MOODY'S ANALYTICS

COVID-19 ANALYTICS AND DATA

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Navigating Credit Beyond COVID-19

Abstract

As institutions attempt to use established, well-developed models to evaluate the current environment, it is clear these are not working adequately. Internal ratings — an institution's cornerstone for long-term investment and lending strategies — rely on fundamental, name-level analysis, which cannot be updated at frequencies required to react to and plan for quickly changing developments. Meanwhile, forward-looking measures used in regulatory stress testing or with CECL/IFRS 9 impairment may rely on scenarios defined by broad-brushed variables such as unemployment. These scenarios might not be sufficiently differentiated across certain industries (for example, Medical Devices, Hotels, or Transportation); their performances could vary in sensitivity to COVID-19 itself, and in their response to the direct and indirect protective measures put in place.

This paper addresses these challenges with practical applications you can incorporate into your Current Internal Rating Assessment and Projected Ratings and Loss Measures methodologies. Our Current Internal Rating Assessment anchors to a reasonable and well-understood starting point, December 31, 2019, and uses Moody's Analytics Cross-Sectional COVID-19 Overlay Model that brings together epidemiological, economic, and market data to assess the state of credit. The Cross-Sectional COVID-19 Overlay Model accounts for the granular, name-level, and cross-sectional impacts of COVID-19 across regions, countries, and across well over 100 corporate segments.

In addition, we introduce quantitative overlays that enable institutions to quantify the direct and indirect effects of COVID-19–related stimulus programs targeted to individuals, small businesses, corporations, and the airline industry bailout. These projections have natural applications for Comprehensive Capital Analysis and Review (CCAR)/European Banking Authority (EBA)/European Central Bank (ECB) stress testing and CECL/IFRS 9 impairment calculations. They can complement credit portfolio management and capital planning processes.

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1. Introduction

In spring 2020, we are all aware that this period of the unprecedented COVID-19 pandemic has brought challenges. Predictions of radical change are flooding the media, and the degree, length, and the severity of change in various geographies continues to be a widely debated topic. One certainty is true; uncertainty is here and change is coming. How different could the post-coronavirus world look? How will the psychological impact of isolation and health fears accelerate change and drive new behaviors? How will the corporate commercial real estate footprint change? What corporations and industries will stay open for business? What will the new normal look like after this event? Will it be business as usual 12 months from now? Will governments, institutions, and individuals change the way we interact with one another, thus creating a paradigm shift for global economies and markets?

Another certainty is that the epidemiological and social drivers, the economic impact felt around the world, and the evolving risks of the coronavirus are forcing risk managers, credit analysts and lenders, portfolio managers, regulators, and credit strategists to reevaluate how they manage and measure credit risk. Currently, we are in a reactionary mode, attempting to evaluate and learn to develop understanding, insights, and clarity on how to best move forward. We are improving our grasp of COVID-19's impacts, and this enables us to develop new ways of measuring risk.

As we try to use established, well-developed models to evaluate the current and the post-COVID-19 environment, it is clear these models are not working adequately. Internal ratings — a cornerstone to an institution's long-term investment strategy — rely on fundamental, name-level analysis, and cannot be updated at frequencies that allow financial institutions to react and plan for quickly changing developments. Meanwhile, forward-looking measures used in regulatory stress testing or with CECL/IFRS 9 impairment may rely on scenarios defined by broad-brushed variables such as unemployment. These scenarios might not sufficiently differentiate across industries (for example, Medical Devices, Hotels, or Transportation); their performances may vary in sensitivity to COVID-19 itself, and in their response to the direct and indirect protective measures put in place.

Moody's Analytics has introduced quantitative methods that dynamically measure the economic impact of policy actions and programs on industries, lenders, and borrowers. We need current-state credit assessment. We need to look closely at future scenarios that consider potential epidemiological paths and implications for the severity and length of this unprecedented economic slowdown across industries, while also accounting for government reactions and targeted fiscal policies (for example, the CARES Act and the Main Street Lending Program).

This paper introduces new tools that address these needs. Our Current Internal Rating Assessment anchors to a reasonable, well-understood starting point, December 31, 2019, and uses Moody's Analytics Cross-Sectional COVID-19 Overlay Model that brings together epidemiological, economic, and market data to assess the state of credit. The Cross-Sectional COVID-19 Overlay Model accounts for the granular, name-level, and cross-sectional impacts of COVID-19 across regions, countries and across well over 100 corporate segments.

Meanwhile, our Projected Ratings and Loss Measures use Moody's Analytics Cross-Sectional COVID-19 Overlay Model, anchoring to an organization's traditional forward scenarios — described through projections of GDP and unemployment, for example — with the same name-level granularity, recognizing the cross-sectional impacts of COVID-19 across a set of regions, industries, and across countries. In addition, Moody's Analytics Fiscal & Monetary Overlay Model quantifies the direct and indirect effects of COVID-19–related stimulus programs targeted to individuals, small business, corporations, and the airline industry bailout on credit. These projections have natural applications for CCAR/EBA/ECB stress testing and CECL/IFRS 9, and can provide a useful complement to credit portfolio management and capital planning tools.

The rest of the document is structured as follows: Section 2 offers a quantitative sense of how COVID-19 has affected credit and the magnitude of government response. Section 3 introduces the Cross-Sectional COVID-19 and Fiscal & Monetary Overlay Models. Section 4 describes how to use these models to inform Current Internal Rating Assessment and Projected Ratings and Loss Measures through a series of case studies. Section 5 concludes with a discussion of what we might experience beyond COVID-19, and how these models might be applied to future events.

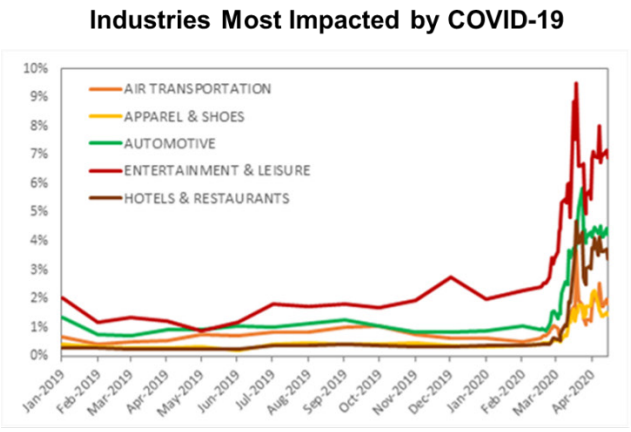
2. COVID-19, Credit Risk, and Government Action

This section reviews the impact COVID-19 has had on credit, and the government programs rolled out to bolster deteriorated segments. This section serves as a backdrop to the Cross-Sectional COVID-19 and Fiscal & Monetary Overlay Models detailed in Section 3.

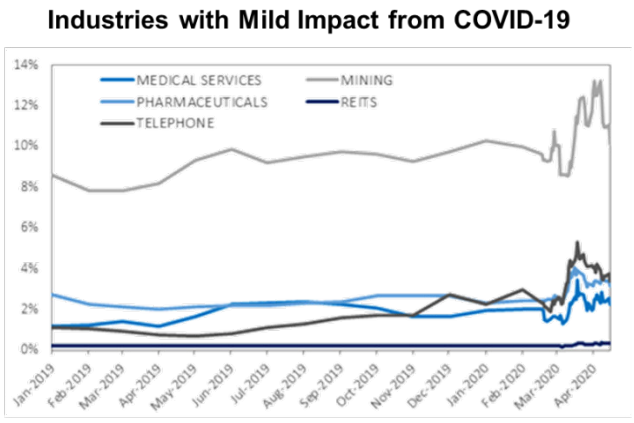
To get a sense of COVID-19's effect on credit risk across industries, and the general level of uncertainty it has generated, Figure 1 highlights the heightened default probability for firms in industries most- and least-affected by COVID-19 and the heightened level of uncertainty. Notice the pronounced volatility in levels, as measured by Moody's Analytics one-year EDF™ (Expected Default Frequency) credit measure.[1] This measure uses equity market and financial statement information to produce a name-level forward-looking assessment of default risk. In the left-side panel, perhaps not surprisingly, we see probability of default (PD) increase materially at the end of February and March for sectors such as Air Transportation, Automotive, and Entertainment & Leisure. Meanwhile, in the right-side panel, we see industries more mildly affected by the coronavirus such as Medical Services, Pharmaceuticals, and Telephone. While PD levels for these segments are much lower — except Mining, which had heightened EDFs pre-COVID-19 — all sectors are experiencing heightened volatility.

The pronounced cross-sectional differences across industries highlight the need to quantify dynamics and assess the impact the coronavirus has had, and will have, on various portfolio segments; recognizing the impact will vary as the severity of lockdowns unfolds. The Cross-Sectional COVID-19 Overlay Model addresses this issue and is discussed further in Section 3.

Figure 1 Empirical default probability patterns — how has COVID-19 affected industries so far?



*Measured using Moody's EDF™ credit measure



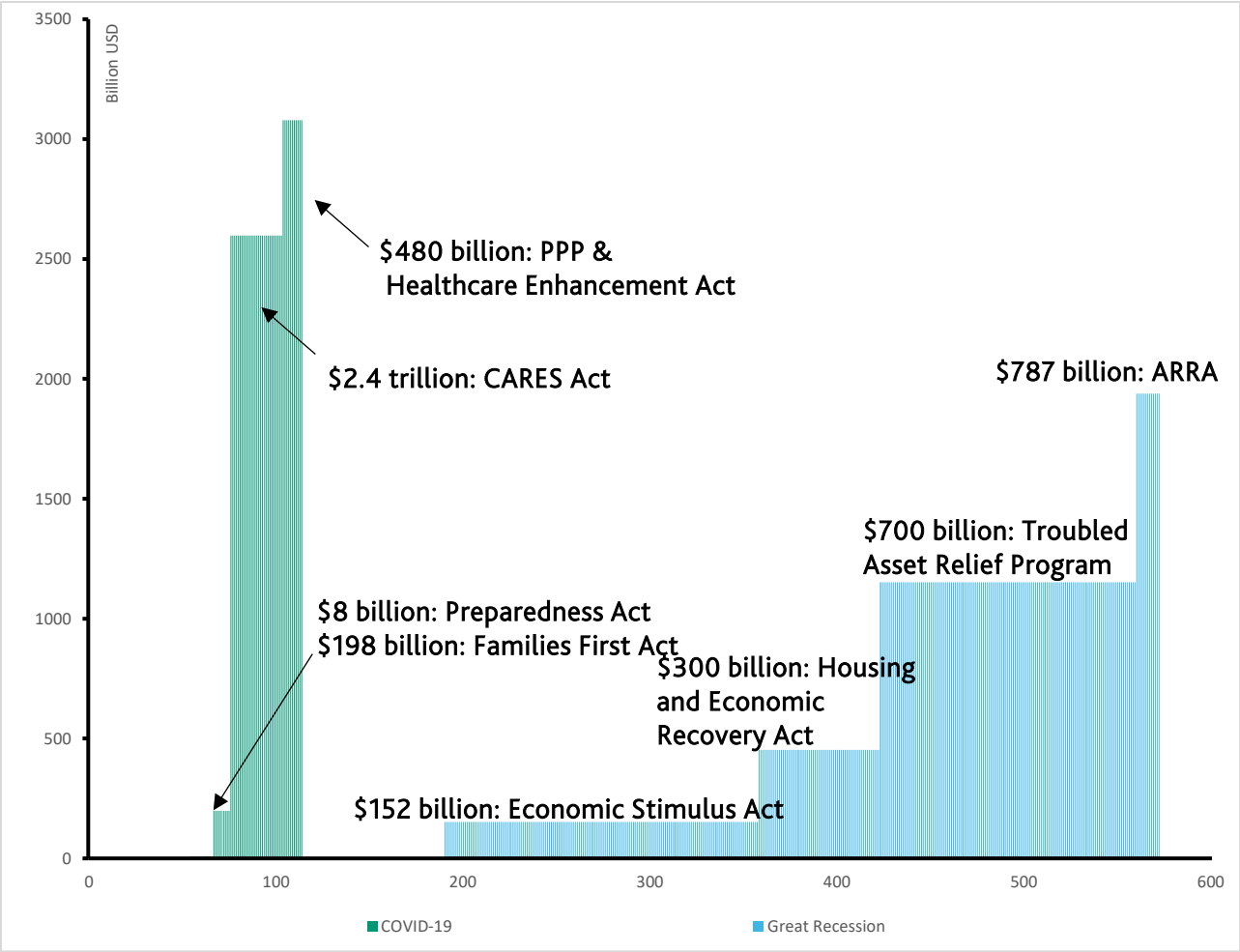
*Measured using Moody's EDF credit measure

We next look at the uncertainty surrounding fiscal and monetary response to these pronounced events. The past 50 years have seen many significant crises that severely affected industries, segments, and institutions. We have also had targeted bolstering of various segments, including bailouts, but these fiscal injections are not always limited to bailouts. The government has other mechanisms to support affected segments during crises to ensure industries can survive.

The way in which COVID-19 is playing out is unique, not only in the effects on different industries, but in the remarkable fiscal and monetary response designed to bolster various sectors. To get a sense of just how remarkable the response has been, in Figure 2, the chart shows the level and timing of the funds authorized by Congress since the beginning of the coronavirus crisis in blue, compared to the beginning of the Great Recession in red. While we recognize the vast differences between the two crises, it is worth recognizing that Congress has now authorized more funding in a matter of weeks than the amount authorized during a year-and-a-half into the 2008–2009 financial crisis.

[1] Pooya Nazeran and Douglas Dwyer, "Credit Risk Modeling of Public Firms: EDF9," Moody's Analytics Model Methodology, June 2015.

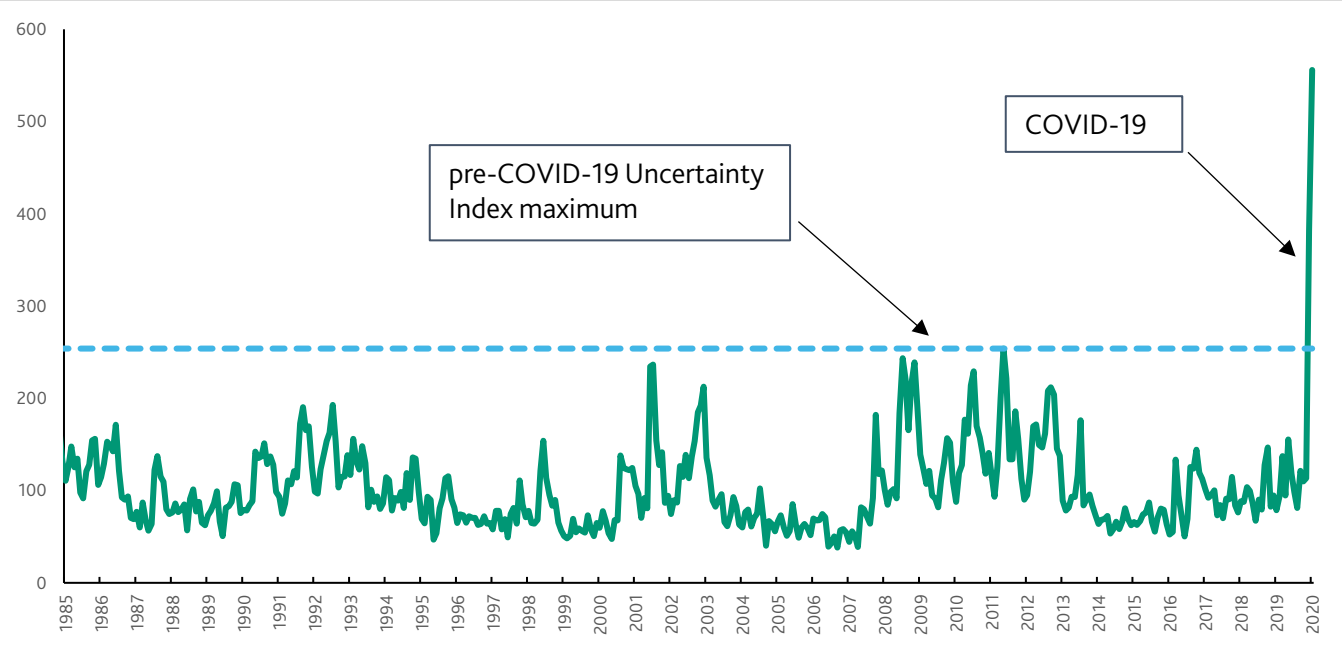
Figure 2 COVID-19 fiscal action compared to the Great Recession



Source: Moody's Analytics

It is important to recognize that generally, markets incorporate existing and future expected government programs into prices. The EDF measures presented in Figure 1 incorporate information from the equity markets, thus reflecting market expectations of monetary and fiscal support. Figure 3 highlights the Economic Policy Uncertainty Index for the United States, currently at a record high. Policymakers are stepping in at a remarkable pace, but there is a material amount of uncertainty in the form of the support — part of which is associated with the unknown trajectory of the virus. So beyond quantifying cross-industry dynamics, it is critical to understand and quantify fiscal and monetary actions, while recognizing two important sources of ambiguity around future actions and the impact of those actions. The Fiscal & Monetary Overlay Model addresses these sources, discussed in Section 3.

Figure 3 Economic Policy Uncertainty Index hits record highs



As reported by FRED Economic Data (https://fred.stlouisfed.org/series/USEPUINDXD).

3. The Cross-Sectional COVID-19 and Fiscal & Monetary Overlay Models

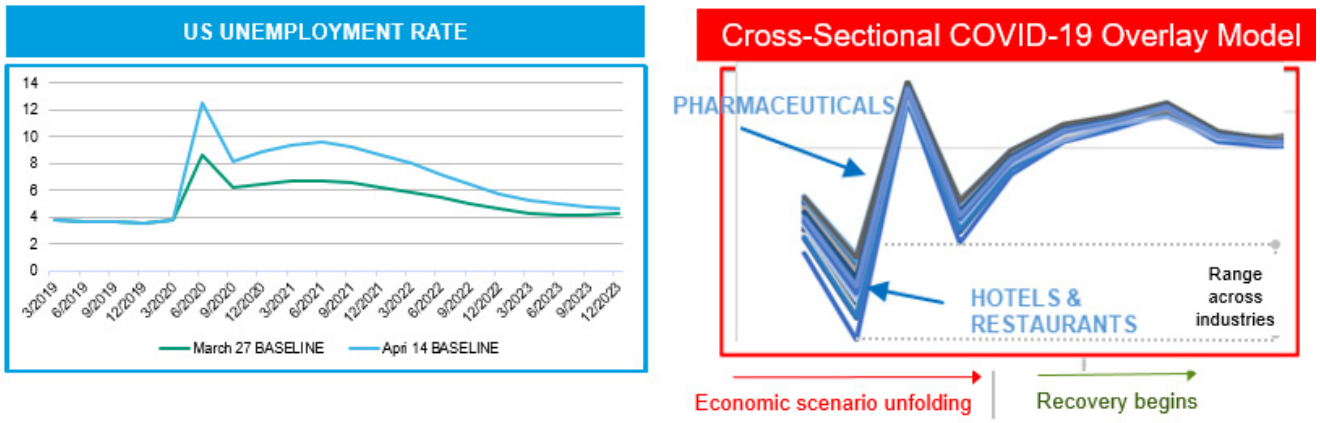
This section introduces the Cross-Sectional COVID-19 Model and Fiscal & Monetary Overlay Models. As discussed, these models serve as the foundation for Current Internal Rating Assessment and Projected Ratings and Loss Measures.

Cross-Sectional COVID-19 Overlay Model

The Cross-Sectional COVID-19 Overlay Model captures COVID-19's varying impact across portfolio segments. We use epidemiological data along with name-level EDF dynamics to quantify forward-looking projections. The model uses a specific starting point for a credit portfolio, along with traditional macroscenarios as anchors, taking a stance on cross-sectional sensitivity to the coronavirus-induced economic slowdown as depicted in the right-side graphic in Figure 4. In spirit, cross-sectional dynamics are calibrated to those observed in Figure 1, with additional name-level information recognizing name-variation in cyclicality and sensitivity to COVID-19, along with the virus' progression in each region/country.

This cross-sectional overlay structure is particularly powerful in quantifying dynamics across changing and widespread estimates for the severity, length, and forecasted recovery from the COVID-19 downturn. Note the cross-section of views on the severity and length of the downturn as seen in the differences between the March 27 and April 14 Baseline scenarios, and varying views on GDP growth between banks, such as between Goldman Sachs and Morgan Stanley.

Figure 4 Economic impact defined by broad-brushed scenarios require an industry overlay model



There is a Wide Range of Economic Forecasts

Goldman Sachs projects GDP to fall by ▼ **24%** in Q2 2020

Morgan Stanley projects GDP to fall by ▼ **30.1%** in Q2 2020

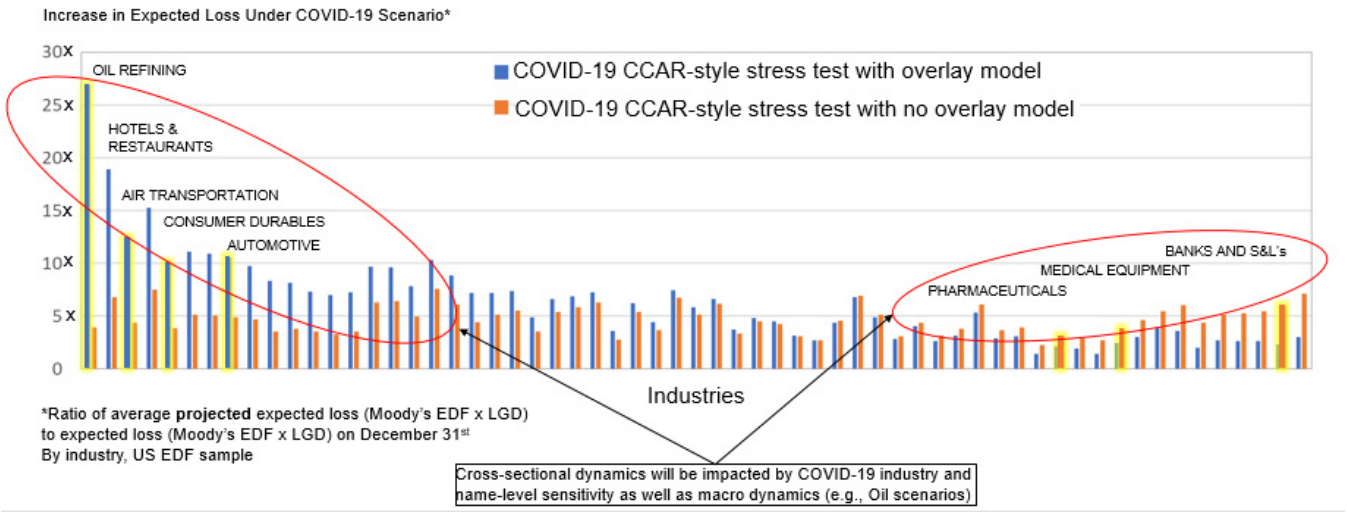
Note: CECL is a pooled-level application of risk used for accounting purposes. This methodology allows you to drill deeper into loan-level industry sectors and can be used for active portfolio managers.

Source: Moody's Analytics

To provide a sense of magnitude, Figure 5 explores expected loss levels across industries under projected COVID-19 CCAR-style stress testing, without (orange) and with (blue) the Cross-Sectional COVID-19 Overlay Model. While both the blue and orange bars highlight the material deterioration in credit, with expected losses increasing by more than fivefold for many industries, the Cross-Sectional COVID-19 Overlay Model scenarios recognize the most affected industries. When recognizing the COVID-19 industry impact, we can see that industries relying upon the physical proximity of clients or employees will likely see more than a tenfold increase in expected loss.

Intuitively, we calibrate/estimate a traditional CCAR stress testing model using the historic relationship between factors such as unemployment and credit losses, migration, or default. We find portfolio losses are material under these stressed scenarios, but the variation in loss across industries does not line up with how the coronavirus is unfolding. The sensitivity of, for example, a further extension to stay-at-home lockdowns will affect Hotels and Restaurants, Entertainment, and other COVID-19–sensitive industries (depicted in blue) much more than what we have seen historically under similar credit downturns.

Figure 5 New analytics and data to navigate COVID-19: models calibrated to historical dynamics can mislead



Section 4 demonstrates applications of the Cross-Sectional COVID-19 Overlay Model, which includes a current-state assessment to internal ratings and an adjustment to stress testing/CECL/IFRS 9 models.

Fiscal & Monetary Overlay Model

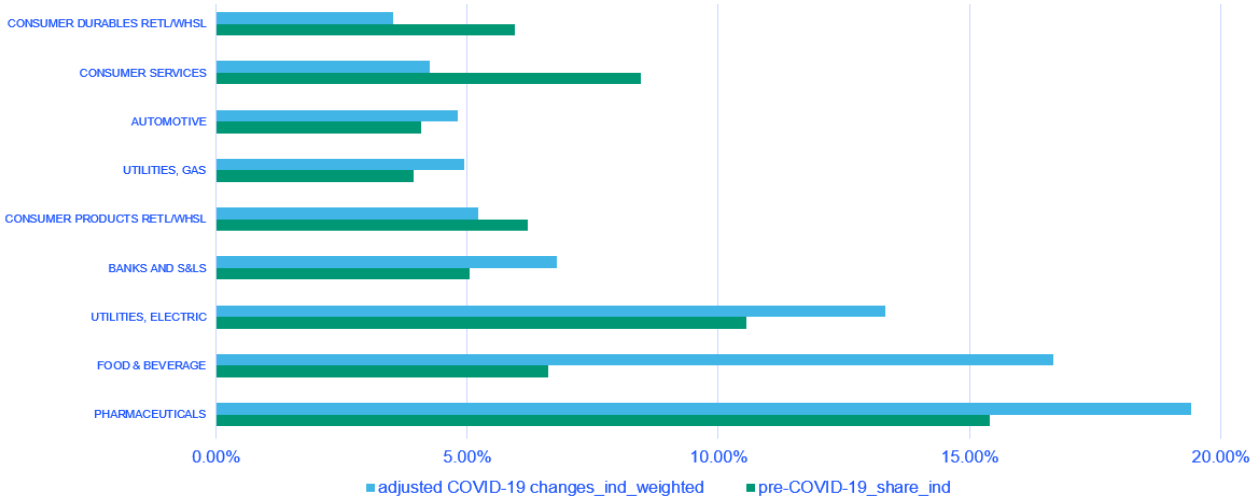
In addition to the direct impact of COVID-19 across industries, Figure 2 highlighted the remarkable fiscal and monetary response bolstering segments that must be understood and quantified. As discussed, while markets incorporate expectations of the response and its effectiveness into prices, Figure 3 highlighted the material uncertainty around future responses and their effectiveness. The Fiscal & Monetary Overlay Model quantifies the impact of existing programs on credit, providing a point of reference for modeling the impact of unanticipated program effectiveness, as well as the impact of future programs on credit.

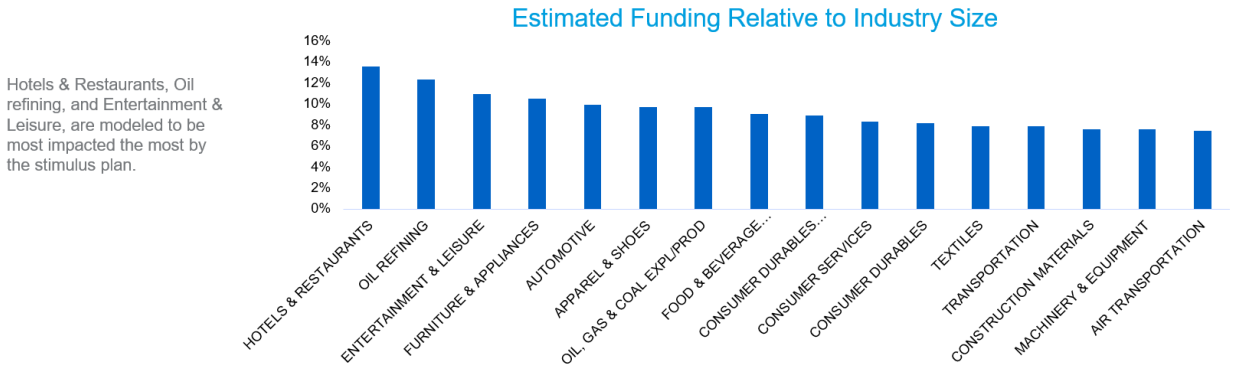
To begin, a review of the various programs and ongoing revelation of their details, in conjunction with an assessment of COVID-19's impact, provides an estimated support level for different corporate segments, whether for small business or programs for larger corporates. Beyond airlines (receiving a targeted bailout), the Fiscal & Monetary Overlay Model highlights most-affected segments as those receiving the most quantifiable support in various forms, including deferred interest loans and forgiveness for those meeting various criteria. In Figure 6, the upper-left table represents industries most affected by COVID-19. In addition, a review of individual spending patterns represented at the top-right provides a sense of how individual rebates flow into corporate revenues, estimated to be more than 70%, which are then combined with margin estimates. The total estimated funds relative to industry size are shown on the bottom of the figure, and they can be material, with many segments receiving more than 5%. Quantifying the programs rolled out to date and their cross-industry impacts on mitigating credit risk is the first step in our analysis.

Figure 6 Quantifying targeted stimulus across segments

Aid Directly Targeting Corporate Segments
Industries Most Severely Impacted by COVID-19

CONSUMER PRODUCTS RETL/WHSL	AUTOMOTIVE	CABLE TELEVISION	OIL REFINING	FOOD & BEVERAGE RETL/WHSL
OIL, GAS & COAL EXPL/PROD	CONSUMER DURABLES RETL/WHSL	CONSUMER PRODUCTS	BUSINESS PRODUCTS WHSL	CONSTRUCTION
HOTELS & RESTAURANTS	MACHINERY & EQUIPMENT	TRANSPORTATION	CONSUMER SERVICES	BROADCAST MEDIA
FOOD & BEVERAGE	ENTERTAINMENT & LEISURE	APPAREL & SHOES	PAPER	FURNITURE & APPLIANCES
ELECTRICAL EQUIPMENT	CONSTRUCTION MATERIALS	CONSUMER DURABLES	TRANSPORTATION EQUIPMENT	TEXTILES





Source: Moody's Analytics

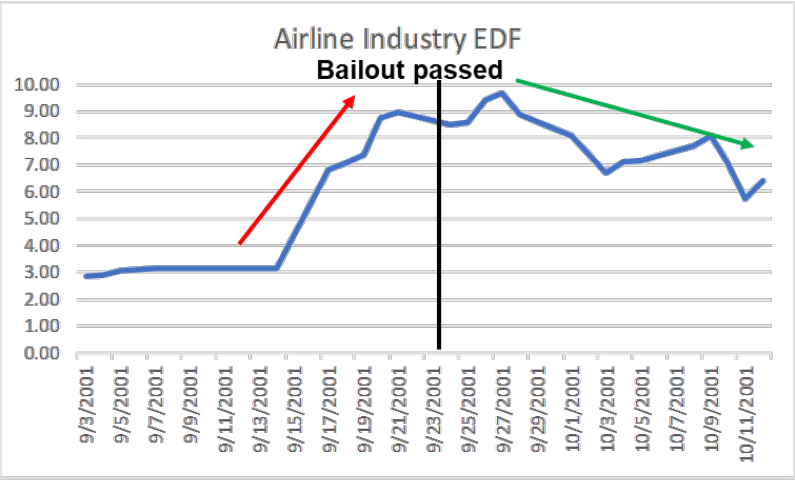
Next, we quantify the impact and effectiveness of various government programs — recognizing there is an assortment of timing and mechanisms by which support is given to targeted segments. Whether referencing various rounds of the CARES Act or the Main Street Lending Program, we must understand that we face uncertainty in the range of fiscal and monetary programs, which will have varying and uncertain timelines. This uncertainty should not be surprising, and it is very much in line with historical experiences.

A notable example includes the $15 billion airline bailout in September 2001, which took several weeks to fully understand. Figure 7 highlights the behavior of the EDF credit measure, which increased drastically on September 11, 2001. Meanwhile, the bailout announcement on September 23, 2001 took a few weeks to completely affect default probabilities. We see similar patterns with the recent airline bailout reported on April 14, 2020.

On a similar note, a study by the Congressional Budget Office estimates that as much as 50% of the 2009 American Recovery and Reinvestment Act (ARRA) was deployed after 2010, almost two years out.[2] During 2008–2009, Congress authorized multiple rounds of funding. We now face wide-ranging fiscal and monetary scenarios, with varying timeline uncertainties and effectiveness levels. We use these observations and studies to construct narrative scenarios related to fiscal actions.

[2] Congressional Budget Office, "Estimated Impact of the American Recovery and Reinvestment Act on Employment and Economic Output in 2014," February 2015.

Figure 7 Airline industry EDF values over time



NOTE Impact of fiscal policy can be quantified – significant increase in EDF after 9/11, mitigated after Congress approved bailout package

This returns us to a previously observed need addressed by the Fiscal & Monetary Overlay Model — an approach to quantifying the impact of future unexpected actions and the uncertainty surrounding the effectiveness of those actions on credit.

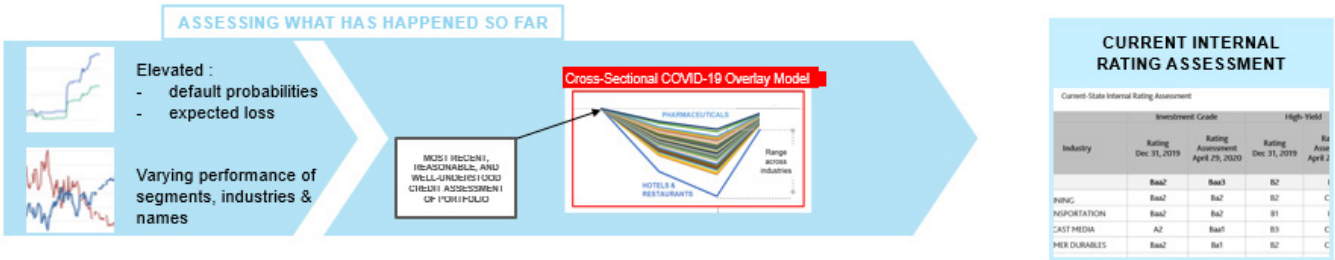
4. Current Internal Rating Assessment, and Projected Ratings and Loss Measures

In this section, we describe two applications of the Cross-Sectional COVID-19 and Fiscal & Monetary Overlay Models: Current Internal Rating Assessment, and Projected Ratings and Loss Measures. We present case studies to provide a sense of how an organization would use these models, and a sense of their materiality.

Current Internal Rating Assessment

The Current Internal Rating Assessment anchors to a reasonable, well-understood starting point, December 31, 2019 for example, and uses Moody's Analytics Cross-Sectional COVID-19 Overlay Model to project what has happened up to now. The assessment gives an estimated current credit rating, accounting for granular, name-level, and cross-sectional impacts of the coronavirus across a set of regions, industries, and across countries. Figure 8 shows the information needed and how the assessment is conducted. To begin, an organization specifies the most recent, reasonable, and well-understood credit assessment of their portfolio. Then, using the Cross-Sectional COVID-19 Overlay Model, we add an assessment of what has happened so far.

Figure 8 Cross-Sectional COVID-19 Overlay Model produces Current Internal Rating Assessments



Looking at a case study, Figure 9 tabulates estimated ratings on March 31, 2020 for hypothetical investment grade and high-yield portfolios based on a December 31, 2019 rating anchoring date, which represents a reasonable, well-understood state of the portfolio. For exposition, we highlight industries with varying impact to COVID-19. To the right of the December internal rating is the rating assessment on March 31, 2020, as estimated by the Cross-Sectional COVID-19 Overlay Model, applying the COVID-19 industry factors realized between December and April to each name in the portfolio and aggregated by industry. Not surprisingly, industries such as Oil and Air Transportation are most affected, with multiple-notch ratings downgrades expected. Utilities and Food & Beverage show the least impact, with ratings generally not affected. The Current Internal Rating Assessment provides organizations with a quantitative and internally consistent current-state view of their credit portfolios recognizing the variation in how COVID-19 has affected segments. These ratings can be used across the range of traditional applications — including IFRS 9/CECL impairment calculations, limits, and stress testing — that can be coupled with the subjective assessments many organizations are relying on.

Figure 9 Current Internal Rating Assessment

	INVESTMENT GRADE		HIGH-YIELD	
INDUSTRY	INTERNAL RATING DEC. 31, 2019	ESTIMATED INTERNAL RATING ASSESSMENT MAR. 29, 2020	INTERNAL RATING DEC. 31, 2019	ESTIMATED INTERNAL RATING ASSESSMENT MAR. 29, 2020
Oil Refining	Baa2	Ba2	B2	Caa1
Air Transportation	Baa2	Ba2	B1	B3
Consumer Durables	Baa2	Ba1	B2	Caa1
Restaurants	A3	Baa1	B2	Caa1
Pharmaceuticals	Baa2	Baa2	B3	Caa1
Food & Beverage	Baa2	Baa2	B2	B2
Utilities, Electric	Baa2	Baa3	Ba2	Ba2

Source: Moody's Analytics

Projected Ratings and Loss Measures

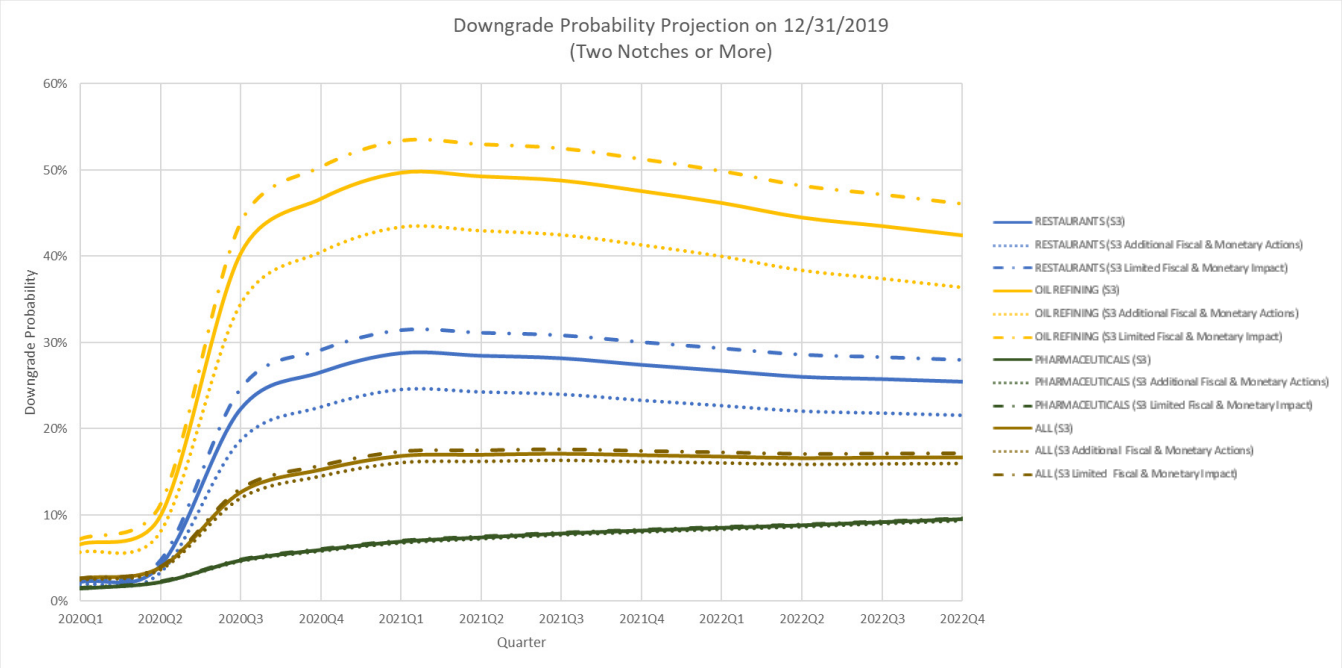
We now shift attention to our Projected Ratings and Loss Measures. As depicted in Figure 10, Moody's Analytics Cross-Sectional COVID-19 and Fiscal & Monetary Overlay Models are anchored to an organization's current internal rating and traditional forward economic scenarios to project ratings and loss. The projections account for the cross-sectional impacts of COVID-19 across a set of regions, industries, and across countries, quantifying the direct and indirect effects of COVID-19–related stimulus programs targeted to individuals, small businesses, corporations, and industry bailouts. These projections have natural applications for CCAR/EBA/ECB stress testing and CECL/IFRS 9 impairment calculations. They provide useful complements to credit portfolio management and capital planning processes.

Figure 10 Moody's Analytics Cross-Sectional COVID-19 and Fiscal & Monetary Overlay Models produce projected ratings and loss measures

Once current internal ratings are established for the indicative portfolio, Figure 11 highlights internal ratings that are projected along Moody's Analytics S3, 90% Downside scenario, along with the Cross-Sectional COVID-19 and Fiscal & Monetary Overlay Models. The likelihood of downgrades of two or more notches for Oil Refining and Restaurants increase materially in the first few quarters, but subside after the second half of 2021 for those that survive, with fiscal and monetary programs playing a material

role in bolstering their credit quality. Meanwhile, industries whose credit quality are less affected by COVID-19, such as Pharmaceuticals, experience a relatively mild increase in their likelihood of a downgrade.

Figure 11 Projected two+ notch downgrade probabilities anchored off of Dec. 31, 2019, with a Mar. 31, 2020 assessment using the Cross-Sectional COVID-19 and Fiscal & Monetary Overlay Models



Source: Moody's Analytics

Next, we explore losses projections, with Figure 12 highlighting expected defaults as measured by the EDF credit measure. Credit risk has changed markedly since December 31, with values on May 1 being orders of magnitude higher for many industries. Oil Refining and Air Transportation were hit particularly hard, and perhaps not surprisingly, Utilities were barely affected. Figure 12 shows the application of the overlay models on projected expected credit losses — applicable in CCAR/EBA/ECB stress testing and IFRS 9/CECL — in blue and green. We can see that under the 90th-percentile Downside, forward-looking scenario, where lockdowns persist through June 2020, the Air Transport and other coronavirus-sensitive industries are affected materially. Oil Refining is hit particularly hard, reinforced by conflicts across oil-producing countries that put downward pressure on oil prices, creating an even-more challenging environment for related segments. The Fiscal & Monetary Overlay model provides a quantitative assessment of additional stimulus; as highlighted in black, bolstered hard-hit segments' PDs subside for Oil Refining, Hotels & Restaurants while other segment PDs improve. Alternatively, conditions will further deteriorate for these segments if the actions taken until now end up limited. The last three columns in Figure 12 demonstrate how dynamics play out under a 96th-percentile scenario, overlaid with fiscal and monetary scenarios.

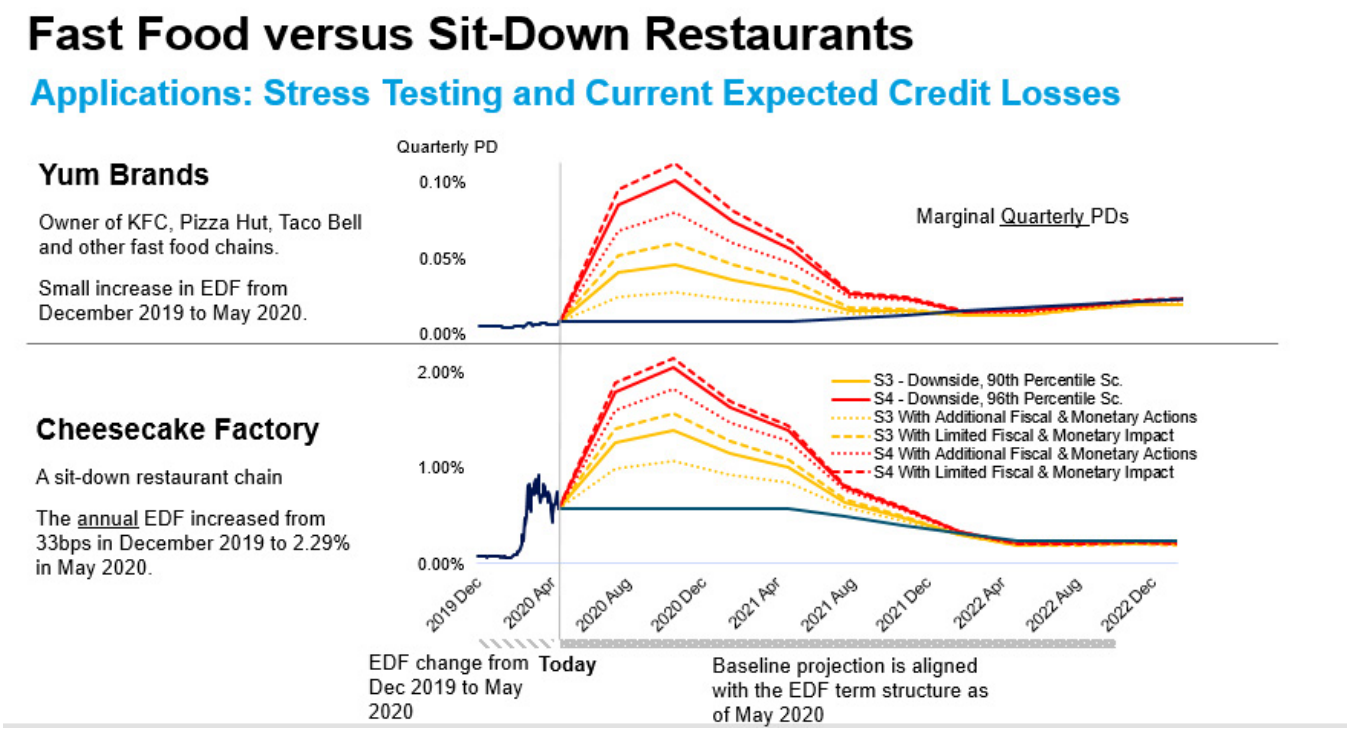
Figure 12 Most and least coronavirus-sensitive industries: US one-year default probabilities along Cross-Sectional and Fiscal & Monetary Overlay Models[3]

INDUSTRY	RATING	EDF DEC 31, 2019	EDF MAY 8, 2020 (BASELINE)	90TH% DOWNSIDE SCENARIO (S3)	90TH% DOWNSIDE SCENARIO (S3) ADDITIONAL FISCAL & MONETARY ACTION	90TH% DOWNSIDE SCENARIO (S3) LIMITED FISCAL & MONETARY IMPACT	96TH% DOWNSIDE SCENARIO (S4)	96TH% DOWNSIDE SCENARIO (S4) ADDITIONAL FISCAL & MONETARY ACTION	96TH% DOWNSIDE SCENARIO (S4) LIMITED FISCAL & MONETARY IMPACT
All	IG	0.05%	0.14%	0.33%	0.26%	0.35%	0.49%	0.46%	0.50%
All	HY	0.18%	0.82%	1.60%	1.31%	1.77%	2.30%	2.13%	2.39%
RESTAURANTS	HY	0.21%	2.19%	4.20%	3.44%	4.65%	5.80%	5.29%	6.06%
OIL, GAS & COAL EXPL/PROD	HY	2.57%	8.63%	16.55%	13.74%	18.07%	21.56%	20.51%	22.03%
APPAREL & SHOES	IG	0.07%	1.15%	2.50%	1.99%	2.80%	3.58%	3.27%	3.72%
CHEMICALS	IG	0.03%	0.12%	0.38%	0.28%	0.43%	0.68%	0.62%	0.70%
COMPUTER SOFTWARE	IG	0.02%	0.03%	0.08%	0.06%	0.09%	0.13%	0.12%	0.14%
PHARMACEUTICALS	IG	0.03%	0.03%	0.07%	0.05%	0.07%	0.10%	0.10%	0.11%
UTILITIES, ELECTRIC	IG	0.01%	0.02%	0.03%	0.03%	0.03%	0.04%	0.04%	0.04%

Figure 13 illustrates how the Cross-Sectional COVID-19 and Fiscal & Monetary Overlay Models can drill down to provide Cross-Sectional and cross-firm quantification through a comparison of Yum Brands and Cheesecake Factory. It shows projected default probabilities along the Baseline and 96th-percentile S4 Downside Moody's Analytics economic scenario, with Cross-Sectional COVID-19 and Fiscal & Monetary Overlay Models. The case highlights how the models can quantify dynamics across two firms with differing business models, where Yum Brands focuses on fast food and has weathered fairly well, compared to Cheesecake Factory, which relies on a sit-down model. Interestingly, we see that even under the S4 96% Scenario, Yum Brands remains reasonably robust.

[3] U.S. Moody's IG rated firms as of December 31, 2019 with one-year EDF value<10% Fiscal Scenario Model as of April 13, 2020.
Baseline: sudden, sharp recession, with 50% of industries locked down in April, 40% in May, and 20% in June. Activity forecasted to bounce back during the second half of 2020.
90th% Downside: longer recession, with 50% of industries locked down in April, 40% in May, and 40% in June. Activity weakly recovers in 2020 Q3 but falls again in 2020 Q4 (double-dip recession). Sustained recovery from 2021 Q2.
96th-Percentile Downside: longer recession relative to moderate scenario, with 50% of industries locked down in April, 50% in May, and 50% in June. More pronounced double-dip recession. Sustained recovery starting 2021 Q4.
Additional Fiscal Action: additional stimulus in 2020 Q2/3, similar in size and scope to what has been released so far.
Limited Fiscal Impact: implementation challenges result in existing stimulus packages not being impactful as expected. The scenario assumes 40% impact based on studies including CBO assessment of the 2009 ARRA Act.

Figure 13 Cross-firm quantification – Yum Brands vs. Cheesecake Factory



To summarize, Moody's Analytics Cross-Sectional COVID-19 and Fiscal & Monetary Overlay Models anchor to an organization's current-state internal ratings assessment (possibly from Moody's Investors Service, or Moody's Analytics EDF), along with traditional forward scenarios (for example, GDP and unemployment) to produce granular, name-level projections with natural applications for CCAR/EBA/ECB stress testing and CECL/IFRS 9. Both can complement credit portfolio management and capital planning tools. This paper focused on two applications of the models. We will discuss additional applications in forthcoming papers.

5. Beyond COVID-19

The current situation we are trying to navigate presents an unlimited number of unknown scenarios and outcomes. COVID-19 has rendered many traditional risk assessment methodologies challenged, due to the rapid changes and impacts resulting from the virus. Inevitably, we will continue to develop better insights using tools such as these new overlays. However, despite our attempts to model and project, we may have shifted into a new paradigm where many structural changes and uncertainties radically alter our embedded systems. Adjusting these systems requires unique datasets and analytics that update frequently, perhaps faster than anything we have ever tried.

These datasets must evaluate the current state of credit and a range of economic paths, including fiscal stimulus actions. Because of this unique experience, we can state that all recessions are created equal compared to the current situation. The market is evolving daily. Industry and borrower credit profiles are rapidly deteriorating, with many unknowns and a lack of clarity around when things will return to normal, and which businesses, industries, and so on will survive. Past events do not apply here; we must look forward to accurately gauge the impact of this pandemic.

With this in mind, we should not narrowly focus on the coronavirus and how it is currently affecting credit. Instead, we should recognize the pandemic within the broader context of risks that are becoming increasingly understood to be more relevant and that transcend basic risks. Examples include climate and geopolitical risks, which have a common geospatial element, but also risks such as cyber terrorism and grid susceptability. As we evaluate frameworks that can help us navigate today's complex environment, we have a critical opportunity to think beyond COVID-19 and plan for risks that will inevitably be present in our future.

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