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Research on Influence of Covid Prevention Measures on China's Economic

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Abstract: Since 2020, governments around the world have taken different measures to prevent and control the new crown pneumonia epidemic, which has curbed the spread of the epidemic to a certain extent. However, the epidemic prevention and control measures have restricted people's travel and consumption, which has had a strong impact on the economic development of various countries. In March 2022, the new crown pneumonia epidemic broke out in Shanghai. In order to control the epidemic, the Chinese government ordered a blockade of Shanghai and restricted the normal flow of people. At the same time, the economy was also severely affected. This paper analyzes the negative impact of the 2022 COVID-19 prevention and control measures (taking Shanghai as an example), including lockdown and regular polymerase chain reaction tests, on the Chinese economy through qualitative analysis and review. These measures have lowered the growth rate of the economy to a certain extent.

Keywords: economic, China, Covid-19, lockdown

1. Introduction

It has been over 3 years since Covid-19 first appeared in Wuhan, China in 2019. As the disease is highly contagious, it has spread to almost every corner of the earth in four months , causing great casualties and economic damage: labor force decrease; Leisure and Hospitality are greatly affected; Shopping and eating outside became less normal; air transport was battered seriously; Many countries are facing extremely high inflations; International communication reduces. Emergency measures including lockdown, border shutdown, travel restrictions, and school and workplace closure, were widely used at the beginning of the pandemic to control the disease. With the development of dozens of covid vaccination and administrations of more than 10 billion doses [1], the epidemic has been quickly alleviated. As a result, increasing numbers of countries started easing COVID restrictions [2]: people no longer need to wear masks indoors in most countries including France, Greece, Israel, Ireland, Singapore and so on; Travel restriction has been slowly eased even in Hongkong, China; North Korea declared to lifts COVID restrictions [3]; Most countries accept "living with covid". However, in mainland China, the authorities instituted and still insist on a "zero-COVID policy, though these policies are criticized as "unsustainable" and "authoritarian", and negatively influence the economy. Strict covid rules, such as lockdown(or "silent management") and regular polymerase chain reaction tests, known as PCR tests(get PCR test every 48/72 hours [4]), are practiced rigidly. In this paper, we will introduce and evaluate two main covid restrictions(lockdown and regular PCR

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test) and their effects on the economy in China to help people understand the cost of those restrictions and help the government to weigh up the loss of continuing those strict covid policies.

2. Lockdown (Silent Management)

In the first half of 2022, Covid-19 cases resumed rising in several major cities including Jilin and Shanghai after two years' silence. To control the pandemic, those cities with millions of residences took strict lockdown measures.Lockdown also called silent management in China, required everyone in the control area to stay at home and do PCR tests every day. All citizens are prohibited to go outside and people in other regions are prohibited to go inside the control area unless they have special permission from the government and neighborhood. According to Nomura analysts, full or partial lockdowns are in place in 45 Chinese cities, affecting a quarter of the population and approximately 40% of the economy. We cannot deny that lockdown is one of the quickest and most effective ways to control the pandemic in a short period, as proved at the start of the pandemic in Wuhan, but by analyzing data from the most flourished and important city, Shanghai, we can see that lockdown wreaked havoc on the economy. The lockdown in Shanghai began in late March and ended on June 1st. Therefore, The second quarter economy was most affected. According to the National Bureau of Statistics of China, the second quarter GDP(2022) of Shanghai was 993.9billion Yuan, around 145.12 billion US dollars(1 USD= 6.85 Yuan), reduced by 13.7% compared to that of the second quarter in 2021. A negative GDP increase rate occurred for the first time since the 4th quarter of 2020(2 years after the covid-19 pandemic). Furthermore, total retail sales of social consumer goods decreased significantly, decreasing 3.8% in the first quarter of 2022 and 16.1% in the second quarter of 2022, which is only 4.3% lower than the decrease rate of the first quarter of 2020 when the pandemic just started, ranking the second in 5 years. The cost of lockdown is extremely huge whether in small cities or metropolises, and the cost sometimes can reach to billions of dollars. The influence is durable and extensive: the lockdown of Shanghai influences the national economy and global economy because the supply chain and shipment was influenced. In addition, lots of consumers' and investors lost their confidence in the economy. Whether the cost is worth it under the background of the covid-19(Omicron) mortality rate decrease [5] should be discussed.

As the figure 1 show, the economy in Shanghai was terribly influenced by the lockdown, and the time for recovery would be very long.

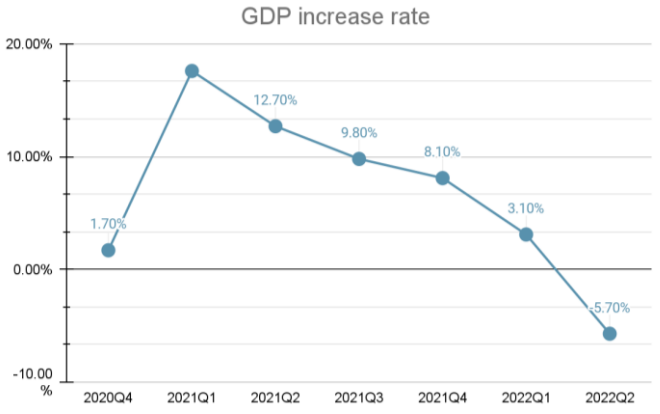

Figure 1: GDP increase rate in Shanghai.

2.1. Transport Industry

In most cases, a city-wide lockdown will restrict the connection between the lockdown city and other regions by temporarily suspending passenger flights, trains, buses, and highway access. Even small-

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scale lockdowns will influence transportation by forbidding drivers, riders, and walkers through the section. Therefore, lockdown is a devastating blow to the transportation industry, and therefore, greatly influences a region's economy [6]. In April, Shanghai Airport cargo throughput decreased 72.27% year-on-year, the quantity of railway transportation decreased 34.7% year-on-year, total truck transport decreased 72.3%, and total water transport, which was the lightest influence, decreased 12.7%. According to the Wall Street Journal [7], Shanghai ports were idle for an average of 8.3 days as of April 18, more than double the wait time before the lockdown was imposed (Figure 2).

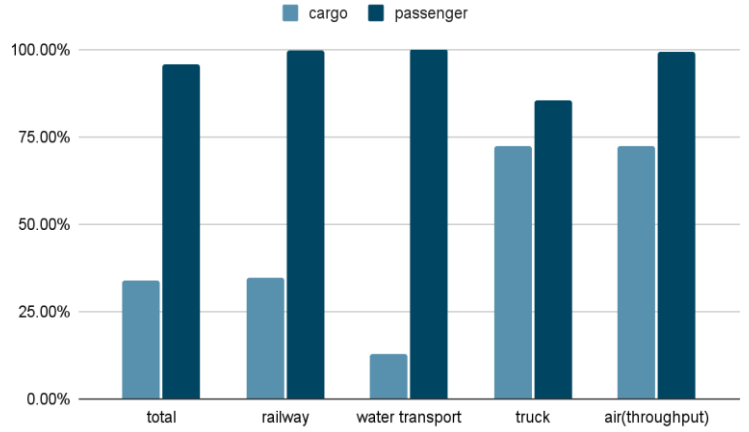

Figure 2: Decrease rate of transportation in April, Shanghai. [6]

2.2. Manufacuring

Lockdown is devastating for manufacturing. Employees are trapped at home (unlike internet companies that are easy to work online, manufacturing industries require to operate offline), raw materials are stuck outside of cities, and products are unable to be exported to other regions. Though companies and the government try to ask employees to live in the factories, the situation doesn't change too much. Shanghai April industrial output disclosure shows a 61.1% decrease compared to March [8]. As the headquarter of the SAIC MOTO, China's biggest car maker, is located in Shanghai, automobile manufacturing was extremely hit. The production of automobiles decreased 70% compared to the same time the previous year. A report of China Passenger Car Association (CPCA) claimed that no vehicles were exported to other territories from Giga Shanghai during April and the long shutdown appears to have caused a 97.7% month-over-month drop in the company's wholesale figures [9]. Furthermore, as the center of semiconductor manufacturing, Shanghai has 46% of China's semiconductor makers, and therefore, the lockdown seriously hit the semiconductor industry in China. According to Bloomberg, Output of integrated circuits dropped 4.2% [10] in the first quarter because of the dramatic decline in March. The lockdown also impacted other manufacturing industries: Shanghai Bureau of Statistics's data shows that output of food manufacturing (Year-on year) decreased 51.4%; cigarette manufacturing decreased 99.5%; Printing manufacturing decreased 77.5%.

2.3. Service and Retail Industry

The service industry and retail industry may be the biggest victims of lockdown. Consumers were not able to entertain and shop offline, and merchants could not operate during the lockdown. Public entertaining venues such as Cinemas, shopping centers, bars, and karaoke were prohibited for months even after the end of lockdown. Swire Properties Limited's second quarter operating statement indicated a significant decrease in retail sales(52.9% year-on-year) of one of the most popular shopping centers in Shanghai, HKRI Taikoo Hui. More than 100 international companies report loss because

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of the lockdown: Shiseido's Sales in China, for instance, plunged 21% year-on-year in the quarter [11].The catering industry's consumer market has shrunk dramatically: One reason is that eating in was banned; another is that customers did not have opportunities to eat in restaurants or buy coffee (bubble tea), for those who regularly ate out during workday lunchtime worked from home and those who eat out for relax is forbidden. Statistics showed that the turnover of Shanghai catering industry turnover in the first half year 2022 decreased by 37.1% year on year, and particularly, the hospitality industry in April decreased by 69% year on year [12]. There were an estimated 373000 close downs in the last 6 months. Counterintuitively, online shopping was influenced. City-wide movement restriction that Gate Pass was required during the lockdown to go out of your residential area or go in Shanghai limited the transportation of goods inside cities; and the block of communication with other regions limited the imports of goods. The takeaway industry was struggling as other industries were on the lockdown as delivery workers and restaurants were all confined.

2.4. Tourism

Tourism was the most affected sector during the lockdown with suspension of transportation, closure of hotels, and travel restrictions put in place. Most tourist attractions, including Disneyland, Oriental Pearl Tower, Zoos, and museums, were shut down. Furthermore, Shanghai authorities suspended cross-provincial tours, causing a 95.7% decrease in the number of travelers. The revenue of the Hospitality business above designated size decreased 32.2% in the first two quarters of 2022 in Shanghai [13]. And a report from Minhang district, Shanghai, shows that travel agency reception numbers in January to May decreased 99% [14]. In 2020, tourism accounted for approximately 6% of total GDP, so the terrible situation in April (also in May and June) would badly influence the whole economy in Shanghai. In addition, the long-term lockdown deprived travelers and consumers' confidence that many of them lost interest in traveling to Shanghai.

3. Regular PCR (Polymerase Chain Reaction Tests) Test

Except those regions with outbreak of covid-19 pandemic (high risk area) that are in lockdown, other regions(medium and low risk areas) in China also started regular mass PCR test. By June 25, approximately half Chinese citizens are required to take regular PCR tests, but the interval time between two required PCR tests varies in different cities: most regions now require a mass PCR test once a week, while some areas still require the test every 48 hours. Residents are not allowed to enter public places, use public transportation, and travel to other regions without doing a PCR test in time. Experts and authorities in China believe regular mass PCR tests can help them to discover and control the covid-19 at the beginning stage, and, therefore, to avoid disastrous lockdown like Shanghai. Though mass PCR testing does help the Chinese government control the pandemic in certain areas before it truly breaks out, the cost can be huge, increasing the government's fiscal pressure.

The cost of mass regular PCR tests includes three parts:

- The cost of covid-19 testing kit(Nucleic acid testing device)
- The cost of labor
- The cost of venues

3.1. The Estimated Cost of Regular PCR Test

The cost of covid-19 testing devices(Nucleic acid testing kit)

Total cost of covid-19 testing devices is equal to cost per test multiple of the frequency of the PCR test. The Frequency of PCR tests can be deduced from the population and required interval time of the area.

$$TC=C*F$$

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TC: total cost of PCR test device
C: cost per test
F:Frequecy

The total number of people who need to take regular PCR tests is measured as half of the total population of China (based on the data showing that about half the population in China is involved in the regions that require mass regular PCR tests), which is 0.7 billion. The average purchase price of a Nucleic acid testing device shown by the Guangdong Provincial Medical Security Bureau is 6.26 yuan(about 0.91 dollars) per person [15].

If each person is required to take a PCR test every 7 days, which is 52times a year, the total cost of the PCR test would be 0.7 billion * 52* 6.26=227.864billion Yuan(33.21billion dollars) a year.

Nevertheless, the situation of testing every seven days is not common. Instead, most cities require residents to take tests every 48 hours or 72 hours. If each person takes the PCR test every 72 hours, the cost of the kit will be 0.7*122*6.26=534.6 billion Yuan(77.92billion dollars) a year; if each person takes the test every 48 hours, the cost would reach 766.5 billion Yuan(117.2billion US dollar).

3.2. The Cost of Labor

Multiple cities plan to build a “15-minutes PCR test service station ”(residents can get PCR tests around their homes and workplace) to meet the need for regular PCR tests. A local media in Hangzhou reported that there are approximately 10,000 PCR test service stations, ensuring that there is one station for every 1200 residents on average. The density of test stations is similar in most regions, so if 0.7 billion people need to take regular mass PCR tests every 48 hours, there have to be 0.7billion/1200/2≈300000 stations in total. Typically three staff [16] members are needed at the same time in one station: one medical staff, one who helps to confirm the identification, and another to preserve order. Scientific crew scheduling suggests that 5 employees at every test station are required to ensure that employees have adequate rest time. By calculation, at least 1500000 people will be engaged in work related to the PCR tests, and their salaries are normally around 5000 Yuan. Therefore, the total cost of labor should be approximately 7.5 billion Yuan (1.09billion).

3.3. The Cost of Venue

As mentioned in the last part, there will be approximately 10000 PCR test service stations. Though most stations are built inside hospitals, metro stations, community centers, office buildings, and open squares with large tents, the PCR kiosks are getting popular. Portable PCR kiosks make mass regular tests more flexible, and provide a more comfortable environment for healthcare workers, especially in cold winter and hot summer. In addition, the kiosk can avoid direct contact with people under tests. However, the cost of PCR kiosks is not cheap. According to Taobao, the biggest and most popular listings one-commerce site in China, the price of PCR kiosks is between 1000 Yuan and 5000 Yuan. Government purchase prices are even higher, reaching 53800 Yuan per kiosk [17]. Though the kiosks are not necessary for every region, the cost still can not be ignored.

3.4. Cost

If the regular mass PCR test is carried out long-term, the cost would be a heavy burden for the Chinese government. Our calculation shows If each person is required to take a PCR every 48 hours, the cost would be around 774 billion a year, 20% of the total medical insurance funds balance in 2021. However, our calculation didn’t include the huge opportunity cost. Is the cost worth it should be considered [18].

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4. Conclusion

The great success of covid-19 controlling the Chinese government is undeniable, but after two years' breakout and under the background that most countries start easing the covid-19 restrictions, China's zero covid policy seems not worth the cost. The government may consider finding a way to gradually lift restrictions on Covid and restart normal lives. However, the sources of essays are mostly second-handed, and also because of the lack of information, some data could be inaccurate. Furthermore, the essay considers very limited factors. Therefore, further research is required and more data should be collected to support Chinese authorities to make final decisions.

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