
2011	32.2	41.4	26.3
2012	27.4	40.3	32.3
2013	29.6	35.4	35.0
2014	31.7	25.7	42.6
2015	26.7	38.5	34.8

This table provides a descriptive analysis of the dynamics of firms' productivity that received ERDF support to investment. This analysis considers firms' position in the productivity distribution at the time of receiving the ERDF support and its position in the productivity distribution three years later. This analysis is built on transition matrices across productivity deciles between the year of the ERDF contract ( $t$ ) and three years later ( $t+3$ ).

**The percentage of firms that improved their relative position in the productivity distribution** of the economy three years after receiving the ERDF incentive, decreased over time, from 36.8% in 2008 to 26.7% in 2015.

**The percentage of firms that moved to lower productivity deciles** three years after receiving the ERDF incentive increased from 18.3% in 2008 to 42.6% in 2014 (34.8% for firms financed by ERDF in 2015).

These trends apply to grants and repayable assistance.

**These results suggest that ERDF incentives may have fallen short in fulfilling the goal of improving firms' productivity and competitiveness and suggest that the selection procedure has not been optimal.**



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## 6. The impact of ERDF instruments on firms' performance

- Econometric models evaluate the impact on investment, employment, value-added, exports and productivity
- Evaluate how the impact of ERDF varies:
  - with firm size
  - with the number of projects funded
  - with the form of ERDF support, that is, grant, repayable assistance or prize
  - with the financial condition of firms

## 6. The impact of ERDF instruments on firms' performance

Panel A – All firms					
	Investment	Employment	Value-Added	Exports	Productivity
LnERDF (-1)	0.06212*** (0.003458)	0.00424*** (0.000329)	0.00266 (0.001665)	0.02012*** (0.003407)	-0.00168 (0.001364)
LnERDF (-2)	-0.02179*** (0.003826)	0.00024 (0.000285)	0.00401* (0.001807)	0.00475 (0.003497)	0.00313* (0.001520)
LnERDF (-3)	-0.01369*** (0.004135)	0.00089* (0.000444)	0.00321 (0.002081)	0.00516 (0.004146)	0.00268 (0.001692)
Panel B - SMEs and large-size firms					
LnERDF (-1)	0.04117*** (0.003879)	0.00218*** (0.000379)	0.00327* (0.001530)	0.01596*** (0.004000)	0.00078 (0.001159)
LnERDF (-2)	-0.00973* (0.004176)	0.00003 (0.000317)	0.00482** (0.001646)	0.00213 (0.004016)	0.00385** (0.001275)
LnERDF (-3)	-0.01097* (0.004517)	0.00116* (0.000517)	0.00044 (0.002011)	0.00722 (0.005012)	-0.00036 (0.001469)
Panel C – Micro-sized firms					
LnERDF (-1)	0.08977*** (0.010940)	0.00470*** (0.000753)	-0.00835 (0.005692)	0.02536** (0.009634)	-0.01273* (0.005124)
LnERDF (-2)	-0.06708*** (0.012156)	0.00044 (0.000652)	0.00015 (0.005930)	0.02095* (0.009412)	0.00037 (0.005415)
LnERDF (-3)	-0.03309* (0.013136)	0.00160 (0.000890)	0.00914 (0.007008)	0.01799 (0.010833)	0.00653 (0.006268)

**The estimates show a positive and statistically significant impact of ERDF incentives on investment, employment, value-added, exports and productivity.**

The impact of ERDF support in SMEs and large-sized firms is very similar to the ones reported in Panel A (all firms); that is, it seems to have a positive effect on investment, employment, value-added, exports and productivity.

**On the other hand, for the sample of micro-sized firms, Panel C, the impact of ERDF incentives is only positive and statistically significant for employment and exports.**

## 6. The impact of ERDF instruments on firms' performance

Impact of ERDF support, one treatment versus multiple treatments, SMEs and large-sized firms, NSRF and PT2020

	Investment	Employment	Value-Added	Exports	Productivity
One treat	0.69791*** (0.060834)	0.03384*** (0.005254)	0.04363 (0.022547)	0.23230*** (0.065801)	0.00931 (0.017176)
First Treat	0.38911*** (0.063853)	0.00756 (0.005636)	0.01283 (0.020090)	0.04856 (0.058546)	-0.00175 (0.015124)
Second Treat	0.46770*** (0.055604)	0.02780*** (0.005357)	0.04389 (0.022671)	0.13209* (0.054951)	0.01230 (0.016705)
Third Treat	0.58462*** (0.062669)	0.03984*** (0.006631)	0.08949*** (0.019893)	0.00170 (0.065497)	0.04103** (0.015003)
Fourth Treat	0.54211*** (0.091685)	0.06908*** (0.009904)	0.13494*** (0.019398)	-0.15889 (0.084493)	0.05100*** (0.015200)
Fifth Treat	0.63148*** (0.086050)	0.08424*** (0.012834)	0.14586*** (0.026342)	-0.09855 (0.079460)	0.04699* (0.019491)

Impact of ERDF support, one treatment versus multiple treatments, Micro-sized firms, NSRF and PT2020

	Investment	Employment	Value-Added	Exports	Productivity
One treat	0.87381*** (0.102134)	0.06081*** (0.006617)	0.02293 (0.054549)	0.19885* (0.080759)	-0.05324 (0.049719)
First Treat	0.94523*** (0.260507)	0.05888*** (0.017071)	0.21215 (0.122520)	-0.02186 (0.235997)	0.11527 (0.108119)
Second Treat	1.00975*** (0.217926)	0.10314*** (0.015720)	0.17299 (0.143572)	0.36221 (0.209307)	0.04734 (0.126117)
Third Treat	1.27737* (0.558314)	0.11876*** (0.032106)	0.05924 (0.337798)	1.17137** (0.438463)	-0.07119 (0.292083)
Fourth Treat	-0.17360 (1.039059)	0.16124* (0.062716)	0.06784 (0.823512)	1.19022* (0.528778)	-0.06748 (0.720087)
Fifth Treat	2.92322*** (0.666989)	0.42421* (0.212247)	0.20485 (0.369900)	2.53374*** (0.436292)	-0.29077 (0.170359)

Firms that receive a one-off ERDF support show a positive effect on investment, employment, value-added and exports. No impact on productivity is found. A single treatment result in an increase of 84.1% in investment, 7.4% in employment, 9.3% in value-added and 26.8% in exports relative to non-selected firms.

**Firms with several projects supported by ERDF show a clear positive and statistically significant effect on investment, employment, value-added, exports and productivity.**

Furthermore, the estimates suggest that **the magnitude of the effect of ERDF incentives on investment increases with the number of awarded projects to each firm.**

## 6. The impact of ERDF instruments on firms' performance

Estimates of the impact of grants, repayable assistance and prizes in the NSRF and PT2020

	Investment	Employment	Value-Added	Exports	Productivity
LnDiff (-1)	0.13931*** (0.005843)	0.00699*** (0.000745)	0.00497 (0.003105)	0.02465*** (0.006484)	-0.00016 (0.002749)
LnDiff (-2)	-0.05495*** (0.007179)	0.00034 (0.000822)	-0.00745 (0.004186)	0.00155 (0.006683)	-0.00616 (0.003333)
LnDiff (-3)	-0.00556 (0.015947)	0.00687*** (0.001882)	0.00612 (0.008823)	0.01798 (0.015422)	0.00290 (0.006841)
LnPrize (-1)	-0.07575*** (0.007041)	-0.00901*** (0.000874)	-0.01728*** (0.004288)	-0.03734*** (0.007744)	-0.00981** (0.003691)
LnPrize (-2)	0.02563** (0.008528)	-0.00156 (0.000958)	0.01016 (0.005671)	0.00057 (0.008219)	0.00903 (0.004629)
LnPrize (-3)	-0.01907 (0.016086)	-0.00127 (0.001916)	0.00732 (0.009324)	0.01261 (0.016118)	0.00530 (0.007314)
LnGrant (-1)	0.04655*** (0.003760)	0.00691*** (0.000400)	0.01235*** (0.002036)	0.02642*** (0.003682)	0.00911*** (0.001849)
LnGrant (-2)	-0.01419*** (0.004287)	0.00077* (0.000361)	0.00490* (0.002262)	0.00656 (0.003784)	0.00475* (0.002056)
LnGrant (-3)	-0.01440** (0.004593)	-0.00005 (0.000569)	0.00206 (0.002647)	-0.00488 (0.004434)	0.00011 (0.002419)

The estimates show that **the impact of grants (*LnGrant*) on investment, employment, value-added, exports, and productivity is positive and statistically significant.**

On the other hand, the estimates suggest that, **in general, there is no impact of repayable assistance (*LnDiff*) and prizes (*LnPrize*) on the firms' performance.**

## 6. The impact of ERDF instruments on firms' performance

### Leverage and the impact of ERDF support to firms' investment in the NSRF and PT2020

	Investment	Employment	Value-Added	Exports	Productivity
LnERDF (-1)	0.05415*** (0.004163)	0.00465*** (0.000429)	0.00340 (0.002060)	0.01804*** (0.003987)	0.00154 (0.001879)
LnERDF (-2)	-0.01668*** (0.004856)	-0.00052 (0.000402)	0.00354 (0.002280)	-0.00124 (0.004230)	0.00256 (0.002102)
LnERDF (-3)	-0.00694 (0.004930)	0.00283*** (0.000561)	0.00884*** (0.002472)	0.01148* (0.004697)	0.00652** (0.002286)
Lev (-1)	-0.48230*** (0.041090)	-0.06292*** (0.005289)	-0.18070*** (0.022995)	-0.19563*** (0.039430)	-0.10244*** (0.022425)
LevxLnERDF (-1)	0.02892*** (0.006215)	0.00252*** (0.000659)	0.00642 (0.003511)	0.01294* (0.006000)	0.00600 (0.003150)
LevxLnERDF (-2)	-0.01865* (0.007633)	0.00130 (0.000701)	-0.00167 (0.004267)	0.01164 (0.007082)	0.00066 (0.003831)
LevxLnERDF (-3)	-0.02674*** (0.007177)	-0.00281** (0.000877)	-0.00860 (0.004519)	-0.00496 (0.007229)	-0.00993* (0.004010)

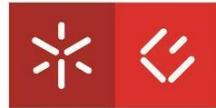
The estimates also show a negative and statistically significant impact of leverage on the five dimensions of firms' performance considered in our analysis.

**The interaction of the ERDF incentive and the variable leverage shows that the impact of ERDF support on firms' performance is mitigated for more leveraged firms.**

## 6. The impact of ERDF instruments on firms' performance

### Main take-ways:

- The econometric estimates show a positive and statistically significant impact of ERDF incentives on firms' investment, employment, value-added, exports and productivity. However, the effect on those variables seems to be more robust to medium and large-sized firms than for micro-sized firms.
- Estimates suggest that the impact of ERDF incentives increases with the number of awarded projects to each firm.
- Estimates show that the impact of grants on investment, employment, value-added, exports, and productivity is positive and statistically significant. On the other hand, estimates suggest that there is no impact of repayable assistance and prizes on the firms' performance. Finally, the estimates suggest that a combination of grants and repayable assistance may effectively increase investment, employment, value-added and exports.
- The econometric results suggest that firms' profitability enhances the positive impact of the ERDF incentives on investment, employment, value-added and exports. On the other hand, estimates show that the impact of ERDF support on firms' performance is mitigated for more leveraged firms.



# Outline

1. Goals of ERDF support to firms' investment
2. Databases and variables
3. Overview of the distribution of ERDF support to firms' investment
4. ERDF instruments to firms' investment: grants, repayable assistance and prizes
5. ERDF support to firms' investment and productivity
6. The impact of ERDF instruments on firms' performance
- 7. ERDF support to co-promotion projects**
8. The impact of ERDF on municipalities' productivity growth.
9. Demand and supply of ERDF
10. Policy recommendations

## 7. ERDF support to co-promotion projects

ERDF support to projects in co-promotion, NSRF and PT2020

	NSRF (2007-2013)	PT2020 (2015-2021)
Number of projects supported by ERDF	637	961
Number of entities	758	1,234
Total ERDF support (th €)	276,969	847,811
Average (th€)	435	882
Standard deviation (th €)	563	1,636
P10 (th €)	146	255
(Median) P50 (th €)	318	524
P90 (th €)	700	1,261
P90/P10	5	5
Total investment supported by ERDF (th €)	539,208	1,370,421.5
Average (th €)	846	1,426
Standard deviation (th €)	1,115	2,991
P10 (th €)	248	392
(Median) P50 (th €)	568	813
P90 (th €)	1,453	2,056
P90/P10	6	5

Source: Own computations with data from Compete

Co-promotion projects aim to strengthen firms' competitiveness and international insertion through industrial research and experimental development activities. These projects are carried out in **partnerships of companies and entities of the research and innovation system**.

In 2007-2021, the multiannual frameworks NSRF and PT2020 allocated 1,124,789 thousand euros to 1,598 projects, involving 143 units of the national scientific and technological system (universities, research centres and interface units), and 1,442 firms.

**Average and median value of the ERDF support to co-promotion projects increased significantly from the NSRF (435 and 318 thousand euros, respectively) to PT2020 (882 and 524 thousand euros, respectively).**

Firms participating in co-promotion projects have a much better financial and operational condition and are larger than the average firm supported by ERDF (see Table 72).

## 7. ERDF support to co-promotion projects

Distribution of ERDF incentives to co-promotion projects by NUTS III regions, PT2020 (2015-2018) (% of total)

	No. Projects	No. Firms	Investment	ERDF incentive
<b>Region Centro</b>				
Multi-regions	12%	23%	18%	20%
Região de Aveiro	11%	7%	8%	9%
Região de Coimbra	8%	5%	4%	5%
Região de Leiria	6%	5%	4%	4%
<b>Region Norte</b>				
AM Porto	21%	13%	19%	15%
Ave	4%	3%	2%	2%
Cávado	3%	2%	11%	9%
Multi-regions	10%	23%	12%	15%

Data indicates that region Área Metropolitana do Porto accounted for 15% of total ERDF incentives to co-promotion projects in PT2020 and region Cávado accounted for 9%.

It should also be stressed the high share of ERDF incentive allocated to projects that involve multi-regions.

## 7. ERDF support to co-promotion projects

Distribution of ERDF incentives to co-promotion projects by industry, PT2020 (2015-2018) (% of total)

	No. Projects	No. Firms	Invest.	ERDF
Manufacturing industries	45%	33%	46%	44%
Information and communication activities	9%	5%	7%	8%
Consulting, scientific, technical and similar activities	15%	8%	15%	11%
Multi-sectors	26%	50%	30%	35%
Other sectors	5%	4%	2%	2%
Total	100%	100%	100%	100%

Data shows that 'Manufacturing industries' received 44% of the ERDF incentive in PT2020 (32% in the NSRF).

The high share of projects involving entities from several sectors (Multi-sectors), 35% in PT2020, should also be stressed (36% in the NSRF).

## 7. ERDF support to co-promotion projects

Estimates of the impact on ERDF support to firms in co-promotion projects, NSRF and PT2020

	Investment	Employment	Value-Added	Exports	Productivity
Co-Promotion (-1)	0.51543*** (0.120663)	0.06221*** (0.014937)	0.13668** (0.052345)	0.16864 (0.133390)	0.04869 (0.040366)
Co-Promotion (-2)	0.50490*** (0.122029)	0.05429*** (0.013875)	0.17813*** (0.044094)	-0.06738 (0.138005)	0.09367** (0.034325)
Co-Promotion (-3)	0.75661*** (0.116471)	0.03669** (0.014169)	0.10660 (0.063805)	-0.16560 (0.125721)	0.05906 (0.048604)
Profit	0.01361*** (0.001490)	0.00135*** (0.000187)	0.04524*** (0.001596)	0.01257*** (0.001348)	0.03953*** (0.001345)
TurnOv. (gr)	0.00299*** (0.000261)	0.00028*** (0.000038)	0.00176*** (0.000239)	0.00258*** (0.000242)	0.00142*** (0.000198)
LnAsset (-1)	0.78358*** (0.048444)	0.39402*** (0.007927)	0.66184*** (0.029939)	1.28317*** (0.054621)	0.22997*** (0.023880)
Lev. (-1)	-1.21622*** (0.112876)	-0.08412*** (0.016429)	-0.40233*** (0.071771)	-0.22648* (0.097287)	-0.27283*** (0.058352)

The evaluation strategy relies on the sample of firms supported by ERDF in 2007-2018. The firms in the sample are classified into two categories. One group includes firms that were part of a consortium participating in a co-promotion project; the other group, the control group, includes firms supported by ERDF in individual projects.

The results in Table 73 show additional benefits from co-promotion projects are of about 177.7% in investment, 15.3% in employment, 31.5% in value-added, and 9.4% in productivity.

Regarding exports, the ERDF support to firms in co-promotion projects seems to have no additional impact.

The control variables are all statistically significant and show the expected effects.

## 7. ERDF support to co-promotion projects

Operational indicators 'Suppliers club', 2010 and 2018

	Employment	Assets (th€)	Turnover (th€)	Exports (th€)
2010	2,813	393,154	310,455	182,064
2018	4,662	740,656	640,024	387,013
% change	65.7%	88.4%	106.2%	112.6%

In 2017, the Portuguese Government launched 'Programa Interface' with the following goals:

- empowering SMEs to integrate networks of global, innovative and internationally competitive suppliers;
- to accelerate the integration of technologies that facilitate adaptation to Industry 4.0.;
- to promote the transformation to the technological requirements of processes and products that provide specialized know-how, resources and critical knowledge, greater productivity, more flexibility and higher quality of products;
- to substitute imports by increasing national value-added and exports.

The 'Suppliers Club' include 31 firms, but we only consider data for the 24 firms that already existed in 2010. Table 75 shows total employment, total assets, total turnover and total exports, for 2010 and 2018. Data show that the aggregate value of employment, assets, turnover and exports increased by 65.7%, 88.4%, 106.2% and 112.6%, respectively.

## 7. ERDF support to co-promotion projects

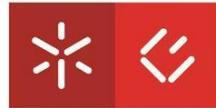
Bosch Engineering and Development Center, Braga, Portugal



The partnership with the Bosch Group and University of Minho, initiated in 2013, was supported by ERDF.

In 2013, Bosch had 1,900 employees, a turnover of 446 million euros, and 104 employees in R&D activities. In 2018, the number of employees increased to 3,700, turnover surpassed 1,100 million euros, and 600 employees in R&D activities were in two R&D centres. These partnerships resulted in more than 40 patents and new technologies already in the market.

This partnership has also produced significant changes, namely in applied research and in teaching approaches, in University of Minho and in the regional supply chain.

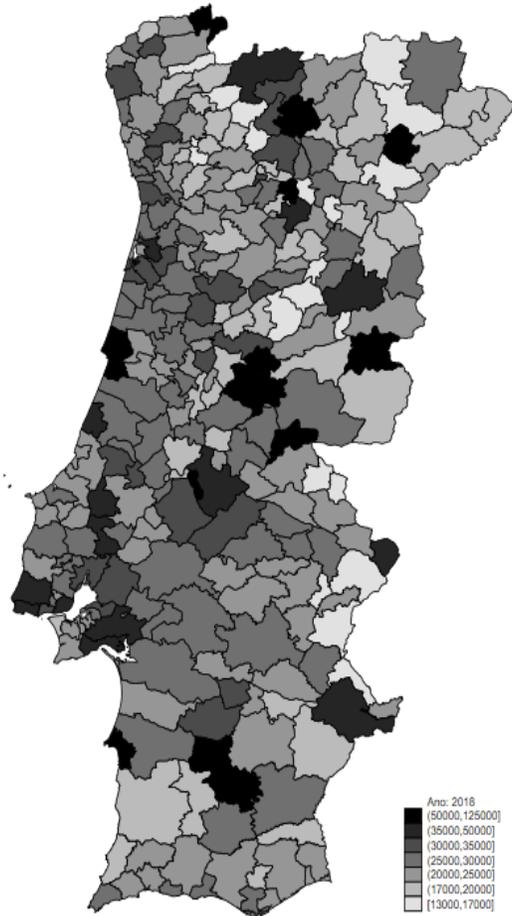


# Outline

1. Goals of ERDF support to firms' investment
2. Databases and variables
3. Overview of the distribution of ERDF support to firms' investment
4. ERDF instruments to firms' investment: grants, repayable assistance and prizes
5. ERDF support to firms' investment and productivity
6. The impact of ERDF instruments on firms' performance
7. ERDF support to co-promotion projects
- 8. The impact of ERDF on municipalities' productivity growth**
9. Demand and supply of ERDF
10. Policy recommendations

## 8. The impact of ERDF on municipalities' productivity growth

Labour productivity in the 278 municipalities of mainland Portugal (euros)

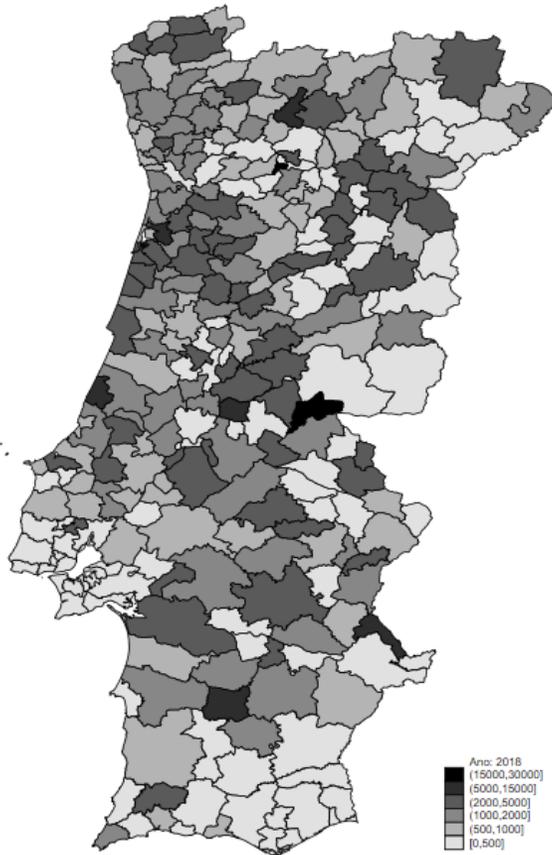


The ultimate objective of ERDF support to firms' investment is to contribute to the structural transformation of the Portuguese economy and the development of convergence regions.

Darker municipalities show higher labour productivity. Map in Figure 18 shows the existence of significant differences in productivity across municipalities.

## 8. The impact of ERDF on municipalities' productivity growth

Accumulated value of ERDF support to firms' investment in the period 2008-2018 divided by the number of workers in each municipality in 2018



The ultimate objective of ERDF support to firms' investment is to contribute to the structural transformation of the Portuguese economy and the development of convergence regions.

Darker municipalities correspond to a higher amount of ERDF incentive per worker. Figure 19 shows the existence of very significant differences in the allocation of ERDF support to firms' investment across municipalities.

## 8. The impact of ERDF on municipalities' productivity growth

Estimates of the impact of ERDF support to firms' investment on municipalities productivity in the NSRF and PT2020

	M1-GMM-FD	M2-GMM-Sys
LnVAW (-1)	0.16543*** (0.012272)	0.43819*** (0.006233)
LnERDF (-1)	0.00929** (0.003195)	0.00425*** (0.001246)
LnERDF (-2)	0.00128 (0.002292)	0.00344*** (0.001044)
LnERDF (-3)	0.00427 (0.002342)	0.00446*** (0.000931)
LnExportsSales	0.76388** (0.237294)	0.32758*** (0.031415)
No. observations	2502	2780

A set of dynamic models were estimated to capture medium-run effects of ERDF incentives on the value-added per worker at the municipality level. The estimates of the impact of ERDF incentives uses firm-level data aggregated at the municipalities level.

**The estimates show a positive and statistically significant impact of ERDF on the municipalities' productivity measured by the ratio of value-added over the number of workers.**

**Additionally, the econometric results also suggest that there was productivity convergence across municipalities.**

In the short run, a 10% increase in ERDF incentives leads to a 0.1% increase in municipalities' labour productivity. In the long run, the impact on productivity becomes 0.2%.

These results suggest that ERDF incentives to firms' investment have had externalities for productivity growth at the municipality level.



# Outline

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2. Databases and variables
3. Overview of the distribution of ERDF support to firms' investment
4. ERDF instruments to firms' investment: grants, repayable assistance and prizes
5. ERDF support to firms' investment and productivity
6. The impact of ERDF instruments on firms' performance
7. ERDF support to co-promotion projects
8. The impact of ERDF on municipalities' productivity growth
- 9. Demand and supply of ERDF**
10. Policy recommendations

## 9. Demand and supply of ERDF

Number of applications, eligible applications and selected applications, NSRF and PT2020 (2015-2019)

	Applications	Eligible	Selected	Funded
2007	84	54	52	39
2008	4,641	2,496	2,282	1,326
2009	3,835	2,735	2,379	1,425
2010	1,758	1,127	920	552
2011	3,228	1,842	1,668	1,056
2012	6,789	4,503	4,200	2,846
2013	7,720	4,380	3,271	2,299
<b>Total NSRF</b>	<b>28,055</b>	<b>17,137</b>	<b>14,772</b>	<b>9,543</b>
2015	13,272	12,613	5,820	4,776
2016	10,602	10,104	6,291	5,011
2017	5,390	5,233	2,130	1,696
2018	3,602	3,468	1,895	1,696
2019	3,923	3,406	1,916	1,830
<b>Total PT2020</b>	<b>36,789</b>	<b>34,824</b>	<b>18,052</b>	<b>15,009</b>
<b>NSRF+PT2020</b>	<b>64,844</b>	<b>51,961</b>	<b>32,824</b>	<b>24,552</b>

A competitive process for ERDF incentives to firms' investment contributes to an optimal allocation of the available funds. A competitive process for ERDF incentives requires effective communication, transparency and efficient application procedures.

The database of Agência para o Desenvolvimento e Coesão (AD&C) allows the classification of applications:

- applications to ERDF;
- eligible applications, that is, applications that comply with the financial and administrative pre-requisites;
- eligible applications selected to receive ERDF;
- and selected applications supported by ERDF.

Table 73 shows a substantial increase in the number of applications to ERDF incentives to firms' investment from 28,055 in the NSRF to 36,789 in PT2020 (2015-2019). However, the increase in the number of applications was concentrated in 2015 and 2016.

**There was also a significant increase in the number of eligible applications.**

**The increase in the number of applications in PT2020 suggests an improvement in the information and communication of the funds available to support firms' investment.**

## 9. Demand and supply of ERDF

### Approval and ERDF incentive ratios

	Eligible/applications	Selected/Eligible	Funded/applications	Funded/Eligible	Funded/Selected
2007	64%	96%	46%	72%	75%
2008	54%	91%	29%	53%	58%
2009	71%	87%	37%	52%	60%
2010	64%	82%	31%	49%	60%
2011	57%	91%	33%	57%	63%
2012	66%	93%	42%	63%	68%
2013	57%	75%	30%	52%	70%
<b>Total NSRF</b>	<b>61%</b>	<b>86%</b>	<b>34%</b>	<b>56%</b>	<b>65%</b>
2015	95%	46%	36%	38%	82%
2016	95%	62%	47%	50%	80%
2017	97%	41%	31%	32%	80%
2018	96%	55%	47%	49%	89%
2019	87%	56%	47%	54%	96%
<b>Total PT2020</b>	<b>95%</b>	<b>52%</b>	<b>41%</b>	<b>43%</b>	<b>83%</b>
<b>NSRF+PT2020</b>	<b>80%</b>	<b>63%</b>	<b>38%</b>	<b>47%</b>	<b>75%</b>

Table 74 presents five ratios that provide information about the gaps between demand and supply of ERDF incentives to firms' investment:

- Eligible to total applications ratio gauges the quality of the applications.
- Selected to eligible applications ratio gauges the amount of ERDF available relative to the amount demanded by projects that fulfil the criteria to receive ERDF.
- Funded projects to applications ratio gauges the gap between the total demand by ERDF revealed by firms and the amount of ERDF available.
- Funded to eligible projects ratio gauges the gap between ERDF supply and the demand of ERDF by good projects.
- Funded to selected projects ratio gauges the misallocation of funds to unsuccessful/unfinished projects.

## 9. Demand and supply of ERDF

- Despite the increase in the number of applications in NSRF relative to PT2020, **the ratio of eligible to total applications increased significantly from 61% to 95%.**
- These results might reflect a better communication of the available funds and an improvement in the quality of the applications.
- **The ratio of funded projects to applications increased from 34% in NSRF to 41% in PT2020, indicating a reduction in the ERDF demand and supply gap.**
- Although the number of applications was much higher in PT2020 than in the NSRF, the total amount of investment considered in the applications to PT2020 in 2015-2019 (around 28 thousand million euros) was lower than the total amount of investment in the applications to the NSRF (about 30 thousand million euros).
- **From the NSRF to PT2020, there was an increase, from 32% to 47%, in the ratio of investment in applications to ERDF and investment financed. This result suggests a decrease in the ERDF demand and supply gap.**



# Outline

1. Goals of ERDF support to firms' investment
2. Databases and variables
3. Overview of the distribution of ERDF support to firms' investment
4. ERDF instruments to firms' investment: grants, repayable assistance and prizes
5. ERDF support to firms' investment and productivity
6. The impact of ERDF instruments on firms' performance
7. ERDF support to co-promotion projects
8. The impact of ERDF on municipalities' productivity growth
9. Demand and supply of ERDF
- 10. Policy recommendations**

## 10. Policy recommendations

- **The empirical results of this report suggest that:**
  - it might be suboptimal to allocate a high share of ERDF incentives to micro-sized firms.
  - it might be beneficial to allocate several ERDF incentives to the same firm instead of giving single ERDF incentives to many firms.
  - grants or a combination of different instruments, namely grants and repayable assistance, may be more effective than ERDF incentives in the form of repayable assistance.
  - the financial condition of firms is relevant for the impact of ERDF incentives and that high leverage may wreak havoc on the project.
  - ERDF incentives may effectively enhance productivity growth at the municipality level.
  - the involvement of SMEs in projects with large-sized firms and the scientific and technological system may be an option to improve the impact of ERDF incentives.