The Impact of the Covid-19 Epidemic Policies on Healthcare Industry from a Comparison of China and the United States

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Keywords: Covid-19, Healthcare, China and United States

Abstract: The introduction of Covid-19 significantly impacted the world healthcare industry and world economy. However, China and United States implemented completely different policies regarding Covid-19. China adhered to zero-infection policy, while United States considered Covid-19 as a normal flu. This paper investigate the impact on healthcare industry under different national policies regarding the Covid-19. We find that China's "zero tolerance" policy boost the healthcare industry in the short term in 2020 and continue to grow. U.S. policy have some negative impact on the healthcare industry in the short term but will return to normal and grow at a high rate in 2021.

1. Introduction

The Covid-19 outbreak is a global pandemic that infected over 647.9 million people and caused over 6 million deaths by December 16, 2022[1]. Covid-19 has significantly impacted the healthcare industry and the world economy. “With 21 million people, is now under the lockdown…” since the outbreak, China has implemented strict prevention and control measures, adhering to a zero-infection policy and adopting a home quarantine approach to interrupt transmission[2]; in contrast, “Trump administration and its allies have decided to reopen the economy” the U.S. has reacted less dramatically, treating the virus as influenza[3]. This opposing policy has had a different impact on the profits of biopharmaceutical companies in both countries.

By comparing the medical sector and some companies' operating revenues and profits, we find that the Chinese epidemic prevention and control policy has driven rapid growth in the short term (2020) for medical devices, virus testing, and other companies related to controlling the epidemic. At the same time, China's medical facilities are relatively backward compared to the U.S., and the volume of devices is insufficient, promoting the Chinese medical industry's development and driving its continued growth. In contrast, U.S. pharmaceutical companies, which were negatively impacted by the outbreak in the early part of 2020, resumed growth in 2021 and achieved high revenue growth in 2021 for U.S. drug companies such as Pfizer and Johnson & Johnson due to increased global demand for vaccines and antivirals.

There is heterogeneity in the impact of the covid-19 on the healthcare industry in China and the U.S. One reason behind the fact is related to the policy of the outbreak, and another is the business differences between Chinese and U.S. healthcare companies.

China has strict epidemic prevention measures, and the government's free nucleic acid testing for its citizens has driven the growth of reagent manufacturing and testing-related companies in the early stages of the outbreak. According to a Deloitte pharma industry survey, China's weak healthcare facilities exposed many need for improvements during the outbreak[4].

The outbreak did not significantly impact the lax policies and more developed healthcare resources in the U.S. In addition, the U.S. has pharmaceutical companies with greater R&D capabilities that can develop vaccines and antiviral drugs quickly and efficiently. As a result, U.S. pharmaceutical companies' profits grew rapidly in 2021. While China's pharmaceutical companies are in the early

  DOI: 10.25236/ssehr.2022.018

stages of development, the whole industry is in the upward stage of development, so the healthcare industry will continue to grow.

2. Institutional Background

Since the outbreak of the epidemic in 2020, different countries have adopted different response strategies. China and the United States, the world's top two economies, have adopted contrasting policies in response to the epidemic. China has been adhering to a "zero policy," requiring home quarantine in areas with outbreaks. The U.S. has advocated a policy of coexistence with the virus, treating the new strain as a "bigger flu" with no defenses for the spread of the virus.

Since 2020, the epidemic has been changing, with mutations and global spread of the virus leading to changes in mortality and infection rates, a gradual decrease in virulence but an increase in transmission rates, and adjustments in both countries' policies towards the epidemic.

At the beginning of the outbreak in 2020, the virus was virulent and had a high mortality rate. China implemented joint prevention and control measures, promptly sending each case to a hospital and isolating every close contact found under the law, cutting off its transmission chain early on. On the contrary, the U.S. did not react much to the virus; they thought that only developing countries had this problem and that developed countries were less likely to have it. This led to a prolonged response.

In the middle of the epidemic, many countries started mass vaccination. China and the United States are leading countries worldwide in vaccine development and mass vaccination of new vaccines. At the same time, China has adopted a "dynamic vaccination" strategy during mass vaccination. The U.S. has adopted a virus coexistence strategy.

Now that the virus has further evolved into Omicron, the number of infections worldwide has increased over the past three months. However, the higher immunity levels in the vaccinated population have resulted in fewer severe Covid-19 cases and lower hospitalization and mortality rates. China is still adhering to its policy since the early days of the outbreak, with schools closed and employees working from home in areas with infected cases. While schools and businesses in the U.S. remain open, and the CDC recommends wearing masks at the most important times and places, China is still enforcing a strict policy that everyone must wear masks.

3. The overall impact of the covid-19 epidemic on the industry

From the perspective of the healthcare industry, the epidemic's impact on human society will tend to weaken over time. However, it will still significantly impact socio-economic activities and the pharmaceutical industry in the short term.

The healthcare industry contains many segments, each exhibiting very different characteristics and being affected by the epidemic differently. In terms of segmentation, the positive impact of the epidemic is mainly for anti-epidemic companies, and the demand for masks, protective clothing, etc., will maintain steady growth in the coming period.

For the pharmaceutical segment, the Covid-19 epidemic increased the demand of Covid-19-related prescription medicine shortages[5]. Four of the top five global pharmaceutical companies showed varying degrees of revenue decline. For the medical devices segment, the global outbreak of the Covid-19 epidemic in 2020 has boosted the demand for medical devices[5]. As a result, the monitors, ventilators, infusion pumps, and medical imaging-related devices required for life information and support are growing rapidly. As epidemic prevention and control slowed down, the growth in demand for medical devices also slowed down.

While the epidemic has impacted the medical industry, it has also given rise to some long-term trends in several areas: Firstly, the public acceptance of vaccines has increased. People are more aware of the whole respiratory disease through the epidemic, so we observed that the Coronavirus vaccinations has increased significantly in the past two years[6]. Secondly, medical facility infrastructure has seen rapid developed. Over the past two years or so, the epidemic has made the world aware of the obvious shortcomings in healthcare infrastructure, such as the insufficient number of ICU beds and the limited number of anti-infection units, so there is a trend of rapid growth in these segments as well. Finally, the epidemic has also significantly driven global investment in R&D in the antiviral and anti-infective direction, including the mRNA technology behind the Covid-19 vaccine and its industrial development. Two of the top five best-selling pharmaceuticals in 2021 are covid-19 vaccines[7]. The demand for safe and effective vaccines is expected to remain high and sustained globally, including in China.

4. Impact on Chinese companies

4.1 Segmentation analysis

1) Medical Device

The outbreak positively impacted the medical devices sector as a whole. A large number of infected people at the beginning of the Covid-19 epidemic stimulated the demand for medical devices. As a result, supplies such as ventilators, impact devices, gloves, and masks were subjected to a short period of rapid growth in demand and shortage. This phenomenon drove the growth of the medical devices segment in 2020. As shown in Table 1, the Chinese main medical device industry operating revenue growth rate was 63.72% in 2020, nearly four times higher than in 2019. The net profit growth rate is also very rapid, from 23.58% in 2019 to 162% in 2020. As the epidemic gradually gets under control, demand for medical devices slows down, with profits for medical devices falling to 17.28% in 2021, returning to pre-epidemic growth levels, with the slowdown mainly due to a high base in 2020 and significant growth in products related to the Covid-19 epidemic.

The outbreak drives a short-term increase in medical devices in the medical industry, declining in growth after 2021 and maintaining faster growth in 2022 due to increased demand from China's continued dynamic clearance policy and the ebb and flow of the epidemic.

Table 1 China Main financial indicators of the medical device industry (million yuan)[1]

Index	2022Q1	2021A	2020A	2019A
Operating income	99241	245439	206286	125999
Growth rate of operating income	55.91%	18.98%	63.72%	15.07%
Gross Profit Margin	64.20%	58.43%	59.78%	54.17%
Ratio of expenses to sales	10.07%	13.53%6	13.29%	18.71%
Ratio of administration expenses to sales	8.79%	12.59%	11.52%	14.56%
Ratio of R&D expenses to sales	4.82%	6.85%	5.96%	7.15%
Net profit attributable to parent company	37476	66474	56681	21634
Growth rate of net profit attributable to parent company	73.33%	17.28%	162.00%	23.58%
Deduct non net profit	36971	61518	53700	18220
Net profit growth rate	86.50%	14.56%	194.74%	20.64%
Operating cash flow/net profit	65.14%	111.92%	128.04%	113.23%

2) Pharmacy

There are 119 companies in China's pharmaceutical segment as of 2021. At the beginning of the Covid-19 epidemic, pharmaceutical companies delayed the start of production to varying degrees; shutdowns, transportation disruptions, logistics controls, and personnel transportation restrictions significantly impacted the pharmaceutical companies. As shown in Table 2, the growth rate of the Chinese main pharmaceutical industry operating income is -4.65% in 2020. What's more, after gains and losses, overall net profit also declined, from 11,472 million in 2019 to 11,317 million, with an overall downward trend in the pharmaceuticals segment. However, by 2021, the pharmaceutical

[1] data source: wind

segment was less affected by the epidemic, with increased profit and operating growth compared to the pre-epidemic period, with overall operating income increasing by 5.6% to 2019 and 10.8% to 2020.

Table 2[2] Main financial indicators of pharmaceutical industry (million yuan)

Index	2022Q1	2021A	2020A	2019A
Operating income	110193	452636	408565	428473
Growth rate of operating income	3.20%	10.79%	-4.65%	11.11%
Gross Profit Margin	53.18%	53.73%	55.47%	56.41%
Ratio of expenses to sales	24.94%	27.03%	28.73%	30.52%
Ratio of administration expenses to sales	14.819	18.44%	18.57%	15.55%
Ratio of R&D expenses to sales	7.60%	10.56%	10.15%	7.84%
Net profit attributable to parent company	10840	30911	20564	19548
Growth rate of net profit attributable to parent company	-13.13%	50.31%	5.20%	-19.196
Deduct non net profit	9784	20463	11317	14472
Net profit growth rate	8.929	80.81%	-21.80%	-22.05%
Operating cash flow/net profit	60.97%	121.95%	164.15%	175.39%

4.2 Enterprise Analysis

1) Fosun Pharma

Fosun Pharmaceuticals achieved solid growth in the early stage of the epidemic. 2020 achieved operating revenue of RMB 30,307 million, up 6.02% year-on-year, and net profit attributable to shareholders of the listed company of RMB 3,663 million, up 10.27% year-on-year; However, as shown in Table 3, compared to 2018 and 2019, the profit growth rate decreased in 2020 due to the impact of the epidemic. In 2021, Fosun Pharmaceuticals' operating revenue was 39,509 million yuan, an increase of 28.7% year-on-year and profit growth was 29.28%. The two-year comparison shows that the overall industry of Fosun Pharma recovered and achieved a high growth rate in 2021, thanks to the effect of epidemic prevention in China on the one hand and the Chinese government's supportive policies for the pharmaceutical industry on the other.

Table 3 [3]The Main financial indicators of FOSUN PHARMA (million yuan)

Index	2021	2020	2019	2018
Basic earnings per share (yuan)	1.85	143	1.3	1.07
Net assets per share (yuan)	15.29	14.44	12.44	10.92
Capital reserve per share (yuan)	547	5.9	4.74	4.11
Net profit growth rate (%)	29.28	10.27	22.66	13.33
Growth rate of total operating revenue (%)	28.7	6.02	14.72	34.45
Weighted return on net assets (%)	12.39	10.84	11.55	10.26

2) ZFSW

ZFSW is a Chinese vaccine research, development, and production company. In 2020, the company achieved operating revenue of 15.19 billion yuan, up 43.48% year-on-year; net profit attributable to shareholders of listed companies was 3.3 billion yuan, up 39.47% year-on-year; the

[2] data source: http://www.cninfo.com.cn/new/index

[3] data source: http://www.cninfo.com.cn/new/index

company is one of the few pharmaceutical companies positively impacted by the steady growth in sales of its vaccine products, driving the company's performance to steadily improve.

In 2021, the company grew even more rapidly, with operating revenue of 30.637 billion yuan, up 101.68% year-on-year; net profit attributable to the mother of 10.197 billion yuan, up 208.88% year-on-year; basic earnings per share of 6.37 yuan. As the graph 1 and graph 2 shown, we can see that the operating revenue and profit for 2021 are growing very rapidly. This mainly benefited from the Chinese government's policy of requiring residents to be vaccinated with the Covid-19 vaccine.

In the future, China will still have a strict epidemic prevention and control policy. The company will continue to grow as the vaccine demand will still increase in a short period as the virus varies unpredictably.

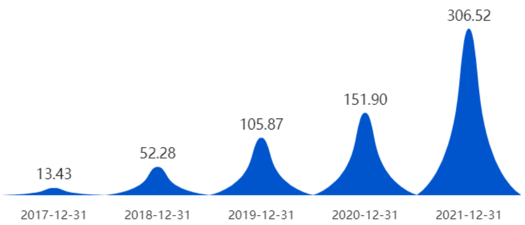

Figure 1: Operating Revenue of ZFSW

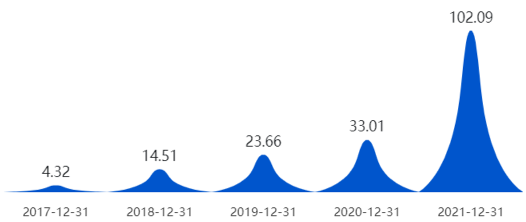

Figure 2: Profit of ZFSW

source:http://www.cninfo.com.cn/new/index

3) Mindray

Mindray is one of the companies that benefited the most from the outbreak in China, with sales increasing as the Chinese government encouraged hospitals to expand their purchases of medical devices due to the problems with medical facilities and public health in China revealed by the outbreak. Myriad Medical's 2020 revenue was 21.026 billion yuan, and, as shown in Table 4, the growth rate was 27%. Myriad Medical's 2020 total profit was 7.438 billion yuan, and, as shown in Table 4, growth rate was 42.24%; in 2020, with the global outbreak of the Covid-19 epidemic, the life information and support business of monitors, ventilators, infusion pumps and the demand for portable color ultrasound and mobile DR of medical imaging business grows significantly, which has a particularly significant pulling effect on the life information and support business. As Graph 3 shown, the most contributor of the increasing operating income is the medical device industry. These businesses were driving Myriad Healthcare's continued growth in 2020. In 2021, as the virus becomes less virulent and people gradually build up herd immunity, Myriad Medical's profit growth rate declines. However, as Myriad Medical continues to penetrate international markets, the business will continue to grow in the future.

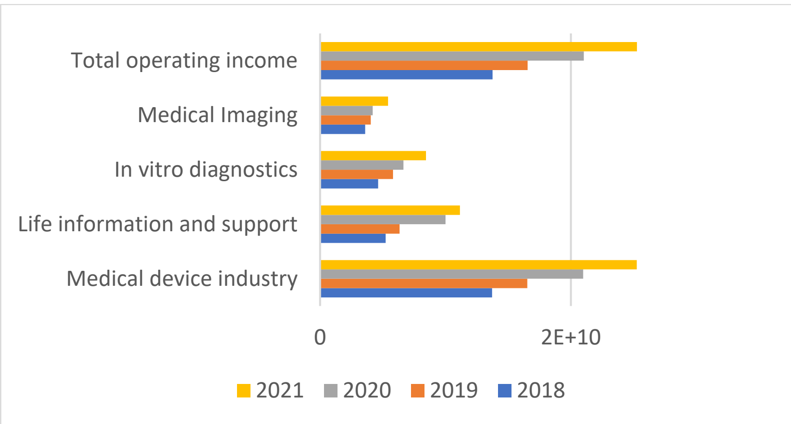

Figure 3: Main financial indicators of Mindray

Data source: http://www.cninfo.com.cn/new/index

Table 4[4] The Main financial indicators of Mindray (million yuan)

Index	2021	2020	2019	2018	2017
Basic earnings per share (yuan)	6.59	5.48	3.85	3.34	2.37
Net assets per share (yuan)	22.17	19.15	15.29	12.47	6.05
Capital reserve per share (yuan)	671	671	672	672	236
Net profit growth rate (%)	20.18	42.24	25.85	43.65	61.78
Growth rate of total operating revenue (%)	20.18	27	20.38	23.09	23.72
Weighted return on net assets (%)	31.92	32.29	27.91	42.16	47

4) KingMed Diagnostics

China's epidemic prevention policy requires all people to enter places such as public places and offices only if they have negative nucleic acid test results, which has driven the development of medical testing companies. 2020 Covid-19 epidemic outbreak made KingMed directly become the beneficiary company of the epidemic, and in 2020, the company's revenue scale exceeded 8.2 billion yuan, and, as shown in Table 5, the growth rate was 56.45%; net profit attributable to the mother exceeded 1.5 billion yuan, and, as shown in Table 5, the growth rate was 275.24%. Data show that 11.5 billion Covid-19 nucleic acid tests have been performed in China since the outbreak of the Covid-19 epidemic in 2020, as of the end of April 2022. This huge market demand makes the company perform brightly in 2020.

In 2021, as the outbreak is brought under control in China and as more testing companies enter the market, the company's operating and profit growth rates slow down. However, nucleic acid testing remains strictly required in all regions of China, and this continued demand for nucleic acid testing provides policy support for the company's continued growth.

Table 5[5] The Main financial indicators of KingMed Diagnostics (million yuan)

Index	2021	2020	2019	2018	2017
Basic earnings per share (yuan)	480	3.29	0.88	0.51	0.46
Net assets per share (yuan)	13.54	8.24	4.97	4.16	3.72
Capital reserve per share (yuan)	2.96	2.01	187	1.84	1.82
Net profit growth rate (%)	47.02	275.24	72.44	23.77	10.86
Growth rate of total operating revenue (%)	44.88	56.45	16.44	19.35	17.7
Weighted return on net assets (%)	44.2	50.06	19.23	12.95	14.52

Data source: http://www.cninfo.com.cn/new/index

5. Impact on U.S. corporate

1) Pfizer

The ongoing two-year outbreak has significantly impacted Pfizer, generating profits for Pfizer.

In the early days of the Covid-19 epidemic, Pfizer was negatively impacted in the short term with a downward trend in sales and sales profit. As shown in Table 6, the net profit declined from 16,272,000 dollars in 2019 to 9,616,000 dollars in 2020, a 41% year-over-year decline, which is primarily caused by lower demand of products in China and disruptions to wellness visit for patients in U.S [8].

In 2021, Pfizer's success in developing Covid-19 drugs brought the company rapid profit growth. As shown in Table 6, 2021 total revenue was $81.3 billion, compared to $41.6 billion in 2020, nearly doubled. Such impressive growth comes mainly from the Covid-19 mRNA vaccine Comirnaty and

[4] data source: http://www.cninfo.com.cn/new/index

[5] data source: http://www.cninfo.com.cn/new/index

the Covid-19 oral drug Paxlovid, which, if shaved off, would leave revenue at $44.4 billion, up only 6% year-over-year. Net profit of $22 billion is more than twice the net profit of $9.2 billion in 2020.

With Pfizer representing the strong R&D strength of U.S. pharmaceutical and biological R&D companies, they will use their strengths to develop vaccines or antiviral drugs. The prevention and control of new coronaviruses will remain a topic of global concern in the future, and the head pharmaceutical companies in the U.S. will still see continued growth.

Table 6[6] The Main financial indicators of Pfizer (million dollar)

Pfizer	2021	2020	2019	2018
Total Revenue	81,288,000	41,908,000	51,750,000	53,647,000
Net Income Common Stockholders	21,979,000	9,616,000	16,272,000	11,152,000
Growth rate of Net Income	129%	-41%	46%	

2) Johnson & Johnson

Compared to Pfizer, Johnson & Johnson was less affected by the epidemic. Johnson & Johnson's business covers more segments, including pharmaceuticals, medical devices, and consumer healthcare, and different segments were affected by the epidemic differently. As shown in Table 7, 2020 Full-year revenue of $82.6 billion, up 0.6% year-over-year, was impacted by the epidemic 2020 epidemic's slower growth rate has slowed. Net income declined 2.68% year-over-year to a profit of $14.7 billion. The decline in demand for Johnson & Johnson's medical devices became the main reason for the decline in profits, with restrictions imposed on surgeries worldwide in the early days of the coronavirus outbreak leading to a reduction in Johnson & Johnson's use of medical devices. And this segment of the market is recovering well as more people return to hospitals and doctors to undergo these important medical procedures.

Looking at the performance of Johnson & Johnson and Pfizer since the outbreak, both companies are large multinational companies whose performance is partly influenced by local policies and partly by the Asia Pacific region, including China, which is especially a major part of their business segments.

Johnson & Johnson and Pfizer are involved in different businesses and have different performances. Both were negatively impacted by the epidemic in 2020, with negative profit growth. The impact of the epidemic showed negative profit growth. As both companies gradually recovered from the epidemic and seized the opportunity to develop new businesses, growth rates rebounded very high in 2021, mainly due to the squeezed demand in 2020. As the demand from the epidemic is gradually released, the growth of both companies will slow down after 2022.

Table 7[7] The Main financial indicators of Johnson& Johnson (million dollar)

Johnson & Johnson	2021	2020	2019	2018
Total Revenue	93,775,000	82,584,000	82,059,000	81,581,000
Net Income Common Stockholders	20,878,000	14,714,000	15,119,000	15,297,000
Growth rate of Net Income	41.89%	-2.68%	-1.16%	
Growth Rate of Total Revenue	13.6%	0.6%	0.6%	

3) Medtronic

In medical devices, Medtronic's performance also declined in 2020; As shown in Table 8, Medtronic's global revenue for the fiscal year 2020 was $28.913 billion, compared to the previous fiscal year's revenue of $30.557 billion, a decline of 5%. The impact of the epidemic, both the postponement of elective surgery and the suspension of medical device sales visits by hospitals, has

[6] data source:https://finance.yahoo.com/

[7] data source: https://finance.yahoo.com/

led to a sharp decline in sales of Medtronic's medical devices.

For the fiscal year 2021, Medtronic posted revenues of $30.117 billion, reporting a 4% increase in revenues. 2022, the company's profits grew rapidly, returning to pre-epidemic levels.

Data source: http://www.cninfo.com.cn/new/index

Table 8[8] The Main financial indicators of Medtronic (million dollar)

Medtronic	2022	2021	2020	2019
Total Revenue	31,686,000	30,117,000	28,913,000	30,557,000
Net Income Common Stockholders	5,039,000	3,606,000	4,789,000	4,631,000
Growth rate of Net Income	40%	-25%	3%	
Growth Rate of Total Revenue	5%	4%	-5%	

6. Comparison of China and the United States

Companies in both the Chinese and U.S. healthcare industries were negatively impacted by the epidemic in 20 The epidemic negatively impacted companies in both the Chinese and U.S. healthcare industries in 2020, and the global outbreak had an all-encompassing impact on the healthcare industry chain. From the upstream supply of raw materials to the downstream use of pharmaceuticals and devices, nearly all pharmaceutical companies in China and the United States will experience slower business and profit growth in 2020.

The U.S. and Chinese healthcare industries are heterogeneous in how they are affected by the persistence of the epidemic and the areas affected.

In terms of long-term impact, the epidemic highlighted short-term deficiencies in China's healthcare resources and medical facilities. After the epidemic, the Chinese government introduced several policies to support the development of the healthcare industry, including providing loans to hospitals and encouraging hospitals to purchase medical devices. By 2021, U.S. companies appeared to be soaring. There are two reasons behind this. On the one hand, the recovery in demand from the 2020 epidemic is squeezing the strong research capabilities of U.S. companies. Pfizer has developed vaccines and drugs to treat viruses. Johnson & Johnson also released vaccines and other products related to the epidemic. Global governments are encouraging residents to vaccinate to establish an immune barrier, so U.S. companies saw a spike in profits in 2021.

Different epidemic prevention policies in China and the United States have different impacts on different segments. China's zero-infection case clearance policy is driving the growth of medical testing companies, represented by Goldcorp Medical, whose profits are growing very rapidly in 2021. In addition, the Chinese government's universal vaccination program is driving profit growth for vaccine companies, with vaccine R&D and production companies represented by Jiffy Biologicals also positively impacted by the outbreak. The OMICRON virus is currently sweeping the world, and a new wave of infections in China, in particular, will drive continued profit growth for vaccine companies.

In summary, China's "zero tolerance" macro policy for new infections is expected to boost the healthcare industry in the short term (2020) and continue to grow. U.S. policy will have some impact on the healthcare industry in the short term but will return to normal and grow at a high rate in 2021.

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