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FLASH REPORT

THE CORONA CRISIS

What the corona crisis means for people, economies and financial markets

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Contents

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Our main intention with this report is to share important facts, implications and consequences about and directly related to the present Corona Crisis. Our areas of focus are medical, society, social economics and financial markets.

This Flash Report is produced by Supertrends Institute, Switzerland. Supertrends Institute AG in a Swiss based, international advisory on future trends, technologies, innovation and global events that have significant impact on societies, economies and businesses.

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01

The COVID-19 disease

The corona virus disease 2019 (COVID-19) was discovered by Chinese authorities on December 30, 2019, after it had begun to spread in Wuhan city and the Hubei province. This is less than 3 months ago.

The beginning

During December 2019, there were a series of pneumonia cases in the Chinese Wuhan city and the Hubei province, where Wuhan is the capital. By December 30, authorities discovered that this was created by a new virus now called COVID-19. This is less than 3 months ago.

By the mid of February, the virus was known to have spread to South Korea, Iran and Northern Italy. Initially, China and then Korea struggled hard with it but seemed to make progress. The rest of the world pretty much ignored it until February 21st., largely assuming that it would remain a local phenomenon.

However, on February 21st, stock markets began sliding due to new interpretations of the corona crisis, and this quickly escalated into a crash which triggered much larger attention to the problem.

The reason was that it became clear to a rising number of people that we had a new pandemic. An “epidemic” is the rapid spread of a disease to people in a given population within a short period of time, whereas a “pandemic” is a worldwide spread of a new disease. On March 11, 2020, the spread of COVID-19 was declared a global pandemic by The World Health Organization (WHO).

Here is where it stands now, in the afternoon of March 22nd, according to the official numbers:

COVID-19 cases: 317,308
COVID-19 deaths: 13,642
COVID-19 recovered: 95,953

Of course, these numbers will have grown by the time that you read this. In any case, I will come back to these numbers later, because they are only the surface of the iceberg.

What is COVID-19?

COVID-19 is a zoonose virus, which means that it has jumped from animals to humans. It is now assumed that COVID-19 originated among bats in China's Yunnan province and was then passed either directly to humans or via another animal, possibly via the Wuhan wet market, where masses of people congregate among live and dead animals of many species.

The fact that it originated from bats is not entirely surprising. For instance, as early as in year 2000, former science editor for the Economist, Matt Ridley, had predicted in a short book about future pandemics that this would happen. In 2020, he wrote about COVID-19:

"This is not the first disease bats have given us. Rabies possibly originated in bats. So did, and does, Ebola, outbreaks of which usually trace back to people coming into contact with bat roosts in caves, trees or buildings. Marburg virus, similar to Ebola, first killed people in Germany in 1967 and is now known to be a bat virus. Since 1994 Hendra virus has occasionally jumped from Australian fruit bats into horses and rarely people, with lethal effect. Since 1998 another fruit-bat virus, Nipah, has also infected and killed people mainly in India and Bangladesh. Sars, which originated in China in 2003, is derived from bats, though possibly via civet cats. So is Mers, a similar bat-borne coronavirus that's killed hundreds of people and camels in the Middle East since 2012."

COVID-19 belongs to a class of virus which is called corona, because when the corona virus family was first discovered in the 1960s, scientists viewed it with electron microscopes and thought it looked like a crown. Now the microscopes are better, and we know that it looks more like a naval mine, which means that it is a sphere with spikes. The membrane of the sphere is made of lipids (its fatty), and the spikes are proteins. When you wash your hands or a surface sufficiently with water and soap, the membrane breaks up, which destroys the virus.

However, when an intact COVID-19 virus meets a human cell in the throat or lungs, the protein spikes on the spheres matches perfectly with a protein on the surface of cells called ACE2, so that the two can dock like two spaceships. Then the virus invade the cell and starts using its resources to produce new viruses, after which the cell dies, and the viruses spread further. This goes on until the patient has developed enough antibodies, or dies.

Now, I just mentioned the protein ACE2, and what is tricky about this is that it plays a role in controlling blood pressure. This might be a reason that people with a condition of high blood pressure are among those with elevated risk of complications or death.

Extreme infection rates

COVID-19 is highly contagious. On average, the annual flu has an infection rate of approx. 1.5, meaning that for a while, each infected person on average infects 1.5 other people.

However, COVID-19 infects people at a rate of between 2.25 and 3.58, and in practice, its doubling time in terms of number of infected has been 6.4 days. Because of compounding, this makes a massive difference in how wide and fast it spreads. If normal flu infects like a firecracker, COVID-19 infects like a hand grenade.

As long as the infection rate is higher than 1, the virus will spread exponentially. When it goes lower than 1, it starts to recede. The Chinese and Korean strategies have been to strike the pandemic very hard with combinations of social distancing (especially in China), and massive testing, tracing and quarantining, and then subsequently monitoring and tracing any remaining occurrences so hard, that their infection rates stay below 1.

Why is it so infectious compared to flu? First, flu normally only infects the first days when you are feeling ill. COVID-19, on the other hand, will frequently infect before you feel ill; indeed, it is estimated that presymptomatic individuals can account for up to 25%

of transmission. That is important, since the average incubation time is 5-7 days and ranges from 2-12 days.

COVID-19 also continues to infect when you do feel ill, and perhaps it goes on to infect up to 10 days after you feel totally recovered. It also infects if you carry it but never feel ill.

It is still unclear how big a proportion of infected are entirely asymptomatic, but it is believed that many infected entirely asymptomatic children and young teenagers can act as walking bioreactors which infect lots of people around them. Virtually no children get seriously ill, and there are as yet no confirmed cases of small children dying from it. Lots of children carry it without showing symptoms.

One special consideration is that it mutates, and there are reports indicating that we now have two major strands, called S and L. In the Faroe Islands, authorities have tested a bigger proportion of the population than

even the South Koreans, and they have traced virtually person-to-person infection links minutely. They found a surprising pattern where it seemed that one strand was extremely infectious to the degree that "two people passing on the street" could infect each other, while another strand was far less infectious and even had an infected person kissing another without passing it on.

This is not yet confirmed through genetic sequencing, but it could become an important factor if proven right. There is an overall tendency that viruses over time become more infective but less dangerous – they become domesticated, so to speak. We cannot exclude the possibility that this will also happen with COVID-19 over time.

There is no indication that dogs, cats and other normal pets can be infected. However, they can carry the virus if their infected owners have touched them.

How it infects

It infects through droplets in the air. These normally fall down quickly, and this is the reason why social distancing of at least 1 meter - and better, 2.5 meters or even more - is a quite effective countermeasure.

COVID-19 can also infect through surfaces such as handles, doorknobs, tabletops and the likes. One meta-study showed that COVID-19 can survive on surfaces up to 9 days. However, for the most part, it will be disabled within a few hours to a few days.

To get a virus particle into your throat doesn't necessarily get you infected. This is because in the throat and bronchia we have the motile cilia which lift pollutants, including bacteria and viruses embedded in droplets, etc. up. If we are lucky, we then swallow them after which they are neutralized in the stomach acid.

As a consequence of this, it is quite useful as a means to reduce risk of infection, to drink frequently in order to flush the throat. Also, this natural defence system works best when people are breathing clean air. So, you can easily get infected by some viral particles but then sending it to your stomach and not get ill.

Another factor worth noting is that how hard the disease will hurt you can depend on how many virus particles you got infected with on day zero. The less it was, the slower it builds up and the longer time your body has to match the multiplication of the virus with multiplication of antibodies.

Another thing that helps is not to have salivary glands. In the winter, we have dry glands, and this might be one of the reasons why flu infects more in winter than in summer.

Finally, being generally healthy, rested and not in lack of vitamin D, for instance, prepares you better for natural defences.

Consequences of infection

How unpleasant, damaging or life threatening is it to catch CIVID-19? By now, we have strong indication that

- 80.9% of infections are mild (with flu-like symptoms or less) and the sick person can recover at home.
- 13.8% are severe, developing severe symptoms including pneumonia and shortness of breath.
- 4.7% are critical and can include: respiratory failure, septic shock, and multi-organ failure.

Apart from this:

- About 40% get fever, 30% get dry cough and 20% get respiratory problems.

COVID-19 mortality: 2.5 to 30 times worse than for flu

The mortality numbers we have seen have been all over the place. In Wuhan, it was 6% and in Italy it was 7%. However, in South Korea, it was only 0.9%.

Why these differences? Firstly, in South Korea, they tested very extensively, so they discovered far more of those who were infected but had no serious symptoms or even no symptoms at all. Secondly, their healthcare system has not been overwhelmed. To conclude about its mortality, one study says:

"We estimated the case-fatality risk for 2019 novel coronavirus disease cases in China (3.5%); China, excluding Hubei Province (0.8%); 82 countries, territories, and areas (4.2%); and on a cruise ship (0.6%). Lower estimates might be closest to the true value, but a broad range of 0.25%–3.0% probably should be considered."

That is 2.5-30 times more than for flu. Let me just put that into perspective.

Illness	Infected	Dead	Mortality
MERS	2500	900	34%
SARS	8000	800	10%
Spanish flu	1/3rd of World population	17-50 million	2-3%
COVID-19	1.5bn-5bn?	0.5m-150m	0.25-3%
Common flu	350m-1.4bn	150,000–650,000	0.1%
Swine flu	700m-1.4bn	150,000–575,000	0.02-0.03%

From these numbers, we can see that COVID-19 is at a low estimate 2.5 times as mortal as common flu and at a high estimate as mortal as Spanish Flu, if not more. It is more contagious than common flu and possibly also more contagious than Spanish flu.

Another interpretation was done by The American Hospital Association, where at a seminar they concluded that the disease burden would be roughly 10x a severe flu season.

I think the consensus is that if you were to test the entire population, and if your healthcare system is not overwhelmed, then the registered mortality is around 1%. However, in many cases, this will not be so, and then mortality rates shoot up. Indeed, it looks like healthcare systems might become completely overwhelmed in many nations, which can lead to higher mortality.

Some sources list mortality as approx. 2.8% for men and 1.7% for women. They also quote 11% for people with circulatory problems, 7% for people with diabetes, 6% for people with chronic respiratory problems or high blood pressure - and overall "only" 0.9% for people who have none of those problems. However, if we assume that a bigger than expected part of the infections are not recorded, all of these numbers should be adjusted downwards.

At this point, WHO has estimated case-fertality-ratio (percent of confirmed cases) to 4%, but infection-fatality-ratio (fatality among all infected) to just 0.3-1%. fatality among infected and none-infected will be a fraction of that number, depending on how many are infected.

In terms of age, the virus is most dangerous by far to elderly people:

Age	Death Rate confirmed cases	Death Rate all cases
80+ years old	21.9%	14.8%
70-79 years old		8.0%
60-69 years old		3.6%
50-59 years old		1.3%
40-49 years old		0.4%
30-39 years old		0.2%
20-29 years old		0.2%
10-19 years old		0.2%
0-9 years old		no fatalities

There are far more infected than we have registered

There are various sites that track infections, and one of them is Worldometers (www.worldometers.com). Here we can see that the number infected in the world per March 22nd is approx. 317,308.

Now let's look at the number for Iran. It says that by now, they have some 21,638 infected. But is that the true number? Of course not, every nation and every observer know that there is a shadow figure which is higher. So, how high is the real number for Iran?

On March 9, the Atlantic published six alternative estimates, which ranged from 590,000 to 8 million infected in Iran.

- Looking at infected airline passengers arriving in 3 nations, University of Toronto estimated that there were 586,000 cases in Iran.
- Another approach was to look at the proportion of parliament members that were confirmed infected. That was 7.9%, and if you extrapolated from that number, you reached an overall number for the country of approx. 6.4 million cases. Doing the same exercise for other politicians lead to an estimate of 4.7 million.
- A government website invited Iranians to submit details of symptoms they were experiencing. After 2 million responses, about 9 percent reported COVID-19 symptoms. In the United States, among those Iranians whose symptoms and history have led them to be tested for COVID-19, about 10 percent have eventually tested positive. If those infection rates are indicative, Iran would have 730,000 cases.
- On March 4 and 5, two evacuation flights of Chinese citizens could leave Tehran for China's Gansu province. Upon landing, Chinese authorities tested passengers and found 3.5 percent infected, equivalent to 5.7 million cases overall in Iran, but accounting for other factors, they reached an estimate of 8 million.
- Another estimate based on Canadian travellers to Iran reached 590,000 cases.
- Finally, an estimate based on use of hospital beds in the Golestan province indicated 2 million infected.

Alleged mass grave excavation for COVID-19 victims in Iran, © 2020 Maxar Techologies

So overall, we have estimates ranging from some 590,000 cases to 8 million cases in Iran. However, the official Iranian number of cases at the time of the report in the Atlantic was just 6,566 infected. This means that these estimates ranged from 90 to 1200 times the official estimate. Since then, the official Iranian number of infected has roughly trebled, which one would expect. However, if we also treble the unofficial estimates since March 9, we reach 1.8 million to 24 million infected in Iran. For perspective, the country has 81 million inhabitants.

Of course, we cannot know with any reasonable certainty what the real number of infected in Iran was or is, but we know for sure, that the real number is vastly higher than what is and has been reported. Indeed, Washington Post and others have brought reports from Iran of large mass graves, and there are also satellite images that appear to show the same. They are not officially verified, but there are really many indications that it is very bad.

Let's just return to Worldometer's numbers. Right now, they show that there are approx. 317,308 infected globally. However, well-documented figures and studies from Wuhan city show that during the virus's acceleration phase, which lasted until they enforced total lockdown, there was a constant of about 27 times as many infected as they measured on any given day. OK, so if we just peel Iran out of Worldometer numbers and then multiply the rest by 27, we get about 8.6 million infected in the world (minus Iran). Then let's add 10 million for Iran, and then we reach more than 15-20 million globally.

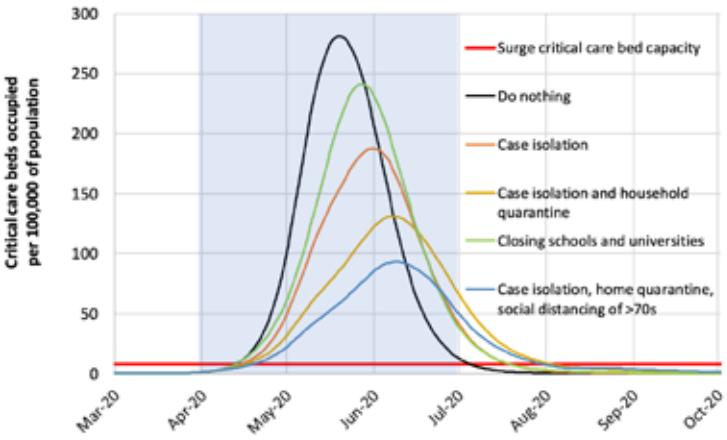
Again, I can't know this, but the order of magnitude is in all likelihood not that far off.

This has only just begun

If you think 15 million is a high number, let me just remind you that it is actually just 0.2% of the world's population.

On social media, we see all these people comparing how many people have been killed by corona with how many people were killed last year by flu, etc. I think a lot of these posts will be quietly deleted over the next

weeks or months. I think authorities in the UK and US discovered the severity of this when they saw a study from Imperial College estimating the impact. There was a graph in this which you can see below.

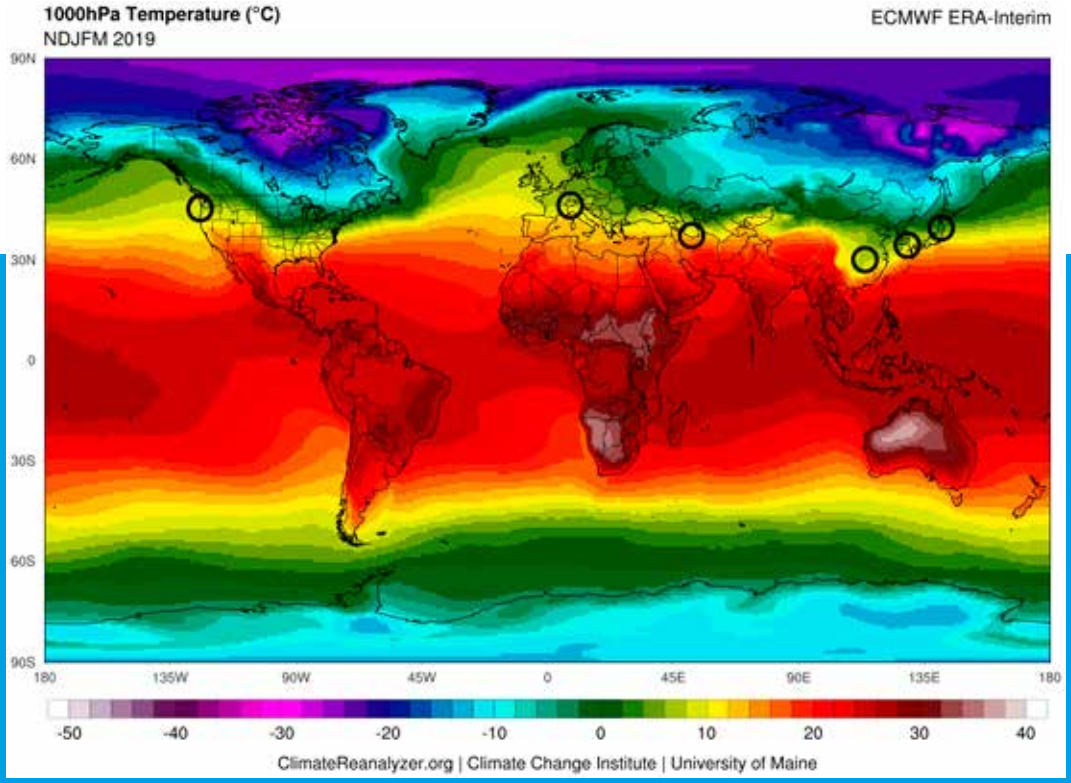


The horizontal red line at the button shows the hospital intensive care capacity, and the curves show the number of people who will need intensive care under different assumptions. As you can see, all scenarios involve massive overload of the health care system

How will it spread?

The daily rise in infection rates over the last few weeks has been approx. 20%, and if this continues uninterrupted, the number 15 million will mathematically grow to around 90 million by the end of this month and to 1 billion in the middle of April.

If we instead assume that there are not 15 million infected now, but "only" 1 million, what does that do to these numbers? Then we get to 6 million infected by the end of this month and to 1 billion cases just before the end of April. It basically postpones the outcome by two weeks. The spread is still exponential, and April and May become very tough.



Black circles represent countries with significant community transmission (> 6 deaths as of 3/5/2019) 1000hPA, NDJFM 2019, ECMF ERA-Interim, Temperature from Climate Reanalyzer (https://ClimateReanalyzer.org), Climate Change Institute, University of Maine, USA.

Many experts estimate that 25-75% of the world's population will be infected sooner or later. Sometimes 60% is mentioned as a good estimate. That would mean over 4 billion infected. However, such simple forecasts models need to be tempered by a number of factors, which I will discuss now.

Potential seasonality

The most important is seasonality. We cannot help noticing that the highest infection rates seem to be mainly in the more affluent parts of the world. is this because people from these regions travel more?

Perhaps, but it could also be because this virus is very weather dependent and thus seasonal. The base case of most experts is that it is indeed seasonal – just like seasonal flu - but we cannot know this for sure. Just a note about why common flu is seasonal:

- People are more outdoors in summer, where infection is less likely than indoors
- Peoples immune systems are assumed to better in summer than winter, which can relate to levels of vitamin D and melatonin, etc.
- People have less glands in summer than in winter.

Now, when analysing seasonal fluctuations in viruses, one must distinguish between:

- Areas of low infection rates (such as many very hot and very cold areas now where there is apparently little corona activity right now)
- Areas with high infection rates, but where the infections are predominantly imported through travel activity (such as when people came to Denmark bringing contagion from Italy and Austria)
- Areas of high INTERNAL infection rates (such as when Italians now infect their family members, neighbours and friends.)One interesting study suggested strongly that it is seasonal. As can be seen from the world map from the previous page, the areas (marked with circles) where we have seen particularly high internal infection rates have been largely confined to a narrow temperature band.

Of course, correlation is not necessarily equal to causation, but the pattern in the picture does seem striking. If this pattern is not a coincidence, then we must expect the high-risk area for internal infection to move north as we enter spring and summer, which in turn will reduce the risk in the south before reducing the risk in the north.

Another paper, this one from and about China, also indicated high dependency on temperature and humidity conditions. It concluded:

"[…] high temperature and high relative humidity significantly reduce COVID-19 transmission, respectively, even after controlling for population density and GDP per capita of cities […] This result is consistent with the fact that the high temperature and high humidity significantly reduce the transmission of influenza. It indicates that the arrival of summer and rainy season in the northern hemisphere can effectively reduce the transmission of the COVID-19."

Human intervention

02

So far, I have not considered human intervention. Let's start with medications against COVID-19.

This virus encodes for 27 different proteins. Now, viruses are very compact, and unlike bacteria and other organisms, their genetic code is also very compact; it is generally assumed that they do nothing that doesn't help them spread. This means that we assume that every one of the 27 proteins is essential, and that gives pharmaceutical scientists at least 27 potential points of attack.

Vaccine

Let's start with vaccine. 14 days after the Chinese authorities discovered the COVID-19 virus, they sent its genetic code, which by the way isn't inscribed in DNA but in RNA, to the World Health Organisation. At the end of January, Doherty Institute in Australia had developed a COVID-19 culture which they shipped to laboratories around the world for experimentation. One month later, at the end of February, there were some 20 vaccination programs in progress. That number had increased to more than 40 by today.

Just a brief note about vaccines. There exists many kinds of vaccines with names such as first-generation-, attenuated, - second-generation-, subunit-, inactivated-, conjugated- and recombinant vaccines. Often the core principle is to inject some sort of inactivated form of the bacteria or virus in question so that the body can develop antibodies and then be ready to fight the real thing.

These types work fine, and many such vaccines are approved. However, many also take 15-20 years to develop.

The alternative and great hope now is so-called third-generation vaccines, also known as genetic vaccines. One report describes this as follows:

"DNA vaccines include direct injection of plasmid containing the encoding gene of the considered antigen, which is expressed in the cells with the aid of specific promoter that causes induction of the immune system. Therefore, instead of prescribing recombinant protein needed to stimulate the immune system (such as hepatitis B), it will be produced in the body."

Explained in other words, the principle here is to inject small strings of DNA or RNA into the patient. This will then produce antibodies once inside the human body cells.

This principle has been tried since the 1990s, but not a single vaccine based on it has as yet been approved. However, the hope is that we can create a vaccine by developing testing and – most important – approving such a vaccine within 12-18 months.

The potential advantages, as quoted from the aforementioned report, are:

1. “they do not have the limitation of common recombinant protein and peptide vaccines
2. are able to immunize against several different strains of qualified antigen diversity,
3. produce antigen in a natural form and properly deliberated to the immune system,
4. are able to stimulate the humeral, cellular, and mucosal immunity,
5. can make sustainable immunity,
6. cause a lack of immune response to the injected vector and not generate antigen against transfected cells,
7. there is no possibility to activate attenuated vaccines and infection risk,
8. it has been possible to produce multiple vaccines,
9. have ease, speed of mass production and similar stages of vaccine production,
10. the quality control is an easy process, and
11. it is stable in various temperatures and the cold chain is not required for maintenance.”

However, there are also risks:

12. “the ability to be only used for protein antigens,
13. effect cells growth by controlling genes,
14. are capable of joining the host genome and inducing tumors, and
15. and cause autoimmune diseases.”

So far, the US-based company Moderna has already commenced testing its third-generation mRNA-1273 vaccine candidate. Also, Innovio expect to test its third-generation INO-4800 DNA vaccine candidate in US, South Korea and China in April. Patients are expected to be followed one year after these tests.

In April, several other companies will start testing. That’s great, but the sad truth is that to get from this stage to an approved and mass-produced vaccine is still expected to take 12 - 18 months. One of the reasons for it taking a long time to develop a new medication is that it needs to be tested to be safe on many people plus in combinations with many other forms of medication.

We are simply not going to inject genetic material into the blood streams of millions of people without having tested their effect thoroughly beforehand. This means that we should not count on one approved and mass-produced vaccine until next year, when most of the damage by COVID-19 has already been done.

One final approach to vaccination which should be mentioned is to genetically modify a harmless virus so that it produces spikes identical to those on COVID-19. Such virus could be an effective vaccine. This approach is currently pursued in Denmark and elsewhere.

Already approved medications

There are other ways forward, though, and one is to identify already approved medications which can alleviate the symptoms of COVID-19.

This is more promising in the short run. Examples of possible solutions that are currently being investigated are:

- Actemra and Kevzara (gout)
- Camosts (normally used for chronic pancreatitis and postoperative reflux esophagitis)
- Chloroqine/Zitromax (malaria)
- Favipiravir (influenza)
- Hydroxychloroquin/Plaquenil (malaria, arthritis)
- Interferon alfa (hepatitis and cancer)
- Interferon beta (sclerosed)
- Kaletra (HIV)
- Remdesivir (ebola)
- Ribavirin (hepatitis B)
- Umifenovir/Arbidol/Abidol (influenza).

Many of these have been shown to have positive effects in vivo, i.e. on cell cultures with COVID-19. Others will surely follow, and perhaps some of this will be used for severe cases within a few months.

So far, most attention has been given to chloroquin and hydroxychloroquin, On February 13th 2020 both were recommended by a South Korean task force for the experimental treatment of COVID-19, as they were approved and worked well in vitro.

On 17 March 2020, the Italian Medicines Agency also expressed a favorable opinion on them, and on March 24, health authorities in began trials, New York moved to begin trials with 70,000 doses of hydroxychloroquine and 750,000 doses of chloroquine, Furthermore, Bayer, the German drug maker, donated 3 million doses of Resochin, its brand name for chloroquine, to the US government.

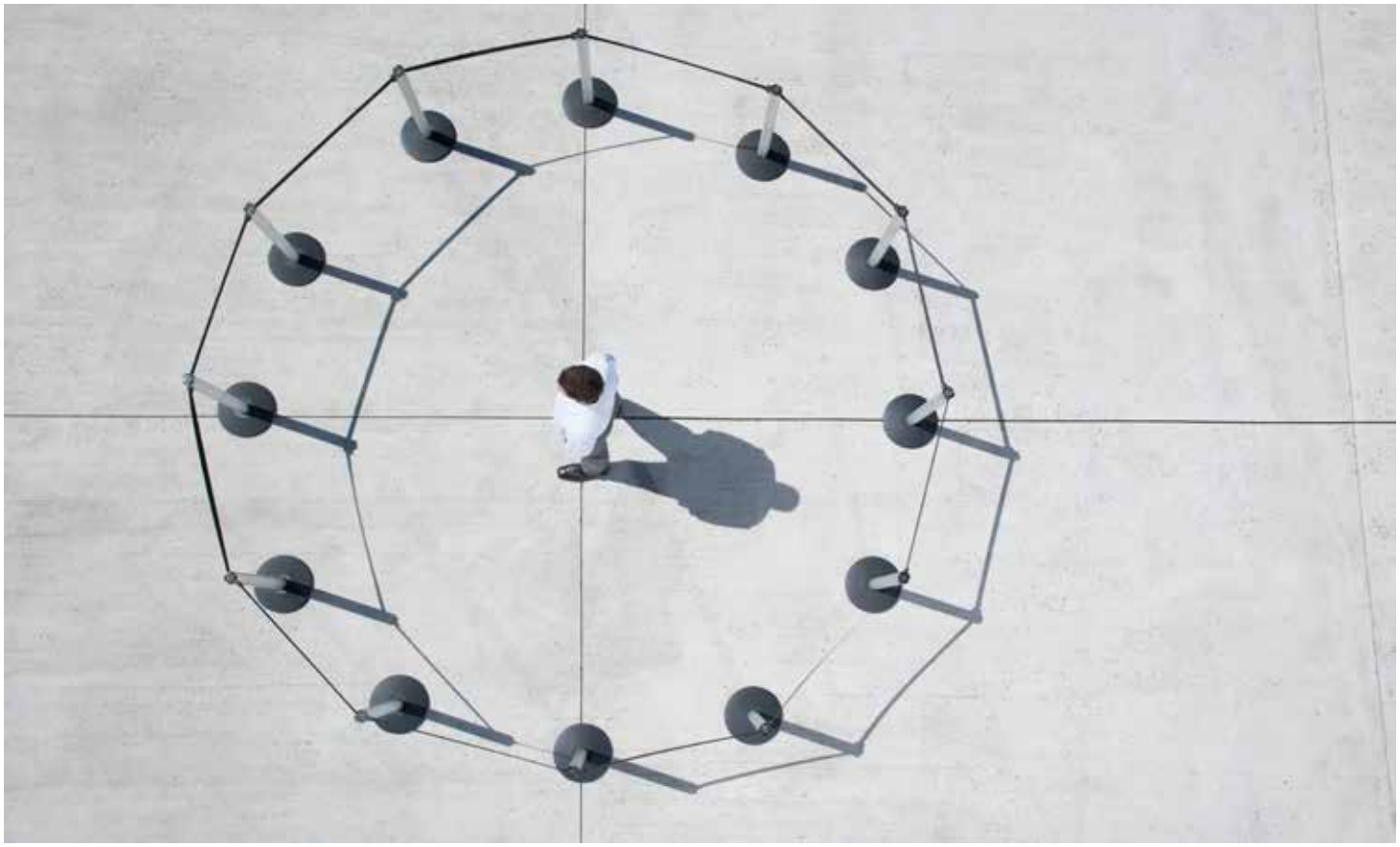
Passive immunity

Passive immunity is the transfer of active human immunity provided by ready-made antibodies. This can be achieved by collecting blood from people who have already recovered from infection with COVID-19 and then extracting their antibodies for COVID-19

and injecting these into healthy people who are not yet infected. However, at least for the time being, this approach has severe practical limitations. Another approach is to use monoclonal antibodies, which are antibodies that are cloned from a single anti-body cell.

General social distancing

The broader approach is to introduce general social distancing, which often involve forms of lockdown. We also know that it was proven really effective in China and South Korea.



This may be viable but is also estimated to be further out in the future.

Tracking and containing

In the current anbsense of vaccines or efficient useful medications, one approach to the pandemic is to test lots of people for the virus, and then – when someone of found to be infected – track down anybody they have been in contact on and since their likely date of infection and then test these too – and finally quarantine anyone in particular risk of having been infected. However, as infection rates go up, this task grows hyper-exponentially and can easily lead to lack of sufficient staff and test-kits.

Government-dependent measures regarding social distancing include:

- mandatory quarantine for potentially exposed individuals
- forbid mass gatherings
- close workplaces where cases have been detected
- recommend social distancing particularly for vulnerable groups (elder people and people with chronic diseases, in this case)
- isolation of households, and eventually of towns or cities with a high number of infections (as is being done currently in Italy).

However, the social cultures in Europe, the US and most of the rest of the world are not like China and South Korea; most of the world has far less social discipline.

Why the drama?

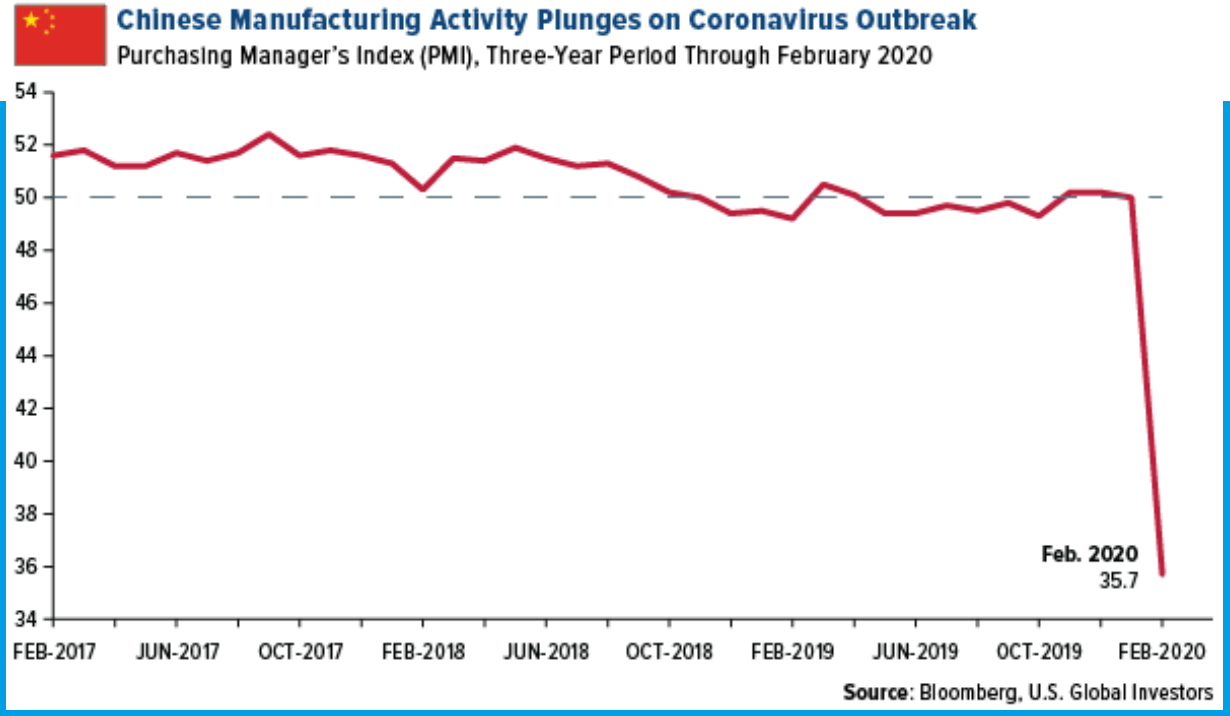
03

Corona is different from most other external shocks

I want to bring in a general observation here. I have been tracking and forecasting economies on a macro scale intensely for 35 years, and I would say that normally, dramatic events that fill the headlines don't mean much to the economies. In fact, you could almost ignore them entirely; the economic machinery has its own dynamics and dances to its own tune. What really matters is business cycles, monetary conditions, asset price fluctuations and those kind of things, but not external events.

Take 9-11, for example. This was a very dramatic event. For instance, it meant that for a few days, you could not fly. But only for a few days. It also led to a massive, military operation, but this didn't hurt the economies either. You could still go to work. And you could still get a haircut, still go to a restaurant and still have meetings, etc. Wheels were still spinning.

The corona crisis is extremely different from almost any other external event in the sense that for a time, it actually severely limits what each and every one of us can do. This means that it has huge economic effect. In the affected areas of China, GDP probably momentarily fell some 20%. Take, for instance, a look at what happened to manufacturing in China when it broke out.



Herd immunity: the hard way to stop it

An epidemic or pandemic wears out by itself if and when infection rates goes below one. Unless enforced through social distancing or enabled by vaccine, this generally happens in a given area when approx. 50% of the local population has created immunity.

We might be close to that around the end of this year, if not before. However, there is a risk that the virus mutates so much that it returns in a version that is sufficiently different to start the whole calamity again. This is what flu does, which explains why you need a new flu shot every year.

The world economy

04

Before the corona crisis broke out, the world economy was in pretty god shape. What I mean by that is that not only did we have steady – in fact accelerating – growth, but also that this was based on rather firm ground. There were no major economic imbalances of the sort that can trigger an international recession.

So, economically it is not like the crash of 2008, which was caused by significant structural imbalances.

In fact, it is not like almost any other onset of recessions. These are normally caused by central banks raising interest rates to stop something unhealthy, or by a part of the economy collapsing because of large imbalances. This is not like that.

How big will the economic impact be?

In 2006, scientists estimated the economic effects of virus pandemics with the following mortalities of the total population:

- Mild: 0.02%
- Moderate: 0.2%
- Severe: 1.1%
- Ultra: 2.2%

The table below shows the estimated drawdowns to GDP under these scenarios:

Table 7: 2006 percentage GDP loss by region

	Mild	Moderate	Severe	Ultra
USA	-0.6	-1.4	-3.0	-5.5
Japan	-1.0	-3.3	-8.3	-15.8
UK	-0.7	-2.4	-5.8	-11.1
Europe	-0.7	-1.9	-4.3	-8.0
Canada	-0.7	-1.5	-3.1	-5.7
Australia	-0.8	-2.4	-5.6	-10.6
New Zealand	-1.4	-4.0	-9.4	-17.7
Indonesia	-0.9	-3.6	-9.2	-18.0
Malaysia	-0.8	-3.4	-8.4	-16.3
Philippines	-1.5	-7.3	-19.3	-37.8
Singapore	-0.9	-4.4	-11.1	-21.7
Thailand	-0.4	-2.1	-5.3	-10.3
China	-0.7	-2.1	-4.8	-9.1
India	-0.6	-2.1	-4.9	-9.3
Taiwan	-0.8	-2.9	-7.1	-13.8
Korea	-0.8	-3.2	-7.8	-15.1
Hong Kong	-1.2	-9.3	-26.8	-53.5
LDCs	-0.6	-2.4	-6.3	-12.2
EEFSU	-0.6	-1.4	-2.9	-5.4
OPEC	-0.7	-2.8	-7.0	-13.6

Source: APG-Cubed model version 63A

However, it is pointless to discuss which scenario we presently have globally, because local outcomes will be very different. Iran and possibly Italy are in the severe category. Iran perhaps even in ultra. Other nations might experience anything from that down to "Moderate" and "Mild".

If we take Europe and assume between "Moderate" and "Severe", we are talking about perhaps 4-6% loss of GDP, and if we assume "Ultra", it's 8%.

However, when this study was made, the authors probably didn't anticipate the effects of strict lock-down that we are now experiencing. Based on recent observation from areas that had enforced lockdown, on Friday March 20th, Goldman Sachs sent a chilling report to their clients. Some quotes:

"We now forecast quarter-on-quarter annualized growth rates of -6% in Q1, -24% in Q2, +12% in Q3, and +10% in Q4, leaving full-year growth at -3.8% on an annual average basis and -3.1% on a Q4/Q4 basis".

Please note the forecast for Q2, 2020: minus 24%. For the whole calender year, the expected draw-down is 3.8%, which is slightly worse than the "Severe" case in the table. Later, the report continued:

"While the exact timing is highly uncertain and relapses are plausible, the assumption of a gradual recovery reflects the potential contributions from factors such as effective mitigation and testing actions, weather effects, medical breakthroughs or adaptation by firms and consumers. The slow pace of recovery even in 2021 allows for longer-lasting scarring effects on businesses and workers."

However, the government can bridge this by stimulating with a somewhat similar amount. For instance, if the government budget is 50% of GDP, they can inject 10% stimulus to national GDP by increasing their budget by 20%.

What we have seen from governments so far is often pretty aggressive with even more expected. First, the EU has allowed its members to exert "full flexibility" in their fiscal policies.

And nation states have done that. Indeed, local governments have combined tax moratoriums, corporate bailouts, state guarantees for bank loans, payment extensions on social charges, and wage subsidies for workers who cannot work or move to part-time roles.

The size of the stimulus package announced by Friday March 20th ranged from 1% of GDP (Australia, EU and Italy), to for instance, 3% in China, 4% in Germany (but with no upwards limit), 5% in Sweden, 6% in japan and 7% in the US.

However, since then news of much more has come in, with indications of the US stimulus package reaching 10% of GDP and with Germany also raising its commitment to about the same level and Switzerland raising its commitment from 1.5% of GDP to 6%, etc.

Central banks have also reacted aggressively, with the Fed taking the lead by cutting interest rates a full percentage point in one go, while announcing a range of other activities, including $700bn in asset purchases, expanded repurchase operations, dollar swap lines with foreign banks and a credit facility for commercial banks and a commercial paper program, to ease household and business lending. More monetary stimulus, such as purchases of municipal bonds, credit-for-lending schemes etc. is possible.

What the US has announced so far is slightly more than they stimulated during the crisis in 2008. However, since more stimulus is on its way and tax revenues will collapse, the US may end up running a spectacular 15-20% fiscal deficit this year – also because it is an election year.

Authorities are well prepared

One advantage governments and central banks do have in this situation is that a lot a approaches and facilities to tackle very abrupt crisis were put in place in the 2008 crisis. Which means that there is considerable readiness, even though this crisis totally blindsided everyone.

Emerging markets in a bind

However, many emerging markets are more squeezed, since before the crisis, they had run up debt denominated in foreign currencies. This situation reminds us of what we had prior to the Asian financial crisis in 1997, where central banks were compelled to lower rates in order to stimulate domestic economies but at the same time fearful of the devaluation that this would create, as such devaluation would increase local value of their foreign debt.

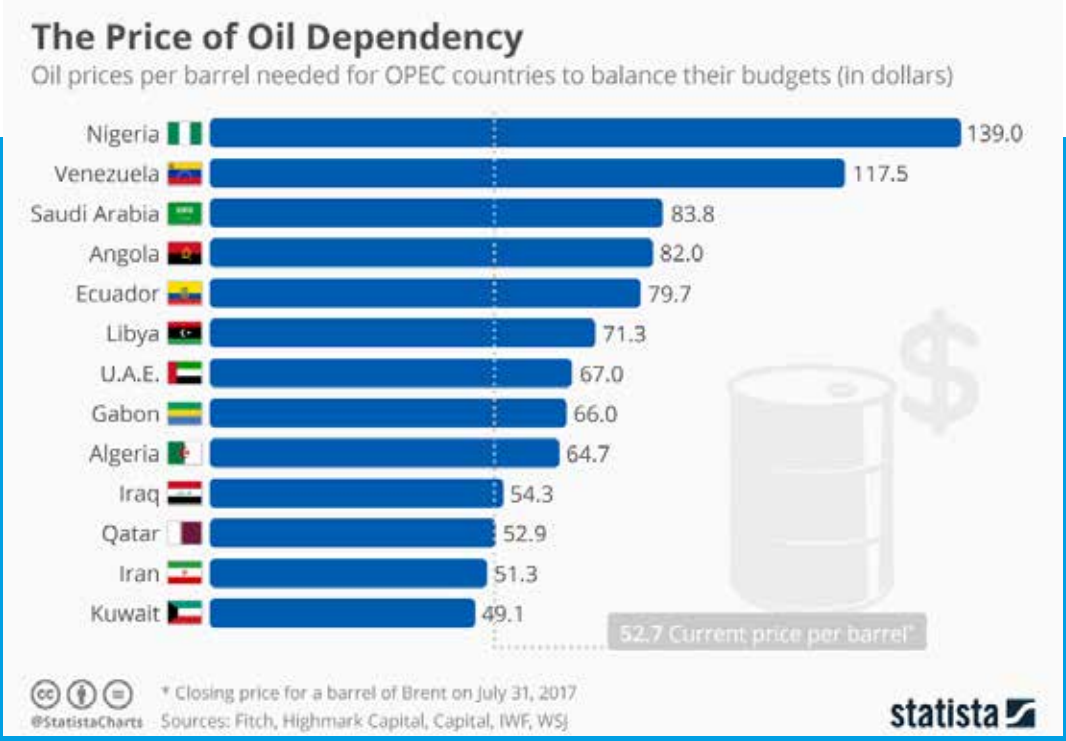
Financial Markets

05

We have just reached the end of the longest-lasting boom ever measured, since NBER started measuring them in 1854. Since then there have been 33 expansions in the US and something comparable in most other developed nations. Before equities peaked in late February this year, they had set an all-time record on bull market duration as well as in bull market price appreciation. They had also reached valuations that by some metrics were identical to the peak levels in 2015 and 2018.

Value considerations

Where are markets now? Lets start with some valuation considerations. In terms of value assessment, you should not base investment thesis on how the world will be the next 6 months: Instead, think 10 years, for instance. Lets again look at Goldmans estimate for the US economy, which showed "annualized growth rates of -6% in Q1, -24% in Q2, +12% in Q3, and +10% in Q4, leaving full-year growth at -3.8% on an annual average basis and -3.1% on a Q4/Q4 basis.". This would mean terrible performance for 6 months, followed by a spectacular comeback and then all pretty normal annual performance after that.



Before markets peaked in February 2020, they remained attractive based on one important measure of value, which was the risk premium. The metric compares earnings yields on equities to interest rates on bank deposits and government bonds. Risk premiums based on current bond yields and normalized equity is now exceptionally high – around 6-8% in most markets - which is very attractive. This is based on normalized earnings, of course.

Typical timing of turning points

As a rule of thumb, bull markets peak around 9 months before the economic cycles peak, and bearmarkets through 5 months before recessions bottom out. Of course this bullmarket peaked only weeks before the economies, since everyone was blindsided by corona. However, if we assume a two-quarter recession, meaning in the order of six months, the bear markets should through pretty soon.

Bear markets normally turn when the bad developments stop accelerating. If we project that principle to the corona crisis, it would mean when daily infection rates no longer grow.

In terms of sectors, leisure travel and public entertainment (when not digital) will be very badly hurt, perhaps even into 2021.

The oil crash

Oil prices and oil producers are hurt badly now. It should be noted that Saudi and Russia cannot sustain their economies with oil prices anywhere near where they are now. Indeed, Saudi needs oil prices north of 80 dollars. Russia is more resilient. They have a huge sovereign wealth fund and can devaluate.

In the longer term, it seems likely that Saudi and Russia will come to terms, which would lift oil prices substantially. From this perspective, buying close to 20 dollars, if not below, would seem like a good deal.

Technical considerations

Using S&P500 as a yard-stick, in my opinion, anything below 2400 is an undershoot.

The index set an all-time-high closing on February 19, 2020 at 3,386. Reaching 2400 means a 30% drop and 2000 would be a 40% drop.

History tells us that buying US equities – or a diversified global portfolio of equities - after a 30% drop almost always gives excellent subsequent 5-year returns. Buying after 40% drops is even better.

Although I will not advise others, personally I would not sell short below 2400, and between 2000 and 2150, I would feel comfortable building up a portfolio for the long term.

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