Credit Guarantees, Firm Response, and Macroeconomics

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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 $\Longrightarrow\downarrow$ 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 \implies 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
 - \implies Increase overall quantity of credit available at more favorable pricing terms
 - Critics point out that CGS can lead to misallocation
 - \Longrightarrow Crowd out bank lending for other sectors of the economy

Motivation, why is it important?

- Policymakers debate about its effectiveness to stimulate economic activity
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 - \implies Increase overall quantity of credit available at more favorable pricing terms
 - Critics point out that CGS can lead to misallocation
 - \implies 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 \implies 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,
- \downarrow 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
 - \downarrow 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 \implies 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 \leq 12 months
 - Loan amount $\leq \max \{ \text{liquidity needs for 12 (18) months, 2} \times \text{wage bill, 25\% turnover} \}$
 - Interest rate $\leq 1.25 +$ guarantee fee

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

- 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) \in 9 mill. turnover, (iii) \in 4.5 mill. assets
 - **SMEs** if firm surpassing \leq one threshold
 - Large if firm above \geq 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** \leq 50 employees
 - Large corporations > 50 employees
- Discontinuity is characterized by single dimension \implies pre-determined employment

- Bel-first: 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 \leq 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 \implies FTE_i = 50 - employment_i (fte)



Identification

• Compare firms barely eligible (treated) and non-eligible (control) for interest rate discount

 \implies Non-parametric Local Polynomials (Calonico, Cattaneo, and Titiunik, 2014)



Identification

• **IDENTIFICATION**: Firms are identical within bandwidth

 \implies Treated (run_i \ge 0) have lower interest rate compared to Control (run_i < 0)



Main Results

Firm Economic Performance

Variables of Interest Summary statistics

- Firm performance measured by:
 - (1) Investment rate

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

(2) Employment Growth

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

 $\implies \mathsf{Employment} = \mathsf{number} \text{ of full-time equivalent employees in the staff register}$

(3) Revenues Growth

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

 \implies Revenues = gross added value

• Upward jump when moving along the eligibility cutoff in 2020



• RD-estimates consistent with graphical evidence

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

- 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.	Δ Rev.
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- Our results not explain by pre-existent trends in economic performance
- Upward jump disappears on year prior policy was implemented RD-estimates



Main Results

Evidence Supporting Identification

Evidence Supporting Continuity and Other Robustness checks (back Identification

• Our RD-design provides an ideal context for isolating the causal effect of favorable pricing conditions

 \implies 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 profits details
 - (2) RD estimates for main outcome variables in 2019 details
- No evidence systematic differences at other employment-cutoffs
 - (1) RD estimates using placebo cutoffs details

Main Results

Exploring the Mechanism

Main Outcomes Summary statistics

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

Main Outcomes Summary statistics

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 - 1. Quantity-frictions \implies increase debt until exhaust sources coming from credit guarantees
 - 2. Price-frictions \implies substitute costly unsecured debt for cheaper guaranteed loans
- 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

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

Main Outcomes Summary statistics

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

(3) Financial burden

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

Interest costs = Financial charges on total liabilities

(4) Debt Overhang

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

 \downarrow debt overhang $\Longleftrightarrow \uparrow$ debt service capacity

(5) **Default Risk**

 $E_{xit_i} = 1$ {Last available year of balance sheet information for *i* is 2020, 2021, or 2022}

Findings about the Mechanism Summary statistics

• Main channel through which credit guarantees operate

⇒ mitigate **debt overhang** + lower **price-related** credit constraints

	Guarant. Debt	Debt	Average	$\Delta Debt Serv.$	Exit
	Accum.	Subst.	Interest	Capacity	Probab.
	(1)	(2)	(3)	(4)	(5)
Sharp-RD	-0.003	-0.181**	-0.015***	0.294***	-0.192**
	(0.02)	(0.09)	(0.00)	(0.08)	(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

 $\Longrightarrow \uparrow {\in} 1$ of guaranteed loan \downarrow non-guaranteed debt by ${\in} 0.13$

	Guarant. Debt Accum. (1)	Debt Subst. (2)	Average Interest (3)	ΔDebt Serv. Capacity (4)	Exit Probab. (5)
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Findings about the Mechanism Summary statistics

- Firms receiving credit guarantees at a 25 bp lower interest rate
 - $-\downarrow$ financial burden: average interest costs reduce by 0.015 pp dynamic estimates
 - $-\downarrow$ debt overhang: Δ debt service capacity is 0.29 pp higher dynamic estimates
 - $-\downarrow$ default risk: exit probability reduce by 0.19 pp alternative measure

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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

THANK YOU!!!



Testing Manipulation (back)

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



Placebo Cutoffs: Economic Performance

- What if change the employment cutoff?
 - \implies No effects on placebo cutoffs



Donut-hole Test **Dack**

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



Testing for Pre-Policy Differences (back Supporting Evidence) (back Identification

• Testing for unbalances in predetermined observable characteristics during 2018-2019.

 \implies No evidence of pre-policy differences in assets, debt, wage bill, earnings, and profits.

Variable	N	lean	RD	Robust Inference		Bandwidth	Obs.
, and be	Treat Control Estimator p-value 95% Cl (1) (2) (3) (4) (5)		(in # emp.) (6)	(7)			
Total assets (mill. €')	44.53	44.19	-0.35	0.87	[-3.95, 3.26]	7.5	5,319
Fixed assets total (mill. \in ')	17.05	16.61	-0.44	0.74	[-2.63, 1.75]	10.1	5,297
Tangible fixed assets (mill. \in ')	14.29	14.14	-0.14	0.91	[-2.23, 1.94]	9.8	5,131
Cash at hand (mill. €')	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. €')	3.01	2.84	-0.17	0.35	[-0.47, 0.13]	22.1	5,283
Ebitda (mill. €')	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) \implies contemporaneous effect (i.e., 2020)
- Column (1) \implies no existing differences 1 year before the CGS
- Column (3)-(5) \Longrightarrow impact on investment disappear 1 year after the CGS

	T-1	т	T+1	T+2	T+3
	(1)	(2)	(3)	(4)	(5)
Sharp-RD	0.05	0.20**	0.11	0.20	0.07
	(0.08)	(0.08)	(0.08)	(0.19)	(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 **Dack**

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

	T-1	т	T+1	T+2	T+3
	(1)	(2)	(3)	(4)	(5)
Sharp-RD	0.02	0.28***	-0.21***	0.07***	-0.07
	(0.03)	(0.04)	(0.07)	(0.03)	(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) \implies contemporaneous effect (i.e., 2020)
- Column (1) \implies no existing differences 1 year before the CGS
- Column (3) \implies higher revenue persist 1 year after the CGS
- Column (4)-(5) \implies revenues catch up 2 and 3 years after the CGS

	T -1	T	T+1	T+2	T+3
	(1)	(2)	(3)	(4)	(5)
Sharp-RD	0.03	0.34***	0.32***	-0.59**	0.06**
	(0.11)	(0.02)	(0.06)	(0.26)	(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

Pre-policy Economic Performance (back Main Results) (back Continuity)

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

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

Dynamic Estimates Debt Substitution Deck

- Column (2) \implies contemporaneous effect (i.e., 2020)
- Column (1) \implies no existing differences 1 year before the CGS
- Column (3) \implies debt substitution lowers but persist 1 year after the CGS
- Column (4) \implies re-adjustment of debt portfolio 2 years after the CGS
- Column (5) \implies 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	-0.181**	-0.095***	0.137***	0.047
	(0.03)	(0.09)	(0.02)	(0.03)	(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) \implies contemporaneous effect (i.e., 2020)
- Column (1) \implies no existing differences 1 year before the CGS
- Column (3) \implies average interest still lower 1 year after the CGS
- Column (4) \implies 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	-0.015***	-0.015***	0.007	0.003
	(0.00)	(0.00)	(0.00)	(0.01)	(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 Lack

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

	T-1 (1)	Т (2)	T+1 (3)	T+2 (4)	T+3 (5)
Sharp-RD	-0.019	0.294***	0.207***	-0.013	-0.135
	(0.09)	(0.08)	(0.06)	(0.05)	(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)

 $Exit_i = \mathbf{1} \{ Firm \ i \ liquidation, \ bankruptcy, \ dissolution \ or \ absorbed \ 20-23 \}$

• Similar results $\implies \downarrow$ exit probability for firms with lower interest rate on credit guarantees

	Last available year	Legal Situation	
Sharp-RD	-0.19**	-0.07**	
	(0.09)	(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}	$N_{\rm obs}$
Total debt (mill. €')	7.4	25.5	0.4	1.0	3.4	2,744
Pub. guarant. debt (mill. €')	2.5	10.2	0.1	0.3	0.9	2,908
Non guarant. debt (mill. €')	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. €')	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. €')	2.9	19.4	0.0	0.1	0.7	2,773
Emp.	53	190	3	53	27	1,743
Rev. (mill. €')	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. gurant. 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
$\Delta Debt$ service (%)	52.9	63.32	11.13	33.7	75.3	2,897
Exit	0.11	0.31	0	0	0	2,662