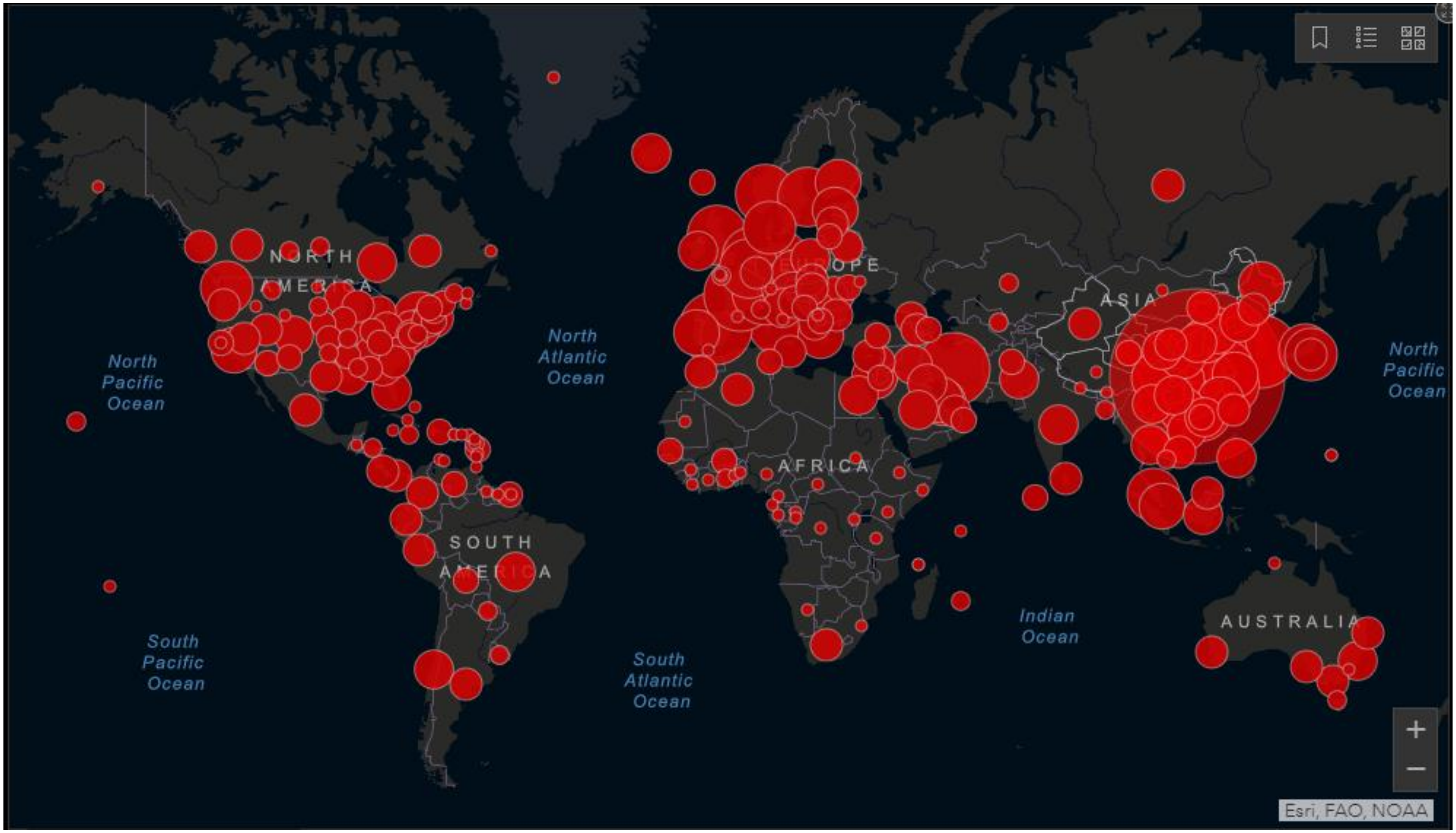
MEKETA
INVESTMENT GROUP

Coronavirus Update

First Quarter 2020

Data as of March 19, 2020

Locations of Major Worldwide Cases[1]



[1] Source: Johns Hopkins CSSE. Data is as of March 19, 2020.

Virus Update

- COVID-19 has rapidly spread globally from its original outbreak in China, and is now materially impacting regions that were less prepared or more open to international travel, such as Europe.
- As of March 19, 2020, there were over 220,000 known cases globally across 157 countries with 9,115 deaths.
- China (81,154) continues to represent the majority of confirmed cases, followed by Italy (35,713), Iran (18,407), Spain (15,014), and Germany (13,093).
- Italy, Iran, and Spain have experienced the fastest growth of new cases, while China is leveling off.
- In the US, there are 9,415 cases across all states, with 150 deaths. As testing capacity increases, the case numbers are expected to dramatically rise.
- A number of countries have banned international travel, while some are imposing restrictions on gatherings including canceling all public events, suspending schools, and requiring the closing, or limited service, of restaurants and social meeting places.
- The disruption comes not just from the supply side, when goods cannot be produced and shipped, but also from the demand side when consumers drastically curtail spending due to restrictions on movement and travel.

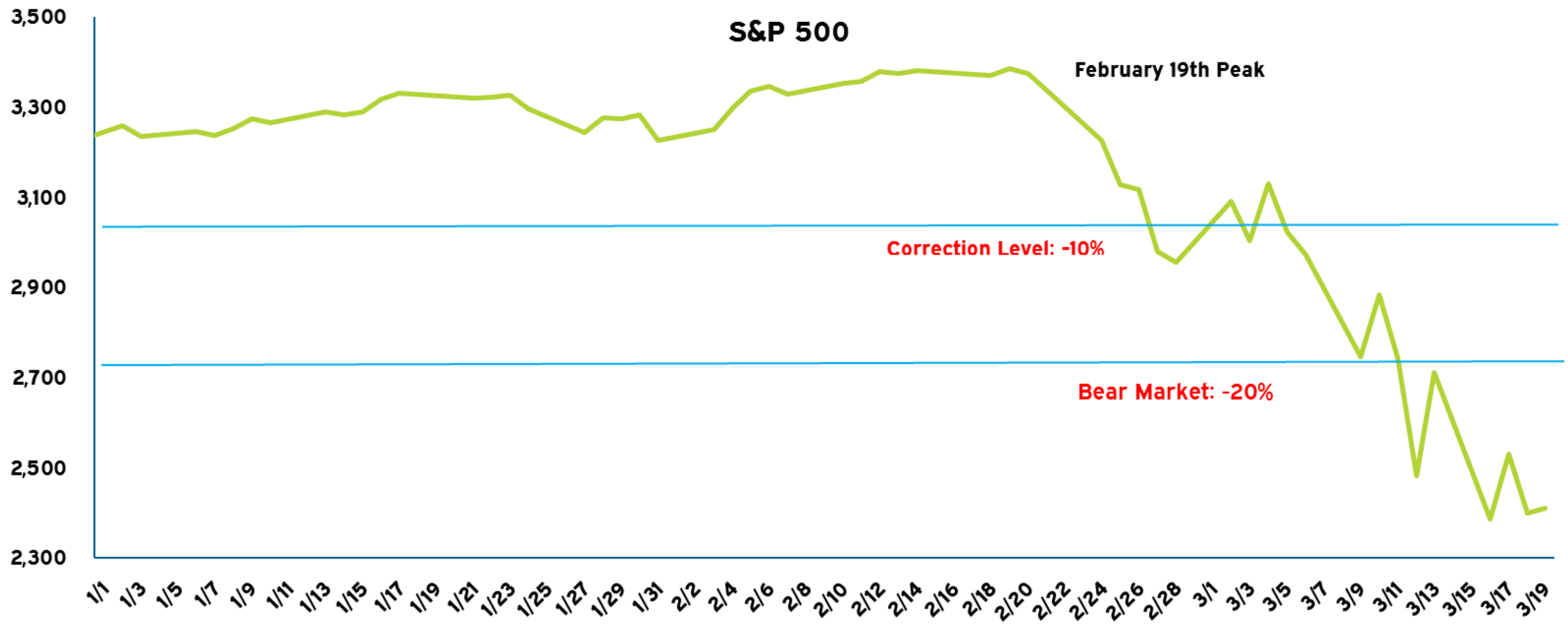
2020 Market Returns[1]

Indices	YTD
S&P 500	-25.1%
MSCI EAFE	-31.9%
MSCI Emerging Markets	-31.1%
MSCI China	-18.5%
KOSPI Index (South Korea)	-38.2%
MSCI Italy	-37.7%
Bloomberg Barclays Aggregate	-0.6%
Bloomberg Barclays TIPS	-3.9%
Bloomberg Barclays High Yield	-17.6%
10-year US Treasury	7.5%
30-year US Treasury	14.5%

- Given uncertainty related to the ultimate impact of the virus on economic growth, company profitability, and societal norms, investors have sought perceived safe haven assets like US Treasuries.
- Stocks have experienced significant declines globally, particularly in areas like Italy where the virus is actively spreading.

[1] Source: InvestorForce and Bloomberg. Data is as of March 19, 2020.

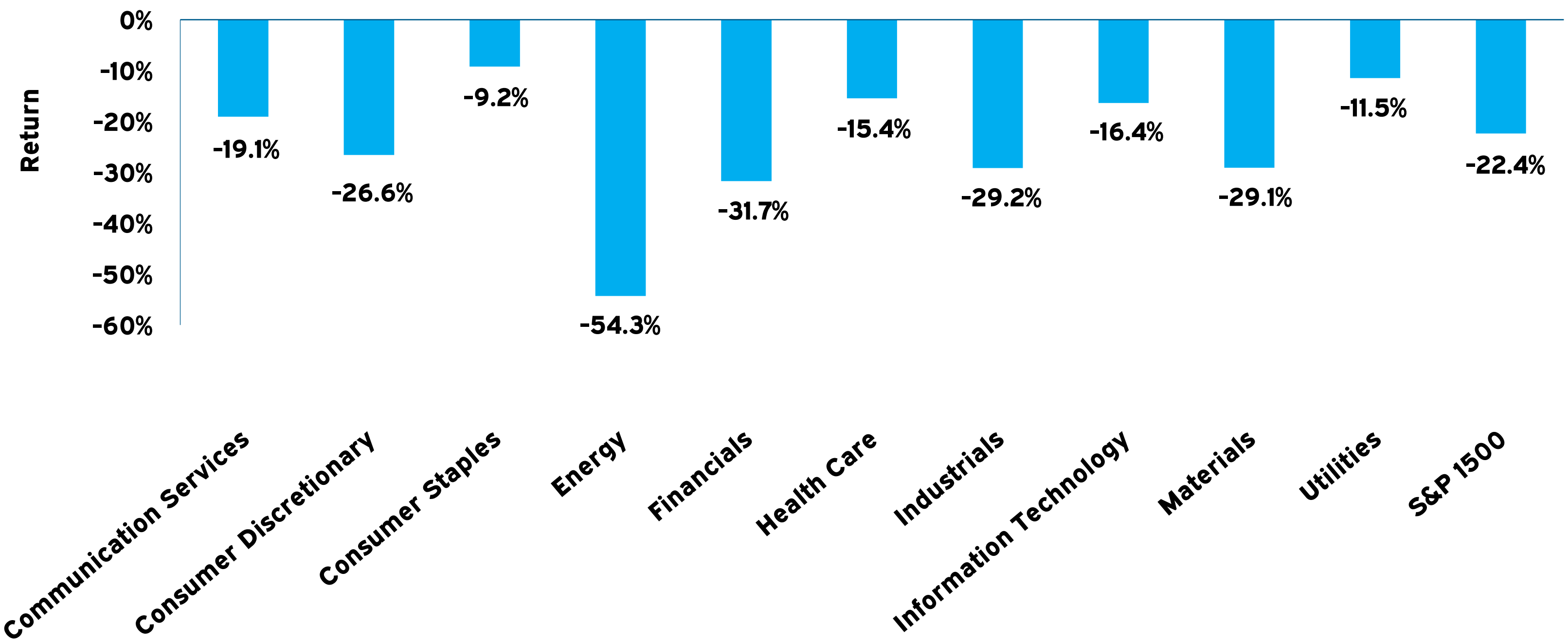
S&P 500 Reaches Bear Market Levels[1]



- Given all the uncertainty, US stocks declined from their recent peak into bear market (-20%) territory at the fastest pace in history.
- From the February 19 peak, the S&P 500 declined 29%, or 976 points, in a matter of 22 trading days.

[1] Source: Bloomberg. Data is as of March 19, 2020.

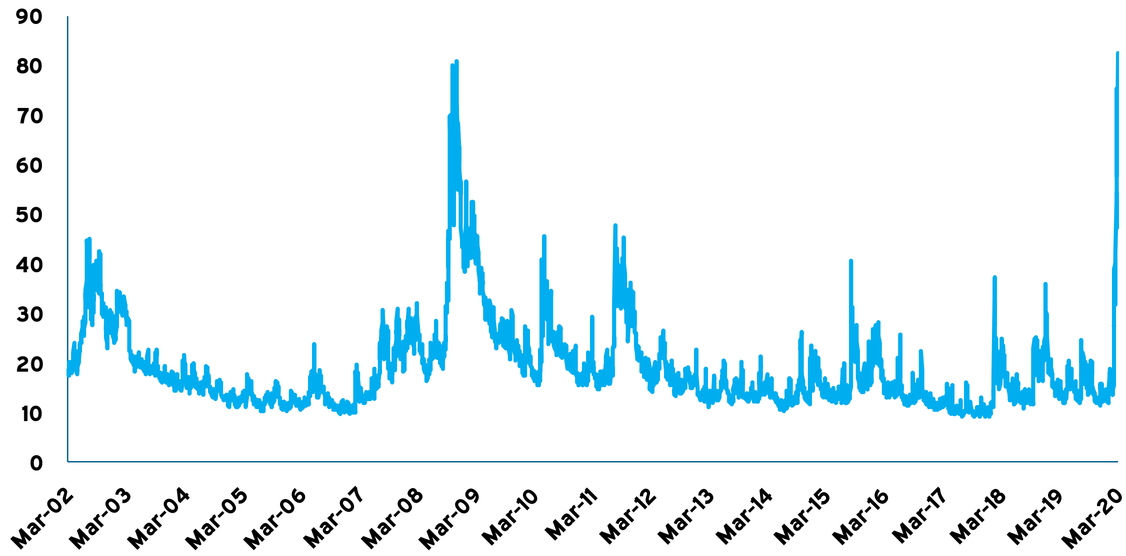
2020 YTD Sector Returns[1]



- The energy sector has experienced the largest declines given the fall in oil prices.
- Financials, materials, and industrials are all lower by around 30%, while defensive sectors like consumer staples and utilities experienced the lowest declines.

[1] Source: Bloomberg. Data is as of March 19, 2020.

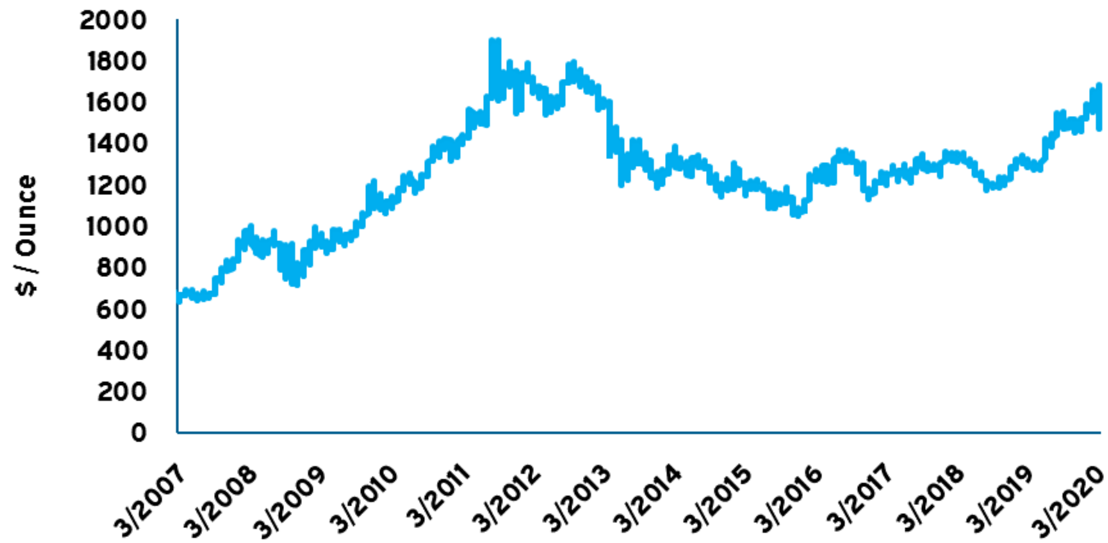
VIX Index[1]



- Consistent with the declines in US equities, expectations of short-term volatility, as measured by the VIX index, has traded to levels not seen since the 2008 Global Financial Crisis (GFC).
- The VIX Index recently reached 82.7, a level surpassing the pinnacle of volatility during the GFC, showing the magnitude of investor fear.
- As investors continue to process the impacts of COVID-19 and further policy responses are announced, it is likely that volatility will remain elevated.

[1] Source: Chicago Board of Exchange. Data is as of March 19, 2020.

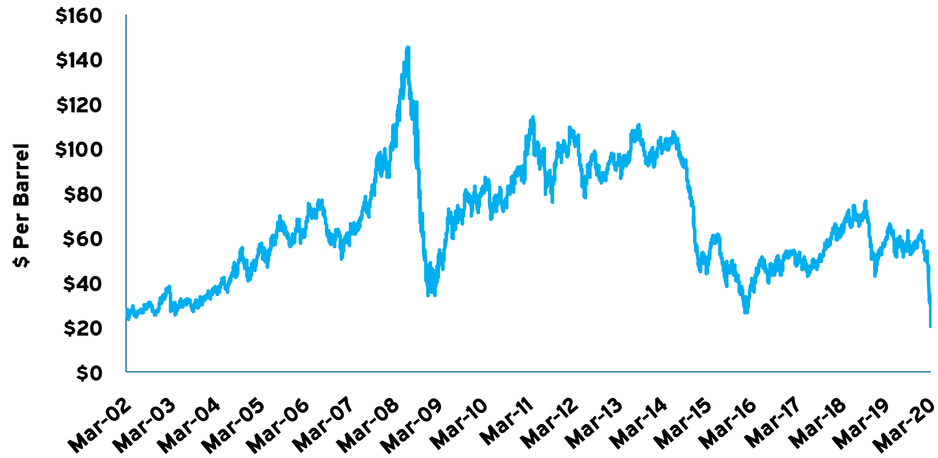
Gold Spot Price[1]



- The price of gold over the last few years has been heavily influenced by central bank demand, particularly from Russia, amidst heighted geopolitical and economic uncertainty; other emerging markets (central banks and private investors) have also been actively purchasing gold.
- However, as risk assets and oil markets declined over the last month, and liquidity broadly deteriorated, demand for gold has declined amidst its use as a source of funds.

[1] Source: Bloomberg. Data is as of March 19, 2020.

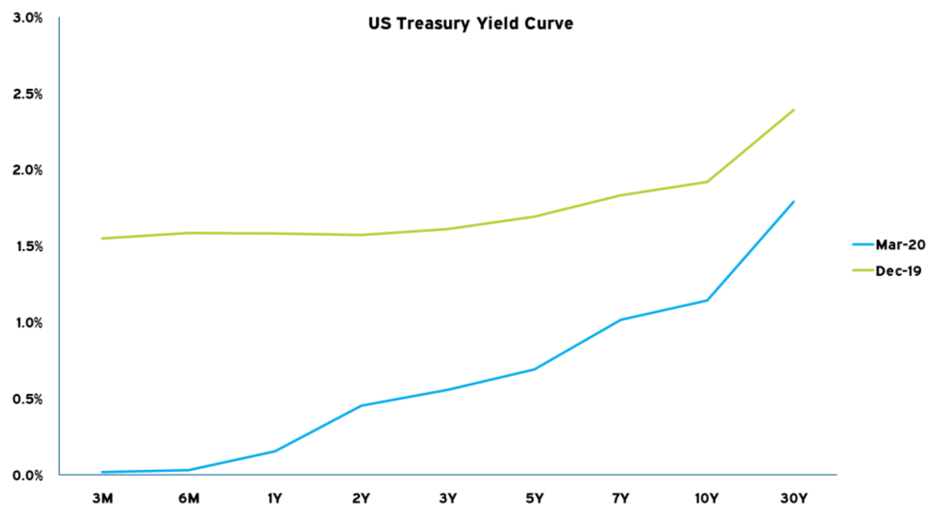
Oil Prices[1]

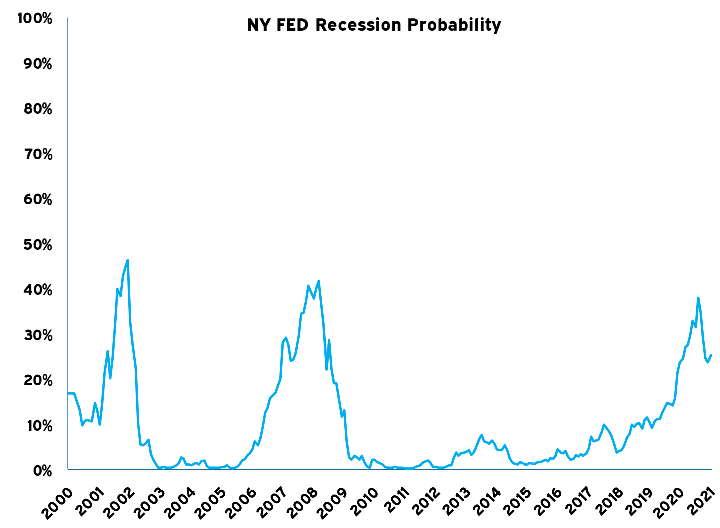


- Oil markets came under pressure as the virus started to impact global growth expectations, but prices deteriorated further when Saudi Arabia initiated a price war due to Russia's decision to not participate in the proposed OPEC+ supply cuts.
- In a recent press conference, President Trump announced that he intends to build US oil reserves in an attempt to support the domestic industry and capitalize on lower oil prices.
- During the volatility and aggressive supplier actions, oil prices (as measured by West Texas Intermediate) traded below $21 dollars per barrel; a decline of over 55% since February 19, to reach levels not seen since 2001.

[1] Source: Bloomberg. Represents first available futures contract. Data is as of March 19, 2020.

US Yield Curve Declines[1]

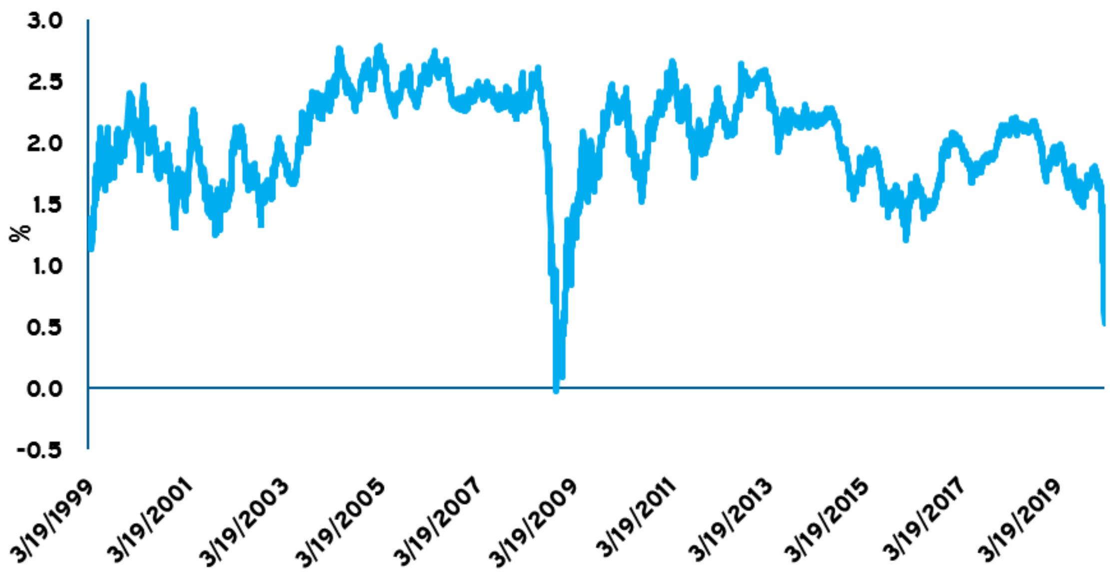




- The US Treasury yield curve has declined materially since last year, driven by notable cuts in monetary policy rates impacting the shorter-dated maturities, and flight-to-quality flows, low inflation, and declining growth expectations driving longer-dated maturities.
- The shape of the yield curve has been one tool to forecast future recessions. Over the next twelve months, the probability of a recession was 31% at the end of February and will go sharply higher at the end of March reading.

[1] Source: Bloomberg. Data is as of March 19, 2020.

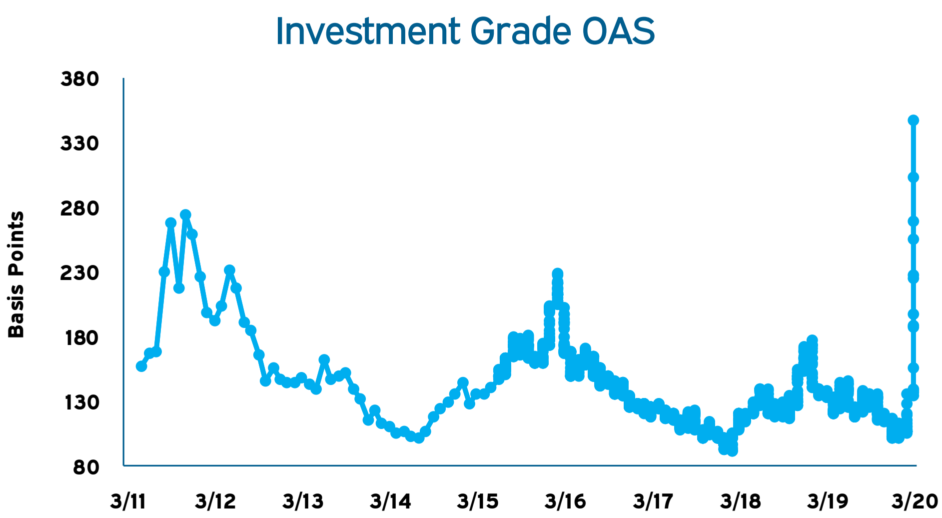
10-Year Breakeven Inflation[1]

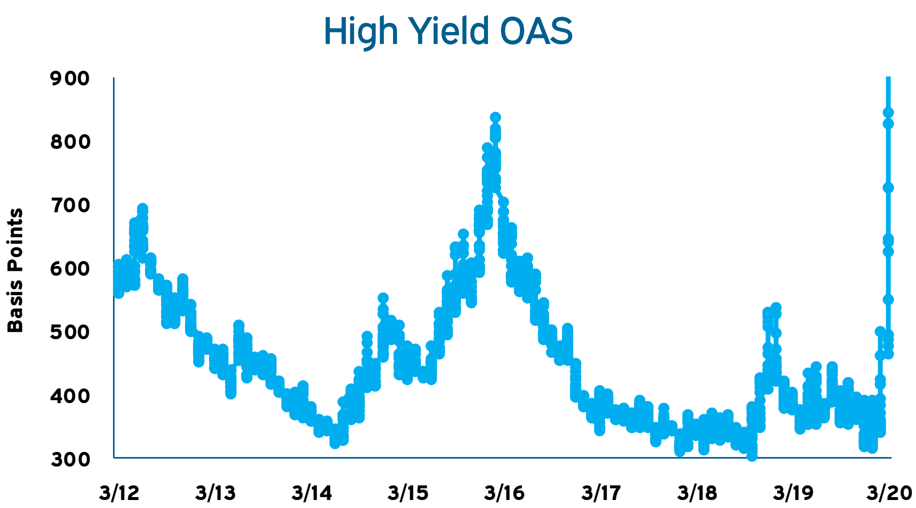


- Inflation breakeven rates have declined materially over the last two months, due to a combination of declines in inflation expectations and liquidity dynamics in TIPS during the height of rate volatility.
- Breakevens have not traded this low since the GFC, and when they did, the Federal Reserve responded with large-scale asset purchases (LSAPs); consistent with recent policy actions.

[1] Source: Bloomberg. Data is as of March 19, 2020.

Credit Spreads (High Yield & Investment Grade)[1]

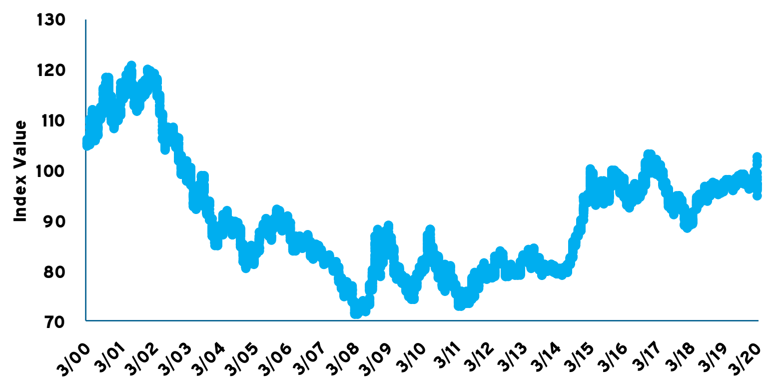




- Credit spreads (the spread between a comparable Treasury bond) for investment grade and high yield corporate debt have been expanding sharply as investors prefer perceived safe-haven bonds.
- Investment grade bonds have been holding up better than high yield bonds, which have a far greater risk of default in this environment. Companies in the reeling energy sector, recently hurt by the decline in oil prices, issue a lot of high yield bonds, also contributing to the decline.
- Corporate debt issuance has more than doubled since 2008, which makes any deterioration in these assets likely to impact a significant number of investors in the future.

[1] Source: Bloomberg. Data is as of March 19, 2020.

US Dollar versus Broad Currencies[1]



- When financial markets began aggressively reacting to developments with the COVID-19 virus, the US dollar came under selling pressure as investors sought safe-haven exposure in currencies like the Japanese yen.
- As the crisis has grown into a pandemic, investors' preferences have shifted to holding US dollars and highly liquid, short-term securities like US Treasury bills. This global demand for US dollars has resulted in an appreciation against most major currencies.
- To help ease global demand for US dollars, the Federal Reserve, working with a number of global central banks, re-established the US dollar swap program.
- The strengthening US dollar dampens domestic inflation pressures and makes US goods more expensive for overseas consumers. Further, as most commodities are traded in US dollars, a strong dollar causes commodity prices outside the US to rise, negatively impacting foreign countries; particularly harmful to emerging markets.

[1] Source: Bloomberg. Represents the DXY Index. Data is as of March 19, 2020.

Policy Responses

	Fiscal	Monetary
United States	$50 billion to states for virus related support, potential payroll tax cut, discussion of over $1.0 trillion direct to consumers potentially via cash payments, paid sick leave for hourly workers	Cut policy rates to zero, started $700 billion QE4, offering trillions in repo market funding, restarted CPFF, PDCF, MMMF programs to support lending and financing market, and expanded US dollar swap lines with foreign central banks
Euro Area	---------------	Targeted longer-term refinancing operations aimed at small and medium sized businesses, under more favorable pricing, and also additional QE until the end of the year
Japan	$20 billion in small business loans, direct funding program to stop virus spread among nursing homes and those affected by school closures, discussion of additional relief in the coming months	Increase in QE purchases (ETFs, corporate bonds, and CP), and 0% interest loans to businesses hurt by virus
China	Tax cuts, low-interest business loans, extra payments to gov't benefit recipients	Expanded repo facility, policy rate cuts, lowered reserve requirements
Canada	$7.1 billion in loans to businesses to help with virus damage	Cut policy rates, expanded bond-buying and repos, lowered bank reserve requirements
UK (BOE)	Tax cut for retailers, small business cash grants, benefits for those infected with virus, expanded access to gov't benefits for self and un-employed	Lowered policy rates and capital requirements for U.K. banks
Australia	$11.4 billion, subsidies for impacted industries like tourism, one-time payment to gov't benefit recipients	Policy rate cut, started QE

Coronavirus Comparison

	Flu in US[1]	SARS (Global)	Coronavirus (Global)[2]
Confirmed Cases	~32,000,000	8,098	227,743
Deaths	~18,000	774	9,115
Death Ratio	<0.1%	9.6%	4.0%
Infectivity Ratio[3]	1.3	3.0	2.3

- While confirmed cases are notably lower than reported cases of the flu, the number of reported COVID-19 infections continues to rise and infectious disease experts do not see that stopping over the near-term.
- The mortality rate of the COVID-19 virus is a focal point in assessing the severity of the illness versus other viruses, and while higher than the flu, it is expected that as nationwide testing becomes more readily available the ratio should decline.

[1] Source: CDC. Reflects medians of estimates for flu season October 2019 – February 2020.

[2] Source: Johns Hopkins CSSE. As of March 19, 2020. Infectivity Ratio from International Journal of Infectious Diseases.

[3] Ratio represents the amount of people infected on average from one patient.

Potential Economic Impacts

Supply Chain Disruptions:

- Factories closing, increased cost of stagnant inventory, and disrupted supply agreements.
- Reduced travel, tourism, and separation policies: Significant impact on service based economies.

Labor Force Impacts:

- Huge layoffs are extremely likely, across both service and manufacturing economies.
- Increased strains as workforce productivity declines throughout increased societal responsibilities (e.g., home schooling of children) and decreased functionality working from home.
- Illnesses from the disease will also reduce portions of the labor force temporarily.

Declines in Business and Consumer Sentiment:

- Sentiment drives investment and consumption, which leads to increased recessionary pressures if sentiment slips.

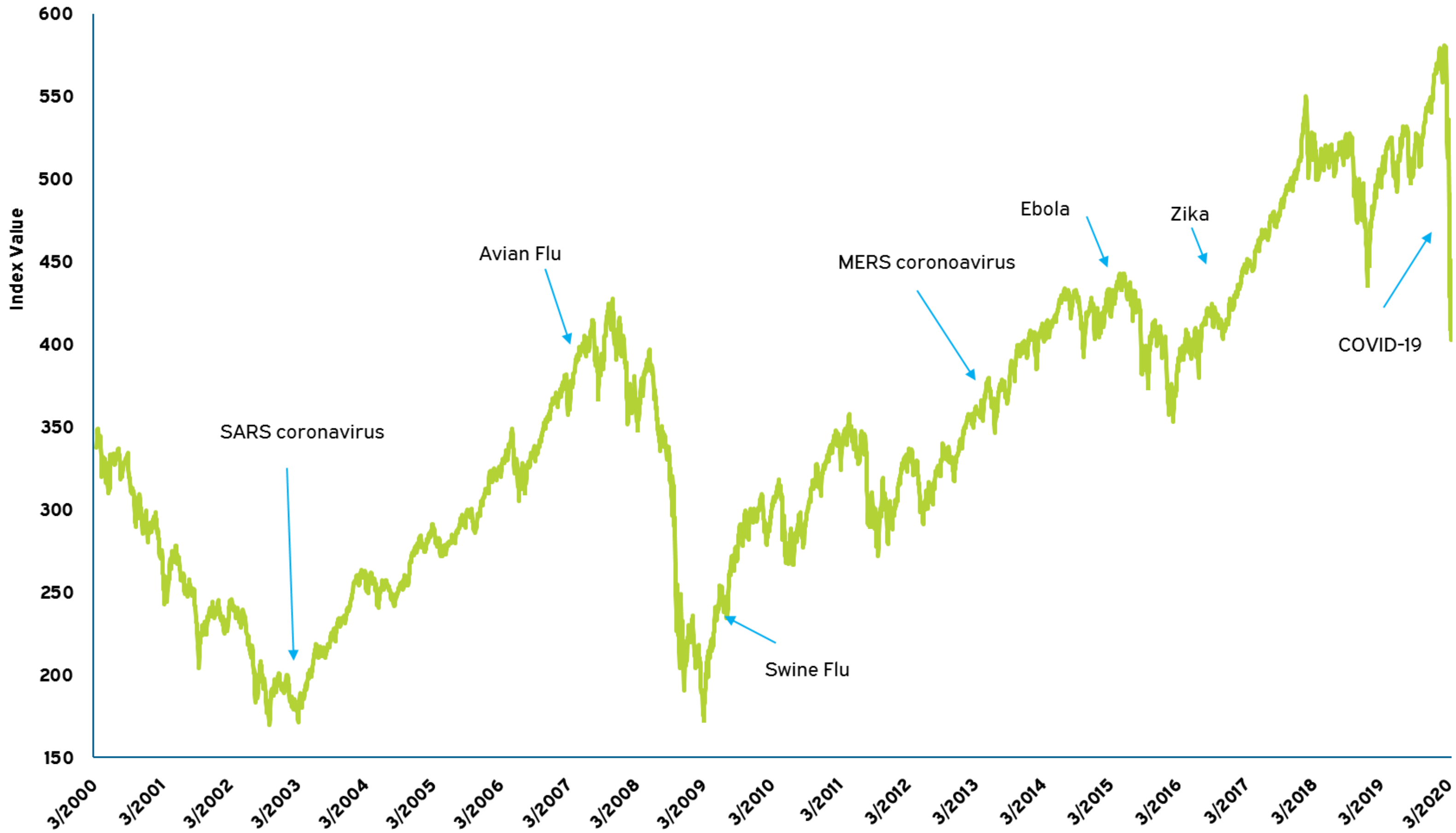
Wealth Effect:

- As financial markets decline and wealth deteriorates, consumer spending will be impacted.

Looking Forward…

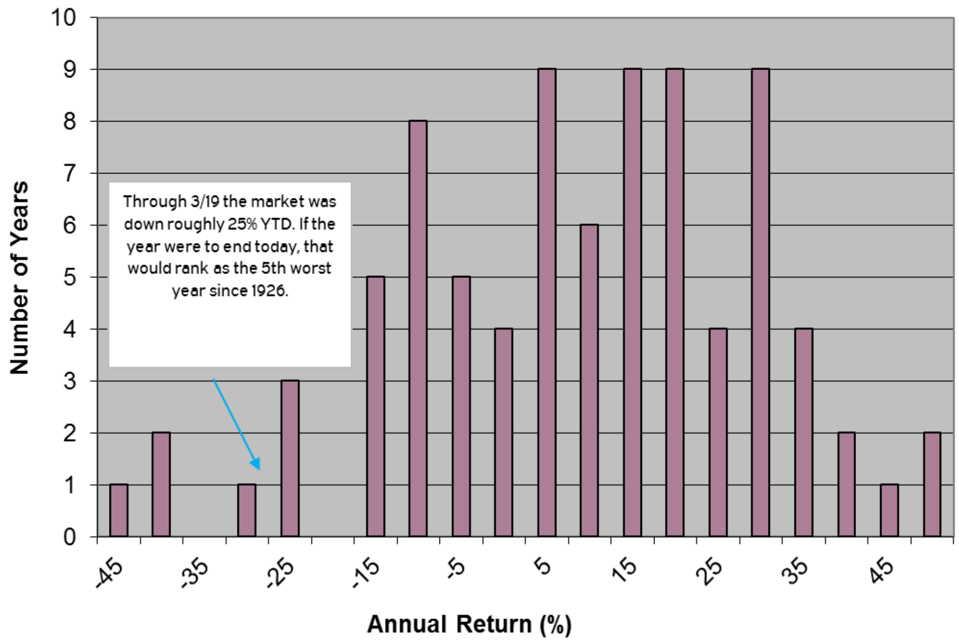
- There will definitely be economic impacts, and likely a recession.
  - How deep will it be and how long will it last?
- The length of the virus and country responses will be key considerations.
  - As of now, it is not clear the end is in sight; however, impacted countries are attempting to lay the groundwork to support a recovery.
- Central banks and governments are pledging support, but will it be enough?
  - Based on initial market reactions to announced policies, the answer is no until the virus gets better contained.
- Expect heightened market volatility given the virus and previous high valuations.
  - This has been a consistent theme over the last few weeks, and volatility is likely to remain elevated for some time.
- It is important to continue to have a long-term focus.
  - History supports the argument that maintaining a long-term focus will ultimately prove positive for diversified portfolios.

Global Equity Markets Have Powered Through Past Viral Outbreaks[1]



[1] Sources: Bloomberg and Centers for Disease Control and Prevention. Data is as of March 19, 2020. Disease labels are estimates of when the outbreak was first reported.

Distribution of Annual S&P 500 Returns[1]
(1926-2020)



- The 25% year-to-date decline in the S&P 500 would be the fifth largest in history if it ended the year at this level.
- With more than 8 months remaining in 2020, and trillions of dollars in fiscal and monetary stimulus being deployed, we expect asset prices to experience notable volatility over the near-term.

[1] Source: Bloomberg.

Prior Drawdowns and Recoveries[1]

Period	Peak-to-Trough Decline of the S&P 500	Recovery Date	Approximate Time to Recovery
August 1929 to March 1933	-83%	January 1945	15 years 5 months
February 1966 to October 1966	-22%	May 1967	1 year 3 months
November 1968 to May 1970	-36%	March 1972	3 years 4 months
January 1973 to October 1974	-48%	July 1980	7 years 6 months
November 1980 to August 1982	-27%	November 1982	2 years
August 1987 to December 1987	-34%	July 1989	1 year 11 months
July 1990 to October 1990	-20%	February 1991	7 months
March 2000 to October 2002	-49%	May 2007	7 years 2 months
October 2007 to March 2009	-57%	March 2013	5 years 5 months
Average	**-42%**		**4 years 11 months**

- Markets are continuing to reprice amidst the uncertain impact of the virus on markets and the global economy, which means this drawdown is still being defined in the context of history.
- That said, financial markets have experienced material declines with some frequency, and while some declines took a meaningful time to recover, markets did recover at some point.
- The current decline being experienced is severe by historical comparisons; however, it is still too early to tell how long a full recovery might take.

[1] Source: Charles Schwab and Bloomberg.

Implications for Clients

- Be prepared to rebalance and take advantage of the age-old wisdom “buy low, sell high”.
  - Before rebalancing, consider changes in liquidity needs given the potential for inflows to decline in some cases.
  - Also, consider the cost of rebalancing as investment liquidity declines.
- Diversification works. The latest decline was an example of a flight to quality.

Performance YTD
(through March 19, 2020)

S&P 500	ACWI (ex. US)	Aggregate Bond Index	Balanced Portfolio[1]
-25.1%	-31.9%	-0.6%	-18.5%

- Meketa will continue to monitor the situation and communicate frequently.
  - The situation is fluid and the economic impact is uncertain at this stage.
- Please feel free to reach out with any questions.
  - We would be glad to assist with performance estimates, memorandums, or phone calls.

[1] Source: InvestorForce. Balanced Portfolio represents 60% MSCI ACWI and 40% Bloomberg Barclays Global Aggregate.

Disclaimers

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