



Question 1: What is the near-term outlook for COVID-19?

Experts at the World Health Organisation believe that the ultimate endgame for COVID-19 is that the virus will likely become endemic. Endemic is a broad term but it means that despite vaccinations, COVID-19 is going to be in circulation, at least in some regions, for the foreseeable future. The long term implications of this could range from continued small regional outbreaks to global seasonal vaccination campaigns and the possibility of children being vaccinated as part of the routine childhood immunisation schedule. The exact path depends on the extent of future mutations in the virus, the degree to which the world becomes successfully vaccinated and the duration of immunity derived from infection or vaccination. The current vaccine campaign and therapeutics being utilised and developed at present will likely do most of the heavy lifting and reduce the main threat posed by COVID-19. This should mean that draconian lockdowns become a distant memory, but the virus' footprint will leave a lasting impression on the world. Importantly, this will not prevent the western world from returning to a state that is close to normality. It will mean that travel and border security will be more restrictive in the coming years though.

Vaccination of those most vulnerable should facilitate a controlled reopening of developed economies and a return close to normality in Q2 2021. Our base case outlook is for the US to have vaccinated c.70% of the population by mid-June, with the UK achieving this level about a month earlier and Europe about two months later. Assuming the vulnerable get priority access to vaccines, deaths associated with the virus will drop to near-zero by April. This will allow a phased removal of restrictions starting in early March, with something resembling normal activity levels achieved by the end of the second quarter. Experts believe this will lead to a consumption driven growth spurt in Q2 and Q3. Risks to this scenario could arise from more resistant variants or logistical issues in vaccine rollout. However, at this point in time, vaccine producers believe that a combination of existing vaccines and boosters currently in development will reduce the prevalence of COVID-19 and its variants to a few regional outbreaks with low levels of resulting mortality.

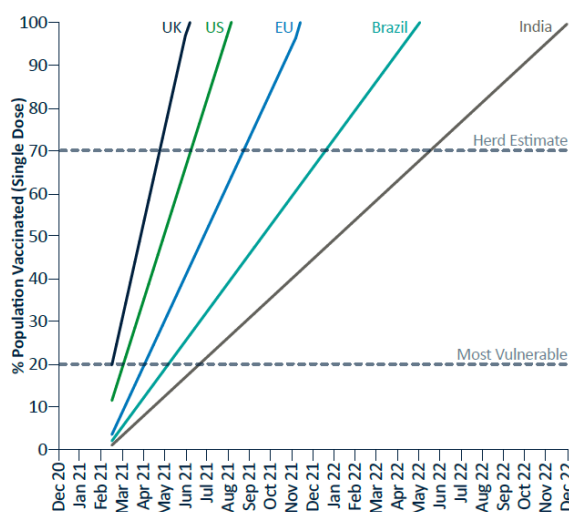
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a. Vaccination Roll-out

Vaccination of those most vulnerable should facilitate a controlled reopening of developed economies and a return close to normality in Q2 2021. Most western government targets suggest that vaccinations of over 70s and those most vulnerable should be completed by 31 March 2021 (at least at a single dose regimen). For most developing countries this will take quite a bit longer, but current projections for Brazil and India are relatively optimistic, suggesting they will have vaccinated those most vulnerable between May and June 2021 as shown in Exhibit 10.

Exhibit 10 takes the current expected rate of vaccination in five countries or regions and estimates the date by which the most vulnerable 20% should be vaccinated¹. The UK reached this milestone in mid-February with the US expected to reach the same level by mid March as of the time of writing.

Exhibit 10
Projected rate of vaccination by region/country

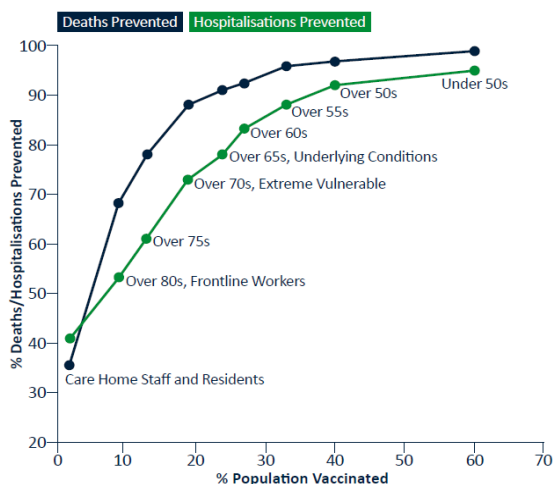


Source: Bloomberg

¹ Vaccination pace (% of population/day); UK 0.7%, US 0.5%, EU (est. 0.35%), Brazil 0.2%, India 0.15%

By prioritising the vaccination of the 20% of the population that are most vulnerable, experts estimate that this should have the effect of reducing deaths as a result of COVID-19 by approximately 90% and hospitalisations as a result of

Exhibit 11 Vaccination of those most vulnerable should mitigate the worst effects of COVID-19



Source: COVID Actuaries Response Group

With vaccination of those most vulnerable significantly reducing the risk of hospitalisation and mortality, it is expected that a phased lifting of restrictions can begin once community transmission rates are at an acceptable level. While explicit guidance on case rates has not been provided, Germany has suggested that a significant easing of restrictions would be possible when the seven-day case rate per 100k is below 50. Based on current case rates and projections using R-0 estimates, a weekly case rate below 50 should be observable for most of Europe by late

March as illustrated in Exhibit 11. The US will take slightly longer to reach this level of transmission but, given that most states have already begun to ease restrictions, this criterion appears to be less relevant for the US. Easing will begin with the reopening of schools (where currently closed), followed by non-essential retail and then hospitality. Regional travel could resume by early summer, but this will likely be facilitated with PCR testing or vaccine passports. Intercontinental travel will still likely be restricted to a large degree in 2021, specifically ring-fencing areas that have made little progress with vaccinations which will include over 70 countries as we move into 2022.

b. New variants present the biggest risk

The biggest risk at present is a significant mutation in the virus, a process known as antigenic drift³, which could render the current vaccines and prior immunity to the virus ineffective. This could result in rolling lockdowns becoming the modus operandi for the remainder of the year. Experts view the risk of a variant completely evading the immunity provided by vaccines in the near term as quite low. All viruses mutate naturally. When a virus infects a host's cell it begins a process of replication to allow the virus to spread. Errors in this replication process over time lead to mutations in the virus. Coronaviruses mutate more slowly than other viruses due to their specialised "proofreading mechanism"⁴ which reduces the number of errors that are observed during replication. Analysis from

² Taken from government websites and Covidactnow.org

³ <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2603026/>

⁴ <https://www.asbmb.org/asbmb-today/science/041020/slipping-past-the-proofreader>

Exhibit 12 Restrictions are already beginning to be lifted across Europe and the US

| | Germany | Italy | Spain | UK | New York | California |
|--|---------------------------|---------------------------|----------------------------------|-----------------------|----------------------|-------------------|
| R-0 Estimate ² | 0.9 | 0.9 | 0.8 | 0.8 | 0.85 | 0.8 |
| Current 7 Day Case Rate/100k | 60 | 140 | 133 | 105 | 250 | 100 |
| 7 Day Case Rate/100k Late-March Projection | 36 | 59 | 49 | 48 | 130 | 47 |
| Schools Open | Late Feb | Open | Open | Early March | Late Feb | Open |
| Non-Essential Retail Open | Early March | Open | Partially Open | Late March | Open | Open |
| Hospitality Open | Review on March 3rd | Open with 6pm curfew | Most closed open in some regions | Outdoor April | Open with limits | Open with limits |
| Travel Begins | Early summer with PCR | Early summer with PCR | Early summer with PCR | Early summer with PCR | Domestic with PCR | Domestic with PCR |
| Sports/Concerts Open | Potentially in the summer | Potentially in the summer | Potentially in the summer | June | Late Feb with limits | Open with limits |

Source: BBC, Financial Times, Bloomberg

the University of Basel suggests that SARS COV-2 mutates at about half of the rate of the influenza viruses in circulation⁵. While this should reduce the risk that vaccines are rendered obsolete another important consideration is that viruses tend to mutate at a higher frequency when viral fitness levels are lower⁶. Viral fitness refers to how easily a virus can transmit or spread between hosts. Viral fitness levels tend to drop when medical intervention (inoculations) or natural immunity starts to rise. Throughout the summer of 2020, it was commonplace to see small changes in the viral genome but in Q4 2020 some more concerning variants emerged. The UK variant of the virus (501.V1), showed more than a dozen mutations. The South African (501.V2) and Brazilian (501.V3) variants showed significant mutations around the spike protein, which many of the vaccines are explicitly targeting for their antibody response. The key question is whether these mutations or future mutations will be enough to prevent an immune response? Studies so far have shown the UK variant to have a very marginal impact on vaccine efficacy. The real risk comes from the South African variant, and others with similar mutations around the spike protein, which appear to be partially impairing the efficacy of the existing vaccines in emerging studies.

When we refer to vaccine efficacy it is important to understand that there are degrees of immunity and different parts of the human immune response that are being targeted by a vaccine. Antibodies are the fastest acting part of the adaptive immune system and serve to prevent the virus from entering cells and infecting the host in the first place. They achieve this by binding to the spike proteins on the surface of the virus. Antibodies can become less effective if they do not recognise the proteins on the surface of the virus due to mutations. T-Cells, the other key element of the adaptive immune response triggered by a vaccine, target the virus in a much broader fashion. They can be triggered to kill any cells that become infected with the virus as they recognise a broader number of epitopes (parts

of the virus antigen⁷. This can mean that if the antibodies are not effective against the virus a vaccinated person could become infected. T-Cells would then become active, given their broader recognition of the virus, resulting in a short-lived, mild or asymptomatic infection. The viral load would likely be far lower from a mild or asymptomatic infection and this would reduce the risk of further transmission from that host given that viral load and transmissibility are positively correlated. This effect was illustrated in a study published by The Lancet in February 2021⁸.

We can see a real-world example of this with the Johnson and Johnson phase 3 trial results against the South African variant, shown in Exhibit 13. The vaccine was 100% effective against deaths and hospitalisations (the influenza vaccine is 40% effective against hospitalisation), 85% effective against moderate to severe infection and c. 60% effective against mild infection. The level of neutralising antibodies generated was lower relative to the broader trial, which allowed for some mild or asymptomatic infection. This suggests that while there may be some evasion of antibodies, T-Cells are still very effective against the virus and the vaccine is still a very effective tool.

All of the major vaccine producers are preparing vaccine boosters which are expected to be ready before the autumn if necessary. Traditional vaccine boosters are intended to increase the durability of immunity to a virus after immune memory has declined through time. In the case of these specific boosters, they will be providing the immune

⁵ <https://www.nature.com/articles/d41586-020-02544-6#:~:text=A%20typical%20SARS%2DCoV%2D2D2,the%20University%20of%20Basel%2C%20Switzerland.>

⁶ <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5908228/>

⁷ [https://www.cell.com/cell/fulltext/S0092-8674\(21\)000076?returnURL=https%3A%2F%2Flinkinghub.elsevier.com%2Fretrieve%2Fpii%2FS0092867421000076%3Fshowall%3Dtrue](https://www.cell.com/cell/fulltext/S0092-8674(21)000076?returnURL=https%3A%2F%2Flinkinghub.elsevier.com%2Fretrieve%2Fpii%2FS0092867421000076%3Fshowall%3Dtrue)

⁸ [https://www.thelancet.com/journals/laninf/article/PIIS1473-3099\(21\)00005-0/fulltext#coronavirus-linkback-header](https://www.thelancet.com/journals/laninf/article/PIIS1473-3099(21)00005-0/fulltext#coronavirus-linkback-header)

⁹ Excludes participants that were HIV positive

Exhibit 13

Vaccine efficacy against the South African strain (501.V2) is diminished but vaccines remain highly effective

| Producer | Efficacy overall | Efficacy vs 501.V2 | 501.V2 Test Details | Effective against Deaths/Hospitalisations | Effective against Moderate – Severe Infection | Effective against transmission |
|-------------|------------------|---|--|---|---|--------------------------------|
| Pfizer | 95% | Reduction in antibodies but no evidence of a drop in effectiveness. | Lab based testing | 100% | 100% | 81% |
| AstraZeneca | 76% | Small study suggests just 22% protection against mild infection | University of Witwatersrand study with < 2000 subjects (not peer reviewed) | 100% | 100% | 67% |
| Moderna | 95% | Reduction in antibodies but no evidence of a drop in effectiveness. | Lab based testing | 100% | 100% | n/a |
| J&J | 66% | 57% | SA phase 3 trial results, 6,500 subjects | 100% | 85% | n/a |
| Novavax | 90% | 60% ⁹ | SA phase 3 trial results, 4,400 subjects | 100% | 87% | n/a |

Source: Vaccine Producers

system with updated information to allow for broader recognition of the virus and a higher degree of protection against current and future mutations. Nadhim Zahawi, the UK minister in charge of vaccine rollout, stated that new versions of COVID-19 vaccines could be made to deal with future variants in less than six weeks. He confirmed that the tweaked jabs would not need to undergo months-long clinical trials as long as they were based on previously approved vaccines¹⁰. In the US, the FDA is actively designing guidelines for modifications and boosters to ensure “an efficient process for authorisation”¹¹. To put the regulatory component of the development timeline into perspective, both Moderna and Pfizer had designed their vaccines in late January and had produced enough vaccines to begin trials by March. The vaccine only received approval in December by regulators. Professor Andrew Pollard, a senior researcher involved in the development of the Oxford/AstraZeneca vaccine, has said a booster that can handle the new variants should be ready by the autumn. Philip Dormitzer who led Pfizer’s COVID vaccine research stated that “the work to tailor vaccines against variants started well before these variants had emerged ... we are now at the point where we are routinely making the DNA templates for variants. And we are having discussions, internally and with regulators, about how far we progress each of these.”

It is important to note that there are no real signs yet that the South African variant is becoming the dominant strain of the virus globally. This is in stark contrast to the UK variant. The

¹⁰ <https://inews.co.uk/news/politics/new-vaccines-battle-covid-19-mutations-finalised-within-days-858555>

¹¹ <https://www.foxnews.com/health/coronavirus-variants-fda-guidance>

¹² Escape Variants: Mutations in the virus which evade the immune system

¹³ Humoral: Part of the immune system that utilises antibodies

¹⁴ [https://www.cell.com/cell/fulltext/S0092-8674\(21\)00076?returnURL=https%3A%2F%2Flinkinghub.elsevier.com%2Fretrieve%2Fpii%2FS009286742100076%3Fshowall%3Dtrue](https://www.cell.com/cell/fulltext/S0092-8674(21)00076?returnURL=https%3A%2F%2Flinkinghub.elsevier.com%2Fretrieve%2Fpii%2FS009286742100076%3Fshowall%3Dtrue)

UK variant (501.V1) represented c. 1% of global infections in November 2020 and as of February 2021, it represents over 30% of all infections. The South African variant (501.V2) represented 2% of global infections in November 2020 and by February 2021 represents just 6% of infections, displaying nowhere near the same growth as the UK variant as shown in Exhibit 14 below. The vast majority of the observed cases of the South African variant have occurred in Africa and Australasia with a limited number in Europe and the US. Speaking in late February, Matt Hancock, the UK Health Secretary, stated that the UK was utilising enhanced tracking and tracing for cases of the South African variant. He noted that while there had been 300 cases of the variant in total, the majority of these had occurred over a month ago and that there were, at present, just 12 cases being monitored. There is a clear consensus among experts that the UK variant will become the most prevalent global strain of the virus in the coming months.

The bottom line is that existing vaccines are still highly effective against the existing strains of the virus. However, as part of the natural evolutionary process, the virus will seek to adopt variants that can avoid immunity over time, allowing it to propagate in newly susceptible hosts. High levels of community transmission provide this opportunity for the virus. Governments are therefore employing caution about lifting restrictions until transmission rates are low enough to reduce this risk of mutation and those most vulnerable have been protected. A paper published by the La Jolla Institute of Immunology at the start of February 2021 stated the following; “Although it is important to track SARS-CoV-2 evolution, it is highly unlikely that the virus will be able to evolve escape variants¹² that avoid the majority of humoral¹³ and cellular immune memory in COVID-19 cases or COVID-19 vaccine recipients any time soon”¹⁴.

Exhibit 14

Neither the South African nor the Brazilian variant have shown signs of becoming the dominant global strain of the virus, unlike the UK variant

| Variant ¹² | Origin | First Identified | % of global cases as at Nov 1st 2020 | % of global cases at present | Change in prevalence (Nov - Present) | Change in R-0 | Mortality Risk | Immune Evasion |
|-----------------------|--------------|------------------|--------------------------------------|------------------------------|--------------------------------------|-------------------|------------------------|---------------------------|
| 20A | China | Jan 2020 | 33% | 19% | -14% | | | No evidence |
| 20B | China | Jan 2020 | 34% | 13% | -21% | | | No evidence |
| 20C | China | Feb 2020 | 12% | 7% | -5% | | | No evidence |
| 20D | China | March 2020 | 4% | 1% | -3% | | | No evidence |
| 20E | China | May 2020 | 7% | 5% | -2% | | | No evidence |
| 20F | China | May 2020 | 0% | 0% | 0% | | | No evidence |
| 20G | China | June 2020 | 7% | 12% | 5% | | | No evidence |
| 501.V1 | UK | Sep 2020 | 1% | 33% | 33% | +56% (NERVTAG) | Potentially 30% higher | Very mild impact |
| 501.V2 | South Africa | Sep 2020 | 2% | 6% | 4% | +50% (ECDC) | No evidence | Some impact on antibodies |
| 501.V3 | Brazil | Oct 2020 | 1% | 4% | 4% | Likely +30% (CDC) | No evidence | Not enough data |

Note: Nomenclature taken from nextstrain.com

Source: <https://nextstrain.org/ncov/europe>

c. The virus will likely become endemic

Vaccine distribution will not be equitable around the globe and this, along with mutations, will mean that the virus becomes endemic. A study by the British Medical Journal suggested that it could take until 2022 for one-quarter of the world to receive vaccines and at least 90% of people in the 67 lowest-income countries stand little chance of getting vaccinated against COVID-19 in 2021. Exhibit 15 from the Economist magazine suggests that it may take until the end of 2023 for many of the world's poorest countries to be fully vaccinated. This is primarily because wealthy nations have reserved more vaccines than they need and developers will not share their intellectual property, according to the People's Vaccine Alliance. To put

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 including all of the Moderna vaccine and 96% of the Pfizer vaccine.

This means the ultimate endgame for COVID-19 is that the virus will become endemic according to David Heymann of the World Health Organisation¹⁵. This is not surprising as smallpox remains the only virus that humans have successfully eradicated to date. Endemic is a broad term but it means that despite vaccinations, COVID-19 is going to be in circulation, at least in some regions, for the foreseeable future. The long term implications of this

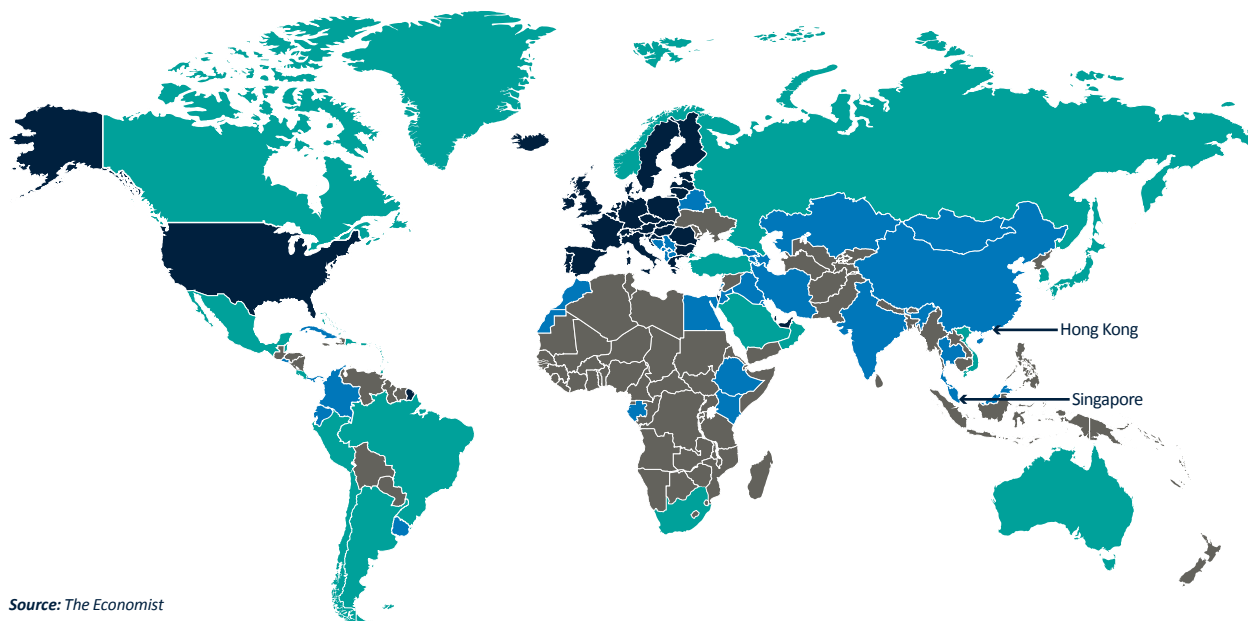
¹⁵ <https://www.healio.com/news/infectious-disease/20210104/qa-will-COVID19-become-endemic>

Exhibit 15

The world's poorest countries won't have widespread distribution of vaccines until 2023.

When will widespread vaccination coverage be achieved?

By Late 2021 By Mid 2022 By Late 2022 From Early 2023 Onwards



Source: The Economist

Exhibit 16

Endemic viruses are managed in different ways

| Endemic Viruses | R0 | Mortality Risk | Outbreak | Risk Management |
|--------------------------|-----|----------------|-------------------|---|
| Measles | 14 | 0.15% | Global Rare | Childhood vaccination schedule |
| Rhinovirus (Coronavirus) | 6 | Near 0 | Global Seasonal | Anti-viral medication/rest/isolate |
| Ebola | 2 | 90% | Regional (Africa) | Tracking, tracing, isolation/developing a vaccine |
| Influenza | 1.5 | 0.10% | Global Seasonal | Seasonal vaccination of those most vulnerable |
| COVID-19 | 2.5 | 0.30% | Global | Dependent on evolution |

Source: CDC

could range from continued small regional outbreaks to global seasonal vaccination campaigns and the possibility of children being vaccinated as part of the routine childhood immunisation schedule. The path depends on the extent of future mutations in the virus, the degree to which the world becomes successfully vaccinated and the duration of immunity derived from infection or vaccination. Exhibit 16 provides examples of other endemic viruses in circulation, their key characteristics and the risk measures which have been implemented to manage them.

It is too early to speculate which of these paths is most likely but most experts agree that the current vaccine campaign and therapeutics being utilised and developed at present will likely do most of the heavy lifting and reduce the main threat posed by COVID-19. This should mean that draconian lockdowns become a distant memory, but the virus' footprint will leave a lasting impression on the world. Importantly, this will not prevent the western world from returning to a state that is close to normality but will mean that travel and border security will be more restrictive in the coming years.

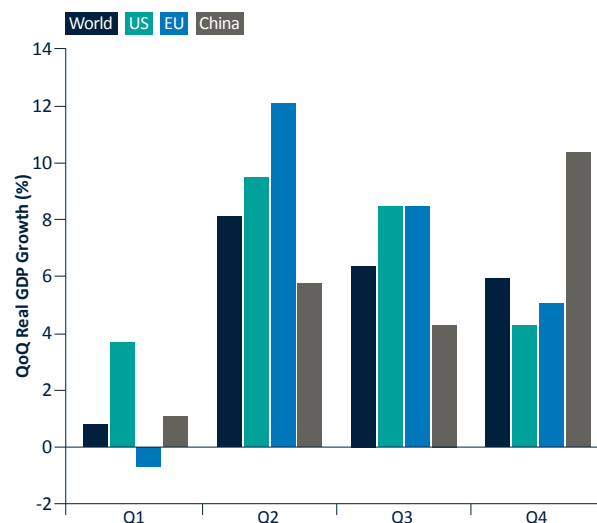
d. Evidence suggests there will be a surge in consumption

A lifting of restrictions is expected to lead to a consumption-driven growth spurt, the key question is when this will occur rather than if it will occur. As the western world reopens and consumer confidence returns, experts expect a surge in growth driven by pent-up demand from consumers, particularly given the elevated levels of personal savings that have been built up. The services sector has been particularly hard hit. The bounce-back will therefore likely emphasise those businesses, particularly the ones that have a communal element, such as restaurants and entertainment venues. China provides some evidence of this potential consumption surge. Singles Day in China, November 11th, saw a record level of sales at an overall level and for the country's two largest online retailers.¹⁶ Manufacturing in China had recovered to pre-pandemic levels by Q2 and retail sales as a whole had recovered by September 2020. The only exception to this trend was international air travel, outside of this, Chinese consumers have begun to act and spend largely as they had done in pre-pandemic times. Australia also offers hope. With the pandemic largely contained, household spending fuelled a faster than expected 3.3% growth rate in the third quarter of 2020 with year on year retail sales rising over 13%, the largest acceleration on record. Experts believe we will see a growth spurt in Europe and the US once restrictions are lifted and consumer confidence returns with GDP growth of over 8% a quarter in both Q2 and Q3 of 2021 as illustrated in Exhibit 17.

¹⁶ CNBC

Exhibit 17

A growth surge is expected in the western world in Q2/Q3 2021



Source: GS, JPM and Capital Economics

The key risks to this view are associated with timing with the rise of new variants threatening efficacy, vaccine supply issues and to a lesser extent consumer retrenchment. Goldman Sachs estimate that a new vaccine-resistant strain could knock over 2.5% from their base case forecast for US growth in 2021 as shown in Exhibit 18.

The global vaccination campaign should mean that draconian lockdowns eventually become a distant memory. The lifting of restrictions in developed economies should lead to a sharp acceleration in growth driven by consumption and pent-up savings in Q2/Q3 2021. The key risk to this view is the emergence of new variants that evade vaccines. However, experts suggest that it is unlikely that a new variant will render existing vaccines ineffective in the near term. The inequitable distribution of vaccines and evolution of the virus will mean that COVID-19 will become endemic, remaining with us in some form for the foreseeable future.

Exhibit 18

Goldman Sachs see a vaccine resistant strain as the biggest risk to growth in 2021

| Forecast/Scenario | Goldman Sachs 2021 GDP Growth Forecasts | | | | |
|--------------------------|---|-------|------|------|--------|
| | Q1 | Q2 | Q3 | Q4 | Annual |
| Baseline | 5.0% | 10.0% | 9.0% | 6.0% | 6.6% |
| Consensus | 2.3% | 4.0% | 4.7% | 3.8% | 4.1% |
| Greater Consumer Caution | 4.5% | 8.2% | 7.4% | 5.2% | 5.9% |
| Highly Infectious Strain | 3.4% | 4.8% | 7.3% | 6.4% | 5.1% |
| Vaccine-Resistant Strain | 5.0% | 0.7% | 2.9% | 4.0% | 4.0% |

Source: Goldman Sachs

Question 2:

What longer-term structural changes are expected to result from the pandemic?

Even as the pandemic fades over time, it will leave a lasting footprint on the planet, mostly around how we live and work. In the private sector, structural impacts will include a continued shift towards economic digitisation resulting in a greater proportion of time spent working remotely and a greater share of consumption shifting to e-commerce. Supply chains will become more domestic, often prioritising stability and redundancy over pure lowest cost sourcing and JIT management. Big government will loom large in our daily lives, with more spending, taxation, healthcare monitoring/provision, and regulation.

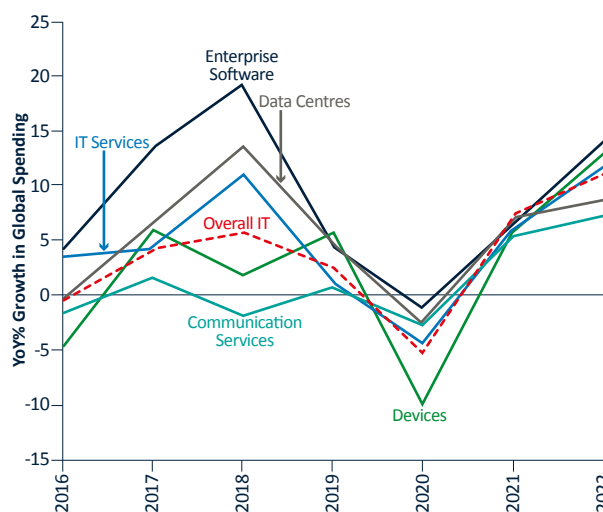
a. Remote working has accelerated technology adoption

COVID-19 has compressed a decade's worth of digital adoption into the space of a year. As well as the shift to remote working, consumption habits have changed forever with technology facilitators being the key beneficiaries. The SARS outbreak in 2002/2003 is widely cited as one of the key factors behind the early adoption of digital payments in China, with companies like Alibaba and JD.COM propelled to the forefront during that pandemic¹. The COVID-19 pandemic will have an even more significant impact on the shift to digital/online. In a survey by McKinsey, at least two-thirds of consumers say they have tried new kinds of shopping during the pandemic and over 75% of those consumers say they intended to continue to shop in a similar fashion post-pandemic. In the United States, the penetration of e-commerce was forecast in 2019 to reach 24% of all retail sales by 2024. By July 2020, it had hit 33% of total retail sales. To put this in perspective, the first half of 2020 saw an increase in e-commerce equivalent to that of the previous ten years². Structural changes do not appear to be limited to consumer behaviour. Organisations have also shifted their mindset on technology investment. KPMG's global CEO survey showed that organisations are investing heavily in technology to address immediate concerns like falling revenue, interrupted supply chains and to build

longer-term competitiveness and resilience. 67% of CEOs say they have accelerated their digital transformation strategy and 63% say they have increased their digital transformation budget as a result of the pandemic³.

Exhibit 19 shows that global spending on IT did fall in 2020 by c. -5% but spending is expected to accelerate dramatically in 2021 and 2022.

Exhibit 19 Global IT spending is forecast to accelerate in 2021 and 2022.



Source: Gartner Research

The winners from this acceleration in digitisation have been the technology facilitators such as the FAANGM stocks⁴. These stocks enjoyed a median gain of nearly 70% in 2020 versus a total return of 18.4% for the broad S&P500 with the median stock in the index gaining just over 8%⁵. Using ETF data we have segmented those sectors and themes that have benefited directly from the pandemic in Exhibit 20, illustrating their change in market capitalisation since the crisis began⁶. Many people turned to home entertainment during periods of self-isolation with video games being one of the biggest beneficiaries. Game sales grew 44% YoY in 2020 and the Wedbush Video Game Tech ETF has risen by c. 75% since the broad markets' pre-COVID-19 peak⁷. Thematic ETFs that represent Hardware, Semiconductors, Enterprise Software and Internet Retail have all gained more than 50% over the same period.

¹ <https://www.cnbc.com/2020/03/26/chinas-2002-2003-sars-outbreak-helped-alibaba-become-e-commerce-giant.html#:~:text=The%20SARS%20outbreak%20appeared%20to,to%20have%20a%20silver%20lining.>

² DTC ecommerce analysis McKinsey

³ <https://home.kpmg/xx/en/home/services/advisory/management-consulting/kpmg-connected-enterprise/going-digital-faster.html>

⁴ Facebook, Amazon, Apple, Netflix, Nvidia, Google and Microsoft

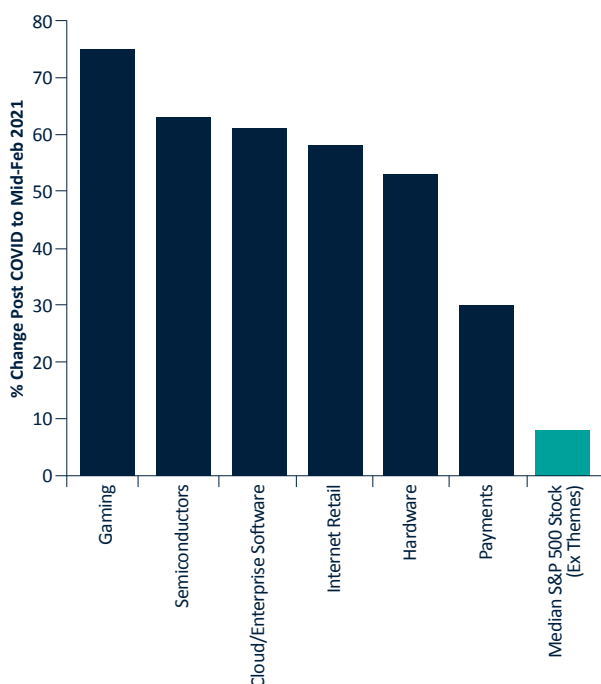
⁵ Bloomberg

⁶ 19 Feb as start point – 14 Feb 2021

⁷ We have stripped out the performance of GAMESTOP for the purpose of this analysis. Pre pandemic peak; 19 Feb 2020

Exhibit 20

Key beneficiaries of the crisis have appreciated by 30-75%, where as the median stock in the S&P500 excluding those themes has appreciated by 7.5%



Source: US based ETFs/Indices; GMR US Equity, SSTECH Index, SOXX US Equity, SKYY US Equity, DJINET Index, IPAY US Equity

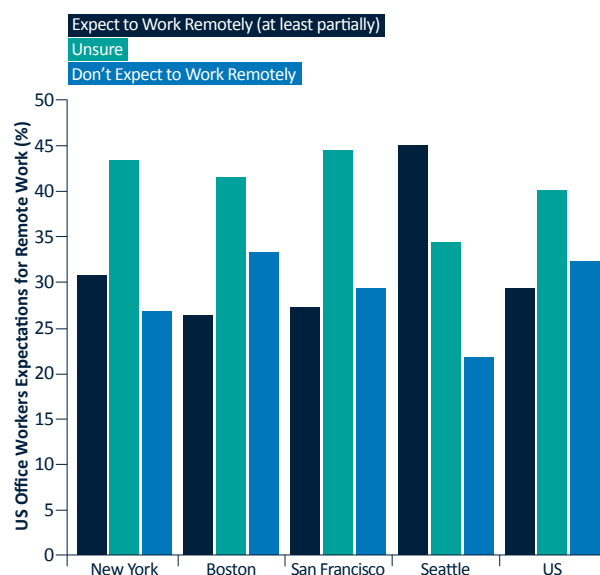
b. The commercial real estate market has been fundamentally changed

The shift to remote work means that office attendance is expected to drop by 15-30%. The impact on the real estate market is expected to be more benign and may have already been reflected in valuations. Prior to the COVID-19 pandemic, McKinsey estimated that approximately 5% of the global workforce could effectively work from home 3-5 days per week without any significant drop in productivity. They now estimate this figure to be just over 20% of the global workforce⁸. Necessity is the mother of innovation and the pandemic created a surge of technology investment coupled with real-time trial and error to enable an enormous swath of the workforce to transform how they work. Microsoft CEO Satya Nadella noted in April 2020 that “we’ve seen two years’ worth of digital transformation in two months”. While it is unlikely that a full 20% of the workforce will work from home 3-5 days a week, it is likely that office attendance will drop by about 20-30% each day in the long term according to research from Barclays bank.

The benefits to both employees and employers are obvious. In the US and the UK, the average daily round-trip commute is approximately one hour⁹. A study by Harvard showed that the average workday increased by 48 mins for those working from home and productivity increased by over 13% according to a Stanford study. US productivity saw its largest improvement since 1965 in the six months following the outbreak of the pandemic¹⁰. Potential cost savings will also have to be factored in. In Manhattan, for example, the average workspace is around 310 square feet. At pre-COVID-19 rental costs, that amounts to an average of \$20,000 per employee and more than \$30,000 for A+ grade buildings¹¹. There are some drawbacks, however. A study by Tristan Capital, a boutique real estate investment manager, showed that 73% of both decision-makers and office workers felt that career development and learning were better in the office than at home. This will likely mean that a hybrid model will emerge with employees having the option of working 1-2 days per week at home on solo tasks with the rest of the time spent in the office. Just over 30% of US office workers expect to go back to the office full time once the pandemic has ended as shown in the survey by Redfin, Exhibit 21.

Exhibit 21

US office workers expectations for remote working post pandemic



Source: BCA, REDFIN

⁸ <https://www.mckinsey.com/featured-insights/leadership/the-next-normal-arrives-trends-that-will-define-2021-and-beyond>

⁹ <https://www.prospectmagazine.co.uk/politics/commute-times-london-uk-work>

¹⁰ The Economist

¹¹ Cushman & Wakefield

The move to remote work creates a physical real estate question. Analysis by Tristan Capital suggests that knowledge-based firms (organisations where >80% have a degree) will reduce time spent in the office by about 15% and low knowledge firms (<50% have a degree) could reduce time spent in the office by about twice this amount. Barclays believe the demand for floor space will fall by a much smaller magnitude due to re-designing of office floorspace and increased spacing between individual desks. They estimate demand to fall by approximately 10-20%. Green Street, a real estate research provider, also suggest that there will be a 30% reduction in office usage, but that alteration of spaces and increased biosecurity means that the impact on demand will be closer to 10%. Asking rents for office space in Manhattan have remained steady but vacancy rates have skyrocketed as shown in Exhibit 22 from Cushman Wakefield. The assumption is that it is only a matter of time before this is reflected in rental rates. In London prime office rental rates are down by about 13% YoY.

The pandemic has only served to accelerate and exacerbate the problems faced by the retail segment of the real estate market. Grade A retail asking rents were about 15% lower year on year in Manhattan in Q4 2020, Exhibit 23. The US also has far too much retail space when viewed from a per-capita perspective; nearly 5x higher than the UK/Europe.¹²

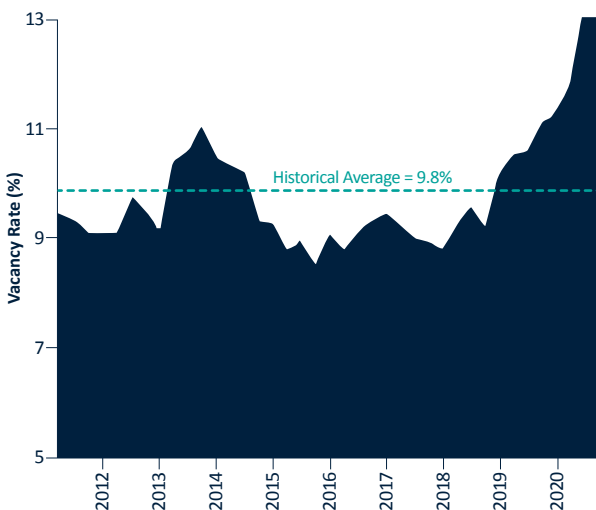
Exhibit 23 Manhattan retail rents have fallen dramatically

| Manhattan Retail Space | Change in Q4 2020 Asking Rents YoY% |
|------------------------|-------------------------------------|
| Soho | -22% |
| Lower Fifth | -20% |
| Herald Square | -18% |
| Madison Ave. | -16% |
| Flatiron | -15% |
| Upper West | -14% |
| Third Ave. | -11% |
| Times Sq. | -5% |

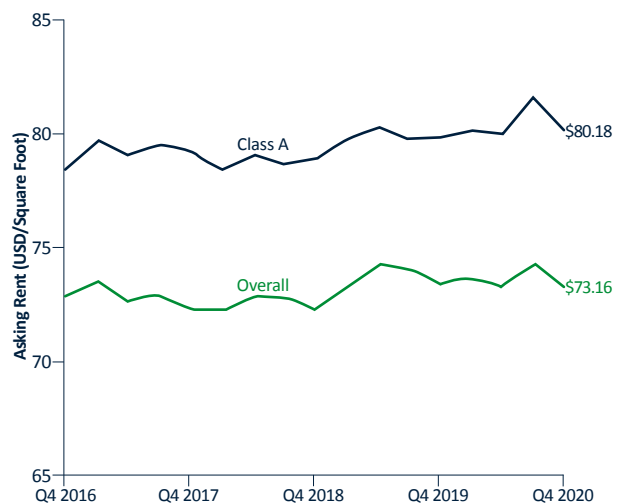
Source: Cushman & Wakefield

The most obvious implication of this is that rents in the retail space are likely to continue to decline. Retail and office REITs, as measured by the S&P500 subsectors, are trading 22-24% lower than they were prior to the crisis. Industrial REITs on the other hand are trading 7% higher having directly benefited from the ecommerce boom,¹³ Exhibit 24.

Exhibit 22 Manhattan office vacancy rates have skyrocketed but asking rents are yet to reflect this;



Source: Cushman & Wakefield

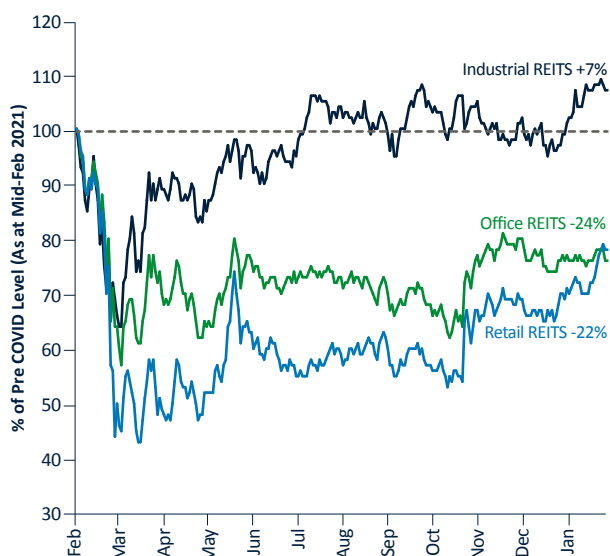


¹² Cushman & Wakefield

¹³ As of 14 February 2021

Exhibit 24

The REIT market reflects a K-shaped recovery



Source: Bloomberg

While there remains a huge amount of uncertainty around the future of the office, particularly in New York where most REIT exposure is concentrated, office REITs may already reflect this to a certain extent, as shown in Exhibit 25. Analysts expect earnings to be 15-20% lower than they would have been without the crisis. Current pricing reflects this fact, but it doesn't appear to reflect any change in the discount rate associated with these earnings. This would suggest that there may be some moderate upside within this segment of the market.

Exhibit 25

Office REITs pricing may reflect a structural cut in EPS but not in the discount rate

| S&P500 Office REITs % difference to DCF fair value (Mid Feb price) | EPS Unchanged | EPS Cut 10% | EPS Cut 15% | EPS Cut 20% | EPS Cut 25% | EPS Cut 30% |
|--|---------------|-------------|-------------|-------------|-------------|-------------|
| Discount Rate Unchanged | 21% | 9% | 3% | -3% | -9% | -15% |
| Discount Rate -20bps | 30% | 17% | 11% | 4% | -2% | -9% |
| Discount Rate -40bps | 41% | 27% | 20% | 13% | 6% | -1% |
| Discount Rate -60bps | 55% | 39% | 32% | 24% | 16% | 8% |
| Discount Rate -80bps | 71% | 54% | 45% | 37% | 28% | 20% |

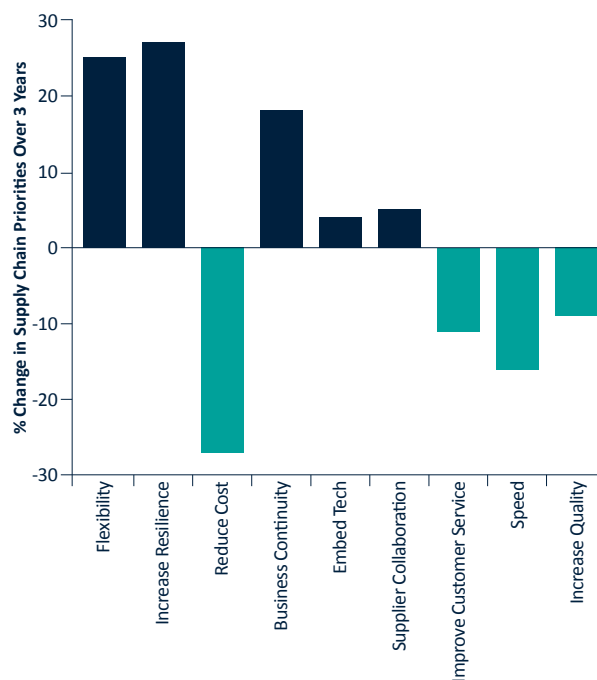
Source: Bloomberg

c. Onshoring and diversification of global supply chains has become a priority

The pandemic has laid bare all of the vulnerabilities in the global supply chain. Experts believe there will be a clear shift away from a focus on cost and efficiency to resilience. This could lead to lower corporate profits, inflationary pressures and some shift in production away from China. A study by Bank of America found that companies in over 80% of sectors have experienced disruptions in their supply chains during the pandemic. As a consequence, supply chains are expected to become shorter and more regionalised. McKinsey has coined the phrase "just in time plus" where the plus signifies a new element of risk management that focuses on resilience. A survey of supply chain objectives from Bain & Company (see Exhibit 26), showed that companies will be emphasising flexibility and resilience over costs in the next three years.

Exhibit 26

Companies are emphasising supply chain resilience and reliability with less regard for costs



Source: Bain & Company Supply Chain Survey

McKinsey has modelled the impact of a significant supply chain shock across all industries to analyse which industries are the most vulnerable as shown in Exhibit 27. Those industries at the top of the list where domestic alternative sources are available, will see the biggest shifts to local sourcing. Industries such as petroleum and mining are

the most exposed to shocks but the geographical risk for these industries is impossible to mitigate. However, textiles, food & beverage, pharmaceuticals, medical devices and automotive, could see big sourcing shifts in the years ahead.

Exhibit 27

Sectors with the most significant supply chain risk

| Sector | EBITDA Margin Loss over 10yrs from sustained supply chain shock |
|---------------------------|---|
| Petroleum | 8.9% |
| Mining | 8.4% |
| Textiles | 7.8% |
| Food and beverage | 7.6% |
| Medical devices/Pharma | 7.4% |
| Aerospace | 7.4% |
| Automotive | 7.3% |
| Machinery and equipment | 6.5% |
| Glass and cement | 6.2% |
| Computers and electronics | 5.9% |
| Chemicals | 5.7% |
| Electrical Equipment | 5.4% |

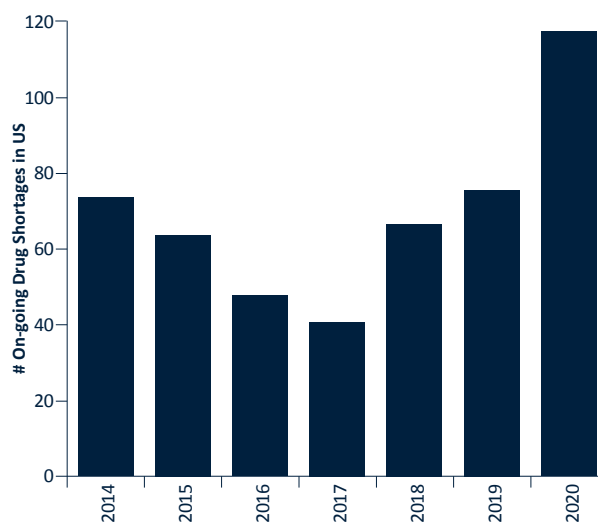
Source: McKinsey & Company

One area that was exposed during the pandemic was the pharmaceutical sector. Active pharmaceutical ingredients (APIs) are the key parts of a drug that produce an effect. The US, Europe, and Japan had produced 90% of the world's APIs until the mid-1990s. But now it is estimated that Chinese and India are the sources of 80% of the APIs imported to the US and Europe.¹⁴ This move to offshore production was primarily a function of cost. European producers, in particular, found it too expensive to maintain the environmental standards demanded by European regulators whilst drug prices fell precipitously. In late March, India's Ministry of Commerce announced they were imposing restrictions on the export of 13 key APIs due to plant closures. Panic ensued in European and US pharmaceutical companies and government health agencies. The US had warned for years that the pharmaceutical supply chain could be "weaponised" by China. While the worst fears were not realised, the scare prompted both the US and Europe into action with a view to re-shore more API production. The European Commission is proposing a shift away from its "lowest possible base" cost model to a pricing model negotiated from the bottom up based on a supplier's cost of goods, regulatory costs, and other considerations. This

will undoubtedly bring about an increase in the price of generic drugs and healthcare overall. We can expect to see several examples of this across global supply chains which will likely lead to upward pressure on inflation.

Exhibit 28

On-going drug shortages reported by the FDA increased by nearly 30% in 2020



Source: FDA

McKinsey believes that as much as a quarter of global goods exports, or \$4.5T, could be re-shored or shifted by 2025. This would have two important consequences. Firstly, the increased costs associated with re-shoring are expected to lead to some margin compression, but this will be somewhat offset by an increased use of automation and subsidies/tax breaks offered by governments to incentivise re-shoring. The Global Robotics and Automation ETF¹⁵ has appreciated by more than 60% since its pre-COVID peak in anticipation of a reshoring drive. Valuation in the space has reflected this with the median P/E multiple on 2021 earnings moving from 23x pre-crisis to 34x.¹⁶ Secondly, China is highly exposed to this trend. Bank of America estimates that 7% of China's GDP (40% of Chinese exports), is derived from exports by foreign companies based in China¹⁷. Bank of America expects this to result in further efforts to stimulate domestic consumption and China's regional ecosystem, bolstered by its "Belt-and-Road Initiative".

¹⁴ theconversation.com

¹⁵ ROBO US Equity

¹⁶ As of 14 February 2021

¹⁷ <https://www.barrons.com/articles/supply-chains-on-the-move-as-global-pressures-mount-51596825253>

d. Business travel will be structurally reduced

While leisure travel will eventually recover, business travel is unlikely to ever return to pre-pandemic levels and this will have a significant impact on airlines, hotels and hospitality in general. The \$8T travel and tourism sector was decimated in 2020 with the number of airline passengers declining by over 60% and hotels averaging just a 40% occupancy rate in the US¹⁸, the lowest occupancy rate on record. To put this in perspective the SARS crisis in 2003 saw airline passengers decline in Asia by just 8%¹⁹. Past crises would suggest that it will take two years for leisure travel to fully recover. The evidence in China would appear to bear this out as well with hotel occupancy and domestic flights having recovered to 90% of their 2019 levels by August 2020. Easyjet has also said that bookings for summer 2021 with its holiday's arm are up 250% on last year. Business travel typically takes at least five years to recover after a crisis and the sector never regained the pre-financial crisis levels. Business travel accounts for approximately 20% of the global travel and tourism sector but crucially its accounts for 70% of the revenue for high-end hotels. While premium class passengers amount to only 10% of airline passengers (Exhibit 29), they typically account for over 30% of revenues and 70% of profits. Jeffrey Goh, CEO of Star Alliance, the world's largest airline group, predicts that the pandemic could structurally reduce business travel by around 30%. A decrease in business travel essentially raises the cost of leisure travel for the general public and this will be exacerbated by shrinking competition within the airline space with several carriers having filed for bankruptcy in 2020. While the MSCI World Hotels Index has recovered its pre-COVID levels, the MSCI World Airlines Index remains c. 25% below its pre-COVID levels.²⁰

e. Big government is back

We anticipate that governments will continue to play a more active role in our lives in the post pandemic world. Heightened control and influence are the price for aggressive stimulus schemes to rebuild the economy with an eye towards decarbonisation and wealth redistribution. The extent and the duration of this more active role remains uncertain. One of the clearest lessons from the pandemic appears to be that government intervention via the introduction of restrictions and removal of individual liberties has proved to be the most effective method of controlling the spread of the virus. In order to achieve this, governments were

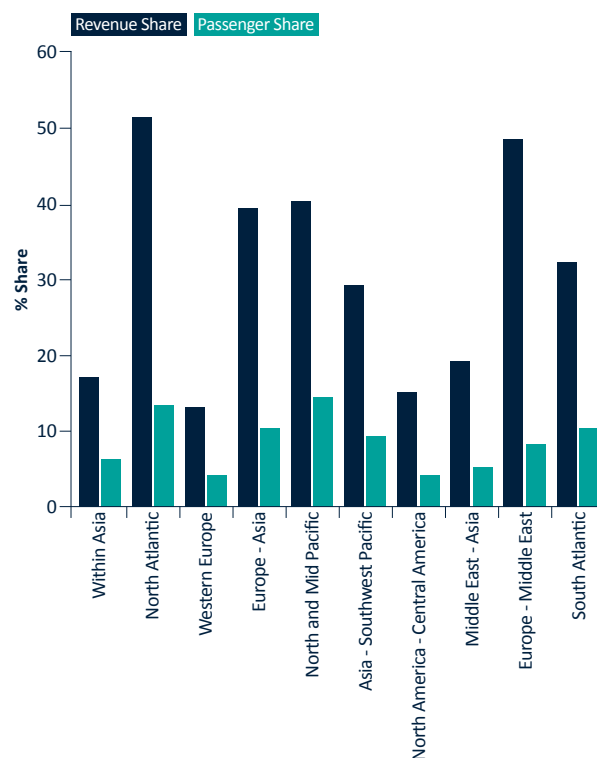
¹⁸ <https://str.com/press-release/str-2020-officially-worst-year-on-record-for-us-hotels>

¹⁹ International Civil Aviation Organisation

²⁰ As of 14 February 2021

Exhibit 29

Premium passengers' amount to 10% of airline passengers but account for over 30% of revenues



Source: IATA/The FT

obliged to provide a massive social security net to prevent the collapse of affected industries and the individuals whose livelihoods depend on them.

Governments across the globe have suggested that their increased role in society has shown clear benefits. Operation warp speed in the US has partially aided the development of vaccines against the virus in record time. In the UK, Chancellor Rishi Sunak has hailed the early success in Britain's coronavirus vaccine rollout as an economic model for the future, with an emphasis on "nimble" regulation and an active role for the state in promoting innovation. Professor Sarah Gilbert, the scientist credited with designing the Oxford vaccine, noted that while it was encouraging to see the government investing in vaccine research, this cannot mask the fact that "there hadn't been the investment we would have liked in vaccine manufacturing and vaccine testing in the UK in the past". While everyday restrictions will be eased, there may be a trade-off with the concept of vaccine passports and the transfer of personal data.

Although this idea may seem quite radical, it is not without precedent. Yellow cards that signified inoculation against cholera existed over 100 years ago and were required when traveling²¹. Sweden, Denmark and Greece are already actively pursuing the concept and the UK government has tendered for proposals from the likes of De La Rue²².

The encroachment by governments on civil liberties has led to warnings from former Superior Court Justices, Lord Sumption and Lady Hale in the UK. Sumption remarked that “the government has discovered the power of public fear to let it get its way. It will not forget.” It is evident that governments in the coming years have effectively been granted more license with fiscal policy and perhaps with regard to civil liberties.

f. The physical economy has given way to the digital economy

COVID-19 has reshaped the global economy with equity sector weightings reflecting a more digital future. In the past the global economy was powered by oil and gas, now the world runs on semiconductors, “the oil of the 21st

century” according to Xi Jinping. Organisations require less physical real estate space and more cloud space. The capital requirements to run an organisation have shrunk with social media providing a gateway to the world at a substantially lower cost. Consumers have seamlessly transitioned from physical purchases to digital transactions. Analysts and investors have modelled the long term impact of the crisis and determined that industries such as energy, banks, insurance, real estate and consumer staples will play a smaller role going forward with their share of the MSCI All Country World Index shrinking by c. -6%. On the other side of this semiconductors, e-commerce, media, software and hardware have seen their share of the global market climb by over 7% as illustrated in Exhibit 30.

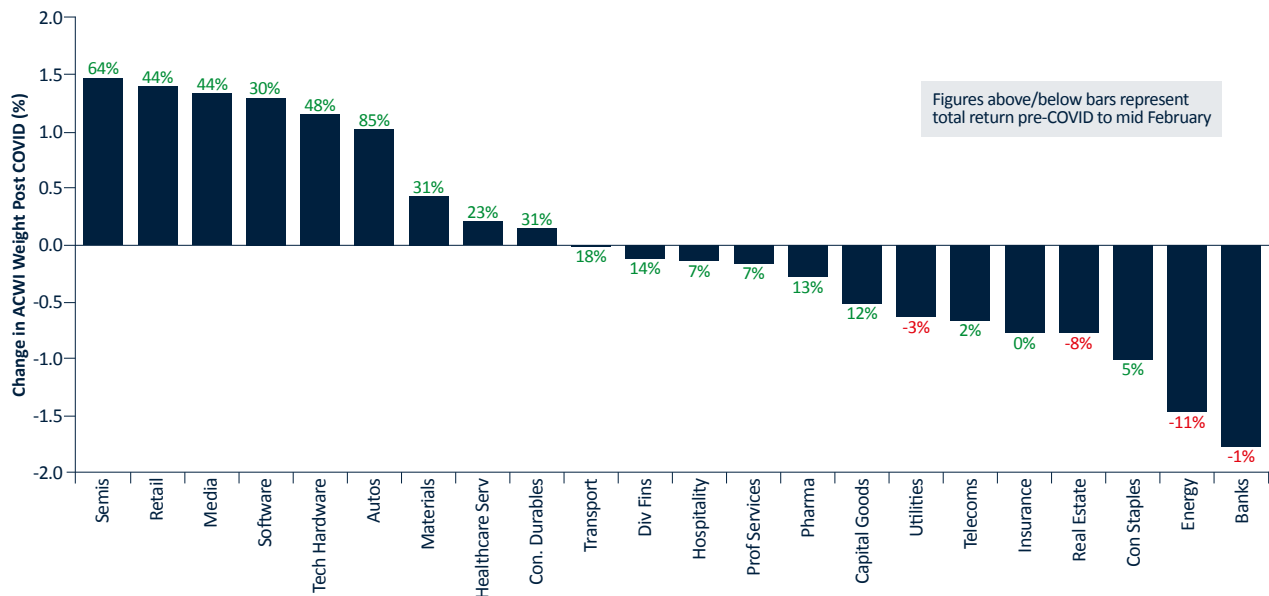
In conclusion, COVID-19 has been an accelerant of many of the trends that were in place before the crisis. Remote working has moved from being marginal to mainstream, the number of companies’ reshoring production has evolved from a trickle to a stream and one third of all retail consumption now occurs online. It has also resulted in some unexpected developments with international mobility potentially restricted for years to come and governments now playing an increasing role in our daily lives. While the former trends appear to be set in stone the duration and sustainability of the latter are far more uncertain.

²¹ The Economist

²² <https://www.telegraph.co.uk/business/2020/11/21/de-la-rue-talks-covid-travel-certificates/>

Exhibit 30

The physical economy gives way to the digital economy



Note: All figures in this chart refer to the period from 19th Feb 2020 – 14th Feb 2021

Source: Bloomberg

Hypothetical return expectations are based on simulations with forward looking assumptions, which have inherent limitations. Such forecasts are not a reliable indicator of future performance.

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