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COVID-19 Impact on United States Middle Market Corporate Firm Credit Risk

Abstract

COVID-19 has become, and will likely continue to be, a major driver of credit risk. In this paper, we continue to monitor the impact of the coronavirus and the concurrent shock in oil prices on US middle market firms to identify which sectors have the greatest credit deterioration.

Using Moody's Analytics probability of default models, we see credit deterioration across firms of all sizes and industries from their through-the-cycle levels. Services and Consumer Products sectors see the largest increase in default risk from through-the-cycle levels. Average size-weighted expected losses across industries more than double from pre-COVID-19 levels.

The as-of date for this analysis is April 7, 2020. In addition, this study considers only the aggregate impact of government aid as it is reflected in the equity market movements and an assumed unemployment rate of 10%. This study does not consider the idiosyncratic effect of government assistance on individual companies. Moody's Analytics may make more updates as the situation develops.

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Executive summary

The purpose of this exercise is to identify which sectors can expect to sustain the greatest impact from COVID-19–related credit stressors. We performed this analysis by running firms' financial statements through default risk models and comparing the following risk measures:

1. **COVID-19 point-in-time (PIT) probability of default (PD).** This point-in-time probability of default risk measure includes the economic stress caused by the coronavirus pandemic and oil price shocks per the as-of date for this analysis.
2. **Through-the-cycle (TTC) PD.** This measure captures the risk level associated with firms' financial ratios without any consideration of prevailing credit cycle conditions.

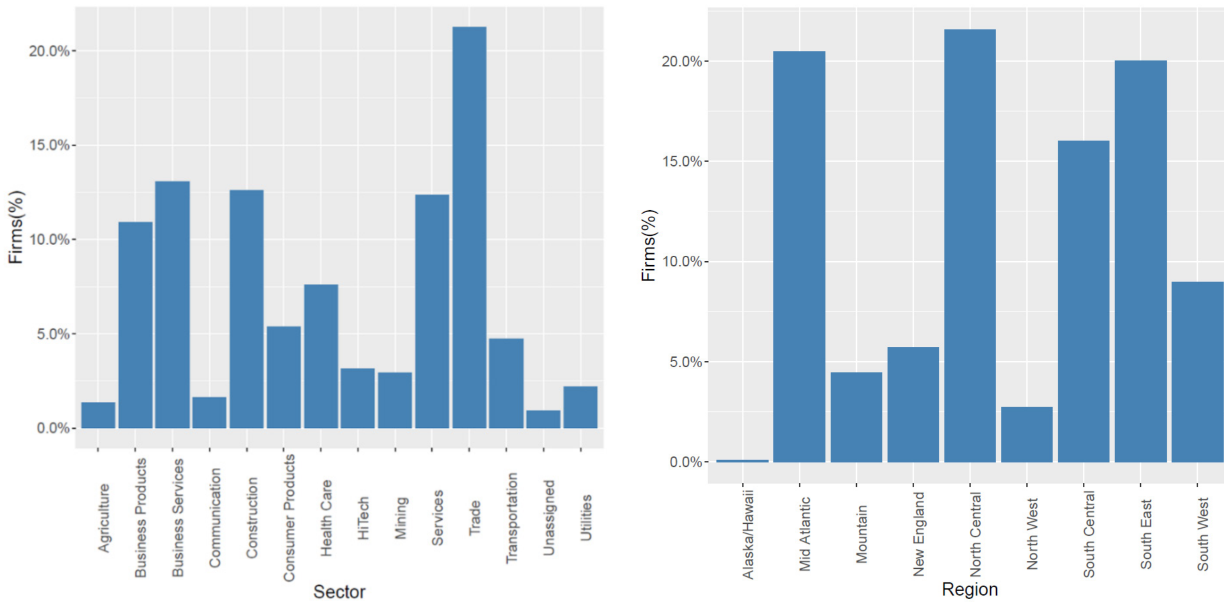
We compare these measures to evaluate how COVID-19 point-in-time probability of default measures exceed through-the-cycle probability of default measures (TTC PD vs COVID-19 PD). We perform this analysis at an industry level and at the risk-band level within industries to identify which industries COVID-19 affects most and with what magnitude. We do not stress financials for individual firms because we expect that market reactions captured by the PIT PD reflect potential future changes in financials.

Data

The middle-market sample includes 30,000 US private firms. We selected all of the firms in our US database with financial statements available in the last three years. The US database is built through cooperation with more than 20 banks.

The chart on the left in Exhibit 1 shows the distribution of firms, which span all the industry sectors in the model. The Unassigned sector is for firms that either do not have an industry identifier or are in an industry that does not map to the RiskCalc™ model's sectors. The chart on the right shows the firms' geographic location. The Mid-Atlantic, North Central, and South East regions capture the most borrowers, though all regions are represented.

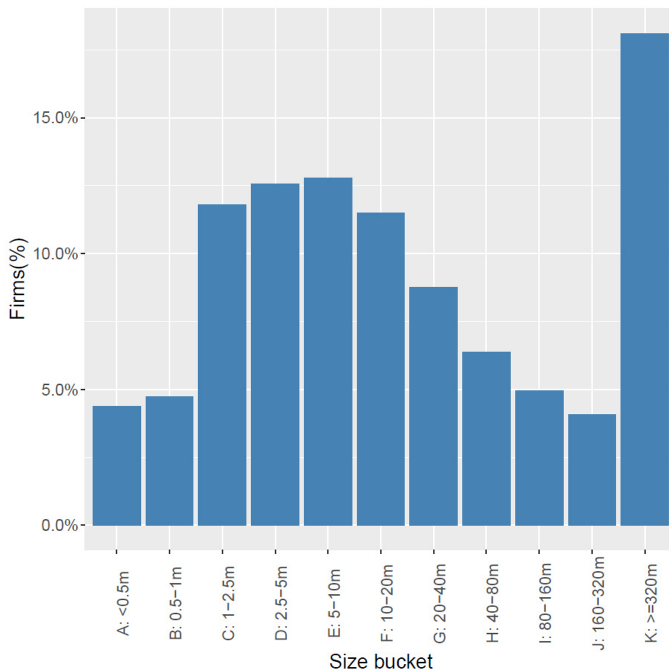
Exhibit 1 Industry and geographic distribution for middle-market firms in the COVID-19 exercise sample



Source: Moody's Analytics Data Alliance

Exhibit 2 shows the distribution of firms by total asset size. Over half of the firms in the sample have total assets between $1 million and $40 million. Approximately 16% of the sample has total assets greater than $320 million.

Exhibit 2 Distribution by total assets for middle-market firms in the COVID-19 exercise sample



Source: Moody's Analytics Data Alliance

Analysis and results

Methodology

The analysis measures the impact of COVID-19 and the oil price shocks on default risk for borrowers. Our model uses financial statement data and associated default observations on historical data samples with defining characteristics similar to those of the data samples used in this exercise. We evaluate firms by their PD measure. The model produces through-the-cycle default risk measures using only firms' financial statements without any consideration of the prevailing credit cycle conditions. It also produces point-in-time default risk measures that account for the credit cycle by translating public equity market signals and unemployment information. The model also translates PD into a PD-implied rating.[1]

We compare these measures to evaluate how COVID-19 has changed point-in-time probability of default measures from through-the-cycle levels. We perform this analysis at an industry level and at the risk-band level within industries.

Results

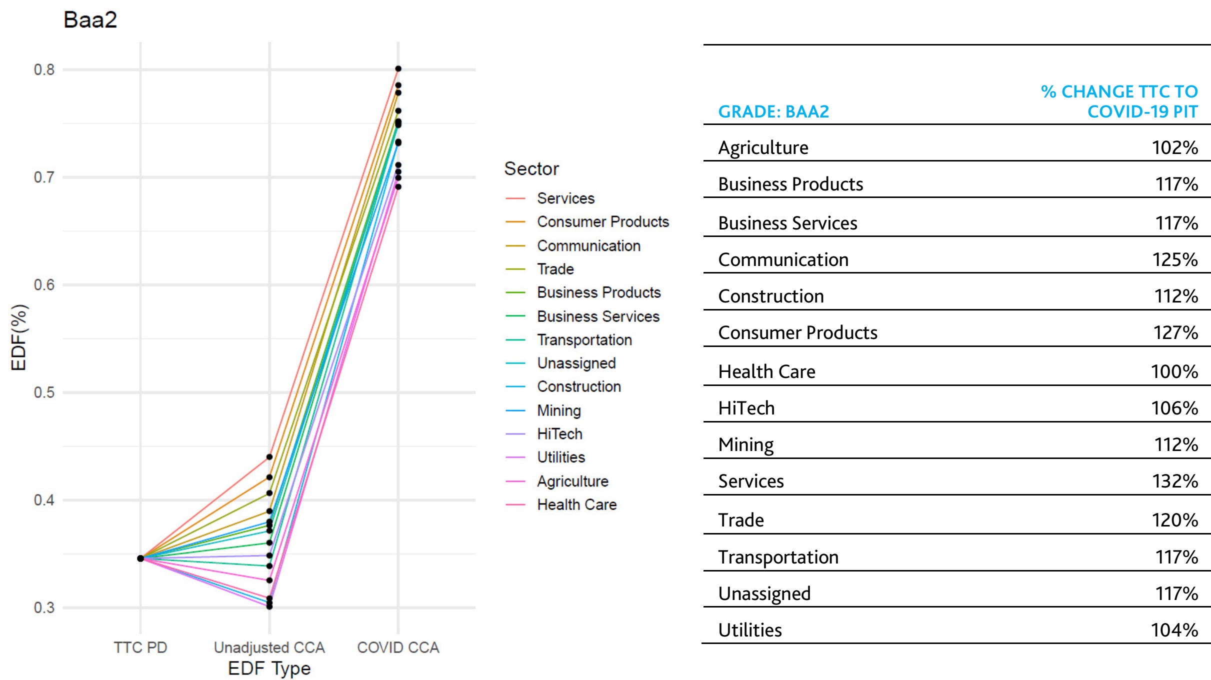
Services and Consumer Products see the greatest increase in risk

To measure the impact of recent events by rating grade, in Exhibit 3 we take a firm whose financial ratios imply a TTC PD rating of Baa2 (~0.35% PD) and apply the COVID-19 credit cycle adjustment of each industry to see how recent developments affect default probability at different starting risk levels. The unadjusted PIT PD shows how the credit cycle at the end of February affects ratings. There was a 0.15% spread between the riskiest and least risky sectors, with some sectors still showing resilience. The COVID-19 PIT PD shows how the most recent events have increased risk for all sectors and tightened the range of sector PIT PDs to nearly 0.1%. Services and Consumer Products have the highest risk level and Agriculture and Health Care have the lowest risk level in terms of magnitude following the impact of COVID-19. All industries have at least twice as high default risk compared to TTC measures.

The table on the right in Exhibit 3 measures the PD movement for each sector from the TTC to the COVID-19 PIT PD. Users can apply this percentage change to their TTC PD to approximate the impact of the coronavirus on their portfolio. For example, if you have an agriculture firm that has a risk profile similar to a Baa2 risk rating with a TTC PD of 0.35%, you can multiply that 0.35% TTC PD by (1 + 102%) to get a point-in-time default risk measure of 0.71% that incorporates the coronavirus credit cycle stressors. Appendix II: Expected Movements in PIT PD Due to COVID-19 presents tables with percentage change adjustments for each industry and implied-rating grade combination.

[1] The PD-implied or EDF-implied rating is generally consistent with the default rates of bond ratings as measured by Moody's Investors Service Default Studies.

Exhibit 3 Change from the TTC PD to the COVID-19 PIT PD by industry for Baa2 firms

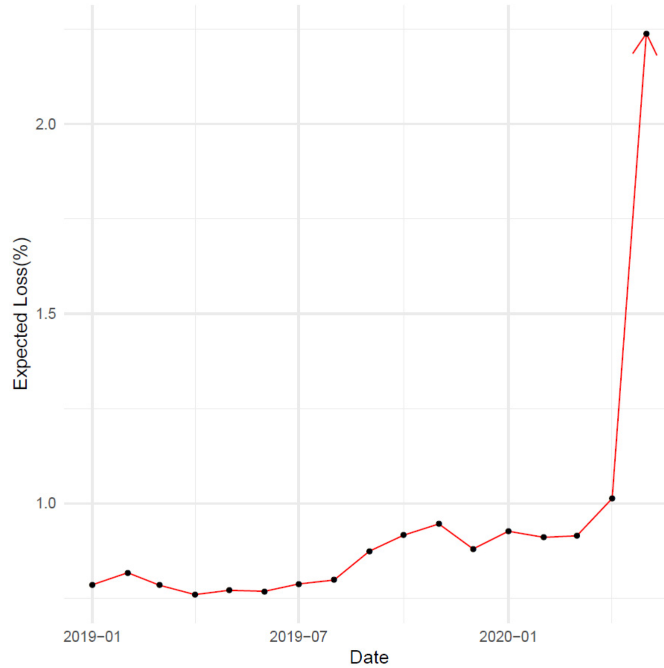


GRADE: BAA2	% CHANGE TTC TO COVID-19 PIT
Agriculture	102%
Business Products	117%
Business Services	117%
Communication	125%
Construction	112%
Consumer Products	127%
Health Care	100%
HiTech	106%
Mining	112%
Services	132%
Trade	120%
Transportation	117%
Unassigned	117%
Utilities	104%

Impact on expected losses

To assess potential impacts on expected losses, we assume a constant loss given default (LGD) of 50% and multiply it by our monthly weighted average PIT PDs. Exhibit 4 charts the weighted average expected loss rates beginning in January 2019 through April 7, 2020. The final datapoint shows the COVID-19 PIT PD based on the latest credit cycle information. We see expected loss rates increase by more than double since the onset of COVID-19.

Exhibit 4 Progression of expected loss rates



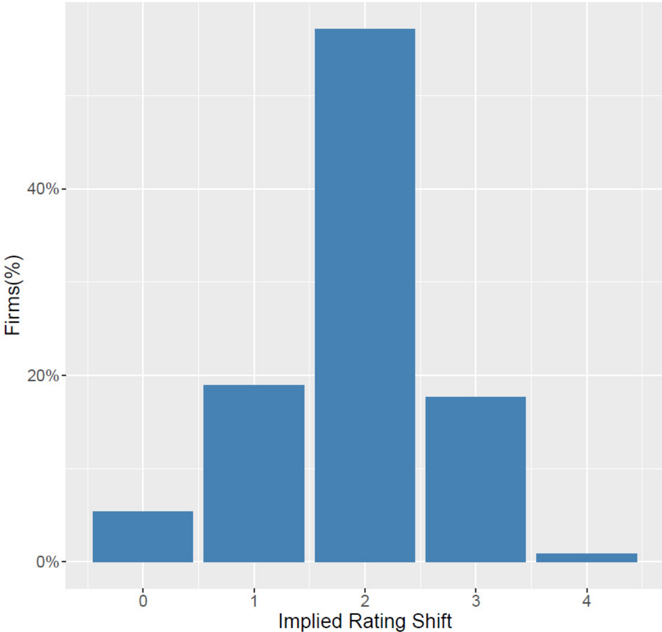
Conclusion

The global coronavirus contagion and the drop in oil prices has shocked firms across all sectors and sizes. Month-over-month, we typically do not expect many PIT risk rating grade changes—and if there are changes, they are usually not more than a one-rating grade upgrade or downgrade. Exhibit 5 illustrates that COVID-19 and oil price shocks have, in general, downgraded borrowers by one or two rating grades across sectors and firm sizes. Roughly 5% of borrowers see no rating grade impact. Nearly 20% see a one-grade downgrade, more than 55% see a two-grade downgrade, and almost 20% have a three- or four-notch downgrade.

Although all industries are negatively affected, Services and Consumer Products see the greatest increase in risk from TTC PD. PIT PD and downgrades have gotten worse since our last update that used credit cycle information from March 24, 2020.[2] We continue to monitor equity market response to COVID-19 that may influence the PIT PD.

[2] https://www.moodys.com/researchdocumentcontentpage.aspx?docid=PBC_1222395

Exhibit 5 Change in implied ratings due to the COVID-19 PIT PD (all downgrades)



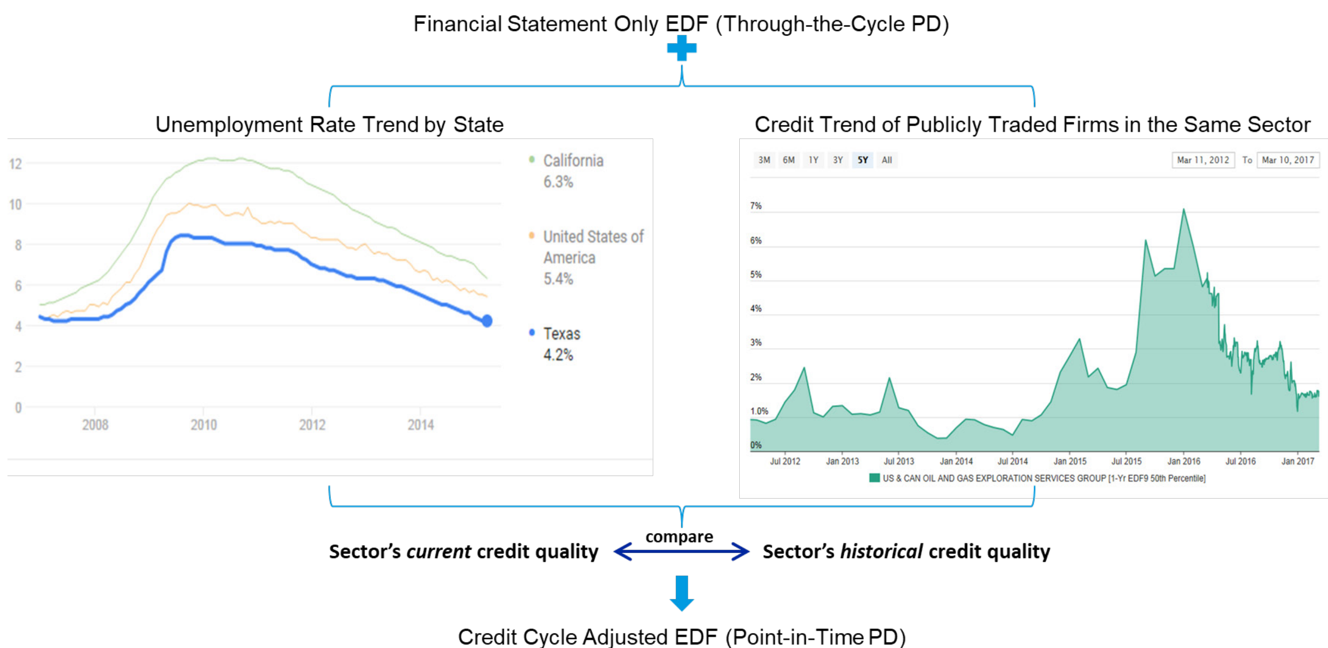
Appendixes

Appendix I: Credit Cycle Adjustment Overview

The credit cycle adjustment (CCA) model produces our PIT risk measures. It accounts for the credit cycle by combining the distance-to-default (DD). DD factors for a given month are obtained in the beginning of the next month. Data goes through quality checks and additional transformations to be released in the CCA for the following month.

Exhibit 6 illustrates the progression of the through-the-cycle default risk measure through our financial statement only (FSO) model (TTC PD model) before applying the adjustment to produce the point-in-time CCA default risk measure. The CCA model demonstrates how the current market signals compare to historical market signals. If the current credit environment is better than the historical average, we adjust the FSO EDF™ (Expected Default Frequency) down to arrive at a less risky CCA EDF. If the current credit environment is worse than the historical average, we adjust the FSO EDF up to arrive at a riskier CCA EDF. EDF is Moody's Analytics nomenclature for probability of default.

Exhibit 6 Illustrative progression of the CCA model



Appendix II: Expected Movements in PIT PD Due to COVID-19

Change in EDF from the FSO to the COVID-19 CCA EDF

Exhibit 7 identifies the expected change in CCA EDF (PIT PD) relative to the FSO EDF (TTC PD) when using the latest credit market signals per this study's as-of date.

Exhibit 7 Change in PD from the TTC to the COVID-19 PIT PD

SECTOR	A1	A2	A3	BAA1	BAA2	BAA3	BA1	BA2	BA3	B1	B2	B3	CAA/C
Consumer Products	29%	66%	87%	101%	127%	172%	196%	197%	240%	236%	194%	139%	91%
Services	30%	68%	89%	104%	132%	177%	202%	206%	247%	241%	197%	141%	93%
Construction	27%	60%	80%	92%	112%	155%	175%	181%	214%	217%	182%	129%	84%
Trade	28%	63%	84%	97%	120%	165%	186%	190%	229%	228%	188%	134%	87%
Business Products	28%	62%	83%	96%	117%	162%	182%	187%	224%	224%	186%	132%	86%
Business Services	28%	62%	82%	95%	117%	161%	182%	187%	224%	224%	186%	132%	86%
Transportation	28%	62%	82%	95%	117%	161%	181%	186%	223%	224%	186%	132%	86%
HiTech	26%	57%	77%	89%	106%	148%	167%	174%	203%	210%	176%	125%	81%
Agriculture	26%	56%	75%	86%	102%	144%	163%	170%	197%	205%	173%	122%	79%
Health Care	25%	54%	74%	85%	100%	141%	159%	166%	192%	201%	171%	120%	77%
Utilities	26%	56%	76%	87%	104%	146%	165%	171%	200%	207%	175%	123%	80%
Mining	27%	60%	80%	92%	112%	155%	175%	180%	214%	217%	181%	129%	83%
Communication	29%	65%	86%	100%	125%	170%	193%	195%	237%	234%	192%	137%	90%
Unassigned	28%	62%	82%	95%	117%	160%	181%	186%	222%	223%	185%	132%	86%

Exhibit 8 presents the change in five-year EDF (PD) that represents the longer-run impact of COVID-19 relative to the FSO EDF (TTC PD) when using the latest credit market signals per this study's as-of date.

Exhibit 8 Change in PD from the TTC to the COVID-19 PIT PD

SECTOR	A1	A2	A3	BAA1	BAA2	BAA3	BA1	BA2	BA3	B1	B2	B3	CAA/C
Consumer Products	4%	8%	51%	41%	48%	56%	57%	59%	69%	71%	79%	78%	57%
Services	4%	9%	52%	41%	49%	57%	58%	61%	70%	73%	80%	80%	58%
Construction	3%	8%	48%	38%	44%	52%	52%	54%	65%	65%	74%	72%	53%
Trade	4%	8%	50%	39%	46%	54%	55%	57%	68%	68%	76%	75%	55%
Business Products	4%	8%	49%	39%	45%	53%	54%	56%	67%	67%	76%	74%	54%
Business Services	4%	8%	49%	39%	45%	53%	54%	56%	67%	67%	75%	74%	54%
Transportation	4%	8%	49%	39%	45%	53%	54%	56%	67%	67%	75%	74%	54%
HiTech	3%	8%	47%	36%	43%	50%	51%	52%	63%	63%	71%	70%	51%
Agriculture	3%	8%	46%	35%	42%	49%	50%	51%	61%	61%	69%	68%	50%
Health Care	3%	7%	45%	35%	41%	48%	49%	50%	60%	60%	68%	67%	49%
Utilities	3%	8%	46%	36%	42%	49%	50%	52%	62%	62%	70%	69%	51%
Mining	3%	8%	48%	37%	44%	52%	52%	54%	65%	65%	73%	72%	53%
Communication	4%	8%	51%	40%	47%	56%	56%	58%	69%	71%	78%	77%	56%
Unassigned	4%	8%	49%	38%	45%	53%	54%	55%	67%	67%	75%	74%	54%

Appendix III: Average Probability of Default by Rating Grade

Exhibit 9 presents the average EDF (or PD) by rating grade.

Exhibit 9 Average PD by rating grade

RATING	AVERAGE PD
Aaa	0.01%
Aa1	0.02%
Aa2	0.04%
Aa3	0.07%
A1	0.11%
A2	0.16%
A3	0.20%
Baa1	0.25%
Baa2	0.35%
Baa3	0.53%
Ba1	0.85%
Ba2	1.35%
Ba3	2.02%
B1	3.03%
B2	4.55%
B3	6.82%
Caa/C	17.10%

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