

How We Are Thinking About Coronavirus and Its Impact on Markets

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A few weeks ago, most of us had never heard of a “coronavirus”—much less “2019-nCoV,” the precise term for the seventh known strain of coronavirus, which first appeared in humans late last year in Wuhan, China. Now, barely a month since it was first reported, the new virus has seized the attention of the world. It has infected thousands of people, disrupted the lives of hundreds of millions, and become a major market driver. And the outbreak appears to be accelerating.

As Ray described last week, we aren’t experts on pandemics, and as a result our focus as money managers is to make sure we are diversified around the risks. This presents a particular challenge for us today, as many of the assets we think are most attractive in the world are also those hardest hit in the short term by the virus. Taking a long-term historical perspective is necessary in order to adequately assess how wide the range of outcomes can be.

I thought it might be complementary to share the perspective I developed during the SARS crisis in 2003 when I was a senior official in the White House and at the center of the North American response to that outbreak, since this is an important index case for understanding 2019-nCoV. As Bridgewater’s chief security officer, this is the perspective that informs the measures we’re taking to safeguard our employees and their loved ones worldwide.

In the pages that follow, I will lay out this framework, the facts about how quickly the virus has been spreading, and the market response. In short, it is starting to look like this outbreak will be the most significant medical disruption in our personal experience. Significant short-term disruptions to Chinese and global growth are already baked in, and most of this activity is unlikely to be made up. In line with this, the market action—including the sell-off over the last couple of days—has been somewhat more severe and broad-based than during SARS. That said, there is still a long way to go before these impacts spiral into a more sustained drag. We got our first taste of what the policy response may feel like over the weekend, when China injected liquidity to prevent contagion and limited short selling to prop up financial asset prices.

How We Are Thinking About the Impacts of the Disease

For students of the history of epidemics, the effects of a pandemic are unsurprising in general even as they may be startling in their speed, proximity, and intensity. William H. McNeill, in his classic 1976 study *Plagues and Peoples*, described how infectious microorganisms (pathogens) have repeatedly influenced the course of human history. Consider the Black Death in the 14th century, Cortes’s conquest of the Aztec empire in the 16th century, the Spanish Flu of 1918, and AIDS in the 1980s. Modern medicine has ameliorated some aspects of the threat of outbreaks, but the forces of globalization, urbanization, and other ecological changes often push in the opposite direction. A temporary disequilibrium between humans and a novel pathogen remains one of great “black swan” tail risks facing the world.

When confronting an outbreak of a new infectious disease, it is useful to frame the challenge into three levels: (1) medical, (2) psychological, and (3) infrastructural. Each level interacts with and feeds on the others in complex, difficult-to-predict ways. Taken together, these factors contribute to the size of the social and economic disruptions, the risk that any given outbreak spirals into a pandemic, and, by extension, the implications for markets. From a medical perspective, the coronavirus has the potential to create the most significant disruption in decades. The policy response appears to be lowering the risk, but it’s too soon to know how effective it will be.

Disease outbreaks as medical crises

The medical analysis and management of a new disease outbreak are immensely complicated and, in the early days of an outbreak, highly uncertain. In the words of the great 1958 Nobel Laureate Joshua Lederberg, “The outcome of encounters between mutually antagonistic organisms is intrinsically unpredictable...Infectious agent outcomes range from mutual annihilation to mutual integration and resynthesis of a new species.” In an outbreak like 2019-nCoV, a huge amount of inaccurate, misleading, or uncertain information floods the global media. The key principles to apply in interpretation of this data are caution, reliance on believable experts, triangulation, and extreme analytic humility.

When assessing the risk of an outbreak, the critical parameters to focus on in trying to predict how severe an outbreak will be are: (1) the case-fatality rate, (2) the incubation and infectious periods of the disease, (3) geographic dispersion, and (4) the reproductive number of the virus. The reproductive number—the average number of secondary infections from any one case in an immunologically naive population—is especially important as a sign of how much disruption a disease may cause. The higher the reproductive number, the faster the disease spreads and the more extreme policy intervention needs to be to contain it.

The reproductive number of 2019-nCoV is not precisely known, but early indications are concerning. A study of the first 425 cases published last week in the *New England Journal of Medicine* estimated it at 2.2. This is higher than influenza (usually in the 1.2-1.8 range) and roughly comparable to SARS before intervention slowed the reproductive number to less than 1. With such a contagious disease, the key near-term determinant of its impact will be whether it achieves sustained transmission across the rest of China or internationally. Given how recently the outbreak occurred, the cone of outcomes remains very wide.

Disease as a psychological event

The second level of analysis when confronting an outbreak is the psychological dimension, which can easily outstrip the medical phenomenon. In an event like 2019-nCoV, the odds of a person being infected by the virus may be infinitesimally low, but the odds that he/she thinks about it approach 100 percent. We know that human estimation of extremely low probability events is bad: people tend to rely on heuristics like availability or vividness as proxies of probability. As a result, events like are 2019-nCoV are much scarier than they objectively need to be. But this does not render the problem imaginary. In fact, quite the opposite. Thousands or millions of people imagining the same thing can become self-reinforcing, amplifying the currents of fear running through society with each snippet of information or new anecdote.

This, in turn, amplifies pressure on decision makers to “do something” even if they do not understand the true character of the situation or if the steps they take are net-harmful. In situations like this, the challenge for leaders at every level is to stay attuned and responsive to the psychological reality of the people (or workforce) while simultaneously making wise, dispassionate, risk-weighted decisions about what to do.

From what we can tell, after a slow start, the Chinese government responded aggressively. It has quarantined tens of millions of people, mobilized a massive medical response, and coordinated with global health authorities. This response has been criticized by some as overblown, and it will likely exacerbate the short-term drag on the Chinese and global economies. But judging by my own experience, this policy response is likely about as effective as any at lowering the risk of sustained transmission within China.

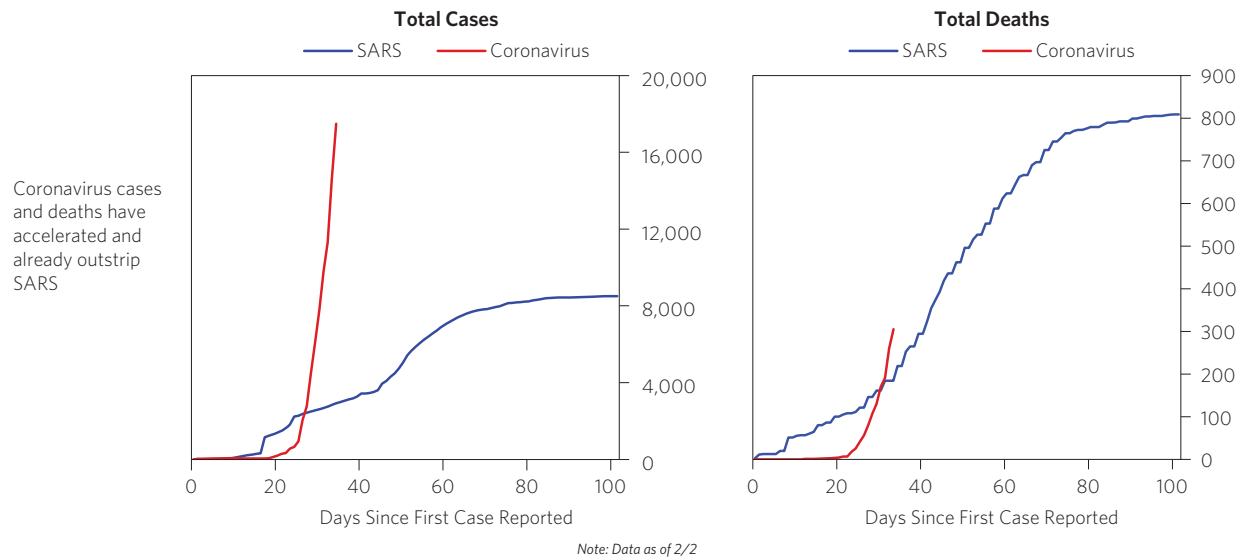
Disease outbreaks as infrastructure challenges

As the medical and psychological dynamics of an outbreak unfold, one of the areas in which real-world impacts appear most swiftly is in the operation of the physical infrastructure that modern society depends on. The transportation sector is typically one of the first to be impacted. This can lead to interruptions of supply chains for food, medical supplies, or industrial inputs. People can become trapped in locations far from home. Hospitals can also become overwhelmed, and this concentration of infected people can accelerate transmission. Schools are also hotspots for transmission and will frequently close early in an outbreak as a first step toward imposing social distance to slow the disease. Even those businesses that choose to remain open may have a difficult time getting their workers to come into the office.

We have already begun to see the coronavirus create some meaningful disruptions, particularly to global tourism and trade. As a reflection of this, many foreign travel companies have limited travel to China and/or temporarily scaled down their business operations there. A key factor to watch is how widely these work stoppages spread.

Facts on the Severity and Breadth of the Outbreak

While we try to avoid making bets on medical events, when an outbreak occurs we need to track its progression and impact on the global economy and markets. At this point, the coronavirus has the potential to be the most significant medical disruption in decades, but the cone of outcomes remains wide. As we show below, infections have continued to accelerate in recent days, as have deaths with the normal lead-lag. The coronavirus has already infected more people than SARS. The likely total number of cases is much higher, both because it takes time to detect them and because some triangulation (such as the share of foreigners evacuated from Wuhan who had the disease) suggests the outbreak is likely more widespread.



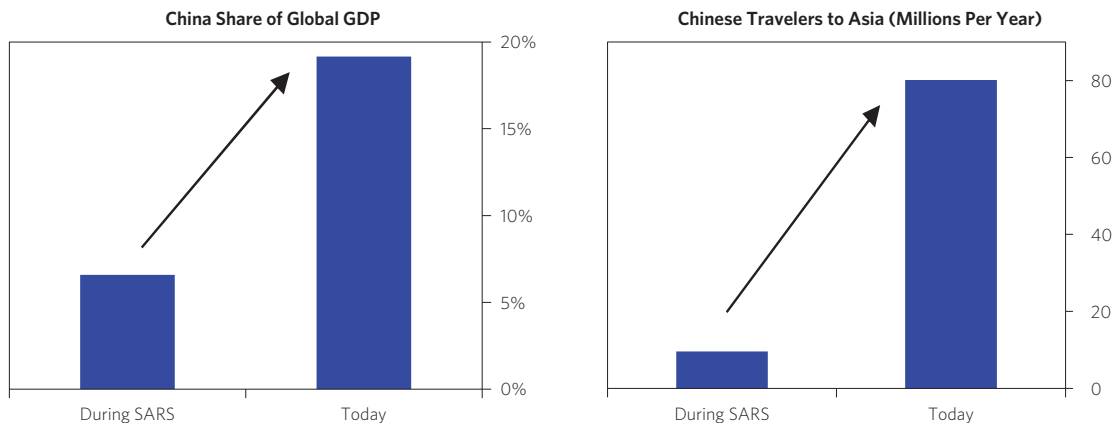
Next, we show the number of cases by country. Coronavirus remains much more contained than SARS was at this point in the crisis. China is the only economy with a meaningful outbreak, and Chinese authorities have taken aggressive steps to contain it (e.g., quarantines). However, given the long incubation period, it is too soon to tell whether this response has been enough to prevent sustained transmission.

The outbreak is worse in China but at least so far is more contained than SARS

	Suspected Cases of Coronavirus	Supected Cases of SARS 30 Days After Outbreak	Final Confirmed SARS Cases
CHN	17,302	1,432	5,327
JPN	20	1	0
TLD	19	8	9
SGP	18	162	238
HKG	15	1,268	1,755
AUS	12	0	6
USA	11	193	27
DEU	10	6	9
FRA	6	5	7
CAN	4	103	251
WLD	17,845	3,293	8,505

*Note: Cases by country don't quite sum to the world totals since we exclude a few countries from this table.
Data as of 2/2.*

Even if the virus stays contained in China, it will still create a meaningful disruption. China is a much more important driver of the global economy than it was even back in 2003 during SARS. China accounts for nearly one-fifth of global output and a much higher proportion of global growth and commodity consumption. Plus, millions of Chinese residents travel abroad (especially in Asia). This means that any disruption to production or travel will create meaningful global ripples. We sketch out rough estimates of the virus's drag on the global economy further below.



The Market Response Has Been More Severe Than During SARS

Over the last week, markets have clearly shifted toward pricing in a meaningful disruption from the coronavirus. As we show below, equity markets in China and in China-sensitive countries (like Korea and Australia, which are big exporters to China) are down more than 15% since the start of the outbreak. Global equity markets are down as well, but much less. The market response has been notably larger and more acute than it was during SARS. Of course, the range of outcomes for markets remains wide, including the chance that the current pricing is overdone.



Below, we provide another perspective on how sensitive various markets have been to the risk from the virus, using our market-based “virus index.” This index is just a basket of assets whose returns are most sensitive to the risk from the virus. We then show how other global markets have moved relative to this basket as the outbreak has worsened. The numbers reflect the estimated impact from the virus’s outbreak on various markets so far. We also show how sensitive various markets were during the peak of the SARS outbreak as a point of comparison.

As we mentioned above, equities in China and in China-sensitive economies have been the most sensitive. The outbreak has led risk-off market action more broadly, with equities selling off overall, bonds rallying, and EM FX selling off against reserve currencies. For example, US bonds have rallied almost 40bps and short rates have shifted to price in almost two more Fed cuts this year—both indications that markets are discounting meaningful global risks that the Fed will have to ease into. The market response has been more severe and more broad-based than during SARS, which suggests that markets are discounting somewhat more risk. The overall size of the moves today has also been exacerbated by how quickly the outbreak has occurred and gotten priced in (especially relative to SARS, where the outbreak was more drawn out). The sensitivity figures below can give you a helpful starting point for what may happen if the outbreak doubles in severity, although to the extent that it broadens they likely understate the potential breadth of the market action.

Betas to the “Virus Index” (Estimated Sensitivity of Various Markets to the Virus)

	Equities	Coronavirus	SARS	Nom Bonds	Coronavirus	SARS	DM FX	Coronavirus	SARS
Chinese and China-sensitive country equities have been hurt the most, though all equities have sold off	CHN	-8.6%	-9.2%	CHN	0.4%	-2.9%	AUD	-2.4%	-1.5%
	KOR	-8.1%	-12.9%	GBR	0.6%	0.9%	NOK	-2.1%	0.9%
	TAI	-7.8%	-10.8%	MEX	0.7%	-0.1%	NZD	-2.0%	-0.6%
	HKG	-7.1%	-7.5%	JPN	0.8%	0.3%	SEK	-1.2%	-0.2%
	SAF	-5.7%	-2.8%	CAN	0.8%	1.0%	EUR	-0.4%	0.3%
	CHI	-5.4%	0.6%	CHE	0.9%	0.8%	CAD	-0.3%	-0.8%
	JPN	-5.3%	-3.3%	EUR	1.0%	0.9%	CHF	-0.1%	0.9%
	TLD	-5.1%	-5.7%	SWE	1.1%	1.0%	GBP	0.0%	0.4%
	NOR	-4.9%	-3.1%	FRA	1.2%	1.0%	JPY	0.9%	0.1%
	PLD	-4.5%	-2.0%	USA	1.3%	1.2%			
	DEU	-4.3%	-5.3%	SGP	1.4%	0.7%	EM FX	Coronavirus	SARS
	GBR	-4.3%	-2.5%	AUS	1.8%	1.7%	COP	-3.4%	-0.3%
	NLD	-4.2%	-6.2%	ITA	2.9%	0.9%	CLP	-3.1%	-0.9%
	FRA	-4.1%	-5.3%				KRW	-2.8%	-0.7%
	GRC	-4.0%	-3.4%	Sov Spreads	Coronavirus	SARS	ZAR	-2.7%	0.7%
	RUS	-3.9%	2.3%	SAF	-0.7%	0.1%	RUB	-2.1%	0.2%
	IRE	-3.8%	-0.3%	MAL	-0.5%	-0.1%	THB	-2.0%	-0.7%
	EUR	-3.7%	-4.8%	BRZ	-0.4%	-0.8%	CNY	-1.9%	0.0%
	SGP	-3.6%	-10.3%	IDR	-0.4%	0.0%	TWD	-1.7%	-0.5%
	SWE	-3.4%	-4.9%	KOR	-0.3%	-0.3%	MYR	-1.4%	0.0%
	IDR	-3.4%	-9.4%	COL	-0.3%	-0.1%	MXN	-1.3%	0.1%
	BEL	-3.3%	-4.7%	MEX	-0.2%	-0.1%	BRL	-1.3%	2.3%
	SAR	-3.3%	0.4%	RUS	-0.2%	-0.7%	SGD	-1.1%	-0.5%
	CZK	-2.7%	0.6%	TUR	-0.2%	0.6%	IDR	-1.0%	-0.9%
	AUS	-2.7%	-0.7%	PHP	-0.2%	-1.3%	INR	-1.0%	0.2%
	BGL	-2.6%	3.8%	HUN	-0.1%	0.1%	TRY	-1.0%	-0.2%
	MEX	-2.6%	-1.8%	IRE	-0.1%	0.0%	HUF	-0.9%	0.6%
ITA	-2.4%	-3.2%	BEL	-0.1%	0.0%	PLN	-0.6%	-1.1%	
MAL	-2.4%	-1.9%	NLD	-0.1%	0.0%	CZK	-0.6%	0.6%	
ESP	-2.4%	-2.8%	PRT	0.0%	0.0%	PHP	-0.5%	-2.1%	
PHP	-2.3%	-	PLD	0.0%	-0.2%	BGN	-0.4%	0.4%	
BRZ	-2.3%	-3.8%	FRA	0.0%	0.0%	HKD	0.0%	0.0%	
CHE	-2.3%	-3.3%	ESP	0.2%	0.0%	SAR	0.0%	0.0%	
PRT	-2.1%	-1.7%	ITA	1.1%	0.0%				
IND	-1.9%	-4.0%				Commodities	Coronavirus	SARS	
COL	-1.7%	1.0%				Copper	-8.9%	-2.5%	
HUN	-1.4%	-2.0%				Oil	-5.9%	-4.0%	
TUR	-1.3%	-0.7%				Soybeans	-4.8%	-3.7%	
NZL	-1.1%	0.5%				Silver	-3.0%	-0.2%	
CAN	-0.6%	-1.7%				Aluminum	-2.4%	-1.5%	
USA	-0.5%	-2.4%				Iron	-1.2%	-	
						Gold	0.9%	0.4%	

Broad risk-off market action: bonds up, most currencies down vs the USD, but “safe-haven” currencies (JPY, CHF) relatively stronger

China-growth-sensitive commodities have also sold off, while gold has rallied

Sketching Out the Implications for the Global Economy

Of course, there is considerable uncertainty around how medical crises like the coronavirus may impact the global economy. It depends in large part on how bad the outbreak is, how long it halts travel and consumer activity, and how disruptive the government response is. The market action can also exacerbate the drag on growth by creating a negative wealth effect, dis-incentivizing borrowing and lending, and/or creating broader risk aversion. At this point, significant short-term disruptions are already baked in for the Chinese and global economies, in large part due to how aggressive the Chinese government response has been. For example, external estimates suggest that the virus will slow the Chinese economy by about 6% and the global economy by about 2%. These numbers have been rising rapidly as the outbreak has accelerated.

More important for markets and the global economy is whether the disruption is sustained. The best case is that the virus will be contained quickly and the quarantines lifted soon, leading growth to bounce back. This is largely what happened after SARS, when both Chinese and global growth bounced back to trend after only a couple of months and the disruption was hardly noticeable over the course of the year. If the coronavirus is contained in a similar way, then the drag on growth over the next year is going to be about one-fourth of the numbers below—about 50bps for the global economy.

		Growth Drawdown During SARS	External Estimates of Drag on Growth from Coronavirus (Q/Q, Ann.)
External estimates suggest the short-term drag from the coronavirus will be much bigger than from SARS.. the bigger question is how long it is sustained	China	-2%	-6%
	Thailand	-4%	-5%
	Hong Kong	-7%	-8%
	Japan	-1%	-1%
	Singapore	-4%	-4%
	Australia	-1%	-2%
	World	-1%	-2%

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