

Potential economic impact of COVID-2019.

The novel coronavirus (COVID-2019) has emerged quickly, causing significant market volatility. We examine the potential economic impact of the virus by looking at past actual and potential pandemics. Our findings include:

- COVID-2019 appears to be neither particularly infective nor particularly fatal when compared to other infectious diseases such as SARS. But the disease spreads easily enough that ultimate case counts are likely to be high.
- Investors should remain calm and focused on long-term objectives
- Economies and equity markets decline in response to virus onset but rebound quickly before crises are completely resolved.
- Our equity strategies have held up well in the face of higher volatility, largely as a result of our focus on high quality companies and because we actively reduced companies with excessive macroeconomic exposure over the past eighteen months.

After analyzing three historic epidemic/pandemic episodes, we find that, although they are accompanied by high levels of market volatility, they leave little long-term economic damage. Economic activity is temporarily suspended during an outbreak and is followed by a strong rebound when pent-up demand is spent.

We believe investors should remain calm and invested given the current development of the disease. As with past endogenous macroeconomic shocks, fear will give way to rationality and staying put may avoid the potential whipsaw of selling at the bottom.

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Introduction

After ignoring building risks for weeks, financial markets sold-off sharply in the last week of February 2020. The S&P 500 hit a new high on February 19 but then declined 12.4% by month-end. Interest rates fell to record lows and both the VIX index and credit spreads rose (Exhibit 1). It was a classic risk-off response prompting a 50-basis point Fed rate cut in response.

Markets continue to be volatile in March as investors attempt to gauge the earnings impact from the virus. The high level of volatility is also an expression of the wide range of potential economic outcomes. What should we expect in terms of financial market and economic impact? We look at historical pandemic shock scenarios (the 2003 SARS outbreak and the 1918 H1N1 “Spanish Flu” Pandemic) and show that in previous pandemic episodes, long-term economic damage was limited and markets regained losses quite quickly. Finally we review current portfolio positioning and show why some of our equity strategies have held up reasonably well.

Given heightened fears about COVID-2019, financial market volatility is sure to rise but investors should remain calm and make decisions with long-term objectives in mind.

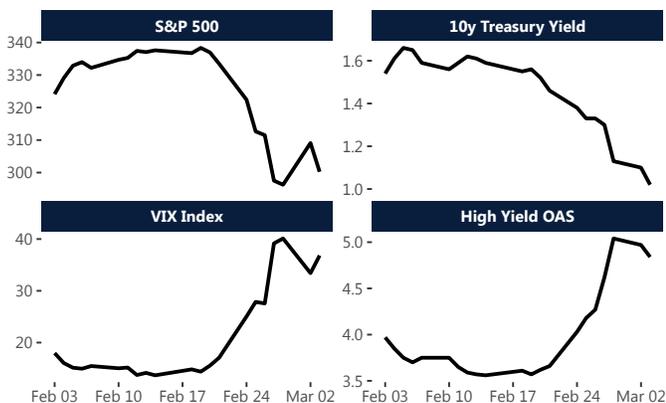
COVID-2019

SARS-CoV-2 is the pathogen that causes Coronavirus Disease 2019 or COVID-2019 for short. It appeared seemingly out of nowhere in December 2019 spreading rapidly through the Huanshan Seafood Market in the industrial city of Wuhan, Hubei Province, China. The government was slow to report details of the disease allowing the spread to take hold.

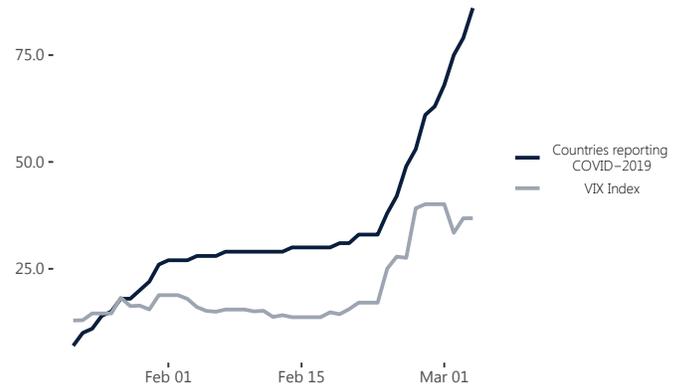
The city – and then much of China – quickly locked down. The timing of the outbreak was unfortunate, occurring on the eve of the Lunar New Year celebration, a traditional family gathering holiday that sees some 3 billion passenger journeys over a 40-day period. By the time Wuhan was locked down, an estimated 5 million of the city’s 11-million population had already left the city, allowing the virus to spread throughout China leading to over 80,000 confirmed cases and 3,000 fatalities.

Within days, the virus appeared in a number of hotspots outside of China — a cruise ship quarantined off of Yokohama, Japan, among a religious sect in South Korea, in Iran and

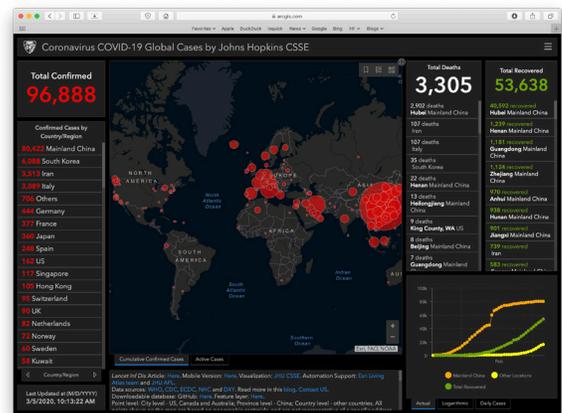
Ex. 1: Market response to onset of SARS-CoV-2



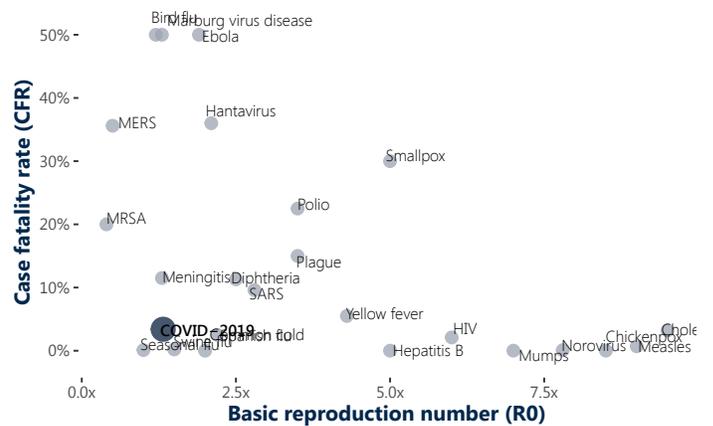
Ex. 2: VIX rises in response to infection spread



Ex. 3: COVID-2019 prevalence, March, 2020



Ex. 4: Reproduction & fatality of major diseases



in Northern Italy — prompting volatility to increase across financial markets (Exhibit 2). Confirmed coronavirus cases rose to over 96,000 in 86 countries (Exhibit 5). While most early reported cases had an identified link to China, community transmission is now occurring around the world.

The COVID-2019 is a coronavirus that belongs to a family of pathogens that typically cause upper-respiratory tract illnesses that range in severity from the common cold to SARS and MERS. There is no vaccine or cure but a number of possible treatments are under active development.

March 2020

What makes this virus so dangerous is a long incubation period, asymptomatic transmission and an unpredictable disease progression. While most cases are mild, some develop into pneumonia during the second week of illness and, in fact, the disease was originally called Wuhan pneumonia (Wuhan feiyan) in Chinese. Most deaths have been among vulnerable populations of patients with preexisting medical conditions.

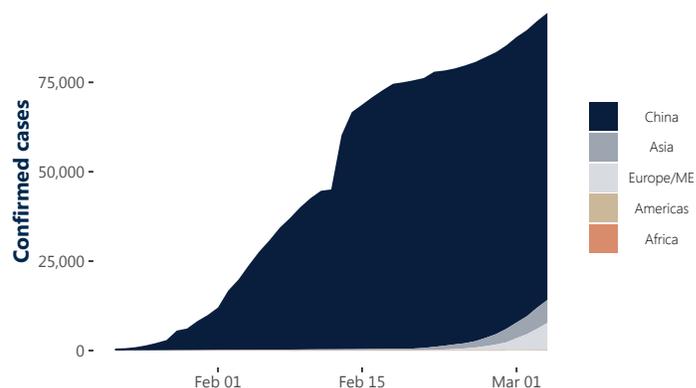
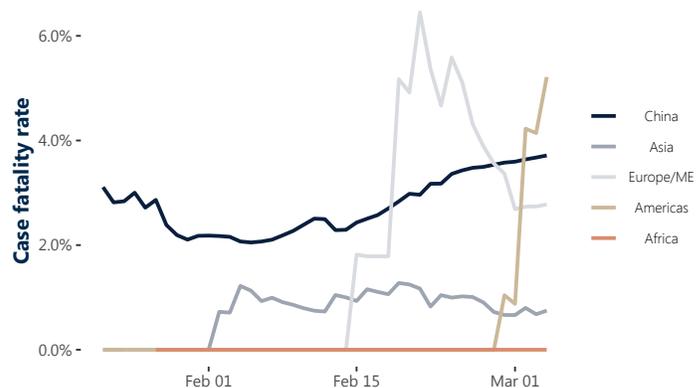
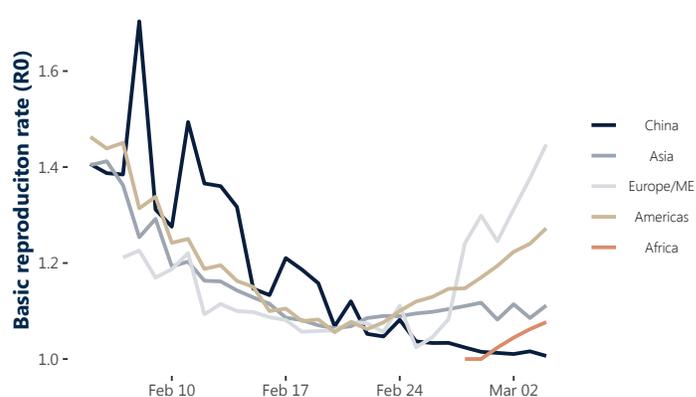
The disease spreads through the droplets emitted when an infected person sneezes, coughs or speaks. Most infections occur among families and through touching an infected surface. Even simple measures like frequent hand washing and isolation can help to slow the virus spread. Despite its rapid spread, Covid-2019 is neither notably contagious nor fatal (Exhibit 4). Its basic reproduction number (R_0 or the number of new infections generated per infected person) appears to vary between countries and ranges from 1.6 in Europe and the Middle East to 1.1 in Asia (Exhibit 7). That compares to an estimated R_0 of 12-18 for Measles and 2-5 for SARS. The case fatality rate (CFR) is currently about 3.4% (Exhibit 2), well below many other major diseases. The CFR for SARS, for example, was about 9.6% but COVID-2019's combination of infectivity and lethality is expected to cause a high confirmed case count and many fatalities.

How will the virus be stopped? One possibility is that COVID-2019 is a seasonal virus like common influenza or SARS that will naturally die out once the weather begins to warm across the northern hemisphere. SARS emerged in February 2003 and was no longer causing new infections by June. COVID-2019 is spreading across latitudes so it is unlikely to be seasonal.

The other means of stopping the disease is through isolation, or quarantine, and contact tracing with the goal of pushing the R_0 to below one, eliminating the spread of the virus. China, according to some media reports, has restricted the free movement of up to 750 million of its citizens and the R_0 in China has declined to 1.0 suggesting its containment methods have been effective at reducing virus spread. Western governments are likely to have less flexibility given constitutional constraints and the infection rate may increase once the isolated population regains free movement.

When might the virus peak? A primary model in epidemiology is the SIR model that solves a series of differential equations to measure the transition of a population from susceptible to infected to recovered. A basic implementation of the model suggests that the virus may peak first in Europe and Africa because the disease is spreading fastest there, followed by China and the Americas. The model also indicates that a secondary outbreak may occur next winter (Exhibit 8).

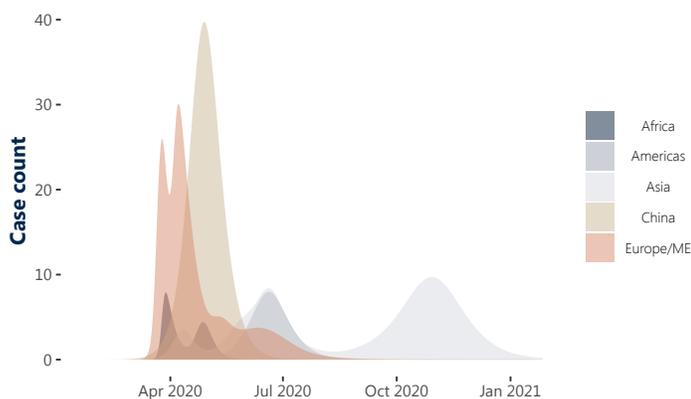
The ultimate economic impact will be determined by the methods taken to contain the virus. A seasonal, fast-moving virus would generate less impact while full isolation across several countries would lead to school and business closures, event cancellations and a longer period of economic inactivity. Some of these full isolation methods are already being implemented in China, Japan and Italy.

Ex. 5: SARS-CoV-2 confirmed cases by region**Ex. 6: Case fatality rate by region****Ex. 7: Basic reproduction rate by region (15-day trend)**

Market reaction to pandemic

Equity markets do not appear to process pandemic-related information very well, first ignoring information and then overreacting to it (Exhibit 9). We looked at market performance during three pandemic episodes: SARS in 2003 (MSCI Hong Kong Index), Ebola in 2014 (MSCI World Index) and COVID-2019 in 2020 (MSCI World Index) from 60 days before and after the World Health Organization (WHO) declared each virus a "Public Health Emergency of International Concern (PHEIC)", an official designation that requires member state response.

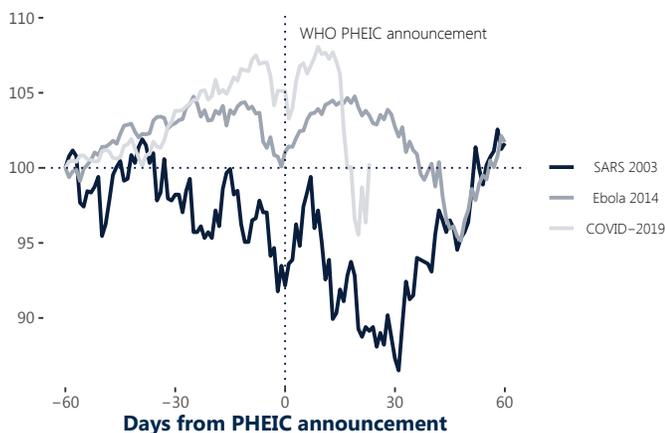
Ex. 8: Basic SIR model case count



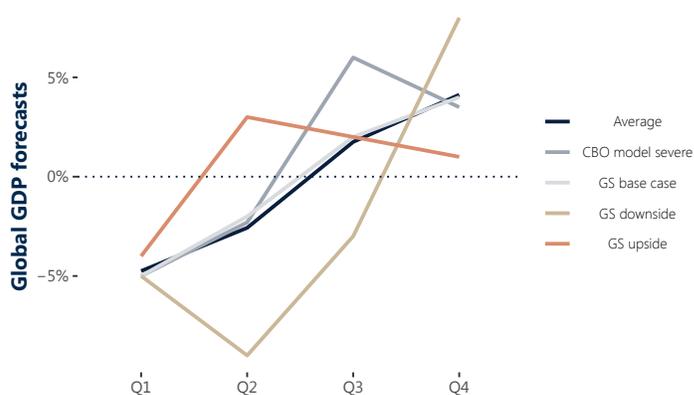
Ex. 10: Equity market reaction to Spanish Flu



Ex. 9: Equity market reaction to pandemic



Ex. 11: 2020 GDP forecasts



In each event, equity markets showed volatility around the announcement date indicating building investor concern but, in each case, markets went up after the WHO announcement before falling again as the crises developed. During SARS and Ebola, however, markets fully recovered drawdowns within 60 days of the WHO announcement.

Markets followed a similar path during the Spanish Flu epidemic in 1918 that killed an estimated 50 million people around the world, including 675,000 Americans. In the US, the flu occurred in three waves. The first began in March 1918 and saw the disease spread across the US, the second wave occurred in the fall of 1918 and was the most deadly phase of the pandemic. The third wave occurred in the winter of 1918 before ending in the spring of 1919. US equity markets seemingly shrugged off the events. The Dow Jones Industrial Average fell about 5% around the start of the first and second waves before recouping losses. The market actually rose 15% during the final wave (Exhibit 10). Our base case is that, similar to previous episodes, equity markets will recoup drawdowns.

Economic impacts of pandemics

The economic impacts of pandemic are both far-reaching and difficult to forecast given the paucity of historical precedents. In any shock episode, demand for goods and other stock items tend to be deferred while demand for time-sensitive goods, or flows, is foregone. Examples of flow goods include airline tickets, restaurant reservation, theater tickets or other goods

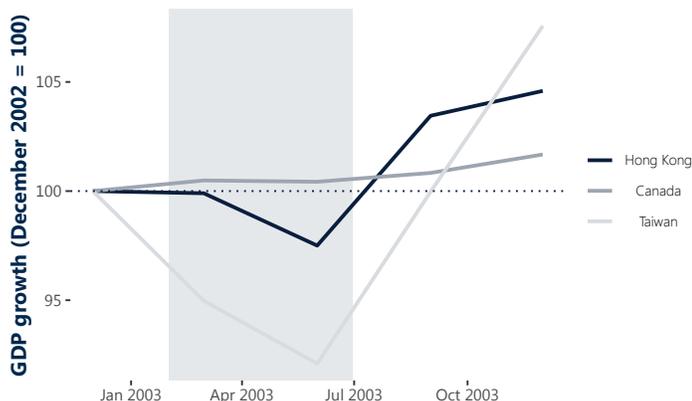
that can only be consumed at a specific time. Stock goods can be held for longer periods of time.

Demand for certain goods can exceed supply as we are currently seeing with protective health care equipment like surgical masks and gloves. In a severe coronavirus episode, demand for health care, for example, would greatly exceed supply, straining medical systems and crowding out the health care needs of non-virus patients. At the same time, demand for other goods and services would decline.

A pandemic can impact supply chains and slow economic growth from both the supply and demand sides of the economy. China's country-wide lockdown is creating supply chain issues for manufacturers around the world and India has forbidden exports of a wide range of pharmaceutical ingredients and generics.

Economists are only now starting to factor the virus into their forecasts for 2020 economic growth. Goldman Sachs economists compiled three scenarios for 2020 global GDP. The base case predicts a global contraction of 5% in Q1 with the economy continuing to decline by 2% in Q2 before rebounding later in the year; Goldman's base case assumes no global recession. The downside scenario does assume a recession and forecasts a 5% contraction in Q1 and a further 12% decline in Q2 and Q3 before seeing a strong rebound in Q4. JP Morgan economists, on the other hand, expect only a modest contraction of global GDP in Q1 before seeing a strong rebound in Q2

Ex. 12: Hong Kong, Taiwan, Canada GDP during SARS



Ex. 13: Hong Kong, Taiwan, Canada equities during SARS



(Exhibit 11). The high level of uncertainty partially explains the high level of market volatility.

We look to two additional sources for insight into the economic impacts of pandemic. First, the actual experience of Hong Kong and Canada during the SARS epidemic in 2003 and an analysis from the Congressional Budget Office on the potential US economic impact of an influenza pandemic with characteristics similar to COVID-2019.

SARS 2003

The 2003 SARS outbreak bears similarities to COVID-2019. Both diseases appeared to be transmitted from bats to humans in outdoor wildlife markets in China and, in both, authorities originally downplayed or obscured the severity of the virus allowing it to take hold outside of the ground zero area. SARS was both more infectious than COVID-2019 with an R0 of 2.8 and more fatal with a CFR of 9.6%; COVID-2019 has an R0 of about 1.4 and a CFR of 3.4%. SARS could only be transmitted by patients with obvious symptoms so isolation and contact tracing was an effective mechanism for stopping the spread of the disease while COVID-2019 can spread through asymptomatic transmission meaning isolation may be less effective. Only 8,000 people contracted SARS but more than 800 died. The high fatality rate increased public fear.

SARS mostly affected China, Hong Kong and Taiwan before spreading to Canada. The virus began in February 2003 and

Ex. 14: CBO economic impact of pandemic

Sector	GDP	GDPpct	Mild	Severe
Agriculture	\$173	0.8%	-3.0%	-10.0%
Mining	\$311	1.4%	-3.0%	-10.0%
Utilities	\$336	1.6%	0.0%	0.0%
Construction	\$890	4.1%	-3.0%	-10.0%
Manufacturing	\$2,366	11.0%	-3.0%	-10.0%
Wholesale trade	\$1,267	5.9%	-3.0%	-10.0%
Retail trade	\$1,185	5.5%	-3.0%	-10.0%
Transportation/warehousing	\$684	3.2%	-17.0%	-67.0%
Information	\$1,129	5.2%	0.0%	0.0%
Finance	\$4,512	21.0%	0.0%	0.0%
Professional/business services	\$2,770	12.9%	0.0%	0.0%
Education	\$265	1.2%	0.0%	0.0%
Health care	\$1,628	7.6%	4.0%	15.0%
Entertainment/lodging	\$903	4.2%	-20.0%	-80.0%
Other services	\$459	2.1%	-1.0%	-5.0%
Government	\$2,645	12.3%	0.0%	0.0%
Total / Impact	\$21,523	0.0%	-2.0%	-7.3%

was contained and eliminated by June 2003. Occurring amidst a number of macroeconomic headwinds – the 9/11 attack, the implosion of Enron, the bursting of a credit bubble and the US invasion of Iraq – the virus caused widespread disruption to affected economies and hit transportation, retail and entertainment sectors hard.

During the course of the virus, affected economies showed a similar pattern, slowing or declining during the active phase of the virus before strongly rebounding by the end of the year (Exhibit 12). The Hong Kong and Taiwan economies were much more affected than Canada’s where the outbreak was isolated primarily to Toronto. Economies grew strongly after the virus peaked, with rebounds returning economies to trend levels by Q4. Each of the countries grew in 2003 with Hong Kong GDP rising by 4.6%, Taiwan by 7.5% and Canada by 1.7%.

Equity markets show a similar pattern. Although Hong Kong and Taiwan stock indices fell as much as 20% in the midst of the crisis, they rebounded strongly once the situation settled (Exhibit 13). By year’s end, all three markets showed strong gains.

CBO Estimate

In response to SARS, fears of an avian flu and concerns about bio-terrorism, in 2005, the Congressional Budget Office prepared an analysis of the potential economic effects of two pandemic scenarios, one similar in severity to the 1918 Spanish Flu and another with a more mild severity. Although the authors noted, “There is a substantial amount of uncertainty associated with these scenarios because there is scant empirical evidence available to inform many of the assumptions that are needed for the calculations underlying the economic effects”. However, the CBO did create a framework for assessing economic impact by estimating the potential reduction in demand for each economic sector, as reported in the National Income and Product Accounts release from the Bureau of Economic Analysis.

We applied the CBO study sector impacts to the most recent GDP sector data to gauge potential economic impact and show the CBO assumptions for the mild scenario would reduce

GDP by 2.0% over the course of the outbreak while the more severe scenario would reduce GDP by 7.3%.

BAM portfolio positioning

Bruderman Asset Management (BAM) equity portfolios have not declined as much as benchmarks since the virus began to spread outside of China. We measure COVID-to-date (COVTD) performance from January 22, 2020 through March 4, the date of this report (Exhibit 15). Our Dividend strategy, for example, was down 2.7% over the period versus declines of 8.6% for the Dow Jones Select Dividend Index (DVY), its closest benchmark, and 5.6% for the S&P 500 (SPY). Other strategies also exceeded their primary benchmarks. Although not shown, volatility was below benchmarks as well.

Strategies benefited from our focus on high quality companies with low leverage and high earnings visibility and due to our decision over the past two years to actively reduce exposure to companies with high levels of macroeconomic exposure. Avoiding highly macro-exposed companies helped during the trade war with China and even more during the COVID-2019 crisis.

In addition, our strategies have lower exposure to the most virus-exposed sectors such as airlines, hotels, banks and mining. Exhibit 16 shows the cumulative weight invested in sectors ranked by their beta to the S&P 500 since January 22. The dark orange line shows how the weight of the S&P 500 accumulates into higher beta sectors. Only 32% of the S&P is held in sectors with a below average beta while 69.3% of the Dividend strategy is held in sectors with below average crisis beta.

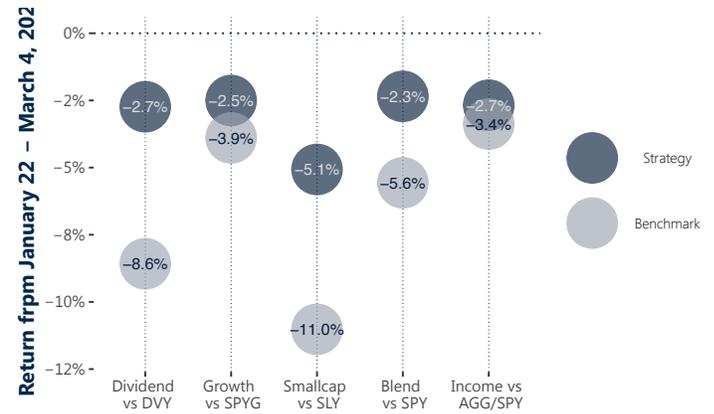
While we expect volatility to continue until the virus peaks around the world, we believe our strategies may continue to perform with lower volatility than overall markets.

Conclusion

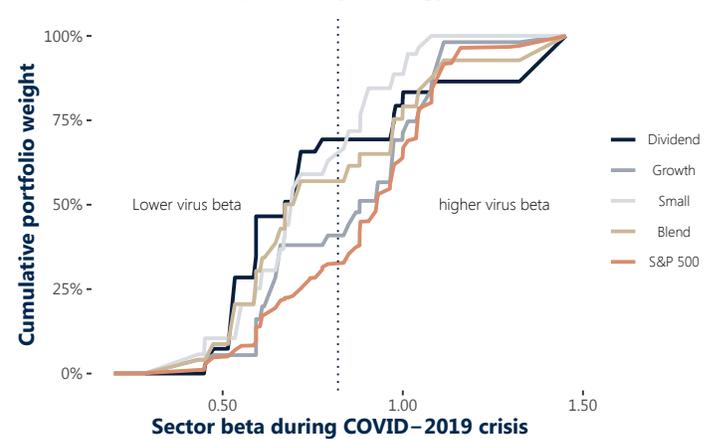
We expect COVID-2019 to continue to cause market volatility until the virus peaks, perhaps by early summer. Long-term economic damage is unlikely but we do expect the virus to have a significant impact on economic output. Until then, investors should invest with an eye towards their long-term goals as during previous epidemic/pandemic episodes, equity markets have quickly regained drawdowns.

If you have any questions, concerns or would like additional information, please contact your investment advisor.

Ex. 15: BAM equity strategy performance since January 22



Ex. 16: BAM sector exposure by strategy



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- Bruderman Asset Management calculations

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