U.S. SECURITIES AND EXCHANGE COMMISSION
Division of Economic and Risk Analysis

DERA Economic and Financial Outlook

FEBRUARY 15, 2021

Table of Contents

The Division of Economic and Risk Analysis (DERA) advances the Commission's statutory mission to protect investors, maintain fair, orderly, and efficient markets, and facilitate capital formation through sound economic analysis and rigorous data analytics. DERA engages across the entire range of the agency's functions, including rulemaking, examination, and enforcement. Its multi-disciplinary analyses are informed by research insights and they rely on the knowledge of institutions and practices when examining regulatory and risk-related matters. DERA assists the Commission in its efforts to identify, analyze, and respond to economic and market issues, including those related to new financial products, investment and trading strategies, systemic risk, and fraud. DERA's data analytics work develops a variety of financial and market data analysis tools, gathers economic statistics, and promotes data standards. DERA economists publish regularly in top peer-reviewed journals, including the *Journal of Financial Economics*, the *Journal of Labor Economics*, and the *Review of Financial Studies*.

DERA Research Staff: Chandler Lutz (Lead Economist), Gregory Allen, and Pamela Urban.

OPA Design Team: Chris Gamboa-Onrubia, Zehra Sikandar, and Jennifer White.

sec.gov/dera

Key Highlights as of February 15, 2021

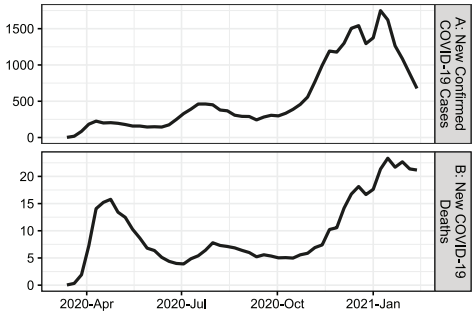
Following the historic and unprecedented COVID-19 economic shock in March 2020, financial markets appear to have largely recovered as aggregate equity prices have risen and credit spreads have tightened. While economic output is expected to expand during 2021, forecasters predict that gross domestic product (GDP) will remain below its pre-pandemic trend through 2021, as the uneven economic recovery continues to weigh on certain sectors. Capital market activity has also recently accelerated as corporations have increased borrowing and as more firms have entered public markets through initial public offerings (IPOs) or special purpose acquisition companies (SPACs). Both households and firms in aggregate have bolstered their cash positions by increasing savings rates or taking advantage of historically low interest rates.

The Path of COVID-19 Cases Is Uncertain

After Rising During 2020Q4, New U.S. COVID-19 Cases and Deaths Have Recently Dropped as the United States Ramps Up Vaccine Distribution: The number of new confirmed COVID-19 cases increased during 2020Q4 and peaked at about 1.75 million per week in early January 2021 (Figure 1.1A). This increase in cases prompted some local and state authorities to reverse or delay reopening protocols as a response. Yet as the United States has begun distributing COVID-19 vaccines, new confirmed COVID-19 cases have dropped to a weekly rate just below 700,000 as of February 12, 2021. Similarly, newly reported deaths reached nearly 23,000 per week in mid-January 2021 but have since fallen slightly (Figure 1.1B). CDC Data retrieved February 12, 2021, indicate that 35.8 million Americans have received at least one dose of a COVID-19 vaccine.

Figure 1.1: New COVID-19 Cases and Deaths Have Dropped as the U.S. Ramps Up Vaccine Distribution

Notes: U.S.; Thousands per week

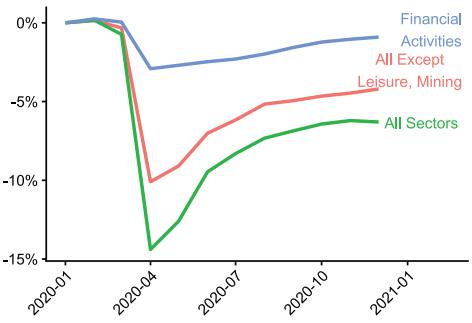


The Effects of the COVID-19 Recession on Employment Remain Uneven

The Effects of the COVID-19 Recession on Employment Remain Uneven Across Sectors: Following the partial economic slowdown caused by COVID-19 health protocols, by April 2020 employment as measured by non-farm payrolls fell nearly 15% from its pre-pandemic highs (Figure 1.2; green line). Then, as the country adjusted to public health measures and as local economies partially reopened, job gains quickly accelerated. These gains were concentrated in the sectors most hard-hit by the economic lockdowns associated with the pandemic (*DERA Economic and Risk Outlook*, July 2020; p. 1). While recent

Figure 1.2: The Effects of the COVID-19 Recession Remain Uneven Across Sectors

Notes: Non-farm employment growth by sector from January 2020; Monthly



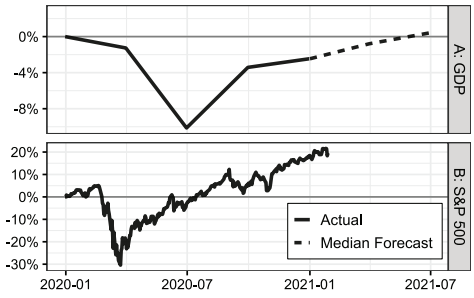
total job growth has slowed (green line), employment excluding the leisure and mining (mining, oil and gas, etc.) sectors continues on a slight upward trend (red line). Thus, the COVID-19 recession continues to have outsized adverse effects on certain sectors. Yet there have also been relative bright spots across the U.S. jobs landscape. For example, employment in the financial activities sector (Figure 1.2; blue line), including the banking, insurance, and real estate industries, was relatively flat in 2020. Similar positive employment dynamics have also transpired in other industries, such as the online retail and technology sectors.

Equity Markets Have Recovered Faster Than the Overall Economy

The Pace of the Equity Market Recovery Has Eclipsed The Economic Recovery: Although recent data suggest that the economy remains below full employment (Figure 1.2), equity market performance coming off lows in March 2020 has been notable. Figure 1.3 highlights the relatively faster pace of the recovery in equity markets by plotting the growth in actual values and forecasts of GDP (panel A; forecasts tabulated by MarketWatch) and the S&P 500 (panel B) from 2019Q4. Forecasters expect GDP to return to pre-pandemic levels in July 2021, while the S&P 500 has already increased by about 20% compared to January 2020 levels.

Figure 1.3: The S&P 500 has Recovered Faster than GDP Since March 2020

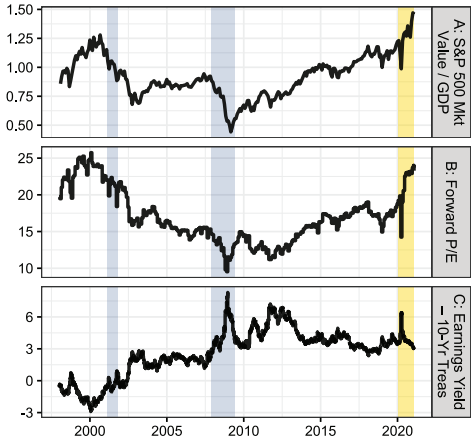
Notes: Growth from last value in 2019Q4; GDP is Quarterly; S&P 500 is Daily; GDP Forecasts from MarketWatch



As noted in the July 2020 issue of the *DERA Economic and Risk Outlook*, several factors in isolation or in combination may have contributed to the recent run-up in equity prices, including (1) COVID-19-induced increases in the frequency of internet shopping and remote work—trends that favor large technology firms, which constitute a substantial portion of value-weighted equity indices; (2) low expected interest rates that increase the present value of future profit streams; or (3) anticipation that the pandemic will not continue much longer, in part because of increased vaccine availability. Moreover, recently there may have also been elevated equity purchases or options trading by retail investors.

Figure 1.4: Equity Market Valuation Signals Are Mixed

A: S&P 500 Market Value / GDP; 2012 Dollars
B: Price / Next 12 Months Estimated Earnings; Total Market
C: Next 12 Months Estimated Earnings / Price – 10-Yr Treasury

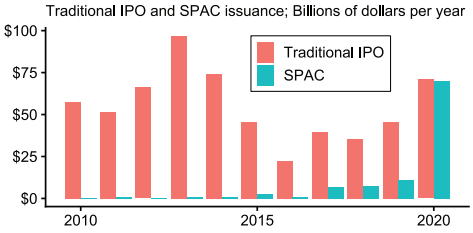


Certain Equity Market Valuation Proxies Are Near Historical Highs. Yet After Accounting for Low Current Interest Rates, Valuations May Be in Line With Historical Levels: The recent rise in stock prices, especially compared to economic growth, has coincided with increases in certain equity market valuation proxies. Figure 1.4A plots the S&P 500 market value relative to GDP, where the blue bars are NBER recessions and the yellow bar represents the start of the COVID-19 recession through the end of the data sample. Not surprisingly, given the considerable equity price growth compared to the relatively weaker economic growth (Figure 1.3), the ratio of the S&P 500 market value to GDP has increased markedly since March 2020 (Figure 1.4A).

Currently, the S&P 500 market value is about 1.5 times the size of GDP, surpassing the previous peak in this ratio of 1.3 in 2000. Similarly, the forward P/E (price / earnings) ratio for the entire stock market (the price relative to estimated earnings for the next 12 months) shows that equity prices have recently increased sharply relative to expected earnings but have not reached the levels seen during the early 2000s (Figure 1.4B). As noted above, several factors may have contributed to the recent rise in equity prices relative to economic growth or expected earnings. In particular, sustained low interest rates increase the present value of future profits. They also may make equities attractive relative to bonds, pushing traditional valuation proxies higher (e.g., Figure 1.4, panels A and B). To account for the current historically low levels of interest rates, Figure 1.4C plots the expected earnings yield from equities (next 12 months expected earnings / price) minus the 10-year Treasury yield. Spikes in the earnings yield–Treasury spread may indicate that equity prices are low, suggesting that investors perceive equity investments as risky and therefore expect to be better compensated for holding stocks versus bonds (e.g., a higher earnings yield relative to the 10-year Treasury). This occurred, for example, at the height of the Great Recession in 2009. In contrast, when the earnings yield–Treasury spread is low, like at the height of the tech bubble in 2000, investors may expect little additional compensation for holding stocks and thus may expect relatively lower subsequent equity market risk. The most recent data shown in Figure 1.4C indicate that earnings yield–Treasury spread is in line with historical levels, perhaps suggesting that investors expect approximately average levels of risk in equities going forward. That said, as noted above, several factors may be contributing to the recent rise in equity prices.

IPO Market Activity Accelerated During 2020, Especially For SPAC IPOs: Investor interest in SPACs jumped in 2020 (Figure 1.5). In 2020 through SPACs, firms raised $70 billion in 227 deals, up from $11 billion in 2019. Activity in the traditional IPO market also expanded in 2020, with 189 deals worth $71 billion, the largest dollar issuance since 2014.

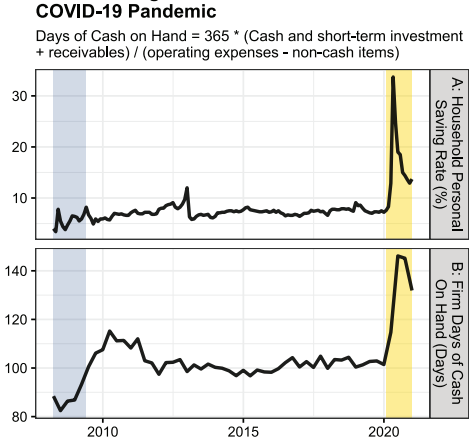
Figure 1.5: IPO Issuance Increased in 2020, With Particularly Large Gains for SPAC IPOs



Both Households and Firms Are Accumulating Cash

With the Onset of COVID-19-Induced Economic Uncertainty, Both Households and Firms Began Accumulating Cash: As COVID-19-induced economic distress and uncertainty permeated across markets, both households and firms bolstered their aggregate cash holdings. Indeed, the household personal savings rate spiked to over 30% in April 2020 (Figure 1.6A). This elevated savings rate is likely due to a combination of factors, including precautionary savings by households, COVID-19-induced partial economic lockdowns that limited consumption choices and household mobility, and a reduction in debt-service payments (e.g., mortgage payments through refinances) attributable in part to historically low interest rates.

Figure 1.6: Households and Firms Began Accumulating Cash with the Onset of the COVID-19 Pandemic



As local economies have reopened and households have adjusted to COVID-19 health protocols and financial stress has ameliorated, the personal savings rate has retreated somewhat but remains nearly double its pre-pandemic levels. Similarly, many firms have increased available cash on hand, perhaps because of uncertain revenue outlook and attractive interest rates. Figure 1.6B plots the available days of cash on hand for the median public firm and shows that days of cash on hand increased markedly following the start of the COVID-19 recession. Data as of 2020Q4 indicate that the number of days of cash on hand for the median firm remains about 30% above its pre-pandemic levels.

Data Sources: **Figure 1.1:** The New York Times, based on reports from state and local health agencies (available at https://github.com/nytimes/covid-19-data); and Johns Hopkins University Center for Systems Science and Engineering (CSSE) (available at https://github.com/CSSEGISandData/COVID-19). **Figure 1.2:** Bureau of Labor Statistics (BLS), retrieved from The Federal Reserve Economic Database (FRED) (IDs: PAYEMS, USCONS, MANEMP, USTPU, USINFO, USFIRE, USPBS, USEHS, USSERV, USGOVT). **Figure 1.3:** Datastream; U.S. Bureau of Economic Analysis (BEA), retrieved from FRED (IDs: GDPC1). **Figure 1.4:** Datastream. **Figure 1.5:** Capital IQ. **Figure 1.6:** BEA; retrieved from FRED (IDs: PSAVERT); Datastream.

Macro-Financial Overview

The macro-financial environment is encapsulated in three key aggregate drivers of financial decisions: (1) economic fundamentals and growth; (2) monetary policy and the interest rate trajectory; and (3) financial market signals and credit conditions.

Economic Fundamentals and Growth

Key Takeaway: GDP is expected to expand during 2021 but remain below its pre-pandemic trend through the end of the year. More broadly, economic indicators are mixed, signaling that certain sectors of the economy are recovering faster than others.

Figure 2.1: GDP Is Expected To Grow Swiftly During 2021 But Remain Below Its Pre-Pandemic Trend

Notes: Quarterly; ($ Trillions); Forecasts from MarketWatch

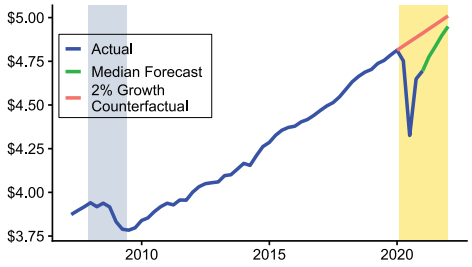
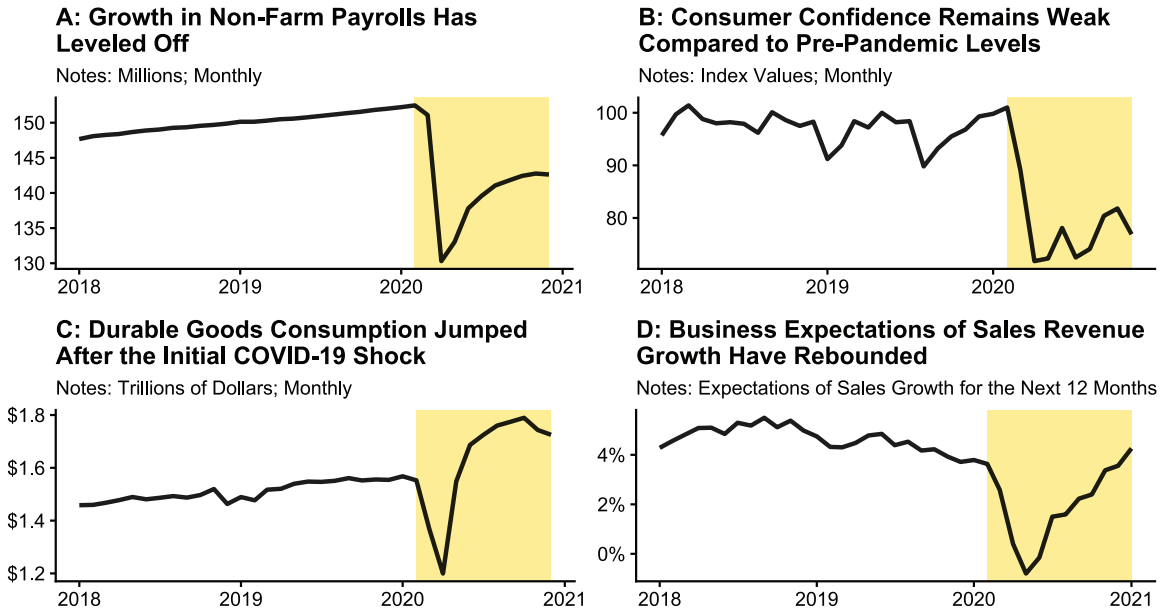


Figure 2.1 plots real quarterly GDP dating back to the Great Recession (blue line), as well as GDP forecasts (median forecasts tabulated by MarketWatch; green line). The U.S. economy was consistently expanding at a 2–3% annual real rate before the onset of the COVID-19 pandemic. Then the United States entered into a COVID-19-induced recession in March 2020, and GDP fell 10.1% during the first half of 2020. Economic growth then surged in 2020Q3. Going forward, economic output is expected to rise swiftly through 2021 (Figure 2.1; green line) but remain below its pre-pandemic trend. Indeed, assuming that in the absence of the COVID-19 recession the U.S. economy would have grown at a 2% annual rate (Figure 2.1; red line), the lost economic output due to the COVID-19 outbreak through 2020Q4 was approximately $1 trillion. If the path of GDP follows analysts' predictions (Figure 2.1; green line), lost economic output through 2021, compared to the 2% growth counterfactual, will reach $1.5 trillion.

The impact of the COVID-19 recession on key economic indicators remains mixed, as seen in Figure 2.2. Broadly, all economic indicators signaled distress in the immediate wake of the COVID-19 recession. Yet following the initial shock, the pace of the recovery has varied across economic proxies, suggesting that some parts of the economy are recovering faster than others. For example, Figure 2.2A shows job growth quickly accelerated during mid-2020 but has since leveled off. Indeed, the number currently employed, as measured by non-farm payrolls, is nearly 10 million below its pre-pandemic highs. Similarly, consumer confidence has remained weak since March 2020 (Figure 2.2B), coinciding with elevated economic uncertainty and an increased savings rate (Figure 1.6). In contrast, other proxies have recovered. Figure 2.2C indicates that durable consumption, often a procyclical indicator, has exceeded its pre-pandemic peak. As noted in the November 2020 issue of the *DERA Economic and Risk Outlook*, this jump may be related to households making up for missed consumption opportunities following the initial COVID-19-induced lockdowns, a decline in debt-service payments as households have capitalized on low interest rates, or households using low interest rates to finance durable purchases. Finally, Figure 2.2D documents that business expectations of future revenue growth have recovered but remain below the levels seen at the height of the economic expansion in 2018 and 2019.

Figure 2.2: Economic Indicators Are Mixed

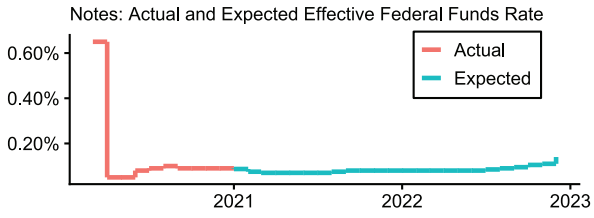


Monetary Policy and Interest Rates

Key Takeaway: Market participants expect the federal funds rate to remain at its zero lower bound through 2022, and interest rates have fallen more broadly. Following unprecedented monetary stimulus and a broader economic and financial market recovery, inflation expectations have returned to the Federal Reserve's (Fed) 2% inflation target.

As the COVID-19 pandemic unfolded, the Fed lowered the federal funds rate to a target range of 0–0.25% by March 15, 2020. Figure 2.3 plots the recent path of the federal funds rate, along with the expected federal funds rate as implied in futures market prices. Futures traders expect the federal funds rate to stay at its zero lower bound through 2022, as the economy recovers from the COVID-19 recession.

Figure 2.3: Futures Markets Signal a Sustained Low Federal Funds Rate

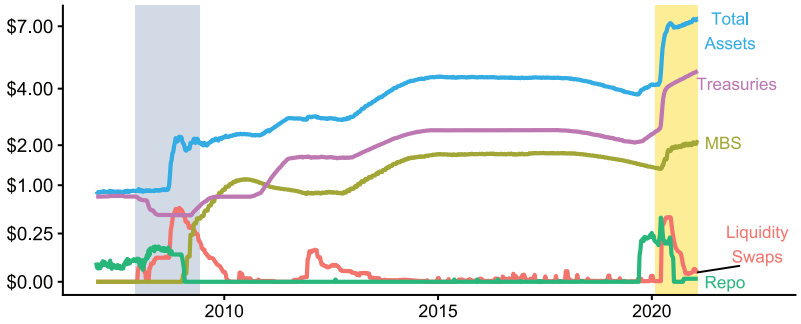


At the height of COVID-19-induced financial market distress in March, the Fed also announced unlimited purchases of Treasuries and agency mortgage-backed securities (MBS). These large-scale asset purchases coincided with the formation of numerous liquidity and lending facilities. The November 2020 issue of the *DERA Economic and Risk Outlook* described these programs in depth and compared the Fed's COVID-19 response to its response during the Great Recession.

Figure 2.4 summarizes the Fed's recent balance sheet actions by plotting the path of total Fed assets during the pandemic (blue line), as well as the asset classes that constitute the largest share of Fed assets in crisis response. From March 4, 2020, through January 20, 2021, total Fed assets increased over $3 trillion to more than $7.4 trillion, about a 75% gain. The bulk of this rise, consisting mostly of Treasury purchases (purple line), central bank liquidity swaps (red line), and MBS purchases (gold line), occurred in the immediate aftermath of COVID-19-induced financial market distress.

Figure 2.4: Fed Assets Increased Markedly To Counter the COVID-19 Recession

Notes: Trillions of dollars; Weekly; Vertical axis has a square root scale

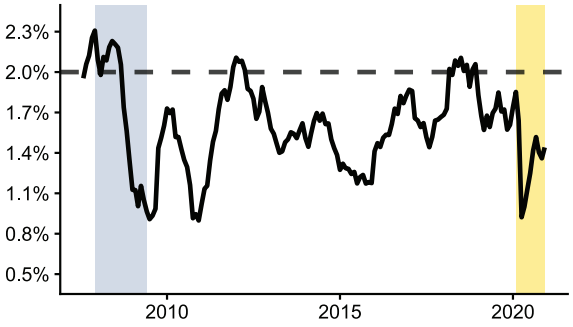


During 2020, inflation plummeted with COVID-19-induced economic distress. Figure 2.5A shows the annual inflation rate fell to 1% in April 2020. Inflation has since rebounded but remains below the Fed's 2% inflation target. Figure 2.5B plots inflation expectations over the next 5 and 10 years from a given point in time, computed from Treasury nominal and inflation-protected securities. The graph documents that with the onset of the pandemic, inflation expectations sank; in April 2020, market participants had expected an average annual inflation rate below 1% over the following 5 years. Since then, with expectations of sustained low interest rates, Fed announcements of a 2% average inflation target, and possibly expectations of a broader economic recovery, the expected average annual inflation rate (as of January 28, 2021) has reached the Fed's 2% target.

Figure 2.5: Expectations Suggest Inflation Will Rise Going Forward

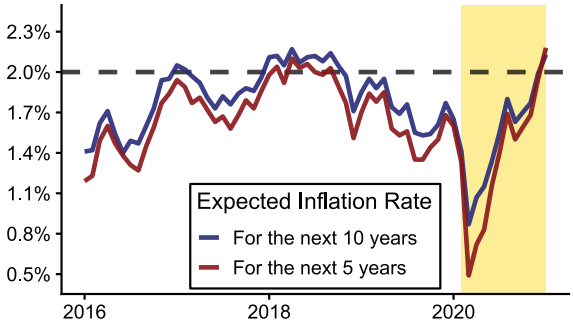
A: Inflation Has Rarely Reached the Fed's 2% Target Over the Last Decade

Notes: Core Inflation Rate (Less Food and Energy)



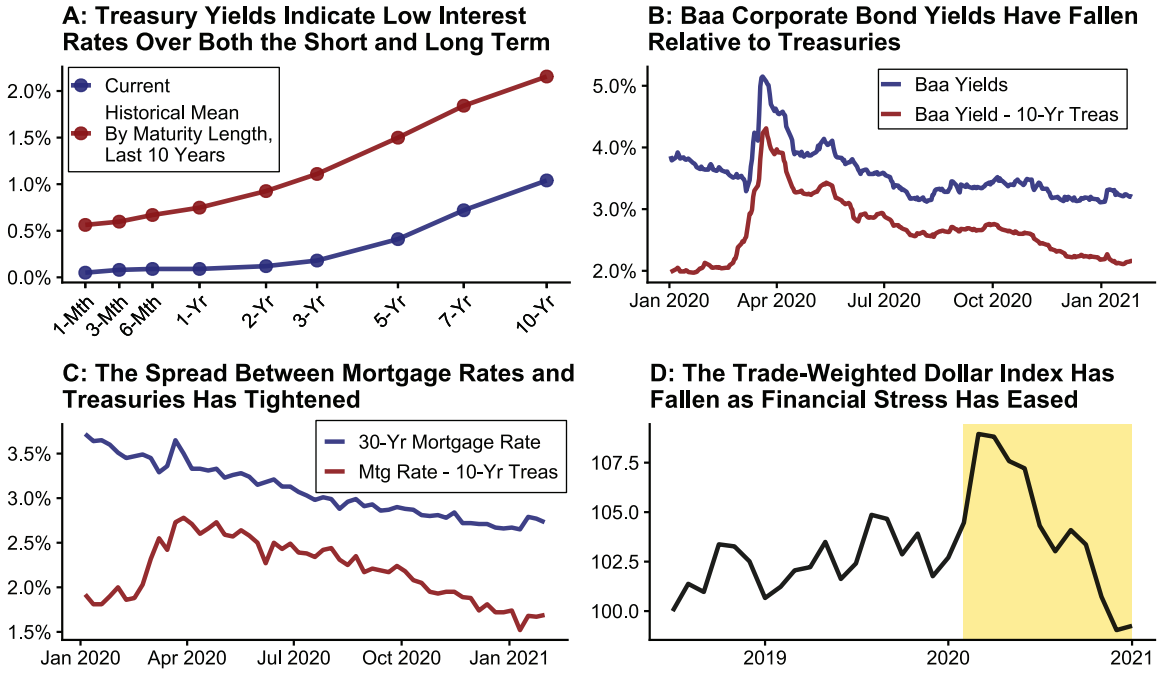
B: Inflation Expecations Have Recently Reached the Fed's 2% Target

Notes: Market Expectations of Inflation by Year-Month



The Fed's sizable monetary stimulus and moderate inflation expectations, coupled with perhaps an elevated demand for U.S. Treasury securities, collectively presage low U.S. Treasury interest rates. Figure 2.6A plots the current yield curve for U.S. Treasury securities (blue line) versus its average over the past 10 years (red line) by maturity horizon. Not only are rates historically low at the short end of the yield curve (e.g., for short-term securities), but they are also low for longer maturities. Long-term yields comprise the current short-term rate plus the sum of market participants' expectations of future interest rate changes, as well as a term premium (the additional interest that investors demand in exchange for being locked into a longer term bond rather than just continuously investing in short-term bonds). The low long-term yields suggest that the term premium and investors' expectations of future interest rate increases are low.

Figure 2.6: Low Interest Rates Have Coincided with a Falling Dollar



Interest rates on other assets have also experienced large declines in response to current conditions. Indeed, Figures 2.6B and 2.6C show a large drop in Baa corporate bond yields and the 30-year mortgage rate since the onset of the COVID-19 recession, as well as tightening spreads relative to Treasuries. The broad-based decline in U.S. interest rates has also coincided with a decrease in the value of the U.S. dollar. Figure 2.6D plots a trade-weighted dollar index and shows that the dollar's value increased about 6% from January to March 2020 before declining 9% through January 15, 2021.

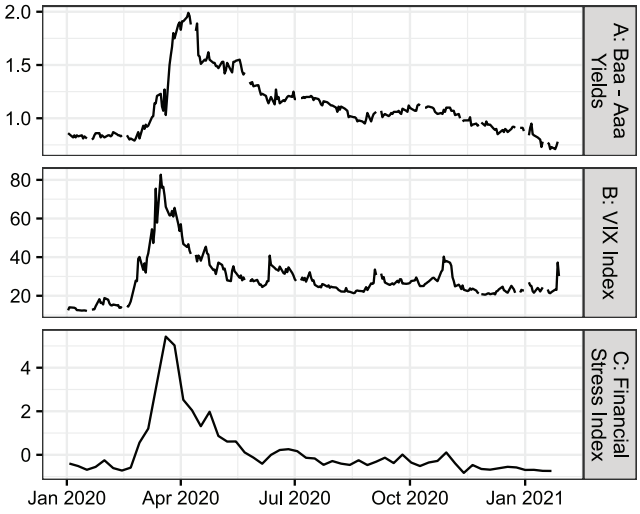
Financial Market Signals

Key Takeaway: Financial market risk proxies spiked in March 2020 with COVID-19-induced financial market distress but have recently fallen to near pre-pandemic levels. Expected debt default probabilities have also fallen, but default risk in hard-hit sectors remains slightly elevated.

With the onset of the COVID-19 recession, financial risk proxies spiked. Figure 2.7 plots the corporate default spread (Baa - Aaa corporate bond yields; panel A), the VIX equity market volatility index (panel B), and the St. Louis Fed Financial Stress Index that aggregates several financial market stress proxies into a single index (panel C). All of these indices spiked at the height of the COVID-19-induced financial market distress in March 2020. Then, as financial conditions eased and the Federal Government implemented unprecedented monetary and fiscal stimulus, all three risk proxies fell. Currently, the proxies plotted in Figure 2.7 are near or below their pre-pandemic levels, in line with moderate credit conditions.

Figure 2.7: Financial Market Stress Has Subsided

Notes: Corp. Default Spread = Baa - Aaa Yields (% points)

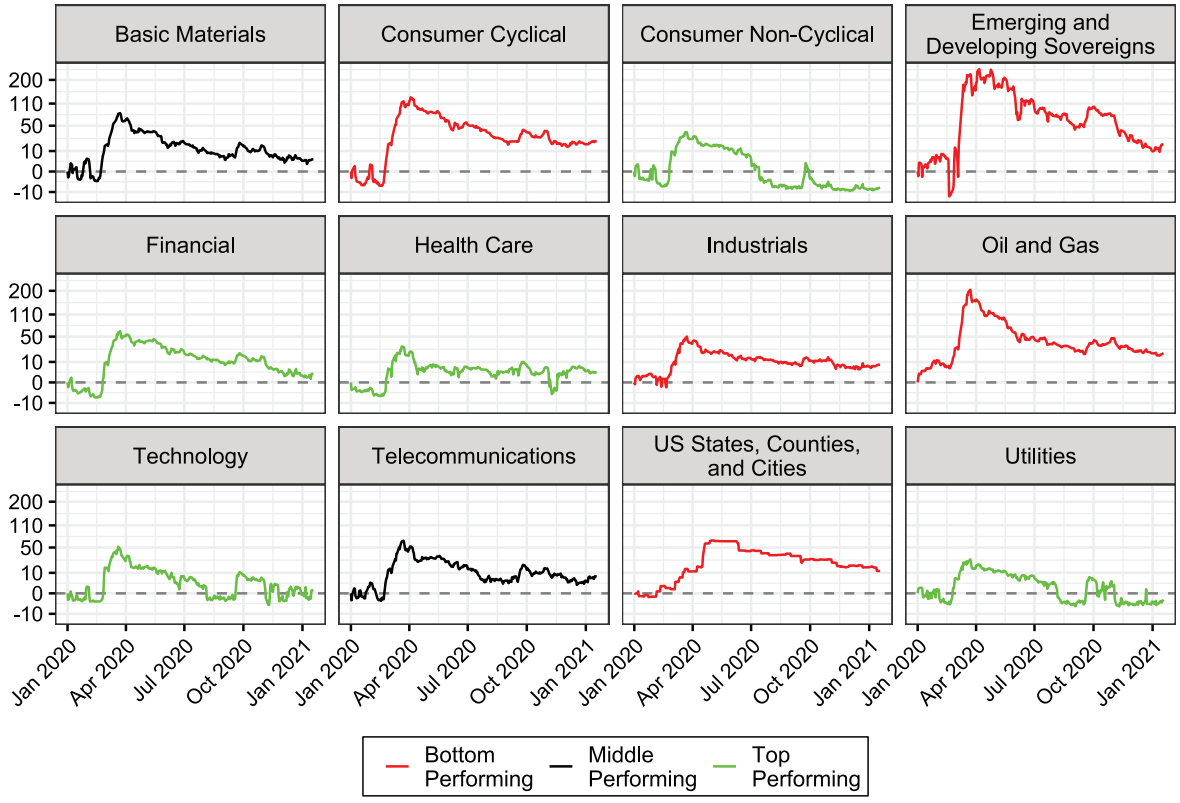


To gauge default risk across sectors, Figure 2.8 plots the change in prices for credit default swaps (CDS) from January 1, 2020, by category. CDS prices, often referred to as spreads and quoted in basis points, track the cost to insure an entity's debt against a future credit event. Thus, a CDS spread of 200 basis points indicates that the cost to insure $100 million of debt would cost $2 million per year (100 * 0.02). Broadly, rising CDS spreads signal increased expectations in the probability of default.

While CDS spreads increased drastically in April 2020 across a wide range of economic sectors, the magnitude of these changes varied across the categories listed in Figure 2.8. Since then, CDS spreads have slowly fallen. Yet data as of January 18, 2021, indicate that several categories in Figure 2.8 have CDS spreads slightly above their January 2020 levels and hence elevated expected default probabilities (red lines). These economic sectors include those whose future revenue streams are most threatened by the economic fallout from the COVID-19 recession. Indeed, the most affected debt instruments include consumer cyclicals (travel, tourism, etc.), emerging markets and developing sovereigns, industrials, oil and gas companies, and U.S. states, counties, and cities. For further information, see the Research Spotlight, "CDS Pricing and Credit Events in 2020."

Figure 2.8: CDS Prices Have Fallen From COVID-19-Induced Highs

Notes: Change in CDS Prices By Category from January 1, 2020; Basis Points.
Vertical axis has a signed square-root scale. Red lines have largest (most positive) CDS price changes and green lines have smallest price changes measured from January 1, 2020 to January 18, 2021



Data Sources: **Figure 2.1:** BEA, retrieved from FRED (ID: GDPC1); and MarketWatch. **Figure 2.2A:** BLS, retrieved from FRED (ID: PAYEMS). **Figure 2.2B:** University of Michigan, retrieved from FRED (ID: UMCSENT). **Figure 2.2C:** BEA, retrieved from FRED (ID: PCEDG). **Figure 2.2D:** Federal Reserve Bank of Atlanta, retrieved from FRED (ID: ATLSBUSRGEP). **Figure 2.3:** Federal Reserve Board (FRB) (ID: FEDFUNDS) and Datastream. **Figure 2.4:** FRB, retrieved from FRED (IDs: WALCL, TREAST, WSHOMCB, WORAL, SWPT). **Figure 2.5:** U.S. Treasury, retrieved from FRED (IDs: PCEPILFE, T5YIE, T10YIE). **Figure 2.6A:** U.S. Treasury and FRB, retrieved from FRED (IDs: DGS1MO, DGS3MO, DGS6MO, DGS1, DGS2, DGS3, DGS5, DGS7, DGS10). **Figure 2.6B:** Moody's, retrieved from Wharton Research Data Services (WRDS) and FRB, retrieved from FRED (ID: DGS10). **Figure 2.6C:** Freddie Mac and FRB, retrieved from FRED (IDs: MORTGAGE30US, DGS10). **Figure 2.6D:** FRB, retrieved from FRED (ID: DTWEXBGS). **Figure 2.7A:** Moody's, retrieved from WRDS. **Figure 2.7B:** Chicago Board Options Exchange, retrieved from FRED (ID: VIXCLS). **Figure 2.7C:** Federal Reserve Bank of St. Louis, retrieved from FRED (ID: STLFI2). **Figure 2.8:** S&P Capital.

Market Segments

The U.S. Securities and Exchange Commission's mission is to protect investors, maintain fair, orderly, and efficient markets, and facilitate capital formation. Below we examine the underpinnings of financial markets through the lens of these three mission areas and study (1) markets; (2) investors; and (3) borrowers, securities issuers, and other entities that raise capital. The chart below illustrates the interlinkages between these three segments.

Markets

Key Takeaway: Aggregate equity and bond markets have nearly fully recovered from the initial COVID-19-induced financial market distress in March 2020.

Figure 3.1: After Large Declines in March 2020, The Russell 2000 Has Recently Outperformed

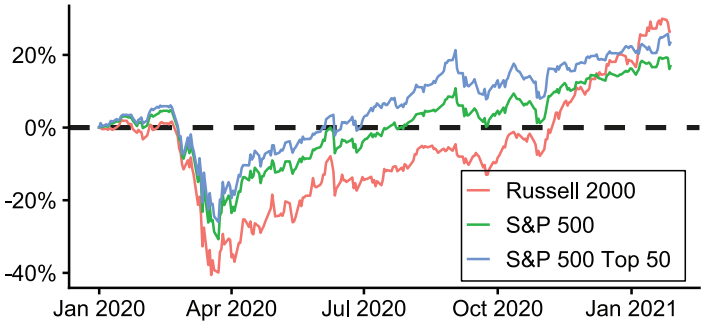
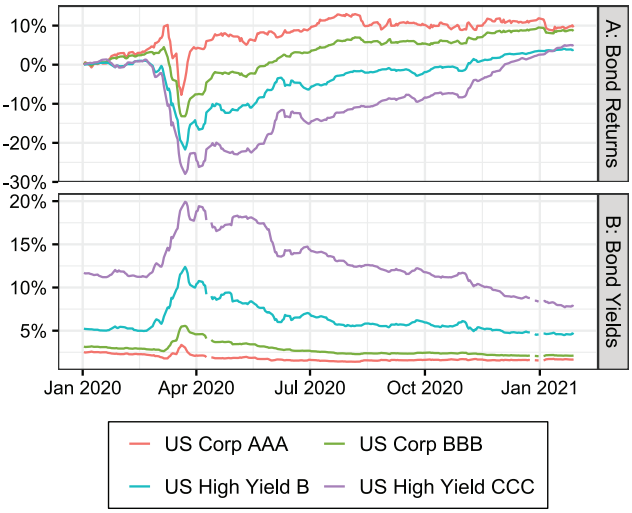


Figure 3.1 graphs the price change from January 1, 2020, for the Russell 2000 (an equity index of small cap stocks), the S&P 500, and the S&P 500 Top 50 (the 50 largest companies in the S&P 500). The plot shows that equity indices plunged following the initial COVID-19 financial market shock, with the Russell 2000 falling nearly 40%. The outsized decline in the Russell 2000 may have been due to the often more volatile income and revenue streams of smaller companies. Conversely, the S&P 500 Top 50 outperformed. This outperformance may have been related to the strong financial position of large firms in the lead-up to the pandemic, as well as the sectoral makeup of firms in the S&P 500 Top 50. Indeed, as noted in the July 2020 issue of the *DERA Economic and Risk Outlook*, many of the largest firms that make up the S&P 500 Top 50 have business models well suited to cope with recent changes in consumer and firm behavior, such as those induced by COVID-19 health and physical distancing protocols. As economic and financial stress eased starting in April, all three indices moved upwards in parallel, highlighting the broad-based recovery in financial markets. Recently, beginning in October 2020, returns on the Russell 2000 accelerated so that the total returns over the plotted period are similar across all three indices.

For fixed income markets, Figure 3.2 displays total bond market returns and yields by credit rating. Panel A shows total bond returns since 2020, while panel B plots bond yields. Because of a decline in economic activity due to the COVID-19 slowdown and thus increasing credit risk concerns and default probabilities, total returns on the lower rated B and CCC bonds fell between 15% and 25% from January to mid-March 2020 (Figure 3.2A). These credit risk concerns likely outweighed a broader decline in the risk-free interest rate (e.g., U.S. Treasuries). Indeed, the poor returns for lower rated securities through March coincided with a spike in yields (Figure 3.2B) that began to abate in April 2020. Since then, risk-free interest rates have fallen (Figures 2.3 and 2.6), and bond market conditions have eased considerably. Hence, yields across rating categories have returned to or fallen below their pre-pandemic levels (Figure 3.2B), as bond return indices have marched upwards (Figure 3.2A).

Figure 3.2: An Easing of Financial Stress Has Bolstered Lower Rated Bonds

Notes: Bond Total Returns and Yields Since January 1, 2020



Mutual Fund and ETF Investors

Key Takeaway: With COVID-19-induced financial market volatility in March 2020, mutual fund and exchange-traded fund (ETF) investors increasingly moved assets away from bond and equity market investments. Then, as credit conditions eased, investments returned, particularly in taxable bond funds.

Figure 3.3 presents weekly net fund flows into select classes of mutual funds and ETFs from January 1, 2020, to January 13, 2021. Before the COVID-19 pandemic, there were substantial fund inflows into taxable and municipal bond funds, outflows from domestic equity funds, and slight inflows into commodity funds. Then, as the COVID-19 pandemic unfolded and the corresponding economic slowdown became imminent, investors, in net, redeemed assets from both bond and domestic equity markets.

Figure 3.3: Cumulative U.S. ETF and Mutual Fund Flows

Notes: Weekly Data from January 1, 2020; $ Billions

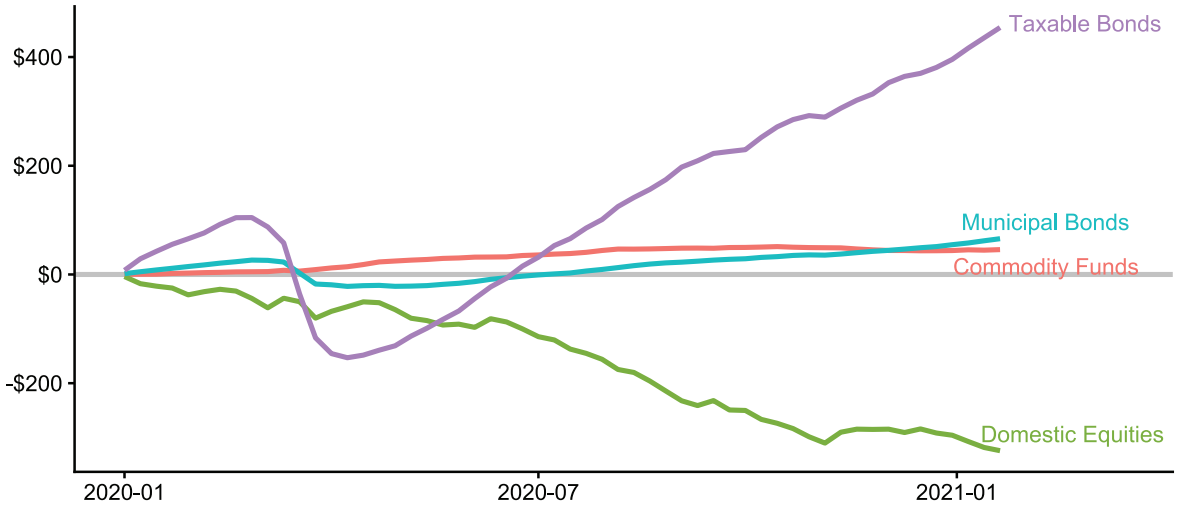


Figure Notes: Taxable bonds include, for example, corporate bonds. ETFs sell large blocks of shares to, and redeem them only in large blocks from, authorized participants, who may transact on their own behalf or act as agent for others, while individual ETF shares trade on the secondary market.

Net withdrawals from equity funds began in January 2020 and continued following the onset of the COVID-19 pandemic. Outflows from equity funds may be related to increased direct investment activity by retail investors in equities. In contrast, taxable bond funds experienced sizable inflows until late February 2020. Then, investors withdrew nearly $300 billion from taxable bond funds, as default probabilities increased for lower rated bonds and as investors may have sought to increase their cash positions. Investors' preference to move assets away from this market may have resulted in their selling bonds held directly. Outflows may have also indirectly prompted funds to sell assets in response to redemption requests. The outflows, however, reversed beginning in April, as credit market stress attenuated and as the Fed, in conjunction with the Treasury, announced the establishment of corporate bond liquidity facilities. Indeed, net fund flows into taxable bond funds increased by over $400 billion from mid-April to October 2020. A similar, though muted, trend occurred in municipal bond funds.

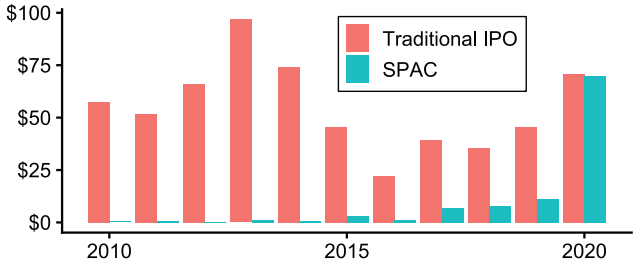
Borrowers, Securities Issuers, and Capital Formation

Key Takeaway: Capital market activity accelerated in 2020, as more firms entered public markets and bond issuance increased. Aggregate firm debt-service ratios have also risen but are in line with historical levels.

Investor interest in SPACs jumped in 2020 (Figure 3.4). In 2020 through SPACs, firms raised $70 billion in 227 deals, up from $11 billion in 2019. Activity in the traditional IPO market also expanded in 2020, with 189 deals worth $71 billion, the largest dollar issuance since 2014.

Figure 3.4: IPO Issuance Increased in 2020, With Particularly Large Gains for SPAC IPOs

Traditional IPO and SPAC issuance; Billions of dollars per year

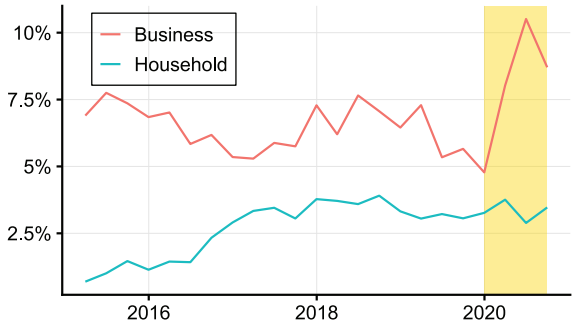


In debt markets, non-financial businesses increased borrowing in 2020 with the onset of the COVID-19 recession (Figure 3.5A). As noted in the November 2020 issue of the *DERA Economic and Risk Outlook*, firms may have increased borrowing to capitalize on low interest rates (Figure 2.6), to accumulate cash in the face of COVID-19-induced economic uncertainty (Figure 1.6), or to prepare for future investments. More specifically, Figure 3.5A shows that year-over-year (YoY) debt growth for non-financial businesses increased to about 10% in 2020Q2, up from a range of 5–7.5% from 2015 to 2019. In marked contrast, household debt growth changed little with the onset of the COVID-19 recession.

Figure 3.5: Business Debt Spiked With the COVID-19 Recession

A: Business Debt Growth Jumped In 2020 Compared To Household Debt Growth

YoY pct change in non-financial business and household debt



B: Non-Financial Bond Issuance Spiked In 2020Q2

Bond issuance by non-financial firms (2020 $; billions)

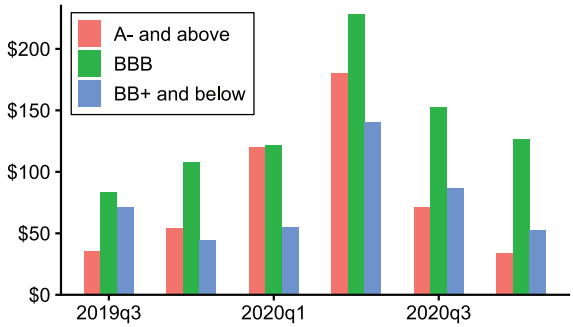
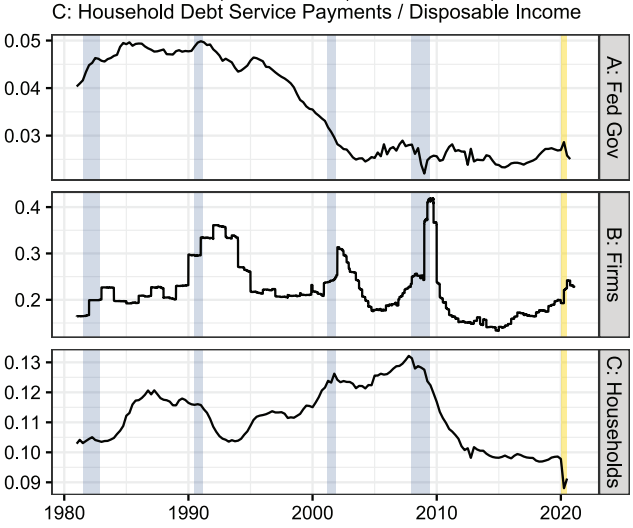


Figure 3.5B further examines non-financial corporate bond issuance by credit rating. Firms across all ratings categories issued large amounts of bonds in 2020Q2. Since then, issuance has declined to normal historical levels but remains slightly elevated for BBB-rated firms.

To gauge the burden of debt payments across sectors, Figure 3.6 plots debt-service ratio proxies for the Federal Government (panel A), public firms (panel B), and households (panel C). First, as discussed in the November 2020 issue of the *DERA Economic and Risk Outlook*, Federal Government interest payments relative to GDP (Figure 3.6A) remain in line with recent historical values, despite the passage of substantial fiscal stimulus to combat the COVID-19 recession. These low Federal Government debt-service payments are a result of historically low Treasury rates (Figure 2.6A).

Figure 3.6: Debt-Service Ratios Remain In Line With Historical Values



Next, Figure 3.6B plots the debt-service burden for public firms in aggregate, proxied by interest expense relative to earnings before interest and taxes (EBIT) over the last 12 months. While this debt-service ratio has increased as business debt issuance has accelerated (Figure 3.5), it remains in line with historical values as corporate interest rates have fallen (Figure 2.6B). Yet there is heterogeneity in debt burdens across sectors (Figure 2.8 in this report and *DERA Economic and Risk Outlook*, *November 2020*), meaning that debt payments are more onerous for some firms compared to others.

Finally, Figure 3.6C plots the aggregate household debt-service ratio, measured as debt-service payments relative to disposable income. With mortgage and other interest rates falling to historical lows (Figure 2.6), many households have refinanced their mortgages and perhaps other debt. Thus, debt-service payments have plummeted. Indeed, data as of 2020Q3 indicate that household debt-service payments account for just 9% of household disposable income.

Data Sources: **Figure 3.1:** Datastream. **Figure 3.2:** Ice Data Indices, LLC, retrieved from FRED (IDs: BAMLCC0A1AAATRIV, BAMLCC0A3ATRIV, BAMLCC0A4BBBTRIV, BAMLHYH0A1BBTRIV, BAMLHYH0A2BTRIV, BAMLHYH0A3CMTRIV, BAMLC0A1CAAAEY, BAMLC0A3CAEY, BAMLC0A4CBBBEY, BAMLH0A1HYBBEY, BAMLH0A2HYBEY, BAMLH0A3HYCEY). **Figure 3.3:** Datastream. **Figure 3.4:** Capital IQ. **Figure 3.5A:** Federal Reserve Flow of Funds, retrieved from FRED (IDs: NCBDBIQ027S, NCBLL, NNBLL, HMLBSHNO). **Figure 3.5B:** Capital IQ. **Figure 3.6A:** BEA, retrieved from FRED (IDs: A091RC1Q027SBEA, GDP). **Figure 3.6B:** Datastream. **Figure 3.6C:** FRB, retrieved from FRED (ID: TDSP).


+12,00.50
+11,00.00

Spotlight

CDS Pricing and Credit Events in 2020

Jovan Stojkovic, Anne Yang (Division of Economic and Risk Analysis), and David Metzman (Division of Trading and Markets)

Overview and Key Highlights

The COVID-19 pandemic has caused millions of deaths, as well as societal and economic disruption worldwide.[1] The impacts of the COVID-19 pandemic continue to be observed in credit markets and, in particular, the credit default swaps (CDS) market. This analysis compares the impact of the COVID-19 pandemic on the CDS market across several relevant reference entity types—corporate, sovereign, and U.S. municipal CDS, and CDS indices referencing these types of entities, as well as, particular credit events that occurred during the pandemic. These are the key takeaways:

- Although CDS prices across the board increased and peaked in late March and early April 2020, when single name CDS prices doubled and CDS index prices more than tripled compared to the beginning of the year, no major market disruptions in terms of default contagions have been observed. At the end of 2020, while prices in some sectors had remained slightly elevated, the CDS market overall continues to function as a valuable tool for hedging.

- In 2020, credit events triggered 23 CDS contracts, resulting in 19 CDS auctions. The number of credit events is almost double compared to previous years, and they were more concentrated in particular sectors, including oil and gas, consumer cyclical, and consumer noncyclical. This concentration, as well as market uncertainty, likely resulted in lower average recovery rates of 22.6%. In comparison, in 2009 during the Global Financial Crisis (GFC), there was a record high number of 45 CDS auctions, but they were in sectors across the broader economy, with an average recovery rate of 33.8%.

- There were four CDS credit events in 2020 in the sovereign CDS market, which was the highest number since 2005, but only half of these credit events could be directly linked to the economic impact of the COVID-19 pandemic. By contrast, the other half of sovereign credit events were due to unique crises that began before the pandemic.

- CDS that reference U.S. municipal debt saw an increase in trading and prices during 2020. Although there were no CDS credit events, price levels are likely to remain slightly elevated in the future, as municipalities continue to be impacted by increased health and unemployment costs and lower tax revenue.

1 A WHO timeline of its COVID-19 pandemic response is available at: (link).

1 Introduction: CDS Market

CDS are financial derivative contracts that are almost exclusively traded over the counter (OTC) by institutional investors. A CDS contract typically provides the CDS buyer protection from loss from a credit event on debt issued by the entity referenced in the CDS contract. A CDS contract can also protect the buyer against the bankruptcy, insolvency, receivership, or liquidation of the issuer of such debt. The referenced entity may be a corporate, sovereign, or municipal entity, or an index of entities or obligations of entities.[2] In return for receiving credit protection, the CDS buyer pays the CDS seller a "CDS spread." A CDS spread is a yearly premium paid in quarterly coupons. After the International Swaps and Derivatives Association (ISDA) adopted protocols in 2009, the CDS market began using standardized coupons and an upfront payment that nets out the difference of future CDS spread payments.[3] The CDS buyer or seller exchanges upfront initial payments to net out the differences between the CDS spread used in a particular transaction and the standardized, pre-set coupon rates. This standardization allows CDS contracts to be uniform, permitting traders to net future cash flows almost perfectly. Buying a CDS contract is generally the economic equivalent of being short a bond, and, likewise, selling a CDS contract is generally the equivalent of being *long a bond* with the same coupon rates.[4] A payment obligation under the CDS is typically triggered when there is a credit event that occurs for the reference entity, or issuer, referenced in the CDS. In this respect, CDS contracts are often directly related to the bonds of the reference entities.

Central clearing removed a significant amount of counterparty credit risk by centralizing that risk with the central clearing counterparties (CCPs). A Financial Stability Board (FSB) analysis of global derivatives markets shows that since the mid-2000s, there has been a significant increase in central clearing of OTC derivatives and that such growth was observed for credit derivatives where more than 60% of CDS indices and 40% of single name CDS were cleared at the end of 2017.[5] In its "Weekly Swaps Report," the Commodity Futures Trading Commission (CFTC) noted that clearing rates for CDS indices had increased to 74% by the end of 2020.[6]

In the 2020 market shock that resulted from the COVID-19 pandemic, the capital held by CCPs was not impacted by the higher number of credit events or by the lower recovery rates. Significant intraday margin calls across market participants did not require CCP members to provide additional capital to CCPs. This market shock could have created default contagions through exposures of CDS issuers, as observed during the GFC. However, thus far no such issues or contagions have been observed in the CDS market during the COVID-19 pandemic. Accordingly, both single name CDS and CDS indices continue to be valuable hedging tools.[7]

2 A CDS index is an index covering a specific region, sector, or investment rating providing proportional credit risk protection for the index buyer in case one or more of the index components default, e.g., a CDS buyer with a $100 million notional index with 100 reference entities would receive from the CDS seller, at most, $2 million if two of the reference entities default.
3 ISDA "small bang protocol": (link); ISDA "big bang protocol": (link).
4 The coupon payments are standardized and fixed. Accordingly, when a CDS contract is trading below the coupon rate, the CDS buyer receives an upfront payment to gross it up for the higher coupon payments it will be required to make during the life of the contract. When a CDS contract is trading above the coupon rate, the CDS buyer would pay an upfront payment to gross up the seller for the lower coupon payments the buyer will be required to make during the life of the contract. Standard coupon rates for CDS North American contracts are 100 basis points (bps) and 500bps, while for European contracts they are 25bps, 100bps, 500bps or 1,000bps. Both have coupon payment dates of the 20th of each of March, June, September and December. ISDA Standard North American contract specifications, available at: (link); ISDA Standard European contract specifications, available at: (link).
5 Figure C.4 of "Incentives to centrally clear over-the-counter (OTC) derivatives" (link).
6 CFTC Weekly Swaps Report (link).
7 SEC Staff report, "U.S. Credit Markets Interconnectedness and the Effects of the COVID-19 Economic Shock" (link).

2 Impact on Pricing

To understand the impact of the COVID-19 pandemic on the broader CDS market, this analysis compares normalized indices of median CDS prices from January to December 2020, discussed in the following sections:

Section 2.1, Impact on CDS market and indices: Five global CDS indices: North American Investment Grade ("NA.IG"); North American High Yield ("NA.HY"); and North American High Volatility ("NA.Hvol") indices; and European investment grade ("iTraxx") and high-yield ("Crossover") indices, (Exhibit 4.1, top chart) and the impact on market liquidity (Exhibit 4.1, bottom chart).

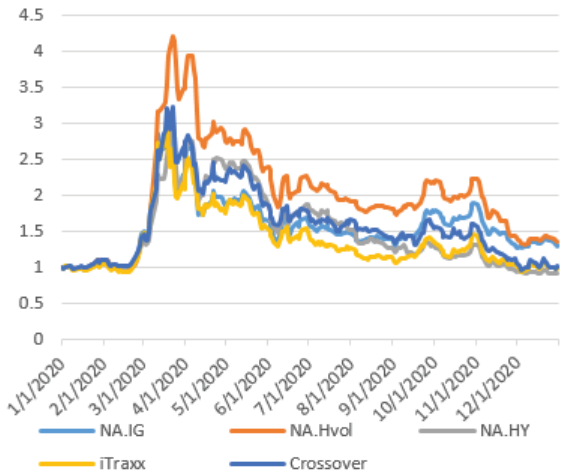
Section 2.2, Impact on single name corporate CDS: Four affected sectors: *consumer cyclical, consumer noncyclical, oil and gas,* and *other* sectors (Exhibit 4.2).

Section 2.3, Impact on single name sovereign and municipal CDS: sovereign CDS split into *advanced economies* (AEs), *U.S. municipal* (U.S. Muni), and *emerging market economies* (EMEs) (Exhibit 4.3, top chart) and price movement of CDS referencing sovereign entities that had a credit event—Argentina, Ecuador, Lebanon, and Zambia (Exhibit 4.3, bottom chart).

2.1 Impact on CDS Market and Indices

In the first quarter of 2020, the combination of the COVID-19 pandemic and the oil-price war led to increased economic uncertainty and record CDS market activity.[8] As CDS indices are often regarded as the most liquid and effective instrument to hedge credit risk, CDS prices had a surge of three to four fold, before they dropped back to close to normal levels starting in the late fall of 2020 (Exhibit 4.1, top chart). These economic shocks impacted certain reference entities especially hard, particularly in the *oil and gas and consumer cyclical sectors*. A survey of 172 market participants around the world found that the wider swap market experienced a drop in liquidity earlier in 2020 and that the CDS market was particularly impacted. The situation improved after the Federal Reserve (Fed) and the European Central Bank (ECB) announced that they would intervene in the markets.[9] The relative bid-offer spread scaled by the mid-CDS price, which is used as an indicator for liquidity, confirms this temporary drop in liquidity in March/April, which was more pronounced in the higher normalized relative CDS index bid-offer spread (Exhibit 4.1 bottom chart).

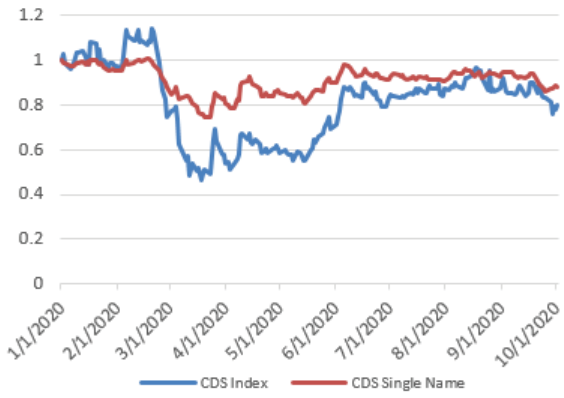
Normalized CDS Market Prices of CDS Indices During the COVID-19 Pandemic (2020) — Exhibit 4.1



Sources: S&P Capital CDS price, normalized into an index.

The plot displays the largest CDS indices, North America investment grade ("NA.IG"), high yield ("NA.HY"), and high volatility ("NA.Hvol"), and European investment grade ("iTraxx"), and high yield ("Crossover").

Normalized Relative Bid-Offer Spread from January to October, 2020



Source: S&P Capital CDS pricing.

The plot displays a drop in liquidity (relative bid-offer spread) at the peak of the crisis before the regulatory interventions, CDS Index (blue line) and CDS single name (red line).

2.2 Impact on Single Name Corporate CDS

Oil and Gas

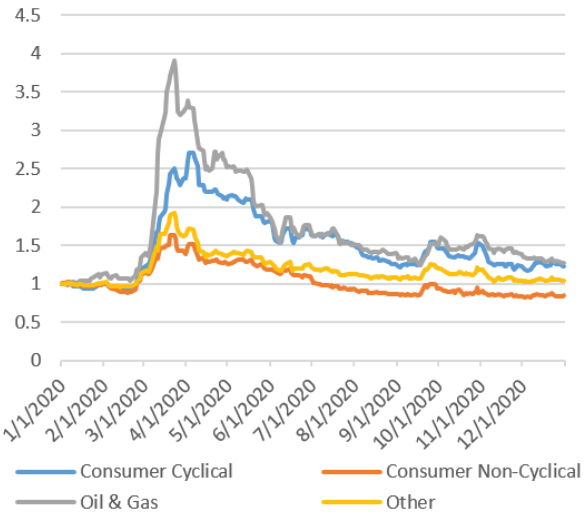
The *oil and gas* sector was impacted by two overlapping shocks. In particular, the early phases of the COVID-19 pandemic occurred while oil and gas firms were already suffering from

8 The Washington Post describes "the oil-price war" as, "*A petroleum price war [that] exploded in March after the dramatic collapse of an alliance between the OPEC cartel and Russia, a pact that had underpinned world oil markets for three years. In the days that followed, the price of oil plunged more than 50%, sending shockwaves through a global economy reeling from the fallout of the coronavirus pandemic.*" Washington Post, "Why the OPEC-Russia Blowup Sparked All-Out Oil Price War" (link).

9 "The Impact of COVID-19 and Government Intervention on Swaps Market Liquidity" (link).

lower commodity prices. CDS referencing oil and gas companies accounted for 6 out of 19 corporate CDS credit events, or almost one-third, since April 2020.[10] CDS prices on a number of oil and gas companies drastically increased again starting in late September 2020 and some oil and gas companies were trading close to all-time highs in the fall of 2020. Not surprisingly, in the broader context, CDS prices on EMEs that are significant exporters of raw commodities, particularly *oil and gas*, increased in the first months of the pandemic. The press and analysts reported on this trend for the Gulf states, but none had a credit event in 2020.[11]

Normalized CDS Market Prices of Key Sectors During the COVID-19 Pandemic (2020) Exhibit 4.2



Sources: S&P Capital CDS price, normalized into an index.
The plot displays CDS referencing major sectors of the global economy.

Consumer Cyclical/Consumer Noncyclical

The consumer cyclical sector refers to companies relying heavily on the business cycle and economic conditions. Consumer cyclical firms include industries such as automotive, travel, housing, entertainment, and retail. Four out of 19 corporate CDS triggers since the onset of the COVID-19 pandemic involved the debt of companies in the *consumer cyclical* sector.[12] CDS written on *consumer noncyclical* companies also triggered credit events.[13]

10 This figure is calculated based on staff observations of credit events listed on the CDS Determination Committee website (link) and Credit Fixing website (link).
11 Reuters, "Credit risk rises for Gulf crude exporters on virus fears" (link).
12 Source: S&P Capital CDS pricing.
13 Sector categorizations do change from time to time.

2.3 Impact on single Name Sovereign and Municipal CDS

Advanced and emerging market economies have been impacted differently by the pandemic, and this is reflected in their different CDS price movements. The impact of the COVID-19 pandemic on AEs' credit markets seemed to be transient, especially in the near term. Although these economies issued large amounts of debt to protect their financial systems, the demand for less risky assets, predominantly government bonds, lowered their borrowing costs. The initial uncertainty caused by the COVID-19 pandemic created a flight to safety, attracting investors to AEs' debt. In the immediate term, at the beginning of 2020 in the infancy of the COVID-19 pandemic, AEs had minimum CDS price increases, but by late March and into April of 2020, the pricing on CDS issued on AEs more than doubled. This elevated level was relatively brief, as prices started to revert and, by the end of the summer, almost totally recovered. At the end of September 2020, the median price of a CDS from AEs was trading at 1% to 5% higher compared to the beginning of the year — in essence, trading at par.[14]

On the other side of the spectrum, three types of sovereign CDS credit event scenarios developed for EMEs: (1) EMEs that had ongoing problems with expected credit events even before the pandemic; (2) EMEs that were severely impacted by the COVID-19 pandemic and reprioritized their spending; and (3) EMEs that are significant exporters of raw materials, where CDS prices increased as a result of a decrease in the demand for raw materials.

Impact on Emerging Market Economies' CDS

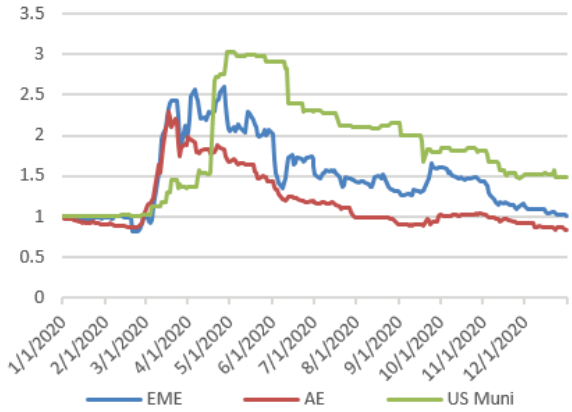
CDS prices referencing debt issued by EMEs experienced significant price volatility, and the economic effects of the COVID-19 pandemic seem to be nontransient for EMEs. Four EMEs triggered their CDS in 2020.[15] Two credit events were observed in the spring of 2020, and were somewhat expected, as the two countries suffered from social economic issues and a shortage of hard currencies. Both of these credit events were a consequence of deep economic problems and political instability.[16] A third default was the result of not treating all debt with the same seniority equally. CDS pricing data indicates that only one credit event appeared to be very clearly and directly related to the economic impact of the COVID-19 pandemic. In this instance, that country's government decided to use funds to relieve some of the effects of the COVID-19 pandemic.[17] Another default is a result of not treating all debt with the same seniority equally.[18]

14 There were instances when the relative order changed. For example, in early summer, U.S. sovereign CDS were, for the first time, priced higher than CDS prices on debt issued by France, but these minor price changes did not have a great impact and were transient.
15 Staff reviewed CDS credit events listed on the CDS Determination Committee website (link) and Credit Fixing website (link).
16 Congressional Research Service, "Argentina's Economic Crisis and Default" (link) and facts presented to the DC with regard to Argentina (link).
17 Facts presented to the DC with regard to Ecuador (link).
18 Facts presented to the DC with regard to Zambia (link).

The price dynamics in the period prior to CDS triggering show the difference in the default events. Exhibit 4.3 shows a price index of the four sovereign CDS prices 50 days before the Credit Derivatives Determination Committee (DC) determined their auction dates.[19] One month before the default, the CDS price of one sovereign drastically increases — it came close to tripling compared to initial levels (Exhibit 4.3, bottom chart). This price jump in CDS referencing this sovereign reflected news that the sovereign's government planned to suddenly shift funds to focus on the pandemic, instead of paying foreign bondholders.[20] This sudden price increase is likely indicative of institutional investors being surprised by the government's decision. Another sovereign's default, while likely related to the pandemic, did not have a significant impact on the market because of the technical nature of the credit event and the small CDS outstanding notional. This sovereign's government may have given preference to certain government debt, as compared to other debt holders.[21]

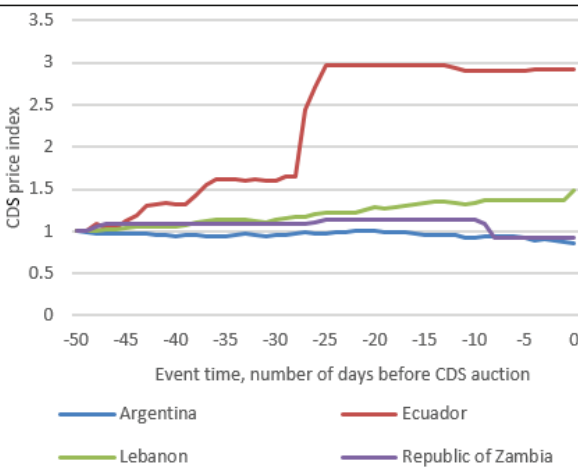
In the fall of 2020, CDS referencing South and Central American sovereigns continued to increase as CDS prices increased by 35%. Similar increases were also observed in other geographical regions including CDS referencing African and Eastern European sovereigns; prices on those CDS contracts approximately increased by more than 15% and 30%, respectively.

Normalized CDS Market Prices of Sovereigns During the COVID-19 Pandemic (2020) Exhibit 4.3



Sources: S&P Capital CDS price, normalized into an index. The plot displays CDS referencing emerging market economies (EMEs), advanced economies (AEs), and U.S. municipalities (U.S. Muni).

Normalized CDS Price Index 50 Days Before CDS Auctions



Source: S&P Capital CDS prices

19 The DC is a committee made up of relevant market participants that, among other things, determines credit events (link).
20 Bloomberg, "Ecuador Default Odds Surge as Virus Prompts Calls for Moratorium" (link).
21 Financial Times, "The 'blood, sweat and tears' behind Zambia's default,"("Hours before the default, bond investors rejected a request for a standstill over concerns that Mr Lungu's [President of Zambia] government was not coming clean on Chinese debts worth $3bn. The government said that bondholders were getting the same treatment as Chinese and other creditors that it had already defaulted on.") (link); Facts presented to the DC with regard to Zambia (link).

Although larger sovereigns are unlikely to default in the near or medium term, as the press reported, the relatively high CDS price is likely indicative of future credit concerns.[22] Similar, prominent increases were not observed in Asia.

Impact on U.S. Municipal CDS

At the start of the COVID-19 crisis, there was little to no impact on CDS contracts that reference U.S. municipal entities. This suggests that investors did not immediately realize the impacts on the costs and future needs of the U.S. municipalities and local governments. During the period prior to the COVID-19 pandemic, the price dynamics of CDS referencing U.S. municipals were similar and correlated to investment grade sovereigns, Exhibit 4.3, top chart.

Due to COVID-19-related impacts on increased health costs, lower tax revenues, and large unemployment benefits paid out by local and state governments, U.S. municipal CDS prices peaked in mid-May, at a slightly later point in time, and were trading at three times their January levels. These higher price levels occurred in CDS referencing larger municipalities, such as Chicago and New York City, and the states of Illinois and California. Such spikes in CDS pricing generally reflect the surges of COVID-19 cases in these states and localities. Beginning in May 2020, the prices of CDS referencing these municipalities slowly and steadily decreased, but never again reached the lower initial pre-COVID-19 pandemic levels. In late summer and early fall of 2020, the trend changed and municipal CDS prices began to hold steady at higher levels, with some of them slightly increasing.

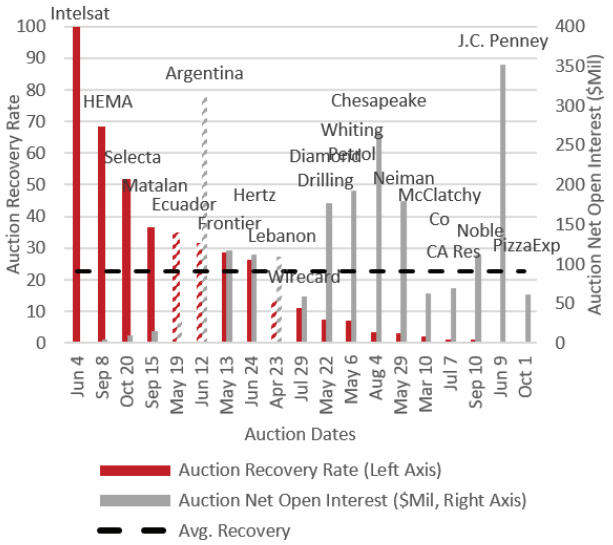
3 Impact on Recovery Rates

During the peak economic impact of the COVID-19 pandemic in March and April 2020, large movements in CDS prices were observed across different sectors and indices. The price changes reflected a change in value and expected payments, but because of a lag in the timing of CDS triggers, the credit event dates and hence potential CDS auctions were delayed. For example, there is normally a grace period of 30 days, or more, following a failure to make an interest payment before a credit event can be declared, thereby triggering the CDS. If there is a potential CDS trigger resulting from a credit event, under a CDS contract, a holder of the CDS can submit a request to the DC to decide whether there has been a credit event triggering payments under the CDS contract. The DC then decides whether the CDS have been triggered. The three most common credit events triggering a payment under CDS are (1) bankruptcy or insolvency of the issuer, (2) payment defaults (which usually include a grace period for bond interest payments), and (3) debt restructuring. It there is a CDS credit event, the buyer of the CDS is normally paid par for the obligation, minus the current value of the defaulted debt, which is determined by an auction — the auction recovery rate.

22 Bloomberg, "Year of Pain Sets Stage for 2021's Top 10 Emerging-Market Themes" (link).

Market stress was evident in the number of CDS contracts that had a credit event in 2020, amounting to 23 contracts in total. CDS on high-risk debt were the first to be impacted. This number included 4 sovereign debt issuers, out of which 3 held auctions (see shaded lines in Exhibit 4.4) and 19 corporate debt issuers, out of which 16 held auctions (bold in Exhibit 4.4). There were only 12 CDS auctions in 2019 and 6 auctions in 2018 across all corporate entities. Prior to the COVID-19 pandemic, Venezuela was the last sovereign to have a credit event, which was in 2017, with a recovery rate of 24.5%.[23] While the number of CDS contracts that had a credit event was larger in 2020 relative to previous years, that number is still relatively small compared to the GFC. For example, in 2009 there were 45 CDS auctions, which resulted from defaults by 43 corporate and 2 sovereign issuers. In addition, the observed recovery rates in 2020 are lower compared to the previous years. In 2019 and 2018, the average recovery rates for corporates were 46% and 57%, respectively. The dashed line in Exhibit 4.4 denotes the average recovery rate in 2020.[24]

Auction Dates and Results Sorted by Recovery Rate, Largest to Smallest (2020) — Exhibit 4.4



Source: Credit fixing (link).

List of credit events, their corresponding recovery rate (left axis/red), and net open interest (right axis/grey), in the CDS auction from credit fixing, sorted by largest to smallest recovery rate. In total, there were 16 corporate (bold) and 3 sovereigns (shaded) CDS auctions settled in 2020.

CDS credit events in 2020 were clustered in particular sectors. For example, CDS credit events took place in the oil and gas sector, specifically offshore drilling.[25] In addition, brick and mortar focused retailers were affected. This appears to be directly related to the COVID-19 pandemic, as some retailers have defaulted with noticeably lower recovery rates, meaning their *cheapest-to-deliver bonds* were valued at lower than initially expected recovery rates.[26] Meanwhile, other U.S. brick and mortar retailers were downgraded, resulting in the reshuffling of the investment grade and high-yield indices. The unusually low recovery rates from CDS auctions of brick and mortar retailers are likely to be even lower than what investors had initially expected when they entered the CDS contracts. We expect

23 Facts presented to the DC with regard to Venezuela (link) and the auction results (link).
24 According to J.P. Morgan, the default cycle caused by the COVID-19 pandemic in Europe will be less severe than expected because of monetary and fiscal stimulus (Bloomberg terminal). Recovery rates in these times of crisis have been the lowest average recovery rates since records began in 2005. These low recovery rates led to record credit derivatives payouts. (Financial Times article: link).
25 Facts presented to the DC and the auction results with regards to Whiting Petroleum Corp. (link/link), Diamond Offshore Drilling (link/link), California Resources (link/link), Chesapeake Energy Corp. (link/link), Noble Corp. (link/link), and Ensco (link), respectively.
26 Facts presented to the DC with regard to J.C. Penney (link) and the auction results (link). Facts presented to the DC with regard to Neiman Marcus (link) and the auction results (link).

that these low recovery rates occurred because defaults clustered in particular industries. For example, several companies in the retail sector defaulted around the same time, and — examined in relation to their liquidation value — the real estate of each company may have a lower recovery value as compared to a scenario where both companies did not default contemporaneously.

4 Conclusion

No major market disruptions have been observed in the CDS market in connection with the COVID-19 pandemic, and the CDS market continues to function well, as have the CCPs. Single name CDS and CDS indices overall, with some exceptions, were trading at a slight premium at the end of 2020, compared to where they were at the beginning of that year. Those trends are expected to continue into 2021, but the actual outcome will reflect the overall state of the economy, the course of the COVID-19 pandemic, and the speed of the vaccine rollout. The prices of CDS referencing EMEs and municipal issuers may remain elevated because of health care costs that are expected to continue to increase and which may lead to higher government debt levels. The municipal CDS market is small relative to credit markets, and any credit events that may occur are not expected to lead to broader market contagion. The markets for single name CDS and CDS indices are not expected to be disrupted and are expected to continue to function as valuable hedging tools for the wider credit markets.

U.S. SECURITIES AND EXCHANGE COMMISSION