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Liquidity Insurance vs. Credit Provision: Evidence from the Covid-19 Crisis

Columbia University/Bank Policy Institute
February 12, 2021

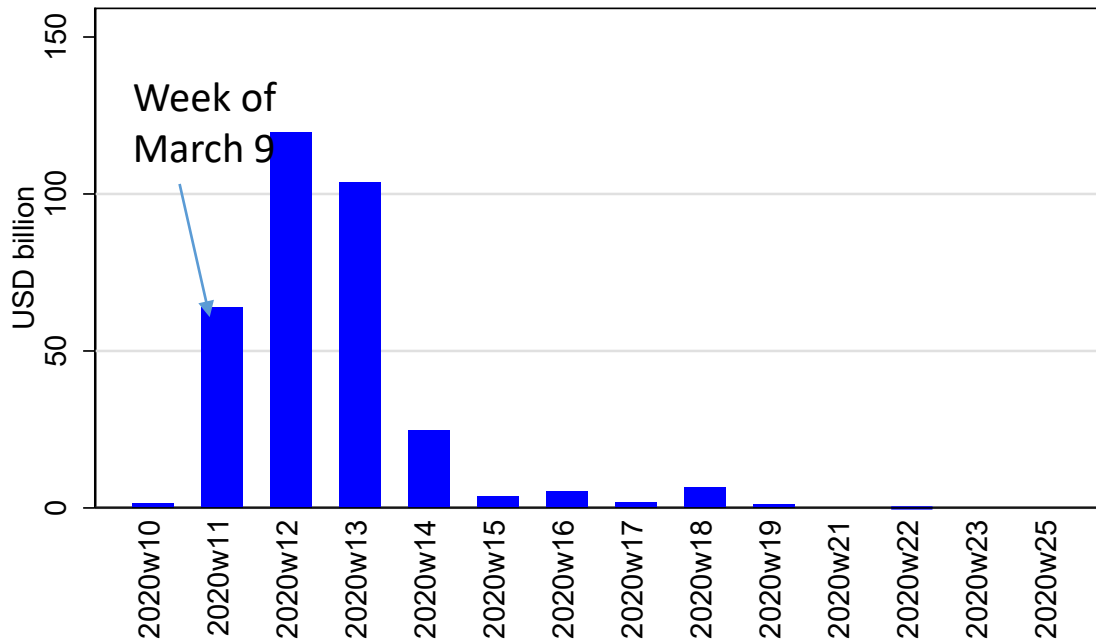
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Motivation



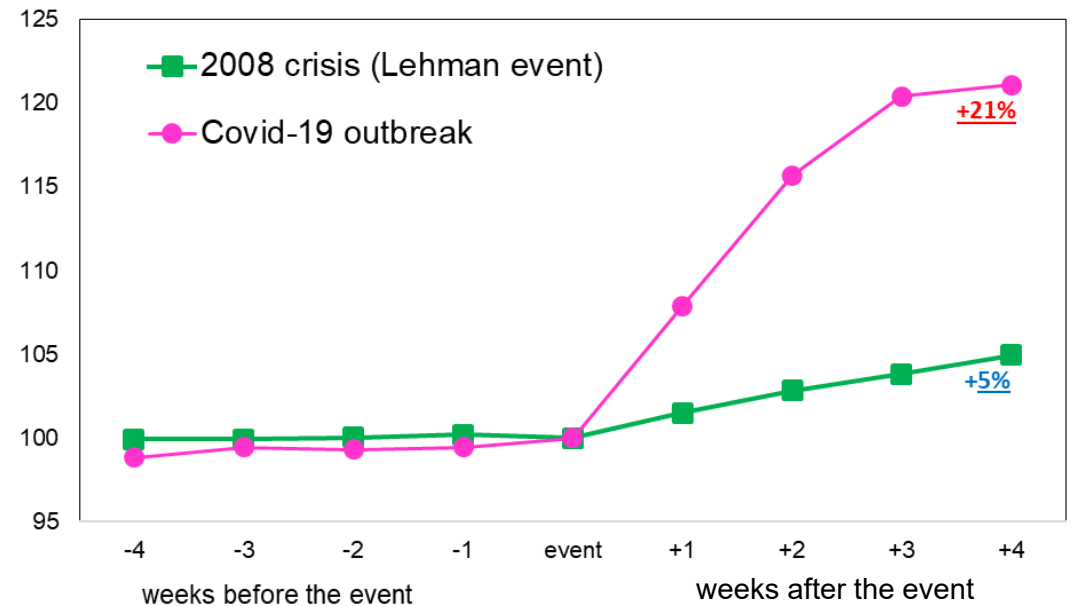
- As firms faced cash pressures in the early phase of the Covid-19 crisis, banks experienced a surge in credit line drawdowns (CLDDs).
- CLDDs were large by historical standards, well exceeding GFC levels.

Credit Line Drawdowns reported by S&P
2 March 2020-30 June 2020



Source: S&P Global Intelligence.
Dataset covers mostly public U.S. firms and some private firms that file 8-K forms with the Securities and Exchange Commission.

Normalized C&I Loans around 2008 and Covid-19 Crises



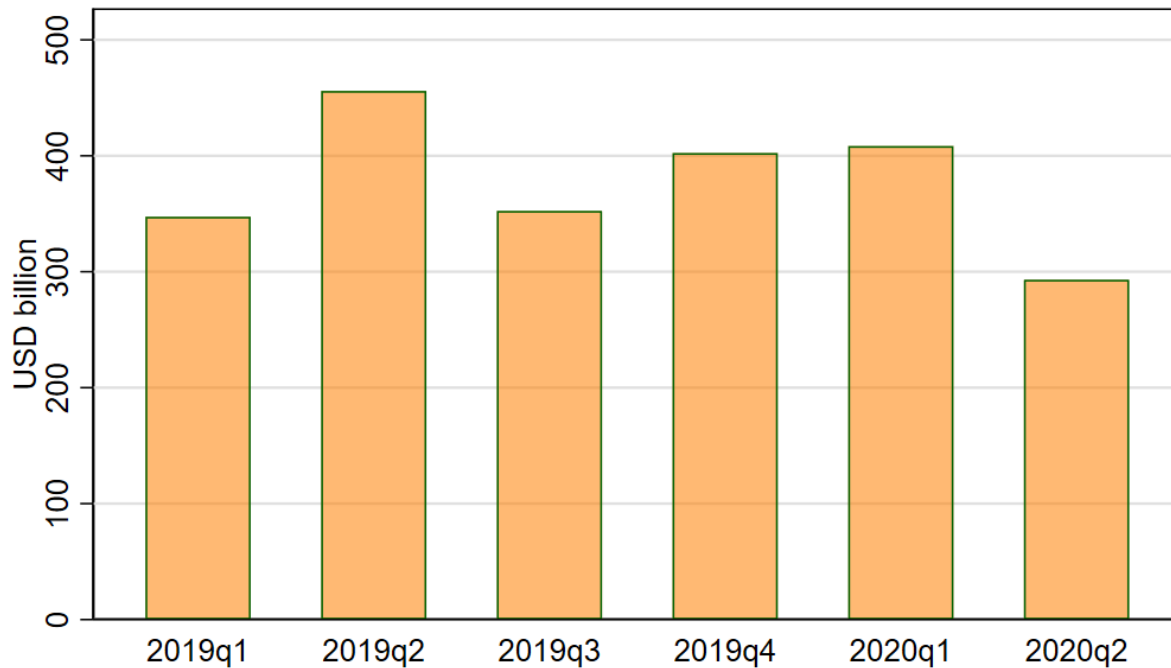
The Lehman event (2008) crisis is centered on 9/17/2008 while the Covid-19 outbreak is centered on 3/11/2020 (declaration of national emergency). Source: Federal Reserve's "Assets and Liabilities of Commercial Banks in the United States" (FR2644, H8 data release).

Motivation



- Banks met these drawdowns, fulfilling their liquidity insurance function.
- But bank credit has declined, and lending standards have tightened.

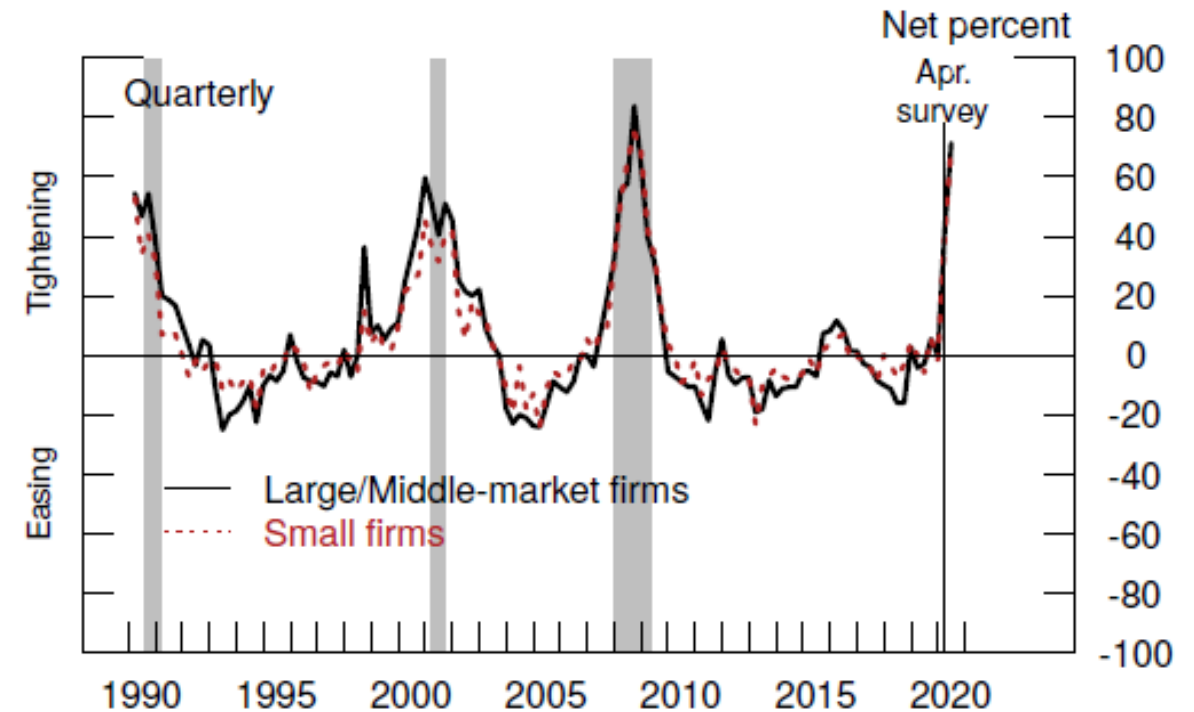
Total New Syndicated Loans
2019Q1-2020Q2



Loans originated by U.S. banks to U.S. borrowers.

Source: Authors' calculations using Dealscan and Hale-Kapan-Minoiu (2019).

Standards for C&I Loans



Source: Senior Loan Officer Opinion Survey.



Through which channels can CLDDs make banks more cautious in lending decision?

- **Liquidity drain**
 - Loans need to be funded
- **Reduction in capital ratios**
 1. Increase in RWA and reduction in capital ratios
 - Moving CLs from off- to on-balance sheet increases risk weights and reduces capital ratios
 2. Increase in balance sheet size reduces the leverage ratio
- Changes in the risk profile of the borrowers drawing down their CLs
- Potential for future losses, hence **higher risk aversion**

Research Questions



- What is the impact of CLEs on banks' lending decisions vis-à-vis business borrowers?
 - On the supply of new loans
 - Intensive vs. extensive margin
 - Large business loans vs. small business loans
 - On the standards and terms of new business loans
 - On participation in government-sponsored credit subsidy programs
- What are the precise mechanisms?

Evidence from Three Analyses



Drawing on the following data sets on global and U.S. banks' lending decisions during the pandemic:

1. Syndicated Loans: Refinitiv DealScan at the loan level

Global database of large (syndicated) commercial loans (Q2 2020)

2. Lending Standards and Terms: Survey of U.S. Bank Loan Officers (SLOOS)

at the bank-level: four surveys (Q1-Q4 2020)

3. Government credit support programs

- **Paycheck Protection Program (PPP)** at the loan level (Q2 2020)
- **Main Street Lending Program (MSLP)** at the bank level (Q3-Q4 2020)

Additionally: Fitch Connect (Fitch Solutions) and U.S. Call Reports for bank financials

The Evidence Covers Entire U.S. Bank Loan Market

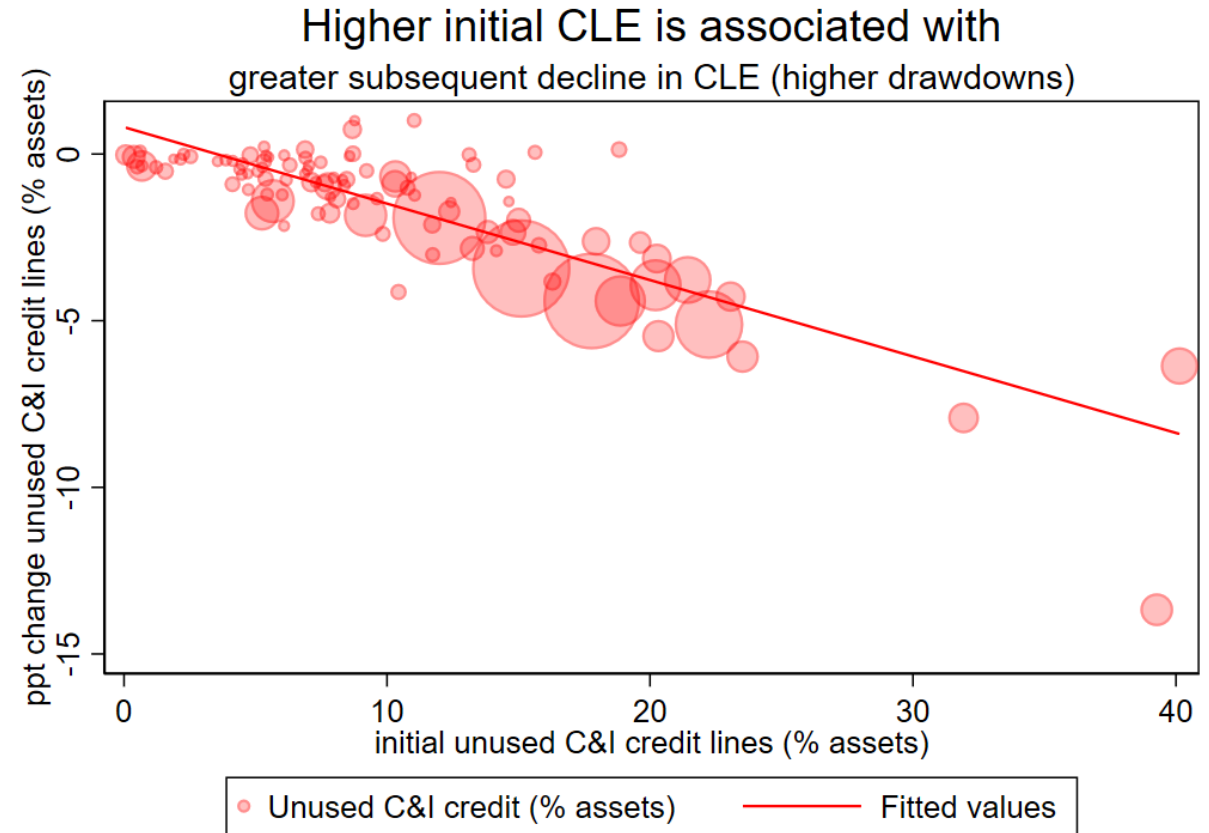


	Large banks	Small banks
Large firms	Syndicated loans (Dealscan) SLOOS surveys MSLP	MSLP
Small firms	SLOOS surveys PPP MSLP Small loan credit registry (confidential)	PPP MSLP

Bank Exposure to CLDDs



- We need a measure of **potential** exposure to CLDDs once the outbreak begins and unexpected draws start (measured *ex-ante*)
 - *Ex-post* draws could be partially endogenous
- **Credit Line Exposure (CLE)**
 - For each bank: keep CLs originated during 2016-2019 (in Dealscan) and still outstanding as of end-March 2020, scale by total assets
 - CLEs are sizeable with much variation across banks (8% for GSIBs vs. 3.3% for non-GSIBs; 14.7% for US banks vs. 0.5% for Chinese banks)
 - Strongly correlated with ex-post CLDDs



The chart shows a scatterplot and linear fitted line for the link between ex-ante CLEs measured as the unused C&I credit lines (% assets) in 2019Q4 and the change in variable during 2019Q4-2020Q1 – capturing the actual credit line draws over the period. Sample: 506 banks. Source: U.S. Call Report.



Evidence from Syndicated Loans: Intensive margin

Banks' credit lines exposures and the intensive margin of lending

Dep. Var.: Growth rate of average loan volume between 2019 and 2020:Q2

	(1) GSIBs	(2) GSIBs	(3) GSIBs
Credit line exposure (CLE)	-3.5721*** (0.995)	-2.0808** (1.006)	
CLE * U.S. bank			-4.0007*** (1.136)
CLE * non-U.S. bank			-1.3388* (0.734)
Bank controls	Yes	Yes	Yes
Firm cluster FE		Yes	Yes
Observations	1,949	1,797	1,797
R-squared	0.020	0.669	0.670

Dependent variable: growth rate of average lending volume in the after vs. before period. Bank controls include: size (log-assets), Tier 1 capital ratio, ROA, and loan-to-asset ratio. The sample contains 30 GSIBs and 267 borrowers (country-industry clusters). Industries are based on 3-digit SIC classification. Standard errors clustered on bank. Sources: Refinitiv's Dealscan, Fitch Connect, S&P, Bloomberg.

- Higher CLEs are associated with a lower growth rate of lending during 2020:Q2
- Col 2: A 5.7 ppt increase in CLE (st.dev.) leads to loan growth rate decline of close to 12 ppts
- Results are
 - Stronger for banks with CL portfolios more exposed to COVID-affected industries
 - Similar for the extensive margin: higher CLEs are associated with lower probability of new loan extension and renewals, and lower probability of new relationship formation
- Results are robust to:
 - Individual firm fixed effects
 - Defining the CLEs on shorter window
 - Changing the before/after time periods
 - Controlling for energy exposures

Evidence from U.S. Loan Officers' Opinions



- Bring together data from April and July 2020 **SLOOS** surveys
 - Inquire about banks' changes in C&I lending standards and terms over previous quarter
 - Match SLOOS respondents with Dealscan and Call Reports (N=75 U.S. banks)
- Use the following survey questions:
 - **Lending standards:** *Over the past three months, how have your bank's credit standards for approving applications for C&I loans or credit lines changed?*
 - **Loan terms:** *For applications to C&I loans or credit lines that your bank is currently willing to approve, how have the terms of these loans changed over the past three months?*
 - Separate questions for loans to large vs. small firms
 - **Demand for loans:** *Apart from seasonal variation, how has demand for C&I loans changed over the past 3 months? (Please only consider funds actually disbursed as opposed to requests for new or increased lines of credit.)*
 - Control variable in (bank-level) regressions

Evidence from the SLOOS: Lending standards



Dep. Var.: Dummy for banks that report tightening lending standards for approving C&I loan applications

	(1) 2020:Q1	(2) 2020:Q2	(3) 2020:Q3	(4) 2020:Q4
To large firms				
Credit line exposure (CLE)	0.0042** (0.002)	0.0013 (0.002)	-0.0019 (0.001)	-0.0003 (0.001)
Observations	44	48	45	47
R-squared	0.166	0.068	0.277	0.213
To small firms				
Credit line exposure (CLE)	0.0064*** (0.002)	0.0061*** (0.002)	0.0041* (0.002)	0.0023 (0.002)
Observations	42	45	42	43
R-squared	0.360	0.555	0.159	0.342
Bank controls, incl. demand	Yes	Yes	Yes	Yes

Dependent variable: Dummy variable taking value 1 if the bank responded that they tightened somewhat or significantly in response to the questions about changes in lending standards on C&I loans over the past quarter. Bank controls include: size (log-assets), Tier 1 capital ratio, ROA, loan-to-asset ratio, and a dummy variable for banks that reported increasing loan demand. The sample contains 75 SLOOS respondents matched to Dealscan. Regression results weighted by bank size. Standard errors clustered on bank. Source: Federal Reserve Senior Loan Officer Opinion Survey, Dealscan.

- Higher CLEs are associated with greater likelihood of reporting tighter standards on C&I loans, especially for smaller firms
- Col 1, top and bottom coefficients: A 35 ppt increase in CLE (st.dev.) raises the likelihood of tightening standards on C&I loans
 - to large firms: by 14.7% and to small firms by 22.4% (40% and 72% of the mean)
- Results are Similar for the terms of loans: higher CLEs predict relatively stronger tightening of loan terms to small firms (maximum size of CLs, maturity, covenants and collateral requirements)

Evidence from Government Credit Support Programs



- The PPP is a large-scale grant-giving program funded by Congress, which deployed \$525 billion in \$100k loans (on average) to 5.2 million small businesses (< 500 employees), to maintain payroll during pandemic
- **Risks? PPP loans are a very low-risk product, but not entirely risk-free**
 - Complex application process for forgiveness
 - Some loans may not be eligible for forgiveness and written off
 - poor documentation and self-certification, banks are liable for underwriting errors (audit risk)
 - fraud risk

- The MSLP is a credit support program (Treasury/Fed) targeting small and mid-sized businesses (< 15,000 employees) that were sound before the pandemic and in temporary distress; deployed \$16bn.
- **Risks?**
 - **Credit risk:** Banks retain only 5% of credit risk, but borrowers must meet strict eligibility criteria
 - Borrower criteria: good overall financial standing (“pass” rating), maximum leverage
 - **Uncertainty about loss-sharing** with the MSLP if borrower defaults (September 2020 SLOOS)

Results from Paycheck Protection Program (PPP)



Banks' credit line exposures and PPP lending

Dep. Var.: Log(loan amount)

	(1)	(2)	(3)
Credit line exposure (CLE)	-0.0014*** (0.000)	-0.0013*** (0.000)	-0.0014*** (0.000)
Bank entity type dummies	Yes	Yes	Yes
Bank controls	Yes	Yes	Yes
Borrower state	Yes	Yes	Yes
Borrower industry	Yes	Yes	Yes
Borrower state X week		Yes	Yes
Borrower industry X week		Yes	Yes
Borrower state X industry X week			Yes
Observations	255,286	255,260	245,123
R-squared	0.297	0.320	0.374

Data is at the bank-state-industry-week level, for 384 banks lending to firms in all states and territories, and in 107 industries (3-digit NAICS). Dependent variable: Log(loan amount). Bank controls include: size (log-assets), Tier 1 capital ratio, loan-to-asset ratio, loan loss provisions, and net interest margins. Standard errors double clustered on bank-week. Source: U.S. Small Business Administration's PPP loan data, Refinitiv's Dealscan, Fitch Connect.

Banks' credit line exposures and probability of lending in MSLP

Dep. Var.: Dummy for banks that granted MSLP loans

	(1)	(2)	(3)	(4)
Credit line exposure (2020:Q2)	-0.0059* (0.003)		-0.0062* (0.003)	
Credit line exposure (2020:Q3)		-0.0064* (0.003)		-0.0071** (0.003)
Bank controls	Yes	Yes	Yes	Yes
Bank exposure to pandemic controls			Yes	Yes
MSLP facility fixed effects	Yes	Yes	Yes	Yes
Observations	602	603	594	594
R-squared	0.062	0.064	0.066	0.068

Data is at the bank level, for 603 banks that registered for the MSLP. Dependent variable: dummy for banks that actively granted MSLP loans among MSLP-registered banks. Bank controls include: size (log-assets), Tier 1 capital ratio, loan-to-asset ratio, C&I loan to total loan ratio, core deposits to asset ratio, and bank-level exposure to pandemic intensity (Covid-19 cases per capita and proportion of firms moderately or severely hit by pandemic). Standard errors are robust. Source: Federal Reserve Board and Federal Reserve Bank of Boston for public MSLP data (released on Jan 11 2021), Refinitiv's Dealscan, Call Report.

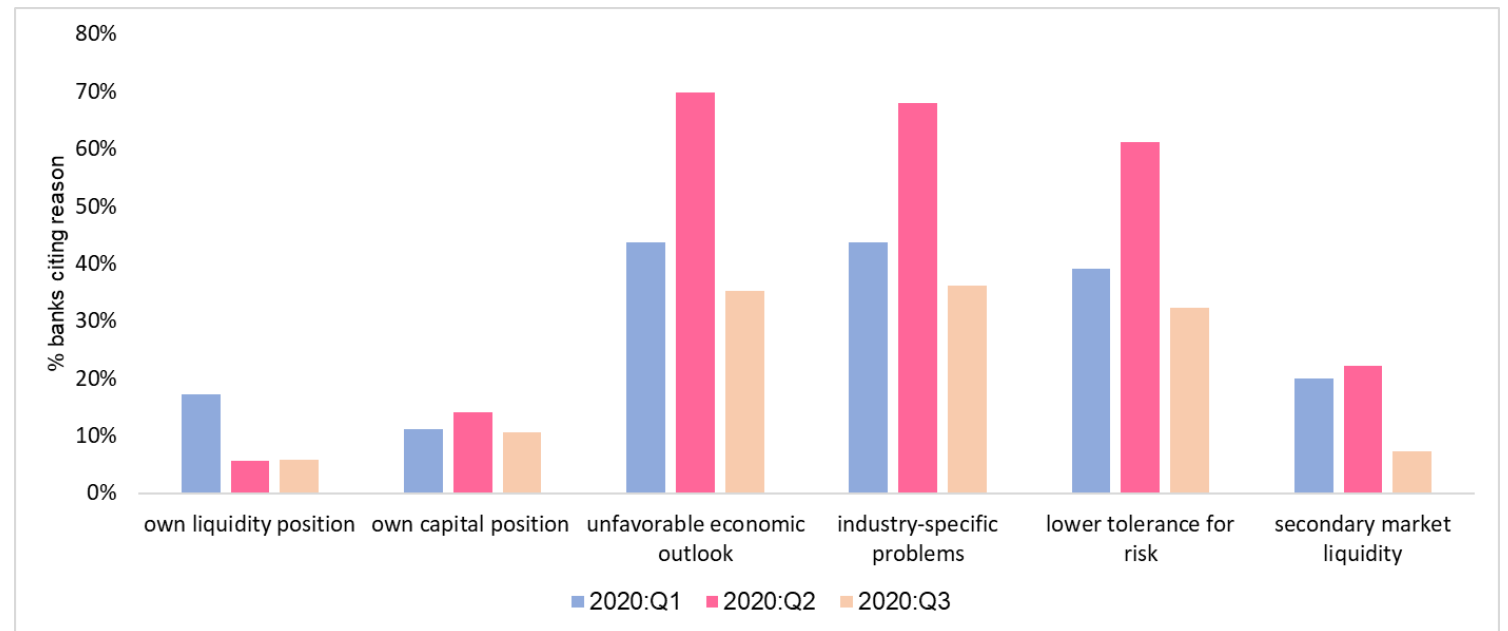


Mechanisms: Why Did Banks with More CLEs Tighten?

- Reduction in capital ratios, liquidity pressures, higher risk aversion?
- Exploit SLOOS questions about the reasons why banks tightened lending standards

Survey question: *If your bank has tightened or eased its credit standards or its terms for C&I loans or credit lines over the past three months, how important have been the following possible reasons for the change?*

- Own capital and liquidity positions
- Economic outlook
- Industry specific problems
- Risk tolerance
- Secondary market liquidity
- Etc.



The bars represent the fraction of respondents citing each factor as a somewhat or very important reason for tightening lending standards on new C&I loans or credit line approvals. Source: Federal Reserve.

Mechanisms: Regression Evidence



Banks' credit line exposures and reasons cited for tightening lending standards

Dep. Var.: Dummy for citing each reason as ****important**** for tightening decision

	(1)	(2)	(3)	(4)	(5)	(6)
	own liquidity position	own capital position	unfavorable economic outlook	industry- specific problems	lower tolerance for risk	secondary market liquidity
Credit line exposures X 2020:Q1	0.0026** (0.001)	-0.0006 (0.001)	0.0020 (0.003)	0.0016 (0.002)	0.0055*** (0.002)	0.0037*** (0.001)
Credit line exposures X 2020:Q2	0.0001 (0.000)	-0.0006 (0.000)	0.0032 (0.002)	-0.0000 (0.001)	0.0085*** (0.002)	0.0021 (0.002)
Credit line exposures X 2020:Q3	0.0000 (0.000)	-0.0012* (0.001)	0.0015 (0.003)	-0.0013 (0.001)	0.0034* (0.002)	-0.0000 (0.001)
Bank controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	129	125	128	128	129	129
R-squared	0.243	0.058	0.353	0.353	0.274	0.156

Dependent variable: Dummy variable taking value 1 if the bank responded that each reason indicated as column heading was somewhat or very important in its decision to tighten lending standards on new C&I loans over the past quarter. Bank controls include: size (log-assets), Tier 1 capital ratio, ROA, loan-to-asset ratio and a dummy variable for whether the bank cited increasing loan demand. The sample contains all the SLOOS respondents matched to Dealscan. Regression results weighted by bank size. Standard errors clustered on bank. Source: Federal Reserve Senior Loan Officer Opinion Survey, Dealscan.

Summary and Policy Implications



Banks with higher ex-ante CLEs:

1. Curtailed the supply of new syndicated loans
2. Tightened the standards and terms of new C&I loans
3. Participated less in low-risk government credit support programs

Main takeaway: CLDDs did not pose the systemic risks created by securitized products or reliance on unsecured short-term wholesale funding seen in 2008, yet they had a meaningful impact on banks' financial intermediation.

Implications for policymakers:

- Banks' off-balance sheet credit exposures deserve closer attention.
 - Revisit the stressed credit line usage assumption of the LCR under Basel III: "Banks should assume a **10%** drawdown of the undrawn portion of these credit facilities" → likely calibrated with experience from the GFC, but in reality closer to 20-30%



Annex Slides

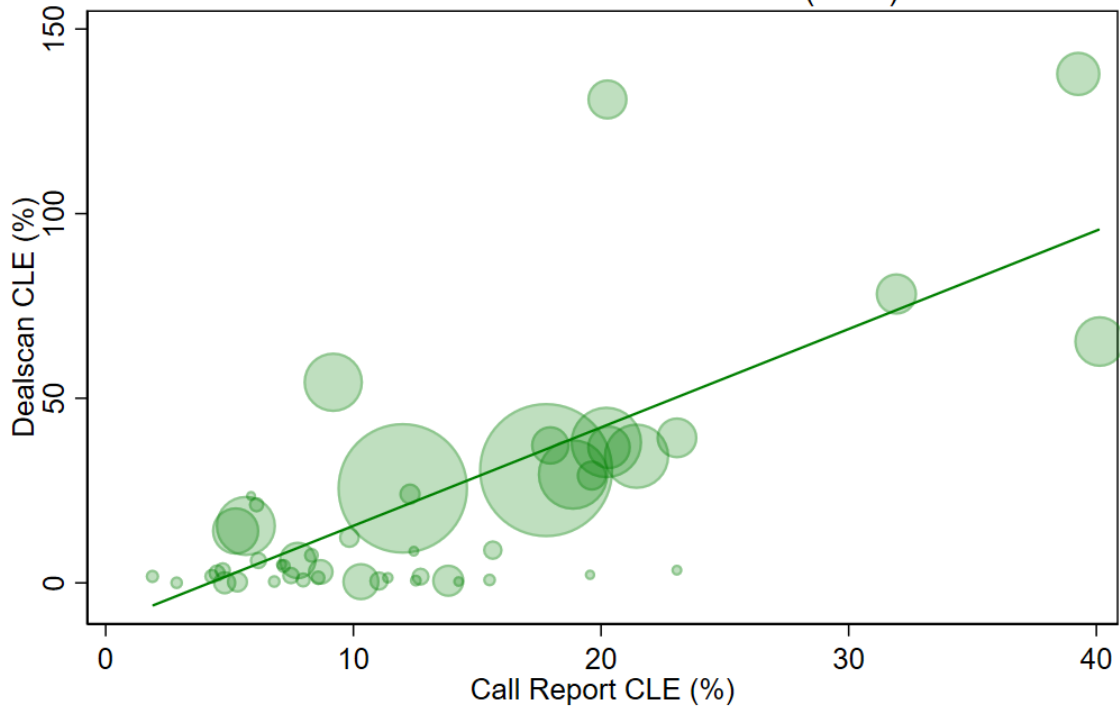
- **Exogenous variation in credit line exposures?**
 - Orthogonal on other bank characteristics and macro environment
 - Difficult, because banks decide how much credit to pre-commit
 - Use ex-ante, pre-pandemic CLEs
 - Control for potentially confounding factors, e.g., credit quality of loan portfolio
 - Loan loss reserves in Q1, Q2
 - Bank exposure to Covid-sensitive industries (ongoing)
- **Separating credit supply from demand effects**
 - Loan-level data: exploit presence of multi-bank borrowers and add borrower fixed effects (Khwaja and Mian, 2008)
 - Bank-level data: control directly for demand using banks' self-reported assessment of changes in demand
- **Evidence across multiple data sets**

Validating the CLE Measure



Measurement concerns of Dealscan CLEs

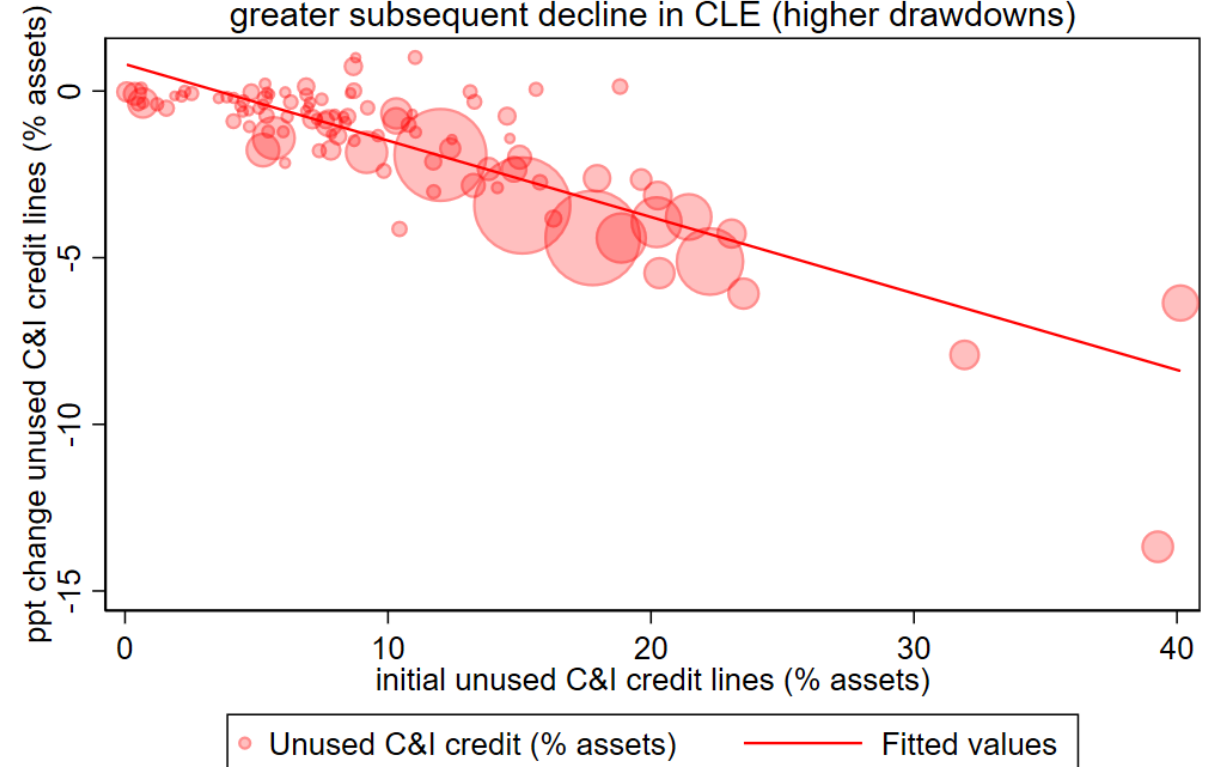
Dealscan and Call Report CLE are positively correlated
SLOOS-Dealscan matched banks (n=75)



The chart shows a binned scatterplot and linear fitted line of the link between CLEs computed as undrawn C&I credit commitments (% assets) in 2019Q4 from the Call Reports and CLEs (% assets) computed from Dealscan (outstanding as of March 2020). Sample: 75 matched banks. Sources: Refinitiv's Dealscan, Call Report.

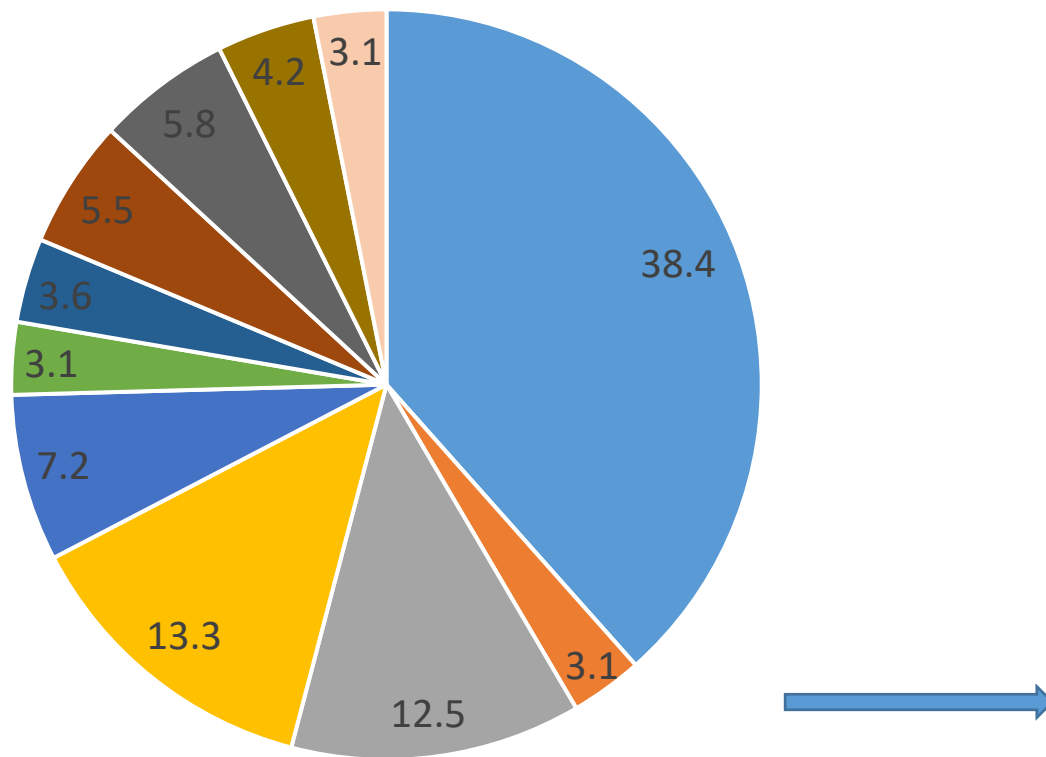
Ex-ante exposure vs. ex-post draws

Higher initial CLE is associated with
greater subsequent decline in CLE (higher drawdowns)



The chart shows a scatterplot and linear fitted line for the link between ex-ante CLEs measured as the unused C&I credit lines (% assets) in 2019Q4 and the change in variable during 2019Q4-2020Q1 – capturing the actual draws over the period. Sample: 506 banks. Source: Call Report.

Sectoral Breakdown of CLDDs

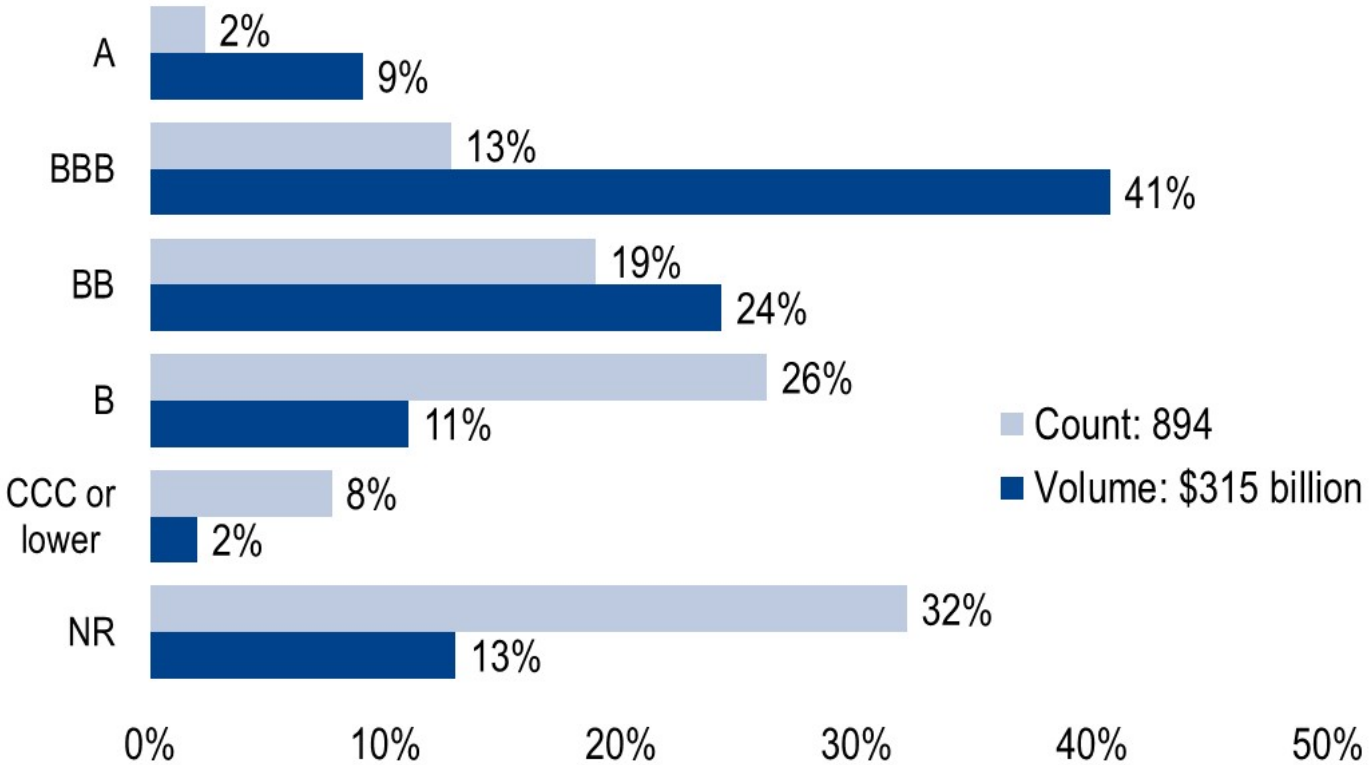


- S&P reports actual draws from regulatory filings of U.S. public companies (SEC filings, 8K forms)
- Industries with the lowest excess returns were *generally* the larger drawers of CLs
- “VW hit by €2bn-a-week cash drain” (3/27)
- “GM draws down \$16bn to shore up finances” (3/24)
- “Ford borrows \$15.4bn to manage plant shutdown (3/19)”

Ratings Breakdown of CLDDs



US RC drawdowns since March 5 – by corporate credit rating



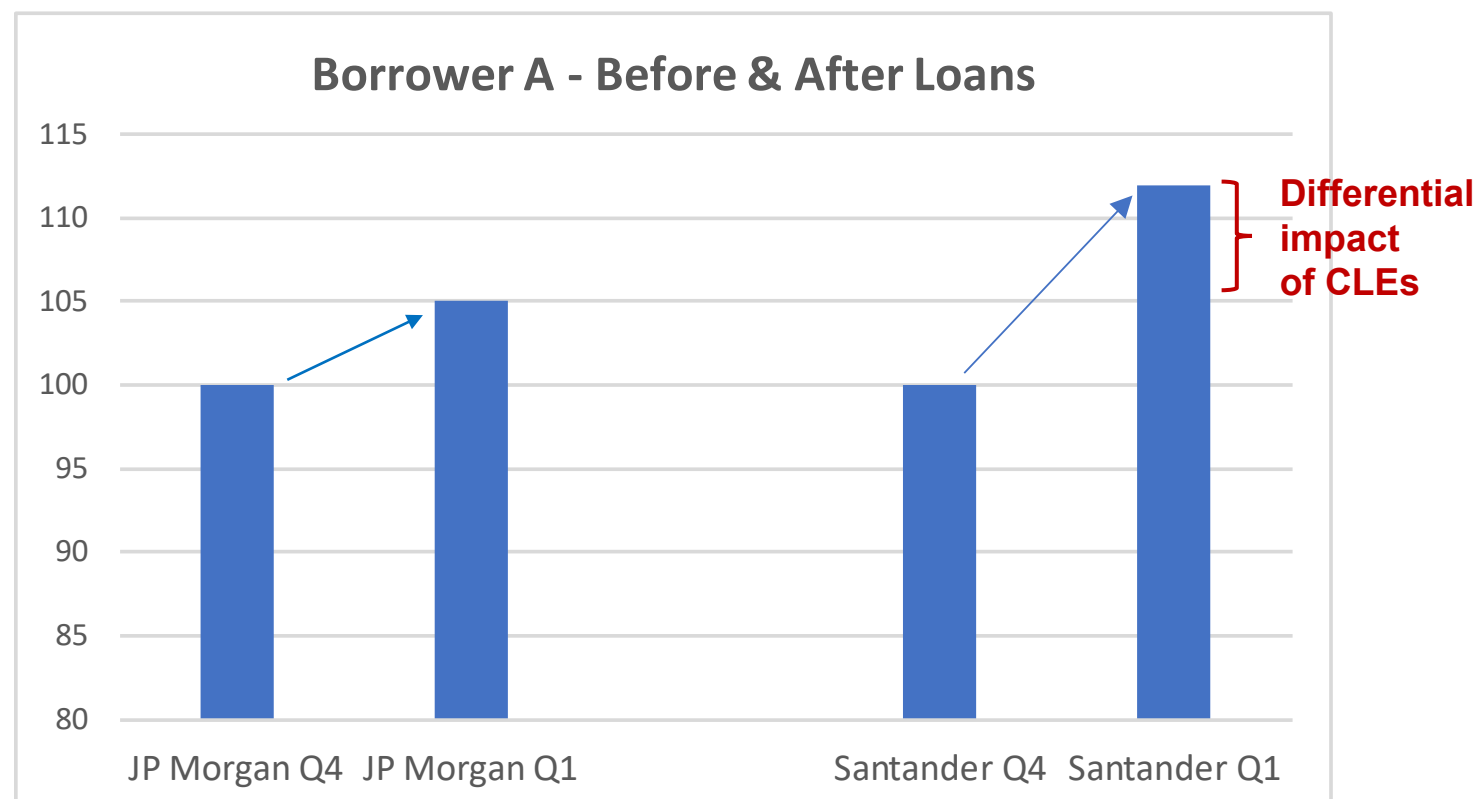
Volume excludes SD-rated borrowers
 Source: LCD, an offering of S&P Global Market Intelligence
 Data as of 6/19/2020

Khwaja-Mian identification strategy



- Compare how the same borrower's loan growth from a more exposed bank with that from a less exposed bank
- Control for change in loan demand with borrower FEs: *within-borrower* comparison of changes in lending from banks with differential exposures to the COVID-19 shock.
- Borrower: *cluster of firms* in the same industry (SIC) and country

Khwaja-Mian (2008) approach to controlling for demand



Example: CLE and CL drawdown



- SEC 8-K regulatory filing: American Airlines was granted 3 CLs on Nov 8, 2019

Deal Date	Maturity	Loan Type	Purpose	Deal Amount (\$mm)	Lenders
8-Nov-19	5 yrs	Revolver/Line >= 1 Yr.	Corp. purposes	1,643	Citibank, Bank of America, JP Morgan, Goldman Sachs, Credit Suisse AG, Deutsche Bank AG, Credit Agricole CIB, Industrial and Commercial Bank of China, MUFG Bank Ltd, ... (17 lenders)
8-Nov-19	5 yrs	Revolver/Line >= 1 Yr.	Corp. purposes	750	...
8-Nov-19	5 yrs	Revolver/Line >= 1 Yr.	Corp. purposes	450	...



- S&P (SEC 8-K reg. filing) reports American Airlines drawdowns on Apr 1, 2020

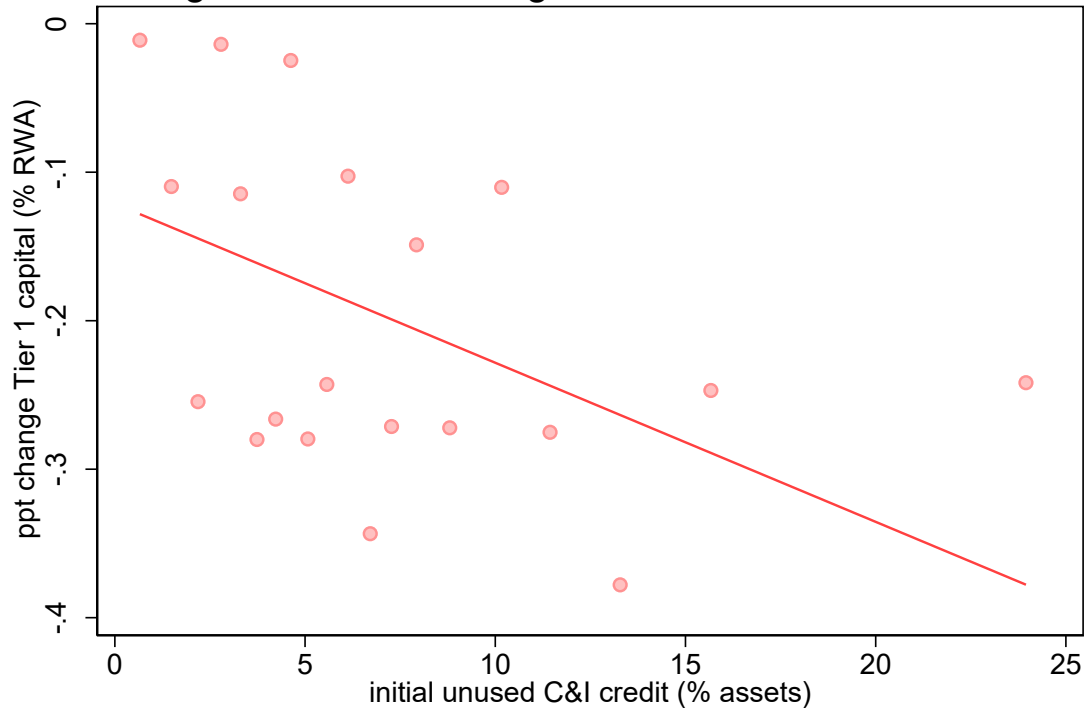
Date	Borrowing Amount \$mm	Capacity \$mm	Rating on Date Drawn (S&P/M)	Status
4/1/2020	1,533	1,643	B/Ba1	Partially drawn
4/1/2020	450	450	B/Ba1	Fully drawn
4/1/2020	750	750	B/Ba1	Fully drawn

CLEs and Capital Erosion



CLEs and change in Tier 1 capital ratios

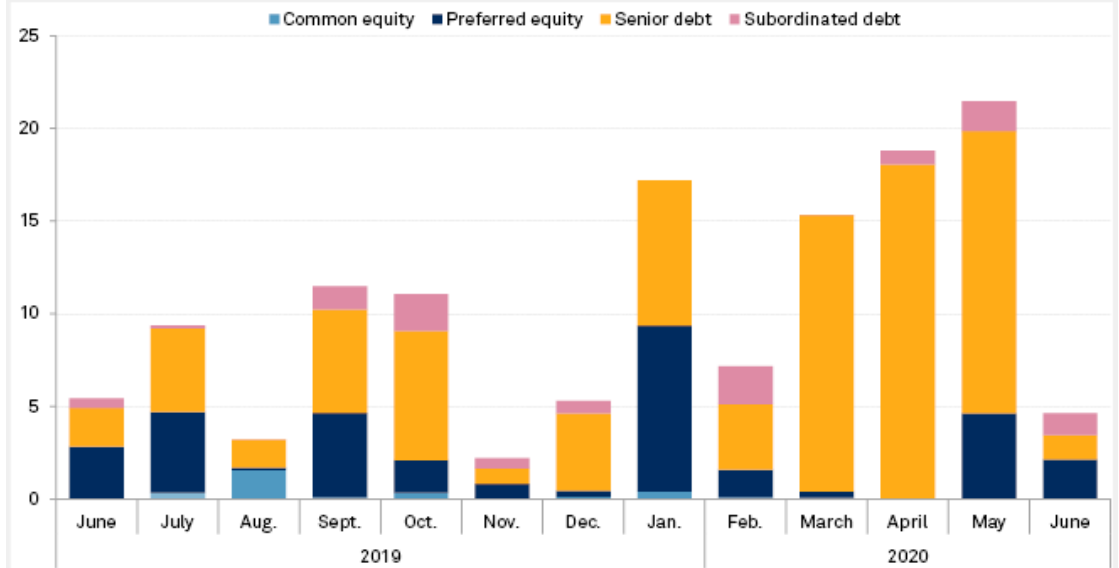
Higher initial CLE --> greater decline in Tier1/RWA



The chart shows a binned scatterplot and linear fitted line of the link between CLEs computed as undrawn C&I credit commitments (% assets) from the Call Reports in 2019Q4 and the ppt change in Tier 1 capital (% RWA) between 2019Q4 and 2020Q1. Sample: 506 banks. Sources: Call Report.

Capital issuances by banks 2019Q2-2020Q2

Monthly comparison of bank capital raises (\$B)



Data compiled July 9, 2020.
 Consists of offerings by U.S.-based companies classified as banks or thrifts completed between June 1, 2019, and June 30, 2020.
 Excludes exchange offerings.
 Offering size reflects gross proceeds raised by the company in instances where offerings had primary and secondary components.
 Debt does not include medium-term notes, branded notes or structured-finance issues.
 Source: S&P Global Market Intelligence

Source: S&P Global Market Intelligence.