

Credit Guarantees, Firm Response, and Macroeconomics

Yasin Kürşat Önder
Ghent University

Jose Villegas
Ghent University

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Motivation, why is it important?

- **Credit Guarantees** are a widely used policy during economic downturns
- **Target stressed borrowers** with liquidity needs

Third party (e.g., Government) guarantees loans taken out by firms

Banks are insured against the event of borrower not paying back ⇒ # **default risk**

- Credit Guaranteed Schemes (CGS) gained popularity in the aftermath of the 2007 GFC.

First implementations goes back to 1950 (US Small Business Act 1953, 1958)

- During **COVID-19 pandemic** ⇒ **cornerstone** of the policy strategy for **EU countries**

July 2021: 26 EU member states (out of 27) committed about **€2,093 billion**

Average CGS in EU: (i) **7.9% of nominal GDP**, (ii) **40% of fiscal budget**

Motivation, why is it important?

- Policymakers **debate about its effectiveness** to stimulate economic activity

Advocates argue credit is allocated to businesses that **otherwise won't be able to secure financing**

⇒ Increase overall quantity of credit available at **more favorable pricing terms**

Critics point out that CGS **can lead to misallocation**

⇒ Crowd out bank lending for other sectors of the economy

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⇒ Crowd out bank lending for other sectors of the economy

- **Existing literature** views CGS as instruments expanding the absolute supply of credit

- The impact of **favorable pricing conditions** with credit guarantees **largely unexplored**

Main difficulty ⇒ **Separate effect** of **lower interest** from impact of **credit expansion**

Stressed borrowers with no collateral likely afflicted **elevated borrowing costs**

This Paper

- Novel evidence on the effect of favorable pricing conditions on guaranteed loans
- **Empirical approach**

Exploit policy-induced variation in the pricing conditions for firms participating during 2020 Belgian CGS

Interest rate on guaranteed loans reduced by 25 basis points (bp.) for firms with less than 50 employees

Use balance sheet-data for firms participating in 2020

Regression Discontinuity Design (RDD) to estimate effect on economic performance

Provide evidence on the channel

Related Literature

- **Alleviation measures for stressed firms**

Önder et al., (2023) (**corporate debt moratoria**), Guler et al., 2024 (**mortgage debt moratoria**)

Lelarge et al. (2010) (**CGS and start-up creation and growth**)

Gonzalez-Uribe and Wang (2022), Bonfim et al. (2023), Güler and Samarin (2023) (**EU CGS during COVID-19**)

- **Impact of policy interventions on financial frictions**

Banerjee and Duflo (2014) (**targeted lending**)

Brown et al. (2009) (**information sharing**)

Main Findings

1. Lower interest rates on guaranteed loans improve firms' economic performance
 - " Investment, Employment, Revenues,
 - # Exit probability
2. Better price conditions on credit guarantees mitigate Debt Overhang problems for firms due to lower price-related credit frictions
 - Guaranteed debt issuance is similar
 - " Substitution of non-guaranteed debt
 - # Financial burden
 - " Debt service capacity

TODAY'S PRESENTATION

1. **INSTITUTIONAL DETAILS**
2. **EMPIRICAL STRATEGY**
3. **MAIN FINDINGS: FIRM ECONOMIC PERFORMANCE**
4. **EVIDENCE SUPPORTING IDENTIFICATION**
5. **EXPLORING THE MECHANISM**
6. **CONCLUSIONS**

Institutional Details

The Belgian Credit Guarantees Scheme

Belgian CGS Eligibility Conditions

- Implemented on April 1, 2020 => mitigate the effects of the COVID-19 Pandemic
- Envelope amount €50 billion disburse to Belgian banks based on their market share
 - 11.8% nominal GDP in 2020
 - About 60% of the total fiscal measures to respond to the COVID-19 pandemic
- Firms need to show liquidity problems linked to the pandemic to participate
 - Less than 30 days delinquency by 02/2020 but no delinquency before that.
 - No restructuring or insolvency procedures started before 12/2019

Guaranteed Loans Characteristics

- Under the first CGSs (01/2020-12/2020) eligible firms receive a guaranteed loan

All new loans except to refinance existing credits (i.e. issued before 2020)

Maturity 12 months

Loan amount max liquidity needs for 12 (18) months, 2 wage bill, 25% turnover g

Interest rate 1.25 + **guarantee fee**

$$\text{guarantee fee} = \begin{cases} 25 \text{ bp.} & \text{if firm is SMEs} \\ 50 \text{ bp.} & \text{if firm is Large} \end{cases}$$

- For firms participating in the CGSs **interest rate reduce by a 25 bp** if classified as SMEs

Exogenous source of variation in loan pricing conditions

Change discontinuously with firm size category

Empirical Strategy

Regression Discontinuity Design

Defining our RD-Setup

- Interest rate on guaranteed loans reduced deterministically by 25 bp. based on firm's size category
- **First**, we focus to firms participating in the 2020 CGS
 - Discontinuity in the interest rate is only relevant for guaranteed loans
- **Second**, we focus on single dimension to define the size category
 - Reduce the dimensions of discontinuity to simplify analysis
 - No loss of generality or sample representativeness

Defining our RD-Setup: Firms in the Belgian CGS

- Identify firms participating on the 2020 CGSs
 - Use statements for amounts payable for 2020
 - Detail report of guaranteed debt portfolio
- We define firms participating in the CGS if they report positive balance on debts guaranteed by Belgian public authorities at the end of 2020

Defining our RD-Setup: Size Category

- Size category defined by comparing statements during past two years with thresholds

(i) 50 employees, (ii) €9 mill. turnover, (iii) €4.5 mill. assets

SMEs if firm surpassing **one threshold**

Large if firm above **two thresholds**

- In most cases size defined by employment being above or below cutoff (98% for 2018-2019)
- We focus on firms that in 2018 are either:

SMEs 50 employees

Large corporations > 50 employees

- Discontinuity is characterized by **single dimension** => **pre-determined employment**

- *Bel-rst*: Firm-level balance sheet

Statements of amounts payable for 2020

Assets, income, and social balance statement from 2017-2023

- Based on our selection criteria: sample contains 2,904 firms

Treatment: 2,564 firms with ≤ 50 employees (**SMEs**)

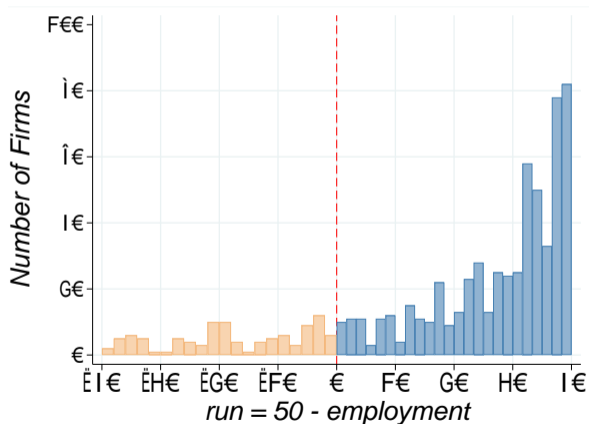
Control: 344 firms with > 50 employees (**Large**)

Empirical Strategy

Identification

Identification

- Let fte_i the number of employees in 2018 of firm i participating in CGS
running variable \Rightarrow $FTE_i = 50 + \text{employment}_i$ (**fte**)



Identification

- Compare firms barely eligible (treated) and non-eligible (control) for interest rate discount
=> Non-parametric Local Polynomials (**Calonico, Cattaneo, and Titiunik, 2014**)

Identification

- **IDENTIFICATION:** Firms are identical within bandwidth
=> **Treated** ($\text{run}_i \geq 0$) have lower interest rate compared to **Control** ($\text{run}_i < 0$)

Observable Characteristics

Other supporting evidence

Main Results

Firm Economic Performance

- Firm performance measured by:

(1) **Investment rate**

$$\text{Inv.rate} = \frac{\text{Acquisitions of Tangible Fixed Assets}_{i;t}}{\text{Total Fixed Assets}_{i;t-1}}$$

(2) **Employment Growth**

$$\Delta\text{Emp.} = \frac{\text{Employment}_{i;t} - \text{Employment}_{i;t-1}}{\frac{\text{Employment}_{i,t} + \text{Employment}_{i,t-1}}{2}}$$

⇒ Employment = number of full-time equivalent employees in the staff register

(3) **Revenues Growth**

$$\Delta\text{Rev.} = \frac{\text{Revenues}_{i;t} - \text{Revenues}_{i;t-1}}{\frac{\text{Revenues}_{i,t} + \text{Revenues}_{i,t-1}}{2}}$$

⇒ Revenues = gross added value

^ Upward jump when moving along the eligibility cuto in 2020

(a) Investment: 2020

(b) Employment: 2020

(c) Revenues: 2020

- RD-estimates consistent with graphical evidence

	Inv. Rate (1)	Emp. (2)	Rev. (3)
Sharp-RD	0.20** (0.1)	0.28*** (0.0)	0.34*** (0.0)
Observations	2,773	1,743	2,897
BW (in # emp.)	10.5	7.3	4.7

Main Findings: Economic Performance

Summary statistics

^ Firms receiving guaranteed loans at a 25 bp lower interest

" investment rate by 0.20 pp. dynamic estimates

" employment growth by 0.28 pp. dynamic estimates

" revenues growth by 0.34 pp. dynamic estimates

	Inv. Rate	Emp.	Rev.
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Main Findings: Economic Performance

Summary statistics

- ^ Our results not explain by pre-existent trends in economic performance
- ^ Upward jump disappears on year prior policy was implemented

RD-estimates

(a) Investment: 2019

(b) Employment: 2019

(c) Revenues: 2019

Main Results

Evidence Supporting Identification

- ^ Our RD-design provides an ideal context for isolating the causal effect of favorable pricing conditions
 - =) **evidence supporting the continuity** assumption in our RD setup
- ^ No evidence of **manipulation** of firms' employment to obtain interest rate discount
 - (1) Test for continuity of firm's distribution around cutoff (McCrary, 2008) [details](#)
 - (2) Donut hole test [details](#)
- ^ No evidence on **pre-policy trends** for firms in treatment and control groups
 - (1) RD estimates for assets, debt, wage bill, earnings and profit [details](#)
 - (2) RD estimates for main outcome variables in 2010 [details](#)
- ^ No evidence systematic differences **after employment-cutoffs**
 - (1) RD estimates using placebo cutoffs [details](#)

Main Results

Exploring the Mechanism

- ^ Following Banerjee and Du o (2014) we test if firms receiving more favorable loan pricing conditions
1. **Quantity-frictions** => **increase** debt until exhaust sources coming from **credit guarantees**
 2. **Price-frictions** => **substitute** costly **unsecured debt** for cheaper guaranteed loans

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^ We employ on two measures:

(1) Debt issuance

$$\text{Guaranteed debt Accumulation} = \frac{\text{Guaranteed debt}_{i,t} + \text{Guaranteed debt}_{i,t-1}}{\text{Total Liabilities}_{i,t}}$$

(2) Changes in Non-Guaranteed Debt

$$\text{Debt Substitution} = \frac{\text{Non-Guaranteed Debt}_{i,t} - \text{Non-Guaranteed Debt}_{i,t-1}}{\text{Total Liabilities}_{i,t}}$$

^ Next, check if evidence on quantity/price frictions is consistency with changes in:

(3) Financial burden

$$\text{Average Interest} = \frac{\text{Interest costs}_{i;t}}{\text{Total Liabilities}_{i;t}}$$

Interest costs = Financial charges on total liabilities

(4) Debt Overhang

$$\text{Debt Service Capacity} = \frac{\text{EBITDA}_{i;t}}{\text{Short Term Debt}_{i;t}} \quad \frac{\text{EBITDA}_{i;t-1}}{\text{Short Term Debt}_{i;t-1}}$$

debt overhang) " debt service capacity

(5) Default Risk

Exit_i = 1 if Last available year of balance sheet information for is 2020, 2021, or 2022

^ Main channel through which credit guarantees operate

=) mitigate debt overhang + lower price-related credit constraints

	Guarant. Debt Accum. (1)	Debt Subst. (2)	Average Interest (3)	Debt Serv. Capacity (4)	Exit Probab. (5)
Sharp-RD	-0.003 (0.02)	-0.181** (0.09)	-0.015*** (0.00)	0.294*** (0.08)	-0.192** (0.09)
Observations	1,437	1,424	2,547	2,552	2,662
Bandwidth (in # emp)	12.0	10.0	8.5	7.4	8.9

Findings about the Mechanism

Summary statistics

^ Firms receiving credit guarantees at a 25 bp lower interest rate

do not accumulate additional guaranteed debt

reduce non-guaranteed debt by 0.18 pp more dynamic estimates

=) " e 1 of guaranteed loan # non-guaranteed debt by 0.13

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Findings about the Mechanism

Summary statistics

^ Firms receiving credit guarantees at a 25 bp lower interest rate

financial burden: average interest costs reduce by 0.015 pp dynamic estimates

debt overhang: debt service capacity is 0.29 pp higher dynamic estimates

default risk: exit probability reduce by 0.19 pp alternative measure

	Guarant. Debt Accum. (1)	Debt Subst. (2)	Average Interest (3)	Debt Serv. Capacity (4)	Exit Probab. (5)
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CONCLUSIONS

Conclusions

- ^ This paper study impact **effect of favorable pricing conditions** on guaranteed loans **on stressed firms**
- ^ Exploit policy-induced **variation in the pricing conditions** for firms participating during **2020 Belgian CGS**
 - Interest rate on guaranteed loans reduced by 25 bp for firms with less than 50 employees
- ^ Favorable pricing conditions on guaranteed loans improve economic performance of firms
- ^ Better price conditions on credit guarantees mitigate debt overhang by reducing price-related financial frictions

Testing Manipulation

back

^ Reject manipulation of the running variable (p-value=0.61)

(a) Treatment Distribution

(b) McCrary's Test

Placebo Cuto s: Economic Performance

back

^ What if change the employment cuto ?

=) No effects on placebo cuto s

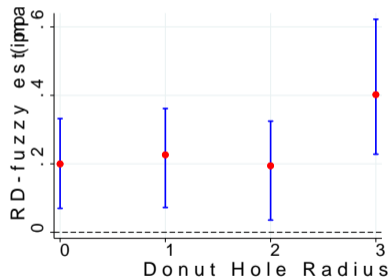
(a) Investment

(b) Employment

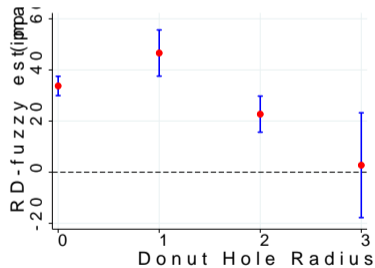
(c) Revenues

Donut-hole Test back

- Test checks for additional "bunching" of observations around the cuto
- Most estimates are robust when excluding firms with 1,2, and 3 employees above/below the cuto



(a) Investment



(b) Employment

(c) Revenues

- Testing for unbalances in predetermined observable characteristics during 2018-2019.
- => No evidence of pre-policy differences in assets, debt, wage bill, earnings, and profits.

Variable	Mean		RD Estimator	Robust Inference		Bandwidth (in # emp.)	Obs.
	Treat (1)	Control (2)		p-value (4)	95% CI (5)		
Total assets (mill. e')	44.53	44.19	-0.35	0.87	[-3.95, 3.26]	7.5	5,319
Fixed assets total (mill. e')	17.05	16.61	-0.44	0.74	[-2.63, 1.75]	10.1	5,297
Tangible fixed assets (mill. e')	14.29	14.14	-0.14	0.91	[-2.23, 1.94]	9.8	5,131
Cash at hand (mill. e')	1.84	2.12	0.28	0.44	[-0.32, 0.88]	13.7	5,226
Leverage	2.21	2.18	-0.03	0.92	[-0.57, 0.50]	15.8	4,814
Short-term debt share	0.30	0.35	0.05	0.27	[-0.02, 0.12]	8.8	5,319
Long-term debt share	0.28	0.24	-0.04	0.42	[-0.12, 0.04]	13.9	4,904
Wage Bill (mill. e')	3.01	2.84	-0.17	0.35	[-0.47, 0.13]	22.1	5,283
Ebitda (mill. e')	1.08	1.13	0.05	0.91	[-0.62, 0.72]	12.8	5,318
Profit rate	-0.00	0.02	0.02	0.21	[-0.006, 0.052]	13.4	5,318

Dynamic Estimates Investment [back](#)

- Column (2) ⇒ contemporaneous effect (i.e., 2020)
- Column (1) ⇒ no **existing** differences 1 year before the CGS
- Column (3)-(5) ⇒ impact on investment disappear 1 year after the CGS

	T-1 (1)	T (2)	T+1 (3)	T+2 (4)	T+3 (5)
Sharp-RD	0.05 (0.08)	0.20** (0.08)	0.11 (0.08)	0.20 (0.19)	0.07 (0.28)
Observations	2,331	2,773	2,429	2,392	1,700
Bandwidth (in # emp.)	8.0	10.5	9.9	14.6	10.0

Dynamic Estimates Employment back

- Column (2) ⇒ contemporaneous effect (i.e., 2020)
- Column (1) ⇒ no existing differences 1 year before the CGS
- Column (3)-(4) ⇒ employment catch up 1 and 2 years after the CGS
- Column (5) ⇒ convergence to pre-policy equilibria 3 years after the CGS

	T-1 (1)	T (2)	T+1 (3)	T+2 (4)	T+3 (5)
Sharp-RD	0.02 (0.03)	0.28*** (0.04)	-0.21*** (0.07)	0.07*** (0.03)	-0.07 (0.04)
Observations	1,729	1,743	1,702	1,643	1,337
Bandwidth (in # emp.)	10.4	7.3	8.5	5.9	13.7

Dynamic Estimates Revenues back

- Column (2) ⇒ contemporaneous effect (i.e., 2020)
- Column (1) ⇒ no existing differences 1 year before the CGS
- Column (3) ⇒ higher revenue persist 1 year after the CGS
- Column (4)-(5) ⇒ revenues catch up 2 and 3 years after the CGS

	T-1 (1)	T (2)	T+1 (3)	T+2 (4)	T+3 (5)
Sharp-RD	0.03 (0.11)	0.34*** (0.02)	0.32*** (0.06)	-0.59** (0.26)	0.06** (0.03)
Observations	2,545	2,897	2,529	2,480	1,767
Bandwidth (in # emp.)	8.1	4.7	4.5	7.6	6.9

- RD-estimates using data for 2019
- No significant differences on year before the CGS

	Inv. Rate (1)	Emp. (2)	Rev. (3)
Sharp-RD	0.05 (0.080)	0.02 (0.033)	0.03 (0.109)
Observations	2,331	1,729	2,545

Dynamic Estimates Debt Substitution back

- Column (2) ⇒ contemporaneous effect (i.e., 2020)
- Column (1) ⇒ no existing differences 1 year before the CGS
- Column (3) ⇒ debt substitution lowers but persists 1 year after the CGS
- Column (4) ⇒ re-adjustment of debt portfolio 2 years after the CGS
- Column (5) ⇒ convergence to pre-policy equilibria 3 years after the CGS

	T-1 (1)	T (2)	T+1 (3)	T+2 (4)	T+3 (5)
Sharp-RD	0.020 (0.03)	-0.181** (0.09)	-0.095*** (0.02)	0.137*** (0.03)	0.047 (0.06)
Observations	895	1,518	1,541	1,153	685
Bandwidth (in # emp.)	18.5	10.0	7.8	9.3	14.8

Dynamic Estimates Average Interest back

- Column (2) ⇒ contemporaneous effect (i.e., 2020)
- Column (1) ⇒ no existing differences 1 year before the CGS
- Column (3) ⇒ average interest still lower 1 year after the CGS
- Column (4) ⇒ convergence to pre-policy equilibria 2 years after the CGS

	T-1 (1)	T (2)	T+1 (3)	T+2 (4)	T+3 (5)
Sharp-RD	-0.001 (0.00)	-0.015*** (0.00)	-0.015*** (0.00)	0.007 (0.01)	0.003 (0.01)
Observations	2,442	2,264	2,525	2,478	1,763
Bandwidth (in # emp.)	9.8	8.5	7.1	13.7	14.6

Dynamic Estimates Debt Service Capacity back

- Column (2) ⇒ contemporaneous effect (i.e., 2020)
- Column (1) ⇒ no existing differences 1 year before the CGS
- Column (3) ⇒ higher debt service persist 1, year after the CGS
- Column (4) ⇒ convergence to pre-policy equilibria 2 years after the CGS

	T-1 (1)	T (2)	T+1 (3)	T+2 (4)	T+3 (5)
Sharp-RD	-0.019 (0.09)	0.294*** (0.08)	0.207*** (0.06)	-0.013 (0.05)	-0.135 (0.09)
Observations	2,551	2,552	2,529	2,481	1,766
Bandwidth (in # emp)	20.0	7.4	12.7	14.6	10.3

Exit Probability: Alternative Measure back

- Exit based on **legal situation** events reported by the Crossroads Bank for Enterprises (CBE)

$Exit_i = 1$ if Firm i liquidation, bankruptcy, dissolution or absorbed 20-23g

- Similar results => **# exit probability** for firms with lower interest rate on credit guarantees

	Last available year	Legal Situation
Sharp-RD	-0.19** (0.09)	-0.07** (0.03)
Observations	2,662	2,662
Bandwidth (in # emp)	8.9	8.9

Robust Bias-corrected standard errors in parentheses, *, **, ***, indicate significance at the 10% 5% and 1% respectively

	Mean	S.D	P^{25}	P^{50}	P^{75}	N_{obs}
Total debt (mill. e')	7.4	25.5	0.4	1.0	3.4	2,744
Pub. guarant. debt (mill. e')	2.5	10.2	0.1	0.3	0.9	2,908
Non guarant. debt (mill. e')	9.0	125.4	0.2	0.5	2.0	2,744
Leverage	0.6	0.3	0.4	0.6	0.8	2,744
Short-term debt (%)	54.6	29.4	29.2	57.0	81.4	1,668
Long-term debt (%)	45.4	29.4	18.6	43.0	70.8	1,668
Total assets (mill. e')	13.6	48.2	0.7	1.7	5.7	2,908
Tangible fixed assets (%)	44.8	29.4	18.2	45.3	69.0	2,810
Cash and equiv. (%)	13.5	14.9	2.6	8.2	19.6	2,870
Acquis. tang. fixed assets (mill. e')	2.9	19.4	0.0	0.1	0.7	2,773
Emp.	53	190	3	53	27	1,743
Rev. (mill. e')	2.9	11.1	0.12	0.38	1.62	2,897
Inv. rate (%)	34.0	94.5	1.0	5.8	24.9	2,773
Δ Emp. (%)	-0.5	55.2	-9.5	0.0	7.3	1,743
Δ Rev. (%)	-0.9	72.4	-22.6	1.2	15.5	2,897
Pub. guarant. debt accumulation (%)	35.4	32.5	9.1	26.0	59.9	1,339
Debt substitution (%)	-3.4	52.7	-8.3	-0.6	7.3	1,518
Average interest (%)	2.5	2.9	1.3	2.0	3.0	2,264
Δ Debt service (%)	52.9	63.32	11.13	33.7	75.3	2,897
Exit	0.11	0.31	0	0	0	2,662