CREDIT RISK REPORT

APRIL 16, 2020

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EDF Report March 2020 for North American Corporate Firms:

Special Issue on the Impact of COVID-19 on Credit Risk

North American corporates experienced very steep credit quality decline in March 2020, following the global outbreak of the COVID-19 pandemic. By the end of March, the median EDF™ (Expected Default Frequency) value of North American corporate firms climbed to 2.31%, more than double its level last year. This increase marks the first time the median EDF value has doubled year-over-year since September 2008.

The elevated credit risk over the past year is mostly attributable to substantially increased market leverage, stemming from a severe drop in equity markets during February and March.

We also observe a similar magnitude of increasing credit risk in both bond spread and credit default swap (CDS) spread. More specifically, the spread between high-yield and investment grade widened significantly to historical levels.

When we compare the recent equity volatility and stress current asset volatility to the same levels seen during the last financial crisis in 2008–2009, resulting EDF levels climb to all-time highs across all ratings.

This special issue of the EDF report provides an extensive discussion of COVID-19's effects and the implications for leveraged lending during an unprecedented stressed environment for North American corporates.

Table of Contents

1. Overview

The North American corporates experienced a very steep credit quality decline in March 2020, following the global outbreak of COVID-19. By the end of March, the median EDF value of North American corporate firms reached 2.31%, more than double the prior year's level. This increase marks the first time the median EDF value has doubled year-over-year since September 2008. The elevated credit risk over the past year is mostly attributable to significantly increased market leverage, stemming from a severe drop in equity markets during February and March 2020. The median EDF credit measure increased by 124% year to date.

We also observe a similar magnitude of increased risk in the credit markets, with both bond spread and CDS spread surging substantially to five-year highs. In particular, we observe substantial spread increase in the high-yield space, while investment grade levels remained relatively moderate.

Observed corporate defaults of non-financial public firms still remained low by historical standards, which may not be surprising. The onset of the outbreak was sudden and relatively recent. It will take time for impacts to trickle down and become default events. However, we have started to see a few COVID-19–related defaults in the United States.

A number of risky industry/sectors' EDF levels increased significantly during the last 12 months. Specifically, oil- and consumer-related industries made up the top of the list when ranking industries by liabilities-weighted EDF measures. These sectors were also among the industries that experienced the largest increase in risk during the prior year.

This report first shows the overall credit trend reflected through realized default counts, the EDF credit measure and its drivers, and credit spreads for North American non-financial firms. Subsequently, we analyze the riskiest industry sectors using a variety of metrics. We also report credit migration patterns using EDF metrics. As a special issue of the EDF report, we also conduct extensive discussion regarding the impact of the COVID-19 pandemic on credit risk, as well as its implications for leveraged lending for North American corporates.

During the last financial crisis, we published periodic EDF reports that many clients found helpful. This report marks the first EDF report focused on the current economic impact on EDF credit risk measures, with a series of related studies to come.

2. Credit Measure Trends

This section shows EDF credit measure movement and key drivers for North American non-financial companies between January 2000 and March 2020. We report these trends in conjunction with realized default counts and credit spreads.

2.1 Realized Defaults

Figure 1 shows quarterly default counts for North American corporates, classified by whether the firm is rated at the time of default. Figure 2 presents quarterly number of defaults, highlighting bankruptcy defaults. Default occurrences reaffirmed that the most recent benign credit environment continued at least to the end of 2019. So far, we have seen only a handful of defaults in the sample during Q1 2020. However, given that the onset of the pandemic has been sudden, and it is still relatively recent, we expect to see a significant increase in defaults during the second half of 2020 if the credit environment continues to deteriorate. Figures 1 and 2 detail default counts by rating status and default type, respectively. Figure 3 reports monthly default counts in the previous year, during which period the default counts remained low. The 12-month default count rolling average currently stands at 3.92, down from 4.17 one year ago. As a benchmark, during the past 10 years, the average monthly default count is 11.01.

2.2 EDF Credit Measures and Drivers

Figure 4 reports quartiles of the EDF credit measure and its drivers, including the underlying asset volatility and market leverage, from January 2000 through March 2020. Recently, we have seen a substantial rise in EDF values as a result of substantial increases in market leverage. During the past 12 months, the median EDF value rose dramatically, from 0.90% to 2.31%, more than a factor of two, to its five-year high. Median leverage increased from 21.86% to 30.67%, due to a significant equity market sell-off. Median asset volatility increased from 38.10% to 38.61%. As asset volatility typically lags equity volatility, we expect asset volatilities to continue to rise, which would result in further EDF value increases.

Figure 1. Quarterly Default Counts by Rating Status

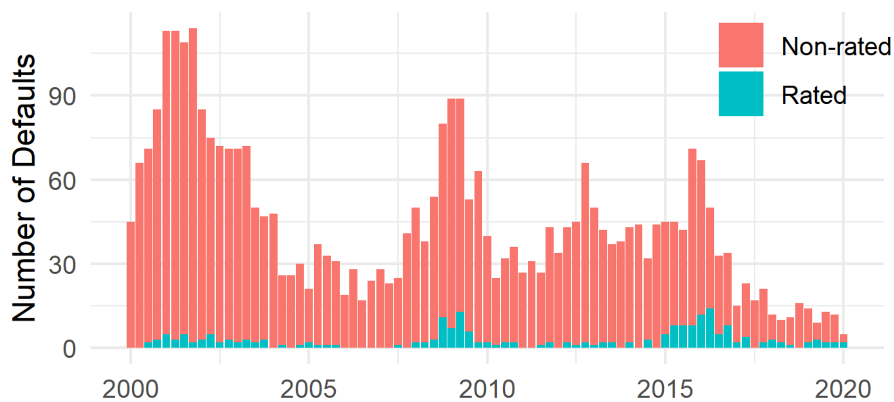


Figure 2. Quarterly Default Counts by Default Type

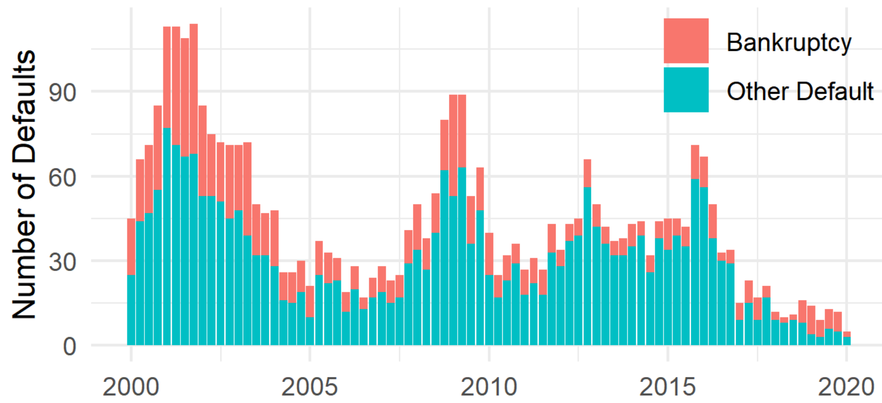


Figure 3. Monthly Default Counts During Past Year

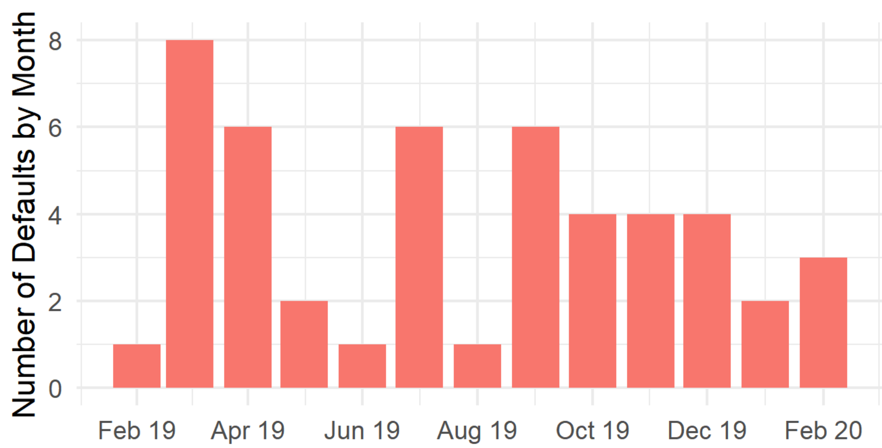
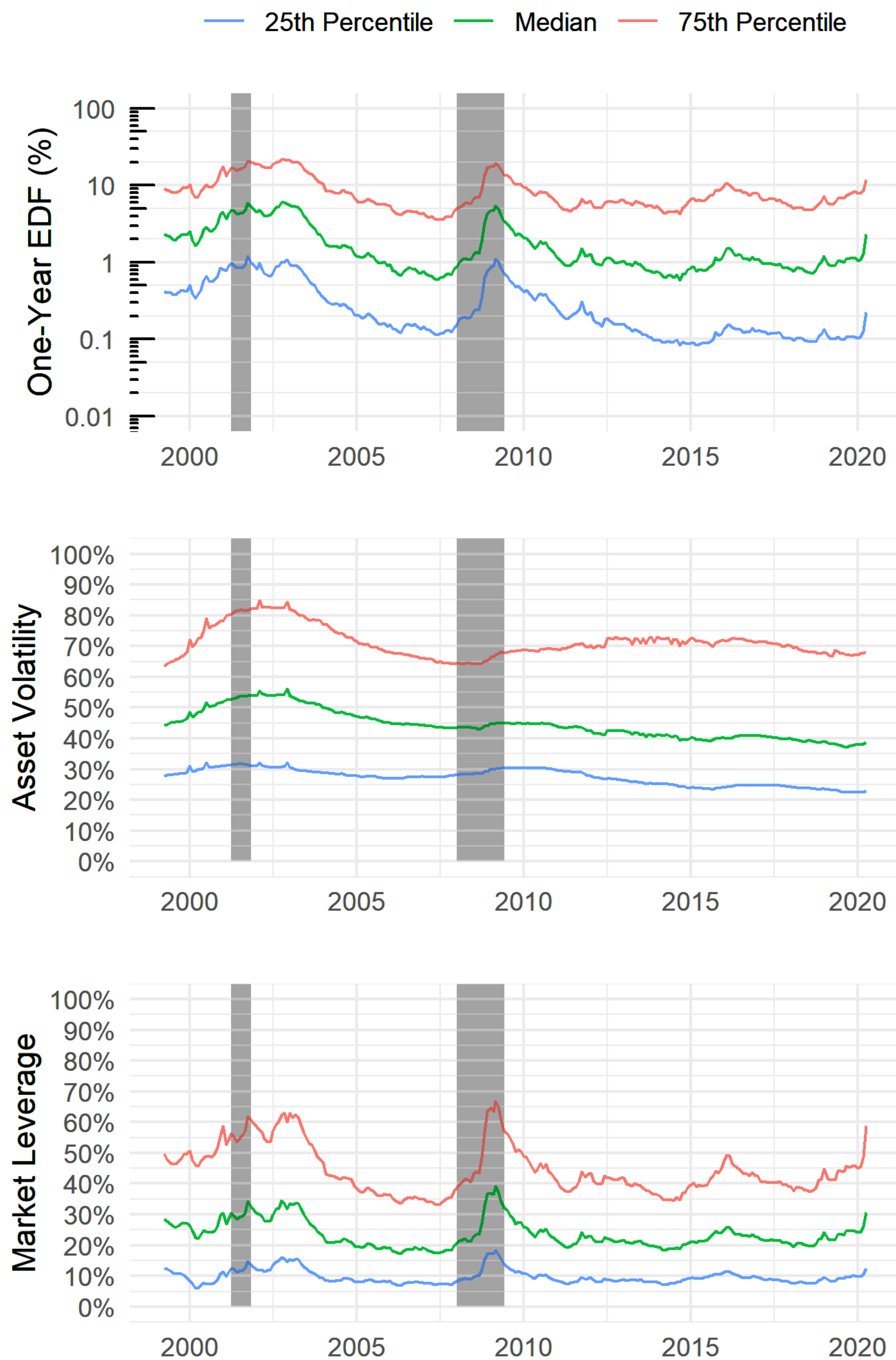


Figure 4. Trends of One-Year EDF Credit Measures and Drivers



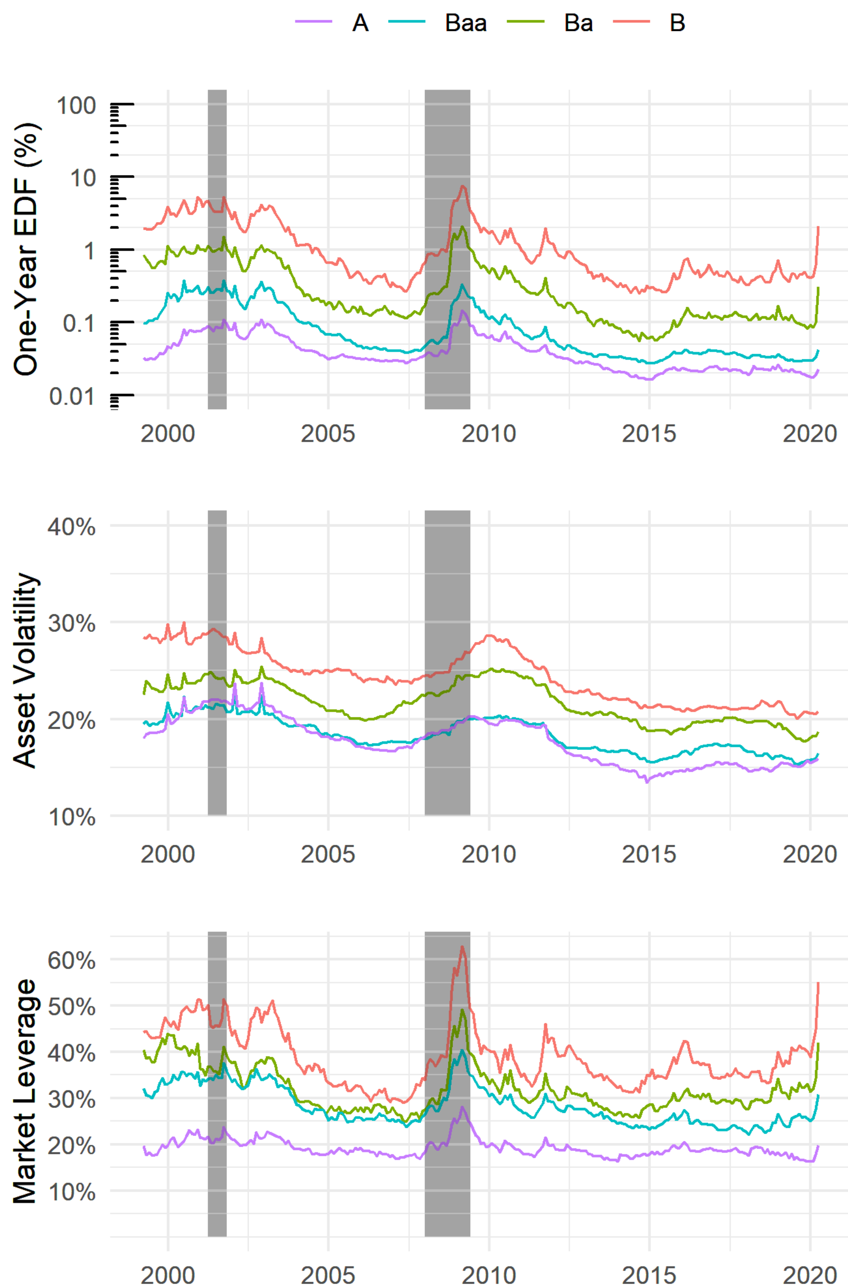
2.3 EDF Credit Measures and Drivers: Rated Firms

Figure 5 presents EDF measures and drivers for firms holding a Senior Estimated Rating assignment by Moody's Investors Service. To ensure each rating group has a sufficiently large number of firms, we analyze only groups rated A through B. In the cross-section, the median EDF values for these rating groups are consistent with the risk order indicated by agency ratings. For EDF value drivers, B-rated firms are riskiest in terms of both business risk (that is, asset volatility) and financial risk (that is, leverage). The EDF value difference between Baa-rated and Ba-rated firms is primarily driven by asset volatilities, while leverage is the main driver for the EDF value difference between Baa-rated and A-rated firms.

Currently, Ba and B-rated firm EDF credit measures are approaching the historical highs seen during 2008–2009. These levels show a stark contrast with the much more benign credit environment observed during the past few years. For example, a Ba-rated firm is now almost as risky as a B-rated firm in early 2019. However, despite the recent uptick, the EDF credit measures for investment grade firms are still relatively moderate.

We observed a moderate increase in median asset volatilities across all rating groups, up from historic lows at the second half of 2019. The bottom panel of Figure 5 shows that the market leverage — the ratio of the default point over the market value of assets — presented a sharp increase from their historic lows during 2019. The magnitude of the recent increase in leverage is almost as steep as the one observed during October and November 2008. Currently, B-rated corporate leverage is approximately 55.10%, quickly approaching the peak reached during the 2008–2009 crisis. This recent sharp increase in market leverage reflects the dramatic drop in market capitalization for North American corporates across all rating groups. As the market cap reflects expectations regarding future corporate earnings, this sharp drop points to the quickly deteriorating debt service capacity of North American corporates.

Figure 5. Trends of One-Year EDF Credit Measures and Drivers: Rated Firms



2.4 Credit Spreads

Figure 6 presents the time series of median values for the EDF credit measure, the five-year CDS spread, and the option-adjusted spread (OAS) of investment grade and high-yield North American public firms from January 2014 to March 2020. Median bond option-adjusted spreads are derived from the sample of bonds in coverage by the Moody's Analytics EDF-based bond valuation model. Generally, all three measures have been moving in tandem during the long history. The recent dramatic change is readily apparent for all three measures, especially for the high-yield space. Table 1 shows the median credit metrics by broad rating group as of March 31, 2020 and one year ago. As oil and gas-related firms account for a large portion of high-yield bonds, we see the high-yield space was essentially doubly hit by both the COVID-19 pandemic and the recent oil price shock, causing significant distress to speculative-grade debt.

Similar to the pattern observed for EDF credit measures, both OAS and five-year CDS spreads present a substantially steeper credit risk increase in the high-yield space than in the investment grade space, suggested by the increasingly widening gap between the two broad rating classes, shown as the dashed blue line in Figure 6.

Figure 6. Medians of Credit Measures: Investment Grade vs. High-Yield

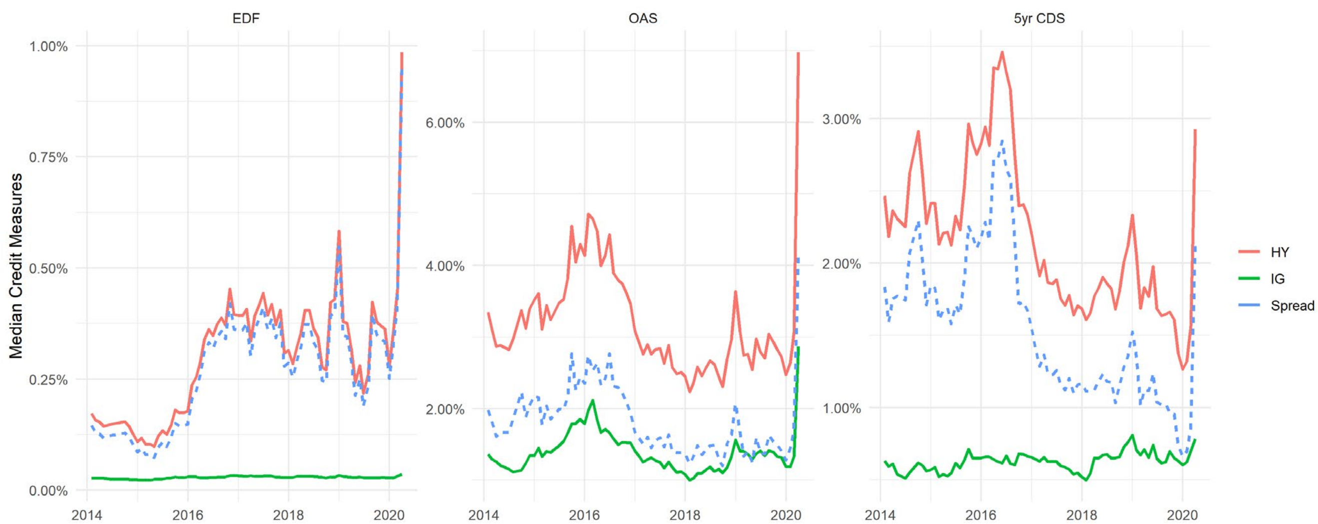
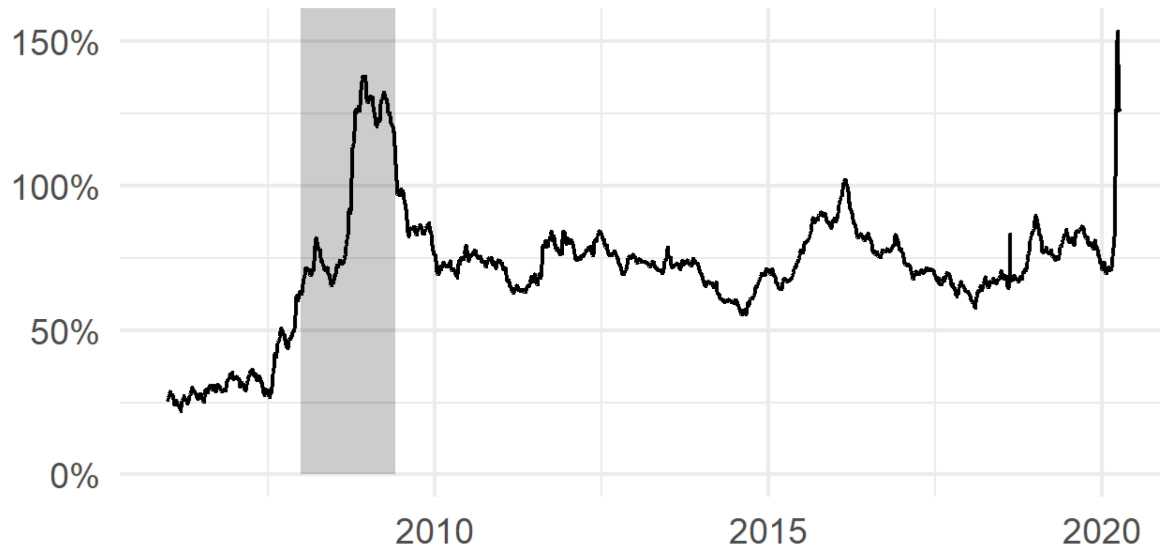


Table 1. Median Credit Measures as of March 31, 2020 and March 29, 2020

2019-03-29				2020-03-31			
Rating	EDF	5yr CDS	OAS	Rating	EDF	5yr CDS	OAS
Aa	0.01%	0.32%	0.62%	Aa	0.01%	0.38%	1.32%
A	0.02%	0.49%	0.89%	A	0.03%	0.56%	2.07%
Baa	0.03%	0.82%	1.52%	Baa	0.06%	1.01%	3.20%
Ba	0.14%	1.59%	2.42%	Ba	0.38%	2.51%	6.14%
B	0.50%	2.38%	3.24%	B	3.74%	3.47%	7.58%
<B	4.39%	5.39%	5.29%	<B	20.18%	9.93%	14.20%

As the current elevated level of credit spreads potentially reflects both the anticipated increase in default risk and investors' increased risk aversion, we analyze the market Sharpe ratios, estimated using Moody's Analytics EDF-based bond valuation model, shown in Figure 7. It is apparent that the estimated market price of credit risk has risen drastically during the last month, surpassing the levels seen during the last financial crisis.

Figure 7. Market Prices of Credit Risk Estimated from Bond Option-Adjusted Spreads and EDF Value Data



3. Industry Analysis

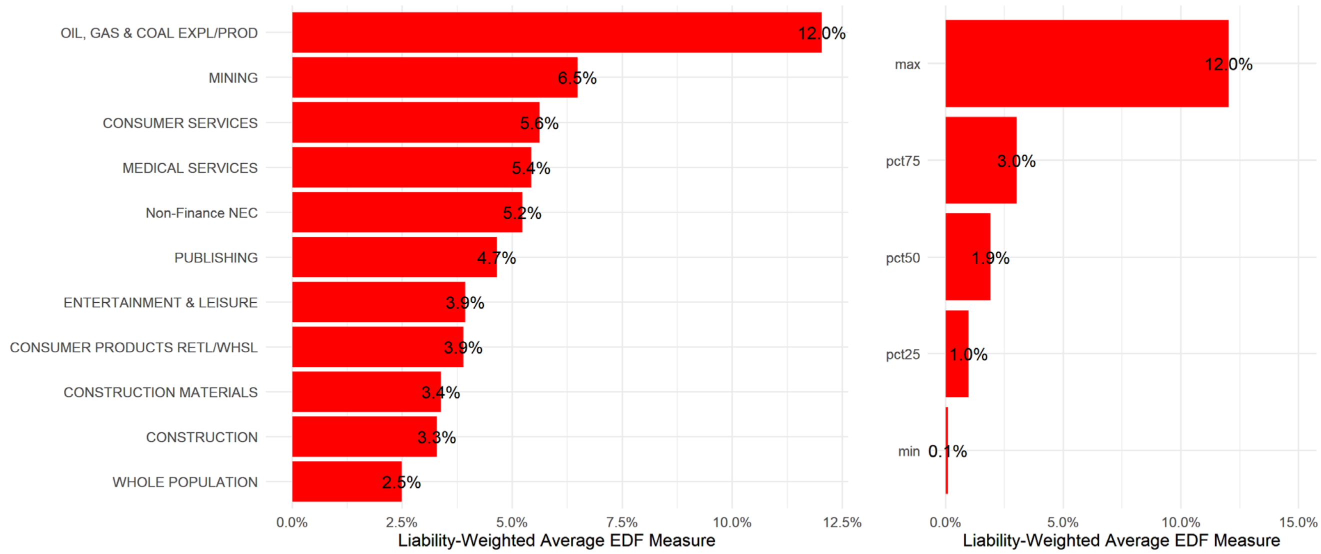
This section applies two measures that capture different aspects of industry risk. The first measure is based on the average EDF value weighted by total liabilities of each company in a given industry. Therefore, this measure is dominated by the risks of firms with large amounts of liabilities. The second measure is the percentage of firms with EDF values greater than the 90th percentile of the entire population of North American non-financial companies. Consequently, this measure tends to be more represented by the risks of smaller companies, which are likely to be riskier in most industries. With both measures, the analysis in this section helps paint a relatively complete picture of industry-level credit risk for North American corporates. To avoid small sample bias, we examine only industries with more than 20 firms as of March 31, 2020.

3.1 Riskiest Industries

The entire North American corporate population has a 2.49% liabilities-weighted EDF credit measure, up from 1.27% last year. Figure 8 shows the riskiest industries and the distribution of liabilities-weighted EDF credit measures across all industries. The chart on the left side displays the top-ten riskiest industries and their EDF measures; the chart on the right displays the EDF measure distribution of all industries.

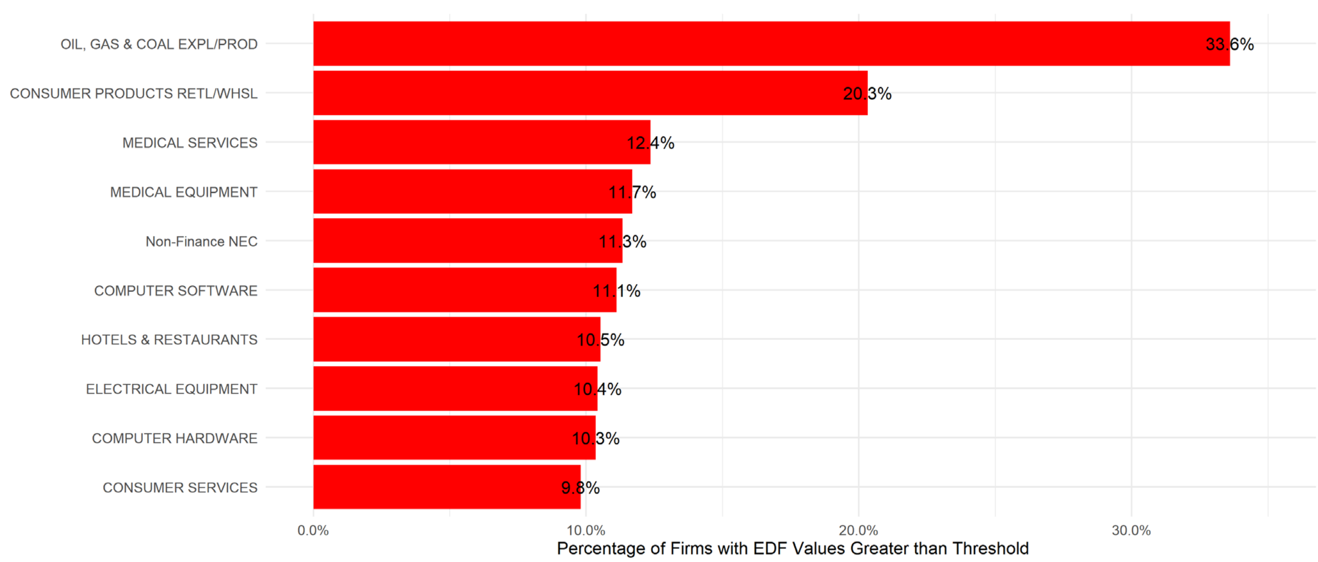
The top-two riskiest industries are Oil & Gas Refining and Mining-related, probably not surprising. These industries were hit twice in rapid succession — decreased demand due to the COVID-19 pandemic and a massive equity price drop due to the fall in oil prices. In particular, the liabilities-weighted EDF value for the Oil, Gas & Coal Exploration/Production industry is 12%, presenting alarming levels of default risk. Other industries topping the list tend to be non-essentials, including Consumer Services as well as Consumer Goods Retailers and Wholesalers, Entertainment & Leisure, and Construction-related. All of these industries have above a 3% liabilities-weighted EDF measure. Medical Services, considered a "mission-critical" industry in light of the COVID-19 pandemic, is still relatively risky and ranked fourth. However, as shown in Table 3, the Medical Services industry is doing relatively well compared to other industries, given the moderate increase in its median EDF measure.

Figure 8. Riskiest Industries by Liability-Weighted Average EDF Credit Measures



Examining an alternative measure of industry risk, we compile the percentage of firms within an industry that have EDF values greater than the 90th percentile of the EDF value distribution for the entire population. At the end of March 2020, for the population of North American non-financial firms, this threshold value was 30.70%. Figure 9 lists the riskiest industries using this measure. The list is largely consistent with the list obtained using the other measure. Again, the Oil, Gas & Coal Exploration/Production industry is ranked as the riskiest, with almost 35% of firms over the threshold. Hotels & Restaurants appears on this list, consistent with a substantial drop in demand.

Figure 9. Riskiest Industries by Percentage of Firms with EDF Values Greater than Threshold



3.2 Industries with the Largest Credit Risk Increase

The sharp elevation in credit risk is more apparent when we look at year-over-year increases in EDF values within each industry. From March 2019 to March 2020, most industries in the North American corporate space experienced substantial increases in credit risk: the median EDF value for all industries has almost doubled from a year ago. The industries with the largest percentage increases are reported on the chart to the left in Figure 10, where we find industries heavily engaged in travel and leisure (for example, Hotels & Restaurants, Entertainment & Leisure), as well as international trade (Apparel & Shoes, Electronic Equipment, Furniture & Appliances).

Among these industries, the median EDF value for Apparel & Shoes increased almost by ten-fold in light of the COVID-19 pandemic. The chart on the right side of Figure 10 presents the distribution of changes across all industries, which is skewed, with a median percentage increase of 147%.

Figure 10. Industries with the Largest Increases in Liabilities-Weighted EDF Credit Measures

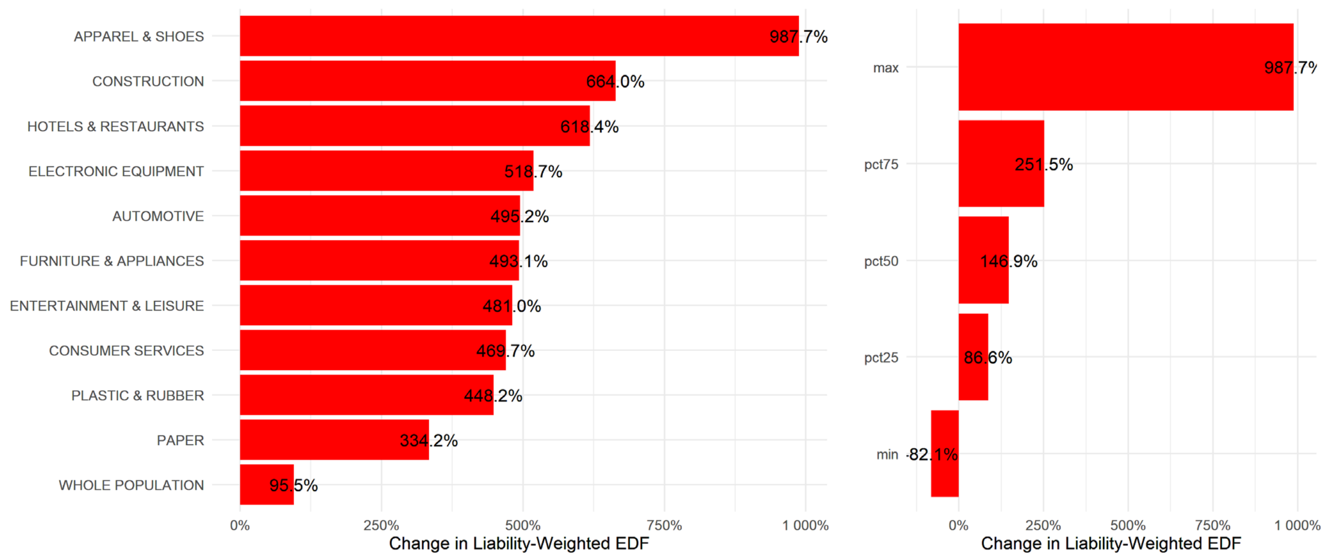


Table 2. EDF-Implied Rating Mapping for North American Non-financials

Investment Grade				High-Yield			
Rating	Median	Lower Bound	Upper Bound	Rating	Median	Lower Bound	Upper Bound
Aaa	0.0100%	0.0100%	0.0126%	Ba1	0.2754%	0.1921%	0.3949%
Aa1	0.0159%	0.0126%	0.0178%	Ba2	0.5663%	0.3949%	0.7305%
Aa2	0.0200%	0.0178%	0.0215%	Ba3	0.9423%	0.7305%	1.2156%
Aa3	0.0231%	0.0215%	0.0248%	B1	1.5682%	1.2156%	2.0230%
A1	0.0266%	0.0248%	0.0285%	B2	2.6098%	2.0230%	3.3457%
A2	0.0306%	0.0285%	0.0347%	B3	4.2892%	3.3457%	5.4988%
A3	0.0394%	0.0347%	0.0447%	Caa1	7.0494%	5.4988%	9.0373%
Baa1	0.0507%	0.0447%	0.0575%	Caa2	11.5858%	9.0373%	13.0872%
Baa2	0.0652%	0.0575%	0.0934%	Caa3	14.7832%	13.0872%	18.8629%
Baa3	0.1340%	0.0934%	0.1921%	Ca	24.0685%	18.8629%	34.6904%

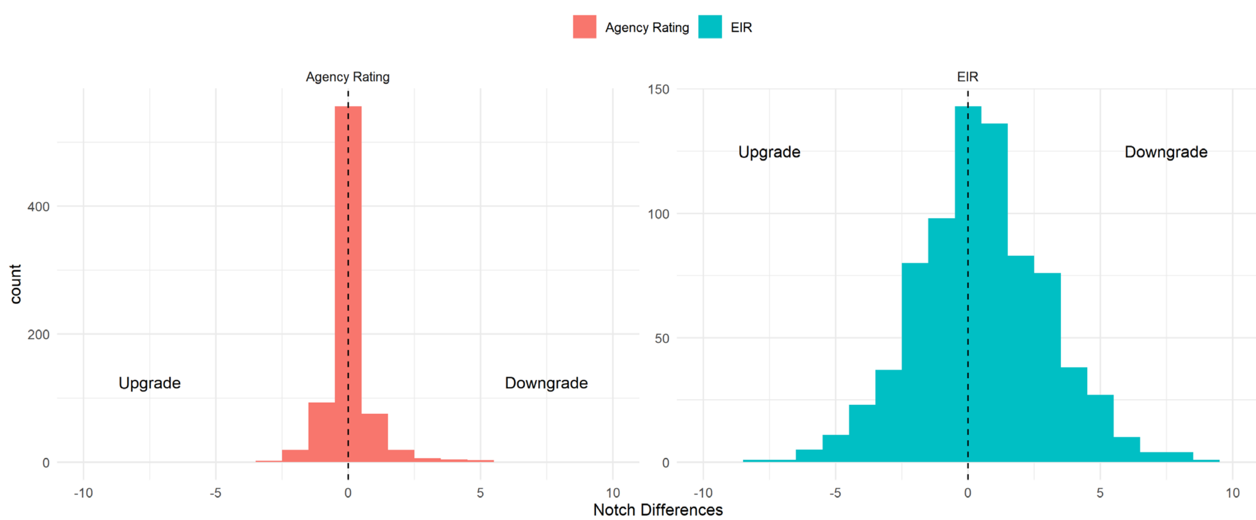
4. Credit Migration

This section analyzes credit quality shift from both the change in agency rating and the change in EDF-implied rating. The agency rating is more latent, reflecting the credit risk ranking of a firm over a long period of time, and is thus, more stable. On the other hand, the EDF-Implied Rating (EIR) is calibrated monthly, and is, therefore, more point-in-time, but also more volatile.

Table 2 shows the mapping between EDF values and the corresponding implied ratings for North American non-financials as of March 2020. EDF values within the lower bound and upper bound are mapped to the corresponding rating class. The resulting EIRs are then compared to their counterparts in March 2019. Figure 11 shows the differences, along with the notch differences in agency ratings.

Looking at the histogram of notch differences, even though the agency ratings suggest that the longer-term credit risk for the majority of the firms have changed little, we see a positive skewness for the EIR, suggesting clear, immediate credit deterioration, in line with other credit metrics.

Figure 11. EDF-Implied Rating Change: March 2020 vs. March 2019



5. Risk Highlight

March 2020 EDF values were highly affected by COVID-19. Emerging as a surprise wildcard risk, the pandemic will likely continue to have a profound risk impact as the situation evolves. Because of the recent outbreak, financial institutions are likely to re-assess expected losses, while portfolio managers will likely adjust their credit exposures.

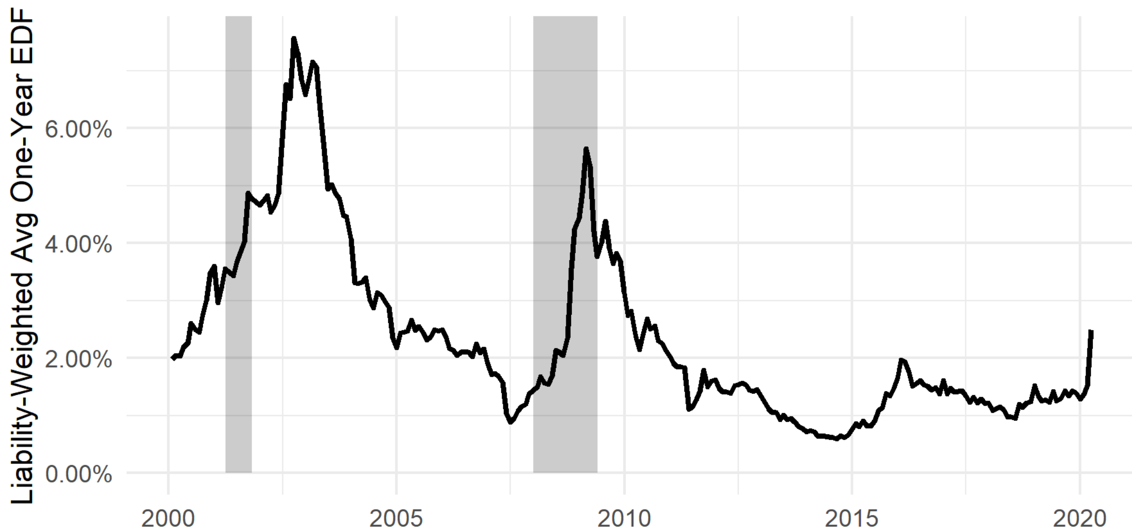
Among a variety of asset classes impacted significantly by COVID-19, leveraged lending is certainly one of the most concerning. The dramatic decline in equity markets reflects pessimistic expectations for future corporate earnings. This issue could lead to deteriorating debt servicing capability, which would be especially problematic for highly leveraged, speculative-grade companies.

We next highlight specific risks associated with the immediate impact of COVID-19 across industries, as well as the implications for leveraged lending.

5.1 COVID-19

On an aggregate level, March 2020 has seen one of the steepest one-year EDF measure increases during the past 20 years, shown in Figure 12. This metric has almost doubled, compared to where it has been during the past three years. However, this measure has yet to reach the level last seen during the 2008–2009 financial crisis. Given a fixed loss given default (LGD) and exposure, this observation suggests that a well-diversified portfolio currently has an expected loss more than double its level at the beginning of the year.

Figure 12. Liability-Weighted EDF Values Saw Significant Increases During the Past Month



However, as shown in previous sections, the current asset volatility level remains relatively tame, especially for investment grade. We estimate asset volatility using a three- to five-year rolling window, designed to be less volatile. Given that equity volatility, often proxied by the volatility index (VIX), reached a historical high in March 2020, it would be reasonable to think that asset volatility would follow the same path, given the uncertainties ahead. Figure 13 presents the stressed EDF value calculated with the current level of leverage, but assuming the asset volatility in the 2008–2009 high range (shown as the triangular points). With such heightened volatility, we would see EDF values across all rating grades, rather than just with high-yield, climbing back to their respective all-time highs.

The first immediate impact of COVID-19 is the re-shuffling of industry risks. With lockdowns enforced across many regions and countries, the universal stay-at-home order has become the most devastating economic force in modern history. A variety of Main Street industries have been significantly affected. However, some industries seem to be coping better than others.

Table 3 compares median EDF values on March 31, 2020 to respective values on December 31, 2019. The table ranks industries from top to bottom, by the year-to-date percentage change. From the year-to-date perspective, industries related to travel, transportation, entertainment, and leisure were among those hardest hit by the pandemic, perhaps not surprising, as consumers significantly cut travel and entertainment needs. In addition, firms in Apparel and Shoes, as well as Consumer Goods, found themselves caught between slashed demand and disrupted supply chains. Meanwhile, oil refiners fought hard to maneuver through the pandemic, in addition to feeling the effects of a profound oil price shock. On the other end of the spectrum, industries deemed "essential," such as Utilities and Agriculture, as well as "mission-critical" industries related to Medicals Services and Pharmaceuticals, performed relatively well.

Such "relativeness" can be better seen by analyzing the EIRs. While most industries experienced an EIR downgrade, some in the bottom-10 impacted list are associated with EIR upgrades, despite increased in EDF values, suggesting relatively better performance and less risk than other industries, year-to-date.

Figure 13. Stressed EDF Values with Volatility Assumed Returned to 2008–2009 Highs

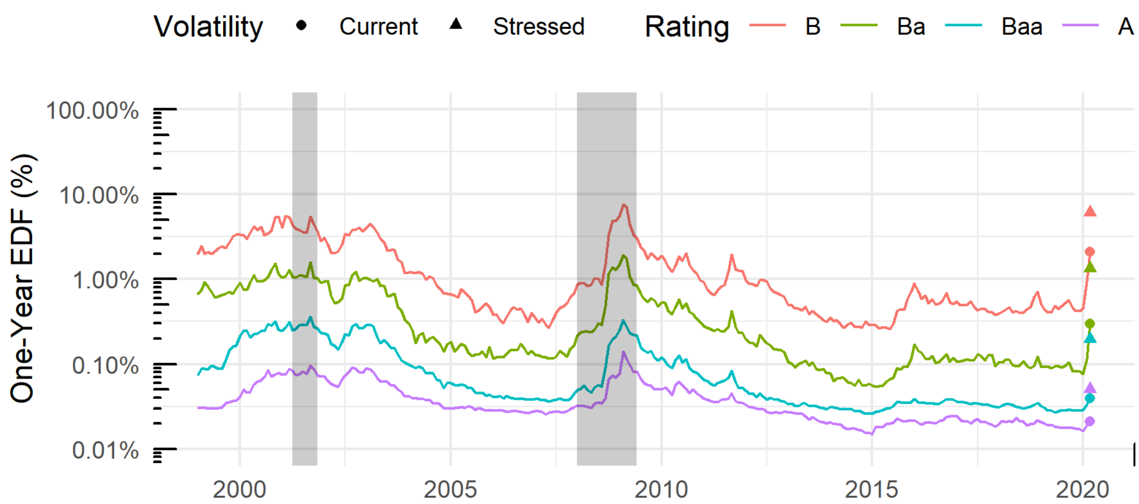


Table 3. Industries with the Largest Percentage Change in Median EDF Values

NDY	12/31/2019		03/31/2020	
	Median EDF	EIR	Median EDF	EIR
Top-10				
AIR TRANSPORTATION	0.13%	Ba2	1.20%	Ba3
TRUCKING	0.08%	Ba1	0.61%	Ba2
HOTELS & RESTAURANTS	0.29%	B1	2.18%	B2
OIL REFINING	0.14%	Ba3	0.96%	Ba3
AEROSPACE & DEFENSE	0.08%	Ba1	0.36%	Ba1
ENTERTAINMENT & LEISURE	0.75%	B3	3.20%	B2
APPAREL & SHOES	0.16%	Ba3	0.66%	Ba2
PRINTING	3.34%	Caa2	13.54%	Caa3
LUMBER & FORESTRY	0.08%	Ba1	0.28%	Ba1
CONSUMER PRODUCTS RETL/WHSL	1.31%	Caa1	4.86%	B3
Bottom-10				
TOBACCO	3.63%	Caa2	5.95%	Caa1
AGRICULTURE	0.34%	B1	0.53%	Ba2
ELECTRICAL EQUIPMENT	2.50%	Caa1	3.75%	B3
MEDICAL EQUIPMENT	0.93%	B3	1.33%	B1
PHARMACEUTICALS	2.17%	Caa1	3.05%	B2
MINING	3.18%	Caa2	4.07%	B3
MEDICAL SERVICES	1.81%	Caa1	2.20%	B2
Non-Finance NEC	1.83%	Caa1	2.15%	B2
CABLE TV	0.03%	A3	0.03%	A2
UTILITIES, ELECTRIC	0.02%	Aa3	0.02%	Aa3

Table 4. Air Transportation Top-10 EDF Value Changes

		12/31/2019		03/31/2020		Percentage Change	
PID	**Name**	**EDF (%)**	**EIR**	**EDF (%)**	**EIR**	**EDF**	**Market Cap**
N12817	AIR CANADA	0.08	Ba1	1.69	B1	1,911%	-68%
902549	UNITED AIRLINES HOLDINGS, INC.	0.07	Ba1	1.17	Ba3	1,644%	-65%
N20700	SPIRIT AIRLINES INC	0.62	B2	7.22	Caa1	1,057%	-68%
N11775	CHORUS AVIATION INC	0.11	Ba2	1.27	B1	1,038%	-64%
N08526	JETBLUE AIRWAYS CORP	0.11	Ba2	0.89	Ba3	717%	-53%
011659	ALASKA AIR GROUP, INC.	0.13	Ba2	0.93	Ba3	615%	-58%
N14303	EXCHANGE INCOME CORP	0.11	Ba2	0.73	Ba3	552%	-60%
830879	SKYWEST INC	0.20	Ba3	1.23	B1	530%	-60%
N12001	ALLEGIANT TRAVEL CO.	0.12	Ba2	0.78	Ba3	525%	-53%
247361	DELTA AIR LINES INC	0.05	Baa3	0.33	Ba1	510%	-52%

Table 5. Pharmaceuticals Top-10 EDF Value Changes

		12/31/2019		03/31/2020		Percentage Change	
PID	**Name**	**EDF (%)**	**EIR**	**EDF (%)**	**EIR**	**EDF**	**Market Cap**
N25601	PROTEON THERAPEUTICS INC	4.72	Caa2	0.13	Baa3	-97%	1,378%
B03137	VIR BIOTECHNOLOGY, INC.	5.10	Caa3	0.15	Baa3	-97%	173%
N20787	IBIO INC	32.07	C	1.90	B1	-94%	1,253%
B01758	GENPREX INC	3.04	Caa2	0.32	Ba1	-89%	1,190%
N24117	ONCONOVA THERAPEUTICS INC	32.21	C	3.87	B3	-88%	1,812%
N24407	GENUFOOD ENERGY ENZYMES CORP	41.82	C	5.24	B3	-87%	3,706%
N02070	NOVAVAX INC	32.57	C	4.13	B3	-87%	562%
N23211	TONIX PHARMACEUTICALS HLDG	23.20	Ca	2.97	B2	-87%	1,694%
N27989	CO-DIAGNOSTIC INC	2.04	Caa1	0.35	Ba1	-83%	1,247%
N14798	TRILLIUM THERAPEUTICS INC	6.35	Caa3	1.18	Ba3	-81%	930%

To illustrate the substantial negative impact of COVID-19 on some companies' credit risk, Table 4 presents select cases in Air Transportation, one of the most heavily impacted North American corporate sectors. Ranking by the year-to-date percent change in EDF value, Air Canada's EDF measure at the end of March 2020 was more than 20 times its level at the beginning of the year, with its market capitalization dropping 68%. Many airlines on the top-10 list in terms of EDF value change were regional airlines or airlines that employ a volume-based business model (for example, Spirit, Allegiant, and Skywest), which potentially made them particularly vulnerable to a sharp drop in passengers. But some major players in the industry were significantly affected as well. Airlines on the top-10 list all had more than a 500% EDF value change, with market capitalizations cut at least in half.

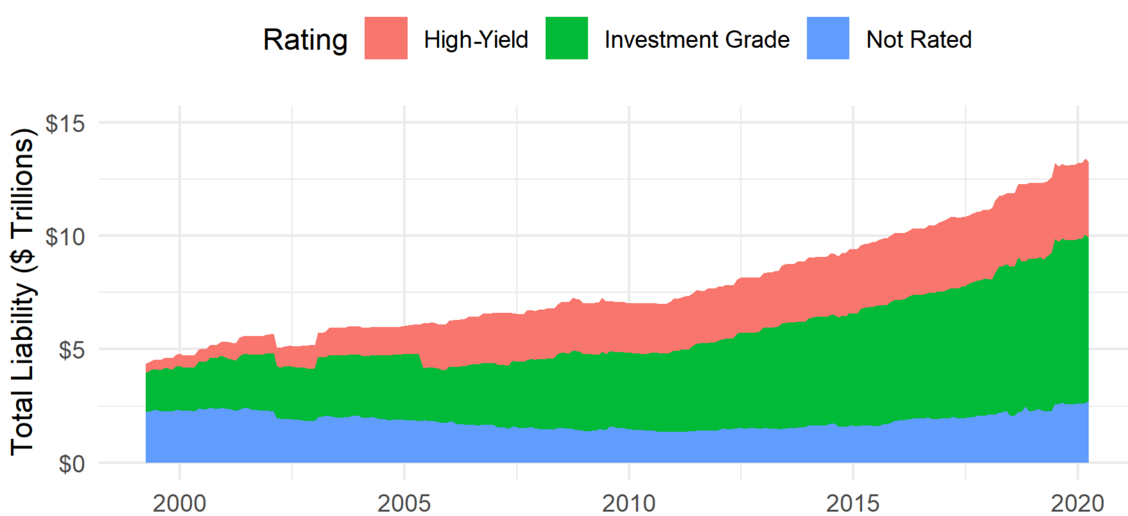
Although most main street industries have been negatively impacted by COVID-19, some companies in certain industries appear to have managed well. For example, Table 5 lists the top-10 companies with the most EDF value decrease in the Pharmaceutical industry. Some companies that were among the riskiest in the industry have experienced more than an 80% drop in EDF value and substantial upgrades in EIR while looking at soaring market capitalizations. Although certain companies on this list achieved substantial market cap increases due to mergers and acquisitions and positive news on other fronts, others managed to turn the tide, potentially because of being perceived as mission-critical during the pandemic. For example, this includes a number of companies associated with coronavirus vaccine development, testing, and treatment (Vir Biotechnology, IBIO, Co-Diagnostic, and so on).

5.2 Leveraged Lending

Highly-leveraged speculative companies are mostly likely to fall victim to the COVID-19 pandemic's ramifications, given their vulnerability to falling equity and earnings. In particular, the oil and gas companies that account for a large portion of the high-yield space are navigating a double-hit, from both the pandemic and the oil price shock, which makes these companies especially vulnerable.

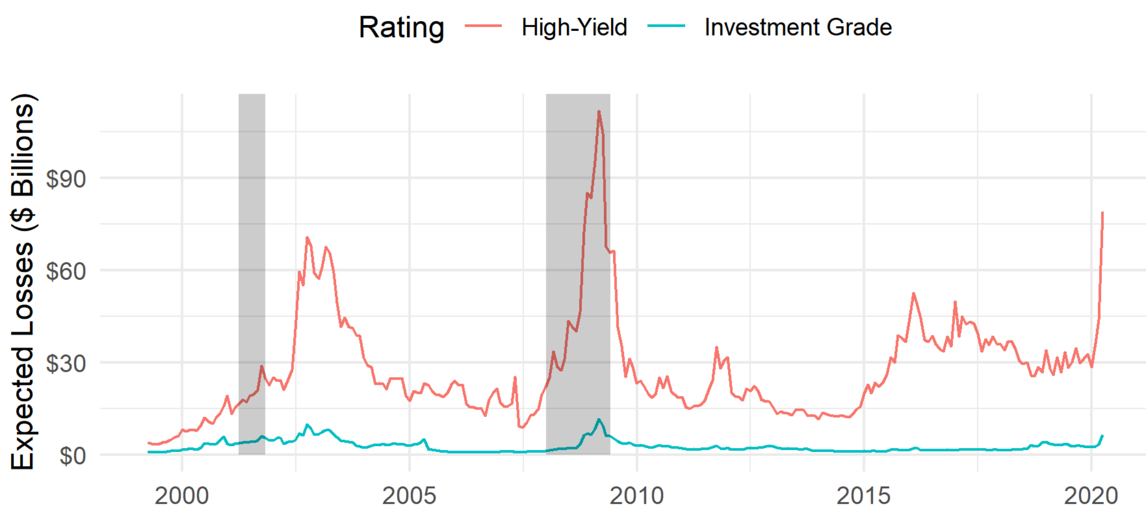
As shown in previous sections, we have already seen a significant divergence in credit spreads between investment grade and high-yield. Figure 14 shows the historical breakdown of total liabilities by rating for North American non-financials. While high-yield has been steady at around 25% of the entire sample, the sheer amount has been fast-increasing, almost tripling during the past 20 years, to about $3 trillion USD today.

Figure 14. Total Liability by Rating for North American Non-financials



If we consider the entire sample of North American corporates as a portfolio, with an assumption of 50% LGD, we can calculate the expected loss amount for both investment grade and high-yield, shown in Figure 15. The most recent expected loss for high-yield has surged passed its high of the early 2000s, on its way to approaching levels last seen during the 2008–2009 financial crisis.

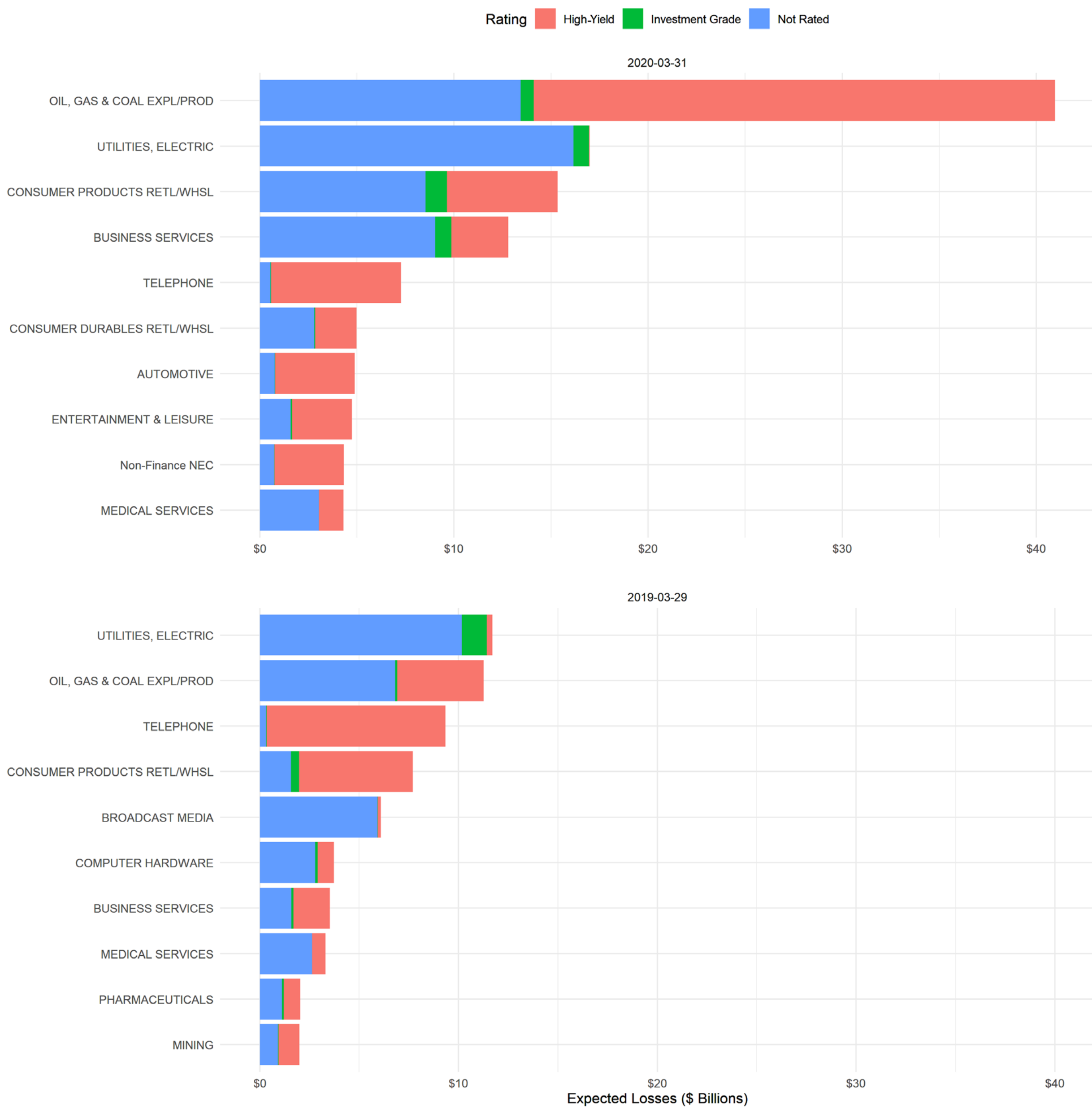
Figure 15. Expected Losses by Rating



Taking a closer look at the high-yield space, Figure 16 presents the top-10 industries with the highest expected losses as of March 31, 2020, as well as breakdowns by rating. The distribution of expected losses among high-yield is extremely skewed, where the top-10 industries amount to 72% of the total. While the current expected loss for investment grade is relatively stable compared to its level a year ago, expected loss for high-yield has increased substantially, and its distribution has become much more extreme, with the risk increasingly concentrated in a handful of industries. For leveraged lending, the Oil and Gas Exploration/Production industry shows an alarming increase in expected loss, rising from about $5 billion USD one year ago to $27 billion USD currently.

With the Federal Reserve's current market operation continuously purchasing investment grade instruments on the line, this gap between investment grade and high-yield may further expand in the near future. Previously, during the dot.com bubble and the 2008–2009 financial crisis, when the total expected loss for all ratings reached similar levels, we saw increases in both asset correlations and systematic risks. The current situation calls for precaution and possible government intervention, as we continue to navigate the turbulent COVID-19 pandemic.

Figure 16. Total Expected Losses by Rating and Industry: Top-10



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