

# CCAR and 3<sup>rd</sup> Quarter Reporting: COVID Induced Cultural Shifts in Credit Modeling

OCTOBER 2020

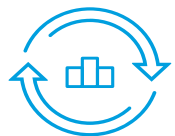
# Goals for Today



Review the challenges with forecasting credit losses



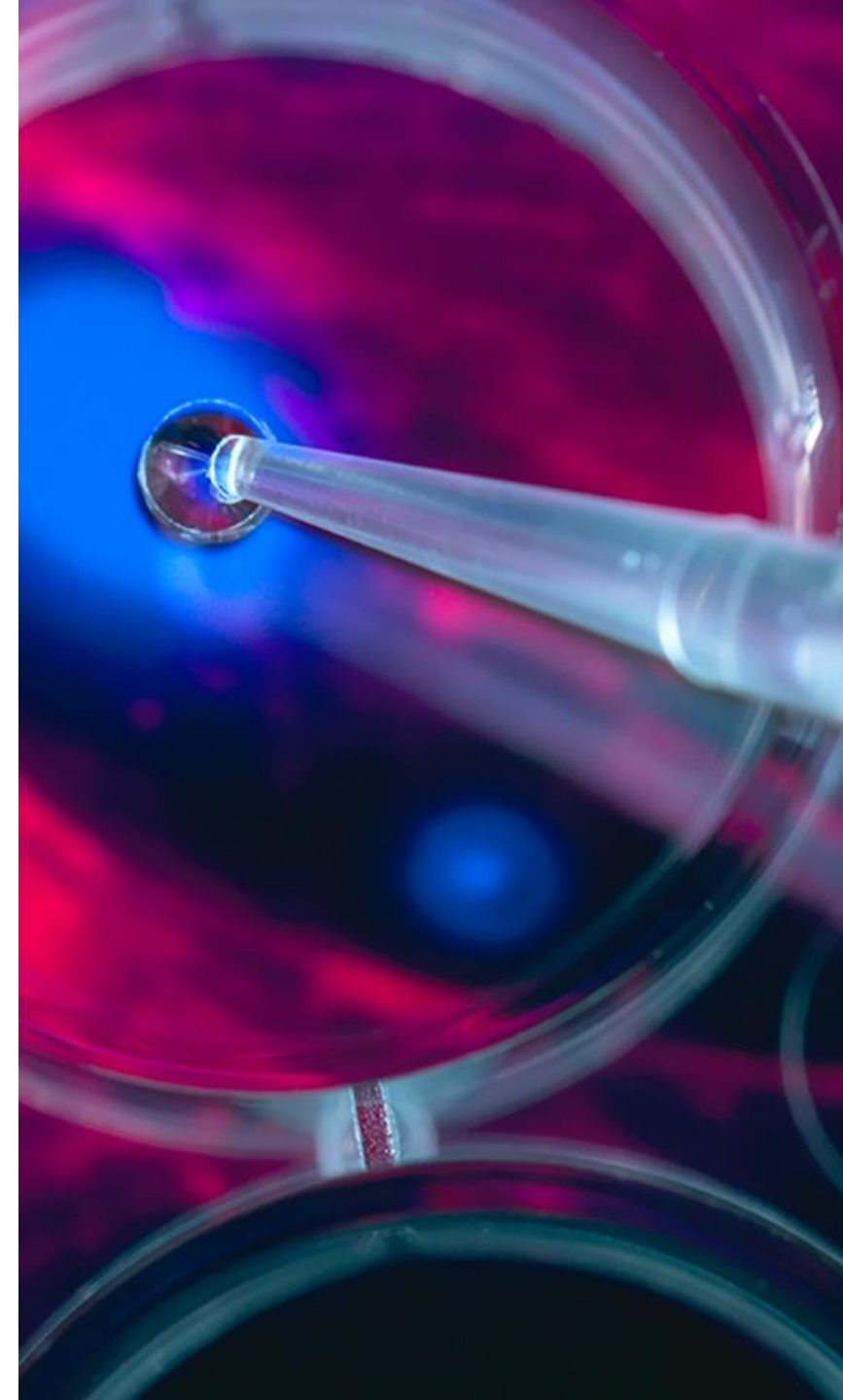
Demonstrate the value of alternative data and analytics anchored to traditional scenarios



Propose an approach to assess cross-industry-country risk due to COVID induced cultural shifts



Live Q&A



# Today's Speakers



**Amnon Levy**

*Head of Portfolio Management*



**Tim Daly**

*Head of Strategic Accounts-  
Americas*



**Anna Krayn**

*Enterprise Risk Solutions  
Moderator*

# Observed Challenges in the Industry



*“Historical relationships are clearly broken, we can’t rely solely on the tools from the past and believe the answers.”*



**Head of Model Development  
Mid-size US Bank**



*We need a new way of looking at credit, the old way won’t work in this environment. We are defining a new risk appetite at a more detailed level*



**Head of Credit Strategies  
Large Multi-National Bank**



*It’s unreasonable to downgrade everyone. We need a better way to sift through the noise within industry groups to arrive at a tractable approach for credit monitoring over the long term.”*



**Global Credit Analytics Group  
Large US Bank**

# Environment and Credit Risk Measurement

Nature of risks and their uncertainty likely to persist



## DRIVERS

- » **Epidemiological** – progression of the epidemic
- » **Sociological** - response of people, businesses, governments and medical community



## ECONOMIC ENVIRONMENT

Varies Across Countries and Regions

- » **Supply shocks** – from illness and lockdowns and supply chain disruption
- » **Demand shocks** – income impacted by employment, fiscal stimulus, and cultural shifts



## Challenges with Credit Risk Measurement

- » **Internal Rating** - rely on fundamental name-level analysis, difficult to update quickly, and require quantification of loss for CCAR and impairment
- » **Credit Loss Forecast Models** – often calibrated to past downturns and not accurately reflecting COVID's cross-sectional impact

# Challenges with Credit Loss Forecast Models

## CCAR and Impairment Models

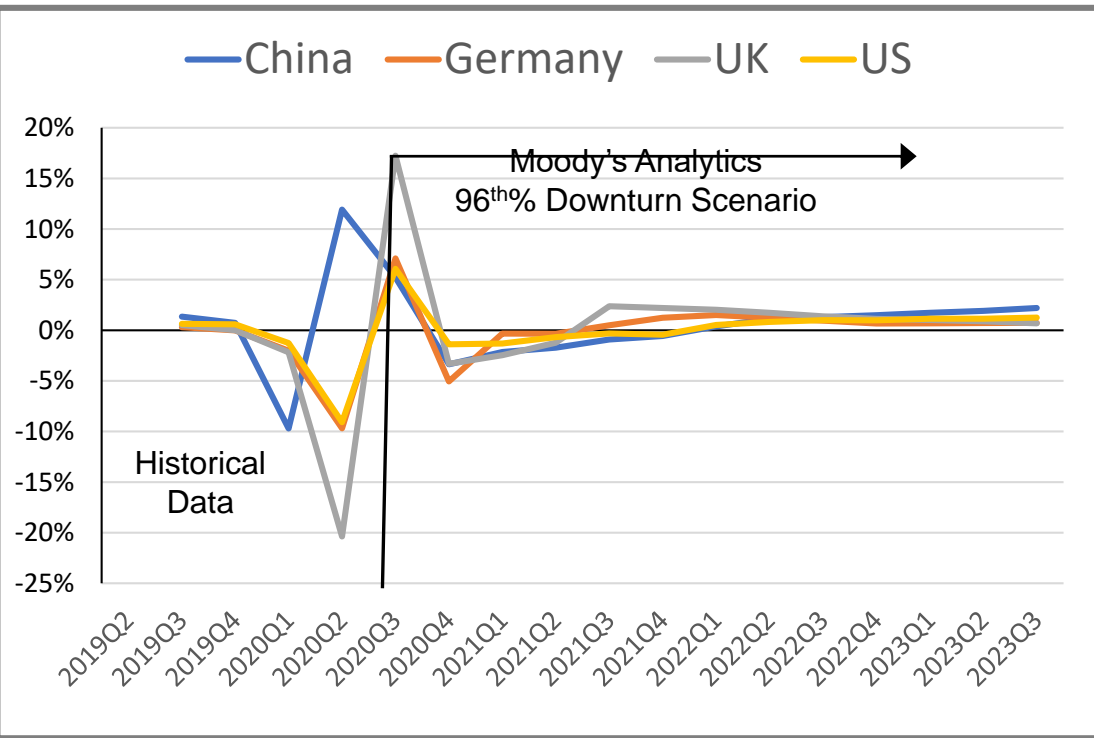
- » Can't describe COVID's evolving and varying impact on sociological shifts and credit segments
- » Unable to capture government and fiscal policy impact across segments
- » Leverage broad-brush economic scenarios that have been extreme, often out of range, and not representing the credit environment

## Data and Analytics for Emerging Risks

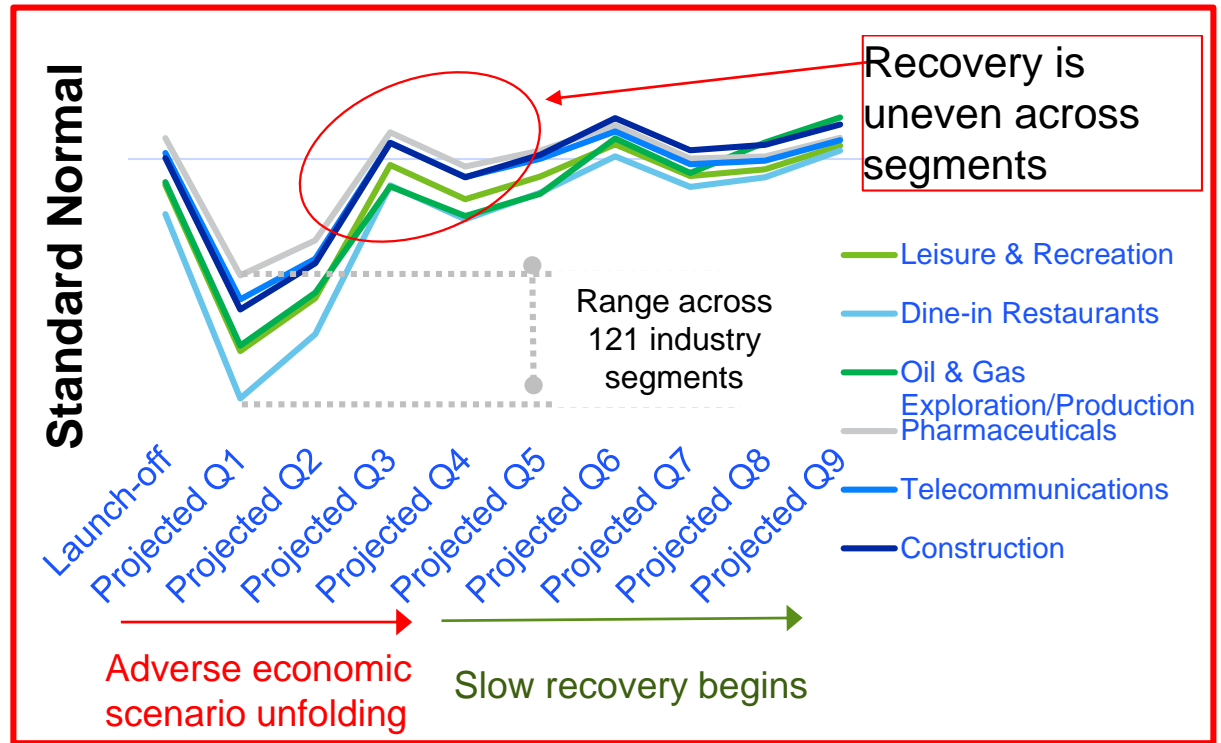
- » Alternative Data
  - Epidemiological
  - Mobility
  - Supply Chain and Geolocation
  - Tourism and Trade...
- » Flexible and anchored to internal models
- » Emerging risks transcend COVID
  - Hazard events (e.g., Fukushima)
  - Climate (e.g., Australian and California wildfires)

# A Cross-Sectional COVID Overlay for Credit Loss Forecasting

## TRADITIONAL MACRO SCENARIO GDP GROWTH



**ANCHORING TO TRADITIONAL MACRO SCENARIOS THE CROSS-SECTIONAL COVID-19 OVERLAY USES GRANULAR CREDIT AND ALTERNATIVE DATA TO DIFFERENTIATE COVID'S IMPACT ACROSS SEGMENTS**

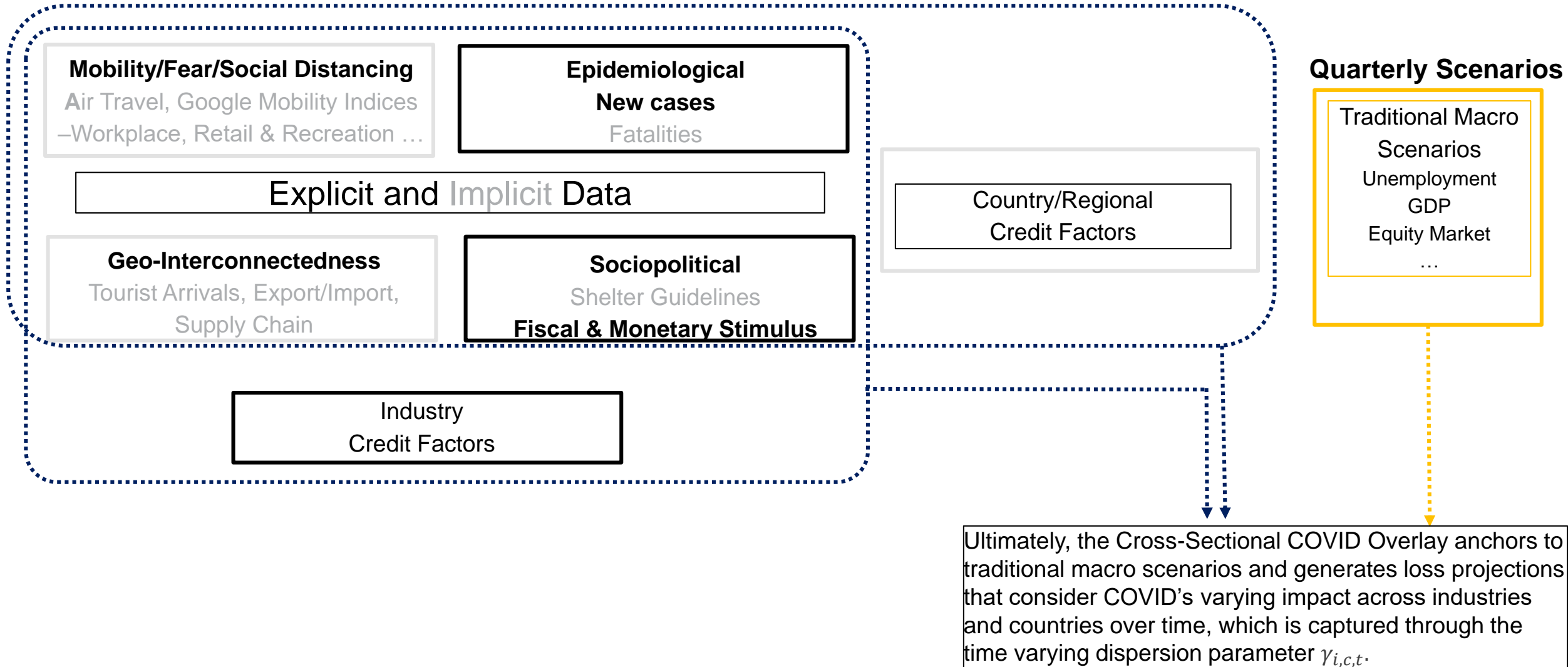


Source: Moody's Analytics

Source: Moody's Analytics

# Alternative Data and Analytics for Emerging Risks

## Cross-Sectional COVID 19 Overlay



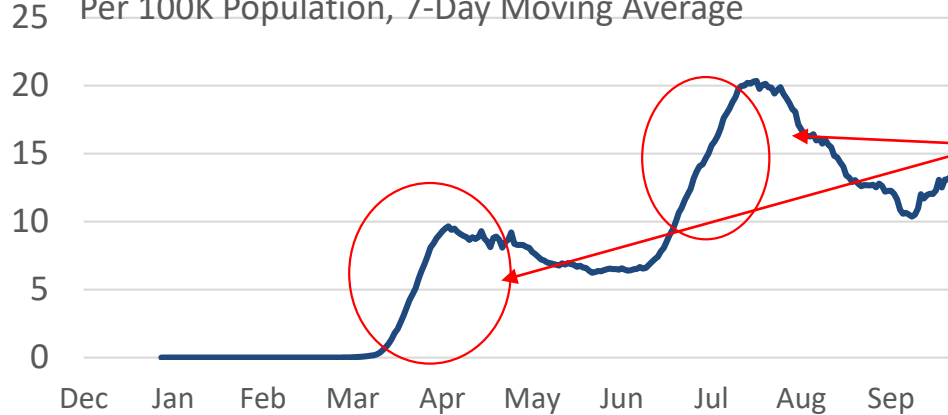


# Alternative Data, Transient/Permanent Behavior Shifts, and Credit Risk

## Insights from the US to guide cross industry quantification

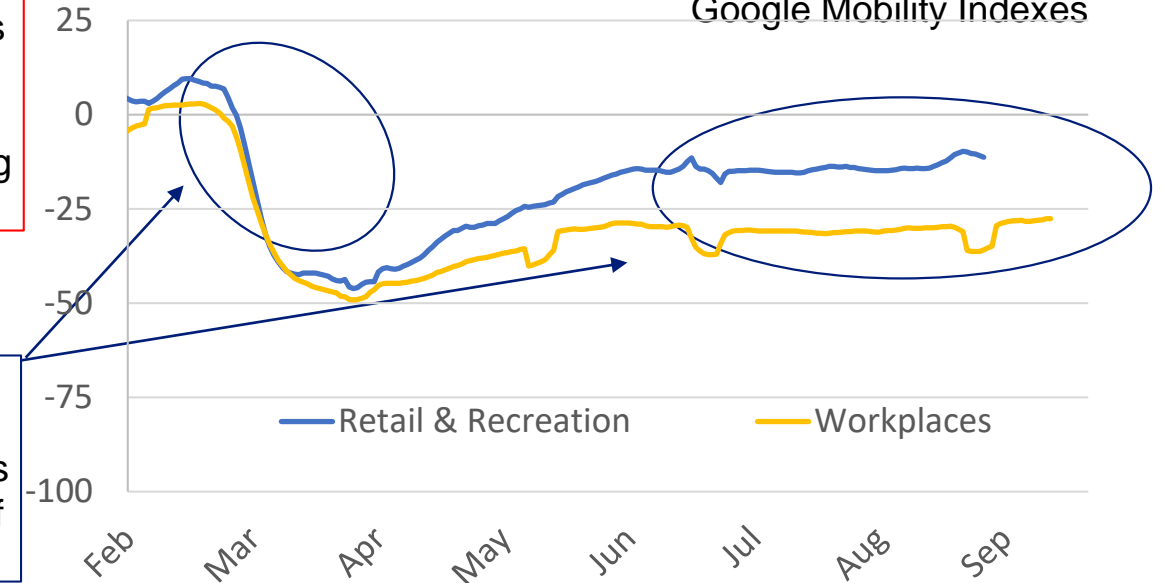
Daily New COVID-19 Cases

Per 100K Population, 7-Day Moving Average



Difficult to compare across time given factors such as changing testing standards

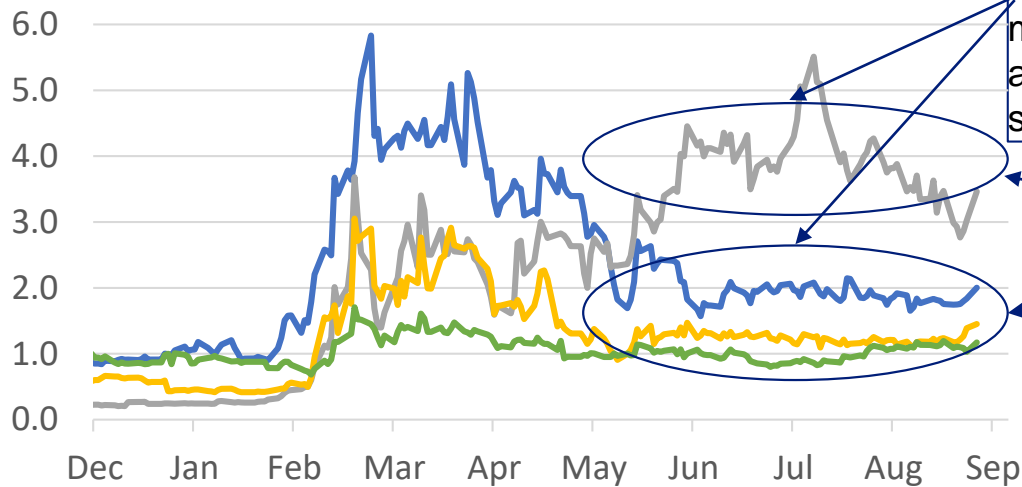
Google Mobility Indexes



Interesting that by June US mobility reaches an asymptote of sorts.

**EDFs increased in March**, decreased in many cases decreased, and stabilized to some extent by June although volatility is still very high.

7.0% Median EDF

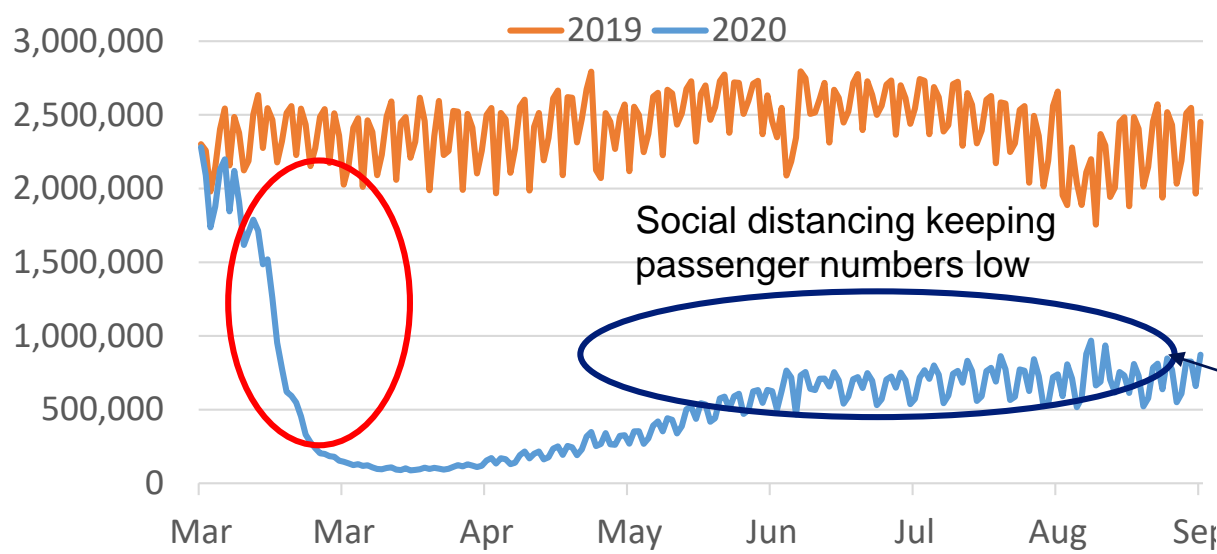


— AUTOMOTIVE — LEISURE & RECREATION — CONSUMER DURABLES — MEDICAL EQUIPMENT

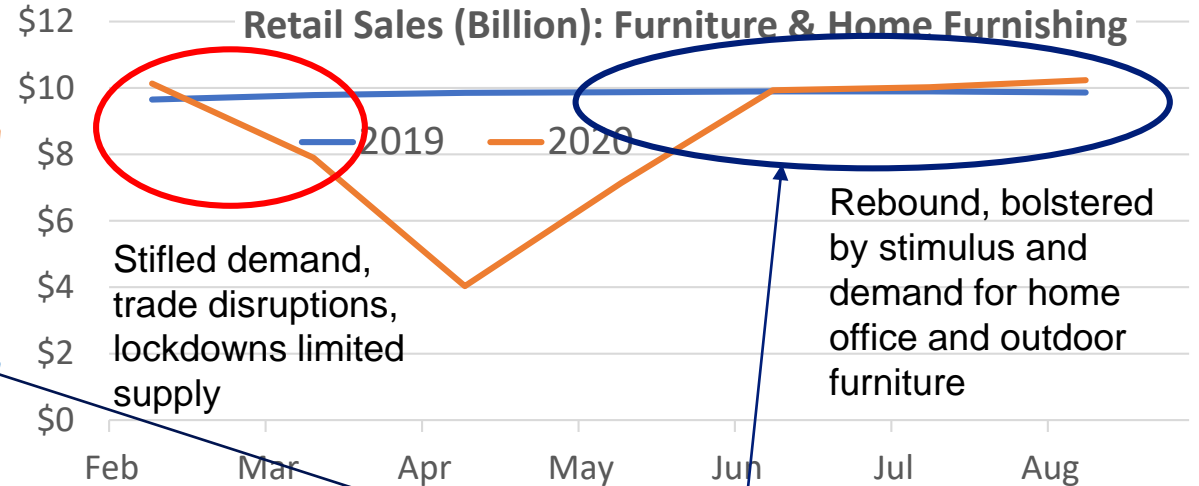
# Alternative Data, Transient/Permanent Behavior Shifts, and Credit Risk

Insights from the US to guide cross industry quantification

TSA: Daily Number Of Passangers at the US Airports



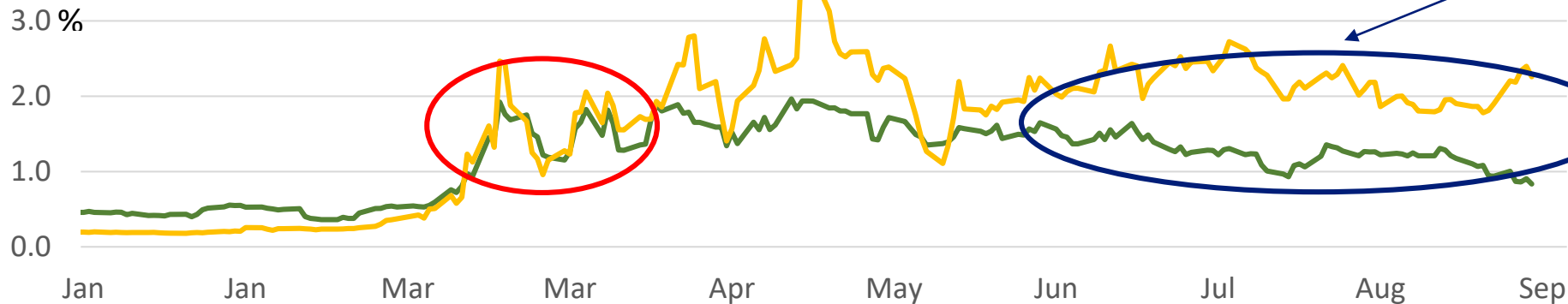
Retail Sales (Billion): Furniture & Home Furnishing



Median EDF

FURNITURE & APPLIANCES

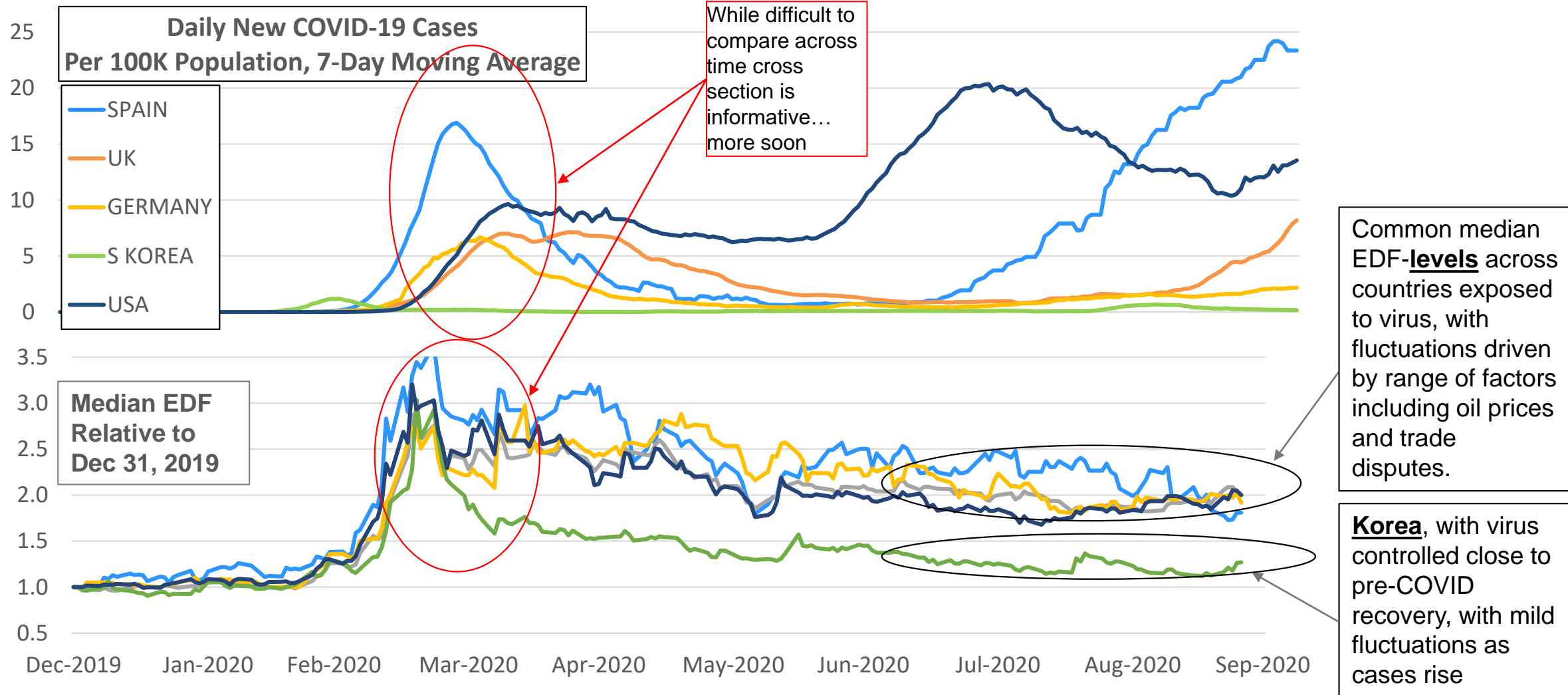
AIRLI



By **June**, similar asymptotic behavior as recovering Furniture & Home Furnishing sales and sustained low level of airline daily passengers speak to the more permanent/transient nature of the impact COVID is having on those industries, and the implications for credit.

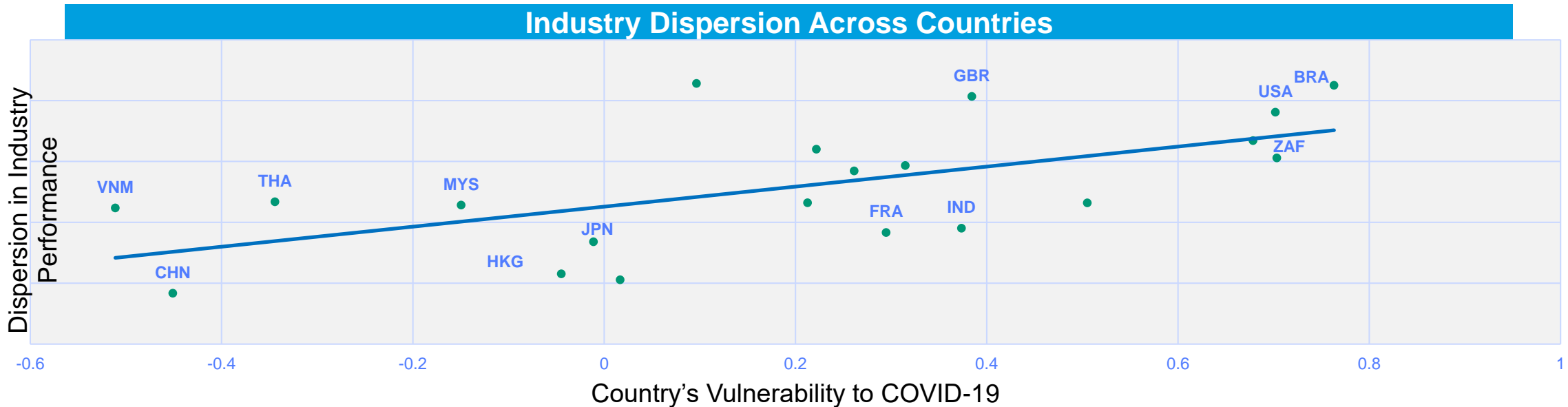
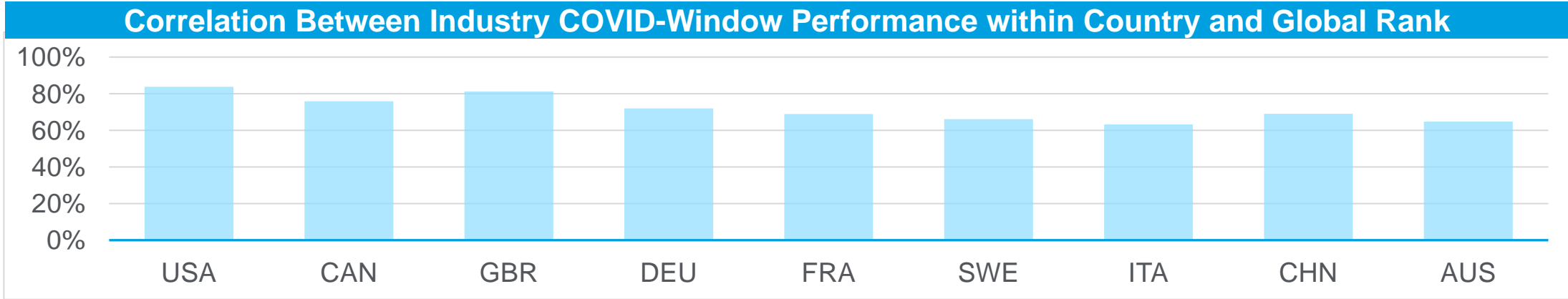
# Alternative Data, and Cross-Country Credit Risk Dynamics

Common patterns in median default probability levels



# COVID's Cross-Industry Impact Similar in Rank Across Countries

But with material variation in dispersion...

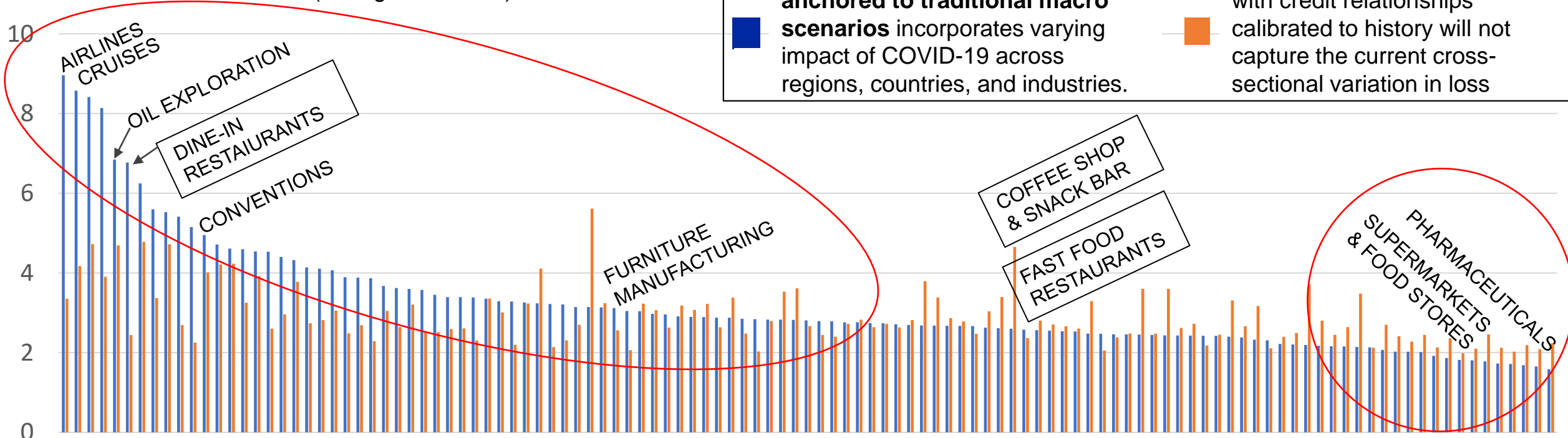


# Cross-Sectional COVID-19 Overlay Results

A re-evaluation of industry segmentation and credit dynamics

**Ratio of 1-year projected default probabilities to EDF as of Dec 31st 2019**

Realized (through June 2020) and Moody's S4\*  
96% Downside Scenario (through Dec 2020)



**Cross-Sectional COVID Overlay scenarios** anchored to traditional macro scenarios incorporates varying impact of COVID-19 across regions, countries, and industries.

**Traditional macro scenarios** with credit relationships calibrated to history will not capture the current cross-sectional variation in loss

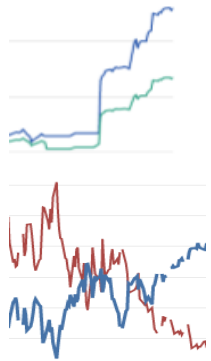
Source: Moody's Analytics  
Public Firm Sample Firms with Dec 2019 EDF < 3%

**\*U.S. 96th% Downside (S4):** assumes the crisis to last significantly longer with more cases and deaths than anticipated. Business closures wind down much more slowly than in the Baseline. There is a modest rebound in 2020 Q3 but a second wave of recession begins in 2020 Q4 until 2021 Q3. Real GDP growth rate is projected to be -7% in 2020 and -4.3% in 2021 (compared to -4.9% and 2.6%, respectively, in the Baseline). Unemployment rate reaches a peak of 13% in early 2022. Disagreements in Congress prevent the passage of additional fiscal stimulus.

# Cross Sectional COVID Overlay

Measuring COVID's evolving impact on credit loss forecasts

## ASSESSING WHAT HAS HAPPENED SO FAR

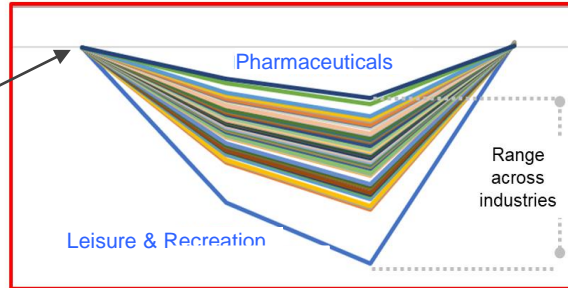


Elevated :  
- default probabilities  
- expected loss

Varying performance  
of segments,  
industries & names

MOST RECENT,  
REASONABLE, AND  
WELL-UNDERSTOOD  
CREDIT ASSESSMENT  
OF PORTFOLIO

### Cross-Sectional COVID-19 Overlay



## Applications

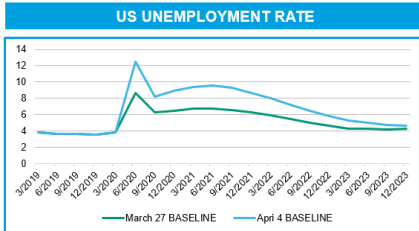
### CURRENT CREDIT ASSESSMENT RATINGS & PDs

Current-State Internal Rating Assessment

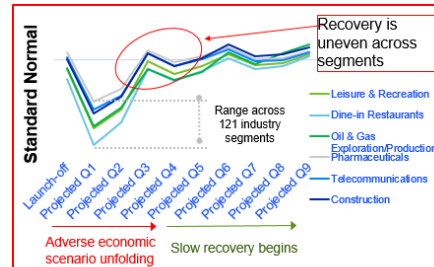
Industry	Investment Grade		High-Yield	
	Rating Dec 31, 2019	Rating Assessment April 29, 2020	Rating Dec 31, 2019	Rating April 29, 2020
MINING	Baa2	Baa3	B2	B2
TRANSPORTATION	Baa2	Ba2	B2	B2
MASS MEDIA	A2	Baa1	B3	B3
CONSUMER DURABLES	Baa2	Ba1	B2	B2

## PROJECTING WHAT MIGHT HAPPEN NEXT?

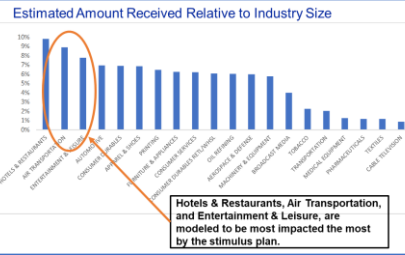
### Varying macro scenarios



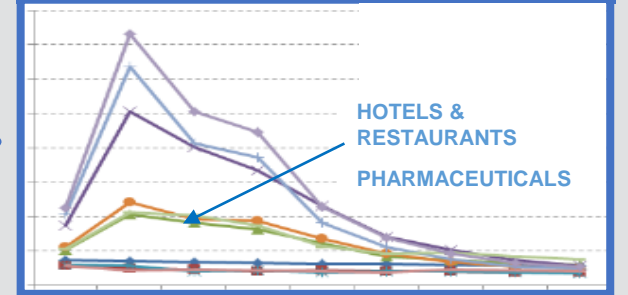
### Cross-Sectional COVID-19 Overlay



### FISACL & MONETARY OVERLAY

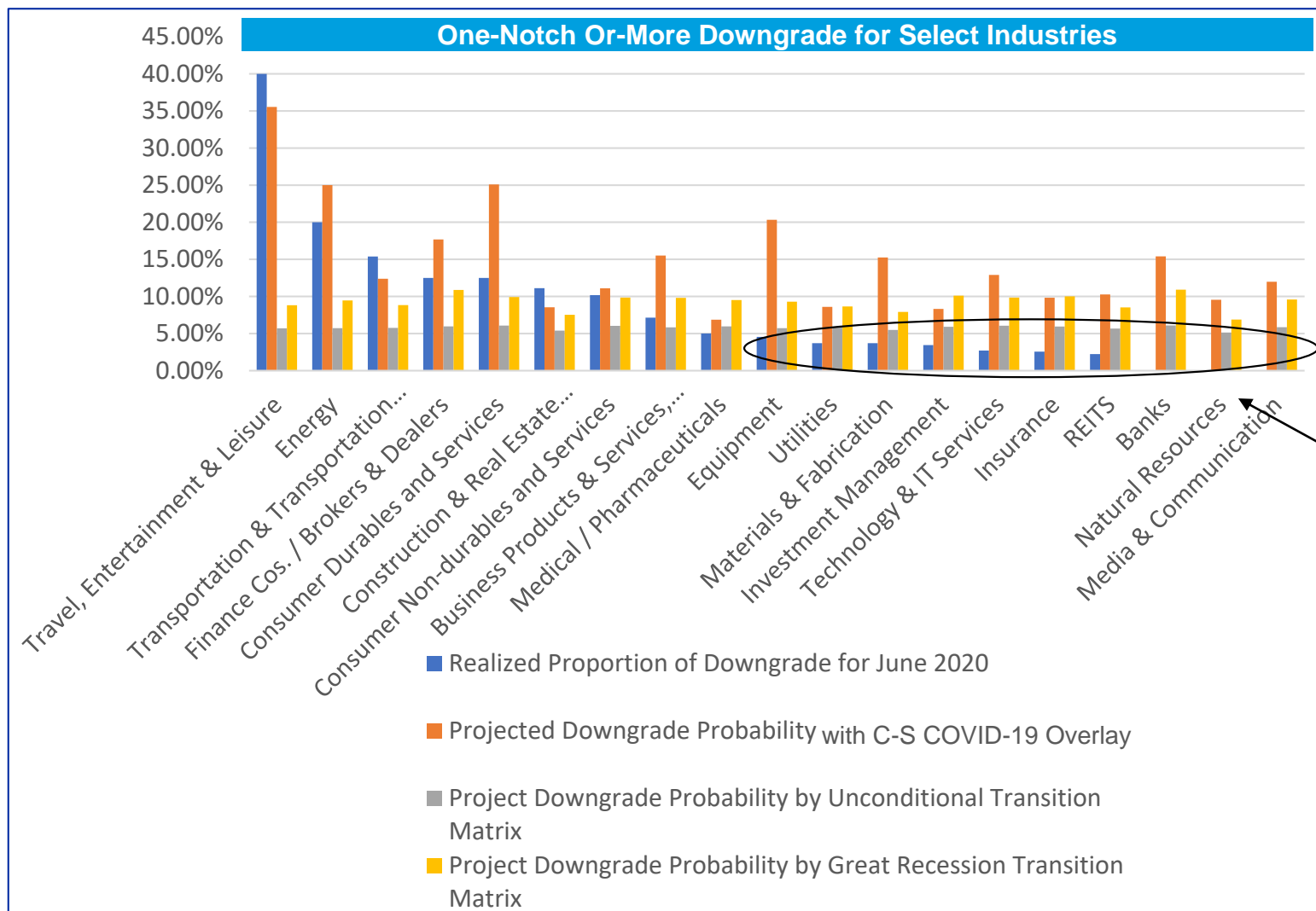


### PROJECTED RATINGS, OTTI, RBC, SPREADS AND LOSS MEASURES for CCAR/CECL REPORTING



# Performance - December 2019 to June 2020

## Credit Migration and Cross-Sectional COVID-19 Overlay



Accuracy Ratio			
Method	Number of downgrade notch	IG Firm	HY Firm
Cross-Sectional COVID -19 Overlay	1+	0.409	0.384
	2+	0.343	0.562
Unconditional Transition Matrix	1+	0.062	0.231
	2+	0.033	0.003
Great Recession Transition Matrix	1+	0.051	0.129
	2+	0.089	0.228

Model is probabilistic. Comparing actual vs modeled/projected will be challenging for industries with small samples.

**NOTES**

US Moody's rated firms as of Dec 31, 2019

EDF data as of Dec 31 2019

Probability of downgrade from Dec 2019 to June 2020 are projected based on the realized macroeconomic statistics

# 2020 Expected Default Rates - Select Industries

## Impact of Cross-Sectional (C-S) COVID-19 Overlay

Average One-year Default Probabilities (Dec 2019 to Dec 2020)

Industry	US			German			UK		
	EDF 31-Dec-19	Baseline	Baseline With C-S COVID Overlay	EDF 31-Dec-19	Baseline	Baseline With C-S COVID Overlay	EDF 31-Dec-19	Baseline	Baseline With C-S COVID19 Overlay
Leisure & Recreation	1.82%	3.12%	4.57%	0.13%	0.25%	0.47%	0.20%	0.63%	1.21%
Clothing and Non Durables Retail/Wholesale	1.79%	2.93%	4.35%	4.54%	6.91%	9.47%	2.07%	4.02%	5.08%
Banks and S&Ls	0.36%	0.85%	0.93%	0.34%	0.88%	0.97%	0.84%	2.29%	2.31%
Computer Software	0.95%	1.62%	1.49%	1.01%	1.67%	1.62%	1.03%	2.01%	2.00%
Investment Management	0.59%	1.32%	1.09%	0.55%	0.95%	0.89%	0.17%	0.53%	0.45%

**Leisure & Recreation** relative performance deteriorates and **Computer Software and Investment Management** improves with Cross-Sectional COVID Overlay

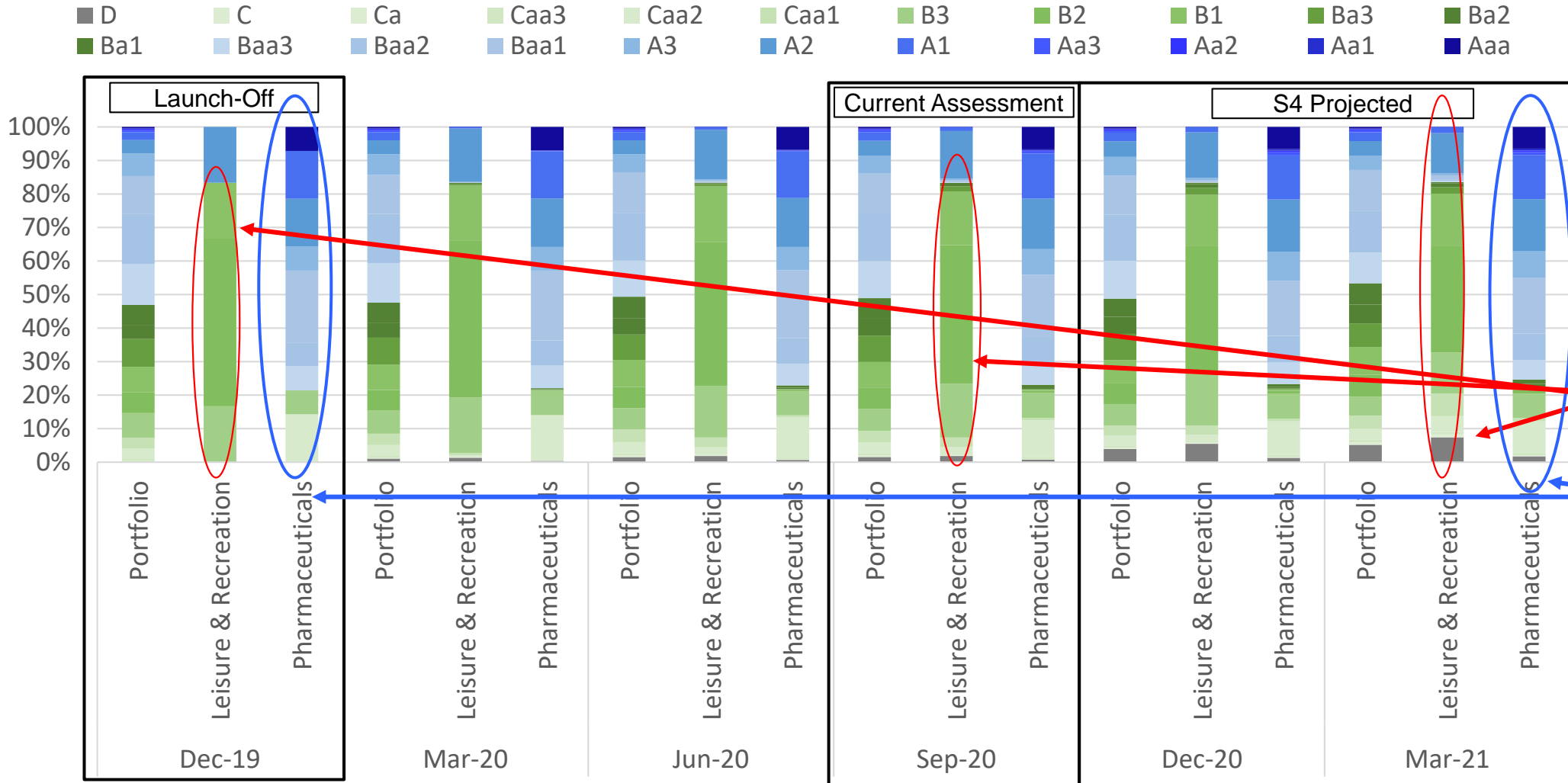
**UK economic scenario is more severe than Germany or US. The US and UK industries are more sensitive to COVID, and have a higher dispersion parameter than Germany.**

- Source: Moody's Analytics
- Public Firm Sample Firms with Dec 2019 EDF<3%
- September vintage scenarios (*realized shocks for 2020 Q1 and 2020 Q2, projected shocks for 2020 Q3 and 2020 Q4*).
- C-S COVID Overlay as of September, 2020.



# Rating Composition Forecasts – Select US Industries

Current (through September) and S4 96% downside projection

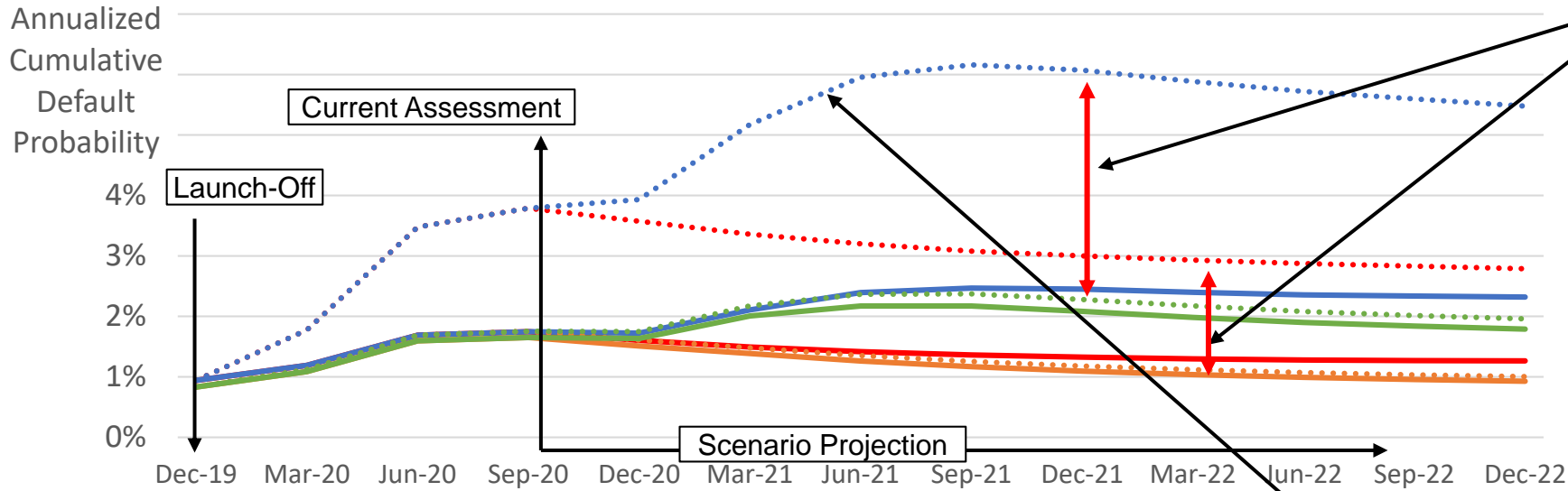


**Leisure & Recreation** experience material credit quality deterioration under downturn scenario, with almost 8 % of the sample defaulting by March 2021.

**Pharmaceuticals not** impacted much with limited migration.

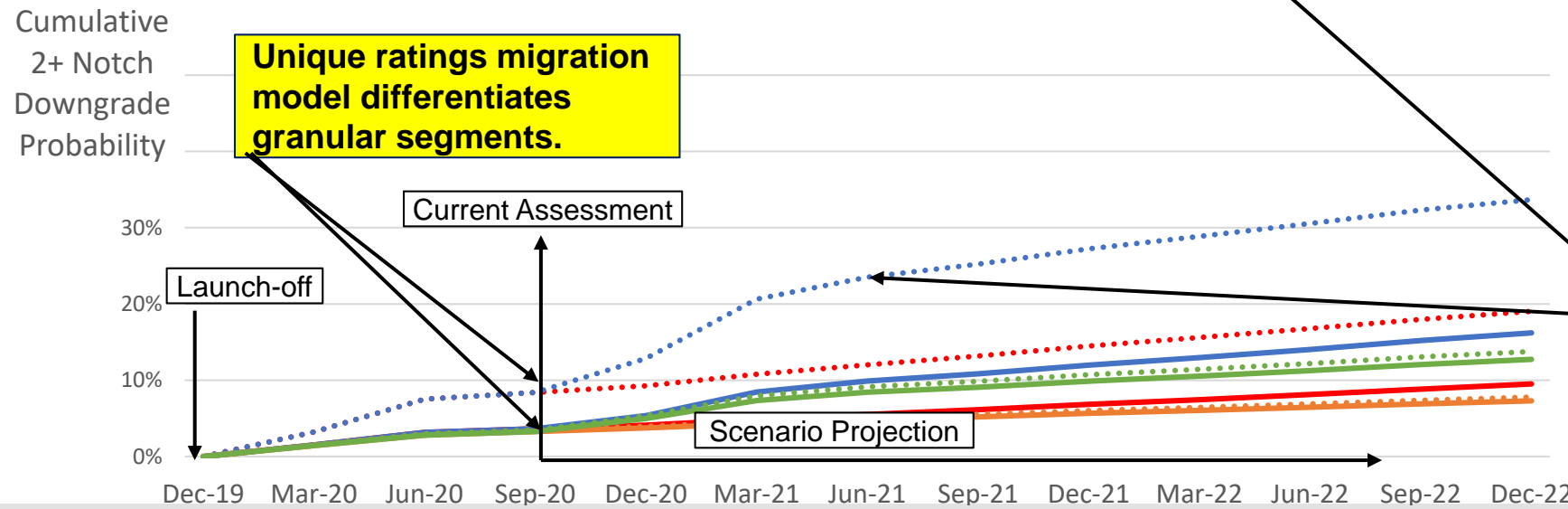
# Current PD and Rating Assessments and Credit Loss Forecasts

## US Dine-In and Fast-Food Restaurants



**Dine-In Restaurants in US experience an even more pronounced deterioration once the Overlay is accounted for. Fast-Food Restaurants, though still impacted by the Pandemic, exhibit a lower deterioration relative to Dine-In.**

- Dine-In Baseline w/o C-S Overlay
- ... Dine-In Baseline with C-S Overlay
- Dine-In S4 w/o C-S Overlay
- ... Dine-In S4 with C-S Overlay
- Fast-Food Baseline w/o C-S Overlay
- ... Fast-Food Baseline with C-S Overlay
- Fast-Food S4 w/o C-S Overlay
- ... Fast-Food S4 with C-S Overlay

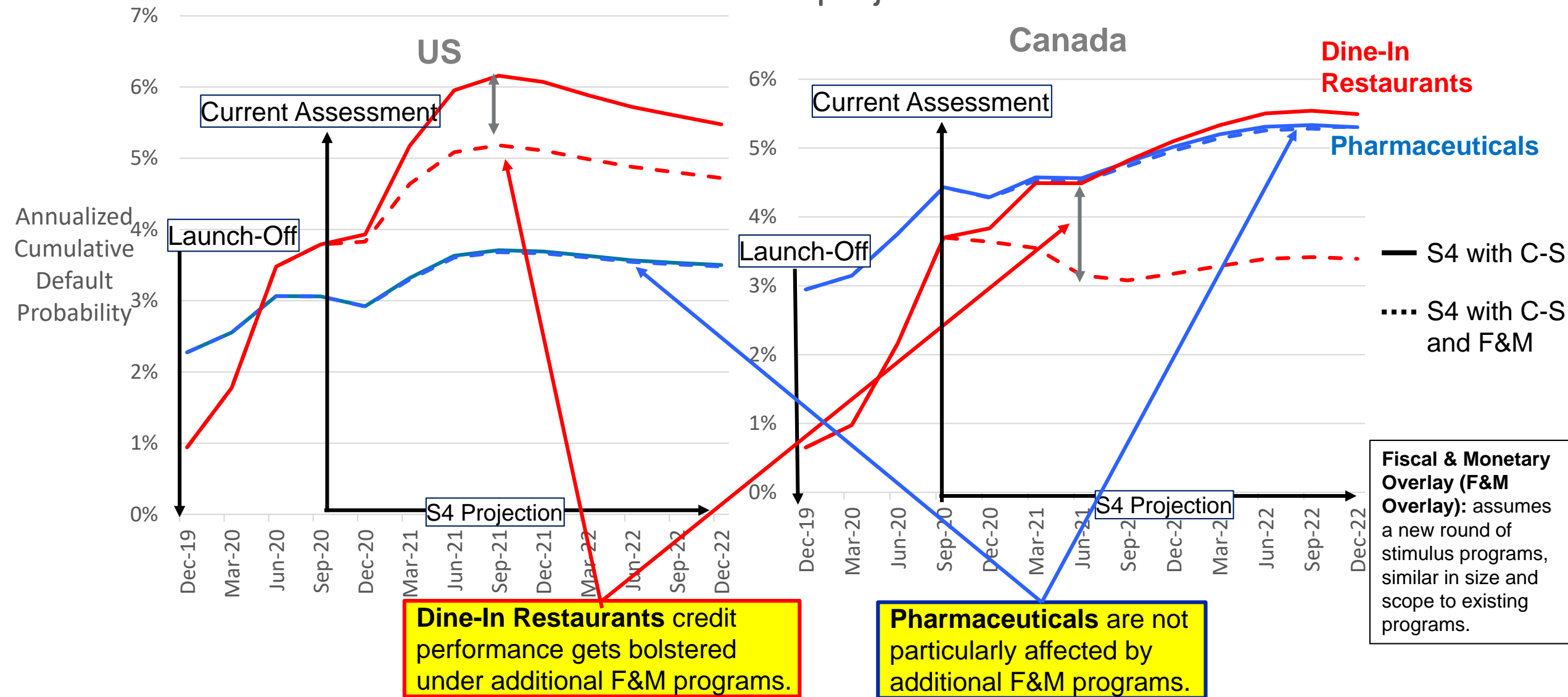


**Unique ratings migration model differentiates granular segments.**

**Ratings react more slowly than forward looking PD to macroeconomic conditions, corresponding to empirical patterns.**

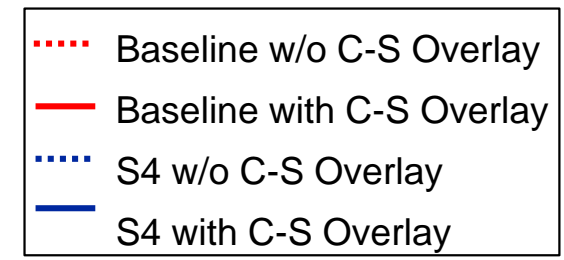
# Impact of Additional Fiscal and Monetary Actions Across US and Canada

Current Assessment and S4 96% downside projected

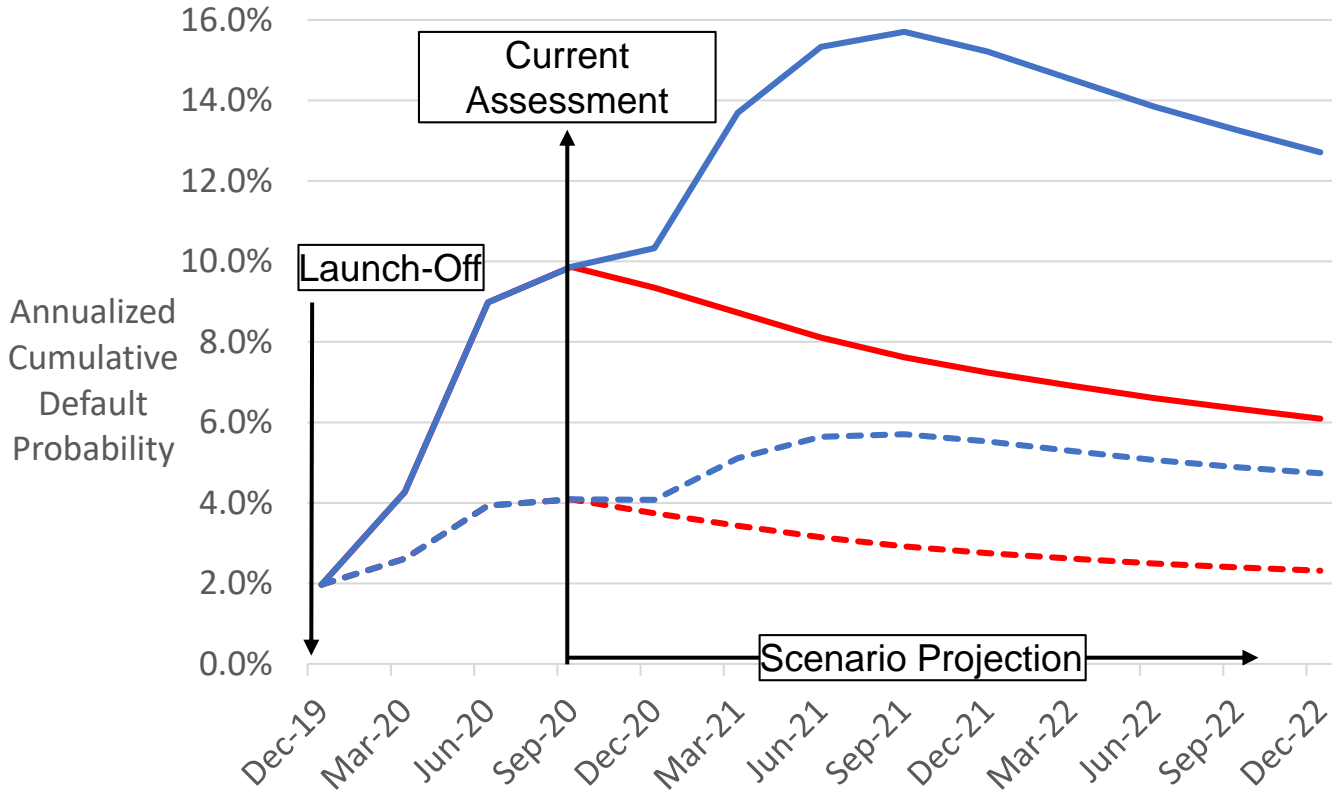


# Name-Level Dynamics

## Dine-In vs Fast-Food (Take-Out) Restaurants

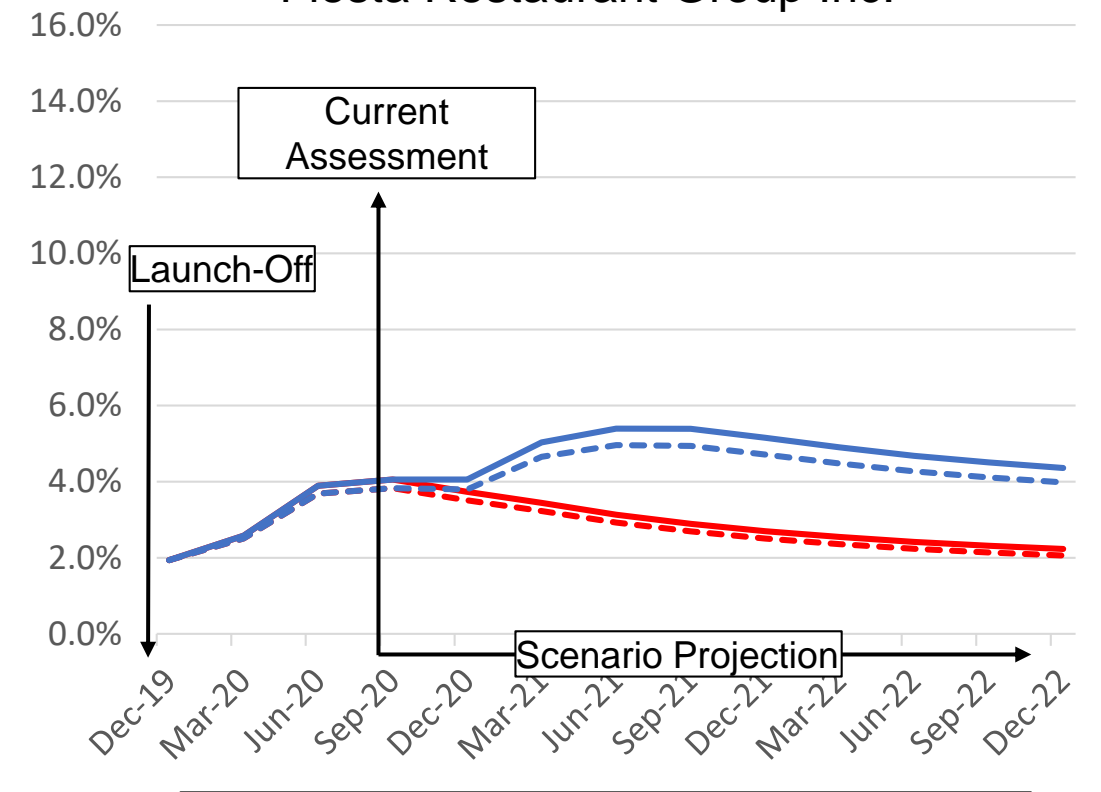


### Red Robin Gourmet Burgers Inc.



**Red Robin Gourmet Burgers inc, is a Dine-In Restaurant, who's deteriorating credit quality has been captured by the Cross Sectional Overlay.**

### Fiesta Restaurant Group Inc.



**Fast-Food Restaurants, such as Fiesta Restaurant Group Inc, are less impacted by the pandemic compared to Dine-In or**

# Pandemic Credit Data and Analytics (PCDA)

## Fiscal and Monetary Action Settings

Select Existing Scenario
New Scenario Name

Add Fiscal & Monetary Overlay
-------------------------------

Name	Included	Size (USD billion)	Country	Type	Target Size	Target Credit Quality	Target Industry Code	Starting Quarter
Direct payments to taxpayers	Yes	\$ 300.00	USA	Consumer_spending	ALL	ALL	ALL	2020-Q2
Increase jobless benefits	Yes	\$ 260.00	USA	Consumer_spending	ALL	ALL	ALL	2020-Q2
Student loans	Yes	\$ 7.92	USA	Consumer_spending	ALL	ALL	ALL	2020-Q2
PPP loans	Yes	\$ 395.40	USA	Consumer_spending	ALL	ALL	ALL	2020-Q2
Defense Industry Bailout	Yes	\$ 17.00	USA	Bailout	ALL	ALL	N01	2020-Q2
Airline Bailout	Yes	\$ 50.00	USA	Bailout	ALL	ALL	N03	2020-Q2
Commercial Paper Funding Facility	Yes	\$ 100.00	USA	Subsidized_lending	ALL	IG	ALL	2020-Q2
Money Market Fund Liquidity Facility	Yes	\$ 100.00	USA	Subsidized_lending	ALL	IG	ALL	2020-Q2
Main Street Lending Program	Yes	\$ 600.00	USA	Subsidized_lending	TS1,TS2	ALL	ALL	2020-Q2
Primary Market Corporate Credit Facility	Yes	\$ 500.00	USA	Subsidized_lending	ALL	IG	ALL	2020-Q2
Municipal Liquidity Facility	Yes	\$ 350.00	USA	Subsidized_lending	ALL	IG	ALL	2020-Q2
Secondary Market Corporate Credit Facility	Yes	\$ 250.00	USA	Subsidized_lending	ALL	IG	ALL	2020-Q2
Term Asset-Backed Securities Loan Facility	Yes	\$ 100.00	USA	Subsidized_lending	ALL	ALL	ALL	2020-Q2
Bankers' Acceptance Purchase Facility	Yes	\$ 6.30	CAN	Subsidized_lending	ALL	ALL	ALL	2020-Q2
BCAP BDC Co-Lending to SMEs	Yes	\$ 15.00	CAN	Subsidized_lending	TS1,TS2	ALL	ALL	2020-Q2
BCAP BDC MidMarket Financing Program	Yes	\$ 15.00	CAN	Subsidized_lending	TS2	ALL	ALL	2020-Q2
BCAP EDC Guarantee for SMEs	Yes	\$ 15.00	CAN	Subsidized_lending	TS1,TS2	ALL	ALL	2020-Q2
BCAP EDC MidMarket Guarantee and Financing Program	Yes	\$ 15.00	CAN	Subsidized_lending	TS2	ALL	ALL	2020-Q2
Large Employer Emergency Financing Facility	Yes	\$ 15.00	CAN	Subsidized_lending	TS3	ALL	ALL	2020-Q2
Canada Emergency Business Account	Yes	\$ 18.75	CAN	Subsidized_lending	ALL	ALL	ALL	2020-Q2
Canada Emergency Wage Subsidy	Yes	\$ 57.00	CAN	Consumer_spending	ALL	ALL	ALL	2020-Q2
Canada Emergency Response Benefit	No	\$ 26.63	CAN	Consumer_spending	ALL	ALL	ALL	2020-Q2
Canada Emergency Student Benefit	Yes	\$ 3.98	CAN	Consumer_spending	ALL	ALL	ALL	2020-Q2
Increasing Credit Availability to Agriculture and Food Processing	Yes	\$ 3.75	CAN	Subsidized_lending	ALL	ALL	N02,N25	2020-Q2
Increasing the Canada Child Benefit	Yes	\$ 1.43	CAN	Consumer_spending	ALL	ALL	ALL	2020-Q2
Cleaning up Orphan and Inactive Gas Wells	Yes	\$ 1.28	CAN	Direct_grant	ALL	ALL	N40	2020-Q2

# Pandemic Credit Data and Analytics (PCDA)

## Projected Rating Migrations

Select Analysis 1  
Sample\_S3\_Covid\_20200729074355

Select Analysis 2  
Sample\_S3\_Covid\_20200729074355

Calculate

Segmentation	Segment
Custom 2	Hotels

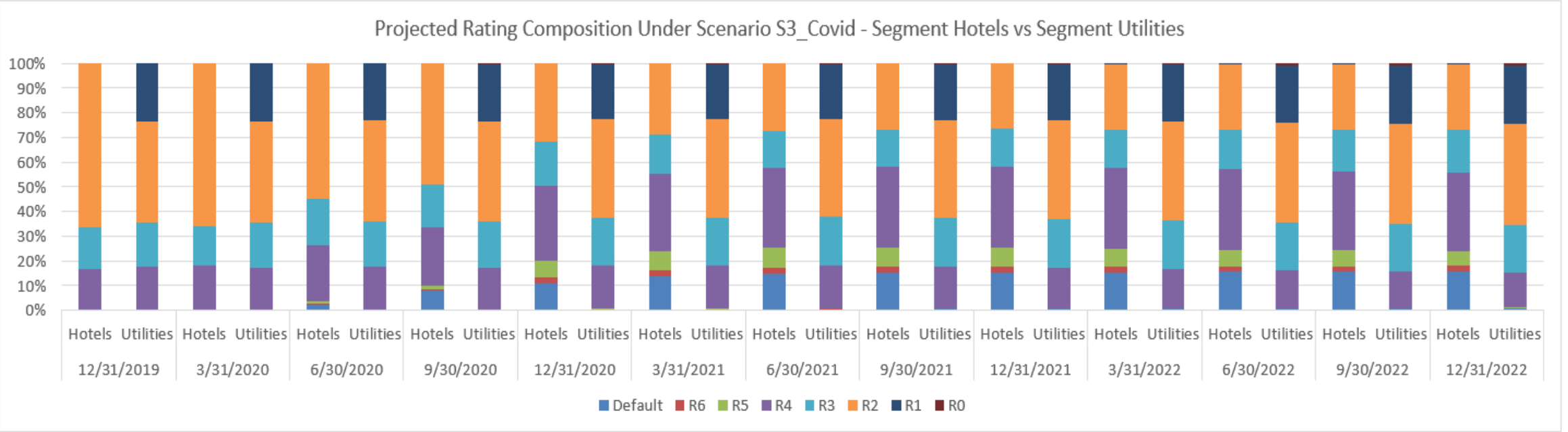
Type
Compare

Segmentation	Segment
Custom 2	Utilities

Number of Notch Downgraded
2

Use Internal Rating
Yes

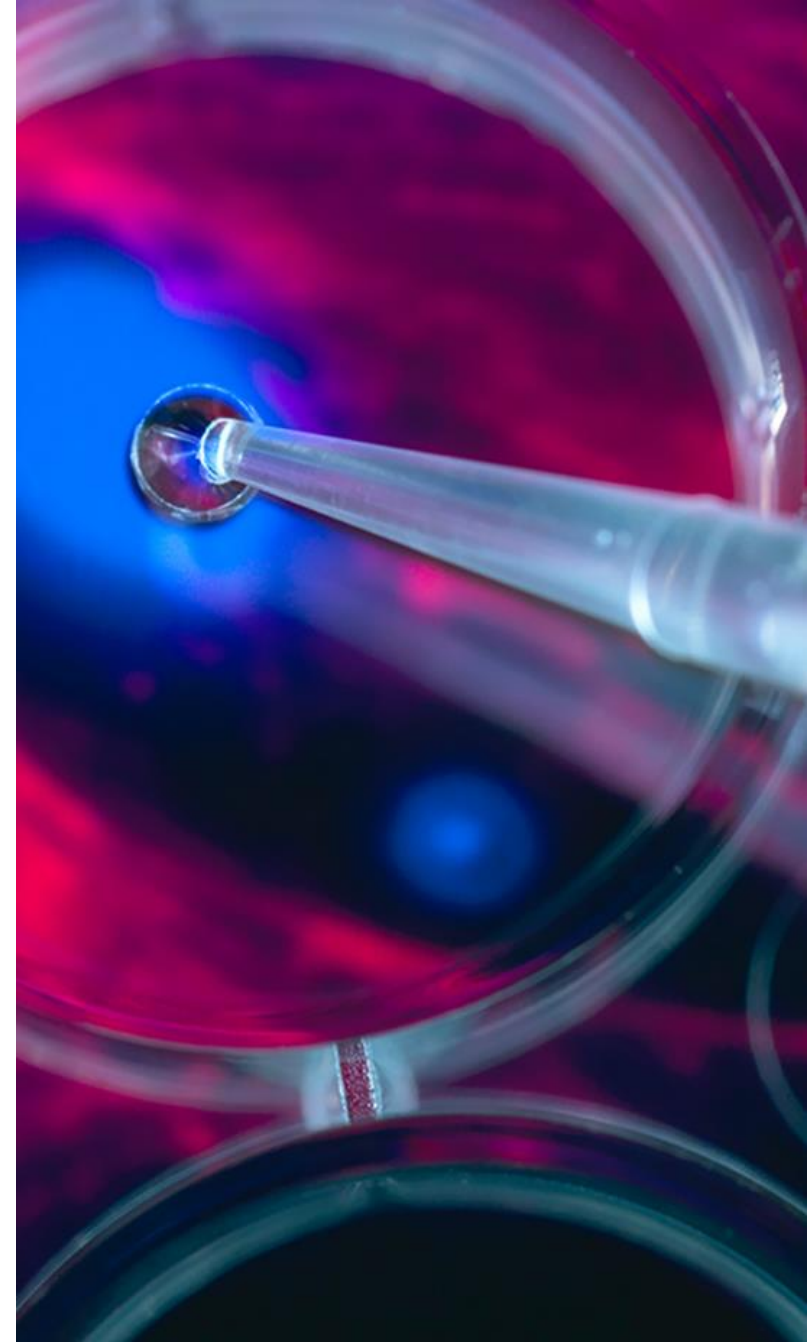
Segment Level Report



# Emerging Risks

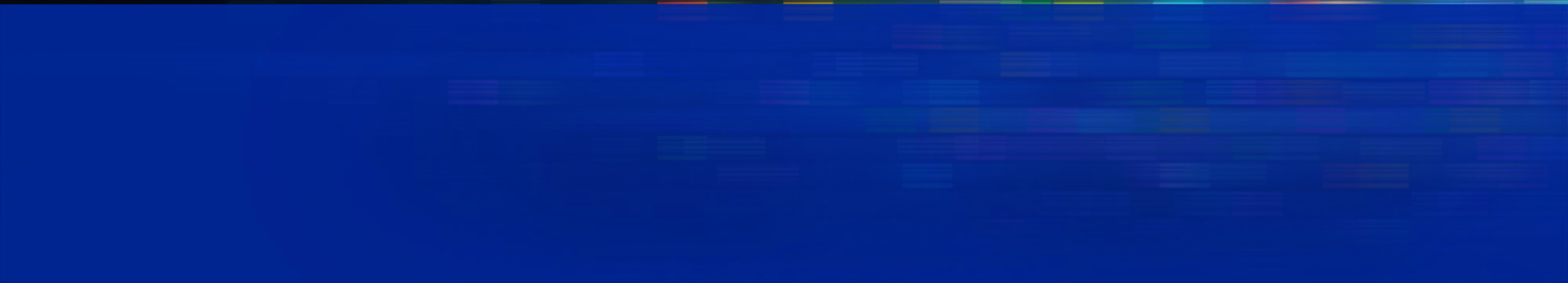
## Preparing for future unknowns

- » Navigating the uncertainty of COVID-19 is causing a re-evaluation of common risk factors.
- » Exposure to climate risk – supply chain risk driven by common exposure to typhoon risks off the coast of Malaysia
- » Emerging concentration risks are shifting our views of geospatial dynamics
- » How can we design analytics to help us navigate this change?



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*Better  
Faster  
Decisions*





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