The Credit Cycle Before And After The Market's Awareness Of The Coronavirus Crisis In The U.S.

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When we published our annual report on the "Defaults and returns in the high-yield bond and distressed debt markets" in late February, 2020 (Altman & Kuehne, 2020), the credit cycle was still in a benign state, albeit with some unmistakable storm clouds on the horizon. The four indicators of credit cycle dynamics that we assess were pointing to a fairly average credit environment condition, although a few were approaching the historic average after being considerably below average for some time. Indeed, we were then approximately 11 years into the so-called benign cycle, which began in the second quarter of 2009. The corporate bond default rate in the high yield (HY) bond market was 2.87% in 2019 (dollar denominated) compared to the historic average of 3.3%; the recovery rate on those defaulting bond issues was 43.5%, compared to a 46.0% historic average; yield spreads required by investors in HY bonds and leveraged loans were about 100 bps *below* the historic average, and the liquidity in the risky debt segment was extremely high. Indeed, in the first two months of 2020, new issues were at record levels. The U.S. economy was perking along at a reasonably high rate, certainly at a level above most of the developed world. The outlook for 2020 was still fairly rosy, despite the coronavirus ravaging the Wuhan area in China.

As noted, however, there were some disturbing fundamental financial and economic signals pointing to a potential dramatic change in the credit cycle, especially if the real economy experienced its long overdue recessionary state. We had been concerned with the storm clouds for over two years, but the markets seem to shrug off these problematic fundamentals. Indeed, the stock market had just had an extremely profitable year in 2019, rising about 30%, and HY bond investors enjoyed a return of about 14%.

New issues in 2019 totaled $250 billion in the high-yield bond market and almost $500 billion in leveraged loans. Collateralized loan obligations (CLOs) reached about $650 billion outstanding and "shadow banks" provided an additional $600-$700 billion, in total. All of these statistics invited a "risk-on", low interest-rate environment.

Storm Clouds Before the Pandemic

While it's always easy in hindsight to say that ominous signals of a credit meltdown were clear, we did observe several of these indications in our early 2019 reports. For example, the amount of corporate bonds, both investment and non-investment grades, in the U.S. had doubled to more than $9 trillion at the end of 2019, from what it was in 2009. The largest growth in dollar amount was in the BBB rating class, to over $3 trillion. We will return to this huge and controversial rating class at a later point. Coupled with a similar growth in leveraged loans to over $1.2 trillion, most without any meaningful protective covenants for investors, and historically low interest rates, we can easily see why even the lowest quality, CCC rated issues, had fostered a risk-on, low default rate scenario. In addition, non-bank lending to commercial borrowers, mostly LBO companies, exploded to an estimated 42% of all commercial lending and perhaps $600 billion (Bank of America estimate in 2018). In short a "Debt Bubble" was building almost without pause as of the end of 2019 and into the first two months of 2020!

Skeptics of the Debt-Bubble theory could assert that if the levels of corporate debt were considered relative to equity measured in terms of market values, instead of book values, the corporate debt level was actually lower than it was 10 years ago. While that is true, if you simulated the debt/equity ratio with a 20-40% *decline* in market equity values, the levels in 2019 would be the highest in modern cycles, except at the time of the highest default year ever, 2009 (See Figure 1).

Figure 1: U.S. Total Non-Financial Corporate Debt as a Proportion of GDP and Market Cap of Equity
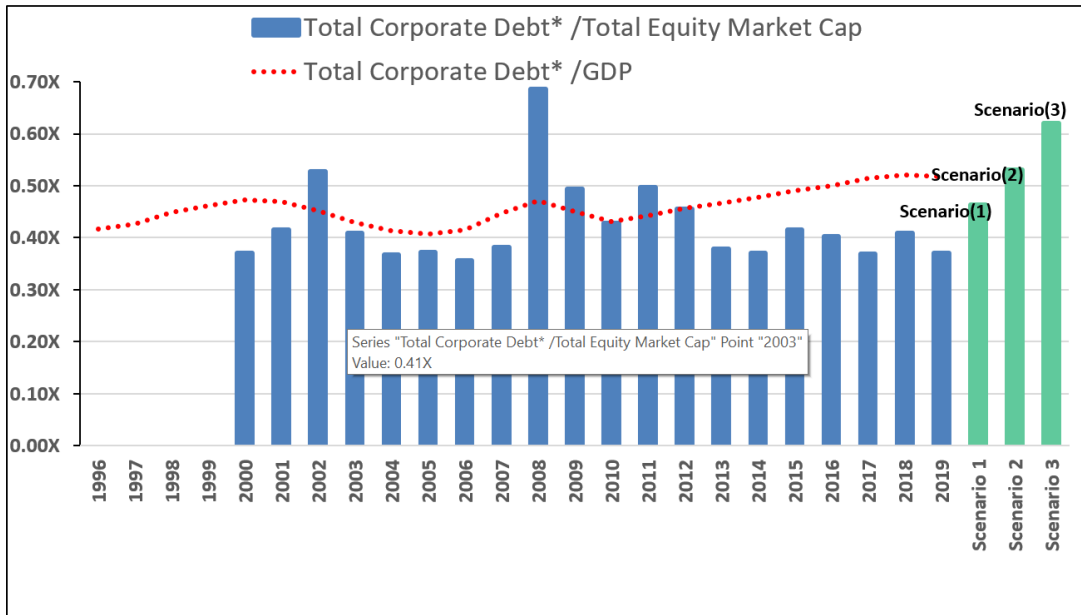

Sources: Bank of America, FRED, World Federation of Exchanges, Volatility & Risk Institute, NYU Stern

Scenario assumptions (1,2,3) – Equity Market Cap lower by 20%,30%,40%
* Debt and Equity do not include financial firms; Market Cap includes NYSE and NASDAQ companies

A related storm cloud involved the U.S. levels of non-financial corporate debt (NFCD) as a percentage of U.S. GDP. Figure 2 shows this percentage from 1987-present, with three remarkable peaks in that ratio over this sample period [1990-91 (43%), 2001-02 (45%), and 2008-2009 ((45.2%)]. Also shown in figure 2, are the levels of high yield bond default rates over the same sample. Note that in every case, peaks in and NFCD/GDP were followed within about 12 months or less, by peaks in the default rate. *Every time*! In 2019 we can observe a new peak and the highest ever at 47%. And as indicated earlier, the default rate at the end of 2019 was still below average. Would that low-risk, default rate continue into 2020 and beyond? To understand the likelihood of defaults remaining at a benign level, we also need to observe that the prior three peaks in debt levels and the subsequent spike in default rates to crisis levels, ie.,2 standard deviations or more above the mean annual rate, occurred concurrently with real economy recessions (see Figure 3).

Figure 2: U.S. Non-financial Corporate Debt (Credit Market Instruments) to GDP: Comparison to 4-Quarter Moving Average Default Rate
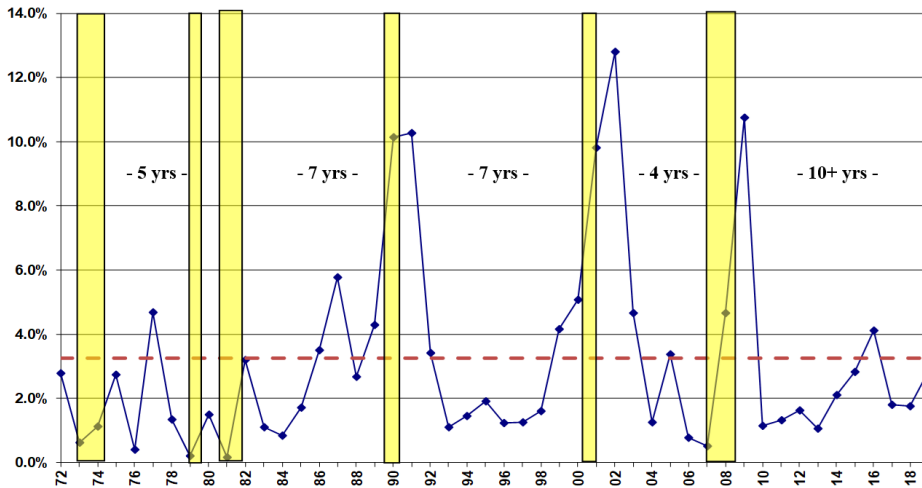
January 1, 1987 – December 31, 2019
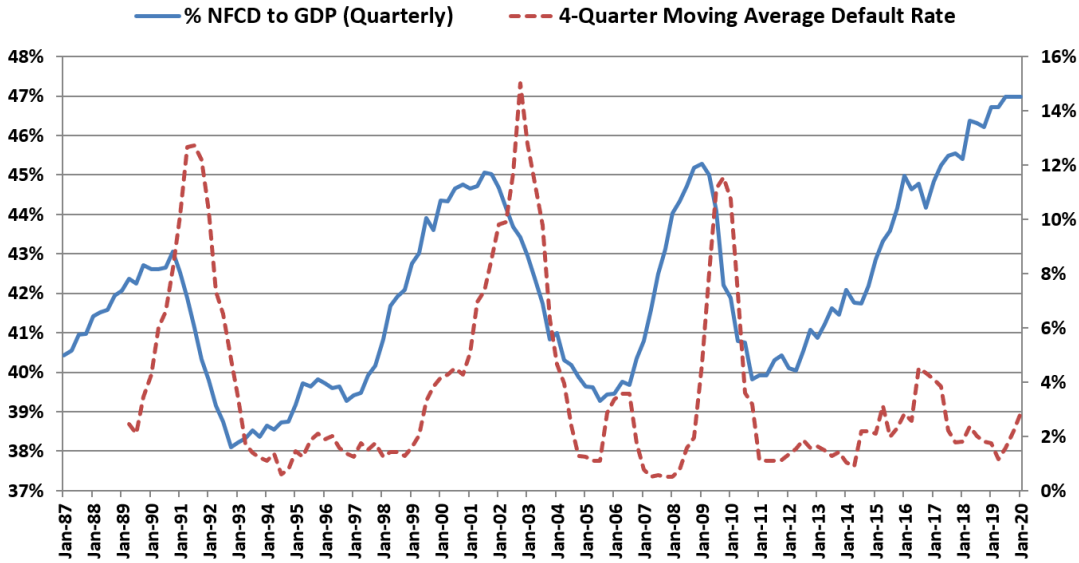
Sources: FRED, Federal Reserve Bank of St. Louis and KBRA/Altman High-Yield Default Rate data.

Figure 3: Historical Default Rates, Benign Credit Cycles and Recession Periods in the U.S.*

High-Yield Bond Market (1972 – 2019)

Periods of Recession: 11/73 - 3/75, 1/80 - 7/80, 7/81 - 11/82, 7/90 - 3/91, 4/01 – 12/01, 12/07 - 6/09

*Benign credit cycles are approximated. All rates annual.

Source: E. Altman (NYU Salomon Center) & National Bureau of Economic Research

The key question was, therefore, what was the likelihood of an economic recession in 2020 or 2021. We now know some of the answers. Most economists are predicting with almost perfect certainty that the Coronavirus crisis will result in an economic recession in the United States, and globally, by the end of Q2/2020 and many say will continue beyond. Indeed, both Morgan Stanley (30% drop in GDP) and Goldman Sachs (24% drop) are predicting an unprecedented collapse in the real economy. And, this is not just in the US. China, which was already signaling much reduced growth in 2020 even before the coronacrisis, is sure to have at least a short term recession, although there are now signs of a return to some expansion as the health crisis lessens there.

More on the Economy

While just about all near-term economic forecasts are predicting a recession, in order to see a sustained revival in the economy a number of sectors need to improve dramatically and simultaneously (**NY Times, March 26, 2020**). These include (1) the consumer, including those who have become (temporarily?) unemployed, (2) those businesses that have had to lay off workers need to start operating again and to see the demand for their products and services rebound quickly, if indeed they survive the downturn. The FED's actions and the new stimulus package from the Federal Government (The Coronavirus Aid, Relief and Economic Security Act (CARES), March 27, 2020) are addressing the business continuity issue with subsidies and credit availability measures in unprecedented amounts). Finally, (3) the financial and credit markets need to function well and substantial liquidity return to the system. For all three to return to near normalcy is a tall order! The incredible volatility of the stock and credit markets that has characterized our markets since mid-March needs to calm down to motivate investors to supply capital and firms to be able to afford new financing, beyond what the federal government will be providing to certain entities.

The Catalyst for Credit Market Changes

The buoyant, but fragile credit markets that we observed at 2019 year end continued its risk-on market confidence until early March, 2020 despite ominous warnings from the virus in China and some other countries. We had written earlier that perhaps the catalyst for a change in the credit cycle, from benign to distressed, could come as a result of China's GDP decline, even before the coronavirus crisis became evident. But, the virus proliferation on a global scale, was clearly the catalyst for a major shift in the current market environment. Yield spreads that were 100 bps below average as of year end, spiked by +150 bps by March 6, 2020. And, in the fortnight that followed spreads doubled to over 1000 bps.

New issues in the leverage finance market which were setting monthly records in early 2020, essentially dried up with firms postponing new debt issues due to much higher investor required interest rates, and the distress ratio (bonds trading at more than 1,000 bps over Treasuries) jumped from 8.2% as of the end of 2019 to almost double that level by early March, approaching the historic average. The distress ratio actually reached 40% in late March! Returns on high-yield bonds went from +1.5% in the first month and a half to a negative -14% in late March! These declines were only the beginning of the negative trends which became much more severe as of the end of March, at the time of this writing. Furthermore, the stock market's enormous decline caused a bear market (-20%) declaration.

Default Rate Forecast

In order to help confirm that the benign credit cycle is, indeed, over, we should assess the expected default rate on HY bonds and estimate if it is significantly higher than the current rate and also above the historic average. We can observe that all of the credit rating agencies and most investment banks now forecast a speculative grade default rate over the next 12 months ranging from 5-6% (Fitch) to 10% (S&P). Moody's most likely sharp down-turn scenario has a 6.8% expectation, but in a severe recessionary

scenario it is 20.8%! BofA expectations is 9.6%. These forecasts are mostly based on the number of issues of high yield bonds, but also the dollar amount that we can expect to default. We now turn to our forecast.

We have for the last 10 years estimated the next 12 months default rate (dollar denominated for North American HY bonds) based on three methods: these are (1) the mortality rate approach, (2) the required yield-spread required by market investors, and (3) the distressed ratio method; the last two observed from current market data.

We developed mortality rate analytics 30 years ago (Altman, 1989) and have maintained and updated that database on an annual basis ever since. Results are published once a year, the most recent estimate was in February (Altman and Kuehne, 2020). This actuarial technique records the frequency of the defaults of newly issued bonds from every major rating category, including investment and non-investment grades, for 1-10 years after issuance. Our latest estimates cover 3,578 corporate bond defaulting issues from 1971-2019 (Figure 4). A similar analysis and compilation is done for mortality losses and can be used to estimate loss-given-default (LCD), which includes our observations of recovery rates on defaulting issues. These mortality statistics can be used to forecast default rates or probability of default (PD). The technique involves the impact of bond–aging by adjusting the base population over time for such other disappearances, like "called" bonds by the issuer, maturities, merger related activities, in addition to defaults. As such, if we observe the dollar amount of new issues by rating category for the past 10 years and apply the marginal mortality rate estimates from Figure 4, we can aggregate the amount of the defaults in a subsequent year and then divide that amount into the population of HY bonds (as of the mid-year of the next 12 months) - Our technique for forecasting the annual default rate.

Figure 4: Mortality Rates by Original Rating

All Rated Corporate Bonds*
1971-2019

Years After Issuance

		1	2	3	4	5	6	7	8	9	10
AAA	Marginal	0.00%	0.00%	0.00%	0.00%	0.01%	0.02%	0.01%	0.00%	0.00%	0.00%
	Cumulative	0.00%	0.00%	0.00%	0.00%	0.01%	0.03%	0.04%	0.04%	0.04%	0.04%
AA	Marginal	0.00%	0.00%	0.16%	0.04%	0.02%	0.01%	0.03%	0.03%	0.03%	0.04%
	Cumulative	0.00%	0.00%	0.16%	0.20%	0.22%	0.23%	0.26%	0.29%	0.32%	0.36%
A	Marginal	0.01%	0.02%	0.08%	0.09%	0.07%	0.03%	0.02%	0.21%	0.05%	0.02%
	Cumulative	0.01%	0.03%	0.11%	0.20%	0.27%	0.30%	0.32%	0.53%	0.58%	0.60%
BBB	Marginal	0.28%	2.23%	1.19%	0.94%	0.47%	0.19%	0.20%	0.20%	0.18%	0.30%
	Cumulative	0.28%	2.50%	3.66%	4.57%	5.02%	5.20%	5.39%	5.58%	5.75%	6.03%
BB	Marginal	0.88%	2.11%	3.77%	1.94%	2.36%	1.50%	1.40%	1.05%	1.36%	3.05%
	Cumulative	0.88%	2.97%	6.63%	8.44%	10.60%	11.94%	13.18%	14.09%	15.26%	17.84%
B	Marginal	2.82%	7.60%	7.70%	7.70%	5.70%	4.42%	3.66%	2.01%	1.68%	0.68%
	Cumulative	2.82%	10.21%	17.12%	23.50%	27.86%	31.05%	33.57%	34.91%	36.00%	36.44%
CCC	Marginal	8.03%	12.35%	17.64%	16.17%	4.85%	11.56%	8.37%	4.74%	0.59%	4.20%
	Cumulative	8.03%	19.39%	33.61%	44.34%	47.04%	53.16%	57.08%	59.12%	59.36%	61.07%

*Rated by S&P at Issuance
Based on 3,578 issues

Source: S&P Global Ratings and Author's Compilation

Using the above mortality methodology, our forecast for the next 12 months as of December 31, 2019 was 5.75%. Note that we aggregate estimates based on all initial ratings, even investment grade bonds.

Our second technique was introduced in 2008 and relies on the current yield spread in the market compared to 10-year Treasury bonds. We started using the 10-year benchmark before the market adopted a similar method, called the option-adjusted-spread (results are mostly very close between the two). This method observes the historic annual relationship between current (t) yield spreads and a default rate on HY bonds in t+1 (one year in the future). We update results annually and the latest regression estimate is based on data from 1978-2018 yield spreads and 1979–2019 defaults, resulting in a default rate estimate equation:

Default Rate (t+1) = -3.15 + 1.28 (Yield Spread (t)).   Adjusted R2 = 59.6%

Plugging in the yield spread as of March 26, 2020 of 9.84%, our next 12 month forecast

(PD) is a default rate of 9.45%. It should be noted that due to extreme market volatility in late March, 2020, that the yield spread has fluctuated from as low as 8.6% to over 11.0%, so our estimated default rate is likewise volatile.

   Our final technique is the so-called "distress-ratio" method, a measure we developed in 1990 (Altman, 1990) to assess the segment of the high-yield market that is most likely to default, should either specific firms' condition worsen and/or the real economy deteriorates significantly. In these cases, default rates, in general, increase. We originally utilized the benchmark of 10% above the 10-year T-bond rate as our distress ratio criterion, but have now adopted the market standard of 1,000 bps above the comparable duration treasury rate (the OAS). Since 2000, this distress ratio's median annual rate has been 10.35%, with an average rate of 16.38%. This ratio has been as high as 81.2% in December, 2008 and as low as 1.62% in December 2006.

   Based on market data for 2000-2018 for the distressed ratio and 2000-2019 for default rates, our linear regression estimated equation is:

Default Rate(t+1) = 0.923 + .140 (Distress Ratio(t)   Adjusted R2=75.9%

   Plugging in the distress ratio as of March 24, 2019 of 33% (the ratio reached as high as 40.0% recently), our PD estimate for next 12 months is 5.54%, about the same as our mortality rate method. Averaging the

three methods, our preliminary forecasted default rate for the 12 month period ending March, 2021 is 6.88%, about 2.4 times the rate in 2019.

Mortality Rate = 5.75%

Yield Spread   = 9.45%

Distress Ratio = 5.45%

Average   =6.88%

Finally, we have decided to add a new element to our 2020 forecast based on the huge increase in triple-B rated debt and the "crowding-out" effect caused by the likely increase in downgrades to "junk" status, ie. fallen-angels. These downgrades could have a negative impact on marginal firms' ability to survive in a downturn. See our more in-depth discussion, below. This new factor, not considered in our historic time series models, will add, I believe, an additional 1% to our forecasted default rate, bringing the forecast for 2020 to about 8%. Therefore, the forecasted total dollar amount of the defaults would be $127 billion, which would be the highest amount ever, surpassing the $123 billion in 2009! Admittedly, the added triple-B related element to the forecasted default rate is somewhat arbitrary, but to ignore it would be an oversight. Already in the last weeks of March this year, 94 billion dollars from 12 issuers have been downgraded to junk bond status.

Recovery Rate in 2020

Utilizing our now well established association results that analyzes the concurrent relationship between default and recovery rates (recovery is based on price just after the default), see Altman et al.(2005), the 8% forecast of the default rate in 2020 implies an average recovery rate on these defaults of 36%, about 10 percentage points below the weighted average historic recovery rate (46%), (See Figure 20 in Altman and Kuehne (2020) for the log-linear regression estimate, that we prefer to use).

The BBB-Rated Debt Explosion and Debate

Even before the Coronavirus crisis realization in the U.S., much debate in the financial press was focused on the huge increase in the amount of bonds and loans outstanding that received a BBB rating from the Credit Rating Agencies (CRAs). Indeed, the amount of BBB bonds exploded to well over $3 trillion on December, 2019, with 53% of all investment-grade debt, more than double what it was in 2007. When asked about the amounts of downgrades to below BBB that could be expected when the credit markets would change to a distressed condition, all of the major rating agencies and most analysts opined that the impact of these fallen angels would be minimal on the high-yield market, and that the amount would probably not top 10%, that is about $300 billion, added to the 1.7 trillion HY bond market over a 2-3 year downturn period. Hence, the so-called crowding-out effect of new financing competitors on marginal high-yield firms would not be material. These marginal firms, including "zombie" companies kept alive somewhat artificially by record low interest-rates, with little or no protective covenants and a buoyant new issue market, would default in relatively small amounts. The main basis for these assertions was to observe what happened to BBBs in the last great financial crisis of 2008/2009 and also in other past downturns.

My assessment of the issue, which I felt could be important, was different. I was, and I still am, concerned about a much larger deterioration of ratings in the market's perception of BBB's, even if there were only modest actual downgrades. My concern motivated the application of our Z-Score models to manufacturing and nonmanufacturing industrial firms as of their financials in 2019 (Q3). Based on a sample of 181 BBB firms for which stock market price data, as well as balance-sheet and P&L's, were available and 230 firms with either market or book equity data available, we examined the bond rating equivalents (BREs) of these BBB entities. For a discussion of Z and Z" models and my experience with these models over the last 50 years, see Altman, Hotchkiss, and Wang (2019). The results of our analysis are both revealing and, to some, quite surprising.

Figure 5 shows our application of the Z and Z"-score models on a large sample of BBB rated companies that were rated by S&P Global as of 2019 and their BREs. Our results show that 34% of these firms rated by Z-scores, and 36% by Z"-Scores, were classified as non-investment grade, BB or B rated companies. If, say, the percent that are actually downgraded to junk levels is 20-25%, instead of 10%, over a 2-3 year downtown, that would result in about $700-$875 billion of new fallen angels or about a 44-55% increase in the amount of HY "junk" bonds outstanding – – not a trivial amount. Our results also imply some evidence that we are observing a rating-inflation of BBB rated bonds and loans. Of course, we do not expect that the CRAs will downgrade this significant total since their estimate of a maximum of 10% downgrades could be a self-filling prophecy. But, markets have shown, of late, that prices of bonds and loans of many BBB companies, like the airlines, or A-rated firms, like Boeing, will drop to distressed levels (eg. Below 70 cents on the dollar), even if the coveted investment grade ratings stay intact.

Figure 5: Downgrade Vulnerability of BBB Rated Bonds Based On Z-Score As Of 2019

Z-Score Determined Bond Rating Equivalents Of BBB Rated Bonds		Z"-Score Determined Bond Rating Equivalents Of BBB Rated Bonds	
• From BBB to BB	34/181 (19%)	• From BBB to BB	49/230 (21%)
• From BBB to B	27/181 (15%)	• From BBB to B	34/230 (15%)
• Total	61/181 (34%)	• Total	83/230 (36%)

Conclusion

Between 30% to 40% of the sample of currently rated BBB Bonds are vulnerable **to downgrades to non-investment grade** in an economic downturn adding pressure to a possible increased default rate cycle. The High-Yield Bond population could increase by as much as 20-25% of currently rated BBBs. Hence, the real possibility of a crowding-out effect on existing low-rated bonds, for refinancing, adding to pressures on a Default Rate Spike.

Our analysis implies that the expected default rate in a major and sustained credit market downturn will be exacerbated by the recent explosion of BBB rated debt. See our earlier discussion on forecasted default rates due to fallen angels. This is consistent with our original hypothesis of a debt-bubble and also perhaps rating inflation of lower investment grade companies.

Conclusion

I have attempted to show an objective and non-emotional analysis of the impact on our credit market of a major downturn of our economy based on an unprecedented build-up of corporate debt and asset values. The economic downturn most immediately will be caused by the Coronavirus pandemic. No doubt, the situation we find ourselves in today is unprecedented in terms of the speed of recent asset price declined due to the crisis realization and the expected impact on corporate defaults. This makes the future extremely difficult to predict, especially given the enormous record amounts of both monetary and fiscal

stimuli by the US FED and Treasury. As such, we may not have reliable models to capture these dynamics based on historic modern credit market experience. Our best estimate, at this point, despite these uncertainties is a default rate forecast for the next 12 months of 8%, or about a 127 billion dollars. We hope that our analysis has provided some guidance to these important issues.

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