OLIVER WYMAN

WEBINAR: COVID-19 AND IMPACT ON THE US FINANCIAL SYSTEM

CCAR results and model management

July 1st, 2020

Please note that this session was held at a particular point in time (Wednesday, July 1, 2020, 4pm-5pm EDT), and in light of the rapidly evolving Covid-19 situation, it is possible these discussions are no longer accurate after that date.

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WEBINAR AGENDA

1	CCAR 2020 with COVID-19
2	Model management in the time of COVID
	- Recap of current situation
	- Actions to take now
	- Deep dive into key model families
3	Q&A

OUR PANELISTS

Til Schuermann
Partner & Co-Head – Risk &
Public Policy
New York

Jeff Brown
Partner, Risk and
Organizational Effectiveness
Washington, D.C.

Ramy Farha
Partner, Risk & Public Policy
Toronto

Mike Hepinstall
Partner, Risk & Public Policy
New York

Ross Eaton
Partner, Risk & Public Policy
New York

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CCAR 2020 WITH COVID-19

Panelist: Til Schuermann

CCAR/DFAST-2020: OVERVIEW

- On June 25, the Federal Reserve released the results of the CCAR-2020 analysis; 33 banks participated, all "passed"
  - 18 large and complex banks participate annually of which 6 are FBOs
  - 15 large and non-complex banks participate biannually (even years) of which 5 are FBOs
- FRB also conducted sensitivity analysis to reflect COVID crisis
  - 3 scenarios with different economic paths: V, U and W-shaped
  - Analysis does not include capital depletion that would result from distributions over the nine-quarter window
  - Only aggregate disclosures for sensitivity analysis
- Sensitivity analysis results
  - Loan losses different across scenarios: credit cards and other consumer loan losses higher when recovery is slower (U and W-shaped)
  - Bottom quartile in W scenario close to regulatory min of 4.5% CET1 driven in part by an increase in provisions against losses incurred outside of the nine-quarter window
- Regular DFAST results show few surprises
  - Industry-wide ratios remain well above regulatory minimums (min. avg. CET1 ratio is 9.9% & Tier 1 leverage ratio is 7.1%)
  - Drivers of losses remain consistent with 2019; loan losses a bit higher
  - Note: DFAST-2020 stress impact excludes common dividend payments
- FRB is requiring that firms resubmit their capital plans within 45 days of release of new scenarios and, pending the resubmission, has barred share repurchases and capped dividend payouts
- Results from DFAST-2020 determine Stress Capital Buffer (SCB)
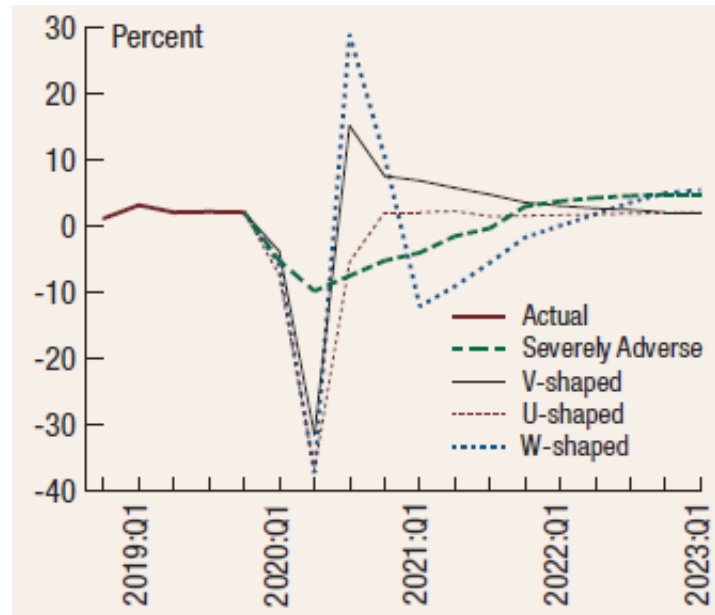
SENSITIVITY SCENARIO VARIABLE PATHS

Unemployment, GDP and Treasury rates in the sensitivity scenarios vary substantially from the Severely Adverse scenario; other financial variables (e.g. equities, Resi/Comm. Real estate) broadly follow the Severely Adverse paths
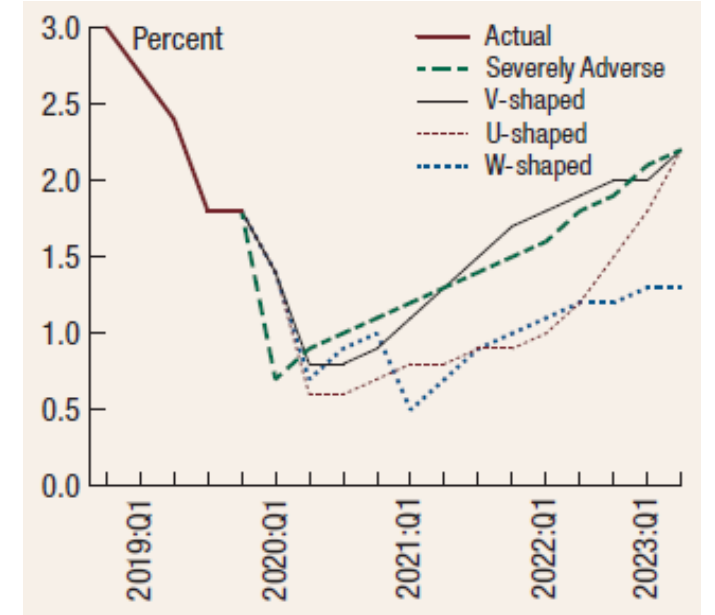
Unemployment rate
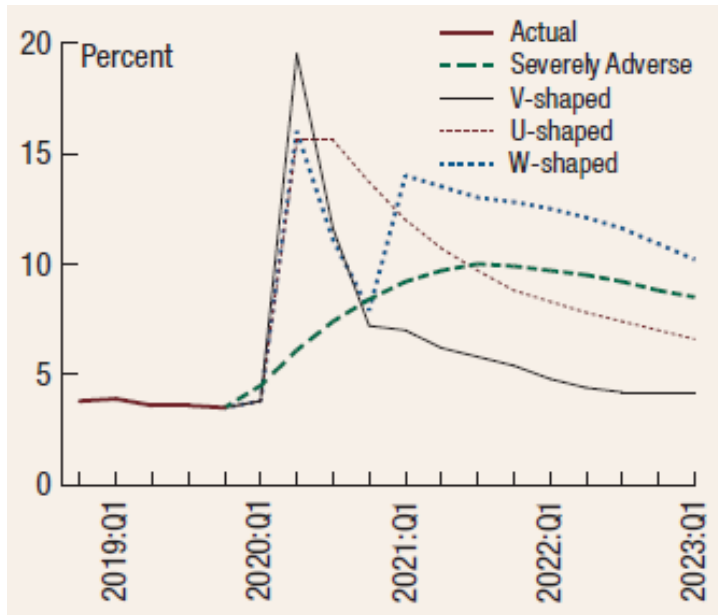
Real GDP growth

10-year Treasury rate

RESULTS OF COVID-19 SENSITIVITY TESTS

Sensitivity analyses demonstrate that the impacts of COVID-19 vary significantly by the path of recovery, but are worse than the Severely Adverse scenario - bottom-quartile firms approach the regulatory minimum in the W-shaped scenario

Minimum CET1 ratios by scenario
Industry weighted average and interquartile range
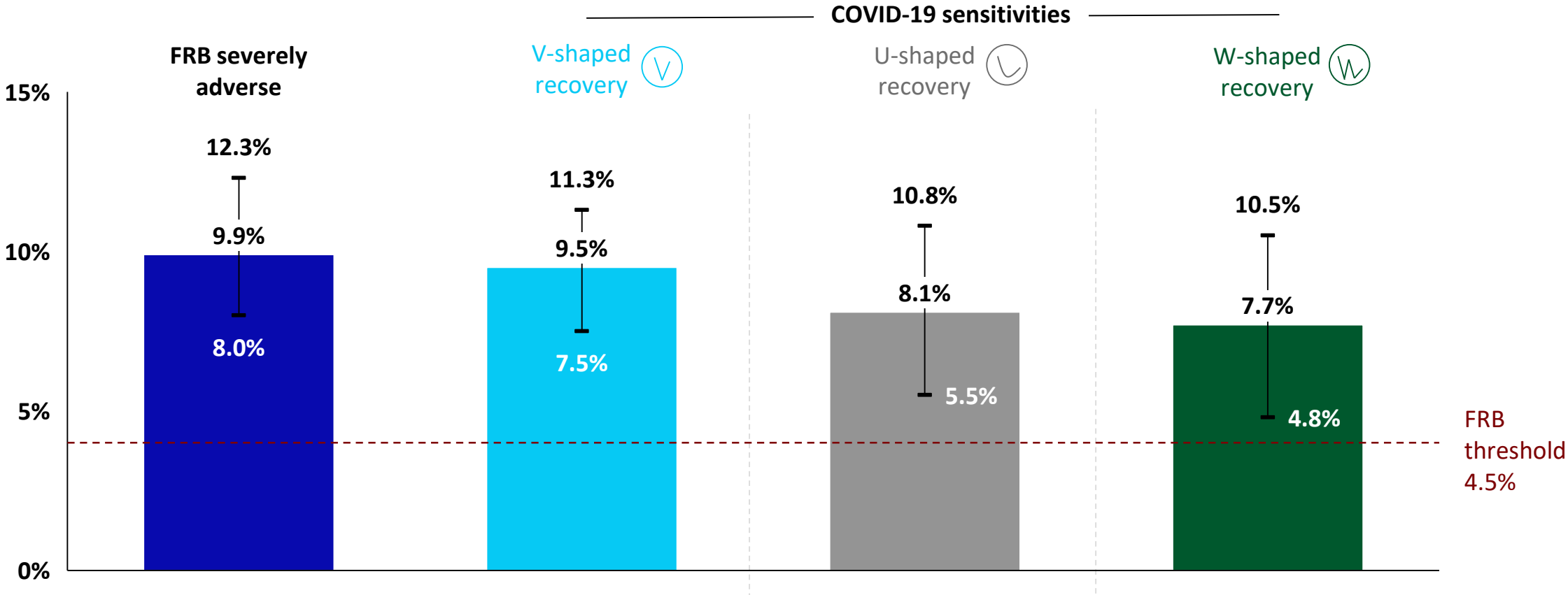
Note: Fed estimates do not assume CECL allowances; however, banks reporting on a CECL basis must forecast CECL allowances in their own capital planning, which could result in higher capital depletion
Source: FRB "Assessment of Bank Capital during the Recent Coronavirus Event", June 2020
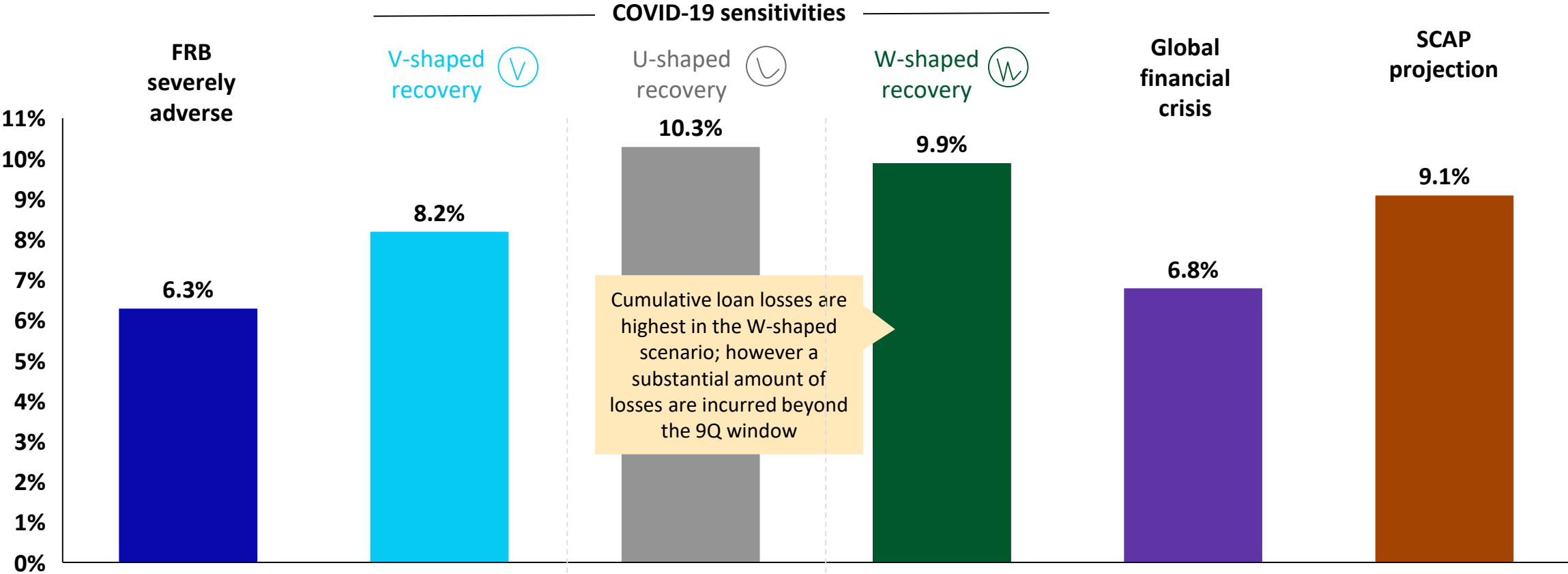
LOAN LOSS SENSITIVITIES

Loan losses drive the biggest divergence in losses between scenarios – loss rates across each of these scenarios exceed the losses experienced in the GFC and some exceed those projected for SCAP participants in 2009

Cumulative loan losses rates (as percent of portfolios)
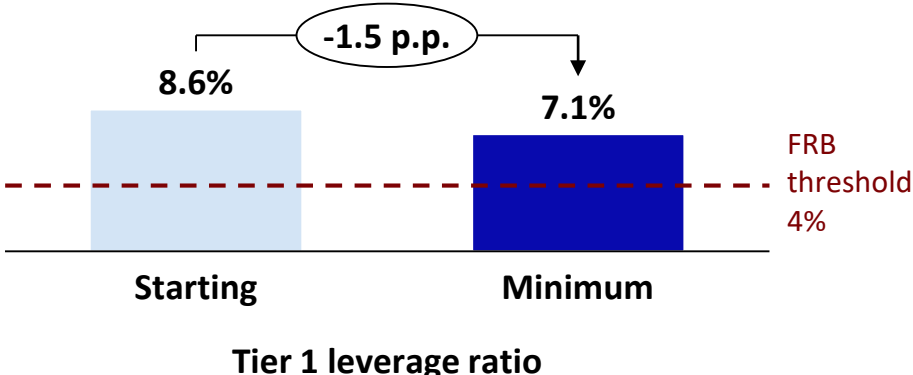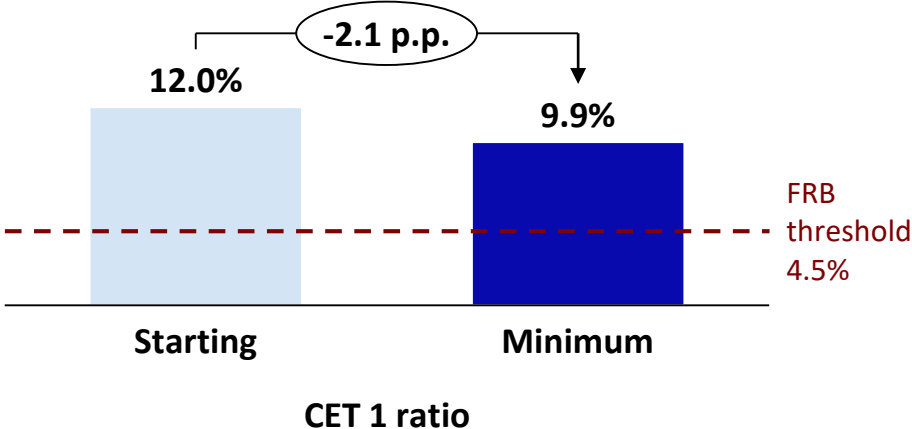Industry weighted average

Cumulative loan losses are highest in the W-shaped scenario; however a substantial amount of losses are incurred beyond the 9Q window

Source: FRB "Assessment of Bank Capital during the Recent Coronavirus Event", June 2020
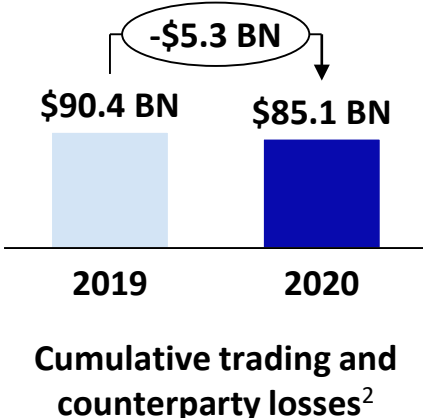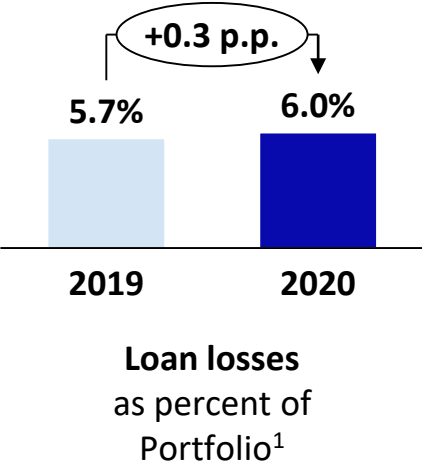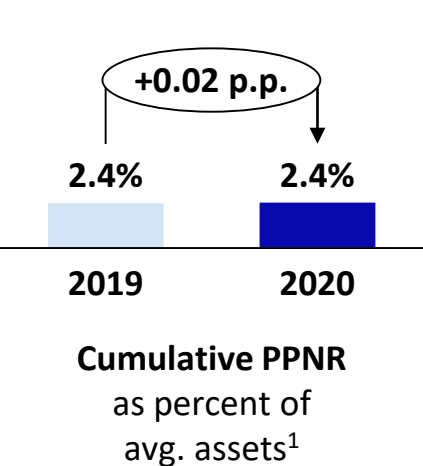
INDUSTRY-LEVEL IMPACT OF FRB SEVERELY ADVERSE SCENARIO

2020 stress tests show that industry capitalization is still strong

Difference between starting and minimum ratios

Aggregate ratios across 33 firms, reported by FRB

-2.1 p.p.

12.0%

9.9%

FRB threshold 4.5%

Starting   **Minimum**

CET 1 ratio

-1.5 p.p.

8.6%

7.1%

FRB threshold 4%

Starting   **Minimum**

Tier 1 leverage ratio

Projected losses by component

+0.02 p.p.

2.4%   2.4%

2019   **2020**

Cumulative PPNR
as percent of
avg. assets[1]

+0.3 p.p.

5.7%   6.0%

2019   **2020**

Loan losses
as percent of
Portfolio[1]

-$5.3 BN

$90.4 BN $85.1 BN

2019   **2020**

**Cumulative trading and
counterparty losses**[2]

STARTING AND PROJECTED MINIMUM CAPITAL RATIOS – CET1

CET1 depletion averaged 2.4% in the FRB's projections

Starting and projected minimum CET1 ratio
By bank category
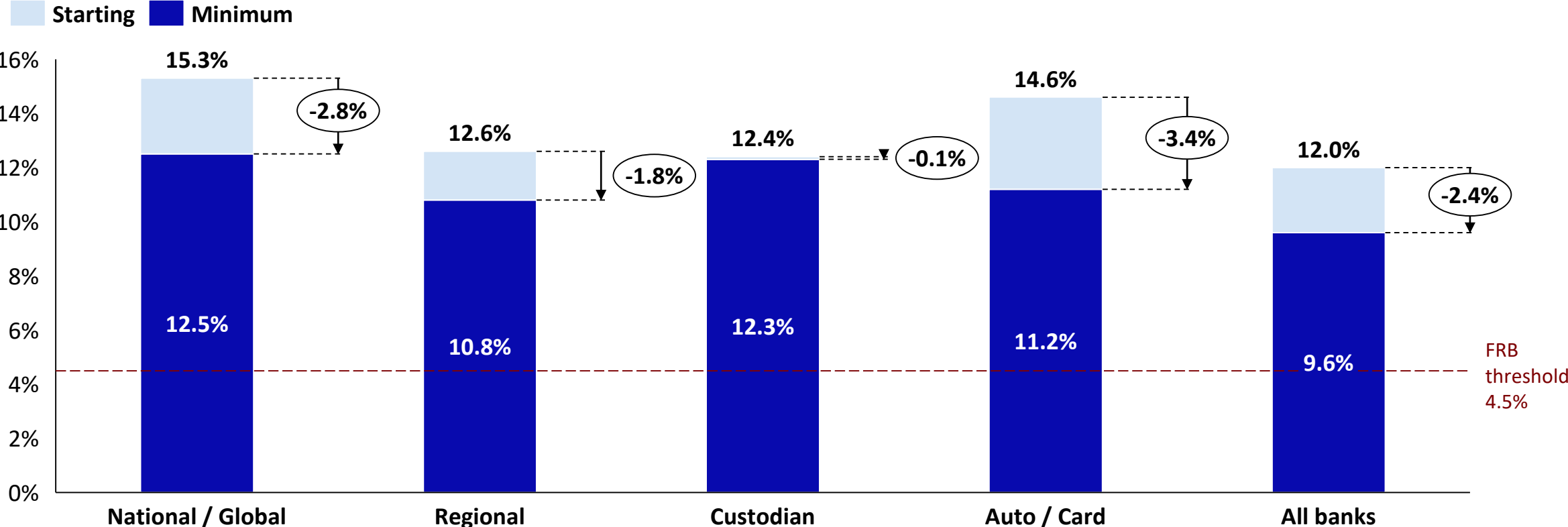
Note: Averages may differ due to weighting methodology. Starting CET1 ratio weighted by starting RWA and minimum CET1 ratios weighted by ending RWA
Source: Fed DFAST disclosure

STARTING AND PROJECTED MINIMUM CAPITAL RATIOS – TIER 1 LEVERAGE

Tier 1 depletion averaged 1.7% in the FRB's projections

**Starting and projected minimum Tier 1 leverage ratio**
By bank category
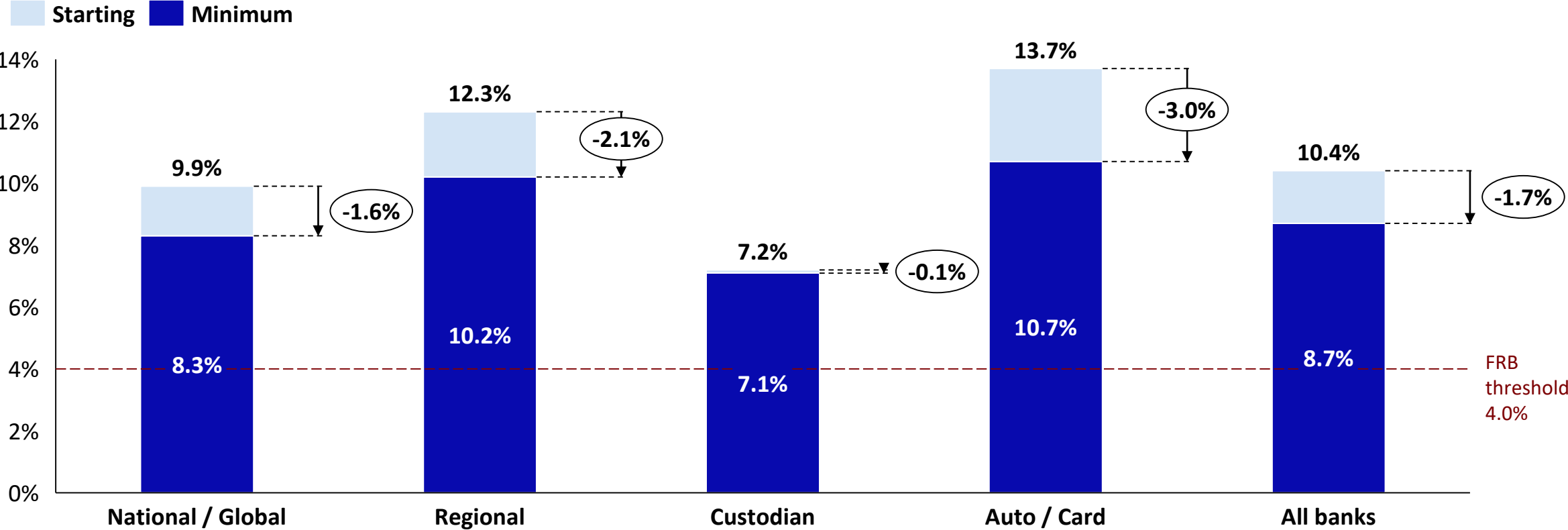
Note: Averages may differ due to weighting methodology. Tier 1 leverage ratios weighted by avg. assets
Source: Fed DFAST disclosure

PROJECTED CUMULATIVE PPNR – 2019 VS. 2020

The FRB's 2020 PPNR projections are in line with its projections a year ago

Cumulative PPNR as a percentage of avg. assets
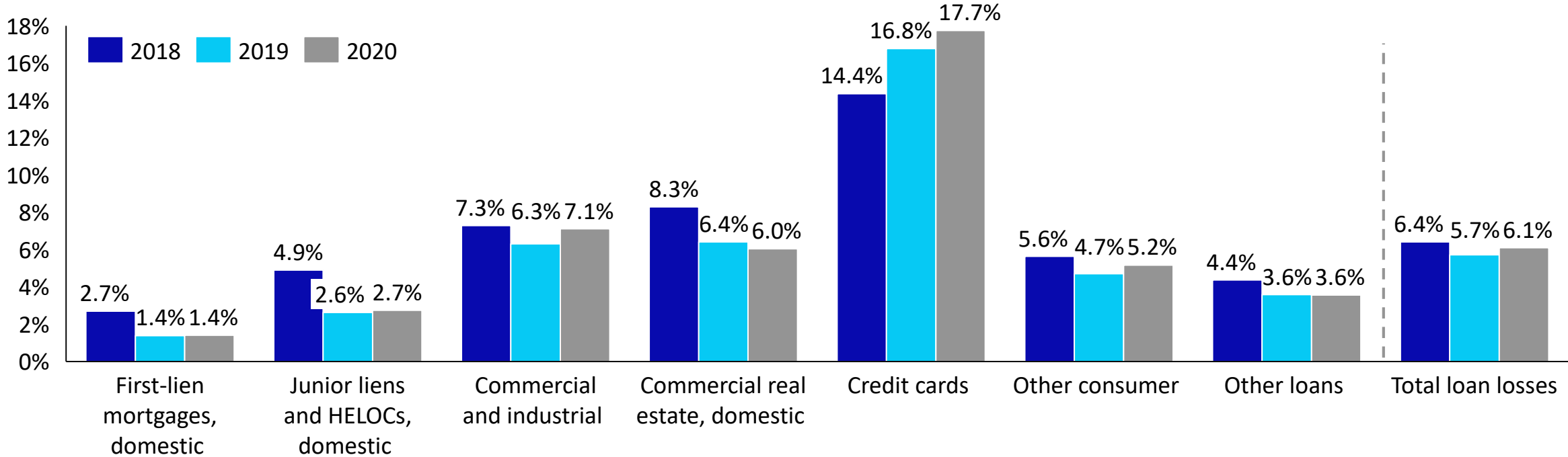By bank category
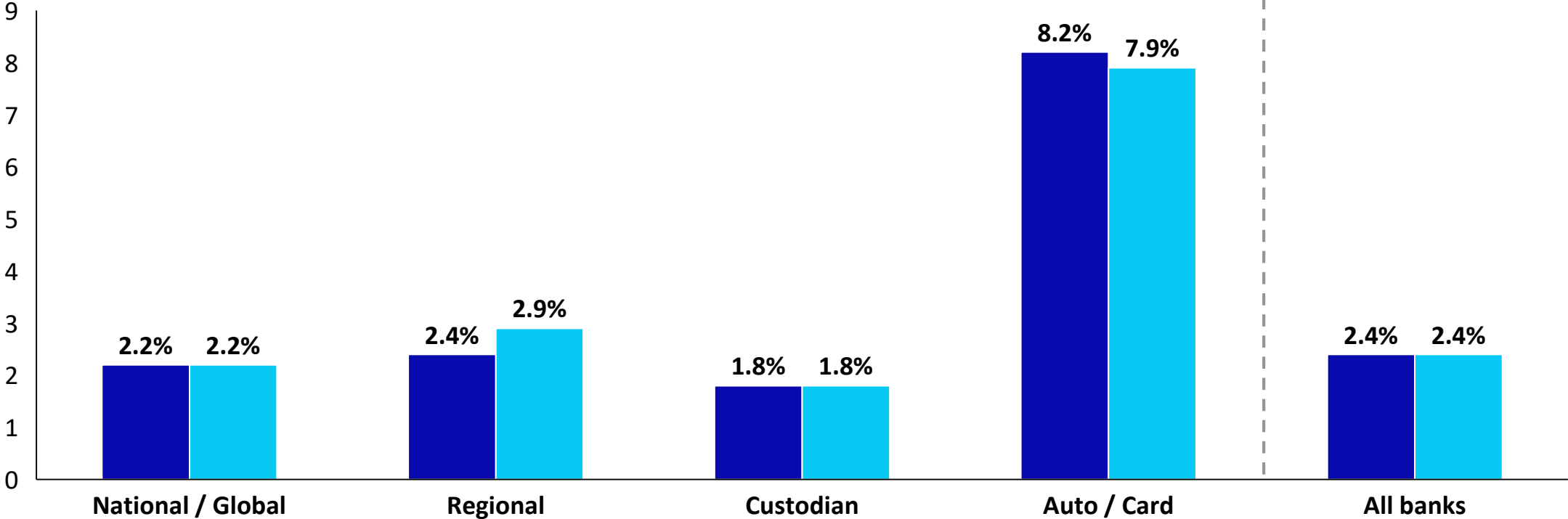
Note: Average percentages weighted by avg. assets. Only includes subset of 18 firms that participated in 2019 as well
Source: Fed DFAST disclosure

CUMULATIVE FRB LOSS RATES (BALANCE WEIGHTED) BY ASSET CLASS

Projected loss rates are higher than last year's projections and more consistent with projections from 2018; credit card loss rates have increase significantly over the last 3 years

Cumulative loss rates as a percentage of loan balances
Balance-weighted, by asset class

2

MODEL MANAGEMENT

Panelist: Jeff Brown, Ramy Farha, Mike Hepinstall, Ross Eaton

CONTEXT: RECAP OF THE NATURE OF THE COVID-19 CHALLENGE

EPIDEMIOLOGY

- Unprecedented (in our lifetime) pandemic
- Uncertain duration, and uncertain risk of recurrence

GOVERNMENT RESPONSE

- Unprecedented size and breadth of fiscal stimulus
- More stimulus expected if demand shock persists for an extended period of time

MACROECONOMY

- A global economic shock
- And unprecedented speed of revision to macro forecasts
- Longer-term impact unclear

CLIENT BEHAVIOR
(and bank behavior)

- Massive shifts in consumer and corporate behavior
- Bifurcation of experience to a degree not previously seen – e.g., by industry of employment
- Uncertain impact of stimulus measures, and thus hard to say when parts of the economy may revert to "normal" recessionary behavior
- Bank behavior in response to customers and macro situation (e.g. widespread deferrals for consumers)

COVID-19 has put large parts of the economy on "pause" and greatly disrupted the way some parts operate on a day-to-day basis; asking models to account for all these factors is extremely difficult

COVID-19 PRESENTS SIGNIFICANT CHALLENGES TO LOSS FORECASTING

Existing models may struggle to estimate financial impact from COVID-19 and overlays are necessary; understanding financial impact as soon as possible is required to prepare for Q2 and avoid surprises

Unprecedented depth, speed and character of economic shocks

- Models may behave unpredictably when extrapolating far outside historic ranges
- Impacts even more extreme and uneven across geography, sectors, etc.

Significantly different quality of shocks compared to other recessions

- More than 2/3 of job losses are classified as temporary
- With lower consumption opportunities, consumers who work from home have increased savings

Extreme uncertainty in forecasts, particularly considering potential for further outbreaks

- Uncertain policy transmission – will further outbreaks prompt lockdowns?
- Uncertain consumer response – will demand return if policy is less restrictive but virus continues spreading?

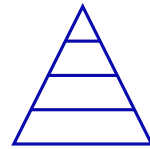**Widespread government and lender assistance**

- Extensive liquidity support for companies
- Expanded unemployment benefits, which can exceed pre-COVID wages at low end
- Widespread lender-provided forbearance

THERE ARE SEVERAL PRACTICAL STEPS THAT CAN BE TAKEN NOW TO PREEMPT AND PREPARE FOR THE EXPECTED SURGE IN MODEL MANAGEMENT ACTIVITY
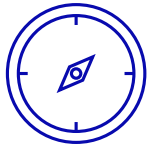
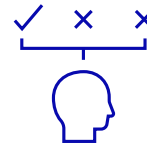| 1. Guiding principles	2. Tiering framework	3. Monitoring standards	4. Decision trees	5. Compensating controls	6. Senior guidance
Develop a set of principles — jointly between model validators and model developers — to guide model management decisions during the COVID-19 pandemic; firms should continue to revisit and revise these principles as necessary as new learnings emerge during the pandemic	Identify impacted models and tier these models based on expected COVID-19 impact to concentrate on most material areas of increased model risk	Leverage existing model monitoring standards to reflect nature of potential COVID-19 impacts and the need for more nuanced interpretation of results	Develop flow charts, both generalized and 'model family' specific, to identify key decision points, highlight potential pathways and guide decisions on model treatment in a more consistent way between models	Review and update existing compensating controls, mainly the model overlay process, to support the expected increase in one-time model uses/ overlays needed and to better balance rigor and expediency	Convene a "Model Management SWAT" team comprised of experienced model development and validation staff, and any relevant senior stakeholders including the businesses, to provide oversight and guide triage decisions during the pandemic

These steps will help the bank better deal with the current situation and develop a model management plan, including timelines and resources, to guide the remainder of 2020 and subsequent activities
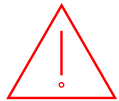
KEY CHALLENGES FOR RETAIL CREDIT MODELS

Issues with existing models
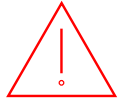
⚠️ Many models use unemployment as a common driver of ability to pay for all borrowers, but the linkage is currently weakened
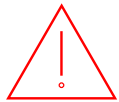
⚠️ Detailed choice of unemployment measures, selected on historical fit, may imply very different outcomes under sharp but temporary shocks

⚠️ Loan-level models capture traditional portfolio risk drivers e.g. underwriting quality, payment history – but do not account for emerging risk drivers e.g. employment sector

⚠️ Lender-provided forbearance should help mitigate temporary distress, but currently makes measurement more challenging

LENDERS ARE WORKING ON SEVERAL METHODS TO ADJUST RETAIL CREDIT FORECASTS
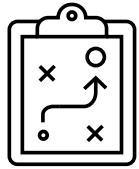
Adjust scenario inputs

- Disaggregate or adjust scenario inputs along key portfolio dimensions e.g.
  - Employment sector
  - Income level
- Align geographic dimension of economic scenarios with pandemic scenarios
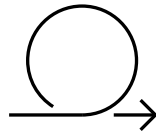
Revisit specifications of macro variables

- Consider different time windows and related variables, e.g. U1/U3/U6, UI claims
- Re-evaluate tradeoffs between historical fit and explainable sensitivity
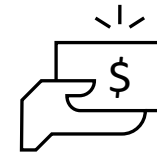
Account for assistance

- Lender forbearance and government assistance both reduce impact of short-term unemployment
- Loans already in forbearance can be expected to carry higher risk – while performance is not yet observable, historical loss mitigation benchmarks may be considered
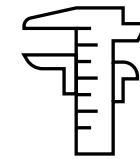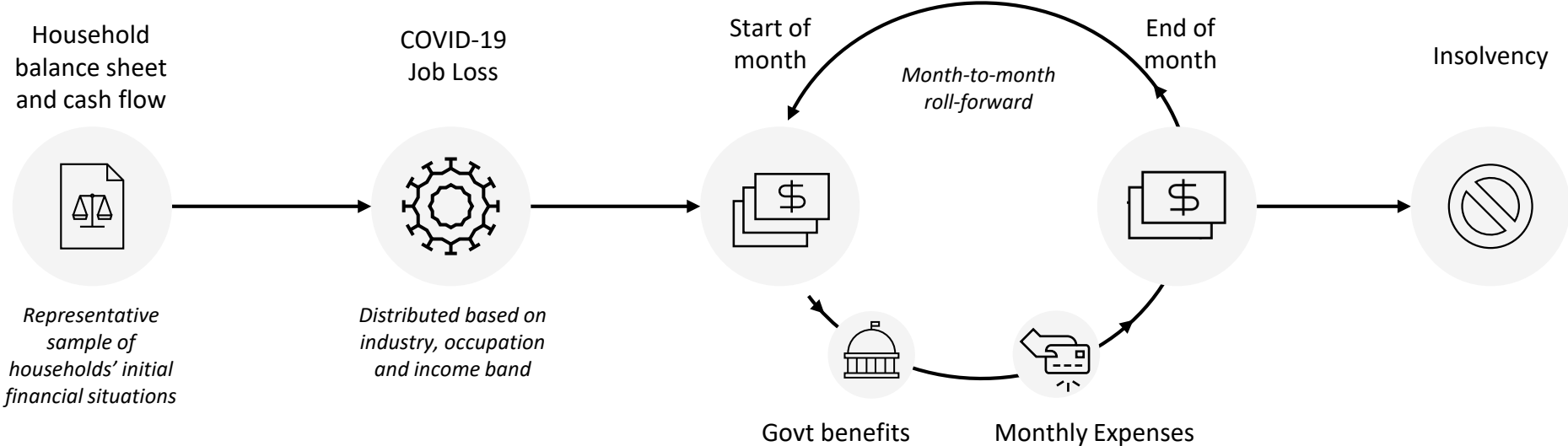
Benchmark outcomes

- Lenders should cast a wide net, considering creative approaches to benchmark potential outcomes
- Analytical frameworks customized to the event may prove more helpful than statistical challenger models

Example on next page

EVENT-SPECIFIC ANALYTICAL FRAMEWORKS CAN COMPLEMENT STATISTICAL MODELS

Example: structural model for simulating impacts of job loss and assistance programs on household cash flow distress

Household balance sheet and cash flow

Representative sample of households' initial financial situations

COVID-19 Job Loss

Distributed based on industry, occupation and income band

Start of month

Month-to-month roll-forward

End of month

Insolvency

Govt benefits   Monthly Expenses

Model	**Simulate**	**Calculate**
• Create balance sheets and cash flow statement reflecting representative households	• Randomly assign job loss to households based on industry/ income tier • Simulate monthly cash flows for each household, accounting for non-wage income, government benefits, debt payments, expenses and cost savings • Run alternative scenarios for different durations of job loss, further policy interventions	• Evaluate months to insolvency for each affected household • For a given unemployment path, can produce an average insolvency rate

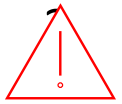# KEY CHALLENGES FOR NON-RETAIL CREDIT MODELS

Issues with standard models

⚠️ Ratings out of date or inappropriate

⚠️ C&I loss forecasting models group many industries

⚠️ Likewise, CRE loans are likely to suffer very disparate impacts by property type that may not be captured in current bank models

⚠️ Impact of government support (e.g., PPP, airline bailouts) cannot easily be incorporated

ILLUSTRATION: TRIANGULATION OF NON-RETAIL LOSS ESTIMATES

Traditional loss forecasting

Traditional models driven by macroeconomic scenarios (linked to pandemic scenarios)

Market implied estimates

Relative "micro" shocks on sector level derived from market data
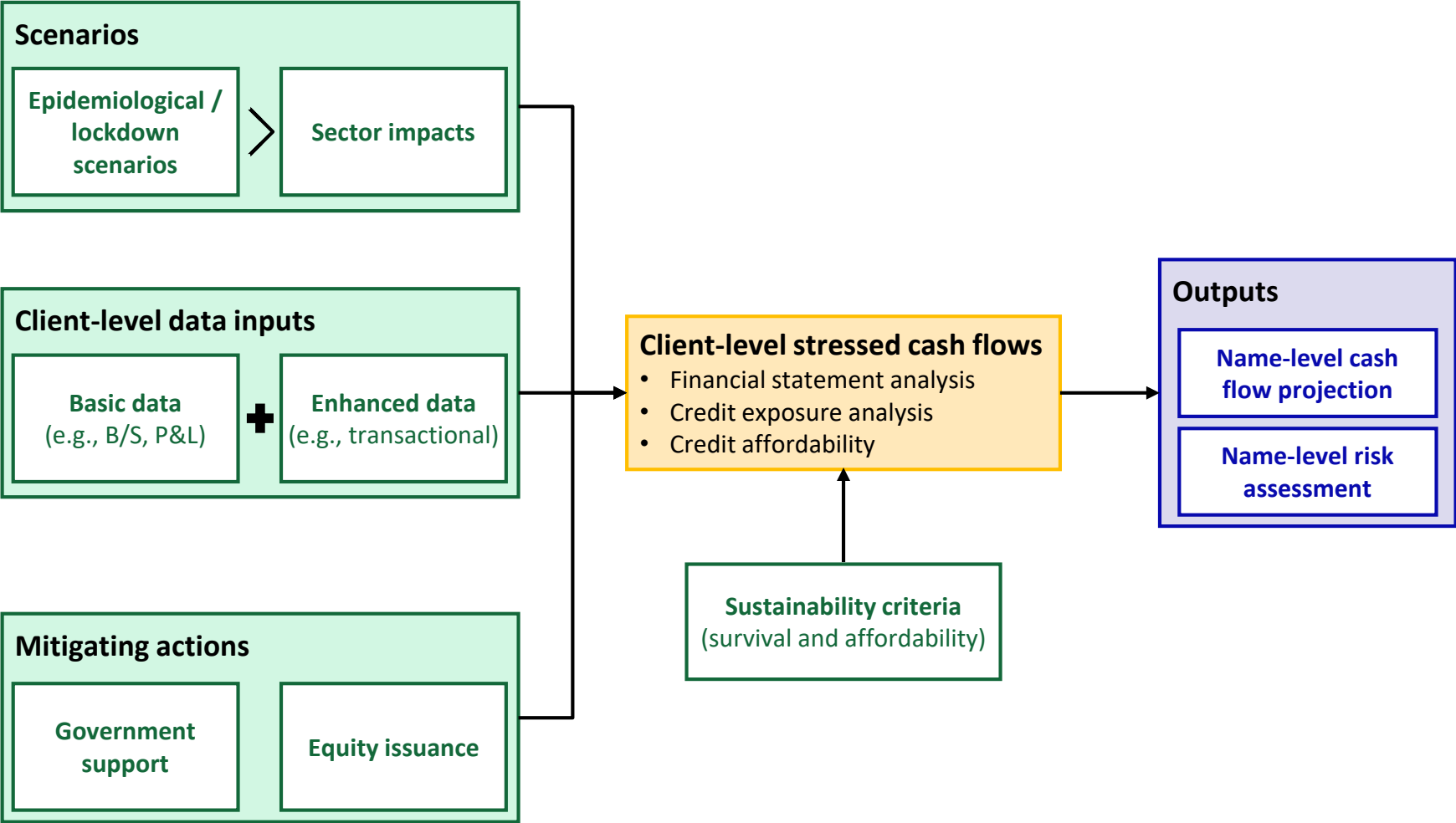
Company level cash flow forecasting

Cashflow projection and credit viability based on sector-specific drivers of profitability and company financials
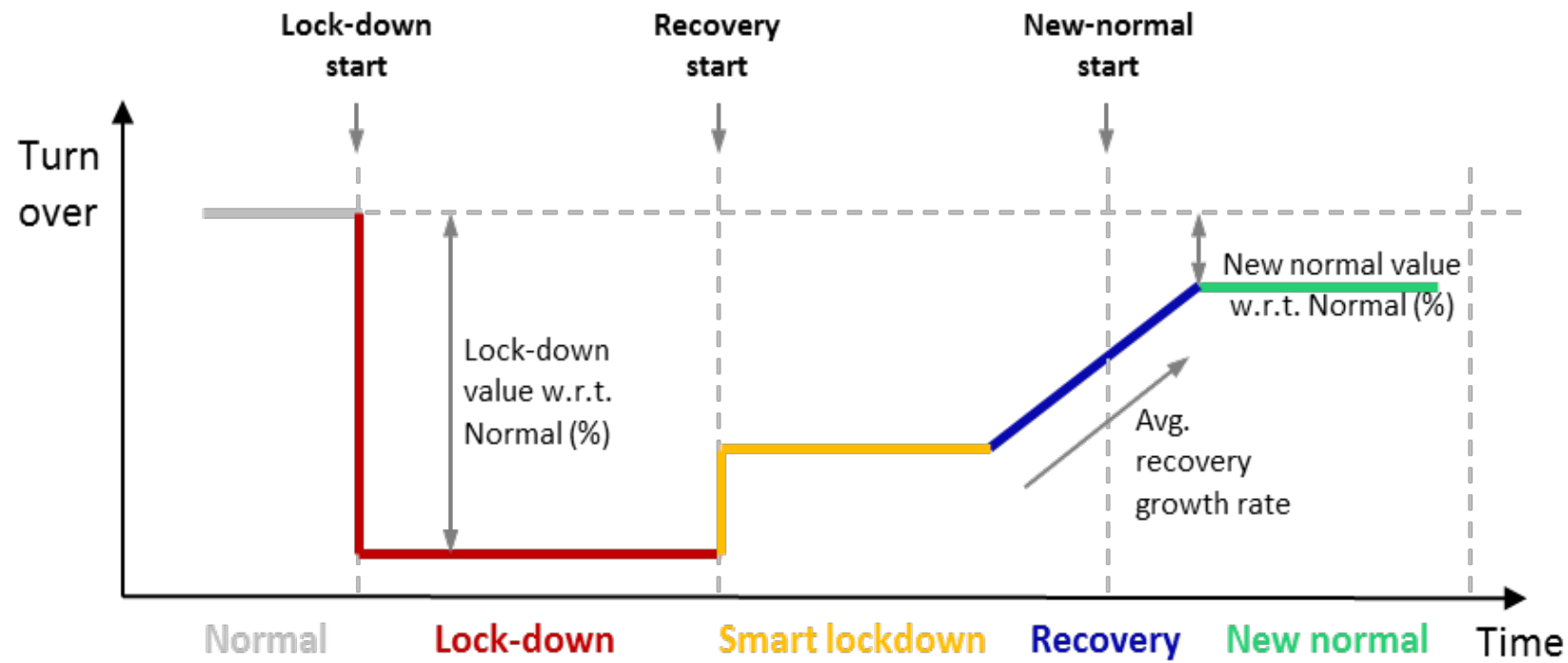
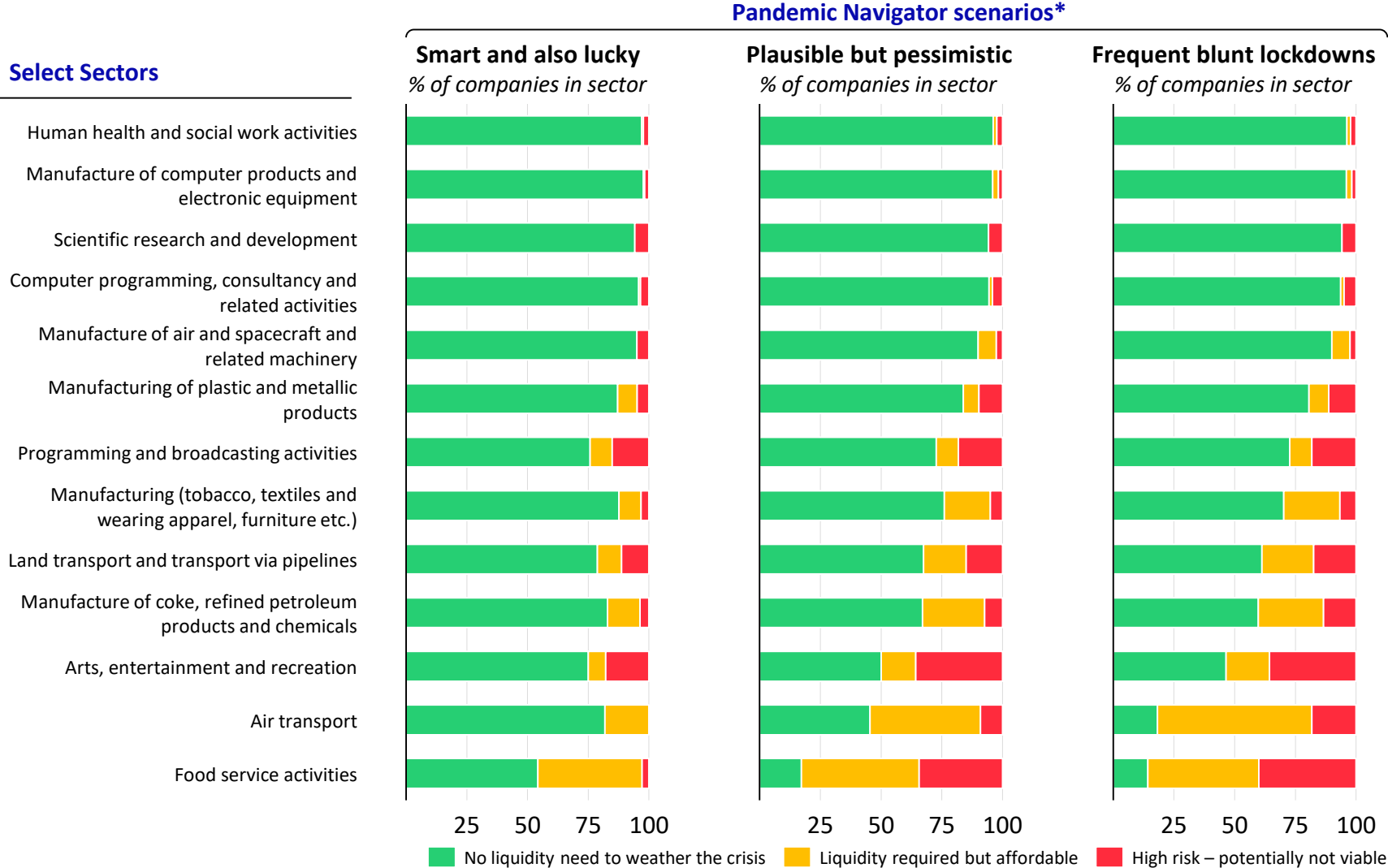# EXAMPLE OF COMPANY CASH FLOW ANALYSIS BASED ON EPIDEMIOLOGICAL SCENARIOS

ILLUSTRATION: COMPANY REVENUE INFLUENCED BY LOCKDOWN CONDITIONS

**Relationship between lock-down and revenues**

EXAMPLE OF CASH FLOW-BASED VIABILITY ANALYSIS

Select public, profitable US Companies by sector and scenario

Pandemic Navigator scenarios*

Select Sectors	Smart and also lucky *% of companies in sector*	Plausible but pessimistic *% of companies in sector*	Frequent blunt lockdowns *% of companies in sector*

Select Sectors:
- Human health and social work activities
- Manufacture of computer products and electronic equipment
- Scientific research and development
- Computer programming, consultancy and related activities
- Manufacture of air and spacecraft and related machinery
- Manufacturing of plastic and metallic products
- Programming and broadcasting activities
- Manufacturing (tobacco, textiles and wearing apparel, furniture etc.)
- Land transport and transport via pipelines
- Manufacture of coke, refined petroleum products and chemicals
- Arts, entertainment and recreation
- Air transport
- Food service activities

Legend:
- 🟩 No liquidity need to weather the crisis
- 🟨 Liquidity required but affordable
- 🟥 High risk – potentially not viable

* Source: Company filings; Capital IQ; Oliver Wyman analysis; sample of public companies in select US industries -

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PPNR MODELS: KEY OBSERVATIONS BY MODEL TYPE

Model type	What we have seen to date	Extent of adjustments/ overlays expected
All	• Models relying on GDP or unemployment more likely to "break" • Models relying on rates/ market variables often behaving better	
Loans and deposits, NII	• Extreme draws on corporate lines and increase in corporate deposits • Significant build up in retail deposits due to stimulus checks • Other loans behaving closer to expectations	◑
Fees (banking book)	• Payments and transaction volumes declined sharply, with affected models (e.g., card interchange, merchant processing) "breaking"	◕
Capital Markets and IB	• Sales & trading models performing as expected • Spike in DCM issuance (IG, then sub IG) not predicted by models • Significant May/ June surge in ECM likely not predicted by models • Depressed M&A levels in Q2 more in line with expectations	◑
Wealth & Asset Management	• Models performing more as expected, with fees tracking asset prices	○

A detailed narrative around virus and lockdown conditions is essential to inform qualitative estimates / overlays

THANK YOU; POST-WEBINAR LOGISTICS; Q&A

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Model Management in the COVID-19 Era

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MODEL MANAGEMENT IN THE COVID-19 ERA

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Scott Bredall
Jeffrey Brown
Varun Arte

https://www.oliverwyman.com/our-expertise/insights/2020/may/model-risk-management-in-the-covid-19-era.html

READ OUR LATEST INSIGHTS ABOUT COVID-19 AND ITS GLOBAL IMPACT ONLINE

Oliver Wyman and our parent company Marsh & McLennan (MMC) have been monitoring the latest events and are putting forth our perspectives to support our clients and the industries they serve around the world. Our dedicated COVID-19 digital destination will be updated daily as the situation evolves

Visit our dedicated COVID-19 website:
https://www.oliverwyman.com/coronavirus
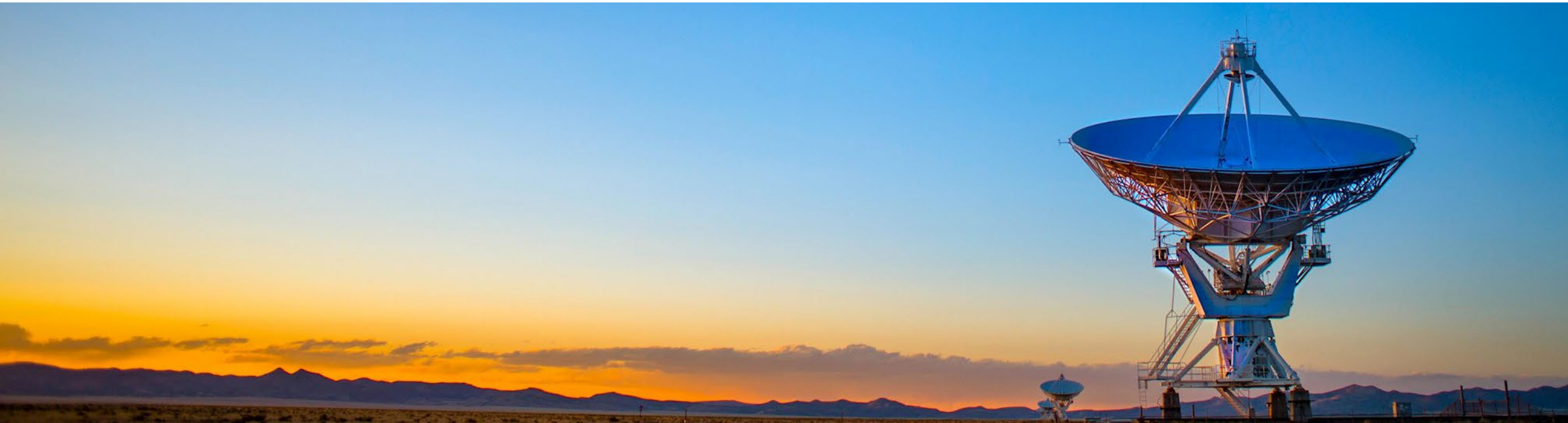
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