

## ***The Corona Virus Pandemic: January 2020 to the Present (June 2023) – a compendium of how we reacted to and reported on the crisis.***

*The worst pandemic to hit the planet in over 100 years became known in January 2020 and continues to influence daily life and economics through to the present. Partners Capital treated this as a potential humanitarian and economic disaster of such a proportion to warrant daily senior management meetings to assess the situation and debate investment actions to protect client portfolios. We assembled a team headed by the Founder and then CEO of Partners Capital, Stan Miranda, to scour the information universe for the most accurate facts and data on what was fraught with false information which was in some cases adding to the catastrophe. In the absence of any reliable source of information, we resorted to sorting through all of the misinformation to find what we believed to be as close to scientific and economic fact as possible and shared those thoughts with our clients in the following 17 publications starting in February 2020 and finishing in December 2021 as copied below. We recently put this together as a single document to remind ourselves of “how to behave in a crisis” as that may be one of the most important skills we look for in the investors we back with client capital.*

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### **#1 Covid 19 and Your Portfolio – Rebalancing Action – February 28 2020**

In light of the recent sharp market movements resulting from the Coronavirus (Covid-19) outbreak, we have examined the timing for rebalancing the risk of your portfolio. We are at trigger levels already for some clients, but not for others. So your client team are on top of this now and are reviewing the need for rebalancing, which we will execute without delay.

Covid-19’s long-term economic effects are too early to call but experts currently estimate full-year 2020 global economic growth decline of up to -1.3%. This is the estimated net effect of a steep Q1 decline followed by a sharp recovery in Q3 and Q4. The overall impact will depend on the duration of the epidemic, the global scale of infections, and the scale of containment measures taken around the world. At the time of writing, the outbreak has infected c 84,000 people, resulted in c. 3,000 deaths and spread to over 50 countries with by far the largest impact within the Hubei province of China. While it appears to be getting under control in China, it is still spreading elsewhere with many countries just beginning to implement containment measures. The more containment measures are taken in large economies, the larger the impact on global growth and on financial asset valuations.

As of 27 February, global market equities are down c. -10% from their peak on 19th February, but down only -7% YTD. US markets have corrected by a greater amount, with the S&P500 down -12% from its peak and by -8% YTD.

Asset	Peak to 27 February	YT-27 February
MSCI World	-11%	-7%
MSCI All Country World	-10%	-7%
Euro Stoxx 50	-11%	-8%
S&P 500	-12%	-8%

CSI 300	1%	0%
NASDAQ	-13%	-3%
10-Year US Treasury Yield (%)	-0.31 bps	-66 bps
10-Year Bund Yield (%)	-12 bps	-36 bps
Gold	2%	8%

According to Bridgewater Associates, this decline in equities markets implies more than a -2.0% hit to global GDP in 2020 and more than a -25% hit to DM corporate earnings. While this appears to price in more economic and financial damage than most experts are predicting, those experts' views have no unique insights into how far the virus will spread, nor insights into the scale of human containment efforts that will be taken by major nation states. There may be scope for further downside if and when the virus spreads more broadly in developed economies, particularly in the US. This downside may not result so much from the disease itself, but from the containment measures taken. Our rebalancing efforts will carry on without attempting to call a bottom.

On the positive side, the number of new infections in China continues to trend lower. Outside of Hubei, only 66 new cases have been reported in China since February 22nd. This has allowed an increasing number of Chinese companies to resume operations. Also encouraging is the fact that the mortality rate outside China appears to be below 1% vs 3% inside China. A few countries such as Japan, Singapore, and Thailand, which at one point seemed on track to experience major epidemics, have gained control of the situation. Others like Korea and Iran do not have it under control. Most governments outside China have chosen to implement relatively draconian containment approaches in the hope of limiting the outbreak to a few regional clusters. It is not clear that countries like the US will place the same level of constraints on populations as did China. There are also some promising signs of vaccine development, but these are not likely to be available in large quantities for many months – potentially over a year away.

We are now following our standard procedure to use this correction to rebalance your portfolio risk at more attractive valuations once equivalent equity risk levels fall by c. 2 points or more. For many client portfolios, we are very close to that trigger point and your client team will act in line with agreed procedures and communications.

Over the longer term, we will continue to focus on delivering a portfolio diversified across all major asset classes in a way that spreads the risk most efficiently. Despite the uncertainty, what is clear is that there will be volatility and dispersion across assets, creating winners and losers which will potentially benefit our managers' alpha generation potential. But not all managers come out ahead in these situations. We expect that most of your managers will of course be riding this one through without trying to time events but will be trading around positions taking advantage of any apparent investor over or under-reactions on individual stocks.

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## #2 Our Thoughts on Your Portfolio Today - March 9<sup>th</sup>, 2020

Given today's extreme market volatility, we wanted to keep you updated on current events, our interpretation of those events, and how we are accordingly managing your portfolios.

We had anticipated that markets would be extremely volatile today in reaction to weekend headlines on new Covid-19 cases outside of China and announcements of extreme containment measures (e.g., Lombardy, Italy) which would dramatically reduce economic activity. However, we

did not anticipate the oil price war which Saudi Arabia initiated over the weekend. The combined effects on the markets are as follows as of 2pm EST:

- 5% decline in the S&P 500, or a peak-to-trough decline of 18%
- 8% decline in the EuroStoxx 50, or a peak-to-trough decline of 23%
- 21% peak-to-trough decline in Japan (Nikkei 225) and UK (FTSE 100)
- US 10-year Treasury yields are at record low at <50 bps, compared to 1.9% at the start of the year
- Brent crude at \$36/bbl, compared to \$66/bbl at the state of the year

As long-term investors, our default approach has been to stay the course and methodically rebalance portfolios. We therefore rebalanced most client portfolios on 28<sup>th</sup> February when the MSCI All Country equity index was at the same level it closed last Friday. Therefore, we would need to experience another c.10% decline in equity markets before we rebalance again. We saw 7-8% equity market declines today, which translate into approximately 5-6% declines for the average Partners Capital client portfolio, today alone.

Unlike the 2008 global financial crisis, we do not see a systemic breakdown in the global economy or financial system as a likely outcome. Rather, we expect to see a temporary, but significant drop in economic activity in the areas of world where containment efforts are required. The most direct damage will be felt in certain sectors like transport, restaurants, hotels, shipping, semi-conductors and, indirectly, energy. Many sectors of the economy should have little direct effect including utilities, telecoms, internet businesses, business services, pharma, consumer staples, etc. The negative economic impact will therefore be determined primarily by the length of the containment period which most experts believe will end between April and June, although consumer and business sentiment may take more time to normalize. This timeline is extrapolated from the experience of China, HK and Singapore where containment measures have proven to be effective to date.

There is a downside scenario where the rest of the world is not successful, and containment measures and economic consequences extend beyond the summer. Experts are not suggesting that summer temperatures will slow the virus down and a vaccine is on a 12-month timeline. In our base case or this downside scenario, we have to consider the possibility of negative second-order effects on credit markets, business investment and financial institutions. However, these could also be offset by positive second-order effects such as monetary and fiscal policy actions and lower discount rates (which support higher P/E multiples).

The oil industry is bracing for a 1 to 2% decline in demand, given that jet fuel represented 5.5% of global oil consumption before the outbreak. Brent fell to \$52 before the weekend in anticipation of an agreement from OPEC+ (14 OPEC members + 10 other non-OPEC nations including Russia) to cut production by an amount to offset the coronavirus's impact. However, OPEC+ negotiations collapsed over the weekend as Russia and other non-OPEC partners rejected OPEC's proposal to collectively reduce oil supplies by 1.5m bbl/day in 2Q20. Russia is hurt by this as a high cost producer. However, it seems unlikely that Saudi Arabia will want to see Brent stay below \$40 for an extended period given pressures on its own domestic budget.

With the "twin" uncertainty from both the coronavirus and oil markets, we remain focused on the long-term and take comfort that our average client's portfolio:

- Remains diversified across asset classes and asset managers
- Has minimal exposure to oil or oil & gas companies
- Has minimal exposure to high yield credit (which itself has significant energy exposure)
- Has approximately 60-65% equity-like risk

- Is dominated by active managers who are seeking to capitalize on market dislocations.

While maintaining your risk levels will be stressful with significant near-term volatility, we do not believe that long-term investors should hide from market volatility. Market timing requires the de-risking decision and the re-entry decision to both be well-timed. The probability of both decisions being successful is low and typically destroys value relative to our preferred approach of methodical rebalancing. Furthermore, we and your active asset managers will be looking to exploit the substantial dislocations in the coming months when markets substantially deviate from fundamentals. Through the end of February, most of your liquid managers were reporting modest positive outperformance through the turmoil, but it is still early days in what will be at least another four months of extreme uncertainty and heightened volatility.

### #3 Message to Clients on Covid-19 Crisis – March 12<sup>th</sup>, 2020

Today's market performance is looking like one of the worst days in recent history for equity markets. Let me try and explain what caused it and put this YTD selloff in the context of past selloffs.

12 March 2020 Major Market Movements (as of 1pm EST)				
Market	%	Today	Peak to Trough	YTD
US: S&P 500	55	-8.2%	-25.7%	-22.1%
Europe: Euro Stoxx 50	25	-12.4%	-34.1%	-32.0%
Asia: MSCI Asia Pacific ex Japan	13	-8.9%	-23.5%	-21.1%
Asia: Japan	7	-4.1%	-23.9%	-22.9%
<b>World: MSCI ACWI (Est for today)</b>	<b>100</b>	<b>-9.1%</b>		<b>-24.5%</b>

#### What drove today's selloff?

- News worsened around the spread of Covid-19;
- The WHO classified Covid-19 as a pandemic yesterday;
- Announced US and European policy responses came out tepid relative to the likely impact of the virus;
- Companies hardest hit are facing a liquidity crisis which is spilling into credit markets;
- Crude oil prices dropped another 8%;
- Yale economist, Robert Shiller tells CNBC that "it is likely now that we'll have a recession...What we have now is really two epidemics. We have an epidemic of the coronavirus, but we also have an epidemic of fear based around a narrative that is not necessarily keeping up with scientific reality."

Personal stress levels were elevated as containment efforts went into high gear across the US and Europe, with many employees forced to work from home which creates its own dystopian sensation.

You can put this correction in the context of past corrections measured from peak to trough. This is the worst correction outside of a recession since 2002. You can see that most of the recent selloffs recovered within a year and some in a matter of a few months.

## S&P 500 10% Corrections outside of Recessions

Start date	End date	Time to bottom (trading days)	Size of selloff (%)	Time to recover to prior level (trading days)
8-Jul-66	7-Oct-66	65	-16.4	85
28-Apr-71	9-Aug-71	72	-10.7	127
8-Sep-71	23-Nov-71	55	-11.0	19
11-Jan-73	21-May-73	90	-14.6	1810
15-Jul-75	21-Aug-75	28	-13.1	99
31-Dec-76	31-May-77	105	-10.6	558
19-Jul-77	2-Nov-77	76	-10.9	189
25-Nov-77	6-Mar-78	69	-10.1	37
11-Oct-78	31-Oct-78	15	-11.6	194
6-Jan-84	24-Jul-84	139	-12.7	75
25-Aug-87	4-Dec-87	72	-33.5	415
7-Oct-97	27-Oct-97	15	-10.8	29
17-Jul-98	31-Aug-98	32	-19.3	60
19-Mar-02	23-Jul-02	88	-31.8	583
22-Aug-02	9-Oct-02	34	-19.3	161
14-Jan-03	13-Feb-03	22	-12.3	57
23-Apr-10	2-Jul-10	50	-16.0	88
22-Jul-11	3-Oct-11	51	-18.3	88
20-Jul-15	25-Aug-15	27	-12.2	220
3-Nov-15	11-Feb-16	69	-13.3	81
26-Jan-18	8-Feb-18	10	-10.2	138
20-Sep-18	24-Dec-18	67	-19.8	82
<b>Average</b>		<b>57</b>	<b>-15.4</b>	<b>236</b>
<b>Median</b>		<b>60</b>	<b>-12.9</b>	<b>94</b>

Source: Haver, Deutsche Bank Asset Allocation

We do not know if the correction so far is pricing in a recession. Historically, markets sold off in significantly larger doses in selloffs related to a recession than when not associated with recession. The current selloff of -25% is in line with the size of the median selloff in a recession (-23.9%) as you can see below.

## S&P 500 Returns in Past Recessions

Period	Peak-to-trough	Trough-to-end of recession	Peak to end of recession
1929-32	-86.2%	33.0%	-81.6%
1937-38	-54.5%	36.0%	-38.1%
1945	-6.3%	15.6%	8.3%
1948-49	-20.6%	18.4%	-6.0%
1953-54	-14.8%	28.5%	9.5%
1957-58	-20.7%	11.4%	-11.7%
1960-61	-13.9%	21.3%	4.4%
1970	-36.1%	25.8%	-19.6%
1973-75	-48.2%	33.8%	-30.7%
1980	-17.1%	23.9%	2.7%
1981-82	-27.1%	35.3%	-1.4%
1990-91	-19.6%	27.0%	2.1%
2001	-49.1%	18.0%	-39.9%
2007-09	-56.8%	35.9%	-41.3%
<b>Average</b>	<b>-33.6%</b>	<b>26.6%</b>	<b>-15.9%</b>
<b>Average (post-war)</b>	<b>-29.4%</b>	<b>26.1%</b>	<b>-11.0%</b>
<b>Median</b>	<b>-23.9%</b>	<b>27.0%</b>	<b>-3.4%</b>
<b>Median (post war)</b>	<b>-20.7%</b>	<b>26.4%</b>	<b>0.2%</b>

We are now on this roller coaster, committed to riding it to where it lands on the other side of this panic. Looking through our usual long-term lens, we believe that this crisis has an end... and a return

to economic normality. We don't know if that is 3, 6 or even 12 months from now. But it will come to an end. And we believe at that end point, we will look back and see significant damage done to businesses and the economy. There will be defaults and bankruptcies, somewhat softened by bailout programmes. But from that point, most businesses should have a bounce fuelled by pent up demand in certain sectors, strong stimulus and the general economic recovery that follows any decline.

In the case of the 2008/09 global financial crisis, markets fell further than this as we did not know what the extent of global financial system failure was likely to be. Most of us felt then that we were on the edge of a precipice. We don't believe that there is a precipice ahead of us today. Some may think there is. The virus appears to be contained in China, Singapore and Hong Kong and on its way to containment in Korea. There appears to be a pattern of containment and viral decline to follow in each place where aggressive containment efforts are deployed and well-managed. That is our base case for where we expect Covid-19 to end up in the places where it is growing exponentially today. As the virus finishes taking its toll in each country around the world, we expect to find the economy and markets somewhere in more proper proportion to the actual damage to companies than what markets are pricing at present.

We thought you would like to know that we have been surveying our asset managers frequently throughout this crisis looking for 2008-like hedge fund failures. To date we have seen no signs of that.

Going forward, we plan to stick with our methodical rebalancing of your portfolio. We have updated portfolio valuations today and, since our last rebalancing, we are not yet at the trigger point for another rebalancing for most clients. To give you some sense of how your portfolio may have performed, we estimate that our Master Portfolio -C is down year-to-date through 1pm EST today (12<sup>th</sup> March) by approximately 11%. As we rebalanced many portfolios on the 28<sup>th</sup> of February, we have a bit further to go with most portfolios before another rebalancing.

From here, we expect to continue to have our nerves tested with headline after headline telling the story of exponentially growing number of cases and deaths from the virus. We will also hear about struggling and failing companies and a lack of liquidity and predictions of recession. This could well go on for months before good news returns, but it will end.

Let me finish with a note on how our team is responding to the Coronavirus. In order to protect the health of all employees and to reduce the risk of potential exposure to the Coronavirus, Partners Capital has shifted to remote business operations in New York, San Francisco, and Boston and expect to do the same in our London office starting next week with the majority of employees working from home and a small skeleton crew in the offices. Enacting our remote work protocols is being done out of an abundance of caution as there are no known cases among our staff around the world. This action is consistent with our long-established business continuity plans and takes advantage of technologies we have in place. We believe we are well positioned to adjust and adapt our work processes as circumstances require.

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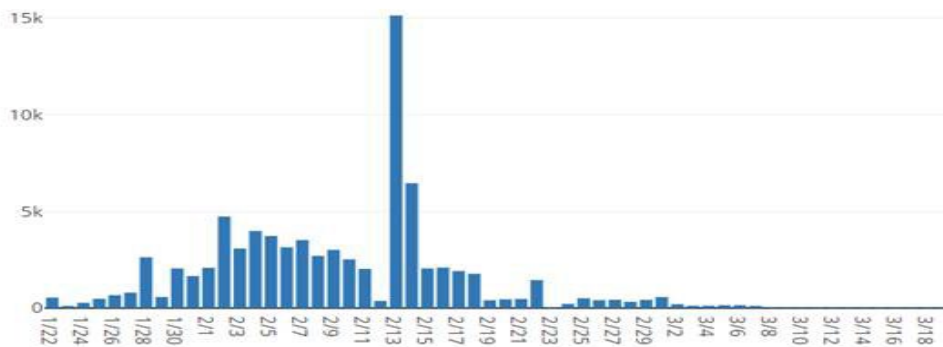
## #4 Covid-19 Update Investment Note – March 20<sup>th</sup>, 2020

Whilst we have spoken with many of you this week, we did not get to all of you. For that reason, I am passing on this note which captures our current thinking. I recall this very feeling from 2008. There is so much information coming at all of us, I wish I had someone just telling me what is the most important set of things to know. At this moment in time, this is my attempt at the answer to that question. For those who are interested in more detail, I have attached **a report from Colin Pan, our global Chief Investment Officer, on manager performance** through this period of extreme turmoil.

### The virus

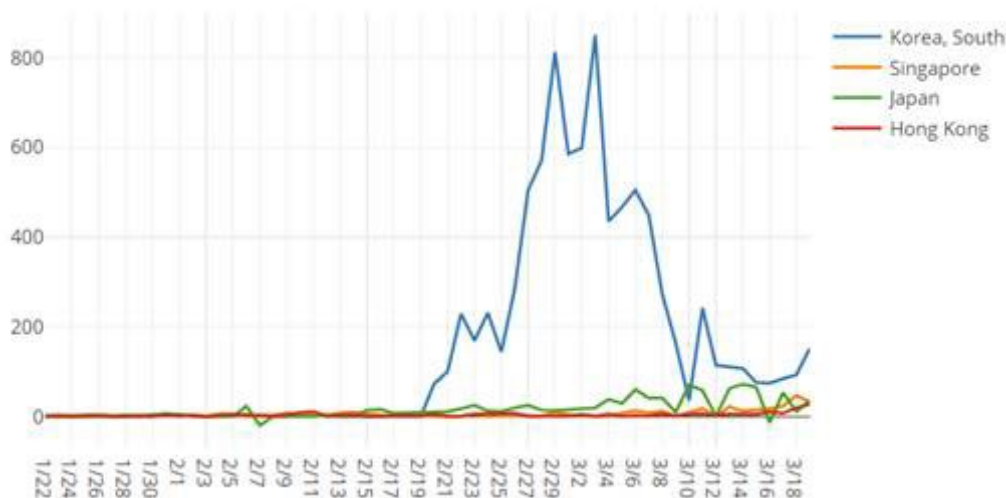
1. The early virus outbreaks in China have shown a pattern of case decline after c. 3 weeks resulting from a strategy of extreme suppression (vs. mitigation). It is not clear that this can and will be replicable in the US and Europe.

### Ex. 1: Confirmed new cases/day in China have come down to 20 to 30



2. Early outbreaks in Singapore, Hong Kong and Korea have shown a similar pattern of decline from different mitigation approaches (tracing, social distancing) by compliant populations with prior experience with epidemics. Japan has virtually kept it from taking root from the outset.

### Ex 2: Korea, Singapore, Japan and Hong Kong





3. Suppression (full lock down) runs the risk of reoccurrence (echo-epidemics like the Spanish flu) and mitigation runs the risk of higher casualties.
4. Covid-19 is now in 146 out of 195 countries all at different stages, with different strategies for containing it, with many sub-country level variations in development stage. Country borders will be controlled until the last country sees it recede to zero.
5. Unless a vaccine is developed, running the course of the virus around the globe could take much of 2020, and longer if there are second waves of the virus. Vaccine is felt to be 12 months away at best.

### The economy and markets

1. Containment efforts generally shut down 10-15% of an economy. Given the duration of containment efforts implied above, experts forecast a global recession, with Goldman Sachs reducing its estimate of global real GDP growth for 2020 at 1.25% (vs 1.9% 3 months ago).

#### Ex 3: Goldman Sachs Real GDP Estimate Revisions

Latest 2020 Real GDP Forecast Revisions			
Economy	Latest	Before	
Global	1.25%	1.9%	
United States	0.4%	1.2%	
Euro Area	-1.7%	0.3%	
Germany	-1.9%	-0.2%	
France	-0.9%	0.4%	
Italy	-3.4%	-1.3%	
Spain	-1.3%	1.3%	
UK	-1.1%	0.5%	
China	3.0%	5.5%	
Japan	-2.1%	-1.3%	

2. We expect client portfolios are down between 10% and 20% to 19 March (the lower numbers helped by \$ appreciation; the higher numbers including a rough estimate of declines in Private asset valuations of c 20% which have not yet been marked.
3. MSCI World has declined -25.8% since the beginning of the year or -28.9% peak to current (19 March).

#### Ex 4: Equity markets as of 19 March 2020 close

	MSCI World	S&P500	China A-shares
MTD	-19.2%	-18.3%	-8.9%
YTD	-25.8%	-25.1%	-12.4%
From Peak	-28.9%	-28.7%	-14.7%

4. Interest rates are lower than where they started in 2020: 10Y Treasury yields are at 1.0%; UK Gilts 0.62% Bunds -0.29
5. Credit spreads have blown out:

#### Ex 5: High Yield Spreads are twice what is normal (5%):

	Spread vs US Treasuries	Yield (TW)
Global HY	10.9%	11.7%
US Corp HY	9.8%	10.8%



6. This level of market correction appears to be pricing in some probability of a long period of containment weighing on the global economy and driving it into a global recession.
7. Our managers are broadly stable – there are some signs of hedge fund stress from leverage among the large multi-strat hedge funds (which we are largely not in). We have a number of disappointments of hedge fund strategies in merger arb, fixed income and macro. Our equity managers have, on average, slightly outperformed year to date.
8. News flow is likely to worsen before it gets better. Market volatility is likely to remain high until cases peak in the US and Europe (c. 1 April earliest) but this will be followed by bad Q1 earnings news through April.
9. Expect at least 2 more months of extreme volatility, so your client teams will continue to be focused on liquidity for currency hedges and rebalancing.

### **The policy response**

1. Policy makers are pulling out full artillery. Most recently Senate Republicans have introduced legislation to inject more than \$1tn of fiscal stimulus (c. 6% of GDP). The legislation provides for up to \$208bn in loans and loan guarantees to businesses hit by the coronavirus outbreak, including \$50bn for passenger airlines, \$8bn for cargo airlines and \$150bn for companies in unspecified sectors. Also includes the proposal to give every tax payer \$1,200 (likely up to a certain income bracket).
2. The Federal Reserve announced that they were establishing US dollar swap lines with 9 further central banks, adding to their existing swap lines with the ECB, BoE, BoJ, SNB and BoC. This is potentially important as it reduces Dollar funding strains outside of the US.
3. The Bank of England's MPC unanimously voted to cut rates by a further 15bps down to 0.1%. This is the lowest ever level since the BoE was formed in 1694
4. Oil rose \$6.6 to \$26.9/barrel yesterday as President Trump said that he would get involved with the oil price war between Saudi Arabia and Russia when it was appropriate. It is suspected that Trump will take measures to support US oil industry as he needs their support in the election.

### **Final observations and investment implications**

1. "This too shall pass", but it is unclear when. On the other side, the world will be different. Manufacturing will be repatriated. Supply chains will be more diversified. Tourism will be constrained. There will be excess capacity in airlines, hotels and certain retail sectors. Working from home will be much more common. Pharma, healthcare and technology will thrive.
2. We are already thinking about how to position portfolios for that very different world. We are working hard to find evidence of panic over-reacting in certain sectors. But liquidity is tight for taking full advantage.
3. We should be cautious about viewing the recent drop in equity prices as a clear buying opportunity as prices may yet go lower, but we will continue to follow our normal rebalancing process.
4. Our focus is on client portfolio liquidity, monitoring asset managers' systemic risk, rebalancing and selective tactical moves to take advantage of "panic level" or just lower prices in robust sectors.

We are grateful for the commitment that our global team has shown to our clients in overseeing their assets through extremely challenging circumstances.

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## #5 Partners Capital Covid-19 Update – March 27<sup>th</sup>, 2020

We had another significant week in the Covid-19 crisis that saw an acceleration in the spread of the virus across US and Europe (384,000 active cases globally), as well as the announcement of multi-trillion-dollar fiscal support programmes to combat the sharply negative economic effects of the virus. Global equity markets took comfort from “do whatever it takes” stimulus packages and rallied +12% from the low points reached at the end of last week.

We expect our client portfolios to have clawed back some of the losses and are estimated to be down between -8 to -15% for the year depending on the risk budget of the portfolio and extent of unhedged USD exposure. Most of this negative return is driven by our broad market exposures (“beta”), but manager alpha is also detracting within hedge fund arbitrage strategies that have struggled from sustained technical selling pressures in the market. However, our managers appear to be stable and we expect that several of these strategies will outperform strongly when markets start to normalise (more on this below in the tactical opportunities we are watching).

Due to this market upturn, our client teams will be rebalancing many client portfolios by selling down equities in your portfolios and buying lower beta assets such as inflation-linked bonds and Gold. You should expect to hear from your teams shortly on this front to the extent they need your approval to execute these.

Looking ahead, the evolution of the crisis remains highly uncertain with a wide spectrum of outcomes possible. We believe the three critical questions investors should be asking are as follows:

1. What are the most likely scenarios for the rest of 2020 given the containment efforts and possible medical developments associated with the virus?
2. What do these scenarios imply from an economic perspective, net of all the stimulus programmes? What does this imply for valuations and how much bad news is priced in?
3. How do we “play offense” given the possible scenarios? What investment opportunities offer the most compelling probability-adjusted returns?

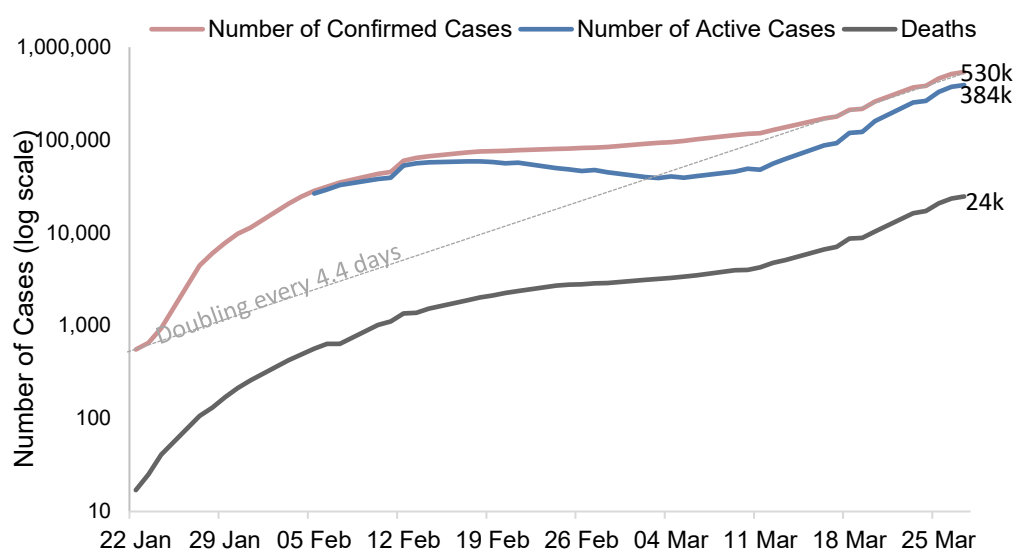
The note below starts by reviewing the key developments this week before turning to our latest thinking on each of the three questions above.

### **Key Weekly Developments**

As at the end of day on March 26<sup>th</sup>, the total number of confirmed cases had crossed 530,000, with 384,000 active cases and deaths exceeding 24,000. The crisis is now primarily concentrated in Western Europe and the US, with China and the rest Asia reporting very few new cases at this point.

Exhibit 1 below shows the total number of cases and deaths plotted on a logarithmic scale, where we can see that the number of cases and deaths have started to accelerate globally.

### Exhibit 1: Cases of Covid-19 have started to accelerate globally



Source: Bloomberg, Johns Hopkins University, World Health Organization

Policy makers have responded comprehensively with containment measures and substantive stimulus programmes in all major economies. Exhibit 2 below summarises the key developments so far.

### Exhibit 2: Key developments in Covid-19 related policy responses

<b>Containment</b>	<ul style="list-style-type: none"> <li>• <i>China</i>: Hubei schools and businesses are still mostly closed but are now expected to open on April 8th; the rest of China is getting back to work but social interaction appears to be limited.</li> <li>• <i>Mainland Europe</i>: All non-essential travel into the region banned for at least 30 days. Work from home being implemented by most companies.</li> <li>• <i>US</i>: Some schools closed, work from home policies being implemented. US has also placed travel ban on non-residents from Europe, the UK and Ireland.</li> </ul>
<b>Policy Responses</b>	<ul style="list-style-type: none"> <li>• Significant monetary and fiscal stimulus from the US, Europe, UK, China, Hong Kong, Singapore, South Korea and Japan. \$50B IMF bailout fund and \$1T ready to be mobilised. \$12B World Bank bailout fund.</li> <li>• US Fed cut interest rates to 0%, committed to purchase \$500B US Treasuries and \$200B agency MBS and made \$1.5T of short-term loans available. The Senate has approved a \$2T stimulus package approved by the House today (27/3). US government may buy into corporate rescues.</li> <li>• BOE has cut rates by 65bps to 0.10%. UK government has announced a stimulus package of £350bn and is set to cover 80% of salaries in industries directly affected by the outbreak.</li> <li>• ECB has agreed to provide cheap loans to banks, purchase an additional €120B of bonds by the end of 2020 and reduced capital requirements for loans to SMEs. The ECB has also launched a €750bn (6.5% of GDP) Pandemic Emergency Purchase Program (PEPP).</li> </ul>

Global equity markets appear to have taken comfort from these significant stimulus measures and have rallied +12.2% this week (as measured by MSCI World to end of Thursday). The S&P 500 has risen by 17.6% over the last 3 days, its best three-day return since 1933. The MSCI World index is now down -22.2% from the January peak and -18.8% lower year-to-26 March (Exhibit 3 below)

### **Exhibit 3: Equity markets as of 26 March 2020 close**

	MSCI World	S&P500	China A-shares
Week-to-26 March	+12.2%	+14.1%	+1.2%
MTD	-11.5%	-10.8%	-6.1%
YTD	-18.8%	-18.2%	-9.7%
From Peak	-22.2%	-22.2%	-12.1%

#### **1. What are the most likely scenarios for the rest of 2020 given the containment efforts and possible medical developments associated with the virus?**

We believe there are three possible scenarios that could play out through the course of 2020.

**Base Case: “China Pattern” - 60% probability:** we see global outbreaks follow the broad lifecycle that we saw in China, with 3-4 weeks before reaching a peak in active cases. In the West, we expect cases to peak as a result of weaker containment efforts than China “lock downs.” We expect most countries gradually return to work in May with the colossal fiscal stimulus assisting businesses and employees through the rest of 2020.

**Bear Case: “Second Wave” – 30% probability:** we see recurrences of the virus around the world as populations attempt to resume normal behaviour, much like what was witnessed during the Spanish flu epidemic in 1918. These recurrences carry on into 2021 in some regions and extend the containment measures that in turn severely hamper some sectors in the economy. Fiscal response is ramped up significantly with extensive support to hard hit industries and the unemployed. The crisis ends only in 2021 when either herd immunity builds up or a vaccine becomes available.

**Our bull case “Single Wave” – 10% probability:** containment efforts in the rest of the world mirror the success in China. A combination of factors including the availability of effective anti-viral drugs, and widespread testing and tracing helps the health care systems deal with the virus effectively and businesses return to full capacity gradually starting from late April. Fiscal stimulus remains highly supportive to ensure a strong recovery in the second half of the year.

Exhibit 4 below shows these scenarios in more detail.

#### **2. What do these scenarios imply from an economic perspective, net of all the stimulus programmes? What does this imply for valuations and how much bad news is priced in?**

The first half of 2020 is witnessing a very sharp reduction in global GDP, irrespective of which scenario above plays out. Certain industries such as travel and leisure, and consumer durables are likely to be hit particularly hard. Bottom-up estimates by experts forecast that US GDP will reduce by 10-15% in the first half with other developed economies witnessing similar levels of decline.

The speed of recovery in the second half of 2020 will be dictated by which of the scenarios plays out, and the extent of fiscal stimulus pumped into the economy:

- In the base case, consensus estimates suggest that global GDP will largely recover and be down only marginally at -0.4% for the full year (vs. pre-virus IMF forecast of +3.4%)
- In the bear case, the rebound is significantly hampered in the second half of the year with global GDP declining by -3.8% for the full year

- In the bull case, global GDP recovers strongly and ends up +2.0% for the year.

So what does this mean for equity valuations? While financial markets may remain highly volatile over the course of 2020, we know from past crises that once the problem is better understood, markets tend to look ahead of current economic data and revalue according to future expectations.

The most recent corporate earnings estimates we are tracking from experts see 2020 S&P 500 EPS declining by -33% to \$110 (from \$165 in 2019). However, the base case outlook for a gradual resumption of economic activity in the second half of 2020, combined with fiscal stimulus of \$2T lead to the 2021 S&P 500 EPS estimate of \$170. Attaching a relatively conservative 16x P/E multiple (considering the very low interest rates likely to remain in place) provides our base case S&P 500 level of c. 2750 at the end of 2020 (or +5% from Mar 26<sup>th</sup> levels of 2630).

However, expert opinion also suggests that the S&P 500 is likely to drop significantly below current levels through to c. 2000 (-24% from Mar 26<sup>th</sup> levels) which we expect will persist through to year-end in a downside scenario. Our upside case of 3100 (+18% from Mar 26<sup>th</sup> levels) simply represents the base case of some of the more optimistic experts we surveyed.

### **3. How do we “play offense” given the possible scenarios? What investment opportunities offer the most compelling probability-adjusted returns?**

During times of acute stress as we are in right now, markets tend to over-react due to technical selling pressure and poor sentiment. We are analysing several asset and sub-asset classes that should offer compelling returns across these scenarios – the key ones are across the following 8 categories:

- a) Gaining access to **“rare capacity” active managers** who are opening their vehicles selectively to take in new capital
- b) Adding exposure at **attractive entry points to long-term investment themes** (e.g. Biotech)
- c) Implementing a **basket of “virus-agnostic” stocks** that feature across our manager portfolios in specific industries such as communication services, consumer discretionary and industrials
- d) Adding exposure to **Chinese internet/ technology stocks** that provide access to an attractive growth segment that should be resilient against the crisis
- e) Adding **selectively to arbitrage strategies (e.g. merger arbitrage)** where the spreads on offer bake in substantial downside protection
- f) Exploiting **liquid credit market dislocation plays** amidst massive spread widening across the IG and HY markets
- g) Selectively adding to **private debt stressed/ distressed opportunities** in the face of limited wholesale funding
- h) Diversifying the safety net asset by **holding a mix of Gold and inflation-linked bonds** that should benefit from a volatile and “zero rates” environment.

We are in active due diligence across all these areas and look forward to featuring these opportunities in your portfolio over the course of the next few weeks.

## Exhibit 4: 2020 Global Covid-19 Scenarios (as of 27 March 2020)

Scenario	Bear Case – 2 <sup>nd</sup> wave	Base Case- China pattern	Bull Case – Single Wave
Probability	30%	60%	10%
<b>Spread of virus in China and rest of world</b>	<ul style="list-style-type: none"> <li>• Recurrences around the world as populations attempt to resume normal behaviour – similar pattern to Spanish flu.</li> <li>• R0 at 2.5x without containment; Mortality varies by country hospital situation and peaks of resurgences (ranging &lt;1% to 4%)</li> <li>• Reoccurrences carry on into 2021 in some regions</li> </ul>	<ul style="list-style-type: none"> <li>• Globally, outbreaks in each country follow the broader China life cycle due to containment efforts and see an active case peak approximately 3-4 weeks after outset.</li> <li>• US is slower than most to contain. Day 1 being 20 Feb, peak predicted for end April.</li> <li>• R0 @ 2.5x; Mortality is below 1% and recoveries ramp up after two months</li> <li>• No recurrences in China due to ongoing testing, case quarantine and limited travel</li> <li>• Handful of countries see prolonged virus risk to the ROW due to poor containment efforts</li> </ul>	<ul style="list-style-type: none"> <li>• ROW containment mirrors success in China (with exceptions) so early peaks at 4-6 wks after onset.</li> <li>• R0 down below 1.0 after short containment phase. Testing proves mortality rate is</li> <li>• No reoccurrence in China</li> <li>• Herd immunity proven OR Antiviral medicines take the pressure off hospitals and reduce mortality (decreases fear and people move/spend more freely)</li> </ul>
<b>Containment Efforts</b>	<ul style="list-style-type: none"> <li>• Travel, work, school and mass event containment measures extended in light of 2<sup>nd</sup> &amp; 3<sup>rd</sup> outbreaks</li> <li>• On and off again measures but certain sectors of economy collapse.</li> </ul>	<ul style="list-style-type: none"> <li>• Isolated developing countries around the world with weak systems drag on into the 2<sup>nd</sup> half of 2020, with major countries having to deploy travel bans and on-off again social isolation, shutting schools, businesses and mass events</li> <li>• Testing becomes more widespread along with systematic centrally controlled contact tracing which works</li> <li>• Antiviral drugs come too late to curb containment earlier</li> </ul>	<ul style="list-style-type: none"> <li>• Travel bans control spread back to DM from lagging EM markets</li> <li>• Massive testing and case tracing</li> <li>• Major efforts and cases are spread out over time to take pressure off health system</li> </ul>
<b>Policy Response</b>	<ul style="list-style-type: none"> <li>• Policy approaches MMT. Escalated version of base case (announced) policy action with all guns blazing on rates, fiscal spend in the form of govt liquidity injections; hard hit industries get injections. Full support to unemployed. Massive fiscal deficits.</li> </ul>	<ul style="list-style-type: none"> <li>• Colossal fiscal support for unemployed, effected businesses, healthcare system, etc. (\$2T US, £350B UK announced already); ECB launched €750bn (6.5% of GDP) Pandemic Emergency Purchase Program (PEPP). Full extent of potential monetary stimulus where rates allow plus huge QE buying programs, financial system support.</li> </ul>	<ul style="list-style-type: none"> <li>• Same as base case</li> </ul>
<b>Timeline</b>	<ul style="list-style-type: none"> <li>• Chaos reigns over 2020 and into 2021. Only by end of 2020 do the strains of the virus weaken or immunity build up (herd or vaccine).</li> </ul>	<ul style="list-style-type: none"> <li>• During May, most countries gradually return to work and schools but with cautious participation in mass events for rest of 2020</li> </ul>	<ul style="list-style-type: none"> <li>• Late April we gradually return to work and schools but with cautious participation in mass events for rest of 2020</li> </ul>

## #6 Virus Mathematics – April 4<sup>th</sup>, 2020

There is an obvious framework for discussing the current crisis that we will follow as we continue to deepen our understanding of it in the months to come. We don't have answers today and, may not have answers to many of these questions six months from now. What we will seek to do is provide you with concise and sensible summaries of the best data and thinking we can get our hands on from the ocean of information flooding down our broadband Wi-Fi networks into our homes. Our crisis-management investment approach is to minimize surprise and be positioned at minimum for what we (and others) can see coming and, at maximum, take advantage of anything we feel the rest of the world has not seen clearly and have yet to fully exploit. We believe we should all be seeking answers to the following 6 key questions:

1. How will the virus spread?
2. How will testing, antiviral drugs and vaccines alter its course?
3. What containment actions will we be taken, and for how long?
4. What policy actions from governments will there be and what effect will they have?
5. What are the resulting economic and financial scenarios?
6. What are the investment implications?

We aim to decrease your reading burden, not add to it. So, we will only write what is new and different to our previous understanding and communication.

## Key Market Movements and Portfolio Performance

Through Friday's close, the MSCI World equity index is down -26.2% from the January peak and -23.0% lower year-to-3 April (Exhibit 1 below).

### Exhibit 1: Equity markets as of 3 April 2020 close

	MSCI World	S&P500	China A-shares
WTD (Mar 30 – Apr 3)	-2.4%	-2.0%	0.7%
MTD	-4.0%	-3.7%	1.3%
YTD	-23.0%	-22.6%	-8.8%
From Peak	-26.2%	-26.3%	-11.2%
Q1 2020	-19.8%	-19.6%	-10.0%

Source: Bloomberg

10yr Government Bond Yields: US: 0.60%; UK: 0.31%; Germany: -0.44%

Global Corporate Bond High Yields are yielding 10.6% (yield to worst) while US Corporate High Yield bonds excluding energy sector bonds are yielding 8.6%. The latter represents 800bps of spread over comparable duration Treasuries versus a long-term average spread of 500bps.

The **US weekly initial jobless claims** rose to 6.6M in the week to March 28th, which is double the previous week's record 3.3M reading. That sums to 10M new unemployed in two weeks which implies a 6.6% increase in overall unemployment to approximately 10%. This is halfway to the 20% unemployment level that Treasury Secretary Steven Mnuchin warned the country about on the 17<sup>th</sup> of March. No experts were forecasting such a huge number last week, as it exceeded even the highest estimate on Bloomberg's survey of economists. The worst week in the financial crisis was "only" 665k in March 2009 and the worst week in 53 years of data was 695k in October 1982, which gives a sense for how significant these numbers are.

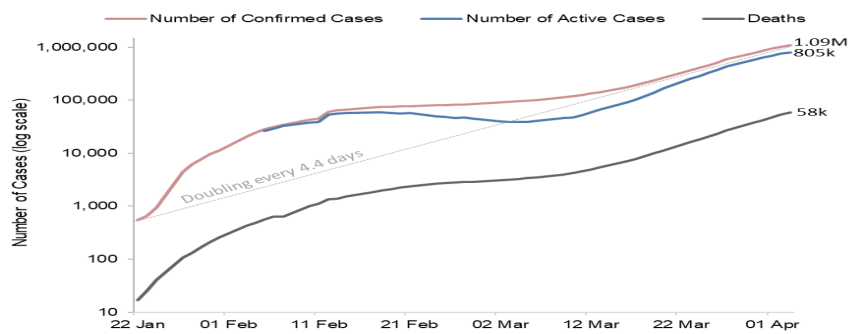
As at the end of March, we expect our client portfolios to be down between -8 to -15% for the year, depending on the risk budget of the portfolio and extent of unhedged USD exposure. Most of this negative return is driven by our broad market exposures ("beta"), but manager alpha is also detracting within hedge fund arbitrage strategies that have struggled from sustained technical selling pressures in the market. However, our managers appear to be stable and we expect that several of these strategies will outperform strongly when markets start to stabilize.

### Q1. How will the virus spread?

As at the end of day on April 3<sup>rd</sup>, the total number of confirmed cases has crossed one million, with 805,025 active cases and 58,415 deaths. Exhibit 2 below shows the total number of cases and deaths plotted on a logarithmic scale.



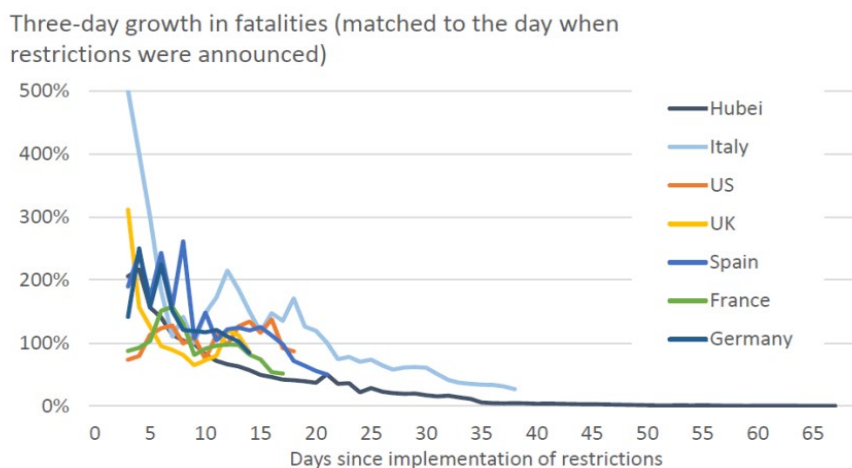
## Exhibit 2: Cases of Covid-19 have started to accelerate globally



Source: Bloomberg, Johns Hopkins University, World Health Organization

While these numbers look as though they are accelerating, one important measure to track is the growth in the number of fatalities by region. Tracking this on a rolling 3-day basis suggests that the countries implementing social distancing measures are seeing a downward trajectory in the fatalities growth rate.

## Exhibit 3: Fatality growth rates since implementation of containment restrictions



Source : Deutsche Bank, WHO, CDC, Worldometer

For this growth rate to carry on declining, some key medical developments are essential in the near-term

### Q2. How will testing, antiviral drugs and vaccines alter its course?

There are 4 key medical developments to track the status of – the roll out of the PCR nasal/ throat swab tests, availability of antibody blood tests, development of effective antiviral drugs, and finally the development of a vaccine. Increasingly, experts monitoring these developments believe that the PCR test capacity will in the next two months grow to the point where all who need to be tested are given the test. But it will be well into summer before all who want to be tested can be tested. Antibody tests that can identify those who are immune are early in roll out, but we have no visibility yet on how quickly these will become available to all. However, we do expect that the antibody test should be widely available earlier before the PCR tests are, given that the antibody test is likely to be self-administered. Antiviral drugs, Remdesivir and Chloroquine being most promising, are weeks away from formal approval but are being used in “compassionate” cases. It is not clear that these will have a material impact on mortality rates. If the results are in any way positive (as analysts are

reasonably hopeful about) then they believe the FDA will move heaven and earth to get them approved within days. Vaccines are 12-18 months off. See Exhibit 3 below.

**Exhibit 4: Status report on the four key medical developments needed**

Medical Need	Purpose	Status / Rollout plan
<b>PCR nasal and throat swab tests</b>	Know who is infected at present or not. Keep infected home and let others go back to work ASAP. Anti-body tests are not able to tell if you are currently infected, so PCR tests will be crucial for the "dance" phase in terms of contact tracing and targeted suppression strategies.	5M tests conducted (1:1600 on planet). Initial results in the most tested countries show approximately 6% of tests as positive. Scale up has been difficult primarily due to supply of chemicals (no longer a major problem) and a shortage of testing labs (moving towards decentralisation). Expect the UK to be testing 25,000/day in the next two weeks. Similar scale up will be more difficult in the US due to federal system. States have been competing against the federal government for purchase of tests as well.
<b>Antibody blood test (serological)</b>	Build a picture of herd immunity within the population. Know who is immune and send them back to work. The UK has specifically mentioned the idea of immunity certificates.	Providers have developed millions of tests which they say are ready to use. Government/health organisations around the world are verifying the robustness of these tests. UK expects roll out in coming weeks, assume a similar timeline for the US. These tests do not require labs for verification.
<b>Antiviral drugs</b>	Stop the spread of the virus or reduce the most life-threatening symptoms. Remdesivir in particular may be able to alleviate some of the pressure on ventilators that could in turn reduce fatalities.	Greatest hope is with Ebola drug Remdesivir and malaria drug Chloroquine. Reliable clinical test results are several weeks away. Analysts believe that the initial trial may be enough for product approval even if the data is somewhat mixed. More broadly based earlier stage trials are expected to reveal the true benefit of the antivirals within the next 6-8 weeks. Manufacturing has been ramped up after fears of initial shortage and an adequate stockpile will be available within the coming weeks.
<b>Vaccine</b>	Permanently inoculate the entire population, or at least front line workers.	Consensus is that this is 12-18 months away due to testing restrictions but rules have been relaxed to expediate phase 1 and 2 human trials.

**Q3. What containment actions will we be taken, and for how long?**

- *China:* Hubei schools and businesses are expected to open on April 8th; the rest of China is getting back to work but with some restrictions which differ by province but include restrictions on some movement across provinces and closing of cinemas. The country remains closed to foreigners.
- *Europe:* All non-essential travel into the region banned for at least 30 days. Work from home being implemented by most companies. Various levels of lockdown in all countries with the notable exception of Sweden.
- *US:* Most schools closed, stay at home polices being implemented statewide in 40 states, 5 with partial stay at home policies and 5 with none. On 23rd March there were only 9 statewide orders.

US has also placed travel ban on non-residents from Europe, the UK and Ireland. Travel restrictions between US states are also being introduced.

- *India*: one of the latest to impose lockdown of almost all economic activity, confining 1.4B people to their homes.

Deutsche Bank predicts that based on these measures that several Western Economies will gradually start to remove social distancing measures through the course of May. See Exhibit 4 below.

**Exhibit 5: Potential dates for the initial lifting of restrictions**

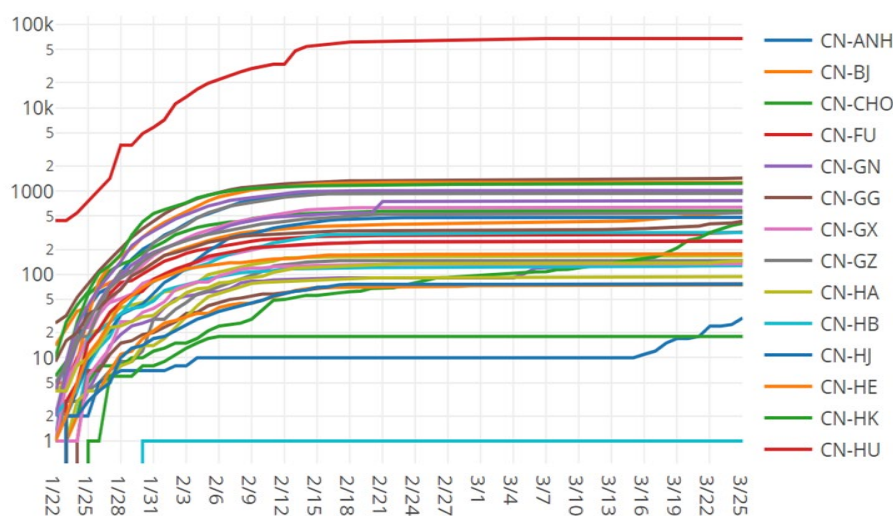
	End of announced lockdown (not including possible extensions)	Estimated date that restrictions will start to be lifted based on the Hubei experience	Estimated date of "containment" based on 2003 SARS experience **
US	30 April *	22 May	19 June
Italy	12 April	07 May	04 June
UK	12 April	23 May	20 June
Spain	11 April	18 May	15 June
France	15 April	18 May	15 June
Germany***	19 April	22 May	19 June

Source : Deutsche Bank, WHO, CDC, Worldometer  
 \* Different US states have enacted different restrictions. The 30 April date represents the date until which President Trump has issued social distancing guidelines  
 \*\* This is assumed to be a period of two generations of the covid-19 (max 28 days) in which there are no new cases. Hubei last declared a new case on 24 March so 'containment' would theoretically occur on 21 April. We deem these dates unlikely for the countries in this analysis, however, we include them here as a reference point  
 \*\*\* Angela Merkel announced social distancing measures should be applied nationwide through to at least 19 April. However, various states have implemented other restrictions as well

The above is contingent on effective "first wave" containment across the countries and the ability to use testing and tracking to manage the continued cases that will arise when the countries reopen their economies. One of the greatest uncertainties today is whether there will be a need to return to a lock-down or heavy suppression actions as the result of a second wave of the virus. Most experts expect a second wave will occur in most countries but may be containable without returning to full lock-down as much of the world is presently in.

Is there a predictable pattern we can observe from China and other Asian countries who have successfully contained the virus? Unfortunately, the data would suggest it is dangerous to extrapolate from these case studies. Trusting the Chinese data, we observed remarkable consistency in how each Chinese province contained the virus in just 2 to 3 weeks from onset.

**Exhibit 6: Cases in Chinese provinces peaked between 2 and 3 weeks form onset in a remarkably consistent pattern**



Of all the other Asian countries, only Korea saw a similar pattern with onset on the 20<sup>th</sup> of February and peak cases 20 days later and containment below 100 cases a few days after peak active cases.

Korea achieved this without locking down the economy, but rather achieved it with extensive testing early on followed by command-and-control centralised tracking and tracing. Taiwan and Japan have not yet reached peak cases but have not seen much spread with Japan currently seeing ~250 cases/day and Taiwan around 10 cases/day. Japan has closed schools, but most attribute their and Taiwan's success to past experience with pandemics and readiness. Mitigation actions have dominated, with little suppression.

**Exhibit 7: Studying the pattern of all more recent Western countries, there is little to learn.**

Country	Onset date	active cases today	Peak active cases	Daily cases today (3 day avg)	Daily Growth Rate
China	01-Jan	1558	58016	75	4.8%
Korea	20-Feb	3867	7362	90	2.3%
Japan	22-Feb	2352		252	10.7%
Italy	23-Feb	85388		4650	5.4%
Iran	26-Feb	31954		2800	8.8%
Germany	01-Mar	65309		6400	9.8%
France	01-Mar	61650		10012	16.2%
Spain	02-Mar	77488		7600	9.8%
USA	03-Mar	257486		29543	11.5%
UK	05-Mar	34428		4300	12.5%
Taiwan	20-Mar	293		8	2.7%

Italy and Iran are 6 weeks since onset with no sign of peak cases in sight, although the rate of growth is falling as shown in Exhibit 2 above. This may mirror the experience of Hubei province which took approximately 6 weeks to contain (reach peak active cases).

Imperial College estimates that the suppression tactics in Europe have reduced the contagion rate R-0 by c. 65%. They state that there is about a 50% probability that the R-0 in Europe is now below 1.0. They estimate that suppression tactics have saved circa. 60,000 lives in Europe alone.

Keeping the R-0 under or close to 1.0 after the end of the full lockdown phase as people return to work will be essential. If we look at the evidence from China, Korea and Singapore, it appears that they have achieved this firstly via international travel restrictions while the rest of the world gets to grips with the first wave of the virus. They have also imposed some restrictions on day to day life to keep the R-0 close to 1.0.

Exhibit 7 below illustrates that the larger the percent of population with immunity, the fewer draconian actions are required to work toward herd immunity. For example, if 20% of the population is immune and suppression actions reduce the natural contagion rate from 2.5x to below 1.3x, then the effective R-0 is below 1.0. It is quite possible that testing, contact tracing, personal hygiene and case isolation will be sufficient at a point where immunity is at 20% or higher.

**Exhibit 8: The higher the proportion of the population that is immune the higher the contagion that can be tolerated without suppression actions**

Effective R	R-0 Post Suppression							
	1	1.1	1.2	1.3	1.4	1.5	1.8	2
5%	0.95	1.045	1.14	1.235	1.33	1.425	1.71	1.9
10%	0.9	0.99	1.08	1.17	1.26	1.35	1.62	1.8
15%	0.85	0.935	1.02	1.105	1.19	1.275	1.53	1.7
20%	0.8	0.88	0.96	1.04	1.12	1.2	1.44	1.6

25%	0.75	0.825	0.9	0.975	1.05	1.125	1.35	1.5
30%	0.7	0.77	0.84	0.91	0.98	1.05	1.26	1.4
40%	0.6	0.66	0.72	0.78	0.84	0.9	1.08	1.2
50%	0.5	0.55	0.6	0.65	0.7	0.75	0.9	1
60%	0.4	0.44	0.48	0.52	0.56	0.6	0.72	0.8

We are acutely aware of the fact that the world does not return to normal until the last infection in the last country suffering with the virus has contained it. Depending on assumptions surrounding suppression actions needed in the second waves of the virus, we model some of the average timeframes for the first wave and second waves around the world to arrive at a range of “back to normality” timeframes varying from early June to late August. Our base case scenario in Exhibit 11 assumes a “partial” return to normality in the June to August timeframe, which continues to incur some economic cost, but significantly reduced from what we are incurring at present. This of course assumes the absence of powerful antiviral drug solutions or a vaccine.

#### Q4. What policy actions from governments will there be and what effect will they have?

As discussed last week, policy makers have responded comprehensively with containment measures and substantive stimulus programmes in all major economies. The key points are:

- Significant monetary and fiscal stimulus from the US, Europe, UK, China, Hong Kong, Singapore, South Korea and Japan. \$50B **IMF** bailout fund and \$1T ready to be mobilised. \$12B **World Bank** bailout fund.
- **The US Congress** approved a \$2.1T US fiscal stimulus to provide a c. 4% GDP boost including the following highlights:
  - \$350 billion in aid for small businesses.
  - \$300 billion for middle- and lower-income Americans
  - The duration of unemployment benefits is extended an additional 13 weeks and normal benefits are topped up with an additional \$600 per week.
  - \$150 billion for state and local governments
  - \$117 billion for hospitals and veterans’ health care
  - \$500 billion for aid to industry, non-profits, states, and cities. Some of this will be directed toward industries that have been particularly hard hit, notably the airlines.
- **US Fed** cut interest rates to 0%, committed to purchase \$500B US Treasuries and \$200B agency MBS and made \$1.5T of short-term loans available. US government may buy into corporate rescues.
- **BOE** has cut rates by 65bps to 0.10%. UK government has announced a stimulus package of £350bln and is set to cover 80% of salaries in industries directly affected by the outbreak.
- **ECB** has agreed to provide cheap loans to banks, purchase an additional €120B of bonds by the end of 2020 and reduced capital requirements for loans to SMEs. The ECB has also launched a €750bn (6.5% of GDP) Pandemic Emergency Purchase Program (PEPP).

#### Q5. What are the resulting economic and financial scenarios?

##### Economic (GDP) impact

Since our last weekly note, economic growth forecasts have been sharply downgraded, leading to downgrades in our own growth projections across scenarios. This increased downside arises from the expectation of more widespread and time extended containment measures and the knock-on effects on all sectors of the economy as we go into a global recession. While the domestic economies start to recover, we are likely to see severe travel restrictions globally kept in place for the rest of the year to prevent second/ third waves.

- It is now expected that growth will be severely negative in Q1 and Q2 of 2020 before stabilising and bouncing back sharply in Q3/Q4 2020 or Q1 2021.
- Global GDP is expected to contract on average by c. -2% in 2020. Even the most optimistic forecast in our sample by Deutsche Bank at 0%, would represent the lowest growth since the GFC.
- JP Morgan's prediction of -5.3% for 2020 US GDP would be the largest one-year decline in the US since WWII.
- Developed Market growth is expected to be negative -4.6% with most analysts expecting Europe to be the most impacted region.
- EM growth is expected to remain positive primarily driven by China which is expected to recover faster than the rest of the world from the outbreak.

#### Exhibit 9: 2020 GDP Forecasts

2020 Real GDP Growth Forecasts							
	JP Morgan	Goldman Sachs	Deutsche Ba	Capital Economics	HIS Markit	Bloomberg	Average (USD)
Last Update	27-Mar	31-Mar	01-Apr	18-Mar	30-Mar	24-Mar	
Global	-2.6% (USD) -1.7% (PPP)	-3.3% (USD) -1.9% (PPP)	--	-1.0%	-2.8%	-0.2%	-2.0%
DM	-4.3%	-6.1%	--	-3.5%	--	--	-4.6%
US	-5.3%	-6.2%	-4.2%	0.0%	-5.4%	-1.0%	-3.7%
Eurozone	-3.4%	-9.0%	-6.9%	-8.5%	-4.5%	-2.0%	-5.7%
Japan	-3.1%	-3.1%	-3.9%	-4.0%	-2.5%	-1.4%	-3.0%
EM	0.0%	1.4%	--	0.4%	--	--	0.6%
China	1.1%	3.0%	-1.4%	-3.0%	2.0%	1.4%	0.5%

Note: GDP PPP is gross domestic product converted to international dollars using purchasing power parity rates

#### Where will corporate earnings be in 2020 and beyond?

It is still largely impossible to accurately predict corporate earnings for 2020 when management teams still have little ability to forecast their company's earnings. As a result, consensus bottom-up earnings estimates tend to be slow moving and stale (currently showing only a -1% drop from 2019 to 2020). This forces us to turn to top-down 2020 forecasts, which also carry little reliability, but vary from -7% to -36% relative to 2019. Investors will likely view the hit to 2020 EPS as a one-off event and anchor their equity view to 2021 estimates where those same analysts are projecting a substantial earnings rebound in 2021, resulting in only a net -1% average drop in 2021 earnings relative to 2019. This

implies that the S&P500 could be back to the level of YE 2019 by the end of this year, depending on equity risk premia and discount rates at that time.

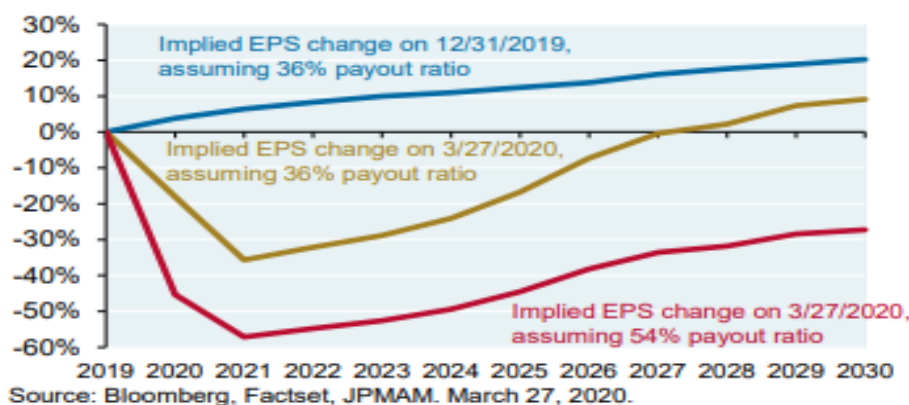
**Exhibit 10: Top Down S&P 500 EPS growth forecasts**

Source	2020	2021	2021/2019
GS	-28%	+55%	+12%
JPM	-16%	+15%	-3%
MS	-7%	+12%	+5%
Bernstein	-36%	+33%	-15%
CS	-18%	20%	-1%
<b>Average</b>	<b>-21%</b>	<b>27%</b>	<b>-1%</b>

**How do these earnings estimates compare with what markets are currently pricing?**

Equities are a long duration asset whose value derives from the discounted value of earnings over many years and even decades. The closest market proxy for longer-term earnings growth estimates can be found in equity dividend futures. Recent studies by Bridgewater Associates and JP Morgan show that dividend futures are currently pricing that the S&P500 earnings will not recover to 2019 levels for at least another 7 years.

**Exhibit 11: S&P 500 earnings per share assumptions implied by dividend futures - % change in earnings per share from 2019**



To put this into context, long term history shows that, with the exception of during the Great Depression, it has never taken seven years for US corporate earnings to recover their pre-crisis level. It has generally taken less than four years to regain the peak, and sometimes less than three.

None of this is to suggest the equity markets have already bottomed. Despite the 19% rally last week, many experts warn of risks of further declines in the near term. In past crises, it has not been uncommon to see several cycles of large declines followed by rallies. Between September and December 2008, the S&P 500 experienced six distinct bounces of 9% or more, with some rallies as large as 19% while the actual market bottom did not occur until March 2009. However, if economic activity starts to recover after the summer, even if not fully at previous levels, equity and other risk assets will likely look through near term data. This has been the case in most previous crises,



including the GFC when both equity and credit markets rallied sharply while bankruptcies and defaults were still increasing.

## Q6. What are the investment implications?

You heard last week what our playbook is for “going on offence” in this current crisis. We did rebalance many client portfolios selling equities on the back of the market spike last week. Gold features alongside inflation linked bonds as our core safety net allocation. We have approached many previously closed asset managers and secured additional capacity for clients and are still working on that opportunity.

We have launched the New World Equity Portfolio containing a basket of “virus-agnostic” stocks that feature across our manager portfolios in specific industries such as communication services, consumer discretionary and industrials. This has outperformed the S&P 500 since its initial construction on the 18<sup>th</sup> of March to 2 April by just over 2% and has demonstrated defensiveness in the downturns.

We are poised to add approximately 4% to liquid credit when and if we see a significant further widening of credit spreads. We are in the process of setting up a new vehicle with one of our long-standing asset manager partners in the special situation lending arena and are choosing from a short list of distressed private equity investors.

Finally, we have been monitoring the cost of various fat-tail hedging options including puts, currencies, gold, Treasuries and a hedge fund manager we have benefited from this year who specializes in fat-tail hedging. Given the current high prices of puts, the only attractive fat tail hedging options would appear to be gold and, potentially, US dollars for our non-US\$ clients.

## Scenarios

The attached Exhibit 12 is an update from last week’s version of our three scenarios which reflects the significant reduction in expected 2020 global GDP growth.

We welcome comments and contrary views.

### Exhibit 12: 2020 Global Covid-19 Scenarios (as of 4 April 2020)

Scenario	Bear Case – On-again/ off-again	Base Case- China pattern + 2 <sup>nd</sup> wave	Bull Case – Single Wave
Probability	30%	60%	10%
Spread of virus in China and rest of world	<ul style="list-style-type: none"> <li>Reoccurrences around the world as populations attempt to resume normal behaviour – similar pattern to Spanish flu.</li> <li>R0 at 2.5x without containment; Mortality varies by country hospital situation and peaks of resurgences (ranging &lt;1% to 4%).</li> <li>Reoccurrences carry on into 2021 in some regions.</li> </ul>	<ul style="list-style-type: none"> <li>Globally, outbreaks in each country follow the broader China life cycle due to containment efforts and see an active case peak approximately 3-4 weeks after outset.</li> <li>US is slower than most to contain. Day 1 being 20 Feb. peak predicted for end April.</li> <li>R0 @ 2.5x; Mortality is below 1% and recoveries ramp up after two months.</li> <li>No reoccurrences in China due to ongoing testing, case quarantine and limited travel.</li> <li>Handful of countries see prolonged virus risk to the ROW due to poor containment efforts.</li> </ul>	<ul style="list-style-type: none"> <li>ROW containment mirrors success in China (with exceptions) so early peaks at 4-6 wks after onset.</li> <li>R0 down below 1.0 after short containment phase. Testing proves mortality rate is below 0.5%.</li> <li>No reoccurrence in China.</li> <li>Herd immunity proven OR Antiviral medicines take the pressure off hospitals and reduce mortality (decreases fear and people move/spend more freely).</li> </ul>
Containment Efforts	<ul style="list-style-type: none"> <li>Travel, work, school and mass event containment measures extended in light of 2<sup>nd</sup> &amp; 3<sup>rd</sup> outbreaks.</li> <li>On and off again measures but certain sectors of economy collapse.</li> </ul>	<ul style="list-style-type: none"> <li>Isolated developing countries around the world with weak systems drag on into the 2<sup>nd</sup> half of 2020, with major countries having to deploy travel bans and on-off again social isolation, shutting schools, businesses and mass events.</li> <li>Testing becomes more widespread along with systematic centrally controlled contact tracing which works.</li> <li>Antiviral drugs come too late to curb containment earlier.</li> </ul>	<ul style="list-style-type: none"> <li>Travel bans control spread back to DM from lagging EM markets.</li> <li>Massive testing and case tracing.</li> <li>Major efforts and cases are spread out over time to take pressure off health system.</li> </ul>
Policy Response	<ul style="list-style-type: none"> <li>Policy approaches MMT. Escalated version of base case (announced) policy action with all guns blazing on rates, fiscal spend in the form of govt liquidity injections; hard hit industries get injections. Full support to unemployed. Massive fiscal deficits.</li> </ul>	<ul style="list-style-type: none"> <li>Colossal fiscal support for unemployed, effected businesses, healthcare system, etc. (\$2T US, £350B UK announced already); ECB launched €750bn (6.5% of GDP) Pandemic Emergency Purchase Program (PEPP). Full extent of potential monetary stimulus where rates allow plus huge QE buying programs, financial system support.</li> </ul>	<ul style="list-style-type: none"> <li>Same as base case</li> </ul>
Timeline	<ul style="list-style-type: none"> <li>Chaos reigns over 2020 and into 2021. Only by end of 2020 do the strains of the virus weaken or immunity build up (herd or vaccine).</li> </ul>	<ul style="list-style-type: none"> <li>During May, most countries gradually return to work and schools but with cautious participation in mass events for rest of 2020.</li> </ul>	<ul style="list-style-type: none"> <li>Late April we gradually return to work and schools but with cautious participation in mass events for rest of 2020.</li> </ul>
Real 2020 Global GDP Impact (PPP)	-5.1% Recession	-1.7% Recession (vs +3.4% IMF Jan 2020)	0.7%
10Y Treasury Yld @YE (.60% today)	0.50%	1.60%	2.40%
S&P 500 @YE	2000 (-38% YTD; -20% from 2488 today)	2750 (-15% YTD; +10% from 2488 today)	3100 (-4% YTD; +25% from 2488 today)

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## #7 Unlockdown Plans – April 10 2020

We have had a relatively stable week as the number of active cases started to peak in parts of Europe and the US, and policy makers turned their attention to the question of when and how to reopen their economies. Global equity markets took comfort from these indications and rallied strongly through the week, leaving them down only -15% for the year.

As we set out in last week’s note, our framework for analyzing these developments hinges on answers to the same six questions around the spread of the virus through to the investment implications but starts with a summary update on market movements and client performance.

### **Key Market Movements and Portfolio Performance**

Through last Thursday the 9<sup>th</sup> of April close, the MSCI World equity index is down -18.3% from the January peak and -14.7% lower year-to-9 April (Exhibit 1 below).

### **Exhibit 1: Equity markets as of 9 April 2020 close**

	MSCI World	S&P500	China A-shares
WTD (6th - 9th)	10.5%	12.1%	2.1%
MTD	6.3%	8.0%	2.9%
YTD	-14.7%	-13.2%	-7.4%
From Peak	-18.3%	-17.4%	-9.8%

10yr Government Bond Yields: US: 0.72%; UK: 0.31%; Germany: -0.35%

Global Corporate Bond High Yields are yielding 10.4% (yield to worst) while US Corporate High Yield bonds excluding energy sector bonds are yielding 8.3%. The latter represents 750bps of spread over comparable duration Treasuries versus a long-term average spread of 500bps.

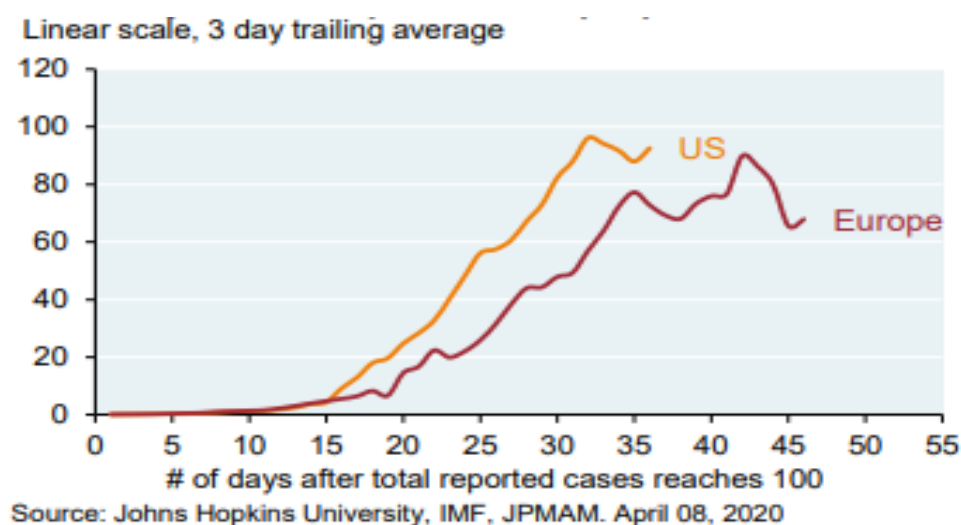
**As at the end of March**, we expect our client portfolios to be down between -8 to -13% for the year, depending on the risk budget of the portfolio and the extent of unhedged USD exposure. This compares to global equities which declined -20% in the first quarter. Most of this negative return is driven by our broad market exposures (“beta”), but manager alpha was also negative in the quarter with the exception of our hedged equities program. With world equity markets up 6% in April to the 9<sup>th</sup>, we expect client performance to be in the range of -4% to -9% for year to the 9<sup>th</sup> of April.

### **Q1. How will the virus spread?**

As at the end of day on April 10<sup>th</sup>, the total number of confirmed cases has crossed 1.7M, with 1.2M active cases and 103,000 deaths. The number of new cases in the world continues to grow at approximately 100,000 new cases/day, more than China has counted since the virus outbreak.

Exhibit 2 below shows the apparent results of European and US containment efforts as the 3-day trailing average new daily infections per 1 million people has stopped rising.

## Exhibit 2: New daily infections per 1 million people



Exhibits 3 and 4 show key data on aggregate cases and fatalities and the path of their respective growth rates by country. “T-1 is yesterday, while T-5 is five days ago. So reading from right to left on each row shows you the trend in growth rate. There are some key observations we can draw from the data:

- In the most severely affected countries such as Italy, Spain and the US, the decline in case growth is clearly showing that the containment efforts are having their desired effect
- Fatalities growth rates are typically higher than case growth rates, although the trend is clearly slowing, particularly against data from 14 days ago
- Emerging market countries such as India and Brazil are seeing higher case and fatality growth rates in general, although this may partly reflect the availability and accuracy of data as testing becomes more widespread

## Exhibit 3: Cases and Growth Rates by Country (8 April)

Country/Territory	Confirmed Cases	Cases/1M Population	Last 5 Days Daily Rate of Change					Rate of Change 14 days ago	Total Testing	Tests/ 1M Population
			T-1	T-2	T-3	T-4	T-5			
United States	435,128	1,315	8.7%	9.1%	9.0%	8.2%	12.3%	25.3%	2,202,894	6,655
<i>New York</i>	151,171	7,776	6.2%	7.9%	7.2%	7.2%	10.9%	22.8%	365,153	18,783
Spain	148,220	3,170	4.4%	3.9%	3.8%	4.3%	5.8%	16.7%	355,000	7,593
Italy	139,422	2,306	2.8%	2.3%	2.8%	3.5%	4.0%	8.3%	807,125	13,349
Germany	113,296	1,352	5.2%	4.1%	3.2%	4.2%	5.4%	17.7%	1,317,887	15,730
France	112,950	1,730	3.6%	11.3%	5.6%	3.2%	9.5%	15.5%	224,254	3,436
China	81,865	57	0.1%	0.1%	0.0%	0.0%	0.0%	0.1%		
Iran	64,586	769	3.2%	3.5%	3.9%	4.5%	4.8%	8.8%	211,136	2,514
United Kingdom	60,733	895	9.9%	7.0%	8.0%	14.1%	9.8%	22.3%	282,074	4,156
Turkey	38,226	454	12.1%	12.9%	11.6%	13.1%	18.0%	30.0%	247,768	2,946
Belgium	23,403	2,022	5.4%	6.6%	5.7%	6.8%	9.9%	26.3%	84,248	7,277
Switzerland	23,280	2,690	4.6%	2.8%	2.6%	2.9%	4.6%	8.4%	171,938	19,867
Netherlands	20,549	1,196	4.9%	4.1%	5.3%	7.4%	5.7%	16.3%	101,534	5,910
Brazil	16,188	76	15.3%	14.7%	8.4%	8.9%	12.7%	19.8%	54,824	258
South Korea	10,423	203	0.4%	0.5%	0.5%	0.5%	0.8%	1.1%	477,304	9,310
Russia	8,672	59	15.7%	18.2%	17.7%	13.9%	14.0%	27.7%	910,221	6,237
Sweden	8,419	834	9.4%	6.8%	5.5%	6.0%	5.1%	11.8%	54,700	5,416
India	5,916	4	10.6%	12.0%	11.4%	19.5%	17.3%	14.5%	167,235	121
Japan	4,667	37	9.6%	9.0%	6.9%	16.4%	7.0%	7.0%	55,311	437
Mexico	3,181	25	14.2%	14.2%	13.8%	13.4%	12.0%	17.3%	25,410	197
Worldwide	1,518,719	195	6.1%	6.3%	5.8%	6.0%	7.6%	13.5%		

Source : Deutsche Bank, WHO, CDC, ECDC

**Exhibit 4: Fatalities and Growth Rates by Country (8 April)**

Country/Territory	Confirmed Deaths	Deaths/1M Population	Last 5 Days Daily Rate of Change					Rate of Change 14 days ago
			T-1	T-2	T-3	T-4	T-5	
United States	14,795	45	15.1%	18.2%	13.0%	13.8%	18.7%	38.5%
New York	6,268	322	14.2%	15.4%	14.4%	16.7%	21.5%	35.1%
Spain	14,792	316	5.3%	5.3%	5.5%	5.8%	6.7%	19.7%
Italy	17,669	292	3.2%	3.7%	4.0%	3.4%	4.6%	9.5%
France	10,869	167	5.2%	15.9%	10.3%	6.9%	16.2%	27.4%
Germany	2,349	28	16.5%	11.4%	14.3%	9.7%	13.3%	29.6%
China	3,335	2	0.1%	0.1%	0.0%	0.1%	0.1%	0.2%
Iran	3,993	48	3.1%	3.6%	3.8%	4.4%	4.8%	7.6%
United Kingdom	7,097	105	15.2%	14.6%	8.9%	14.4%	19.6%	24.8%
Turkey	812	10	12.0%	11.7%	13.1%	14.6%	17.9%	34.1%
Belgium	2,240	193	10.1%	24.7%	12.8%	12.8%	12.2%	23.6%
Switzerland	895	103	9.0%	7.3%	7.0%	7.4%	12.7%	25.5%
Netherlands	2,248	131	7.0%	12.5%	5.7%	7.0%	11.0%	21.9%
South Korea	204	4	2.0%	4.2%	3.2%	1.6%	3.4%	4.0%
Sweden	687	68	16.2%	23.9%	19.0%	7.5%	4.2%	57.1%
Japan	94	0.7	1.1%	1.1%	8.2%	10.4%	11.6%	4.4%
Russia	63	0.4	8.6%	23.4%	4.4%	4.7%	26.5%	-
India	178	0.1	11.3%	17.6%	16.2%	18.2%	15.1%	60.0%
Brazil	820	3.9	19.5%	21.2%	16.2%	9.4%	22.6%	35.1%
Mexico	174	1.3	23.4%	50.0%	19.0%	31.7%	20.0%	-
Worldwide	88,502	11	7.8%	9.9%	7.5%	7.4%	9.8%	13.6%

Source : Deutsche Bank, WHO, CDC, ECDC

Our base case scenario for the path of the virus is that containment efforts will have the desired impact in most major economies in the coming month and many of us are back to a highly constrained normal by the end of May with schools resuming in late summer in most places. Travel and social interaction will remain constrained, but the economy will be back to 90% before the effects of rebounds in certain sectors which will take 2021 economic growth above normal levels (global growth at 5% vs 3% normal).

As lockdowns are released, virologists expect a second wave of cases. Early tracking and tracing systems will be critical to early containment of second waves, and not all regions will be successful, resulting in a sequel to the containment program we are currently experiencing. We discuss these aspects in more detail below in question 3.

**Q2. How will testing, antiviral drugs and vaccines alter its course?**

In last week’s note, we suggested that there are 4 key medical developments to track the status of the roll out of the PCR nasal/ throat swab tests, availability of antibody blood tests, development of effective antiviral drugs, and finally the development of a vaccine.

Experts continue to believe that the PCR test capacity will in the next two months grow to the point where all who need to be tested are given the test. Abbott Labs recently unveiled a PCR test that can render a positive result in just five minutes, and a negative one in thirteen minutes. Widespread availability of testing kits could be a game changer as it will allow for highly targeted containment measures that do not necessitate imposing full lockdowns on the economy.

Antibody tests that can identify those who are immune continued to see positive development, with the FDA authorising a rapid antibody blood test developed by Cellex, and Germany approving a test by Euroimmune. The quality of these tests is being assessed right now with a view to having

something ready for wide-spread use by the end of April in most major economies. A Shenzhen National Clinical Research Center serology test showed strong empirical support that routine application of serological testing should accurately diagnose for antibodies after 15 days of infection. A Fudan University test of a 175-patient cohort found a third with no or low antibodies and could not determine whether they were still susceptible. So there will be fits and starts until the FDA assesses approvals for the over 50 companies that have applied in the US beyond Cellex.

Antiviral drugs Remdesivir and Chloroquine remain the most promising drugs although Avigan (Favipiravir), a drug made by Fujifilm in Japan, is also showing some promising signs from early stages of trials in Japan, China and Germany. As of this moment, Chloroquine tests are discouraging while Remdesivir tests are encouraging. Vaccines remain 12-18 months off.

You may have also read that a New York Institute of Technology study suggested that higher death rates were presented in countries that never implemented a universal BCG (TB) vaccination policy. Our examination of that study suggests the number of data points is not yet compelling. There were too many countries with a universal BCG policy with higher death rates than the US, Lebanon, Belgium and Netherlands who never had a universal BCG policy. Only Italy stood out as a country without universal BCG and a high death rate.

### Q3. What containment actions will we be taken, and for how long?

As discussed above, watching the individual countries’ and regions’ paths for the virus has led us to the conclusion that economies should be able to soon get back to something approaching (80-90%?) of normal openness once the mitigation practices, medical readiness and social disciplines are in place. This is a tall order, with massive technological and political obstacles, and warrants much longer discussion defining each of the requirements listed below in more detail. But we believe that the economic consequences for not putting these actions in place will be too great for most countries to not put them in place. Many research and academic institutions have recently published plans that they propose for what follows mass containment and gets individual economies restarted. These plans are similar with different packages of actions deployed in different phases, but most include the list of requirements below. We refer to this as the “Korean model” and incorporates 10 key requirements:

#### Exhibit 5: The Korean Model – Key Requirements to Unlock the Economy

Medical Readiness (ample supplies of:)	Social Discipline
Personal Protective Equipment (PPE)	Centralized tracking and tracing of cases (i.e., “digital pandemic surveillance”)
Mass PCR tests	Hygienic practices
Mass Antibody tests	Self-social distancing/face masks
ICU Units with ventilators	Travel restrictions/testing at borders
Effective anti-viral drugs	Elderly and vulnerable self-isolate

While this is the optimal list, different economies will open up before all 10 features are in place with different biases in favour of mass testing over mass surveillance, for example. Some requirements like digital pandemic surveillance or anti-viral drug supplies are expected to follow in stages. Even Korea is early on with anti-viral drugs and mass anti-body tests, but these are key parts

of the package required for medical and social readiness when we go back to normal working. In the days ahead, we expect to hear more facts around the timelines required to put such plans into action given the massive shortages of medical resources today and virtually no centralized tracking and tracing in many countries today. The Appendix attached to the back of this letter is our model for tracking progress towards readiness to return to work to help you think about the likely time and economic damage that must pass before various countries are ready to unlock their economies.

Any relatively uncontrolled outbreaks (New York, Lombardy style) from delayed early containment actions will of course delay re-opening. China is economically, but not socially, back to near normal levels with Wuhan waiting three months to open. In a little over one month from now, we expect that most of the US, UK and Europe will be unlocking their economies with various aspects of the Korean Model being put into place and with some remaining constraints on economic activity relating to travel and socializing.

One of the greatest uncertainties today is whether there will be a need to return to a lock-down or heavy suppression actions as a result of a second wave of the virus. Most experts expect a second wave will occur in most countries but may be containable if the Korean model is in place, without returning to full lock-down. This is not a given however as we are seeing in Singapore where the numbers have soared in recent weeks resulting in the need for a “circuit breaker” lock-down as the Prime Minister Lee Hsien Loong put it.

The degree of this level of second wave containment is the difference between our base case and our downside case scenario. Our base case is that the re-containment level will be such that major economies are successful in re-starting their economies with a return to growth in the latter part of Q3.

#### **Q4. What policy actions from governments will there be and what effect will they have?**

Policy makers have responded comprehensively with record-breaking stimulus programmes in all major economies. With new fiscal and monetary programs announced this week, experts now estimate the combined fiscal boost to world economic growth has increased to c. 2.6% of 2020 global GDP (i.e., the global economy would shrink by 2.6% more without this support). Such record-breaking stimulus includes significant monetary and fiscal stimulus from the US, Europe, UK, China, Hong Kong, Singapore, South Korea and Japan. The most important packages include the following:

- \$50B **IMF** bailout fund and \$1T ready to be mobilised as needed
- \$12B **World Bank** bailout fund
- **The US Congress** approved a \$2.1T US fiscal stimulus to provide a c. 4% GDP boost (profiled in last week’s note)
- **US Fed** cut interest rates to 0%, committed to purchase \$500B US Treasuries and \$200B agency MBS and made \$1.5T of short-term loans available. **On 9 April, the Fed also announced provision of up to \$2.3 trillion in credit to businesses and state and local governments via three new facilities:**
  - a. The largest of the new facilities is the establishment of the **Main Street Lending Program**, which will partner with commercial banks to provide up to \$600 billion in credit to small- and mid-sized businesses (less than 10,000 employees and or \$2.5 billion in revenues). The US

Treasury will provide \$75 billion credit protection to the Fed. For banks that make new loans or make upsized loans to existing borrowers, the Main Street facility will purchase 95% of the loan. The loans are 4-year maturity, pre-payable, adjustable at SOFR+250-400bps, with principal and interest prepayment deferred for a year.

- b. The second new facility is the **Municipal Liquidity Facility** to buy up to \$500 billion in short-term obligations from states and large cities (over one million population) and counties (over two million population). Treasury will provide \$35 billion credit protection to the Fed.
  - c. The third new facility is the **Paycheck Protection Program (PPP) Liquidity Facility** which will provide liquidity to banks to fund PPP loans (loans to small businesses to guarantee eight weeks of payroll).
- **BOE** has cut rates by 65bps to 0.10%. The UK government has announced a stimulus package of £350bn and is set to cover 80% of salaries in industries directly affected by the outbreak.
  - **ECB** has agreed to provide cheap loans to banks, purchase an additional €120B of bonds by the end of 2020 and reduce capital requirements for loans to SMEs. The ECB has also launched a €750bn (6.5% of GDP) Pandemic Emergency Purchase Program (PEPP).
  - **EU** announced this week a €540B package with which member states will be able to receive precautionary credit lines from the region's ESM bailout fund amounting to at least 2% of a country's economic output, or some €240B. In addition, up to €200 billion in loans are made available to EU businesses, and a €100 billion jobs support program was agreed.
  - **Italy** announced this week a loan guarantees facility worth up to €400B, aimed at facilitating the banking system's ability to grant long-term concessionary loans to the corporate sector.

## Q5. What are the resulting economic and financial scenarios?

### Economic (GDP) impact

Since our last weekly note, economic growth forecasts have been further downgraded, leading to downgrades in our own growth projections across scenarios. This increased downside arises from the expectation of more widespread and time extended containment measures and the knock-on effects on all sectors of the economy as we go deeper into a global recession.

Many experts we track project Q2 to represent a bottom for the global economy for two main reasons. First is the growing consensus that we can begin to go back to work in May by implementing something like the Korean model as defined above. Second, the aggressive and quick response of policy makers, in terms of both fiscal and monetary action, has reduced the risk of a seizing up in financial markets that would have greatly magnified the initial shock.

We are closely watching China to ascertain the extent to which their economy is getting back to normal. Economic activity appears to be bouncing back when we look at real estate sales (47% of 1 Jan 2020 levels), traffic congestion (93%), container freight (68%), air pollution (70%) and power plant fuel consumption (71%). Social activity does however appear to be constrained when we look at weekend traffic levels and box office receipts (although theatres only re-opened this week).



Even with a sharp recovery in the second half, global GDP is not likely to return to pre-crisis levels. Analysis of pre-GFC trends suggests that the GFC created a permanent loss of output of between 5% and 15% of US GDP relative to potential. However, following the GFC, credit channels remained blocked for years, and the ensuing emphasis on austerity and deleveraging further slowed the recovery. Most experts think that following the Covid-19 crisis, fiscal and monetary policy will remain highly stimulative well into 2021. Global GDP is expected to contract by c. -3.6% in 2020 according to the most recent forecasts (vs -2.0% reported last week). However, 2021 is expected to be a strong recovery year with forecasts predicting growth +5.6% on average vs the pre-crisis global growth forecast of around +3%.

So on balance, the estimates we see above are currently modelling a cumulative permanent loss over the course of 2020 and 2021 of c. \$4.2T or a c. -4.5% reduction of global output relative to what it was expected to be prior to the virus. The math on this is that the global GDP for 2019 was \$86.6T and was expected to be \$92.4T in 2021 at current prices. A -3.6% economic shrinkage in 2020 takes global GDP to \$83.5T and back up to \$88.2T in 2021 at +5.6% growth which is \$4.2T less than where it was expected. These estimates are net of the effects of the colossal multi-trillion-dollar stimulus programs coming into force. We are not endorsing these GDP growth estimates, but rather encourage you to step back and think about whether these estimates are reasonable dimensions for the permanent loss in economic activity from a partial stoppage of the global economy for a period of at least three months in most major economies.

#### Exhibit 6: 2020 and 2021 GDP Forecasts

2020 Real GDP Growth Forecast						
	JP Morgan	Goldman Sachs	Deutsche Bank	Capital Economics	IHS Markit	Average (USD)
Global	-3.6% (USD) -2.7% (PPP)	-3.3% (USD) -2.4% (PPP)	-4.5%	-4.0%	-2.8%	-3.6%
DM	-5.5%	-6.2%	-4.9%	-5.5%	--	-5.5%
US	-7.7%	-6.2%	-4.2%	-5.0%	-5.4%	-5.7%
Eurozone	-3.4%	-9.0%	-6.9%	-9.0%	-4.5%	-6.6%
Japan	-4.4%	-6.0%	-3.9%	-7.0%	-2.5%	-4.8%
EM	-0.8%	0.7%	--	--	--	-0.1%
China	1.1%	3.0%	-1.4%	-3.0%	2.0%	0.3%

2021 Real GDP Growth Forecast						
	JP Morgan	Goldman Sachs	Deutsche Bank	Capital Economics	IHS Markit	Average (USD)
Global	5.5% (USD) 5.7% (PPP)	6.5% (USD) 6.2% (PPP)	4.8%	8.1%	3.3%	5.6%
DM	5.5%	6.0%	4.0%	6.0%	--	5.4%
US	6.2%	5.5%	3.8%	6.5%	3.4%	5.1%
Eurozone	4.7%	7.8%	4.8%	10.0%	1.2%	5.7%
Japan	1.0%	3.1%	2.6%	5.0%	1.2%	2.6%
EM	6.3%	7.0%	--	--	--	6.7%
China	9.2%	8.5%	11.9%	14.0%	6.4%	10.0%

#### Corporate earnings impact

Last week we shared the average S&P 500 EPS growth forecasts from various bank forecasters showing an average drop in 2020 EPS of -21% with an expected 2021 recovery of +27% for a net drop of -1% over the period, suggesting 2021 EPS will return to where it was in 2019 in 2021. We have not seen any significant recent revisions but will update this next week. This hit to profits has translated into the 15% YTD global equities decline, which would appear to be still pricing in more significant earnings declines than those shown here. Our three scenarios as shown in last week's report still stand as our best guess at the range of scenarios ahead of us, with significant market volatility to continue for many months ahead.

## Q6. What are the investment implications?

There have been no major changes to our playbook for “going on offence” in this current crisis. We mentioned last week that we have been monitoring the cost of various fat-tail hedging options including puts, currencies, gold, Treasuries, etc. While the VIX volatility measure has dropped from its peak of 83 on the 16<sup>th</sup> of March to 42 today, it remains a long way from its normal level in normal markets of c. 18, indicating that hedging strategies are still expensive.

We will continue to monitor credit spreads this coming week to find the right entry point for our planned equity to credit tactical allocation switch. Finally, we have progressed the due diligence on several distressed credit and private equity vehicles for upcoming client commitments.

As usual, comments and contrary views are welcome.

## Appendix

On the next two pages, we show Exhibit 7 which is our framework for tracking how far along each major economy is toward being able to implement the Korean model of mitigation, medical and social practices, and the consensus views on when each economy will go back online.

### Exhibit 7: Global Economic Containment Forecast (page 1 of 2)

	China (ex Hubei)	Developed Asia (Japan Proxy)	Europe (Italy, Germany, France)	UK	US	India
<b>Virus Status</b>						
3-day new case growth rate	0%	5%	4%	10%	10%	16%
Time to/from Peak Active Cases	6 weeks since peak	4 weeks since peak	1 week since peak	1-2 weeks to peak	1-2 weeks to peak	3 weeks to peak
Last week's deaths/million	0	0.2	60	66	27	0.1
Estimated Population Infection rate (positive test rate)	1.50%	7%	16%	26%	19%	4%
<b>Mitigation Practices &amp; Medical Readiness ("Korean model" deployment)</b>						
Early Detection & Case Containment: Temperature Scanning, Tracking & Tracing Apps	Checks in place at all major transport hubs and large buildings. Centralised command centre which monitors all data and transactions to gather data on outbreaks.	Checks in place at all major transport hubs and large buildings. Centralised command centre which monitors all data and transactions to gather data on outbreaks.	Germany has developed a smartwatch app which can detect early symptoms of fever. Users must agree to share their data on all apps however which may reduce the effectiveness of tracking.	Several apps are in development. Preparations being made for wide spread temperature checks. Any apps which are developed will require users to allow their data to be utilised. This may reduce the effectiveness of tracking.	Several apps are in development. Preparations being made for wide spread temperature checks. Any apps which are developed will require users to allow their data to be utilised. This may reduce the effectiveness of tracking.	Unknown
PPE for Health Care Workers	The more normalised admission levels has allowed time to replenish supplies. Key suppliers are also in geographic proximity.	The more normalised admission levels has allowed time to replenish supplies. Key suppliers are also in geographic proximity.	Stocks of gloves, masks and paracetamol remain a concern but lower case loads should reduce shortages.	Stocks of gloves, masks and paracetamol remain a concern but lower case loads should reduce shortages.	Stocks of gloves, masks and paracetamol remain a concern but lower case loads should reduce shortages.	Medical supplies are an issue but India is a major medical supply centre for the rest of the world so this is not the primary issue for India.
Mass PCR Tests	High capacity for testing.	High capacity for testing. Can test 1: 1400 of the population/day.	Testing capacity has ramped up in mainland Europe. Can test 1: 1250 of the population/day.	No evidence yet of being able to test more than 13,000/day = 1: 5000 of the population/day.	Testing capacity has been ramped up to the required threshold. Can test 1: 1700 of the population/day.	Testing is insufficient with 1:10,000 of the population being tested/day
Antibody tests to assess herd immunity	Some early stage tests being trialled. No date provided for mass rollout.	Some early stage tests being trialled. No date provided for mass rollout.	Germany now rolling out antibody populations sample tests. Expects mass rollout in May.	After ordering over 3.5M serology test kits, the first tests purchased by the UK were found to be unreliable.	CDC is developing 2 antibody tests, one of which is now being used to do population sample testing. Expects mass rollout in May.	No news on antibody tests in India, but assume it will be available for use once technology is wide spread.
Cases/Critical Beds Ratio	4 beds/100k people	7.5 beds/100k people	16 beds/100k people	7 beds/100k people but this is increasing	35 beds/100k people	2.3 beds/100k people (likely insufficient)
Ventilators	Ready	Ready	Ready in next 1-3 weeks	Ready in next 3-4 weeks	Ready in 3 weeks	Unknown
Antivirals which reduce strains on healthservice	Several drugs being used in trials but few details on recommended treatments.	Antivirals being used in human trials and compassionate cases. Avigan may be approved in early summer.	Antivirals being used in human trials and compassionate cases. Remdesivir and Avigan are being looked at closely for approval. (May/June)	Antivirals being used in human trials and compassionate cases. Oxford university engaged in largest global trial "Recovery", results expected mid summer.	Antivirals being used in human trials and compassionate cases. Remdesivir could be approved in next 2 weeks.	Antivirals being used in human trials and compassionate cases.

## Exhibit 7: Global Economic Containment Forecast (page 2 of 2)

	China (ex Hubei)	Developed Asia (Japan Proxy)	Europe (Italy, Germany, France)	UK	US	India
<b>Containment Status Today</b>						
Mass Events (sports, music, cinemas)	Some restrictions	Closed	Closed	Closed	Closed	Closed
Schools & Universities	Open	Closed	Closed	Closed	Closed	Closed
Bars & Restaurants	Open	Some restrictions	Closed	Closed	Closed	Closed
Services businesses (non-food, bar, rest retail) closed or WFH	Open	Some restrictions	Closed	Closed	Closed	Closed
Manufacturing	Open	Some restrictions	Only essential	Only essential	Only essential	Only essential
Travel	Some restrictions	Some restrictions	Closed	Closed	Closed	Closed
<b>Containment Exit Forecasts</b>						
Mass Events (sports, music, cinemas)	June	June	June	June	June	June/July
Schools & Universities	Open	Sep/Oct	Sep/Oct	Sep/Oct	Sep/Oct	Sep/Oct
Bars & Restaurants	Open	Restrictions remain to July	Early May	Mid May	Mid May	Mid June
Services businesses (non-food, bar, rest retail) closed or WFH	Open	Restrictions remain to July	Late April	Early May	Early May	Early June
Manufacturing	Open	Restrictions remain to July	Late April	Early May	Early May	Early June
Travel	Restrictions remain to July	Restrictions remain to July	Regional travel by mid summer	Regional travel by mid summer	Regional travel by mid summer	Restrictions to end of summer

## #8 Q1 Manager Performance – April 17 2020

This week's note on the Covid-19 macro scenario is comprised below in the body of this email, being a much abbreviated version of our past notes. However, more importantly, we have attached a special update on our core managers' performance in the first quarter, to give you a preview before you receive your Q1 statements which will arrive as usual at the end of April. The attached manager update has been written by our global CIO, Colin Pan, with input from the asset class heads Alex Band (equities), Sam Diedrich (absolute return), Emma Bewley (debt) and Suzanne Streeter (private equity).

### Markets

- Equities are holding on to recent gains as politicians signal their intentions for a gradual relaxation of lockdown measures. The MSCI World equity index has now fallen by only -14.9% for the year to 16 April and is -18.5% below the January peak. Bond yields are marginally lower: US10Y Yields: US Treasury 0.65%; UK Gilts 0.30% Bunds -0.47%.

- Equity markets as of 16 April 2020 close:

	MSCI World	S&P500	China A-shares
WTD (13th - 16th)	-0.3%	0.4%	0.9%
MTD	6.1%	8.4%	3.2%
YTD	-14.9%	-12.8%	-7.2%
From Peak	-18.5%	-17.0%	-9.6%

- Credit Markets as of 16 April Close:

	Spread	Yield TW
Global High Yield	8.8%	9.2%
US Corp High Yield	7.3%	7.9%
US Corp High Yield ex-energy	6.3%	6.9%

- European (Eurostoxx 50) markets closed up 2.7% today (17<sup>th</sup>) and the US S&P 500 is trading up roughly +1.6% at 1pm EST.

#### Covid-19 news

- According to Johns Hopkins data, there are now 2.16M confirmed cases of Covid-19 globally, an increase of 4.6% in the last 24 hours which is again higher than yesterday's growth rate of 4.2% and the recent low of 3.1% daily growth on Wednesday. France (+11.6%), Russia (+14.1%) and Singapore (+19.7%) had the highest daily increase. Singapore is perhaps the most worrying as it highlights the risk of second waves.
- Antivirals Update: A report released after the market closed last night indicated that a phase 3 trial of Gilead's drug **Remdesivir** has shown promising results, with a group of patients being treated in Chicago seeing rapid recoveries in fever and respiratory symptoms. The study had enrolled 125 patients and suffered only two fatalities with the majority being discharged from hospital within a week. It should be noted that these were not the formal trial results, as this is only a preliminary report, but it was enough to send Gilead shares up +16% in after-hours trading and help drive S&P500 futures up to a recent high of nearly 2,900. Gilead is conducting two trials of the drug in moderate and severe patients, with a goal of enrolling 4,000 people. Gilead expects to report data from a controlled study in patients with severe disease by the end of April, with data from a study of patients with moderate disease coming in late May.

#### Containment / Opening news

- President Trump announced new guidelines on easing restrictions and reopening the US yesterday. He announced that 29 states may reopen soon, with a set of markers needed to be hit before state governors should open their states up. The recommendations include that states show a downward trajectory in cases for at least two weeks, have adequate testing facilities and can treat all patients without crisis care. Then they can begin a three-phase process to reopen. States would then need to show declining caseloads for an additional two weeks before moving onto the next phase, while any significant "rebound" in numbers could mean needing to bring restrictions back. Schools, day cares and bars would not reopen before phase two, whereas restaurants, movie theatres and sports stadiums could open in phase one under certain restrictions. California cases have been declining for 11 days at present. New York cases only declining for one day after Wednesday's spike.
- France announced 11 May as the targeted end of their Paris lock-down.

#### Economic news

- China released their Q1 GDP estimate this morning, with growth of -6.8% yoy (consensus - 6.0%). This is the first time in data going back to 1992 that the Chinese economy has not expanded by more than +6%, let alone contracted by more -6%, so a rather historic moment for modern China. Industrial production was better than expected -1.1% yoy (vs. -6.2% expected) however both retail sales and fixed asset investment were much weaker than expected at -15.8% yoy (vs. -10.0% expected) and -16.1% ytd yoy (vs. -15.0% expected), respectively. So, industrial production got a lot better in March after a disastrous January-February, but fixed asset investment and retail sales are lagging.
- The US weekly initial jobless claims saw another astonishing reading at 5.2M in the week ending April 11 which wasn't quite as bad as the consensus estimate (5.5M). If you add up the last 4 weeks' readings, which are the highest in the history of the series, they sum to over 22M. For context, the total number of nonfarm payrolls in the US in March stood at

152M, so we're talking about nearly 15% of the entire US workforce in the space of a month having made jobless claims.

### **Global Growth forecasts**

2020 Real GDP Growth Forecast								
	IMF	JP Morgan	Goldman Sachs	Deutsche Bank	Capital Economics	IHS Markit	Bloomberg	Average (USD)
Date	14-Apr	09-Apr	09-Apr	01-Apr	01-Apr	30-Mar	24-Mar	
Global	-3.0%	-3.6% (USD) -2.7% (PPP)	-3.3% (USD) -2.4% (PPP)	-4.5%	-4.0%	-2.8%	-0.2%	-3.5%
DM	-6.1%	-5.5%	-6.2%	-4.9%	-5.5%	--	--	-5.6%
US	-5.9%	-7.7%	-6.2%	-4.2%	-5.0%	-5.4%	-1.0%	-5.1%
Eurozone	-7.5%	-3.4%	-9.0%	-6.9%	-9.0%	-4.5%	-2.0%	-6.0%
Japan	-5.2%	-4.4%	-6.0%	-3.9%	-7.0%	-2.5%	-1.4%	-4.3%
EM	-1.0%	-0.8%	0.7%	--	--	--	--	-0.4%
China	1.2%	1.1%	3.0%	-1.4%	-3.0%	2.0%	1.4%	0.6%

2021 Real GDP Growth Forecast							
	IMF	JP Morgan	Goldman Sachs	Deutsche Bank	Capital Economics	IHS Markit	Average (USD)
Date	14-Apr	09-Apr	09-Apr	01-Apr	01-Apr	30-Mar	
Global	5.8%	5.5% (USD) 5.7% (PPP)	6.5% (USD) 6.2% (PPP)	4.8%	8.1%	3.3%	5.7%
DM	4.5%	5.5%	6.0%	4.0%	6.0%	--	5.2%
US	4.7%	6.2%	5.5%	3.8%	6.5%	3.4%	5.0%
Eurozone	4.7%	4.7%	7.8%	4.8%	10.0%	1.2%	5.5%
Japan	3.0%	1.0%	3.1%	2.6%	5.0%	1.2%	2.7%
EM	6.6%	6.3%	7.0%	--	--	--	6.6%
China	9.2%	9.2%	8.5%	11.9%	14.0%	6.4%	9.9%

Note: The weightings for Global GDP are typically either calculated using current USD or measures of purchasing power parity (PPP).

The latter typically ascribes a higher weighting to EM countries where growth tends to be higher, and so biases up the resulting global GDP estimate.

### **#9 Post Pandemic World – April 25 2020**

Markets showed extreme levels of resilience to bad news last week for the reason investors were expecting as much. We summarise some thoughts on how various economies will open up below, in painfully slow phased approaches. We update you on the various drug developments and testing rollouts. Our main focus however, is on what the post-pandemic world may look like and what the investment implications for your portfolio are.

10yr yields this morning: US: 0.60%; UK: 0.29%; Germany: -0.47%

Equity markets as of 24 April 2020 close

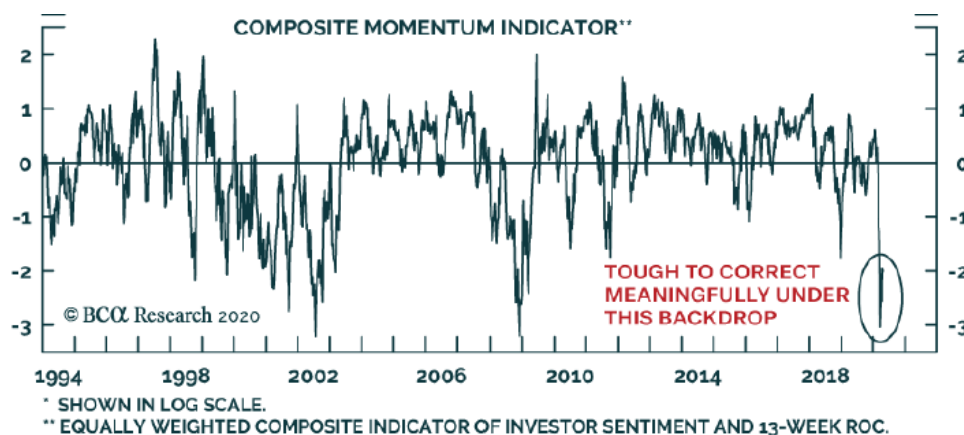
	MSCI World	S&P500	China A-shares
WTD (20 - 24th)	-1.3%	-1.3%	-1.1%
MTD	7.5%	9.9%	3.0%
YTD	-13.8%	-11.7%	-7.3%
From Peak	-17.4%	-15.9%	-9.7%

Credit:

	Spread	Yield (YTW)
Global High Yield Bonds	9.3	9.8
US Corp High Yield	7.8	8.4
US Corp HY ex-energy	6.8	7.4

Despite worsening news on unemployment (26M new claims since mid-March in the US), severely contractionary business survey results (US composite PMIs at 27.4 and Europe at 13.5), further downward revisions to GDP forecasts and negative corporate earnings surprises, equity markets fell by just 1% last week, implying investors were expecting as much. This conclusion is supported by the composite indicator of investor sentiment being at its historical low point (below).

**Exhibit 2: Investor sentiment at a bottom implies markets may not fall further on bad news**



**Economy re-openings**

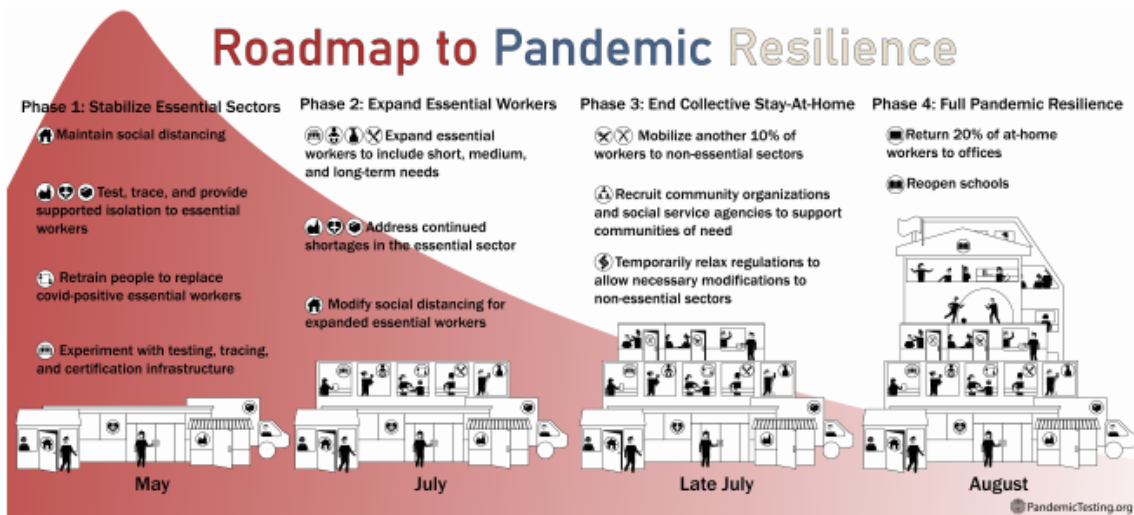
Watching China and other countries early to open their economies, we know it will be a gradual phased re-opening the pace of which will be set by the Korean model with opening paced by the supply of PPE, PCR testing and Serology antibody testing capacity and adoption of digital tracing apps.

It is sad how little progress has been made in most Western economies on these measures such that early May exits are turning to late May with gradual phasing as per the Harvard Safra Center report Roadmap to Pandemic Resilience below. This report is the best written plan we have found for what needs doing under the heading of massive scale testing, tracing and supported isolation (TTSI). That paper describes the Korean model as laid out in our missive #6.

What is revealing in this report is how little the US has done along these lines on any dimension. There are two thresholds for testing. One is PCR testing of those who are symptomatic so that they can be isolated. Experts set this threshold at 5 - 6x the number of cases per day which is where the 200,000/day testing threshold comes from for the US. The second threshold is for testing a much larger portion of the population such that we catch a large percentage of those who are

asymptomatic, but infected. Harvard sets this threshold testing rate at a 2M PCR tests/day for phase I opening below and 20M for phase IV opening. This compares to the roughly 100,000 per day being done today in private and public labs in the US. Interestingly, we note that the Foundation for Innovative New Diagnostics (FIND) posts 468 commercially available sources of diagnostic tests (PCR and other). So there is a lot of activity, but it is not clear that there is any centralized coordination to bring tests to patients as quickly as possible.

**Exhibit 1: Harvard Safra Research on 4-phases to US Economic Re-opening**



We summarise below the expected (announced in some cases) dates for when various parts of the economy in the key countries are likely to officially open back up. We expect many people will still work from home and not participate in these parts of the economy at their normal levels despite them opening up.

**Exhibit 2: Containment Exit Forecasts**

Part of Economy open/closed	China (ex Hubei)	Developed Asia (Japan Proxy)	Europe (Italy, Germany, France)	UK	US (larger states)	India
Schools & Universities	Open	Sep/Oct	Sep/Oct	Sep/Oct	Sep/Oct	Sep/Oct
Bars & Restaurants	Open	Restrictions remain to July	Mid May	Late May	Late May	Mid June
Services businesses (non-food, bar, rest retail) closed or WFH	Open	Restrictions remain to July	Early May	Mid May	Mid May	Early June
Manufacturing	Open	Restrictions remain to July	Early May	Mid May	Mid May	Early June
Mass Events (sports, music, cinemas)	June	June	June/July	June/July	June/July	June/July
International Travel	Restrictions remain to July	Restrictions remain to July	Regional travel by mid summer	Regional travel by mid summer	Regional travel by mid summer	Restrictions to end of summer

Note: Heat map colour coding: green is open or soon to open by end May, yellow in summer, red in fall or later



## Antivirals Development Update

The news is not pleasant here. In a paper published in mid-April in the Journal of the American Medical Association, the authors concluded that “currently, there is no evidence from randomized clinical trials that any potential therapy improves outcomes in patients with either suspected or confirmed COVID-19, and there are no clinical trial data supporting any prophylactic therapy” The paper analysed the 291 clinical trials underway at the time, including those not yet recruiting, recruiting, active, or completed. Their conclusion may change as the results of clinical trials underway become known but is a reminder that many press reports floating around in March 2020 had overstated the potential for certain drugs.

Hydroxychloroquine (HCQ) and azithromycin (a “Z-pack”) have failed with an NIH panel on 19 April recommending against their use and of lopinavir/ritonavir or other HIV protease inhibitors and against interferon. This says that three of the four areas of focus of the WHO “Solidarity” trial are non-starters for Covid-19 treatment, leaving just Remdesivir.

Equity markets rallied this time last week on the back of leaked trial results from Gilead’s Remdesivir. The leaked results suggested that out of a group of 125 pre-screened patients 123 recovered and the antiviral was found to noticeably expediate recovery times. While the results were very encouraging the key issues with the trial were that patients were pre-screened and that there was no control group. This was shortly followed by news the drug had performed exceptionally well in monkey testing trials, this time with a control group. This Thursday however we had yet more leaked results on Remdesivir, on this occasion the trial in question was on late stage patients in China, with a control group. The drug was found to offer no clinical benefit relative to the control group and the trial was terminated early due to a lack of patients. While this is undoubtedly a setback, Gilead have been quick to point out that the drug is likely to be far more effective in treating earlier stage patients and that the lack of patients and early termination of the trial cloud its efficacy. Gilead is expected to publish its earlier stage patient trial data in mid-May and it remains to be seen whether Remdesivir will prove to be an effective weapon against the virus.

## Vaccines Development Update

RNA vaccines, recombinant protein vaccines and cell culture-based vaccines are all options being examined for COVID-19 vaccines. RNA vaccines are the newest and potentially the most likely to be effective. They aim to leverage the body’s ability to generate the immunogenic (i.e., antibody-provoking) protein. No vaccines have ever been approved using this technology. Cell culture-based vaccines are the incumbent technology in which the immunogenic protein is generated outside the body in vitro, and injected into the body.

Last Thursday Bill Gates published his views on the pandemic and the cures based on the work of his foundation. He is focused on the RNA vaccine:

*“A big challenge for vaccine trials is that the time required for the trials depends on finding trial locations where the rate of infection is fairly high. While you are setting up the trial site and getting regulatory approval, the infection rate in that location could go down. And trials have to involve a surprisingly large number of people. For example, suppose the expected rate of infection is 1 percent per year and you want to run a trial where you would expect 50 people to be infected without the vaccine. To get a result in six months, the trial would need 10,000 people in it.*

*The goal is to pick the one or two best vaccine constructs and vaccinate the entire world—that’s 7*

*billion doses if it is a single-dose vaccine, and 14 billion if it is a two-dose vaccine. I am often asked when large-scale vaccination will start. Like America's top public health officials, I say that it is likely to be 18 months, even though it could be as short as nine months or closer to two years."*

These five are among the most promising vaccines in development today:

- The first vaccine to start human trials is an RNA vaccine from **Moderna**, which started a phase 1 clinical safety evaluation in March.
- **J&J** announced a very ambitious timetable for a COVID-19 vaccine that uses the same technology platform as their Ebola vaccine aiming for production by Spring 2021.
- **Sanofi and GlaxoSmithKline** have accelerated development of a vaccine based on the delivery of SARS-CoV-2 spike proteins into humans, a process designed to engender an antibody response. Unlike RNA/DNA vaccine development, applying the Flu-Blok approach to COVID-19 relies on more proven vaccine technology and aims for FDA approval in the latter half of 2021.
- China's **CanSino Bio** has become the first developer to move their vaccine to phase 2 trials (10<sup>th</sup> April).
- Researchers at Oxford University Jenner Institute are very confident on developing up to a 1 million doses of a fully functioning vaccine called **ChAdOx1** by September of this year. They say the initial doses could be used to treat front line workers. Phase 1 clinical trials have begun, and they are already enrolling up to 2,000 volunteers for phase 2 trials. The same vaccine technology has been used on other diseases, including the related coronavirus MERS, as well as Ebola.

Vaccine development has a far higher success rate for treating infectious diseases compared to antiviral medications. While just 90 antivirals have been approved for use against infectious disease since 1960 out of thousands proposed, vaccines have nearly a 35% success rate in clinical trials.

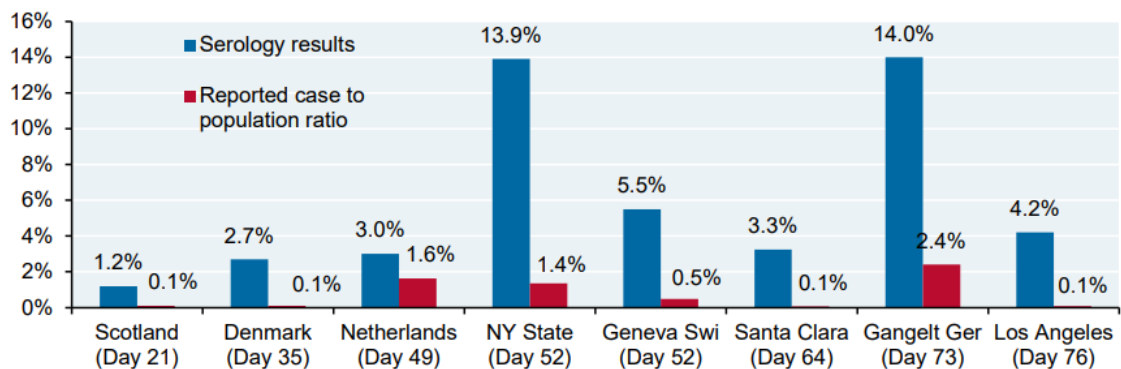
### **Polymerase Chain Reaction (PCR) Testing Update**

This is a test for whether you are currently or recently infected and involves taking a nasal swab and processing it in a Polymerase Chain Reaction (PCR) machine to identify presence of the virus. These are critical for front-line health care workers and for early identification of cases and isolation of the individuals. Presence of the virus can be detected before symptom appear. Today tests are taken out of the home and sent to labs for processing. There are severe limitations on the quantity of PCR tests everywhere in the world as described above, where Harvard is calling for 20M tests/day as a precursor to phase IV economic opening. The Gates foundation invested in research showing that having patients do the swab themselves, at the tip of the nose, is as accurate as having a doctor push the swab further down to the back of your throat. Swabs have been in short supply, so Gates Foundation grantees are also working to design swabs that are cheap and able to be manufactured at large scale but work as well as ones that are in short supply. This self-swab approach is faster, protects health care workers from the risk of exposure, and should let regulators approve swabbing in virtually any location instead of only at a medical center. The PCR test is quite sensitive—it will generally show whether you have the virus even before you have symptoms or are infecting other people. Bill Gates was silent on how far out in time home PCR testing is. We will report on this when we have an estimate. This could be a serious break-through to foster earlier leaps to phase III or IV economic opening.

## Serology Antibody Testing Update

These are the blood tests which tell you whether you have the antibodies from having been infected, whether you were symptomatic or not. Serological tests are not a “back-to-work” mechanism for the whole population unless there are high levels of infection first. In recent weeks, governments have begun to utilise sample population serology tests to get a sense of the true magnitude of the population that may be immune to the virus to help decide when to open up parts of their economies. This week we began to see the first results of these sample tests published. Infection/immunity levels ranged from 1% in Scotland to over 21% in New York City. Areas which are more densely populated clearly seem to exhibit higher rates of infection/immunity. Infection levels were between 10-25x higher than official case records.

### Exhibit 3: Serology test results vs reported cases as a % of population



Source: JPMAM, JHU. 2020. See page 7 for serology data sources.

This demonstrates the true proportion of asymptomatic or mild carriers of the disease. Epidemiologists have been quick to point out that these sample tests may understate the true levels of infection/immunity as antibodies can take up to 5 weeks to develop in some subjects. These results have a number of important consequences, firstly they show that the true mortality rate is far lower with the denominator in that equation understated by a magnitude of 10-25x. Theoretically, higher levels of immunity mean that restrictions can be less severe. However, widespread serological testing has a limited ability to send the bulk of the population back to work as the percentage of the population that is immune needs to be at 60% or so, levels well above even these higher measurements. But antibody testing adds to the mix of things that work toward the Korean model.

## Post Pandemic World

There are three key questions to think about in the post pandemic world which we attempt to answer below.

### Q1. What are the likely long-term secular effects of the massive debt-fuelled fiscal and monetary stimulus programmes?

Global central bank liquidity injections and new government spending both amount to a little over \$8 trillion, or nearly 10% of global GDP each as shown below.

#### Exhibit 4: Monetary & Fiscal stimulus in response to the crisis<sup>1</sup>

	Central Bank Liquidity Injection		New Government Fiscal Stimulus		Rate Cuts
	US\$ Trillions	Percent of GDP	US\$ Trillions	Percent of GDP	Basis Points
US	\$4.80	22.4%	\$2.82	13.1%	-150
Eurozone	\$1.10	8.3%	\$1.76	13.2%	
Japan	\$0.20	3.9%	\$0.99	19.2%	
United Kingdom	\$0.25	9.0%	\$0.14	5.1%	-65
China	\$1.29	9.0%	\$0.54	3.8%	-100
Rest of World <sup>2</sup>	\$0.65		\$1.85		
<b>Total</b>	<b>\$8.29</b>	<b>9.6%</b>	<b>\$8.10</b>	<b>9.4%</b>	

#### Notes:

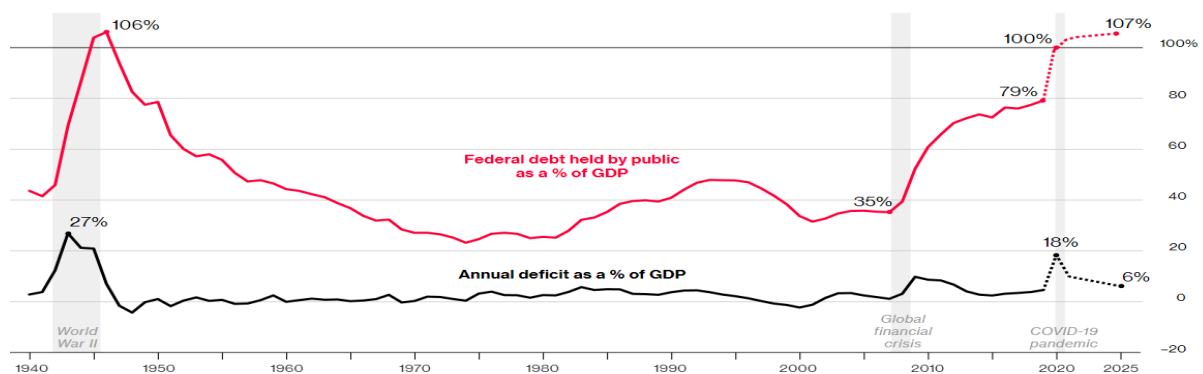
1. Data as of 15 April 2020, source is Cornerstone, JPM Economic Research

2. Asian Development Bank, IMF, World Bank

Using the US as an example, The Committee for a Responsible Federal Budget estimate that the budget deficit this year will be \$3.8 trillion (18.7% of GDP) and \$2.1 trillion (9.7% of GDP) in 2021. If correct, US debt will rise to 100% of GDP this year, and reach 107% by 2023, surpassing the prior record set after World War II. These projections likely understate the future deficit and debt level as they assume no further legislation and spending is enacted to address the crisis. The projections also assume the economy experiences a recovery in 2021 and fully returns to its pre-crisis trajectory by 2025.

Past precedents suggest that the current debt burden will be dealt with through a combination of higher inflation and taxation. The last time US debt was close to current levels was in the aftermath of the second World War - Net debt-to-GDP declined from 80% in 1950 to a recent low of 23% in 1974. This steady deleveraging was driven primarily by strong real GDP growth which averaged 4.2% over the two decades from 1950 to 1970 with inflation running at 2.7%. The yield on 10-year US Treasuries averaged 3.9%, rising from 2.3% at the start of 1950 to 7.9% by 1970. With nominal growth above the cost of debt and the Eisenhower government running a relatively balanced budget, debt-to-GDP steadily declined.

## Exhibit 5: US debt is expected to reach 100% of GDP this year as the deficit spikes to 18% of GDP



Sources: Committee for a Responsible Federal Budget, Congressional Budget Office, Bloomberg data

However, in the aftermath of the GFC, government debt levels remained persistently high as the developed economies did not have the same post-war advantages of young demographics and booming productivity growth rates. Deleveraging and austerity measures had the adverse effect of constraining growth, making debt/GDP reduction more difficult. As a result, the decade following the GFC was marked by low growth and low inflation in most of the developed world.

Experts are divided on the expected playbook for policymakers following the Covid-19 crisis. Clearly, the short-term impact of the Covid-19 crisis is disinflationary as lockdowns have suppressed aggregate economic demand more so than aggregate supply, putting downward pressure on prices. The c. -70% drop in oil prices since the start of the year is perhaps the starkest manifestation of this disinflationary shock.

Looking further out, the outlook for inflation will depend on whether the structural forces that have suppressed the rise in consumer prices over the past few decades intensify or abate. Some of the experts we track such as KKR warn of long-term disinflationary risks as policymakers tighten fiscal policy in order to pay off the massive debts incurred during the pandemic. Such policies would weigh on growth and inflation as households and firms restrain spending.

In the aftermath of the GFC, policymakers across developed economies embarked on various forms of deleveraging and austerity. These included the Tea Party movement in the US, the Osborne 'Austerity' budgets in the UK, the strict fiscal discipline imposed by Brussels on Italy and Greece following the European sovereign debt crisis. Such policies disproportionately impacted lower income segments of society dependent on income, while wealthier segments benefitted from massive asset price inflation (equities, bonds, property) as central banks pushed interest rates down to zero (or negative) levels. The origins of the resulting populist/protectionist movements in the US (Trump), UK (Brexit) and Europe (Lega/5-Star) can be all be directly traced to this income and wealth polarisation.

Other experts such as BCA and JPM suggest that in the aftermath of the Covid-19 crisis, policymakers will refrain from attempting to deleverage too quickly. There are already signs that Germany will not impose draconian conditions on Italy in exchange for some form of fiscal transfer / debt mutualisation. High government debt levels may increase the political pressure on central banks to keep rates low for longer, even once the labour market recovers. This could eventually lead to

economic overheating and faster inflation over the two-to-three years following the pandemic. Inflation could also be supported by a pull-back of globalisation which would also contribute to cost-driven rising inflation. Global trade was already stagnant even before the trade war flared up. The pandemic may further inflame nationalist sentiment and drive businesses to repatriate manufacturing inside national borders.

On balance, we suspect that inflation will rise more than expected over the long haul. This is not a particularly high bar to clear as expected inflation in the US is only 1.2% over the next decade based on TIPS breakevens. Market-based inflation expectations are even more subdued in most other advanced economies.

The longer-term implications of the deflationary vs inflationary scenarios are very different across asset classes, except for government bonds which are likely to provide poor returns in both scenarios given low starting yields, although returns will be even lower in the inflationary scenario. In the disinflationary scenario, expect credit and other sources of contractual income to outperform growth assets such as equities. This may very well be the case in the near term (see investment implications further below). However, in our base case of continued fiscal and monetary accommodation over a longer period, expect risk assets to outperform. Within this context, there will likely be lasting trends that reprice sectors and geographic markets very differently from the past.

## **Q2. Given the global nature of the pandemic, what does this imply for geopolitics? How will it reshape the world order?**

Deglobalisation and Regionalisation: Deglobalisation was already in motion before Covid-19 and the post-pandemic world will only see that accelerate in favour of both repatriation within national borders, but also a few tightly knit regional blocks. In the Eurozone, Germany will acknowledge that it is already de-facto fiscally integrated with Italy and other southern European nations via the ECB's Target system. Any breakup of the Euro will leave Germany holding billions of devalued Italian government bonds. So the Covid crisis may serve to accelerate a more formal institutionalisation of these fiscal links. In North America, deep existing ties and geographic proximity will incentivise the US to maintain economic links with Canada and Mexico via variants of NAFTA. A failed state on the US southern border is not in anyone's interest. The Asian region will thrive despite the US 'decoupling' economically from China as it diversifies its supply chains to other producers (including onshoring). China will increasingly build economic (and political) ties to neighbouring countries via its Belt and Road initiative. It will also increasingly assert its authority in the South China Sea.

Bigger Government: Another consequence of the Covid-19 crisis will be that 'big government' will become more prevalent. Already the State is expanding more into the private sector with various forms of direct subsidies and loan guarantees. The need for universal healthcare will become a greater political force. This will have implications for taxation and a likely rollback of some of the more controversial privatisations of the Reagan/Thatcher era, particularly in the UK (Royal Mail, Rail services, etc.). A trend towards a surveillance state may already be underway, as western democracies are forced to adopt tracking measures in place in Asian countries to contain the spread of Covid. Once the pandemic is contained, it may be difficult to roll back these measures.

## **Q3. What permanent impact does the virus have on businesses, in the way we work, and in the way we consume goods and services?**

After a decade of building up corporate debt levels (much of it used for share buybacks and dividends rather than investment and capital expenditure), companies will focus on building

resilience, diversifying supply chains, reducing leverage and short-dated funding and improving liquidity. However, the crisis-driven investments in technology infrastructure and implementation, will propel the use of new technology across all aspects of life from e-commerce, remote working, online education etc.. Despite increased levels of remote working, companies, are unlikely to completely abandon centralised business centres (financial capitals, technology hives, etc) as these are too important for innovation and communication.

There will also be greater supply chain diversification leading to more supply side redundancy, localised supply chains, higher stock inventory (less JIT manufacturing), all leading to lower cost efficiency and lower margins. A survey by KKR suggests that US manufacturing executives are likely to accept up to a 15% increase in supply costs to avoid risks of supply chain disruption from trade tariffs, epidemics, etc..

Certain well-established trends already in play prior to the crisis will find broader implementation. The combination of technological advancement and social distancing will result in increased digital delivery of a range of other essential services including healthcare, education, etc. Some industries permanently see a loss of demand (business travel) as many corporates clamp down on travel, particularly mid-level travel as companies make greater use of videoconferencing to cut their carbon print.

### **Investment Implications (Covid Crisis Playbook)**

We have updated our playbook based on the above analysis to include the following 7 strategies:

1. **Religiously rebalance** through expected volatility ahead.
2. **Expect risk of higher inflation** in the medium term. US Government bonds to underperform due to low starting yields and rising inflation. Find alternative safety net assets starting with inflation linked bonds and gold.
3. **Credit to outperform equities in near term.** We are poised for rotation on further credit spread widening.
4. **Sectoral mix shifts:**
  - Technology: Greater demand for on-line/virtual/digital services and infrastructure, whether for public health (surveillance), business resilience, education, leisure or medical diagnosis. Positive effects of WFH on carbon footprint will add further tailwind.
  - Healthcare: Countries will not be caught off-guard again. Stockpiles and redundant capacity will drive short-term burst followed by domestic healthcare companies becoming a strategically significant industry.
  - Real estate shake-up: lower commercial office space demand, higher warehousing/ logistics demand.
  - Our New World Equity Portfolio was specifically built to exploit these sectoral opportunities.
5. **Geographic mix shifts:**
  - US has more of the secular winners (Tech, Comms, Healthcare) which comprise a larger share of US market (52%) than of EM (26%) or Japan (33%).

- The long-term economic damage and debt burden will be lower in Asia/China given their greater capacity to manage the “dance phase” of managing the virus, both from public health and stimulus perspective. China will also have a high share of secular winners (40%).
- Currently implementing ETF basket including over-weights to Korea and Taiwan.

#### 6. Quality Equities Theme:

- Quality to out-perform, especially mega to large-cap companies with bullet-proof balance sheets.
  - Our “quality” equity managers have moved in this direction already
7. **Distressed lending and private equity:** several manager commitments are in progress alongside due diligence on two

#### #10 In Liminal Space – May 3 2020

On the back of the 27% increase in the S&P 500 since its trough on the 23<sup>rd</sup> of March, we are looking at the current equity market level (S&P 500 at 2830 – down -12% YTD) and ask four questions before thinking about any investment implications:

1. What explains the 27% recovery?
2. What is the likely impact of the massive government stimulus programs?
3. When will the lockdowns end and will they spur a second wave?
4. When will the largest single focused medical investment in human history deliver a widely available vaccine?

We take a stab at answering each of these questions drawing from some of the recent research and update our downside, base and upside case scenarios and draw out the investment conclusions.

10yr yields: US: 0.61%; UK: 0.25%; Germany: -0.59%

#### Equity Market Performance

	MSCI World	S&P500	China A-shares
WTD (27 April - 1 May)	0.5%	-0.2%	3.0%
Performance in April	10.6%	12.8%	6.1%
YT-1 May	-13.4%	-11.8%	-4.5%
From Peak	-17.0%	-16.1%	-7.0%
Increase from low	23.1%	26.7%	10.8%



Credit as of 1 May

	Spread	Yield (YTW)
Global High Yield	9.0%	9.4%
US Corp High Yield	7.5%	8.1%
US Corp HY ex-energy	6.6%	7.2%

**Q1. What explains the April recovery?**

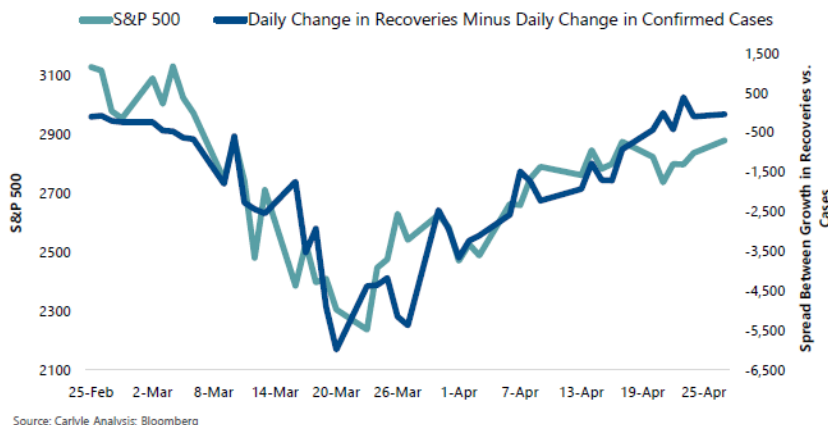
The April recovery was led by, above all, the massive fiscal and monetary stimulus which is conservatively estimated to provide a c. 4% boost to US GDP in 2020. Investors interpreted this level of stimulus as putting a floor on the extent of further declines. In addition, the sharply lower cost of capital has augmented the TINA (“there is no alternative”) case for equities, prompting investors to add exposure to risk assets.

Other factors which may have also contributed to the rebound were the peaking of Covid-19 infection rates in Europe and later in the US, the easing of some social distancing in some Western economies, increased signs of effectiveness of the Remdesivir anti-viral medication, and better than feared US Q1 earnings data (with outright strong earnings reported by the five mega-cap tech companies).

With over a third of S&P500 companies having reported so far this season, 65% have beaten previous EPS estimates. EPS growth is coming in at -16% y/y, 2% below consensus expectations. Earnings delivery for Financials has been particularly weak, down nearly 50% y/y, but much of this is related to boosting loan loss reserves. S&P500 ex-Financials EPS growth is flat this quarter, on a yoy basis. Overall top-line revenue growth is flat, with 66% of companies beating estimates.

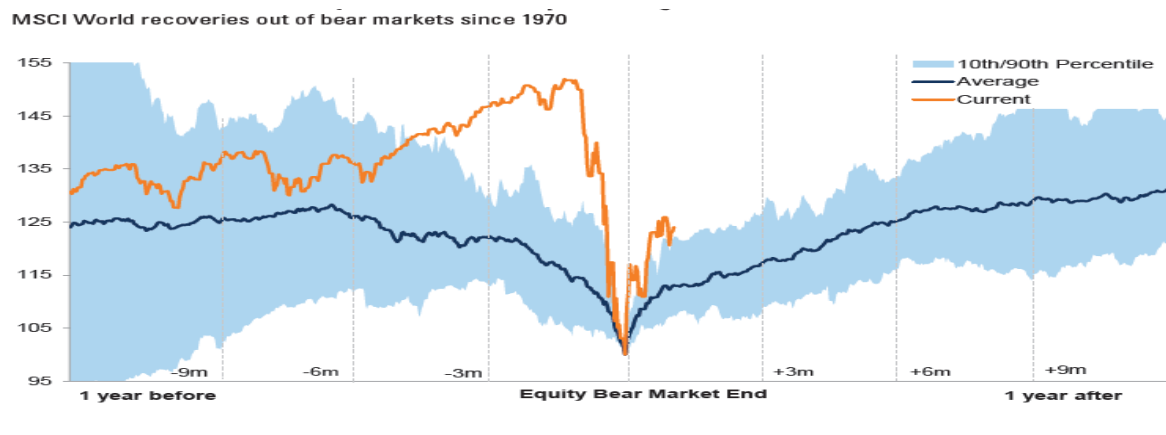
More for entertainment value, I attach the chart below to prove you can find a chart to prove anything.

**Exhibit 1: Strong relationship between S&P 500 and outstanding Covid-19 cases**



More relevant is the chart below showing how dramatic this recovery is in an historical context, with the orange line showing how the MSCI World equities index has bounced back relative to the range of past recoveries shown in the blue shading. This adds to the evidence that it was related to the historical record-breaking level of government stimulus.

**Exhibit 2: The current recovery has been the sharpest among historical bear markets**



Source: Datastream, Goldman Sachs Global Investment Research

**Q2. What is the likely impact of the massive stimulus programs?**

The total fiscal stimulus to date tallies to \$8.1T worldwide (9.3% of global GDP) and there is a similar amount of \$8.3T (9.6%) in central bank liquidity injections, for a grand total of 19% of the global GDP.

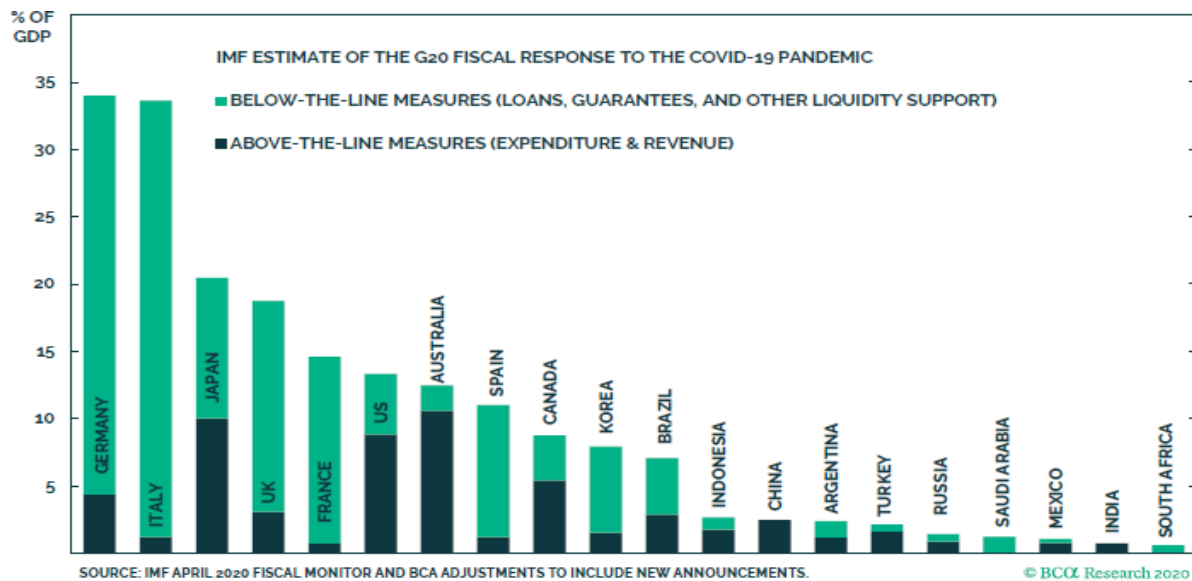
**Exhibit 3: Current tally of global stimulus is over \$16T or 19% of global GDP**

	Central Bank Liquidity Injection		New Government Fiscal Stimulus		Rate Cuts
	US\$ Trillions	Percent of GDP	US\$ Trillions	Percent of GDP	Basis Points
US	\$4.80	22.4%	\$2.82	13.1%	-150
Eurozone	\$1.10	8.3%	\$1.76	13.2%	
Japan	\$0.20	3.9%	\$0.99	19.2%	
United Kingdom	\$0.25	9.0%	\$0.14	5.1%	-65
China	\$1.29	9.0%	\$0.54	3.8%	-100
Others	\$0.65		\$1.85		
<b>Total</b>	<b>\$8.29</b>	<b>9.6%</b>	<b>\$8.10</b>	<b>9.4%</b>	

Sources: 1. Asian Development Bank, IMF, World Bank 2. Data as of 15 April 2020, source is Cornerstone, JP Morgan

The \$8.1T of fiscal stimulus has been broken down by the IMF into “above the line measures” which are expenditures and revenue (blue part of bars) and the “below the line measures” which are loan guarantees and other liquidity support (green part of the bars). “Revenue” stimulus means tax cuts. The above the line measures have a higher multiplier (or yield) impact on GDP than the below the line measures and varies between 1% of GDP for France and 11% of GDP for Australia with straight line average being 4% of GDP, with the US at 9% of GDP.

#### Exhibit 4: IMF Summary of G20 Fiscal Response at a % of GDP

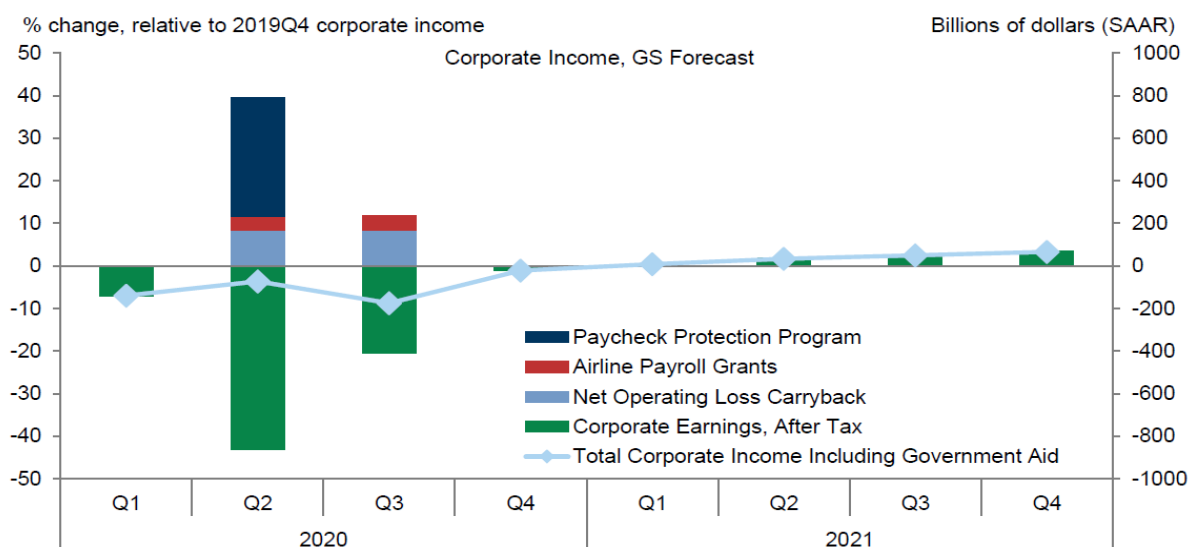


Wharton, JP Morgan, Goldman Sachs, the IMF and BCA have all just published their research on the likely impact of government stimulus, helping us to answer the question of the extent to which it will offset the direct and indirect effects of the pandemic on global economic growth.

Our conclusion from reading all of this analysis is that governments have averted a global depression and reduced it to a large-scale recession. What would have been a 2020 global GDP decline of -6% to -8% is more likely to be -3% to -4%. Liquidity injections have stabilized the financial system which doesn't show up in these figures. Similarly, loans and other corporate support payments have kept companies from insolvency and defaulting on their debt, which could have seen corporate earnings taking a disproportionate hit relative to GDP impacts. It has done the trick in terms of stabilizing financial markets, which says it is enough for now, but more may be needed, and governments are likely to add if needed. There will be pushback from here, and so we should not assume the hole is filled under any circumstance. There is a limit, and we are probably not there yet, but we should not need more if we test, track and isolate soon and testing supplies and tracking teams are needed to pre-empt that need.

Below is an illustration of some of the analysis produced around these stimulus programs. The Goldman Sachs work shows how the Paycheck Protection Program and other programs have nearly, but not quite, offset the full effect of the Covid-19 impact on corporate profits.

## Exhibit 5: US Government fiscal support will offset much of the decline in corporate earnings



Source: Goldman Sachs Global Investment Research

Our base case of negative -3.0% global GDP growth in 2020 assumes that, without the stimulus, global GDP would be closer to -6.5%. The IMF and JP Morgan analysis both point to this 3.5% boost in global GDP. This number is broadly in line with the IMF's summary of revenue and expenditure stimulus assuming dollar for dollar impact. The reality is that there will be leakage from individuals not spending their unemployment benefits for example, but there will be second order benefits to GDP from the massive loan guarantees, liquidity support and monetary stimulus.

The big issue is what the academics call the multiplier effect on money spent. Income recovery payments will be inefficient as individuals generally do not spend nearly as much locked up at home (so it will be in part used to pay off debt or go into savings). Injecting liquidity into banks or buying bonds to save the credit market ends up in equity prices (which is explicitly a Fed policy – keeping markets stable), and so does not support GDP directly. Government spending where they are hiring people for example or paying state and local municipalities to not fire people, increases income and spending almost dollar for dollar.

If we take the US as an example with 9% of GDP in expenditure and revenue stimulus, JP Morgan estimates that this will translate into 4% GDP impact. Wharton analysed the \$2.3T US CARES Act program line by line, and came out with a similarly huge haircut, estimating that only \$800B will translate into economic output (4% of GDP), but there are other programs beyond CARES, so the total offset could be more than 4%.

BCA researched deep into each program in each country and concluded that these programs will be sufficient to avoid an “L-shaped recovery” (i.e., no recovery for a long time) in the US, China and Germany and deficient for Italy, Spain and France. They go on to say that the level of stimulus must rise if there is a second round of lockdowns of major economies. US House Speaker, Nancy Pelosi, is already proposing an additional \$1 trillion for state and local government support.

We conclude from this that the programs are sufficient to fund the current expected lockdown scenario. But in the absence of adequate testing and tracing of cases, we will see a very expensive second set of lockdowns around the world or social distancing that has to go beyond what China,

Korea and others are still deploying which will keep output at suppressed levels compared to what is being forecast for late 2020 and 2021.

### Q3. When can the lockdowns end?

Economies should only open up when they believe the virus' impact can be minimised through isolation of the vulnerable, testing and tracing, and having adequate healthcare resources to deal with the expected increased number of cases from opening. By isolating those most vulnerable, that is those over 70 years old or with severe underlying conditions, one can dramatically reduce the strain on hospital resources and the overall mortality rate. The table below shows that 70% of all hospitalisations for Covid-19 are patients who are over 70 years old. The proportion of Covid-19 related deaths accounted for by those over 70 are 75% in the US, 80% in the UK and 87% in Europe. Over 90% of deaths involve hospital patients with known underlying conditions (which includes most of those over 70). The most dangerous underlying conditions related to Covid-19 appear to be severe hypertension, morbid obesity and chronic lung diseases.

**Exhibit 6: Proportion of hospitalisations and deaths accounted for by those over 70 and by those with severe underlying health conditions**

	Hospitalisation		Deaths	
	Those >70yrs	With Underlying Conditions	Those >70yrs	With Underlying Conditions
US (CDC)	70%	90%	75%	91%
UK (GOV.UK)	70%	55%	80%	95%
EU (ECDC)	70%	66%	87%	93%

As a working example, we can take the peak daily case level in the UK (circa. 6,000/day) and distribute these cases by age cohort in line with the research so far. We can then take the hospitalisation rate observed so far for each cohort and look at what would happen to hospital cases if the economy was to fully re-open with and without those most vulnerable. The notional effect of this would be to reduce daily hospital admissions from nearly 1,300 to 479. While hospitalisations for the under 70s will go up with opening, we have that much more hospital capacity to cope.

**Exhibit 7: If Over 70s are isolated, hospital demand drops by over 60%**

Age Cohort	Share of cases	Cases/day	Hospitalisation Rate	Hospitalised	Proportion of Hospitalised
70+	17%	1020	80%	816	63%
60-69	9%	540	22%	119	9%
50-59	14%	840	15%	126	10%
40-49	12%	720	12%	86	7%
30-39	12%	720	9%	65	5%
20-29	30%	1800	4%	72	6%
0-19	6%	360	3%	11	1%
	100%	6000	22%	1295	100%
Hospital cases excluding over 70s				479	

We can carry out the same exercise for mortality. Imperial College looks at the probability of dying from COVID by age group, computed as a percentage of all people estimated to have contracted the disease (reported + unreported). The latter grouping is not observable and has to be estimated using

different techniques, but is more informative than the “case fatality rate” which typically excludes asymptomatic people, many of whom are young.

**Exhibit 8: Imperial College estimates that the true mortality rate for the c 85% of the population under 70 is very low**

Infection fatality ratio

Age-group (years)	% symptomatic cases requiring hospitalization	% hospitalized cases requiring critical care	Infection fatality ratio
0 to 9	0.1%	5.0%	0.002%
10 to 19	0.3%	5.0%	0.006%
20 to 29	1.2%	5.0%	0.03%
30 to 39	3.2%	5.0%	0.08%
40 to 49	4.9%	6.3%	0.15%
50 to 59	10.2%	12.2%	0.60%
60 to 69	16.6%	27.4%	2.2%
70 to 79	24.3%	43.2%	5.1%
80+	27.3%	70.9%	9.3%

Source: Imperial College COVID-19 Response Team. March 16, 2020.

We also know that a disproportionate number of Covid-19 hospitalisations and fatalities for those under 70 have severe underlying conditions including severe hypertension, morbid obesity and chronic lung diseases. 85% of hospitalisations of under 65 have underlying conditions according to the CDC (see table below). So the expected mortality rate from going back to normal social distancing after isolating the vulnerable population could be well below 0.1% of those infected. Once enough serology testing is done to prove the true mortality rate and this thesis is proven more robustly by those findings, we should then see a return to more normal social and economic activity.

**Exhibit 9: US hospitalisations with underlying conditions by age group**

Underlying condition	Age group (yrs), no./total no. (%)			
	Overall	18–49	50–64	≥65 years
Any underlying condition	159/178 (89.3)	41/48 (85.4)	51/59 (86.4)	67/71 (94.4)
Hypertension	79/159 (49.7)	7/40 (17.5)	27/57 (47.4)	45/62 (72.6)
Obesity <sup>§</sup>	73/151 (48.3)	23/39 (59.0)	25/51 (49.0)	25/61 (41.0)
Chronic metabolic disease <sup>¶</sup>	60/166 (36.1)	10/46 (21.7)	21/56 (37.5)	29/64 (45.3)

Source: CDC US study 1 – 31 March, 2020.

BCA released a model on Friday for predicting lock-down end dates based on the linear trend from the peak 5-day moving average of confirmed cases and fatalities when we reach zero. The table below highlights that these methods generally prescribe a reopening date of May 31 or earlier, with a few exceptions. BCA compare these projected dates to what Wuhan experienced starting from lock-down date to zero cases and deaths, which was 70 days. BCA highlight that US newly confirmed cases are only currently projected to fall to zero by February 2021 which is the clear outlier on this table. This is a somewhat mechanical extrapolation from a curve that has yet to flatten and we would expect this to be a much earlier date as long as individuals and state government leaders are sensible about isolating the vulnerable and meeting testing needs to identify cases early.

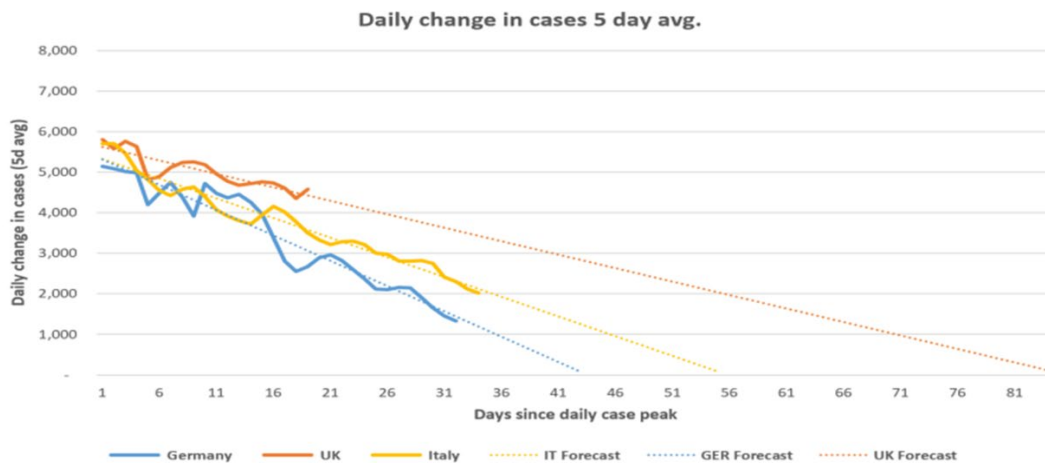
**Exhibit 10: BCA of potential lockdown end dates using 70-day rule and straight-line projection from peak cases**

COUNTRY	70-DAY RULE**	BASED ON:
		CONFIRMED CASE TREND
AUSTRALIA	MAY 31, 2020	APRIL 24, 2020
CANADA	MAY 25, 2020	JUNE 21, 2020
FRANCE	MAY 12, 2020	APRIL 29, 2020
GERMANY	MAY 6, 2020	MAY 5, 2020
ITALY	MAY 2, 2020	MAY 22, 2020
JAPAN	MAY 5, 2020	MAY 11, 2020
NETHERLANDS	MAY 21, 2020	MAY 15, 2020
SPAIN	MAY 18, 2020	MAY 21, 2020
SWEDEN	NA	MAY 14, 2020
SWITZERLAND	MAY 22, 2020	MAY 1, 2020
UK**	MAY 25, 2020	JULY 11, 2020
US	MAY 28, 2020	<b>FEBRUARY 11, 2021</b>
ADVANCED ECONOMIES OVERALL	MAY 31, 2020	JUNE 14, 2020

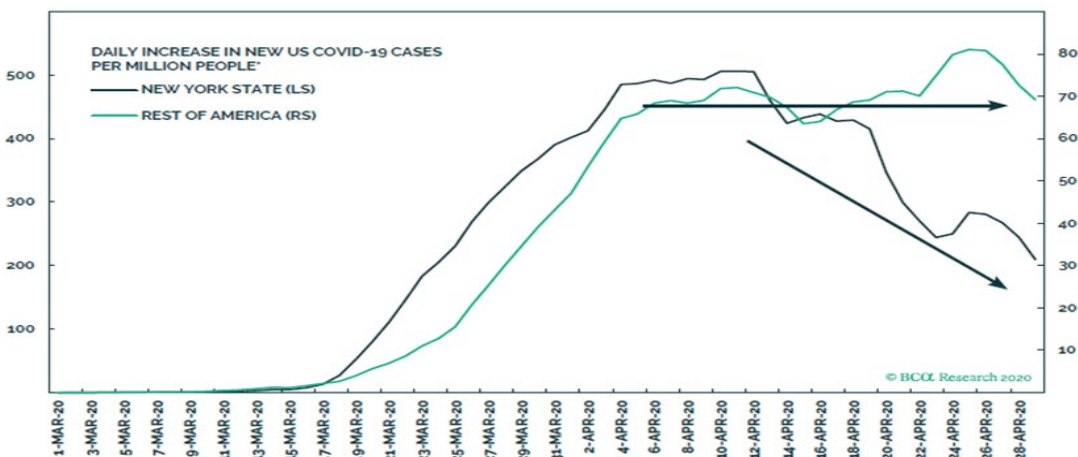
\* SOURCE: CENTER FOR SYSTEMS SCIENCE AND ENGINEERING (CSSE) AT JOHNS HOPKINS UNIVERSITY AND BCA CALCULATIONS. DATA AS OF APRIL 29, 2020.  
 \*\* SOURCE: OXFORD COVID-19 GOVERNMENT RESPONSE TRACKER AND BCA CALCULATIONS. CALCULATED AS 70 DAYS FOLLOWING DATE OF SCHOOL OR WORKPLACE CLOSURE.  
 \*\*\* EXCLUDES APRIL 29 FATALITY UPDATE OWING TO DEFINITION CHANGE.

The UK’s confirmed case count and fatality trends are still too shallow to suggest an end of May re-opening, as is the case in Canada. We compare the UK to Italy and Germany in the chart below to show how different their respective linear forecasts are.

**Exhibit 11: Simple straight-line projection of when cases go to zero in UK, Italy and Germany**



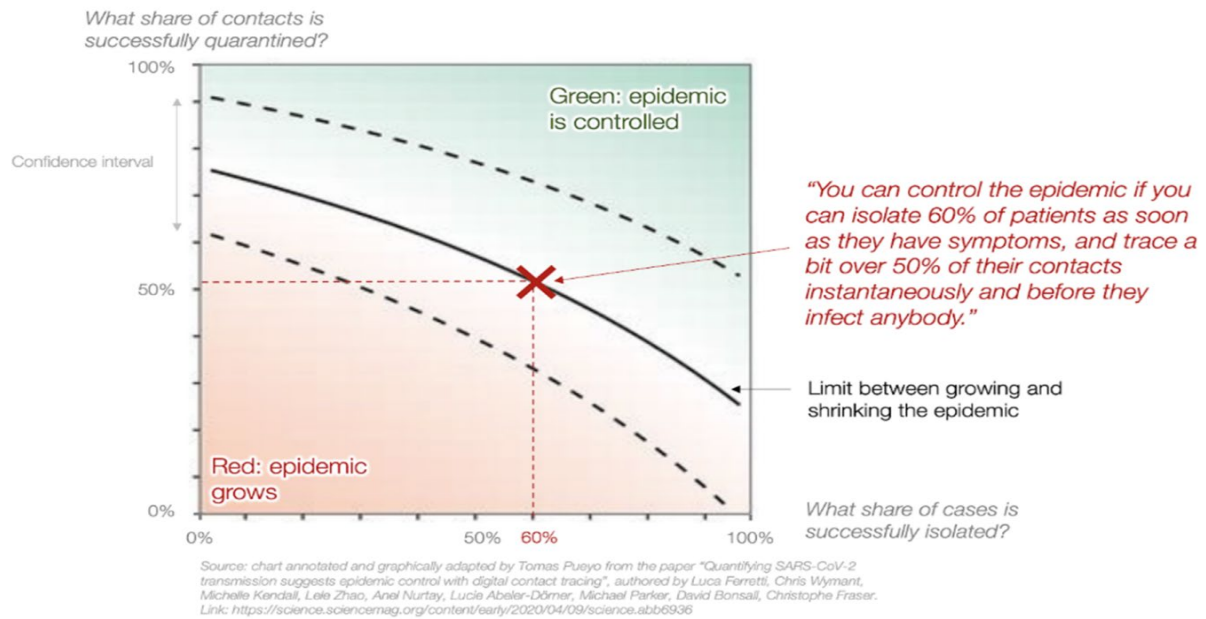
**Exhibit 12: The US has no clear downtrend yet outside of NY State**





After isolating the vulnerable, and with testing tracking and tracing in place this should give governments, business and schools the confidence to open back up. An Oxford University research team published in Science magazine on 31 March a very compelling piece of research entitled “Quantifying SARS-CoV-2 transmission suggests epidemic control with digital contact tracing.” It concludes that to control the virus (keep the R-0 below 1), you must test enough to isolate over 60% of cases and trace and quarantine over half of the contacts made by any infected person identified with no delays in isolating cases once discovered.

**Exhibit 13: Oxford suggests controlling the epidemic requires isolating 60% of cases and trace half of those they contacted**



This research does not assume the vulnerable are isolated, but rather they are among the 60% of cases that must be caught with testing. So lower levels of testing and tracing should be able to achieve  $R_0 < 1.0$  in the case where the vulnerable are isolated.

**How back to normal will we be when no longer locked down?** One month after removing restriction in late March, China is still not back to normal – it looks like about 90% back if you look at the numbers below. China has fully opened their economy but with continued mass testing, contact tracing and quarantining of the small handful of new cases. They have ongoing restrictions on international travel. What we have observed so far is a reasonably strong rebound in manufacturing but a degree of caution on the consumer side. While retail sales, auto sales and property sales have rebounded we can see that consumers are uncomfortable travelling around cities. Retail footfall is at 73% of pre-crisis levels, public transport is at 41% and air travel is at just 36%. There have been numerous photos and videos of restaurants in Beijing and Shanghai that are essentially empty. There are some tentative signs of improvement however and this will be likely to continue further with the passage of time and with low severity of second waves.



**Exhibit 14: China is still not fully back to pre Covid-19 levels (year on year %)**

China Economic Openness Measure	at Trough	Today (April)
% of retail stores operational	78%	98%
Retail customer traffic	41%	73%
Retails sales	58%	92%
Air Travel	16%	36%
Auto Sales	21%	93%
Subway ridership	7%	41%
Cargo Throughput volumes	67%	136%
New residential property sales (50 cities)	34%	80%

Source: Carlyle Group Economic Indicators April 2020

With isolation of the vulnerable and adequate testing and tracking resources, we would expect major Western economies to see a similar pattern of gradually returning to a semblance of normalcy as implied above. Cautious consumer spending is however likely to persist and act as a drag on the economy until a vaccine is found.

**Risk of Second Wave.** It would appear that the global scientific community have come to the conclusion that second and further waves are inevitable.

*“There’s a possibility that the assault of the virus on our nation next winter will actually be even more difficult than the one we just went through... We’re going to have the flu epidemic and the coronavirus epidemic at the same time.”*

**CDC Director Robert Redfield**

21 April 2020

*“[A second round of the coronavirus] is inevitable... If by that time we have put into place all of the countermeasures that you need to address this, we should do reasonably well. If we don't do that successfully, we could be in for a bad fall and a bad winter.”*

**NIAD Director Anthony Fauci**

29 April 2020

China, South Korea, Taiwan, Hong Kong, and other countries early to the virus, have given us the best proof that significant second waves that prompt further lock-downs may be manageable by isolating the vulnerable and having sufficient testing and tracing.

The greatest risk of a second wave in a major economy appears to be in the US. If a portion of the US states are presently or soon to be relaxing lock-down including not isolating the vulnerable and do not have the testing and tracking capability, experts feel there is a high chance of a second wave.

Increasing quantities of PCR testing kits are on their way with innovations in progress for home testing. We are very unlikely to reach the testing levels proposed by the Harvard Safra report (20M per day required for full economic opening), but by late June, we should have in most countries enough to test those who need to be tested (vs want to be tested) and positive cases from those tests can then be traced. This is where the real obstacle comes in.

**Exhibit 15: New confirmed cases in China**



According to the Johns Hopkins plan, the US would need 100,000 contact tracers. Other calculations put that number at 600,000. Tomas Pueyo's most recent chapter of "The Hammer and the Dance" educates us on the labour intensity of tracking and tracing, suggesting that each positive tested case requires between 15 and 20 person days of effort to track and isolate those in contact with each case. With the US currently reporting 30,000 cases per day, this implies that a small army of 600,000 people would be required. Pueyo suggests that countries wait until daily new case loads reach a more manageable number when we would require fewer contact tracers.

High tracing technology adoption can reduce this considerably. A number of countries are turning to smartphone apps to help with contact tracing, with Germany one of the most successful. In the US, Apple and Google are expected to release by mid-May a mobile software tool that will let iPhones and Android devices talk to each other and enable future digital contact tracing.

**The Cost of a Longer Lockdown.** The cost of a longer lockdown on risk asset valuations should not be huge as those costs are incurred over just 2020 and 2021 with more lasting structural economic damage limited to certain sectors (airlines, travel and mass events), with offsetting benefits to technology and healthcare sectors. Bank analysts (GS, JPM, MS, CS, DB, RBC, IBES consensus) have published an average S&P 500 earnings decline forecast of -22% for 2020 vs 2019. If we assume a second lockdown with some rough math, we could see a -56% decline in corporate earnings in 2020, but with this behind them at the end of 2021, investors will be focused on what happens in 2021 and beyond. The effects of a second lockdown in the winter of 2020/21 will certainly spill over into 2021 but analysts are forecasting average earnings growth of +26% in 2021 over 2020, leaving corporate earnings -3% behind where they were in 2019. We don't know how much a second wave would enlarge this decline, but investors should still be looking beyond 2021 for the bulk of equities valuation impact.

Governments may increase stimulus for longer lockdowns which would serve to offset the -56% downside case scenario for 2020 earnings. Obviously, more stimulus enlarges the deficits that need to be funded from government balances sheets which in turn gets paid off through inflation and higher taxes which comes out of our pockets, just spread out further down the road. Any further government support would offset some of the expected 2021 corporate earnings hits from longer lockdowns or second lockdowns.

#### **Q4. When will the largest single focused medical investment in human history deliver a widely available vaccine?**

It is now abundantly clear that the world cannot fully return to normal levels of social and economic activity until a vaccine is found. Never before have so many lives, livelihoods, and economies depended so much on a single health intervention. Never before have so many research organisations, pharmaceutical companies, governments and multi-lateral organisations invested as much as they are investing now in any one medical endeavour -- with 111 potential vaccines currently in various stages of development, of which 8 are in phase 1 trials and only CanSino is in phase 2. Success is not certain as we are reminded that no vaccine has yet been developed for any human coronavirus.

The pandemic can only be brought to an end after billions of doses are produced affordably and made available to everyone. Producing and distributing billions of doses of a new vaccine would be challenging at the best of times. Doing so during a pandemic will require an unprecedented global effort.

The first effective and FDA approved vaccine could be available by this fall from the Oxford project, but most developments are managing expectations to mid or late 2021. Last week, **Oxford's Jenner Institute** announced two partnerships; one with AstraZeneca which will provide the capabilities to produce up to 100M doses of the vaccine by year end, and one with the Serum Institute of India (one of the largest vaccine manufacturers in the world) to produce 40M doses beginning right now in anticipation of the vaccine being approved. They have announced a target of 1M doses produced by the fall.

There is no good or bad news out of the other high-profile developments in progress with firms including **J&J, Sanofi/GSK, CanSino, BioNTech/Pfizer, Sinovac/Dynavax, Novovax and Moderna/Inovio**. **Moderna** talks about emergency use in primary populations as early as fall 2020.

Moving beyond vaccines into antivirals, this week the US National Institute of Health (NIH) released results of a trial on severely ill patients being treated with the Gilead antiviral drug, **Remdesivir**. The trial showed that Remdesivir had a statistically significant benefit as a therapeutic being used against Covid-19. The average patient in the Remdesivir trial group recovered after 11 days versus 15 days for the control group. There was also a notable (but statistically insignificant) decrease in the mortality rate. While this is unlikely to be a game changer in terms of the speed and degree of re-opening (Remdesivir is administered intravenously as opposed to at point of care) it is promising news which led to its approval for emergency use last night by the FDA. Under the emergency authorization, the drug can be used to treat patients who are hospitalized with a severe enough case of the disease that they need to be given supplemental oxygen or placed on a ventilator. Results of a similar Remdesivir trial of earlier stage patients will be released later this month and many analysts believe the antiviral may be even more effective when administered at earlier stages.

**PCR testing** levels have continued to grow globally, particularly in the UK. The UK is just now testing over 100,000 people per day according to last night's report from Health Secretary Matt Hancock. This is four times the level of two weeks ago but is still below the levels being carried out in other European countries. In the latest chapter of the "Hammer and the Dance" from Tomas Pueyo, he suggests that a good benchmark for countries to begin reopening would be the point at which just 3% of all tests are returned positive. This assumes testers are working their way from the most infected populations to the least, with early populations expected to test over 10% positive after outbreaks and closer to zero for many subsets of the population who would be the last to test. This

target can be combined with the research completed by Oxford which indicates that the effective reproduction rate (R) can be brought below 1 by capturing 60% of cases with testing and tracing 50% of their contacts. 60% is a tough target given the nature of the virus where infected individuals have no symptoms but are contagious.

**Serological antibody blood tests** are performed to identify those who have immunity and can therefore return to normal activity. The false positives are a problem though. One such test claims to correctly identify people with those antibodies 94% of the time. By contrast, it identifies phantom antibodies in 5% of people who don't have them (false positive). That false-positive rate sounds acceptably low. It's not. Let's assume 5 percent of the U.S. has been infected so far. Among 1,000 people, the test would correctly identify antibodies in 47 of the 50 people who had them (94%), but it would also wrongly spot antibodies in 50 of the 950 people without them (=5% false positives). The number of true positives and false positives would be almost equal. In this scenario, if you were told you had coronavirus antibodies, your odds of actually having them would be near 50/50.

The rate of false positives needs to be extremely low (<1%) for such tests to be reliable enough to filter one's workforce for example and determine who need not socially distance. There remain some issues around reinfection as well.

#### **Macro Scenarios and Investment implications:**

Keeping our eyes on the long-term, we have been looking for insights around how the world and the US will be different with near zero interest rates which are forecast to remain in place for an extended period in light of slower US economic growth and the overhang of continued massive monetary easing.

**Long Term implications of zero interest rates.** The US has returned to ZIRP (zero interest rate policy) after having already experimented with ZIRP in the aftermath of the GFC and successfully exited it beginning in late 2015. Other economies that have never exited their post GFC ZIRP such as Japan and Europe, have not redefined their respective investment rankings with ZIRP. So looking at the recent history of Europe and Japan, what are the clues for how the US economy might evolve over the longer term under a ZIRP regime? We are only part way into studying this question, but firstly we note that there are significant idiosyncratic reasons why these economies may not be representative of what will happen in the US. The booming Japanese economy of the 1980's has struggled to maintain its position as it faces significant headwinds from both its own aging demographics as well as competition from the Asian tigers which compete in many of Japan's leading industries from consumer electronics to automobiles. Europe has struggled since the inception of the monetary union to reconcile a common currency without a fiscal union and diverging growth rates across member states. In addition, since 2017, its export machine has been impacted by slowing Chinese demand as well as the consistent threat of trade tariffs from the Trump administration. Populist movements have also slowed implementation of much needed structural reforms.

The above constraints are not representative of the US economy, although it could be argued that other risks lie ahead including ballooning budget deficits and political polarisation. However, as we highlighted last week, the US stock market has the highest representation (52%) of the sectors that are likely to thrive in the post-Covid-19 world.

However, it does seem likely that US interest rates will remain low for an extended period. There are two main reasons for this. Not only will policymakers wish to avoid any nascent recovery being

stillborn, but also the huge debt burden created by the fiscal stimulus programs will need to be serviced at affordable interest rate levels for many years to come. Last week, Fed Chair Powell's latest communication this week suggests that monetary policy is likely to remain highly accommodative over the foreseeable future.

The main implication of this is likely to be higher inflation rates over the longer term. Clearly the initial demand shock of the Covid crisis is disinflationary, but with continued fiscal stimulus (for example Nancy Pelosi is advocating another \$1T in support to State and Local governments), rising risks of protectionism (both Trump and Biden are escalating their anti-China rhetoric) these add further support to our base case outlook that inflation pressures will likely start building over the longer term. With short-term interest rates on hold, this will imply a steepening of the yield curve as a higher term or risk premium is built into longer maturity treasuries. Rising inflation also means real rates will remain low, benefitting inflation-linked bonds and gold. Equities are likely to perform well over the longer term but face short term headwinds given their recent run and elevated valuations. Credit should do well on a risk-adjusted basis, as policymakers are keen to support the flow of credit to businesses. These investment implications are listed in greater detail further below.

**Base, Upside, and Downside Case Scenarios.** While we of course welcome the recent rally in risk assets given we have held client risk exposure firmly in place, we continue to see risks of elevated volatility in the second half of the year. Most experts agree that a second wave at some point is inevitable in most countries. This explains our continued push to strengthen safety asset exposure where possible.

What is not inevitable is that these second waves will be as severe as the first wave, particularly if the vulnerable are isolated and there is adequate testing and tracing of cases for the rest. Better testing and treatment measures will facilitate economic functioning until a vaccine is available.

So in this context, we have updated our macro scenarios into year-end and are spelled out at the back of this document. While we have slightly revised down our expectations for interest rates across scenarios, we have moderately increased our expectations for equity markets.

The investment implications which follow below, reflect this range of scenarios around more or less pronounced second waves with governments flexing monetary and fiscal stimulus in response to those waves.

#### **Investment Implications (similar to last week)**

1. Religiously rebalance through expected volatility ahead.
2. Expect risk of higher inflation in the medium term. Longer-maturity US Government bonds to underperform shorter-maturity bonds due to rising inflation and ballooning budget deficits. Find alternative safety net assets starting with inflation-linked bonds and gold.
3. Credit to outperform equities in the near term on a risk-adjusted basis. We are poised for rotation on further credit spread widening.
4. Equities may be subject to further short-term volatility, but over the longer term will be supported by recovering economic activity, better earnings and higher multiples
5. Sectoral mix shifts:

- Technology: Greater demand for on-line/virtual/digital services and infrastructure, whether for public health (surveillance), business resilience, education, leisure or medical diagnosis. Positive effects of WFH on carbon footprint will add further tailwind.
- Healthcare: Countries will not be caught off-guard again. Stockpiles and redundant capacity will drive short-term burst followed by domestic healthcare companies becoming a strategically significant industry.
- Real estate shake-up: lower commercial office space demand, higher warehousing/logistics demand.
- Our New World Equity Portfolio was specifically built to exploit these sectoral opportunities.

#### 6. Geographic mix shifts:

- US has more of the secular winners (Tech, Comms, Healthcare) which comprise a larger share of US market (52%) than of EM (26%) or Japan (33%).
- The long-term economic damage and debt burden will be lower in Asia/China given their greater capacity to manage the “dance phase” of managing the virus, both from public health and stimulus perspective. China’s equity market will also have a high share of secular winners (40%).

7. Quality Equities to out-perform, especially mega to large-cap companies with bullet-proof balance sheets. Our “quality” equity managers have moved in this direction already

8. Distressed credit and private equity: several manager commitments are in progress alongside due diligence on two others.

#### **Caveat lectorem on our reports – all information changes on a dime**

We thought we should finish with a caution about many of our assertions and conclusions in these documents. We are trying to get it as right as we can, but in situations like this, information changes rapidly. I thought Ed Yong, who writes for the Atlantic magazine captured what it feels like right now with the vast amount of information coming your way and our way every day.

*“The pandemic’s length traps people in a liminal space. To clarify their uprooted life and indefinite future, they try to gather as much information as possible—and cannot stop. “We go seeking fresher and fresher information, and end up consuming unvetted misinformation that’s spreading rapidly,” Bergstrom says. Pandemics actually “unfold in slow motion,” he says, and “there’s no event that changes the whole landscape on a dime.” But it feels that way, because of how relentlessly we quest for updates. Historically, people would have struggled to find enough information. Now people struggle because they’re finding too much.”*

## Exhibit 16: Macro Scenarios (Updated 1<sup>st</sup> May 2020)

Scenario	Downside– On-again / off-again lockdowns	Base Case- China pattern + manageable 2 <sup>nd</sup> wave	Upside Case – Single Wave
Probability	30%	60%	10%
Spread of virus and Containment Efforts	<ul style="list-style-type: none"> <li>Second and multiple outbreaks of large magnitude around the world in 2H of 2020 and winter into 2021 impede attempts to resume normal behaviour – similar pattern to Spanish flu.</li> <li>Mortality varies by country hospital situation and peaks of resurgences (ranging &lt;1% to 4%).</li> <li>Travel, work, school and mass event containment measures are on and off and extended into 2021 with winter bringing new outbreaks.</li> <li>Testing, tracking and tracing in major Western countries continue to lag needs through much of 2020.</li> <li>Certain sectors of economy collapse and are totally dependent on government support</li> <li>No vaccine success until late 2021 or later.</li> </ul>	<ul style="list-style-type: none"> <li>Globally, outbreaks in each country follow the broader China life cycle due to containment efforts and see an active case peak after two months of lockdown.</li> <li>US is slower than most to contain. Day 1 being 20 Feb, peaking mid-May. Different states opening at different times delays flattening.</li> <li>In most other develop countries, cases peaking now and recoveries ramping up after two months of lockdown.</li> <li>Mortality is below 0.5% as vulnerable/elderly people are isolated and younger populations with symptoms get tested and isolate.</li> <li>Any second / third waves much smaller in scope and manageable with existing healthcare resources.</li> <li>Many schools closed until Sept. Limited mass events.</li> <li>Isolated developing countries with weak systems see case growth drag on into 3<sup>rd</sup> quarter 2020, with major countries having to deploy travel bans.</li> <li>Testing becomes more widespread along with systematic centrally controlled contact tracing which works.</li> <li>Antiviral drugs come too late to accelerate exit from lockdown.</li> <li>Vaccine comes in mass scale in mid-2021.</li> </ul>	<ul style="list-style-type: none"> <li>Globally, outbreaks in each country follow the broader China life cycle due to containment efforts and see an active case peak after two months of lockdown. US States hold off opening until most are ready.</li> <li>Massive testing and case tracing put in place by June in most major markets.</li> <li>Testing proves mortality rate is c 0.5% and lower with vulnerable isolated. Higher than reported infection rates leave 20% plus immune.</li> <li>Second waves limited to small isolated populations. Travel bans control spread back to DM from lagging EM markets.</li> <li>Antiviral medicines take the pressure off hospitals and reduce mortality (decreases fear and people move/spend more freely).</li> </ul>
Policy Response	<ul style="list-style-type: none"> <li>Escalated version of base case (announced) policy action with all guns blazing on rates, fiscal spend in the form of govt liquidity injections; hard hit industries get direct cash injections. Full support to unemployed. Massive fiscal deficits.</li> </ul>	<ul style="list-style-type: none"> <li>Colossal fiscal support for unemployed, effected businesses, healthcare system, financial system, etc.</li> <li>Over \$8T of global government fiscal stimulus and over \$8T of central bank liquidity injections possible = almost 20% of global GDP.</li> </ul>	<ul style="list-style-type: none"> <li>Same as base case without top ups and less liquidity and fewer asset purchases.</li> </ul>
Real 2020 Global GDP Growth (PPP)	-6.0% Long recession	-3.0% Short / sharp recession (vs +3.4% IMF Jan 2020)	-1.0%
10Y Treasury Yld @YE	0.25%	1.25%	1.75%
S&P 500 @YE2020	2,300	2,850	3,200

### #11 The quickest route to low mortality numbers in the US and UK – May 22 2020

I spoke live last Wednesday with Professor Danielle Allen, the Director of the Harvard Safra Center who is one of the author’s behind the two Safra Center papers – “Roadmap to Pandemic Resilience and Pandemic Resilience – Getting it Done.” These papers describe the importance of testing, tracking and isolating to take R0 down to near zero as China, Taiwan, South Korea and Germany have all done to varying degrees of success. The solution is in the detail.

**Problem #1: PCR Testing Capacity.** These papers have reached government leaders around the world including the White House. The Safra Center cited the 5M tests/day target in their first paper which certainly got Trump’s attention. This is the article CNBC wrote on 29 April quoting Trump and his assistant secretary of health, Admiral Giroir.

*“There is absolutely no way on Earth, on this planet or any other planet, that we can do 20 million tests a day, or even five million tests a day,” Adm. Brett Giroir, assistant secretary of health who is in charge of the government’s testing response, told TIME in an interview he gave Tuesday morning that was published later in the evening. Speaking to reporters the following day, Trump denied having said there would be 5 million tests per day, but he added that he does believe there will, in fact, be 5 million tests per day at some point.*

*“Somebody came out with a study of 5 million people. Do I think we will? I think we will, but I never said it,” Trump claimed during an event at the White House. “Somebody started throwing around 5*

*million. I didn't say 5 million," the president insisted, adding, "Well, we will be there. But I didn't say it. I didn't say it."*

In response, the Safra Center wrote a second paper which then laid out a state by state approach to testing in quantities warranted by varying levels of virus prevalence, which helped to clarify the numbers (e.g., 85% of the US could achieve suppression with 3 million tests a day; for the remaining 15% of the population where prevalence of active virus is above 1%, there would also be a need for an investment of 2-3 million tests a day). Professor Allen sent me the GinkgoBioWorks paper which made the case that "Next Generation Sequencing (NGS)" labs can be converted to process over 1M Covid-19 tests/day vs traditional Real Time quantitative Polymerase Chain Reaction (RT-qPCR) labs at several hundred thousand per day, provided that a distributed sample accessioning system can be put in place.

NGS labs like the Broad Institute's in Boston began RT-aPCR processing in March. GinkgoBioWorks, a commercial lab, is preparing protocols to use NGS machines for processing. I have not found any NGS labs poised in the UK to process Covid-19 PCR tests. Leeds University hospital has one of the largest NGS labs in the UK but makes no mention on their website of Covid-19 test applicability.

**Problem #2: Swab-to-lab logistics.** Today, 100% of the coronavirus testing is RT-qPCR testing and there is no NGS testing yet. Going to the Next Generation Sequencing (NGS) approach requires FDA approval. Professor Allen highlighted that even if NGS labs were ready and approved to process swabs, the logistics of accessioning swabs and of swab delivery to processing labs is the bottleneck. It does not appear that anyone in government has focused on the logistics problem of getting the swabs from homes, hospitals and clinics, accessioned and to the large processing labs. There are different swab options from the normal deep nasal and throat swabs which are more difficult to self-administer and transport, but if done correctly, they have very high accuracy. Then there are saliva tests which can be self-administered and shipped without great care but are less "sensitive" and so have lower accuracy but can be transported more easily. A simple and obvious solution would be to have deposit boxes in car parks or local NHS clinics for mass collection and shipment to the nearest labs by dedicated collectors.

**Problem #3: Government "who should be tested" policy.** The Safra Center stress that another obstacle to tackle is the official policy around who should be tested. The US made the early mistake of saying that only front-line workers and those that are symptomatic should be tested. They now realise that the key to getting back to work is for much higher levels of testing including testing contacts of every Covid-positive individual, including asymptomatic contexts, and also routine testing for workers in critical infrastructure roles. The industries they support represent, but are not limited to, medical and healthcare, telecommunications, information technology, defence, food and agriculture, transportation and logistics, energy, water and wastewater, law enforcement, and public works.

The White House announced a testing policy on April 27, including presentations by Dr Birx (Coronavirus Response Coordinator) emphasizing that the new testing guidance supported testing of asymptomatic individuals. What is published today on the CDC website (posted 3 May) is a prioritisation which includes:

*"Persons without symptoms who are prioritized by health departments or clinicians, for any reason, including but not limited to: public health monitoring, sentinel surveillance, or screening of other asymptomatic individuals according to state and local plans... Other considerations that may guide*



*testing are epidemiologic factors such as known exposure to an individual who has tested positive for SARS-CoV-2.”(CDC 3 May)*

This still doesn't go far enough to say that anyone who wants to be tested can be tested but, of course, where testing capacity is limited, priorities will go to those most in need.

The UK has made a similar mistake to that of the US prior to their guidance revision, as they announced similar constraints on testing which remain in place today. At minimum, the UK government officials need to clearly state that there will be enough tests to test all those that we can track down as having come in contact with infected persons. That could be just a few people for each infected person, or it could be hundreds. As we open economies back up, the latter becomes more likely. Ideally, the UK government will soon move to a policy of all who want to be tested can be.

**Problem #4: Contact tracking staff levels & apps.** It is the Safra Center's strong belief that the key policy action to be enforced should be contact tracing and testing those contacts. Their analysis is that a notional target could be that planning to test on average 25 contacts for each person testing positive would create the need for more tests and therefore lead to someone cracking the logistics problem of getting swabs to labs. The US problem (and probably the UK's) was that they started by talking about electronic tracking via phone apps (vs manual) which raised privacy issues that created political obstacles for putting resources behind contact tracking. Prof Allen believes that if digital tracking was never mentioned we would have teams in place today tracking “the old fashioned way” with people getting on phones and calling people to tell them they need to be tested because they were in contact with an infected person. Bloomberg published an insightful article yesterday on how Germany succeeded with tracking using the old fashioned way.

The US appears to be way behind now though on contact tracking because politicians don't want to take on the public over privacy.

States like North Dakota and Utah have launched tracking apps but take up is low so far. As a result of the focus on privacy invading apps, the old-fashioned manual alternative is not moving as fast as it could have in the US. Journalists haven't helped matters by making the privacy issue a bigger issue according to Prof Allen. Google and Apple have opted for anonymised decentralised data stored locally on their phone. They may have judged the public correctly, but some states want the data centrally and will have to find other apps or build on the Google/Apple API. The NHS's digital arm, NHSX, has developed its own coronavirus tracking app, which will hold data centrally, instead of opting for an alternative from Google and Apple. Governments should get on with setting up manually trained teams now and not let the lack of apps slow down tracking and testing.

In the UK, the recent hiring of 17,000 contact trackers is not dependent upon digital tracing and privacy issues. The former head of the US Center for Medicare Services estimates that 15 person days are needed for each case to be traced to the average number of contacts and to get tests in progress for them. So, with 3000 cases/day in the UK, this suggests 45,000 trackers are needed. This number goes down if digital apps are being used.

To date no US state has hired any meaningful number of trackers. In early May, NPR surveyed all 50 states and with responses from 44, they reported that there are plans to hire a total of 66,197 workers, an increase of 30,000 from their survey done 10 days earlier. Among the recent updates to states' plans, California announced a partnership with UCSF to put 3,000 people a week through its 20-hour contact tracing training, with a goal of ultimately having 20,000 contact tracers. New York state also announced a plan to hire as many as 17,000 workers. Estimates of how many are needed range from 100,000 (CDC) to 300,000 (15 person days x 20,000 cases per day) in the US.

**Summary next steps for US and UK Governments (or any government which has yet to control the infection):** So the US and UK solution should be to address privacy issues with the tools that have always been used to protect privacy in the context of manual contact tracing, hire contact tracers who will create the demand for more test kits which will in turn highlight the need to fix the swab-to-lab logistical challenge. With the logistics sorted, this will increase the need for more and faster testing labs, which will point to the need for NGS approval by the FDA. It should not take long to operationalise those labs to do millions of tests per day in the US, which may be needed if the suppression techniques fail to stop the growth of cases. In the UK, the three mega-labs may be sufficient to handle the contact tracing requirements (e.g., 3000 cases/day x 25 to 50 contacts = 75,000 to 150,000 tests/day. The cost will be significant, but nothing compared to the ongoing economic cost of social distancing including the cost of the large-scale furlough and other stimulus efforts.

The US and UK governments and their agencies may not yet have fully understood this path of dominos that need to fall because a lot is being thrown at them and it must be hard to know what is important and what is not. Prof Allen felt there may be a lack of confidence among state and federal governments to know what to do, which is complicated by a fear of being blamed for failure or for removing individual freedoms and rights (e.g., privacy rights with certain tracking apps).

According to Prof Allen, the White House should be confident. All of the public health policy groups are pretty much saying the same thing about contact tracing, testing and logistics needs: Johns Hopkins Center for Health Security, Harvard Center for Communicable Diseases, Harvard Global Health Institute, the Duke Margolis Center, University of Washington, the American Enterprise Institute and the Center for Infectious Disease Research and Policy (CIDRAP). If this is true, then it **would seem there is a right answer and it is tracing contacts, testing far larger numbers of people, solving the swab logistics bottleneck and using all testing modalities including converting NGS labs to process Covid-19 tests, whether with PCR methods or sequencing methods. This is the only way to get our testing in the US and UK into the millions/day so that people can know they can move freely without fear of infecting others.**

I am reasonably sure that Imperial College and other respected UK medical institutions are likely saying the same thing or will be soon and the UK government will do the right thing. The only question is how long this will take and how many more deaths there will be and how much additional economic damage will be left behind.

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## **#12 What the data says to us about the likely damage – May 23 2020**

From an investment perspective, we would all like to have the crystal ball that tells us what the quantum of economic and financial damage from Covid-19 will be. The answer to this will be most directly determined by when people go back to near-normal levels of work, socialisation and spending. This will in turn be driven primarily by when reported fatalities from the virus drop low enough to give us confidence to resume normality, rather than by governments telling us when and what we are allowed to do. Reported fatalities will drop when centralized resources and processes are in place for isolating the vulnerable, testing and tracing contacts in large quantities, and effectively quarantining infected cases. Medical breakthroughs – whether in treatments or vaccines – could be a gamechanger. We also need the crystal ball to tell us how effective the massive stimulus will be in offsetting the economic damage from the total effects of the above.

Nobody really has the answer but there is a huge amount of intellectual energy being poured into finding the answer ahead of others. Here is our framework in algorithmic form:

**Independent variable = quantum of economic and financial damage from Covid-19**

Factor inputs:

**= f (when people go back to near normal levels of work, socialisation and spending)**

= f (reported fatalities from the virus); not when government leaders tell us to go back

= f(isolating the vulnerable, massive PCR testing, tracking and tracing);

**+ f (scale and efficiency of massive stimulus programs)**

**+ f (timing and effectiveness of a vaccine delivered to billions of people)**

We will review all of these inputs but start with our current view of the quantum of economic and financial damage caused by the virus.

**Economic forecasts.** The experts are saying the global economy will fall by over -4% in 2020 vs. the +3% forecast pre-Covid-19. The global economy is forecast to recover strongly in 2021, rising by over +6%. These estimates incorporate the underpinning of the decline from the \$16+ trillion (20% of GDP) in stimulus where GDP would have been nearly 3% lower in 2020 and 1.5% lower in 2021 according to JP Morgan's interpretation of IMF figures. After two years, economists expect global GDP to still have grown by a cumulative +1.7% from the end of 2019, compared to the +6% cumulative growth as forecasted prior to Covid-19. Put another way, economists expect that we will have lost approximately 1.5 years of global growth.

**Corporate earnings forecasts.** Analysts are forecasting 20-30% declines in 2020 S&P 500 EPS with an expected recovery of S&P 500 EPS for the full year 2021 to the EPS level of 2019. The expected impact of the virus is therefore to lose two years of EPS growth, not two years of earnings. The crystal ball needs to explain why 23% unemployment in the US, along with less spending from higher savings will translate into a -6% 2020 US GDP decline with a +5% recovery in 2021. The GDP and corporate earnings estimates appear to make heroic assumptions about a return of the economy to near normal levels of activity which appear inconsistent with the trajectory of Covid-19 cases and deaths.

We have already seen that, unlike Asia where they are ~90% back to normal, the first lockdown will carry on for longer in Europe and the US, but with greater freedom than we had at the outset of the lockdown. Looking across the data shown in Exhibit 3, we estimate that social and economic activity is at 30% and 70% of 2019 levels for London and the United States, respectively.

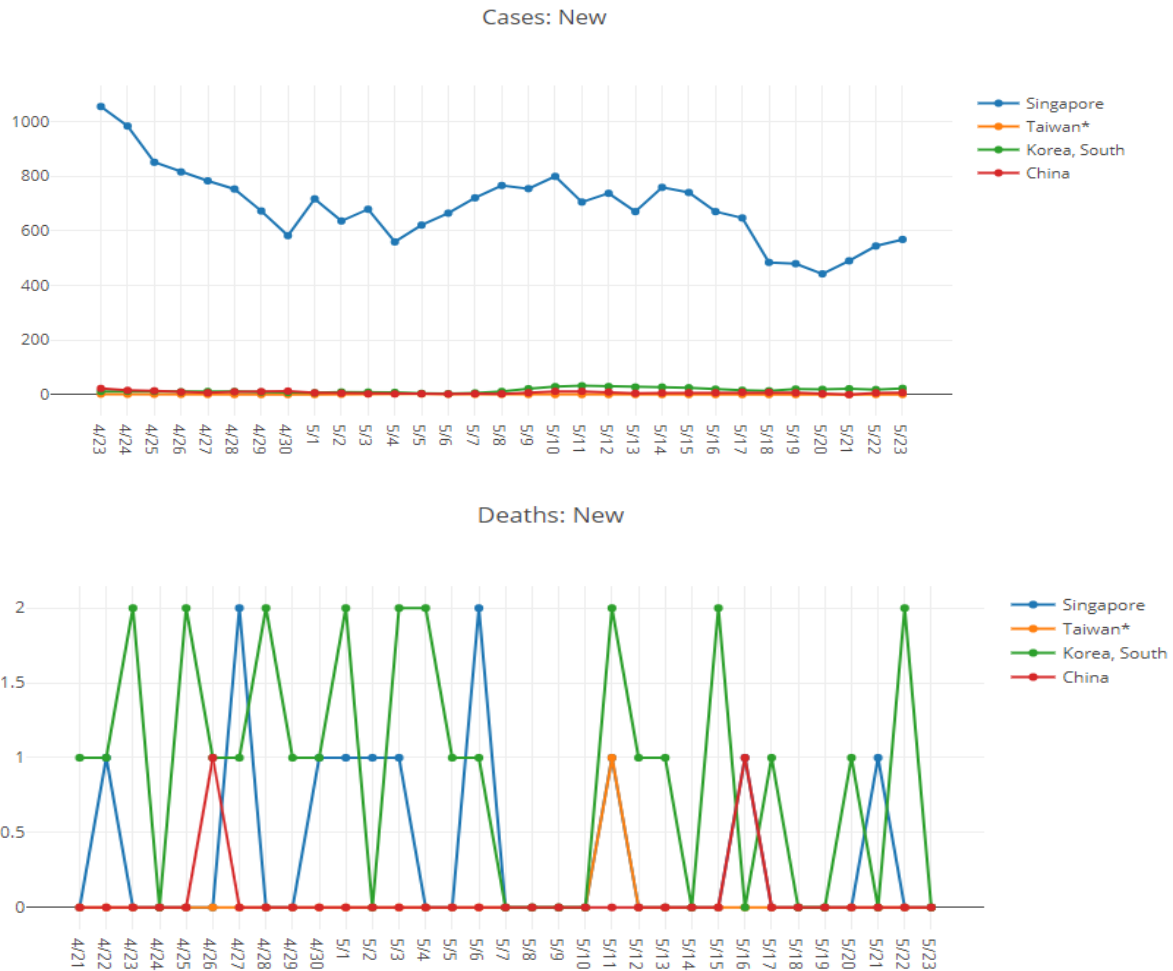
The data that bring us to this conclusion is provided from answers to six questions below.

**Q1. Have lockdowns in the US, UK and other major economies dropped the cases and mortality rates enough for people to return to work and engage in less social distancing soon?**

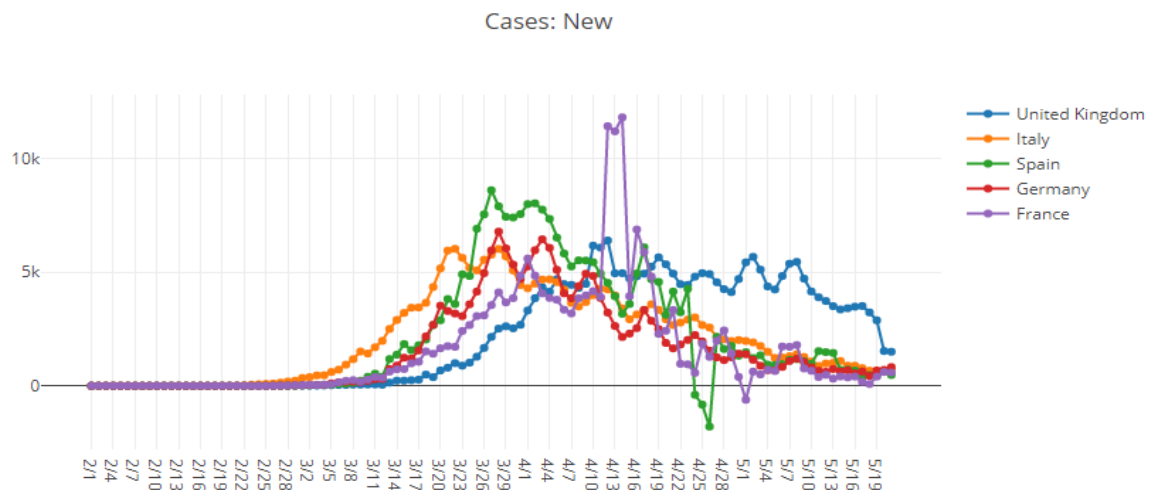
Europe and the US are opening up before case rates have dropped anything like what happened in Asia. Other parts of the world are seeing exponential case rate growth despite lockdowns.

**Exhibit 1: Path of Covid-19 cases by geographic area (earliest regions to latest to experience)**

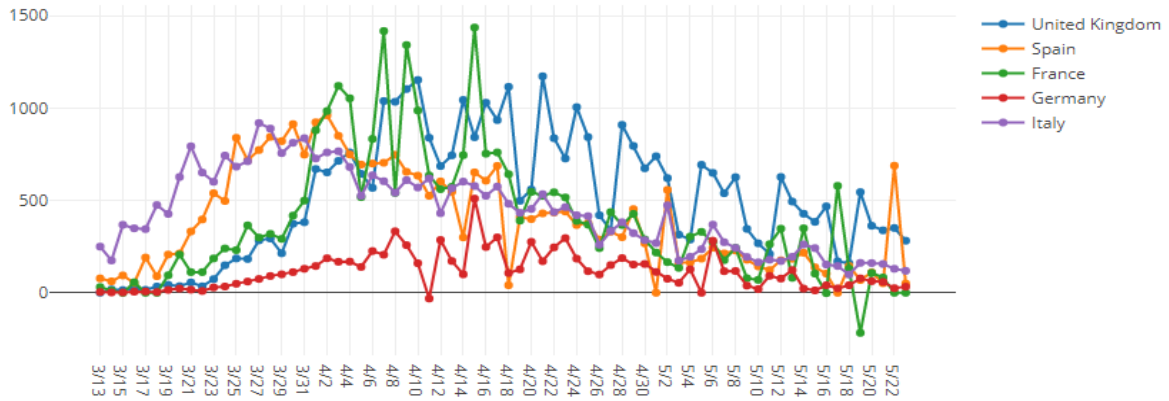
**Asia: Covid-19 is well contained in major economies; Singapore is dealing with outbreaks in migrant worker dormitories but with only 1-2 deaths per day.**



**Europe: Lockdown brought case rates down to 300 to 900 cases/day, but the UK continues to lag with 2000+ cases/day and 250+ deaths/day.**

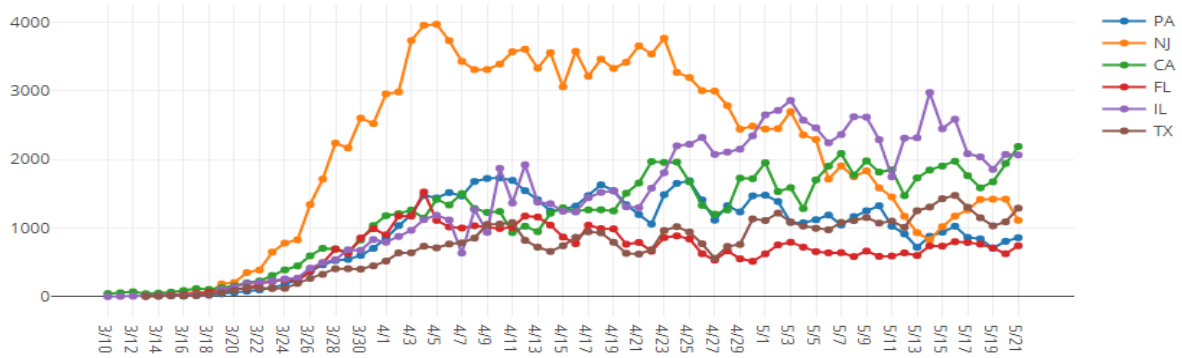


Deaths: New

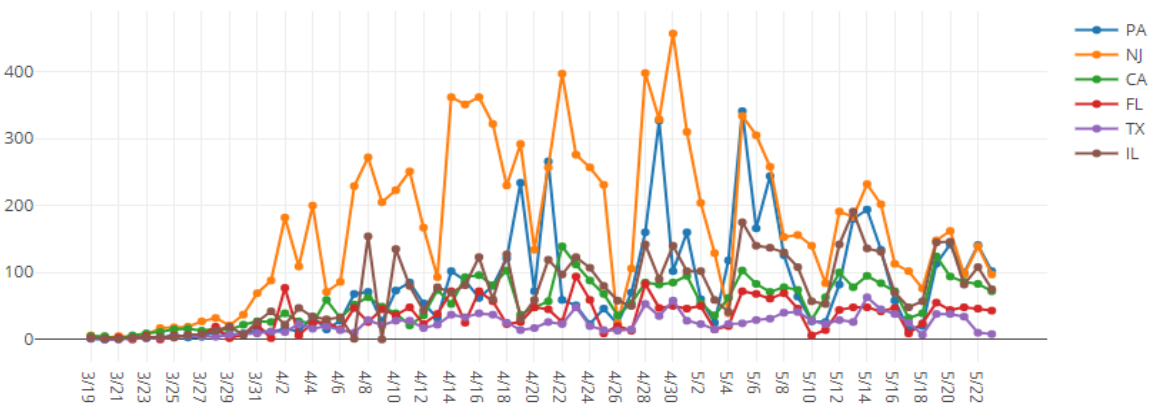


**US: New York State (not shown) is still experiencing 2000 cases/day and other major states have not flattened (800 to 2200 cases/day) with many states still experiencing over 100 deaths/day (=1200 US-wide deaths/day)**

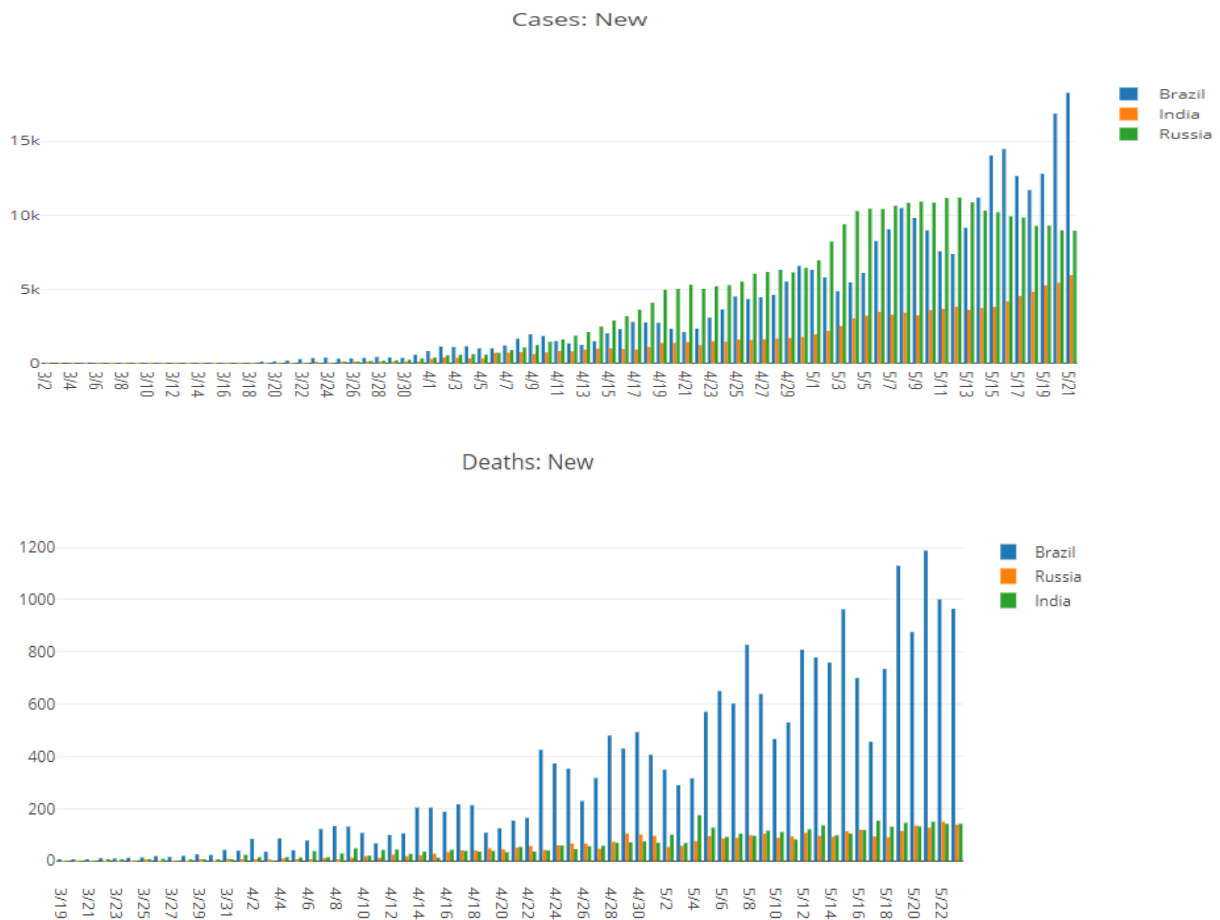
Cases: New



Deaths: New



**Other Emerging Markets: Brazil, Russia and India are early in epidemic (5000 to 17,000 cases/day) and climbing exponentially with Brazil experiencing over 1000 deaths/day**



**Q2. What is the likelihood of a second wave and second set of lockdowns in the US, UK and rest of Europe?**

We continue to believe that there will be second waves once people narrow their social distancing, but we are not yet seeing many examples of it. To date we have seen no real evidence of large scale second wave outbreaks at a country level. This can be seen in the countries that were earliest to have eased restrictions including South Korea, Germany, Denmark and Austria below. While restrictions have only been eased at the margin (red line indicates lifting date) it is none the less a promising sign so far. All countries have continued to see a decline in active cases.

There have been minor outbreaks at a regional level which seem to have been contained. In Seoul restrictions were imposed on bars/nightclubs after a man reportedly spread the virus to several others. There have been six new cases reported in Wuhan which has led authorities to test the entire 11M population. In Chinese cities along the Russian border there have been reports of cases with the virus still yet to reach its peak in Russia, this has led Chinese authorities to impose tighter restrictions at key land border points. In Germany the Robert Koch Institute warned that the infection rate was rising but RO remained close to 1.0 and the virus was under control.

**Exhibit 2: No significant second waves from regions which have already come out of lockdown**



Governments are opening up and “essential workers” are back to work, but a combination of remaining controls and self-imposed behavior is still constraining economic activity as you can see in the table below. There would appear to be a low likelihood of second waves given people are continuing to social distance, but the two-month lockdowns have not reduced deaths enough to make people comfortable to move about freely. We are therefore not yet focused on a possible second lockdown, but rather are quite concerned that the first lockdown will be protracted well into the summer months. You can see from the table below that the UK, France and Italy are still the most locked down from measures of the percentage of normal activity (note that the heat mapping shows red for the highest negative %’s under normal).

**Exhibit 3: Percent of normal activity in various parts of the economy (countries and cities)**

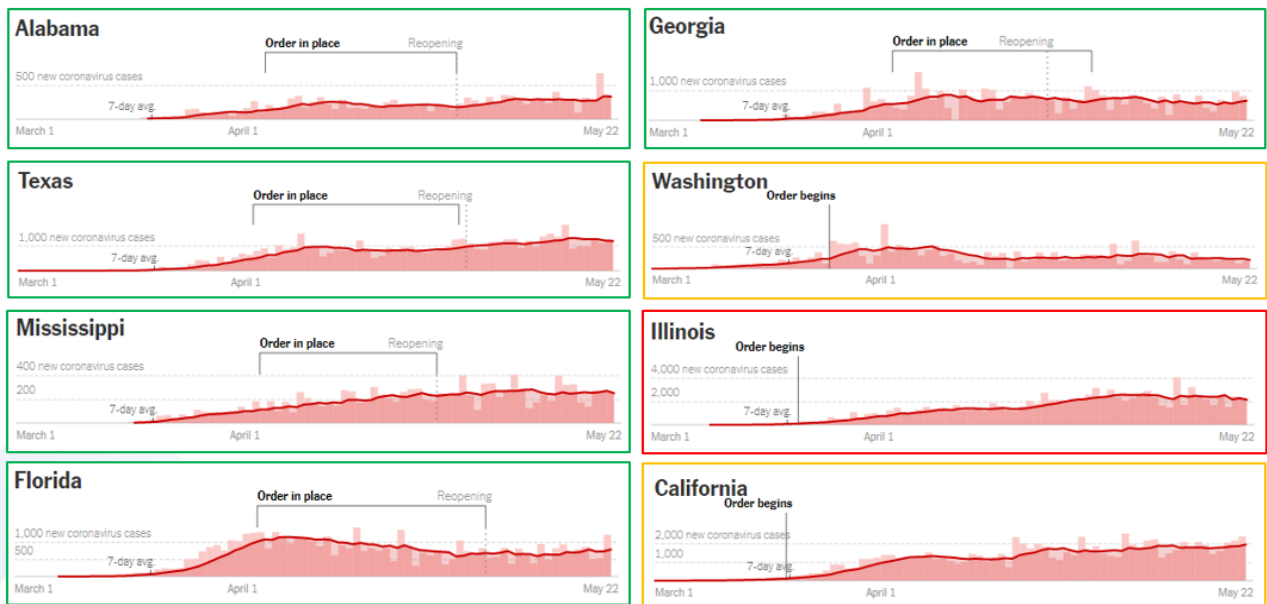
	Retail & Recreation			Grocery & Pharma			Parks			Transit Stations			Workplaces		
	1 Month Ago	Current	Change over last month	1 Month Ago	Current	Change over last month	1 Month Ago	Current	Change over last month	1 Month Ago	Current	Change over last month	1 Month Ago	Current	Change over last month
US	-39	-30	9	-13	-3	10	-14	32	46	-50	-34	16	-49	-24	25
NYC	-61	-47	14	-20	-9	11	-35	73	108	-70	-52	18	-61	-33	28
CA	-54	-47	7	-16	-7	9	-34	-14	20	-53	-41	12	-52	-27	25
UK	-73	-74	-1	-27	-25	2	-7	5	12	-70	-58	12	-69	-43	26
LON	-79	-78	1	-32	-28	4	-15	-2	13	-79	-68	11	-76	-49	27
GER	-53	-35	18	-3	-6	-3	57	53	-4	-48	-28	20	-43	-5	38
FRA	-81	-51	30	-31	-12	19	-58	-13	45	-78	-43	35	-69	-20	49
ITA	-79	-61	18	-37	-26	11	-75	-37	38	-76	-53	23	-63	-34	29
S Korea	-17	-8	9	-2	12	14	33	26	-7	-13	-8	5	-4	-4	0
HK	-24	-17	7	-6	7	13	-7	-12	-5	-29	-20	9	-12	-10	2
Average	-56.0	-44.8	11.2	-18.7	-9.7	9.0	-15.5	11.1	26.6	-56.6	-40.5	16.1	-49.8	-24.9	24.9

Source: Google mobility data. The baseline is the median value from the 5-week period 3 Jan – 6 Feb 2020.

Over 40 US states have now begun the process of reopening. New York and New Jersey have followed the pattern of Italy with exponential growth, containment and an encouraging pattern of case and death declines. The majority of other states have avoided major outbreaks but are seeing a continuing low level of case growth. In the four other largest states, Texas, California, Illinois and Florida, we are seeing 800 to 2000 new cases a day with no pattern of decline. The charts below show a mixture of states that have re-opened (green frame), have regional re-openings (orange frame) and that are still

in lockdown (red frame). It appears that most of these states that re-opened did not meet the Federal guidance of 14 days declining cases prior to re-opening.

**Exhibit 4: US Daily cases pre and post re-opening (through 22 May)**



Notes: Data sourced from the New York Times

One of the richest data sources we have found is the Covid-19 Infections Tracker which forecasts the number of new cases and deaths out to August for all countries and individual US States. <https://covid19-projections.com/infections-tracker/>. It is a depressing picture for the UK and states like California, Illinois and Texas where projections indicate continued moderate levels of 60 (Texas) to 200 (UK) new deaths per day in each region through the summer. This is not an outcome conducive to people returning to normal activity levels.

**Q3. Are we doing enough testing, tracing and isolation to get R0 down below 1.0? When can we reduce social distancing?**

As our Covid-19 update #11, we wrote a 3-page note intended just for government audiences which provides the answer to this question which we summarise here. It is mostly informed by my interview with Professor Danielle Allen, Director in charge of the Harvard Safra Centre, who has been responsible for several research papers which President Trump and his health advisors have only recently benefitted from. Please email me if you would like to see a copy of what we wrote.

To answer the question above, Germany executed well with significant levels of contact tracing, while the tough lockdowns in Italy and France contained cases to a low enough level for their relatively modest amount of testing to work. But the US and UK are the most worrying as the case levels are still high relative to PCR testing capacity and most US States and the UK are only just now recruiting tracing teams.

With new case levels at 2,500/day in the UK and 25,000/day in the US, current testing levels of 100,000/day in the UK and 500,000/day in the US are not enough. Our view is that even after case levels drop further, we need mass PCR testing for certifying that people can feel safe again with less social distancing. Many businesses will never recover with the current 2-metre / 6 feet distancing requirements. Getting to high levels of testing and tracing is a massive logistical challenge involving adequate supplies of PPE, swabs, reagents, PCR lab processing machines, tracing staff recruitment and



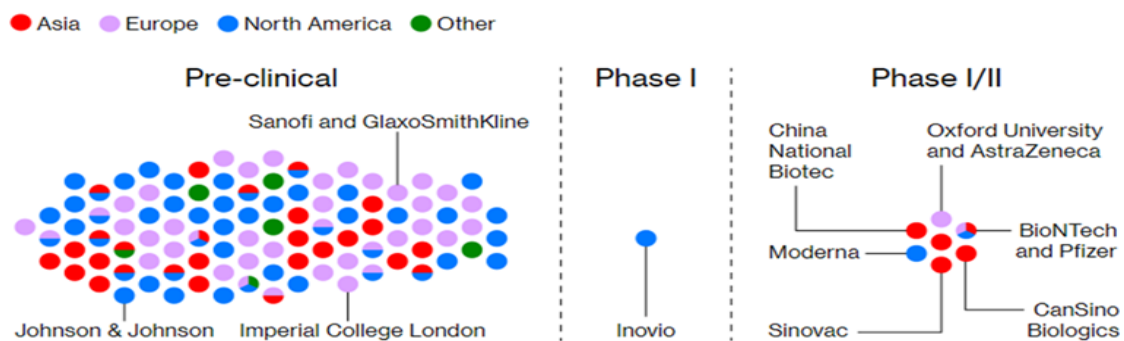
training, sample shipment and IT support throughout. This requires strong leadership placed at the right regional level. On 7 May, Baroness Harding was assigned this role in the UK. To date no US state has hired any meaningful number of trackers. In early May, NPR surveyed all 50 states and with responses from 44, they reported that there are plans to hire a total of 66,197 workers. California announced a partnership with UCSF to put 3,000 people a week through its 20-hour contact tracing training, with a goal of ultimately having 20,000 contact tracers. New York state also announced a plan to hire as many as 17,000 workers. Estimates of how many are needed range from 100,000 (CDC) to 300,000 (15 person days x 20,000 cases per day) in the US.

PCR tests have high levels of accuracy if administered correctly. We continue to see this as the key to opening economies as demonstrated by Korea, Taiwan, Hong Kong and China.

**Q4. What is the update on vaccines?**

Over 120 vaccines are currently under development, but with only 6 in clinical trials, the rest are pre-clinical. The most advanced vaccines at present are those from **CanSino** (phase 2) and **Oxford University** (phase 2) and **Moderna** (phase 2). These companies have aspirations of producing enough dosages of a working vaccine to assist frontline workers by the fall of 2020. Oxford have established relationships with AstraZeneca and the Serum Institute of India allowing for production of 100 million doses by year end (assuming approval). Moderna released promising phase 1 trial results on 18 May, although this is only the first of many steps in the drug approval process.

**Exhibit 5: While there are over 100 vaccines in development, most are still in pre-clinical trials.**



Data: World Health Organization, compiled by Bloomberg

Under the White House programme entitled “Operation Warp Speed,” the United States plans a massive testing effort involving more than 100,000 volunteers and a half dozen or so of the most promising vaccine candidates in an effort to deliver a safe and effective one by the end of 2020. The project will compress what is typically 10 years of vaccine development and testing into a matter of months. To get there, leading vaccine makers have agreed to share data and lend the use of their clinical trial networks to competitors should their own candidate fail. Candidates that demonstrate safety in small early studies will be tested in huge trials of 20,000 to 30,000 subjects for each vaccine, slated to start in July. The Moderna vaccine, developed in partnership with the NIH, will be the first to enter large-scale testing in July, and may be joined by the vaccine from Oxford University and AstraZeneca.

**Q5. Are there any changes to what we expect to happen in our economic scenarios?**

In summary, we still believe our three scenarios below reflect the range of possible outcomes as shown below.

## Exhibit 6: Range of likely scenarios with base case of continued social distancing through summer

Scenario	Downside– On-again / off-again lockdowns	Base Case- China pattern + manageable 2 <sup>nd</sup> waves	Upside Case – Single Wave
Probability	30%	60%	10%
Spread of virus and containment efforts	<ul style="list-style-type: none"> <li>Multiple outbreaks of large magnitude around the world in 2H of 2020 and into 2021 impede attempts to resume normal behaviour – similar pattern to Spanish flu.</li> <li>Mortality rate from 1% to 4%.</li> <li>Mass event containment measures expected to extend into 2021.</li> <li>Testing, tracking and tracing in major Western countries continue to lag needs.</li> <li>Certain sectors of economy collapse.</li> <li>No workable vaccine is developed.</li> </ul>	<ul style="list-style-type: none"> <li>Globally, outbreaks in each country follow the broader China life cycle but decline much more slowly due to lagged and weaker containment.</li> <li>Any second / third waves are much smaller in scope and manageable with existing healthcare resources.</li> <li>Mortality is below 0.5% as vulnerable/elderly people are isolated and younger populations with symptoms get tested and isolate.</li> <li>Testing becomes more widespread along with systematic centrally controlled contact tracing which works- but slow progress has many staying isolated waiting for death counts to approach zero which happens in late June.</li> <li>Antiviral drugs come too late or too weak to accelerate full exit from lockdown.</li> <li>Vaccine comes in mass scale in mid-2021.</li> <li>International travel restricted and mass events still banned.</li> </ul>	<ul style="list-style-type: none"> <li>Combination of full Korean-model works in most developed countries.</li> <li>Massive testing and case tracing put in place faster than expected.</li> <li>Mortality rate is below 0.5% with vulnerable isolated.</li> <li>Higher than reported infection rates leave 20% plus immune.</li> <li>Second waves more like ripples</li> <li>Antiviral medicines take the pressure off hospitals and reduce mortality (decreases fear and people move/spend more freely).</li> <li>Vaccine available in late 2020.</li> <li>International travel restricted</li> </ul>
Policy Response	<ul style="list-style-type: none"> <li>Escalated version of base case (announced) policy action with all guns blazing. Massive fiscal deficits.</li> </ul>	<ul style="list-style-type: none"> <li>Over \$8T of global government fiscal stimulus and over \$8T of central bank liquidity injections = almost 20% of global GDP.</li> </ul>	<ul style="list-style-type: none"> <li>Similar to base case without top ups. Earlier taper of liquidity and asset purchases.</li> </ul>
2020 Global GDP Real Growth (PPP)	-6.0% Long recession	-3.0% Short / sharp recession (vs +3.4% IMF Jan 2020)	-1.0%
10Y Treasury Yld @YE	0.3%	1.25%	1.75%
S&P 500 @YE2020	2,300	2,850	3,200

But we now have seen more clearly through the clouds about what is happening at street level. The severity of the current contraction guarantees that economies initially will see one or two quarters of very strong growth when businesses resume operations. However, it is hard to be positive about the pace of recovery beyond that initial spurt. Many businesses, especially small ones, may decide against reopening given the uncertainty about future revenue growth and the restrictions imposed by new physical distancing procedures. Many of them are financially fragile with the median company holding less than one month's cash on hand. According to OpenTable, 25% of US restaurants will close permanently. Against this background, considerable fiscal stimulus will not deliver a strong recovery; it merely limits the severity of the downturn.

Despite the increasing clarity on the negative economic effects of the virus, markets have remained resilient. Investor sentiment remains at extremely low levels with huge amounts of market shorts in place. These factors have historically underpinned equity market floors. The S&P 500 at 2950, 13% off its pre-Covid-19 peak, may still make sense in light of the economic damage being mostly limited to 2020 and 2021 and the scale of the stimulus.

These factors imply that there is now a lower probability of there being a near-term 10-15% equity market correction which decreases the potential value of tail hedges like gold, inflation-linked bonds and tail-hedging funds that we have in many client portfolios. However, the downside remains a non-trivial risk and we are retaining our "safety net" exposures to protect in such a scenario.

Turning to the longer-term, the extent of stimulus being pumped into the economy will have repercussions over the next decade. The growth it saves today will likely cost us in the future and we are unclear on how much of this is priced into markets today as this also depends on how future discount rates evolve. To help inform this thinking, we next turn our attention to review some key longer-term structural changes to the economy.

## Q6. What will be the longer-term structural changes to the global economy?

Here is a preview on what people we respect are saying today about tomorrow. As you read through it, think about whether markets have discounted these headwinds (or tailwinds, in the case of areas such as technology) into risk asset prices today.

1. **Structurally higher unemployment** will remain due to small company failures, while large companies will continue to gain market share without the need to hire given operating leverage. In the US, after spiking to the current 15% rate, unemployment is expected to end 2020 at c. 8%, but end 2021 probably c. 5-6% (vs. the 2019 low of 3.4%). A University of Chicago study estimated something worse than this 5-6% estimate. Their research forecast that 42% of recent job layoffs will end up being permanent which would add point to 8% unemployment in 2021. Europe had high unemployment going in and will suffer more from export market shrinkage (China turning inward).
2. **Disinflation followed by inflation.** We are already seeing deflation in major economies given the severity of the lockdowns. There is no chance that developed economies will be able to grow out of their rising debt-to-GDP levels, and we should rule out explicit default. No voters will have the stomach for the degree of austerity that would be required to bring deficits and debt-to-GDP back to reasonable levels. That leaves monetisation as the likely end point, which implies easier monetary policy than warranted by economic conditions, leading eventually to higher inflation. However, governments and central banks will also need to limit inflation such that rising healthcare and social security costs, as well as debt service, remain sustainable over the longer term.
3. **Ongoing massive fiscal and monetary stimulus** will favour some sectors more than others. This points to a bigger role of government which is generally not helpful to economic productivity.
4. **Companies will invest in resilience, not growth** suggesting lower foreign direct investment and business investment typically driving growth out of recession. Investors will want to identify those companies “leaning in.” Corporate investment levels will be constrained in any case by already high levels of debt and shareholder propensity to push for deleveraging for resilience.
5. **Deglobalisation through “on-shoring” and supply chain diversification** will exacerbate nationalist trends which were in place prior to Covid-19. Reductions in immigration means slower labour force growth and higher average wages. Deglobalisation will be more evident from the decoupling of US & China than any other change as we discussed in Partners Capital Insights 2020. With the virus’s Chinese origins, we will see many current customers and suppliers diversifying away from China.
6. **Savings rates will continue to rise** as those living more on the economic edge prepare for the next pandemic or other unexpected economic shock. The 60+ demographic will continue to cut discretionary spending such as travel in order to save for rising healthcare costs.
7. **Property market excess capacity** - the office sector will suffer as more companies adopt work-from-home and hot-desking policies, although lower density may raise effective costs. We expect retail to continue to suffer given continued social distancing measures and the acceleration of eCommerce adoption.
8. **Higher individual and corporate taxes** to fund fiscal deficits will stunt both consumer spending and business investment. This will be both related to cutting government deficits and funding higher healthcare costs, although the costs of redundant pandemic readiness

resources is not a big enough number to spur a boom in the sector despite what many analysts are saying.

9. **Borders effectively closed for much of 2020 and possibly part of 2021** – quarantines, selective travel bans, etc, with some trading and tourist hubs using technology and testing to bring flows back. Travel restrictions are only likely to be fully lifted once a vaccine becomes available.
10. **Boost to growth in the digital economy** – accelerating trends in place prior to Covid-19 as businesses and individuals turbocharged their use and understanding of technology to get through the crisis. There is also an added incentive to accelerate the adoption of labour-saving and productivity enhancing technologies.

The combination of the above structural changes would seem to point to slower global economic growth and slower corporate profit growth given the pressure on margins from rising wages from onshoring, supply chain diversification, and resiliency investment. Balancing this is the probable fall in discount rates we are likely to see over an extended period.

Our research team is spending a significant amount of time studying these critical questions related to growth, corporate profits, inflation and discount rates. The next few months will give us further clarity on what the future will look like, which will feed into revised long-term return assumptions by asset class. With a further drop in expected interest rates and the risk of inflation and rising rates, portfolios should continue to favour equities over bonds. And with lower expected traditional asset class returns generally, active management and private assets should continue to warrant high portfolio allocations.

#### **Q7. What implications does this update have for our investment strategy and manager selection?**

Despite the huge amount of uncertainty in the outlook for economic growth and financial markets, we are focused on staying disciplined and true to our core investment principles as we navigate our client portfolios through this market environment.

While we do not time overall portfolio risk, we continue to look across asset classes to determine how we can optimally allocate overall risk and rebalance your portfolios. Although we are informed by both fundamental and technical factors, some judgment is inevitably involved in the exact timing, size and asset class choices for rebalancing and tactical asset allocation.

Our economic scenarios argue for a shift in favour of more credit exposure at the expense of equities and absolute return (adjusted to maintain equivalent risk levels), with a focus on pockets within structured credit where we see compelling risk-adjusted returns. The distressed cycle, for which we have been patiently waiting, also seems to be picking up steam given accelerating downgrades and rising defaults, and we will be continuing to allocate to a series of distressed managers in the coming quarters. Finally, we continue to favour certain sectors within equities that will be most resilient in the post-pandemic world such as technology and life sciences, as expressed actively through our managers or through our newly-launched New World Equity Portfolio.

With the extreme market volatility in March now firmly in the rear-view mirror, we have also been able to step back and assess whether our managers are the right ones for the current and post-pandemic environment.

The events of the past few months have only accelerated themes and trends which were meant to play out over much longer timeframes. This greater rate of change points to greater opportunities for active long-short equities managers especially in areas such as consumer, technology and healthcare, consistent with our thematic positioning pre-Covid-19. While China will be negatively impacted by the restructuring of global supply chains and continued geopolitical tensions, our focus on the domestic consumer market and continued digitalization of the economy remains intact and ripe for alpha generation. In addition, we continue to underweight sectors and geographies which may continue to face structural headwinds such as energy, financials and emerging markets (excluding China).

Markets increasingly driven by Covid-19 news flow and increased geopolitical tensions also points to a greater need for nimble and opportunistic managers at the expense of dogmatic managers which cannot adapt to the new world order, or managers who are too large to be nimble. For example, several of our generalist equities managers were quick to recognise the dramatic and lasting impact of Covid-19 and quickly rotated as much as half of their portfolios from sectors/companies with headwinds to those with tailwinds. Conversely, value-oriented managers who are unable or unwilling to recognise the acceleration of long-term structural changes may continue to struggle. Quantitative managers, which generally struggled in Q1, may also be less well-positioned to navigate the Covid-19-driven news flow and geopolitical risks that lie ahead.

Upon examination and reflection, our managers generally passed the test of March 2020 with very few exceptions. While market movements blew through most downside stress tests, our managers successfully navigated through and have emerged stronger as a result with tighter risk management. While manager alpha was in aggregate marginally negative across liquid asset classes, it did not reflect what was one of the most severe market corrections since October 2008. The quarter has reinforced our conviction in most of our managers who have demonstrated calm, discipline and opportunism, with our best managers seeing this as an opportunity to further enhance long-term outperformance.

Finally, another reflection of our manager quality has been the fact that many of our closed managers opened to new capital to take advantage of the opportunities presented by the market dislocation. This is part of our standard playbook for periods of even small corrections. We reached out to several dozen managers including those who we have never successfully accessed. We had extraordinary success in March and April on this front, allocating to over a dozen managers including a new relationship with Sequoia China, and additional capacity with managers such as Ishana (Asian long-short equity manager) and Candlestick (consumer-focused long-short equity manager). Many of our clients will have benefited from these new allocations inside The Master Portfolio, other pooled vehicles and our latest Condor vintage.

### **Closing Comment**

As I mentioned in our Covid-19 update on 2 May, we plan to write only when we think you may have questions for us that we have not answered in our normal interactions between you and your Partners Capital team members. Given how fast facts are moving, we have communicated more than our usual cadence in the past couple of months, but we expect this to reduce going forward.

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## #13 Starting to sense a pattern – June 12 2020

Since we last wrote to you three weeks ago, the strong recovery in equity markets has led us to systematically rebalance many client portfolios. This protected clients from being “over-risked” going into last Thursday’s -5% correction, the worst day for equity markets since March.

We are largely back to “investing as usual” – rigorously rebalancing towards target risk levels, upgrading managers to those we expect to thrive in this market environment, and committing to thematic opportunities arising from the Covid-19 turmoil including dislocations and distress in credit, and the acceleration of technological disruption.

However, there remains considerable uncertainty regarding (i) how the Covid-19 pandemic continues to play out across the world (ii) how governments, businesses and consumers will respond (iii) the resulting impact on economies, and (iv) the resulting impact on markets. The mechanism and impact of each one of these categories on the next remains highly complex, rapidly changing and difficult to analyse. Nevertheless, we address four questions that we thought you would have on your minds.

**Q1.** How bad are the recent Coronavirus outbreaks in the US that spooked markets last Thursday?

**Q2.** How do we reconcile equity market price levels with the status of the coronavirus and its economic impact?

**Q3.** What are the investment implications of the latest US Federal Reserve announcement that they expect to hold rates near zero for next three years?

**Q4.** What ever happened to the Google/Apple contact tracing application?

Of course, these are not the only macro issues that we are watching closely. The impending US elections are likely to create significant domestic and international volatility, while increasing geopolitical tensions with China (not just with the United States) will continue to strain international cooperation and trade. Finally, mass demonstrations in the wake of George Floyd’s death in late May have now spread to over 140 cities across the United States (with the National Guard mobilized in 21 cities) and over 60 countries on every continent.

As always, we welcome any feedback and data you think we may benefit from. We hope you enjoy this weekend wherever you may be sheltering.

### **Market Overview**

#### **Government Bond markets (as of 12 June 2020)**

	Yields
US 10-year Treasury	0.70%
UK 10-year Gilt	0.21%
German 10-year Bund	-0.44%

### **Equity markets as of Thursday (as of 11 June 2020)**

	MSCI World	S&P 500	China A-shares
11-Jun-20	-5.0%	-5.9%	-1.1%
WTD (8-11 June)	-5.2%	-6.0%	-0.1%
MTD	-0.3%	-1.3%	3.3%
YTD	-7.4%	-6.2%	-2.5%
From Peak	-11.3%	-10.8%	-5.0%
From low	31.5%	34.8%	13.2%

### **Credit markets as of Thursday (as of 11 June 2020)**

	Spread over Treasuries			Yield to Worst		
	11 Jun 2020	Change MTD	Change YTD	11 Jun 2020	Change MTD	Change YTD
Global High Yield	6.6%	-40 bps	235 bps	7.0%	-1 bps	133 bps
US Corp High Yield	6.2%	-122 bps	284 bps	6.8%	110 bps	165 bps
US Corp High Yield ex-energy	5.6%	-77 bps	265 bps	6.3%	-13 bps	149 bps

### **Q1. How bad are the recent Coronavirus outbreaks in the US that spooked markets last Thursday and what do we learn about the virus' likely future spread with economic opening?**

We have been logging all second waves we hear about and these are summarized below. Most would say that this is far better than expected at this point in time, with the greatest concern being in the US.

#### **Exhibit 1: Log of Second Waves of the Coronavirus around the world**

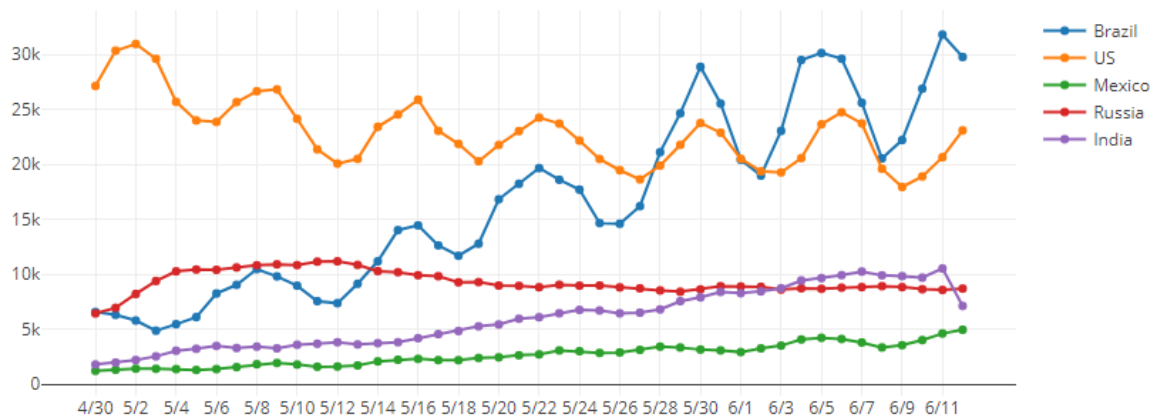
Date	Second Wave	Source	Impact	Cause
04-Apr	<b>Singapore</b>	Chinese and Malaysian migrant worker dorms	23 deaths	border breach
06-May	<b>South Korea</b>	29-yr old super spreader visited 5 Itaewon nightclubs	250 cases; no deaths	breach of quarantine
15-May	<b>Iran</b>	Mid-April restrictions eased, broad based second wave	from 1000 cases back to 3000/day	premature lockdown opening
19-May	<b>China</b>	Shulan City received migrant Chinese workers back from Russia	40 cases reported (expect it was far more)	border breach
20-May	<b>Germany</b>	Abattoirs and food processing plants in 4 cities across Germany	800 cases, 2 deaths	latent infected in spreading environment

26-May	<b>South Korea</b>	Coupang Co e-commerce distribution centre in Bucheon, near Seoul	70 cases, no deaths	breach of quarantine
28-May	<b>Alaska</b>	Anchorage care home outbreak, attributed to staff	17 cases, no deaths	care home staff
02-Jun	<b>Hong Kong</b>	Lek Yuen public housing estate in Sha Tin; tested HK nationals returned from Bangladesh	9 cases, no deaths	border breach
02-Jun	<b>Tokyo</b>	Musashino Central Hospital and spread to nearby neighbourhood	34 cases, no deaths	infected hospital employee
06-Jun	<b>South Florida</b>	Premature opening as this is broad based across several counties	from 500 to 1600 cases/day, 20 to 47 deaths	premature lockdown opening

The clear lesson from these clustered outbreaks is that border security and screening would appear to be crucial to preventing new outbreaks. The one area where we have truly seen a second wave is in Iran. Iran expected to have brought the virus under control by late April via its lockdown. However, an easing of restrictions, outbreaks occurring in neighbouring countries, low level adherence to social distancing rules and an almost non existing test, track and trace system has led to a second wave of cases. Iran's second wave appears to have originated in the oil border province of Khuzestan. The town is subject to a lot of international arrivals as it is an oil hub and on the border with Iraq. Iraq's case levels were only beginning to rise as Iran started to ease restrictions.

The number of new cases in the US, as shown in the yellow line below, points to a "bumpy flattening" which reflects the continued challenges of containing the pandemic. Meanwhile, it is clear that the pandemic continues to rage outside the US, especially in emerging markets. Brazil has surpassed the US in new case count. India and Mexico are still seeing rapid growth with no effective containment. Russia appears to have flattened the curve, as testing increases to over 100,000 per day.

**Exhibit 2: Countries with largest new case growth (3-day average of daily new cases)**



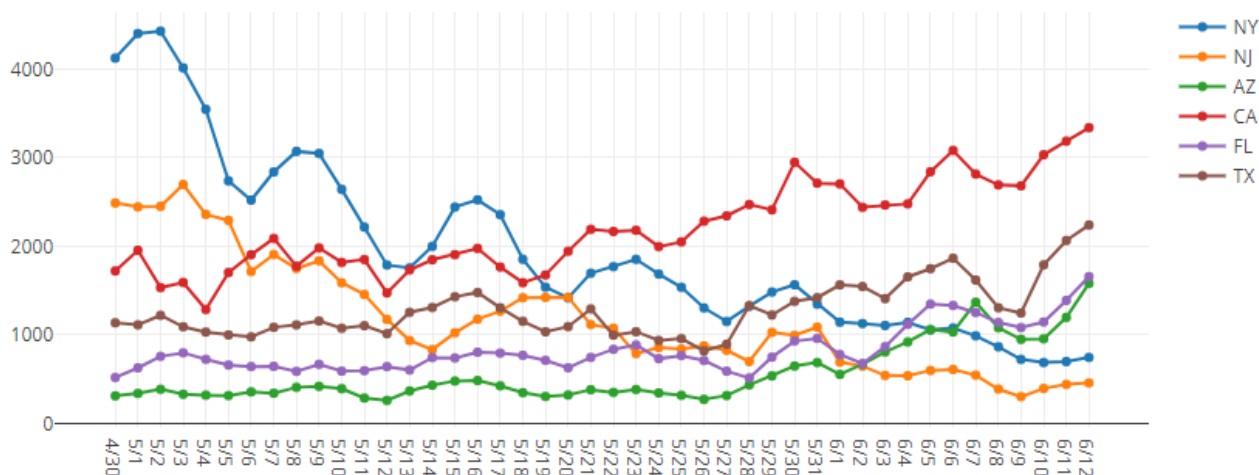
Within the US, the total number of cases has declined by 15% over the last five weeks from the end of April to the 11<sup>th</sup> of June, although the number of cases will be inflated by increased testing. Encouragingly, nationwide deaths are down 61%. However, it is clear that the US statistics reflect both states such as New York and New Jersey, which were the worst hit and showing no signs of a second wave at present, and states which are beginning to see an acceleration in both cases and deaths.



Cases are rising in 21 US states with the worst being California, Florida, Texas and Arizona. Increased testing will partially explain the increased number of cases. However, the number of daily deaths is still increasing in nearly a dozen states, albeit off a low starting point, with Florida at double the number of daily deaths compared to April. Arizona deaths are up 58% while Texas and California are experiencing a persistent, but not increasing, number of deaths.

It remains premature to be discussing a second wave when half the country has not yet even fully dealt with the first wave. States such as New York which have survived the first wave have only just begun to open their economies (e.g., New York City only began reopening on 8<sup>th</sup> June), so it is also too early to tell what the effect of opening will be on new cases. Also, it will be critical to track the potential escalation in cases in the coming weeks arising from the mass demonstrations across the country.

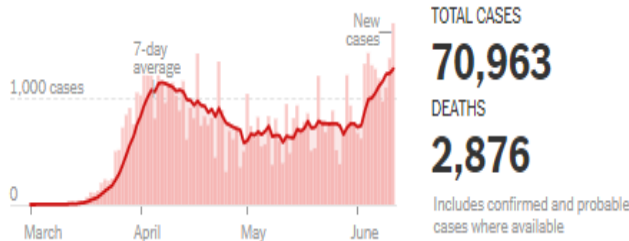
**Exhibit 3: Current four worst states for rising cases (CA, TX, FL, AZ), compared to previous worst states (NY, NJ) – (3-day average of daily new cases)**



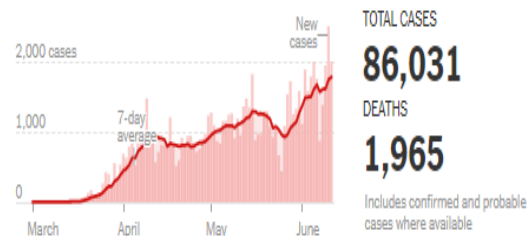
**Exhibit 4: Trends for cases and deaths in 6 largest states and nationwide**

State	% of US population	April 30th 7-day avg daily deaths	June 11th, 7-day avg daily deaths	Growth in Deaths	Apr 30 newly infected	11 Jun newly infected	Case Growth Rate	30 Apr - 9 Jun Testing Increase %	infection rate (R0)	Positive Test Rate %
New York	6%	373	58	-84%	4125	744	-82%	128%	0.79	1%
New Jersey	3%	257	68	-74%	2488	456	-82%	225%	0.85	2%
Florida	7%	20	47	135%	517	1657	221%	168%	1.07	4%
Texas	9%	28	22	-21%	1135	2239	97%	67%	1.09	8%
Arizona	2%	12	19	58%	310	1581	410%	308%	1.26	14%
California	12%	85	80	-6%	1721	3339	94%	143%	1.03	5%
<b>6 States subtotals</b>	<b>39%</b>	<b>775</b>	<b>294</b>	<b>-62%</b>	<b>10296</b>	<b>10016</b>	<b>-3%</b>			
<b>Total US</b>	<b>100%</b>	<b>2259</b>	<b>886</b>	<b>-61%</b>	<b>27133</b>	<b>23095</b>	<b>-15%</b>			
<b>FL, TX, AZ + CA %</b>	<b>30%</b>	<b>6%</b>	<b>19%</b>		<b>14%</b>	<b>38%</b>				

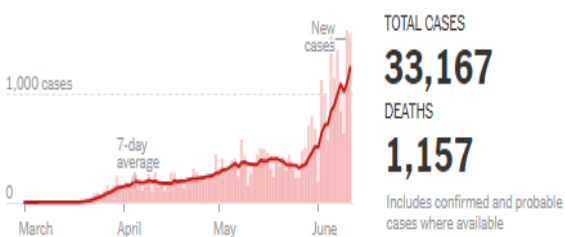
## Florida



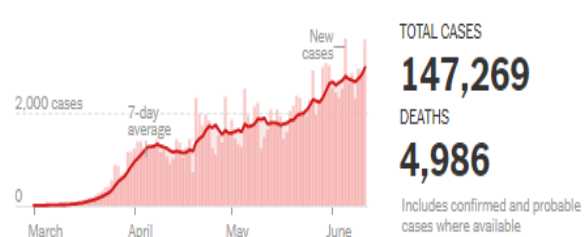
## Texas



## Arizona



## California



In Florida, which is clearly showing signs of a second wave, cases have tripled since late April to 1,657 a day with deaths more than doubling from 20 to 47 per day. Tests have increased by 167% since the end of April which will explain part, but not all, of the measured case increase. The state slowly began to reopen in May. Now in June, most businesses across the state are open at limited capacity with social-distancing regulations in place.

Cases in Texas have doubled to over 2,000 per day vs 1,000 per day in late April. Tests have increased 67% over the same period. About a quarter of the new cases are in counties with large prisons and meatpacking plants that were never forced to shut down. However, deaths appear to be stable for now. Texas has reported average daily deaths at 22, down from 28 in late April.

In Arizona, cases have increased by 400% since the end of April to 1,580 per day while the number of deaths has risen from 12 to 19 per day. A quarter of all cases in the state are on Indian reservations, which have especially high-risk populations. Arizona appears particularly ill equipped to deliver on testing and tracing, with only 100 contact tracers. With 1,580 new daily cases, Arizona may need over 20,000 contact tracing staff to trace all new cases in 48 hours, which is the critical window of containment before too many other people are infected.

California is now averaging nearly 3,000 new cases a day, up from 2,000 per day at the end of April. Deaths remain at around 80 per day, unchanged from late April. The infection is shifting to Southern California. Los Angeles County has recorded 48% of new cases in the last two weeks, while home to only a quarter of the state's population. Testing is increasing but is still below California's goal of averaging more than 60,000 tests per day.

What will have to happen for cases to get under control in places like Phoenix and Los Angeles? Few experts or politicians are advocating for herd immunity, given the poor outcome in Sweden relative to its neighbours, Denmark and Norway. With what are now believed to be highly accurate antibody tests, initial results suggest infection rates ranging from 5% to 15%, nowhere near the 60% required

for herd immunity. Innate immunity needs to be very high to close this gap. Until we have an effective vaccine, there is therefore no alternative to social distancing, although the severity of this can be reduced where there are effective testing and tracing processes in place. The US and UK, in particular, are still struggling to implement these systems. As we can see from the Google Mobility data, whether governments are opening or not, people are voting with their feet and still staying home far more than would be required for a V-shaped economic recovery.

**Exhibit 5: Google Mobility Reports showing 10<sup>th</sup> June level of return to normal activity (Jan 2020)**

Country/Region	Retail & Recreation		Grocery & Pharma		Parks		Transit Stations		Workplaces	
	1 Month Ago	Current	1 Month Ago	Current	1 Month Ago	Current	1 Month Ago	Current	1 Month Ago	Current
US	-29	-20	-6	-2	6	34	-43	-34	-44	-36
NYC	-54	-44	-16	-8	-30	4	-65	-57	-55	-46
CA	-46	-36	-10	-5	-17	-10	-47	-42	-48	-40
UK	-69	-63	-22	-17	16	9	-62	-56	-63	-53
LON	-77	-71	-27	-20	16	-3	-74	-67	-71	-62
GER	-33	-20	-5	-2	49	21	-35	-32	-28	-26
FRA	-72	-26	-23	-1	-49	-7	-69	-37	-57	-33
ITA	-61	-28	-28	-10	-32	1	-58	-40	-46	-32
S Korea	-10	-6	9	10	48	37	-4	-2	-1	-2
HK	-21	-13	-2	3	-11	-17	-29	-19	-9	-8
Average	-47.2	-32.7	-13.0	-5.2	-0.4	6.9	-48.6	-38.6	-42.2	-33.8

There is still a lot that scientists do not know about the spread of the virus. But there is ample evidence that social distancing makes a difference, with some measurable relationship between the stringency of those actions and the resulting impact on deaths as shown in some recent regression analysis performed by research house, BCA.

The testing and tracing response show a low correlation as most countries in this data base had little testing activity in place. The rest of these results are not overwhelmingly conclusive but do conform to common sense outcomes from specific actions. This leaves us believing that social activity will be constrained even after governments remove restrictions as the fatality rates are unlikely to fall to levels which give people sufficient confidence to move about freely unless testing and tracking programs do the job they can do.

**Exhibit 6: School closures, cancelling public events and international travel restrictions appear to explain lower fatalities**

R-Squared Values: Stringency of Early Covid-19 Government Response vs the Magnitude of confirmed cases and fatalities

<b>Government Response</b>	<b>R-squared to Magnitude of Fatalities</b>
School Closing	33%
International Travel Restrictions	33%
Cancel Mass Public Events	28%
Domestic Travel Restrictions	17%
Public Information Campaign	17%
Workplace Closing	15%
Close Public Transport	13%
Stay at Home Requirements	13%
Restrictions on Gatherings	8%
Testing Policy	8%
Contact Tracing	2%

Source: Hale, Thomas, Sam Webster, Anna Petherick, Toby Phillips, and Beatriz Kira (2020). Oxford Covid-19 government response tracker, Blavatnik School of Government, The Center for Systems Science and Engineering at Johns Hopkins University, and BCA Research calculations. Data as of 3 June 2020. Above regressions exclude Belgium, Italy, the Netherlands, Spain and Switzerland, countries where the virus reached extreme levels before any containment actions were implemented.

**Q2. How do we reconcile equity market price levels with the status of the coronavirus and its economic impact?**

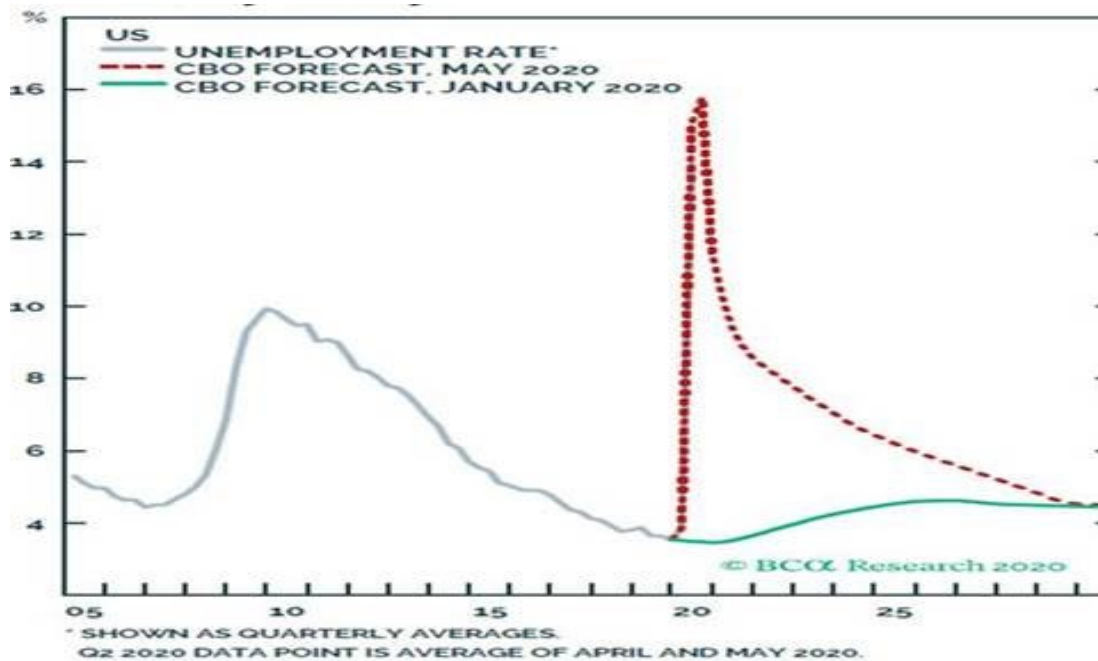
Incorporating Thursday’s -5% fall in global equity markets, global equity markets are down -6% YTD through Friday and down -10% from the peak. How do we reconcile the negative economic and pandemic data with a nearly full recovery of equity markets to previous highs? We of course cannot be certain, but we believe that there are several factors explaining this.

First, the S&P 500 is a market cap weighted index of which ~25% is represented by the technology sector. If you include communications services (e.g., Google and Facebook) the broader definition of technology represents c. 36% of the index. While revenue growth in these sectors had been strong prior to Covid-19, the pandemic has merely accelerated trends which were already in place. Conversely, cyclical and value stocks were initially hit much harder and have only partially recovered, particularly energy companies (reduced energy demand) and banks (increased loan loss reserves).

Second, fundamental data has been improving. While last week’s payrolls data was a huge surprise at a gain of 2.5 million jobs vs expectations for a decline of -7.5 million, it only represents c. 10% of the jobs lost since the beginning of the crisis. However, as lockdown measures have been eased other high-frequency indicators have been improving faster than the official data. Auto sales have now fully recovered to pre-crisis levels and Chase consumer card spending data suggest broader consumer spending has risen from -60% below average to only -16% below average today. The positive momentum in the cyclical / value sectors has been further validated by CEO guidance. At the end of May, at the Bernstein Strategic Decisions Conference in New York, JP Morgan’s CEO, Jamie Dimon, said that the consumer is in good shape and consumer spending in aggregate has improved from the trough levels of April.

However, there are lingering questions about how long it will take for employment levels to recover. Although the most recent Federal Reserve projections in June see unemployment declining to 5.5% in 2022, and to 4.1% in 2023 and beyond, a slightly older (mid-May) estimate from the CBO forecasted a much slower rate of decline in the unemployment rate. Clearly, the trend in data has improved sharply since mid-May, but with about 12% of US workers employed in the hospitality, restaurant, and travel sectors, there is still much uncertainty around when activity in these sectors will recover.

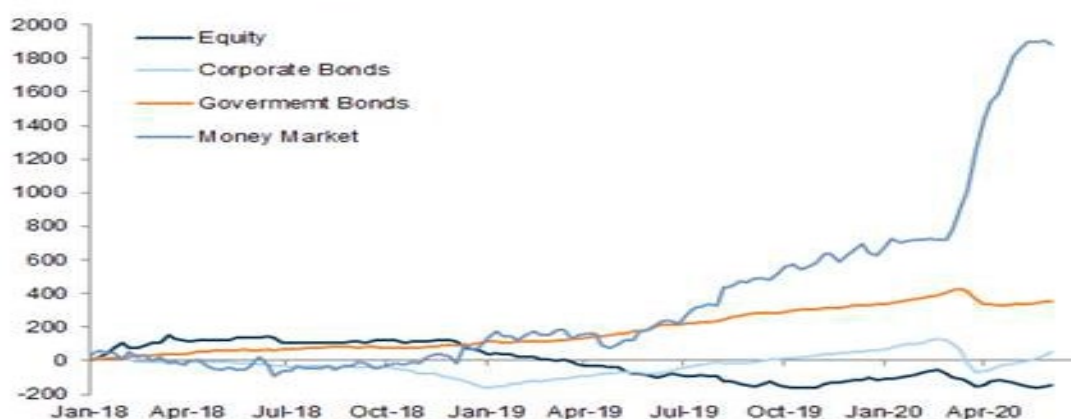
**Exhibit 7: CBO project the US unemployment rate will fall very gradually**



Third, the wall of monetary liquidity created by the Fed has to go somewhere. The US Treasury is now holding \$1.5 trillion in its cash account at the Fed, up from \$400 billion prior to the pandemic. Money supply (M2) growth is now growing at the fastest rate ever (up over +17% yoy). Flows into money market funds have been huge, but with record low interest rates, equity earnings yields of c. 5% (inverse of forward P/E multiples of 20x) still look attractive. This gap may put a floor on equity markets with the big assumption that any second waves will not precipitate a return to mass lockdowns.

**Exhibit 8: Money market inflows have been large, while equity fund flows turned positive only last week**

Cumulative fund flows globally (\$ bn)



Source: EPFR, Haver, Goldman Sachs Global Investment Research

In conclusion, equities are a long duration asset and investors look through temporary economic weakness, as long as it remains temporary. Clearly the wall of liquidity and stimulus that is being pumped into the economy also helps. But if fundamentals don't eventually pick up, none of this will help. Recall what happened over the last ten years in Japan which, despite huge monetary and fiscal stimulus via all the Abe arrows, still experienced anaemic economic and equity market growth. Conversely, if economic activity picks up in the US and the rest of the world, then we won't really need any of this firepower.

**Q3. What are the investment implications of the latest US Federal Reserve announcement to hold rates near zero for next three years?**

On Wednesday the Federal Reserve released its first Summary of Economic Projections (SEP) following the Covid-19 crisis. The most important takeaway was the expected path of interest rates. With remarkable unanimity, 15 members saw unchanged interest rates until the end of 2022, except for one member who expected one increase in 2022, and one member who expected four increases in 2022.

The median expectation for US GDP growth this year was -6.5%. However, experts have been noting upside risk to this based on May spending data. 2021 growth is expected to rebound by +5.0%. Interestingly, the longer-term (post 2022) growth, inflation and unemployment rates are all expected to revert close to 'normal' levels as shown in US Fed's estimate in the table below.

The clear message from these projections is that the Fed sees the economic impact from the pandemic as likely to be temporary as long as sufficient monetary and fiscal supports are provided and maintained. In his press conference, chair Powell reiterated his call to Congress to provide further fiscal stimulus. For its part, the Fed is crucially signalling to investors that it intends to keep monetary stimulus in place for an extended period of time, even if it believes growth will start to recover sharply in 2021.

Overall, this aligns with our view that growth, employment and inflation will be positive economic factors over the longer term, and more crucially that the Fed will likely err on the side of keeping rates lower for longer to ensure support for the economic recovery.

**Exhibit 9: US Federal Reserve GDP, Inflation and Interest Rate Forecasts**

(%)	2020	2021	2022	Longer-Run (2023 onwards)
<b>Real GDP</b>				
June latest projections	-6.5	5	3.5	1.8
Dec '19 projections	2	1.9	1.8	1.9
<b>Unemployment Rate</b>				
June latest projections	9.3	6.5	5.5	4.1
Dec '19 projections	3.5	3.6	3.7	4.1
<b>Core PCE Inflation</b>				
June latest projections	0.8	1.6	1.7	2
Dec '19 projections	1.9	2	2	2
<b>Fed Funds Rate</b>				
June latest projections	0.1	0.1	0.1	2.5
Dec '19 projections	1.6	1.9	2.1	2.5

**Investment Implications of Fed news:** To the extent that interest rates are kept low through 2022, this will provide support both for economic growth and for risk assets, including both credit and equity markets. The key question is whether inflation will rise faster than expected in the context of fiscal and monetary stimulus, combined with a political drift towards greater protectionism. Normally, higher deficits and inflation would build an inflation or term premium into longer maturity bond yields, even if the Fed keeps short term interest rates low. However, the Fed has signalled it intends to use all its tools, including forward guidance and bond purchases (which will continue for the indefinite future) to keep bond yields down for as long as needed.

On bond purchases, some have suggested that if the Fed were to use yield caps rather than pure QE, it would be less advantageous for risk assets (e.g., equities). With yield caps, the Fed would buy bonds only when yields exceeded certain target levels, whereas pure QE would inject liquidity into the market regardless of yield levels. The latter scenario of a liquidity deluge would push investors to allocate more capital into riskier assets. In any event, Powell has made it clear that at this stage all options are being considered, and policy tools would be decided upon depending on the path of economic growth.

#### **Q4. What ever happened to the Google/Apple contact tracing application?**

Testing and contact tracing is the key to re-opening economies. Contact tracing can be done entirely manually or with the help of digital contact tracing applications. Such apps have contributed to the success of Singapore and Australia as they have seen some of the highest adoption rates of a contact tracing app. They both used TraceTogether, which received strong adoption in part due to intense government marketing. South Korea has integrated its app into a multi-pronged, nationwide response that includes extensive testing and detailed data collection. China, meanwhile, has both a national app and a number of regional versions with disparate approaches to collecting data and privacy.

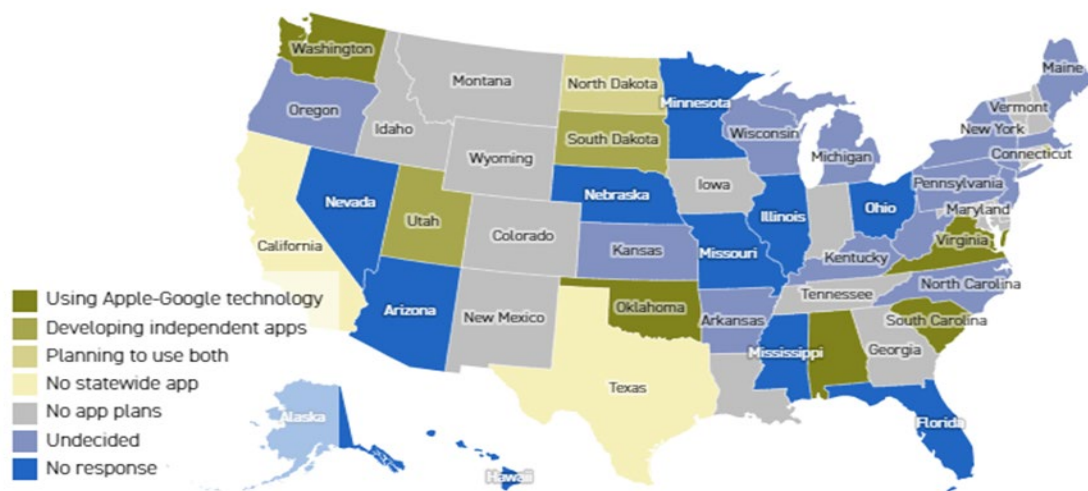
On 20<sup>th</sup> May, Apple and Google released their long-awaited smartphone technology to automatically notify people if they might have been exposed to the coronavirus. The technology from Apple and Google is not technically an application — rather, it is software that public-health authorities can use to build their own apps. The companies had said that 22 countries and several US states were already planning to build voluntary phone apps using their software.



That said, any app built on this platform would protect the identity of app users by encryption and anonymous identifier beacons that change frequently. The software will be downloadable on most Androids and iPhone models. The Google-Apple rules assure users of privacy in that it only permits apps that store data on the user's phone by default, instead of automatically uploading it to a central database. Users have to consent to share data with authorities.

Public-health agencies in the US have been reluctant to adopt the technology, preferring technology that gives them the contact data. Business Insider magazine contacted officials in all 50 states and Washington, DC; only three states confirmed plans to use the technology from Apple and Google. Meanwhile, 16 states ruled out the possibility of building contact-tracing apps entirely. Georgia, Maine, and Indiana are among the states that said they planned to rely only on human contact tracers. The slow uptake casts doubt on the viability of containing the coronavirus with contact-tracing apps, which require the majority of people to participate in order for it to have the desired effect. It is looking as though these tech giants might not play a major role in the coronavirus response after all.

**Exhibit 10: State tracing app usage plans**



Notes: California and Texas each have regional apps. New York City has its own system.  
Map: Bob King/Politico - Source: POLITICO research | Updated: June 11, 2020 1PM

For smartphone-based contact tracing to work, experts say, at least 60% of a country's population have to adopt it. If there are multiple apps, they have to talk to each other. Three weeks after the Google/Apple technology was made available, it appears there may not be a single app solution in the US, and many US states and countries will be going down their own paths, just as Germany is with SAP and Deutsche Telecom. Purely manual tracing will have to suffice in the interim.

**Overall Investment Implications of Recent Events**

We remain sceptical of the ability of government authorities to build scalable testing and tracing programs, which is essential to enable economies to fully re-open in the absence of a vaccine. Equity markets appear to be looking through these challenges but are likely well supported by the ultra-accommodative stance of the Federal Reserve. This ultra-dovish outlook for monetary policy significantly reduces the risk of rising rates in the near-term, but with near-zero yields, we still struggle to allocate to fixed income, and will continue to hold gold and inflation linked bonds as our safety net assets. Despite the recovery in liquid credit in sympathy with equities (supported by the unprecedented buying of high yield bonds by the Federal Reserve), we believe that we are entering a



distressed cycle and will see continued dislocations and an increasing opportunity set for distressed credit and rescue financing.

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#### **#14 Sir Ronald Cohen's new book: 2<sup>nd</sup> July Release – 25 June 2020**

You will soon be receiving from us a copy of Sir Ronald Cohen's latest book, *Impact: Reshaping capitalism to drive real change*. Ronnie is a long-time strategic investor in Partners Capital, the founder of the €50B Apax Partners venture and growth capital firm and is referred to as "the father of impact investment", having been a leader in this arena for over 20 years, and chairing the G8 Social Impact Investment Taskforce in 2013-14.

This book is not just about impact investing. It lays out what needs to change in order to spread opportunity more fairly to those most in need around the globe, reduce inequality and preserve our environment.

I devoted an afternoon last weekend reading Ronnie's manuscript of the 194-page book, which he sent me in advance of the official release date of 2<sup>nd</sup> of July. This felt a bit like being invited to the premiere of the next 007 movie, so I read it in order to be the first to tell you about it. With podcasts and masses of other media and a plethora of new books out every month, should you read this one? Let me share with you what I got out of it.

First of all, Ronnie convinced me that I am not alone in not trusting governments by themselves or the invisible hand of capitalism to save our planet, eliminate poverty and reduce inequality (whose consequences have been so starkly evidenced yet again by the outcry following the murder of George Floyd). This is increasingly the majority view; and people who care hugely about seeing more positive social and environmental impact are not sitting still waiting for someone else to deal with it. The UN's Sustainable Development Goals (SDGs), the \$31T of ESG investments comprising 15% of all investments in the world and the growth of impact investing are things we know a bit about. Do you need to read more on this?

I read books to change my way of thinking in a positive direction. This book did exactly that, by educating me about where we are in this journey towards creating an "impact economy" in Ronnie's words and what momentum there is behind it. Frankly, I also read it because I can't afford to be surprised by where this phenomenon is in its evolution. Before reading the book, I thought all of us here at Partners Capital were way out in front on ESG and impact investing and "pulling" people into this new form of investing. Having read the book, I am inspired to move a lot faster in making our clients aware of these new trends and impact investing in particular. The book gives data and live examples about where pension managers, foundations, governments, asset managers, shareholders and corporate boards are today with regard to impact investing and where we might expect to find them soon. It is not a book full of concepts and philosophy, but rather chock full of examples of actual impact investments and what these different stakeholders are already doing in the field of impact investing.

Ronnie starts with the simple point that investors are quickly moving in the direction of evaluating every investment on the basis of risk-return-impact, not just risk-return. Ronnie believes that the impact revolution will follow a similar pattern to that of the tech revolution. He tells us where regulators should be on mandating "impact-weighted accounts" which he views as the tipping-point to creating the impact economy. He educates the reader about the new breed of philanthropists (people like Pierre Omidyar and Bill Gates), most of whom have come out of the tech world and are managing foundations where grant making is tightly tied to impact measurement and

portions of the foundation’s capital is being allocated explicitly to impact investing. Several of our institutional clients are named in the book, who have had impact investing programs in place for many years.

The book’s primary purpose is very clear: to be a catalyst for accelerating the progress all stakeholders make in entering the impact investing world and to that end, if no other, I encourage you to give it a read once you receive your copy from us in early July.

## #15 What a mature pandemic looks like - October 11 2020

As we enter the fourth quarter of this tumultuous year, experts estimate that 8% of the world’s population has been infected with Covid-19. Inadequately improved levels of testing have distorted data on case counts, but new cases are stubbornly persistent in the US, many parts of Europe and in Brazil. With improved therapies and hospital treatment, mortality rates are approaching levels of the seasonal flu. Despite the recent Covid case resurgence, the drop in mortality rates combined with public fatigue of lockdowns suggests a repeat of the severe lockdowns of last March remains an unlikely prospect in most countries going forward. Localised lockdowns will continue where case clusters sprout. Human behaviour, rather than government-imposed lockdowns continue to depress levels of economic activity to 10-15% below normal with pockets of deeper declines in the obvious places. Sectors such as hospitality, entertainment, and travel are currently undergoing or at risk of further restrictions and business failures.

While no miracle cure has yet been found, enormous progress has been made in both therapeutics and vaccine development, but mass availability of vaccines should not be expected before Q2 of 2021. On the economic front, Q2 2020 growth was less depressed than feared, and third-quarter growth has exceeded even some of the more optimistic predictions. The latest full-year 2020 growth forecasts suggest global GDP will be down c. -4.0%, while US growth may ‘only’ decline -3.7% vs earlier expectations of -8.0%. With governments continuing to support history-making levels of stimulus, financial markets have rebounded, and global equities are now in the black up c. 1.0% YTD; an unfathomable outcome given the severity of the crisis.

### Equity markets as of 6 October 2020

Equity Index	YTD	From Peak	From Low
MSCI World	1.0%	-4.8%	48.4%
S&P500	5.5%	-5.0%	52.4%
China A-shares	19.2%	-1.5%	43.7%

### Credit markets as of 6 October 2020

	Spread over Treasuries			Yield to Worst		
	Current Level	Change MTD	Change YTD	Current Level	Change MTD	Change YTD
Global High Yield	5.3%	-0.3%	1.0%	5.7%	-0.3%	0.0%
US Corp High Yield	4.8%	-0.4%	1.5%	5.4%	-0.4%	0.2%
US Corp High Yield ex-energy	4.4%	-0.4%	1.4%	5.0%	-0.4%	0.2%

Source: Bloomberg

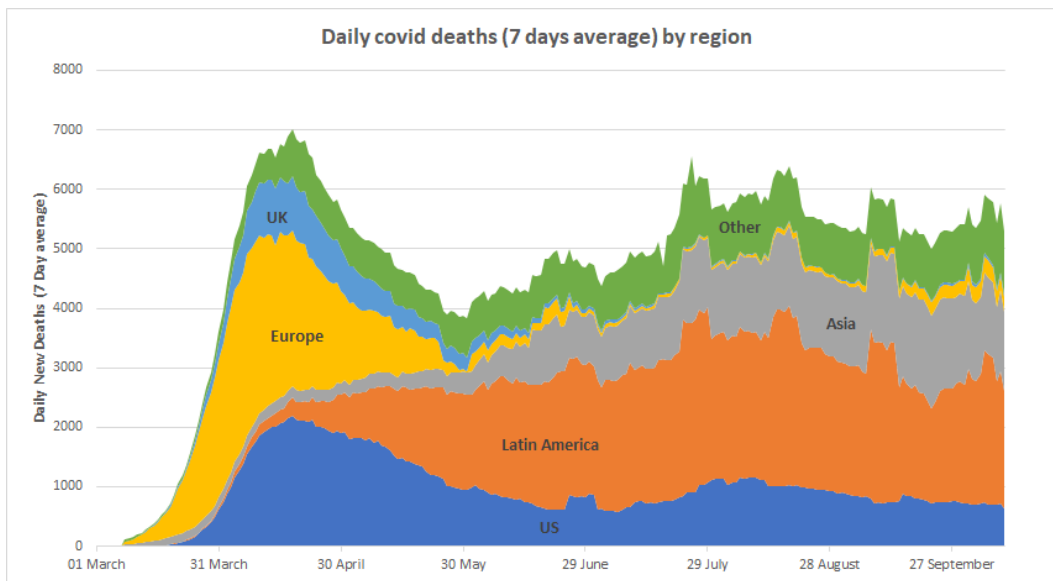
In this note, we aim to bring our clients up to speed on the latest developments and prospects on Covid-19, the stimulus response from policymakers, their cumulative impact on the economy and how these shape investment themes and portfolio positioning. In addition to Covid-19 developments, the outcome of the upcoming US election will also be a key determinant of the amount and shape of any further fiscal stimulus, but we also argue below that the election outcome appears to be increasingly linked to this pandemic, bringing these two issues together. Many experts suggest that to the extent that the pandemic is the key issue on voters' minds in November (as opposed to, for example, taxes or law and order), the more likely a Democratic win becomes, and by extension the greater odds for increased fiscal stimulus.

### **1. What is the current trajectory is Covid-19?**

What we now know is that the stealth nature of this virus makes it difficult to measure how much the situation is improving using case counts. Experts believe that the initial waves may have underestimated case counts by nearly 20-fold and actual daily cases today are 10% of the peak level in May. Perhaps the most reliable measures for tracking the pace of virus change are deaths as a proportion of the population and mortality rate. Deaths/million/day in advanced economies have declined from c. 10 in March-April to approximately 1 death/million/day today. Mortality rates (Hospitalisation rate x deaths/hospitalisation) have fallen 82% in the US from 2.3% (adjusted for higher testing) to 0.42% today. Adjusting for asymptomatic cases, the mortality rate is very close to that of a normal flu, which has a death rate of 0.10% with 30 million cases and 600,000 hospitalisations on average over the last 10 years in the US.

Eight months into the global pandemic, we see the global death rate has remained stubbornly high at or about 6,000 deaths per day since hitting that level for the first time in April, with a cumulative death count of over one million. Exhibit 1 below shows the flatness of this tragic pattern, but sees it migrating across the globe over time from China to Europe, then to the US and now predominantly in Latin America and India. Latin America is the current epicentre of the pandemic, with the region accounting for over a third of all new virus-related deaths, driven by Brazil, Mexico and Colombia as illustrated in Exhibit 1. India appears to have finally peaked with over 90k daily cases and 1,000 daily deaths. In Europe, Australia and Japan, governments have implemented new localised restrictions to contain second waves, with Spain and France struggling the most. These second waves are differentiated by far lower hospitalization and death rates. Hospitalisations are just 2-3% of cases compared to over 10% during the summer but experts believe many cases may have gone undetected, particularly in the early stages of the pandemic. The official Covid global case count currently stands at just over 36 million, although experts put the actual number at over 600 million.

**Exhibit 1: Latin America accounts for nearly 40% of Covid related deaths**



Source: Bloomberg

Although in some regions the current wave of new cases appears as large or larger than the first, this is almost certainly explained by an underestimation of the scale of the first wave. The Economist recently published a seropositivity model based on data gathered from studies by Johns Hopkins. The model uses 279 serosurveys (antibody test-based sampling) taken from different regional sample populations which are extrapolated based on reported cases, confirmed deaths and average country income. While we would emphasise that this is purely a model estimate, the implications are quite striking. The model's results are shown in Exhibits 2 and 3 estimating that the true number of global cases is closer to 600 million<sup>1</sup> vs the officially reported 36 million. This would suggest that 8% of the global population has been infected.

**Exhibit 2: Cumulative Global Covid cases are estimated to be 8% of the global population at 600M to date vs the 36M reported**

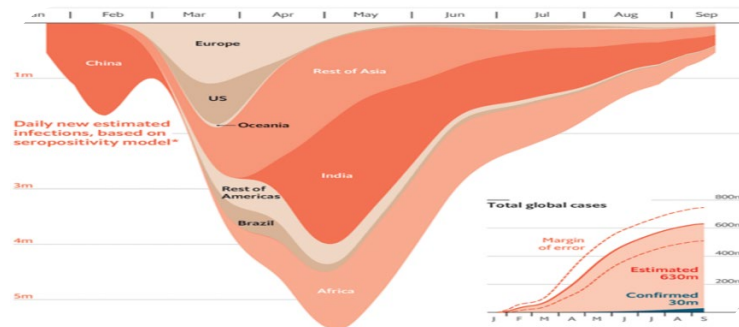


Source: The Economist

Exhibit 3 shows the models' estimate that global new cases peaked in early May at 5.7M per day vs the officially reported 90,000/day or over 60 times more cases than were reported. The model suggests that current daily cases are approximately 10% of where they were in May at around 500,000 cases vs the 350,000 cases being reported then. This huge disparity is largely explained by low levels of testing in most countries in the early stages of the pandemic combined with poor government data

from developing countries including China. The model estimates that China’s cases peaked in mid-February with 1.7M cases per day when China was reporting just 8000 cases per day. The second wave currently taking place in Europe would appear to be just under one-tenth of the size of the initial wave using the Economist’s model. While the US was reporting 25,000 cases per day in late May the estimate of actual cases is 700,000.

**Exhibit 3: Daily new cases today are estimated to be about one-tenth of where they were in late April**



Source: *The Economist*<sup>2</sup>

The estimated 90% decline in cases is explained by the actions of social distancing. The biggest drivers are people working from home regularly, this is now 43% in the UK<sup>3</sup>, more prevalent use of facemasks and greater sheltering among the most vulnerable. There is also likely some degree of immunity present following the initial wave.

The implication is that the current situation is not as bad as the official data would suggest – i.e., current waves are in reality much smaller than what was truly happening in the first waves. Cases are, however, on the rise in many countries, even after adjusting for testing rates and other factors. The trigger for this new wave of cases in Europe appears to be a mix of people returning from holidays, offices partially reopening and perhaps most importantly schools and universities reopening. Data in the UK suggests that nearly 50% of all new Covid cases in the last month have come from schools or universities<sup>4</sup>.

Mortality curves provide a clearer picture of the trajectory of the virus and regional variations than case counts. As shown in Exhibit 4, depending on the region, death rates peaked somewhere between 6 and 14 deaths/million/day except for Asia. Asia never saw more than 1 death/million/week. Despite differences in mitigation strategies, Europe, Sweden and the UK experienced similar death rates per million population trajectories as shown below in Exhibit 4. At “maturity” (outside of Asia) the virus seems to settle around 1 death/million/day or lower. In the US, still at 2 deaths/million/day, what appears to be more stubborn persistence of the virus, is exaggerated by cases migrating from one region to another throughout the country and only progressing to the southern states after the initial lockdowns ended. Latin America is furthest from maturity still experiencing approximately 4

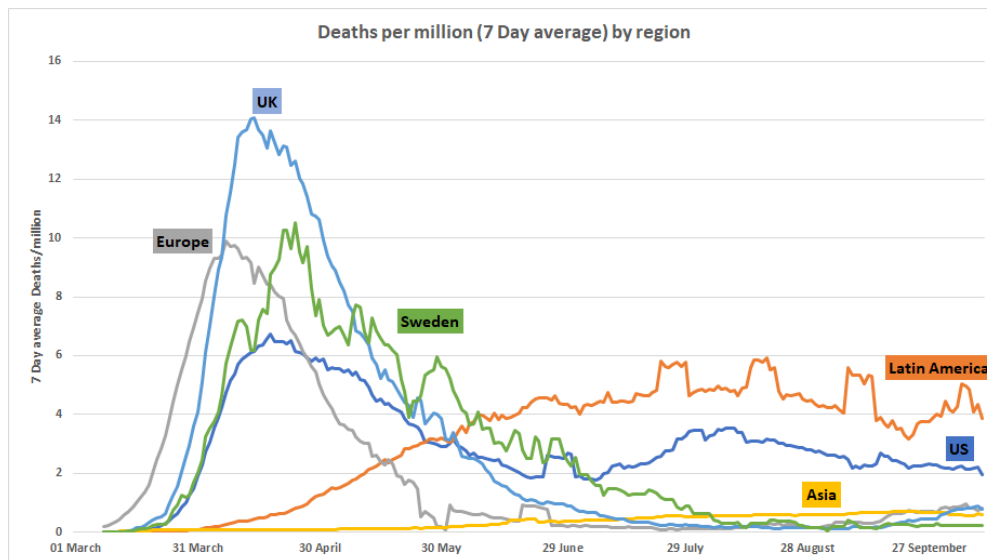
<sup>2</sup> Extrapolation from linear model of seroprevalence

<sup>3</sup> <https://www.bbc.co.uk/news/uk-wales-53946487>

<sup>4</sup> <https://www.wsws.org/en/articles/2020/10/05/surv-o05.html>

deaths/million/day with a similar explanation of its persistence being related to migration within regions of Brazil and across Latin America.

**Exhibit 4: Despite differences in mitigation policies, new Covid related deaths/million have followed similar trajectories in the Europe, Sweden and the UK.**



Source: Bloomberg

The big difference in fatality rates is in Asia, where Korea and Japan have hardly seen any increase in excess mortalities<sup>5</sup>. Experts have suggested many theories for this but the most logical appears to be that there was a better system in place for dealing with pandemics following the 2003 SARS outbreak in Asia, including the use of facemasks which was already common practice. Once Germany set up its own 'gold standard' track and trace program, its mortality rate has behaved similarly to those of Japan and Korea. Germany, today, is experiencing less than 0.1 deaths/million/day. Another theory suggested by experts is that the SARS and Swine Flu outbreaks in Asia provided a higher level of cross-immunity to Covid-19 in the region<sup>6</sup>. This would not explain low rates in Germany.

There is no one factor that explains the lower death rates observed at present, but rather a combination of factors. This is best explained by looking at the individual components of mortality rates. Mortality rate is defined as the hospitalisation rate as a % of Covid cases x Deaths/Hospitalisations- i.e., the joint probability of finding oneself in hospital and dying there. In June, in the US, the hospitalisation rate was 11.5% which means 11.5% of people who tested positive for Covid ended up in the hospital. 28% of those died, so the mortality rate of Covid patients was 3.2%, varying considerably by age and vulnerability cohort. Today, we estimate the mortality rate at 0.4%, having declined by 88%. So what explains this huge improvement?

Firstly, hospitalisation rates have dropped. Data from the CDC in the US shows that the hospitalisation rate for Covid cases averaged about 11.5% in the period from May to late June then dropped sharply to an average of 3.5% between late-June and the end of August<sup>7</sup>. This drop in the hospitalisation rate is explained by two developments. First, data from the CDC shows that the median age of infection has dropped by about 15 years over the same period, from 50 to 35 years<sup>8</sup>. This is most likely due to the

<sup>5</sup> <https://www.medrxiv.org/content/10.1101/2020.07.09.20143164v4>

<sup>6</sup> <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7326438/>

<sup>7</sup> <https://www.cdc.gov/coronavirus/2019-ncov/Covid-data/Covidview/index.html>

<sup>8</sup> <https://www.cnbc.com/2020/07/06/dr-anthony-fauci-says-the-average-age-of-us-coronavirus-patients-has-dropped-by-15-years-as-sun-belt-states-gets-hit.html>

elderly isolating more than those younger and better management of care homes. This lower median age translates into a 30-35% reduction in hospitalisations. Younger Covid-infected people have less severe cases. Second, according to Stat News, the rise in testing levels is also responsible for an increase in the number of positive cases being discovered<sup>9</sup>. So the hospitalisation rate denominator rose, taking the rate down. Testing levels in the US are up about 25-30% from mid-June levels with the positivity rate remaining stable. In other words, this is an accounting difference affecting mortality rates, not a real improvement. This suggests that the actual hospitalisation rate was 8.2%. With 28% dying in hospital, the mortality rate from last summer is estimated to have been 2.3% rather than 3.2%, but still implying an 82% improvement in mortality rates.

Survival rates of hospitalised patients have improved from 72% to 88% as explained above based on data from Johns Hopkins<sup>10</sup>. The higher survival rate is partly attributable to new treatments such as Remdesivir, Dexamethasone and other corticosteroids which reduce mortality rates in the most serious of patients by about 20-30%<sup>11</sup>. The rest is attributable to hospitals being better resourced and more experienced in treating Covid patients. For example, the use of the prone position, the timing of drug and oxygen administration and an understanding that the virus is a vascular disease and not just a respiratory illness have all contributed to a reduced mortality rate. A breakdown of this data is presented in Exhibit 5.

Recent estimates for the US and UK suggest that the mortality rate is somewhere between 0.25% and 0.40%, but this does not account for unrecorded asymptomatic cases which by many estimates are up to 50% of cases<sup>12</sup>. This would in effect halve the implied mortality rate to 0.12% to 0.20%. For reference, the mortality rate for seasonal flu is estimated to be about 0.10% in the US<sup>13</sup>.

#### Exhibit 5: Breakdown of the implied Covid mortality rate

US Data from CDC	%
Mid-Summer Hospitalisation Rate (% of Covid cases)	11.5%
Change in median age	-3.7%
Change in testing levels	-3.2%
Unexplained	1.1%
Current Hospitalisation Rate	3.5%
US Data from Johns Hopkins	%
Mid-Summer Hospital Survival Rate	72%
Prone/Timing of Oxygen, other treatments	7%
Remdesivir/Dexamethasone/Steroids	9%
Current Hospital Survival Rate (Survivors/Hospitalised Patients)	88%
<b>US Implied Mortality Rate (Hospitalisation rate*Deaths/Hospitalisation rate)</b>	<b>0.42%</b>

<sup>9</sup> <https://www.statnews.com/2020/07/20/trump-said-more-Covid19-testing-creates-more-cases-we-did-the-math/>

<sup>10</sup> <https://www.economist.com/briefing/2020/09/26/the-Covid-19-pandemic-is-worse-than-official-figures-show>

<sup>11</sup> <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7320713/>

<sup>12</sup> <https://www.sciencedaily.com/releases/2020/06/200612172208.htm>

<sup>13</sup> <https://www.livescience.com/new-coronavirus-compare-with-flu.html>

UK Data from ECDC/NHS	%
UK Hospitalisation Rate (% of Covid cases)	5%
UK Deaths/Hospitalisations	5%
<b>UK Implied Mortality Rate (Hospitalisation rate*Deaths/Hospitalisation rate)</b>	<b>0.25%</b>

Source CDC, Johns Hopkins, the NHS

If Johns Hopkins' model is correct and we are still seeing 500,000 daily cases worldwide, even a 0.10% Mortality Rate in the absolute is something we would like to stop, with 500 people dying each day or 180,000 if it carries on at its current level for another year. But this is unlikely, given the estimated daily new 500,000 cases are mostly in Africa, Latin America and India today, where case counts and deaths appear to be coming down, even without adjusting for increased testing.

## 2. What is the status of testing and which systems work best?

In most countries outside of Asia and Germany, Covid (PCR) testing rates are barely sufficient to test front line workers and those with symptoms but continue to be well below desired levels to catch asymptomatic infected individuals or levels which would increase mobility (travel without quarantine). Low adoption rates of integrated track and trace systems have hindered their effectiveness in most regions.

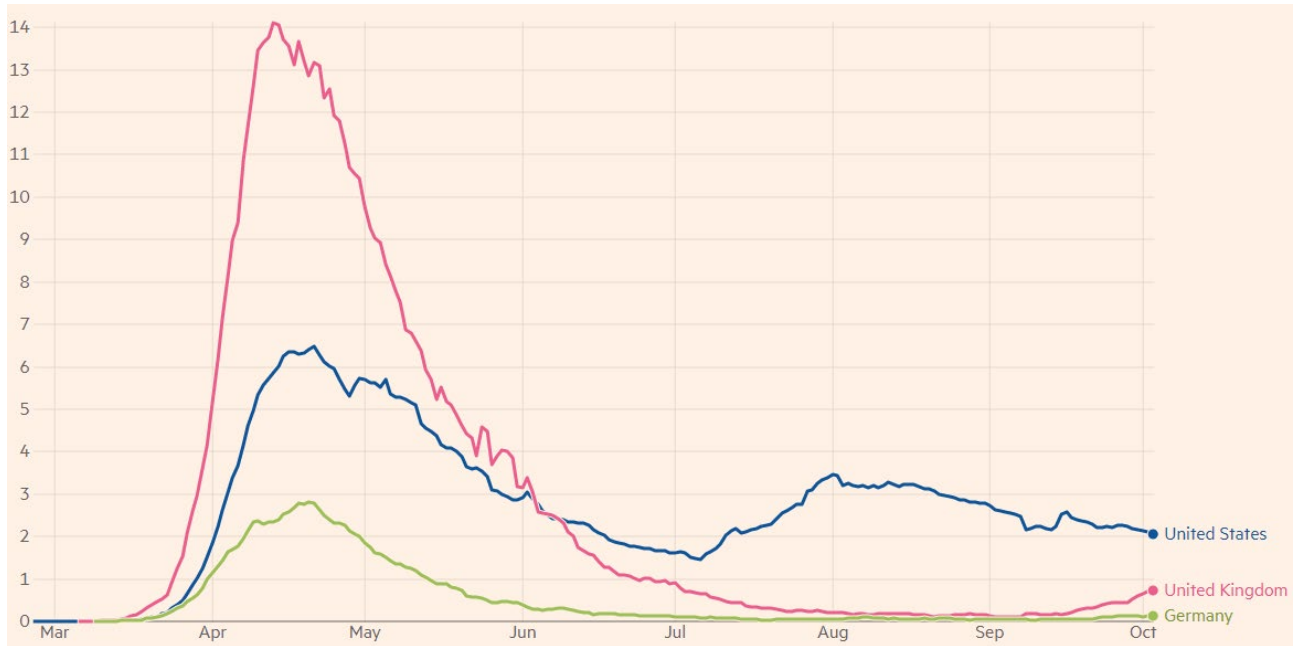
Testing rates have increased sharply in some regions. Both the US (2.7 tests/thousand) and the UK (3.4/thousand) currently have some of the highest per capita testing rates globally. Germany, which has a much lower testing rate of just 2.0/thousand has nevertheless achieved better results in containing the virus, as shown in Exhibit 6. This is attributable to a more efficient test and trace program, similar to the Asian model.<sup>14</sup> Germany has managed to maintain a lower test positivity rate of about 1% despite the lower testing rates.

### **Exhibit 6: Germany has handled the crisis far better than the UK and US with a lower daily death rate**

(7-day rolling average of daily deaths/million attributable to covid.)

<sup>14</sup> <https://ourworldindata.org/coronavirus-testing>





Source: Financial Times

While it is difficult to assess the US testing strategy because it is comprised of a patchwork of different strategies, we can compare the UK and Germany. Germany had a contract tracing system fully in place at the beginning of May. Germany uses a decentralised public health system where each state is responsible for managing its testing, tracking, and tracing resources<sup>15</sup>. Over 97% of Germany's Covid test results are provided within 24 hours. By contrast the UK only had a contract tracing system partially in place by late July and utilises a centralised system that has outsourced large parts of its testing and tracing infrastructure to private companies. The Financial Times reported in early-September that only 63% of UK test results were communicated within 24 hours. For a week in mid-September, this figure dropped to just 10%, and current estimates suggest that just 38% of test results are communicated within 24 hours<sup>16</sup>. Germany's welfare protection scheme, "Kurzarbeit", has been described as the model Covid furlough system. It has been wide-reaching and provided a safety net for the livelihoods of those experiencing Covid symptoms. This is in stark contrast to areas in the north of England where workers fear losing their jobs and self-employed people are not covered by the UK's furlough scheme.

Hence, testing alone is not the answer. Instead, a decentralised public health structure with an integrated, rapid test, track and trace system accompanied by adequate employment support of those isolated, has been a more effective way to control the spread.

Contract tracing apps have yet to provide the potential benefit demonstrated in Korea in other countries due to low adoption rates. Back in March, Singapore launched the world's first track and trace app based on Bluetooth technology called Trace Together, but only 20% of its inhabitants downloaded. As a result, Singapore has started distributing dedicated Bluetooth contact-tracing tokens to its five million residents to augment the use of Trace Together used on iPhones. Bluetooth technology is currently being used in track and trace apps by countries including Australia, Switzerland, France, Germany, the UK (only recently), Finland, Denmark, Japan, Italy, Poland and Latvia, among others.

<sup>15</sup> <https://www.bmj.com/content/369/bmj.m2522>

<sup>16</sup> <https://www.ft.com/content/ab006ca3-bd4f-49ef-a248-276381276d76>

In April, Apple and Google released their technology allowing individual states develop their own apps and integrate into their local health systems. Only six states signed up. In early September, Apple and Google, provided custom apps for each state. States will still need to opt in, but the tech companies will take care of more of what is solidly in their hands: the technology. Still, getting those apps working at a large scale, so that they become useful tools to public health officials, will require overcoming the nation’s patchwork pandemic response. The system still has bugs. Studies at Trinity College Dublin found that apps using the Apple-Google method performed inconsistently on buses and trams due to interference. They suggested changing the threshold for what qualifies as “exposure” to being within 6 feet of an infected person for 10 minutes, as opposed to 15 minutes.

Adoption rates outside of the US range from 35% in Switzerland, 33% in Finland and Germany, 21% in Australia to just a 5% average in France and across the rest of Europe<sup>17</sup>. Experts assert that adoption rates above 50% are required for them to be effective. Swiss officials argue that any level of adoption can be helpful, citing 26 people recently reported testing positive who went into quarantine after receiving an alert via the Swiss national app. Others may have received alerts and chosen to self-quarantine. In contrast, app effectiveness has recently been called into question by authorities even in Germany. In a recent survey, just 38% of public health departments in Germany found their tracing app to be a useful addition in their armoury, as opposed to conventional tracing systems.

### 3. How are activity levels evolving?

At the aggregate level, global activity levels are about 10-15% below normal but there are sharp sectoral and regional differences. A return to full lockdown is considered unlikely and progress in vaccines and therapeutics will eventually allow further re-opening.

There remains a great deal of divergence across sectors and regions. The latest data from Google Mobility in Exhibit 7 suggests that recreation activity (bars, restaurants, retail, cinemas, sporting events, etc) in the US and Europe remains about 10-15% below normal levels<sup>18</sup>. Data from Asia is slightly more encouraging and suggests that activity is getting back closer to levels observed in early January. In the US and Europe, there have been pockets of exceptionally strong activity with mortgage applications, new business applications and e-commerce transactions hitting multi-year highs. However, certain sectors continue to suffer severely. Hotel occupancy rates remain about 15-20% below historical levels, department store sales are 20-30% below January levels, the number of daily flights is down about 40% YoY and workplace/office attendance is down about 30%<sup>19</sup>.

**Exhibit 7: Google Mobility data shows that we are still 10-15% below normal activity levels in the western world but slightly closer to normal in developed Asia.**

Country/Region	Retail & Recreation (% change from Jan 2020 level)		Workplaces (% change from Jan 2020 level)	
	1 Month Ago	Current	1 Month Ago	Current
<b>UK</b>	-14	-24	-38	-27
<b>Germany</b>	-5	-10	-19	-12

<sup>17</sup> <https://www.statista.com/statistics/1134669/share-populations-adopted-Covid-contact-tracing-apps-countries/>

<sup>18</sup> Google Mobility

<sup>19</sup> <https://privatebank.jpmorgan.com/content/dam/jpm-wm-aem/global/pb/en/insights/eye-on-the-market/S1-US-reopens-embedded.pdf>

France	-8	-18	-28	-15
Italy	-8	-11	-26	-18
South Korea	-26	-7	-11	-14
Hong Kong	-27	-16	-20	-9
Japan	-12	-5	-12	-8
Brazil	-27	-28	-8	-5
India	-49	-42	-25	-23
US	-16	-16	-29	-26
<b>Average</b>	<b>-19</b>	<b>-18</b>	<b>-22</b>	<b>-16</b>

Source: Google Mobility

What is the probability of a return to the extreme lockdowns we saw in Q1? Such a degree of lockdown appears to be a low probability due in part the analysis above on the Mortality Rate having fallen to a level comparable to the seasonal flu. In addition, we add the following reasons:

- a) **The cost/benefit trade-offs are not compelling.** Analysis from Equitile notes that all government healthcare spending undergoes a cost/benefit analysis to determine which health treatments the government is willing to fund. They do so by estimating the treatment's cost per Quality Adjusted Life Year (QALY) which is an estimate of the cost of extending quality life by one year. The NHS sets an upper limit of £30,000/QALY. Equitile estimate that the lockdown in Q1, which was in effect a form of healthcare spending, translated to a cost of £1 million/QALY<sup>20</sup>. On October 5<sup>th</sup> Germany's economics minister stated that there would be no second lockdown for businesses in order to contain the pandemic, arguing the costs far outweighed the benefits.
- b) **Daily case rates alone should not determine public policy.** Cambridge statistician David Spiegelhalter has also called into question the use of daily new cases as a basis for forming public policy. He argues that the accuracy of PCR tests, their lack of comparability through time and their actual impact make them a completely inaccurate tool to utilise to design public policy. He argues that deaths and hospitalisations are far better indicators albeit subject to a lag<sup>21</sup>. In the US for example there have been 70,000 officially recorded Covid cases on university campuses since they have reopened. These cases have translated to less than 10 hospitalisations<sup>22</sup>.
- c) **Public support for full lockdowns is waning.** The fear and uncertainty surrounding the virus in Q1 accompanied with furlough schemes facilitated high levels of public compliance and support for lockdowns. Public weariness has however crept in and less generous furlough

<sup>20</sup> <https://www.equitile.com/article/lockdown-what-did-we-get-why-did-we-do-it>

<sup>21</sup> <https://www.ft.com/content/45af2de8-8207-4c7d-8eeb-50347a7f8518>

<sup>22</sup> Dr Simone Gold/collated university statistics

schemes will reduce support for full-scale lockdowns.

- d) **Governments are starting to face legal and parliamentary challenges.** In the UK several legal challenges have been brought by the hospitality industry against the recent curfew laws with demands to produce scientific backing for the legislation<sup>23</sup>. Parliament has also reined in government powers by demanding votes on changes to restrictions retrospectively and going forward.

#### 4. When will a vaccine be available?

Experts believe that a vaccine will be available for mass distribution in Q2 2021 according to data from the Good Judgement Project<sup>24</sup>.

While there is a lot of uncertainty around vaccine production, McKinsey have estimated that 1 billion doses of vaccine will be produced in 2020 and 9 billion doses by the end of 2021<sup>25</sup>. There are currently ten vaccines in phase 3 trials at present, all shown in Exhibit 8, with the lead candidates being Pfizer (BioNtech), AstraZeneca (Oxford), Moderna and Johnson and Johnson. Each of these companies have said they will have enough data to know whether their vaccine is effective prior to year-end<sup>26</sup>.

Historical analysis from Deutsche Bank shows that once a vaccine (for an infectious disease) has reached phase 3 trials it has about an 85% chance of being approved<sup>27</sup>. However, virtually all successful vaccines in the past have been developed from a weakened whole virus, a fragment of the virus or a deactivated form of the virus being treated. Both the AstraZeneca and Johnson & Johnson candidates are viral vector vaccines, based on the virus gene, that have thus far only been utilised for the treatment of animals. The Moderna and Pfizer candidates are mRNA vaccines and only one such vaccine has been approved in the past. That was an Ebola vaccine that was approved in December 2019<sup>28</sup>. mRNA and viral vector vaccines have advantages over traditional vaccines in that they are far quicker to produce and may also trigger the innate immune system as opposed to just the acquired immune system which traditional vaccines target. If these candidates are not successful, more traditional protein-based vaccines will arrive later in Q4 from Novavax and from GSK, Sanofi and Merck in Q1 2021.

Phase 3 vaccine trials are structured so that half of the participants receive the vaccine, and half receive a placebo shot consisting of saltwater. Neither the volunteers nor the doctors treating them know who gets which. Two shots are needed for Moderna, Pfizer and AstraZeneca's candidates. Johnson and Johnson's candidate has the advantage of requiring just one shot. The participants are then monitored to see if they test positive for the virus or experience any side effects. They are not forcefully exposed to the virus for obvious reasons. The clinical trial is monitored by a data and safety monitoring board, or DSMB, a group of independent experts hired to make sure volunteers in the study are safe. The DSMBs conduct what is called an interim analysis after a certain number of people have been infected with Covid-19 and show symptoms. During this interim analysis, they have the ability to recommend stopping a study not only if a treatment is unsafe, but also if it is so clearly ineffective that continuing would not be ethical. Pfizer believe they will have reached this point in late October. AstraZeneca are

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<sup>23</sup> <https://www.simpsonmillar.co.uk/media/government-faces-legal-challenge-over-10pm-curfew/>

<sup>24</sup> <https://goodjudgment.com/Covidrecovery/>

<sup>25</sup> <https://www.mckinsey.com/industries/pharmaceuticals-and-medical-products/our-insights/on-pins-and-needles-will-Covid-19-vaccines-save-the-world>

<sup>26</sup> <https://www.nytimes.com/interactive/2020/science/coronavirus-vaccine-tracker.html>

<sup>27</sup> DB research

<sup>28</sup> <https://www.hhs.gov/about/news/2019/12/19/hhs-secretary-azar-statement-on-fda-approval-of-ebola-vaccine.html#:~:text=On%20Thursday%2C%20December%2017%2C%202019,eastern%20Democratic%20Republic%20of%20the>

also expecting results on a similar timeline. Moderna and Johnson and Johnson expect to reach the same point by mid-November. Once this point is reached the candidates could be approved for emergency use. This would likely lead to vaccine doses being provided for front line workers and those most vulnerable. US states have been told to prepare for a vaccine by November.

**Exhibit 8: The vaccine pipeline suggests a vaccine will be approved for emergency use prior to year-end**

Leading Candidate	Pre-clinical	Phase 1	Phase 2	Phase 3	Fast Track Reg Approval	Dates announced
Normal Time		3 months	3 m - 2 years	1 - 4 years	60 days	
CanSino Biologics						Approved for military emergency use 28/6
Oxford/Astra						Emergency Use Nov 2020/Temporary halt in US
Johnson & Johnson						Will know by year end if effective/Hope to have 1B doses by 2021
Gamleya Research Institute (Russia)						Experts sceptical about the vaccine speed, no phase 1/2 results
Moderna						Emergency Use Nov 2020/Patent dispute has caused some issues
BioNTech/Pfizer						Submit data to FDA Oct 30th/Emergency use thereafter
Imperial College/ Morningside						Expect conclusive results by year end
Zydus						
AnGes/Takara/OU						Recruiting for phase 3 trial
Curevac						Seeking approval early 2021/Partnering with Tesla to produce faster
DukeNUS						Expect initial data in the fall
Beijing Inst./Sinopharm						
Wuhan Inst./Sinopharm						
Sinovac						Approved for emergency use in China in July
Inst. Of Medical Biology						
BHARAT						Target changed from August to early 2021
MERCK/THEMIS						
ZFSW/China AMS						
Novavax						Data in Dec/Jan.100m doses by Q1 2021
Sanofi						Phase 3 trials by Dec, regulatory approval Q1 2021 with 1bln doses
Inovio						Phase 2&3 in Sep/100m doses in 2021

Type of Vaccine	Description
Non-replicating Viral Vector	Viral gene is added to a different, non-replicating, virus and delivered to the vaccine recipient. No approved product of this kind has resulted to date.
DNA/mRNA Based	Work by inserting a genetically engineered blueprint of viral gene(s) into small DNA molecules (called plasmids) for injection into vaccinated people. Cells take in the DNA plasmids and follow their instructions to build viral proteins, which the immune system recognises as foreign, triggering the immune response that protects against the disease. Only one vaccine approved of this kind in December 2019 which was an Ebola vaccine.
Protein Subunit	A fragment of the virus is used to trigger an immune response and stimulate immunity. Examples include the subunit vaccines against hepatitis B and shingles.
Live Attenuated Virus	Whole viruses introduced live to elicit a stronger immune response but weakened to reduce virulence. Examples include those for measles, mumps, and tuberculosis.
Inactivated Virus	Disease-causing virus that has been killed (with heat or chemicals), so it won't make you sick, and can be used in people that may not be able to use a live attenuated virus vaccine (e.g., those who are immunocompromised). These do not provide as strong of an immune response as live attenuated virus vaccines, so additional doses of the vaccine may be needed to get a strong enough immune response.

Source: New York Times

## 5. What is the status of therapeutics development?

Monoclonal antibodies like Regeneron's and other new therapies are on the way to supplement existing treatments such as Remdesivir, Dexamethasone/corticosteroids, convalescent plasma and oxygen administration. These have already helped to reduce hospital survival rates up by c 9% to c 88%. With new monoclonal antibodies, hospitalisation rates could fall dramatically (85% in the case of Ely Lilly's).

It is now seven months since Covid-19 was labelled a global pandemic and the key lesson so far is that this is a virus that disproportionately affects those over 70 years of age and those with comorbidities. Over 70's account for 90% of coronavirus deaths and this increases to 95% when we include those with comorbidities<sup>29</sup>. In advance of a reliable vaccine being made available in large quantities, substantial progress has been made in the area of treatments (Exhibit 9).

### Exhibit 9: Therapeutics have already reduced the mortality rate and more effective treatments are potentially on the way in Q4.

Manufacturer	Treatment	Treatment Type	Development Stage	Function	Effect	Target
Gilead	<b>Remdesivir</b>	Antiviral	Approved for use, now trialling with beta interferons	Kills or prevents	Recovery time decreased by 30%	Severe Patients
Oncolmmune	<b>SACCOVID</b>	Antiviral/Immuno modulator	Phase 3 trials	Alleviate Cytokine storm	Reduced mortality by 50%	Severe Patients
Merck/ Ridgeback	<b>EIDD-2801/MK-4482</b>	Anti-viral nucleoside analogue	Phase 3 trials (results expected Oct)	Kills or prevents	Unknown - only animal trials to date	Mild Patients
Generic	<b>Dexamethasone</b>	Steroid/ Anti-inflammatory	Approved for use	Anti-inflammatory (Alleviate Cytokine storm)	Mortality rate reduced by 20-33%	Severe Patients
Regeneron	<b>REGN-COV2</b>	Monoclonal Antibodies	Phase 3 trials, FDA assessing data. Utilised on the US president.	Infusing antibodies or prophylactic	Shown promise to reduce hospitalisation rate in early trials.	Vulnerable, immuno deficient patients or front line workers

<sup>29</sup> <https://www.cdc.gov/coronavirus/2019-ncov/Covid-data/investigations-discovery/hospitalization-death-by-age.html>

Eli Lilly	<b>LY-CoV555</b>	Monoclonal Antibodies	Phase 3 trials, FDA assessing data.	Infusing antibodies or prophylactic	Reduced risk of hospitalisation by 85%.	Vulnerable, immuno deficient patients or front line workers
Mayo Clinic, Rockefeller University	<b>Convalescent Plasma</b>	Antibodies	Approved for emergency use.	Infusing antibodies	Some promising	Vulnerable, immuno deficient patients or front line workers

Source: Stat News, New York Times, Barclays

New therapies with the most promise include :

1) **Monoclonal antibodies (prophylactics)** that reduce the risk of infection or progression from mild infection early on. These include monoclonal antibodies from Eli Lilly and Regeneron which may be available for use before the end of the year. Eli Lilly submitted data for emergency use authorisation on 7<sup>th</sup> October. Their phase 3 data showed that the risk of hospitalisation from initial mild cases was reduced by 85% versus a placebo group. Lilly have said they will have one million doses available in Q4. Regeneron are expected to submit data for their monoclonal antibodies in the coming weeks. Regeneron’s antibodies have already been trialled on the US president which would suggest they could be even more effective than Eli Lilly’ antibodies. Regeneron have approximately 500,000 doses available and have manufacturing capacity for 250,000 doses per month.

2) **Antivirals** that can stop mild cases from developing into more severe cases. MK-4482 from Merck/Ridgeback has shown the potential to arrest symptoms in mild patients and may prove to be more effective than Remdesivir. Phase 3 results are expected this month.

3) **Immunomodulators** which can reduce mortality rates for the most severe hospitalised cases. SACCOVID from Oncolmune has been shown to reduce mortality by up to 50% in severely ill patients in initial clinical trials<sup>30</sup>. The hope is that these treatments can soon be added to the existing armoury of Remdesivir, Dexamethasone/corticosteroids, convalescent plasma and oxygen administration.

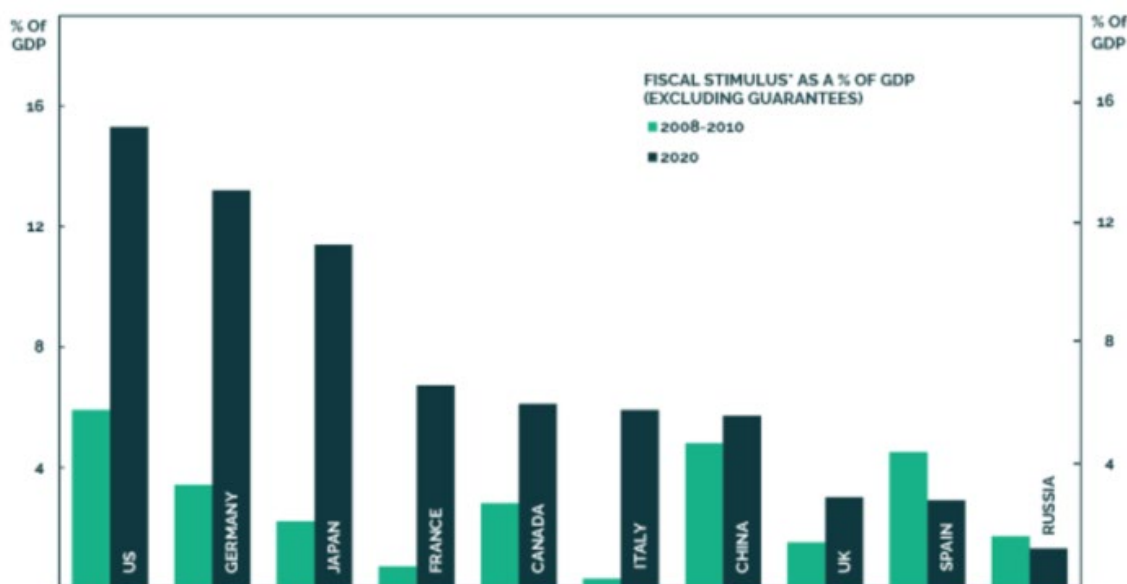
## 6. What are the prospects for additional fiscal stimulus?

The magnitude of the fiscal policy response has been far greater than in 2008. Further stimulus is likely on the way, the magnitude of which depends on which party controls Congress in 2021.

Within weeks of the outbreak of the pandemic, the taps of global fiscal and monetary policy were turned on aggressively.

**Exhibit 10: The magnitude of fiscal stimulus is far greater than during the financial crisis.**

<sup>30</sup> <https://www.pharmaceutical-business-review.com/news/oncoimmune-sacCovid-Covid-19/>



Source: BCA Research

In the US, fiscal policy has tightened since August as many emergency measures have expired. However, Congress appears unable to pass another round of stimulus. The inability has stemmed from differences between Democrats and Republicans on the size of the package required. Democrats are seeking another \$2 to 3T in stimulus whereas Senate Republicans will only agree to a package of less than \$0.5T. It is now increasingly unlikely a meaningful deal can be reached until after the election. While both parties have promised greater stimulus, in the event of a 'Blue Sweep' of both the White House and Congress, we expect a significant increase in fiscal spending. As it stands, Biden's spending plans are estimated at an additional \$6T with higher healthcare spending accounting for over one third of that. Roughly \$4T in increased taxes will partially offset that spending, leaving c. \$2T of net stimulus.

Turning to other economies, the UK government unveiled a fresh round of economic and fiscal measures in early October. The intent is to ease the burden on both employees and firms by subsidising part-time work and by extending government-guaranteed loan programs. At the beginning of September, the Macron government announced a €100bln stimulus plan in France. Meanwhile, European leaders are moving forward on a €750bln stimulus package that was announced this summer. In Japan, the new Prime Minister Yoshihide Suga has indicated that he will pursue a third budget to fight the economic downturn, adding that "there is no limit to the number of bonds the government can issue to support an economy battered by the coronavirus pandemic." The Japanese government now earns more interest than it pays because two-thirds of all Japanese debt bears negative yields<sup>31</sup>.

## 7. What is the latest outlook for global economic growth?

The economic impact is unprecedented in recent history but appears less severe than originally feared. The range of forecasts for 2020 GDP growth have narrowed considerably with most experts estimating global growth will contract by c. 4%<sup>32</sup>.

To put this in context, this will be the largest contraction since WWII and roughly twice as severe as the global financial crisis. Unprecedented levels of global monetary and fiscal stimulus have however

<sup>31</sup> BCA research

<sup>32</sup> Experts as referenced in tables below



helped prevent some of the major spillover effects that often occur in recessions and have allowed for a sharp recovery.

As economies began re-opening in May, pent-up household demand was amplified by fiscal support that more than offset the dramatic compression in labour income. Global consumer goods spending surged over May and June, returning close to pre-pandemic rates by midyear. The latest data show that global growth remained strong through September, even in the face of rising case counts and a pullback of fiscal support. Consumer credit card spending is now only c. 6% below pre-pandemic levels. While the initial surge in consumer spending is now moderating, business spending is picking up. A turn in the global inventory cycle is underway as the combination of forced factory shutdowns and a slow response of manufacturers to the midyear spending bounce has depleted inventories. Proxy indicators point to a strong rebound in business investment, with global capex (ex. China) tracking at a c. +35% annualised surge in Q4.

The IMF will release their updated forecast for growth on October 13<sup>th</sup> and have already stated that it will be an upgrade to their June forecast as conditions having improved markedly.

**Exhibit 11: GDP forecasts for 2020 suggest a contraction of about 4% from 2019.**

	2020 Real GDP Growth Forecasts					
	IMF	JP Morgan	Goldman Sachs	Deutsche Bank	Capital Economics	Average
Date	24-Jun	02-Oct	05-Oct	06-Oct	02-Oct	
<b>Global</b>	<b>-4.9%</b>	<b>-3.8%</b>	<b>-3.2%</b>	<b>-4.0%</b>	<b>-4.8%</b>	<b>-4.1%</b>
DM	-8.0%	-5.2%	-5.7%	-6.0%	-5.5%	-6.1%
US	-8.0%	-3.6%	-4.8%	-4.0%	-3.7%	-4.8%
Eurozone	-10.2%	-6.9%	-7.6%	-8.0%	-7.5%	-8.0%
Japan	-5.8%	-5.7%	-5.8%	-6.2%	-5.3%	-5.8%
EM	-3.0%	-2.0%	-1.1%	-2.7%	-4.3%	-2.6%
China	+1.0%	+2.3%	+3.0%	+2.0%	-1.0%	+1.5%

Turning to 2021, experts expect global growth to re-accelerate by 5-7%, taking the level of GDP back to slightly above 2019 levels.

**Exhibit 12: GDP forecasts for 2021 suggest we will return to GDP levels just above those observed in 2019.**

	2021 Real GDP Growth Forecasts					
	IMF	JP Morgan	Goldman Sachs	Deutsche Bank	Capital Economics	Average
Date	24-Jun	02-Oct	05-Oct	06-Oct	02-Oct	

<b>Global</b>	<b>+5.4%</b>	<b>+6.1%</b>	<b>+6.5%</b>	<b>+5.4%</b>	<b>+7.0%</b>	<b>+6.1%</b>
DM	+4.8%	+4.0%	+6.2%	+3.8%	+4.8%	+4.7%
US	+4.5%	+2.8%	+6.4%	+3.3%	+4.5%	+4.3%
Eurozone	+6.0%	+5.6%	+7.4%	+5.4%	+5.0%	+5.9%
Japan	+2.4%	+3.0%	+3.3%	+1.7%	+3.5%	+2.8%
EM	+5.9%	+7.0%	+6.7%	+6.3%	+8.2%	+6.8%
China	+8.2%	+8.7%	+8.1%	+9.0%	+11.0%	+9.0%

## 8. What is the outlook for corporate earnings?

Earnings in the US are expected to recover to 2019 levels in 2021, however a large dispersion among sectors is likely to persist.

The Q3 earnings season begins in earnest this week and should provide more clarity on how companies are being impacted at present and how they see this crisis developing. For the S&P500, the latest forecasts point to a -21% contraction in full-year 2020 earnings from 2019 levels. 2021 earnings are expected to grow by about 27%, leaving earnings in line with 2019 levels as shown in Exhibit 13.

### Exhibit 13: Consensus EPS forecasts suggest by 2021 we will have recovered back to 2019 earnings levels.

S&P500	2019 EPS	2020 Consensus	2021 Consensus	2022 Consensus
EPS	\$165	\$130	\$165	\$195
Change from previous year	1%	-21%	27%	18%

Source: I/B/E/S Consensus

A sectoral breakdown of the earnings in Exhibit 14 shows where the impact of the crisis will be temporary and where lasting structural damage is expected. Energy, Hospitality and Airlines are forecast to be loss-making in 2020 and have earnings estimates that have been lowered by 30-50% for 2022. Conversely, the tech and household goods sectors are expected to be more profitable this year and structurally more profitable by about 5% over the longer term<sup>33</sup>.

### Exhibit 14: The S&P500 is skewed towards technology sectors which have been relative beneficiaries of the pandemic.

Industry	S&P500 Weight	2020 EPS estimate change from Jan 1st	2022 EPS estimate change from Jan 1st
Software	15%	11%	9%
Semis	5%	6%	0%

<sup>33</sup> Bloomberg data

Household Goods	2%	5%	6%
Hardware	8%	4%	-5%
Pharma	7%	-1%	0%
Food Staples	2%	-2%	1%
Utilities	3%	-2%	-1%
Bev & Tobacco	3%	-5%	-4%
Commercial Ser.	1%	-8%	-5%
Healthcare Equip	7%	-9%	-5%
Retail	8%	-12%	2%
Insurance	2%	-14%	-8%
Communications	2%	-15%	-7%
Real Estate	3%	-14%	-18%
Media	9%	-16%	-4%
Materials	3%	-19%	-9%
Durables	1%	-21%	0%
Div Fins	5%	-24%	-21%
Aerospace & Def.	2%	-46%	-24%
Banks	3%	-52%	-23%
Autos	0%	-90%	-17%
Energy	2%	-110%	-45%
Hospitality	2%	-112%	-33%
Airlines	0%	-296%	-55%

Source: Bloomberg

## 9. How has the pandemic impacted loan defaults and corporate bankruptcies?

Despite a larger economic impact than the GFC, fewer defaults and bankruptcies are occurring due to fiscal support and stronger balance sheets.

The shock to 2020 US GDP from the Covid-19 crisis is expected to be about 60% larger than that experienced in 2008 during the peak of the global financial crisis (GFC). Despite the scale of the economic shock, bankruptcies, defaults and loan loss provisions are expected to be only 50-90% of the magnitude experienced during the GFC<sup>34</sup> as shown in Exhibit 15. JP Morgan anticipate that by year-end, default rates for 2020 will have risen to about 8% for high yield bonds and 5% for leveraged loans, which would be about 70% and 40%, respectively, of the magnitude of defaults in 2008. However, it is worth noting that loss recovery rates are far lower for high yield bonds based on observations so far in 2020<sup>35</sup>.

<sup>34</sup> Quarterly filings

<sup>35</sup> JPM Monthly Default Monitor

Many sectors have been protected to a certain extent by loan guarantees, payroll protection plans and rent moratoriums. The energy sector however has been hardest hit with over 33% of total defaults occurring in this sector alone. The retail sector is the next worst affected contributing 17% of all defaults.

**Exhibit 15: While the hit to GDP will be greater than the GFC, the financial impact has been softened by greater stimulus and more robust consumer and banking balance sheets.**

US Data	Dotcom Crisis (2001)	Global Financial Crisis (2008)	Covid Crisis (2020)	Covid relative to GFC
Real GDP Growth YoY	1.2%	-2.5%	-4.0%	1.6
Fiscal Stimulus % GDP	n/a	5.8%	16.0%	2.8
Tier 1 Capital Ratio major banks (average year prior to crisis)	8.2%	8.2%	14.4%	1.8
Personal Savings as % Disposable Income (Pre-crisis average)	5.8%	3.7%	7.8%	2.1
% Change in Permanent Unemployed (estimate)	1.3%	3.5%	1.7%	49%
Peak Bank Loan Loss Provisions as a % of assets	1.8%	3.1%	2.5%	81%
Number of bankruptcies > \$1B in US (YTD for Covid)	37	50	44	88%
Total Bankruptcies (Annualised Q2 data for Covid)	12617	14135	8080	57%
High-Yield Bond Default Rate	10.0%	11.0%	8.0%	73%
Leveraged Loan Default Rate	7.5%	14.0%	5%	36%
Default/Distressed Volume (\$B)	127	290	123	42%
HY Recovery Rate	25%	25%	15%	60%
Loan Recovery Rate	67%	53%	47%	89%

Source: Bloomberg, JP Morgan, BAML, BCA, Quarterly Filings

The key to understanding this mismatch between the GDP shock and financial impact is to look at 1) the magnitude of support that has been injected into the financial system via fiscal policy (approximately 3x the amount from the GFC) 2) the health of the consumer due to lower borrowing, higher savings rates (2x pre GFC levels) and greater fiscal support and 3) bank balance sheets prior to Covid in contrast to the GFC (core capital nearly 2x larger)<sup>36</sup>. The GFC was a balance sheet recession where consumers and banks were forced to de-lever over a number of years resulting in a drawn-out recession and an anaemic recovery. Aggressive fiscal policy and healthier balance sheets should ensure that as restrictions are lifted the subsequent recovery will be far swifter with a more benign financial impact. The key risk in terms of defaults and bankruptcies from here would be a true second wave of Covid that was met with the same type of lockdowns we observed in Q2 but without the accompanying fiscal stimulus.

<sup>36</sup> Bloomberg data/quarterly filings

## 10. What are the likely scenarios for the evolution of the pandemic?

The base case doesn't see economic normality until mid-2021 and even then, there will be some remaining restrictions in travel and mass events. Some changes to working and living practices will stay embedded in our normal lives beyond the pandemic, with flexible working and concern for the environment among the most significant. Key events to watch for changes in scenarios are the usual ones: vaccine and therapy approvals, the election and case counts as we socialise indoors and flu season hits.

There is little debate among experts on what is needed to achieve a return to full normality (i.e., large-scale immunity either from vaccines and/or treatment remedies to reduce its effects), but there is considerable debate on the timing. McKinsey's base case scenario sees this happening in mid-2021, but many experts are more pessimistic and expect this could take several years.<sup>37</sup> However, even without full immunity, as therapeutic measures improve, many activities can resume on a near-normal basis with adequate safeguards.

### Exhibit 16: Key Event Calendar: There are several milestones and events into the end of January that will likely have a significant bearing on the trajectory of the virus.

Date	Event Calendar
9 Oct 2020	Congressional deadline for passing stimulus
22 Oct 2020	FDA Vaccine Committee Meets
31 Oct 2020	High speed antigen tests expected
31 Oct 2020	Pfizer to submit data for EUA to FDA
Mid Oct/Early Nov	Monoclonal antibodies phase 3 data may allow for EUA
3 Nov 2020	US Presidential Election
Mid/Late Nov	Astra/Moderna/J&J expect phase 3 data
26 Nov 2020	Thanksgiving holiday (more travel in the US - watch for spike)
Mid/Late Dec	Novavax expect phase 3 data
Late Dec 2020	Christmas (expect significant travel and potential spikes)
Early/Mid Jan 2021	Sanofi/Innovio expect phase 3 data
20 Jan 2021	US Presidential Inauguration

### Exhibit 17: Covid Scenarios: vaccine and monoclonal antibody approvals will likely prove crucial to the path to the end of the pandemic

Category	Pessimistic Case	Base Case	Optimistic Case
<b>Q4 2020</b>			
<b>Vaccines</b>	No vaccine approvals	One vaccine is approved for emergency use	2 or more vaccines are approved for emergency use

<sup>37</sup> <https://www.mckinsey.com/industries/healthcare-systems-and-services/our-insights/when-will-the-Covid-19-pandemic-end>

<b>Treatments</b>	No treatment approvals	Monoclonal antibodies are introduced but not at scale	Monoclonal antibodies rolled out for use in care homes
<b>Testing</b>	insufficient PCR tests to open up travel and tourism	insufficient PCR tests to open up travel and tourism	Begin to see PCR testing replacing quarantine
<b>Seasonality</b>	Flu season is severe	Flu season is mild as it was in southern hemisphere	Flu season is mild as it was in southern hemisphere
<b>Trajectory</b>	Cases remain elevated across EU/US	Cases fall in line with the 2-month cycle we have observed.	Cases fall in line with the 2-month cycle we have observed.
<b>Stimulus</b>	No further US stimulus agreed	No further US stimulus agreed	US Stimulus package announced
<b>Mobility</b>	Further tightening of restrictions	Small loosening of restrictions late in the quarter	Significant loosening of restrictions late in the quarter with the hospitality sector getting a boost and offices increasing capacity
<b>Q2 2021</b>			
<b>Vaccines</b>	One vaccine is approved for emergency use to begin inoculating those most vulnerable	More vaccines are approved with those most vulnerable being inoculated and mass vaccinations begin	Mass vaccinations are in full flow for most of the developed world
<b>Treatments</b>	Monoclonal antibodies are introduced but not at scale	Monoclonal antibodies are also utilised to help ensure against further spikes	Monoclonal antibodies are also utilised to help ensure against further spikes
<b>Testing</b>	insufficient PCR tests to open up travel and tourism	Abundant PCR testing opens travel and tourism (end to quarantine)	Testing of low importance due to low case counts (vaccines)
<b>Seasonality</b>	Flu season begins to fade	Flu season has passed with no major complications	Flu season has passed with no major complications
<b>Trajectory</b>	Cases start to subside after a post-Christmas spike	Following a brief blip post-Christmas cases resume their downward trend	There is no spike in cases post-Christmas suggesting we may be nearing the end of the pandemic
<b>Stimulus</b>	US government passes stimulus package	US government passes stimulus package	US government passes stimulus package
<b>Mobility</b>	Offices remain at low capacity; Some loosening of restrictions with hospitality starting to fully reopen	Offices move to 50%+ capacity Sporting events/concerts start to be green lighted.	Offices return to new normal 10-20% below pre Covid levels Sporting events/concerts have large crowds returning, some inter-continental travel resumes between countries that are vaccinating at scale

## 11. What are the investment implications?

Our seven core investment themes remain resilient in the current context. However, the two themes around inflation and ESG are likely to gain particular prominence.

From the perspective of an investor, the Covid-19 pandemic appeared in early January 2020 and soon became the most impactful driver of both economic growth and financial market performance of our lifetimes. Ten months later we still cannot say that this pandemic is behind us, nor even that we have confidence that a definitive cure is close at hand (although there has been some unprecedented progress). Even after this pandemic is behind us, its effects on the global economy will continue to be felt as the way we interact with each other and with the natural environment may be permanently impacted, possibly in some ways for the better.

At the same time, our focus must increasingly revert to including other classical macro factors that drive economic and financial performance. These include the upcoming US elections and its implications for fiscal stimulus, stretched valuations in certain equity sectors and regions, the monetary policy/inflation outlook and ongoing geopolitical risks. Any investment implications we arrive at must take into account all of the above, as investors can no longer base investment decisions exclusively on Covid-19.

Currently, the biggest question on many investors' minds is to what extent the US will provide further fiscal stimulus to the economy. The answer to this largely depends on which party will control the Senate. While earlier polls suggested the Senate was securely in Republican hands, more recent polls see this race as very close, and betting markets actually give a clear lead to the Democrats. While such a 'Blue Sweep' scenario could also be partly classified as a direct consequence of Covid-19 (i.e. President Trump, rightly or wrongly, is perceived as having downplayed the severity of Covid), it would nevertheless result in a wide range of policy changes, including not only greater fiscal stimulus (to the tune of an extra \$6T of spending), it would also likely bring higher taxes (\$4T), some degree of wealth redistribution, greater healthcare spending and investment in renewable energy sources.

Such an outcome does not materially change our core investment themes which are by design meant to be long lasting (see below with updates). However, in the current context, the two themes around inflation and ESG may gain particular prominence.

#### Exhibit 18: Core investment themes

Investment Theme	Status
1. Long Innovation	This had been a consensus view, but some are now concerned about valuation/regulatory risk in large cap tech. Our view is that there are short term risks but as long as growth prospects remain strong and interest rates remains subdued, innovation remains an attractive theme over the long term.
2. China's emerging middle class and digitalisation	This was a non-consensus view during the last few years of trade wars but has performed well and remains attractive as a diversification bet on the other major economic growth game in town (tech).
3. Maximum exposure to Private Markets	Non-consensus, but generally accretive over the longer term given expected 4-5% returns from traditional equity/bond portfolios.
4. Diversified safety net allocation	Non-consensus originally, but gold now becoming more consensus so near-term risk to retail investor sentiment. Longer term a good hedge against liberal monetary policy and weakening US\$.
<b>5. Accelerated ESG implementation</b>	See detail below
6. Prepare for distress	Low consensus. Some opportunities in March but credit generally held up better than in the GFC. Longer term opportunities in commercial real estate, energy and sectors in the eye of the Covid storm.
<b>7. Prepare for higher inflation</b>	See detail below.

**Prepare for higher inflation:** The Covid-19 crisis initially resulted in a disinflationary demand shock. Inflationary pressures are now building and may rise further over the medium-term as demand builds while the supply of goods and services is constrained by protectionism and years of underinvestment in capex. While few expect a return to the double-digit inflation rates of the 1970's, the long-lasting 2% inflation ceiling could easily be punctured, and we could see periods of low to medium single-digit

inflation over the next few years. Such an overshoot (fully endorsed by the Fed's new average rate targets) would be supported by lower-for-longer short-term rates, and lead to higher breakeven inflation rates causing real yields to decline. This would suggest diversified allocations to Gold, TIPS and inflation-sensitive equity sectors would be prudent for portfolios. Such an inflationary scenario could also result in a degree of sector rotation from growth to value and, if combined with yield-curve steepening, would favour the financial sector in particular. While there may be a short-term retracement of some of the explosive 2020 gains in tech stocks (e.g. NYSE FANG+ index up +73% YTD) we do not anticipate any such correction would be long-lived (even with some increased regulatory/anti-trust burden) as the underlying growth generated in that sector is expected to persist for decades.

**Accelerated ESG implementation:** We have seen policymakers in the EU explicitly target much of their new €750B stimulus package towards renewables and would expect a similar tendency in the US from a newly elected Democratic Congress. If anything, the scale of the Covid-19 pandemic has refocused attention on the sustainability of life on this planet. Employers are recasting working from home policies with the impact on their carbon footprint very much top of mind. Right through the crisis, Partners Capital took new strides on asset managers' ESG integration, ESG equity manager due diligence and built a deeper understanding of the growing universe of impact investment opportunities, particularly those focused on climate change. Aggregated assets in ESG-themed ETFs kept growing despite Covid-19 through to June of this year. But investment committee conversations have started to shift from purely Covid-19 related discussion to more focus on the best way to shift portfolio investing to measure risk, return and impact, along the lines of what Sir Ronald Cohen discusses in his latest book: *Impact: Reshaping Capitalism to Drive Real Change*. We will discuss ESG themes in more detail in our upcoming Webinar dedicated to this theme.

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## #16 Vaccines and Variants – January 27 2021

### Covid-19 Summary

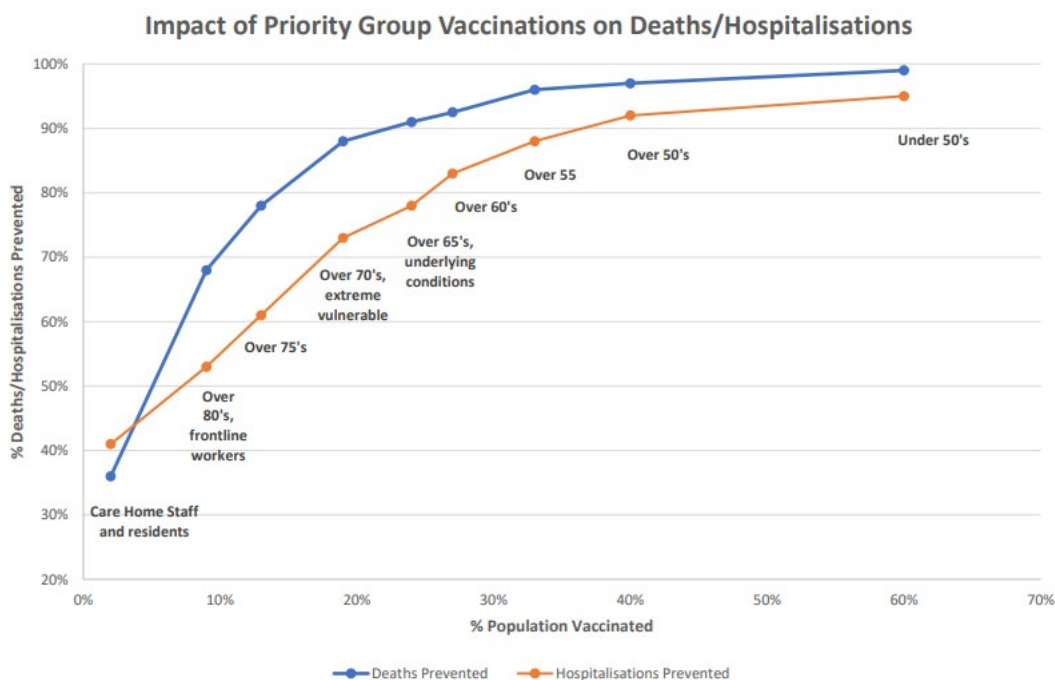
- After six weeks since the first vaccines were administered, we are starting to get indications of how the vaccine roll-out will play out on the global economy throughout 2021.
- 71M doses have been administered across 57 countries, today at 3.6M doses per day.
- Seven vaccines are approved and available with two additional promising ones, J&J and Novavax, expected in early Spring.
- Contracts are in place for delivering over 8 billion doses, enough for half of the global 7.8 billion population (3 billion from AstraZeneca alone) – 5.5 billion doses from currently approved vaccines.
- The UK has the highest level of contracts in place per population (4.5 doses per person including children who will not be vaccinated).
- If priority vaccination sequencing is done appropriately, 30% vaccination will reduce mortality rates to near zero and precipitate economic re-openings.
- At the targeted rates of vaccination, the UK should be able to offer a single dose vaccination to the point of herd immunity (assuming this is achieved at 70% of the population) by the end of April, closely followed by the US in mid-June and the EU at the end of July.
- Developing countries will only reach herd immunity towards year end or early 2022, which will have ongoing international travel restrictions continuing throughout 2021
- Covax has contracted for approximately 2 billion doses of vaccine and will distribute those with a bias to those most developing nations most in need.



- Moderna tests on the South African and Brazilian variants of Covid-19 suggest significantly reduced potency, but sufficient to remain protective.
- We are in a race against virus mutations which will continue to emerge from new places around the globe. This poses the greatest threat to when the Covid pandemic comes to the end we all want to see.

### Impact of Priority Group Vaccination on Deaths and Hospitalisations

The UK has committed to vaccinating the first 4 priority groups by February 15th . This represents about 19% of the UK population. Analysis from the Covid Actuaries Response Group suggests this will lower Covid deaths by circa. 90% and hospitalisations as a result of Covid by just under 75%. It is hoped this will facilitate a risk management reopening of the economy.



### What is the Expected Pace of Vaccine Rollout?

Based on the projected run rate the UK will have Projected Rate of Vaccination (Single Dose) administered at least one dose to all those over 70 or with underlying conditions by the middle of February. The US should reach this point in late March with Europe reaching the same point by late March.

### The key risks are;

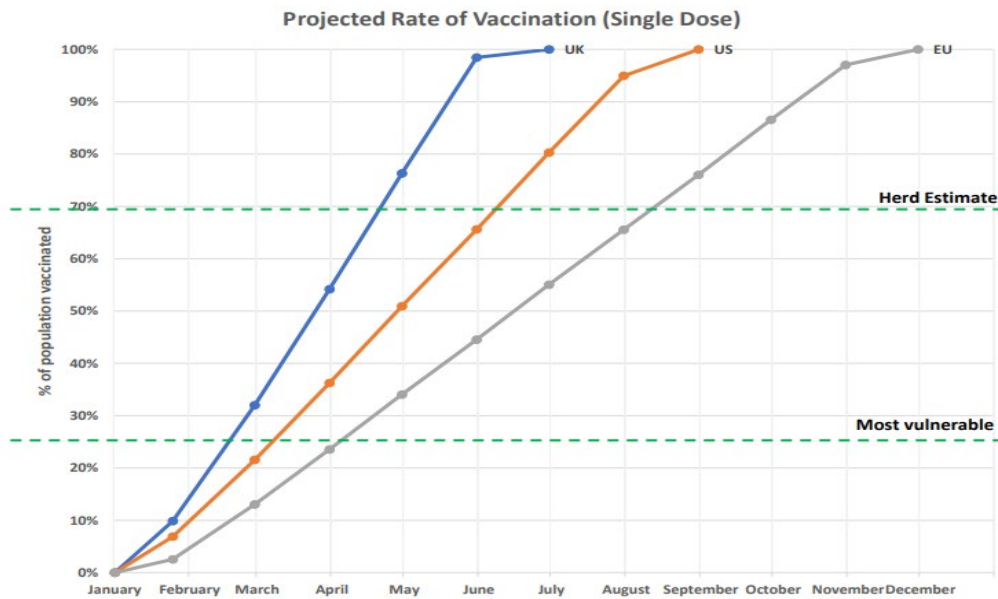
1. Vaccine supply; Europe has already run into issues with both Pfizer and AstraZeneca.
2. Vaccine efficacy against emerging strains, initial evidence suggests vaccines should still be effective.

### Assumed run rate;

UK: 450k doses/day (current 3 day average) with 10% vaccinated at present – NHS

US: 1.5m doses/day (current 3 day average) with 7% vaccinated at present - CDC

EU: 1.5m doses/day starting one week from today (about 2x the current rate which is in line with gov guidance assuming approval of AZ vaccine) with 3% vaccinated at present - EU guidance



Sources; 1.

<https://www.bloomberg.com/graphics/covid-vaccine-tracker-global-distribution/?sref=ABA0JC7B> 2.

<https://coronavirus.data.gov.uk/details/vaccinations> 3. <https://covid19-projections.com/#view-us-infections-estimates>

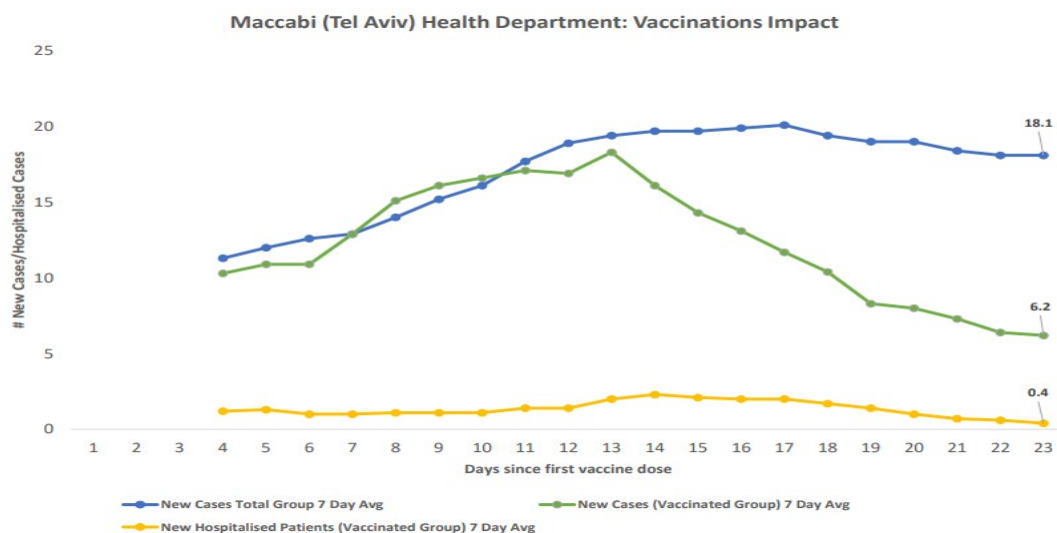
### What is the Real World Impact of Vaccines?

The initial data on the effect of vaccinations from Israel (the world leader in vaccinations) is quite promising.

14 days after the first dose is administered a clear gap in new cases emerges between those vaccinated and those not vaccinated.

23 days after the first dose this extends to 66% reduction in cases in the vaccinated group versus those not vaccinated.

Hospitalisations for those vaccinated remain close to zero.



Source: Maccabi Health Department

## Where is the Production and Supply Concentrated?

The AstraZenca vaccine will be the most important for the world with over 3bln doses contracted for production.

The world's wealthiest nations have reserved more vaccine than they need and developers will not share their intellectual property, says the People's Vaccine Alliance.

To put the scale of this into perspective countries that have only 14% of the world's population have reserved 53% of the supply of the eight most promising vaccines.

Supply issues for AstraZeneca have already become apparent particularly with supply to Europe expected to be cut by up to 60% in Q1.

Producer	Total Contracted	USA	UK	EU	China	Japan	India	Brazil	Russia	Covax	Latam ex Brazil/Mex	Other
Astra Zeneca	3036	300	100	300	200	120	1000	100	0	300	150	466
Moderna	461	200	17	80		50						114
Pfizer/BioNTech	836	200	40	300		120						176
Johnson & Johnson	346	100	30	200								16
Novavax	1314	110	60	200			1000					-56
Sanofi/GSK	722	100	60	300						200		62
Gamaleya/Sputnik	727						200	100	160			267
Curevac	225			225								0
Sinopharm	223				Unspecified contract size							223
UBI Group	202									200		2
Sinovac Biotech	180							46				134
Other	218											218
<b>Total</b>	<b>8490</b>	<b>1010</b>	<b>307</b>	<b>1605</b>	<b>200</b>	<b>290</b>	<b>2200</b>	<b>246</b>	<b>160</b>	<b>700</b>	<b>150</b>	<b>1622</b>
Population (mln)	7800	330	68	378	1400	126	1366	211	146	250	317	3208
Doses/mln population	1.09	3.06	4.51	4.25	0.14	2.30	1.61	1.17	1.10	2.80	0.47	0.51
Total approved dose (mln)	5463	700	157	680	200	290	1200	246	160	300	150	1380
Approved doses/mln pop	70%	212%	231%	180%	14%	230%	88%	117%	110%	120%	47%	43%
Approved												
Soon to be approved												

Source: Bloomberg

## What do we Know?

Several new variants with mutations around the spike protein emerged in the last quarter of 2020. These new variants appear to be more transmissible (+50%) but generally no more deadly. This may not hold true for the UK variant with some emerging evidence suggesting it may be more deadly.

Existing vaccines look as though they will provide protection against the UK strain (B117).

The news on the South African variant is more mixed but Moderna say their vaccine will still work despite significant reduction in antibody development after a single dose.

Variant	Name	Originally Detected	Origin	#Countries	Transmission	Mortality Estimate	Vaccine Efficacy
UK Variant	B117	September	South east, England	60	+56%	Mixed evidence, possibly higher, but still to early	Unhindered according to Pfizer and Moderna.
South Africa Variant	B1351	October	South Africa	20	+50%	No evidence of higher mortality	Small study suggests issues but Pfizer say they need to complete analysis. AstraZeneca and J&J are actively testing. Moderna say their vaccine delivers 1/6 <sup>th</sup> the neutralizing power against this variant but remains above levels expected to be protective.
Brazil Variant 1	B11248 (P1)	December	Manaus, Brazil	n/a	50%	No evidence of higher mortality	Small study suggests issues but Pfizer say they need to complete analysis, Astra/J&J actively testing
Brazil Variant 2	VUI202101 (P2)	December	Rio de Janeiro, Brazil	n/a	No hard evidence of increased transmission	No evidence of higher mortality	No suggestion of reduced efficacy

Source: <https://www.ft.com/content/c0c8f72c-e58e-4319-80c4-0db153ad85db>  
<https://www.statnews.com/2021/01/20/pfizer-biontech-covid-19-vaccine-works-just-as-well-against-variant-first-detected-in-u-k-study-indicates/>

## Expert Views

Experts believe that the vaccines will ultimately be effective against the new strains of the virus.

They do warn that efficacy may be diminished somewhat but that vaccines can be altered and improved in a relatively short period of time.

Person/Agency	View
Tal Zaks, Chief Medical Officer Moderna	From what we've seen so far, the variants being described do not alter the ability of neutralizing antibodies elicited by vaccination to neutralize the virus. My definition of when to get worried is either when we see real clinical data that suggest that people who've either been sick or have been immunized are now getting infected at significant rates with the new variants... We've seen some case reports here and there of people getting reinfected. But in a context of millions getting infected, I don't think that is material.
Dr. Moncef Slaoui, Operation Warp Speed Chief Adviser	This virus actually mutates as part of its normal behavior, and therefore it is normal to expect that there will be variants. Based on the information shared with us by the UK scientists and early data that we have here, we think that this virus variant should be under control with this vaccine.
BioNTech CEO Ugur Sahin	"We don't know at the moment if our vaccine is also able to provide protection against this new variant. But scientifically, it is highly likely that the immune response by this vaccine also can deal with the new virus variants."
Dr. Dean Winslow, infectious disease physician at Stanford Health Care.	The antibody response is broad and even in the presence of certain protein substitutions like [South African variant], antibodies may still be able to neutralize and prevent attachment/entry of the virus
Mulk et.al. (2021)	These data, together with the combined immunity involving humoral and cellular effectors induced by this vaccine, make it unlikely that the [UK variant] will escape [current vaccine]-mediated protection.
Dr. Richard Lessells, infectious diseases specialist	[The South African variant] doesn't completely knock out or stop the neutralization but there's a quite substantial effect in some of the samples of blood we tested...it was "possible" that the effectiveness of the Covid-19 vaccines may be "slightly diminished"
Philip Dormitzer, one of Pfizer's top viral-vaccine scientists	"We've now tested 16 different mutations, and none of them have really had any significant impact. That's the good news. That doesn't mean that the 17th won't."

Source: Goldman Sachs

## Expert Views – From one of our Biotech Investors

On the 25th January, Moderna presented preclinical data assessing the viral inactivation and neutralization titers for various emerging strains of SARS-nCoV2. Pfizer-BioNTech have previously presented similar data for their vaccine, suggesting that the antibody responses were unimpaired to the novel strains (Muik et al.). The Moderna presentation and pre-print article paint a more troubling picture. The neutralizing potency of vaccine-induced antibodies was 6-10 fold lower against two of the emerging viral strains ("South Africa" – B.1.351 and "Brazil" – B.1.1.28). This does not mean that

everyone vaccinated or previously infected is vulnerable to being infected again, but it does suggest that individuals with poor immune responses after prior exposure could be vulnerable.

There are other implications from the behavior of these more infectious and potentially resistant strains. First, vaccines with lower immunogenicity (such as J&J's) may fail to achieve protection against these more resilient viral strains. Second, these strains are likely to spread rapidly, unless we get vaccine doses into arms expeditiously. Third, vaccine development for COVID is unlikely to stop with the current generation of vaccines, or the current doses being given. In the face of these immune-resistant variants, we take some solace from the experience with common coronaviruses where re-infections with variants resistant to antibody neutralization are mild. In a series of experiments this year on common coronaviruses, scientists have reported that coronaviruses mutate to escape immune pressure (*Eguia, et al., 2020 bioRxiv; Edridge et al., 2020 Nature*), resulting in re-infection that is presumed mild and short in duration (i.e., a cold).

Most COVID vaccine companies will have to match Moderna's strategy of developing second generation vaccines to address these new variants of SARS-nCoV2. The next important catalysts for the COVID vaccine field are the results of several pivotal trials of "2nd wave" COVID vaccines. These will include the results of the phase III trials of the Novavax vaccine NVX-CoV2373 in the UK (# = 10,000) and South Africa (# = 4,400).

The reduced neutralizing effect of antibody generated immunity to novel strains of SARS-nCoV2 poses a serious risk to our assumptions about controlling the pandemic and returning to more or less normal economic activity. If significant changes to viral surveillance, vaccine development, testing, distribution and use are not made, we run the very real risk of widespread dissemination of these resistant strains, with resulting increased risk of reinfection in previously infected or vaccinated individuals, and therefore continued economic and public health disruption.

Given the uncertainty that the recent disclosure about B.1.351 has created, we have identified 7 steps that we believe public health authorities should consider averting the risk these strains pose to our economic and immunologic recovery. These steps are: 1. do much more COVID strain sequencing; 2. agree on an immunologic surrogate for protection; 3. halt partial (one dose) vaccination strategies; 4. vaccination should be geographically rather than demographically implemented; 5. border security will need to be maintained or tightened; 6. immediately assess heterologous (clones from a different cell-type) vaccination strategies; 7. accelerate development of novel and second-generation vaccines.

Source: Great Point Partners

## Maintaining Discipline and Diversification

Portfolio Construction	Investment Themes	Active Management
<ul style="list-style-type: none"> <li>• "Stay the course" with rigorous rebalancing to target risk levels.</li> <li>• Ensure that portfolios remain balanced across growth, value quality and other factors</li> </ul>	<ul style="list-style-type: none"> <li>• Maintain right-sized exposure to secular long-term themes               <ul style="list-style-type: none"> <li>- Technology</li> <li>- Life Sciences</li> <li>- China</li> <li>- Venture/Growth</li> <li>- Decarbonisation</li> <li>- Inflation protection</li> </ul> </li> <li>• Tactical opportunities around reflation and economic recovery</li> </ul>	<ul style="list-style-type: none"> <li>• Maintain nimble managers who can navigate the volatility around the ongoing complexities of Covid and its after-effects.</li> <li>• Maintain diversified sources of alpha that are not dependent on the accurately calling the macro environment</li> </ul>

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## **#17 What does Omicron tell us about the likely future evolution of the virus and economic lockdowns? – Dec 20 2021**

Many researchers and investors are now watching to see if the most mutated coronavirus variant, Omicron, will crowd out other strains and pave the way for the pandemic to slowly ebb away as an endemic virus, where the world learns to live with the pathogen. The majority of expert virologist research says that while some viruses gradually become less virulent over time, there's no guarantee that SARS-CoV-2 will follow that pattern. New variants beyond Omicron will emerge and some could be more infectious and, at the same time, more virulent. Vaccines will continue to play a critical role in containing the effects of SARS-CoV-2 on its journey to becoming endemic. But vaccines have to reach all corners of the planet and they will have to be modified to respond to new variants. In essence, vaccination has to outpace the virus's ability to mutate, everywhere in the world.

How SARS-CoV-2 evolves over the next several months and years will determine what the end of this global crisis looks like — whether the virus morphs into another common cold or into something more threatening such as influenza or worse. A global vaccination push that has delivered nearly 8 billion doses is shifting the evolutionary landscape, and it's not clear how the virus will meet this adversary. Meanwhile, as countries lift restrictions, opportunities increase for SARS-CoV-2 to make significant evolutionary leaps.

### **1. How virulent is Omicron?**

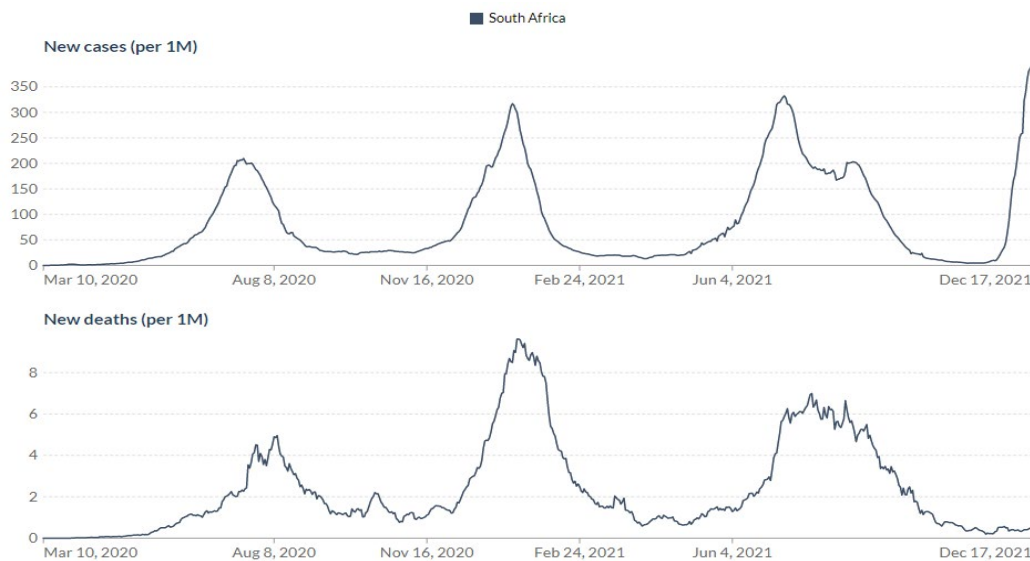
This question is enormously important. Unfortunately, the early data has been a bit all over the place.

We are four weeks into South Africa's experience with Omicron and two weeks into the UK's. South Africa is saying that Omicron is three to five times more infectious than the Delta variant, and 29% as severe as the first wave of infections in South Africa. This is based on a research report from Discovery Health, South Africa's largest health insurer, from a sample of 19,070 positively tested omicron patients during the "omicron period" from November 15th to December 7th. The Pfizer-BioNTech vaccine is the predominant vaccine in South Africa. Vaccine effectiveness has been reduced from 80% in the Delta wave to 33% in the Omicron wave. Vaccine prevention of severe complications (hospitalization risk) has reduced from 93% in the Delta wave to 70% in the Omicron wave.

However, new analysis from South Africa suggests both that the hospitalization rate in South Africa may have been reduced by as much as 91 percent, compared to the country's last wave, and that the death rate among those hospitalized may also have fallen by two-thirds — two points that, taken together, suggest as much as a 25-fold or even 30-fold reduction in mortality. A 30x reduction translates into Omicron being just 3.3% as deadly as the last wave. That is comparable to seasonal flu.

As you can see in Exhibit 1, South African deaths have not increased significantly despite the massive rise in Omicron cases over the four-week life of the new variant.

**Exhibit 1: South African deaths have not increased significantly despite the massive rise in Omicron cases over the four-week life of the new variant**



Source: [ourworldindata.org](https://ourworldindata.org)

In the UK, Imperial College has reported that they have found “no evidence” that the Omicron coronavirus variant is milder than Delta. This conclusion was based on UK Health Security Agency and National Health Service data on people who tested positive for COVID-19 in a PCR test in England between November 29 and December 11. The actual data coming out in the UK would contradict Imperial College’s view. Omicron is believed to account for 56% of Covid cases in the UK today where we now see an average of around 90,000 Covid cases a day, compared to 30,000 two weeks ago. Interestingly, deaths have averaged around 110 per day with no noticeable uptick over the past two weeks. Given the two-week lag between cases and deaths, we will know a lot more in two weeks’ time.

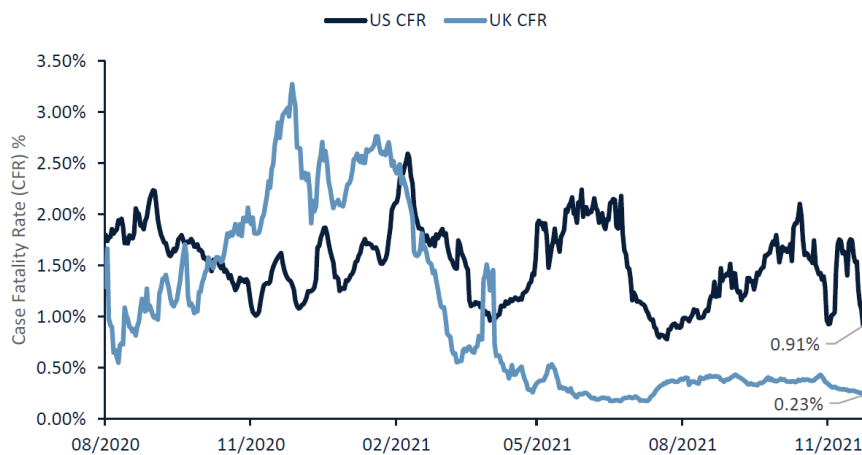
A University of Hong Kong study found that Omicron replicated less efficiently, more than 10 times lower, in the human lung tissue than the original strain which may signal “lower severity of disease.” They also found that the omicron variant infects around 70 times faster than delta and the original Covid-19 strain, though the severity of illness is likely to be much lower. This study adds weight to the early observations from South African doctors.

Omicron only needs to be 5x less virulent than Delta for it to be less deadly than the Delta variant. In the coming weeks, we will have a better idea.

It is undoubtedly too early to tell, but there is no indication of rising case fatality rates in the UK looking at the data in Exhibit 2. Note that these reported case fatality rates (CFRs) over-estimate the actual CFRs by 2x in the case of the UK where only half of all Covid cases are estimated to be reported and by 4x in the case of the US where it is estimated that only 25% of cases are reported. As of the 19<sup>th</sup> of December, only 3% of US cases are believed to be the Omicron variant.



## Exhibit 2: Case Fatality Rates (CFRs) have not yet risen since Omicron



Source: Github date through to 17 December 2021. South Africa data not available/reliable.

A growing body of preliminary research suggests the Covid vaccines used in most of the world offer almost no defence against becoming infected by the highly contagious Omicron variant. All vaccines still seem to provide a significant degree of protection against serious illness from Omicron, which is the most crucial goal. But only the Pfizer and Moderna shots, when reinforced by a booster, appear to have initial success at stopping infections, and these vaccines are unavailable in most of the world.

Early research shows that other shots, including those from AstraZeneca, Johnson & Johnson and vaccines manufactured in China and Russia, do little to nothing to stop the spread of Omicron. And because most countries have built their inoculation programs around these vaccines, the gap could have a profound impact on the course of the pandemic. This may mean that production needs to shift away from these vaccines to Moderna and Pfizer.

Airfinity, a health analytics company, estimates that in a best-case scenario, where all vaccine manufacturers quickly scaled up production to manufacture just Pfizer and Moderna vaccines, it would take until October 2022 for the 6B doses of Omicron-targeted vaccines to be made available, which is the number needed to stop Omicron. 8.7B vaccine doses have been delivered since they first started approximately one year ago. The current rate is 40M/day.

### 2. Will Covid naturally evolve to a more infectious virus, but one that is far less severe?

We have studied what many virologists have said on this topic, and the answer seems to be “not necessarily.” The table below provides a summary of each of the most significant COVID-19 variants to emerge since the beginning of the pandemic. The pattern so far has been increased transmissibility and virulence with each of the major variants to emerge. That is until Omicron. For the unvaccinated, the R-0 is estimated to be near 20, or three to four times Delta’s R-0. As we discussed above, the virulence is unknown with a wide range of estimates from 29% less severe to 97% less severe.



**Exhibit 3: The five variants of concern have had a pattern of increase transmissibility and virulence, until Omicron**

COVID 19 Variants	First Identified	Date of designation	R-0	Immune evasion	Virulence (mortality relative to original strain)
Variants of concern					
Original Strain	China	01/02/2020	3.5	n/a	1.0
Beta	South Africa	18/12/2020	4.4	High	1.5
Gamma	Brazil	11/01/2021	4.8	High	1.5
Delta	India	11/05/2021	6.0	Medium	2.3
Omicron	South Africa	26/11/2021	18-24	High	0.7 – 0.03?

Source: The WHO

All of us hope that this turn to a less virulent virus will also translate into a less deadly one, after factoring in the higher rate of infection. We also want to believe that this is the natural evolution of viruses.

Examples of viruses which became less dangerous over time include the H1N1 influenza viruses responsible for the 1918 Spanish flu, the 2009 swine flu pandemics and the myxoma virus that causes myxomatosis in rabbits. OC43, a human coronavirus that causes the common cold, also began life as a more deadly coronavirus and it is believed that it may have been responsible for a pandemic in 1890, which killed more than a million people worldwide, but obviously became less dangerous over time. Most experts, but not all, agree that in the long term, through infection with different virus strains and vaccine updates, it is likely the global population will eventually build up a wall of immunity that COVID-19 will have difficulty overcoming. Mutations that overcome some people’s antibody responses are likely over time, but T-cell-mediated immunity, the other arm of the immune response, is far more resilient to changes in the viral genome.

But this view is far from unanimous. Francois Balloux, a computational biologist at University College London, says that the COVID-19 virus could evolve to be less severe, but that outcome is far from certain. “There’s this assumption that something more transmissible becomes less virulent. I don’t think that’s the position we should take.” Variants including Alpha, Beta and Delta have been linked to heightened rates of hospitalization and death, potentially because they grow to such high levels in people’s airways. The assertion that viruses evolve to become milder “is a bit of a myth”, says Andrew Rambaut, an evolutionary biologist at the University of Edinburgh. “The reality is far more complex.”

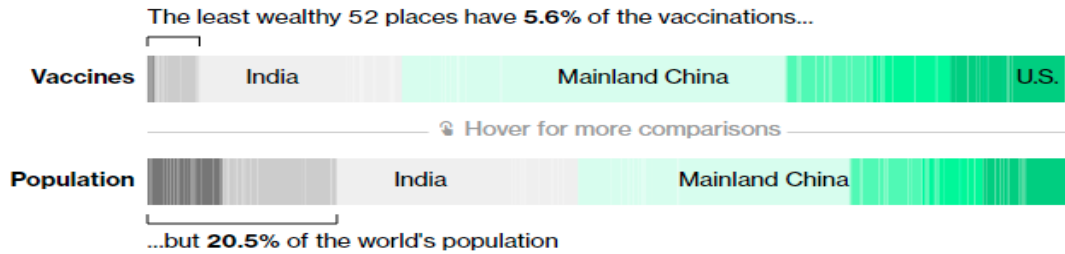
**3. Where are we on the path to global vaccination?**

Nearly 50% of the global population has now been fully vaccinated (two doses) against COVID-19 but the split of vaccinations between rich and poor countries is stark. In the US and Europe full vaccination rates are 60% or higher. In Asia, vaccination rates are just over 52% and rising rapidly. In Africa however the percentage of the population fully vaccinated stands at just 6%. Bloomberg estimates that at the current run rate it will take 3 months to provide at least one dose to 75% of the world’s population and 6-8 months to provide 2 doses. Furthermore, the WHO estimates that the rollout of boosters and the vaccination of children under 12 in developed countries will create a production shortfall of 3 billion jabs. Roughly 120 countries have initiated booster programmes and 30 are vaccinating children.

**Exhibit 4: The least wealth 52 countries have 5.6% of the vaccinations and 20.5% of the world's population**

**Uneven Access to Vaccines**

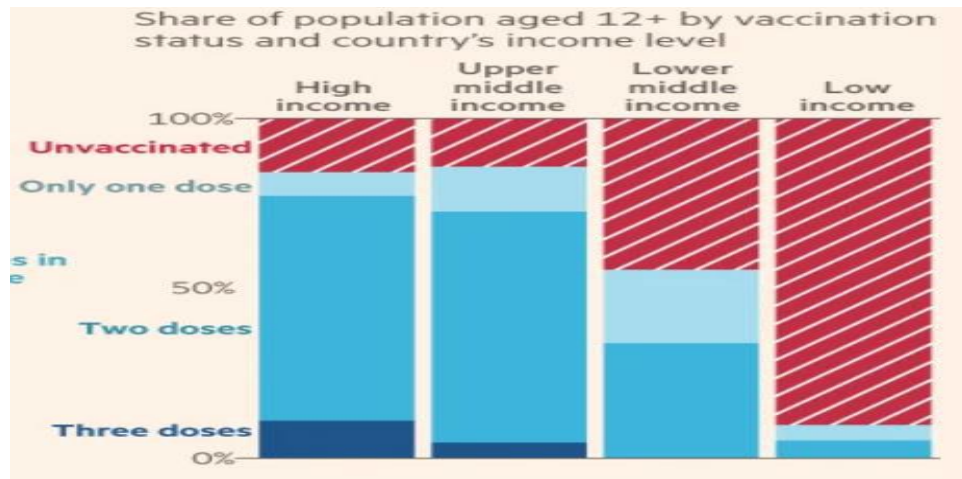
Least wealthy Most wealthy



Note: Countries and regions are ordered by GDP per capita (PPP).

Source: Bloomberg 19 December 2021

**Exhibit 5: The lowest income countries are largely unvaccinated a year after vaccines became available**

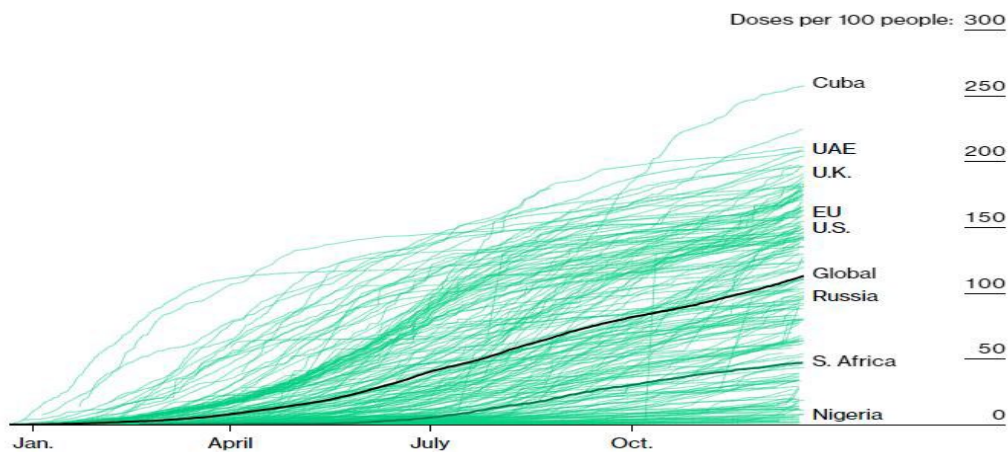


Source: The Financial Times

Beyond the tragic mortality implications of the inequitable vaccine distribution, one of the greatest concerns with that inequity is that this allows for the ongoing propagation of new variants in parts of the world with lower vaccine coverage. Take the example of the Omicron variant, experts were shocked at the number of mutations present in the variant. The most prevalent view among virologists is that the Omicron variant spent months mutating in an immunosuppressed person with a chronic infection. The immune response of an untreated HIV patient would be too weak to clear the virus but strong enough to drive the process of evolution. More than half of the world's 38M HIV sufferers are in east and southern Africa. Jonathan Li, director of the Harvard/Brigham virology specialty laboratory in Boston, said it was "striking" that two variants of concern, Beta and Omicron, had arisen in southern Africa, a region with "large numbers of immunosuppressed individuals as a result of HIV infection". Soumya Swaminathan, the WHO's chief scientist, noted that "if we had used the vaccines produced so far in a rational and fair manner, we wouldn't be seeing the high death rates, two years into the pandemic". The key message is that we will continue to see new variants emerge from areas of the world with poor vaccine coverage.

WHO had set a target to vaccinate 10% of every country, economy and territory by the end of September 2021, but by that date 56 countries had not been able to do so, the vast majority of these are countries in Africa and the Middle East. In October, the WHO launched a new strategy which outlines a plan for achieving targets to vaccinate 40% of the population of every country by the end of this year and 70% by mid-2022. 80 doses per 100 people would be required to have 40% of the population vaccinated under a Pfizer or Moderna two-vaccine regime. Below we note that approximately 50 countries sit below this target today including large populations such as Sudan, Ethiopia, Egypt, Nigeria, Kenya, Uganda, South Africa, Iraq, Pakistan and Bangladesh.

**Exhibit 6: Over 50 countries have vaccination rates below 40% including many with large populations**



Source: Bloomberg 19 Dec 2021

The WHO revised its targets prior to Omicron and has not factored in the competition for limited Pfizer and Moderna vaccines in light of the need for booster jabs. It would seem unlikely to us that the WHO will achieve its 70% vaccination target in each and every country by mid 2022, and would be fortunate to achieve this by the end of 2022 as aid agency COVAX estimates (see below). It was originally thought that 11.2B doses would be needed to vaccinate 70% of the world’s near 8B population (8 x 70% x2). That number rises to 16.8B with a third booster. Prior to Omicron, that demand could have been met with any of the eight WHO approved vaccines (Pfizer, Moderna, Novavax, J&J, AstraZeneca, Covaxin, Sinopharm and Sinovac), including those from China and Russia. If it ends up being proven to be true that only Pfizer and Moderna can stave off Omicron, then we will have a large bottleneck potentially pushing the WHO’s 70% vaccination target for each country out well into 2023. There are also political, geographic and social obstacles to pulling every country up to the 70% target. Omicron targeted vaccines should be available by the end of Q1 2022, which could ameliorate this challenge, especially if a single dose version works.

The 20% of the world’s population most under-vaccinated shown in Exhibits 4 and 6 above will require approximately 1.5B doses from where we are today to achieve the 70% vaccinated target. COVAX was set up last year with the Coalition for Epidemic Preparedness and Innovation, Gavi and the WHO to help secure vaccines for the developing world. The scheme has delivered 582M doses to date but has fallen short of its June 2021 delivery forecast of 800M doses. It has suffered from a lack of transparency by drugmakers, manufacturing issues, export bans and what the WHO and other agencies have described as “hoarding” by richer countries. The expectation is that COVAX will have delivered 1.4B doses by the end of Q1 2022, allowing up to 50% of adults in developing countries to be protected against the worst effects of the virus. With deliveries and production continuing to

accelerate there is an expectation that most of the developing world will be sufficiently vaccinated by the end of 2022.

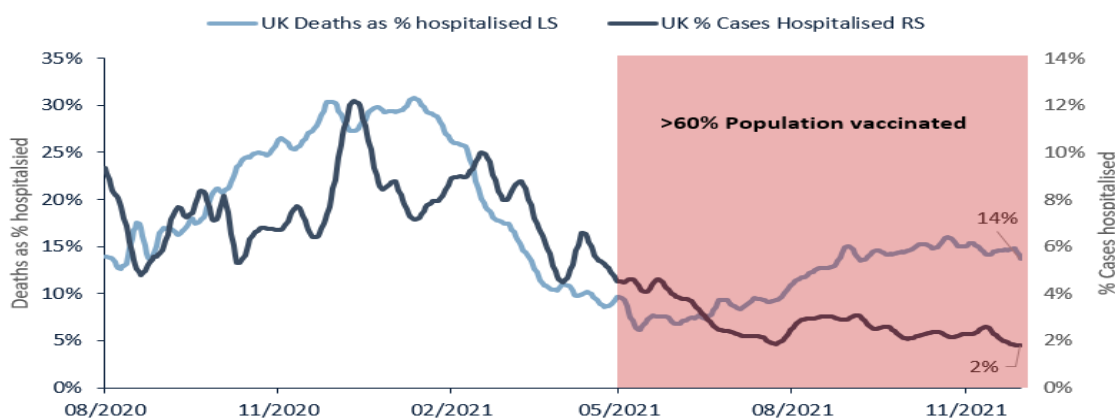
#### 4. What role will antivirals play in containing Covid’s health impact?

Two new antiviral pills to treat COVID-19 are now being brought to market: Molnupiravir from Merck/Ridgeback and Paxlovid from Pfizer. Molnupiravir was originally developed to treat Ebola but has now been repurposed to treat COVID-19. Paxlovid is a new antiviral designed specifically for COVID-19. Whereas vaccines are a preventative, these drugs are a treatment for those unfortunate enough to be infected. In essence, these drugs prevent the target virus from reproducing itself, which crucially means that the antivirals remain effective against mutant variants whose spike proteins are harder for antibodies to recognize. As the drugs are consumed in a pill format they can be administered outside of a hospital setting.

Initial trial results from Pfizer show that Paxlovid cut the risk of hospitalization by nearly 90% if taken within 3-5 days from the onset of symptoms. The drug-maker has announced its intention to produce enough of the medication to treat 50 million people in 2022. In addition, it is allowing generic versions to be manufactured in developing countries. Molnupiravir was tested in outpatients with mild to moderate disease who had a high vulnerability to severe disease. It reduced the risk of hospitalization or death by 30% if given within five days of developing symptoms. The drug proved so beneficial that the clinical study was called off early. The target market for these treatments is the unvaccinated and those that are unfortunate enough to experience breakthrough infections (particularly the elderly and the vulnerable).

Case Fatality Rates could be halved without accounting for Omicron variant. Using data from the NHS in the UK, we know that since the full rollout of the vaccine programme, the risk of being hospitalised if you catch Covid is just under 2% (on reported cases, likely far lower when asymptomatic accounted for). The risk of dying while in hospital is somewhere in the range of 10-15% as shown in the graph below. The product of these two percentages, give us a rough implied CFR (case fatality rate) range of 0.2 – 0.3%. Paxlovid and Molnupiravir have the potential to cut the risk of hospitalisation in half when they become widely available, potentially taking the CFR down to 0.1%.

**Exhibit 7: Case Fatality Rates are falling as both hospitalisation and death in hospital drop post vaccination**



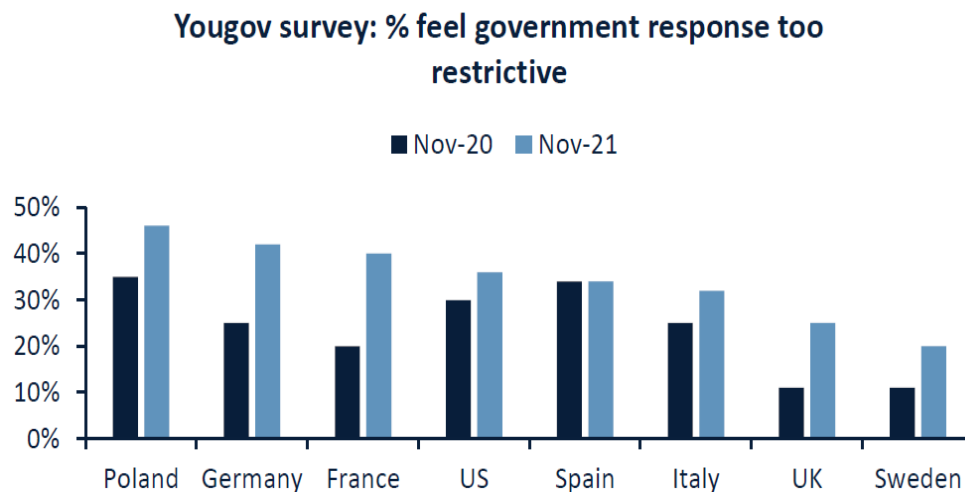
Source: The NHS

## 5. What are the investment implications of Omicron and the fear of future more virulent mutations of COVID-19?

As of last Friday, the S&P 500 is only 2% off its recent 4,705 peak, reflecting a 4% drop on the Omicron news in late November and a 2% recovery from news of low severity. This and next week will have investors on tenterhooks watching every bit of news about Omicron. Worries will be high around lockdowns returning, like that announced over the weekend by the Netherlands which will last over the holidays and through to the 15th of January. Travel restrictions were initiated a couple weeks earlier among most countries, and the politics of economic closing is returning front and centre.

One of the immediate questions will be how governments respond to emerging variants in the coming years. First and foremost, public acceptance of large-scale restrictions has waned significantly. A YouGov poll in November showed a significant increase in the percentage of respondents who felt that the measures being taken by their respective governments were too restrictive, but 60-70% do not feel they have been too restrictive in places like the US and UK.

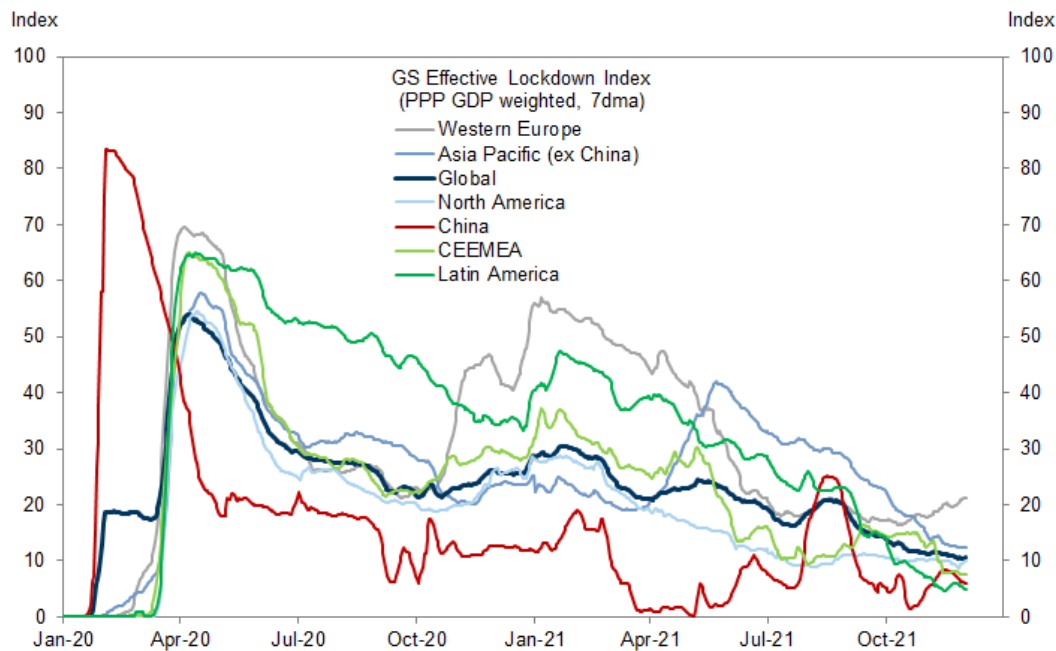
### Exhibit 8: More voters feel government restrictions have been excessive in 2021 than 2022, but the majority do not



Source: YouGov

Outside of a select group of countries, governments have been trending towards less restrictive broad-based measures and more targeted measures against those who are unvaccinated. The Goldman Sachs effective lockdown index combines data on mandated social-distancing measures and the amount of adherence they meet to provide a gauge of economic impact and the chart below shows that despite some increase in western Europe it has continued to move lower in recent months.

**Exhibit 9: Goldman Sachs Effective Lockdown Index has not yet reacted to Omicron other than some tightening in Western Europe (grey line)**



Source: Goldman Sachs Global Investment Research, University of Oxford (covidtracker.bsg.ox.ac.uk), Google LLC "Google COVID-19 Community Mobility Reports", Wind, Apple mobility

As an example of lower adherence to restriction, the Netherlands and Austria are technically in lockdown, but people are about twice as mobile as they were at the beginning of 2021, according to an analysis by the Economist. This should mean that restrictions will be less stringent over time, adherence will be lower and the impact on economic growth should be significantly reduced.

**Investment Implications**

**More Inflation.** To the extent Covid has increased inflation already, this realisation that COVID-19 may be here in its newly mutated forms for at least another 12 months, and possibly several years to come, suggests inflation pressures will persist longer than expected. We will see more labor supply constraints and more supply chain disruption. 2022 will start with most of those who worked from home in 2020 and 2021, carrying on working from home. Accordingly, our inflation playbook applies with more fervour. This continues to call for portfolios with very low interest rate risk (duration), the usual inflation hedges of inflation linked bonds and property, as well as equity managers focused on inflation risk through allocations to companies with pricing power and low labor costs.

**Market Correction focused on growth assets.** As news emerges from country after country about partial or full return to lockdowns, this will have to be factored into company earnings forecasts which could see a correction between now and year-end. With the implications for rising inflation and interest rates, this could be the catalyst for triggering a growth asset price correction – which has already partially started at the small-cap end. However, the resilience of the market to bad Covid news may never cease to surprise us. As such, we stand firm with every intention of maintaining our client’s targeted risk levels in their portfolios through this turbulence.

**Credit risk in Covid-sensitive sectors.** Where problems are almost certain to arise is in ultra-sensitive sectors such as hospitality and travel if governments are unwilling or unable to provide explicit

support schemes. In the UK at present, the Chancellor has suggested that there will be no further financial support provided, given that there is currently no lockdown. However, government guidance and messaging has shifted towards what experts have called a “voluntary public lockdown” by appealing to people to meet only when necessary and to limit social contacts. This has in effect left business with reduced footfall and no financial support cushion. If there is less explicit financial support, “voluntary public lockdowns” and reduced asset purchase programs by central banks it could spell problems for specific sectors in high yield credit, an asset that looks to be displaying little or no risk premium at present.

In conclusion, we fully expect to hear new news that could alter our views in the coming weeks that could change much of what we have written about here. But we thought events around Omicron warranted you hearing our views sooner than later. As ever, we welcome your comments and questions.



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