

MassMutual

Market Update
May 20, 2020



Among the many mysteries of nature is the story of the chrysalis. Contrary to popular belief, a caterpillar doesn't just sprout wings, slim down a bit, add some colors, and fly away.

When a caterpillar begins its transformation into a butterfly or moth, it first turns into what is called a chrysalis. A chrysalis is essentially a pile of slimy, gooey protoplasm. As the caterpillar transforms, there are, in fact, no legs, no eyes...no physical remnants of what the caterpillar used to be.

Historically, people thought that when the caterpillar dies, a new creature rises out of its remains. In some cases, religions have embraced this as proof that metamorphosis is not only possible, but naturally occurring. The idea of a caterpillar metamorphosing into a butterfly was, to some, believed to be akin to a human transforming as he or she entered heaven.

Scientifically, however, the question of how metamorphosis occurs has stumped researchers for years. It is one of nature's least understood black boxes.

We find ourselves asking a similar question. How will the world act when its citizens re-emerge? How will it look? How will it be different? Will consumers, in aggregate, behave as they had historically, or will they have changed entirely?

Martha Weiss, a professor of biology at Georgetown University, decided to answer this very question: is the butterfly the same creature it was before the metamorphosis?

She did this by performing a wonderful experiment. When the caterpillar was still a caterpillar, Weiss exposed it to a nasty smelling nail polish-like odor, repeatedly, while simultaneously applying a 10-second electrical zap. Over and over again. Odor and zap. Odor and zap. Unsurprisingly, the caterpillar quickly began to dislike the smell, and would move (as quickly as a caterpillar can move) in the other direction.

Soon after, the caterpillar began to pupate. Organs dissolved, muscles melted, and what appeared to be a cataclysmic and catastrophic transformation occurred. Cut open a chrysalis and you'll find no sign of either butterfly or caterpillar. Just soupy, slimy goop. One month later, generally on schedule, a moth or butterfly emerges.

Professor Weiss took the new butterfly and exposed it to the same odor. Sure enough, the butterfly moved quickly in the other direction! The organism, in other words, despite a total reorganization and metamorphosis, still retained some fragment of memory that told it to act a certain way (e.g., to avoid the threat or, in this case, odor).

In much the same way, we believe we are beginning to see similar behavior by consumers in spite of a total reorganization over the past several months. What we have experienced has been both unprecedented and disorienting. Consumers, businesses, and governments acted far outside of the scope of expectations, and we have seen economic numbers that have forced many of us to check our math for fear of an error. And yet...consumers have remained fairly confident, and markets have rebounded as uncertainty has declined.

With that, what follows is an update and analysis of: 1) the progression (and hopefully contraction) of COVID-19, 2) an update on economic data, and 3) a perspective from markets.

Let us begin.

As of the morning of May 19¹:

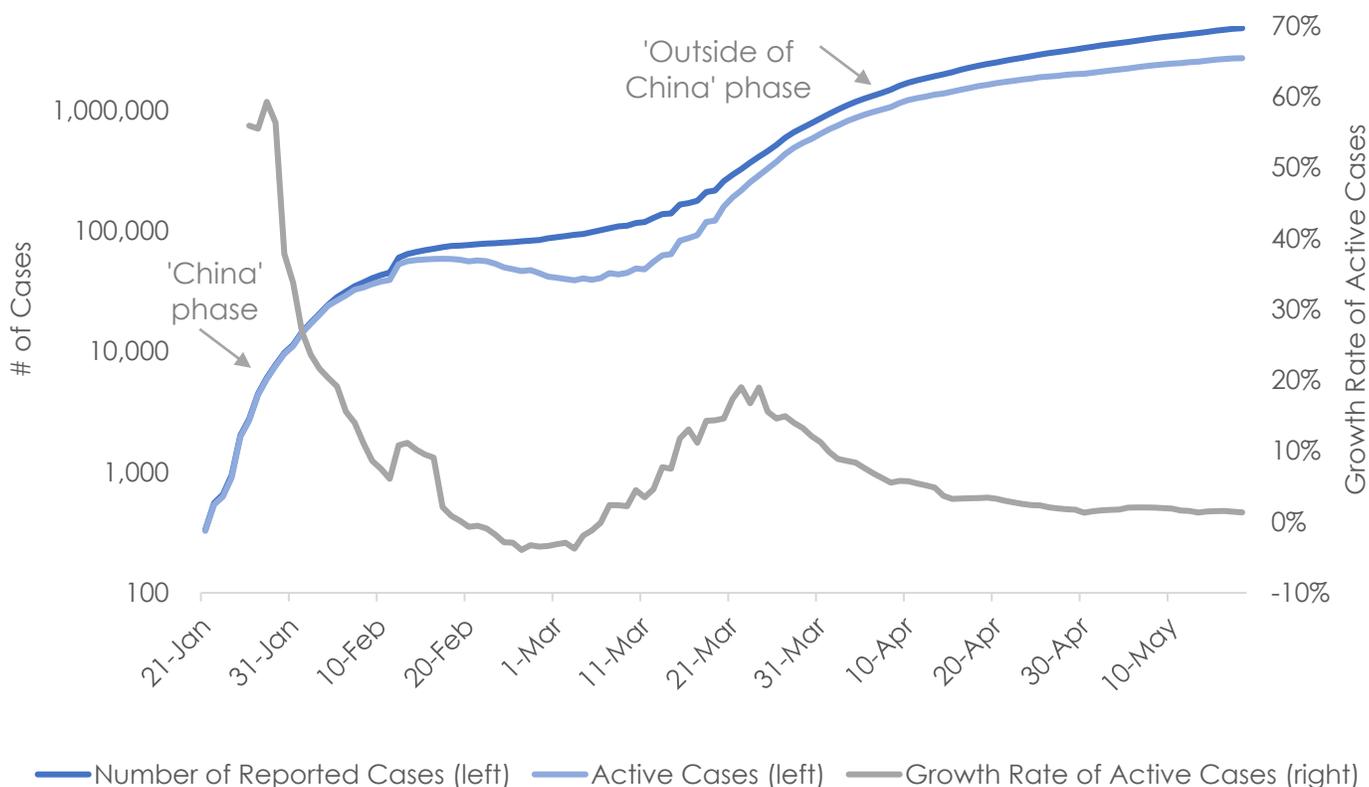
- 1) The novel coronavirus (COVID-19) has infected more than 4.6 million people and killed more than 297,000² people worldwide.
- 2) In the United States, there are now more than 1.5 million confirmed cases along with a more than 90,000 deaths³, with 28,000 deaths occurring in New York alone.
- 3) Italy, Spain, the U.K., and France all now have roughly 30,000 deaths² each.

Those numbers are both staggering and tragic. There is a reason they have dominated the headlines and garnered so much of our daily attention.

Yet they are also changing and, to underline that further, they are changing despite a gradual re-opening.

Chart 1 helps to demonstrate both the absolute numbers (which are frightening), and the changes (which are encouraging).

Chart 1: COVID-19 Worldwide Outbreak⁴



The blue lines demonstrate the total number of cases around the world. The grey line demonstrates

¹ <https://worldometers.info/coronavirus>, as of May 19, 2020

² Johns Hopkins University, as of May 19, 2020

³ <https://www.worldometers.info/coronavirus/>; as of May 19, 2020

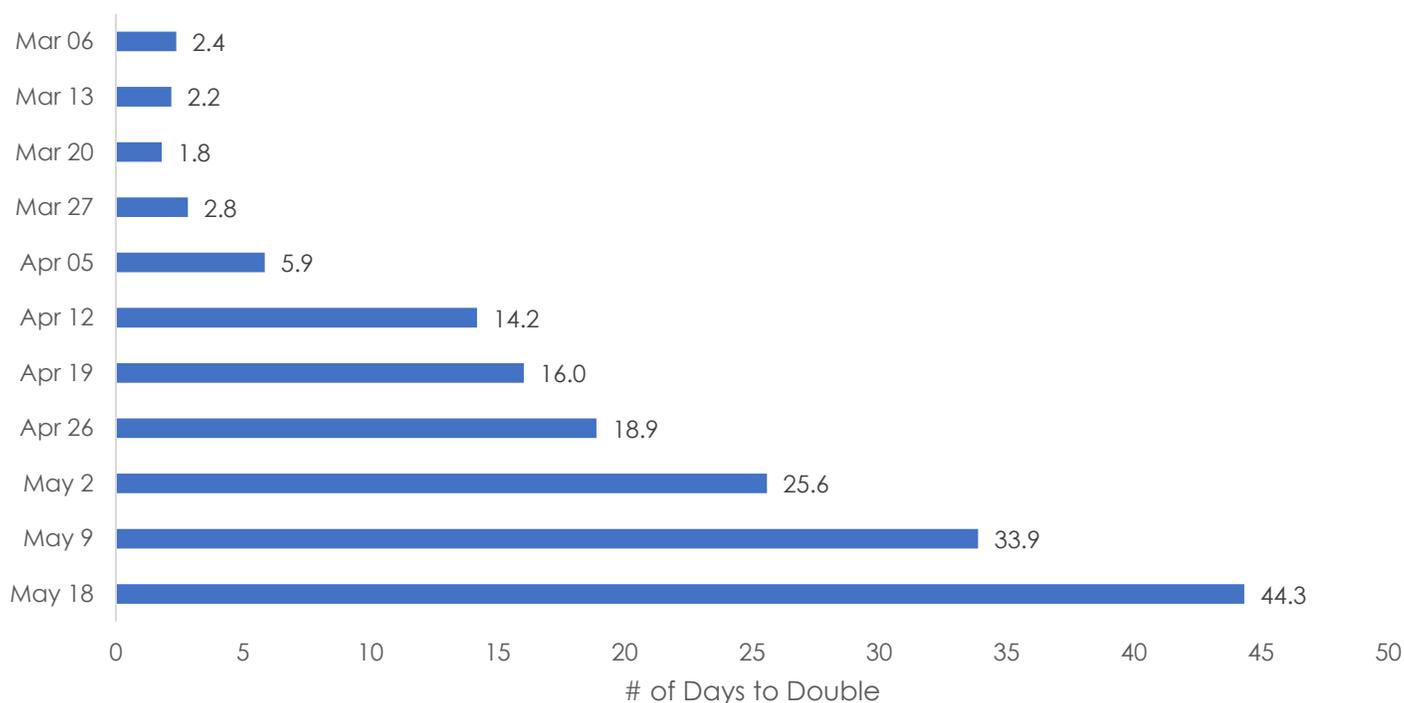
⁴ Sources: Bloomberg, World Health Organization

how the number of cases is growing. On March 22, the growth rates were roughly 20% per day. Today, those growth rates are now consistently approaching 1% per day⁵. Over the last two weeks, the global growth rate has been cut in half and the number of cases is now doubling every 52 days.

Within the United States, the picture is perhaps even more dramatic. On March 21, the U.S. growth rate was 40%. As of May 5, it is now nearing 1%⁶. One month ago, the number of cases doubled every 1.8 days; today, the number of cases doubles every 44 days!

Chart 2 puts those growth numbers in context by showing how the number of days to double has changed over the past two months.

Chart 2: United States: Number of Days to Double Confirmed Cases⁷



Clearly, this is great progress and has saved thousands of lives. The impact of the slowdown cannot be overstated. It relieves pressure on our healthcare systems, it saves lives, and it continues to slow the transmission rate.

Additionally, while we don't have enough data yet, we are encouraged to see a generally positive picture from the states re-opening. Yes, there have been isolated increases, but states like Georgia, Alaska, and Tennessee⁸ continue to see declines (note: we are watching Oklahoma and Texas closely).

⁵ <https://www.arcgis.com/apps/opsdashboard/index.html#/bda7594740fd40299423467b48e9ecf6>

⁶ <https://www.worldometers.info/coronavirus/country/us/>, as of May 19, 2020

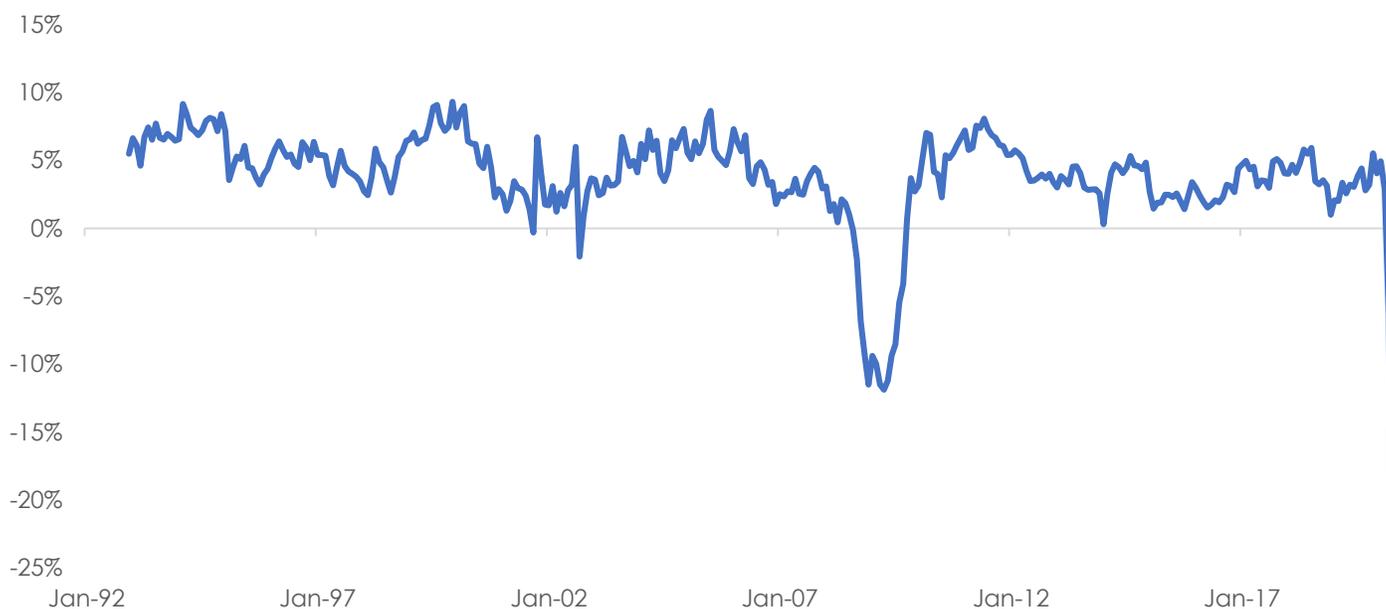
⁷ Sources: Bloomberg, World Health Organization, as of May 18, 2020

⁸ <https://covid19.healthdata.org/united-states-of-america/tennessee>, as of May 19, 2020

This then brings us to the second section of the update, namely the economic impact. We still don't know how large the impact will be but, thus far, the economic impact has a) been massive, and b) financial markets have not really cared (more on this in the last section).

For right now, as this has largely been a consumer-driven contraction (and consumers make up roughly 70% of the U.S. economy), let's look at how they have spent money, and how they are feeling. Chart 3 demonstrates the former, and Chart 4 demonstrates the latter.

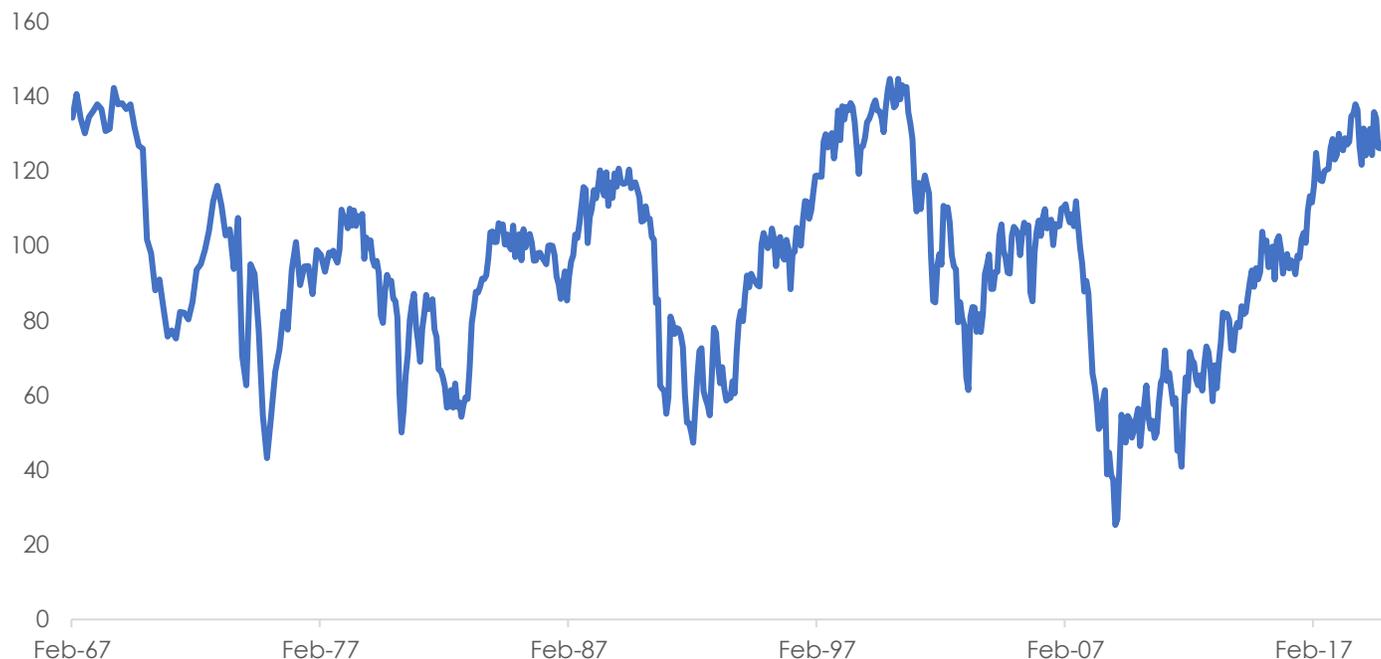
Chart 3: 12 Month % Change in Adjusted Retail & Food Service Sales⁹



For comparison, during the Global Financial Crisis, the 12-month change in retail sales dropped around 12%. Based on recent numbers, so far retail sales have dropped 22%. Roughly speaking, this means that for the month of April, U.S. consumers purchased roughly \$100 billion less goods and services than they did a year ago. More broadly, since the beginning of March, the U.S. consumer has purchased roughly \$160 billion less goods and services than they did over the same time period a year ago.

⁹ Sources: Bloomberg, World Health Organization

Chart 4: U.S. Consumer Confidence¹⁰



As Chart 4 demonstrates, perhaps surprisingly, the U.S. consumer remains somewhat optimistic. They are at a similar level of unease, with say, the environment after the dot-com bubble ended, or the beginning of the Gulf War in 1990, and nowhere near the pessimism that occurred toward the end of the 2008 crisis. Yes, confidence has been rattled, and yes, it has fallen quickly...but it is nowhere near the nadir of times past.

This, then brings us to the third section of the update: the financial markets.

Before we review how markets have behaved, however, let us take stock of what we know:

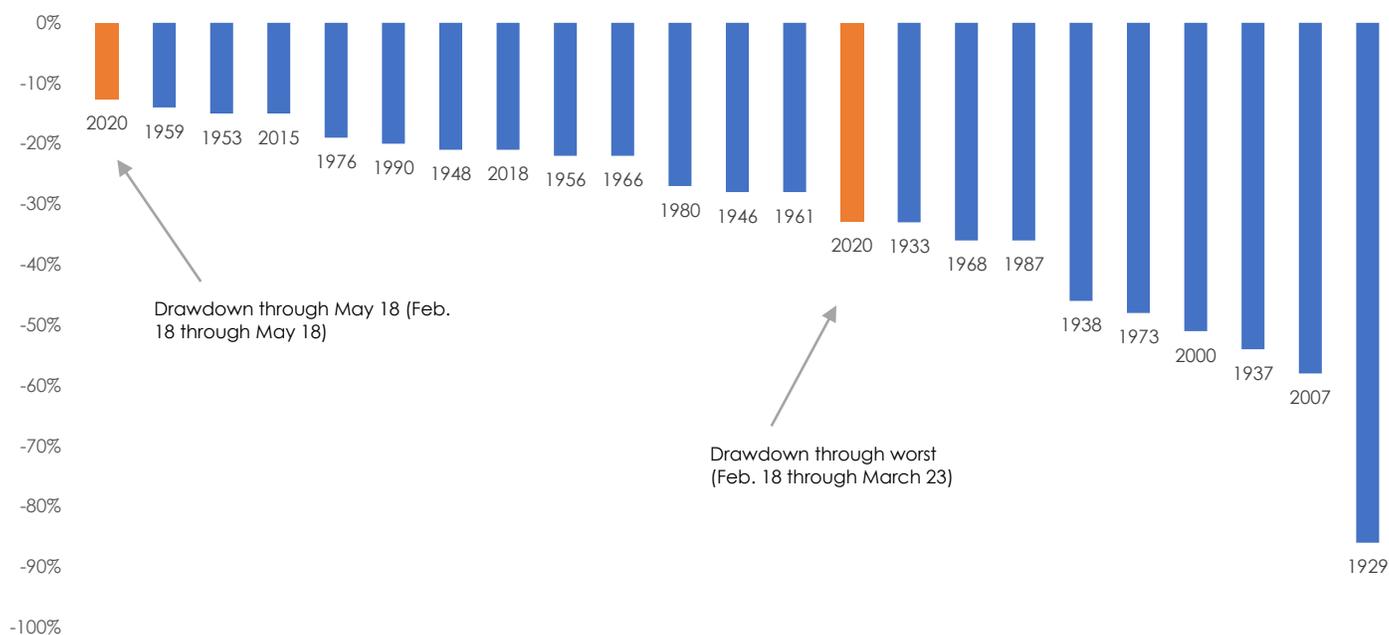
- 1) We, as a global citizenry, have just experienced an unprecedented global pandemic that has changed our daily life as we know it. Millions have been infected, and several hundred thousand people have died. The case growth rates were remarkably high and appear to come down very quickly.
- 2) The economic contraction has, thus far, been deep and unprecedented. Unemployment, retail sales, money demand, and many other metrics have set records for both their levels and their rate of change.
- 3) The fiscal and governmental response also has been unprecedented. In the U.S., as an example, the Central Bank has created several trillion dollars to ensure markets continue functioning and liquidity remains ample, and the U.S. Government has provided another several trillion dollars of relief and stimulus.

¹⁰ Sources: Bloomberg, University of Michigan; <https://data.sca.isr.umich.edu/data-archive/mine.php>

In short, we're experiencing an unprecedented pandemic, an unprecedented contraction, and unprecedented levels of government support.

And yet, peak to trough, the U.S. equity market¹¹ (as proxied by the Standard & Poor's 500 index) is down 12.6% since Feb. 19. That's right, just 12%. Had you begun a long nap mid-February and woken up last night, you probably wouldn't have noticed your 401 (k) balance is down slightly.

Chart 5: U.S. Equity Market Drawdown Comparison¹²



As Chart 5 shows, the worst part of the drawdown ranked roughly middling when compared to all of the largest sell-offs in the past 100 years and, through yesterday, it wouldn't even have made the chart had I not forced it to.

The question is why? How can we have experienced such pain, such fear, such unprecedented moves of so many dimensions and markets are only down 12% (so far)?

The answer, I believe, has something to do with Chart 4. It is hope. It is optimism. It is a belief by some that ingenuity will end this pandemic, or by others that the U.S. Government will provide enough support for us to survive this financially. Whatever the underlying reason for each individual, in aggregate, consumers have endured an incredible amount of stress, and yet, as the chart shows, the confidence has not fallen as much as one might expect. To go back to my chrysalis mystery, the caterpillar has innate tendencies that will likely carry through the transformation.

In short, as uncertainty has decreased, the future has become less murky, and with it, markets have responded in kind.

¹¹ Sources: Bloomberg; as of May 18, 2020

¹² Sources: Bloomberg; as of May 18, 2020

Is it right? Is the market priced fairly? I have no idea.

Yet I do feel, that over the long run, markets reflect expectations, and markets dislike uncertainty. Markets reward ingenuity and efficiency at the company level, and reward patience and discipline at the return level.

Therefore, I believe in allocating to capital markets as an extension of capitalism, and only doing so when the long term is the period by which we can benefit. Ignore the short term.

As we have seen thus far, and innumerable times before, the short term is complicated and very difficult to predict. Yet investing over the long term has historically allowed us, as investors, to grow our capital at a rate that is higher than the rate of inflation, thus, enabling us to meet our long-term financial goals.

We remain at your service and watching closely. Please let us or your investment professional know how we can serve you, and please stay safe.

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