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

DERA Economic and Risk Outlook

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2020

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About the Division of Economic and Risk Analysis (DERA): As the agency's "think tank," DERA's analysis draws on multidisciplinary quantitative and qualitative approaches and leverages its knowledge of market institutions and industry practices to help the Commission address complex matters. DERA assists in the Commission's efforts to identify, analyze, and respond to risks and trends, including those associated with new financial products and strategies. DERA engages in activities across the entire range of the SEC, including policy-making, rule-making, enforcement, compliance, and examination. In addition, DERA economists participate in and produce high-quality research. Specifically, 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*.

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Key Highlights as of April 15, 2020

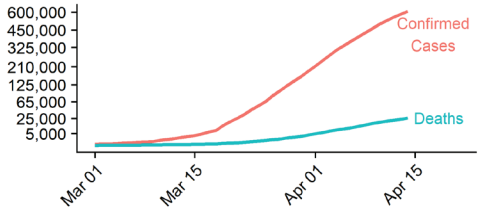
Economic Activity in the United States and Globally is on Pause to Battle the Coronavirus (COVID-19) Pandemic: To combat the coronavirus pandemic, policymakers have enacted stay-at-home orders for nonessential workers and encouraged citizens to practice social distancing. These actions, while necessary for public health, prevent many consumers and firms from engaging in their typical, day-to-day economic activities. In anticipation of a sharp slowdown in economic activity, during mid-March U.S. equity indices declined, firm default probabilities spiked, and financial market volatility surged as investors expected starkly lower corporate profits and revenues. In addition to reducing profits, lower revenues also render debt service less certain, leading to increased interest rates for lower rated debt and widening credit spreads that have persisted through mid-April. As the coronavirus-induced economic downturn unfolded, initial unemployment claims, often a leading economic indicator, spiked. In response to the crisis, both the Federal Government and the Federal Reserve (Fed) have implemented unprecedented economic and monetary stimulus.

The Proliferation of Coronavirus Cases

Increases in U.S. Coronavirus Cases: The number of coronavirus cases climbed in March 2020 and subsequently totaled over 600,000 by April 15 with 25,000 deaths (Figure 1.1). Dr. Anthony S. Fauci, the Director of the National Institute of Allergy and Infectious Diseases (NIAID), expects U.S. coronavirus deaths to rise from the last levels seen in Figure 1.1.

Figure 1.1: U.S. Coronavirus Cases and Deaths Have Increased

Note: Vertical Axis has a square-root scale



Financial Market Stress and Fed Response

The Coronavirus-Induced Economic Slowdown Quickly Rippled through Corporate Equity and Debt Markets: In response to a rapid rise in the number of confirmed coronavirus cases in the United States in early March 2020, authorities announced stay-at-home orders for workers in many industries and encouraged social distancing policies for the entire population. A widespread slowdown in economic activity ensued, a spike in unemployment became likely, and a large decline in corporate revenue and profits followed. Equity prices declined sharply and corporate debt became riskier. In addition, during mid-March, uncertainty rose dramatically as witnessed in a historically large rise in the VIX index (Figure 1.2). The market volatility is related to varying estimates of

Figure 1.2: The VIX Volatility Index Spiked Once Investors Expected a Large, Negative Shock Due to COVID-19

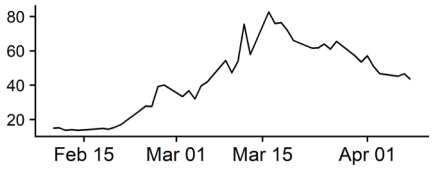
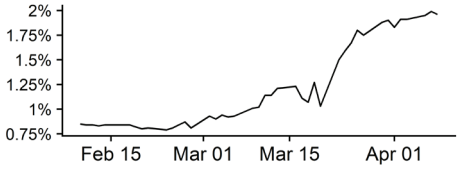


Figure 1.3: Interest Rates on Lower Rated Corporate Debt Jumped

Notes: Baa - Aaa Corporate Bond Yields

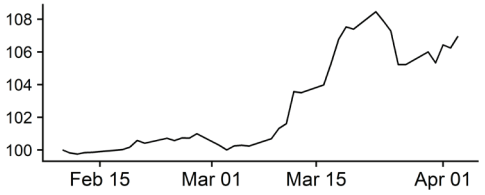


the severity and length of the impact of the coronavirus on the economy as well as the nature of policymakers' response to the crisis. These changing dynamics corresponded with widening credit spreads that reflect increased default probabilities and deteriorating expectations of firms' ability to service debt (Figure 1.3).

As the Coronavirus Pandemic Intensified, Firms and Investors Increasingly Demanded Dollars as Prospects of Future Revenue Declined: Coincident with lower expectations of economic output and corporate profits, many firms, investors, and households rushed to strengthen their cash balances to better cope with the adversity that they expected. Firms initiated asset sales and began to draw on their credit lines. This large-scale shift likely contributed to the decline in asset values and the surge in volatility documented above, but it also led to a marked increase in the value of the dollar. Figure 1.4 shows that between February 10 and March 23, coinciding with the rise of coronavirus-related market uncertainty and volatility, a trade-weighted dollar index increased by over 8%.

Figure 1.4: The Value of the Dollar Spiked as Economic Activity Halted

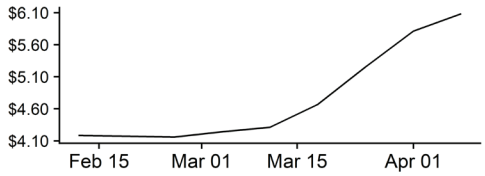
Notes: Trade Weighted Dollar Index



Declining Economic Output, Market Illiquidity, and Financial Market Stress Prompted the Fed to Pursue Crisis-Era Policies and Increase the Size of Its Balance Sheet: In response to the significant stresses in financial markets, beginning in mid-March 2020 the Fed initiated a wide array of crisis-era policies under pressing circumstances to provide exceptional monetary stimulus and market liquidity. These actions included large-scale asset purchases of U.S. Treasuries and agency mortgage-backed securities (MBS) as well as various liquidity facilities and dollar swap lines. Altogether with these actions, as of April 15, the Fed's balance sheet has grown by about $2 trillion since mid-February (Figure 1.5).

Figure 1.5: The Fed Increased the Size of Its Balance Sheet To Fight Market Illiquidity and Provide Monetary Stimulus

Notes: Trillions of Dollars

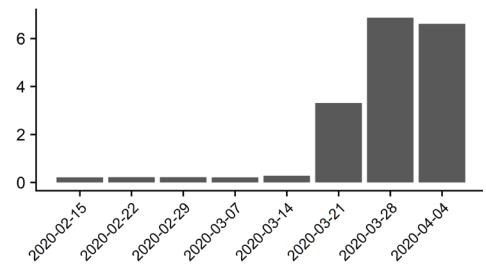


The Coronavirus Unemployment Spike and Fiscal Stimulus

To Counter the Sharp Coronavirus-Induced Increase in Unemployment, the Federal Government Implemented Unprecedented Economic Stimulus: Because of the coronavirus economic slowdown, weekly initial unemployment claims increased by more than a factor of 10 to over 6 million in late March and early April (Figure 1.6). To combat the far-reaching economic stoppage, the Federal Government implemented fiscal stimulus of $2 trillion through the CARES Act. This law allocates $560 billion for individuals with stimulus checks

Figure 1.6: Initial Unemployment Claims Leapt To Over 6 Million per Week Following The COVID-19 Economic Slowdown

Notes: Millions



of up to $1,200 per person for those earning less than $75,000 and provides for the expansion and extension of unemployment benefits. In addition, the bill allocated large amounts for loans, loan guarantees, and other investments, including $500 billion for large corporations; $377 billion for small businesses; $340 billion for state and local governments; and $153.5 billion for public health.

The Coronavirus Impact Varies Markedly by Sector

The Coronavirus Economic Fallout has had an Outsized Negative Effect on the Energy, Industrial, Transportation, and Homebuilding Sectors: Figure 1.7 proxies the coronavirus impact by sector using exchange-traded fund (ETF) returns from February 10 to April 10, 2020. The hardest-hit sectors (red lines) include the energy, homebuilder, industrial, metals and mining, and transportation sectors. The energy, industrial, and metals and mining sectors face large demand declines in the aftermath of the pandemic, where oil firms are further impacted by increased price and supply competition. Homebuilders are suffering from the broad economic decline, potential mortgage market dislocations attributable to turmoil in the non-bank sector, and the impact of social distancing on the showing of homes. Likewise, coronavirus-induced social distancing is directly reducing travel and transportation across the country.

Figure 1.7: ETF Returns By Category from February 10, 2020

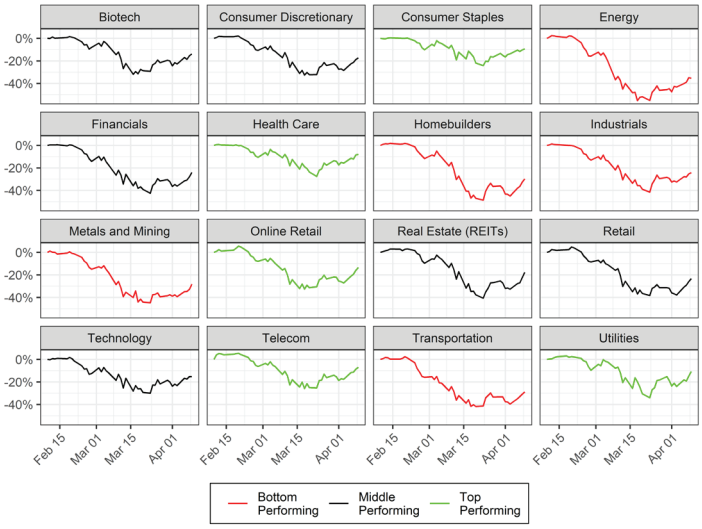


Figure Notes: Red lines are the 5 industries with the lowest (most negative) total price change from February 10 to April 10, 2020. Green lines are the top performing industries in terms of total price change from February 10 to April 10, 2020.

CARES Act: https://www.congress.gov/bill/116th-congress/house-bill/748/text

NPR CARES Act Summary: https://www.npr.org/2020/03/26/821457551/whats-inside-the-senate-s-2-trillion-coronavirus-aid-package

Figure Notes: Blue bars are NBER recessions.

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 CSSE (available at https://github.com/CSSEGISandData/COVID-19). **Figure 1.2:** Chicago Board Options Exchange, retrieved from The Federal Reserve Economic Database (FRED) (ID: VIXCLS). **Figure 1.3:** Moody's, retrieved from Wharton Research Data Services (WRDS). **Figure 1.4:** Fed Board, retrieved from FRED (ID: DTWEXBGS). **Figure 1.5:** Fed Board, retrieved from FRED (ID: WALCL). **Figure 1.6:** U.S. Employment and Training Administration, retrieved from FRED (ID: ICSA). **Figure 1.7:** 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 path of interest rates; and (3) financial market signals and credit conditions.

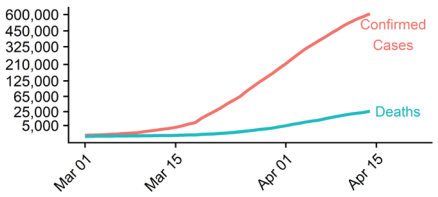
Economic Fundamentals and Growth

Key Takeaway: In the wake of the coronavirus pandemic, U.S. economic output is predicted to fall substantially, initial unemployment claims increased to a rate of more than 6 million per week, and 701,000 jobs were lost during the month ending March 12, 2020. Economic growth is forecasted to turn positive again by 2020Q3.

U.S. coronavirus cases increased in March and April 2020, with more than 600,000 confirmed cases and over 25,000 deaths as of April 15, 2020 (Figure 2.1). Dr. Anthony S. Fauci, the director of the NIAID and a leading infectious disease expert, expects U.S. deaths due to the coronavirus to rise from the last levels seen in Figure 2.1.

Figure 2.1: U.S. COVID-19 Confirmed Cases and Deaths Have Increased

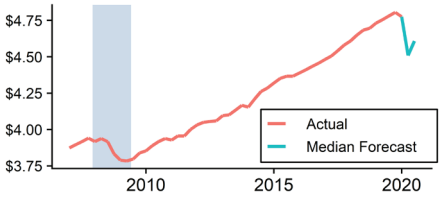
Note: Vertical Axis has a square-root scale



To fight this pandemic, local and federal U.S. policymakers issued stay-at-home guidelines for nonessential workers and encouraged citizens to practice social distancing. Although health experts deemed such actions as necessary for public health, they severely limit consumers and firms from participating in their usual, everyday economic activities. Figure 2.2 plots real quarterly gross domestic product (GDP) dating back to the Great Recession, as well as forecasted GDP for 2020Q1-Q3. While the U.S. economy was consistently expanding at a 2–3% annual rate prior to the coronavirus outbreak, forecasters currently predict a 6% GDP drop in just two quarters from its peak in 2019Q4 (median forecast tabulated by MarketWatch). Assuming that the economy would have otherwise grown at 2%, the lost economic output due to the coronavirus outbreak just through 2020Q2 will be nearly $400 billion. In historical terms, a two-quarter GDP drop of this magnitude is unprecedented. During the Great Recession of 2008-09, GDP from peak to trough fell only 4%, as seen in Figure 2.2.

Figure 2.2: A Large Predicted Drop in 2020Q2 GDP Followed by a Return to Growth in 2020Q3

Notes: Quarterly Real GDP ($ Trillions)



Going forward, the severity of the coronavirus economic damage will hinge on the pandemic's duration *and* how quickly the United States and its principal trading partners can resume normal economic activity in whole or in part. Many factors will determine the time for recovery, including frictions in labor market search and matching, firm failures, housing and mortgage market activity, as well as consumer confidence and spending. Indeed, the resumption of economic activity will require a recommencement of both supply and demand. Thus, even if firms restart production, households may be hesitant to venture out to enjoy the available potential output. Such hesitancy may be a direct consequence of the pandemic. For example, when restaurants reopen, unless customers walk in to dine in those establishments in the same numbers or with the same frequency as before the slowdown, economic activity will not match pre-coronavirus levels. Households may also not quickly return to their normal pre-coronavirus consumption patterns because of the economic fallout of the pandemic. If severely affected consumers only slowly regain employment or if their savings dwindled as the economy contracted, they may forego some purchases immediately after the crisis. Nonetheless, forecasts as of mid-April collected by MarketWatch (see Figure 2.2) expect the United States to register robust economic growth at an annual rate of 7% in 2020Q3, but with output below its pre-coronavirus levels.

The sudden and unprecedented impact of the coronavirus shock is also apparent in the swift rise in initial unemployment claims, which reached over 6 million per week in late March and early April (Figure 2.3). The jobless claims will likely morph into a higher unemployment rate.

Figure 2.3: Initial Unemployment Claims Increased To Over 6 Million per Week After the COVID-19 Economic Slowdown

Figure 2.4 shows several other economic series that are already experiencing coronavirus-induced economic weakness. Figure 2.4A documents that after a year of increasing employment, the economy lost 701,000 jobs in the month ending March 12, 2020. The leisure and hospitality sector accounted for the bulk of the job losses where employment fell by 459,000.

Figure 2.4A: Change In Nonfarm Payrolls (Thousands)

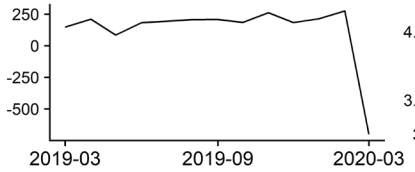


Figure 2.4B: Unemployment Rate

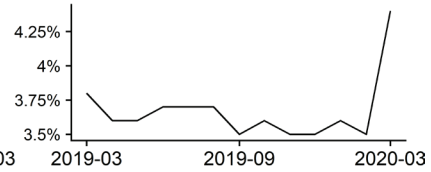


Figure 2.4C: Total Vehicle Sales (Millions)

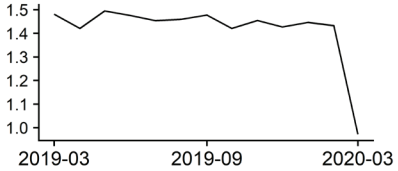
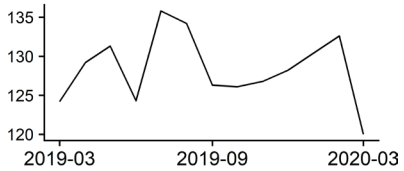


Figure 2.4D: Consumer Confidence Index



Key Figure Takeaway: The coronavirus pandemic has taken a large toll on employment and consumption.

Figure Data Sources: **Figure 2.4A:** The Bureau of Labor Statistics (BLS), retrieved from FRED (ID: PAYEMS). **Figure 2.4B:** BLS, retrieved from FRED (ID: UNRATE). **Figure 2.4C:** Bureau of Economic Analysis (BEA), retrieved from FRED (ID: TOTALSA). **Figure 2.4D:** Datastream.

The jump in the unemployment rate for the United States overall was 0.9 percentage points to 4.4%. The 20+ million unemployment claims filed in late March and early April, as noted above, will likely translate into an unemployment rate that will be markedly higher in upcoming months.

Altogether, the economic outlook is bleak in the near term, whereas longer term economic prospects depend on the swiftness of virus containment and the restarting of the U.S. economy. Indeed, while the end date for the pandemic-induced economic pause is not yet known, forecasts indicate that growth in 2020Q3 may be around 7%, but output will be substantially below pre-coronavirus levels (Figure 2.2).

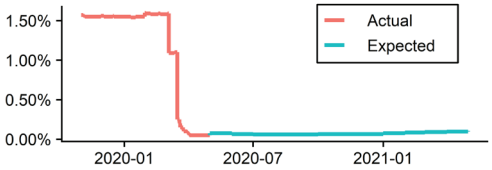
Monetary Policy and Interest Rates

Key Takeaway: To counter the coronavirus pandemic, the Federal Reserve Open Market Committee (FOMC) lowered the target range for the fed funds rate to 0–0.25% and announced unlimited purchases of Treasury securities and agency MBS. In addition, the Fed, in conjunction with the U.S. Treasury, initiated various liquidity and purchasing facilities targeting corporate bonds, small- and medium-sized businesses, municipal securities, asset-backed securities (ABS), dollar swaps, commercial paper, and repo markets, among others, to provide further monetary stimulus and battle market illiquidity. As of April 15, 2020, the size of the Fed's balance sheet had already surpassed $6 trillion. Yet yields on a variety of lower rated debt instruments rose as default probabilities increased and market liquidity fell. The yield curve suggests a low risk-free rate moving forward, but wide credit spreads persist as of mid-April 2020.

As the coronavirus pandemic unfolded, the FOMC lowered the fed funds rate first by 50 basis points to a target range of 1–1.25% on March 3 and then to a target range of 0–0.25% on March 15. Figure 2.5 plots the recent path of the fed funds rate, along with the expected fed funds rate as implied in futures markets' prices. Futures traders expect the fed funds rate to stay at its zero lower bound; hence, the Fed's monetary stance is expected to remain accommodative as the economy recovers from the coronavirus crisis.

Figure 2.5: After the Fed Lowered the Fed Funds Rate to Zero, Futures Markets Signal Sustained Low Interest Rates

Notes: Actual and Expected Effective Fed Funds Rate



Note: More information and term sheets associated with the Fed's extraordinary monetary policy actions can be found at https://www.federalreserve.gov/newsevents/pressreleases/monetary20200323b.htm. For the most recent Fed press releases, see https://www.federalreserve.gov/newsevents/pressreleases.htm.

To support market liquidity, the Fed also announced unlimited purchases of Treasuries and agency MBS (both commercial and residential). These large-scale asset purchases coincided with the formation of numerous facilities to provide liquidity and further monetary stimulus in credit markets. The Fed programs include facilities to support liquidity in various markets and target corporate bonds and ETFs in the primary and secondary markets (rated BBB-/Baa3 or higher as of March 22, 2020, and BB-/Ba3 at the time of purchase); AAA-rated ABS backed by certain loans, including student loans, auto loans, credit card loans, loans guaranteed by the Small Business Administration (SBA), commercial mortgages, (leveraged) corporate loans through collateralized loan obligations (CLOs), or related securities; money market funds; municipalities; and loans to small- and medium-sized businesses. Fed measures also consist of dollar liquidity swap lines with foreign central banks and lowering the primary credit rate by 150 basis points to encourage banks to borrow from the discount window.

Altogether, the Fed's balance sheet has increased from about $4.1 trillion to over $6 trillion in response to the crisis (Figure 2.6). The purchase of Treasury securities accounts for the majority of this change.

While the recent asset purchases are sizable, Figure 2.6 also places the data in historical perspective by showing data back to the Great Recession. In response to the Great Recession, Fed assets grew from just under $1 trillion to approximately $4.5 trillion, an addition of $3.5 trillion, which is larger both in absolute and relative terms than the Fed's recent actions. Yet as the economic effects of the coronavirus crisis linger, the Fed might further increase asset purchases, and thus the size of its balance sheet in the coming months.

Figure 2.6: The Fed has Increased the Size of its Balance Sheet In Response to the COVID-19 Crisis to over $6 Trillion

Note: Trillions of Dollars; Vertical Axis is in sqrt(dollars)

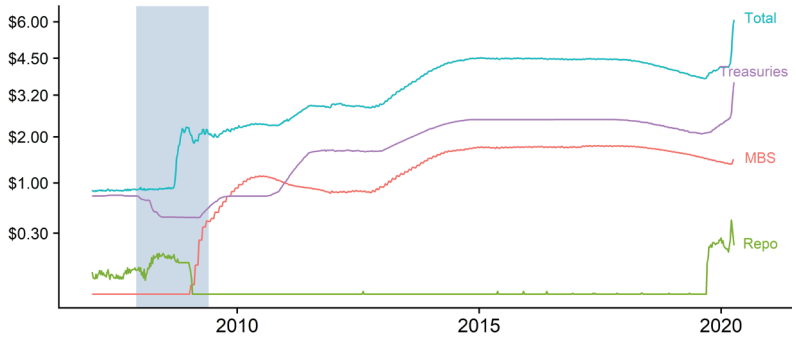


Figure Data Source: Fed Board, retrieved from FRED (IDs: WALCL, TREAST, WSHOMCB, WORAL).

Despite the recent Fed stimulus, the coronavirus crisis has caused inflation expectations to plummet. To provide historical context, Figure 2.7A shows that the core inflation rate rarely reached the Fed's symmetric 2% inflation target over the last decade. Figure 2.7B 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 prior to the crisis the expected inflation rate typically fluctuated between 1.3% and 2.1%. With the onset of the pandemic, inflation expectations sank; as of April 15, 2020, market participants expect an average annual rate below 1% over the next 5 years.

Figure 2.7A: Core Inflation Rate (Less Food and Energy)

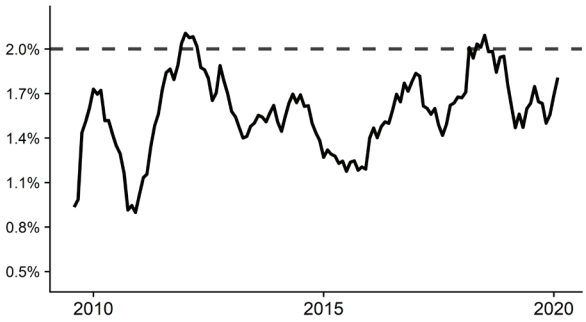
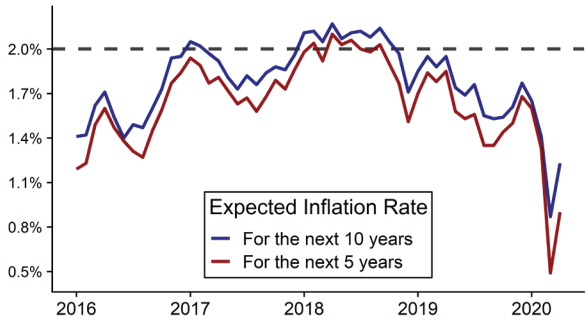


Figure 2.7B: Market Expectations of Inflation by Year-Month



Key Figure Takeaway: Following the coronavirus outbreak, inflation expectations have declined sharply.

Figure Data Source and Notes: U.S. Treasury, retrieved from FRED (IDs: PCEPILFE, T5YIE, T10YIE). Breakeven inflation rates are computed from Treasury Inflation-Protected Securities (TIPS) and Nominal Treasury Securities.

The dramatic decline in economic activity after the coronavirus outbreak, including a shift away from more risky assets, the Fed's large monetary stimulus, and diminished inflation expectations collectively presage exceptionally low U.S. Treasury interest rates. Figure 2.8 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 relatively flat current yield curve suggests that the term premium and investors' expectations of future interest rate increases are low.

Figure 2.8: The Current Yield Curve is Flat with Low Interest Rates Over Both the Short and Long Term

Notes: Horizontal Axis is in sqrt(months)

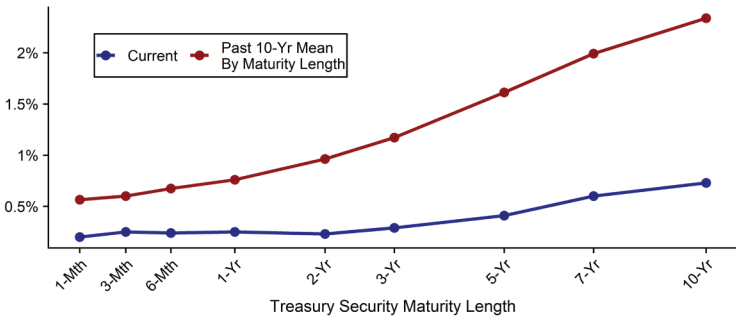


Figure Notes: The blue line is the current Treasury Yield Curve; the red line represents the past 10-year average, computed by taking the mean by each maturity date. For more on Term Premia, see newyorkfed.org/research/data_indicators/term_premia.html.

Figure Data Source: U.S. Treasury, retrieved from FRED (IDs: DGS1MO, DGS3MO, DGS6MO, DGS1, DGS2, DGS3, DGS5, DGS7, DGS10).

Although Treasury yields are near historic lows, interest rates on other assets have not all experienced comparable declines. The likely reason is that credit risk has risen because of diminished economic activity following the slowdown. Figure 2.9 documents that yields on Baa-rated corporate bonds increased beginning in late March, likely because of elevated default probabilities. Likewise, Figure 2.10 plots the average 30-year U.S. mortgage rate and its spread relative to the 10-year Treasury. The 30-year mortgage rate has hovered around 3.5% since mid-February, even as Treasury rates have fallen markedly. Thus, the spread between the average 30-year mortgage rate and the 10-year Treasury yield jumped more than one-half of a percentage point between February 15 and April 1. The increase in the spread between the mortgage rate and the Treasury yield is due in part to a glut of mortgage refinance demand immediately after rates declined, greater uncertainty about the employment prospects for many mortgagees, and perhaps MBS market illiquidity. Indeed, a lack of financial market liquidity also likely contributed to higher borrowing costs, at least initially following the pandemic outbreak, across a number of debt instruments, including MBS. Broadly, as households, firms, and investors feared a coronavirus-induced sharp deterioration in income, these entities sought to raise cash and increase their cash balances. Higher demand for dollars from foreign entities manifested as an appreciation of the dollar, as the dollar gained 8% between February 10 and March 23, relative to a trade-weighted basket of foreign currencies (Figure 2.11). Thus, the extensive crisis-era actions described above followed significant concerns regarding liquidity and functioning of the markets. The most recent data in Figures 2.9 to 2.11 suggest that the combination of Fed actions, along with a decline in overall market volatility, have somewhat eased stress in credit markets.

Figure 2.9: Higher Expected Corporate Defaults Contributed to an Increase In Baa Bond Yields

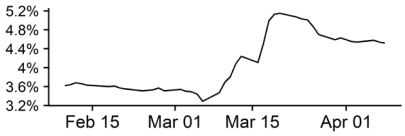


Figure 2.10: The Spread between the 30-Yr Mortgage Rate and 10-Yr Treasury Increased

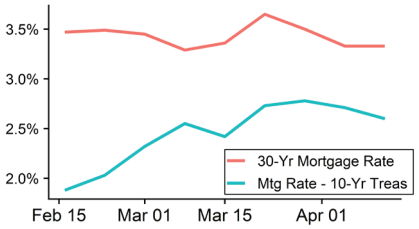
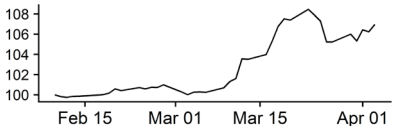


Figure 2.11: Firms, Households, and Investors Rushed to Acquire Cash and Dollar Demand Accelerated

Notes: Trade-Weighted Dollar Index



Financial Market Signals

Key Takeaway: In mid-March 2020, at the peak of coronavirus financial market distress, the VIX equity market volatility and uncertainty index reached levels last seen during the Great Recession of 2008-09. The VIX has retreated somewhat since then, but remains at elevated levels. Similarly, the corporate default spread (Baa - Aaa yields), a broad credit market risk proxy, rose notably with no signs of abatement through early April. Higher interest rates for lower rated bonds reflect higher expected default probabilities from the perspective of bond market investors, but also perhaps reflect market illiquidity. Indeed, credit ratings downgrades increased substantially in March 2020. Last, during the early stages of the pandemic, many public companies highlighted coronavirus risks in their disclosures on SEC Forms 8-K and 6-K.

The impact of the coronavirus pandemic on financial markets is apparent in the path of the VIX volatility index. During the height of coronavirus-induced financial market stress in mid-March, the VIX reached values around 80, corresponding to historical highs last seen during the Great Recession (Figure 2.12A). These peak VIX realizations signaled extreme investor uncertainty about firms' future profits and economic output because of the economic slowdown. Recently, uncertainty proxied by the VIX index has retreated somewhat (Figure 2.12B), owing to fiscal and monetary stimulus, as well as hopes that the total duration of the coronavirus pandemic might not be too long.

Figure 2.12A: The VIX Index Since The Great Recession

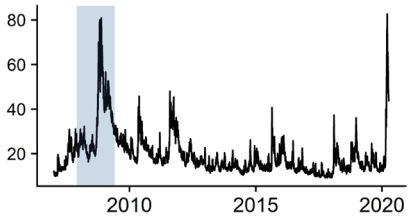
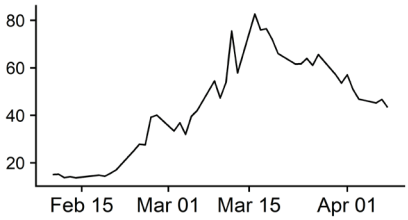


Figure 2.12B: Recent Values of The VIX Index



Key Figure Takeaway: The VIX Index reached levels last seen during the Great Recession, suggesting high levels of uncertainty over expected economic output and firm profits, but recently it has retreated somewhat.

Figure Data Source: Chicago Board Options Exchange, retrieved from FRED (ID: VIXCLS).

Figure 2.13 plots the corporate default spread, Baa - Aaa corporate bond yields, an aggregate proxy of credit risk in the corporate bond market. After the onset of the coronavirus crisis, corporate default spreads rose sharply in March, meaning that yields on lower rated corporate debt increased relative to those on higher rated bonds. This widening credit spread is due largely to increased default probabilities on lower rated corporate debt. Specifically, as economic activity falters with the coronavirus slowdown, investors may fear that various income streams might decline and firms might find it difficult to refinance their other debt obligations. These factors make debt service difficult and costly, boosting the likelihood that a borrower may miss a payment and subsequently default.

Figure 2.13A: The Corporate Default Spread Since the Great Recession

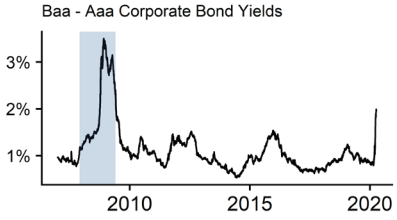
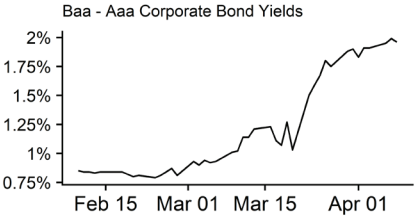


Figure 2.13B: Recent Values of The Corporate Default Spread



Key Figure Takeaway: The corporate default spread (Baa - Aaa corporate bond yields) has increased recently, but it has not reached levels last seen during the Great Recession.

Figure Data Source: Moody's, retrieved from WRDS.

Figure 2.13A also shows that while the recent rise in the corporate default spread is notable, current values remain well below those seen during the Great Recession and perhaps suggest credit markets are less strained than in 2008-09.

Next, Figure 2.13B plots the recent path of the corporate default spread. Unlike the VIX index (Figure 2.12B), the corporate default spread has not fallen as of mid-April, suggesting that financial stress persists in corporate credit markets in that investors expect lower rated corporate borrowers to struggle to service and repay debt in the upcoming months, relative to higher rated borrowers, as the economic fallout from the coronavirus slowdown unfolds.

Credit Ratings Outlook

The already realized and potential economic impact of the coronavirus pandemic has dramatically changed the credit outlook of U.S. borrowers. The economic downturn has affected not only short-term market indicators, but also credit ratings that reflect long-term views on the credit quality of fixed income instruments (rating through the cycle). Credit rating agencies, which are important intermediaries in providing information in securities markets, started to change their views in March 2020, in response to rapidly changing economic conditions.

As recently as February 2020, rating agencies anticipated a modest slowdown with a low recession likelihood. However, the events of March 2020 have changed their views. As shown in Figure 2.14A, rating agencies lowered U.S. corporate debt issuers' ratings at a faster pace than in previous episodes of global or localized economic crises. For example, in each of the last 2 weeks in March 2020, S&P downgraded more corporate issuers than in any week during the Great Recession of 2008-09 or during the drop in commodity prices that affected a large number of oil and mining companies in late 2015 through early 2016. Moreover, rating agencies are responding more rapidly and aggressively than during the Great Recession, when the bulk of issuers' rating downgrades took place in early 2009, several weeks after the worst point of the crisis in the fall of 2008. During the coronavirus pandemic, the rating agencies are reacting much more quickly.

Figure 2.14A: LT Corporate Issuers Upgrades - Downgrades

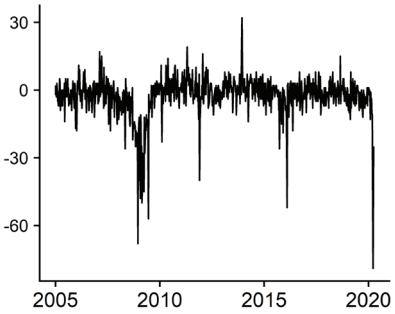


Figure 2.14B: Structured Finance Upgrades - Downgrades

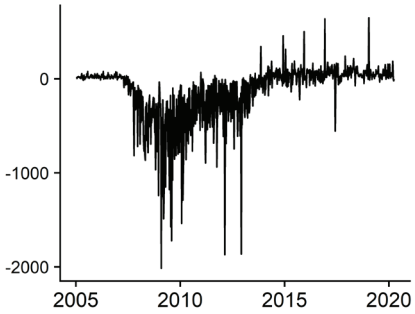


Figure Notes: Net rating changes of S&P credit ratings, i.e., number of upgrades minus number of downgrades, weekly. Figure 2.14A: Long-term (LT) ratings of corporate issuers. Figure 2.14B: Structured finance deals with at least one tranche rating action. Data source: Refinitiv DataScope.

Rating activity is relatively tempered in the structured finance (SF) space, even though the coronavirus pandemic also affects many SF ratings. Structured products' cash flows emanate from the borrowers in the underlying loans paying on their obligations, and the borrowers are sensitive to economic conditions. So far, there is little action in the SF credit ratings space, even in potentially the most affected commercial mortgage-backed securities (CMBS) and CLO segments. To compare SF rating downgrade activity during the Great Recession to that activity now, see Figure 2.14B.

In the corporate space, the March 2020 rating downgrade activity is tilted to non-investment grade debt issuers and to industries that the ratings agencies believe are most affected by the pandemic. Non-investment grade issuers generally are more levered and have weaker financial positions than investment grade issuers, and, thus, are more affected by negative economic shocks. Issuers that have been subject to the most rating downgrades are in industries directly exposed to the pandemic, namely, recreation, tourism, and travel (Table 2.1); commodities because of historic drops in oil prices; and discretionary retail spending.

Table 2.1: Industries with Largest No. of Issuers with at Least One Bond Downgrade

SIC 2	Standard Industrial Classification (SIC) 2 Description	Down	Total	%
67	Holding and Other Investment Offices	76	708	11%
13	Oil and Gas Extraction	43	108	40%
79	Amusement and Recreation Services	16	23	70%
28	Chemicals and Allied Products	11	103	11%
49	Electric, Gas, and Sanitary Services	10	287	3%
70	Hotels and Other Lodging Places	10	22	45%
45	Transportation by Air	9	14	64%
58	Eating and Drinking Places	8	19	42%
61	Non-Depository Credit Institutions	8	53	15%
48	Automotive Dealers and Gasoline Service Stations	8	105	8%
37	Transportation Equipment	7	44	16%
56	Apparel and Accessory Stores	6	8	75%
53	General Merchandise Stores	5	17	29%

Table Notes: Industries (by primary SIC2 code) with the largest number of issuers that have at least one bond downgraded by one of the three largest Nationally Recognized Statistical Ratings Organizations (NRSROs) in March 2020. Data source: Refinitiv DataScope.

Ratings are often reactive to information about the issuers' changing financial fortunes and ratings often follow (not lead) securities markets in reflecting that information. However, changes in ratings, especially downgrades, have some incremental effect on corporate credit spreads (e.g., see BIS, 2006, or ECB, 2004, for a review of evidence). Thus, the current economic downturn and widespread downgrades affect issuers' cost of capital not only through increased prices of credit risk for individual rating categories (see Figure 2.13) but also through a mass transition of issuers to lower credit rating groups.

Investment mandates or capital requirements that stipulate minimum credit ratings for investments represent another channel through which credit ratings might influence issuers' cost of capital. Such requirements may be soft (elevated capital charge for lower rated investments) or hard (requirement to avoid investing in lower rated categories and to disinvest a downgraded security). Thus, rating downgrades might trigger "fire sales" of affected bonds. (See, e.g., Ellul et al., *Journal of Financial Economics*, 2011.) From this perspective, downgrades of issuers and securities from an investment grade category (BBB- or Baa3 and above) to a non-investment grade or high-yield category (BB+ or Ba1 and below), so called "fallen angels," could be especially concerning now. In the last week of March, the three largest NRSROs issued such downgrades to a larger number of bonds than in any week since 2014.

The Fed actions to expand the scope of the Primary and Secondary Market Corporate Credit Facilities (PMCCF and SMCCF) to fallen angels that were rated investment grade before March 23, 2020, will partially alleviate the negative effects from the rapidly increasing number of fallen angels. The purchases via PMCCF and SMCCF are designed to soften the impact of the cost of capital channel directly and to reduce the price impact of fire sales potentially triggered by the regulatory requirements.

Figure 2.15: Fallen Angels

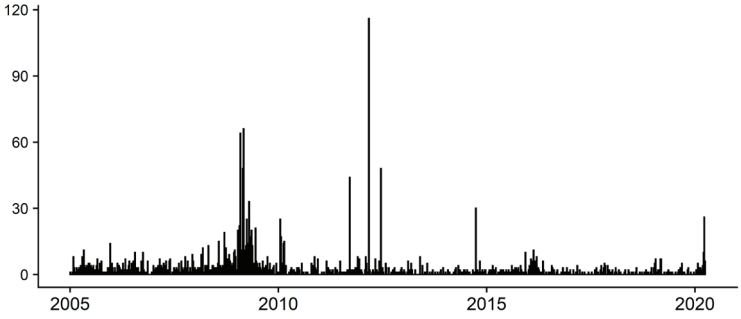
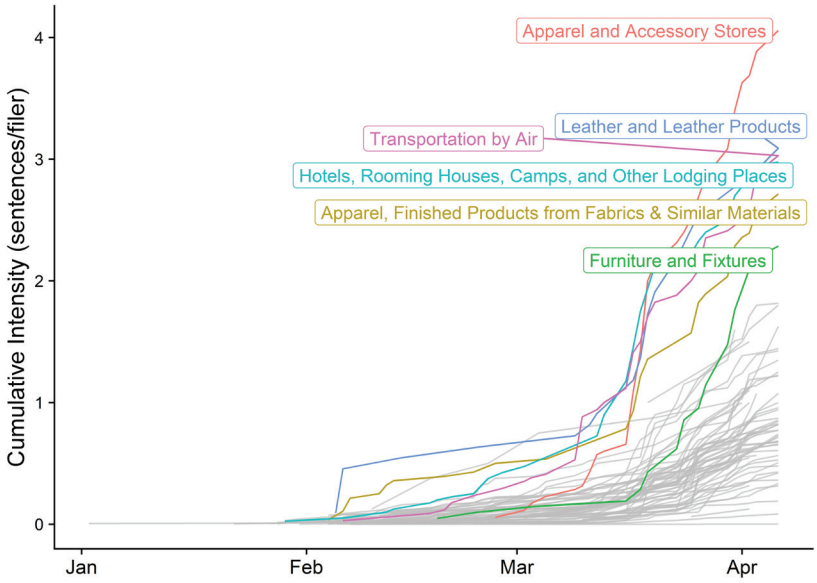


Figure Notes: The number of corporate issuers that have at least one bond downgraded by one of the three largest NRSROs. NRSROs from investment grade to non-investment grade (fallen angels), weekly. Data source: Refinitiv DataScope.

Coronavirus Impact in SEC Disclosures

Figure 2.16: Coronavirus Business Impact by Industry



Using a textual analysis of public companies' 8-K and 6-K disclosures, Figure 2.16 plots the number of sentences per filer in a given industry relating to the business impact of the coronavirus (i.e., the "frequency" of business impact discussion). Specifically, the algorithm extracts all paragraphs in 8-K and 6-K filings that mention "coronavirus" or its variants and categorizes each sentence in these paragraphs into one of three categories as identified through cluster analysis: "business impact" discussion, "forward-looking statements," and discussion of the Securities Act and regulations. Overall, the results are telling: while discussion of the coronavirus-induced business impact initially originated in apparel and leather-goods firms (whose supply chains were disrupted early in the outbreak), by mid-March the effect of the pandemic was discussed more often among the lodging and air transportation firms.

Data Sources not previously mentioned: **Figure 2.2:** BEA, retrieved from FRED (ID: GDPC1), and "Marketwatch Economic Calendar" available at https://www.marketwatch.com/tools/calendars/economic. **Figure 2.5:** Fed Board, retrieved from FRED (ID: DFF), and Datastream. **Figure 2.10:** Freddie Mac, retrieved from FRED (ID: MORTGAGE30US); and Moody's, retrieved from WRDS.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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 economic growth 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: Because of the coronavirus pandemic, key equity indices plunged between 30-40% from January to mid-March 2020, before recovering somewhat by early April. Investor expectations of weak corporate earnings following the coronavirus-induced economic slowdown likely led to this fall in equity prices. In fixed income markets, AAA-rated corporate securities have outperformed other lower rated bonds, where the yields on AAA-rated securities are near their pre-pandemic levels. Yields on non-investment grade debt have climbed substantially, likely reflecting investor concerns over increased default probabilities.

Asset Values

After a historically long bull market, equity market prices fell sharply in the immediate wake of the coronavirus-induced economic slowdown. Figure 3.1 plots equity returns from January 2020 for the S&P500 and the Russell 2000, an equity index composed of smaller companies. Both the S&P500 and the Russell 2000 fell in late February as investors increasingly anticipated a decline in economic activity that would ultimately depress corporate profits. Thus, valuations fell relative to historical earnings, but they remain higher than they were at the depths of the Great Recession (Figure 3.2). By mid-March, the S&P500 fell approximately 30%. In comparison, the Russell 2000 declined nearly 40%, coinciding with the coronavirus' likely outsized impact on the often more volatile income and revenue streams of smaller companies. By early April, equity indices had partially recovered.

Figure 3.1: Key Equity Indices Fell between 30-40% From Jan 1 to Mid-March

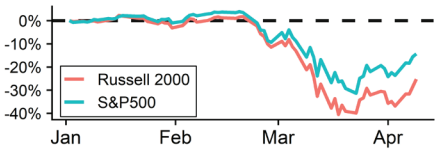
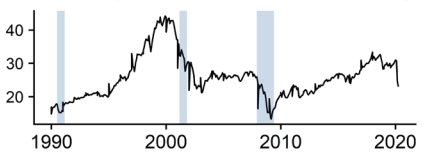
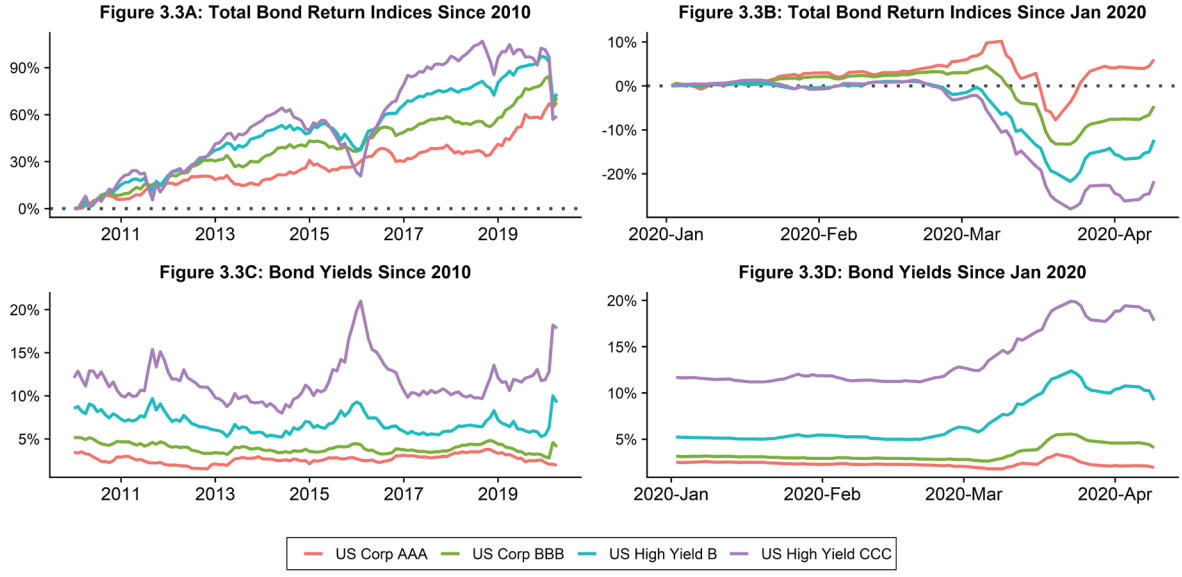


Figure 3.2: Equity Valuations Measured by The CAPE (10-Year P/E) Have Fallen

Notes: Equity Prices / Mean(10 Years of Annual Earnings)



For fixed income markets, Figure 3.3 displays total bond market returns and yields by credit rating. First, Figure 3.3A shows that bonds across asset classes have appreciated since 2010, where the lower rated B and CCC (or lower) bonds nearly doubled in value before the coronavirus outbreak. However, lower rated bond prices are more volatile, as seen by the large drops in late 2011, 2016, 2018, and, most recently, in 2020. Because of an expected decline in economic activity due to the coronavirus, total returns on the lower rated B and CCC bonds fell between 15% and 25% by mid-March (Figure 3.3B). The low 2020 returns for these securities coincide with a spike in yields (Figures 3.3C and 3.3D) that did not abate by early April 2020. The rise in yields implies investors likely expect a greater incidence of defaults for lower rated debt following the coronavirus, but diminished liquidity may have also impacted interest rates. In contrast, AAA-rated bonds have outperformed and, by April, their yields had returned to their pre-coronavirus levels. Last, while BBB-rated corporate bonds experienced a drop in total returns and an uptick in yields, the changes are relatively smaller than for lower rated debt.



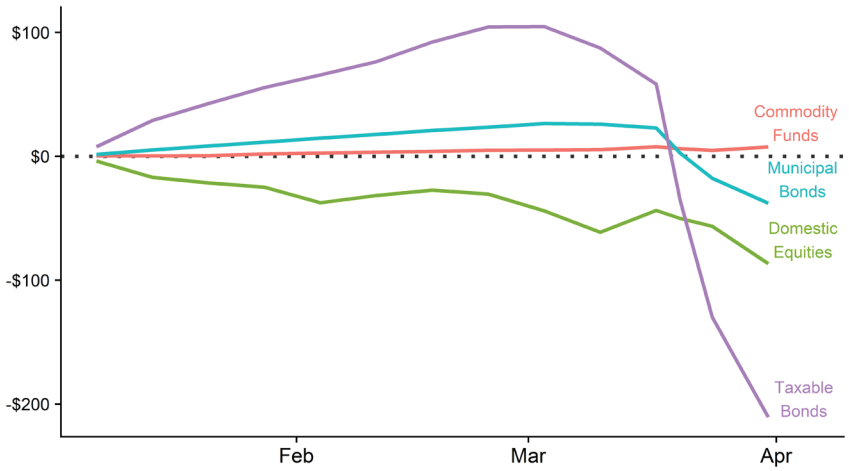
Money Market, Mutual Fund, and ETF Investors

Key Takeaway: With coronavirus-induced financial market volatility, investors increasingly moved assets away from bond and equity market mutual funds and ETFs and into money market funds backed by U.S. government agency or Treasury securities beginning in March 2020. Yet despite the extreme stress in financial markets and substantial fund redemptions, through April 17 (i) no mutual fund or ETF has suspended redemptions, and (ii) no money market fund has imposed liquidity fees or suspended redemptions.

Figure 3.4 presents net fund flows into select classes of mutual funds and ETFs from January to April 2020. Prior to the coronavirus pandemic, there were substantial fund inflows into taxable and municipal bond funds, outflows from domestic equity funds, and slight inflows into commodity funds. Yet as the coronavirus pandemic unfolded and the corresponding economic slowdown became imminent, investors withdrew funds from taxable and municipal bonds as well as domestic equities.

Figure 3.4: Cumulative U.S. ETF and Mutual Fund Flows

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



Key Figure Takeaway: Both equity and bond funds experienced outflows following coronavirus-induced financial market stress.

Figure Data Source: Investment Company Institute (ICI), retrieved from Datastream.

Other Notes: ETFs sell creation units to and redeem creation units 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.

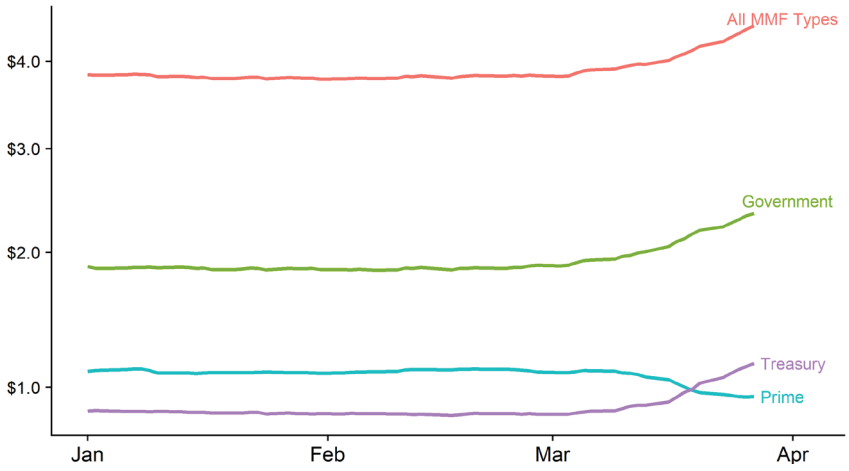
Net withdrawals from equity funds following the coronavirus pandemic extended a longer-term trend. Recent outflows likely reflect a diminished outlook for corporate profits because of the coronavirus-induced economic slowdown.

Taxable bond funds experienced sizable inflows until late February 2020. Then, investors withdrew approximately $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. A similar trend occurred in municipal bond funds, although the reversal in cumulative fund flows for this asset class did not begin in earnest until mid-March. Investors' preference to move assets away from this market may result in their selling bonds held directly. Outflows may also indirectly prompt funds to sell assets in response to redemption requests.

In addition to withdrawing funds from equity and bond mutual funds and ETFs, investors have also reduced their exposure to prime money market funds (MMFs) beginning in March 2020, as seen in Figure 3.5. Prime MMFs, which can impose gates or liquidity fees, invest in assets, such as commercial paper, that are not necessarily backed by the U.S. Government; thus investors may have elected to allocate capital towards other investments, increase their cash balances, or reduce their exposure to more risky assets as the coronavirus slowdown ensued. In contrast, investors increasingly allocated capital into MMFs that invest in government securities. This shift was mostly driven by institutional investors who moved $650 billion into institutional government and Treasury MMFs, while withdrawing $110 billion from prime institutional money market funds (source: Crane Data).

Figure 3.5: Money Market Funds -- Assets Under Management

Notes: Trillions of Dollars; From January 1, 2020; Vertical Axis has a square-root scale



Key Figure Takeaway: Investors have increasingly allocated capital into government agency and Treasury money market funds but have withdrawn money from prime money market funds.

Figure Data Source: Crane Data

Other Notes: Government Money Market Funds invest in securities such as agency debt. Prime money market funds invest in securities not necessarily backed by the U.S. government, such as commercial paper issued by corporations.

The structure of mutual funds, ETFs, and MMFs is such that sponsors offer investment products and manage investors' funds on their behalf. A sponsor itself is a separate legal entity that provides advisory or other services to an MMF (or a mutual fund or an ETF) according to a contract. In the case of an MMF, investors expect their capital plus an investment return. MMFs typically hold very safe and liquid assets (e.g., Treasury securities) and therefore they rarely lose their capital. In rare instances when an MMF loses its capital, its net asset value (NAV) might fall below a dollar. In these circumstances, the sponsor might extend "support" to the MMF for various reasons, including to protect its reputation and brand and to prevent declines in its funds' market-based NAVs. The sponsor might support an MMF, for example, by injecting capital to restore the fund's $1.0000 shadow price, by purchasing illiquid or distressed securities to prevent

a fund from dropping below a certain SEC-mandated threshold, and by waiving advisory fees to prevent a negative yield. In March 2020, two banks affiliated with the funds purchased securities of three institutional prime funds, while another adviser provided capital support for one of its tax-exempt funds. In each case, the sponsor purchased securities from the fund. This provided a cash infusion to funds that were experiencing large redemptions as the stock market plunged and institutional investors decreased investments in prime MMFs and allocated more capital to safer government MMFs.

Overall, the coronavirus-induced economic slowdown has created extreme financial market volatility and distress. At the same time, investors have withdrawn capital from a variety of funds that invest in different asset classes, perhaps adding further stress on financial markets. Yet despite these challenging market conditions, through April 17, 2020 (i) no mutual fund or ETF has suspended redemptions, and (ii) no money market fund has suspended redemptions or imposed liquidity fees.

Borrowers, Securities Issuers, and Capital Formation

Key Takeaway: Following the coronavirus-induced financial market distress in March 2020, firms raised substantially less capital in public equity markets. At the end of 2019, the building materials and retail sectors had relatively little available cash to absorb the coronavirus shock.

U.S. Equity Offerings

As the coronavirus pandemic drove down stock prices, firms raised substantially less capital via equity markets. Figure 3.6 graphs seasoned equity offerings (SEOs, billions of dollars at an annualized rate). The annual rate raised via SEOs was between about $100-120 billion in 2019 and the first 2 months of 2020. Then in March 2020, once coronavirus-induced volatility struck financial markets, firms raised only an annual rate of $41 billion via seasoned offerings, as the coronavirus increased risk and uncertainty in financial markets and dimmed the financial outlook (and need for capital) for companies.

Similarly, Figure 3.7 plots the annualized dollar volume that firms raised via initial public offerings (IPOs). While IPO volumes have been more volatile than SEOs, Figure 3.7 shows that IPO volume dropped to its lowest level since 2019 with an annualized rate of just $20 billion.

Figure 3.6: After Equity Prices Declined With the Coronavirus Pandemic, Seasoned Equity Offerings Dropped

Notes: Billions of Dollars; Annualized Rate

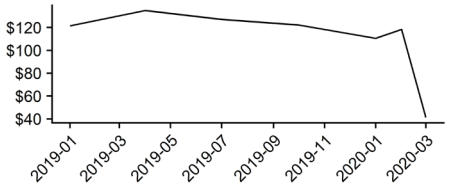
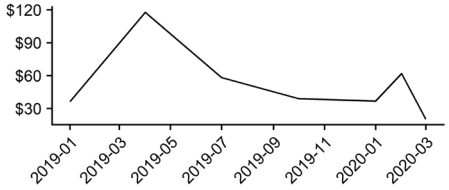


Figure 3.7: IPO Dollar Volume Fell Following The Coronavirus Pandemic

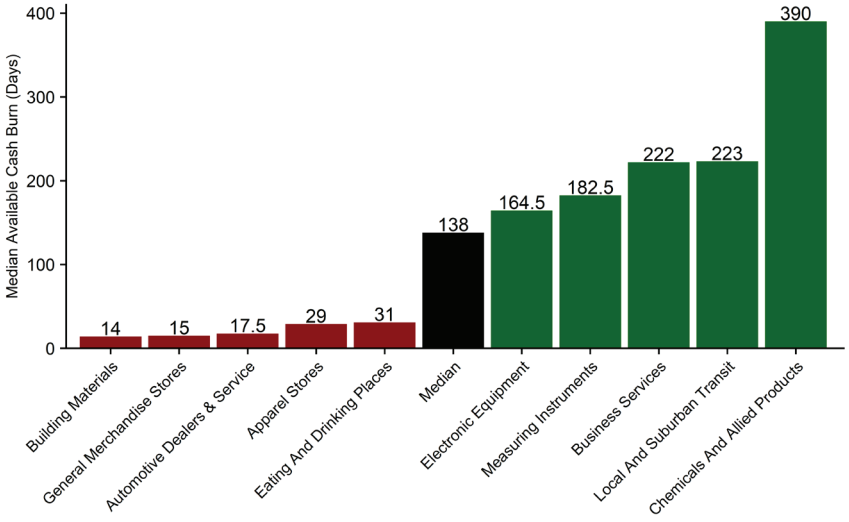
Notes: Billions of Dollars; Annualized Rate



Days of Cash on Hand (Cash Burn) by Industry

A firm's need and ability to raise capital depends not only on current market conditions, but also on the firm's financial position. Generally, when a firm has more available resources, it is in a better position to weather an economic shock or raise capital via debt markets because of its lower credit risk. A broad proxy for available resources during a crisis is cash on hand. Indeed, firms with larger relative cash positions are more likely to sustain operations during an economic slowdown, while investors view such firms more favorably, all else equal. Figure 3.8 plots the median days of cash on hand (cash burn) by industry at the end of 2019. Intuitively, available cash burn signifies how many days a company could operate, without cutting expenses or laying off workers, with available cash on hand. Hence, available cash burn broadly measures a firm's ability to withstand a large economic shock, but also is one dimension through which investors measure credit risk.

Figure 3.8: The Building Materials and Retail Sectors had the Shortest Available Cash Burn at the End of 2019



Cash Burn Definition: 365 * (Cash and short-term investment + receivables)/(operating expenses – non-cash items)

Figure Data Source: WRDS and Compustat.

At the end of 2019, the median cash burn across all firms was 138 days, indicating that the median firm could operate for 138 days without reducing expenses. Figure 3.8 also shows the top and bottom five industries (SIC2) ranked by available cash burn. The firms with the least available cash relative to expenses are concentrated in the building materials, retail, and food service industries, whose cash positions typically would not have covered more than one month's expenses using year-end 2019 data. Unfortunately, not only were the building materials, retail, and food service firms in relatively weaker cash positions, but these firms were also the most directly hit by the coronavirus-induced social distancing policies. Not surprisingly, those sectors have also accounted for substantial job losses and increases in unemployment.

Figure Data Sources not previously mentioned: **Figure 3.3:** Ice Data Indices, LLC, retrieved from FRED (IDs: BAMLCC0A1AAATRIV, BAMLCC0A3ATRIV, BAMLCC0A4BBBTRIV, BAMLHYH0A1BBTRIV, BAMLHYH0A2BTRIV, BAMLHYH0A3CMTRIV, BAMLC0A1CAAAEY, BAMLC0A3CAEY, BAMLC0A4CBBBEY, BAMLH0A1HYBBEY, BAMLH0A2HYBEY, BAMLH0A3HYCEY). **Figure 3.6:** Thomson Reuters SDC Platinum. **Figure 3.7:** Thomson Reuters SDC Platinum.

U.S. SECURITIES AND EXCHANGE COMMISSION