

# “Stress Test” for Banks as Liquidity Insurers in a time of COVID

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## *Abstract*

The unfolding events associated with the COVID-19 virus will likely put the liquidity insurance function of banks for the U.S. economy to a real-life test. Stock prices have markedly declined and credit market conditions have severely tightened; firms typically respond to such outcomes by exercising their liquidity insurance and drawing down their credit lines. Using two “stress tests,” specifically, the experience from U.S. firms’ draw-down behavior during the last two recessions and during the 2008-2009 global financial crisis (GFC), we assess that the quantum of credit commitments likely to move onto banks’ balance sheets can be managed given the healthier capitalization of banks relative to pre-GFC. However, in a severely adverse scenario, for example, due to steeper stock market corrections that coincide with other shocks eroding bank capital, the Tier 1 capital to risk-weighted assets ratio of banks will likely move closer on average to the regulatory minimum of 8% and for some banks well below 8%. Given the pace and scale of present market corrections and the already accelerating credit line usage over the last two weeks, regulators should plan in advance for such a severe stress test by ensuring that banks prevent any further capital depletion through dividend payouts or share buybacks.

## *Introduction*

During the last few weeks, the spread of the COVID-19 virus has rattled the global economic prospects and financial markets. Growth and employment forecasts for the global economy have been revised substantially downward to recession levels for the next two quarters; global stock prices have declined, especially for banks and other financial intermediaries; credit spreads have surged, notably for junk-rated paper in developed economies; and, central banks have reacted with substantial rate cuts and/or liquidity provision and asset purchase programs.

The root of the present stress is different compared to the primary cause of the 2008-2009 global financial crisis (GFC). Importantly, the present stress did not originate in the banking system as was the case for GFC; pre-GFC, the banking system was over-leveraged with poor underwriting decisions in the housing sector, and the household sector was over-leveraged too. Presently, the root cause is a pandemic; containing the virus and the drastic (social distancing to isolation) steps that governments need to undertake contribute as an immediate impact on the real economy through the simultaneous occurrence of both demand and supply shocks, with attendant financial sector spillovers and side-effects such as the oil-price war. In particular, debt repayments will come due as usual, but liquidity appears to be quickly evaporating for both small and large companies as economic activity grounds to a virtual halt.

In spite of their better capitalization and liquidity position relative to pre-GFC, the banking sector in developed economies, notably in the United States, has already been severely under pressure as bank stock prices have declined about 40-50%. One important reason behind this

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could be the role of banks as liquidity insurers for the real economy. While non-bank financial institutions took over a large share of corporate financing over the past decade, particularly of highly leveraged firms, banks remain the main source of liquidity insurance for all firms – investment-grade, non-investment grade and also unrated firms. Indeed, as leveraged loans and bonds financed by the non-bank financial sector come due, firms may draw down on the bank lines of credit, causing credit to re-intermediate (involuntarily) to the banking system.

In other words, if firms experience liquidity problems or are uncertain about future liquidity needs or availability, they might use the insurance arranged with banks and start drawing down their credit lines. Worse, liquidity needs can potentially become highly correlated among firms and they could start running upon their banks *en masse*. Banks could then experience substantial liquidity problems themselves, which could be further elevated if other short-term creditors of banks stop rolling over their funds.<sup>3</sup> Moreover, draw-downs require additional bank capital as they manifest as loans on bank balance-sheets, constraining the ability to provide further – new – loans to the economy, and in some cases, potentially also bringing banks closer to insolvency. Liquidity problems can this way quickly morph into solvency problems.

It thus makes sense as a “liquidity stress test” to quantify the likely insurance function banks may have to provide involuntarily at this stage of the COVID-19 scenario and how large it looks relative to their balance-sheet buffers in terms of capital and liquidity needs. It is also useful to investigate what the past stressed experiences for bank credit-line drawdowns can tell us about the likely outcomes in terms of financial markets and real lending.

### *Data*

We use data for non-financial firms headquartered in the U.S. to illustrate the nature of the present liquidity stress for banks. We obtain data on undrawn credit lines as well as balance sheet information from Capital IQ as of Q4 2019. Overall, our sample comprises 2,425 U.S. non-financial firms with non-missing information on outstanding credit lines. We do not condition on the nationality of banks, *i.e.*, liquidity insurance is provided by both U.S. as well as non-U.S. banks.

Figure 1a shows the industry distribution of our sample firms. Firms are highly concentrated with about 95% of all firms operating in five industries: 54% in manufacturing, 20% in the service industry, 9% in transportation, 7% in mining, and 4% in wholesale.

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<sup>3</sup> See, e.g., Ivashina and Scharfstein (2010) and Acharya and Mora (2013) about liquidity-shortfalls at U.S. banks during 2007-08 GFC, and Acharya and Steffen (2015) in relation to the “slow run” by U.S. money-market funds on European banks in the fall of 2011.

Industry distribution of US non-financial firms  
(Q4 2019)

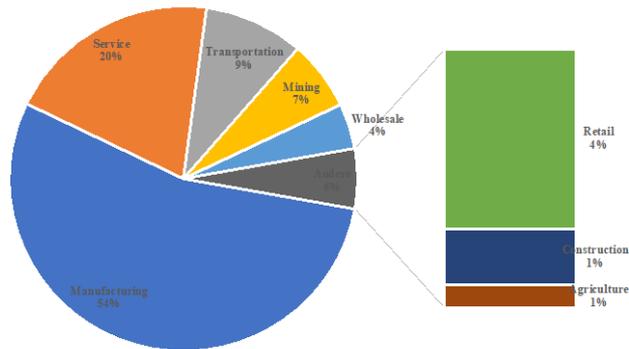


Figure 1a. Industry distribution of U.S. non-financial firms with undrawn credit lines

### Quantifying the liquidity insurance of U.S. non-financial firms

The total amount of outstanding credit lines at the end of 2019 is **USD 958 billion**, *i.e.*, on average, each firm in our sample has about USD 397 million outstanding loan commitments. Assuming that firms have not significantly drawn down these commitments in the first 1 ½ months in 2020, this is the amount of liquidity insurance banks had provided to the U.S. non-financial firms when the COVID-19 outbreak started. The outstanding amount of undrawn credit lines represents, on average, 81% of total committed credit lines and is about 8 times the amount of bank debt that is already on firms' balance sheets at the end of 2019.

Figure 1b shows the rating distribution of these U.S. non-financial firms as of Q4 2019. 70% of firms are unrated, 18% non-investment grade rated, 8% BBB rated, and only 4% are AAA/AA or A-rated. The construction sector has the largest share of credit lines outstanding to non-investment-grade rated firms (43%), followed by the services industry (39%) and then by mining (35%).

Only 18% of firms in the manufacturing sector, which have the largest dollar amount of outstanding credit lines, are non-investment grade rated. However, this sector comprises a large number of firms that are BBB rated, *i.e.* these firms are at the investment-grade boundary. Their access to credit can worsen substantially if they are (close to being) downgraded, which might increase their demand for liquidity.

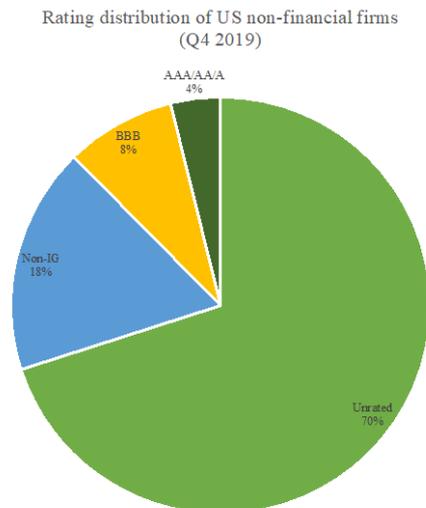


Figure 1b. Rating distribution of U.S. non-financial firms with undrawn credit lines

Table 1 shows the bank exposure to undrawn credit lines by rating class of firms. More than 57% of the commitments are provided to firms either below investment-grade or which are at the investment-grade boundary; 27% only to high quality (AAA, AA or A rated) firms.

Rating	Credit Line	%
Unrated	\$146,807	15.3%
AAA/AA/A	\$257,444	26.9%
BBB	\$323,255	33.7%
Non-IG	\$230,753	24.1%
	<b>\$958,260</b>	

Table 1. Exposure by rating class

Why is this important? Because not all firms are equally likely to use their liquidity insurance. Firms exercise their tradeoff between using insurance now versus saving it for later; low-quality firms, however, are in general more likely to draw down their credit lines when credit markets tighten as they are closer to their default thresholds. Another important implication is that if central bank support in the form of asset purchases is primarily geared towards high-rated firms' corporate bonds (as is usually the case), then it is again the low-rated segment of firms that is likely to rely upon the banking sector by drawing down its credit lines.

#### *Link between the commercial paper market and bank credit lines*

The liquidity insurance function of banks is intimately linked to the commercial paper market – a short-term, unsecured credit market for rated non-financial firms – that directly finances a wide range of economic activity. Many firms issue credit lines as a backstop at the same time they issue commercial paper, as credit lines are funds that are available through the banking sector if firms experience problems in refinancing their outstanding commercial paper. This form of credit “enhancement” enables the commercial paper to acquire credit rating that makes it eligible for investment by money-market funds.

Changes in the commercial paper rates can be used to gauge stress in the commercial paper market. For example, starting March 16, 2020, the rate of lower rated A2/P2 commercial paper increased from about 1.5% to 3.5%, and even the rates of highly rated A1/P1 commercial paper increased. To avoid a disruption in economic activity, the Federal Reserve

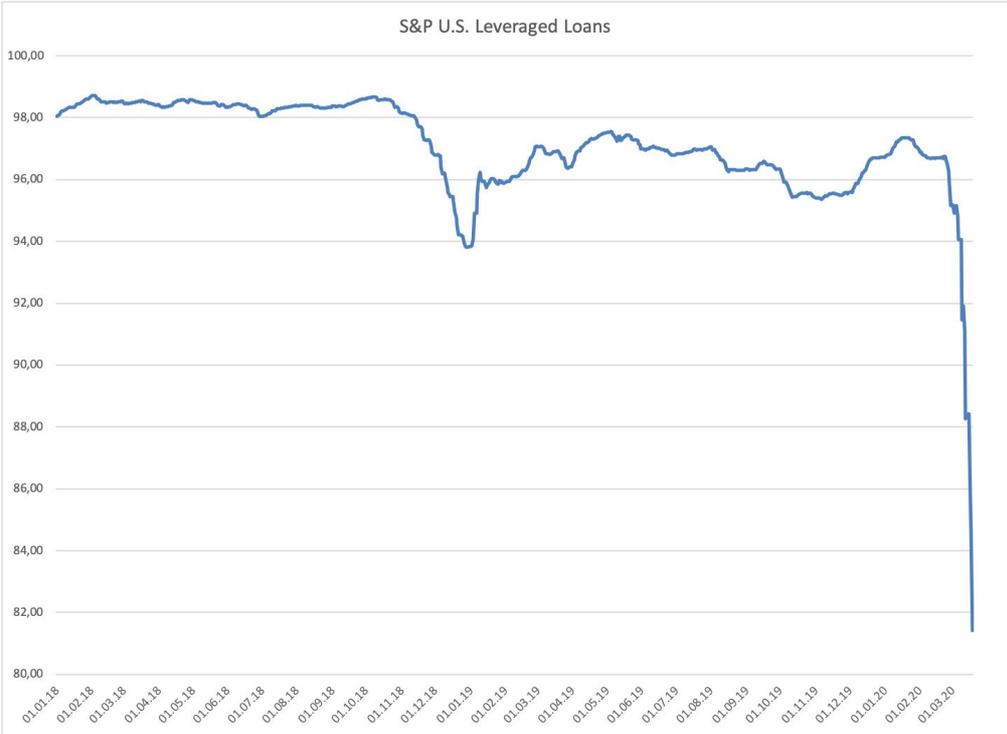
Board established a Commercial Paper Funding Facility (CPFF) by close of March 17, 2020 of USD 10 billion as credit protection against rollover risk.<sup>4</sup> This is aimed at allowing the commercial paper to get rolled over, reduce (any) money-market fund redemptions, and in turn, substantially reduce the likelihood that commercial-paper issuers will use their liquidity insurance and draw-down bank credit lines.

At the end of 2019, the U.S. firms in our sample had a combined volume of outstanding commercial paper of about USD 131 billion. Even if we assume that this is fully backed by credit lines which firms do not intend to use or are unlikely to use given the Fed backup of the commercial paper market, the remaining exposures to credit lines is nevertheless still quantitatively large at USD 887 billion as this amount might potentially get drawn down.

*Credit markets*

Credit markets have also come under stress since the outbreak of the crisis. Figure 2 shows the LSTA Leveraged Loan Index since January 2018 which shows the daily price of the index that contains about USD 1.5 trillion outstanding leveraged loans. Loan prices have dropped by 9 percentage points (or more than 10%) within a few days.

Saunders et al. (2020) show that changes in the spreads of secondary loans forecast business cycle activity in the U.S. (GDP, employment and investment) because they reflect loan supply conditions in the primary loan market that feed into the well-being of the real sector. Loan market spreads contain additional information *vis-à-vis* other credit spread measures such as bond spreads, as the loan market features a different borrower segment compared to the one that accesses bond markets, in particular, firms that feature higher default risk and whose access to external funding is more limited compared to other firms (for example, unrated firms). In other words, tightened spot credit market conditions might encourage particularly these firms to draw upon their bank credit lines.



<sup>4</sup> <https://www.federalreserve.gov/newsevents/pressreleases/monetary20200317a.htm>

Figure 2. U.S. leveraged loan index (LSTA)

*How much do firms draw down their credit lines?*

Berg et al. (2016) provide some evidence as to which firms utilize their credit lines using U.S. data over the 1986 to 2011 period. Table 2 (from this paper) shows the percentage draw-down of firms as a function of their respective stock market performance over the last 12 months. Using average draw-down rates over the long time-series of 25 years allows the authors to use information from two recessions, the 2002 to 2003 period as well as the GFC.

**Panel A: Measuring economic performance via equity returns**

Quintile	IG	Non-IG	Not rated	Total
1 (Highest equity return)	18.45%	29.89%	28.62%	25.23%
2	20.18%	28.57%	29.65%	25.98%
3	22.64%	24.79%	32.60%	27.19%
4	19.97%	28.35%	34.53%	27.83%
5 (Lowest equity return)	20.20%	36.04%	43.20%	33.23%
Q5 – Q1	1.75%	6.15%**	14.58%***	8.00%***
t-stat	(1.07)	(2.35)	(7.71)	(6.71)

Table 2. Draw-down of credit lines of US non-financial firms

Berg et al. (2017) emphasize the sensitivity of credit line draw-downs of U.S. non-financial firms to changes in the performance of the S&P 500 index. For example, a 25% decline in the S&P 500 index over the previous 12 month increases the usage of credit lines by 5 percentage points (pp), a decline of 40% increases the usage by about 8 pp. Given an average usage rate of 24% during their sample period, an 8 pp increase in usage rates implies an increase of draw-downs of about one-third.

It is a reasonable “stress scenario” in the present context that firms will experience a stock performance consistent with the lowest quintile of equity returns shown in Table 2 for the two preceding recession periods. We can thus apply these historical draw-down patterns to the current environment as a liquidity stress scenario. Table 3 shows the calculation of the expected draw-downs of US firms, which amounts to about USD 264 billion based on the historical drawn-down rates and present outstanding amounts for undrawn credit lines.

Rating	Credit Line	%	Draw-down rate	Expected draw-down
Unrated	\$146,807	15.3%	43.2%	\$63,421
AAA/AA/A	\$257,444	26.9%	20.2%	\$52,004
BBB	\$323,255	33.7%	20.2%	\$65,298
Non-IG	\$230,753	24.1%	36.0%	\$83,164
	<b>\$958,260</b>			<b>\$263,886</b>

Table 3. Expected drawn-down vs. total exposure

Using average usage rates at the end of 2008 provides a similar picture (Table 4). Expected usage based on the 2008 draw-down rates is about USD 244 billion. Note that draw-down rates spiked around the Lehman Brothers default in Q3 2008 and already abated in Q4 2008, which explains the difference with the expected usage rates based on equity performance.

<b>Rating</b>	<b>Credit Line</b>	<b>%</b>	<b>Draw-down rate</b>	<b>Expected draw-down</b>
Unrated	\$146,807	15.3%	39.2%	\$57,549
AAA/AA/A	\$257,444	26.9%	17.0%	\$43,843
BBB	\$323,255	33.7%	23.8%	\$76,902
Non-IG	\$230,753	24.1%	28.5%	\$65,788
	<b>\$958,260</b>			<b>\$244,081</b>

Table 4. Expected drawn-down vs. total exposure – 2008 usage rates

If we even assume a 40% decline in the S&P500 index in a stress scenario, the predicted draw-downs would increase to about USD 312 billion, a 20-30% increase relative to the baseline calculations in Tables 3-4.

*How big is the estimated liquidity stress due to credit line draw-downs for the banking sector?*

While we do not know the identity of the banks providing the undrawn loan facilities that we analyze above, banks provide information regarding their aggregate undrawn commitments in their quarterly filing. We collected this information for the largest 100 U.S. banks at the end of 2019 from SNL Financial as well as other balance sheet characteristics.

Assuming that their outstanding commitments are drawn as assumed in Table 3 (using an average draw-down rate of 33.2%), banking sector Tier 1 capital ratio (defined as Tier 1 capital as a percentage of risk-weighted assets) declines from 12.7% to 11.8% on average as a result of loans being added to bank balance-sheets. In comparison, banks entered the GFC with substantially lower Tier 1 ratios (lower by more than 20% of the present levels). Given the better capitalization and liquidity position of U.S. banks and the additional liquidity that can be accessed through the Federal Reserve, a potential solvency problem for U.S. banks due to (even correlated) credit line draw-downs appears to be limited.

If the actual market performance scenario turns out to be more adverse than the scenario assumed in Table 2 for the weakest quintile by stock performance, or worse than the GFC, possibly because market corrections turn out to be far greater, then the resulting strain from credit line draw-downs on U.S. banks would bring them closer to the regulatory capital requirement. In fact, data collected by S&P Global Market Intelligence based on public company filings shows that 71 firms have almost fully drawn down their credit lines since March 5, 2020 (USD 73 billion out of USD 86 billion commitment). The draw-downs are concentrated in the most affected industries (Hotels, Restaurants and Retail) and concentrated among few large banks.

Thus, if we assume that firms *fully* draw-down their credit lines, banks' Tier 1 ratio would decline by 2 pp to 10.7%. There is some heterogeneity across banks as to how much their Tier 1 ratio declines with some banks even falling below the 8% capital ratio. Worse, this would be an extremely adverse liquidity stress scenario that might coincide with other stress factors eroding bank capital such as an increase in default rates on banks' loan portfolio. Realized volatility in some asset classes has risen to close to 100% and the volatility index VIX ("fear gauge") has reached levels of above 80 in March 2020, emphasizing the high level of uncertainty around COVID-19 fallout on financial markets going forward.

In summary, it is a testament to the success of the post-GFC reforms of the financial sector that the present levels of capitalization in the banking sector appear adequate to deal with liquidity stress tests that feature undrawn credit line withdrawals in line with past two recessions or the global financial crisis. Regulators should persist with the success of this

effort and plan in advance for possibly more severe stress, given the heightened uncertainty at present for the global economy and financial sectors. A minimum immediate regulatory response could be to preserve bank capital by ruling out any capital erosion from dividend payouts or share buybacks. Such capital preservation may even allow for countercyclical relaxation in capital requirements down the line should severe liquidity stress materialize.

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