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## **Risks & Rewards**

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# Highlights From “COVID-19: Implications for Capital Markets and Investment Modeling” Town Hall and Some Additional Commentary

By Hal Pedersen

The Investment Section hosted a 60-minute town hall “COVID-19: Implications for Capital Markets and Investment Modeling,” on April 24, 2020. The event was co-sponsored with the Joint Risk Management Section. The focus of the event was on the implications of the COVID-19 pandemic and the ensuing governmental and central bank policy

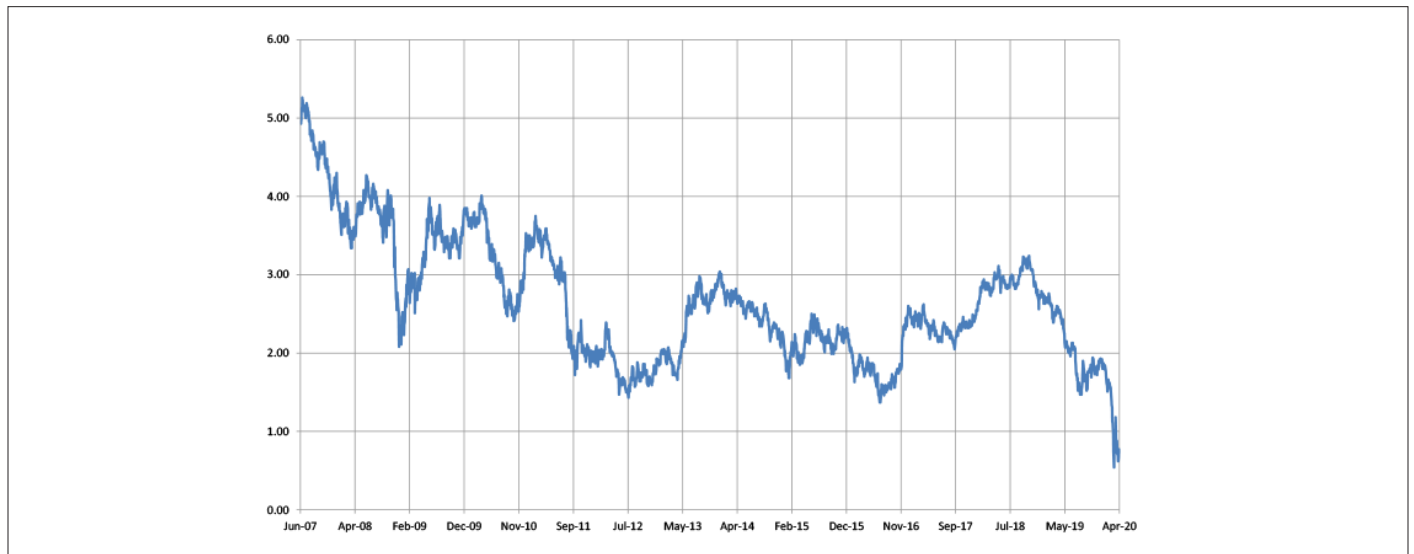
responses for capital markets and insurance operations. It was a very lively session with approximately 150 participants.

The session panelists were Dennis Woessner, CFA, of TDAM USA; Dan Schobel, ASA, of Numerix; and Max Rudolph, FSA, CERA, CFA, MAAA, of Rudolph Financial Consulting. The moderator was Hal Pedersen, Investment Section chair.

The town hall kicked off with the moderator giving an overview of the economic and public health situation in the United States as of the third week of April, 2020. Important economic observations included:

- Fed setting of the Fed Funds rate to zero.
- Collapse of U.S. 10-year treasury yield to about 0.6 percent (i.e., 60 basis points) and an increase in the daily volatility of yield. (See Figure 1)
- Enormous increase in the number of unemployment claims with larger numbers expected.
- Total collapse in the price of oil with negative prices on May contracts.
- Shutdowns in U.S. meat processing plants leading to significant drop in production.

Figure 1  
U.S 10-Year Bond Yield (Daily Data)



Source: St. Louis Federal Reserve, FRED

Data from The COVID Tracking Project<sup>1</sup> was used to provide a summary of the public health situation in the United States. As of April 22, 2020, there were a total of 831,370 confirmed cases of COVID-19 and a total of 42,508 deaths attributed to COVID-19. There were 2,037 deaths attributed to COVID-19 on the day of April 22, 2020. The death rate per confirmed case was about 6.5 percent. Measuring the deaths from COVID-19 is a challenge as is assessing the death rate.

The average number of deaths per day for all U.S. residents from all causes can be summarized as shown in Table 1.

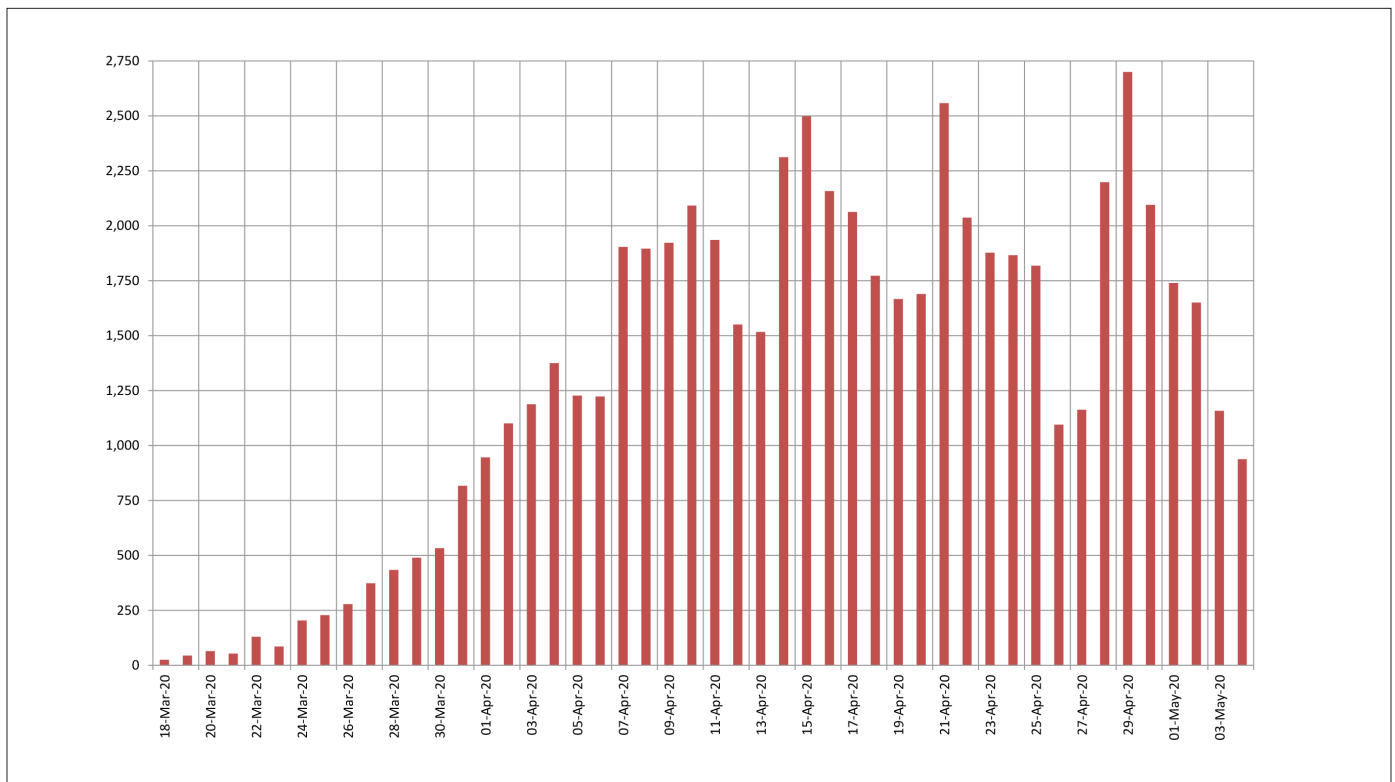
At the time of this writing, May 5, 2020, the public health situation in the United States continues to be very fluid and Figure 2 gives a snapshot.

Table 1  
U.S. Deaths Per Day

	Resident Deaths (US)	Average Deaths/Day	Age Adjusted Death Rate
2016	2,744,248	7,518	0.729%
2017	2,813,503	7,708	0.732%
2018	2,839,205	7,779	0.724%

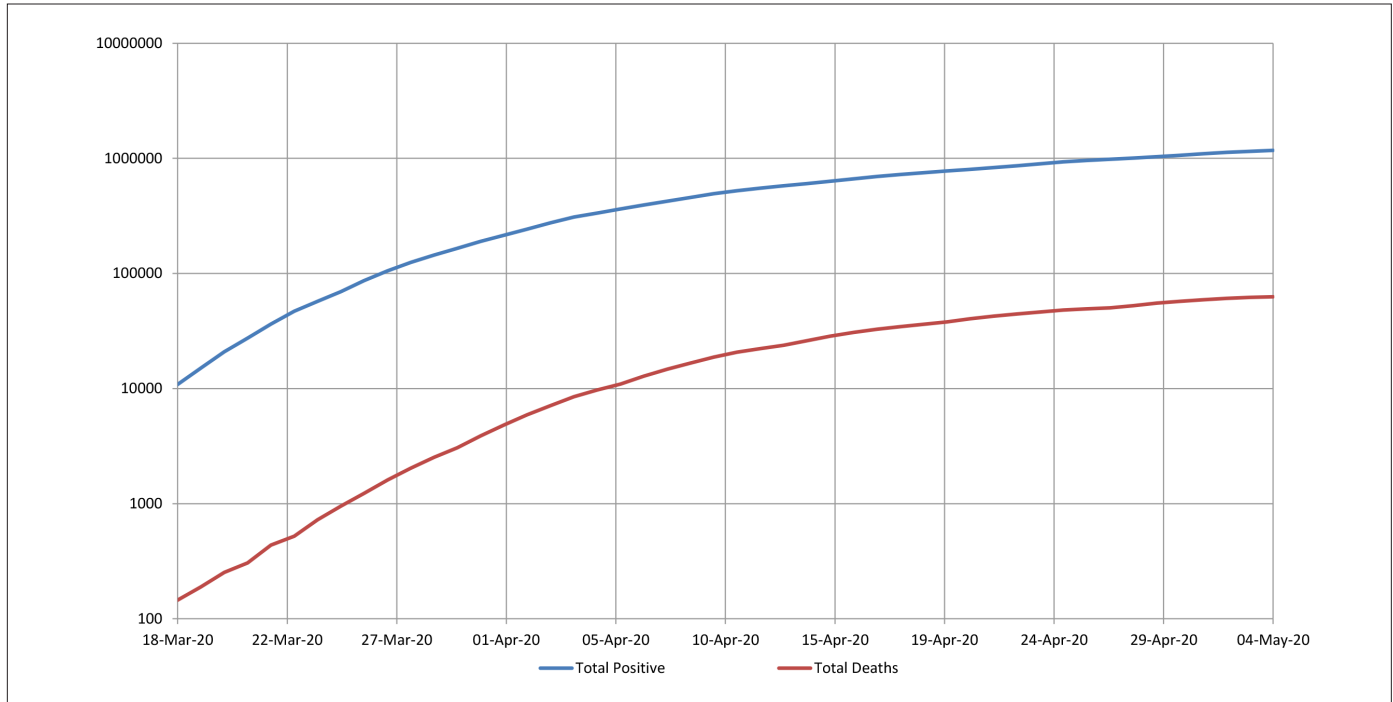
Source: National Vital Statistics Reports, U.S. Department of Health and Human Services and the National Center for Health Statistics

Figure 2  
U.S. Daily Deaths Attributed to COVID-19 (March 18, 2020 to May 4, 2020)



Source: The COVID Tracking Project

Figure 3  
U.S. Cumulative Positive Cases and Number of Deaths (Log Scale Base 10)



Source: The COVID Tracking Project

Table 2  
U.S. Unemployment Measured by Initial Claims

Week Ended	Initial Claims (NSA)	Last Year Comparable
April 4, 2020	6,211,406	N/A
April 11, 2020	4,964,568	N/A
April 18, 2020	4,267,395	211,762

Source: U.S. Department of Labor

Social distancing measures appear to have “bent the curve,” as we can see from Figure 3 that shows the total confirmed cases of COVID-19 and total number of deaths attributed to COVID-19 plotted on a logarithmic scale.

Strict social distancing policies have taken a heavy toll on the U.S. economy and employment. U.S. unemployment, measured by initial claims, is staggering. As Table 2 shows, these are very difficult times for the American worker.

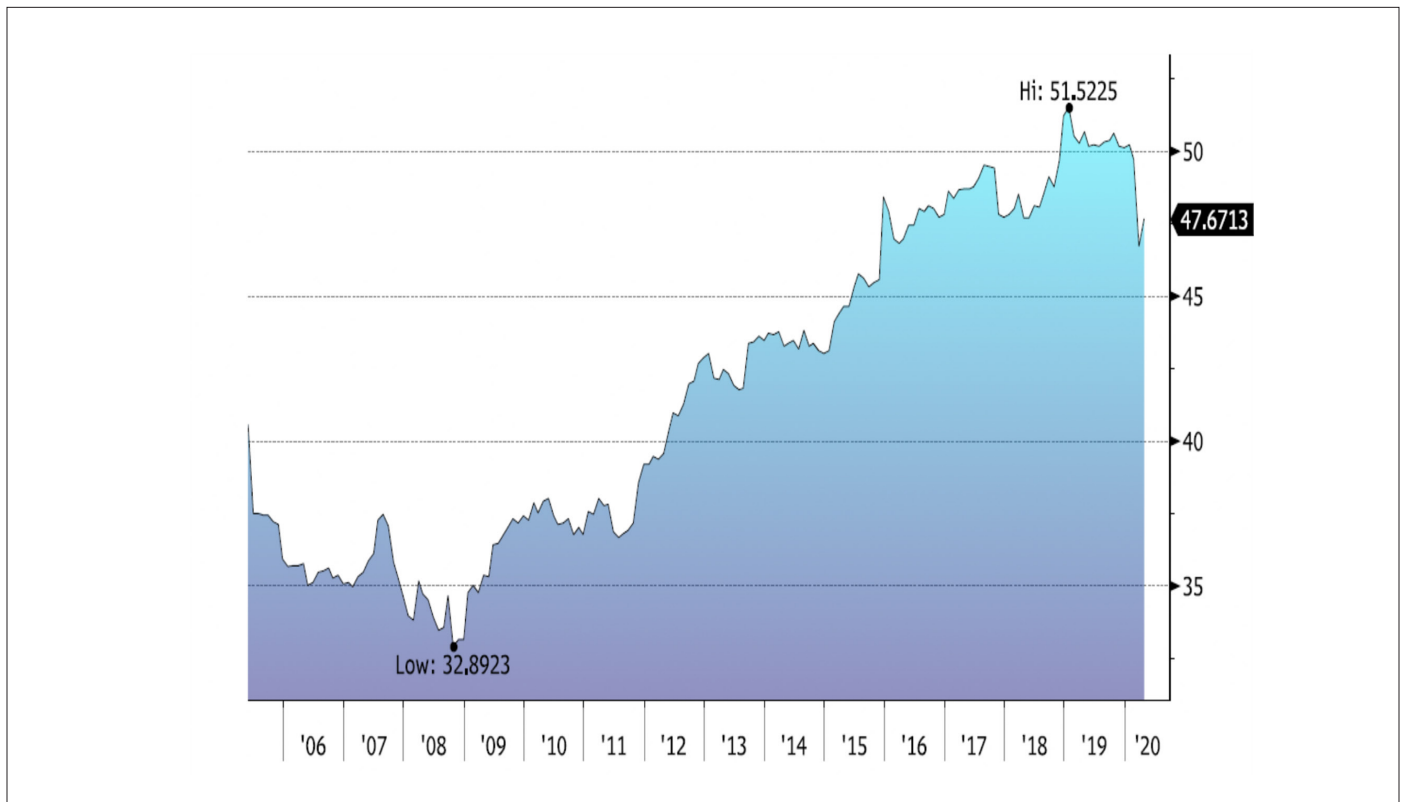
The discussion then shifted to capital markets considerations. Dennis Woessner gave an insightful overview of the current situation in the markets. It was noted that central bank

quantitative easing and government fiscal policy in response to COVID-19 was enormous. For example, the combined QE and fiscal stimulus in the U.S. as of April 16, 2020, was about 35 percent of GDP.

Despite the huge QE and stimulus, it was noted that inflationary pressures were likely to be muted.

Several scenarios for U.S. GDP, unemployment and inflation were discussed. A significant decline in real GDP is now baked in and unemployment in excess of 8 percent looks likely. A drop in U.S. year-over-year inflation to around 1 percent seems

Figure 4  
 BBB Exposure within US Corporate Bond Index



Source: Bloomberg LLP

probable, with central banks looking increasingly concerned about the prospects for deflation.

A point of potential concern is the increase in the exposure of the U.S. corporate bond market to BBB rated bonds. The following chart shows the BBB exposure within Bloomberg/Barclays U.S. Corporate Bond Index. Since BBB bonds are at the bottom of investment grade range, a serious economic shock could trigger significant rating migration downgrades. This could cause some dislocations in the bond market because many institutions would sell bonds that get downgraded to below investment grade. (See Figure 4)

Dan Schobel then walked us through some of the practical considerations that the shocks from COVID-19 have presented for economic scenario generation. Some specific examples that are cropping up in data needed for ESG work are:

- **Risk-free Curves:** Unusual yield curve shapes turning up in more economies that imply extreme forward rates. Filtering is sometimes required to ensure sufficiently smooth forward rates and resulting simulations.

- **Credit Curves:** Increased difficulty in choosing a suitable set of quotes from which to construct curves with reasonable forwards. Erratic forwards without filtering quotes can imply unreasonable long-term behavior in simulations (e.g., A-rated curve eventually crosses BBB-rated).
- **Volatility Surfaces:** Availability of swaption data is strained in recent data (e.g., March 9, 2020) and traditional measures like Black implied volatility is less reliable.

Dan also talked about some challenges in risk-neutral modeling:

- **Constant Elasticity of Variance (CEV):** Historical data far in the past suggests a moderately strong relationship between rate levels and volatility of rates. Recent historical data is challenging this assumption with historically low rate levels occurring together with high rate volatility (e.g., U.S. Treasury data in March).
- **Model Selection may need to be revisited:** Unshifted Libor Market Model (ULMM) struggles to calibrate to historically low rate environments with high interest rate volatility. Lognormal dynamics generally performing worse than normal dynamics in recent data.



- **Model Calibration:** Lack of usable volatility surface quotes on some dates (e.g., March 9, 2020) forces changes in calibration strategy/settings

There are many challenges in real-world modeling as well. It was noted that the AAA/NAIC ESG assumptions are strained due to soft floors embedded in the model. Models for commodities are not expecting or even built to accept negative oil prices.

Max Rudolph then guided the town hall through some of the broad macro issues. As a general risk management principle, Rudolph cautioned that well-established rules of thumb will no longer hold in this environment and as a result one should use first principles for strategic planning. Potential problems coming out of the crisis may well include persistent long-term low interest rates and market liquidity issues.

Rudolph asked if the response to this crisis is setting up the next one and what some of the risk interactions we should be thinking about might look like:

- Globally—Loose fiscal and monetary policy.
- Large businesses saved but small businesses allowed to fail.
- Low growth will bring some tough choices.
- Health care, education, ecosystem—changes in infrastructure and public expectations.
- High unemployment.
- Possibility of stagflation and then demographic deflation.
- Impact of demographics—age, fertility, immigration.

Rudolph noted that systemic investment risk and its management was now front and center. A focus would be made on building resilience and sustainability of a business. There are real dangers of the clustering of severe events: Pandemic plus things like crop failure, natural disasters, and wildfires, and such clustering could produce catastrophic losses for insurers.

Rudolph noted that a good assessment of these risks would be best addressed with deterministic stress tests, such as:

- CDC severe pandemic scenario;
- negative rates;
- stagflation; and
- considerations such as regional mercantilism—low growth, low energy prices, low political harmony.

The town hall then entered a question and answer session with a good amount of audience participation. Some of the questions that were addressed included:

- Where would you say the current economic scenarios fall—is this outside of a 90th or 99th percentile and how might this affect standardized model assumptions going forward?
- Is the sudden expansion of the Fed balance sheet a worry for stoking inflation?
- What is the prognosis for insurers being able to generate yield?
- How are your clients changing their ESG calibrations in response to this crisis?
- Are there historical periods that we could look at to gain insights into our scenarios?
- How do you see life insurers responding to this? Is there any reason to do anything since what do they really control?

If you find these questions of interest, please take an hour to [listen to the recording](#) of the town hall. ■



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#### ENDNOTES

- 1 <https://covidtracking.com/data>