Shadow Always Touches the Feet: Implications of Bank Credit Lines to Non-Bank Financial Intermediaries

Viral V. Acharya, Manasa Gopal, Maximilian Jager, Sascha Steffen

September 6, 2024

Motivation

- Between 2013 and 2023, bank credit lines to NBFIs tripled from $500 billion to $1.5 trillion (today 20% of all bank credit lines; Acharya, Cetorelli and Tuckman (2024))
- About half of all NBFI exposure is through Real Estate Investment Trusts (REITs) - major holders of CRE
- Post-COVID, high interest rates and economic slowdown impacted CRE sector and bank balance sheets through CRE exposure (Gupta, Mittal and Van Nieuwerburgh, 2022)

Commercial Real Estate Crisis Affecting Banks

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REAL ESTATE

The Clearest Sign Yet That Commercial Real Estate Is in Trouble

Lenders are issuing a record number of foreclosure notices related to risky property loans

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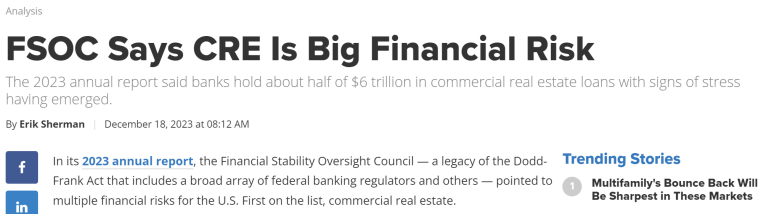
Commercial Property Losses Hammer Banks on Three Continents

Banks in the U.S., Japan and Switzerland announced losses tied to troubled real-estate lending

By *Margot Patrick* Follow, *Eliot Brown* Follow, and *Gina Heeb* Follow



Analysis

FSOC Says CRE Is Big Financial Risk

The 2023 annual report said banks hold about half of $6 trillion in commercial real estate loans with signs of stress having emerged.

By **Erik Sherman** | December 18, 2023 at 08:12 AM

In its **2023 annual report**, the Financial Stability Oversight Council — a legacy of the Dodd-Frank Act that includes a broad array of federal banking regulators and others — pointed to multiple financial risks for the U.S. First on the list, commercial real estate.

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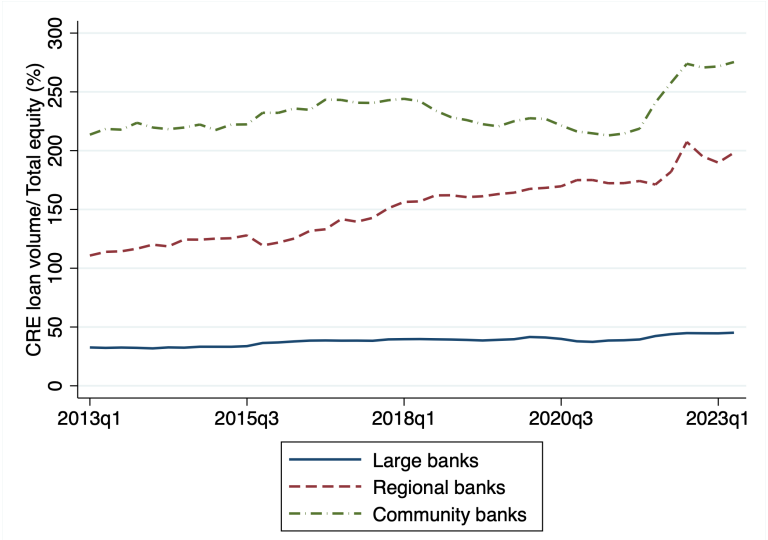
What About Credit Lines?

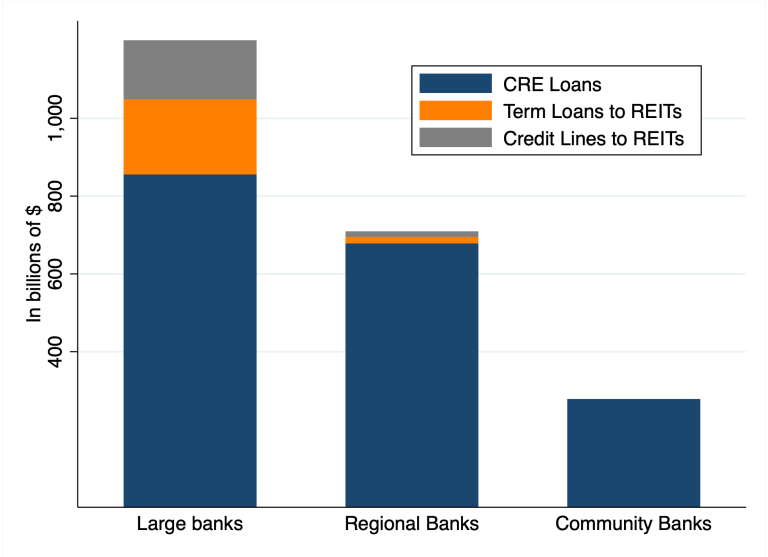
- Between 2013 and 2023, bank credit lines to NBFIs tripled from $500 billion to $1.5 trillion (today 20% of all bank credit lines)
- About half of all NBFI exposure is through Real Estate Investment Trusts (REITs) - major holders of CRE
- Post-COVID, high interest rates and economic slowdown impacted CRE sector and bank balance sheets through CRE exposure

⇒ **This paper, we ask what are the implications of bank provision of credit lines using REITs as an example**

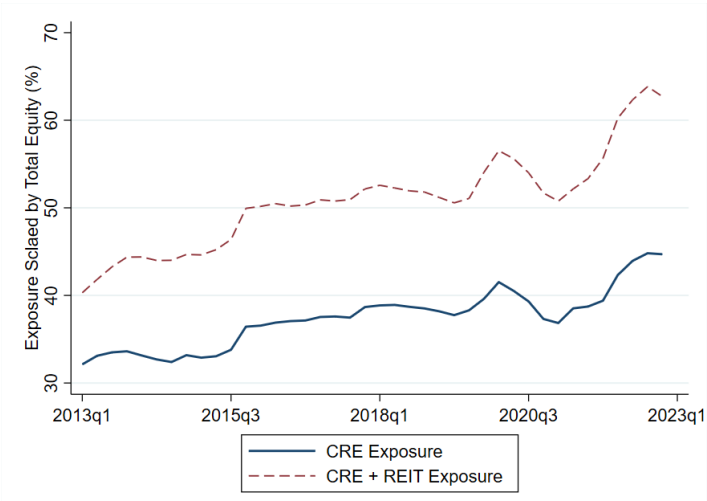
Crisis of smaller banks?



Banks' Total Exposure to CRE



Large Banks' Total Exposure to CRE



In a nutshell

- **Fact:** Commercial Real Estate (CRE) in the US is struggling
- **Popular narrative:** Small banks are affected, but large banks not so much
- **This paper:** We show that large banks are strongly affected, too
  - Large banks give credit lines (CLs) to Real Estate Investment Trusts (REITs)
  - REITs have very high drawdown sensitivity to stress
  - Bank stock returns historically suffered from REIT CL exposure
  - Stress test exercise reveals significant capital shortfall among large US banks

Literature Review

- Liquidity provision by banks -
  - Asset-side counterpart to deposit-taking - Kashyap, Rajan and Stein (2002), Gatev and Strahan (2006)
  - but risky - Acharya and Mora (2015); Ippolito, Peydró, Polo and Sette (2016); Kapan and Minoiu (2021); Chodorow-Reich, Darmouni, Luck and Plosser (2022); Acharya, Engle, Jager and Steffen (forthcoming)

- Linkages between banks and NBFIs -
  - Substitution between banks and nonbanks - Buchak, Matvos, Piskorski and Seru (2018); Fleckenstein, Gopal, Gutierrez and Hillenbrand (2020); Chernenko, Erel and Prilmeier (2022); Gopal and Schnabl (2022)
  - Funding from banks to nonbanks - Acharya et al. (2024); Jacewitz, Unal and Wu (2021); Cetorelli and Prazad (2024); Caglio, Copeland and Martin (2021)

- REITs and CRE crisis - Mei and Saunders (1995); Cole and White (2012); Gupta et al. (2022); Jiang, Matvos, Piskorski and Seru (2023); Glancy and Kurtzman (2022)

Background

Credit Lines

What is a credit line?

- Lender commits to provision of credit at pre-arranged terms (interest rate etc.)
- Borrower decides if and when to use the provided credit ("drawdown")
- Borrower decides when to repay the provided credit

Credit Lines

What is a credit line?

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- Borrower decides if and when to use the provided credit ("drawdown")
- Borrower decides when to repay the provided credit

How do drawdowns affect banks?

- Credit line commitments are reported "off-balance sheet"
- When credit lines are drawn, it becomes a loan on the bank's balance sheet
- Banks have to finance these loans - both with liqudity and capital
- If there are correlated drawdowns (like during COVID-19), it may put pressure on bank balance sheets and affect bank performance

Background - REITs

- Real Estate Investment Trust (REIT) invest in properties (equity REIT) or mortgages (mREIT)
- More than 95% of REIT investments ($4 trillion) are in commercial real estate
- **Special**: Need to distribute min. 90% of profits as dividends $\rightarrow$ hard to build cash buffers $\rightarrow$ depend on CL for liquidity

Data

- Borrower credit line issuance - Refinitiv Loan Connector (DealScan)
- Borrower credit lines commitment and usage- CapitalIQ
- Borrower financial information - Compustat
- Bank balance sheets - FR Y-9C
- Stock prices and indices - CRSP
- **Sample** - Public firms from 2005Q1 to 2022Q4

Summary statistics - Firm Characteristics

	Equal-Weighted			Value-Weighted		
	REIT	Financial Ex-REIT	Non-financial	REIT	Financial Ex-REIT	Non-financial
Log(Assets in mil.)	8.16	9.05	7.90	9.48	12.14	10.84
Debt/Equity	2.00	1.90	1.11	3.22	4.59	1.45
Cash/Assets	0.03	0.12	0.08	0.03	0.13	0.09
Liquidity/Assets	-0.01	0.07	0.04	-0.01	-0.01	0.03
Short Term Debt Ratio	0.09	0.22	0.15	0.08	0.37	0.16
Debt Issuance/Assets	0.14	0.11	0.14	0.14	0.03	0.07
Share Unrated	0.10	0.23	0.74	0.05	0.06	0.08
Average Rating	3.22	2.76	3.14	2.71	1.59	2.22
Observations	1211	1782	48958	1205	1708	15214

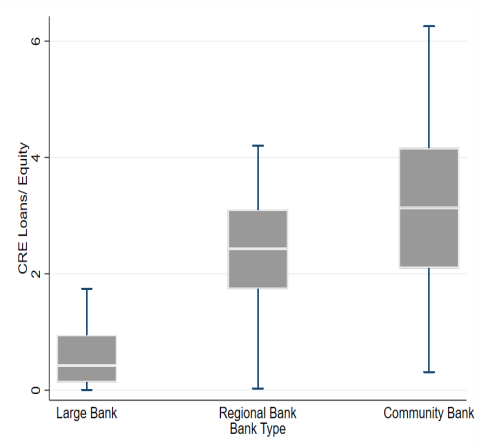
- REITs have lower cash, short-term debt, liquidity levels; are more likely to be rated

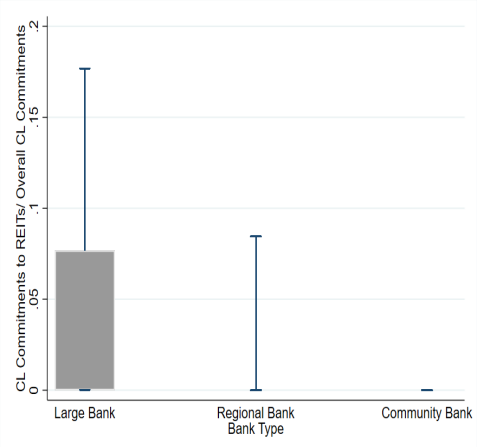
Summary statistics - Credit Line Characteristics

	Equal-Weighted			Value-Weighted		
	REIT	Financial Ex-REIT	Non-financial	REIT	Financial Ex-REIT	Non-financial
Loan Size (mil.)	594.07	722.04	343.27	1,172.46	1,480.41	1,794.36
Drawn spreads (bps)	169.40	167.96	239.99	149.78	131.02	137.03
Undrawn spreads (bps)	26.35	24.52	31.49	22.48	16.66	18.23
Maturity (months)	42.93	40.22	47.98	44.30	37.40	44.88
Financial Covenanats	0.60	0.42	0.22	0.63	0.20	0.37
General Covenanats	0.23	0.26	0.14	0.20	0.04	0.14
Observations	1211	1782	48958	1205	1708	15214

• REITs have larger credit lines, lower spreads and maturity compared to non-financial borrowers

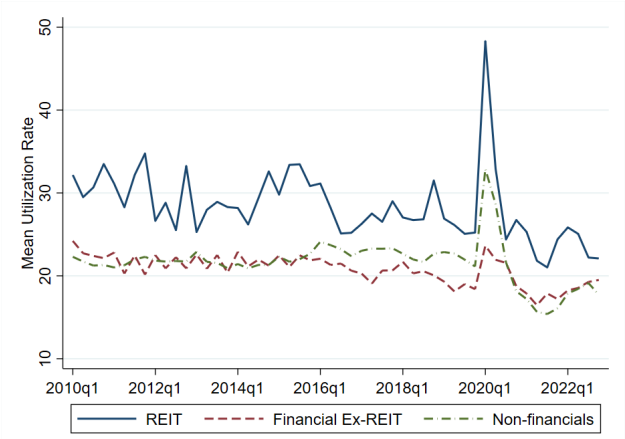
CRE Exposure by Bank Type - Distribution





Firm Drawdown Behavior

Differential drawdowns of REITs



- REITs draw down more than non-financial corporations on average
- REITs have other spikes and cyclicality as well

Differential drawdowns of REITs

	All	AAA-A	BBB	Non-IG	Unrated
Number of REITs in a quarter	92.55	6.92	46.13	27.07	125.05
REIT - Total CL commitments ($ mil.)	634.14	2,089.38	996.33	725.87	412.33
REIT - Avg. Utilization (%)	29.87	8.15	20.89	26.37	34.97
REIT - Wt. Avg. Utilization (%)	28.19	11.91	23.17	31.29	32.96
Number of Financial Ex-REIT in a quarter	830.53	56.07	75.59	39.22	964.78
Financial Ex-REIT - Total CL commitments ($ mil.)	553.32	2,639.54	1,574.40	932.02	285.11
Financial Ex-REIT - Avg. Utilization (%)	21.58	11.02	17.64	23.25	22.62
Financial Ex-REIT - Wt. Avg. Utilization (%)	22.37	13.92	20.11	32.76	27.83
Number of Non-financials in a quarter	1,647.47	141.02	293.43	546.37	2,218.80
Non-financial - Total CL commitments ($ mil.)	496.01	1,780.32	1,369.49	571.78	229.72
Non-financial - Avg. Utilization (%)	22.47	5.20	10.04	19.40	26.79
Non-financial - Wt. Avg. Utilization (%)	17.00	3.25	9.89	26.16	24.26

- REIT utilization higher than financial and non-financial borrowers across rating categories

Differential drawdowns of REITs

	All	AAA-A	BBB	Non-IG	Unrated
REIT - Utilization (%) - normal times	28.77	6.99	19.98	25.52	33.94
REIT - Utilization (%) - GFC	38.04	20.43	27.18	32.05	41.81
REIT - Utilization (%) - Covid-19	48.30	24.04	43.88	56.29	51.36
Financial Ex-REIT - Utilization (%)- normal times	21.14	10.31	16.48	22.88	22.26
Financial Ex-REIT - Utilization (%) - GFC	25.30	16.29	29.19	25.80	25.69
Financial Ex-REIT - Utilization (%) - Covid-19	23.64	9.44	22.50	29.75	24.26
Non-financial - Utilization (%) - normal times	21.73	4.37	8.90	18.23	26.35
Non-financial - Utilization (%) - GFC	27.24	12.38	19.08	27.06	29.33
Non-financial - Utilization (%) - Covid-19	32.89	12.48	18.43	39.62	35.30

- REIT utilization consistently higher during both normal and crisis times

Differential drawdowns of REITs

	Utilization Rate (%)				
	(1)	(2)	(3)	(4)	(5)
REIT	7.606***	8.063***	8.069***	8.001***	9.486***
	(0.276)	(2.232)	(2.234)	(2.240)	(2.851)
Rating FE	N	Y	Y	N	N
Rating Group FE	N	N	N	Y	Y
Year-Quarter FE	N	N	Y	Y	Y
Sample					2010-2019
Obs.	246,872	182,384	182,384	182,384	105,348
R^2	0.003	0.171	0.180	0.177	0.188

- REITs have higher utilization rate compared to non-REIT borrowers

Differential drawdowns of REITs

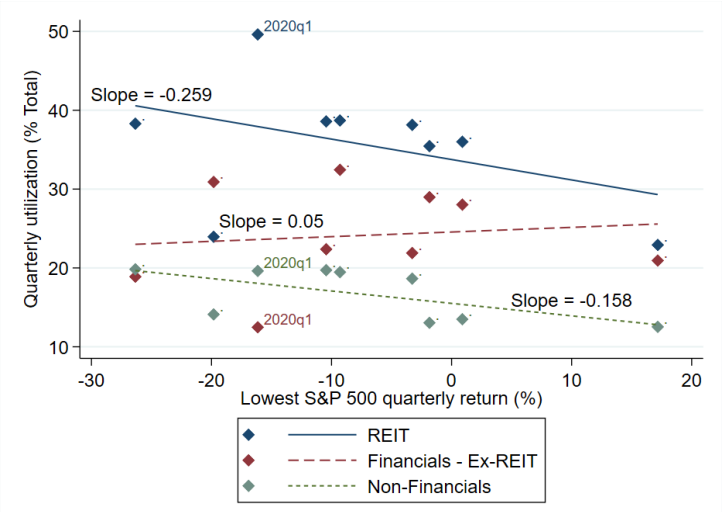
	Utilization Rate (%)				
	(1)	(2)	(3)	(4)	(5)
REIT	7.606***	6.689***	6.690***	6.609***	7.871***
	(0.276)	(2.215)	(2.217)	(2.222)	(2.826)
Financial Ex-REIT		−6.587***	−6.590***	−6.584***	−8.222***
		(0.724)	(0.723)	(0.724)	(0.883)
Rating FE	N	Y	Y	N	N
Rating Group FE	N	N	N	Y	Y
Year-Quarter FE	N	N	Y	Y	Y
Sample					2010-2019
Obs.	246,872	182,384	182,384	182,384	105,348
R^2	0.003	0.177	0.186	0.184	0.198

- Higher utilization of REITs not representative of other financial borrowers

Differential drawdowns of REITs as a function of stock performance

	Utilization Rate (%)		
	(1)	(2)	(3)
REIT	7.308***	6.947***	7.351***
	(1.457)	(1.618)	(1.456)
REIT x S&P 500 return	-1.549***		
	(0.559)		
REIT x Positive S&P 500 return		-0.788	
		(1.218)	
REIT x Negative S&P 500 return		-1.892**	
		(0.867)	
REIT x VIX			1.993***
			(0.711)
Controls	Y	Y	Y
Rating Group FE	Y	Y	Y
Year-Quarter FE	Y	Y	Y
Obs.	187,470	187,470	187,470
R^2	0.172	0.172	0.172

Utilization rates of REITs vs other borrowers in crises



Differential drawdowns of REITs - demand vs. supply

	Utilization Rate (%)		
	(1)	(2)	(3)
REIT	6.447***	7.302***	7.420***
	(1.667)	(1.459)	(1.457)
REIT x Sub-sector return	-1.424*		
	(0.731)		
REIT x EBP		-0.206	
		(0.808)	
REIT x ELP			0.630
			(0.868)
Controls	Y	Y	Y
Rating Group FE	Y	Y	Y
Year-Quarter FE	Y	Y	Y
Obs.	126,810	187,470	182,652
R^2	0.155	0.172	0.171

- Utilization appears to be driven by sector performance rather than tight credit supply

Take-Aways

- REITs draw down more than other firms, in general
- Higher draw down specific to REITs (not symbolic of financial borrowers)
- REITs are more sensitive to market stress and have greater sensitivity to their own performance compared to non-financial firms

Economics of REIT Drawdowns

Why do REITs Drawdown? Case Study - Redemptions

- BREIT - assets in excess of 100 billion USD
- 2022 - high interest rates, low investor trust - large redemptions from BREIT
- To satisfy redemptions, BREIT limited redemptions to 2% NAV per month + drew down credit lines
  - 1.1 billion USD in 2022Q1, over 3.8 in 2022Q2 and 5 billion USD in 2022Q3, to 6.3 billion USD in 2022Q4
- Same time, committed credit increased from roughly 7.5 billion USD in 2022Q2 to 12 billion USD in 2022Q4 with Citigroup being the main financier and Bank of America, Deutsche Bank and Wells Fargo in syndicate
- Interestingly, no change in credit spreads

Why do REITs Drawdown? Case Study - Redemptions

- SREIT - $25 billion in assets
- Hit with $1.3 billion in withdrawal requests in 2024Q1 + new fundraising dwindled from $600 million a month in first half of 2022 to less than $15 million a month
- Liquidity dropped - from $2.2 billion at the end of 2022 to $1.1 billion at the end of 2023 and $752 million as of April 2024
- SREIT tapped into lines of credit - entered 2023 without having tapped its $1.55 billion credit line, but by May 2024, SREIT only had about $225 million of undrawn commitment left to utilize

Why do REITs Drawdown? - Redemptions

	Δ Drawn CL Volume				
	(1)	(2)	(3)	(4)	(5)
Δ Shareholder Equity	-0.330**	-0.407**	-0.381**	-0.441**	-0.443**
	(0.160)	(0.178)	(0.174)	(0.199)	(0.209)
REIT FE	N	Y	Y	Y	Y
Year-Quarter FE	N	N	Y	Y	Y
Controls	N	N	N	Y	Y
Controls x Crisis	N	N	N	N	Y
Obs.	6,589	6,583	6,583	2,388	2,388
R^2	0.003	0.026	0.057	0.128	0.129

How do REITs use Credit Lines?

	Investments($)				
	(1)	(2)	(3)	(4)	(5)
	h=0	h=1	h=2	h=3	h=4
Drawdown (in USD) in t	0.301***	0.291***	0.393***	0.431***	0.366***
	(0.000)	(0.001)	(0.000)	(0.000)	(0.003)
Drawdown (in USD) in t x Crisis	-0.247*	-0.216	-0.362*	-0.413*	-0.337
	(0.099)	(0.198)	(0.059)	(0.067)	(0.217)
Firm FE	Y	Y	Y	Y	Y
Year-Quarter FE	Y	Y	Y	Y	Y
Obs.	12,226	11,870	11,493	11,241	10,863
R^2	0.078	0.122	0.164	0.199	0.232

How do REITs use Credit Lines?

Cash and Cash Equivalents($)

	(1)	(2)	(3)	(4)	(5)
	h=0	h=1	h=2	h=3	h=4
Drawdown (in USD) in t	-0.0589	-0.0533**	-0.00592	-0.0115	-0.0199
	(0.158)	(0.016)	(0.780)	(0.751)	(0.385)
Drawdown (in USD) in t x Crisis	0.712***	0.347***	0.149	0.113	0.0838
	(0.000)	(0.000)	(0.147)	(0.270)	(0.345)
Firm FE	Y	Y	Y	Y	Y
Year-Quarter FE	Y	Y	Y	Y	Y
Obs.	12,588	12,243	11,876	11,561	11,240
R^2	0.276	0.324	0.367	0.398	0.422

How do REITs use Credit Lines?

Total Dividend Payout($)

	(1)	(2)	(3)	(4)	(5)
	h=0	h=1	h=2	h=3	h=4
Drawdown (in USD) in t	0.00748**	-0.000588	-0.00179	-0.000407	0.00219
	(0.047)	(0.848)	(0.581)	(0.874)	(0.474)
Drawdown (in USD) in t x Crisis	0.0202**	-0.00743	-0.0119	-0.0161*	-0.0139
	(0.022)	(0.658)	(0.163)	(0.073)	(0.167)
Firm FE	Y	Y	Y	Y	Y
Year-Quarter FE	Y	Y	Y	Y	Y
Obs.	12,375	12,016	11,648	11,319	11,004
R^2	0.209	0.223	0.236	0.216	0.267

How do REITs use Credit Lines?

Short-term Debt($)

	(1) h=0	(2) h=1	(3) h=2	(4) h=3	(5) h=4
Drawdown (in USD) in t	0.196**	0.145**	0.133***	0.0352	0.0860*
	(0.028)	(0.045)	(0.002)	(0.363)	(0.056)
Drawdown (in USD) in t x Crisis	0.0317	-0.187	-0.0571	-0.0902	-0.144
	(0.897)	(0.521)	(0.830)	(0.157)	(0.387)
Firm FE	Y	Y	Y	Y	Y
Year-Quarter FE	Y	Y	Y	Y	Y
Obs.	2,729	2,570	2,393	3,954	2,203
R^2	0.245	0.307	0.377	0.343	0.396

Takeaways

- REITs appear to drawdown to satisfy investor withdrawals
- In normal times, REITs use credit lines to buy property - 30c per 1$ used to finance investments; dividends increase slightly; credit line utilization coincides with reduction in cash and increased short term debt
- In crisis, REITs use credit lines to build cash buffers - 70c per 1$ goes to cash and they do not acquire properties
- Suggests that credit lines are not really serving as a way to stabilize property prices

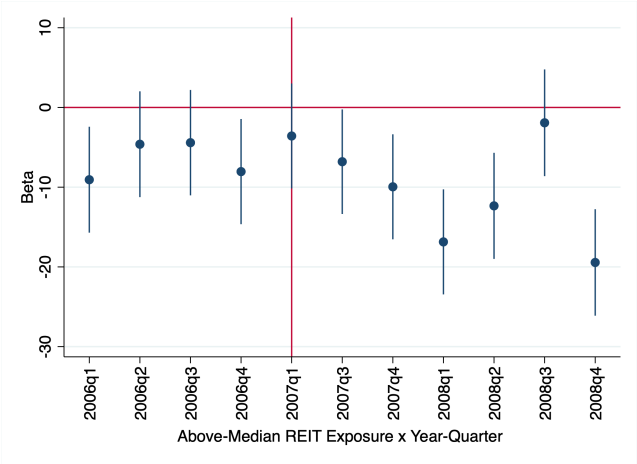
Impact on Banks

Effect on banks

	Quarterly bank stock returns (%)			
	(1)	(2)	(3)	(4)
REIT CL Exposure (std.)	0.0842	0.187	0.169	0.212
	(0.78)	(1.45)	(1.25)	(1.55)
REIT CL Exposure (std.) x Crisis	-1.460***	-1.456***	-1.425***	-1.392***
	(-3.43)	(-3.02)	(-2.91)	(-3.01)
Non-REIT CL Exposure (std.)		-0.481**	-0.475**	-0.382**
		(-2.60)	(-2.55)	(-2.09)
Non-REIT CL Exposure (std.) x Crisis		-0.0111	-0.0124	-0.321
		(-0.03)	(-0.03)	(-0.89)
CRE Exposure (std.)				0.816***
				(3.81)
CRE Exposure (std.) x Crisis				-2.419***
				(-5.46)
Controls	Y	Y	Y	Y
Fama-French 3 Factor	Y	Y	Y	Y
Obs.	9,014	9,014	9,014	9,014
R^2	0.482	0.483	0.483	0.486

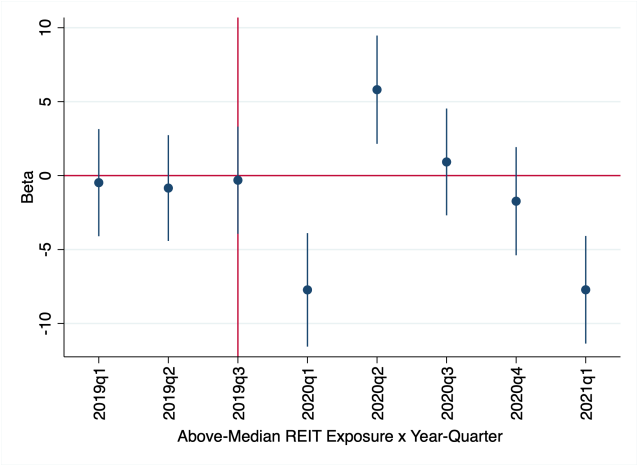
Bank Performance by REIT Exposure - GFC

$$\text{BankStockReturn}_{it} = \beta_{it}\text{High REIT CL Share}_i \times \mathbf{1}_t + X_{it} + \alpha_i + \gamma_t + \epsilon_{it},$$



Bank Performance by REIT Exposure - COVID-19

$$\text{BankStockReturn}_{it} = \beta_{it}\text{High REIT CL Share}_i \times \mathbf{1}_t + X_{it} + \alpha_i + \gamma_t + \epsilon_{it},$$



Pass-through to and effect on banks

Take-Aways:

- Banks with higher REIT exposure face higher drawdowns
- Banks with higher REIT exposure suffer more in crisis times
- This effect goes beyond the general systemic/aggregate drawdown risk
- This effect goes beyond the general CRE exposure risk

Credit Line Pricing

	All in drawn spread (bps)				
	(1)	(2)	(3)	(4)	(5)
REIT	-22.94***	-17.49***	-7.670**	-11.38***	-33.37***
	(0.000)	(0.000)	(0.016)	(0.000)	(0.000)
Constant	188.2***	185.9***	180.4***	221.7***	187.0***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Rating Group FE	N	Y	Y	Y	Y
Lender x Year-Quarter FE	N	N	Y	Y	Y
Controls	N	N	N	Y	Y
Controls x REIT	N	N	N	N	Y
Obs.	16,980	16,980	13,232	13,141	13,141
R^2	0.006	0.149	0.554	0.573	0.574

Systemic Implications

SRISK

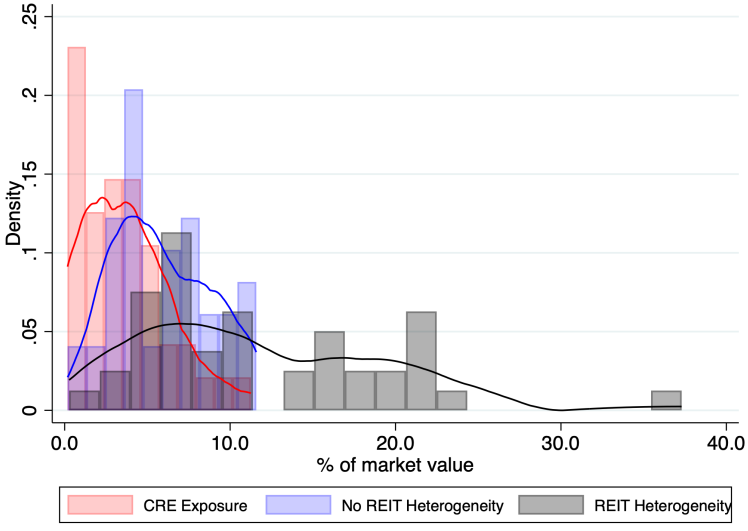
How to incorporate the risk from REIT CIs into bank stress tests and quantify its impact?

- Adapt SRISK methodology and simulate a 40% market downturn Details
- Multiply bank-specific exposure values as of 2022Q4 and coefficients from bank stock return regression Details
- Contrast impact of credit line business in general, the relevance of REITs as a borrower class and the impact of direct on-balance sheet CRE exposure Parameters

SRISK (absolute values)

Bank (Group)	$SRISK^{Baseline}$	$SRISK^{LRMES}$ No Heterogeneity	$SRISK^{LRMES}$ REIT Heterogeneity	$SRISK^{LRMES}$ CRE Exposure
JPMORGAN CHASE & CO.	65.8	16.2	27.7	1.9
BANK OF AMERICA CORPORATION	77.5	15.9	27.7	2.1
WELLS FARGO & COMPANY	39.8	12.2	21.5	3.0
GOLDMAN SACHS GROUP, INC., THE	49.9	4.8	8.3	0.3
MORGAN STANLEY	11.3	4.9	8.9	0.5
All banks (N = 43)	464.6	97.3	179.6	24.0
Large banks (N = 21)	464.8	90.3	163.1	17.6
Regional banks (N = 22)	-0.2	7.0	16.5	6.4

SRISK - Bank-level market impact results (distribution)



Conclusion and Outlook

- Banks are exposed to (systemic) risks through credit lines to NBFIs
- CRE crisis can impact banks through their CL exposure to REITs – borrowers who are very sensitive to financial stress
- This correlated drawdown risk stemming from REITs for large banks seems to have been ignored in recent discussions in the press and by policymakers
- The systemic risk stemming from CL to REITs is a multiple of the risk stemming from direct CRE exposure
- General implication: through the provision of liquidity insurance, the risk of the shadow banking sector always touches the feet of the banking sector

Appendix

SRISK Methodology – standard

$$SRISK_{i,t} = E[K(Debt + Equity) - Equity | Crisis]$$
$$= \text{K Debt}_{i,t} - (1 - K)(1 - LRMES_{i,t})Equity_{i,t}$$

- *Crisis* is taken to be a scenario where the S&P 500 falls by 40% over the next six months
- $Debt_{i,t}$ is the nominal on-balance-sheet debt of bank i's liabilities
- $Equity_{i,t}$ is bank i's market value of equity at time t
- $LRMES_{i,t}$ is the Long Run Marginal Expected Shortfall if bank i at time t, approximated in Acharya, Engle and Richardson (2012) as $1 - e^{-18 \cdot MES}$, where MES is the one-day loss expected in bank i's return if market return is below -2%
- K is an assumed required market-value of equity to quasi-market-assets capital ratio of 8%

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SRISK Methodology – increments

We add two **incremental** elements:

1. $IncrementalSRISK_{i,t}^{CL} = K \times E[Utilization^{REIT}|Crisis] \times UnusedCommitments_{i,t}^{REIT}$
$+ \text{K} \times E[Utilization^{Non-REIT}|Crisis] \times UnusedCommitments_{i,t}^{Non-REIT}$
describes the additional capital needed when committed credit becomes on-balance sheet credit

2. $IncrementalSRISK_{i,t}^{LRMES^C} = (1 - K) \times Equity_{i,t} \times$
-0.4 $\times[\gamma^{REIT} \times REIT\ \ Commitments_{i,t} + \gamma^{Non-REIT} \times Non - REIT\ \ Commitments_{i,t}]$
describes the loss in banks' market valuation through CL exposure in a crisis (same formula can be used to describe the loss due to CRE exposure) Go back

SRISK Methodology – parameters

$E[Utilization^{REIT} \mid Crisis]$	$E[Utilization^{Non-REIT} \mid Crisis]$	γ^{REIT}	$\gamma^{Non-REIT}$
0.448	0.294	10.52	10.28
$E[Utilization^{All} \mid Crisis]$		γ^{All}	γ^{CRE}
0.301		7.04	7.24

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