

Foreign-owned firms and bank distress

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Motivation

- During crises, banks and firms are often tied together in a **doom loop** (Ivashina and Scharfstein, 2010; Cornett, McNutt, Strahan, and Tehranian, 2011; Paravisini, 2008).

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- When the **economy** is not doing well, banks do not have many good lending opportunities. When the **banks** are in distress, firms have difficulties in funding their activities and growth strategies.
- In this paper we examine if lending to foreign firms offers **diversification benefits** to banks and firms during crises, helping to break this doom loop.

Main findings

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- Banks' **diversification** does not always lead to better outcomes for domestic firms.
- During the crisis, more exposed banks lend more to domestic firms, but at lower growth rates.

Contribution to the literature

- **Shock propagation through firms and banks, across borders.**
The literature has focused mostly on examining how shocks abroad can bring pain (or gain) at home (di Giovanni et al., 2021; Cingano and Hassan, 2022; Alfaro et al., 2021).

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- **Foreign firms and lending.** Mixed evidence on the role of foreign firms in stabilizing the effects of crises (Alfaro and Chen, 2012; Poelhekke et al., 2021; Alvarez and Görg, 2007).

- Three steps:
 1. Do foreign-owned firms borrow more?
 2. Do foreign-owned firms borrow more or less during crises?
 3. Does banks' exposure to foreign firms lead to changes in lending decisions?

- ORBIS (ultimate ownership)
 - Central balance sheet database
 - Credit register
 - Supervisory bank data
-
- Period: 2006 – 2018
 - 14,543 foreign firms
 - 3.4 million firm-year observations

▶ Summary statistics and variable definitions

Institutional background

- The Portuguese economy went through a very challenging period in the last decade.
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- Access to credit became severely impaired (Farinha and Félix, 2015).
- Banks recorded increasing amounts of losses and were subject to additional capital requirements and more intrusive supervision (Blattner, Farinha, and Rebelo (2023); Degryse, Karapetyan, and Karmakar (2021); Bonfim, Cerqueiro, Degryse, and Ongena (2022)).

Institutional background

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- The sharp contraction in domestic demand forced firms to adapt.
- Many firms reinforced their sales abroad and many others started to export for the first time (Amador and Opromolla (2017)).
- Foreign direct investment also helped the economy recover. Among the main investors was China, who acquired and reinforced positions in several firms during this period (Dreger, Schüler-Zhou, and Schüller, 2017).

1. Do foreign-owned firms borrow more?

$$Loan_{ft} = \beta_0 Foreign(0/1)_f + \beta_1 Controls_{ft} + \alpha_t + \varepsilon_{ft} \quad (1)$$

- $Loan_{ft}$ can be:
 - $Ln(loan)_{ft}$
 - Symmetric growth rate: $loan\ growth_{ft} = \frac{loan_{ft} - loan_{ft-1}}{0.5 \times (loan_{ft} + loan_{ft-1})}$

1. Do foreign-owned firms borrow more?

Table 1: Borrowing by foreign firms

	Log(loans) (1)	Loan growth (2)	Log(loans) (3)	Loan growth (4)
Foreign firm	1.905*** [49.954]	0.030*** [10.156]	-0.353*** [-10.402]	-0.044*** [-13.508]
Observations	3,411,209	2,833,035	1,791,427	1,791,427
R-squared	0.018	0.006	0.353	0.030
Controls	N	N	Y	Y
Firm fixed effects	N	N	N	N
Sector fixed effects	N	N	Y	Y
Time fixed effects	Y	Y	Y	Y

Note: Standard errors clustered at the firm-level. Robust t-statistics in brackets. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Yes, but only when controls are not included.

2. Do foreign-owned firms borrow more or less during crises?

$$Loan_{ft} = \gamma Foreign(0/1)_f \times Crisis_t + \beta_1 Controls_{ft} + \alpha_t + \alpha_f + \varepsilon_{ft} \quad (2)$$

where *Crisis* is one in 2010-2014 and α_f are firm-fixed effects.

2. Do foreign-owned firms borrow more or less during crises?

Table 2: Borrowing by foreign firms during crisis

	Log(loans) (1)	Log(loans) (2)	Log(loans) (3)	Loan growth (4)	Loan growth (5)	Loan growth (6)
Foreign firm	1.882*** [50.203]	-0.408*** [-12.181]		0.029*** [6.637]	-0.059*** [-12.273]	
Crisis	-0.413*** [-86.169]	-0.399*** [-72.450]	-0.506*** [-108.077]	-0.055*** [-32.039]	-0.088*** [-38.864]	-0.255*** [-105.142]
Foreign firm * Crisis	0.054** [2.345]	0.119*** [5.325]	0.051*** [2.972]	0.002 [0.281]	0.032*** [4.557]	0.046*** [6.229]
Observations	3,411,209	1,791,427	1,740,065	2,833,035	1,791,427	1,740,065
R-squared	0.018	0.353	0.854	0.006	0.030	0.203
Firm fixed effects	N	N	Y	N	N	Y
Sector fixed effects	N	Y	N	N	Y	N
Time fixed effects	Y	Y	Y	Y	Y	Y

During the crisis, banks cut lending less to foreign firms.

3. Does banks' exposure to foreign firms lead to changes in lending decisions?

1: Do banks **in distress** lend differently to domestic and foreign firms? We estimate the following specification:

$$\text{Loan}_{bft} = \gamma \text{Foreign}(0/1)_f \times EBA_{bt} + \delta EBA_{bt} + \alpha_{ft} + \alpha_{fb} + \varepsilon_{fbt}(3)$$

where EBA takes the value one for the banks that were subject to the EBA sovereign capital buffer in 2010, during the crisis period (2010-2014).

3. Does banks' exposure to foreign firms lead to changes in lending decisions?

Table 3: Borrowing by foreign firms from distressed banks

	Log(loans) (1)	Log(loans) (2)	Loan growth (3)	Loan growth (4)
EBA	0.430*** [2.733]	0.020 [0.474]	0.050 [1.540]	-0.055*** [-3.391]
Foreign firm * EBA	0.570*** [2.966]	0.004 [0.058]	0.031 [1.480]	-0.005 [-0.220]
Observations	2,954,232	2,783,593	2,173,022	2,035,900
R-squared	0.616	0.922	0.384	0.544
Firm fixed effects	N	N	N	N
Time fixed effects	N	N	N	N
Firm*time fixed effects	Y	Y	Y	Y
Firm*bank fixed effects	N	Y	N	Y

Banks exposed to the EBA shock increase lending to foreign firms.

3. Does banks' exposure to foreign firms lead to changes in lending decisions?

2: Do banks that are more specialized in lending to foreign-owned firms make different lending decisions?

$$Loan_{bft} = \gamma Foreign(0/1)_f \times Exposure_{bt} + \delta Exposure_b + \alpha_{ft} + \alpha_{fb} + \varepsilon_{fbt}(4)$$

where *Exposure* are loans to foreign-owned firms as a percentage of total loans to firms granted by that bank.

This empirical strategy closely follows that in Federico, Hassan, and Rappoport, 2020.

3. Does banks' exposure to foreign firms lead to changes in lending decisions?

Table 4: Exposure to foreign firms and lending decisions

	Log(loans) (1)	Log(loans) (2)	Loan growth (3)	Loan growth (4)
Exposure	-0.410 [-0.521]	-0.040 [-0.083]	-0.101 [-0.528]	-0.102 [-0.475]
Foreign firm * Exposure	-1.151 [-0.803]	1.241*** [2.908]	0.029 [0.179]	0.414** [2.029]
Observations	2,954,232	2,783,593	2,173,022	2,035,900
R-squared	0.612	0.922	0.384	0.543
Firm fixed effects	N	N	N	N
Time fixed effects	N	N	N	N
Firm*time fixed effects	Y	Y	Y	Y
Firm*bank fixed effects	N	Y	N	Y

Banks more exposed to foreign firms seem eager to reinforce their specialization.

3. Does banks' exposure to foreign firms lead to changes in lending decisions?

3: Does geographical diversification allow banks to mitigate the impact of the crisis on firms?

$$\begin{aligned} Loan_{bft} = & \gamma Crisis_t \times Exposure_b + \\ & \delta Exposure_b + \alpha_{ft} + \alpha_{fb} + \varepsilon_{fbt} \end{aligned} \quad (5)$$

3. Does banks' exposure to foreign firms lead to changes in lending decisions?

Table 5: Exposure to foreign firms during crises

	Log(loans) (1)	Log(loans) (2)	Loan growth (3)	Loan growth (4)
Exposure	-0.177 [-0.252]	0.084 [0.171]	0.051 [0.245]	0.011 [0.055]
Crisis * Exposure	-0.522 [-0.893]	-0.195 [-0.799]	-0.249** [-2.305]	-0.226** [-2.040]
Observations	2,954,232	2,783,593	2,173,022	2,035,900
R-squared	0.612	0.922	0.384	0.544
Firm fixed effects	N	N	N	N
Time fixed effects	N	N	N	N
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During the crisis, banks more exposed to foreign firms cut lending more.

3. Does banks' exposure to foreign firms lead to changes in lending decisions?

A natural extension of this exercise is to further explore lending decisions toward foreign and domestic firms. To address this, we add another interaction term to our specification:

$$\begin{aligned} \text{Loan}_{bft} = & \gamma \text{Crisis}_t \times \text{Exposure}_b + \\ & \delta \text{Exposure}_b + \beta \text{Foreign}_b \times \text{Exposure}_b + \\ & \theta \text{Crisis}_t \times \text{Exposure}_b \times \text{Foreign}_b \alpha_{ft} + \alpha_{fb} + \varepsilon_{fbt} \end{aligned} \quad (6)$$

3. Does banks' exposure to foreign firms lead to changes in lending decisions?

Table 6: Exposure to foreign firms during crises and lending decisions

	Log(loans) (5)	Log(loans) (6)	Loan growth (7)	Loan growth (8)
Exposure	-0.176 [-0.250]	0.026 [0.050]	0.048 [0.226]	-0.009 [-0.042]
Foreign firm * Exposure	-0.012 [-0.013]	1.190** [2.592]	0.090 [0.496]	0.384** [2.227]
Crisis * Exposure	-0.459 [-0.833]	-0.204 [-0.814]	-0.245** [-2.237]	-0.229** [-2.105]
Foreign * Crisis * Exposure	-2.150** [-2.349]	0.167 [0.475]	-0.123 [-1.025]	0.088 [0.627]
Observations	2,954,232	2,783,593	2,173,022	2,035,900
R-squared	0.613	0.922	0.384	0.544
Firm fixed effects	N	N	N	N
Time fixed effects	N	N	N	N
Firm*time fixed effects	Y	Y	Y	Y
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During the crisis, more exposed banks seem to lend more to domestic firms, but at lower growth rates.

Main conclusions

- We find that when banks cut lending during crises, they **rebalance** their credit portfolios towards foreign-owned firms.

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Appendix

Summary statistics

Table 8: Summary statistics

Panel A - Summary statistics at the firm level

	Number	Mean	Min	p5	p50	p95	Max	Std. Dev
Chinese firm	3,411,209	0.0003	0.00	0.00	0.00	0.00	1.00	0.02
Foreign firm	3,411,209	0.014	0.00	0.00	0.00	0.00	1.00	0.12
Log(loans)	3,411,209	10.20	1.39	6.20	10.30	14.10	23.60	2.36
Loan growth	2,833,035	-0.08	-2.00	-1.08	-0.01	0.95	2.00	0.57
ROA	2,465,867	-0.07	-2.47	-0.57	0.01	0.21	0.48	0.36
Liquidity	2,465,867	0.15	0.00	0.00	0.06	0.65	0.96	0.21
Leverage	2,465,867	0.19	0.00	0.00	0.03	0.80	2.04	0.33
Exports (0/1)	2,470,117	0.17	0.00	0.00	0.00	1.00	1.00	0.38
Sales growth	1,793,776	-0.02	-2.40	-0.92	0.00	0.79	2.06	0.57

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Summary statistics

Table 9: Summary statistics

Panel B - Summary statistics at the bank-firm level

	Number	Mean	Min	p5	p50	p95	Max	Std. Dev
Chinese firm	4,782,005	0.0004	0.00	0.00	0.00	0.00	1.00	0.02
Exposure China	4,782,005	0.004	0.00	0.00	0.00	0.01	1.00	0.01
Exposure China (2010)	4,707,165	0.01	0.00	0.00	0.01	0.02	0.03	0.01
Foreign firm	4,782,005	0.02	0.00	0.00	0.00	0.00	1.00	0.13
Exposure foreign	4,782,005	0.12	0.00	0.01	0.13	0.18	1.00	0.08
Exposure foreign (2010)	4,707,165	0.12	0.00	0.02	0.13	0.17	0.68	0.08
Log(loans)	4,782,005	9.86	0.00	6.01	9.89	13.50	21.90	2.25
Loan growth	3,699,078	-0.12	-2.00	-1.12	0.00	0.78	2.00	0.54
EBA	4,782,005	0.27	0.00	0.00	0.00	1.00	1.00	0.44
Troika	4,782,005	0.34	0.00	0.00	0.00	1.00	1.00	0.47
Low ROA bank	4,768,276	0.63	0.00	0.00	1.00	1.00	1.00	0.48
Crisis	4,782,005	0.47	0.00	0.00	0.00	1.00	1.00	0.50

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Variable definitions

- A Chinese firm is defined as a firm operating in Portugal who's ultimate owner is a Chinese firm. A corresponding definition applies to foreign firms.
- $\text{Log}(\text{loans})$ is the log amount of outstanding bank loans of each firm has at the end of a year.
- Loangrowth is a symmetric growth rate, such that
$$\text{loan growth}_{ft} = \frac{\text{loan}_{ft} - \text{loan}_{ft-1}}{0.5 \times (\text{loan}_{ft} + \text{loan}_{ft-1})}.$$
- Exposure to China captures the percentage of loans to Chinese-owned firms in the corporate loan book of each bank.
- Exposure foreign is the corresponding variable for foreign-owned firms. We also consider both variables in 2010, at the onset of the euro area sovereign debt crisis.

Variable definitions

- *EBA* takes the value one for the banks that were subject to the EBA sovereign capital buffer in 2010, during the crisis period (2010-2014).
- *Troika* takes the value one for the eight largest banks in Portugal, that were subject to stricter regulatory and supervisory requirements during the bailout period.
- A *LowROAbank* is a bank with profitability below the median in a given year.
- *Crisis* takes the value one between 2010 and 2014.
- *ROA* is defined as firms' net income over total assets.
- *Liquidity* is cash over total assets.
- *Leverage* is defined as debt over total assets.
- The variable *Exports* captures if a firm exports or not.
- *Salesgrowth* is the year-on-year growth rate of sales.

3. Does banks' exposure to foreign firms lead to changes in lending decisions?

Table 10: Exposure to foreign firms during crises and lending decisions - exposure in 2010

	Exposure to Chinese firms				Exposure to foreign firms			
	Log(loans) (1)	Log(loans) (2)	Loan growth (3)	Loan growth (4)	Log(loans) (5)	Log(loans) (6)	Loan growth (7)	Loan growth (8)
Exposure 2010	38.091*** [5.408]		7.109*** [4.270]		0.135 [0.141]		0.262 [0.870]	
Chinese firm * Exposure 2010	7.830 [0.439]		-8.070* [-1.670]					
Foreign firm * Exposure 2010					-0.537 [-0.328]		-0.201 [-0.634]	
Crisis * Exposure 2010	6.486** [2.191]	6.975*** [2.976]	-3.747*** [-3.334]	-3.699*** [-4.471]	-0.429 [-1.317]	-0.274 [-0.984]	-0.400** [-2.427]	-0.303*** [-2.739]
Chinese * Crisis * Exposure 2010	17.658 [0.851]	6.174 [0.293]	10.377 [1.585]	10.748 [1.376]				
Foreign * Crisis * Exposure 2010					-0.845 [-1.486]	0.666* [1.793]	0.100 [0.470]	0.111 [0.496]
Observations	2,881,147	2,735,017	2,142,278	2,016,861	2,881,147	2,735,017	2,142,278	2,016,861
R-squared	0.625	0.921	0.387	0.543	0.616	0.921	0.385	0.543
Firm fixed effects	N	N	N	N	N	N	N	N
Time fixed effects	N	N	N	N	N	N	N	N
Firm*time fixed effects	Y	Y	Y	Y	Y	Y	Y	Y
Firm*bank fixed effects	N	Y	N	Y	N	Y	N	Y