

# The Liquidity Test Fixed Income ETFs were due for

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The global Coronavirus pandemic has caused some of the sharpest drawdowns fixed income markets have ever recorded. This was certainly a tail risk event that will challenge how markets price credit and liquidity risk for decades to come. Over the coming weeks and months we will witness the earnings impact of social distancing in a consumption driven economy. Over the last six weeks however we have seen the abrupt repricing in credit markets as revenue streams tied to human interaction evaporated in early March with efforts to “Flatten the Curve”. This was a worst case scenario test for Fixed Income ETFs as credit market volatility dwarfed the financial crisis amidst horrific liquidity conditions with credit investors all heading for the exits at once. In this piece, we examine how Fixed Income ETFs held up through this unprecedented market stress.

## How bad was it? Comparing credit market volatility to the Financial Crisis

Much focus has been placed on equity market volatility throughout the last six weeks, and rightfully so as the VIX closed over 80 for the first time since 2008. March witnessed 2 of the 10 worst days ever recorded in the S&P 500, as well as the largest 1-month drawdown since October of 1931. Less attention however has been paid to the violent price action witnessed in fixed income markets last month. During the financial crisis, the iBoxx Investment Grade Corporates index fell -15.7% peak to trough, and did so in 278 days. **In March, the index fell -23.3% in just 14 days.** Six of the ten worst days ever recorded for the IG corporates market occurred in March, including a -5% decline on March 18th, the worst day ever recorded. Credit volatility was truly unprecedented as investors were challenged with assessing the impact of social distancing on credit solvency.

Exhibit 1: Drawdown comparisons by asset class

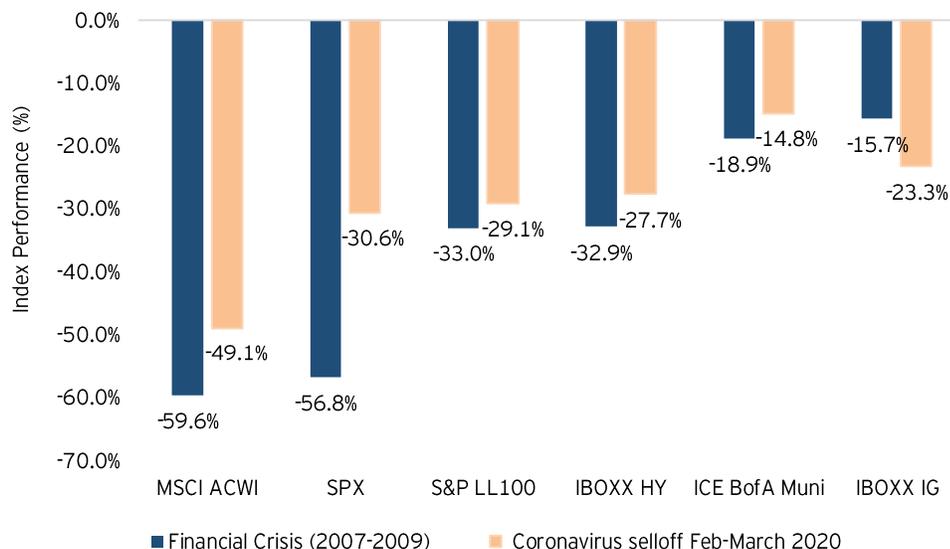


Exhibit 2: Number of trading days to hit max drawdown

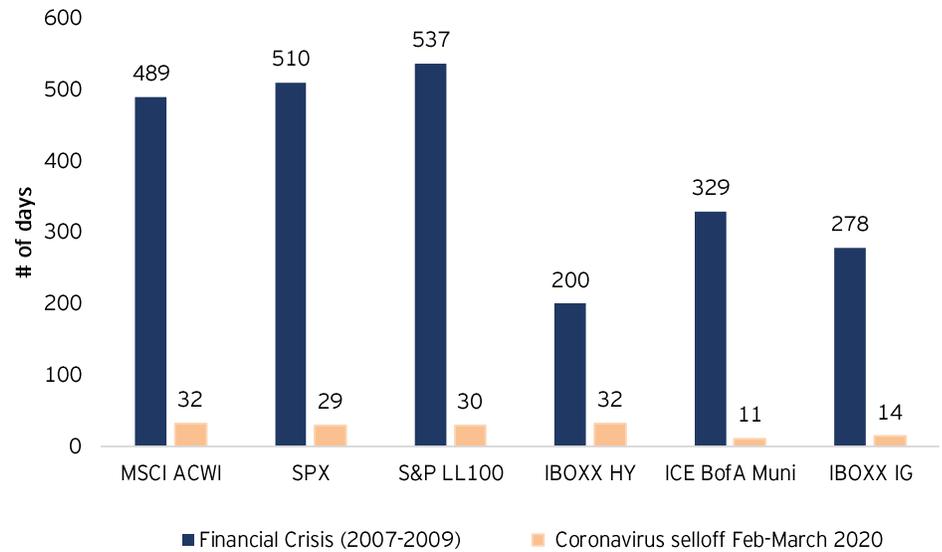


Exhibit 3: Largest one-day losses by category

## Largest one day declines in the S&amp;P500

1	-20.5%	10/19/1987
2	-12.9%	10/28/1929
3	-12.0%	3/16/2020
4	-10.29	10/29/1929
5	-9.9%	11/6/1929
6	-9.5%	3/12/2020
7	-9.1%	10/18/1937
8	-9.1%	10/5/1931
9	-9.0%	10/15/2008
10	-9.0%	12/1/2008

## Largest one day declines in U.S. Investment Grade

1	-5.0%	3/18/2020
2	-3.5%	3/17/2020
3	-3.5%	6/26/2009
4	-3.1%	9/15/2008
5	-3.0%	3/12/2020
6	-2.5%	3/10/2020
7	-2.2%	9/16/2008
8	-2.1%	3/19/2020
9	-2.0%	3/9/2020
10	-2.0%	6/18/2009

## Largest one day declines in Municipal Bonds

1	-3.7%	10/10/2008
2	-3.3%	3/19/2020
3	-3.1%	3/12/2020
4	-3.0%	3/20/2020
5	-2.7%	10/14/2008
6	-2.0%	9/18/2008
7	-1.9%	10/9/2008
8	-1.8%	10/28/2008
9	-1.7%	11/17/2010
10	-1.7%	3/11/2020

## Largest one day declines in U.S. High Yield

1	-4.4%	9/18/2001
2	-4.1%	6/27/2002
3	-4.0%	3/16/2020
4	-4.0%	10/14/2008
5	-3.6%	3/9/2020
6	-3.6%	3/12/2020
7	-3.6%	11/19/2008
8	-3.6%	3/18/2020
9	-2.9%	8/13/2002
10	-2.7%	3/19/2020

### Challenged liquidity conditions as credit investors rushed for the exits

Credit risk appetite evaporated in early March as investors flocked to cash. Money market funds saw record inflows while corporate bond funds experienced record outflows amidst the selloff. Mutual funds were hit particularly hard with redemptions the weeks of March 19th & 26th, exacerbating underlying market stress as portfolio managers were forced to liquidate to meet mounting redemptions. These were the largest weekly outflows ever in Investment Grade, High Yield, Municipal, and Global Bond funds.

Exhibit 4: Fixed Income Fund Flows by Category: Since Equity Market Peak (2/24 to 4/1)

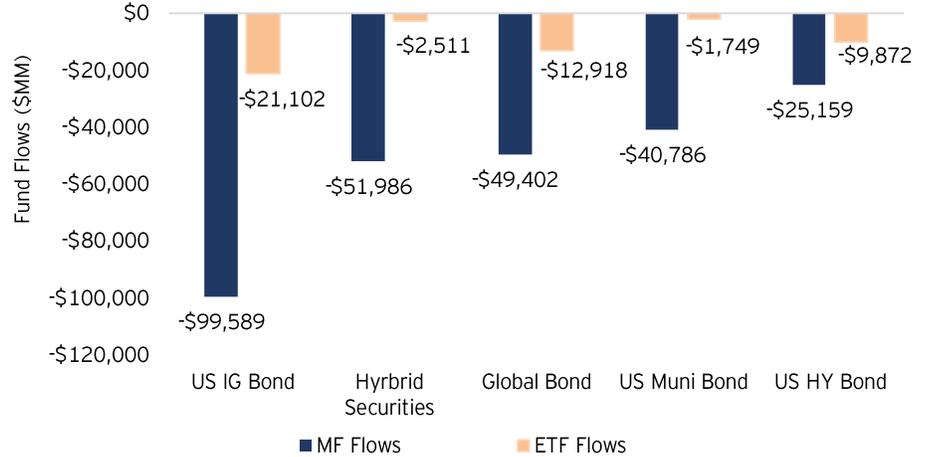
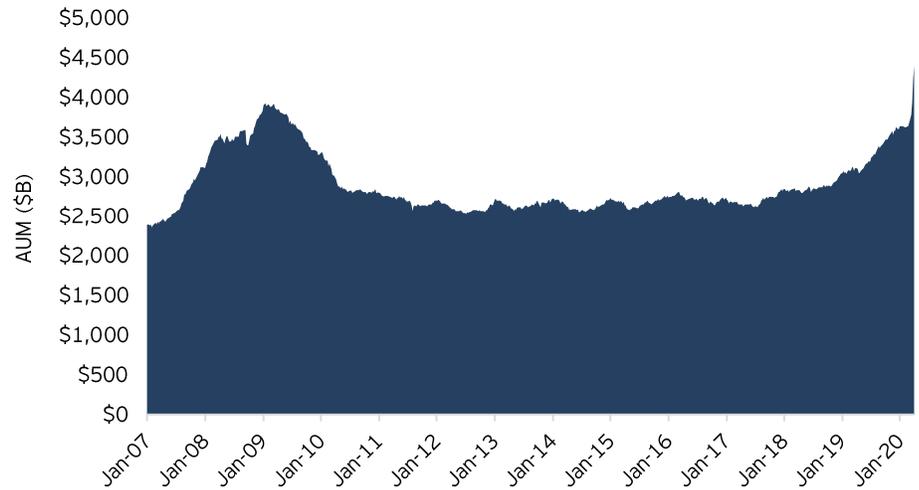
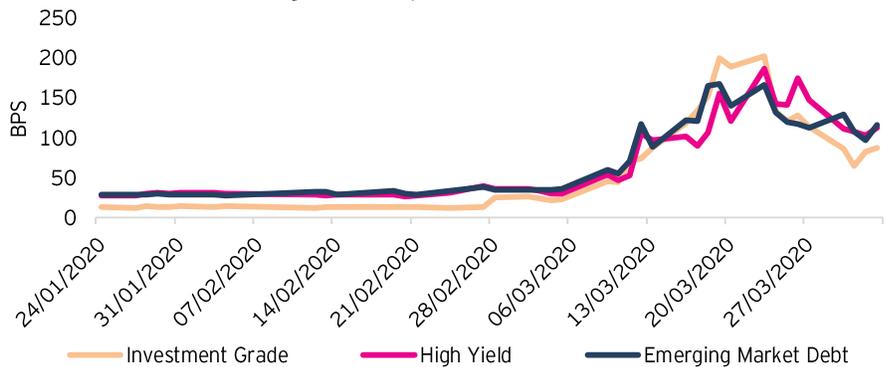


Exhibit 5: Money Market Fund AUM



Banks were better capitalized relative to 2008 and thus the cash bond market continued to function. If you needed to sell however, liquidity came at a price. Redemptions had flooded dealers with supply and record credit volatility magnified the liquidity risk premium for dealers to warehouse inventory. It is worth noting that this all happened while non-essential offices were being shut down, forcing buy-side and sell-side traders to adjust to work from home conditions. It is difficult to measure the direct impact of this however we imagine it further fragmented liquidity conditions. Attempting to quantify the deterioration of credit market liquidity in March, below we include a time series of investment grade, emerging market, and high yield bond bid/ask spreads. We can see that Investment Grade bid/ask spreads were 15x normal, while High Yield and Emerging Market debt was also trading 7x and 5x wider than average.

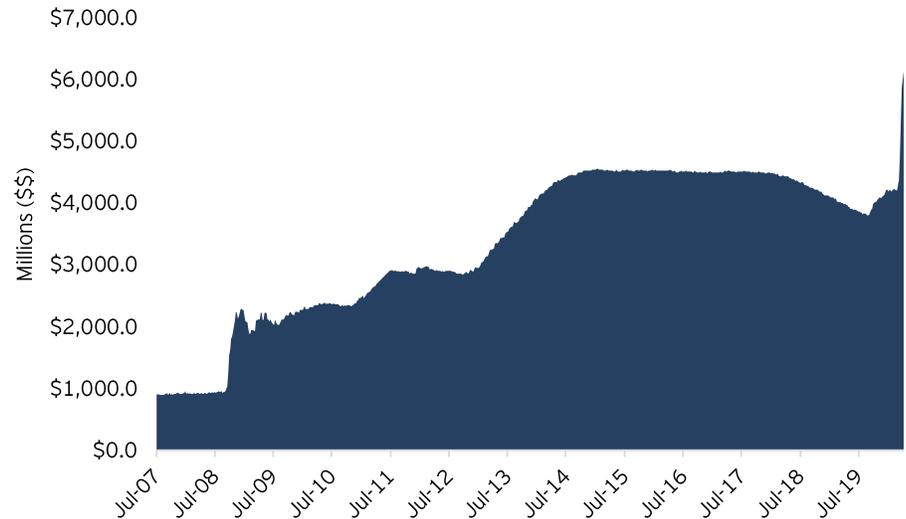
Exhibit 6: Credit Market Average Bid/Ask Spreads



## Federal Reserve's action plan

To help keep credit markets functioning, the Fed announced a plethora of new programs to inject liquidity and restore confidence in a multitude of asset classes. In total, the Fed has announced crisis facilities that could ultimately total more than \$10T. Currently, pledged support has been seen across Municipals (\$500B), Corporate bonds (\$750B), money markets (\$100B), TALF 2.0 (\$100B), & commercial paper (\$10B unlevered) along with support to small businesses (PPP \$350B) and banks in what can only be described as a liquidity bazooka. This comes on top of quantitative easing programs already in place to purchase an unlimited amount of mortgage back securities (MBS) & U.S. treasuries. To put these numbers into perspective, the size of the municipal & U.S. corporate bond market was \$3.8T & \$9.6T at the end of 2019 according to SIFMA. Notably, part of the new corporate bond purchasing program (SMCFF) has the flexibility to purchase U.S. IG & HY Corporate Bond ETFs. With the addition of these new purchasing programs, we've seen a material increase across the Fed's balance sheet.

**Exhibit 7: U.S. Federal Reserve Balance Sheet Assets**



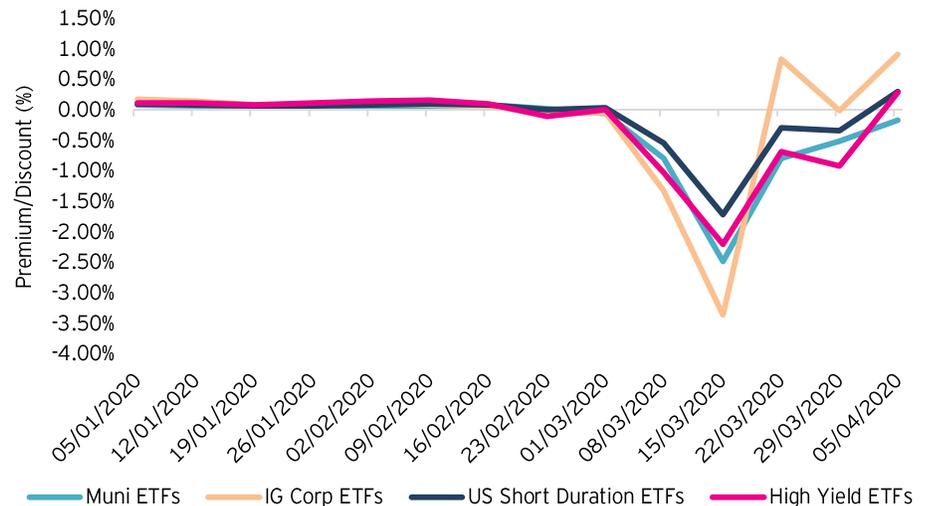
For the time being, the Fed's intervention has helped calm credit markets & restore investor confidence signaling the worst may be over. Nonetheless, the last 6 weeks have provided a historic case study for fixed income ETFs weathering unprecedented market & liquidity conditions.

## How did fixed income ETFs hold up?

Fixed income ETFs faced the worst market conditions that they have ever had to and may ever have to weather. These products were not immune to the selling pressure, however outflows totaled just ~2.3% of assets in March, a fraction of the mutual fund outflows in the space. The ability for fixed income ETF buyers and sellers to match off on exchange helped alleviate some of the underlying market stress in this difficult time. One would think there would only be sellers in this environment however this was not the case. U.S. listed fixed income ETFs traded a total of \$738.8B on exchange during March, and only \$19.8B was redeemed in the primary market over that time. This means that \$719B worth of fixed income ETF products changed hands without forcing a bond to be sold in the underlying market. If fixed income ETFs did not exist & were not available to diffuse selling pressure in the underlying bonds, it is entirely possible that the cash bond market would have collapsed.

Some investors have pointed to dislocations between fixed income ETF prices on exchange and their Net Asset Values (NAV) as a sign that the ETF structure broke down amidst market stress. Below we can see that a broad range of fixed income ETF strategies were certainly trading at steep discounts during the month of March. Through our analysis, we found that it was not the ETF that was broken but rather the NAV as an accurate benchmark of value for their mutual fund and ETF portfolios. Looking under the hood to examine how NAVs were calculated during this period brought to light eye opening issues. We conclude that NAVs were meaningless for fixed income ETFs and mutual funds over this period of credit volatility & that 3<sup>rd</sup> party pricing agents failed to accurately adjust their pricing models used in NAV calculations. We hope this analysis creates a call to action for changes to fixed income market structure & opens the door for new pricing agents with more robust analytics to better handle these situations.

**Exhibit 8: Average ETF Premium/Discount to NAV by Fixed Income Strategy for all ETFs listed in US.**



It is imperative to grasp the mechanics & calculation methodologies behind fixed income ETF NAVs to truly understand the source of premiums & discounts. This has been previously covered at length in multiple research posts including 'Why do FI ETFs trade prem/discs' & 'Fixed Income ETF Liquidity Primer.' At a high level, the ETF price can't be wrong as ETFs are traded in a free market & bound by arbitrage. If the ETF's price is too high versus its underlying basket, there is nothing stopping anyone from shorting that ETF, and if the price is too low there is nothing to stop one from buying that ETF on exchange. Thus when an ETF trades at a discount to NAV, the market has decided that the NAV price is too high, and the underlying securities are worth less. As per the chart above, the average discount to NAV for investment grade corporate bond ETFs reached -3.4% in mid-March, some products even witnessing discounts greater than 8%. If these product's NAV prices were actionable and market makers could sell these bonds substantially higher than the ETF price in the market, why didn't those liquidity providers redeem and arbitrage away the discount to NAV?

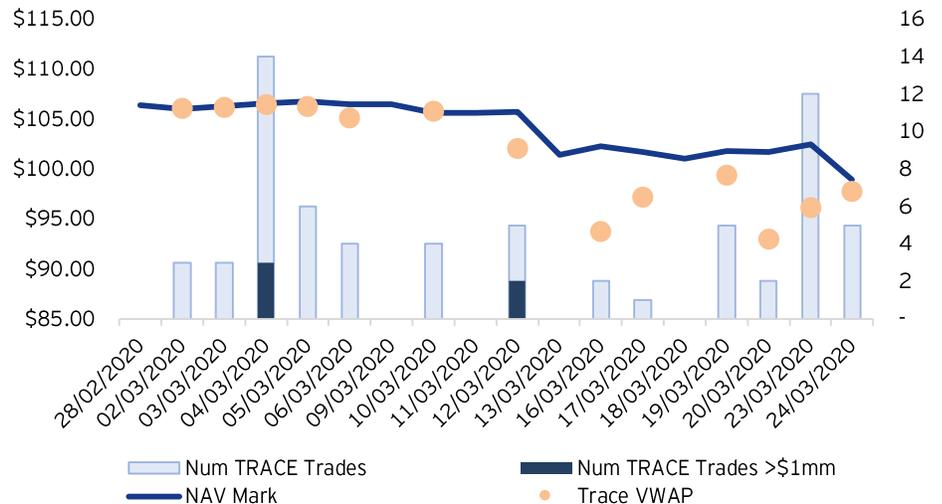
In a domestic equity ETF, it is difficult for the market to disagree with the NAV. The underlying stocks trade on exchange, there is an official closing price for every stock each day, and thus we can trust a NAV derived from these prices. However, bonds trade over-the-counter (OTC) and do not have official closing prices as stocks do. There is not one official price to use for bonds when valuing the NAV of a fixed income ETF or mutual fund. ETF issuers and mutual fund companies have to estimate prices to the best of their abilities for these bonds on any given day to calculate the NAV for fund portfolios. They don't pull these prices out of thin air, and investors must trust that these issuers are doing their best to fairly value their portfolios. Evidently there is a potential for conflict of interest here as issuers could prop up the performance of their portfolio managers by inflating the NAV prices of the bonds that they hold. It is foolish to blindly trust the NAV of an ETF or mutual fund that includes OTC traded securities. Invesco, along with many asset managers, alleviates this conflict of interest by distancing portfolio managers from the valuation process. An internal but independent pricing team sets the valuation procedures for our mutual funds and ETFs, and uses third party pricing agents to provide daily bond prices when calculating our fixed income portfolio NAVs. While using independent pricing services is good practice, the accuracy of our NAVs is only as good as the accuracy of these 3<sup>rd</sup> party pricing agents. Unfortunately, what we saw during the month of March included many red flags that we wish to expose.

In the U.S., corporate bond & municipal bond trades are reported daily to TRACE & MSRB, respectively, but some fixed income markets have no central reporting and prices are fairly opaque. In these markets where OTC traded prices are unreported, third party pricing agents can gather quotes from dealers to help derive a fair value price for each security. Certainly an art rather than a science, and causes complete reliance on dealer quotes being timely & at executable prices. As markets sell off, dealers can be hesitant to mark down their inventory, and these quotes, which are no longer actionable levels for the bonds, can lead to artificially inflated NAV prices. We saw this in action during March, as many bonds traded several percentage points away from indicative dealer bids.

In the U.S. corporate and municipal markets where OTC trades are centrally reported, pricing agents have much more data to work with. This transparency in theory should help improve pricing but the pricing agent's job is still difficult as many bonds don't trade every day. If a bond does not trade then there is no price reported to TRACE or MSRB & pricing agents must again rely solely on dealer quotes to derive fair value prices. Let's look at a few examples of bonds held in an illustrative Corporate Bond ETF.

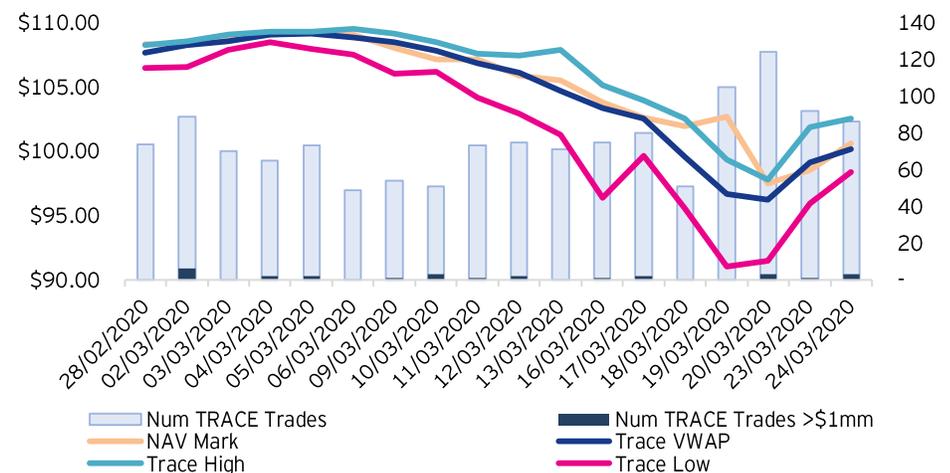
First we have a Sherwin Williams 2024 bond that has TRACE reported trades but did not trade every single day in March. We include the volume weighted average price (VWAP) from the TRACE reported trades each day as well as the daily prices used to value the bond in the illustrative ETF's NAV. In the first week of March the bond traded every day, and the NAV price was fairly close to the reported VWAP. That said, by the third week of March we can see the NAV prices were 5-10% above where investors were actually trading the bond in the market. Thus the NAVs of mutual funds and ETFs that held this Sherwin Williams bond were inflated. ETFs that held this bond should have traded at a steep discount to NAV, as liquidity providers that needed to redeem shares of the ETF would be delivered this bond in-kind, and ultimately would have to sell it in the market significantly below the NAV marked price. Worse however, mutual fund portfolio managers that needed to sell this bond to meet redemptions had to sell at these depressed market prices, significantly below the NAV price. This benefitted mutual fund investors that were redeeming their shares at an inflated NAV price, but the remaining shareholders in the fund had to eat these transaction costs. Pricing agents were doing their best in this stressful environment to value bonds, however it was not good enough & ultimately hurt mutual fund investors that did not sell their positions.

Exhibit 10: Sherwin Williams 2024 Corporate Bond



For bonds that did trade actively, like the Verizon 2024 bond below, pricing agents had more than 50 TRACE reported trades each day to help value the bond. The bond's NAV prices seemed to track the VWAP from the TRACE data, however there were still significant dislocations in the third week of March. For instance, the NAV price of this Verizon bond increased day over day on March 19<sup>th</sup>, which in exhibit 3 we note was the 8<sup>th</sup> worst performing day ever recorded for Investment Grade Corporate Bond market. Verizon's stock price was also down -1.29% on the day, so there is no evidence of firm specific news that would warrant the NAV price to rise as both the stock & bond markets were rapidly selling off. Furthermore, & most head scratching, was the fact that the NAV price on March 19<sup>th</sup> was above any of the bond's reported TRACE trades during the day by more than 3%!

Exhibit 9: Verizon Communications 2024 Corporate Bond



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It is not entirely fair to place all of the blame on these third party pricing agents. As discussed this was the most volatility that credit markets have ever experienced. It was not normal to see high grade corporate bonds falling 5% or more day over day. Stepping into the shoes of a pricing agent tasked with trying to value a bond with no traded price to reference, it would have been difficult & some cases aggressive to mark the bond down several points. Additional mixed signals included receiving dealer quotes that were down just slightly from the day prior, and the max day over day change in the bond's price historically was minimal. We note that pricing agents were also sent to work from home during this period, certainly an inopportune time for an adjustment to working environments. This however highlights the need for enhancements to fixed income market structure as well as improvements to NAV pricing methodologies for fixed income ETFs & mutual funds. More OTC markets should have central reporting of trades and prices, with this data then broadly being distributed to market participants with minimal delay. Additionally, there should be more reliance placed on traded prices than stale or non-executable dealer quotes. To find a silver lining in the recent market events, we hope these insights provide the needed ammunition for potential changes & enhancements to protect all investors in the future.

*All data sourced from Bloomberg LP as of 4/6/2020, unless otherwise noted*

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