MEKETA INVESTMENT GROUP

Coronavirus Update

First Quarter 2020

Data as of March 27, 2020

Locations of Major Worldwide Cases[1]

[1] Source: Johns Hopkins CSSE. Virus data is as of March 30, 2020. Data throughout the rest of the document is through March 27, 2020.

Virus Update

- COVID-19 has rapidly spread from its original outbreak in China to a total of 177 countries.
- As of March 30, 2020, there were 775,000 confirmed cases globally with 37,000 deaths.
- Cases have leveled-off in China with Europe and the United States experiencing the fastest growth rate of new cases.
- The largest number of cases are now in the US (159,000) followed by Italy (102,000), Spain (85,000), China (82,000), Germany (66,000), France (45,000) and Iran (41,000).
- As testing capacity increases, the case numbers are expected to dramatically rise.
- A number of countries have banned international travel and closed their borders, 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 resulting economic 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.

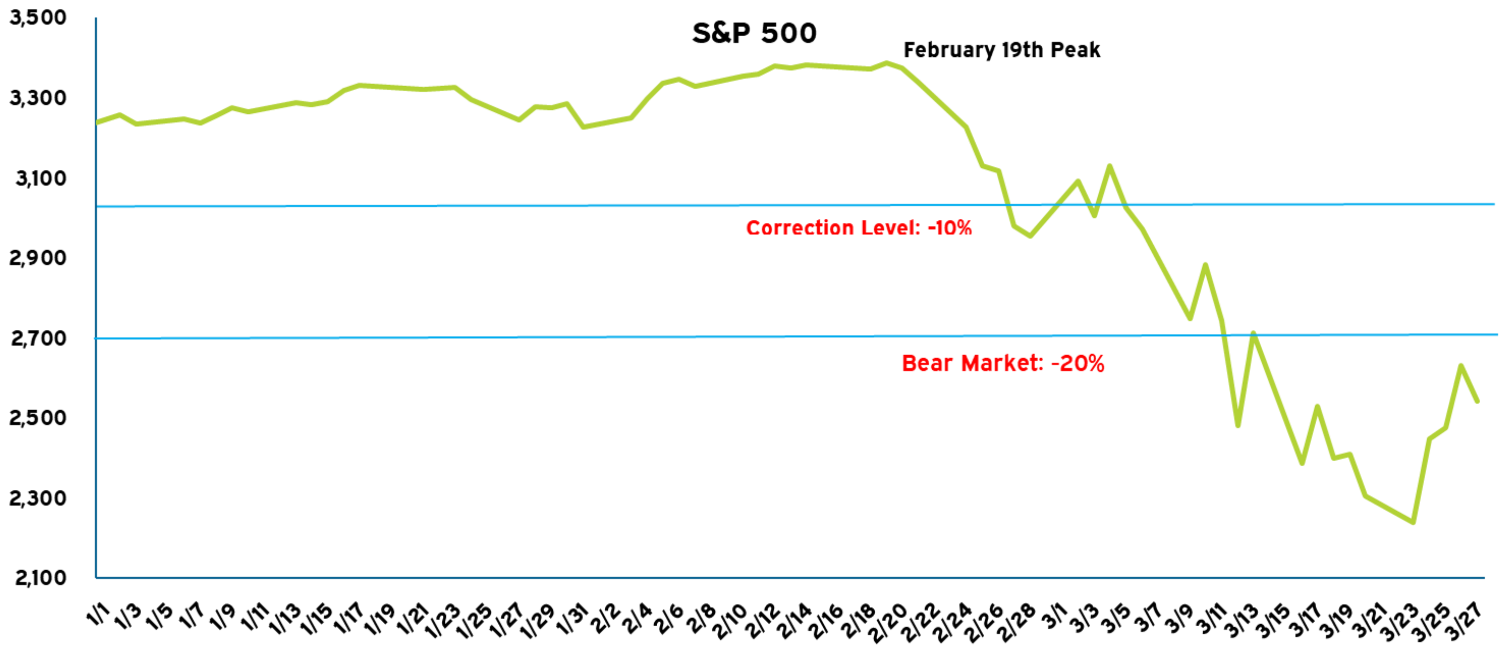
2020 Market Returns[1]

Indices	YTD
S&P 500	-21.0%
MSCI EAFE	-23.6%
MSCI Emerging Markets	-24.2%
MSCI China	-11.3%
KOSPI Index (South Korea)	-25.7%
MSCI Italy	-30.0%
Bloomberg Barclays Aggregate	2.7%
Bloomberg Barclays TIPS	2.2%
Bloomberg Barclays High Yield	-14.0%
10-year US Treasury	11.4%
30-year US Treasury	26.3%

- 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 27, 2020.

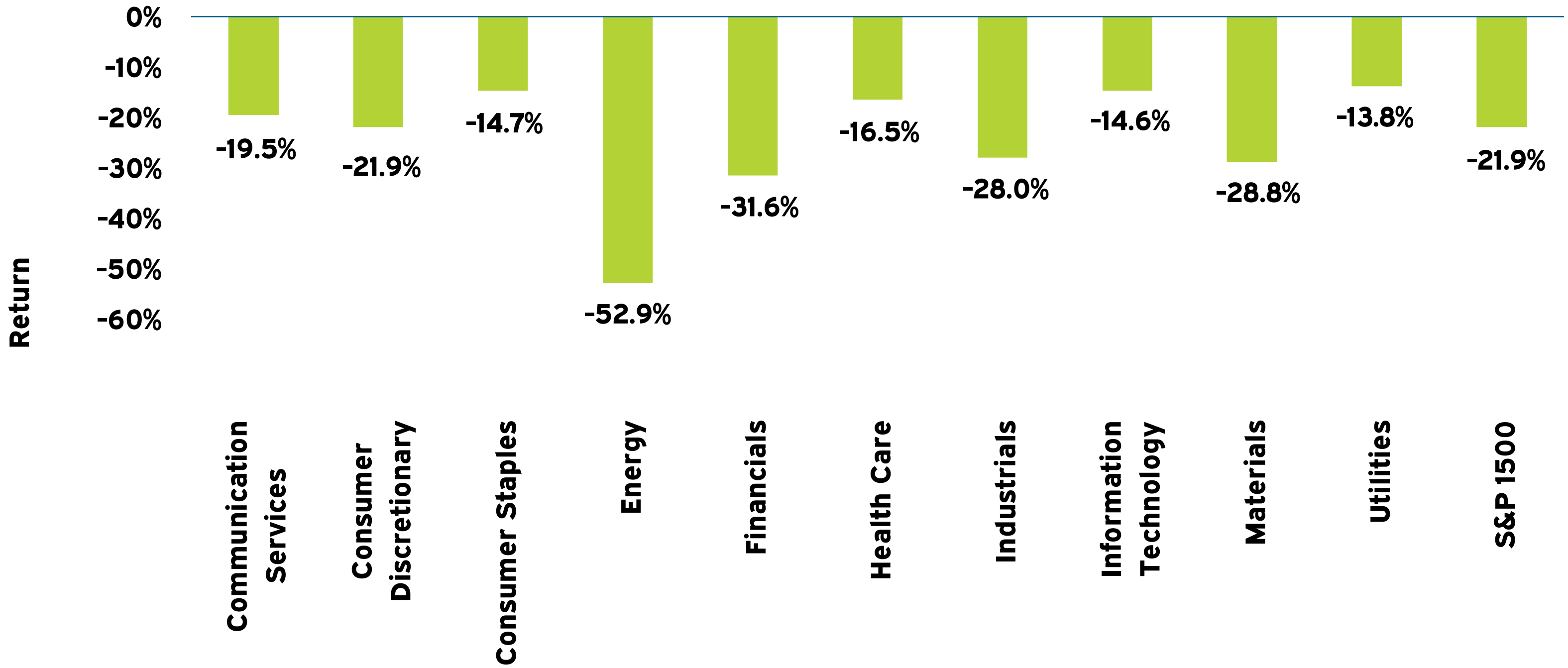
S&P 500 Reaches Bear Market Levels[1]



- 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.
- The index has recovered recently from its lows likely due to the unprecedented monetary and fiscal stimulus announced in the US.

[1] Source: Bloomberg. Data is as of March 27, 2020.

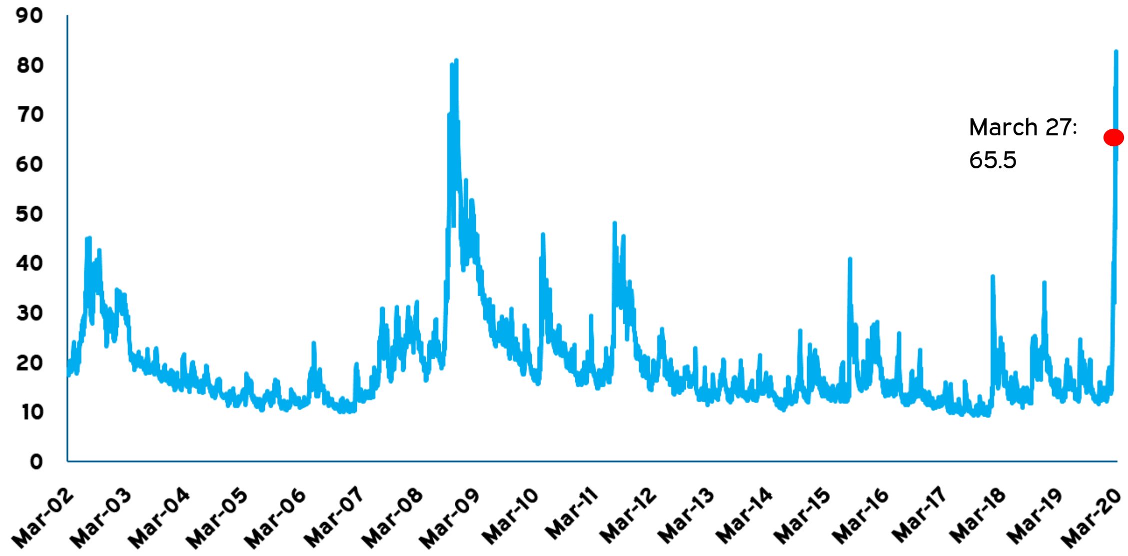
2020 YTD Sector Returns[1]



- The energy sector has experienced the largest declines given the fall in oil prices.
- Financials (-31.6%), materials (-28.8%), and industrials (-28.0%) experienced the next largest declines, while defensive sectors like consumer staples and utilities experienced the smallest declines.

[1] Source: Bloomberg. Data is as of March 27, 2020.

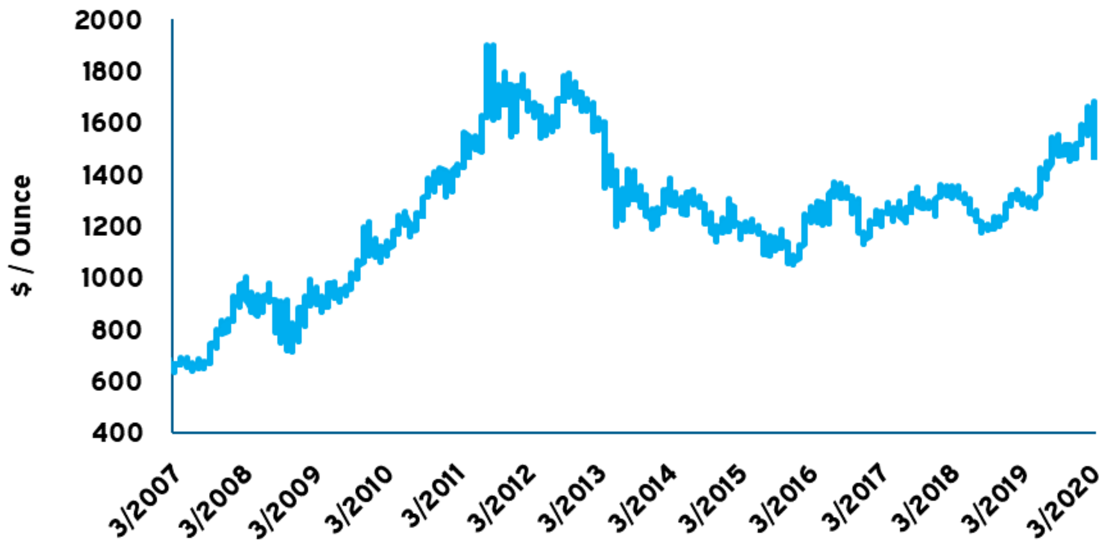
VIX Index[1]



- 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.
- Volatility levels have declined since the policy response in the US, but remain elevated.
- As investors continue to process the impacts of COVID-19 and the effectiveness of the policy response, it is likely that volatility will remain elevated.

[1] Source: Chicago Board of Exchange. Data is as of March 27, 2020.

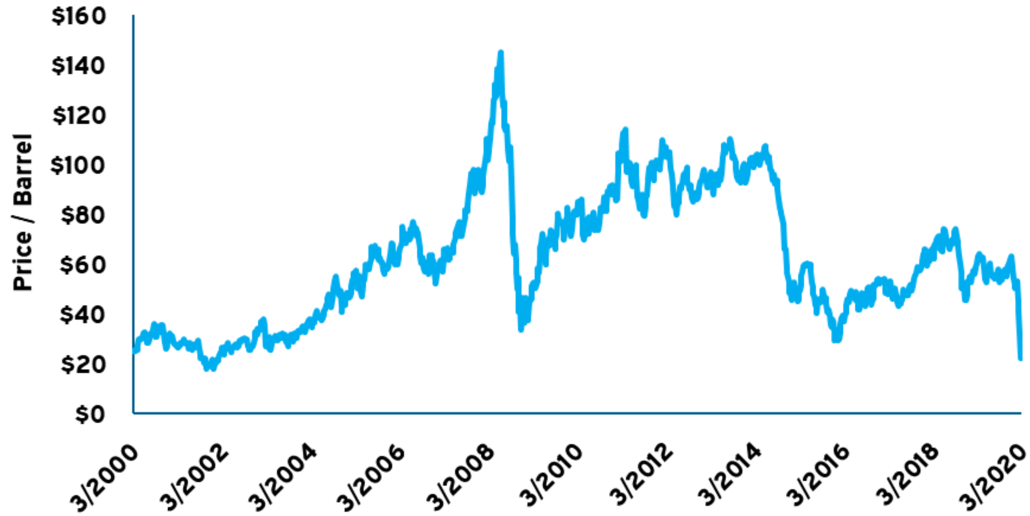
Gold Spot Price[1]



- 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 with its apparently increasing use as a source of funds.

[1] Source: Bloomberg. Data is as of March 27, 2020.

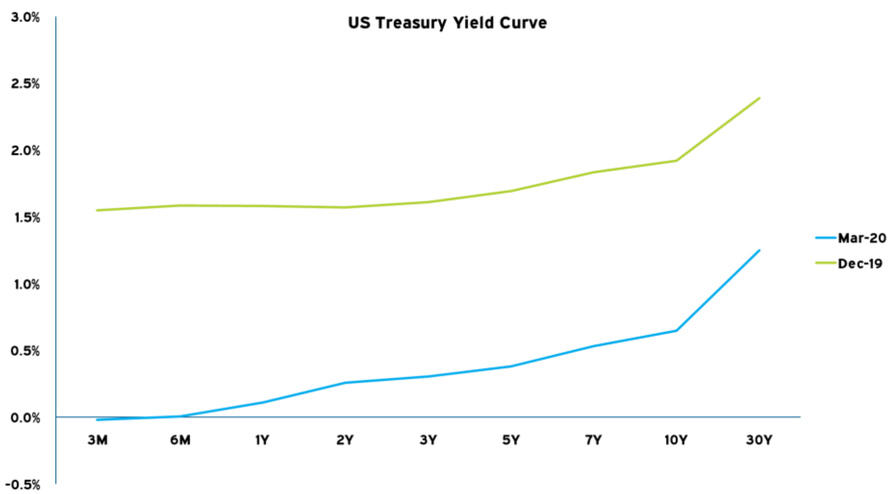
Oil Prices[1]

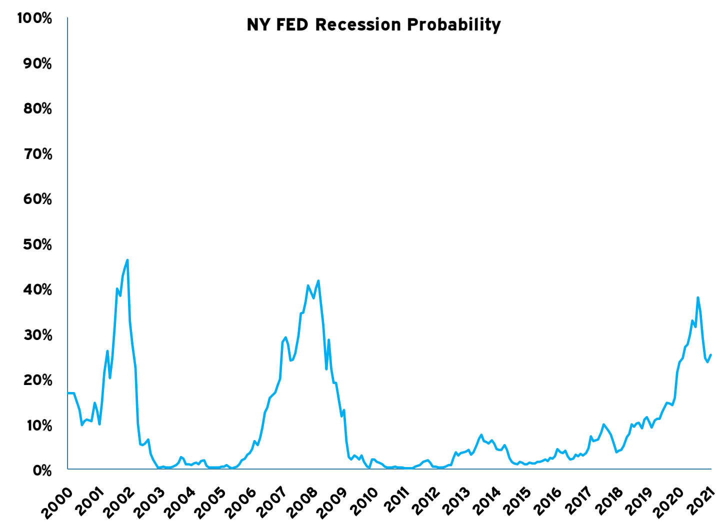


- Oil markets came under pressure as the virus started to lower global growth expectations, but prices deteriorated further when Saudi Arabia initiated a price war due to Russia's decision to not participate in the proposed OPEC+ supply cuts.
- In a recent press conference, President Trump announced 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 per barrel. This represented 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 27, 2020.

US Yield Curve Declines[1]

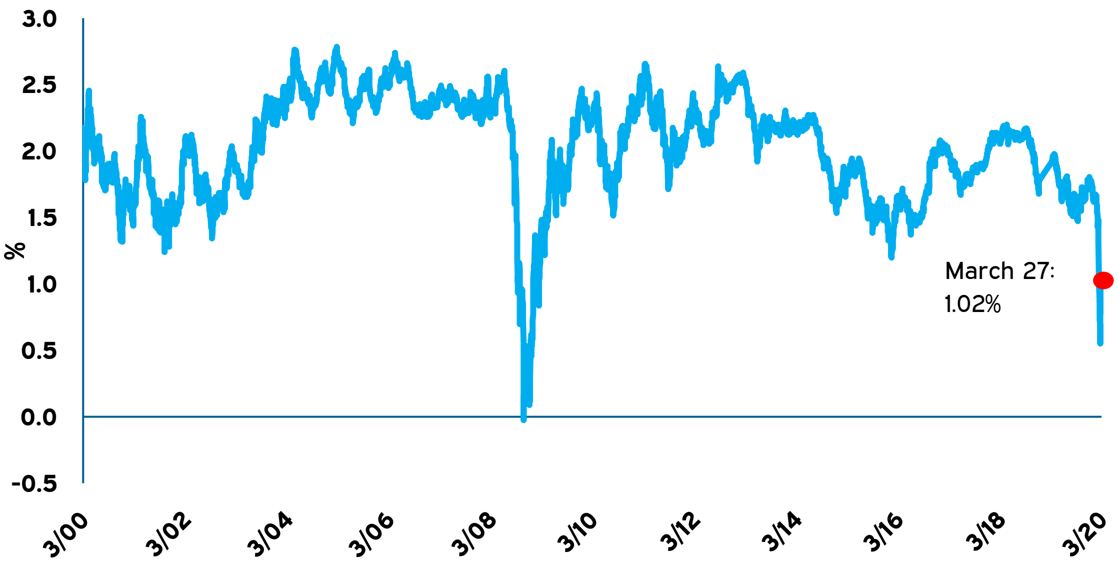




- The US Treasury yield curve has declined materially since last year, driven by notable cuts in monetary policy rates impacting the shorter-dated maturities, and flight-to-quality flows, low inflation, and declining growth expectations driving longer-dated maturities.
- The shape of the yield curve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

[1] Source: Bloomberg. Yield curve data is as of March 27, 2020. NY FED data is as of February 28, 2020.

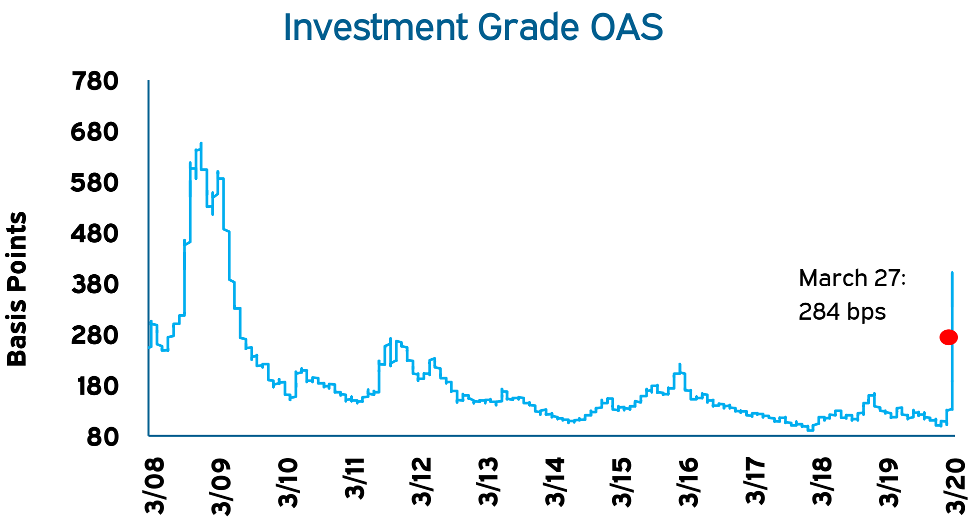
10-Year Breakeven Inflation[1]

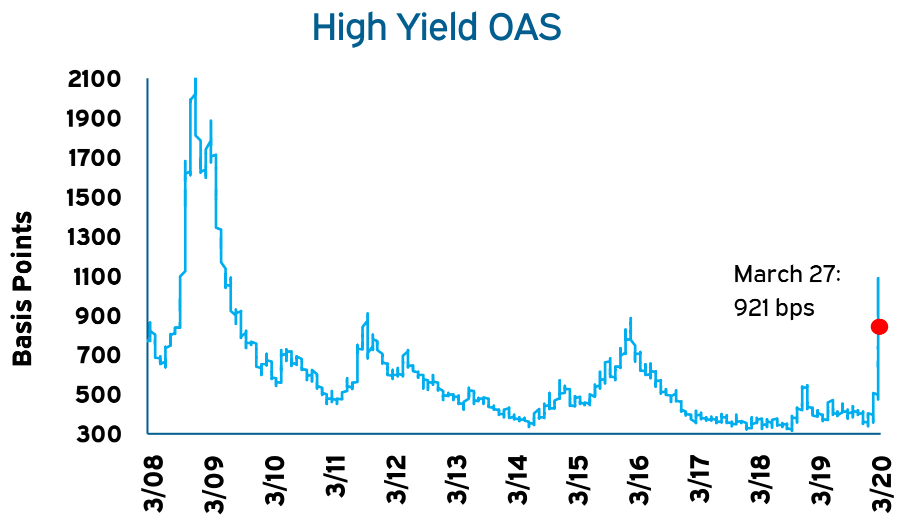


- Inflation breakeven rates declined sharply over the last two months, due to a combination of declines in inflation expectations and liquidity dynamics in TIPS during the height of rate volatility.
- Breakevens have not traded near these levels since the GFC, and when they did, the Federal Reserve responded with large-scale asset purchases (LSAPs); this is consistent with recent policy actions.
- Inflation expectation levels have come off of their recent lows as liquidity has improved and given the potential inflationary impacts of the US fiscal and monetary responses.

[1] Source: Bloomberg. Data is as of March 27, 2020.

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

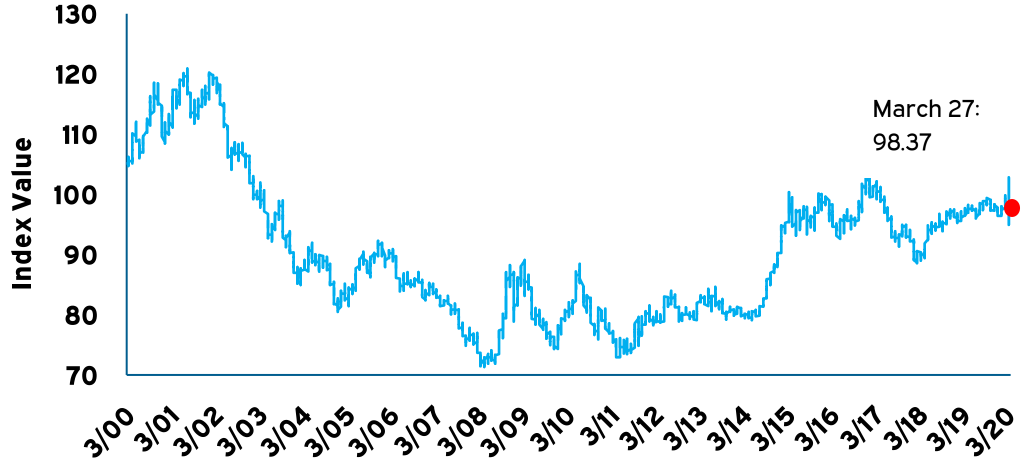




- Credit spreads (the spread between a comparable Treasury bond) for investment grade and high yield corporate debt expanded sharply as investors preferred perceived safe-haven bonds.
- Investment grade bonds have held up far better than high yield bonds, which have a far greater risk of default in this environment. Companies in the reeling energy sector, recently hurt by the decline in oil prices, issue many 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 affect a significant number of investors.

[1] Source: Federal Reserve Bank of St. Louis Economic Research. Data is as of March 27, 2020.

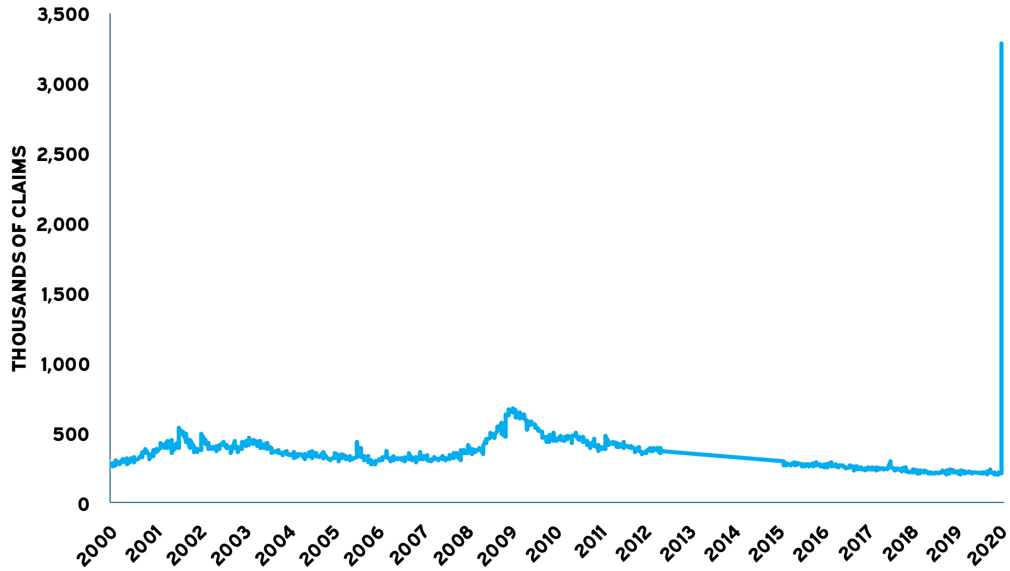
US Dollar versus Broad Currencies[1]



- 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 grew into a pandemic, investors' preferences 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, providing some recent relief to the dollar.
- A relatively strong 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 emerging markets.

[1] Source: Bloomberg. Represents the DXY Index. Data is as of March 27, 2020.

US Initial Jobless Claims[1]



- As COVID-19 spreads and restrictions increase, economic data is expected to significantly deteriorate.
- Layoffs have risen dramatically as businesses have been forced to close in an effort to stop the spread of the disease.
- Last week, 3.3 million people filed claims for initial unemployment benefits, dwarfing prior highs and showing just how immediate and unprecedented the impact of the virus is.

[1] Source: Bloomberg. First reading of seasonally adjusted initial jobless claims. Data is as of March 27, 2020.

Historic $2T US Fiscal Stimulus

Destination	Amount ($ Billion)
Individuals	$560
Large Corporations	$500
Small Business	$377
State & Local Governments	$340
Public Health	$154
Student Loans	$44
Safety Net	$26

- Last week, a historic $2 trillion fiscal package was approved in the US, representing close to 10% of GDP and including support across the economy.
- Individuals will receive a package of cash payments of up to $1,200 per adult and $500 per child, and extended and higher weekly unemployment benefits (+$600/week).
- The package also includes a $500 billion lending program for distressed industries, like airlines, and $377 billion in loans to small businesses.
- Other parts of the package include allocations to state and local governments, support for public health, student loan relief, and a safety net.

Policy Responses

	Fiscal	Monetary
United States	$50 billion to states for virus related support, potential payroll tax cut, paid sick leave for hourly workers, $2 trillion package for individuals, businesses, and state/local governments.	Cut policy rates to zero, unlimited 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 UK 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	770,653
Deaths	~18,000	774	36,946
Death Ratio	<0.1%	9.6%	4.8%
Infectivity Ratio[3]	1.3	3.0	2.2

- 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 30, 2020. Infectivity Ratio from WHO.
[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 including closed borders: 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.

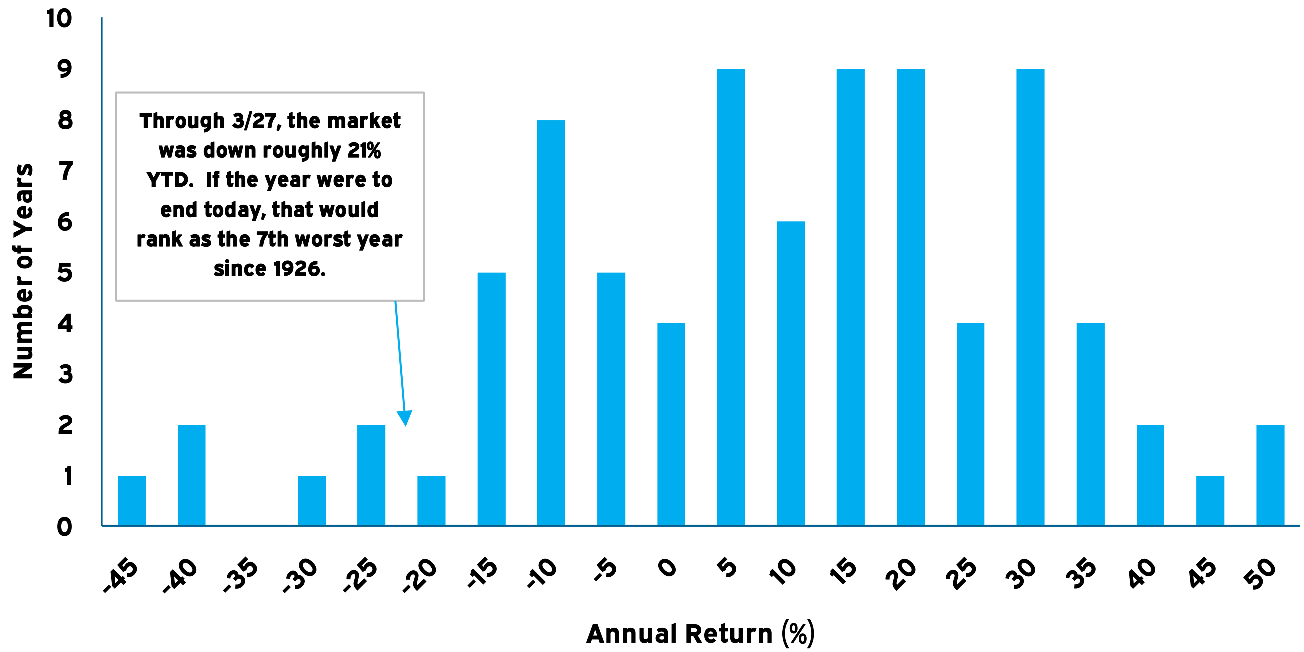
Wealth Effect:

- 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 it will be and how long it will last depend on a number of factors (below) that are unknowable at this time.
- 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.

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



- The 21% year-to-date decline (through 3/27) in the S&P 500 would be the seventh largest in history if it ended the year at this level.
- With close to nine 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
February 2020 to March 2020	-25%	TBD	TBD
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 eventually recover.
- The current decline being experienced is severe by historical comparisons; it is still too early to tell how long a full recovery might take.

[1] Source: Charles Schwab and Bloomberg. Recent peak to through declines are through March 27, 2020.

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 27, 2020)

S&P 500	ACWI (ex. US)	Aggregate Bond Index	Balanced Portfolio[1]
-21.0%	-24.2%	2.7%	-13.6%

- 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.

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