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Navigating Credit in Asia Beyond COVID-19

Abstract

As institutions attempt to use established, well-developed models to evaluate the current credit 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 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 users can incorporate into their 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, which 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.

These projections have natural applications for regulatory stress testing and IFRS 9 impairment calculations. They can complement credit portfolio management and capital planning processes.

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1. Introduction

As we move through the second quarter of 2020, we are all aware that this period of the unprecedented COVID-19 pandemic has created tremendous challenges. Predictions of radical change are flooding the media, and the degree, length, and the severity of change in various geographies continues to be widely debated. One certainty is true; change is here, and uncertainty is the norm. 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 remain 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 associated with 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 step enables us to develop new ways of measuring risk.

As we try to use established, well-developed models to evaluate the current and post-COVID-19 environments, 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 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.

We need current-state credit assessment. We must look closely at future scenarios that consider potential epidemiological paths and implications for the severity and length of this unprecedented economic slowdown across industries.

This paper introduces new tools that address this need and provides examples of their application for credit exposures in China, Japan, and Malaysia. 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, which 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 GDP and unemployment projections, for example — with the same name-level granularity, recognizing the cross-sectional impacts of COVID-19 across a set of regions, industries, and countries. These projections have natural applications for regulatory stress testing and IFRS 9, and they 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 Model. Section 4 describes how to use the model 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 the model 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 Model 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 average 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. On the left-hand side, we look at some country/industry combinations that COVID-19 has most impacted — the Air Transportation industry in Malaysia and the Consumer Durables industry in Japan. There is a significant increase in EDF values starting in February 2020, as COVID-19's impact became clearer and more widespread. The observed peaks and dips over short periods highlights the volatility and uncertainty related to the virus' economic impact, as well as the anticipated impact of future government policy. Meanwhile, the right-side panel highlights industries that have been more mildly impacted by COVID-19. The pharmaceutical industry in China, and the Electric Utilities in Malaysia are shown. These industries are also experiencing some volatility, though not as extreme.

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 that 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?
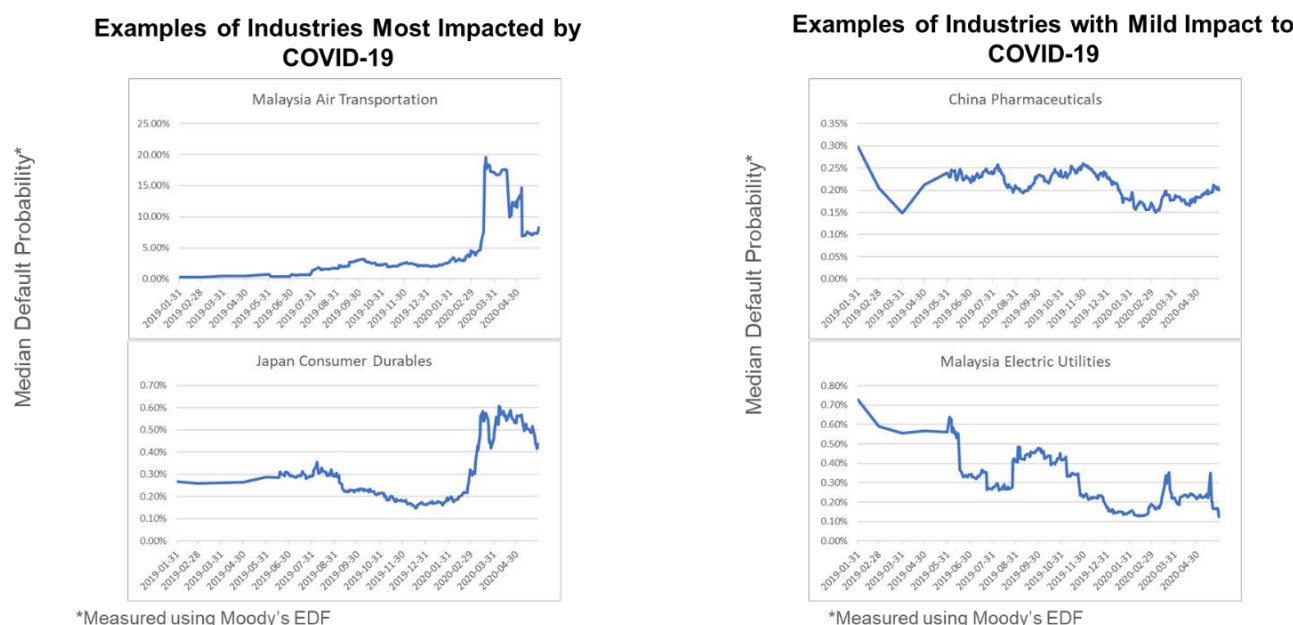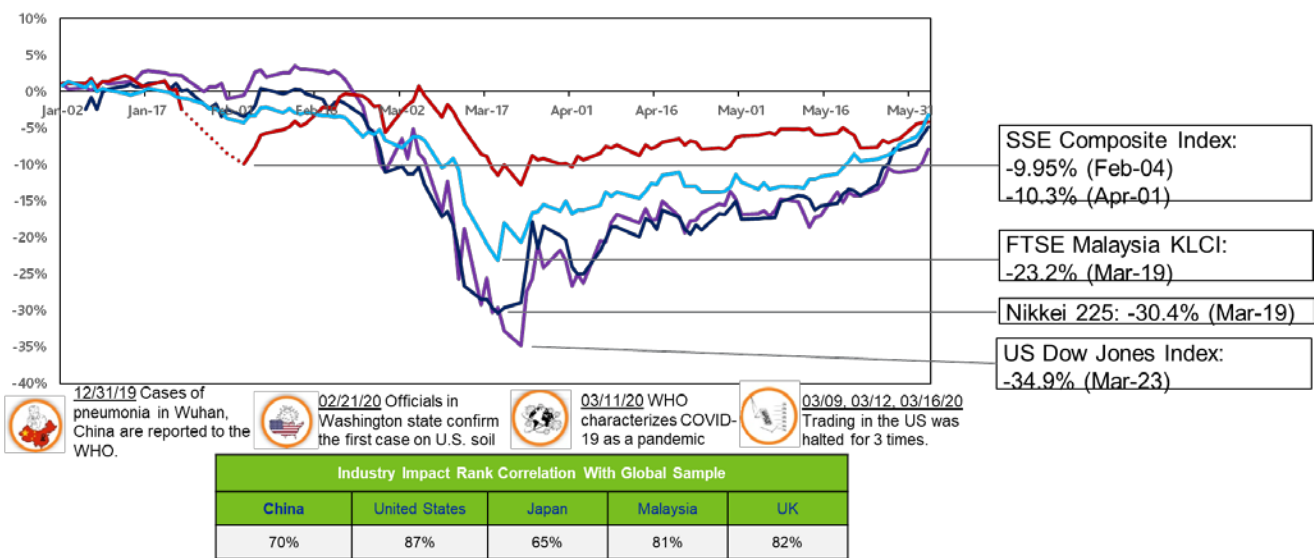

Source: Moody's Analytics

We have seen material variation in COVID-19's impact across countries, as evident in Figure 2, which uses equity market performance in 2020 as a forward-looking lens:

- 10% deterioration of the Chinese SSE by February 4th
- 23% deterioration of the FTSE Malaysia KLCI by March 19th
- 30% deterioration of the Japanese Nikkei 225 by March 30th
- Deterioration of the U.S. Dow Jones Index, roughly in-line with the Nikkei, hitting -35% by March 23rd

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

We use epidemiological data to define event windows across these countries to better understand regularities in COVID-19's impact across industries. At the bottom of Figure 2, the empirical rank-ordering of industry EDF values around the event window is very similar to the global rank-ordering for the highlighted countries, with values ranging from over 65% to more than 87%. In other words, and perhaps not surprising, COVID-19 is impacting industries in a similar way, but with varying magnitudes, depending on geography. It is interesting to note that these values are particularly high, given some countries have few or no companies in some industries, resulting in idiosyncratic noise being introduced into the rank-ordering measures.

Figure 2   Equity Market Performance in 2020

Industry Impact Rank Correlation With Global Sample				
China	United States	Japan	Malaysia	UK
70%	87%	65%	81%	82%

Source: Moody's Analytics

The past 50 years have seen many significant crises that severely affected countries, industries, segments, and institutions. We have also had targeted government bolstering of various segments, including bailouts, but these fiscal injections are not always limited to bailouts. Governments have other mechanisms to support affected segments during crises to ensure industries can survive. The way in which COVID-19 is playing out remains unique, not only in the effects it is having on different industries, but also in the remarkable, global fiscal and monetary responses designed to bolster various sectors.

As Figure 3 illustrates, Malaysia, China, and Japan have all responded with significant fiscal and monetary packages, aiming to support citizens and businesses and to help smooth capital market functioning. Further, in many cases, multiple packages of both fiscal and monetary support have been released as the virus trajectory has evolved. Packages often reach levels in excess of 20% of GDP — as in the case with Japan, whose stimulus is now over 115 trillion yen.

Figure 3   Significant Fiscal and Monetary Response

Malaysia

FISCAL

A second stimulus package of RM 25 bn (1.7 percent of GDP) was released on March 27, 2020, including additional health spending; cash transfers to low income households; wage subsidies to help employers retain workers; and infrastructure spending in East Malaysia. ...

MONETARY AND MACRO-FINANCIAL

(i) on March 3, 2020, Bank Negara Malaysia (BNM) lowered the Overnight Policy Rate (OPR) by 25 basis points to 2.50 percent, citing market disruptions, greater risk aversion and financial market volatility, and tighter financial conditions due to COVID-19;

China

FISCAL

- An estimated RMB 3.6 trillion (or 3.5 percent of GDP) of discretionary fiscal measures have been announced. Key measures include: (i) increased spending on epidemic prevention and control, (ii) production of medical equipment, (iii) accelerated disbursement of unemployment insurance and extension to migrant workers, (iv) tax relief and waived social security contributions.

MONETARY AND MACRO-FINANCIAL

- The PBC provided monetary policy support and acted to safeguard financial market stability. Key measures include: (i) liquidity injection of RMB 3.8 trillion (gross) into the banking system via open market operations ...

Japan

FISCAL

- On April 7 (partly revised on April 20), the Government of Japan adopted the Emergency Economic Package Against COVID-19 of ¥117.1 trillion (21.1 percent of 2019 GDP) and subsumed the remaining part of the previously announced packages ...

MONETARY AND MACRO-FINANCIAL

- On March 16, the BoJ called a monetary policy meeting and announced a comprehensive set of measures to maintain the smooth functioning of financial markets (notably of U.S. dollar funding markets), and incentivize the provision of credit. ...

Source: IMF https://www.imf.org/en/Topics/imf-and-covid19/Policy-Responses-to-COVID-19#J

It is worth observing that, unlike during previous crises, authorities are not limited by moral hazard concerns, as they were during the Great Financial Crisis. Governments are less apprehensive about helping segments facing difficulties — though questions remain surrounding the effectiveness of the distribution.

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. 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 virus' unknown trajectory.

3. The Cross-Sectional COVID-19 Model

This section introduces the Cross-Sectional COVID-19 Model. As discussed, this model serves 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 macro scenarios 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. In the U.S., unemployment forecasts change materially across time, represented by green and light blue lines, updated March 27th and April 4th, respectively. We also see pronounced and varied GDP growth estimates across, say, Goldman Sachs and Morgan Stanley's forecasts, which both substantially revised Q2 GDP estimates from -24% to -34% and from -30% to -38%, respectively. Similarly, we see varying GDP projections across Asia, with Malaysia, China, and Japan represented in red, yellow, and dark blue.

Figure 4   Economic impact defined by broad-brushed scenarios require an industry overlay model
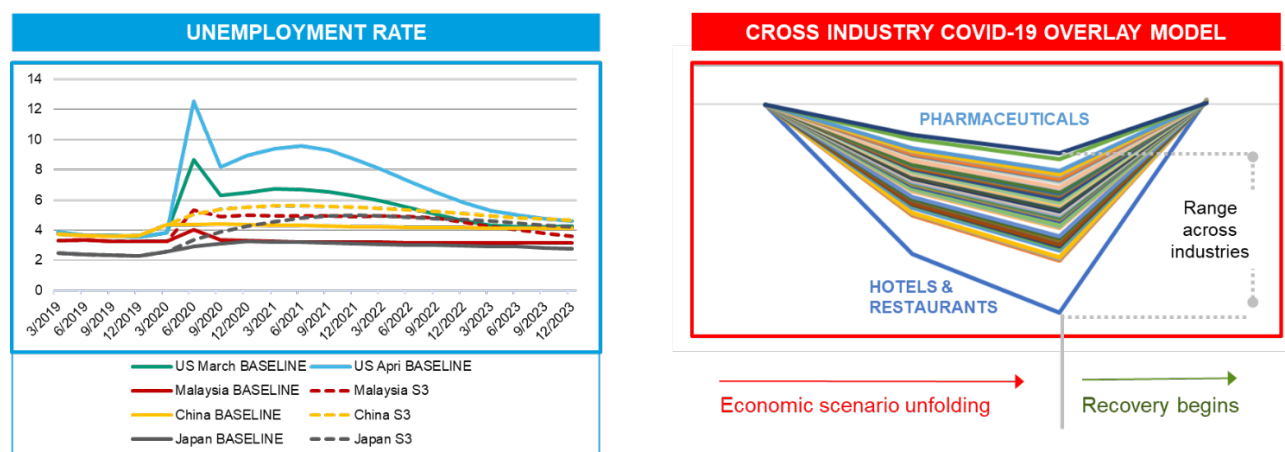
Source: Moody's Analytics

To provide a sense of magnitude, Figure 5 explores expected loss levels across industries under projected COVID-19, expected loss-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 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 pandemic is actually unfolding. For example, how a further extension to stay-at-home lockdowns will affect Hotels & Restaurants, Entertainment, and other COVID-19–sensitive industries (depicted in blue) is much more acute than what we have seen historically under other credit downturns.

Figure 5   New analytics and data to navigate COVID-19: models calibrated to historical dynamics can mislead
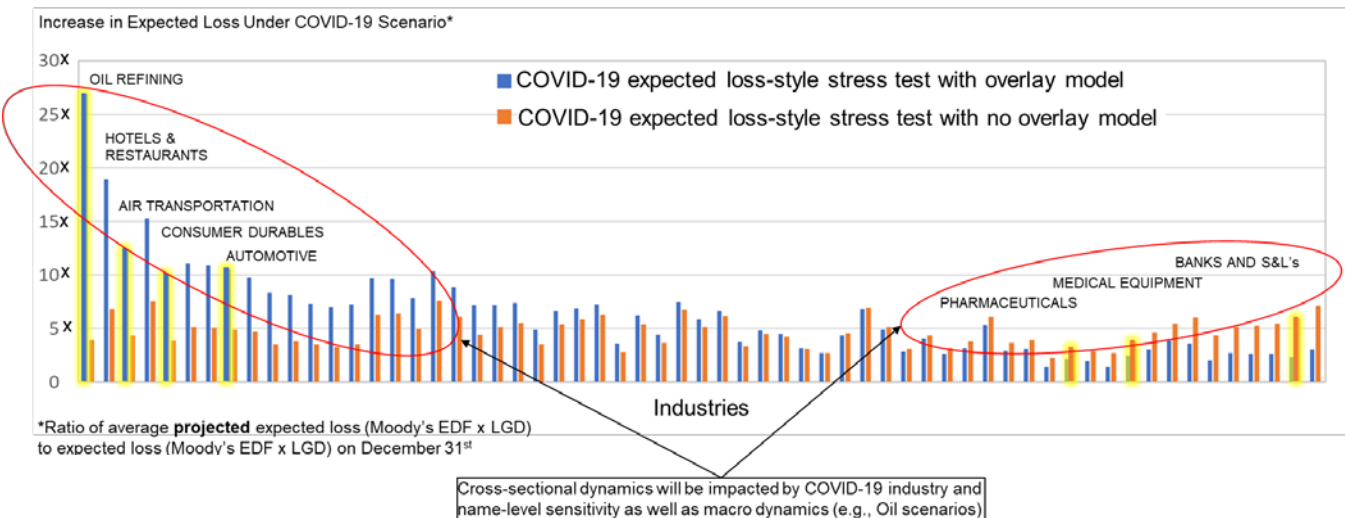
Source: Moody's Analytics

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

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

This section describes two applications of the Cross-Sectional COVID-19 Model: Current Internal Rating Assessment and Projected Ratings and Loss Measures. We present case studies to provide a sense of how an organization can use these models, as well as 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 present. The assessment provides an estimated current credit rating, accounting for granular, name-level, and cross-sectional impacts of the coronavirus across a set of regions, industries, and countries. Figure 6 shows the information needed, and how we conduct the assessment. 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 occurred so far.

Figure 6   Cross-Sectional COVID-19 Overlay Model produces Current Internal Rating Assessments
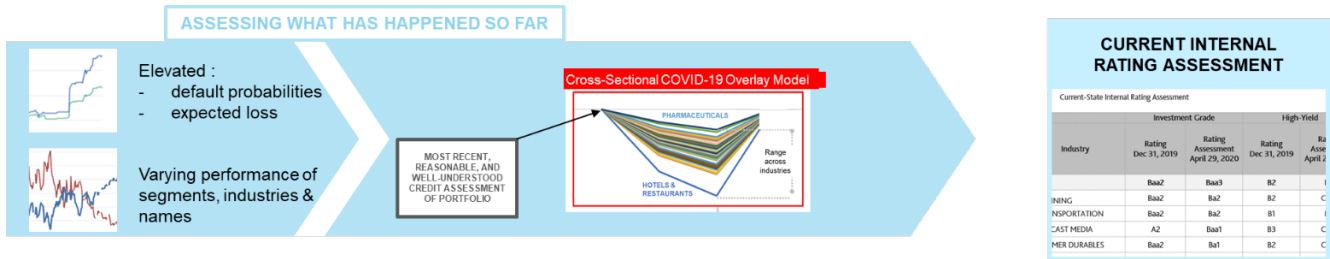
Source: Moody's Analytics

Looking at a case study for China, Figure 7 tabulates estimated ratings on June 2, 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 from COVID-19. To the right of the December 2019 internal rating is the rating assessment on June 2, 2020, as estimated by the Cross-Sectional COVID-19 Overlay Model, applying the COVID-19 industry factors realized between December 2019 and May 2020 to each name in the portfolio and aggregated by industry. Not surprisingly, industries such as Air Transportation and Apparel & Shoes are most affected, with ratings downgrades expected. Pharmaceuticals and Food & Beverage are the least impacted, 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 impairment calculations, limits, and stress testing — that can be coupled with the subjective assessments many organizations rely upon.

Figure 7   Current Internal Rating Assessment — China

| INDUSTRY | Investment Grade | | High-Yield | |
	Internal Rating Dec. 31, 2019	Estimated Internal Rating Assessment Jun. 2, 2020	Internal Rating Dec. 31, 2019	Estimated Internal Rating Assessment Jun. 2, 2020
Air Transportation	A1	A3	B3	Caa1
Apparel & Shoes	Baa3	Ba1	B2	B2
Construction	A1	Baa3	Caa1	Caa1
Agriculture	A2	A1	B2	B2
Pharmaceuticals	Baa2	Baa2	B1	B1
Food & Beverage	Baa2	Baa2	B2	B2

Source: Moody's Analytics

Projected Ratings and Loss Measures

We now shift our attention to Projected Ratings and Loss Measures. As Figure 8 depicts, Moody's Analytics Cross-Sectional COVID-19 Model anchors 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 countries. These projections have natural applications for regulatory stress testing and IFRS 9 impairment calculations. They provide useful complements to credit portfolio management and capital planning processes.

Figure 8   Moody's Analytics Cross-Sectional COVID-19 Model produces projected ratings and loss measures
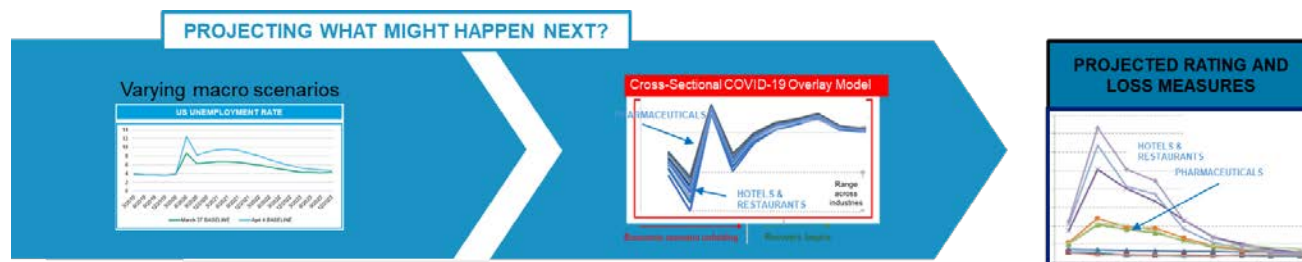
Source: Moody's Analytics

Figure 9 highlights internal ratings for a portfolio of Japanese investment grade firms projected along Moody's Analytics S3, 90% Downside scenario and S4, 96% Downside scenario, along with the Cross-Sectional COVID-19 Model. The likelihood of downgrades of two or more notches for the Oil, Gas and Coal Exploration and Production sector increases materially over the forecast period under the downturn scenarios. Industries whose credit quality is less affected by COVID-19, such as Pharmaceuticals, experience a relatively mild increase in their downgrade likelihood.

Figure 9   Japanese IG firms projected two+ notch downgrade probabilities anchored off of Dec. 31, 2019, with a June 2, 2020
            assessment using the Cross-Sectional COVID-19 Model
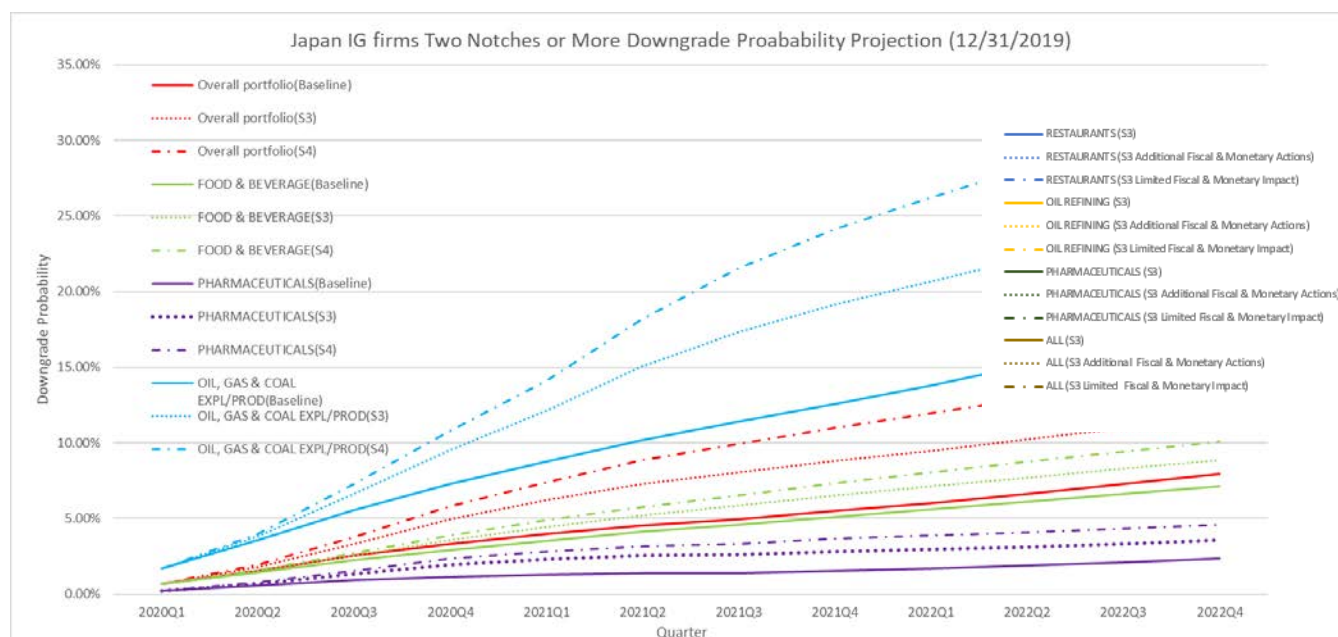
Source: Moody's Analytics

Next, we move to Malaysia and explore loss projections, with Figure 10 highlighting default probabilities as measured by EDF
values. We can see that Malaysian default probabilities have risen from December 2019 to early June 2020, with median default
probabilities increasing from 54bps at the end of December, to 86bps in early June 2020. Under the 90th and 96th percentile
downside scenarios, PDs are projected to increase even further, to 1.02% and 1.16%, respectively. Hotels & Restaurants,
Entertainment & Leisure, and Air Transportation have all seen significant default risk increases. In contrast, some sectors, such as
Medical Equipment, have actually seen decreases in their PDs during the December 2019 to June 2020 period.

Figure 10   Most and least coronavirus-sensitive industries: Malaysian one-year default probabilities using the Cross-Sectional
             COVID-19 Model

INDUSTRY	EDF DEC. 31 2019	EDF 2 JUNE 2020, (BASELINE)	90th% DOWNSIDE SCENARIO (S3)	96th% DOWNSIDE SCENARIO (S4)
All	0.54%	0.86%	1.02%	1.16%
Hotels & Restaurants	0.19%	0.41%	0.69%	0.90%
Entertainment & Leisure	0.23%	0.53%	0.80%	0.99%
Air Transportation	1.98%	5.12%	7.00%	8.20%
Consumer Products Retail/Whsl	0.33%	0.90%	1.10%	1.24%
Food & Beverage	0.17%	0.16%	0.19%	0.22%
Security Brokers & dealers	0.47%	0.33%	0.36%	0.39%
Medical Equipment	0.09%	0.02%	0.03%	0.03%

Source: Moody's Analytics

Figure 11 illustrates how the Cross-Sectional COVID-19 Model can drill down to provide cross-sectional and cross-firm
quantification through a comparison of two firms that operate in the Entertainment & Leisure industry in Malaysia, Berjaya Sports
Toto and Only World Group. The analysis shows projected default probabilities along the Baseline, 90th-percentile S3 Downside,
and 96th-percentile S4 Downside Moody's Analytics economic scenarios, using the Cross-Sectional COVID-19 Model. The case

highlights how the models can quantify dynamics across two firms with differing business models — Berjaya Sports Toto operates lottery games and is involved in the building, leasing, and distribution of on-line lottery systems, and the firm has weathered fairly well. The default risk has hardly moved since December 2019, and, although there is some impact from the scenarios, the overall default risk remains very low. Only World Group, which operates theme-park attractions that rely on in-person visits, has seen a significant increase in default risk during the early part of the year. Note the different scale of the charts showing that the default risk of Only World Group is significantly higher under baseline and downturn scenarios.

Figure 11   Cross-firm quantification — Berjaya Sports Toto vs. Only World Group

Source: Moody's Analytics

To summarize, Moody's Analytics Cross-Sectional COVID-19 Model anchors to an organization's current-state internal ratings assessment (possibly from Moody's Investors Service, or Moody's Analytics EDF credit measure), along with traditional forward scenarios (for example, GDP and unemployment) to produce granular, name-level projections with natural applications for regulatory stress testing and IFRS 9. Both can complement credit portfolio management and capital planning tools. This paper focuses on two applications of the models. We 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 very constrained or obsolete, 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. Adapting and retooling 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. The market is evolving daily. Industry and borrower credit profiles are rapidly deteriorating, with many unknowns and a lack of clarity surrounding when things will return to normal and which businesses and industries will survive. Past events do not apply here; we must look forward to accurately gauge this pandemic's impact.

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 the 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, and 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.