

The views expressed here are ours and do not reflect those of the staff, management, or policies of the International Monetary Fund and the Federal Reserve System.

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

2022 ASSA, IBEFA Session “Banks and firms”

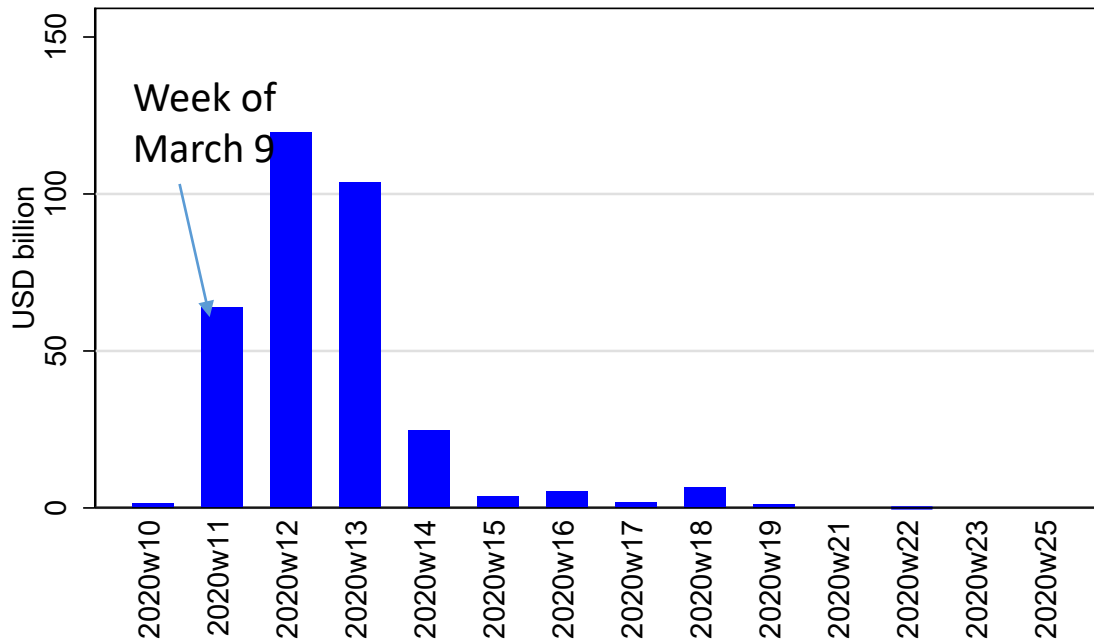
Tumer Kapan (IMF) and Camelia Minoiu (FRB)

# Motivation



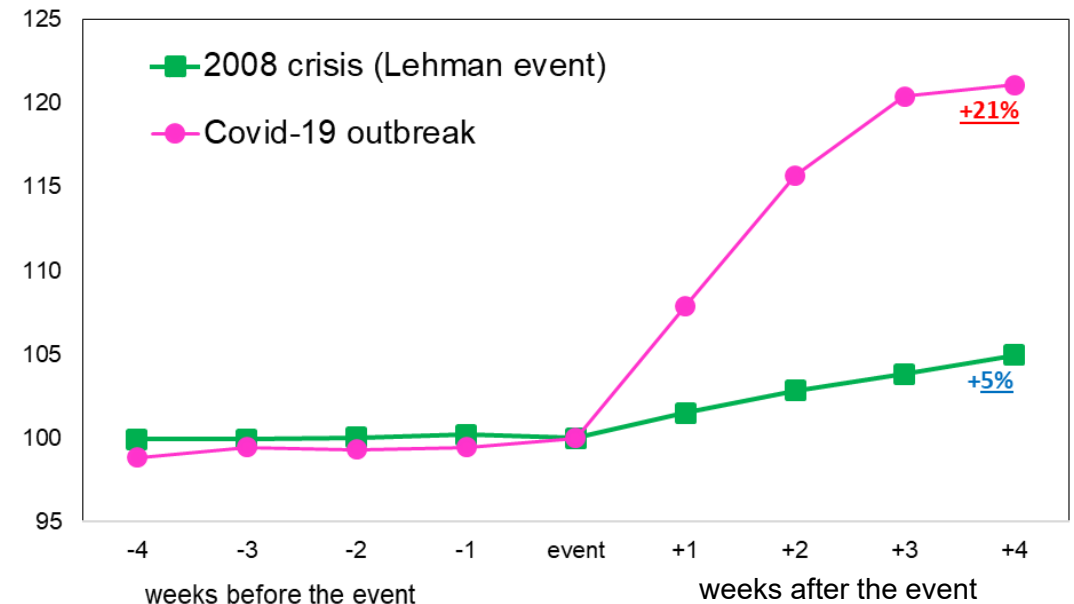
- As firms faced cash pressures in the early phase of the Covid-19 crisis, banks experienced a surge in credit line drawdowns (CLDDs).
- CLDDs were large by historical standards, well exceeding GFC levels.

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



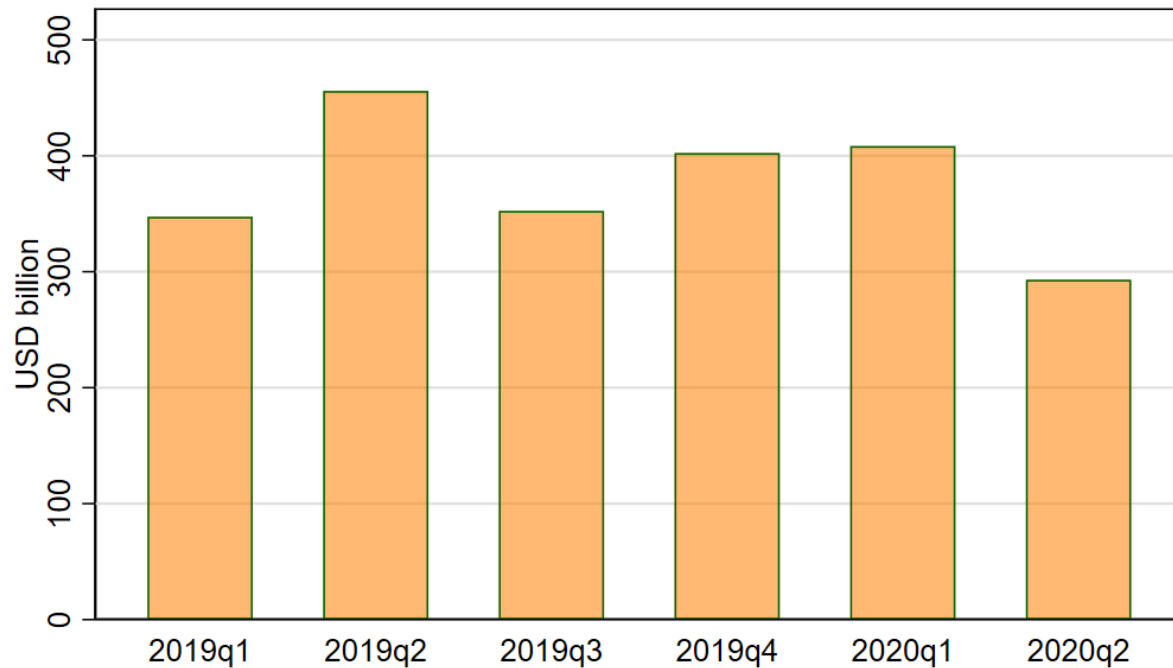
The Lehman event (2008) crisis is centered on 9/17/2008 while the Covid-19 outbreak is centered on 3/11/2020 (declaration of national emergency). Source: Federal Reserve's "Assets and Liabilities of Commercial Banks in the United States" (FR2644, H8 data release).

# Motivation



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

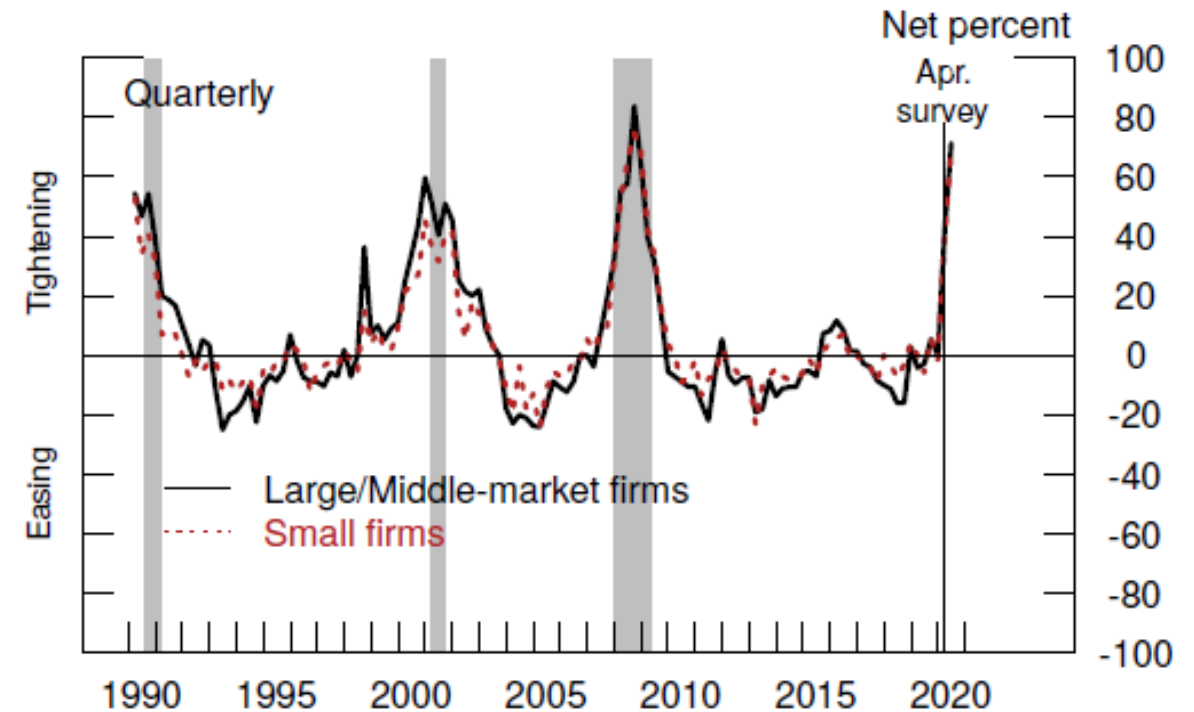
Total New Syndicated Loans  
2019Q1-2020Q2



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**?
  - Risk aversion vs. immediate balance sheet constraints

# Identification Challenges



- **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, show they are strongly correlated with actual drawdowns
  - Control for **potentially confounding factors**
    - Credit quality of existing on and off-BS loan portfolio (% exposures to risky borrowers and COVID-sensitive industries), loan loss reserves
    - Funding availability (change in deposits during the pandemic)
  - Evidence from **many samples of banks**
- **Separating credit supply from demand effects**
  - **Loan-level data:** exploit multi-bank borrowers to add borrower group FE (in the spirit of Khwaja and Mian, 2008)
  - For U.S. banks
    - Control for banks' exposure to pandemic intensity
    - Control for loan demand using survey responses

# Evidence from Four Analyses



Drawing on the following data sets on global and U.S. banks' lending decisions during the pandemic (in 2020:Q2-Q3):

**1. Syndicated Loans: DealScan** at the loan level

Loan-level global database of large syndicated corporate loans

**2. Y-14 data on small business lending by large U.S. banks**

Loan-segment level database

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

Bank-level survey data, quarterly

**4. Government credit support programs**

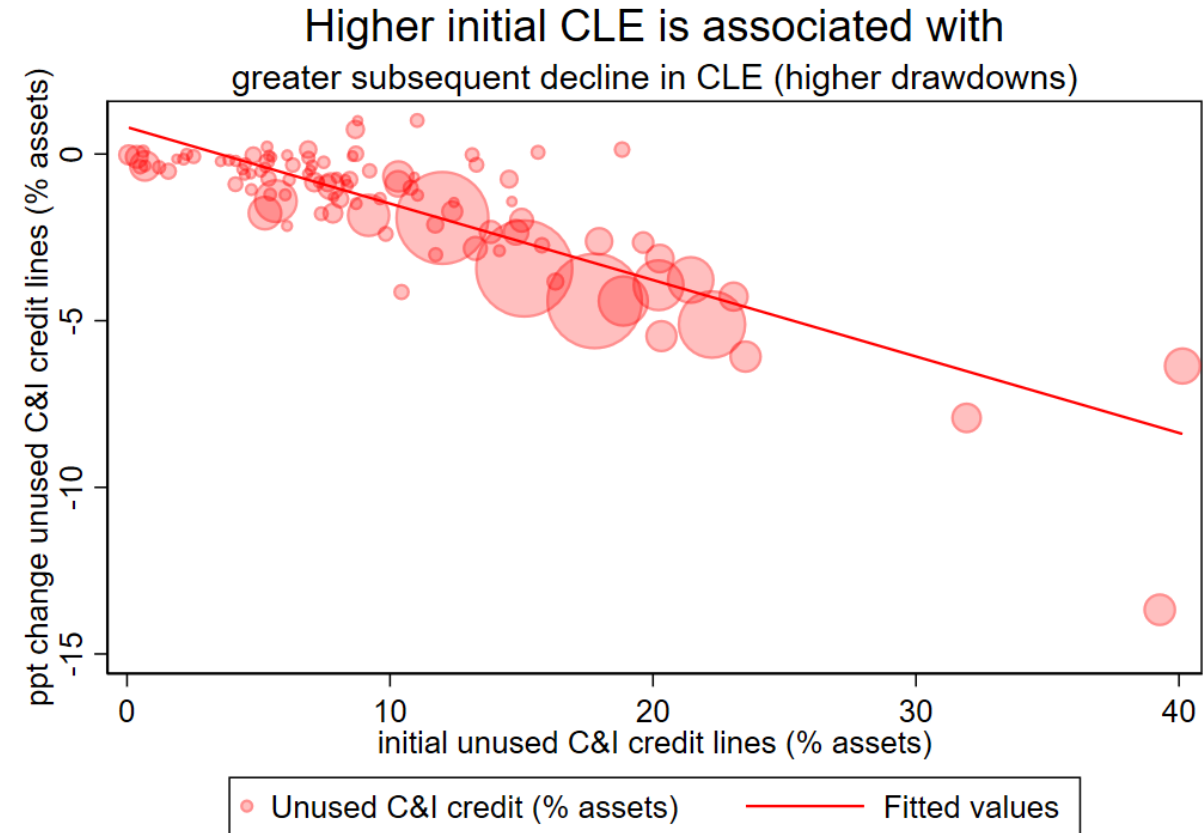
- Paycheck Protection Program (PPP) at the loan level

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

# 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.



# 1/ Evidence from Syndicated Loans: Intensive margin



## Banks' credit lines exposures and the intensive margin of lending

Dependent variable:	(1)	(2)	(3)	(4)	(5)
	Loan growth in 2020 Q2 and Q3				
	All	All	All	GSIB	GSIB
CLE	-2.3751*** (0.872)	-1.2840* (0.750)		-1.9870** (0.846)	
CLE X US bank			-1.6766* (0.876)		-2.1536** (0.868)
CLE X non-US bank			-0.8921 (0.745)		-1.6038 (1.012)
Observations	2,735	2,374	2,374	1,519	1,519
R-squared	0.019	0.630	0.630	0.669	0.669
Bank controls	Yes	Yes	Yes	Yes	Yes
Firm country x industry		Yes	Yes	Yes	Yes

The table shows the link between prepandemic CLEs (at end-2019) and the growth rate of average lending volume during 2020:Q2-Q3. Bank controls include size, capital, ROA, loan/assets, and NPLs. The sample comprise all matched banks between Dealscan and Fitch Connect, of which 30 GSIBs. Firm clusters comprise all individual borrowers in the same country-industry group, where industries are based on the 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-Q3 for all GSIB banks, but esp. US banks
- Col 4: A 5.7 ppt increase in CLE (st.dev.) is associated with loan growth rate lower by nearly 11½ ppts
- Placebo test indicates no association between CLEs and 2019 outcomes
- Additionally:
  - Results are 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
  - Robust to controlling for pre-pandemic energy exposures

# Evidence from Syndicated Loans: Extensive margin



## Banks' credit lines exposures and the extensive margin of lending

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Probability of loan renewal in 2020 Q2 or Q3							
	All	All	GSIB	GSIB	All	All	GSIB	GSIB
Dependent variable:	<u>Prob (loan renewal)</u>				<u>Prob (CL renewal with another CL)</u>			
CLE	-0.0023** (0.001)		-0.0012 (0.002)		-0.0015** (0.001)		-0.0004 (0.001)	
CLE x US bank		-0.0041*** (0.001)		-0.0025 (0.002)		-0.0018** (0.001)		-0.0007 (0.001)
CLE x non-US bank		-0.0035* (0.002)		-0.0028 (0.002)		-0.0006 (0.001)		0.0006 (0.001)
Observations	8,857	8,857	5,378	5,379	14,084	14,084	8,666	8,666
R-squared	0.083	0.022	0.087	0.027	0.052	0.052	0.057	0.057
Bank controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Dependent variable: Columns 1-4 examine the probability of loan renewal for bank-firm pairs in a lending relationships for a maturing loan in 2020 Q2 or Q3. Columns 5-8 isolate credit lines. The sample comprises all matched banks between Dealscan and Fitch Connect, of which 30 GSIBs. Bank controls include size, capital, ROA, loan/assets, and NPLs. Regressions are at the bank-firm (pair) level, with firm country and firm industry (3-digit SIC) fixed effects. Standard errors clustered on bank.

Sources: Refinitiv's Dealscan, Fitch Connect, S&P, Bloomberg.

- Examine the link between ex-ante pre-pandemic CLEs and the probability of loan renewal during 2020:Q2-Q3
- Results:
  - Higher CLEs are associated with a lower probability of loan renewal, incl. new CLs
  - One st. dev. increase in the CLE ratio reduces the probability of loan renewal by 2.1%.
- Additionally,
  - Banks with larger CLEs curtailed the supply of small business loans (Y-14Q data)
  - Placebo test with 2019 outcomes show not association between CLEs and lending

# 3/ Evidence from U.S. Loan Officers' Opinions



- Bring together data from quarterly **SLOOS** surveys during 2020
  - Inquire about banks' changes in C&I lending standards and terms each 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
  - **Direct measure demand for loans:** *Apart from seasonal variation, how has demand for C&I loans changed over the past 3 months?*
    - Add this as control variable in the regressions

# Evidence from the SLOOS: Lending Standards



## Banks' credit lines exposures and extensive margin of lending

Dependent variable:	(1)	(2)	(3)	(4)	(5)
	2020:Q1	2020:Q2	2020:Q3	2020:Q4	2019
	<b>Bank tightened lending standards</b>				<b>Placebo</b>
	<b>A. To small firms</b>				
CLE	0.0064*** (0.002)	0.0067*** (0.002)	0.0040* (0.002)	0.0017 (0.002)	-0.0000 (0.001)
Observations	42	45	42	43	165
R-squared	0.364	0.610	0.161	0.356	0.057
	<b>B. To large firms</b>				
CLE	0.0036* (0.002)	0.0009 (0.002)	-0.0018 (0.001)	-0.0002 (0.001)	0.0006 (0.001)
Observations	44	48	45	47	180
R-squared	0.288	0.096	0.278	0.214	0.052
Bank controls	Yes	Yes	Yes	Yes	Yes
Loan demand	Yes	Yes	Yes	Yes	Yes

Dependent variable: Dummy variable taking value 1 if the bank responded that they tightened somewhat or considerably in response to the questions about changes in lending standards on C&I loans over the past quarter. Bank controls include size, capital, ROA, loan/assets, NPLs, 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, Refinitiv's Dealscan.

- Higher CLEs are associated with greater likelihood of reporting tighter standards on new business loans, especially for smaller firms
- Col 1: A 35 ppt increase in CLE (st.dev.) raises the likelihood of tightening standards on C&I loans
  - to large firms: by 13% and to small firms by 22% (40% and 72% of the mean)
- Additionally,
  - Results are similar for the terms of loans: higher CLEs predict relatively stronger tightening of loan terms (especially spreads and risk premia) to small firms
  - Placebo indicates no patterns in 2019
  - Robust to controlling for expected loan quality (available in 2021 January survey)

# 4/ Evidence from Government Credit Support Programs



- Focus on the Paycheck Protection Program (PPP), a large-scale grant-giving program funded by U.S. 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
    - Lack of clarity whether certain loans can be written off (many changes in rules)
    - Poor documentation and self-certification → banks are liable for underwriting errors and may be “stuck” with PPP loans
      - Some banks sold PPP loan portfolios before forgiveness process
  - Audit risk, fraud risk

# Results from Paycheck Protection Program (PPP)



## Banks' credit line exposures and PPP lending

Dep. Var.: Log(loan amount)

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent variable:	Log(loan amount)					
	Small loans		Round 1	Round 2	Large	
CLE	-0.0059*** (0.002)	-0.0054** (0.002)	-0.0055** (0.002)	-0.0059** (0.002)	-0.0029* (0.001)	0.0016 (0.002)
Bank controls	yes	yes	yes	yes	yes	yes
Borrower state FE	yes	yes	yes	yes	yes	yes
Borrower industry FE	yes	yes	yes	yes	yes	yes
Week FE	yes	yes	yes	yes	yes	yes
Borrower state*week		yes	yes	yes	yes	yes
Borrower industry*week		yes	yes	yes	yes	yes
Borrower state*industry*week			yes	yes	yes	yes
Observations	308,038	307,981	292,793	227,635	65,158	292,793
R-squared	0.474	0.495	0.528	0.265	0.921	0.425

The regressions examine the link between bank CLEs and lending volumes in the PPP program. 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). Small loans are <\$150K. Round 1 ends on June 2 when the 2020 PPP Flexibility Act was passed. Bank controls include size, capital, ROA, loan/assets, and NPLs. Standard errors double clustered on bank-week. Source: U.S. Small Business Administration's PPP loan data over April 3-August 8 2020, Refinitiv's Dealscan, Fitch Connect.

- Higher CLEs are associated with lower PPP lending volumes, especially in the first round of the program (March-May 2020); and small loans (<\$150,000)
- Col 3: A 33 ppt increase in CLE (st.dev.) is associated with PPP lending volumes lower by 18%
- Additionally,
  - Results are similar for the terms of loans: higher CLEs predict relatively stronger tightening of loan terms (especially spreads and risk premia) to small firms
  - Placebo indicates no patterns in 2019
  - Robust to controlling for expected loan quality (available in 2021 January survey)

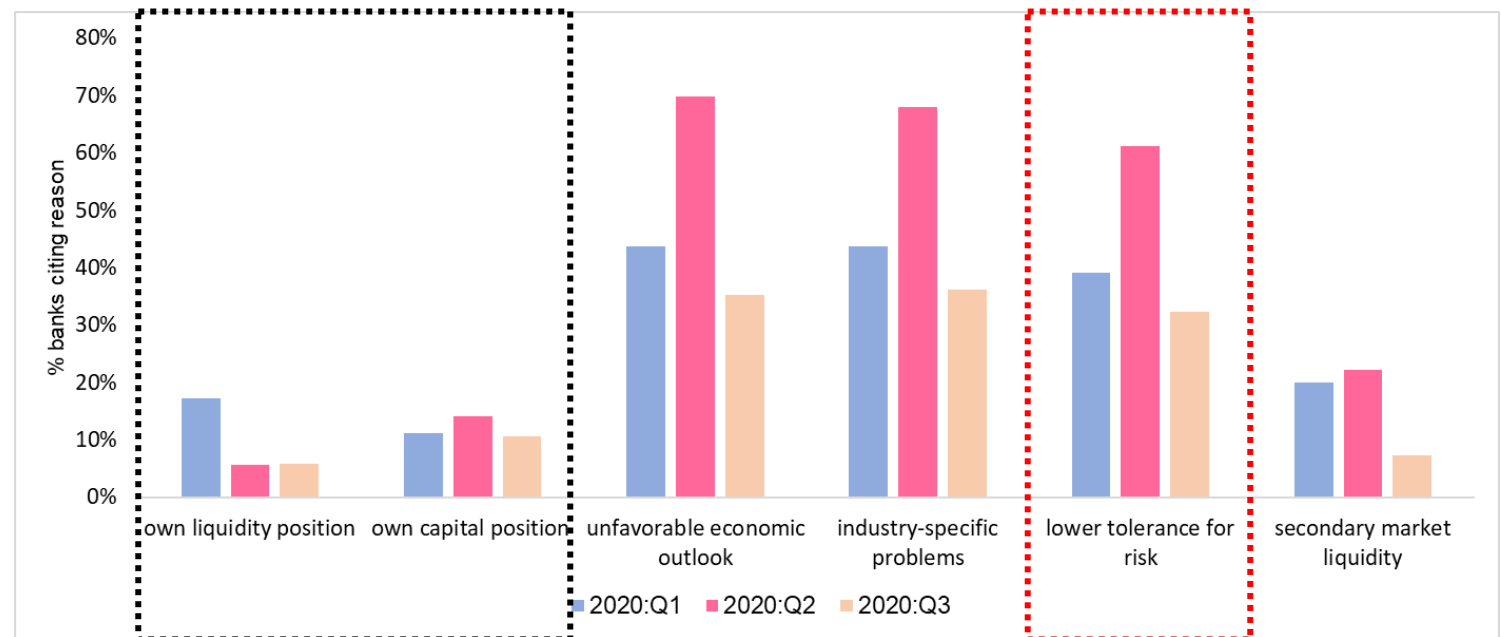


# Mechanisms: Why Did Banks with More CLEs Tighten?

- 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 Senior Loan Officer Opinion Survey.



# Mechanisms: Regression Evidence



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

Dependent variable:	(1)	(2)	(3)	(4)	(5)	(6)
	Bank cites the following reason for tightening C&I lending standards:					
	own liquidity position	own capital position	lower tolerance for risk	own liquidity position	own capital position	lower tolerance for risk
	A. Full period (2020:Q1-Q3)			B. By Quarter		
CLE	0.0009** (0.000)	-0.0008* (0.000)	0.0053*** (0.001)			
CLE x 2020:Q1				0.0030** (0.001)	-0.0002 (0.001)	0.0036** (0.002)
CLE x 2020:Q2				0.0001 (0.000)	-0.0006 (0.000)	0.0084*** (0.002)
CLE x 2020:Q3				-0.0002 (0.000)	-0.0013* (0.001)	0.0036* (0.002)
Bank controls	Yes	Yes	Yes	Yes	Yes	Yes
Loan demand	Yes	Yes	Yes	Yes	Yes	Yes
Observations	129	125	129	129	125	129
R-squared	0.127	0.055	0.215	0.265	0.063	0.275

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, capital, ROA, loan/assets, NPLs, 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, Refinitiv's Dealscan.

- Higher CLEs are associated with
  - A higher likelihood of citing liquidity problems but only in 2020:Q1
  - A higher likelihood of citing reduce risk tolerance, persistent over time and significant each quarter
- Additionally,
  - If anything, there is negative association with capital
  - There is no association between CLEs and the probability of citing other factors as playing a role in banks' lending decisions (economic outlook, industry specific problems, competition from other lenders, etc.)



# 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%