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

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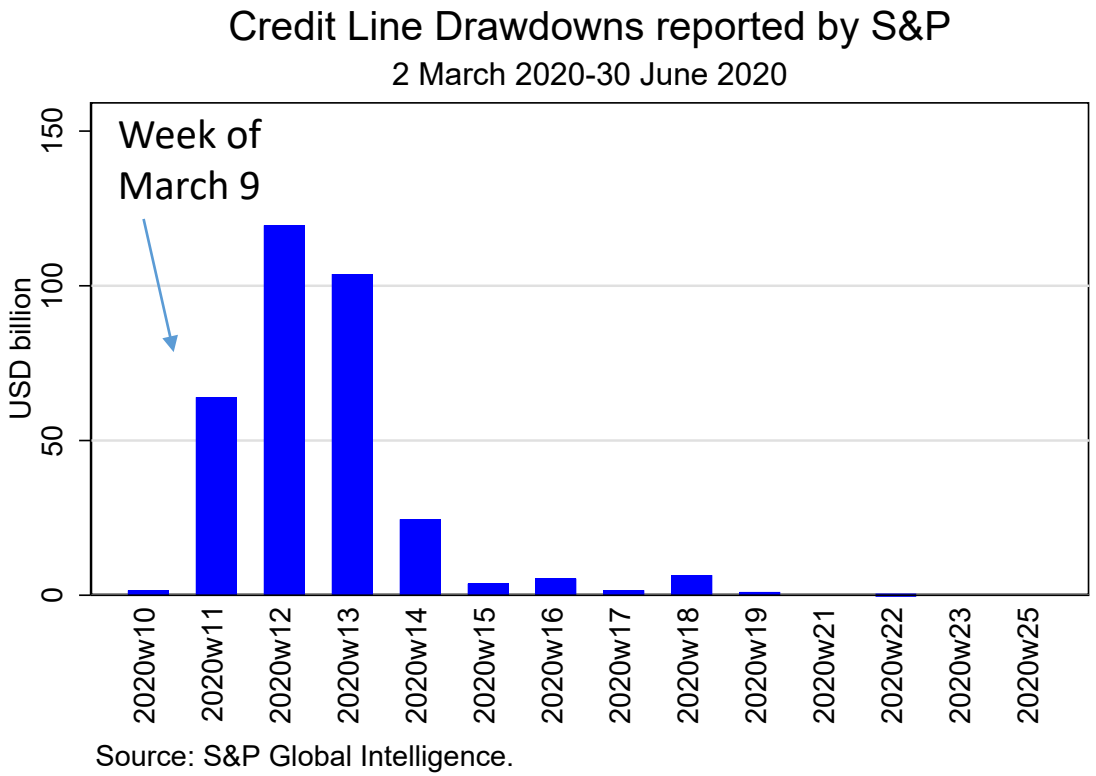
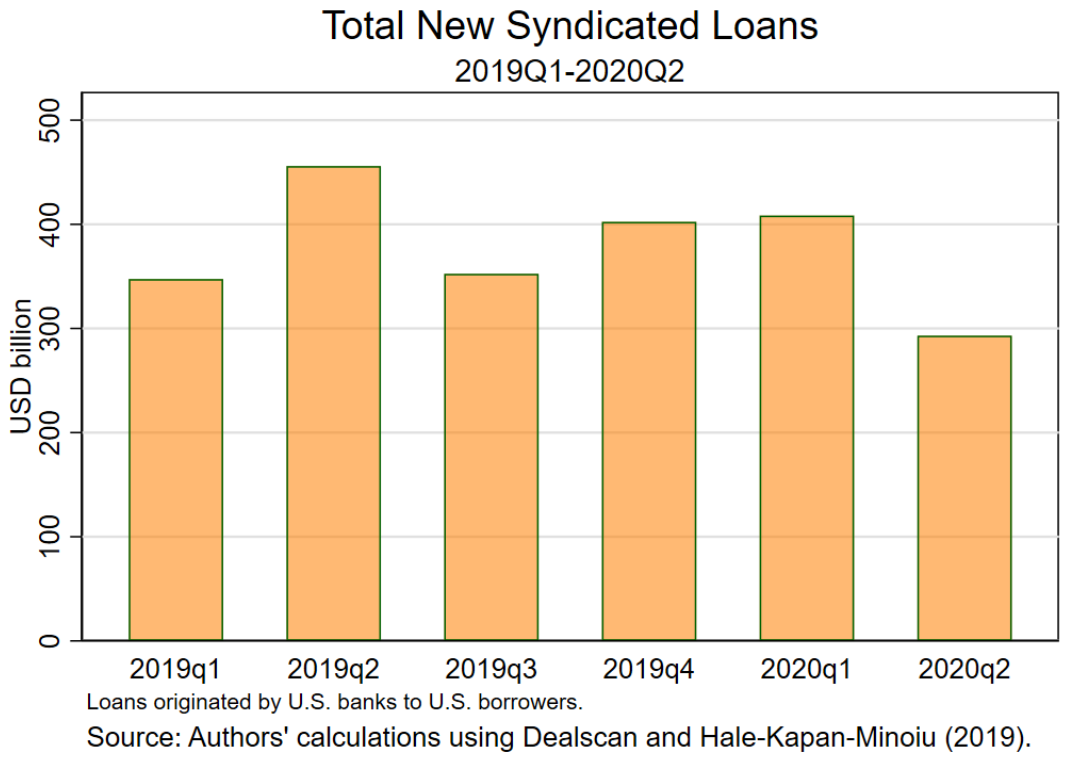
Motivation

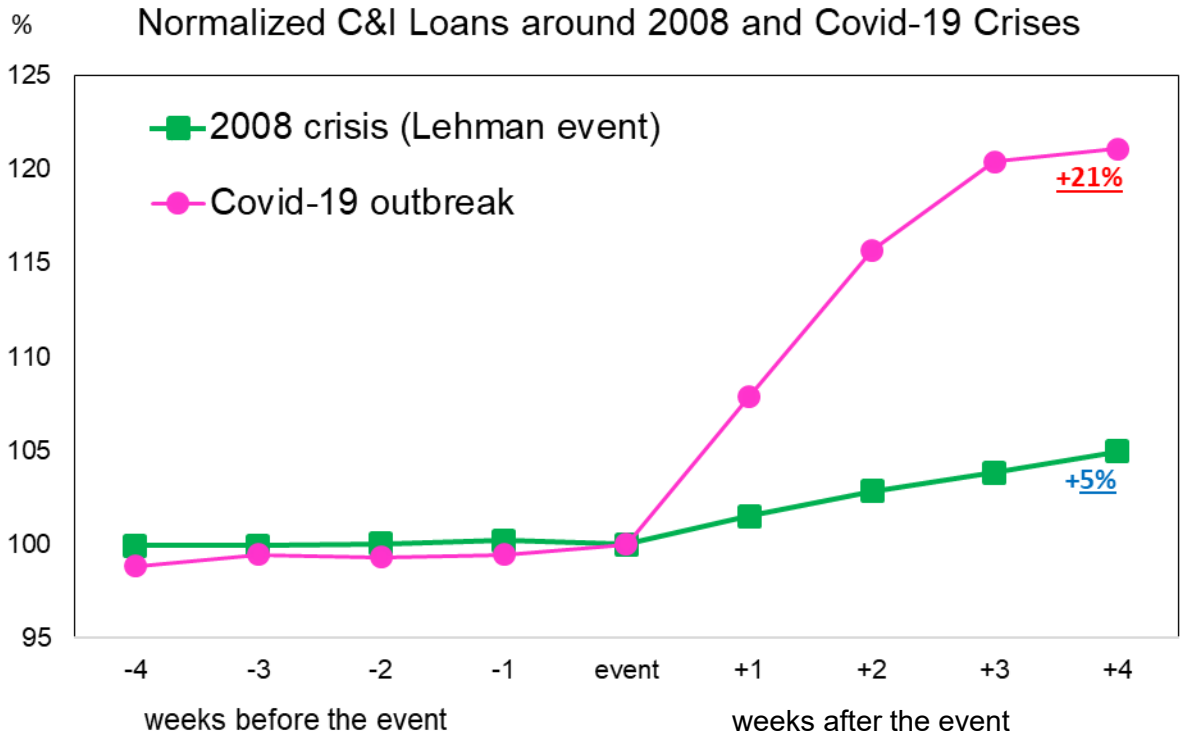
- With firms feeling cash pressures during the early phase of the Covid-19 crisis, banks faced a surge in credit line drawdowns (CLDD).
- Banks met these drawdowns, fulfilling their liquidity insurance function. But bank credit has declined and lending standards have tightened (July 2020 SLOOS).



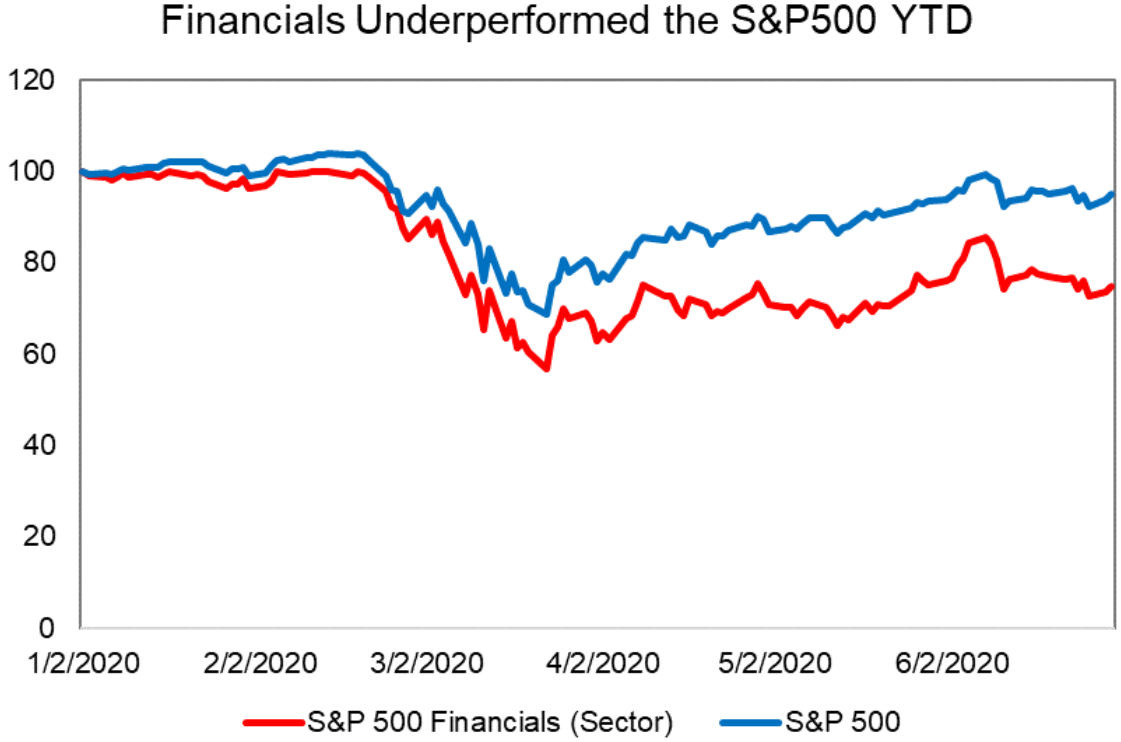


Motivation (cont'd)

- CLDDs were also large by historical standards, well exceeding GFC levels.



In the 4 weeks starting with 9/17/2008: C&I lending at US domestic banks grew by 5% vs. 21% in the 4 weeks starting on 3/11/2020. Source: Federal Reserve's "Assets and Liabilities of Commercial Banks in the United States" - H.8 data release.



The market value of US bank equity has declined and is persistently lower than the overall market. Banks' balance sheet liquidity likely priced into banks' stock returns (Acharya and Steffen, 2020), along with capital lock-in, expected losses. Source: S&P Global Market Intelligence.

Mechanisms

Mechanism by which CLDDs can make banks more cautious in lending decisions include **immediate reduction in capital ratios** and **potential for future losses, hence higher risk aversion**

1. **Increase in RWA and reduction in capital ratios**
   - Moving CLs from off- to on-balance sheet increases risk weights and reduces capital ratios, *even if the bank has sufficient liquidity*
   - A short-term revolver (<1yr) has a credit conversion factor of 20% vs. 50% for a long term revolver (>=1 yr)
   - RW of a CL=0.20*RW of the on-balance sheet loan → five-fold jump in RWA upon draw
2. **Increase in balance sheet size** reduces the leverage ratio
3. **Liquidity drain** ("dash for cash")
4. **Changes in the risk profile of the borrowers** drawing down their CLs

Core Questions

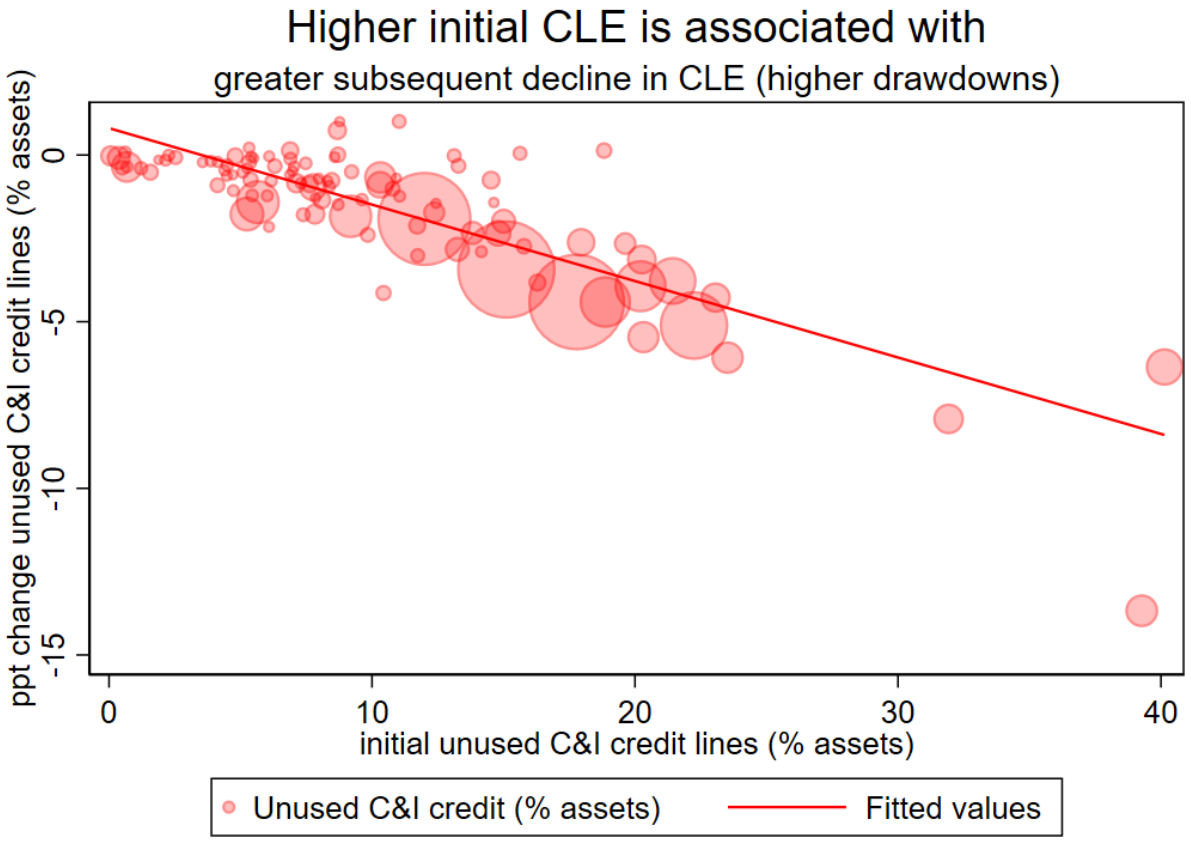
- What is the impact of banks' CLEs on their lending decisions vis-à-vis corporate borrowers?
  - On the **supply of new loans**?
    - Intensive margin
    - Extensive margin
  - On the **standards and terms** of new loans?
  - On **participation** in government-sponsored credit subsidy programs?

Three Pieces of Evidence

- Drawing on the following key data sets:
  - **Syndicated Loans: DealScan** (Refinitiv) at the loan level
    - Global database of large commercial loans, mostly syndicated
  - **U.S. Bank Loan Officers' Responses: SLOOS** at the bank-level
    - Two surveys (April and July 2020)
  - **Payroll Protection Program** (U.S. SBA) data at the loan level
    - All loans extended under the program during April-June 2020
- 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)**
  - Keep CLs originated during 2016-2019 (in Dealscan) and still outstanding as of end-March 2020, express in % 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: Call Report.

Evidence from Syndicated Loans: Intensive margin

Link bank CLEs to the growth rate of average lending volume between 2019 and 2020:Q2 for multi-bank borrowers. Control for demand w/ borrower FE.

Dep. Var.: Growth rate of average loan volume in before-after period.

	(1)	(2)	(3)
Credit line exposure (CLE)	-3.5721***	-2.0808**	
	(0.995)	(1.006)	
CLE * US bank			-3.8927***
			(1.061)
CLE * Non-US bank			-2.7110*
			(1.387)
Bank controls	yes	yes	yes
Borrower fixed effects (country-industry)		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 SIC3 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 2020Q2
- 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
- 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. Bank Loan Officers' Opinions

- Pool together data from the April and July SLOOS surveys
  - Manually match SLOOS respondents with Dealscan (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 other than those to be used to finance M&As to large and middle-market firms and to small firms changed?
  - **Demand** (control variable): 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.)

Evidence from U.S. Bank Loan Officers' Opinions

CLEs and the probability of tightening standards on C&I loans

Dependent variable: Dummy for banks reporting tightening considerably or somewhat

	(1)	(2)	(3)	(4)	(5)	(6)
	To Large Firms			To Small Firms		
	Pooled	April	July	Pooled	April	July
Credit line exposure (CLE)	0.0028**	0.0043**	0.0016	0.0054***	0.0057***	0.0052***
	(0.001)	(0.002)	(0.002)	(0.001)	(0.002)	(0.002)
Demand control	yes	yes	yes	yes	yes	yes
Bank controls	yes	yes	yes	yes	yes	yes
Observations	94	45	49	89	43	46
R-squared	0.081	0.218	0.077	0.410	0.346	0.528

Dependent variable: Dummy variable taking value 1 if the bank responded "somewhat" or "considerably tightened" in response to the questions about changes in lending standards on C&I loans in the last three months. Bank controls include: size (log-assets), Tier 1 capital ratio, ROA, and loan-to-asset ratio. The sample contains 75 SLOOS respondents matched to Dealscan. Regression results weighted by bank size (similar to unweighted). Standard errors clustered on bank. Source: April and July 2020 Senior Loan Officer Opinion Survey, Refinitiv's Dealscan.

- Higher CLEs are associated with greater likelihood of reporting tighter standards on C&I loans
- Cols 1 and 4: A 19 ppt increase in CLE (st.dev.) raises likelihood of tightening standards
  - To large firms: by 5.3% (or 9% of the mean)
  - To small firms: by 10% (or 17% of the mean)
- Results are:
  - Stronger for larger banks
  - Similar for the terms of lending with strong link between higher CLEs and stronger tightening of loan terms vis-à-vis small firms (especially maximum size of CLs, covenants and collateral)

Evidence from Payroll Protection Program

- The PPP granted forgivable loans to small businesses to pay their employees during the Covid-19 crisis.
  - **PPP loans are a very low-risk product but not entirely risk-free**: complex application process for forgiveness and delays in receiving final rules about the program, unclear if some loans can be written off (e.g. borrowers may not qualify for full loan forgiveness, poor initial self-certification→ liability for underwriting errors), fraud risk, audit risk.
- Collected data at the loan level for small loans (<$150,000)
  - Data covers 86.5% of all loans and 27.2% of total volume
  - Manually match PPP lenders (N~5,000) with identifiers in Dealscan (close to 400 banks that account for $343bn of PPP lending), carefully cross-check each match with FDIC database, add balance sheet data from Fitch Connect
  - Very diverse sample of banks ranging from small community banks (<$1bn assets) to large systemically important banks

Results from Payroll Protection Program

CLEs and PPP lending

Data structure: bank-state-industry-week

Dependent variable: Log(loan amount)

	(1)	(2)	(3)
Credit line exposure (CLE)	-0.0014***	-0.0013***	-0.0014***
	(0.000)	(0.000)	(0.000)
Bank controls	yes	yes	yes
Bank entity type dummies	yes	yes	yes
Borrower state	yes	yes	yes
Borrower industry	yes	yes	yes
Borrower state*week		yes	yes
Borrower industry*week		yes	yes
Borrower state*industry*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 (NAICS-3). 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.

- Higher CLEs are associated with lower PPP lending volumes
- Col 3: A 35 ppt increase in CLE (st.dev.) reduces PPP loan volumes by close to 5%
  - Average loan volume at bank-state-industry-week level: $262,000 → hence a reduction by $13,000
- Results are robust to:
  - Additionally controlling for loan demand with borrower size (number of jobs retained)

Summary and Policy Implications

Banks with higher ex-ante CLEs:

1. Curtailed the supply of new syndicated loans in 2020:Q2
2. Tightened the standards and terms of new corporate loans
3. Made fewer small business loans under the PPP

Bottom line: CLDDs are not posing the systemic risks created by securitized products or reliance on unsecured short-term wholesale funding seen in 2008, yet are having a meaningful impact on banks' financial intermediation.

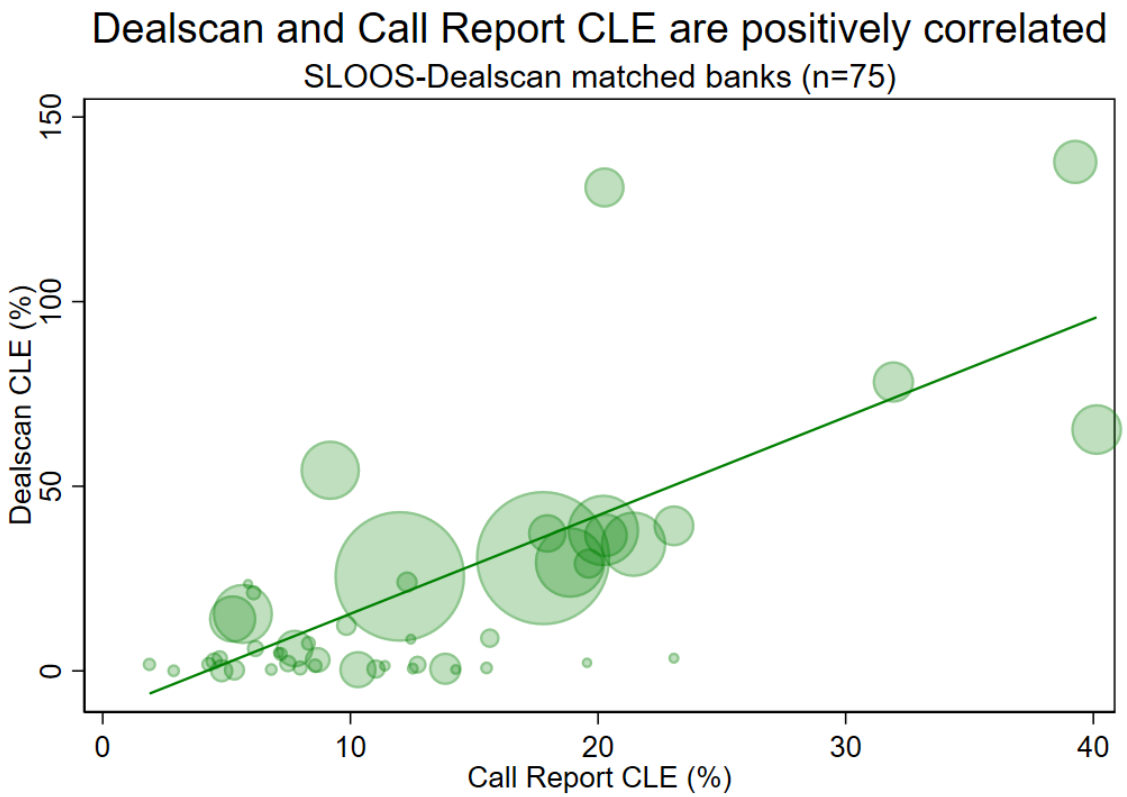
Implications for policymakers:

- Banks' off-balance sheet credit exposures deserve closer attention.
  - Revisit the stressed CL utilization assumption of the LCR: "Banks should assume a **10%** drawdown of the undrawn portion of these credit facilities" (likely calibrated with experience from the GFC)
  - High-frequency monitoring (nearly in real time) of CLDDs likely valuable.

Annex Slides

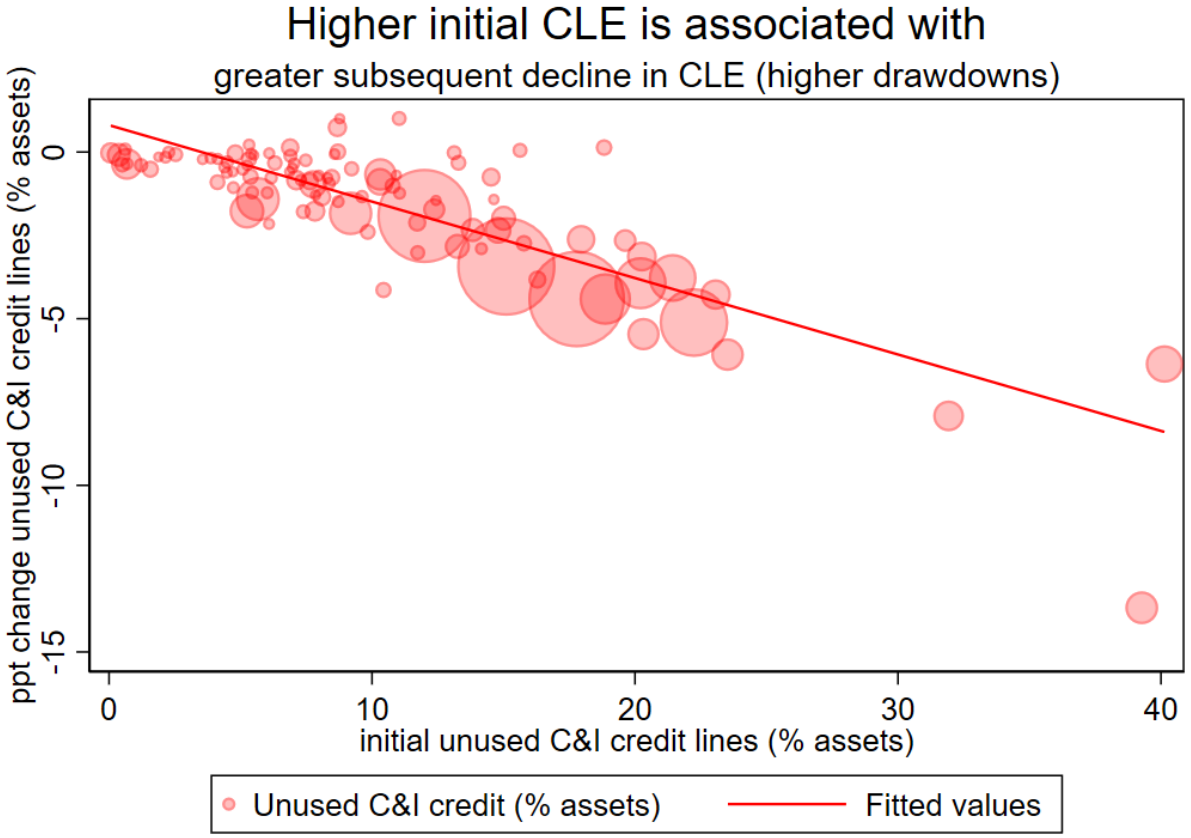
Validating the CLE Measure

Measurement concerns of Dealscan CLEs



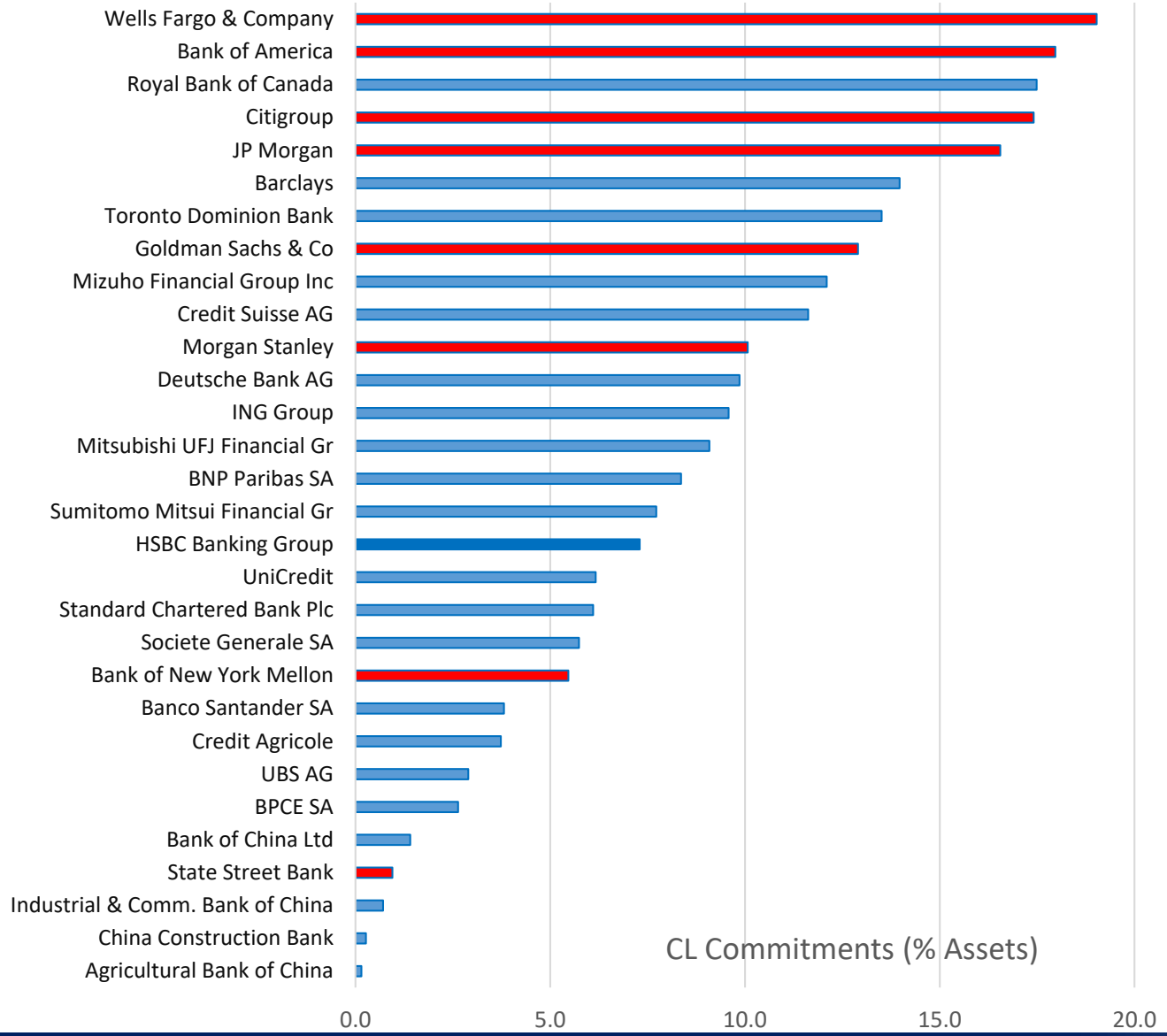
The chart shows a binned scatterplot and linear fitted line of the link between CLEs computed as undrawn C&I credit commitments (% assets) in 2019Q4 from the Call Reports and CLEs (% assets) computed from Dealscan (outstanding as of March 2020). Sample: 75 matched banks. Sources: Refinitiv's Dealscan,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

Ex-ante exposure vs. ex-post draws



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.

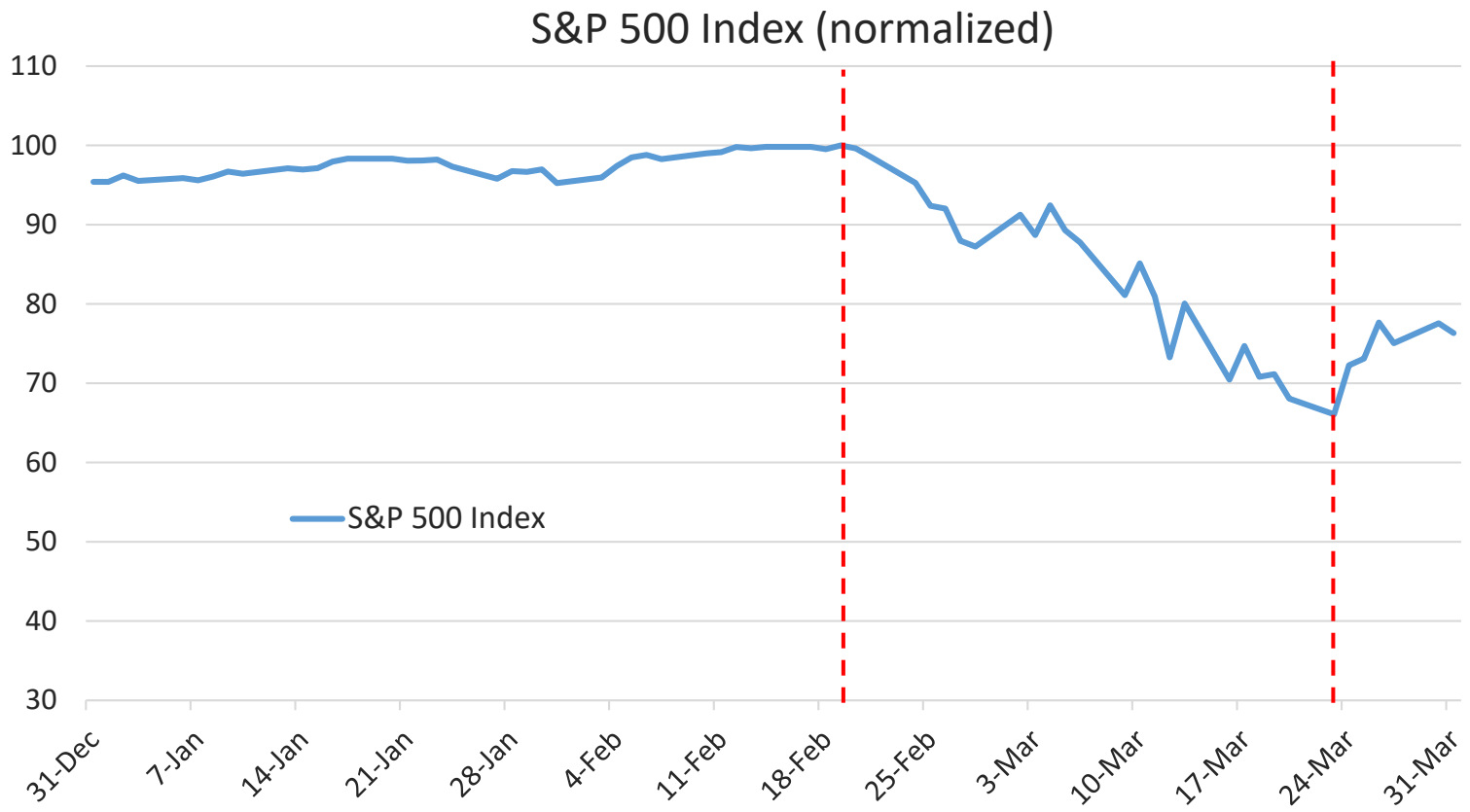
GSIB Total Credit Line Exposures



- Median CLE (CLs to total assets) at 2019 YE: 8% for GSIBs (3.3% for others)
  - 14.7% for US (8 banks)
  - 9.1% for Japan (3 banks)
  - 7.3% for UK (3 banks)
  - 4.7% for France (4 banks)
  - 0.5% for China (4 banks)

Borrower Heterogeneity: Average Excess Returns

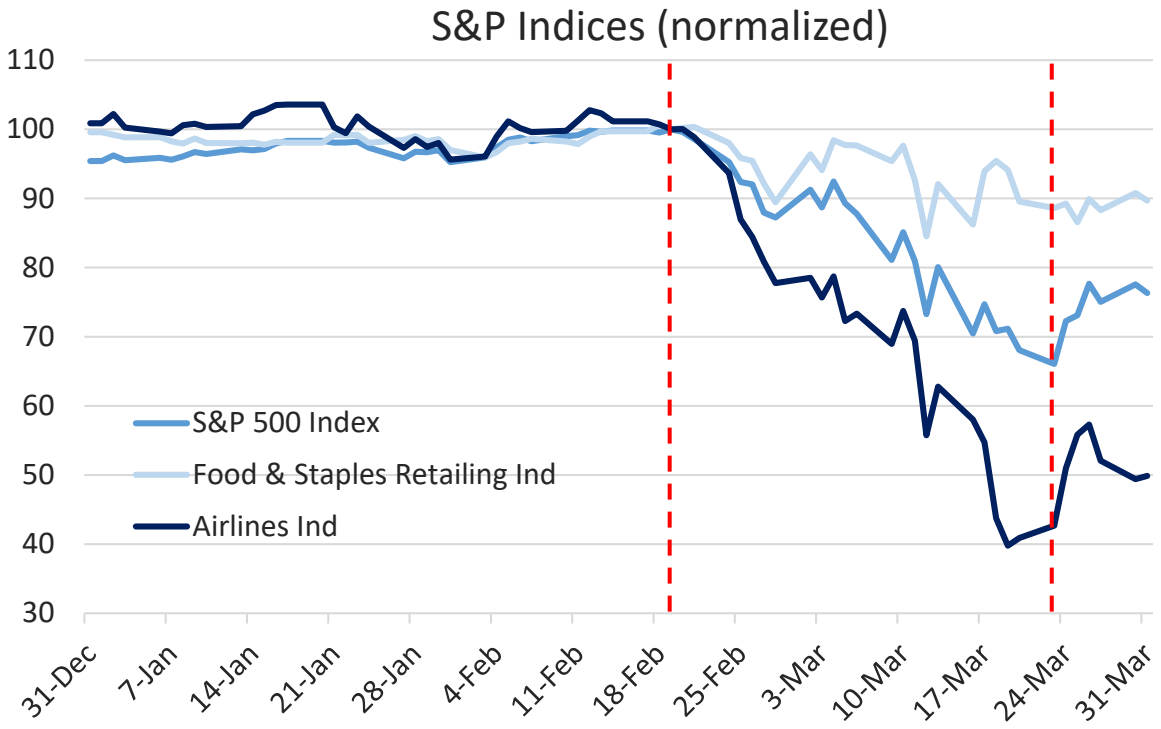
- Broad-based sell-off in equities as COVID-19 started becoming a global outbreak



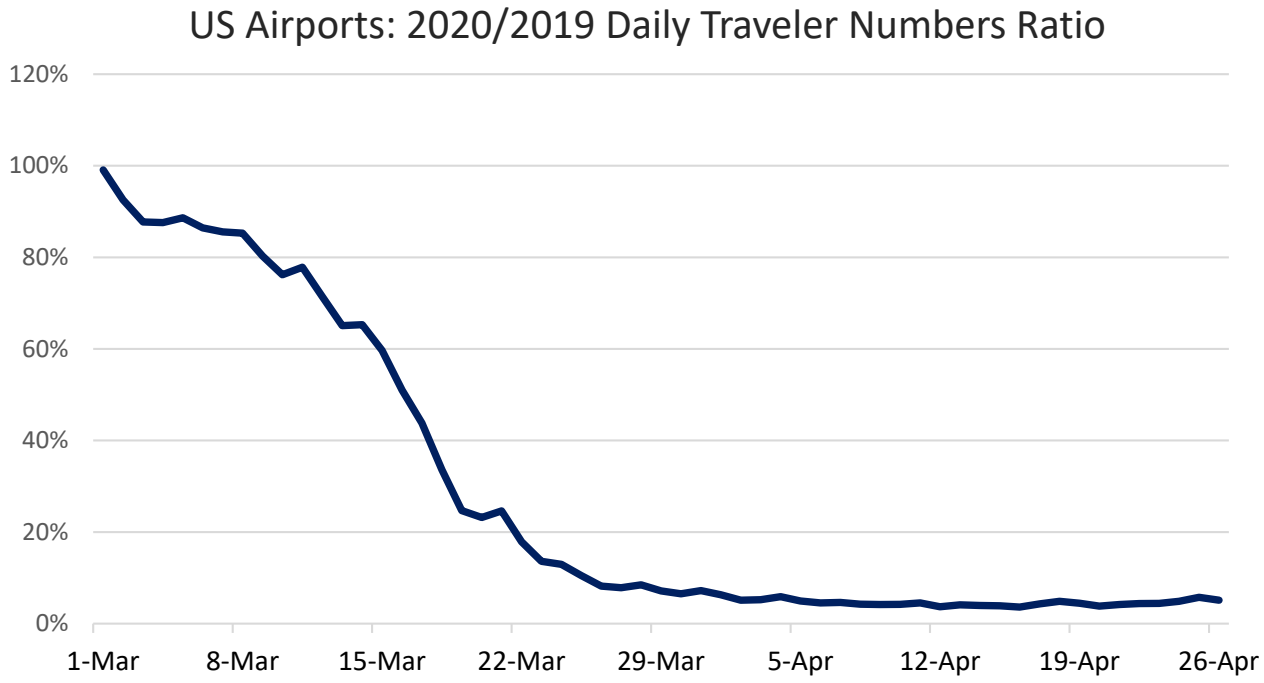
S&P 500 index experienced **peak-to-trough decline of 34%** btw Feb 19-Mar 23.

Borrower Heterogeneity: Average Excess Returns

- Some industries were more vulnerable to the lockdowns. They experienced much larger sell-offs during the panic phase of the crisis.

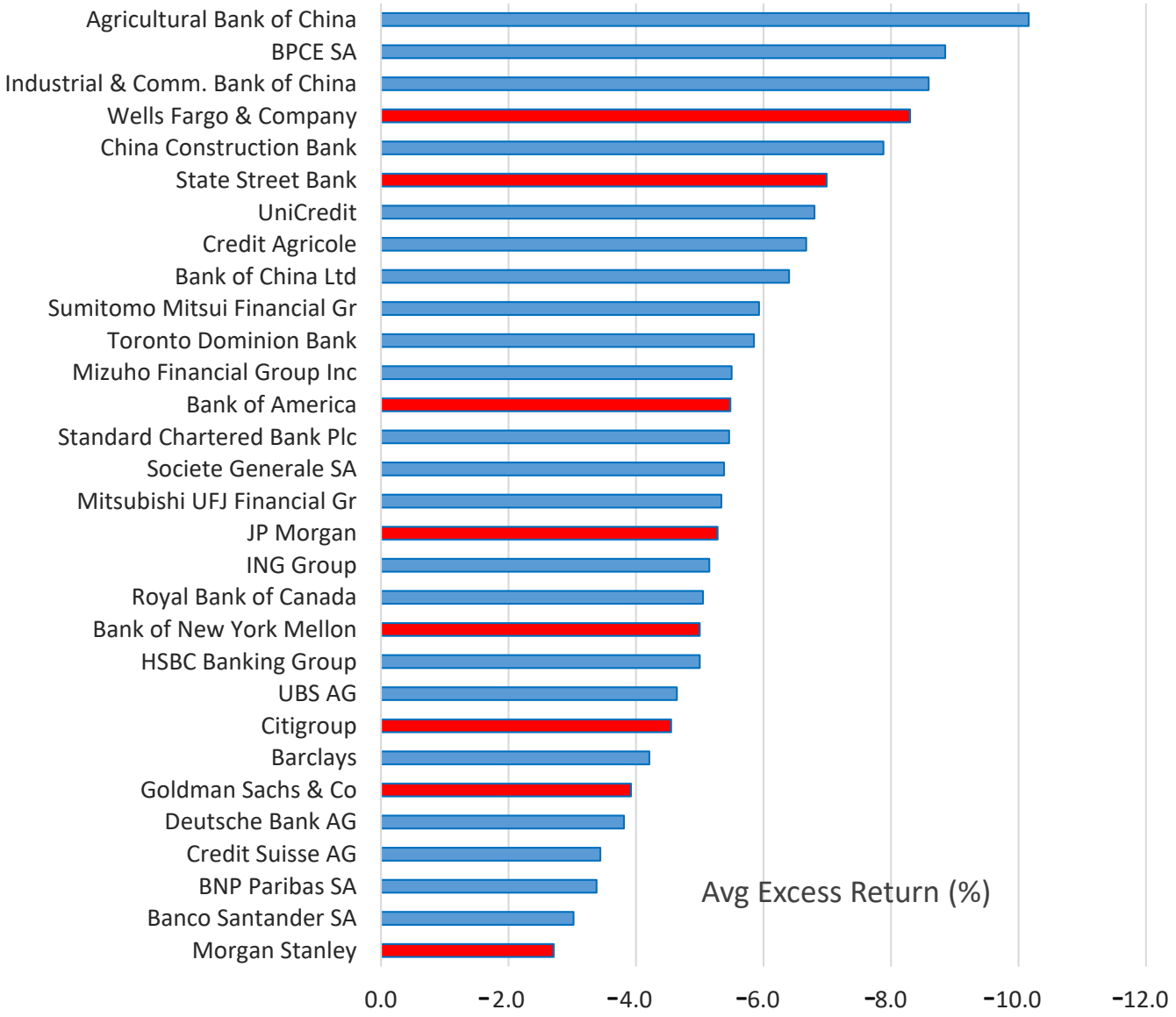


Significant variation across industry-level indices.



Airlines index return was **-57.3%** btw Feb 19-Mar 23

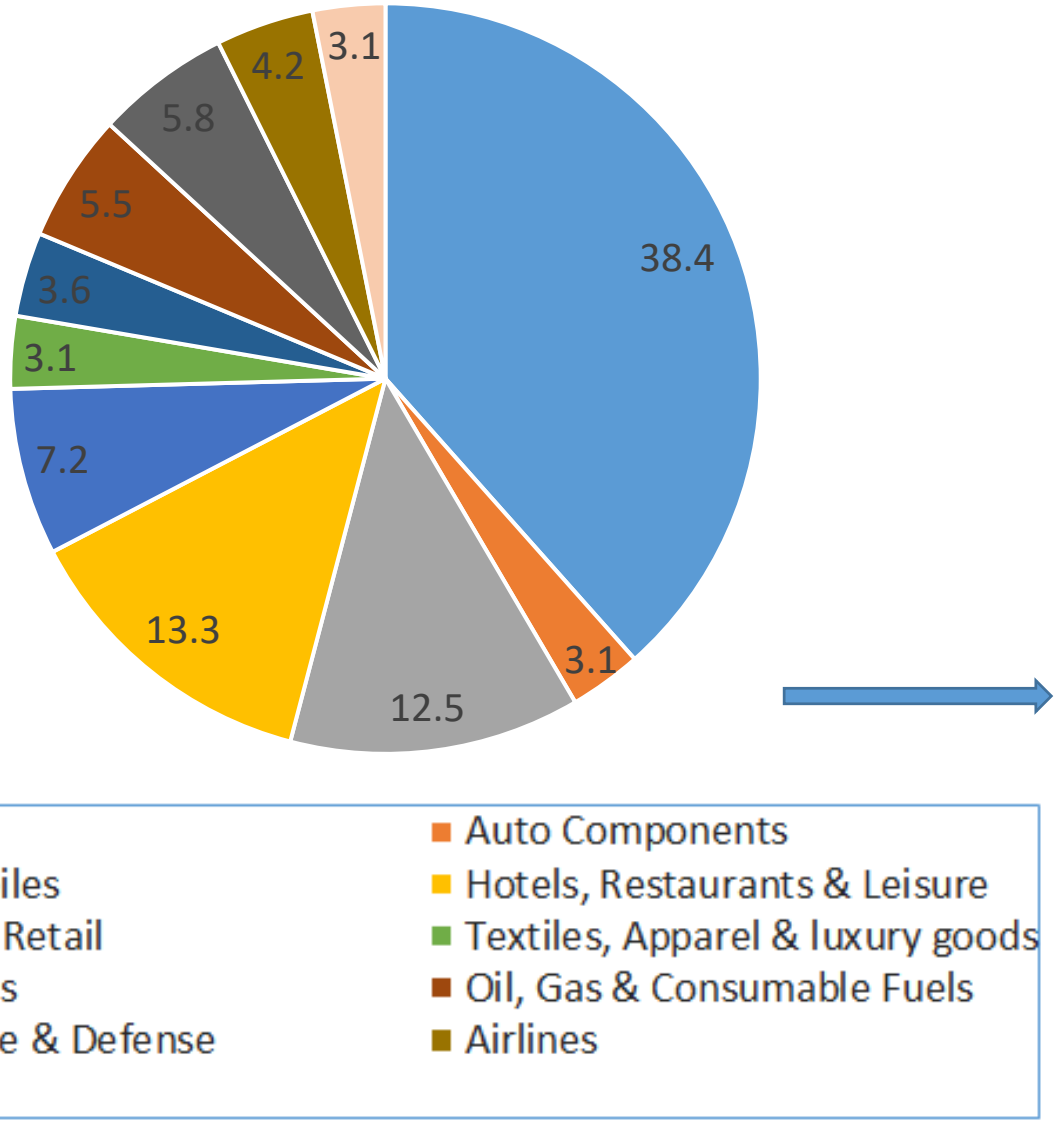
Borrower Heterogeneity: GSIB CLE Portfolio Average Excess Returns



Avg. excess return for the CL borrower portfolio of each bank

- All GSIBs: -5.4% (median)
- -5.1% for US (heavy on energy, but generally diversified)
- -5.5% for Japan (3 banks)
- -5% for UK (3 banks)
- -6% for France (4 banks)
- -8.2% for China (heavy on many vulnerable sectors: energy, auto, and hotels, restaurants & leisure)

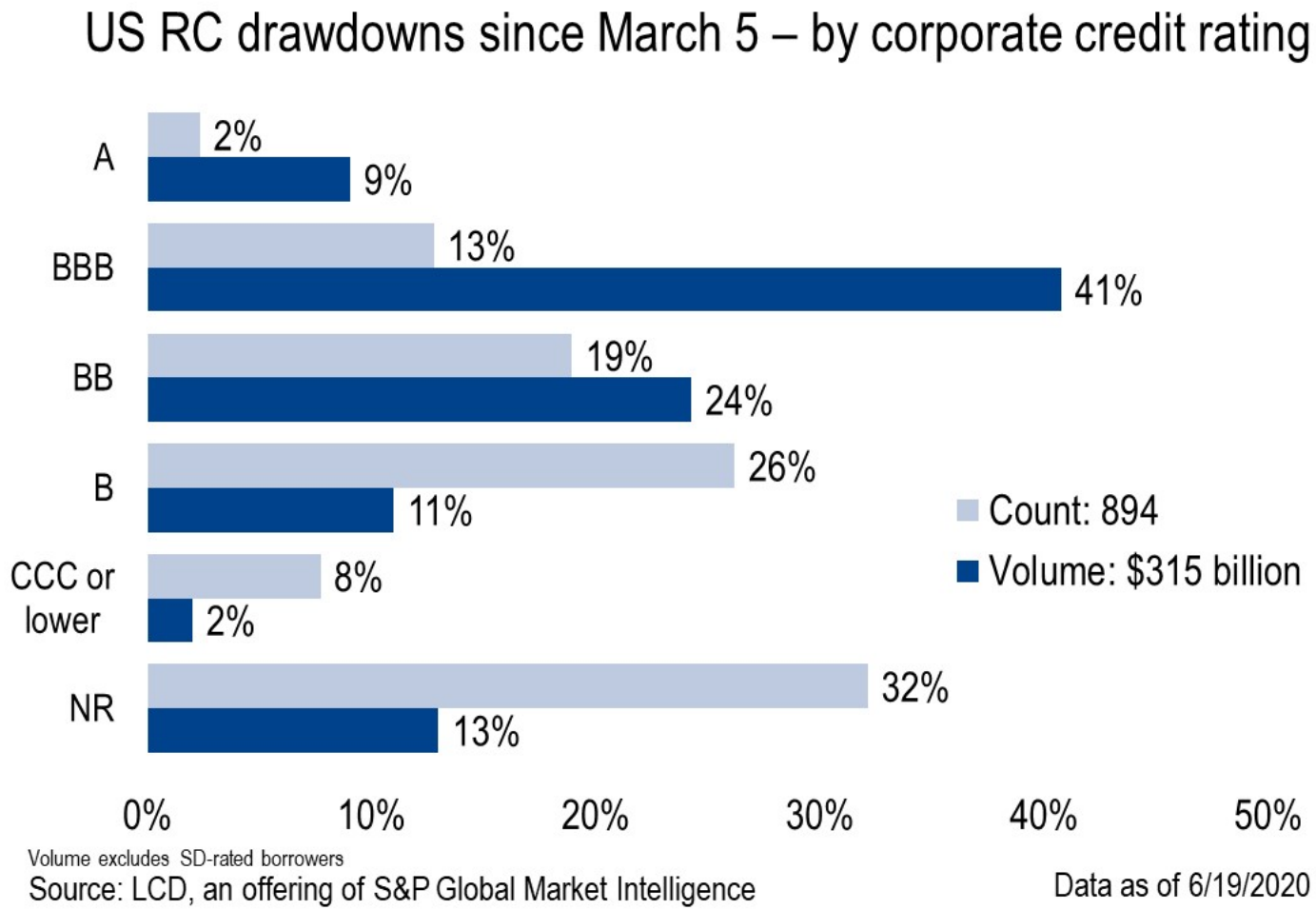
Sectoral Breakdown of CLDDs



- 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)"

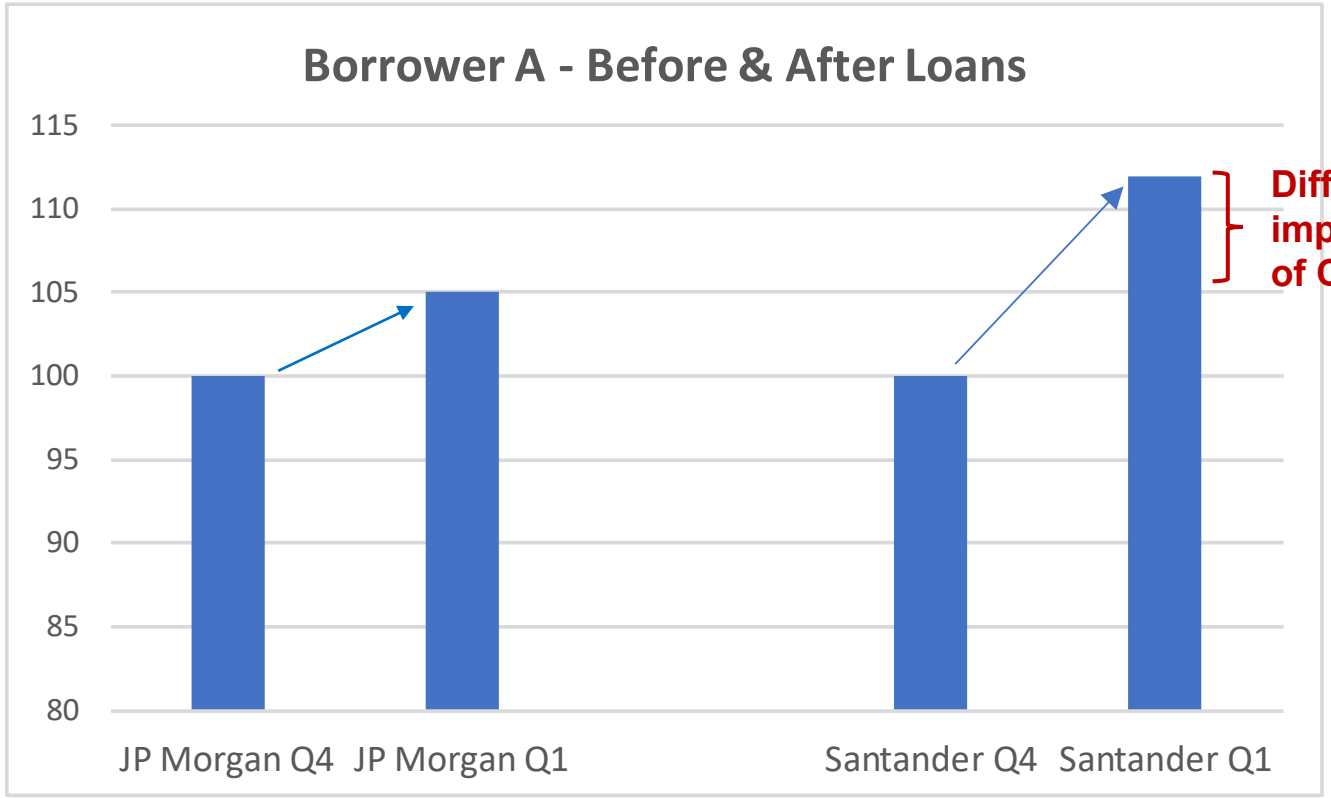
Ratings Breakdown of CLDDs



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

Results from DealScan: Extensive margin

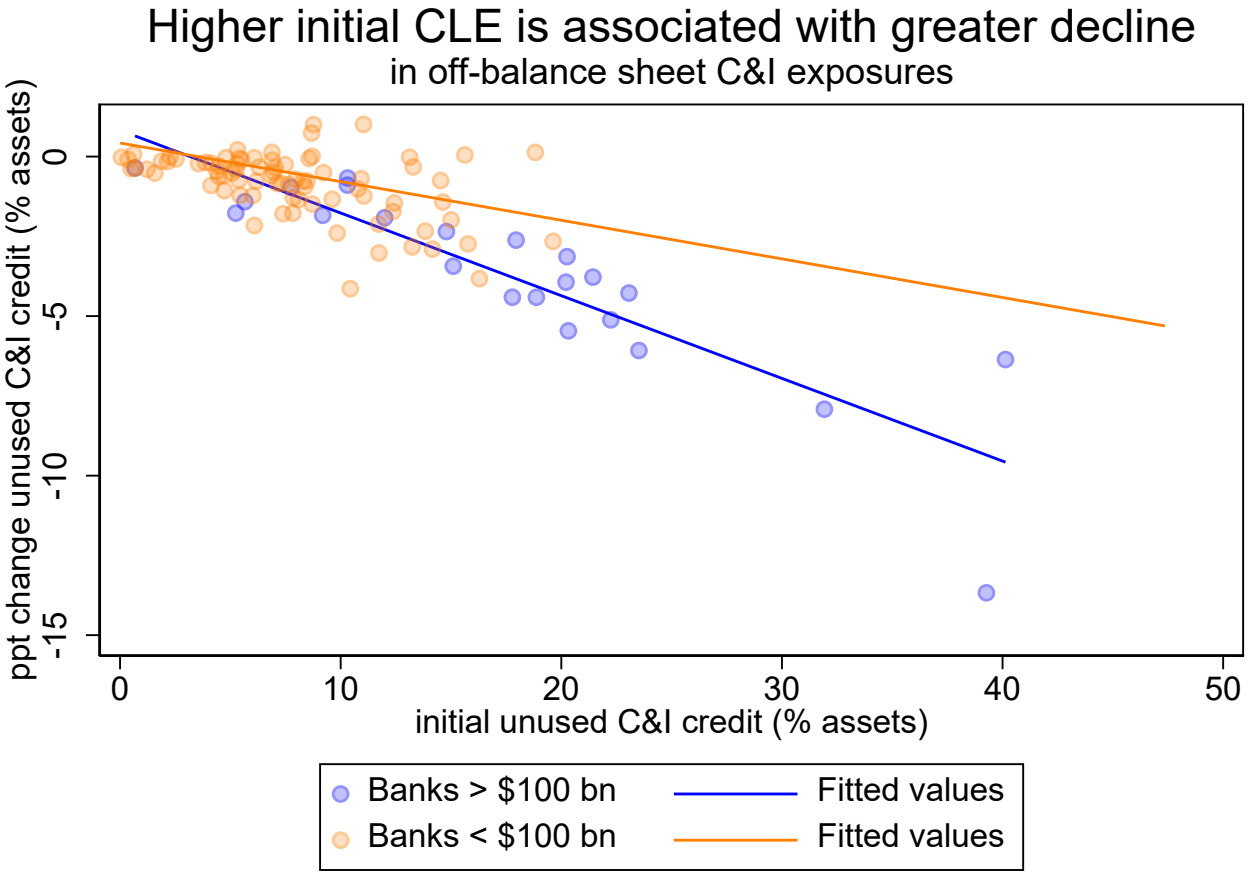
CLEs and the probability of renewing falling-due loans and starting new lending relationships.

	(1)	(2)	(3)
	Probab(renewal)	Probab(renewal of CL with CL)	Probab(new relationship)
Credit line exposure (CLE)	-0.0016***	-0.0030**	-0.0017***
	(0.000)	(0.001)	(0.001)
Bank controls	yes	yes	yes
Observations	5,989	4,191	20,228
R-squared	0.002	0.005	0.161

Dependent variable: Columns 1-2 examine the probability of loan renewal for bank-firm pairs in a lending relationship involving a loan falling due in 2020Q2. Column 3 examines the probability of new relationship formation (compared to existing relationships formed in the previous 5 years). Bank controls include: size (log-assets), Tier 1 capital ratio, ROA, and loan-to-asset ratio. The sample contains 30 GSIBs and the regressions are at the bank-firm level. Standard errors clustered on bank.
Sources: Refinitiv's Dealscan, Fitch Connect, S&P, Bloomberg.

- Higher CLEs are associated with a lower probability of loan renewal and new relationship formation
- Cols 2-3: One ppt increase in CLE ratio leads to 0.3% lower renewal probability and 0.17% lower probability of lending to new borrower.
- One st. dev. increase in the CLE ratio (5.7ppts) reduces the probability of loan renewal by 1.7% (mean: 12%, hence about 14%) and that of new lending relationship by close to 1% (mean: 11%, hence about 9%).

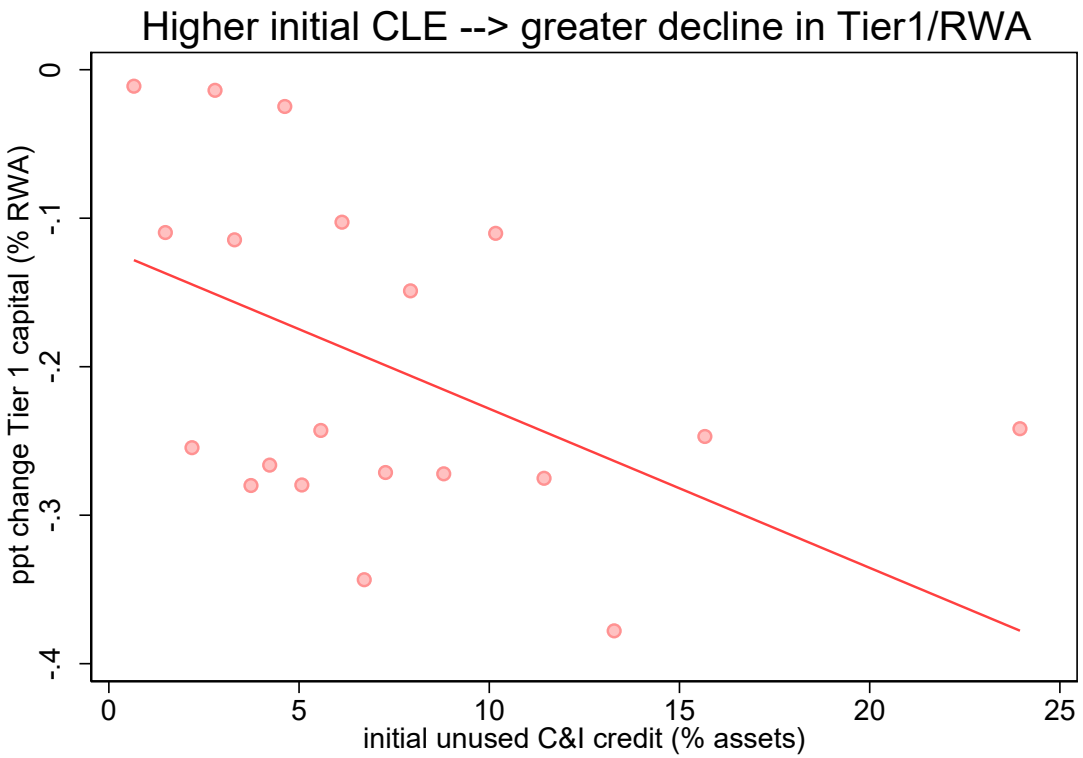
CLEs and CLDDs by Bank Size



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 the same variable (a proxy for CLDDs) between 2019Q4 and 2020Q1. Sample: 506 banks. Sources: Call Report.

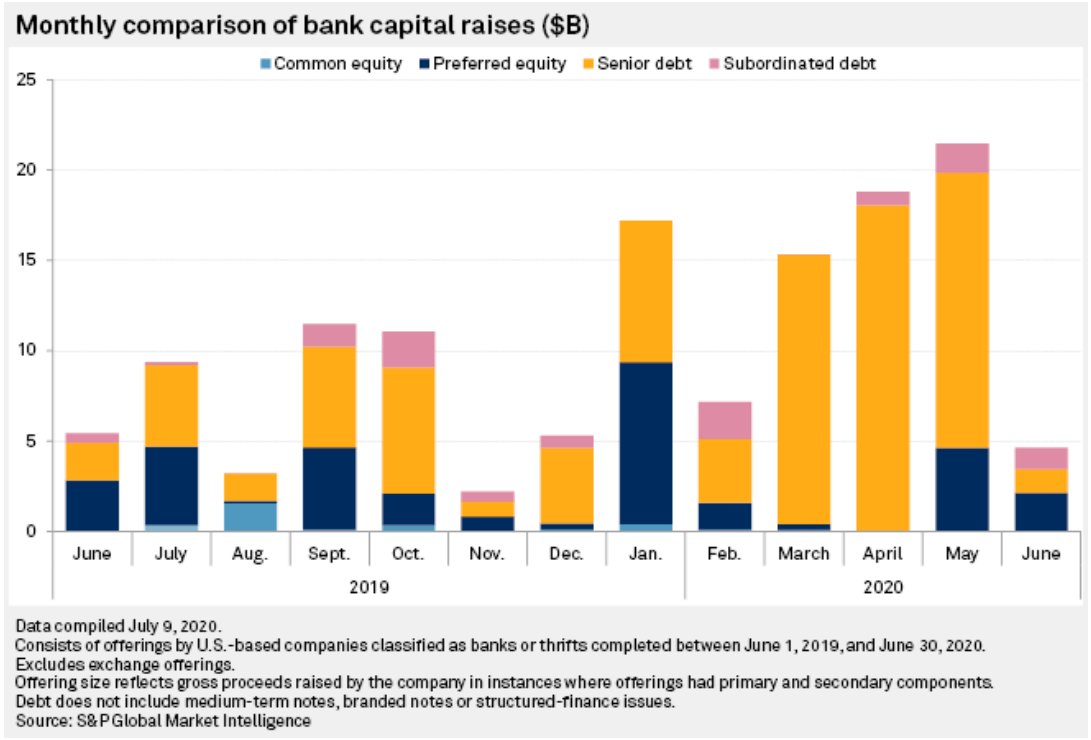
CLEs and Capital Erosion

CLEs and change in Tier 1 capital ratios



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.

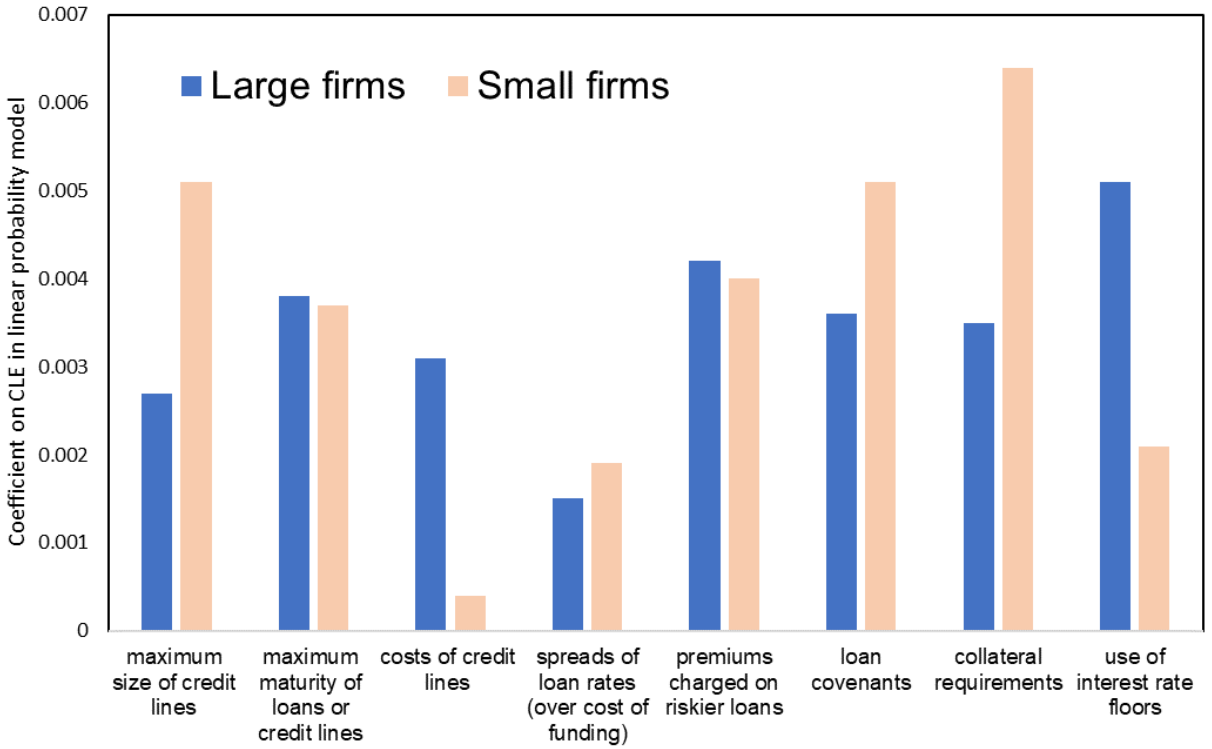
Capital issuances by banks 2019Q2-2002Q2



Source: S&P Global Market Intelligence.

Results from SLOOS (Terms of Lending)

CLEs and the probability of tightening lending **terms** on C&I loans



The chart shows coefficients on CLE in linear probability models (with the same regression specification as in col 1 of table on previous slide) linking the probability of reporting tighter terms of lending to CLE. Source: April and July 2020 Senior Loan Officer Opinion Survey, Refinitiv's Dealscan.

- Higher CLEs are associated with greater likelihood of reporting tighter terms of lending
- With few exceptions, the impact of CLEs on tightening is generally stronger vis-à-vis small firms
  - maximum size of credit lines
  - covenants, collateral
- The most statistically robust results are for:
  - higher premiums on riskier loans
  - covenants, collateral