

OECD GFP Webinar Series 2020 :: 02-12-2020

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## **Financial Distress and the Role of Management in Micro and Small-Sized Firms**

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- Motivation
- ❑ Global instability fuelled by Covid-19 - importance of **corporate management** in coping with **firms' financial distress** during **economic downturns**.
  - ❑ Role of **managerial ability - education and experience - on firm outcomes** under adverse exogenous shocks.
  - ❑ Literature **labour and finance: managerial human capital** - key asset in decision processes and **firm performance**.



- Aim
- ❑ Analyse impact of **managerial features** on **financial distress** and **recovery** of financially distressed firms (FDF).
  - ❑ Explore **managerial ability** on financial performance of **micro and small-sized firms**, prevalent in our context.
  - ❑ Systematize managerial features in 3 types of human capital:  
[formal education](#) | [within-firm knowledge](#) | [previous functional experience](#).
  - ❑ Empirical analysis of full sample and according to firms' size.

### Literature on Management

**Carpenter (2002), Darrat et al. (2016)** - Management teams have executive power directly affecting firms' productivity and performance.

**Bloom and Van Reenen (2010)** - Positive relationship between education and quality of management practices.

**Bloom and Van Reenen (2007), Bloom et al. (2013)** - Firms with better management practices tend to be more efficient, to grow faster and to have higher survival rates.

**Custódio and Metzger (2014)** - CEO experience in finance relevant to firms' optimal financial policies.

**Mion and Opromolla (2014)** - Positive impact of managerial export knowledge on firm trade performance.

**Sazedj et al. (2018)** - New knowledge by outsider CEOs - significant effect on firms' productivity and their capability to survive to negative economic shocks.

Most of the approaches: **case studies and surveys** on medium and large-sized firms, being **less effective in dealing with micro and small-sized** firms.

❑ **Our contribution:** empirical analysis of managerial human capital - **micro and small firms' financial performance.**

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### □ RESEARCH QUESTIONS

**H1:** Does **management teams' human capital** reduce the probability of financial distress, namely of micro and small-sized firms?

**H2:** To firms in a state of financial distress, **does management teams' human capital increase the odds of recovery**, namely of micro and small-sized firms?

**H3:** Does the impact of management teams' characteristics on the financial condition of firms **vary across firm size**?

## □ Case analysis - Portuguese economy and financial distress

- Micro and small firms: pervasive in the Portuguese business structure, accounting for more than half of total employment and value added.
- During the international financial crisis of 2008/2009 and the euro area sovereign debt crisis of 2010/2013, the Portuguese economy went through a severe crisis.
- High share of highly leveraged and financially distressed firms, reaching a peak of **15.1%** in 2012.  
Smaller-sized financially distressed firms: **92%** of total FDF, 29.8% of FDF employment, 20.8% of FDF value-added.

## □ Data Sample

- Data Panel: covers the aftermath of 2008/2009 financial crisis, the euro area sovereign debt crisis of 2010-2013 and the global economic recovery, up to 2018.
- At firm-level: Sample of 49,254 firms - corporate society status with at least one manager, aged 10 years or more. SCIE dataset of about 350,000 firms yearly. 'Integrated Business Accounts System', INE 2018.
- At worker-level on management variables: unique matched employer-employee dataset of about 3,000,000 workers yearly. 'Personnel Records database' QP, INE 2018.

## Variable Selection - overall Structure

### :: Dependent Variables

### :: Management Variables

#### :: Formal Education

#### :: Within-firm knowledge

#### :: Previous experience

(management, finance, export, international)

#### :: Firm-level control variables

Variable	Description	Source
Financially Distressed Firm (FDF)	FDF = 1 if financially distressed; 0 otherwise. FDF has been defined as having an interest coverage ratio inferior to one over three consecutive years.	SCIE
Recovered Financially Distressed Firm	Recovered=1 if the firm recovered from the financially distressed status; 0 otherwise. Recovered firm is defined as being in a non-FDF state over two consecutive years.	SCIE
Managers' age	AgeManager = managers' average age	QP
Managers' education	EducManager = managers' average years of schooling	QP
Manager with a college degree	CollegeManager = 1 if at least one manager has a college degree; 0 otherwise	QP
Share of managers with a college degree	ShareCollegeManager = share of managers with a college degree (%)	QP
Managers' tenure	TenureManager = managers' average years in the firm	QP
Managers' experience	ExpManager = managers' average years of experience in former firms	QP
Managers' experience in finance	FinExpManager = managers' average years of overall finance experience in former firms	QP
Managers' experience in foreign-owned/ international firms	IntExpManager = managers' average years of experience in former international firms	QP
Managers' experience in exporting firms	ExportExpManager = managers' average years of experience in former exporting firms	QP
Leverage Ratio	LevRatio = Total Liabilities/Total Equity and Liabilities	SCIE
Productivity per worker	Productivity = Gross Value-Added at cost of factors (/1000 euros)/Total Workers	SCIE
Exports ratio	ExportsRatio = Total Exports/Total Sales Turnover	SCIE
TeamManagerSize	Number of individuals in the management team	QP
NWorkers	Number of workers by each firm	SCIE

Sources: SCIE and QP.

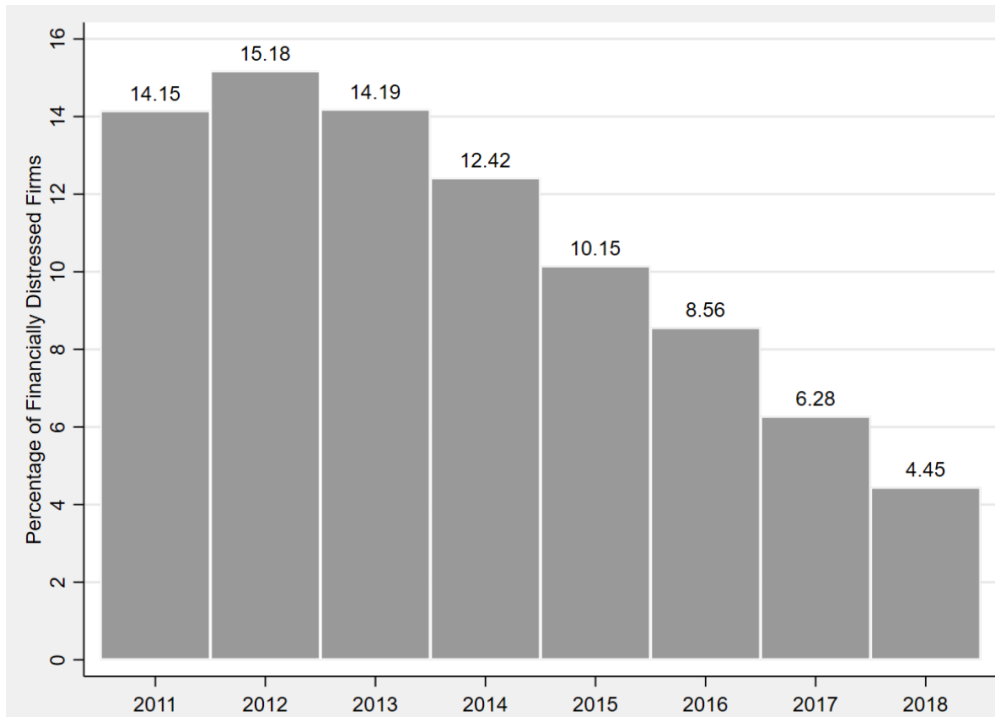
## Variables

### Dependent Variables

#### . Financially Distressed Firm (FDF)

Firm having an interest coverage ratio - ratio of EBITDA to interest expenses - inferior to one, over three consecutive years, aged 10 years or more.

**FDF evolution 2011-2018**



Source: SCIE, QP. Total obs. 327,460; Total firms 49,254; Total obs. FDF 37,123.

#### . Recovered Financially Distressed Firm

Recovered firm is defined as being in a non-FDF state over two consecutive years.

**Recovered FDF evolution 2011-2017**

	non-Recovered	Recovered	Aggregate	Share recovered (%)
2011	6,457	548	7,005	7.8
2012	6,280	890	7,170	12.4
2013	5,458	1,359	6,817	19.9
2014	4,508	2,013	6,521	30.9
2015	3,452	2,694	6,146	43.8
2016	2,648	3,219	5,867	54.9
2017	1,828	3,568	5,396	66.1
Firms	10,944	4,509	10,946	41.2
Observations	36,963	14,291	51,254	27.9

Source: own computations using data from SCIE and QP.

## Variables

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### Management Variables

#### . **Manager**

Managing Directors and Chief Executives (112); Administrative and Commercial Managers (12); Production and Specialized Services Managers (13); Hospitality, Retail and Other Services Managers (14). CPP2010 national classification of occupations.

#### . Managers' **formal Education**

- EducManager = managers' average years of schooling;
- CollegeManager = dummy equal to one if at least one manager has a college degree;
- ShareCollegeManager = share of managers in the management team with a college degree (%).

#### . Managers' **within-firm knowledge**

- TenureManager = managers' average years in the firm.

#### . Managers' **Previous Experience** - functional background

- ExpManager = managers' average years of experience in previous firms;
- FinExpManager = managers' average years of overall finance experience in former firms;
- IntExpManager = managers' average years of experience in former international, foreign-owned firms;
- ExportExpManager = managers' average years of experience in former exporting firms.



## Variables

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### Firm Size classes and Control Variables

#### . Firm Size

- Micro firms - up to 10 workers
- Small firms - between 10 and 49 workers
- Medium firms - between 50 and 249 workers
- Large firms - over 250 workers

#### . Leverage Ratio

$\text{LevRatio} = \text{Total Liabilities} / \text{Total Equity and Liabilities}$

#### . Productivity

$\text{Productivity} = \text{Value Added at cost of factors} / \text{Total Workers}$

#### . Exports Ratio

$\text{ExportsRatio} = \text{Total Exports} / \text{Total Sales Turnover}$

## Management Variables: non-FDF and FDF - evolution 2011-2018

Panel B: non-FDF										
	Micro		Small		Medium		Large		Aggregate	
	2011	2018	2011	2018	2011	2018	2011	2018	2011	2018
EducManager (years)	9.5	10.0	10.6	11.2	12.5	13.1	14.1	14.5	10.0	10.6
CollegeManager (%)	22.7	25.5	41.2	47.3	75.7	82	93.8	96.3	30.5	35.7
ShareCollegeManager (%)	19.5	22.2	28.8	34	49.5	55.9	67.9	73.3	23.7	28.0
TenureManager (years)	14.7	19.9	15.3	19.6	14.7	17.7	13.3	16.5	14.9	19.7
ExpManager (years)	0.1	0.2	0.3	0.8	0.8	2.2	1.7	4.6	0.2	0.6
FinExpManager (years)	0.1	0.1	0.2	0.5	0.6	1.5	1.3	3.4	0.1	0.4
IntExpManager (years)	0.003	0.1	0.03	0.1	0.2	0.6	0.7	2.3	0.02	0.1
ExportExpManager (years)	0.01	0.03	0.1	0.3	0.2	0.9	0.6	1.9	0.04	0.2
Firms by size	32,299		10,939		2,242		376		45,856	
Observations by size	196,944		74,467		16,152		2,774		290,337	
Observations (share)	67.8		25.6		5.6		1.0			
Panel C: FDF										
	Micro		Small		Medium		Large		Aggregate	
	2011	2018	2011	2018	2011	2018	2011	2018	2011	2018
EducManager (years)	9.3	10.1	11.2	12.3	13.2	14.1	13.8	14.7	10.0	11.1
CollegeManager (%)	20.1	26.2	50.7	60.3	85.1	90.7	93.1	100	31.1	42.9
ShareCollegeManager (%)	16.2	22.6	35.4	44.4	56.9	64.3	61.7	74.9	23.0	33.5
TenureManager (years)	15.5	20.4	15.1	17.7	14.3	14.6	13.3	16.3	15.3	19.1
ExpManager (years)	0.1	0.3	0.5	1.4	1.3	4	2.1	5.3	0.3	1.1
FinExpManager (years)	0.1	0.2	0.4	1.0	1.0	2.5	1.5	3.8	0.2	0.7
IntExpManager (years)	0.01	0.03	0.1	0.3	0.2	1.5	0.7	2.0	0.04	0.3
ExportExpManager (years)	0.01	0.05	0.1	0.3	0.4	1.0	0.5	1.7	0.1	0.3
Firms by size	7,810		2,392		509		105		10,816	
Observations by size	26,148		8,337		2,086		552		37,123	
Observations (share)	70.4		22.5		5.6		1.5			

Source: own computations using data from SCIE and QP. We report variables' averages.

Note: Not here exposed, for parsimony. On financial control variables, **FDF** revealed in all size-classes, more deteriorated ratios of leverage, productivity and export intensity than non-FDF.

### ❑ Financially Distressed Firms (FDF) / non-FDF 2011-2018

- Management teams' characteristics: significant **variation across different firm size classes**.  
Human capital variables increase monotonically with firm-size.
- **Education** of management teams: significant improvement between 2011 and 2018, for all firm-size classes, in non-FDF and FDF, reflecting the progress in education in the last decades.
- FDF improved management teams' formal education more than non-FDF, from 2011 to 2018.
- **Tacit within-firm knowledge**: tenure increased in all size classes between 2011 and 2018, suggesting the steadiness of management teams in the same firm over time.
- **Previous functional experience**:  
Medium and Large firms - FDF management shows higher experience in overall management and in finance than non-FDF.  
Small and Medium firms - FDF management teams show a higher average than in non-FDF, in international foreign-owned firms and in exporting companies.

## Management Variables: non-Recovered/ Recovered - evolution 2011-2017

Panel A: non-Recovered										
	Micro		Small		Medium		Large		Aggregate	
	2011	2017	2011	2017	2011	2017	2011	2017	2011	2017
EducManager (years)	9.3	9.9	11.2	12.1	13.2	13.8	13.9	14.6	9.9	10.9
CollegeManager (%)	19.8	24.2	50.9	56.8	85.0	87.0	94.3	100	30.4	39.0
ShareCollegeManager (%)	15.9	20.9	35.6	42.1	57	61.3	62.5	74.4	22.6	30.6
TenureManager (years)	15.4	19.9	15.1	18	14.3	14.8	13.3	16.3	15.3	18.9
ExpManager (years)	0.1	0.3	0.5	1.1	1.3	3.3	2.2	4.9	0.3	0.8
FinExpManager (years)	0.1	0.2	0.4	0.8	1.0	2.2	1.5	3.4	0.2	0.6
IntExpManager (years)	0.003	0.01	0.1	0.2	0.2	1.2	0.7	2.4	0.03	0.2
ExportExpManager (years)	0.01	0.02	0.1	0.2	0.4	0.9	0.5	1.5	0.1	0.2
Firms by size	7,966		2,372		503		103		10,944	
Observations by size	26,463		8,024		1,972		504		36,963	
Observations share (%)	71.6		21.7		5.3		1.4			
Panel B: Recovered										
	Micro		Small		Medium		Large		Aggregate	
	2011	2017	2011	2017	2011	2017	2011	2017	2011	2017
EducManager (years)	9.1	9.4	10.4	11.5	12.8	13.7	14.8	14.3	9.4	10.1
CollegeManager (%)	16.2	19.6	42.1	50	85.7	87.1	100	96.6	21.7	29.7
ShareCollegeManager(%)	14.3	16.6	31.6	36.7	50.7	61.9	71.4	65.8	17.7	23.3
TenureManager (years)	14.4	19.5	16	18.4	13.7	16.1	8.4	15.7	14.6	19.1
ExpManager (years)	0.1	0.2	0.4	0.9	1.4	2.9	2.0	4.5	0.2	0.5
FinExpManager (years)	0.1	0.1	0.2	0.7	0.7	1.9	4.0	3.4	0.1	0.3
IntExpManager (years)	0.01	0.01	0.06	0.2	0.3	0.6	4.0	1.7	0.03	0.1
ExportExpManager (years)	0.01	0.02	0.1	0.2	0.1	0.9	0.3	1.6	0.03	0.1
Firms by size	3,413		874		192		30		4,509	
Observations by size	10,728		2,813		644		106		14,291	
Observations share (%)	75.1		19.7		4.5		0.7			

Source: own computations using data from SCIE and QP.

Note: Not here exposed, for parsimony. On financial control variables, **Recovered FDF** revealed in all size-classes, better ratios of leverage, productivity and export intensity than non-Recovered FDF.

### ❑ Recovered FDF / Non-Recovered FDF 2011-2017

- **Education:** Recovered FDF show a lower relative weight of higher educated managers in management boards than non-Recovered counterparts.
- **Non-Recovered FDF retain a considerable share of highly qualified** managerial workforce.
- **Managerial Tenure:** managers of Recovered FDF are in general, more tenured.
- **Previous functional Experience:** slightly higher overall management, finance, international and exporting experience in the management teams of Recovered FDF, but tendency of non-Recovered to retain experienced managerial workforce over the years.

### □ ECONOMETRIC MODEL

#### Data Panel Logit Model with fixed-effects

$$P(FDF_{it} = 1 | \mathbf{X}_{it}, \boldsymbol{\beta}, \alpha_i) = \frac{\exp(\boldsymbol{\beta} \mathbf{X}_{it} + \alpha_i)}{1 + \exp(\boldsymbol{\beta} \mathbf{X}_{it} + \alpha_i)}$$

$$\begin{aligned} \boldsymbol{\beta} \mathbf{X}_{it} = & \beta_1 \text{EducManager}_{it-1} + \beta_2 \text{TenureManager}_{it-1} + \\ & + \beta_3 \text{LevRatio}_{it} + \beta_4 \text{Productivity}_{it} + \beta_5 \text{ExportsRatio}_{it} \\ & + \beta_6 \text{NWorkers}_{it} + \beta_7 \text{NWorkers}_{it}^2 \end{aligned}$$

- . **Managers' formal Education** captured by three measures: EducManager, CollegeManager, ShareCollegeManager.
- . **Within-firm knowledge** proxied by TenureManager.
- . **Previous experience:** functional experience acquired in other firms, ExpManager, FinExpManager, IntExpManager and ExportExpManager.
- . **Control variables at firm-level:** LevRatio, Productivity and ExportsRatio, NWorkers.

## Estimation Results on the probability of Financial Distress

- Formal Education
- Within-Firm tacit Knowledge

Estimation results by firm size on Probability of FDF (2011 – 2018)

	Micro	Small	Medium	Large
Panel A				
EducManager	-0.120*** (0.015)	-0.115*** (0.021)	-0.099* (0.056)	-0.095 (0.144)
TenureManager	-0.122*** (0.005)	-0.046*** (0.007)	-0.045*** (0.014)	-0.046 (0.038)
Panel B				
CollegeManager	-0.004*** (0.001)	0.002 (0.001)	0.002 (0.003)	0.012 (0.009)
TenureManager	-0.120*** (0.005)	-0.036*** (0.007)	-0.033** (0.013)	-0.049 (0.039)
Panel C				
ShareCollegeManager	-0.009*** (0.001)	-0.006*** (0.002)	-0.003 (0.004)	-0.001 (0.009)
TenureManager	-0.121*** (0.005)	-0.042*** (0.007)	-0.039*** (0.014)	-0.045 (0.038)

Notes: standard errors in parenthesis. Significance levels: \*, 10%; \*\*, 5%; \*\*\*, 1%.

Size: Micro firms <10 workers; 10 <= Small firms < 50; 50 <= Medium firms <250; Large firms >=250.

- Previous Functional Experience

Estimation results by firm size on the probability of FDF (2011 – 2018)

	Micro	Small	Medium	Large
Panel A				
EducManager	-0.057*** (0.014)	-0.077*** (0.021)	-0.005 (0.052)	-0.065 (0.144)
ExpManager	-0.063** (0.027)	-0.039 (0.024)	-0.119*** (0.028)	-0.051 (0.047)
Panel B				
EducManager	-0.058*** (0.014)	-0.079*** (0.021)	-0.008 (0.052)	-0.076 (0.142)
FinExpManager	-0.070* (0.041)	-0.012 (0.030)	-0.092** (0.037)	-0.079 (0.057)
Panel C				
EducManager	-0.059*** (0.014)	-0.076*** (0.021)	-0.026 (0.051)	-0.076 (0.143)
IntExpManager	-0.464** (0.212)	-0.201*** (0.072)	-0.017 (0.049)	-0.112 (0.073)
Panel D				
EducManager	-0.058*** (0.014)	-0.079*** (0.021)	-0.020 (0.051)	-0.078 (0.142)
ExportExpManager	-0.276** (0.116)	-0.064 (0.053)	-0.059 (0.050)	-0.102 (0.074)

## Estimation Results on the probability of Recovery from financial distress

- Formal Education
- Within-Firm tacit Knowledge

Estimation results by Firms' Size on Probability of Recovery (2011 – 2017)

	Micro	Small	Medium	Large
Panel A				
EducManager	0.618*** (0.033)	0.459*** (0.041)	0.470*** (0.096)	0.289 (0.208)
TenureManager	0.549*** (0.012)	0.202*** (0.014)	0.124*** (0.023)	0.148* (0.082)
Panel B				
CollegeManager	0.022*** (0.002)	0.005** (0.002)	0.002 (0.005)	0.000 (0.011)
TenureManager	0.525*** (0.012)	0.154*** (0.013)	0.072*** (0.020)	0.143* (0.079)
Panel C				
ShareCollegeManager	0.062*** (0.004)	0.029*** (0.003)	0.020*** (0.006)	0.015 (0.015)
TenureManager	0.542*** (0.012)	0.183*** (0.013)	0.098*** (0.021)	0.132* (0.080)

Notes: standard errors in parenthesis. Significance levels: \*, 10%; \*\*, 5%; \*\*\*, 1%.  
Size: Micro firms <10 workers; 10 <= Small firms < 50; 50 <= Medium firms <250; Large firms >=250.

- Previous Functional Experience

Estimation results by Firms' Size on Probability of Recovery (2011 – 2017)

	Micro	Small	Medium	Large
Panel A				
EducManager	0.195*** (0.022)	0.230*** (0.034)	0.177** (0.084)	0.484** (0.231)
ExpManager	0.270*** (0.053)	0.235*** (0.045)	0.263*** (0.047)	0.739*** (0.195)
Panel B				
EducManager	0.198*** (0.022)	0.229*** (0.034)	0.181** (0.082)	0.556** (0.223)
FinExpManager	0.293*** (0.072)	0.209*** (0.053)	0.168*** (0.056)	0.786*** (0.196)
Panel C				
EducManager	0.200*** (0.022)	0.234*** (0.034)	0.211*** (0.081)	0.332 (0.213)
IntExpManager	0.758** (0.345)	0.487*** (0.137)	0.138* (0.078)	0.179 (0.171)
Panel D				
EducManager	0.197*** (0.022)	0.229*** (0.034)	0.201** (0.081)	0.342 (0.216)
ExportExpManager	1.281*** (0.497)	0.398*** (0.122)	0.169** (0.073)	0.544** (0.273)



### □ Major Findings and Implications

- Management teams' formal education, within-firm and previous experience: effects vary on firms' size.
- On **micro and small-sized firms** - highly significant impact in reducing probability of financial distress and in increasing chances of subsequent recovery.
- In the sequence of **negative exogenous shocks** such as the global financial crisis, which deteriorated firms' financial conditions, firms with higher skilled managerial workforce (education, within-firm knowledge, experience):
  - appear to be better equipped to avoid the expected outcome of becoming financially distressed;
  - are more likely to recover from a financial distress state.



- Policies that induce an **improvement in the managerial human capital of smaller-sized firms** may contribute to a better financial condition, reducing the likelihood of firms entering a state of financial distress.
- **More skilled management teams** may contribute to enhance performance and the **resilience against adverse shocks**, such as the pandemic Covid-19.

Questions | Suggestions

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Thank you |

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