Monetary Policy Under Heterogeneity: Lessons and Implications for COVID-19

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January 2022, World Bank

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Monetary Policy Transmission under Heterogeneity

$$\text{Interest rates} \Rightarrow \underbrace{\text{Firm Credit}}_{\text{Heterogeneity}} \Rightarrow \text{Investment, Employment}$$

Monetary Policy Effectiveness

Monetary Policy Transmission under Heterogeneity

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Two types of heterogeneity are critical in credit market (Caglio, Darst, Kalemli-Ozcan):

1. Size of the firm
2. Type of collateral

New paper: how heterogeneity in credit market affects firm growth during low interest rates (Caglio, Darst, Dreschel, Kalemli-Ozcan, Penciakova)

Firm and Bank Heterogeneity are Important

Theory: The power of monetary policy depends on heterogeneity

1. Possible trade-off between stimulating the economy and long-run growth depending on:
   - which firms get finance—default risk $+$misallocation of resources
2. Possible trade-off between stimulating the economy and financial stability depending on:
   - which banks take risk—leverage regulation

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- Listed firms account for 26% of employment and 44% of gross output
- Mixed results on small firms responding more/less/same relative to large firms to monetary policy and other macroeconomic shocks
- Mixed results on whether different responsiveness is driven by financial frictions

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We use supervisory administrative data for a more representative sample for the U.S. economy

Data and Facts

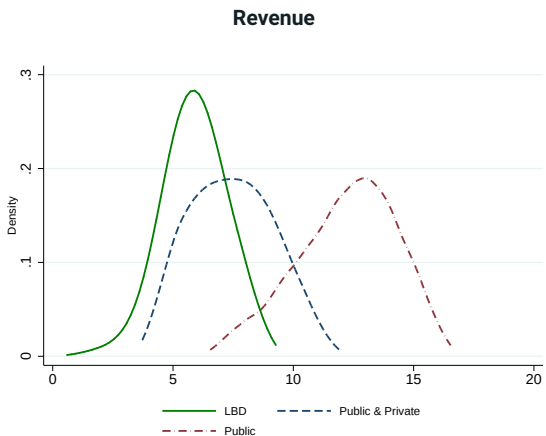
Big Data Gap in US: SMEs Financing

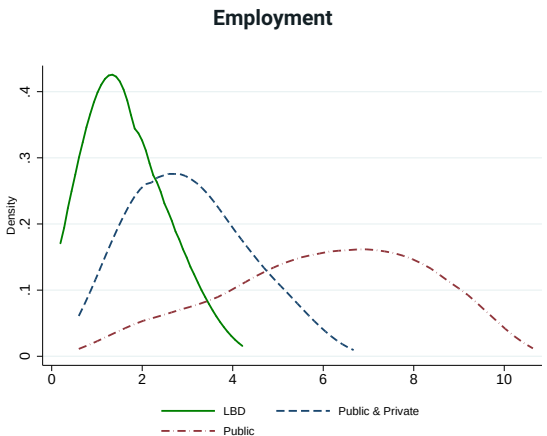
- Great deal is known about life-cycle dynamics of U.S. firms
- Far less is known about how these firms finance their growth
  - Literature often focuses on publicly listed companies,
    26% of employment and 44% of gross output
  - All select samples: the youngest (KFS) and smallest (SBCS)
  - We lack an understanding of financing patterns over the firm size and age distribution.

DInlersoz, Hyatt, Kalemli-Ozcan, Penciakova, 2018:

1. SMEs finance investment and employment with short term debt
2. Financial constraints size dependent conditional on age

Distributions Dinlersoz et. al (2018)





Y-14: Supervisory Data on Bank Lending

- Collected as part of the FR Capital Assessments and Stress Testing (CCAR) exercise for all bank holding companies with total consolidated assets above $50 bil ($100 bil in 2019).
- Firm-bank-loan-quarter level with a reporting threshold of $1 million.
- Contractual terms and firm balance sheet items.
- 2012Q3–2019Q4, **all sectors**. Almost 4 million loan-level observations for 150,000+ corporations, of which 60,000+ have assets less than 10 million.

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Coverage:

- The banks subject to CCAR account for over 85% of the total assets in the banking sector and provide around 70% of all commercial and industrial lending.
- **Supervisory data on private firms' financing: representative relative to Compustat, QFR, Dealscan, CapitalIQ, SBFS,...**
- Y14 firms account 65% of U.S. corporate sector debt and 78% of aggregate U.S. gross output.

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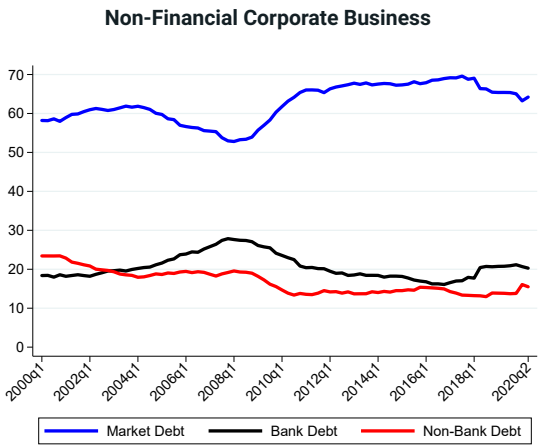
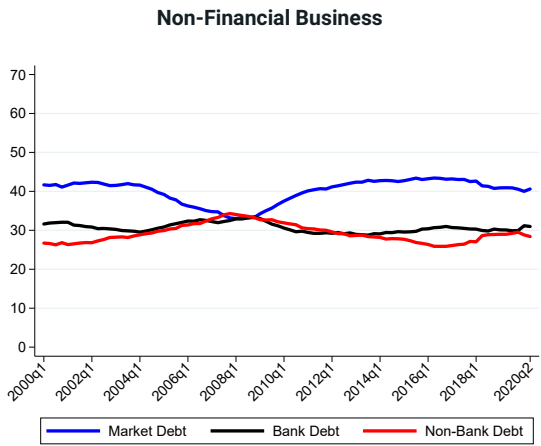
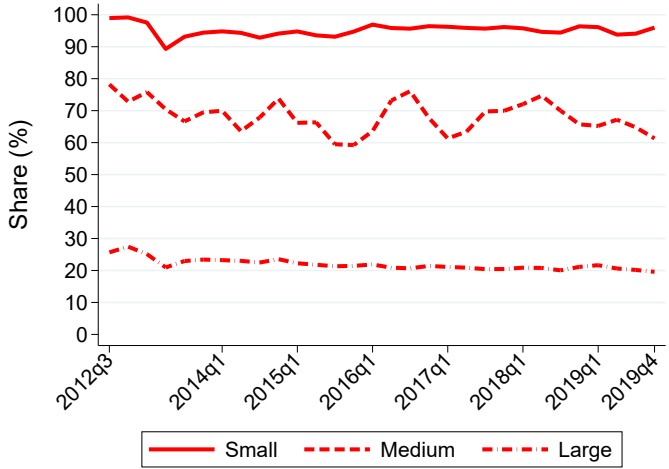
- Y14 firms account 65% of U.S. corporate sector debt and 78% of aggregate U.S. gross output.
- SBA/Census definition: SMEs: $<$500 employee
  $\Rightarrow$ 52% of private sector employment, 48% of private sector output

What do we know: Flow of Funds Data





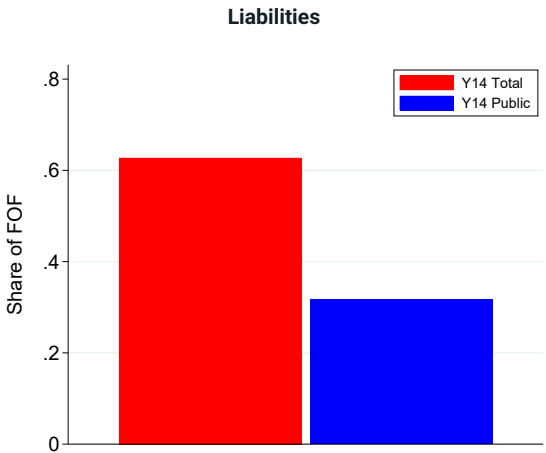
Private Firms' Share of Bank Debt in FR Y-14 All Commitments

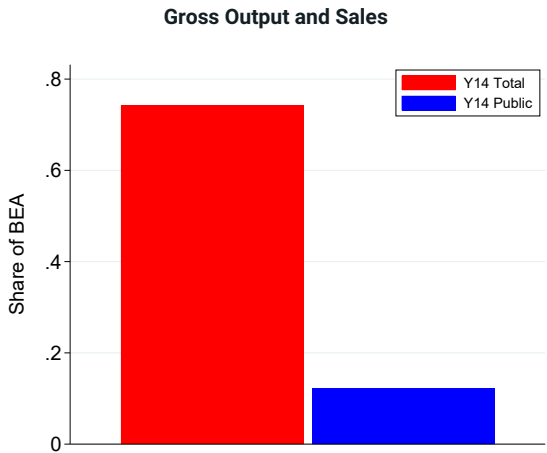


- The entire balance sheet debt of SMEs is bank debt

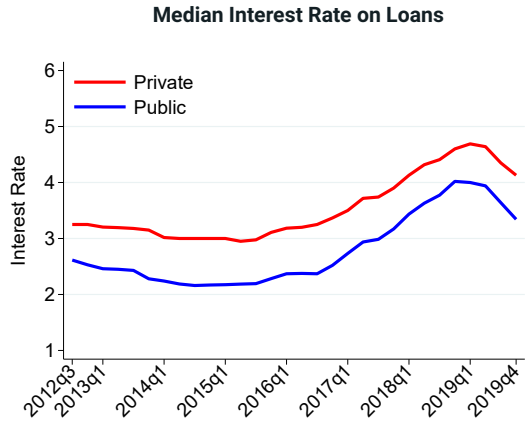
Y14 firms account for much larger share of US Corporate Debt and Output

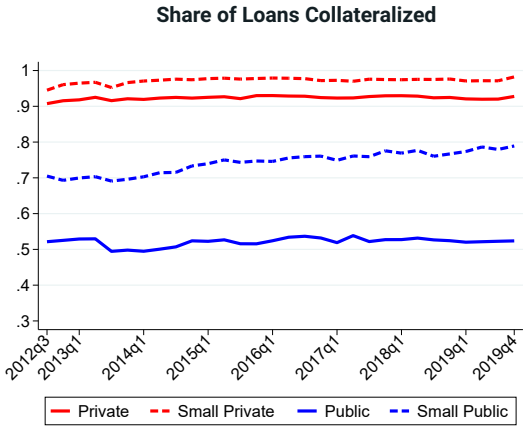
Compustat





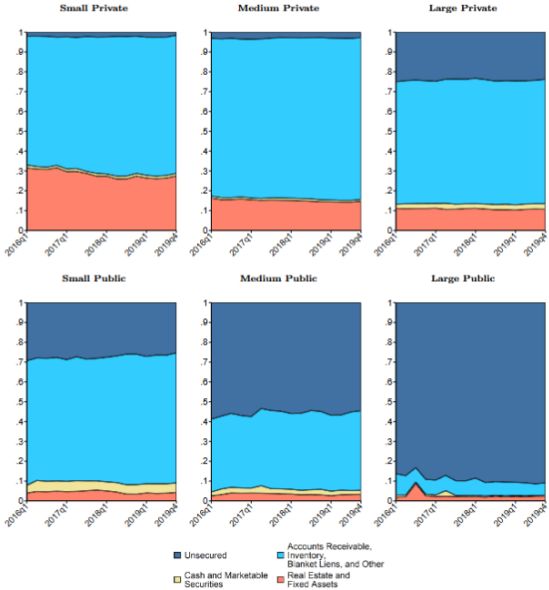
Private firms and SMEs pay higher interest rates and need collateral to borrow





Collateral Types and Financial Constraints

Pub. Values | Priv. Values



- **Based on observed pledged collateral:**

  ⇒ Asset-based: Real estate, fixed assets, cash&securities
  ⇒ Earnings and operation-based: Blanket-liens and accounts receivable & inventory

- Securing financing through AR&I and blanket liens falls monotonically across the size distribution and is replaced by unsecured lending.

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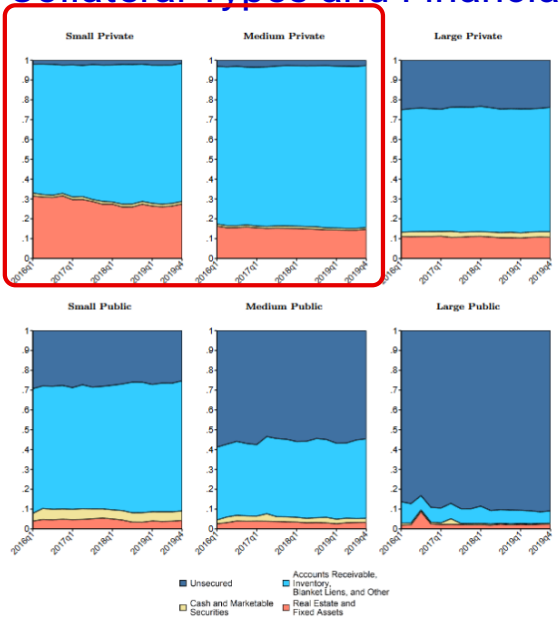

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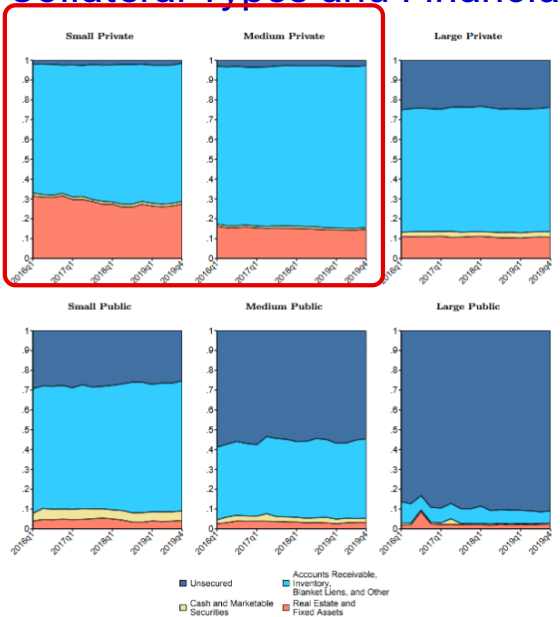

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- **Lian and Ma (2017), Kermani and Ma (2021)**: importance of earnings based-lending instead of asset based-lending for public firms
  ⇒ More important for private firms and SMEs.

  Drechsel (2019), Greenwald (2019):
  Importance of earnings-based lending in macro models for response to shocks.

Mapping Heterogeneity in Credit Markets and Monetary Policy Transmission: Credit Outcomes

Mapping Heterogeneity and Monetary Policy Transmission

1. Private firms, especially SMEs, rely on bank credit.
2. When accessing bank credit, these firms:
   a) face higher interest rates b) use different types of collateral

How does monetary policy transmit differentially through these margins?

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Varying Firm Credit Demand Over Time (Aggregate Loans to Firm-Bank Level):

$$\log \sum_{l \in \mathcal{L}(f,b,q)} Y_{f,b,q}(l) = \alpha_{f,b} + \alpha_{b,q} + \kappa(\textbf{Leverage}_f \times \text{MP}_q) + \vartheta_{f,b,q}$$

Loan Variation Over Time For a given Firm-Bank Pair:

$$\log \text{Y}_{l,f,b,q} = \alpha_{f,b,q} + \beta \textbf{Collateral Type}_{l,q} + \kappa(\textbf{Collateral Type}_{l,q} \times \text{MP}_q) + \vartheta_{l,f,b,q}$$

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Y: loan amount, loan spread; $\mathcal{L}(f, b, q)$: set of loans between firm (f)-bank (b) at quarter q.

$MP_q =$ MP surprise, measured with high frequency methodology around FOMC announcements and aggregated to quarterly frequency as in Ottonello and Winberry (2021).

Mapping Heterogeneity in Credit Markets and Monetary Policy Transmission: Real Outcomes

Mapping Firm Heterogeneity and Monetary Policy Transmission

How does investment of high-low leverage firm differ during MP shocks?

$$I_{f,q} = \alpha_f + \alpha_{sec,q} + \kappa(\textbf{Leverage}_f \times \text{MP}_q) + \vartheta_{f,q}$$

How does investment of high-low collateral firm differ during MP shocks?

$$I_{f,q} = \alpha_f + \alpha_{sec,q} + \kappa(\textbf{Collateral Share}_f \times \text{MP}_q) + \vartheta_{f,q}$$

Leverage and Credit Outcomes

Monetary Policy and Credit Outcomes: Firm Credit Demand

	Quantity: Log(Loan)			Price: Log(1+i)		
	All	Private	Public	All	Private	Public
High Leverage Firm $\times$ MP Surprise$_q$	-0.4212***	-0.8478***	-0.0498	-0.0262***	-0.0395***	0.0156**
	(0.0772)	(0.1221)	(0.2075)	(0.0027)	(0.0035)	(0.0046)
Observations	2460475	2140482	319985	2472261	2150197	322056
Adjusted R^2	0.945	0.939	0.837	0.768	0.768	0.676
Bank $\times$ Firm F.E.	Yes	Yes	Yes	Yes	Yes	Yes
Bank $\times$ Time F.E.	Yes	Yes	Yes	Yes	Yes	Yes
Firm $\times$ Time F.E.	No	No	No	No	No	No

- High leverage firms borrow more, paying higher rates during expansionary policy.
- All firm results are driven by private firms.

Collateral and Credit Outcomes

Collateral, Loans and Spreads: Within Loan Variation

	Quantity: Log(Loan)		**Prices: Log$(1+i)$**	
	Private Firms	*Public Firms*	*Private Firms*	*Public Firms*
Collateralized	0.4181***	-0.8910***	-0.0058***	0.0108***
	(0.0606)	(0.0760)	(0.0012)	(0.0009)
Collateralized$_q$ $\times$ MP$_q$	-2.3107***	-2.0066*	-0.0264*	-0.0092
	(0.4394)	(0.7709)	(0.0105)	(0.0100)
Observations	1371794	485440	1377795	481327
Adjusted R^2	0.282	0.284	0.357	0.378
Bank $\times$ Firm $\times$ Time F.E.	Yes	Yes	Yes	Yes

$^{+}$ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

- For private borrowers, collateralizing a loan is associated with improved access to credit.
- For public borrowers, it is the opposite.

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- Access to credit effect is even stronger for private firms during loose MP.

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- In normal times, private firms can borrow at lower cost by posting collateral.
- It is the opposite for public firms, who pay a higher cost when posting collateral.

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- During loose MP, the negative relationship between collateral and cost of borrowing is less strong for private firms but still negative.

Role of Collateral Type in Monetary Policy Transmission

	Quantity: Log(Loan)		**Prices: Log$(1+i)$**	
	Private Firms	*Public Firms*	*Private Firms*	*Public Firms*
Asset-based	0.0278	-1.6386***	-0.0010	0.0195***
	(0.0546)	(0.0719)	(0.0012)	(0.0010)
Earnings & Operations-based	0.6912***	-0.4388***	-0.0085***	0.0054***
	(0.0608)	(0.0949)	(0.0012)	(0.0009)
Asset-based $\times$ MP$_q$	-1.5839***	-0.3345	-0.0260*	0.0305*
	(0.4050)	(0.7612)	(0.0107)	(0.0120)
Earnings & Operations-based $\times$ MP$_q$	-2.5402***	-4.0888***	-0.0293*	-0.0300**
	(0.4689)	(0.9127)	(0.0107)	(0.0106)
Observations	1371794	485440	1377795	481327
Adjusted R^2	0.310	0.330	0.366	0.390
Bank $\times$ Firm $\times$ Time F.E.	Yes	Yes	Yes	Yes

$^{+}\ p < 0.1,\ ^{*}\ p < 0.05,\ ^{**}\ p < 0.01,\ ^{***}\ p < 0.001$

- Normal times access to finance effect for private borrowers is from earnings and operation based collateral.

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- During expansionary policy both type of collateral increase borrowing, but only earnings and operation based collateral at lower cost for private borrowers.

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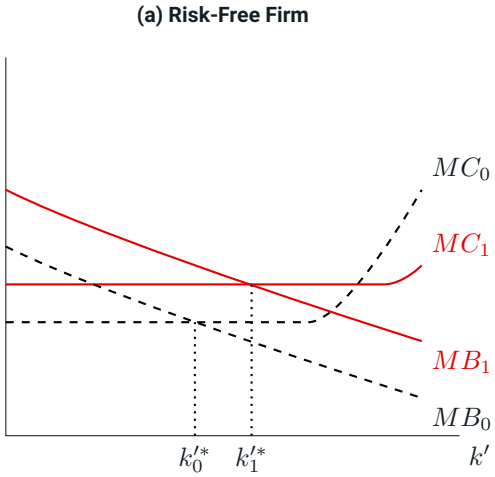
- Both type of collateral signal distress in normal times and during expansionary policy for public firms.

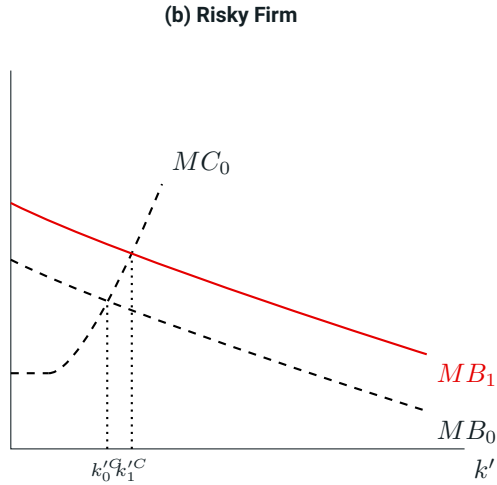
A Primer on the Model

From Credit to Investment and Employment

- Our empirical results from credit market largely carry over to investment though they are still incomplete at the time of this presentation
- We are also expanding Ottonello-Winberry Framework, (ECMA, 2020) to rationalize our results
- Heterogenous firm new keynesian model with default risk—theoretically ambiguous
  - Financial frictions (high leverage) dampen response to monetary policy as MC curve for investment is upward sloping with default risk
  - Expansionary monetary policy can flatten out the MC curve by decreasing the severity of financial friction via higher networth/collateral values and lower spreads (financial accelerator)

Speculative Intuition w/Operational Collateral Constraint





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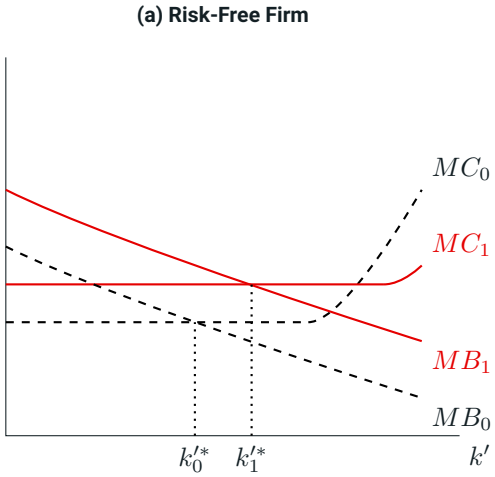
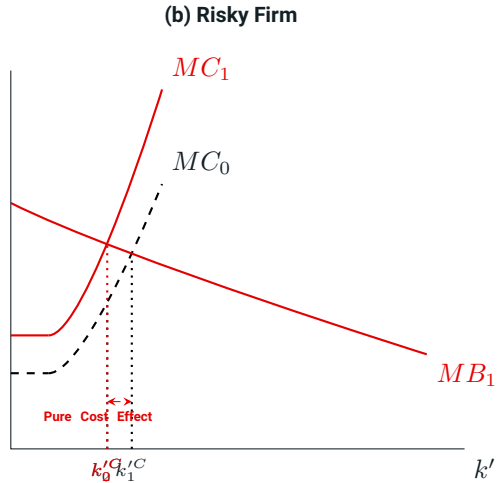
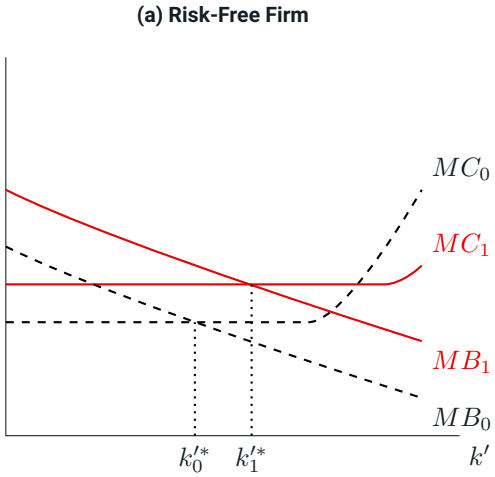
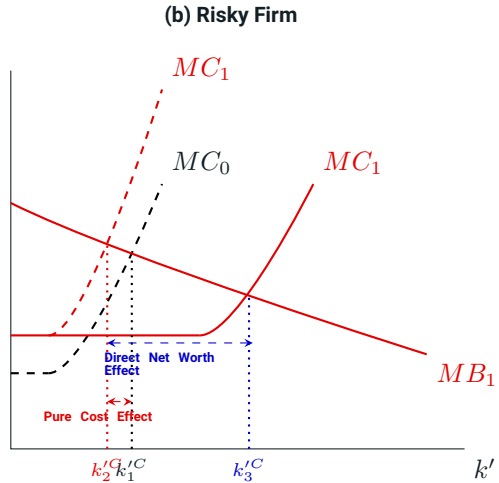


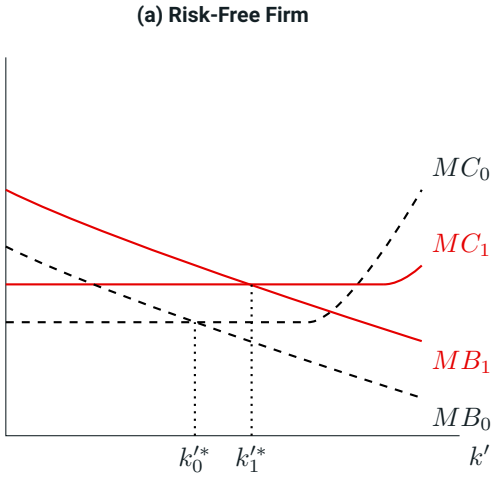


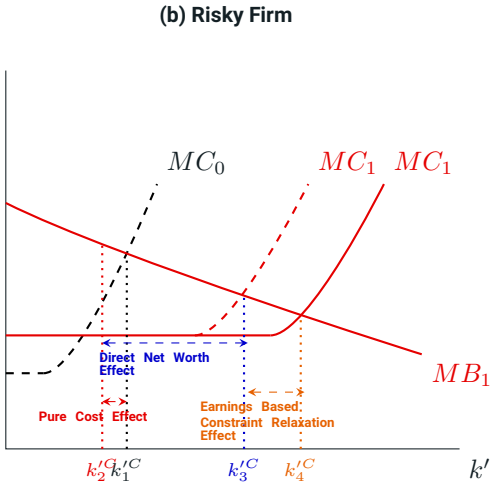
Speculative Intuition w/Operational Collateral Constraint



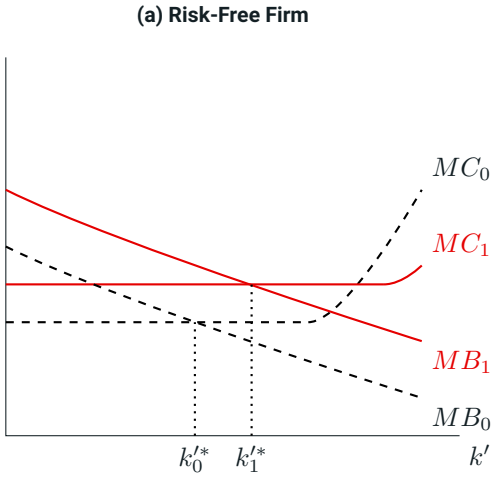


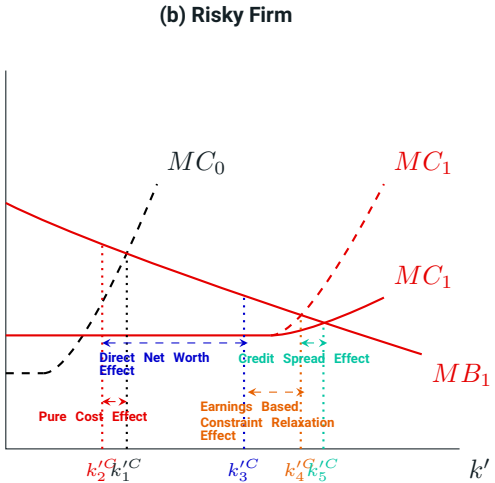
Speculative Intuition w/Operational Collateral Constraint



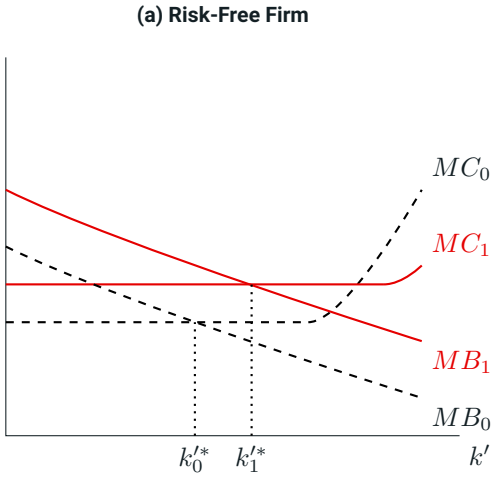


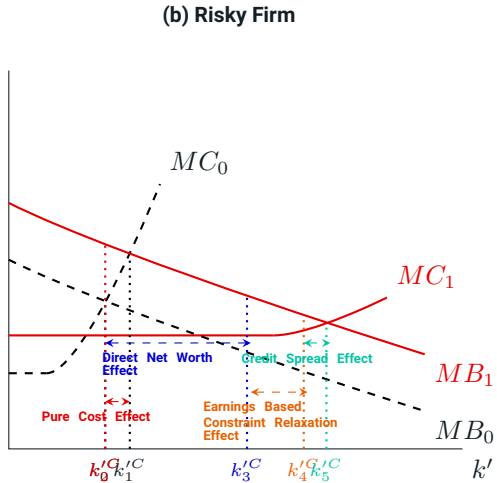
Speculative Intuition w/Operational Collateral Constraint





Speculative Intuition w/Operational Collateral Constraint





Takeaways

- We document new facts about the U.S. credit market that highlight the importance of heterogeneity in firm size and type of collateral.
- We are studying implications of this heterogeneity for firm growth (investment and employment).
- Correlation (collateral, default risk) > 0 for listed firms but < 0 for private firms, indicating access to finance role of collateral for smaller firms $\Rightarrow$ implications for firm growth.
- Private firms/SMEs mostly use "operational" collateral rather than fixed assets, that increases these firms' "ability to pay" under low interest rates.
- Monetary policy effectiveness depends on presence of SMEs who borrow using "operational" collateral.
- Although banks do not lend to firms who defaulted before, there are possible risks to financial stability as more leveraged firms borrow more in a low rate environment.

COVID-19

Heterogeneity in financial constraints

In the macro-finance literature, two types of constraints for firm i:

1. $$b_i \leq \theta \times k_i$$

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Firm data supports (2), both in Europe and U.S.
COVID type shock reminds us the other type:

$$\Delta k_i \leq earnings/cash_i$$

This means:

$$b_i \leq \frac{k_i}{r_i}$$

Evidence from SMEs in U.S.
$\Rightarrow$ COVID is a shock to earnings and collateral at the same time

COVID-19 and Firm Failures

We ask (Gourinchas, Kalemli-Ozcan, Penciakova, Sander, 2020, 2021):

1. What is the impact of COVID-19 on firm failures in a wide range of countries?
2. What is the cost/effectiveness of government interventions aimed at saving firms?
3. Does COVID-19 SME support policies create a “time bomb” of failures in 2021-2022 in terms of debt overhang and zombies?

Methodology to estimate firm failures in real time

- **Challenge**: To identify a liquidity shortage, need firm cashflow under COVID-19.

$$\text{cash} + CF_{\text{COVID}} < \text{financial expenses}$$

- **Approach**: Combine data with model to estimate CF_{COVID}
  - Representative firm-level financial data (ORBIS) from 17 countries.

$$CF_{\text{COVID}} = PY_{2018}\widehat{PY}_{\text{COVID}} - \text{COGS}_{2018}\widehat{COGS}_{\text{COVID}} - \text{Fixed Costs} - \text{Taxes}$$

  - Firm cost-minimizes over labor and materials given supply and demand shocks calibrated at sectoral level (4-digit).

Zombification: Most saved firms are viable

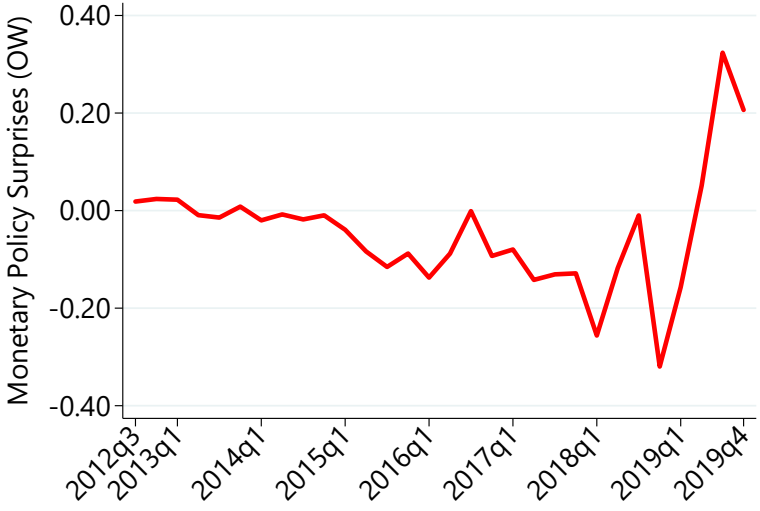
- In 2021: failure rate increases only by 2.6pp (relative to normal) even if firms have to repay pandemic loans.
- 70.2% of firms that survived to the end of 2020 because of policy support also survive until 2021
- Of firms survive 2020 because of policy support, 22.6% are zombies that also survive to the end of 2021 and 13.3% are zombies that fail by the end of 2021

Future: Key risk to manage—financial market panic

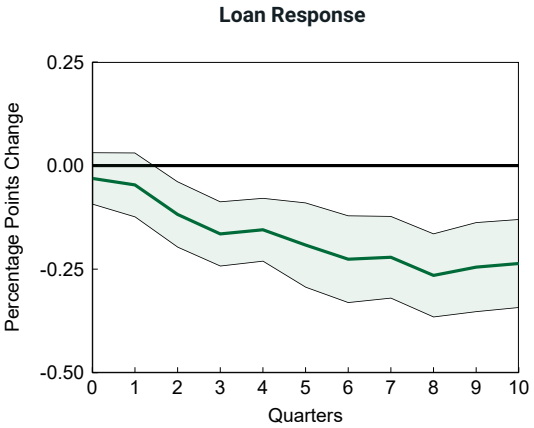
- During COVID-19, large firms can access credit markets and draw from credit lines, SMEs cannot; Chodorow-Reich, Darmouni, Luck, Plosser, 2021
- Our work explains why: COVID-19 is a shock to collateral of SMEs as it is a shock to earnings.
- Policy 'filled-in' for credit markets for SMEs
- An early easing/miscommunicated monetary policy normalization can have serious adverse effects—globally!

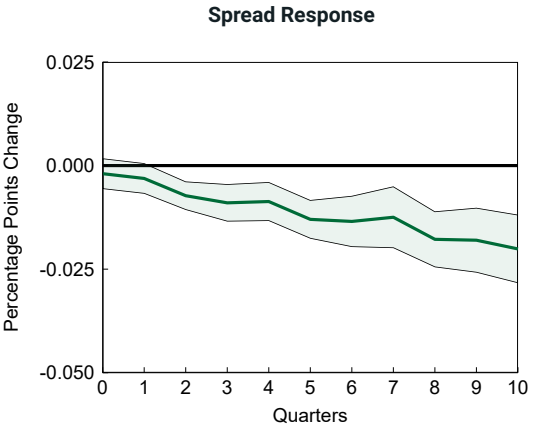
Appendix

Monetary Policy Surprises

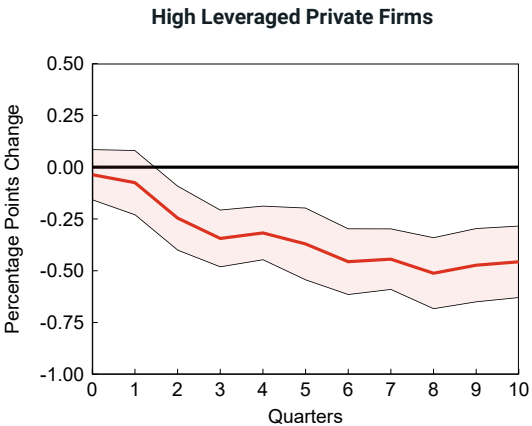


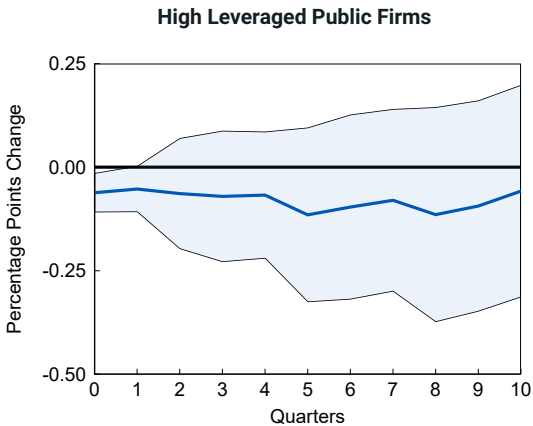
Dynamic Response of Leveraged Firms to MP Surprises, Conditional on Credit Supply



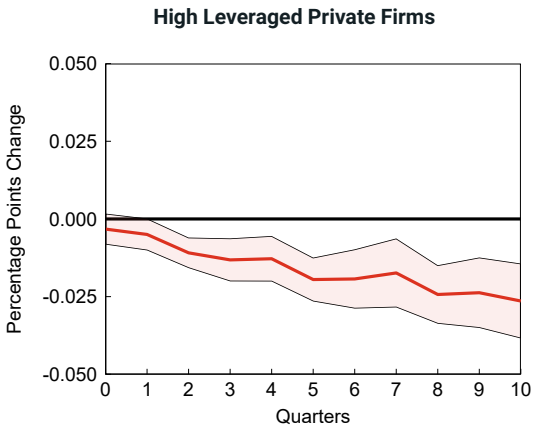


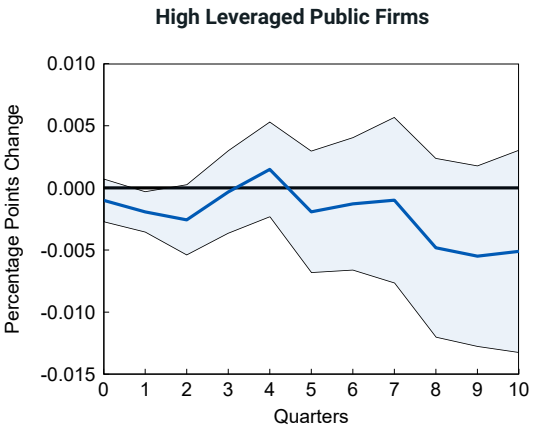
Dynamic Loan Responses—Driven by Private Firms





Dynamic Loan Spread Responses—Driven by Private Firms





Collateral Type and Credit Demand are both Important for Monetary Policy Transmission

Full Results

PRIVATE FIRMS:	*Quantity* Log (Loan)	*Prices* Log $(1+i)$
Fixed assets and real estate$_q$ × MP Surprise$_q$	-0.0606	-0.0008
	(0.0811)	(0.0017)
Cash and marketable sec.$_q$ × MP Surprise$_q$	-0.1948	0.0009
	(0.1258)	(0.0026)
Act. receiv. and inventory$_q$ × MP Surprise$_q$	-1.0223***	-0.0118***
	(0.1391)	(0.0026)
Blanket lien and other$_q$ × MP Surprise$_q$	-0.5070***	-0.0018
	(0.1064)	(0.0018)
Observations	2650313	2781417
Adjusted R^2	0.734	0.647
Bank×Firm F.E	Yes	Yes
Bank×Time F.E	Yes	Yes

- During expansionary policy both AR&I and blanket lien type of collateral increase borrowing
- Normal time negative effect of posting AR&I collateral on spread dominates the positive effect coming from higher credit demand.

Do Banks Prefer Certain Collateral?

PRIVATE FIRMS:	*Quantity* Log (Loan)	*Prices* Log $(1+i)$
Fixed assets and real estate$_q$ × MP Surprise$_q$	-1.0468***	-0.0107*
	(0.2082)	(0.0051)
Cash and marketable sec.$_q$ × MP Surprise$_q$	-0.9140**	-0.0040
	(0.2931)	(0.0062)
Act. receiv. and inventory$_q$ × MP Surprise$_q$	-2.1088***	-0.0135*
	(0.3011)	(0.0052)
Blanket lien and other$_q$ × MP Surprise$_q$	-0.9747***	-0.0105*
	(0.2348)	(0.0045)
Observations	1362500	1365280
Adjusted R^2	0.472	0.442
Bank × Firm F.E	Yes	Yes
Firm × Time F.E	Yes	Yes

- During expansionary policy ALL collateral increase credit supply, but lower cost effect mainly comes from normal times effect of cash and AR&I. Full Results

Do banks take risk by lending to firms with loan losses?

	Private Firms		*Public Firms*	
	Log (Loan)	Log $(1+i)$	Log (Loan)	Log $(1+i)$
$(\text{CCO/Loan})_{q-1}$	-0.0612	-0.0001	-0.2491	-0.0058
	(0.0553)	(0.0022)	(0.2025)	(0.0052)
$(\text{CCO/Loan})_{q-1} \times \text{MP Surprise}_q$	2.8959**	0.0327	-1.4709	-0.0450
	(0.8349)	(0.0268)	(1.6931)	(0.0446)
Observations	310023	297044	285175	277986
Adjusted R^2	0.933	0.874	0.868	0.835
Bank×Firm F.E	Yes	Yes	Yes	Yes
Firm×Time F.E	Yes	Yes	Yes	Yes

$^{+}\ p < 0.1, {}^{*}\ p < 0.05, {}^{**}\ p < 0.01, {}^{***}\ p < 0.001$

- With expansionary policy banks lend less to firms who defaulted on them before

Firm Leverage and Financial Stability

Leverage, NPL and Default Probabilities

	Default Probability								
	All Firms			*Private Firms*			*Public Firms*		
Firm Leverage$_{q-1}$	0.0448***		0.0496***	0.0412***		0.0367***	0.1044***		0.1266***
	(0.0028)		(0.0074)	(0.0027)		(0.0063)	(0.0214)		(0.0327)
Non-Performing Loan$_{q-1}$		0.0181***	0.0175**		0.0525***	0.0519***		0.0002	-0.0007
		(0.0049)	(0.0048)		(0.0115)	(0.0114)		(0.0038)	(0.0038)
Observations	1656049	535836	535836	1454694	415830	415830	201355	120006	120006
Adjusted R^2	0.601	0.810	0.811	0.601	0.822	0.822	0.576	0.663	0.673
Firm F.E.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time F.E.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

- High leverage predicts default both for private and public firms

Leverage, NPL and Default Probabilities

	Default Probability								
	All Firms			*Private Firms*			*Public Firms*		
Firm Leverage$_{q-1}$	0.0448***		0.0496***	0.0412***		0.0367***	0.1044***		0.1266***
	(0.0028)		(0.0074)	(0.0027)		(0.0063)	(0.0214)		(0.0327)
Non-Performing Loan$_{q-1}$		0.0181***	0.0175**		0.0525***	0.0519***		0.0002	-0.0007
		(0.0049)	(0.0048)		(0.0115)	(0.0114)		(0.0038)	(0.0038)
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Adjusted R^2	0.601	0.810	0.811	0.601	0.822	0.822	0.576	0.663	0.673
Firm F.E.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time F.E.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

- NPL predicts default only for private firms

Do high leverage firms likely to be delinquent in the future due to easy monetary policy?

	Dep. Var: Non-Performing Loans		
	All Firms	Private Firms	Public Firms
High leverage firm$_i$ $\times$ MP Surprise$_q$	-0.0498**	-0.0594**	-0.0705$^+$
	(0.0153)	(0.0164)	(0.0377)
Observations	2469016	2150032	318976
Adjusted R^2	0.647	0.636	0.700
Bank$\times$Firm f.e	Yes	Yes	Yes
Bank$\times$Time f.e	Yes	Yes	Yes
Firm$\times$Time f.e	No	No	No

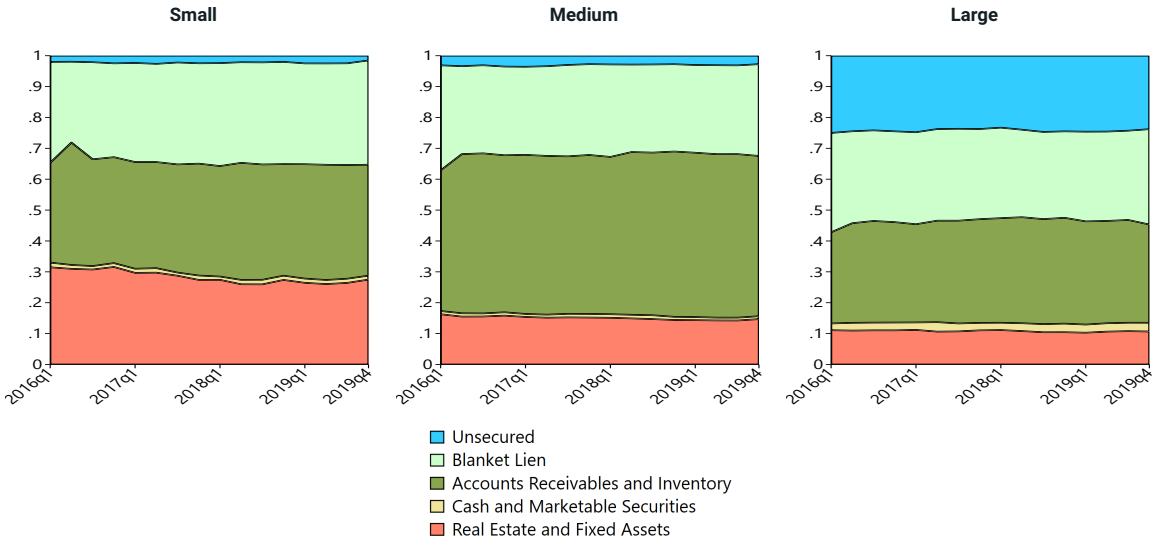
$^+ p < 0.1$, $^* p < 0.05$, $^{**} p < 0.01$, $^{***} p < 0.001$

- If you are high leverage firm, expansionary policy make it more likely that you will be delinquent (result comes from private firms)

Appendix: Figures

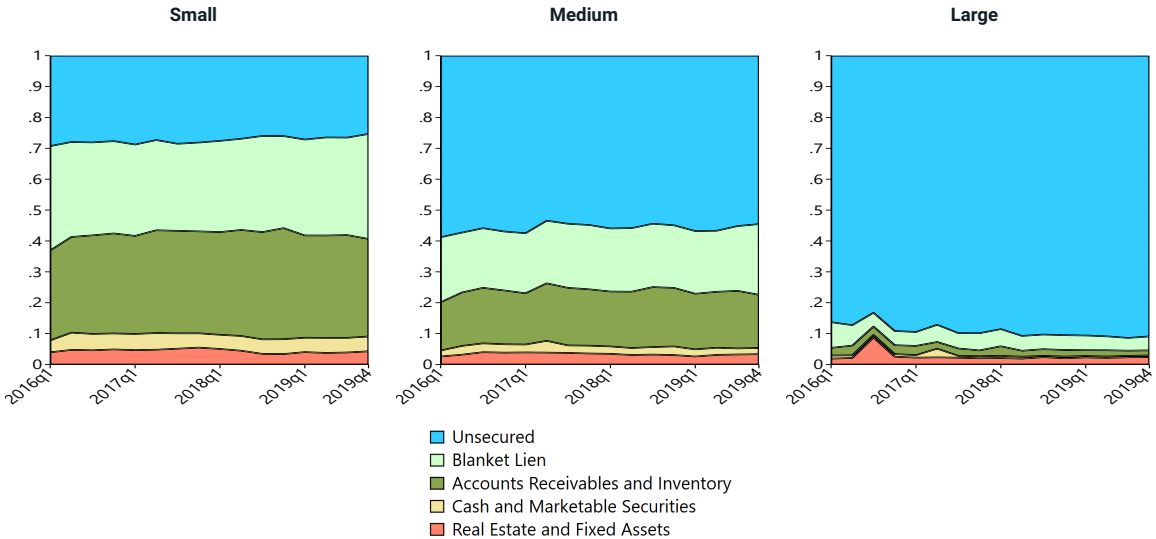
Collateral Types Private Firms: Loan Values

Back

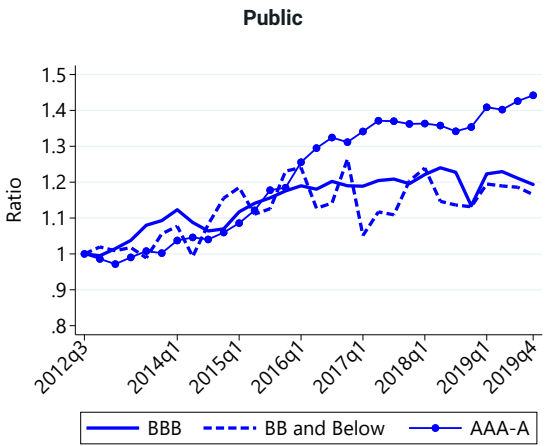


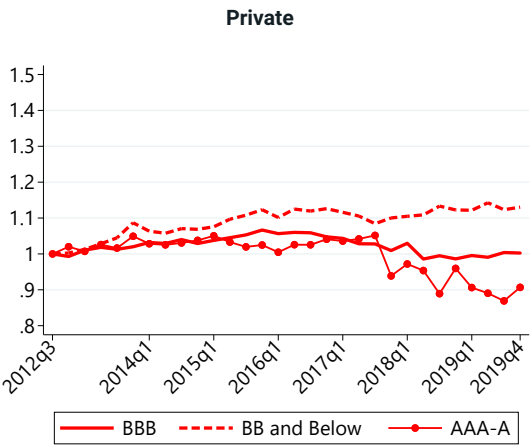
Collateral Types Public Firms: Loan Values

Back

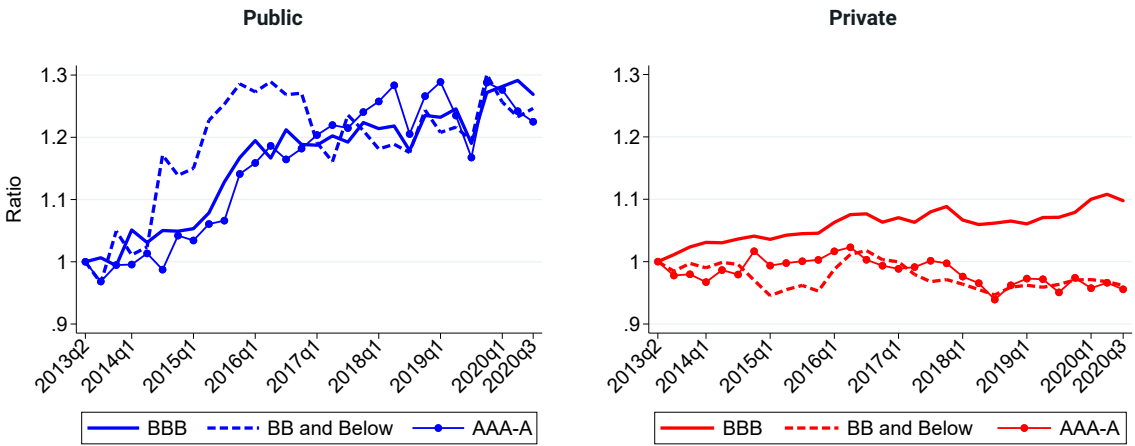


Leverage: Fixed Ratings

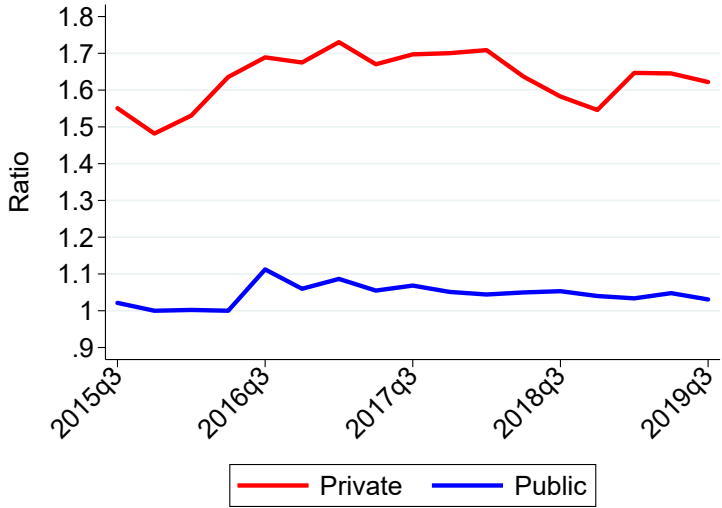




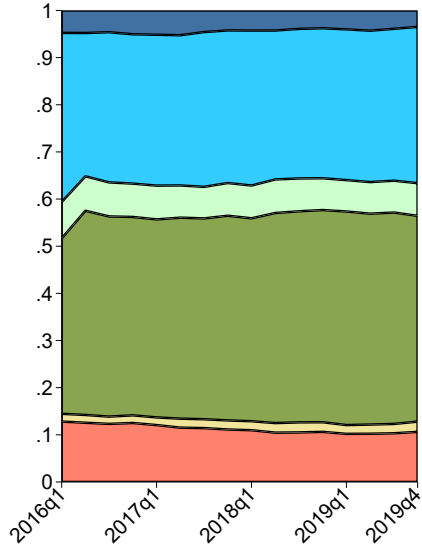
Leverage: Time Varying Ratings



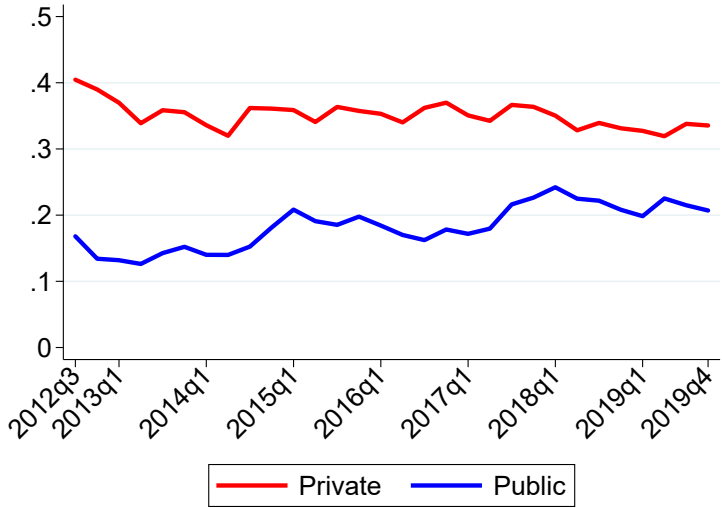
Collateral to Loan Ratio–Intensive Margin: Private vs. Public



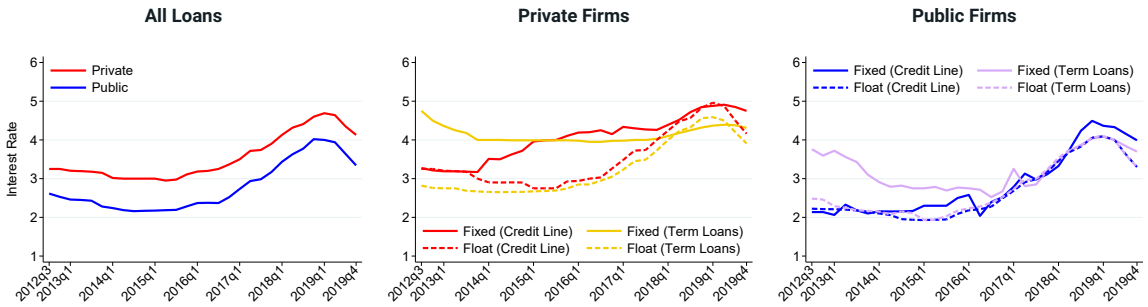
Collateral Type for SMEs



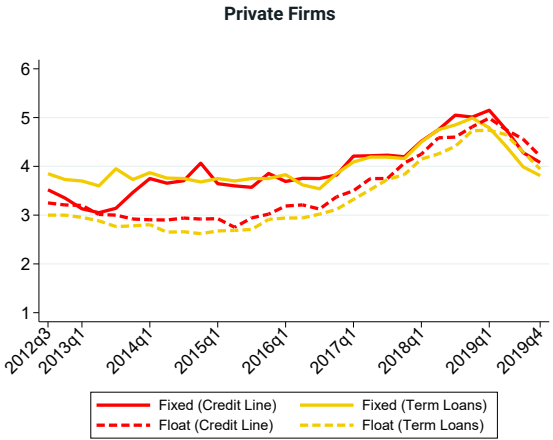
Loan shares Maturity Less than 1 Year

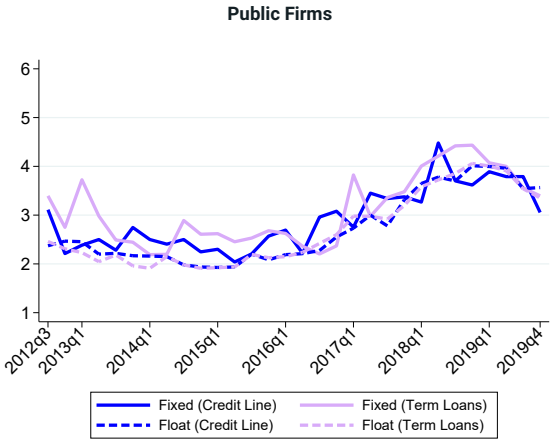


Interest rates: Fixed versus Floating

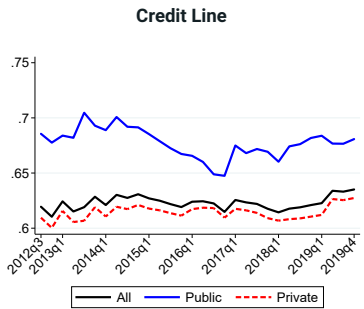


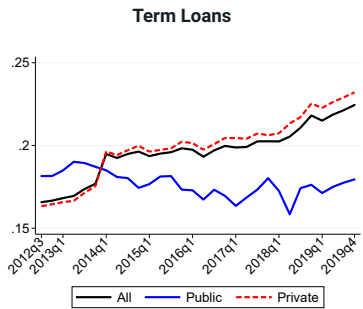
Interest rates on New Originations

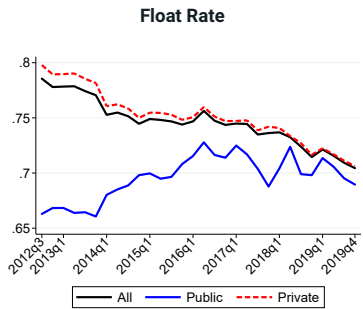




Loan shares: Credit Lines/Term loans and Floating/Fixed Rates



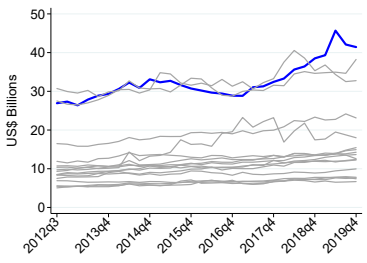




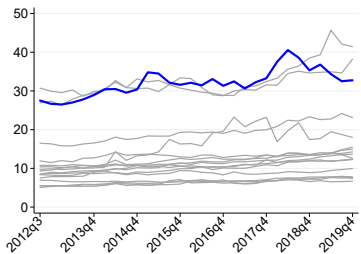
Mean Commited Exposure by Sector

Back

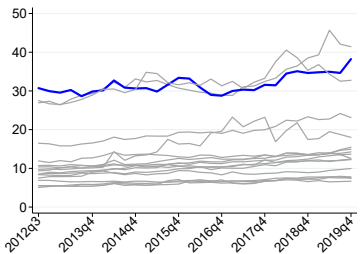
Mining, Quarrying, and Oil and Gas Extraction



Information

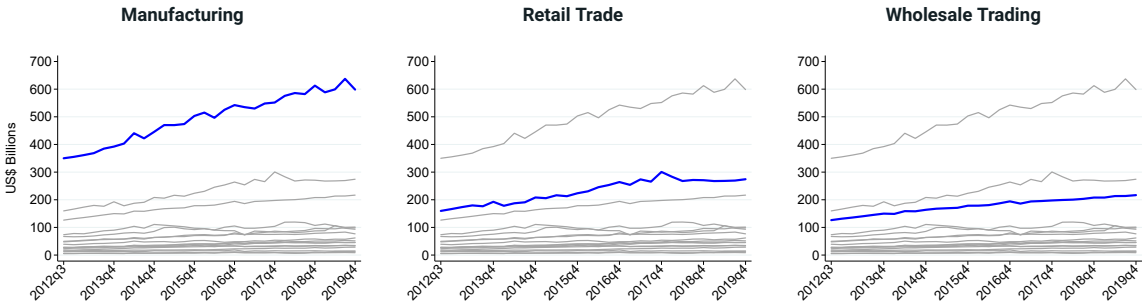


Utilities



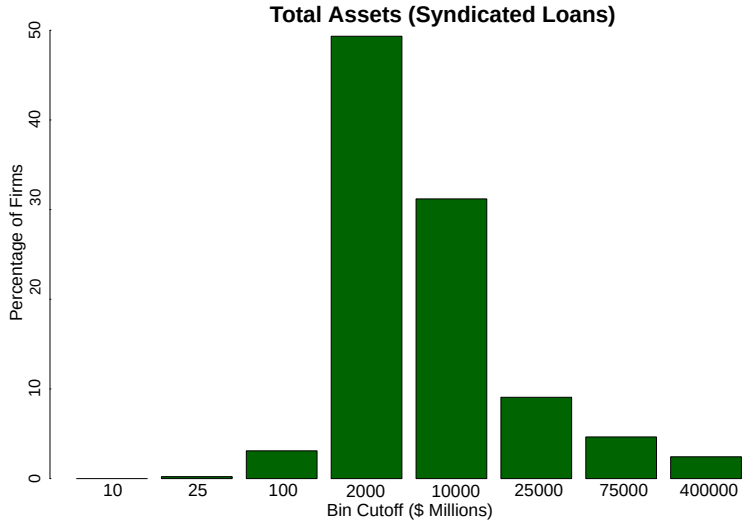
Total Committed Exposure by Sector

Back



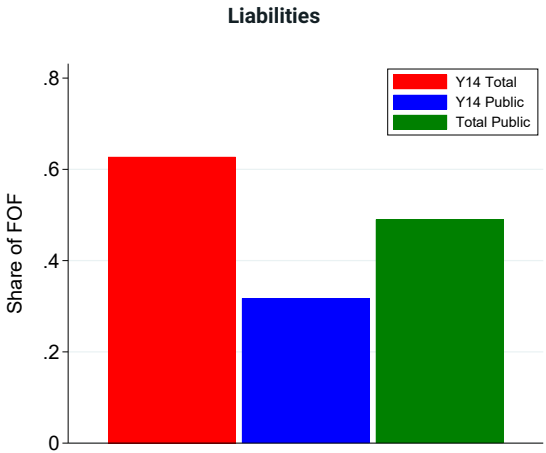
Firm Size Distribution: Syndicated Loan Borrowers

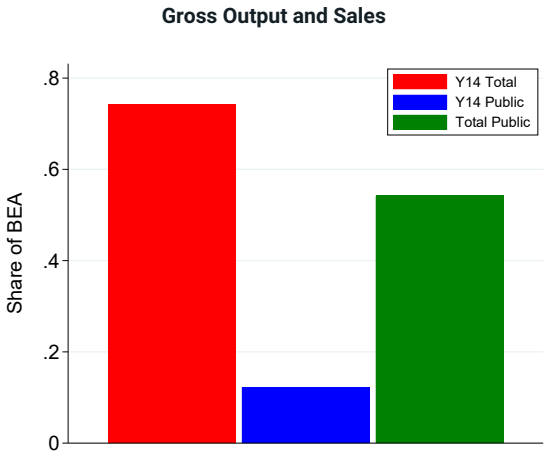
Back



Y14 firms account for much larger share of US Corporate Debt and Output

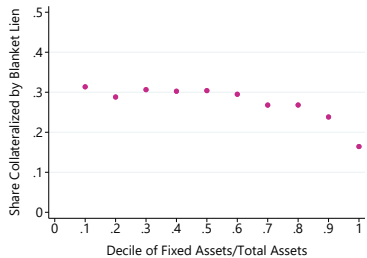
Back





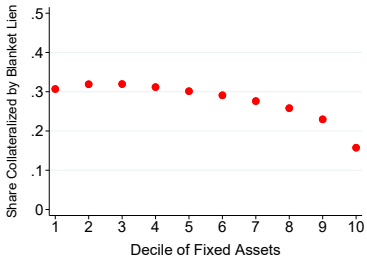
Loan Share Collateralized by Blanket Liens: All Firms

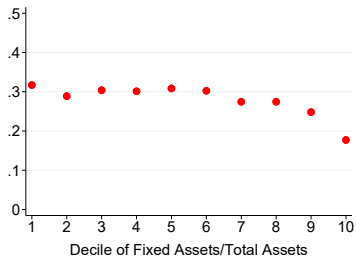
Back



Loan Share Collateralized by Blanket Liens: Private Firms

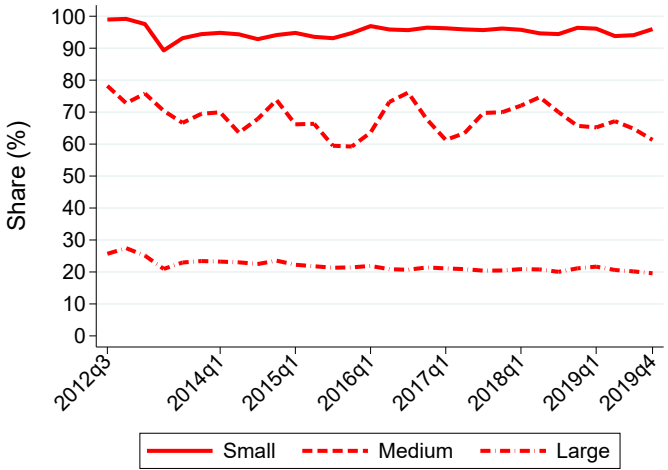
Back





Private Firms' Share of Bank Debt in FR Y-14: Based on All Commitments

Back



Appendix: Tables

Time Variant Firm Leverage

	Quantity: Log(Loan)			Price: Log(1+i)		
	All Firms	Private Firms	Public Firms	All Firms	Private Firms	Public Firms
Firm Leverage$_{q-1}$	0.0078	-0.0231	0.0619	-0.0023^{+}	-0.0025^{+}	0.0002
	(0.0222)	(0.0263)	(0.0674)	(0.0012)	(0.0012)	(0.0014)
Firm Leverage$_{q-1}$ $\times$ MP Surprise$_{q}$	-1.3212***	-1.8097***	-0.0484	-0.0899***	-0.0951***	-0.0082
	(0.1809)	(0.2410)	(0.7931)	(0.0096)	(0.0097)	(0.0209)
Observations	2199353	1935430	263915	2210232	1944550	265674
Adjusted R^2	0.946	0.940	0.839	0.772	0.774	0.674
Bank$\times$Firm F.E	Yes	Yes	Yes	Yes	Yes	Yes
Bank$\times$Time F.E	Yes	Yes	Yes	Yes	Yes	Yes
Firm$\times$Time F.E	No	No	No	No	No	No

Time Variant Bank Leverage

	Quantity: Log(Loan)			Price: Log(1+i)		
	All Firms	Private Firms	Public Firms	All Firms	Private Firms	Public Firms
Bank Leverage$_{q-1}$	0.3699***	0.3486**	0.3957**	-0.0079***	-0.0041	-0.0106***
	(0.0857)	(0.1077)	(0.1127)	(0.0019)	(0.0026)	(0.0020)
Bank Leverage$_{q-1}$ $\times$ MP Surprise$_q$	0.7481^{+}	1.7704**	0.4098	0.0162^{+}	0.0293*	0.0110
	(0.4307)	(0.5686)	(0.5292)	(0.0085)	(0.0138)	(0.0088)
Observations	633771	337330	296129	639054	340486	298156
Adjusted R^2	0.911	0.930	0.864	0.854	0.860	0.820
Bank$\times$Firm F.E	Yes	Yes	Yes	Yes	Yes	Yes
Bank$\times$Time F.E	No	No	No	No	No	No
Firm$\times$Time F.E	Yes	Yes	Yes	Yes	Yes	Yes

Extensive Margin Private

	Quantity			*Prices*		
	Log (Loan)	Log (Loan)	Log (Loan)	Log $(1+i)$	Log $(1+i)$	Log $(1+i)$
Collateralized$_q$	0.2888***	0.3467***	0.4181***	-0.0023***	-0.0045***	-0.0058***
	(0.0353)	(0.0523)	(0.0606)	(0.0005)	(0.0009)	(0.0012)
Collateralized$_q$ $\times$ MP Surprise$_q$	-0.9698***	-2.1818***	-2.3107***	-0.0130***	-0.0190*	-0.0264*
	(0.1719)	(0.3730)	(0.4394)	(0.0033)	(0.0073)	(0.0105)
Observations	2984365	1563912	1371794	3128248	1564644	1377795
Adjusted R^2	0.724	0.454	0.282	0.634	0.428	0.357
Bank$\times$Firm F.E	Yes	Yes	No	Yes	Yes	No
Bank$\times$Time F.E	Yes	No	No	Yes	No	No
Firm$\times$Time F.E	No	Yes	No	No	Yes	No
Bank$\times$Firm$\times$Time F.E	No	No	Yes	No	No	Yes

$^{+}$ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Extensive Margin Public

	Quantity			*Prices*		
	Log (Loan)	Log (Loan)	Log (Loan)	Log $(1+i)$	Log $(1+i)$	Log $(1+i)$
Collateralized$_q$	-0.6190***	-0.6384***	-0.8910***	0.0074***	0.0081***	0.0108***
	(0.0481)	(0.0490)	(0.0770)	(0.0006)	(0.0006)	(0.0009)
Collateralized$_q$ × MP Surprise$_q$	-0.6125*	-0.4756	-2.0066*	-0.0233***	-0.0157*	-0.0092
	(0.2575)	(0.3938)	(0.7709)	(0.0050)	(0.0069)	(0.0100)
Observations	644446	634710	485440	639445	629677	481327
Adjusted R^2	0.506	0.490	0.284	0.479	0.513	0.378
Bank×Firm F.E	Yes	Yes	No	Yes	Yes	No
Bank×Time F.E	Yes	No	No	Yes	No	No
Firm×Time F.E	No	Yes	No	No	Yes	No
Bank×Firm×Time F.E	No	No	Yes	No	No	Yes

$^{+}$ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

The Role of Collateral Type I: Private Firms

Back Credit Demand Back Credit Supply

	Quantity			*Prices*		
	Log (Loan)	Log (Loan)	Log (Loan)	Log $(1+i)$	Log $(1+i)$	Log $(1+i)$
Fixed assets and real estate$_q$	0.0362	-0.0298	0.0332	0.0015**	0.0009	-0.0000
	(0.0324)	(0.0433)	(0.0494)	(0.0005)	(0.0009)	(0.0012)
Cash and marketable sec.$_q$	0.2225***	0.3331***	0.3270***	-0.0049***	-0.0070***	-0.0093***
	(0.0361)	(0.0536)	(0.0713)	(0.0006)	(0.0010)	(0.0013)
Act. receiv. and inventory$_q$	0.5424***	0.7790***	0.8924***	-0.0046***	-0.0082***	-0.0102***
	(0.0406)	(0.0509)	(0.0535)	(0.0006)	(0.0010)	(0.0013)
Blanket lien and other$_q$	0.3668***	0.4817***	0.5787***	-0.0024***	-0.0046***	-0.0053***
	(0.0332)	(0.0431)	(0.0514)	(0.0005)	(0.0008)	(0.0010)
Fixed assets and real estate$_q$ × MP Surprise$_q$	-0.0606	-1.0468***	-1.1313***	-0.0008	-0.0107*	-0.0178*
	(0.0811)	(0.2082)	(0.2485)	(0.0017)	(0.0051)	(0.0072)
Cash and marketable sec.$_q$ × MP Surprise$_q$	-0.1948	-0.9140**	-0.7354+	0.0009	-0.0040	-0.0054
	(0.1258)	(0.2931)	(0.4310)	(0.0026)	(0.0062)	(0.0093)
Act. receiv. and inventory$_q$ × MP Surprise$_q$	-1.0223***	-2.1088***	-2.3031***	-0.0118***	-0.0135*	-0.0227**
	(0.1391)	(0.3011)	(0.3342)	(0.0026)	(0.0052)	(0.0077)
Blanket lien and other$_q$ × MP Surprise$_q$	-0.5070***	-0.9747***	-0.6990*	-0.0018	-0.0105*	-0.0120+
	(0.1064)	(0.2348)	(0.3015)	(0.0018)	(0.0045)	(0.0065)
Observations	2650313	1362500	1192230	2781417	1365280	1199252
Adjusted R^2	0.734	0.472	0.307	0.647	0.442	0.376
Bank×Firm F.E	Yes	Yes	No	Yes	Yes	No
Bank×Time F.E	Yes	No	No	Yes	No	No
Firm×Time F.E	No	Yes	No	No	Yes	No
Bank×Firm×Time F.E	No	No	Yes	No	No	Yes

$^{+}$ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

The Role of Collateral Type I: Public Firms

	Quantity			*Prices*		
	Log (Loan)	Log (Loan)	Log (Loan)	Log $(1+i)$	Log $(1+i)$	Log $(1+i)$
Fixed assets and real estate$_q$	-1.4410***	-1.4400***	-1.8022***	0.0178***	0.0174***	0.0219***
	(0.0609)	(0.0703)	(0.0757)	(0.0009)	(0.0009)	(0.0011)
Cash and marketable sec.$_q$	-0.5642***	-0.5283***	-0.7002***	0.0034**	0.0048***	0.0060**
	(0.0633)	(0.0697)	(0.1222)	(0.0011)	(0.0011)	(0.0020)
Act. receiv. and inventory$_q$	-0.1679*	-0.2192**	-0.2921*	0.0032***	0.0036***	0.0028*
	(0.0690)	(0.0756)	(0.1187)	(0.0007)	(0.0008)	(0.0013)
Blanket lien and other$_q$	-0.3759***	-0.3934***	-0.5355***	0.0045***	0.0052***	0.0073***
	(0.0483)	(0.0505)	(0.0913)	(0.0005)	(0.0005)	(0.0009)
Fixed assets and real estate$_q$ × MP Surprise$_q$	1.0635*	0.9617^{+}	-0.3164	0.0139	0.0060	0.0275*
	(0.4006)	(0.5166)	(0.8001)	(0.0097)	(0.0105)	(0.0127)
Cash and marketable sec.$_q$ × MP Surprise$_q$	-1.7177**	-1.6142*	-2.5546^{+}	0.0041	0.0216^{+}	0.0760**
	(0.5340)	(0.6360)	(1.4276)	(0.0102)	(0.0116)	(0.0246)
Act. receiv. and inventory$_q$ × MP Surprise$_q$	-1.7494***	-2.8136***	-5.5757***	-0.0399***	-0.0287***	-0.0465**
	(0.3921)	(0.5887)	(1.1364)	(0.0055)	(0.0072)	(0.0134)
Blanket lien and other$_q$ × MP Surprise$_q$	-0.7591*	-1.1205*	-2.2961*	-0.0333***	-0.0226**	-0.0203^{+}
	(0.3102)	(0.4592)	(0.9398)	(0.0047)	(0.0065)	(0.0116)
Observations	644446	634710	485440	639445	629677	481327
Adjusted R^2	0.538	0.523	0.339	0.491	0.525	0.398
Bank×Firm F.E	Yes	Yes	No	Yes	Yes	No
Bank×Time F.E	Yes	No	No	Yes	No	No
Firm×Time F.E	No	Yes	No	No	Yes	No
Bank×Firm×Time F.E	No	No	Yes	No	No	Yes

$^{+}$ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

The Role of Collateral Type II: Private Firms

	Quantity			*Prices*		
	Log(Loan)	Log(Loan)	Log(Loan)	Log(1+i)	Log(1+i)	Log(1+i)
Asset-based	0.0544^{+}	-0.0204	0.0278	0.0009^{+}	-0.0001	-0.0010
	(0.0301)	(0.0458)	(0.0546)	(0.0005)	(0.0009)	(0.0012)
Earnings & Operations-based	0.4106***	0.5765***	0.6912***	-0.0038***	-0.0067***	-0.0085***
	(0.0402)	(0.0545)	(0.0608)	(0.0005)	(0.0009)	(0.0012)
Asset-based $\times$ MP$_q$	-0.1172	-1.5071***	-1.5839***	-0.0021	-0.0165*	-0.0260*
	(0.1277)	(0.3319)	(0.4050)	(0.0031)	(0.0077)	(0.0107)
Earnings & Operations-based $\times$ MP$_q$	-1.4829***	-2.5766***	-2.5402***	-0.0173***	-0.0203*	-0.0293*
	(0.2144)	(0.4032)	(0.4689)	(0.0035)	(0.0074)	(0.0107)
Observations	2984365	1563912	1371794	3128248	1564644	1377795
Adjusted R^2	0.731	0.474	0.310	0.635	0.435	0.366
Bank $\times$ Firm F.E.	Yes	Yes	No	Yes	Yes	No
Bank $\times$ Time F.E.	Yes	No	No	Yes	No	No
Firm $\times$ Time F.E.	No	Yes	No	No	Yes	No
Bank $\times$ Firm $\times$ Time F.E.	No	No	Yes	No	No	Yes

$^{+}$ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

The Role of Collateral Type II: Public Firms

	Quantity			*Prices*		
	Log(Loan)	Log(Loan)	Log(Loan)	Log(1+i)	Log(1+i)	Log(1+i)
Asset-based	-1.2454***	-1.2489***	-1.6386***	0.0146***	0.0148***	0.0195***
	(0.0543)	(0.0607)	(0.0719)	(0.0008)	(0.0008)	(0.0010)
Earnings & Operations-based	-0.3105***	-0.3421***	-0.4388***	0.0041***	0.0048***	0.0054***
	(0.0516)	(0.0538)	(0.0949)	(0.0005)	(0.0006)	(0.0009)
Asset-based $\times$ MP$_q$	0.5611	0.5472	-0.3345	0.0116	0.0088	0.0305*
	(0.3421)	(0.4600)	(0.7612)	(0.0086)	(0.0094)	(0.0120)
Earnings & Operations-based $\times$MP$_q$	-1.3400***	-1.7572***	-4.0888***	-0.0364***	-0.0260***	-0.0300**
	(0.2895)	(0.4475)	(0.9127)	(0.0046)	(0.0064)	(0.0106)
Observations	644446	634710	485440	639445	629677	481327
Adjusted R^2	0.530	0.516	0.330	0.486	0.521	0.390
Bank $\times$ Firm F.E.	Yes	Yes	No	Yes	Yes	No
Bank $\times$ Time F.E.	Yes	No	No	Yes	No	No
Firm $\times$ Time F.E.	No	Yes	No	No	Yes	No
Bank $\times$ Firm $\times$ Time F.E.	No	No	Yes	No	No	Yes

$^+$ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Time Invariant Leverage

	Private Firms				Public Firms			
	Quantity		*Prices*		*Quantity*		*Prices*	
	Log (Loan)	Log (Loan)	Log $(1+i)$	Log $(1+i)$	Log (Loan)	Log (Loan)	Log $(1+i)$	Log $(1+i)$
High Leverage Firm $\times$ MP Surprise$_q$	-0.8478***		-0.0395***		-0.1679		-0.0045	
	(0.1221)		(0.0035)		(0.2162)		(0.0051)	
High Leverage Bank $\times$ MP Surprise$_q$		0.5429***		0.0066*		0.1605		0.0059*
		(0.1319)		(0.0027)		(0.1559)		(0.0022)
Observations	2140482	349527	2150197	352806	319985	307355	322056	309448
Adjusted R^2	0.939	0.929	0.768	0.858	0.837	0.862	0.675	0.818
Bank$\times$Firm F.E	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank$\times$Time F.E	Yes	No	Yes	No	Yes	No	Yes	No
Firm$\times$Time F.E	No	Yes	No	Yes	No	Yes	No	Yes

$^{+}$ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Longer Term Rates: Private Firms

	Quantity		*Prices*	
	Log(Loan)	Log(Loan)	Log$(1+i)$	Log$(1+i)$
Firm Leverage	0.0114		-0.0019*	
	(0.0198)		(0.0008)	
Firm Leverage $\times$ MP Surprise$_q$	-0.6175***		-0.0416***	
	(0.0632)		(0.0030)	
Bank Leverage		0.3024**		-0.0038
		(0.1056)		(0.0025)
Bank Leverage $\times$ MP Surprise$_q$		0.4438*		0.0169**
		(0.2075)		(0.0049)
Observations	1935430	337330	1944550	340486
Adjusted R^2	0.940	0.930	0.774	0.860
Bank $\times$ Firm F.E.	Yes	Yes	Yes	Yes
Bank $\times$ Time F.E.	Yes	No	Yes	No
Firm $\times$ Time F.E.	No	Yes	No	Yes

Longer Term Rates: Public Firms

	Quantity		*Prices*	
	Log(Loan)	Log(Loan)	Log$(1+i)$	Log$(1+i)$
Firm Leverage	0.0831		-0.0007	
	(0.0571)		(0.0013)	
Firm Leverage $\times$ MP Surprise$_q$	0.19835		-0.0108	
	(0.2792)		(0.8099)	
Bank Leverage		0.3776**		-0.0102***
		(0.1048)		(0.0019)
Bank Leverage $\times$ MP Surprise$_q$		0.0897		0.0092**
		(0.1929)		(0.0027)
Observations	263915	296120	265674	298156
Adjusted R^2	0.839	0.864	0.674	0.820
Bank $\times$ Firm F.E.	Yes	Yes	Yes	Yes
Bank $\times$ Time F.E.	Yes	No	Yes	No
Firm $\times$ Time F.E.	No	Yes	No	Yes