

More Than Words: Broader information sharing and access to formal credit

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This work studies how information sharing mechanisms might enable Micro and Small Enterprises (MSEs) to increase its access to formal credit markets. Using a unique dataset provided by Brazilian Central Bank and Ministry of Labor, I investigate a change in the threshold of loans that must be reported and shared by all active banks as a gradual increase in MSE's available information. Results suggest that borrowers benefited by this change obtained more loans, smaller interest rates, and, by constituting a good pool of clients, end up receiving smaller maturities. Subjects are also less likely to delay repayments and present smaller loan losses. This evidence sheds light in information asymmetry and financial inclusion literature by showing that information sharing mechanisms improves screening process of loan officers and MSEs become less dependent of relationship lending to obtain credit.

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Hypothesis

This study investigates if an exogenous reduction in asymmetry of information can improve access to formal finance for MSEs (Micro and Small Enterprises).

- Better screening (Pagano and Jappelli, 1993; Bennardo et al., 2015) vs. Monitoring effect (Vercammen, 1995; Padilla and Pagano, 1997; Behr and Sonnekalb, 2012).
- Roll over short-term debt or intense monitoring (Diamond, 1991; López-Espinosa et al., 2016; Bharath et al., 2011).
- Hold-up problem avoidance (Ioannidou and Ongena, 2010; Giertzen, 2017) and soft information dependence (Berger and Udell, 2006; de la Torre et al., 2010).

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- 8 Information sharing makes the firms less susceptible to market reactions.

- In 1997, Brazilian Central Bank started to collect information about loans to better observe bank exposition.
- In July 2002 there were approximately 7 million entries, whereas in early 2016, there were more than 450 million. These 450 million entries represent loans taken by approximately 72.5 million individuals and 4.2 million firms.
- Loan officers require formal permission to access their records in the credit registry (e.g. interest rates, maturity, collateral, risk rating, repayment schedule).
- Monthly updated loan amount and arrears.

- Data from approved loans from January 2011 until December 2012.
- Event: change in loans that had to be reported.
- Announcement January 2012 with the rule becoming effective in April.
- Standard errors robust to autocorrelation and heteroskedasticity at the firm level.

$$y_{i,j,t} = \beta Post + \gamma Treatment + \delta Post \cdot Treatment + \tau + \mu + \varphi + \vartheta + \omega + \varepsilon_{i,b,j,t}$$

Table: Diff-in-diff setup

Groups (Loan ¹ in R\$)	
Treatment	(1,000~5,000)
Control	(5,000~10,000)

Binary and Counting dependent variables

The use of linear models will not harm the observation of the causal effect (see Angrist and Pischke, 2008, p.94).

¹Loan Amount Outstanding with the same bank

Two sources of data: i) Brazilian Central Bank (SCR); ii) Ministry of Labor (RAIS). Merge using a unique firm identifier (CNPJ).

- Interest Rate: annual interest rate paid on the loans.
- Loan Maturity: number of months until the original principal is due.
- Arrears (1,30,90 days): dummy variable that assumes value of 1 if in a given month the firm has late repayments for X days.
- Loan Losses: monetary loss due to default.
- Number of Lenders: number of firm's lenders in a given year.
- Number of Employees: number of firm's employees in a given year.
- Firm Age: number of years from firm foundation.
- Relationship Length: number of years since first transaction with a given bank.

Table 1: Summary statistics of dependent and control variables

Variable	N (1)	Mean (2)	SD (3)	1% (4)	Median (5)	99% (6)
Loan contract outcomes						
Interest rate p.a. (%)	3,271,867	54.52	39.49	1.00	50.00	178.00
Loan maturity (months)	3,445,028	14.02	58.60	0.30	1.93	457.46
Risk realization outcomes						
Arrears > 0 days	3,445,028	0.10	0.30	0.00	0.00	1.00
Arrears > 30 days	3,445,028	0.09	0.28	0.00	0.00	1.00
Arrears > 90 days	3,445,028	0.07	0.25	0.00	0.00	1.00
Loan losses	3,445,028	85.71	766.88	0.00	0.00	3,132
Firm level outcomes						
Number of lenders	818,313	1.04	0.20	1	1	2
Number employees	292,033	5.63	7.19	1	3	37
Control variables						
Firm age (in years)	3,445,028	7.08	8.01	0.24	3.64	36.72
Relationship length (in years)	3,445,028	2.62	4.47	0.01	0.84	22.03
Number of firms	818,313					
Number of banks	892					

Table 2: Interest rate regressions for full sample

Dependent variable: interest rate p.a. (%)					
	(1)	(2)	(3)	(4)	(5)
Post x Treatment	-1.4322*** [0.3923]	-1.2406*** [0.3940]	-1.5309*** [0.3811]	-2.9914*** [0.3942]	-1.1807*** [0.3505]
Post	-13.0760*** [0.2487]	-13.3285*** [0.2493]	-11.6134*** [0.2482]	-9.2310*** [0.2544]	-14.3267*** [0.3394]
Treatment	14.1423*** [0.3514]	13.8345*** [0.3546]	14.9813*** [0.3326]	14.2303*** [0.3507]	
Adjusted R-squared	0.033	0.047	0.055	0.128	0.757
Observations	3,271,867	3,271,501	3,271,867	3,271,486	3,271,852
Time FE	Yes	Yes	Yes	Yes	Yes
State FE	No	Yes	No	Yes	No
Industry FE	No	No	Yes	No	No
Bank FE	No	No	No	Yes	Yes
Firm FE and firm controls	No	No	No	No	Yes

Table 3: Loan maturity

Dependent variable	Loan maturity
Post x Treatment	-7.7274*** [0.4628]
Post	-14.0396*** [0.4391]
Adjusted R-squared	0.7360
Observations	3,445,008
Time FE	Yes
State FE	No
Industry FE	No
Bank FE	Yes
Firm FE and firm controls	Yes

Table 2 shows a reduction in interest rates for loans approved for the treatment group. Results are robust to several specifications.

Table 3 Shows that loan maturity is smaller for treatment groups. It is a positive result. Good borrowers get smaller maturities to protect themselves from liquidity risks (Diamond, 1991).

Table 4: Risk realization regressions

Dependent variable	Arrears > 0	Arrears > 30	Arrears > 90	Loan loss
Post x Treatment	-0.0375*** [0.0026]	-0.0234*** [0.0024]	-0.0362*** [0.0023]	-108.1092*** [9.1248]
Post	-0.0095*** [0.0026]	-0.0274*** [0.0024]	-0.0207*** [0.0023]	78.4893*** [9.1897]
Adjusted R-squared	0.747	0.735	0.705	0.692
Observations	3,445,008	3,445,008	3,445,008	3,445,008
Time FE	Yes	Yes	Yes	Yes
State FE	No	No	No	No
Industry FE	No	No	No	No
Bank FE	Yes	Yes	Yes	Yes
Firm FE and firm controls	Yes	Yes	Yes	Yes

Table 5: Firm-level outcome variables

Dependent variable	Number of loans	Number of lenders	Number of employees
Post x Treatment	1.6799*** [0.0507]	0.0387*** [0.0010]	0.1726*** [0.0553]
Post	2.2604*** [0.0441]	-0.0263*** [0.0008]	-0.6274*** [0.0458]
Treatment	0.2935*** [0.0149]	-0.0134*** [0.0008]	-1.6188*** [0.0448]
Adjusted R-squared	0.029	0.002	0.016
Observations	818,167	818,167	291,999
State FE	Yes	Yes	Yes

MSE instead of SME

Hertzberg et al. (2011) and Giannetti et al. (2017) uses the threshold of US\$ 150,000 to US\$250,000. Due to the large dimensional data, I can use a smaller range and obtain accurate estimators.

Soft & hard information

Banks can rely in hard information to perform arms-length lending to MSE without requiring formation of a long-term relation. Also, banks lend at better loan terms and lower default rates.

Policy Implication

Increase in available information and awareness of the importance of credit registry. With a higher number of loans, more taxes are collected, employment are stimulated, and the cost is distributed among a larger number of clients.

Due to hard access to Central Bank confidential dataset, much has still to be explored.

- Robustness

- McCrary density test.
- Imbens and Kalyanaraman (2012) optimal bandwidth selection.
- Bertrand et al. (2004) suggest collapse the time series.
- A placebo test with different time window.

- Further Analysis

- Long-run effects.
- Repeated borrowers vs. first-time (Behr and Sonnekalb, 2012).
- Good historic vs. bad historic (Cheng and Degryse, 2010).
- Adding and Switching banks (Ioannidou and Ongena, 2010; Giertzen, 2017).

Thanks for your attention.



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