



Global

Cross-Discipline

## Thematic Research

Date

31 March 2020

# The exit strategy

The biggest variable in assessing the economic damage wrought by the covid-19 virus is the length of the lockdowns now in force. Politicians and health officials have discussed dates ranging anywhere from weeks to over a year.

In this piece, we estimate the range of dates within which civic and economic restrictions could begin to be lifted in various key countries. We base these estimates on the experience of the lockdown and reopening in Hubei province, China.

Our extrapolations are based on a comparison of the growth rates in fatalities rather than reported cases as the different testing regimes in various countries make case-load figures less comparable than fatalities. Of course, it is almost certain that restrictions will be lifted in stages, meaning some could still be in place for at least a number of months.

Next, we consider what the process of reopening will look like. We consider how serological testing combined with technology could enable people to return to work faster than expected while those people in higher-risk groups continue to self-isolate.

Finally, as there is much uncertainty over when, and for how long, a second or third lockdown might be needed (if there is a substantial second wave of infections after the current lockdowns end) we discuss several factors that could lead to a quicker reopening than expected and consider the risks that may necessitate the extension of some restrictions.

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## Why the Chinese experience is relevant to other countries

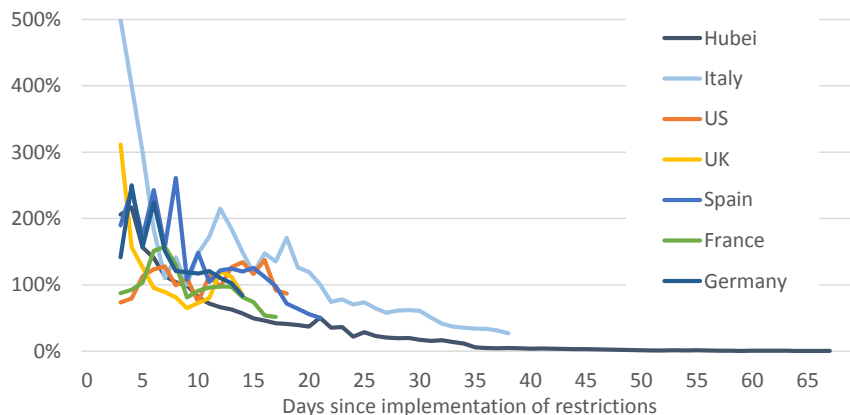
To estimate when countries currently under lockdown may be able to restart civic and economic activity, it is useful to compare and extrapolate the current situation in various countries with the Chinese experience.

We see the Chinese lockdown and reopening experience as being indicative of what other countries can achieve. Indeed, a study by Imperial College London last week confirmed that after implementing various suppression measures, several large countries “appear to be converging onto the decline in the daily growth rate of deaths” seen in China. The study also pointed out that the overall number of deaths in other countries could be between two and eight times the number of deaths as in China.

One way to look at how other countries are converging on the experience in Hubei province, China is shown in the following chart. For this we use a three-day comparison in order to filter out the noise from sudden jumps and drops when figures were relatively small. We also start each time series at the point at which restrictions were introduced to attempt a closer comparison. We then show all the countries individually against the Hubei experience.

Figure 1: Fatality growth rates are beginning to converge on the Hubei experience

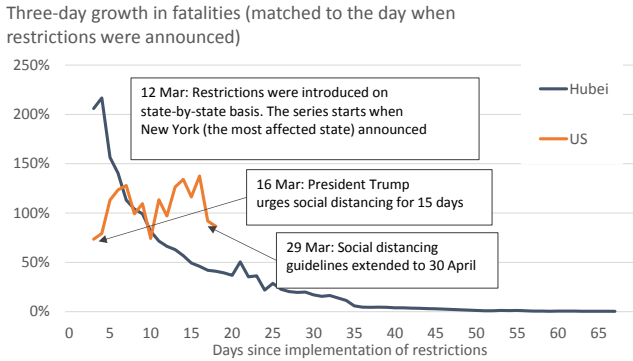
Three-day growth in fatalities (matched to the day when restrictions were announced)



Source : Deutsche Bank, WHO, CDC, Worldometer

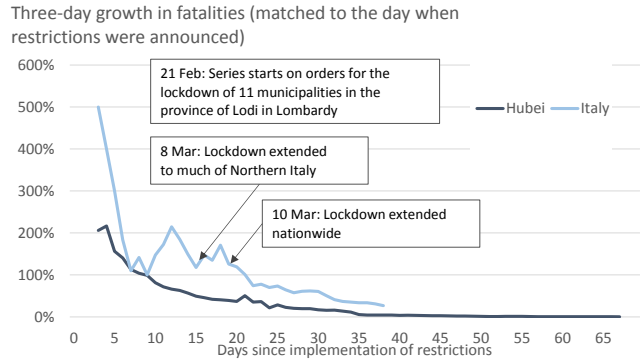


Figure 2: US fatality growth



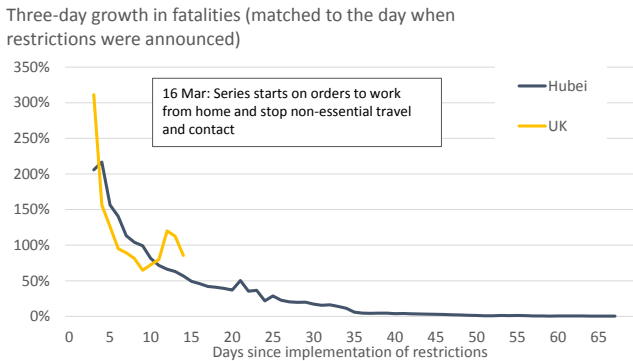
Source : Deutsche Bank, WHO, CDC, Worldometer

Figure 3: Italy fatality growth



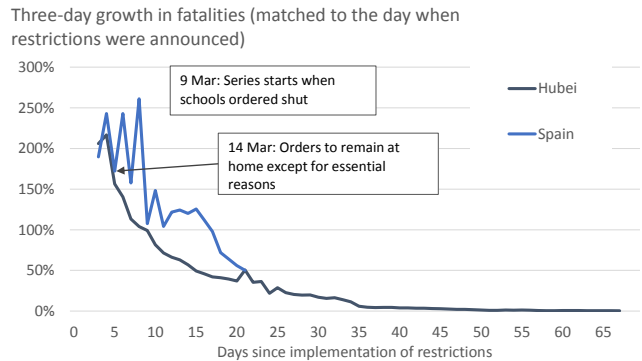
Source : Deutsche Bank, WHO, CDC, Worldometer

Figure 4: UK fatality growth



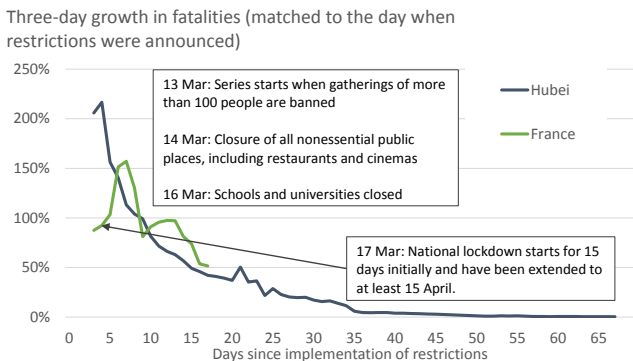
Source : Deutsche Bank, WHO, CDC, Worldometer

Figure 5: Spain fatality growth



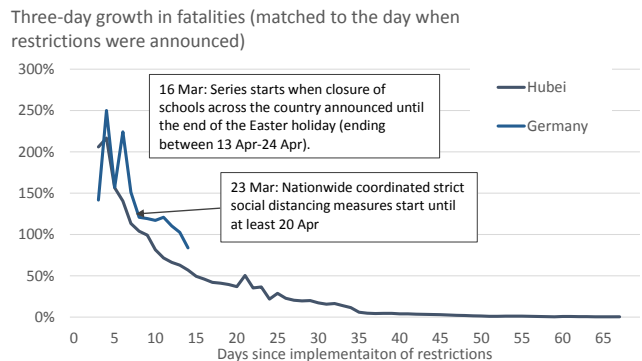
Source : Deutsche Bank, WHO, CDC, Worldometer

Figure 6: France fatality growth



Source : Deutsche Bank, WHO, CDC, Worldometer

Figure 7: Germany fatality growth



Source : Deutsche Bank, WHO, CDC, Worldometer

At first glance, it appears that the growth rate in the number of fatalities in Hubei province is falling faster than that in other countries. This is true, however, it does not invalidate the comparison of Hubei with other countries. That is because Hubei implemented restrictions earlier in the process of infection than did some other

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countries with the US being the laggard. Added to this is the fact that the six other countries examined here have a greater proportion of people in the population that classify as high risk (primarily the elderly). As such, it is not unexpected that the fatality growth curves of these six countries initially lagged that of Hubei.

A comparison with the Hubei experience is still worth examination. While it is early days, most of the charts indicate each country's fatality trajectory are now converging (in different stages) with that of Hubei.

There are certainly outliers. For instance, Germany still has a relatively low number of deaths which has made the calculations swing considerably. Meanwhile, the US still shows a fatality growth rate that is not on an obviously downwards trajectory. Still, it must be noted that there can be a 14-day lag between restrictions and outcomes, and President Trump only urged social distancing on 16 March (while our time series starts at 12 March when New York implemented restrictions). Coupled with this, different states in the US have implemented restrictions at different times. Despite this, the Imperial study mentioned earlier specifically indicated that the US began to show convergence with China last week now that many states have implemented lockdowns.

In summary, extrapolating the Hubei experience of lockdown and the beginning of lifting restrictions gives us an indication of when other economies can be reopened even if the timing is unlikely to exactly match.

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## The Hubei timeline

China informed the WHO about the covid-19 virus on 31 December. It then imposed a quarantine on Wuhan and surrounding counties on January 23, after 444 cases were confirmed in the province and 571 cases confirmed in China. The restrictions were soon extended to the entire province. Nonessential businesses in Wuhan were closed and people were restricted to remain at home, with one person per household permitted out every two days to purchase necessities.

Restrictions were much less onerous outside Hubei. Long-distance travel was restricted – partly because Wuhan is an important transport hub and trains could not transit through it – but formal geographic quarantines were not imposed on other regions. (Some towns and villages imposed their own quarantines, keeping visitors out).

The peak in new case growth in Hubei occurred on 26 January (excluding the jump on 28 January due to a methodology change). From there, the growth in new cases declined at a generally steady rate and hit one per cent on 20 February – just under four weeks after the peak in new case growth.

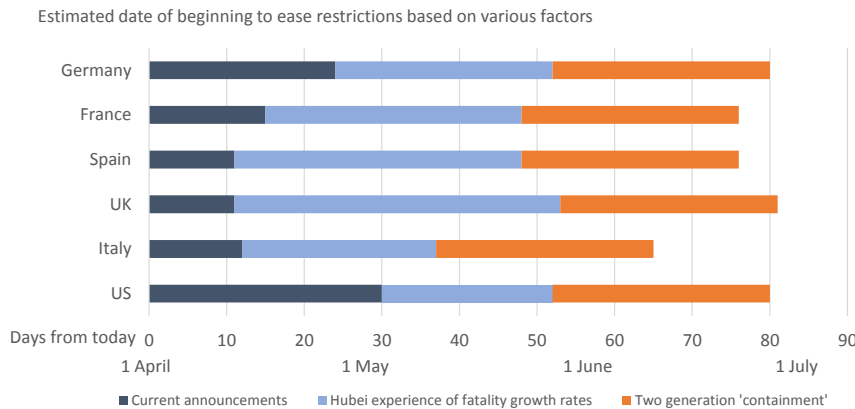
In early March, the Chinese government began encouraging people outside Hubei to go back to work. On 25 March, the travel restrictions in Hubei (excluding Wuhan) were lifted (63 days after the lockdown). This order was given after five days of zero new cases in the province. Travel restrictions are planned to end in Wuhan on 8 April. The relaxation of rules in some areas has been combined with surveillance via smartphone and other methods.



## Extrapolating the Chinese experience

The following chart shows a ‘football field’ representation of the range of possible timelines for the restart of activity in several countries. It includes the current period of lockdowns and the projected time line based on extrapolating the Chinese response. We feel it is likely these countries will begin to loosen restrictions within the range based on the Hubei experience (light blue bar).

Figure 8: The initial lifting of restrictions is likely to fall within a range



Source : Deutsche Bank, WHO, CDC, Worldometer

The decision to relax restrictions depends very heavily on how the epidemic curve in each country progresses. This progression reflects decisions made up to 14 days earlier given the likely incubation period of the virus. In Hubei, the three-day growth rate in new cases decreased from over 200 per cent to 63 per cent in the 14 days after restrictions were put in place. However, it was 63 days after the restrictions were put in place until they were lifted.

The following table summarises the potential dates that restrictions on civic and economic activity could end in various key countries.

Figure 9: 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

It is important to consider that there are notable differences between the experience of Hubei province and the various countries we consider in this analysis. For starters, Hubei was the first region that had to contend with covid-19 and thus authorities had less information available to make decisions. With more information available now, various countries may be able to lift restrictions sooner.

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In addition, the focus of impact in China was different from that of other countries. China managed to implement restrictions on Hubei that kept the majority of the impact inside the province. In contrast, many other countries have seen the virus enter their borders via different channels, which can change the timeline for the breadth of the spread. Finally, political pressure from different groups in western countries may result in pressure to reopen earlier than the Hubei timeline. See appendix one for more specific dates.

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## What happens when countries do reopen?

As we've learnt from this crisis the world can look a totally different place within a few weeks so it shouldn't be a surprise if economies are reopening in around four to six weeks as per our analysis above. However it's also likely that countries will be cautious and will stagger their reopenings. Perhaps the last thing to get back to normal will be travel as countries that have made the effort to domestically remove the virus will be very reluctant to open borders without strong evidence that travellers are virus free. Citizens of countries that have not shown the same evidence of being clear of the virus will likely have their travel curtailed. If the technology is available quickly enough, immunity passports (more below) might encourage more travel. If not mandatory periods of self-isolation on arrival might occur as an alternative to blanket travel bans. So tourism and business travel will likely remain heavily constricted for some time even as life within a country otherwise returns to normal.

So the global economy will have to deal with the consequences of countries opening up their domestic economy before their international one. This will test the full V-shape global recovery thesis.

Nevertheless by June, workers within countries will have resumed their jobs, retail stores will be open, and restaurants functioning. There will likely still be restrictions on the number of people allowed inside a certain space though. Indeed, many Chinese workplaces that have reopened have asked staff to continue to 'socially distance' themselves.

While we expect this gradual reopening to occur over the coming two months, we expect governments to advise people in higher-risk groups to continue with self-isolation (more below).

One of the great unknowns with covid-19 is the extent to which it will return after the 2020 summer (in the northern hemisphere). It is oft pointed out that when the 1918 'flu returned it was more deadly than at the beginning. Bear in mind that if a vaccine for covid-19 can be produced, it is not expected until 2021 (although if all the stars align, one could be available in the second half of this year). Should the virus return in force later in 2020, then countries may need to engage in some form of restrictions again. However, it is also likely that by the end of the summer, researchers will have a greater understanding of how the virus spreads. Meanwhile, testing will certainly be more sophisticated than it is currently and thus public health officials and politicians will likely be able to better control a further outbreak without resorting to the same extent of restrictions in place today.

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## Although civic and economic activity will not reopen for all, better targeting of government stimulus measures will make life better for all

The frustrating thing for both individuals and governments is that those least at risk must self-isolate themselves. As the majority of those least at risk are also of working age, it means that governments are currently giving away stimulus money to people who have less need to be idle.

Of course, self-isolation regimes are necessary to prevent anyone with the virus from passing it to those for whom it is a higher risk. However, we believe this problem can be at least partially solved. As we outline in the next section, we believe the widespread use of serological tests (which some governments say is very close) will allow countries to return to normal more quickly than expected. Although medical researchers are uncertain about what level of immunity a person has once they have recovered from covid-19, it is likely that the individual has at least some immunity.

Once an individual takes a test and determine that they either have already had covid-19, or currently do not have it, then they can be cleared to resume normal life. This proof of this could be managed through the use of smartphone-based technology (a bio-passport?) if privacy concerns can be addressed. At the same time, those who either have the virus, or who are in higher-risk groups, can continue to self-isolate.

The logistics involved mean widespread serological tests will take time but as healthy people return to work, governments will save a tremendous amount of stimulus money. In turn, part of that money can be put towards giving additional financial and lifestyle assistance to those people in higher-risk groups that who will need to isolate themselves for longer.

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## Circumstances that may lead countries to reopen their economies earlier

The number one thing that could quickly reopen economies is the widespread adoption of serological testing discussed above. Organisations in several countries claim to have developed serological tests, however, they have not entered widespread use yet. The UK government has said it has purchased 3.5m of these tests which are “now being trialled”. This will be important as many more people than official numbers suggest have likely already had exposure to the virus. For example, the head of Italy’s Civil Protection Agency estimated the number of cases in the country is ten times the reported figure.

The increased use of technology can also help. Experience in China and Hong Kong is that people who have tested negative can be allowed out of quarantine with tracking via their smartphone to determine contact with others if a new case is found.

Good weather as the summer season approaches in the northern hemisphere may reduce the rates of new cases and fatalities. Yet, while this is the case for most related viruses, it is not the case for all and the reaction of covid-19 to better weather is so far uncertain.

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Finally, the most reliable way to ensure a country is ready to reopen its economy is when a vaccine is developed. However, most medical workers believe this is over a year away and thus it is highly unlikely that countries will wait this long.

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## Potential setbacks

Perhaps the biggest risk to the current potential for the removal of lockdowns is how the rest of the world will react if China has a second wave of infections in the Hubei area now that restrictions are being lifted. Areas like Hong Kong and Singapore are now seeing a second wave as expats return home and reintroduce the virus. As such additional restrictions are being applied again which supports our thesis that travel will be the last thing to get back to normal.

Another risk concerns the ability of governments to maintain their stimulus levels if containment measures have to be continually reinforced. Some governments may lose the ability to borrow at sustainable rates. In this case, they may be forced to either reopen their economy against medical advice, or create an unsustainable debt loop. As a minimum central banks will be forced into more government bond buying with the consequences highly uncertain over the medium to longer term. In particular Europe risks an extreme political crisis if southern economies are not offered significant financial solidarity to fight the virus.

Finally, there is the issue of the impact of mental isolation on people. Many studies show that isolation can create or exacerbate mental problems that decrease life quality. In turn, this can also exacerbate physical health problems. Should lockdowns be extended for a second, third, or fourth time, it is likely that calls to take into account the mental health issues will become louder.

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## Appendix 1 - country specific estimates for the lifting of restrictions

### Restriction lift estimate based on current restriction announcements

US – Different states have different restriction policies and currently about half the population has been told to stay at home. Among other states, lockdowns are in place in New York and California. President Trump has most recently extended the guidelines for social distancing to 30 April.

UK – A nationwide lockdown of three weeks duration is due to end on 12 April.

Spain – a State of Emergency commenced on 14 March and was extended to at least 11 April.

France – The country has been under lockdown since 17 March and the period was recently extended to 15 April.

Italy – A nationwide lockdown commenced on 10 March. The end date was set at



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3 April but it has been extended until Easter on 12 April.

Germany – Citizens have not been ordered to stay at home at a national level, however, some states, such as Bavaria, have requested this. Furthermore, from 16 March many businesses closed nationwide and schools are shut until end of Easter holidays (13 April -24 April). Social distancing measures at least through to 19 April.

#### Restriction lift estimate based on case growth in Hubei province

If we look at the Hubei experience, it was 46 days after the daily case growth rate fell below ten per cent that restrictions were lifted. It was 24 days after the daily case growth rate fell below one per cent that restrictions were lifted. Given the significant testing differences between countries, it makes little sense to extrapolate the Chinese experience with respect to the number of confirmed cases.

#### Restriction lift based on three-day fatality growth rates in Hubei province

The comparison of three-day fatality growth rates across different countries provides a better comparison than does confirmed cases as fatalities tend to be better recorded, even if there is sometimes disagreement over primary and secondary causes. The three-day figure also decreases some of the noise associated with comparing relatively small numbers for some countries.

If we look at the Hubei experience, it was 48 days after the three-day fatality growth rate fell below 50 per cent that restrictions were lifted. It was 28 days after the three-day rate fell below ten per cent that restrictions were lifted.

Even though several other large countries have three-day fatality growth rates higher than 50 per cent, these countries are now implementing suppression methods so we believe it is reasonable to use a point-in-time extrapolation to roughly estimate when most of these countries will resume economic activity if they follow the Hubei model.

US – The current three-day growth rate has been somewhat volatile, however, it currently sits at 86 per cent. At the same point in time, Hubei was 52 days away from lifting restrictions.

Italy – Three-day growth in fatalities has been on a slow by steady trend downwards and sits at 27 per cent. At the same point in time, Hubei was 37 days away from lifting restrictions.

UK – Over the last week, the three-day fatality growth rate has fluctuated and is now 86 per cent. This excludes the change in reporting terms. Although somewhat volatile, there is something of a declining trend. At the same point in time, Hubei was 53 days away from lifting restrictions.

Spain – A downwards trend in the three-day fatality growth rate can be seen over the last week and it now sits at 50 per cent. At the same point in time, Hubei was 48 days away from lifting restrictions.

France – The three-day fatality growth has been on a consistent downwards trajectory similar to that in Italy. The rate is now 52 per cent. At the same point in time, Hubei was 48 days away from lifting restrictions.

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Germany – There have been fewer fatalities in Germany than many neighbouring countries so the outcome could differ depending on the progression over the coming two weeks. Using the same methodology as above, the three-day growth in fatalities has dropped to 84 per cent. At the same point in time, Hubei was 52 days away from lifting restrictions.

#### Restriction lift estimate based on the WHO's declaration after the 2003 SARS epidemic

During the 2003 SARS epidemic, the World Health Organisation declared that the outbreak had been contained after 20 days since the last case. The 20 day period is based on two generations of the virus' incubation period (i.e., two lots of ten days).

Applying this rationale to the current covid-19 virus is a little more complex as the incubation period is still being assessed. One study estimated the median incubation period is five days with 97 per cent of people becoming symptomatic in 11.5 days. To be safe, many healthcare workers are using a 14-day period. That implies a period of 28 days with no new cases is required in order to declare the covid-19 outbreak contained.

If the WHO were to use the same criteria as in 2003, it would still be almost two months until the situation is "contained" and likely much longer in other countries.

Complicating this scenario is that the testing regimes in different countries is highly inconsistent. Indeed, some medical professionals believe covid-19 will remain in constant circulation, similar to seasonal influenza. As such, we do not believe countries will wait for a period of 28 days with no new cases to reopen their economies, and this comparison should be seen as being for 'interest's sake' rather than a solid forecast.

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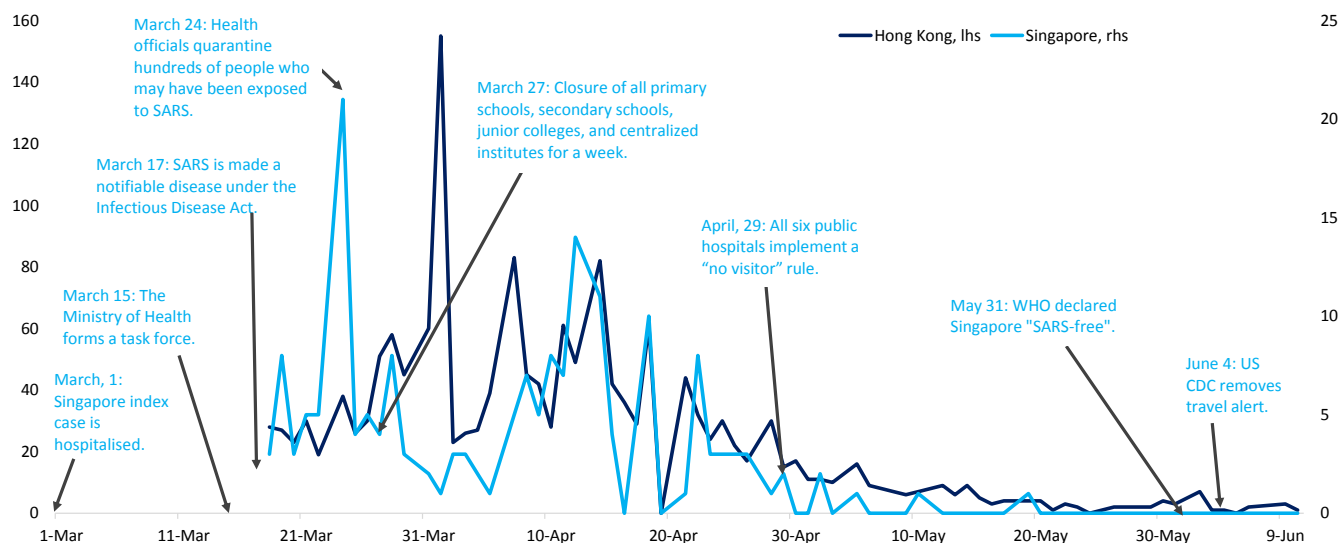
## Appendix 2 - Lessons from the 2003 SARS epidemic

The 2003 SARS epidemic impacted 28 countries, causing more than 8,000 cases and killing almost 800 people. Its incubation period was between two and seven days, shorter than that of covid-19.

Despite the differences between the two viruses, there are lessons from the SARS epidemic that can assist in the management of the covid-19 pandemic. Specifically, the manner with which Singapore and Hong Kong managed SARS offers two illustrations of a successful exit strategy.



Figure 10: Daily confirmed SARS cases in Singapore and Hong Kong



Source : Deutsche Bank, World Health Organisation

### Singapore: A tech-savvy government drove early and targeted intervention

In only three months, the Singaporean government eradicated the 2003 SARS disease from within its borders. Specifically, on 31 May 2003, the WHO declared Singapore “SARS free” three months after Singapore’s first patient, a person who had contracted the disease in Hong Kong, had been admitted to Singapore’s Tan Tock Seng Hospital.

In contrast with some countries’ response to covid-19, the timeline of Singapore’s virus response was extremely fast, and the government initiated a strategic and targeted lockdown. On 15 March, the Ministry of Health formed a task force to deal with the outbreak. Two days later, the government amended the Infectious Diseases Act in order to compel the contacts of suspected SARS patients to be quarantined at home and to fine those who refused to comply. Then, on 24 March, health officials quarantined hundreds of people who may have been exposed to SARS. Another two days later, on 26 March, the government ordered the closure of all primary and secondary schools, as well as junior colleges and centralised institutes for two weeks.

#### Preventive measures

The Singaporean government’s strategies to contained SARS focussed on helping hospitals and other healthcare facilities, plus community control. Government policy strictly enforced quarantine orders by authorising fines. All sectors of society and government were required to cooperate, including the Ministry of Health, clinicians who cared for SARS patients, and the laboratory experts who tested people for SARS and developed early diagnostic tests.

Singapore’s preventive measures can be summarised as follows:

- Early detection: Resources were assigned to identify and detect cases, and to promptly isolate patients at the Tan Tock Seng Hospital.

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- Targeted quarantine: Contacts and sources of identified cases were traced and quarantined if needed.
- Improved infection controls: Hospitals limited visitors and screened patients in the emergency departments.
- Planning for the worst: The government assumed a worst-case scenario and, as a result, located surplus isolation beds in anticipation of a wider outbreak.
- Ongoing government communication: Government officials, through press releases and press conferences chaired by the health minister. There was frequent communication on topics such as, travel restrictions to places with SARS outbreaks and health education campaigns.

#### Hong Kong: 2003 SARS intervention

After China, Hong Kong was the location most impacted by the 2003 SARS epidemic with the number of cases in Hong Kong reaching nearly 1,800. Hong Kong's exit strategy took more than four months: from February, when the index patient was detected, to late June, when the WHO declared Hong Kong to be "SARS free".

On 12 February, Hong Kong hospitals reported suspected or confirmed cases of severe community-acquired pneumonia. One key 'super spreader' was identified as a doctor who had travelled from China. He checked into a hotel on 21 February and later sought treatment in hospital. In all, 23 other hotel guests developed SARS.

On 22 March, a coronavirus had been identified as the agent responsible for SARS and a diagnostic test was under development to detect antibodies in infected patients.

On 23 March, the government asked students to stay home for one week if they had relatives or contacts suffering from "atypical pneumonia," but only about 180 students were affected.

On 27 March, the director of health amended the government's Quarantine and Prevention of Disease Ordinance to statutorily include SARS. The government also announced school suspensions from 29 March to 21 April. In public hospitals, a no-visitor policy was implemented in all acute wards; a restricted visiting policy was enforced in convalescent and psychiatric wards. On 10 April, officials announced that all household contacts of SARS patients would immediately be quarantined at home, with no visitors, for up to ten days.

On 22 April, after four weeks of closure, senior secondary schools resumed classes, but the government required students to wear masks and undergo daily temperature checks. On 28 April, junior secondary schools resumed classes. On 19 May, after eight weeks of closure, primary schools and other special schools resumed classes.

On 6 May, the WHO stated, "The number of new cases (in the single digits for the last several days) has steadily declined, suggesting that the outbreak has peaked." On 23 May, the WHO removed its travel advisory. Likewise, on 4 June, the US Center for Disease Control downgraded its travel advisory for Hong Kong to a travel alert.

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On 23 June, the WHO declared Hong Kong “SARS-free.”

#### *Preventive measures*

Hong Kong’s prevention measures were similar, with some exceptions, to those in Singapore. These included ongoing communication and publicity of preventive measures; border control and temperature checks of travelers; testing and tracing the population; and strict adherence to preventive measures, such as personal hygiene, use of masks, and facility disinfection.

The main difference between Hong Kong’s response and that of Singapore was related to the preparation and organisation of the healthcare system. Hong Kong faced difficulties in designating hospitals for the isolation and treatment of SARS patients. Some hospital wards had to be closed temporarily, and patients with non-SARS problems were transferred to other medical institutions, thereby making room for SARS patients. A shortage of masks and protective clothing in Hong Kong led to a widespread infection of medical staff—by June 2003, 386 had been infected. Due to other factors, the disease accelerated rapidly in Hong Kong. It is estimated that around 80 per cent of the Hong Kong cases were linked to the doctor who spread the disease in his hotel.

#### What best practices can we learn from Singapore and Hong-Kong?

Singapore’s response was very centralised. Tan Tock Seng Hospital was specifically designated as a SARS hospital. The temperatures of all staff and patients were strictly controlled. If needed, staff and patients were isolated. The hospital also identified “fever clusters.” Staff were required to use fit-tested N95 masks and other protective equipment. The hospital strictly limited visitor access. To expand capacity and take pressure off Tan Tock Seng Hospital, the government established “fever clinics” to assess and treat individuals with fevers.

To avoid overloading hospitals and clinics, Singapore established a widespread system to check temperatures, including at schools, workplaces, community centres, Changi Airport, and other border entry points. The government also strengthened borders to protect against a new wave of infections.

The lockdown orders were strictly enforced. Due to an extensive CCTV camera system across the whole country, the government could trace the people who spread SARS and their contacts. The system enabled the government to enforce quarantines and social distancing. When needed, personnel from the armed forces were ready to intervene. Mandatory home quarantines of up to ten days from contact were implemented, but officials also provided appropriate social support. In all of these efforts, telephone and video surveillance, and the threat of monetary fines and detention, ensured compliance.

#### *Hong Kong’s early exit plan*

By mid-May 2003, when the epidemic began to slow down, the government created three strategic priorities and associated committees.

- Hygiene improvement: The Hong Kong government implemented actions for systematic cleansing of previously infected places and initiated environmental improvements in housing.

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- Economic rebound: The government took action to revitalize the city's economy, including tourism, trade, and employment.

- Social relations: The city government recreated social relations and promoted community involvement to improve the city.

Similarly, Hong Kong allocated funds to support research on SARS diagnosis, treatment, and vaccines. The government created the Centre for Disease Control and Prevention to support collaboration with other health authorities.



# Appendix 1

## Important Disclosures

### \*Other information available upon request

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