

## China “Zero-Covid” Policy.

### Abstract

Recently, the world has been looking at the Chinese Covid policy from a very critical perspective particularly in the context of most developed economies having decided to “live with Covid”, (whatever that means and whatever the implications for the future might be). It is best illustrated by the Head of the IMF, Kristalina Georgieva who stated that Beijing should reassess the use of lockdowns to limit the spread of the highly contagious Omicron variant since it became clear the harm to human health was less severe than the Delta variant. Although what is the best Covid policy is still up for debate in light of the millions of people infected and deceased, harsh judgment and criticism of the Chinese policy without offering alternative solutions through an objective assessment of its foundation is not constructive. The Chinese Covid policy should be assessed in the context of China’s own economic structure and policy planning which differs substantially from the rest of the world. The embedded long-term focus of economic policies implemented through the 5-10 years plans implies that existing policies in China might be better assessed through a long-term lens. Capitalism or Socialism with Chinese characteristics are principles that the government has repeatedly emphasized as a foundation of the economic framework. It is the basis of the policies that have been implemented to develop the economic structure and improve the socio-economic environment of the Chinese people over the past 20 years. Analyzing Chinese policies outside of their political and cultural context makes little or no sense from our perspective.

We show that in the context of the research currently available on Covid-19, the damage to organs it might cause, the potential long-term effect on a non-negligible portion of the population and the potential costs associated with it, the current “Zero Covid policy” might be the only viable policy option available to China considering its very large population.<sup>1</sup> We also discuss to what extent the implementation of the policy might be a bigger issue than the policy itself. We therefore advocate potential solutions that would make the policy much less disruptive to economic activity, using Hong Kong as a guide for what small changes might bring to the efficiency of the policy and the well-being of the population. Mobility of population and goods are critical factors to the economy and as a result a major component of maximizing the utility of any supportive economic measures the government might take.

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<sup>1</sup> Note that our aim is not to do an exhaustive review of the medical literature on Covid, nor infer or draw conclusions on the nature and extent of Covid’s sequelae but rather to infer that the probability of Covid-19 having a health impact on the affected population to be relatively significant.

## Introduction

A poll conducted in March 2022 by Axios-Ipsos found that 66% of Americans said they thought Covid-19 poses little or no risk.

Yet in the context of the growing number of medical studies that have been published, the probability that this is indeed the case is very low. It seems that the further the research advances the larger the spectrum of discovered potential issues emerge after a patient has been exposed to Covid:

- A study by the NIHR in the UK: “Researchers looked at the medical records of almost 50,000 people who were hospitalised in England with COVID-19, and discharged. [...] The researchers found that, compared to matched controls, COVID-19 patients: were 4 times more likely to be admitted to hospital; nearly 1 in 3 were readmitted (after the initial discharge); were 8 times more likely to die; were 27 times more likely to have a new diagnosis of a respiratory disease; were 3 times more likely to have a new diagnosis of diabetes and had a higher risk (50% higher) of a new diagnosis of heart disease”.<sup>2</sup>
- In an article of Nature Reviews Neurology analyzing data from 55 countries, the authors identified 41 neurological manifestations that can occur in conjunction with COVID-19. Up to one-third of individuals with COVID-19 were estimated to exhibit at least one of these manifestations. The prevalence of a stroke was 1.2% in people with COVID-19, compared with only 0.2% in those with influenza.”<sup>3</sup>
- “COVID-19 affects multiple organ systems, especially the lungs and heart. In our review of clinical analyses, we found that in 26 studies including 11,685 patients, the weighted pooled prevalence of acute myocardial injury was 20% (ranged from 5% to 38% depending on the criteria used).”<sup>4</sup>
- A retrospective study from the SWEDEHEART database showed that, among 48,482 COVID-19 patients with elevated cardiac troponin levels without a diagnosis of acute coronary syndrome, 7529 patients (15.4%) developed long-term major adverse cardiac events.<sup>5</sup>
- Following the evaluation of 1597 competitive college students in the US after they tested positive for Covid, a study found that “Screening with cardiovascular magnetic resonance imaging, the prevalence of clinical and subclinical myocarditis was 2.3%”. For reference, the estimated prevalence of

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<sup>2</sup> Post-covid syndrome in individuals admitted to hospital with covid-19: retrospective cohort study, Ayoubkhani & al., March 2021.

<sup>3</sup> Counting the neurological cost of Covid-19, Nature reviews neurology, November 2021, Abdul Mannan Baig et al.

<sup>4</sup> Acute myocardial injury in patients hospitalized with Covid-19 infection: A review. Chirag Bavishi et al., Sept-Oct 2020.

<sup>5</sup> Persistent cardiac injury – An important component of long COVID-19 syndrome. Vignesh Chidambaram, Amudha Kumar, Giuseppe Calcaterra, Jawahar L. Mehta. eBioMedicine, The Lancet Discovery Science, March 2022.

Myocarditis in the general population in the US is between 0.01% and 0.1%.<sup>6</sup> We note that athletes health condition is much better than the average US population.

As illustrated by the examples above, there is a growing body of evidence that seems to indicate that exposure to Covid might have serious health consequences during the acute phase, including potential damage to a large spectrum of organs.

## Long Covid

Additionally, there is growing quantity of research on the long-term effects that Covid might induce in affected individuals – generally described as “Long Covid”. In December 2020, the US Congress allocated \$1.15bn to the NIH to study it. Long Covid has also been recognised as a disability by the US Department of Health Human Services Office. It defines it as “Long COVID is a physiological condition affecting one or more body systems (Lung damage; Heart damage, Kidney damage; Neurological damage”; etc.... It follows with “Long COVID can substantially limit one or more major life activities”.

- “The preliminary evidence on the pulmonary, cardiovascular, neurological, hematological, multisystem inflammatory, renal, endocrine, gastrointestinal, and integumentary sequelae show that COVID-19 continues after acute infection. Interdisciplinary monitoring [...] will allow for the early detection of post-acute COVID-19 sequelae symptoms and prevent long-term systemic damage.”<sup>7</sup>
- A study in the city of Hamburg showed that “Subjects who apparently recovered from mild to moderate SARS-CoV-2 infection show signs of subclinical multi-organ affection related to pulmonary, cardiac, thrombotic, and renal function without signs of structural brain damage, neurocognitive, or quality-of-life impairment” . Patients were examined in median 9.6 months after the first positive test.<sup>8</sup>
- “The prevalence of 55 long-term effects was estimated, 21 meta-analyses were performed, and 47,910 patients were included (age 17-87 years). The included studies defined long-COVID as ranging from 14 to 110 days post-viral infection. It was estimated that 80% of the infected patients with SARS-CoV-2 developed one or more long-term symptoms.”<sup>9</sup>

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<sup>6</sup> Prevalence of Clinical and Subclinical Myocarditis in Competitive Athletes With Recent SARS-CoV-2 Infection, JAMA Cardiology, May 2021.

<sup>7</sup> Long-term Effects of Covid-19, Shreeya Joshee, Nikhil Vatti, Christopher Chang, Mayo Clinic Proceedings Journal. March 2022

<sup>8</sup> Multi-organ assessment in mainly non-hospitalized individuals after SARS-CoV-2 infection: The Hamburg City Health Study COVID programme, Petersen & al. European Heart Journal, March 2022.

<sup>9</sup> More than 50 long-term effects of COVID-19: a systematic review and meta-analysis, Sandra Lopez-Leon, Talia Wegman-Ostrosky, Carol Perelman, Rosalinda Sepulveda, Paulina A. Rebolledo, Angelica Cuapio & Sonia Villapol, published in Nature, August 9th 2021

- A paper from the University of Michigan School of Public Health reviewed a total of 40 studies with 9 from North America, 1 from South America, 17 from Europe, 11 from Asia, and 2 from other regions. They found that 43% of the patients presented long Covid symptoms. For those hospitalised, the number was 57%.”<sup>10</sup>
- “Ongoing symptoms exist among infected children in the state of Israel: 11.2% of all children experienced some symptoms after recovery, and about 1.8%-4.6% of them, depending on their age, continue to experience long-COVID symptoms after 6 months from the time of acute illness. Correlation has been found between symptomatic illness and the chances for experiencing subsequent long-term symptoms. Among teenagers aged 12-18 who developed symptomatic illness, 5.6% experienced long-COVID compared to 3.5% among those who experienced no symptoms when confirmed as coronavirus positive” .<sup>11</sup>
- Another study reviewed 273,618 Covid survivors and found that 36.55% of them had one or more long-COVID feature recorded, which is significantly higher than influenza. They noted that “ significant differences in incidence and co-occurrence were associated with sex, age, and illness severity ” .<sup>12</sup>

As illustrated by the examples above, long term effects of Covid are far from negligible and the proportion of the affected population might be significant. It might also be misleading to consider the number of deaths as an indicator of severity of the disease and provide a false sense of comfort and security to the population that might not be warranted and lead them to behavior that might not be appropriate given their health condition.

## **Vaccinated / Unvaccinated?**

However, it is important to note that most of the studies above were made on unvaccinated patients. As described below, being vaccinated greatly decreases the probability of having significant negative health outcomes and suffer from long lasting Covid effects. But it does not reduce it to zero, far from it. It does however emphasize the effectiveness of vaccination to reduce the potential impact of Covid-19 on the general health of the population.

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<sup>10</sup> Global Prevalence of Post-Acute Sequelae of COVID-19 (PASC) or Long COVID: A Meta-Analysis and Systematic Review, Chen Chen et al. November 15th 2021.

<sup>11</sup> Ministry of Health Israel, 14/09/2021

<sup>12</sup> Incidence, co-occurrence, and evolution of long-COVID features: A 6-month retrospective cohort study of 273,618 survivors of COVID-19, Taquet et Al. PLOS Medicine, September 28, 2021.

- In a UK study based on 1.24m users of the COVID Symptom Study app, the authors found that “... the odds of having symptoms for 28 days or more after post-vaccination infection were approximately halved by having two vaccine doses. Almost all individual symptoms of COVID-19 were less common in vaccinated versus unvaccinated participants, and more people in the vaccinated than in the unvaccinated groups were completely asymptomatic.”<sup>13</sup>
- Another study in the UK showed that “...receiving two doses of a coronavirus (COVID-19) vaccine at least two weeks before a first test-confirmed COVID-19 infection was associated with a 41.1% decrease in the odds of self-reported long COVID at least 12 weeks later, [...], Long COVID symptoms of any severity were reported by 9.5% of double-vaccinated study participants, compared with 14.6% of socio-demographically similar participants who were unvaccinated when infected; the corresponding estimates for long COVID symptoms severe enough to result in limitation to day-to-day activities were 5.5% and 8.7% respectively”<sup>14</sup>
- A study made in Israel concluded that “Vaccination with at least two doses of COVID-19 vaccine was associated with a substantial decrease in reporting the most common post-acute COVID-19 symptoms. Our results suggest that, in addition to reducing the risk of acute illness, COVID-19 vaccination may have a protective effect against long COVID”<sup>15</sup>

## Societal Impact & Economic Cost

### 1. Societal Impact:

In a statement published in April 5th, 2022, the White House described the numerous measures and substantial investments that they are putting in place to make sure patients will be treated in the future, recognising de facto that Long Covid is not just a statistical error.

Indeed, the US GAO published a broad report on the subject where they state that “Long COVID can have serious impacts. Some individuals have reported a need to adjust their work hours or stop working altogether due to chronic fatigue or cognitive impairment. One study of nearly 4,000 long COVID patients found that 45% reduced their work hours” . They add that “Studies in the U.S. estimate that 10 to 30% of COVID-19

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<sup>13</sup> Risk factors and disease profile of post-vaccination SARS-CoV-2 infection in UK users of the COVID Symptom Study app: a prospective, community-based, nested, case-control study, *The Lancet Infectious Diseases*, Michela Antonelli et al. Volume 22, Jan 2022.

<sup>14</sup> Self-reported long COVID after two doses of a coronavirus (COVID-19) vaccine in the UK: 26 January 2022

<sup>15</sup> Association between vaccination status and reported incidence of post-acute COVID-19 symptoms in Israel: a cross-sectional study of patients tested between March 2020 and November 2021, Kuodi, Gorelik et al. January 2022.

survivors develop long COVID. If so, 7.7m to 23m people in the U.S. may have developed long COVID as of February 2022. In January 2022, the Brookings Institution conducted a meta-analysis to suggest that long COVID may be responsible for over 1m workers being out of the labor force at any given time” . It relates well to an article written in Barron’s entitled “Where are the workers? Millions are sick with Long Covid” , December 8th 2021, to provide some partial answers to labor participation remaining low and worker shortage persisting as a result.

Finally, The UK ONS reported that as of March 5th 2022, “An estimated 1.7m people living in private households in the UK (2.7% of the population) were experiencing self-reported long COVID (symptoms persisting for more than four weeks after the first suspected coronavirus (COVID-19) infection that were not explained by something else). Long COVID symptoms adversely affected the day-to-day activities of 1.1m people (67% of those with self-reported long COVID).” Because it is self-reported, we would ponder to which extent these numbers might actually be under-estimated by a significant margin.

## 2. Economic Cost

The economic burden on societies of sickness is already very substantial as illustrated below:

- In the US, one study estimated that absenteeism costs \$2,500 to \$3,500 per shift worker per year with significant variations from profession to profession.<sup>16</sup> In October 2004, the Harvard Business Review estimated that the cost of Presenteeism (productivity loss that stems from being at work while ill and performing at a lower level than usual) to the US economy to be app. \$117bn. Two articles in the Journal of the American Medical Association in 2003 reported that depression cost U.S. employers an estimated \$35bn a year in reduced performance at work and that pain conditions such as arthritis, headaches, and back problems cost nearly \$47bn.<sup>17</sup> In Australia, the cost of absenteeism has been estimated at app \$44bn per year in 2015.<sup>18</sup>
- A study by Westfield Health in the UK estimated that in 2020, the cost to the economy of absenteeism due to mental health reasons was app. GBP14bn, up GBP1.3bn from 2019. In 2017, a report released by FirstCare estimated that workplace absence cost the UK economy GBP18bn per year and would reach GBP26bn in 2030. In another survey made on 32,000 workers in 2017, Britain’s Healthiest

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<sup>16</sup> Circadian. Absenteeism: The Bottom-Line Killer. 2005.

<sup>17</sup> <https://hbr.org/2004/10/presenteeism-at-work-but-out-of-it>

<sup>18</sup> <https://www.aigroup.com.au/resourcecentre/resource-centre-blogs/hr-blogs/measuring-absenteeism/>

Workplace estimated that sickness-related absences and presenteeism are costing the UK economy GBP77.5bn a year.<sup>19</sup>

- A study made in Japan on lost productivity due to Presenteeism estimated the national cost at \$27bn/year. The study also noted that “lost productivity costs are significantly greater than medical and pharmacy costs, and are on average, approximately 2.3 times higher” .<sup>20</sup>
- A study conducted by the Centre for Economics and Business Research estimated that Omicron absenteeism might cost the economy GBP35bn in January and February 2022 based on 25% absenteeism or GBP10.2bn if that number is 8%.<sup>21</sup>
- An extensive study made by the Solve Long Covid Initiative on American patients estimated the financial burden to be between \$386bn to \$511bn per year (all inclusive) depending on the model of analysis used. They estimated the number of patients with Long Covid to be between 6.9% and 13.4% of the population and those with disabling Long Covid to be between 2.3% and 4.4%.<sup>22</sup>

As Covid might potentially damage a fairly large spectrum of organs depending on its severity and the health condition of the patient, it might be indicative to look at the current cost of some of the most prevalent medical conditions in the world today.

- A study in the US on asthma found that “during 2008-2013, asthma was responsible for \$3bn in losses due to missed work and school days, \$29bn due to asthma-related mortality, and \$50.3bn in medical costs. All combined, the total cost of asthma in the United States based on the pooled sample amounted to \$81.9bn in 2013. In 2013, approximately 22.6m people in the US (7.3%) had current asthma, including 6.1m children and 16.5m adults.<sup>23</sup>
- A study by the American Diabetes Association found that “The total estimated cost of diagnosed diabetes in 2017 is \$327bn, including \$237bn in direct medical costs and \$90bn in reduced productivity. People with diagnosed diabetes incur average medical expenditures of ~\$16,750 per year, of which ~\$9,600 is attributed to diabetes” .<sup>24</sup>

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<sup>19</sup> [www.vitality.co.uk](http://www.vitality.co.uk)

<sup>20</sup> Economic Burden of Lost Productivity due to Presenteeism Caused by Health Conditions Among Workers in Japan, Yoshimoto et al.

<sup>21</sup> <https://www.thetimes.co.uk/article/economy-risks-35bn-hit-from-omicron-absenteeism-cjzprhp8>

<sup>22</sup> Solve Long Covid Initiative – Long Covid Impact on Adult Americans, April 2022.

<sup>23</sup> The Economic Burden of Asthma in the United States, 2008–2013, Nurmagambetov et al. Annals of the American Thoracic Society, Vol 15 Issue 3.

<sup>24</sup> <https://diabetesjournals.org/care/article/41/5/917/36518/Economic-Costs-of-Diabetes-in-the-U-S-in-2017>

- The US CDC estimated that flu has resulted in 9m - 41m illnesses, 140,000 - 710,000 hospitalizations and 12,000 - 52,000 deaths annually between 2010 and 2020. In 2018, a study found that the annual direct cost for hospitalisations and outpatients visits was \$10.4bn.<sup>25</sup>

The CDC also estimated the cost of heart diseases to be at \$363bn from 2016 to 2017.

It is important to note that all the conditions described above might be potentially worsened by exposure to Covid-19 in light of the medical research findings described in previous parts of that document.

We estimate that between 80m and 100m people are still not fully vaccinated in the European Union. In the US, that number is app. 110m based on CDC data (only 30% of the population has received a booster shot). As a result, a large number of people remains at the mercy of a potential Covid infection with little to no protection brought by the vaccine and potentially suffer substantial negative consequences to their health. If we take 200m people as a base number and 50% of them catch Covid under the “live with Covid” mantra, while 15-30% of them suffer from Long Covid, it is 15m to 30m people that might need on-going treatments and might not be able to work full-time. Using the Solve Long Covid Initiative data, it would be between 2.3m and 4.4m people who would suffer from disabling Long Covid. Those 2 regions are clearly unprepared to treat those patients. The UK has 80 dedicated clinics, the US 160, Spain has 3 and Italy has none.

In conclusion, the additional economic burden brought by any endemic disease that affect a significant portion of the population should neither be discounted nor underestimated, particularly when the medical knowledge surrounding that new disease is developing and the potential emergence of new variants might create further stress on the medical and economic system. Additionally, from an economic point of view, patients that suffer long term consequences from exposure to Covid-19 are much more expensive to society than dead ones. As a result, the false sense of security that a low death rate might provide to the overall population, might be turned into a substantial economic burden to society to treat patients with LT sequelae from exposure to Covid-19.

## **The China Case**

As illustrated by the various data provided in the previous sections, it is critical to account for the fact that diseases are not free of cost to the economy, even if the patient recovers. Combining the cost of absenteeism/presenteeism as well as treatment cost, it becomes obvious that the future cost associated with

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<sup>25</sup> Economic burden of seasonal influenza in the United States, Putri & al. Vaccine, May 2018.



not managing the prevalence of a particular disease might be very substantial to any country, particularly if it has a large population like China.

From a simplistic perspective, the cost of any particular disease is influenced by 3 factors; the severity, the duration and the percentage of the population affected. High mortality in a controlled environment affecting a very limited percentage of the population has the lowest economic cost to society. Low mortality with high prevalence of long-term effects that affect a large percentage of the population has the highest economic cost.

Although more than 88% of the population in China has been vaccinated and more than 50% received a booster shot, it implies that 308m people still remain to be fully vaccinated. The percentage is disproportionately lower the older the population is as elderly have predominantly been users of traditional Chinese medicine solutions rather than modern ones and have been reluctant to get vaccinated as a result. It is therefore critical that the vaccination effort continues particularly as the Sinovac booster seems to have brought the Chinese vaccine efficacy in line with the Pfizer-BionTech one.<sup>26</sup>

Because of its large population, the cost of managing an uncontrolled pandemic is exponential for China. At the peak, the US had 800,000 cases a day, which would translate into a staggering 3.4m cases/day in China. Considering that China has an estimated 4.3 intensive care beds per 100,000 people, far lower than in developed countries, it is easy to understand how quickly the system would be overwhelmed and the number of deaths would spiral out of control since proper treatment of patients has been a key factor to reduce the death rate in the US and Europe for severe cases (2-4% of the infected patients).

In the case of long Covid, taking 2.7% of the population as the reference number based on the UK government study, that would translate into 37.8 million people in China. Using the grimmer data from the Solve Covid Initiative based on the US, that number would balloon to a staggering 95m to 186m people. In light of the cost of absenteeism and medical treatments described in the previous sections, the economic burden to China to have a similar percentage of Long Covid patients would be astronomical and put a significant strain on the government budget and healthcare system.

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<sup>26</sup> Neutralizing antibodies against the SARS-CoV-2 Omicron variant BA.1 following homologous and heterologous CoronaVac or BNT162b2 vaccination, by Cheng et al., Jan 2022, Nature Medicine Journal.

Considering the points made above and the various examples provided throughout this document, it appears that the dynamic “Zero Covid-19” policy might be the only option available to Chinese policy makers from a long-term economic policy stand-point.<sup>27</sup>

One could argue that a similar policy (albeit informal mostly through the considerate behavior of Chinese people who wear mask when sick) might already be in place for Influenza as the prevalence rate in China is 81/100,000 vs. 10,600/100,000 in the US, saving considerable money to the Chinese healthcare system.

However, an article published in April 2022 estimated that “imposing full-scale lockdown on the four largest cities (Beijing, Guangzhou, Shanghai and Shenzhen) for one month would reduce the national real GDP by 8.6%, of which 11% is contributed by the spill-over effects.”<sup>28</sup>

As a result, although “Zero Covid-19” policy might make sense from a long-term perspective in order to minimise the health impact to the Chinese population as well as manage the future financial burden the country healthcare system might have to face, the management and efficiency of lock-downs must be improved to minimize the short-term economic impact.

Looking at the Hong Kong experience, where the government was forced to adjust its policies as the pandemic ran out of control, might provide some guidance to the Chinese government on how to improve the effectiveness of the policy and reduce economic and societal impact to Chinese people. It is even more relevant as the biggest issue of Hong Kong compared to other countries has been its very high population density, particularly in its social housing blocks which were at the centre of the runaway number of infections. Although population is much larger in China, density is lower, which provides the government with a critical edge. We believe Hong Kong provided 4 constructive clues:

1. self-testing has several advantages; speed of reaction (15 minutes), reduce the need for extended full lock-downs and the heavy burden of organizing testing in a broad area. It avoids concentration of population waiting to get tested. It also allows for repetition and targeted use (e.g., have to show a negative test to go to the dentist in HK). It could also be used to perform random testing over-time in areas where it might be deemed necessary.

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<sup>27</sup> On a side-note, it might be worthwhile to recognize how critical it was to the world that China did implement such a drastic policy until today. It allowed the country to produce the billions of dollars of medical equipment that were exported and key to the survival of millions of patients during the peak of the pandemic in 2020 and 1H21. Death rates might have been dramatically different if China had to keep all these equipment to treat its own patients. Additionally, by having its factories running, it also helped reduced the probability of runaway inflation as cheap goods from China continued to reach foreign markets during a period where logistic and production chains were crippled by the lack of workers or lock-downs.

<sup>28</sup> The Economic Cost of Locking down like China: Evidence from City-to-City Truck Flows. Chen & al. April 3rd 2022

The only issue is accuracy and participation. Participation can be addressed through the combination of use of technology (e.g. bar codes on RAT and mobile application reporting) and significant monetary penalties for mis-reporting. Accuracy is an issue as the minimum threshold set by the WHO is 80%, but the government has the ability to put pressure on manufacturers to improve it and/or simply fund additional research.

The aim is not to replace PCR testing but to avoid having all the people who would test positive doing a RAT anyway move around to queue for doing a PCR test, particularly as the majority of the cases in China have been asymptomatic (RAT utility is not negligible as it reached as much as 50% of the reported cases in Hong Kong, speeding up dramatically the identification and isolation process). As a result, it provides a quick and cost efficient first barrier to propagation in a given area by stopping infected people from moving around particularly in the most infectious period of the Covid onset, where the RAT is the most accurate and asymptomatic patients might not even be aware they are infected and continue their life as usual.

2. Home isolation is another significant factor to increase the efficiency of the policy by reducing substantially the need for dedicated units to isolate patients, particularly for asymptomatic cases, as well as reducing the complexity and burden of managing the movements of this population. Other factors might be considered such as number of people in the household, ability to isolate within that household, construction quality of the building, etc... to assess whether home isolation is appropriate. For an asymptomatic single person household, home isolation should be automatic.

It would also help decrease the burden on the healthcare system to allow medical workers to focus on patients with the most pressing needs. The outstanding work, effort and sacrifice provided by medical teams in HK and throughout the world should not come as a given. It is key for policy makers to implement efficient policies that provide them with a near-optimal work environment in a given set of conditions.

As a warning sign on potential coming issues for the healthcare system of several countries, it might be relevant to consider the speed at which nurses and doctors are resigning following the traumatic experience they had to go through in the past couple of years. It might not only cripple the current/future functioning of the healthcare support system in those regions, but it might also become very difficult to replace those key workers unless wages go way higher (well-deserved if you ask us). The cost of diverting resources away from other medical conditions to focus solely on Covid has yet to be assessed as millions of patients have seen their treatment delayed significantly.

Finally, it decreases substantially the moral hazard that comes with inhabitants avoiding testing, mis-reporting or escaping their area, because of their unwillingness to have to go to quarantine facilities which are far from being user friendly considering what has transpired on social media.

3. Testing sewage to allow for the detection of hidden infections and provide valuable information to organize targeted testing and lock-downs, rather than using a blanketing strategy.
4. As the need for broad lock-downs diminishes, the stress on the population decreases, food hoarding subsides and ability to quickly deliver food increases, which creates a positive feedback loop and increases the willingness of the population to follow the policy. People can also go back to work much faster, diminishing the effect on the economy as a whole.

Hong Kong has been functioning with those principles in place for a few weeks and cases have not rebounded.

## CONCLUSION

In light of the significant probability that Covid-19 might have meaningful short-term and long-term health effects on a non-negligible percentage of the affected population, we believe that the Chinese government has little choice but to implement the so-called “Zero Covid policy”, considering the staggering potential economic impact and financial burden it might face if the pandemic was not kept under control.

However, we believe, that the efficiency of the implementation of that policy could be improved substantially by building on the Hong Kong experience, where a combination of self-testing, home isolation and targeted small quick lock-downs have helped bring the spike in cases under control. It has to be added that the diligent and considerate behavior of Hong Kong people to wear masks in public spaces and transportation has been an integral part of the success in controlling that pandemic. Having travelled to China for the past 12 years, we believe that Chinese people are more than willing to make any effort that would help bring an end to the massive extended lock-downs so they can go back to their normal life as soon as possible. In that way the economic impact to the Chinese economy and the World for that matter could be minimized as soon as possible.

When it comes to judging or assessing the Chinese “Zero Covid policy”, it might be wise to wait a couple of years when the full spectrum of Covid health implications is known and the true cost of having so many infected people in the population can be properly estimated by each country. It is particularly relevant when most critics have not proposed any alternative strategy (other than “live with Covid”), that would address the specificities of the Chinese economy and its demography. We believe it illustrates a key difference in policy making between China (*ex ante* model) and the majority of developed economies (*ad hoc/ex post* model).

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