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

Third Conference on Financial Stability

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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.

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.

Motivation

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

**Total New Syndicated Loans**

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.
Mechanisms

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)

• 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 bank-level local exposure to pandemic intensity (weighted by the bank’s geographic footprint)
    • Control directly for loan demand using banks’ survey responses

• Evidence across multiple data sets
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
Data Has Good Coverage of U.S. Bank Loan Market

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<thead>
<tr>
<th></th>
<th>Large banks</th>
<th>Small banks</th>
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<tr>
<td>Large firms</td>
<td>Syndicated loans, SLOOS surveys</td>
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<tr>
<td>Small firms</td>
<td>Y-14 small business lending, SLOOS surveys, PPP</td>
<td>PPP</td>
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</table>
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

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<td>Loan growth in 2020 Q2 and Q3</td>
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<tr>
<td>All</td>
<td>-2.3751***</td>
<td>-1.2840*</td>
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<td></td>
<td>(0.872)</td>
<td>(0.750)</td>
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<tr>
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<td>-1.536**</td>
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<td>(0.868)</td>
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<td>GSIB X US bank</td>
<td>-1.6766*</td>
<td>-2.1536**</td>
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<td>GSIB X non-US bank</td>
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<td>Firm country x industry</td>
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</table>

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

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<td>Probability of loan renewal in 2020 Q2 or Q3</td>
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<td>-0.0015**</td>
<td>-0.0004</td>
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<td>GSIB</td>
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</table>

- **CLE x US bank**
  - -0.0041***
  - (0.001)

- **CLE x non-US bank**
  - -0.0035*
  - (0.002)

- **Observations**
  - 8,857

- **R-squared**
  - 0.083

- **Bank controls**: Yes
- **Firm country FE**: Yes
- **Firm industry FE**: Yes

- **Prob (loan renewal)**
  - Probability of loan renewal in 2020 Q2 or Q3

- **Prob (CL renewal with another CL)**
  - Probability of loan renewal during 2020:Q2-Q3

- **Results**:
  - Higher CLEs are associated with a lower probability of loan renewal, incl. new CLEs.
  - One st. dev. increase in the CLE ratio reduces the probability of loan renewal by 2.1%.

- Examine the link between ex-ante pre-pandemic CLEs and the probability of loan renewal during 2020:Q2-Q3.

2/ Evidence from U.S. Banks’ Small Business Loans

Banks’ credit lines exposures and the intensive/extensive margins of small business lending

<table>
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<tr>
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<td>CLs</td>
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<td>TLs</td>
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Columns 1-3 and columns 4-6 respectively examine the link between ex-ante CLEs and the number of small business loan accounts (log) and the $-value of small business loan commitments. The sample comprises large U.S. bank holding companies that report Y-14Q schedule A9 data (with more than $100 bn in assets). Bank controls include size, capital, ROA, loan/assets, and NPLs. Loan demand refers to a bank-level variable capturing the bank’s exposure to COVID pandemic intensity facing each bank (measured by state-level COVID-19 cumulative cases during March-July 2020 weighted by the bank’s market share based on deposit-taking activities in that state). Regressions are at the bank-loan portfolio segment level, where loan portfolio segments are groups of loans of the same type (credit line, term loan, or other) and borrower risk (FICO score or delinquency rate). Standard errors clustered on bank. Sources: Refinitiv’s Dealscan, Federal Reserve Y-14Q, US Call Reports, FDIC Summary of Deposits, JHU COVID-19 tracking website.

- Y-14 data on small business loans <$1mn from large U.S. banks. Data for similar loans by loan type and borrower risk are grouped into “loan portfolio segments”
- Sample: ~ 20 large U.S. bank holding companies lending to small businesses across 180 loan segments

Result:
- Banks with larger CLEs curtailed the supply of small business loans
- Placebo with 2019 outcomes show not association between CLEs and lending
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

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<td></td>
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<td>CLE</td>
<td>0.0064***</td>
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<td>0.0040*</td>
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<td>(0.002)</td>
<td>(0.002)</td>
<td>(0.002)</td>
<td>(0.002)</td>
<td>(0.001)</td>
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<tr>
<td>Observations</td>
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<td>45</td>
<td>42</td>
<td>43</td>
<td>165</td>
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<tr>
<td>R-squared</td>
<td>0.364</td>
<td>0.610</td>
<td>0.161</td>
<td>0.356</td>
<td>0.057</td>
</tr>
</tbody>
</table>

A. To small firms

| Observations        | 44       | 48       | 45       | 47       | 180       |
| R-squared           | 0.288    | 0.096    | 0.278    | 0.214    | 0.052     |

B. To large firms

| Observations        | Yes      | Yes      | Yes      | Yes      | Yes      |
| R-squared           | 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)**

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<td>-0.0054**</td>
<td>-0.0055**</td>
<td>-0.0059**</td>
<td>-0.0029*</td>
<td>0.0016</td>
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<td>(0.002)</td>
<td>(0.002)</td>
<td>(0.002)</td>
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<td>yes</td>
<td>yes</td>
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<td>yes</td>
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<tr>
<td><strong>Borrower state*week</strong></td>
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<tr>
<td><strong>Borrower industry*week</strong></td>
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<td>yes</td>
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<td>yes</td>
<td>yes</td>
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<td>292,793</td>
<td>227,635</td>
<td>65,158</td>
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<td><strong>R-squared</strong></td>
<td>0.474</td>
<td>0.495</td>
<td>0.528</td>
<td>0.265</td>
<td>0.921</td>
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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

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<td>Bank cites the following reason for tightening C&amp;I lending standards: own liquidity own capital lower own liquidity own capital lower position position for risk position position for risk</td>
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A. Full period (2020:Q1-Q3)  B. By Quarter

<table>
<thead>
<tr>
<th></th>
<th>CLE</th>
<th>CLE x 2020:Q1</th>
<th>CLE x 2020:Q2</th>
<th>CLE x 2020:Q3</th>
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<td>(0.000)</td>
</tr>
<tr>
<td>(3)</td>
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<td>0.0036**</td>
<td>0.0084***</td>
<td>0.0036*</td>
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<td>(0.000)</td>
<td>(0.001)</td>
<td>(0.002)</td>
<td>(0.002)</td>
<td>(0.002)</td>
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</table>

Bank controls: Yes Loan demand: Yes Observations: 129 R-squared: 0.127

• 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.)

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.
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
Evidence from the SLOOS: Loan terms

**Dep. Var.**: Dummy for banks that report tightening specific loan terms

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

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: Federal Reserve Senior Loan Officer Opinion Survey, Refinitiv’s Dealscan.
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.
• 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.
• 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

- 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)”
Little Correlation Between CLDDs and Firm Rating

US RC drawdowns since March 5 – by corporate credit rating

- A: 2% (9%)
- BBB: 13% (41%)
- BB: 19% (24%)
- B: 11% (26%)
- CCC or lower: 8% (2%)
- NR: 13% (32%)

Count: 894
Volume: $315 billion

Volume excludes SD-rated borrowers
Source: LCD, an offering of S&P Global Market Intelligence
Data as of 6/19/2020
No Correlation bw CLDDs and Initial Bank Health

Note: This figure depicts the lack of correlation between credit line drawdowns measured as the change in unused loan commitments (% total bank assets) between 2019Q4 and 2020Q1 (in ppts), and initial bank health (measured at end-2019Q4). Bank health is measured with four metrics: Tier 1 ratio (Panel A), liquidity (securities-to-asset) ratio (Panel B), net charge-offs (panel c), and non-performing loan ratio (panel d). The sample comprises all banks with available data. In all panels, bubble size is proportionate to bank size. Source: Call Report.
• 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 identification strategy

Khwaja-Mian (2008) approach to controlling for demand

Differential impact of CLEs
Example: CLE and CL drawdown

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

<table>
<thead>
<tr>
<th>Deal Date</th>
<th>Maturity</th>
<th>Loan Type</th>
<th>Purpose</th>
<th>Deal Amount ($mm)</th>
<th>Lenders</th>
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<tr>
<td>8-Nov-19</td>
<td>5 yrs</td>
<td>Revolver/Line &gt;= 1 Yr.</td>
<td>Corp. purposes</td>
<td>1,643</td>
<td>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)</td>
</tr>
<tr>
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<tr>
<td>8-Nov-19</td>
<td>5 yrs</td>
<td>Revolver/Line &gt;= 1 Yr.</td>
<td>Corp. purposes</td>
<td>450</td>
<td>...</td>
</tr>
</tbody>
</table>

Nov 2019  
Origination 
Look-forward date 

Mar 2020  

Oct 2024  
Maturity Date

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

<table>
<thead>
<tr>
<th>Date</th>
<th>Borrowing Amount $mm</th>
<th>Capacity $mm</th>
<th>Rating on Date Drawn (S&amp;P/M)</th>
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<td>4/1/2020</td>
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<td>450</td>
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<tr>
<td>4/1/2020</td>
<td>750</td>
<td>750</td>
<td>B/Ba1</td>
<td>Fully drawn</td>
</tr>
</tbody>
</table>
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.

Higher initial CLE is associated with greater decline in off-balance sheet C&I exposures

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**

Higher initial CLE --> greater decline in Tier 1/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 2019Q2-2002Q2**

Monthly comparison of bank capital raises ($B)

Source: S&P Global Market Intelligence.