

# (Pandemic) Stress Test

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29 April 2020, World Bank Webinar

# Topics

- Assessment/Recommendation for Paycheck Protection Program (PPP)

- Based on

“Targeting Paycheck Protection Program to Those Most in Need”

(with Manasa Gopal) and related op-ed in marketwatch.com

- Capital shortfall (SRISK) calculations with contingent liabilities

# Three Recommendations for the PPP

## 1. Target the program:

- Hubbard and Strain (2020) estimate the *“cost of replacing 80 percent of the revenue for three months of private-sector firms with fewer than 500 employees, excluding the manufacturing, health, education, and finance industries, to be \$1.2 trillion”*.
- A classification of businesses into fraction of jobs that can be done from home as in Dingel and Neiman (2020).
- How does the first round of PPP look like? Can it be made better?

# Initial analysis suggests targeting not great...

Granja, Makridis, Yannelis and Zwick (Chicago Booth Working Paper):

- Funds did not flow to areas more adversely affected by the economic effects of the pandemic, as measured by declines in hours worked or business shutdowns. If anything, funds flowed to areas less hard hit.
- The top-4 banks alone account for 36% of total pre-policy small business loans, but disbursed less than 3% of all PPP loans.
- Areas that were significantly more exposed to low-PPP banks received much lower loan allocations.
- Round-robin SBA algorithm? Approve a loan of each bank in a cycle?

# Three Recommendations for the PPP

1. Target the program: (remains a key issue!)
2. Extend the set of eligible lenders: (mostly done)
  - All banks, credit unions, non-bank small business lenders, FinTechs, ...
3. Make public granular data on loan applications and forbearance:
  - Some data provided by state, sector, loan size, etc. (not by bank)  
*Let sunshine be the best disinfectant!*

# Topics

- Assessment/Recommendation for Paycheck Protection Program (PPP)
- Capital shortfall (SRISK) calculations with contingent liabilities

- Based on

[“Stress Test” for Banks as Liquidity Providers in a time of COVID](#)

(with Sascha Steffen), [voxeu.org](http://voxeu.org)

[The Risk of Being a Fallen Angel and the Corporate Dash for Cash in the midst of COVID](#)

(with Sascha Steffen), COVI Economics: A Real Time Journal

# Why draw down credit lines?

“Freeze” in segments of commercial paper, bank loan and bond markets, ...

Borrowers are drawing down heavily on bank lines of credit anticipating that market sources of funding may dry up or get costlier, especially short-term commercial paper, creating stress on bank balance-sheets and liquidity conditions and contagion that could aggravate if stress worsens

<https://www.bloomberg.com/news/articles/2020-03-12/dash-for-cash-is-on-as-corporate-titans-draw-down-credit-lines>):

*“Companies are maxing out unused credit lines for extra liquidity. U.S. banks had a total of \$2.5 trillion of credit commitments to companies that weren’t used at the end of 2019, with two-thirds of provided by JPMorgan, BofA, Citi & Wells Fargo.”*

Can banks withstand “tsunami”  
of credit line drawdowns?

May be, but depends on how severe and wide-spread the stress is...

# “Stress Test” of Bank Credit Line Drawdowns based on past recessions

**Stress Scenario 1:** Firms will experience a stock performance consistent with last two preceding recession periods  
(all figures are in millions)

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>

**Stress Scenario 2:** Firms will use credit lines as they did at the end of 2008  
(all figures are in millions)

Rating	Credit Line	%	Draw-down rate	Expected draw-down
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>

# How big is this liquidity stress?

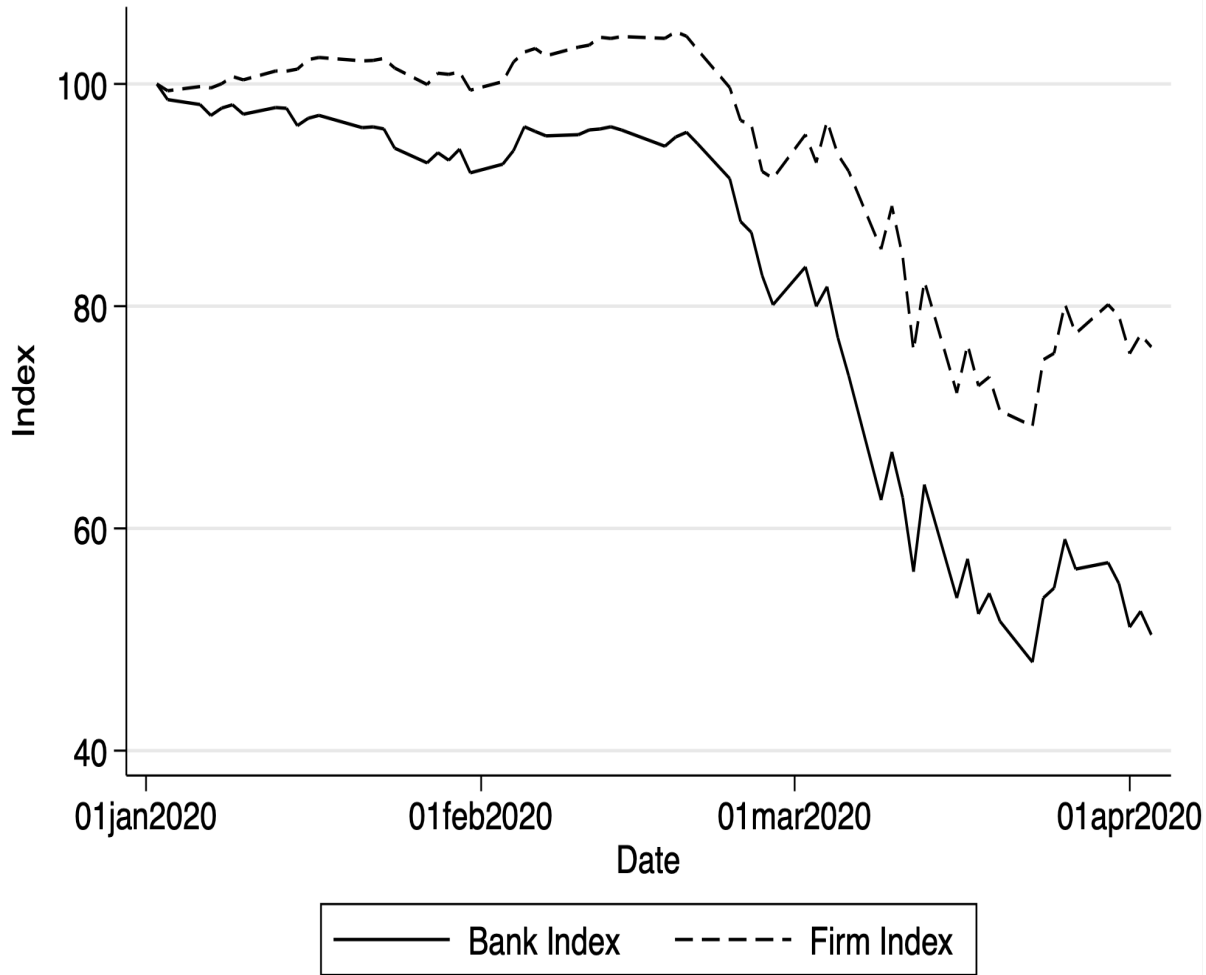
- We look at the 100 largest U.S. banks at the end of 2019, their capitalization and undrawn credit exposure
- If commitments are drawn down as in stress scenario 1, bank Tier 1 capital ratio (as % of risk-weighted assets) drops on average from 12.7% to 11.8%
  - Given better capitalization compared to 2008 and liquidity assistance from the Fed, this does not appear to become a solvency problem
- Extreme adverse scenario? A full draw-down reduces Tier 1 ratio to 10.7%
  - At this point, likely further erosion of their capital through higher default rates
  - Such scenario might bring banks closer to their regulatory minimum requirement

# How have things played out?

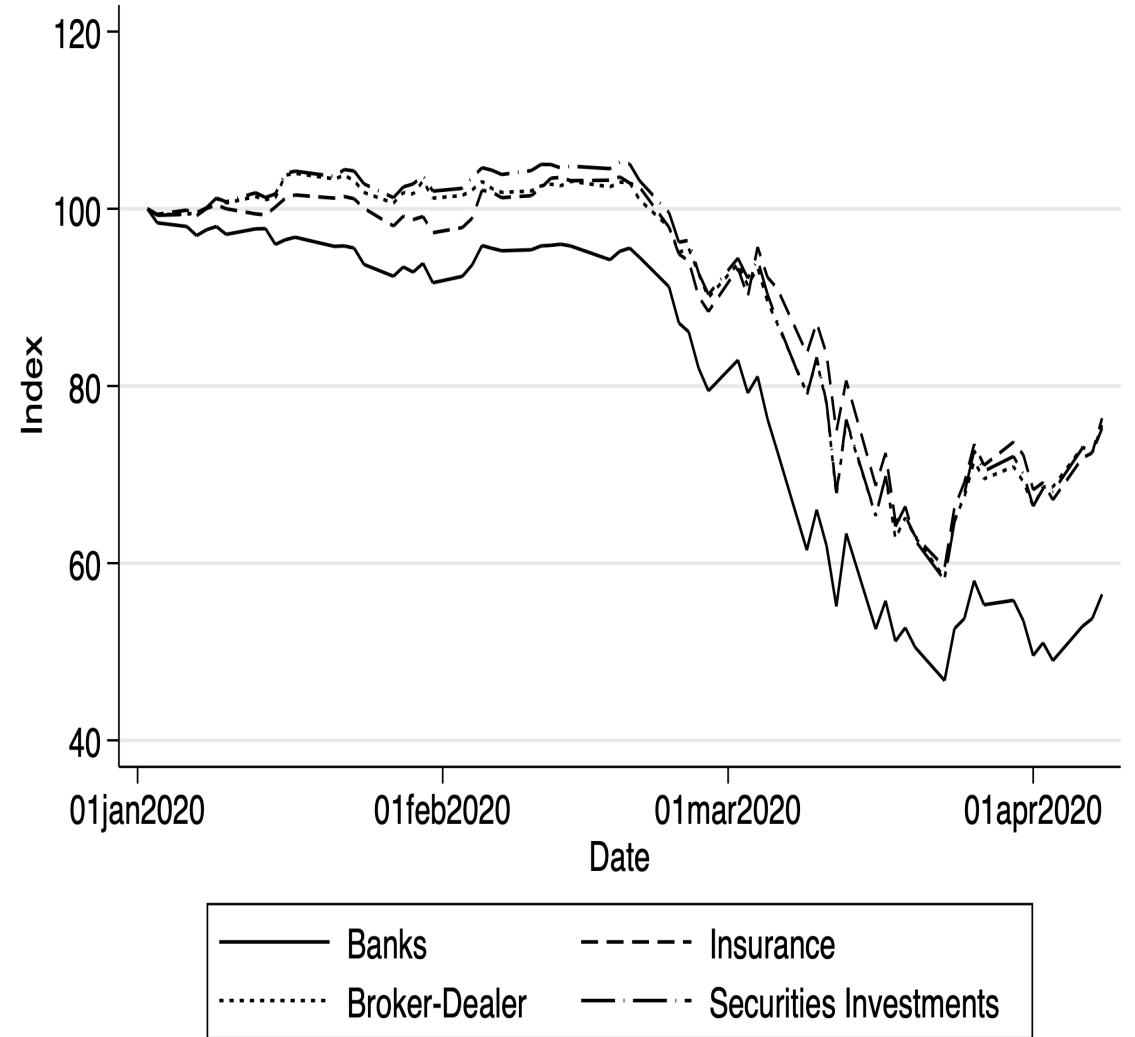
The short-term drawdown risk far more intense than past stress scenarios...

# Bank stock returns have done worse than firms and other financials

## Stock Index: Banks vs Firms

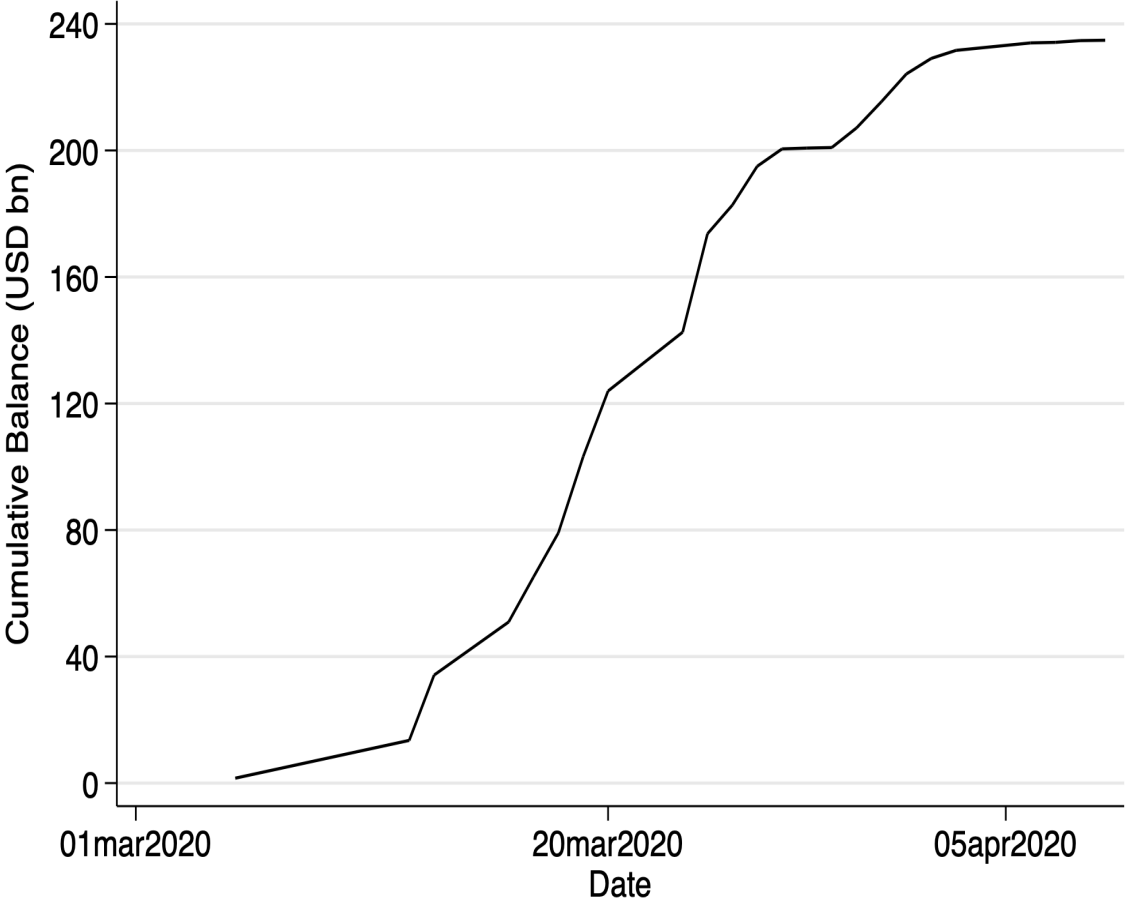


## Stock Price Performance: Banks vs Non-Bank Financials

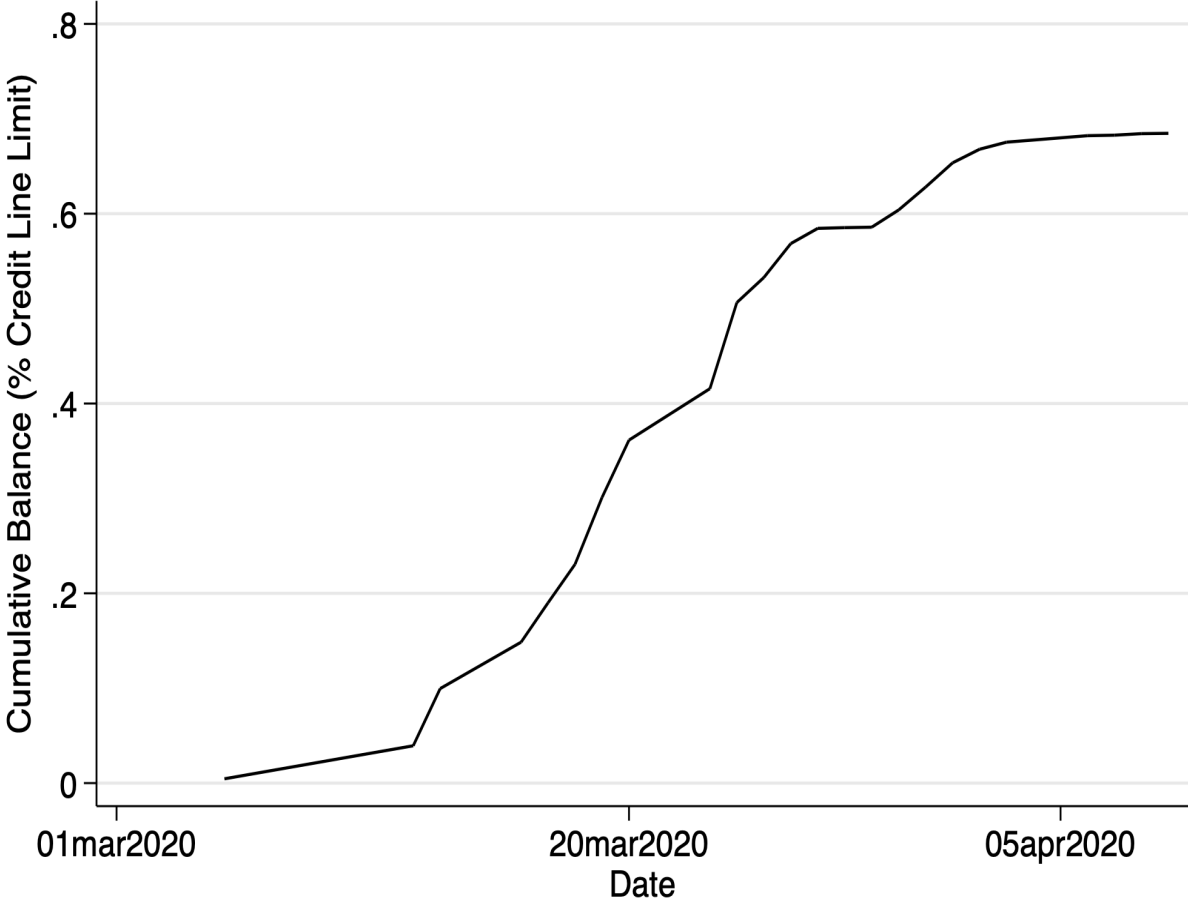


# Unprecedented drawdown rate on bank credit lines since early March

### Cumulative Drawdowns (USD bn)



### Cumulative Drawdowns (% Credit Line Limit)

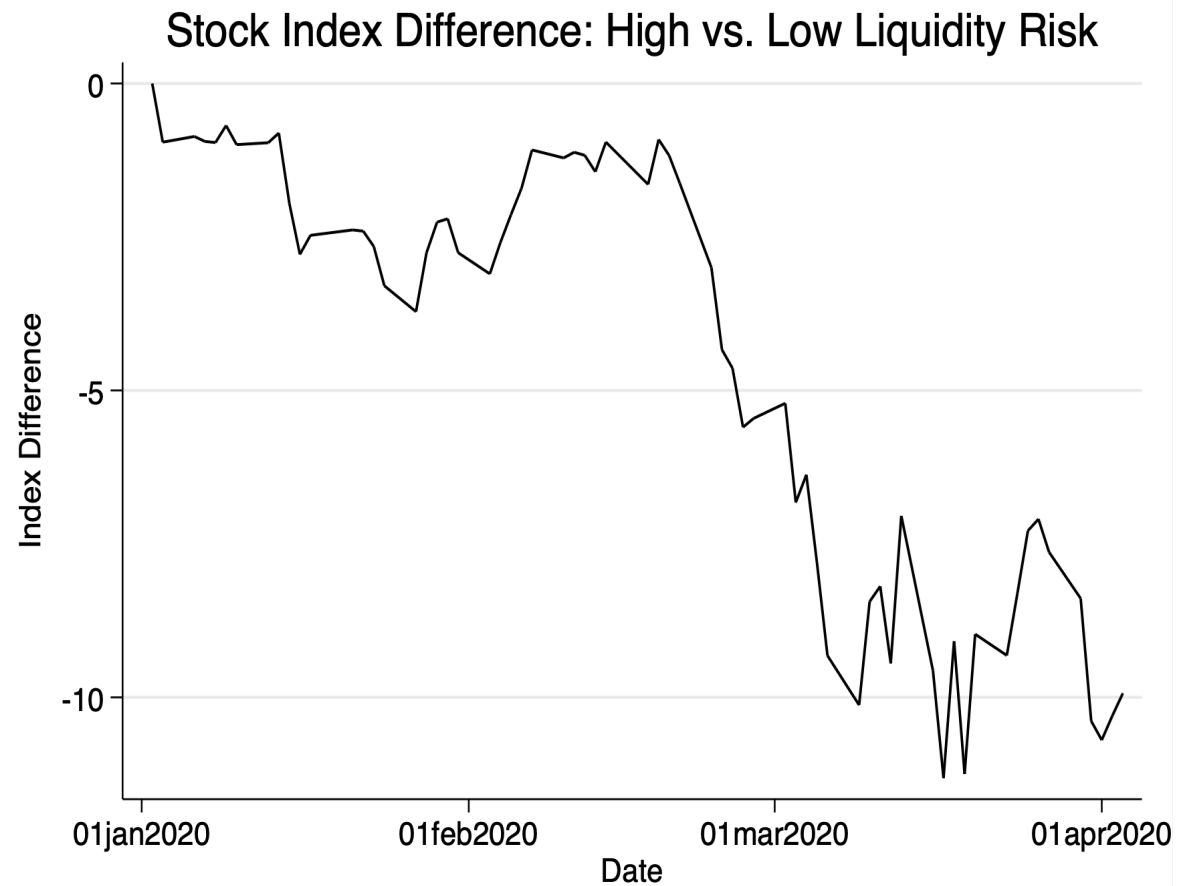
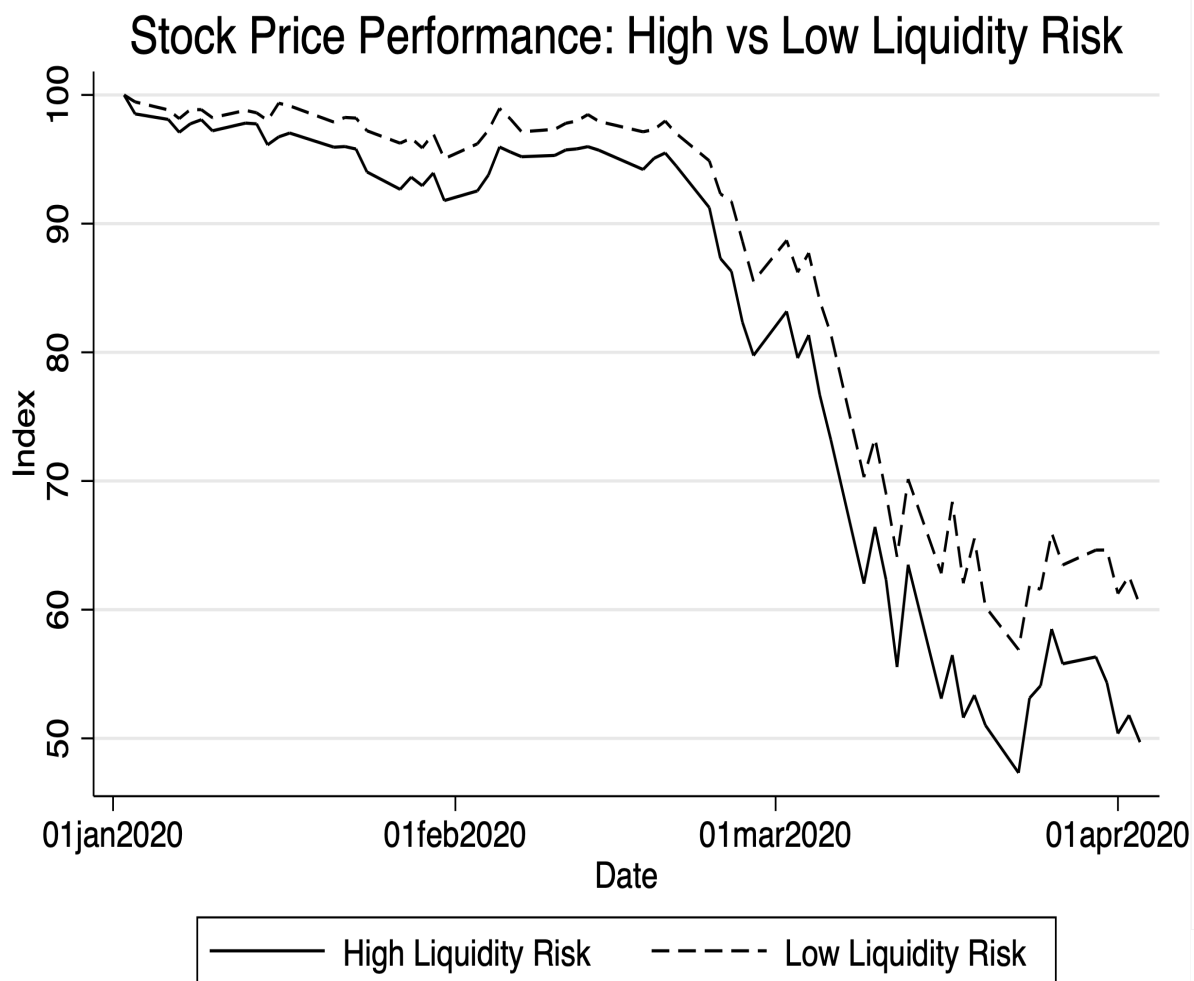


- *Unused Commitments*: The sum of credit lines secured by 1-4 family homes, secured and unsecured commercial real estate credit lines, commitments related to securities underwriting, commercial letter of credit, and other credit lines (which includes commitments to extend credit through overdraft facilities or commercial lines of credit).
- *Wholesale Funding*: The sum of large time deposits, deposited booked in foreign offices, subordinated debt and debentures, gross federal funds purchased, repos and other borrowed money.
- *Liquidity*: The sum of cash, federal funds sold & reverse repos, and securities excluding MBS/ABS securities

We construct a comprehensive measure of bank liquidity risk:

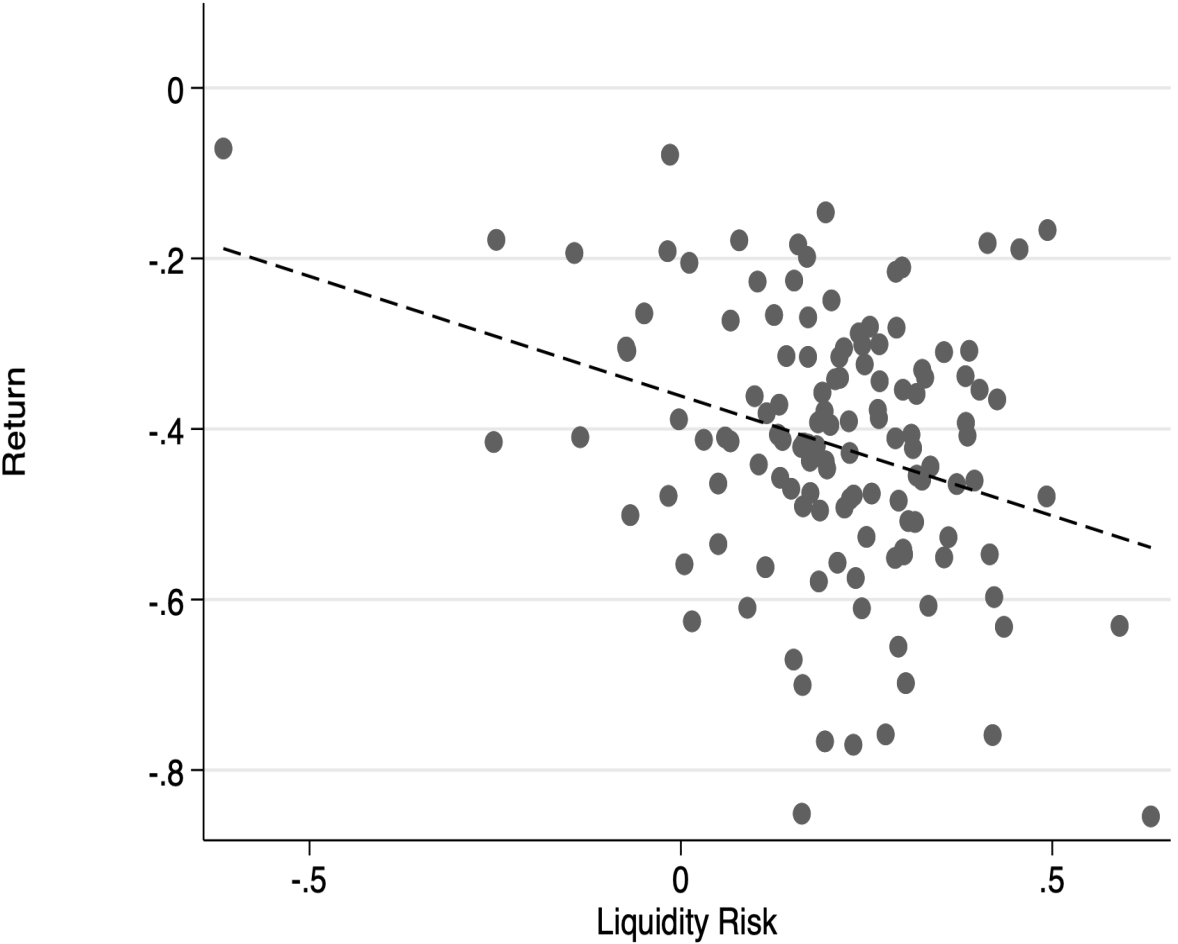
$$\text{Liquidity Risk} = \frac{\text{Unused commitments} + \text{Wholesale Funding} - \text{Liquidity}}{\text{Total Assets}}$$

# Relative bank stock return crash explained by ex-ante liquidity risk

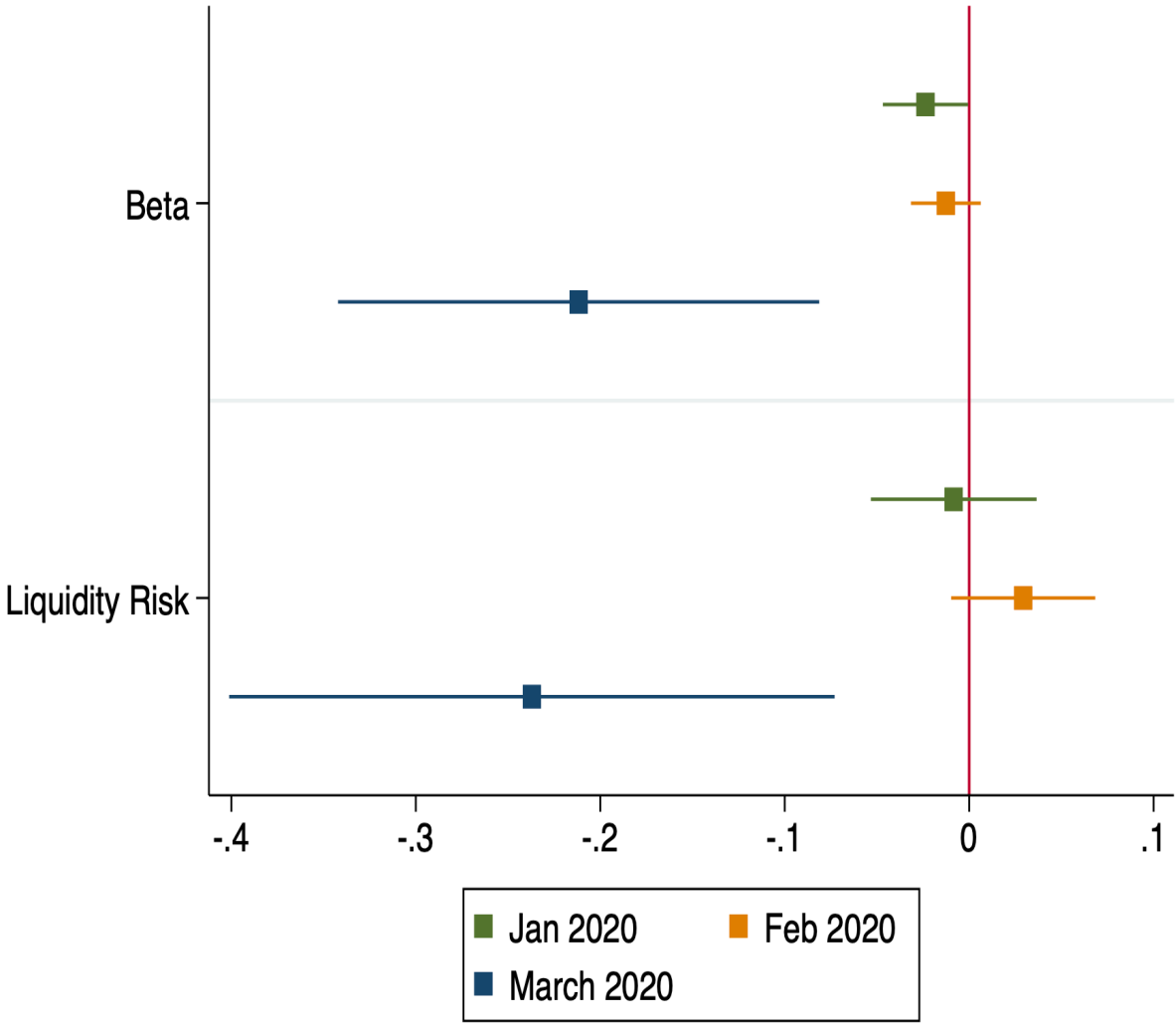


# Market and Liquidity Risk “ignite” in March: Risk that risk will change!

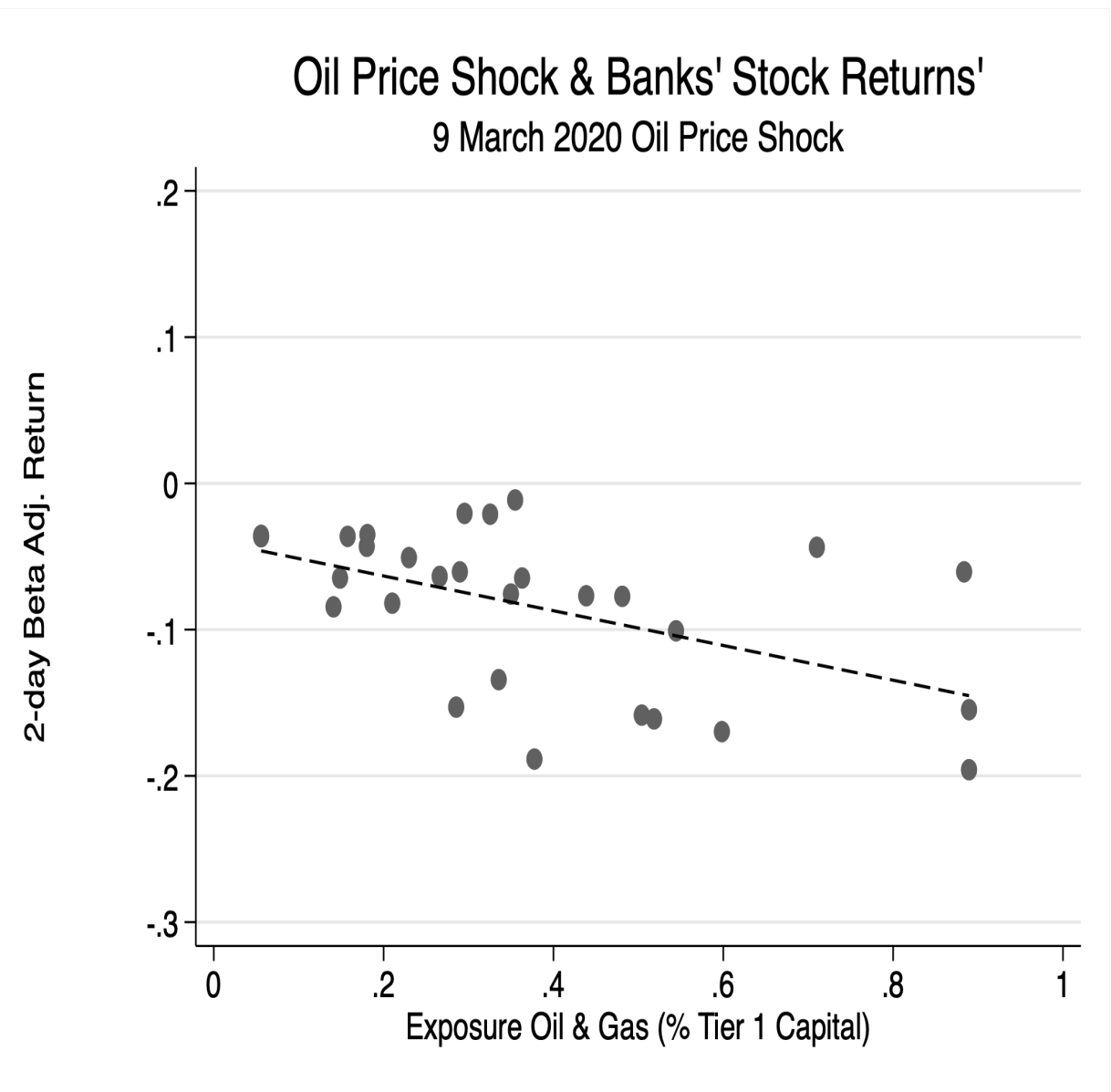
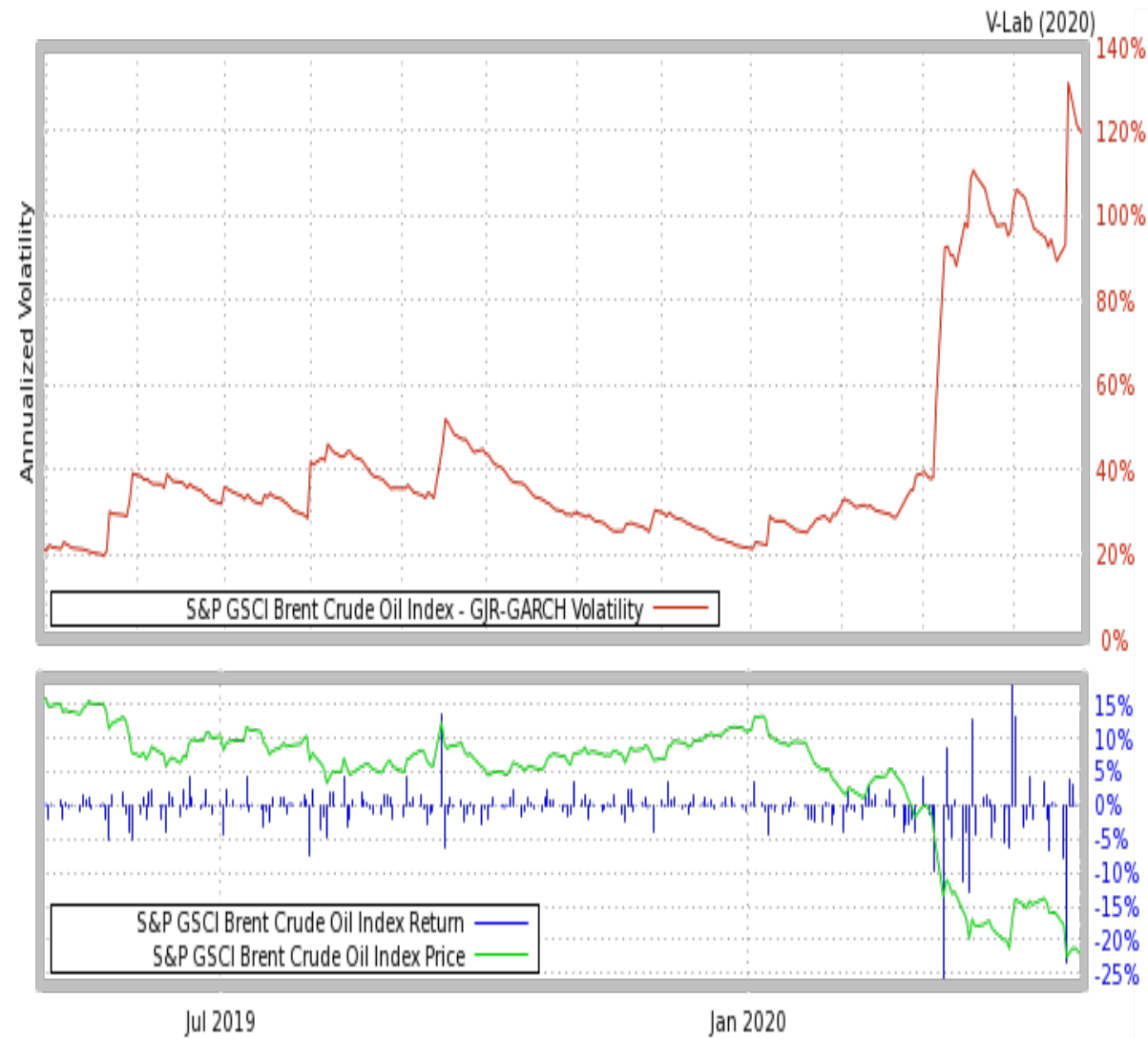
### U.S. Banks' Stock Return & Liquidity Risk



### Coefficient Estimates

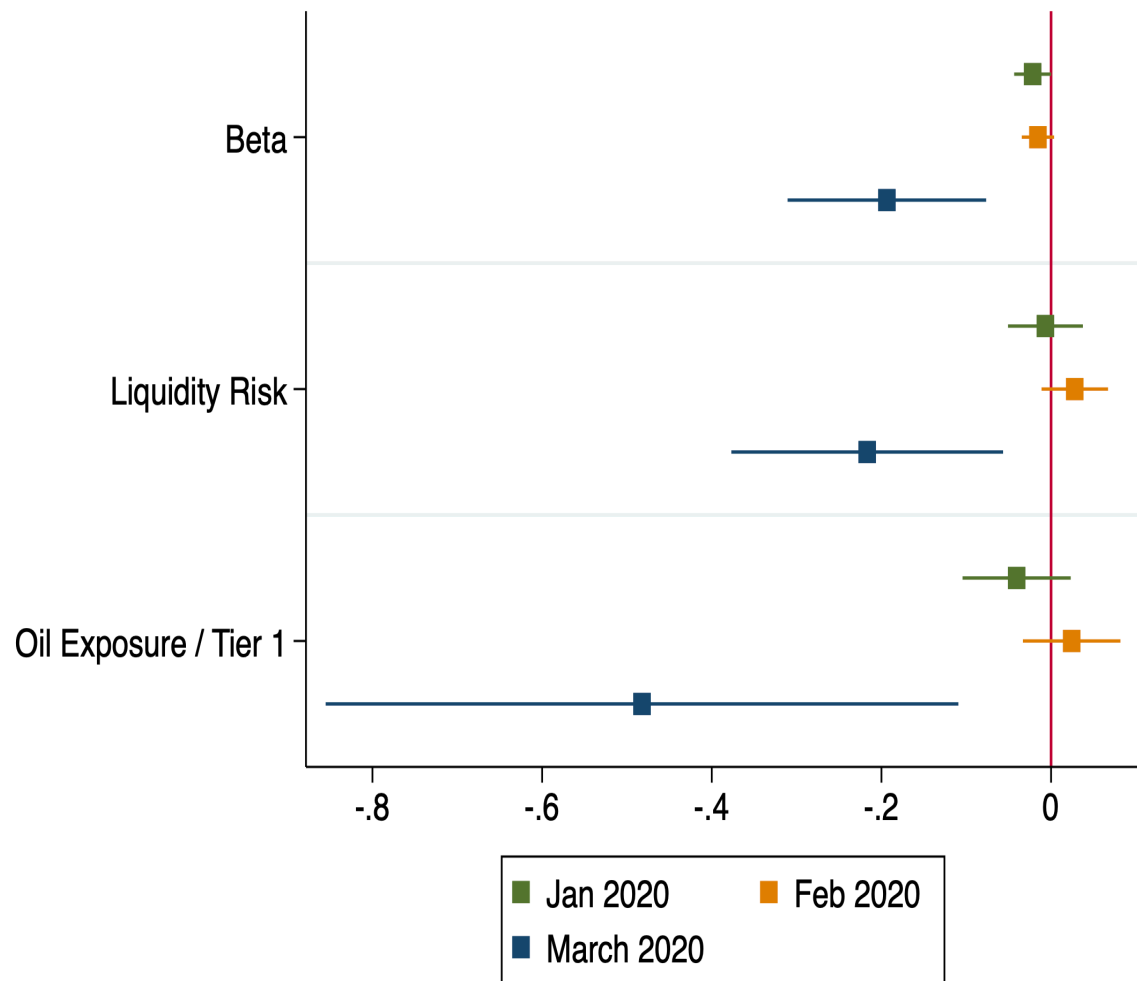


# Banks exposed to oil market-share war and the resulting crash / volatility



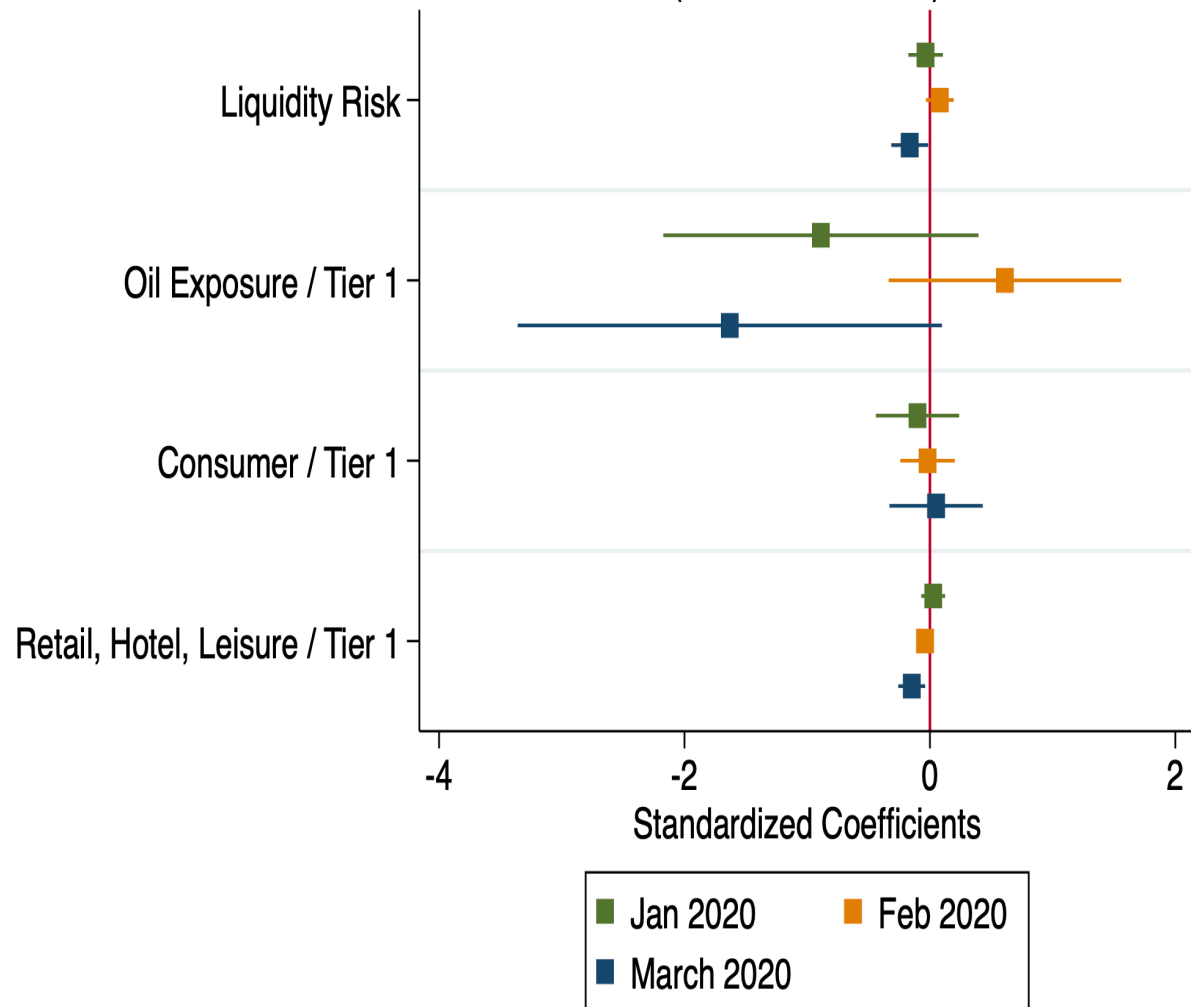
# Within sectoral exposures, bank risk to fossil fuels “ignites” the most

## Coefficient Estimates

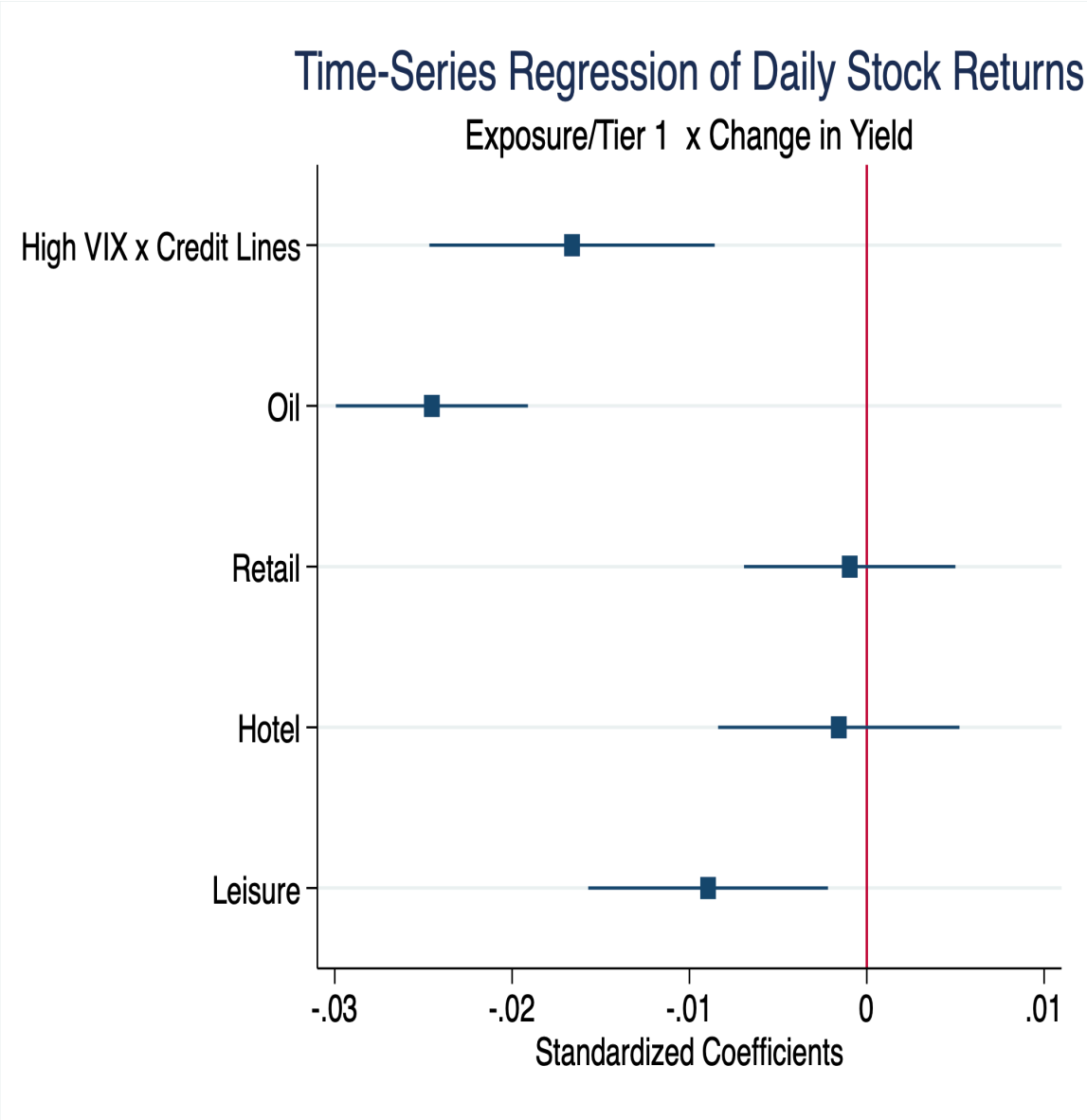
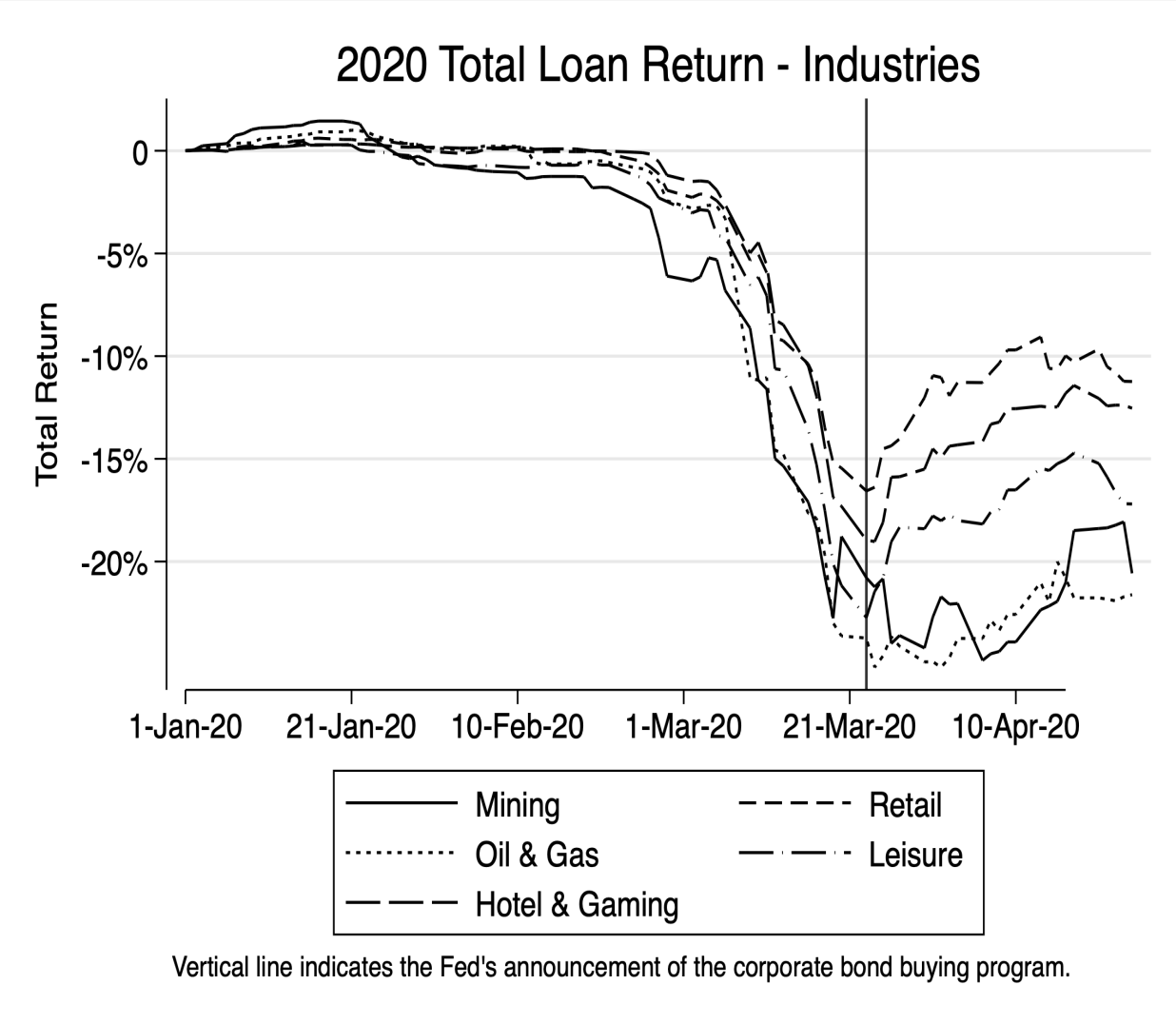


## Cross-Sectional Regression Stock Returns

(1-23 March 2020)




# Within sectoral exposures, bank risk to fossil fuels “ignites” the most



# What should be done now? In future?

- Preserve bank capital:
  - Impact of bank capital being locked down in drawdowns will be on new loans
  - Immediately require by regulation that all banks and systemically important financial institutions (SIFIs) suspend ANY payouts
- Raise bank capital:
  - Require large banks and SIFIs to raise capital immediately (How much?)
    - Not sufficient to nudge them (Neel Kashkari, FT): Debt overhang, signaling problems
  - Fine-tune the additional requirement in future based on a rigorous stress test
- Relax bank capital requirement counter-cyclically:
  - In the recovery phase, the extra capital buffer can be relaxed if necessary

The Volatility Laboratory (Vlab): [vlab.stern.nyu.edu/welcome/risk/](http://vlab.stern.nyu.edu/welcome/risk/) 

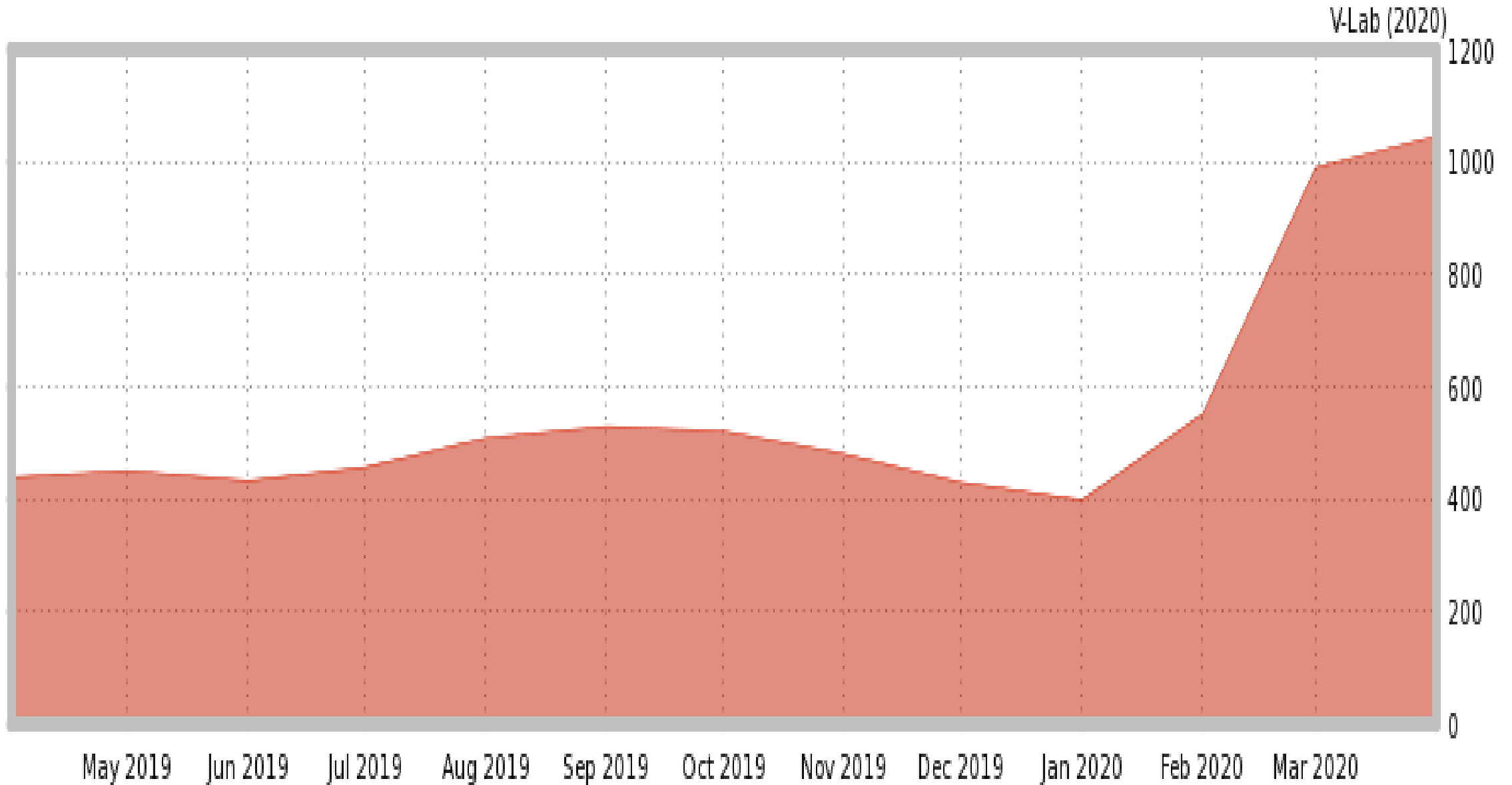
SRISK: the capital a firm would need to raise in the event of a crisis  
(Acharya et al. (2010, 2012); Brownlees and Engle (2011))


$$\begin{aligned} SRISK_{it} &= E_t [k(Debt_{it+h} + MV_{it+h}) - MV_{it+h} | R_{mt+h} \leq -40\%] \\ &= kDebt_{it} - (1 - k)(1 - LRMES_{it}) * MV_{it} \end{aligned}$$

where  $MV_{it}$  is the market value of equity of the bank,  $LRMES_{it}$  is its long-run marginal expected shortfall, and  $k$  is the prudential capital ratio.

What does SRISK suggest as required additional capital?

# *SRISK* suggests the US financial sector capital shortfall up by \$600 bln



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*SRISK-contingent* can factor in the drawdown risk from credit lines:

$$Debt_{i,t+h} = Debt_{i,t} + Drawdown-rate (R_{m,t+h}) * Credit Lines$$



Climate change  
stress test?

Source: NASA