

The Collateral Channel and Bank Credit

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¹Views 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 firms' borrowing constraints and credit allocations that change their ability to invest, further affecting asset prices, credit, and economic activity i.e., *collateral channel* (e.g., [Kiyotaki and Moore, 1997](#)).
- 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.

Mixed evidence on estimates of the collateral channel

- Large and publicly traded firms
 - CRE values and investment [Chaney, Sraer, and Thesmar \(2012\)](#), [Cvijanovic \(2014\)](#), [Campello et al. \(2021\)](#)
 - Earnings-based collateral [Lian and Ma \(2021\)](#)
- Small and bank-dependent firms
 - Higher cyclicalilty: [Gertler and Gilchrist \(1994\)](#) small manufacturing firms respond more to monetary policy shocks. [Crouzet and Mehrotra \(2020\)](#) higher cyclicalilty of bottom 99 pctlile irrelevant for aggregate fluctuations and unrelated to proxies of financial constraints.
 - Evidence from regional data: [Mian and Sufi \(2014\)](#) 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.
 - Non-US: [Bednarek et al. \(2021\)](#): foreign capital inflows into Germany during the European debt crisis impacted local economic growth for firms owning real estate.

What we do in the paper

- We empirically estimate how an increase in real estate collateral values relaxes firms' borrowing constraints, ultimately leading to positive effects on credit and real outcomes at the micro (firm) and under some conditions also at the more aggregate (MSA market) level.
- We use a large confidential dataset of bank loans to publicly listed and **privately held** firms in the US that allows us to observe bank-firm loan characteristics, including the **pledging** of collateral associated to the loan.

Firm-level results

- 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.
 - Efficiency of bankruptcy courts is a determinant of CRE pledging and is reflected in banks' reported loss given default.
 - One percentage point increase in real estate values contributes to:
 - (1) 5 to 9 basis points annual increase in credit growth;
 - (2) 4 to 27 bps increase in capital expenditures growth;
 - (3) 2 bps increase in asset growth.
 - Credit and investment effects are stronger for high bank-dependent firms.
 - Higher collateral values reduce cost of credit and increase maturity.
 - A well-defined rank order of firms' credit growth by collateral type.

Market-level results

- Markets with a sufficiently large number of firms pledging real estate as collateral and sufficiently large appreciation in real estate experience positive expansion in credit and employment from the relaxation of borrowing constraints at high bank-dependent and credit-constrained firms that pledge commercial real estate.
- For the median market's share of firms pledging CRE as collateral:
 - Credit multiplier effect is 3 to 11 $\times$ that of micro-level elasticities.
 - One percentage point increase in real estate collateral values:
 - reduces the MSA unemployment rate by 1.1 bps
 - increases the growth rate in employment by 6 bps.
 - About 6 percent of employment growth could be attributed to relaxation of borrowing constraints over the sample period of 2013:Q1-2019:Q4

Firm's borrowing constraint

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

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

Firm-level effects of the collateral channel

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

$$Y_{f,b,m,t} = \psi_0 \mathcal{I}\{\text{Real estate}_{f,b,m,t}\} + \psi_1 \text{Market value RE}_{f,m,t-1} \times \mathcal{I}\{\text{Real estate}_{f,b,m,t}\} + \Theta' \mathcal{I}\{\text{Non-real estate}_{f,b,m,t}\} + \Gamma' \mathbf{X}_{f,t-1} + \phi_f + \gamma_\alpha \alpha_{\tilde{f},t} + \beta_{b,m,t} + \epsilon_{f,b,m,t}$$

- $Y_{f,b,m,t} = \{\text{credit growth, capex rate, debt and asset growth, net sales, credit spread, maturity, PD, LGD}\}.$
- $\beta_{b,m,t}$ are bank-market-time fixed effects and $\alpha_{\tilde{f},t}$ is a firm factor to account for loan demand.
- $\mathbf{X}_{f,t-1}$ include firm share fixed assets, size, ROA, leverage, investment grade status, and ϕ_f captures unobserved firm fixed effects.
- ψ_1 is coefficient of interest

Market-level effects of the collateral channel

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

$$Y_{m,t} = \psi_0^m \text{Share real estate}_{m,t-1} + \psi_1^m P_{m,t-1} \times \text{Share real estate}_{m,t-1} + \Theta^{m'} \text{Share non-real estate}_{m,t-1} + \gamma_\alpha^m \alpha_{m,t} + \gamma_\beta^m \beta_{m,t} + \mu_m + \tau_t + \epsilon_{m,t}^m.$$

- $Y_{m,t} = \{\text{credit growth, unemployment rate, employment growth}\}.$
- $\{\alpha_{m,t}, \beta_{m,t}\}$ are loan-weighted credit demand and supply factors.
- Credit multiplier effect $\kappa \equiv \frac{\psi_1^m}{\psi_1} \times \text{Share real estate}$, where it is expected that $\kappa \geq 1$ (e.g. [Mian, Sarto, and Sufi \(2023\)](#)).

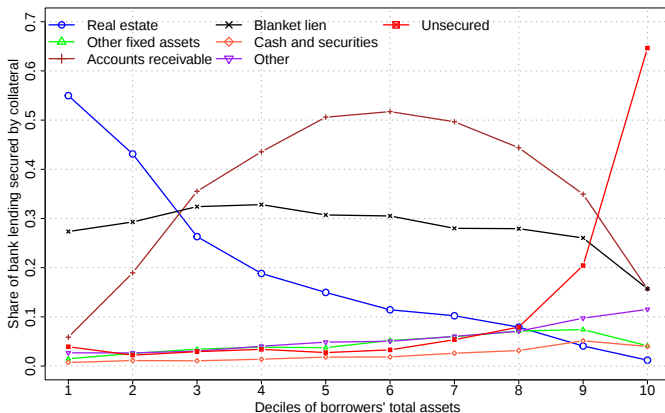
Data

- 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
- CRE property values: CBRE Econometric Advisors and FR-Y14Q H2.
- RE supply elasticities: Saiz (2010).
- Bankruptcy court efficiency: FJC WRDS based on PACER includes 216,763 corporate bankruptcy filings, 2008 through 2023, across all 94 federal district courts.
- MSA-level economic activity: Unemployment Rate (BLS), Local Employment Growth (BLS Quarterly Census of Employment and Wages)

Endogeneity issues

- Real estate collateral values are jointly determined with
 - Decision to pledge real estate collateral
 - Use measures of court efficiency in resolving bankruptcy cases under Chapter 7 and 11.
 - 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.

Measures related to bankruptcy court efficiency

- They affect CRE collateral use and are unrelated to local demand conditions
 - District-specific residual duration of bankruptcy.
 - District-specific preference for conversion of Chapter 11 to 7.
 - Distance of borrower to “forum shopping” destination e.g. Delaware.
- All else equal: Lower residual duration, higher preference for Chapter 7 resolution, and less possibility for forum shopping increases lenders' likelihood and ease of repossessing collateral in bankruptcy, thus, increasing lenders' preference for tangible collateral such as CRE.
- Judicial efficiency may also influence the use of collateral by affecting banks' projected losses given default (LGD). We show that all else equal, LGD is lower for CRE collateral compared to other forms of collateral, and the effect is affected by our judicial metrics.
- We run a probit for the CRE pledge decision using these and other exogenous predictors.

Pledging of commercial real estate

- We model the endogenous choice of pledging real estate as a probit regression

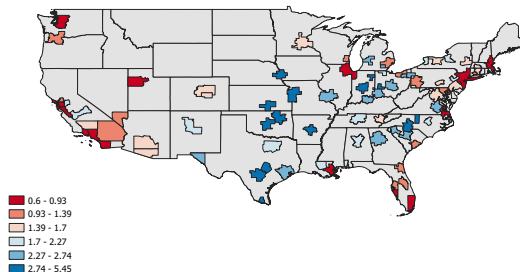
$$\mathbb{E}_{t-1} \mathcal{I}\{\text{CRE collateral}_{f(b),m,t}\} = \Phi(\beta'_1 \text{Judicial efficiency}_{m,t-1} + \beta_2 \widehat{P}_{m,t-1} + \beta_3 \widehat{P}_{m,t-1} \times \text{Share fixed assets}_{f,t-1} + \beta'_5 X_{f,t-1} + \beta'_6 Z_{b,t-1} + \tau_t + \mu_m),$$

- Exogenous predictors of the choice of collateral: (1) instruments based on measures of bankruptcy court efficiency, i.e., court-specific residual duration of Chapter 7 cases, court-specific propensity to convert Chapter 11 cases to Chapter 7, and distance of the borrower headquarters to the district court of Delaware; (2) exogenous variation in CRE prices $\widehat{P}_{m,t-1}$ and its interaction with firms' shares of fixed assets; (3) pre-determined firm and bank characteristics predicting the pledge of CRE collateral.
- Control function approach (2SRI estimation)

Pledging of commercial real estate

	Dependent variable: $\mathcal{I}\{\text{Real estate}_{f,b,m,t}\} \in \{0, 1\}$			
	Probit		Linear	
$\mathcal{I}\{\text{Distance to Delaware} > 200\text{km}\}_f$	0.238*** (0.012)	0.238*** (0.012)	0.102*** (0.013)	0.020*** (0.003)
Residual duration Chapter 7, $c_{,t-1}$	-0.012*** (0.002)	-0.012*** (0.002)	-0.005*** (0.002)	-0.001** (0.0003)
District Chapter 11 to 7 conversion, $c_{,t-1}$	0.150*** (0.010)	0.150*** (0.010)	-0.029*** (0.011)	-0.011*** (0.002)
$\widehat{P}_{m,t-1}$		0.321*** (0.042)	0.065 (0.053)	0.029*** (0.010)
$\widehat{P}_{m,t-1} \times \text{Share of fixed assets}_{f,t-1}$			0.341*** (0.065)	0.039*** (0.013)
Share of fixed assets $_{f,t-1}$			0.981*** (0.011)	0.240*** (0.002)
Share of accounts receivable $_{f,t-1}$			-0.315*** (0.010)	-0.142*** (0.002)
$\log(\text{Total assets})_{f,t-1}$			-0.239*** (0.001)	-0.048*** (0.0001)
Debt-to-assets $_{f,t-1}$			-0.074*** (0.006)	0.020*** (0.001)
Return on assets $_{f,t-1}$			-0.004*** (0.0001)	-0.001*** (0.00002)
Bank CET1 capital surplus $b(f)_{,t-1}$			0.086*** (0.001)	0.018*** (0.0002)
Bank CRE LTV $b(f)_{,m,t-1}$			0.209*** (0.013)	0.028*** (0.003)
Bankruptcy efficiency, F-test	687	686.6	79.5	91.6
Observations	1,392,786	1,392,786	1,392,786	1,392,786
R ²				0.268
Log Likelihood	-593,651	-593,623	-476,003	

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

	<i>Dependent variable: Real estate values</i>			
	Commercial		Residential	
	(1)	(2)	(3)	(4)
Elasticity $\times$ Mortgage rate 30yr,t-1	-0.051*** (0.004)		-0.036*** (0.003)	
Elasticity $\times$ {Elasticity < Q1} $\times$ Mortgage rate 30yr,t-1		-0.178*** (0.014)		-0.122*** (0.019)
Elasticity $\times$ {Elasticity $\in$ (Q1, Q3)} $\times$ Mortgage rate 30yr,t-1		-0.058*** (0.006)		-0.045*** (0.004)
Elasticity $\times$ {Elasticity > Q3} $\times$ Mortgage rate 30yr,t-1		-0.036*** (0.003)		-0.026*** (0.003)
Observations	5,606	5,606	5,341	5,341
R ²	0.314	0.404	0.301	0.335
F-test	35.68	51.40	33.92	38.57

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)

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

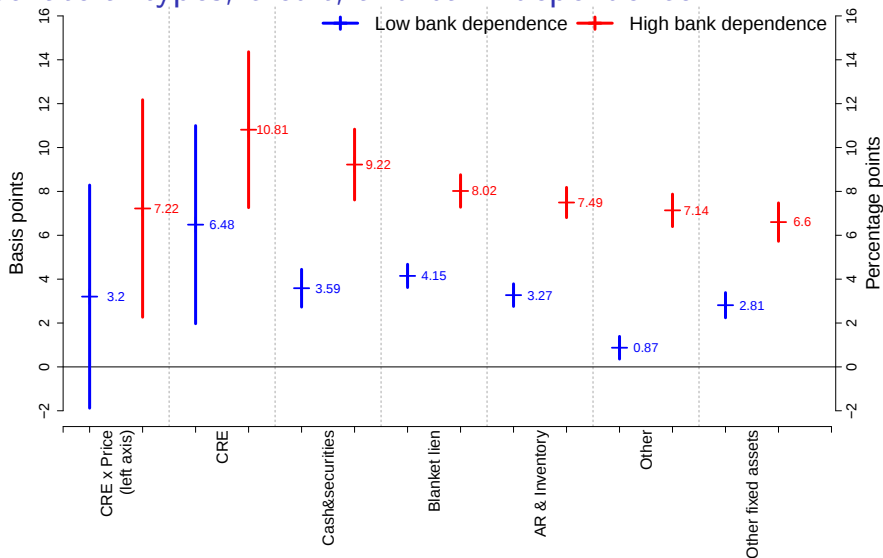
where $\alpha_{f_1,t} = \alpha_{f_2,t} = \dots = \alpha_{f_{N_i},t} = \alpha_{i,t}$, where $\{f_k^i\}_{k \in i}$ are all firms that belong to group i .

- 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 credit effects: OLS vs IV + CF collateral pledge

	Dependent variable: Growth in lending $\Delta_4 L_{f,b,t}$				
	OLS		IV		
	(1)	(2)	(3)	(4)	(5)
$\mathcal{I}\{\text{CRE}_{f,b,t}\} \times P_{m,t-1}$	6.47*** (0.74)		5.08*** (1.75)	5.11*** (1.75)	
$\mathcal{I}\{\text{CRE} \times \text{High BD}_{f,b,t}\} \times P_{m,t-1}$		7.44*** (0.75)			9.45*** (1.82)
$\mathcal{I}\{\text{CRE} \times \text{Low BD}_{f,b,t}\} \times P_{m,t-1}$		5.82*** (0.74)			-0.02 (1.91)
$\mathcal{I}\{\text{CRE}_{f,b,t}\}$	-3.75*** (0.98)	-3.97*** (0.99)	3.75*** (0.38)	9.38*** (1.31)	8.54*** (1.32)
$\log(\text{Firm assets})_{f,t-1}$	-0.92*** (0.08)	-0.80*** (0.08)	-0.93*** (0.08)	-0.64*** (0.11)	-0.60*** (0.11)
Firm return on assets $_{f,t-1}$	0.08*** (0.005)	0.08*** (0.005)	0.08*** (0.005)	0.09*** (0.005)	0.08*** (0.005)
Firm debt-to-assets $_{f,t-1}$	-0.08*** (0.003)	-0.08*** (0.003)	-0.08*** (0.003)	-0.09*** (0.004)	-0.09*** (0.004)
$\mathcal{I}\{\text{Investment grade}\}_{f,t-1}$	0.91*** (0.13)	0.91*** (0.13)	0.92*** (0.13)	0.91*** (0.13)	0.91*** (0.13)
CRE collateral control function $_{f,t-1}$				-2.00*** (0.44)	-1.69*** (0.45)
Collateral+demand+FE controls	Y	Y	Y	Y	Y
Observations	641,424	641,424	641,424	641,424	641,424
R ²	0.32	0.32	0.32	0.32	0.32
Adjusted R ²	0.23	0.23	0.23	0.23	0.23

Collateral types, credit, and bank dependence



Credit spreads, maturity, and expected losses

	<i>Dependent variable:</i>			
	Spread	Maturity	LGD	PD
	(bps)	(months)	(pct)	(pct)
	(1)	(2)	(3)	(4)
$\widehat{P}_{m,t-1} \times \mathcal{I}\{\text{Real estate}_{f,b,t} \times \text{High BD}_{f,t-1}\}$	-11.76*** (3.96)	6.01** (2.42)	-6.31*** (0.87)	-2.17*** (0.50)
$\widehat{P}_{m,t-1} \times \mathcal{I}\{\text{Real estate}_{f,b,t} \times \text{Low BD}_{f,t-1}\}$	0.38 (4.18)	-3.66 (2.40)	-8.64*** (0.88)	-0.59 (0.54)
$\mathcal{I}\{\text{Real estate}_{f,b,t}\}$	-28.20*** (2.24)	-2.25** (1.15)	-1.38*** (0.31)	-2.52*** (0.27)
$\log(\text{Assets})_{f,t-1}$	-2.23*** (0.24)	-0.04 (0.10)	0.11*** (0.03)	-0.34*** (0.03)
$\text{Return on assets}_{f,t-1}$	-0.27*** (0.01)	0.01* (0.005)	-0.004*** (0.001)	-0.05*** (0.001)
$\text{Debt-to-assets}_{f,t-1}$	0.23*** (0.01)	-0.02*** (0.003)	0.01*** (0.001)	0.02*** (0.001)
$\mathcal{I}\{\text{Investment grade}\}_{f,t-1}$	-5.31*** (0.29)	0.22* (0.13)	-0.05 (0.04)	-0.33*** (0.02)
$\text{CRE collateral control function}_{f,t-1}$	10.50*** (0.73)	1.02*** (0.35)	-0.03 (0.09)	0.91*** (0.09)
Observations	541,314	427,266	767,535	769,100
R ²	0.80	0.87	0.74	0.62
Adjusted R ²	0.77	0.85	0.71	0.57

Capital expenditures and asset growth

Table: Firm-level outcomes in full sample

	Dependent variable:				
	ΔCapex	ΔSales	$\Delta\text{Total debt}$	ΔAssets	$\frac{\text{Debt}}{\text{Assets}}$
	(1)	(2)	(3)	(4)	(5)
$\widehat{P}_{m,t-1} \times \mathcal{I}\{\text{Real estate}_{f,b,t} \times \text{High BD}_{f,t-1}\}$	26.51** (10.74)	0.82 (0.99)	6.91*** (2.52)	1.82* (1.06)	0.84*** (0.31)
$\widehat{P}_{m,t-1} \times \mathcal{I}\{\text{Real estate}_{f,b,t} \times \text{Low BD}_{f,t-1}\}$	-1.16 (10.16)	3.39*** (1.11)	0.09 (3.78)	3.10*** (1.06)	-0.31 (0.27)
CRE collateral control function $_{f,t-1}$	3.39*** (1.07)	0.12 (0.12)	-0.59*** (0.22)	0.21** (0.09)	-0.33*** (0.04)
Observations	326,190	326,190	326,190	326,190	326,190
R ²	0.38	0.54	0.49	0.53	0.96
Adjusted R ²	0.33	0.51	0.45	0.49	0.95

Capital expenditures and asset growth: Placebo test on unsecured lending

Table: Firm-level outcomes for unsecured borrowing and real estate ownership

	<i>Dependent variable:</i>				
	ΔCapex (1)	ΔSales (2)	$\Delta \text{Total debt}$ (3)	ΔAssets (4)	$\frac{\text{Debt}}{\text{Assets}}$ (5)
$\widehat{P}_{m,t-1} \times \mathcal{I}\{\text{Real estate} \times \text{High BD}\}_{f,t-1}$	-12.01 (24.34)	2.80* (1.51)	6.79 (6.15)	1.48 (1.75)	0.76 (0.60)
$\widehat{P}_{m,t-1} \times \mathcal{I}\{\text{Real estate} \times \text{Low BD}\}_{f,t-1}$	-11.45 (24.64)	2.70* (1.51)	5.41 (6.05)	1.04 (1.73)	0.66 (0.61)
Observations	46,531	46,531	46,531	46,531	46,531
R ²	0.31	0.50	0.47	0.49	0.96
Adjusted R ²	0.29	0.48	0.45	0.47	0.96

Capital expenditures and asset growth - Robustness

Table: Firm-level outcomes in sample with reported market values of CRE collateral

	<i>A. With Heckman correction for CRE collateral pledge</i>				
	log(Capex)	log(Sales)	log(Debt)	log(Assets)	$\frac{\text{Debt}}{\text{Assets}}$
	(1)	(2)	(3)	(4)	(5)
$\log(\text{Value CRE})_{f,t-1} \times \mathcal{I}\{\text{High BD}\}_{f,t-1}$	0.035*** (0.009)	0.028*** (0.009)	0.034*** (0.006)	0.030*** (0.006)	0.161** (0.078)
$\log(\text{Value CRE})_{f,t-1} \times \mathcal{I}\{\text{Low BD}\}_{f,t-1}$	0.033*** (0.010)	0.041*** (0.009)	0.046*** (0.008)	0.040*** (0.007)	0.195** (0.085)
IMR CRE collateral $_{f,t}$	0.033 (0.022)	0.031* (0.016)	-0.004 (0.014)	0.005 (0.010)	-0.925*** (0.339)
Observations	33,119	41,060	41,260	41,260	41,260
R ²	0.918	0.941	0.939	0.970	0.884
Adjusted R ²	0.901	0.930	0.927	0.964	0.862
	<i>B. Without Heckman correction</i>				
	log(Capex)	log(Sales)	log(Debt)	log(Assets)	$\frac{\text{Debt}}{\text{Assets}}$
	(1)	(2)	(3)	(4)	(5)
$\log(\text{Value CRE})_{f,t-1} \times \mathcal{I}\{\text{High BD}\}_{f,t-1}$	0.035*** (0.009)	0.029*** (0.009)	0.034*** (0.006)	0.030*** (0.006)	0.163** (0.077)
$\log(\text{Value CRE})_{f,t-1} \times \mathcal{I}\{\text{Low BD}\}_{f,t-1}$	0.032*** (0.010)	0.041*** (0.009)	0.046*** (0.008)	0.040*** (0.007)	0.210** (0.088)
<i>(same controls as in panel A)</i>					
Observations	33,119	41,412	41,260	41,260	41,260
R ²	0.918	0.939	0.939	0.970	0.884
Adjusted R ²	0.901	0.927	0.927	0.964	0.862

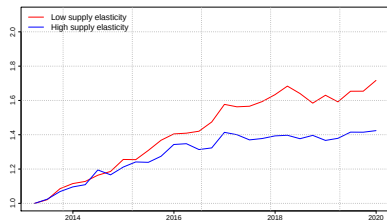
Collateral channel effects for high leverage and low profitability firms - Robustness

Table: Collateral channel effects for high leverage and low profitability firms

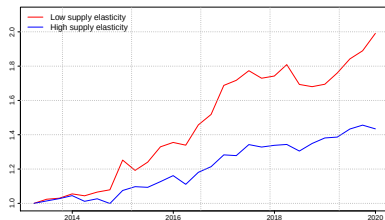
	<i>Dependent variable:</i>					
	Δ_4 Total debt	Δ_4 Capex	Δ_4 Assets	Δ_4 Sales		
	(1)	(2)	(3)	(4)	(5)	(6)
$\widehat{P}_{m,t-1} \times \mathcal{I}\{\text{Real estate} \times \text{High Lev}\}_{f,t-1}$	13.08** (6.03)					
$\widehat{P}_{m,t-1} \times \mathcal{I}\{\text{Real estate} \times \text{Low Lev}\}_{f,t-1}$	5.74 (5.64)					
$\widehat{P}_{m,t-1} \times \mathcal{I}\{\text{Real estate} \times \text{Low ROA}\}_{f,t-1}$		12.30** (5.94)				
$\widehat{P}_{m,t-1} \times \mathcal{I}\{\text{Real estate} \times \text{High ROA}\}_{f,t-1}$		6.08 (5.53)				
$\widehat{P}_{m,t-1} \times \mathcal{I}\{\text{Real estate} \times \text{High D/E}\}_{f,t-1}$			13.13** (6.26)	34.52*** (10.25)	2.06** (1.03)	-0.05 (1.10)
$\widehat{P}_{m,t-1} \times \mathcal{I}\{\text{Real estate} \times \text{Low D/E}\}_{f,t-1}$			4.90 (5.65)	5.55 (10.35)	2.04** (0.97)	2.12** (0.94)
CRE collateral control function $_{f,t-1}$	-4.39* (2.28)	-4.55* (2.28)	-3.61 (2.29)	3.65*** (1.03)	0.21** (0.10)	0.13 (0.12)
Observations	324,604	324,604	311,715	311,715	311,715	311,715
R ²	0.58	0.58	0.58	0.38	0.53	0.55
Adjusted R ²	0.48	0.48	0.48	0.33	0.49	0.51

Market-level credit and CRE supply elasticities

A. All borrowers



B. High bank-dependent borrowers



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

Endogeneity of CRE price and share of CRE collateral

- The aggregation transforms the firm-level collateral pledge indicators into market-level shares of firms pledging the collateral.
- Address endogeneity of CRE prices, share of firms pledging CRE collateral:
 - Instrument for CRE prices using real estate supply elasticities from Saiz(2010).
 - Instrument for share of firms pledging CRE using predicted shares of firms pledging real estate in the market,

$$\widehat{\text{Share CRE}}_{m,t} \equiv \sum_{f \in m} \mathbb{E}_{t-1} \mathcal{I}\{\text{CRE collateral}_{f,b,m,t}\}$$

i.e., market-level average of firm-level predicted values from earlier probit regression on CRE pledging choice1 .

- Alternatively instrument CRE price and share with real estate supply elasticities and the judicial efficiency measures discussed earlier.

Market-level bank credit

	<i>Dependent variable: Market level credit growth.</i>			
	OLS	2SLS two-step	2SLS one-step	
	(1)	(2)	(3)	(4)
$P_{m,t-1} \times \text{Share CRE}_{m,t-1}$	95.38** (45.48)			
$\widehat{P}_{m,t-1} \times \text{Share CRE}_{m,t-1}$		510.30*** (153.52)		
$\widehat{P}_{m,t-1} \times \widehat{\text{Share CRE}}_{m,t-1}$			564.44*** (161.44)	695.58*** (239.26)
$P_{m,t-1}$	-3.26 (14.71)			
$\text{Share CRE}_{m,t-1}$	-98.00** (44.03)	-84.65*** (21.37)		
$\widehat{\text{Share CRE}}_{m,t-1}$			-112.10*** (30.68)	-548.36** (221.64)
$\widehat{P}_{m,t-1}$		-106.75* (62.59)	-115.36* (63.95)	-38.69 (122.57)
Credit demand high $\text{BD}_{m,t}$	0.05 (0.04)	0.04 (0.04)	0.04 (0.04)	0.03 (0.04)
Credit demand low $\text{BD}_{m,t}$	0.21*** (0.02)	0.21*** (0.02)	0.20*** (0.02)	0.18*** (0.03)
Credit supply factor m,t	-0.26 (0.20)	-0.26 (0.20)	-0.27 (0.20)	0.08 (0.30)
Observations	1,652	1,652	1,652	1,652
R^2	0.22	0.22	0.22	0.45
Adjusted R^2	0.17	0.17	0.17	0.43

Market-level employment

	<i>Dependent variable:</i>			
	Unemployment	Growth in employment		
	rate (1)	Total (2)	Non-tradable (3)	Tradable (4)
$\widehat{P}_{m,t-1} \times \text{Share } \widehat{\text{CRE}}_{m,t-1}$	-5.45* (2.84)	30.23** (12.88)	18.26* (10.20)	75.99* (43.06)
$\widehat{P}_{m,t-1}$	2.24** (0.92)	-9.05* (4.55)	-5.62* (3.36)	-27.49* (15.63)
$\text{Share } \widehat{\text{CRE}}_{m,t-1}$	1.79** (0.73)	-0.53 (3.46)	2.09 (3.29)	-20.71* (11.82)
Observations	1,697	1,583	1,583	1,583
R ²	0.96	0.59	0.83	0.30
Adjusted R ²	0.96	0.56	0.82	0.25

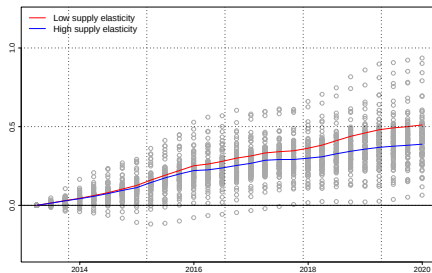
- The median market with 20 % CRE share, a 1 pp increase in CRE prices:
 - Unemployment rate declines by 1.1 bps;
 - Employment growth increases by about 6 bps;
- With 6 percent annual growth in prices, borrowing constraints contributed to about 6 percent of employment growth annually.

Conclusion

- Using C&I loan-level data that include private US firms, we provide micro-level evidence about the effects of changes in collateral values on bank credit
- The channel operates through the explicit pledging of assets, not a wealth effect from ownership.
- The use of real estate collateral is concentrated in private bank-dependent firms
- We find evidence that rising collateral valuations increase credit, ease loan terms, and increase corporate investment and asset growth.
- These effects may translate into market-level outcomes for the unemployment rate and employment growth: The magnitude of the market-level effects varies with the increase in CRE prices and the share of firms pledging CRE.

Supply elasticities and real estate values

A. CRE prices



B. Instrumented CRE prices

