The Collateral Channel and Bank Credit

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[1] Views expressed herein are the authors' and do not represent those of the Federal Reserve System.

Motivation

- Financial frictions and contract incompleteness are usually resolved by use of collateral.
- Fluctuations in the value of collateral change borrowing capacity and credit allocations creating a feedback loop between asset prices, credit, and economic activity i.e. *collateral channel*.
- Recent empirical work based on a sample of publicly traded firms has questioned the role of the collateral channel (Lian and Ma (2021)).
- Our premise: Smaller and bank-dependent firms are more likely to be credit constrained, pledge real estate as collateral, and, hence, experience relaxation of borrowing constraints following increases in commercial real estate values.

Literature

- Empirical studies on the role of the collateral channel provide conflicting evidence for its importance
  - Large and publicly traded firms
    - Chaney, Sraer, and Thesmar (2012), Cvijanovic (2014), Campello et al. (2021)
    - Lian and Ma (2021), Benmelech, Kumar, and Rajan (2020)
  - Evidence on small and bank-dependent firms is mostly indirect
    - Gertler and Gilchrist (1994) small manufacturing firms respond more to monetary policy shocks. Crouzet and Mehtora (2020) higher cyclicality of bottom 99 pctile irrelevant for aggregate fluctuations and unrelated to proxies of financial constraints.
    - Evidence from regional data: Mian and Sufi (2014) The decline in employment during the Great Recession due to lower consumer demand, not tighter borrowing constraints on firms. Adelino Schoar, and Severino (2015): very small businesses in geographic markets with greater increases in residential real estate prices experienced stronger growth in employment than large firms in the same areas and industries.

Summary of results (1/2)

- We identify the firm-level effects of the collateral channel conditioning on pledging of collateral, firm-level demand factors, and bank-level supply conditions using detailed bank-firm-loan level data.
  - One percentage point increase in real estate values contributes to

    (1) 7 to 12 basis points annual increase in credit growth;

    (2) 3 to 7 bps increase in capital expenditures;

    (3) 6 to 9 bps increase in asset growth.
  - Collateral channel effects are stronger for high bank-dependent firms.
  - Higher collateral values reduce cost of credit and increase maturity.
  - A well-defined rank order of collateral types and credit growth.

Summary of results (2/2)

- The market-level effects of the collateral channel indicate amplification of firm-level effects and significant real economic outcomes.
  - A credit multiplier effect is about 7× that of micro-level elasticities.
  - One percentage point increase in real estate collateral values
    - reduces the MSA unemployment rate by 0.8 bps
    - increases the growth rate in employment by 14 bps
    - increases the growth rate in establishments by 4 bps
  - Close to 37 percent of employment growth could be attributed to relaxation of borrowing constraints over the sample period of 2013:Q1-2019:Q4

Credit constraints, asset values, and borrowing capacity

- Examine a firm that maximizes a one-period profit

$$max_{K_{f,t+1}} \left\{ A_{t+1} K_{f,t+1}^{\eta} - R_{f,b,t} L_{f,b,t+1} + P_{m,t+1} K_{f,t+1} \right\}$$

$$K_{f,t+1} = (1-\delta) K_{f,t} + I_{f,t}$$

$$L_{f,b,t+1} = L_{f,b,t} + I_{f,t}$$

$$L_{b,f,t+1} \leq \psi_{b,m,t} \times \underbrace{P_{m,t+1} \times K_{f,t+1}}_{\text{Market value of collateral}} ,$$

where $\eta, \delta, \psi_{b,m,t} \in (0,1)$, $P_{m,t} = 1$, $P_{m,t+1} < R_{f,b,t}$

- Firm f's borrowing capacity is determined by the value of collateral located in market m and the bank b credit policies across markets captured by a loan-to-value ratio $\psi_{b,m,t}$

Credit constraints, asset values, and borrowing capacity

- Optimal borrowing of the firm

$$\Delta L_{f,b,t+1} = \begin{cases} \left(\frac{\eta A_{f,t+1}}{R_{f,b,t} - (1-\lambda(1-\psi_{b,m,t}))P_{m,t+1}} \right)^{\frac{1}{1-\eta}} - (1-\delta)K_{f,t}, & \text{constrained } \lambda > 0 \\ \left(\frac{\eta A_{f,t+1}}{R_{f,b,t} - P_{m,t+1}} \right)^{\frac{1}{1-\eta}} - (1-\delta)K_{f,t}, & \text{unconstrained } \lambda = 0. \end{cases}$$

- Positive association between borrowing and collateral values even when firms are unconstrained (or do not pledge assets as collateral).

- Elasticity of borrowing to collateral values increases with the shadow value of the collateral constraint ($\uparrow \lambda$) and decreases with tighter LTV policies ($\downarrow \psi$).

  $\Rightarrow$ Credit-constrained firms would be more sensitive to real estate values.

  $\Rightarrow$ Bank credit supply constraints observationally equivalent to firm constraints.

Firm-level effects of the collateral channel

- Our baseline specification examines how firm outcomes depend on values of CRE collateral conditioning on CRE pledged

$$
\begin{aligned}
Y_{f,b,m,t} = \theta_0 \mathbb{I}\{\text{Real estate}_{f,b,m,t}\} + \theta_1 P_{m,t} \times \mathbb{I}\{\text{Real estate}_{f,b,m,t}\} + \\
\Theta' \mathbb{I}\{\text{Non-real estate}_{f,b,m,t}\} + \\
\Gamma' \mathbf{X}_{f,t-1} + \phi_f + \gamma_\alpha \alpha_{f,t} + \psi_{b,m,t} + \epsilon_{f,b,m,t}
\end{aligned}
$$

- $Y_{f,b,m,t} = \{$credit growth, capex rate, asset growth, credit spread, maturity, PD, LGD$\}$.
- $\psi_{b,m,t}$ are bank-market-time fixed effects and $\alpha_{f,t}$ are firm loan demand factors.
- $X_{f,t-1}$ include firm share fixed assets, size, ROA, leverage, investment grade status, and ϕ_f unobserved firm fixed effects.
  $\Rightarrow \theta_1 \approx$ Fraction of constrained firms $\times$ Degree of bindingness

Market-level effects of the collateral channel

- Our firm-level specification is aggregated to the MSA level

$$\begin{aligned} Y_{m,t} = \theta_0^m \text{Share real estate}_{m,t-1} + \theta_1^m P_{m,t-1} \times \text{Share real estate}_{m,t-1} \\ + \Theta^{m\prime} \text{Share non-real estate}_{m,t-1} \\ + \gamma_\alpha^m \alpha_{m,t} + \gamma_\beta^m \beta_{m,t} + \mu_m + \tau_t + \epsilon_{m,t}^m. \end{aligned}$$

- $Y_{m,t} = \{$credit growth, unemployment rates, employment and establishments growth$\}$.
- $\{\alpha_{m,t}, \beta_{m,t}\}$ are loan-weighted credit demand and supply factors.
- Credit multiplier effect $\kappa \equiv \frac{\theta_1^m}{\theta_1} \times$ Share real estate, where it is expected that $\kappa \geq 1$ (e.g. Mian, Sarto, and Sufi (2022)).

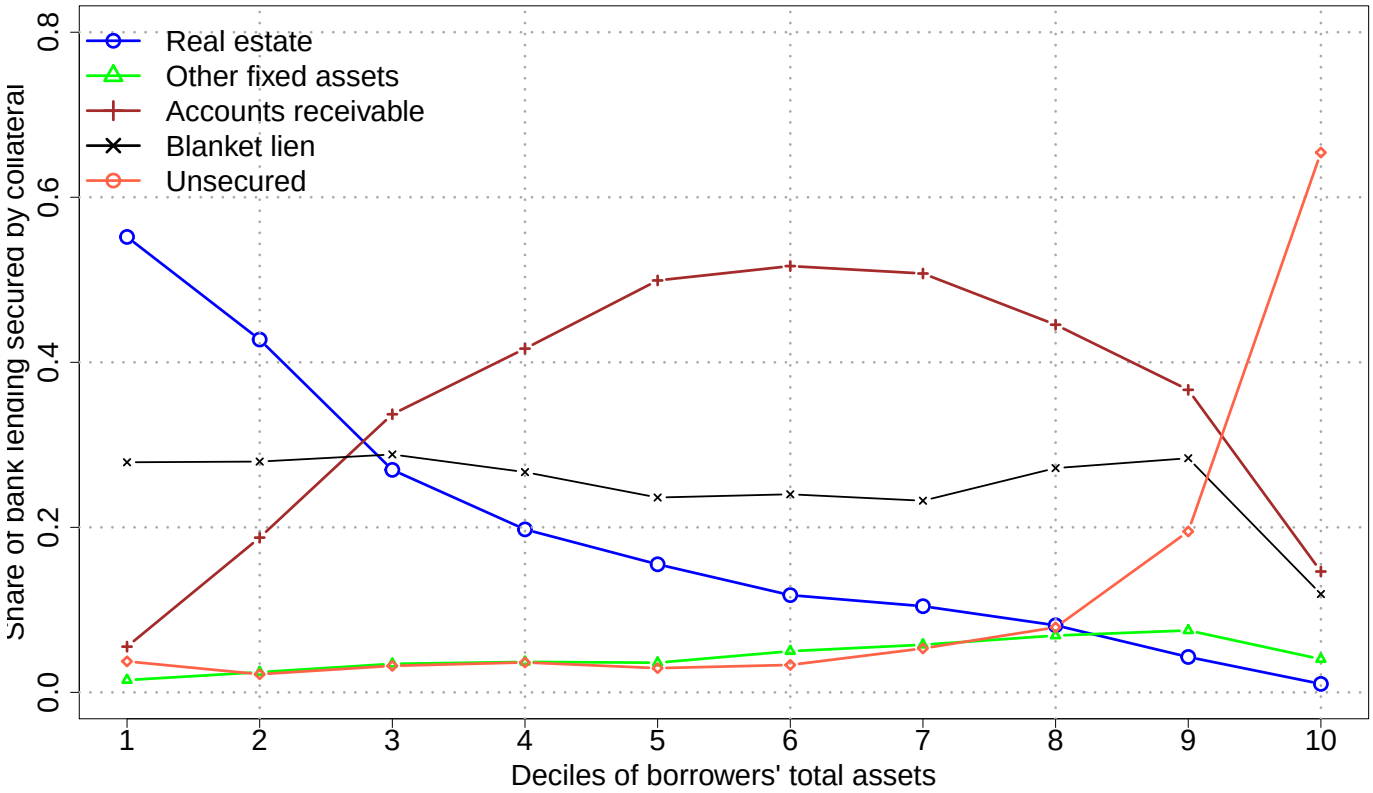
Data

- Main dataset: FR Y-14Q H1 C&I bank-firm-loan dataset
  - All loans $>$ \$1M of public and private U.S. nonfinancial firms at the largest U.S. banks $>$ \$100 billion.
  - Sample: 2013:Q1 - 2019:Q4, unbalanced panel of 37 large BHCs (multimarket banks), 92,069 borrowers, 68 MSA-level markets, 18 2-digit NAICs industries.
  - Observe use of collateral in six mutually exclusive categories
  - Balance sheet and income statements of all borrowers
- Commercial real estate property values: CBRE Econometric Advisors
- MSA-level economic activity: Unemployment Rate (BLS), Local Employment Growth (BLS Quarterly Census of Employment and Wages), Local Establishment Growth (Census Bureau County Business Patterns)

Endogeneity issues

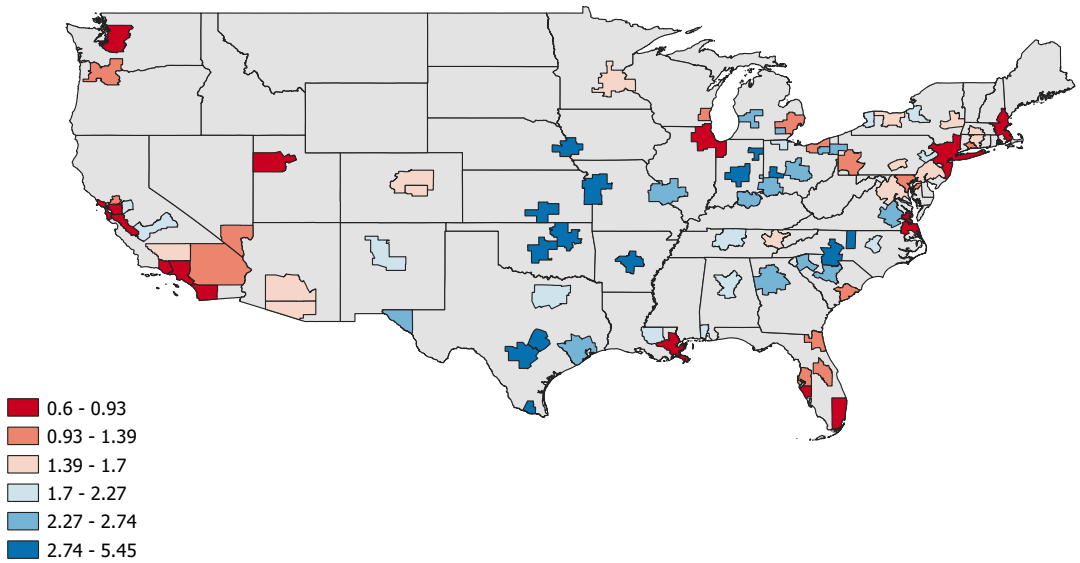
- Real estate collateral values are jointly determined with
  - Decision to pledge real estate collateral
    - Control for firm-level determinants of the decision to pledge CRE collateral
  - Loan demand
    - Use Saiz (2010) real estate supply elasticities as IV for the changes in CRE values.
    - Firm-specific credit demand factors based on Amiti and Weinstein (2018).
  - Bank credit supply
    - Bank-market-time fixed effects
    - Bank-specific credit supply factors (Amiti and Weinstein (2018)).

Use of collateral by firm size



- 68 percent of borrowers post some form of asset-based collateral, 37 percent real estate.
- Lian and Ma (2021) document 80 percent of publicly traded firms use cashflow based collateral.

Real estate supply elasticities



- Saiz (2010) uses geographic constraints to estimate real estate supply elasticities across major MSA areas.
- Commercial real estate prices instrumented in a first-stage regression

$$P_{m,t} = \beta Elasticity_m \times IR_t + \mu_m + \epsilon_{m,t}$$

Supply elasticities and real estate values

	Dependent variable: Real estate values			
	Commercial		Residential	
	(1)	(2)	(3)	(4)
Elasticity × Mortgage rate 30yr, t	−0.050***		−0.035***	
	(0.004)		(0.003)	
Elasticity × {Elasticity < $Q1$}× Mortgage rate 30yr, t		−0.179***		−0.116***
		(0.014)		(0.018)
Elasticity × {Elasticity ∈ ($Q1$, $Q3$)}× Mortgage rate 30yr, t		−0.058***		−0.044***
		(0.006)		(0.004)
Elasticity × {Elasticity > $Q3$}× Mortgage rate 30yr, t		−0.036***		−0.026***
		(0.003)		(0.004)
Observations	5,606	5,606	5,341	5,341
R^2	0.303	0.390	0.293	0.322
F-test	33.85	48.53	32.59	36.28
Note:				*p<0.1; **p<0.05; ***p<0.01

Identification of supply and demand factors

- FR Y14 contains mostly small bank-dependent firms with single bank relationship.
- Collapse data to groups of firms based on **market x industry x bank dependence x IG status** (Degryse et al. 2019)

$$\Delta L_{f,b,m,t} = \alpha_{i,t} + \beta_{b,t} + \epsilon_{f,b,m,t},$$

  where $\alpha_{f_1,t} = \alpha_{f_2,t} = .. = \alpha_{f_{N_i},t} = \alpha_{i,t}$, where $\{f_k^i\}_{k \in i}$ are all firms that belong to group i.
- The remaining bank-firm-market-time variation (e.g. collateral channel terms) in the data is in the residual $\epsilon_{f,b,m,t}$.

Firm-level effects: OLS vs IV

	Dependent variable:					
	Growth in lending $\Delta L_{f,b,m,t}$					
	OLS			IV		
	(1)	(2)	(3)	(4)	(5)	(6)
$P_{m,t} \times \mathbb{I}\{\text{RE collateral}_{f,b,t}\}$	13.80***		13.37***	7.40**		7.75**
	(1.45)		(1.53)	(3.56)		(3.65)
$\mathbb{I}\{\text{RE collateral}_{f,b,t}\}$	−2.78***		−2.68***	−0.30		−0.35
	(0.56)		(0.57)	(0.63)		(0.65)
$P_{m,t} \times$ Firm share fixed assets, t-1		6.37**	3.39		−3.03	−4.29
		(2.57)	(2.56)		(6.31)	(6.40)
Firm share of fixed assets, t-1		−0.19	0.55		1.94*	2.11*
		(1.00)	(0.99)		(1.09)	(1.11)
Firm credit factor $\alpha_{f,t}$	0.11***	0.11***	0.11***	0.11***	0.11***	0.11***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Firm log assets,t-1	−0.64***	−0.59***	−0.62***	−0.59***	−0.59***	−0.58***
	(0.12)	(0.12)	(0.12)	(0.12)	(0.12)	(0.12)
Firm return on assets, t-1	0.04***	0.04***	0.04***	0.04***	0.04***	0.04***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Firm debt-to-assets, t-1	−0.08***	−0.08***	−0.08***	−0.08***	−0.08***	−0.08***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Firm investment grade, t-1	1.45***	1.46***	1.44***	1.47***	1.46***	1.46***
	(0.29)	(0.29)	(0.29)	(0.29)	(0.29)	(0.29)
Firm fixed-effects	X	X	X	X	X	X
Bank-market-time fixed-effects	X	X	X	X	X	X
Observations	726,328	726,328	726,328	726,328	726,328	726,328
R^2	0.27	0.27	0.27	0.27	0.27	0.27
Adjusted R^2	0.14	0.14	0.14	0.14	0.14	0.14

Stronger effects for more bank-dependent firms

	Dependent variable:			
	Growth in lending $\Delta L_{f,b,m,t}$			
	OLS		IV	
Bank dependence	Low	High	Low	High
	(1)	(2)	(3)	(4)
$P_{m,t} \times \mathbb{I}\{\text{RE collateral}_{f,b,t}\}$	11.61^{***}	18.41^{***}	7.37	10.43^{**}
	(1.89)	(2.63)	(5.01)	(4.24)
$\mathbb{I}\{\text{RE collateral}_{f,b,t}\}$	-2.12^{**}	-3.59^{***}	-0.21	-0.40
	(0.81)	(0.82)	(0.95)	(0.75)
Firm credit factor $\alpha_{f,t}$	0.16^{***}	0.05^{***}	0.16^{***}	0.05^{***}
	(0.01)	(0.01)	(0.01)	(0.01)
Firm log assets,t-1	-0.77^{***}	-0.49^{**}	-0.75^{***}	-0.44^{**}
	(0.17)	(0.20)	(0.17)	(0.21)
Firm share fixed assets, t-1	-0.29	1.93^{***}	-0.28	1.99^{***}
	(0.80)	(0.54)	(0.81)	(0.54)
Firm return-on-assets, t-1	0.09^{***}	0.02^{***}	0.09^{***}	0.02^{***}
	(0.01)	(0.01)	(0.01)	(0.01)
Firm debt-to-assets, t-1	-0.10^{***}	-0.07^{***}	-0.10^{***}	-0.07^{***}
	(0.01)	(0.01)	(0.01)	(0.01)
Firm investment grade, t-1	1.39^{***}	1.37^{***}	1.40^{***}	1.42^{***}
	(0.39)	(0.38)	(0.39)	(0.39)
Firm fixed-effects	X	X	X	X
Bank-market-time fixed-effects	X	X	X	X
Observations	460,357	265,971	460,357	265,971
R^2	0.28	0.35	0.28	0.35
Adjusted R^2	0.13	0.18	0.13	0.18

Collateral types, credit growth, and bank dependence

	Annualized growth in					
Dependent variable:	*Credit commitments* $\Delta L_{f,b,t}$			Utilized amounts $\Delta L^{U}_{f,b,t}$		
Bank dependence	All	Low	High	All	Low	High
	(1)	(2)	(3)	(4)	(5)	(6)
$\widehat{P_{m,t}} \times \mathbb{I}\{\text{RE collateral}_{f,b,t}\}$	7.10*	7.24	12.40**	22.99	16.50	57.87*
	(3.61)	(4.40)	(5.40)	(24.21)	(33.14)	(29.82)
$\mathbb{I}\{\text{RE collateral}_{f,b,t}\}$	3.02***	2.95***	3.23***	3.62	3.37	0.36
	(0.70)	(0.90)	(1.07)	(5.50)	(7.08)	(7.66)
$\mathbb{I}\{\text{Cash and securities}_{f,b,t}\}$	6.17***	6.02***	6.66***	18.86***	20.16***	4.77
	(0.75)	(0.82)	(2.07)	(3.37)	(3.52)	(11.70)
$\mathbb{I}\{\text{Accounts receivable}_{f,b,t}\}$	6.47***	6.16***	8.44***	23.75***	24.20***	19.78***
	(0.40)	(0.43)	(0.96)	(2.38)	(2.72)	(5.72)
$\mathbb{I}\{\text{Fixed assets}_{f,b,t}\}$	1.28**	0.82	4.99***	7.29***	6.74***	9.47**
	(0.50)	(0.52)	(0.92)	(1.87)	(1.98)	(4.59)
$\mathbb{I}\{\text{Blanket lien}_{f,b,t}\}$	6.34***	6.35***	6.47***	23.25***	23.73***	20.56***
	(0.38)	(0.41)	(0.94)	(1.90)	(2.22)	(4.92)
$\mathbb{I}\{\text{Unsecured}_{f,b,t}\}$	10.88***	10.86***	11.67***	21.36***	22.49***	2.14
	(0.50)	(0.52)	(1.74)	(3.06)	(3.38)	(7.54)
Firm credit factor $\alpha_{f,t}$	0.12***	0.16***	0.04***	0.12***	0.16***	0.16***
	(0.002)	(0.003)	(0.002)	(0.01)	(0.01)	(0.01)
Firm Controls	X	X	X	X	X	X
Firm fixed-effects	X	X	X	X	X	X
Bank-market-time fixed-effects	X	X	X	X	X	X
Observations	728,104	501,344	226,760	545,603	425,920	119,683
R^2	0.27	0.28	0.35	0.18	0.19	0.29
Adjusted R^2	0.14	0.14	0.16	0.05	0.05	0.06

Credit spreads, maturity, and expected losses

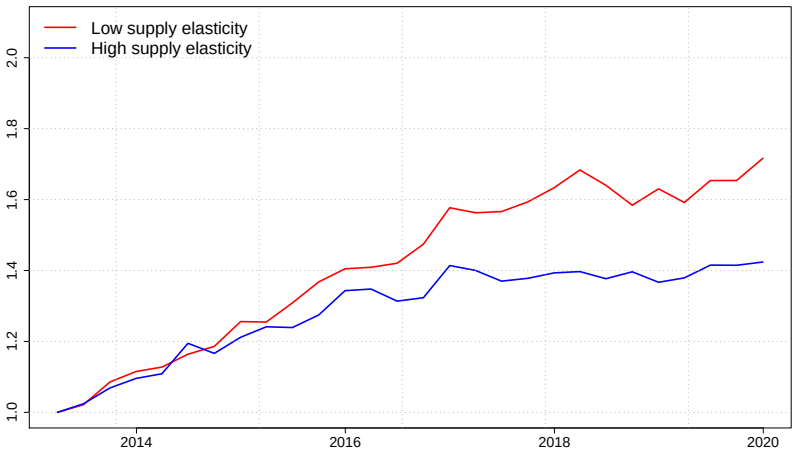
	Dependent variable:			
	Spread	Maturity	LGD	PD
	(1)	(2)	(3)	(4)
$\widehat{P_{m,t}} \times \mathbb{I}\{\text{RE collateral}_{f,b,t}\}$	-0.46^{**}	13.65^{**}	4.86	0.55
	(0.22)	(6.65)	(3.92)	(1.44)
$\mathbb{I}\{\text{RE collateral}_{f,b,t}\}$	0.11^{***}	0.08	-3.13^{***}	-0.02
	(0.04)	(1.16)	(0.74)	(0.38)
$\mathbb{I}\{\text{Cash and securities}_{f,b,t}\}$	0.12^{***}	-1.82^{***}	-2.07^{***}	0.09
	(0.03)	(0.61)	(0.55)	(0.28)
$\mathbb{I}\{\text{Accounts receivable}_{f,b,t}\}$	0.05^{***}	-1.44^{***}	-1.43^{***}	0.26
	(0.02)	(0.35)	(0.32)	(0.16)
$\mathbb{I}\{\text{Fixed assets}_{f,b,t}\}$	0.04^{**}	-1.57^{***}	-0.73^{**}	-0.22
	(0.02)	(0.37)	(0.29)	(0.18)
$\mathbb{I}\{\text{Blanket lien}_{f,b,t}\}$	0.005	-1.35^{***}	0.87^{***}	-0.22
	(0.02)	(0.39)	(0.31)	(0.19)
$\mathbb{I}\{\text{Unsecured}_{f,b,t}\}$	-0.05^{**}	-3.49^{***}	4.18^{***}	-0.12
	(0.02)	(0.35)	(0.33)	(0.13)
Firm credit factor $\alpha_{f,t}$	-0.001^{***}	0.004	-0.0001	-0.004^{***}
	(0.0002)	(0.01)	(0.002)	(0.001)
Firm Controls	X	X	X	X
Firm fixed-effects	X	X	X	X
Bank-market-time fixed-effects	X	X	X	X
Observations	50,206	50,206	50,206	50,206
R^2	0.78	0.80	0.77	0.70
Adjusted R^2	0.66	0.70	0.65	0.54

Capital expenditures and asset growth

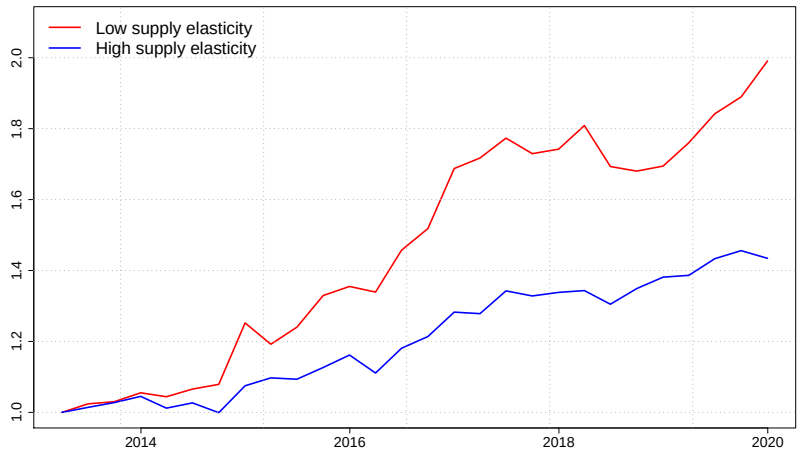
	Dependent variable:					
	Firm capital expenditure, t			Δ Assets, t		
Bank dependence	All	Low	High	All	Low	High
	(1)	(2)	(3)	(4)	(5)	(6)
$\widehat{P_{m,t}} \times \mathbb{I}\{\text{RE collateral}_{f,b,t}\}$	3.48**	2.37	6.85*	5.62***	4.15**	8.75***
	(1.70)	(1.95)	(3.67)	(1.49)	(1.93)	(2.27)
$\mathbb{I}\{\text{RE collateral}_{f,b,t}\}$	−0.20	−0.01	−0.37	−0.72***	−0.55*	−1.01**
	(0.30)	(0.33)	(0.74)	(0.27)	(0.33)	(0.48)
Firm credit factor $\alpha_{f,t}$	−0.002	−0.002	−0.0003	0.003	0.003	0.002
	(0.001)	(0.001)	(0.003)	(0.002)	(0.003)	(0.003)
Bank credit factor $\beta_{b,t}$	0.01***	0.01***	0.03***	0.002	−0.001	0.02*
	(0.002)	(0.002)	(0.01)	(0.003)	(0.004)	(0.01)
Lagged dependent variable, t-1	0.50***	0.50***	0.50***	−0.09***	−0.08***	−0.13***
	(0.005)	(0.01)	(0.01)	(0.003)	(0.003)	(0.003)
Loan Controls	X	X	X	X	X	X
Firm Controls	X	X	X	X	X	X
Firm fixed-effects	X	X	X	X	X	X
Industry fixed-effects	X	X	X	X	X	X
Mkt x Time fixed-effects	X	X	X	X	X	X
Observations	642,288	551,746	90,542	948,256	747,043	201,213
R^2	0.76	0.76	0.79	0.15	0.14	0.17
Adjusted R^2	0.74	0.74	0.75	0.07	0.07	0.04

Market-level effects of the collateral channel

A. All borrowers



B. High bank-dependent borrowers



- Significantly higher growth in bank credit in low supply elasticity markets, especially for high bank-dependent borrowers.

Growth in market-level bank credit

	Dependent variable: Market-level bank credit growth		
Bank dependence	All	Low	High
	(1)	(2)	(3)
$\widehat{P_{m,t-1}} \times$ RE collateral share$_{m,t-1}$	131.68	55.88	414.14*
	(136.87)	(181.46)	(233.29)
RE collateral share$_{m,t}$	91.49**	63.70*	82.12
	(36.73)	(32.15)	(75.03)
$\widehat{P_{m,t-1}}$	−41.50	35.57	−14.09
	(27.87)	(51.45)	(54.62)
Bank credit factor, $\beta_{m,t}$	0.65***	0.60*	0.40**
	(0.15)	(0.34)	(0.20)
Firm credit factor low bank-dependent, t	2.98***	3.51***	0.38
	(0.09)	(0.09)	(0.23)
Firm credit factor high bank-dependent, t	0.30***	−0.03	2.17***
	(0.07)	(0.07)	(0.17)
Observations	1,768	1,768	1,768
R^2	0.55	0.58	0.36
Adjusted R^2	0.53	0.56	0.33

- Market-level estimates imply a credit multiplier $\hat{\kappa} = 414/12 \times 0.2 \approx 7$.
- Higher credit flows due to higher credit demand from low bank-dependent borrowers.

Market-level employment

	Dependent variable:			
	Unemployment	Growth in employment		
	rate	Total	Non-tradable	Tradable
	(1)	(2)	(3)	(4)
$\widehat{P_{m,t-1}} \times$ RE collateral share$_{m,t-1}$	-3.81^{*}	68.51^{**}	98.27^{***}	-16.68
	(2.16)	(31.85)	(24.23)	(125.90)
RE collateral share$_{m,t-1}$	0.50	1.07	0.38	-32.94
	(0.97)	(7.17)	(6.99)	(29.43)
$\widehat{P_{m,t-1}}$	1.80^{*}	-25.27^{**}	-31.22^{***}	-12.25
	(0.92)	(10.32)	(7.40)	(32.96)
Bank credit factor, $\beta_{m,t}$	-0.003	0.20^{***}	0.14^{**}	-0.06
	(0.004)	(0.04)	(0.06)	(0.30)
Firm credit factor low bank-dependent, t	0.001	-0.002	0.02	-0.05
	(0.001)	(0.02)	(0.03)	(0.05)
Firm credit factor high bank-dependent, t	-0.002^{*}	0.03	0.03^{*}	0.04
	(0.001)	(0.02)	(0.02)	(0.07)
Lagged dependent variable, t-1	0.77^{***}	-0.29^{***}	-0.31^{***}	-0.32^{***}
	(0.03)	(0.06)	(0.05)	(0.04)
Controls for Other Collateral Types	X	X	X	X
Market Fixed Effects	X	X	X	X
Time Fixed Effects	X	X	X	X
Observations	1,674	1,768	1,768	1,768
R^2	0.97	0.63	0.74	0.20
Adjusted R^2	0.97	0.61	0.72	0.15

Conclusion

- We have provided direct evidence that the collateral channel is most relevant for non-publicly traded and high bank-dependent firms and quantified its effects.
- Although our estimates are reduced-form, they could be useful in calibrating a structural model to assess the general equilibrium and welfare effects of the collateral channel in the presence of heterogeneous firms.
- Karabarbounis, Macnamara, Sapriza, Yankov (2023) examine how the presence of heterogeneous firms (age, size, productivity) and endogenous choice of collateral type (asset-based vs cashflow based) affects the propagation of financial shocks.