

# COVID-19 as a Stress Test: Assessing the Bank Regulatory Framework

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# Motivation

- Post-financial crisis bank regulatory reforms.
  - Dodd-Frank Act and Basel III Reforms.
    - ⇒ Goal: To make to the banking system more resilient to adverse economic shocks.
- Now: COVID-19 as the first major (real-world) stress test of the post-crisis framework.
- How did the regulatory framework hold up?

# Areas of Investigation

- Capital requirements and bank capitalization.
- Liquidity requirements and banks' liquidity positions.
- Bank activity: lending and trading.
- Market assessment of bank health.

## Literature Review

- Banks were robustly capitalized at the onset of COVID-19.
  - Lewrick, Schmieder, Sobrun, and Takáts (2020 BIS)
  - Blank, Stein, Hanson, and Sunderam (2020 Brookings)
  - Li, Strahan, and Zhang (2020 RCFS)
- Is capital regulation counter-cyclical enough?
  - Blank, Stein, Hanson, and Sunderam (2020 Brookings)
- Buffer usability and payout restrictions.
  - Drehmann, Farag, Tarashev, and Tsatsaronis (2020 BIS)
  - Svoronos and Vrbaski (2020 BIS)
- Capital regulation might have contributed to the March 2020 bond market turmoil.
  - Duffie (2020 Brookings)
  - Kargar et al. (2020 NBER)

# Capital Requirements and Capital Levels

US and European GSIBs had similar capital requirements and levels.

**Table:** Capital Requirements and Capital Levels as of Q4 2019

	US GSIBs	EU GSIBs	US Non-GSIBs	EU Non-GSIBs
<b>Panel A. Avg. Capital Required (pp)</b>				
Min CET1	4.5	4.5	4.5	4.5
CCB	2.5	2.5	2.5	2.5
SCB	1.1		0.5	
SREP Pillar 2		1.9		1.8
M1 G-SIB Surcharge	1.8	1.3		
M2 GSIB Surcharge	0.9			
DSIB Surcharge				1.1
CCYB	0.0	0.2	0.0	0.2
Overall CET 1	10.8	10.4	7.5	10.1
<b>Panel B. Avg. Reported Capital (pp)</b>				
CET1 (AA)	12.6	13.6	10.1	14.4
CET1 (GA)	12.1		10.0	
T1 Capital	13.8	15.6	11.4	15.6
T1 Leverage	7.9	5.1	9.2	5.5
<b>Panel C. Avg. RWA Density</b>				
RWA/TA	57.7	32.5	80.8	35.4
Number of Banks	8	13	14	14

Sources: Regulatory and Annual reports, Pillar 3 Disclosures and Stress Results

## Capital Requirements and Capital Levels cont.

- Broadly speaking U.S. and European banks entered the crisis very well capitalized compared to the start of the financial crisis.
- Capital requirements are also very similar for US and European banks although the following differences in enhancements to capital requirements are worth noting:
  - The U.S. implements Method 2 G-SIB surcharge for GSIBs, while the EU has a DSIB surcharge for non-GSIBs.
  - The U.S. also has an SCB and a Collin's floor, whereas the EU implements Pillar 2 requirements.
- US non-GSIBs have by far the lowest requirements of any of the bank groups.
- Different levels of implementation of Basel III and different accounting regimes also influence capital level differentials.

# Countercyclical Capital Buffer (CCyB)

**Table:** Countercyclical Capital Buffer (CCyB) Responses across Jurisdictions

Country	March 2020	Effective since	Planned rate pre-COVID	July 2020
Belgium	0	Jan-16	0.5	0
Bulgaria	0.5	Oct-19	1	0.5
Czech Republic	1.75	Jan-20	2	0.5
Denmark	1	Sep-19	1.5	0
France	0.25	Jul-19	0.5	0
Germany	0	Jan-16	0.25	0
Hong Kong	2	Oct-19		1
Iceland	2	Feb-20		0
Ireland	1	Jul-19		0
Lithuania	1	Jun-19		0
Luxembourg	0.25	Jan-20	0.5	0.25
Norway	2.5	Dec-19		1
Slovakia	1.5	Aug-19	2	1
Sweden	2.5	Sep-19		0
United Kingdom	1	Oct-19	2	0

Source: BIS, ESRB, Hong Kong Monetary Authority, FRB IF report March 11 and updated by FRB S&R.

## Reductions in CCyB

- Regulators apply CCyB as a tool to increase capital requirements as financial vulnerabilities rise and reduce during downturns.
- Before the pandemic, only 15 jurisdictions had positive CCyB in place, either activated or announced, among 75 jurisdictions with a CCyB framework.
- The CCyB ranged between 0.25 to 2.5 across those 15 jurisdictions.
- Now, only 6 with positive CCyB, and only Luxembourg has not taken any action in response to the COVID-19 shock.
- Most jurisdictions were not able to release capital by lowering the CCyB and turned to other measures, such as encouraging use of buffers.



# Pro-Cyclicality of Capital Requirements

- Ideally, banks build up capital during economic expansions, which they can utilize during downturns.
- Lack of CCyB limits regulator ability to mitigate pro-cyclicality issues.
- The largest banks are subject to 8 different regulatory capital requirements (6 risk-based and 2 leverage), each with different calculation methodologies.
- Regulators took some action to mitigate pro-cyclicality during the COVID-19 crisis.
  - Allowed banks to cap their backtesting multiplier in Market Risk RWA.
  - Allowed banks to temporarily remove U.S. Treasury securities and deposits at the Federal Reserve from SLR requirement.

# Pro-Cyclicality of Capital Requirements cont.

**Table:** Exposure Measure Calculation Comparison by Q1 2020 Percent Growth

Exposure measure	Q1 2020	Q2 2020	Applicable reg cap	Daily avg	Includes OBS	Risk-based
Quarter end TA	+11.5%	+0.9%	None			
AA RWA	+5.9%	-0.6%	AA risk-weighted ratios		✓	✓
SA RWA	+4.4%	-3.7%	SA risk-weighted ratios		✓	✓
Daily avg TA	+3.4%	+7.3%	Leverage ratio	✓		
Total exposures	+2.7%	-9.5%	SLR		✓	

Note: Checkmark indicates that the exposure measure uses the methodology indicated.

Advanced approaches (AA), off-balance sheet (OBS), risk-weighted assets (RWA), standardized approach (SA), supplementary leverage ratio (SLR), total assets (TA).

If SLR relief had not been applied, Total Exposures would have risen by 4.5% in Q2 2020.

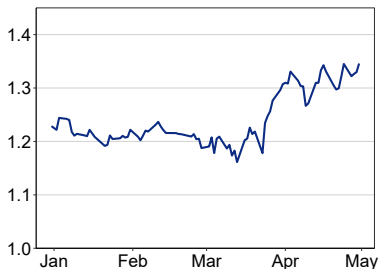
## Buffer Usability

- Regulators encouraged banks to dip into buffers in order to increase lending activity - but no large banks have thus far.
  - March 17, 2020 joint statement from FRB, FDIC, and OCC.
  - However, consequences for dipping into buffers remain the same.
- Large banks subject to the CCAR stress test in aggregate have modestly more excess capital in Q2 2020 (\$238b) than they did in Q4 2019 (\$211b).
  - 23 out of 34 of these firms have a greater capital cushion now than they did pre-COVID-19 crisis.
  - SLR relief resulted in lower requirements. In the absence of SLR relief, Q2 2020 excess capital would have been \$232b
- Banks may be treating capital buffers as minimums.
  - Do not want to signal weakness to investors.

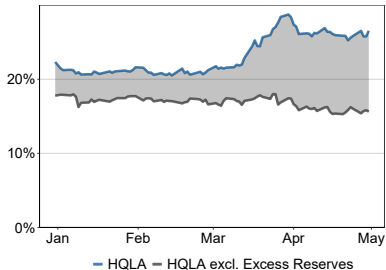
# Liquidity of Large U.S. Holding Companies in 2020

$$\text{LCR} = \frac{\text{High-quality liquid assets (HQLA)}}{\text{30-day net outflows}}$$

Mean LCR Ratio



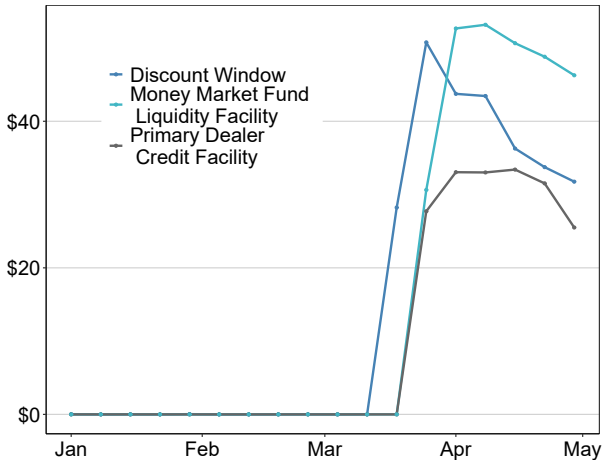
Mean HQLA (% of TA)



- Mean HQLA increased, largely driven by excess reserves.
- Other HQLA components remained stable, on average.

# Federal Reserve Liquidity Facilities in 2020

Aggregate Use of Federal Reserve Liquidity Facilities (\$ billion)



# Dynamic Regression Model of Firm Liquidity

$$y_{i,t} = \sum_{k=1}^p \alpha_k y_{i,t-k} + \sum_{k=0}^3 \beta_k^\top \mathbf{x}_{i,t-k} + \sum_{k=1}^3 \gamma_k^\top \mathbf{z}_{i,t-k} + c + \varepsilon_{i,t}$$

- Fitted on confidential data at a daily frequency.
- $y$  = LCR (% of NOF) or HQLA (% of assets)
- $\mathbf{x}, \mathbf{z}$  = facilities (% of assets) + controls (e.g., deposits, required reserves, net overnight unsecured funding)
- $\Rightarrow$  “impulse response” estimates:  $E[y_{i,t+k} - y_{i,t} \mid x_{i,t} = \tilde{x}_{i,t} + 1]$

# Short-run Effects of Federal Reserve Facilities

- **DW**: incremental increase in HQLA.
  - borrow \$1 → \$2 HQLA increase the next day.
  - borrow \$1 → \$6 HQLA increase in three days.
- **PDCF**: temporary increase in both HQLA and LCR.
  - borrow \$1 → \$1 HQLA increase the next day.
  - borrow 0.1% of assets → 1.5pp LCR increase the next day.
- **MMLF**: no significant effect on HQLA or LCR.

# Lending

- Significant fluctuations in lending activity in Q1 and Q2 2020, but mostly attributable either to changes in demand and PPP.
  - Large wholesale credit line draws in Q1 mostly repaid in Q2.
  - Reduced utilization of retail card lines.
- While growth of credit commitments were weak (absent trends above), there is little evidence of a "credit crunch" due to regulatory capital constraints.
  - No relationship between bank capital and loan or credit growth.
  - Survey evidence (SLOOS) suggests demand is weak and banks are reducing credit risk mostly for economic reasons.



# Credit Growth

**Table:** Growth of Bank Credit (2020), by Loan Type

**Panel A: Quarterly Total Credit Exposure Growth (U.S. Banks)**

	2018-2019 Average	2020 Q1	2020 Q2
C&I	1.6	2.6	5.5**
C&I w/o PPP			-0.6
Commercial RE	1.3	0.3	1.0
Residential RE	0.3	-0.1	0.1
Consumer	1.0	0.0	-0.9**

**Panel B: Quarterly Loan Growth (U.S. Banks)**

	2018-2019 Average	2020 Q1	2020 Q2
C&I	1.2	11.2**	1.4
C&I w/o PPP			-9.5**
Commercial RE	1.2	1.5	1.1
Residential RE	0.3	-0.1	-0.1
Consumer	1.1	-4.3*	-3.5*

Sources: FR Y9-C and FFIEC CALL reports

# Capital constraints and lending

**Table:** Tests for Constraints on Total Credit Exposure Growth (2020)

	Effect on Credit Exposure Growth Excluding PPP Loans	Effect on Credit Exposure Growth Including PPP Loans
	[1]	[2]
CET 1 risk-based ratio (pp)	-0.135 (0.151)	-0.176 (0.198)
Credit Line Exposure/CET1 (pp)	0.004 (0.008)	0.015 (0.009)
Credit Exposure Growth (2019)	0.005 (0.054)	0.051 (0.054)
Size (Q4 2019 log total assets)	-0.483 (0.295)	-1.876*** (0.403)
Interest Income Share (pp)	-0.076** (0.032)	-0.086** (0.039)
Intercept	Y	Y
Loan portfolio share variables	Y	Y
Weighted	Y	Y
Adjusted R2	0.041	0.123

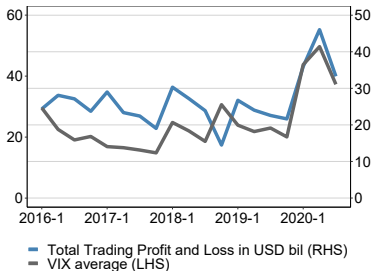
Notes: N = 674 (one cross-section). Regressions include firms present Q4 2018 to present with \$1bn or more in total assets and CET1 ratios between 0% and 25% in Q4 2019.

Heteroskedastic robust standard errors in parentheses. \*\*\* = significant at 1%;

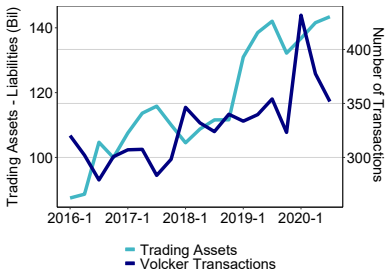
\*\* = significant at 5%. Weighted regressions scale squared residuals by Q4 2019 total assets.

# Trading

**Figure:** Trading Profits & Losses



**Figure:** Trading Positions & Volume

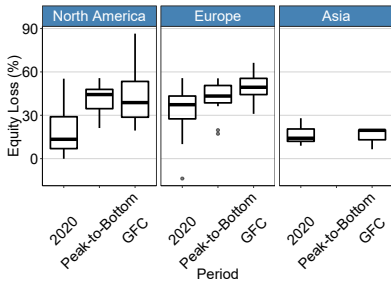


Sources: Volcker Rule Metrics and Bloomberg

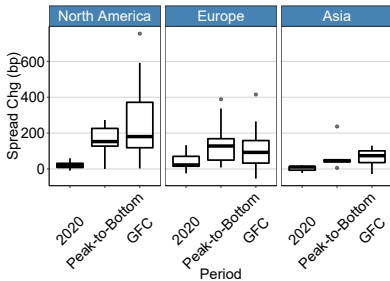
- Driven by market volatility and high trading volumes, trading activities were particularly profitable in the first two quarters of 2020, and stayed elevated in the third quarter.
- Gains in trading revenue helped offset significant increases in loan loss provisions.

# Evidence from Financial Markets

**Figure:** GSIBs' Equity Returns



**Figure:** GSIBs' CDS Spread Changes



Sources: Markit and Yahoo Finance

- In Q1 2020, equity and CDS returns show that North American and European GSIBs were distressed to levels close to the financial crisis.
- By year end 2020, GSIBs are underperforming the broader equity market, while their CDS spreads fully recovered to pre-pandemic levels.
- Changes in CDS spreads appear unrelated to regulatory or market-based capital ratios.

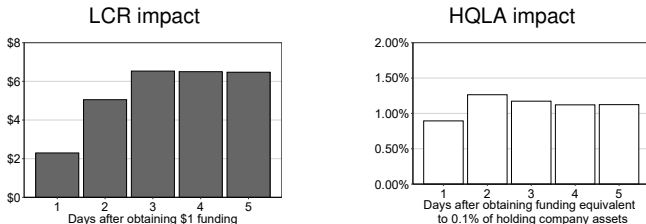
▸ Regressions

# Assessment

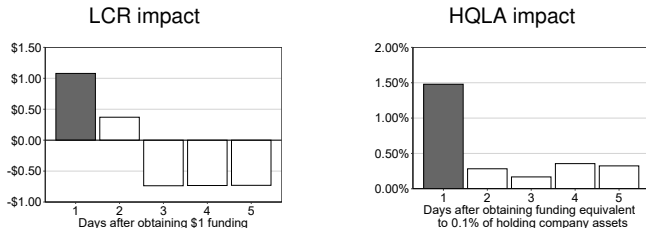
- Banks capital and liquidity were sufficient to withstand the COVID-19 shock.
- Banks continued to lend through stress as firms drew down existing credit lines.
- Banks market making helped bolster their trading revenues.
- Fed facilities increased liquidity during the high uncertainty period.
- Possible refinement: Increase countercyclicality of regulatory requirements.

# Estimated Changes in Firm Liquidity

**Figure A:** After borrowing from the DW



**Figure B:** After borrowing from the PDCF



# Evidence from Financial Markets

**Table:** Effect of GSIBs equity measures on CDS spreads

<b>Independent Variable</b>	<b>Effect on CDS Spreads</b>	
CET 1 risk-based ratio	1.50 (8.17)	-
Market equity to total assets ratio	-	-0.06 (5.35)
LCR	-0.11 (0.68)	-0.10 (0.68)
Dummy for Europe	27.00 (32.19)	28.82 (31.48)
Dummy for North America	66.51** (31.48)	67.46 (45.98)
Intercept	43.92 (131.71)	61.19 (98.26)
Adjusted R2	7.79%	7.63%

Notes: N = 24.  $\Delta$ CDS Spreads in basis points.  
Standard errors in parentheses. \*\* = significant at 5%.