International Invention of Scientific Journal

Available Online at http://www.iisj.in
eISSN: 2457-0958
Volume 04 | Issue 03 | March, 2020 |

Analysis of China's Novel Corona virus Pneumonia Epidemic Based on Previous PHEIC Events

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Received date 04/03/2020 **, Accepted** 17/03/2020 **, Published Date** 19/03/2020

Abstract: The novel corona virus pneumonia epidemic has not only affected China's economy but also the global economy, and the impact is expanding continuously as the epidemic continues. The novel corona virus pneumonia is the sixth PHEIC event announced by WHO. Through the summary of the previous 5 PHEIC events, the impact of the PHEIC events on the economy is analyzed, and the impact of the new corona virus pneumonia on China's economy is analyzed.

Keywords: ***PHEIC; Novel corona virus pneumonia epidemic; Economic impact***

1. Introduction

The novel corona virus epidemic has spread rapidly in China since the beginning of 2020, and the number of infected persons has been increasing. On January 30, 2020, the World Health Organization (WHO) convened the second conference on novel corona virus acute respiratory disease in Geneva, announcing that this event has constituted a "public health emergency of international concern"(PHEIC).The novel corona virus was named 2019-nCoV by the World Health Organization (WHO).Since the establishment of the PHEIC mechanism in 2005, in addition to the newly listed new corona virus epidemic, WHO has announced a total of 5 PHEIC events, namely the H1N1 influenza virus epidemic in 2009, wild-type polio virus epidemic in 2014, the Ebola epidemic in West Africa in 2014, the Zika virus epidemic in Brazil in 2016, and the Ebola virus epidemic in the Congo (DRC) in 2019.The epidemic of novel corona viruses (2019-nCoV) is still spreading globally, and the related effects are still ongoing. Through the summary and review of previous PHEIC events, we can better assess and face the impact of this novel corona virus epidemic.

2. H1N1 influenza virus epidemic in 2009

2.1 Outbreak process

On March 17, 2009, the influenza was first diagnosed in Mexico, and a small cluster infection occurred in Mexico on April 12.The first case was confirmed in the United States on April 15. It broke out in Texas and then in other countries. On April 28, suspected cases of influenza were found in Asia Pacific region, such as South Korea and Thailand. Since May 11, there have been cases in China, Malaysia and Japan, and the

number has increased. According to the data released on the official website of the CDC, from April 2009 when WHO declared the A-H1N1 virus epidemic as public health emergency of international concern (PHEIC) to April of the next year, 60.8 million A-H1N1 influenza cases are expected to occur in the United States, of which 274,304 are hospitalized and 12,469 are dead.By the end of October 2009, there was a second outbreak of influenza A-H1N1 in the United States. At that time, WHO gave up the count of confirmed cases after recording 620,000 confirmed cases and 8,000 deaths.On August 10, 2010, WHO announced to lift the PHEIC of influenza A-H1N1, which lasted for nearly 16 months, and 186 countries were infected.

2.2 Impact of the epidemic on the economy

The epidemic has had an impact on Mexico's economy. It is estimated that Mexico's tourism industry lost about $2.8 billion due to the epidemic. According to the World Bank, air travel decreased by 80% and tourism revenue decreased by 43% during the epidemic period. Because influenza A-H1N1 is a highly contagious acute respiratory disease of pigs, both pork production and pork exports in Mexico are affected. Several studies have suggested that the epidemic has only a short-term impact on Mexico's economy. At the end of 2009, the income of most tourist attractions recovered, and the overall economic situation has improved. In 2009, the United States economy is in the low period after the subprime crisis. During the influenza high outbreak period, the working hours per week decreased, but it was more like the impact of the early subprime crisis than the epidemic.Overall, the influenza doesn't seem to have much impact on business start-ups and jobs.

3. Epidemic situation of wild poliovirus in 2014

3.1 Outbreak process

Between 2013 and 2014, the number of wild-type poliovirus (WPV) infections worldwide surged by 86%, among them, the number of cases of WPV infection in Pakistan increased by 60%, and then WPV infection spread to five countries that had previously declared polio eradication.As of May 20, 2014, a total of 82 cases of WPV infection were reported worldwide, compared with only 34 in the same period in 2013.In this regard, WHO announced on May 5, 2014 that the transmission of wild-type polio virus triggered PHEIC.Prior to PHEIC's announcement, wild-type polio virus had spread to multiple countries, including Pakistan and Afghanistan inthe Central Asia, including the Syrian Arab Republic and Iraq in the Middle East, including Cameroon and Equatorial Guinea in the Central Africa.

As of December 11, 2019, the number of wild poliovirus cases worldwide has increased sharply, reaching 113, compared with 28 in the same period in 2018, which means that the world has not achieved significant success to reverse this trend. In addition, there have been multiple outbreaks of vaccine-derived poliovirus in four WHO regions: Africa, the Eastern Mediterranean, Southeast Asia and the Western Pacific. Since September 16, 2019, seven new countries, Chad, Côte d'Ivoire, Malaysia, Pakistan, Philippines, Togo and Zambia, have reported outbreaks of the epidemic. Till today, the status of PHEIC against wild-type poliovirus has not been lifted, and the WHO announced on December 11, 2019 that it will continue to extend PHEIC.

3.2 Impact of the epidemic on the economy

Although various countries have not announced the economic loss caused by the disease, if children are infected, paralyzed or even died on a large scale, it will cause significant impact and burden on multiple families, and then cause significant indirect economic losses to the country.

4.Ebola epidemic in West Africa in 2014

4.1 Outbreak process

On March 12, 2014, the first human case of Ebola virus infection in recent years was found in Guinea, Africa On March 29, the first Ebola case in Liberia was found near the border between Guinea and Liberia. On May

23, 2014, the epidemic spread to Conakry, the capital of Guinea with a population of 2 million. On August 8, 2014, the World Health Organization issued a circular saying that as of August 6, Guinea, Liberia, Sierra Leone and Nigeria had reported a total of 1,779 cumulative cases caused by the Ebola virus, of which 961 died, and declared the Ebola epidemic as a "public health emergency of international concern"(PHEIC).As of October 14, 2014, there were 9,216 confirmed, probable and suspected cases in Guinea, Sierra Leone, Liberia, Nigeria, Senegal, Spain and the United States, of which 4,555 died. Until January 14, 2016,WHO announced the end of the Ebola epidemic in West Africa. As of May 8, 2016, 28,646 cases and 11,323 deaths were reported, with a mortality rate of 39.5%.

4.2 Impact of the epidemic on the economy

The three most affected countries in West Africa are Liberia, Guinea and Sierra Leone. Liberia's real GDP growth fell from 8.7% in 2013 to 0.7% in 2014. Guinea's real GDP growth in 2015 was 0.1%, compared with Ebola's previous forecast of 4.0%.Due to the increase of iron ore production, Sierra Leone's GDP grew by 4.6% in 2014. Due to the Ebola epidemic, the GDP growth of non-iron ore in 2014 slowed to 0.8% from 5.3% in the previous year. Overall, Guinea, Liberia and Sierra Leone lost $2.2 billion in GDP in 2015 as a result of the outbreak. The biggest losses are in the private sector, agricultural production and trade.

The Ebola virus epidemic and the decline in commodity prices has had a negative fiscal impact on the three countries, resulting in a decline in revenues, an increase in Ebola related spending and a widening deficit. The decline in private and foreign investment has forced the government to step in. The decline in investor confidence has put pressure on budget shortfalls in all Ebola virus epidemic affected countries. The three core countries have a funding gap of more than $600 million in two years. In 2015, the deficit was 9.4% in Guinea, 8.5% in Liberia and 4.8% in Sierra Leone. The increase of financial pressure finally leads to the implementation of fiscal tightening policy.

5.Zika virus epidemic in Brazil in 2016

5.1 Outbreak process

In April 2015, Zika fever caused by Zika virus spread on a large scale in Brazil, spread to the Americas, several Pacific Islands and Southeast Asia, and continued to spread to 59 countries and regions around the world.On February 18, 2016, WHO announced the spread of Zika virus as a "public health emergency of international concern"(PHEIC), based on the wide range and deep impact of the virus.In March of the same year, Brazil's Health Ministry announced that there were 91,387 suspected cases of Zika in Brazil. By May 16, the number of suspected cases had increased to 138,108. In July 2016, the number of people infected with Zika virus in Brazil fell sharply to 700, most of whom have been cured. WHO announced the removal of PHEIC status of Zika virus on November 18 of the same year. The event lasted for 10 months, during which 1.5 million cases were confirmed in Brazil, and more than 4000 pregnant women infected gave birth to microcephaly.

5.2 Impact of the epidemic on the economy

In 2015-2016, Brazil's economic growth declined significantly, especially consumption and investment, but to some extent, it was related to the sluggish global economic growth and low commodity prices. Johns Hopkins Business School estimates that Latin America and the Caribbean region will suffer $7 billion to $18 billion in economic losses due to the epidemic from 2015 to 2017, about 0.05% - 0.12% of GDP. The tourism industry is estimated to have lost $ 6-9 billion in 2015-2017, the worst region is in the Caribbean.

6. Ebola epidemic in Congo (DRC) in 2019

6.1 Outbreak process

The outbreak of Ebola virus epidemic in Congo (DRC) in 2018 is the second major outbreak of Ebola virus in

West Africa after that in 2014.On August 1, 2018, the Ministry of Health of Congo (DRC) announced a new round of Ebola virus epidemic in North Kivu province. Since then, the number of patients has increased every week. As of January 28, 2020, the government of Congo (DRC) has reported 3,421 cases of which 2,242 were dead, with a mortality rate of more than 65.5%.In July 17, 2019, WHO realized the seriousness of the epidemic in Congo (DRC) and announced that the Ebola virus epidemic was transmitted to a "public health emergency of international concern"(PHEIC). At that time, the virus had spread to Goma, the population of the city was more than 2 million, and it was located at the junction of 4 countries, namely Congo (DRC), Uganda, Rwanda and Burundi. The situation was not optimistic. At a press conference held on February 12, 2020, WHO Director-General announced that the Ebola virus epidemic in Congo (DRC) still constitutes PHEIC, and said that at present, there are positive signals for the control of the epidemic in the eastern part of the Congo (DRC).

6.2 Impact of the epidemic on the economy

The mining industry in Congo (DRC) is probably the most affected in the Ebola virus epidemic. The Congo (DRC) is one of the largest copper and cobalt producing countries in the world. The mining industry is an important part of the economy of Congo (DRC). With the increase of the number of people who died of Ebola virus epidemic, the decrease of the number of workers and the restriction of travel and trade, the income from mining industry in Congo (DRC) may be negatively affected.

7.Analysis of the impact of major epidemic on economy

From the previous PHEIC events, the H1N1 influenza virus epidemic has the widest impact, almost affecting the world, and the number of infected people has reached more than 50 million Brazil Zika virus epidemic is also more, although it is not fatal, but the probability of pregnant women infected with small head deformity increased significantly, resulting in the increase of neonatal deaths Although the number of people infected in the two Ebola virus epidemics are relatively small, the mortality rates of those infected are very high, especially in the Congo (DRC) Ebola virus epidemic in 2019, the mortality rate is as high as 65%. At present, novel coronavirus epidemic(2019-nCoV) is relatively less in number of infected persons compared with the 5 epidemics, and the death toll and mortality rate are relatively low.

Table 1 overview of five PHEIC events

epidemic	Listed in PHEIC time	Main affected countries	Number of infected persons	death toll	Mortality
H1N1 influenza virus epidemic	April-June, 2009	Mexico, US, Europe, China, etc	Over 50 million	About 20,000	<0.01%
wild polio virus epidemic	May 2014 to present	Pakistan, Afghanistan, Nigeria	525[a]	-	-
Ebola virus epidemic in West Africa	August 2014 -March 2016	Guinea, Liberia, Sierra Leone	28,646[b]	11,323[b]	39.5%
Zika virus epidemic in Brazil	February-November, 2016	Brazil, Colombia	More than 1.5 million	-	-
Ebola virus epidemic in Congo (DRC)	June 2019 to present	Congo (DRC)	3,421[c]	2,242[c]	65.5%

[a]Cumulative number of infected since 2014;[b]Statistics as of May 8, 2016;[c]Statistics as of January 28, 2020.

Source: WHO, national health agencies

From the perspective of the impact of the previous five epidemics on the economies of all countries, in the year of the outbreak and the subsequent epidemics period, the economic growth of the affected countries has declined in varying degrees, especially those countries with weak economic base and single industrial structure are relatively affected by the epidemic. Take Sierra Leone as an example. Before the outbreak of the Ebola virus epidemic in West Africa in 2014, Sierra Leone's GDP maintained double-digit growth for two consecutive years, making it one of the fastest growing countries in the world. However, due to the dependence of Sierra Leone's economy on mineral exports, especially iron ore exports, after the outbreak of the Ebola virus epidemic, many local mines were closed, many foreign investments were withdrawn, and the economic and social development was greatly affected. In 2015, Sierra Leone's GDP shrank by more than 20% compared with the previous year. Although the economy recovered growth in the following years, the economic growth rate was far lower than before the epidemic. On the other hand, for countries with large economic volume, the outbreak of epidemic is not the main reason for the decline of economic growth, but it plays a role in boosting the momentum. In 2009, the sharp recession of Mexico's economic growth was mainly affected by the global financial crisis. However, the H1N1 influenza virus epidemic in that year made Mexico's tourism industry suffer heavy losses, with economic losses up to tens of billions of dollars, further aggravating the economic recession in Mexico. From the perspective of the impact of the epidemic on the regional economy and the global economy, except that the H1N1 influenza virus epidemic in 2009 almost spread to the world, most of the epidemic has a certain regional nature, and the impact on the regional economy is significantly higher than the impact on the global economy. Take the Ebola virus epidemic in West Africa in 2014 as an example. Before the epidemic, the economy of sub Saharan Africa maintained a long-term rapid growth, which was significantly higher than the global economic growth. However, after 2015, the impact of the Ebola virus epidemic on the regional economy continued to show. The regional economic growth dropped significantly and remained depressed in the following years. It was not until 2019 that the regional economic growth again exceeded the global economic growth. In addition, the direct impact of the epidemic on the economy is usually significantly less than the indirect impact. According to World Bank estimates, during the 2009 H1N1 influenza virus epidemic, the economic impact of fear and evasion accounted for 80% - 90%.

During the outbreak of the epidemic, the sovereign credit status of some countries has been affected. Brazil, Mexico, Congo (DRC) and other countries have been downgraded by most international rating agencies shortly after the outbreak of the epidemic. The main reason is not the outbreak of the epidemic, but the deterioration of their own economic and financial situation, political turmoil and other factors, but the epidemic undoubtedly increased the downward pressure on their economies, especially for countries with heavy debt burden are even worse. Take Brazil as an example. Before the outbreak of Zika virus epidemic in 2016, Brazil's economy had fallen into negative growth due to the decline of international commodity prices. International rating agencies have adjusted Brazil's sovereign rating outlook to "negative" or "focus on downgrade". The outbreak of Zika virus epidemic further increased the downward pressure on Brazil's economy, especially on the development of Brazil's tourism industry, and Brazil's economy declined for two consecutive years. In the context of continuous economic recession, the Brazilian government's financial situation further deteriorated, and the debt level continued to rise, which eventually led to the international rating agencies to reduce Brazil's sovereign credit rating. Although the Zika virus epidemic is not the main

reason for the reduction of Brazil's sovereign credit rating, its impact on Brazil's sovereign credit status cannot be ignored.

8. Novel corona virus pneumonia's impact on China's economy

Compared with the Ebola virus epidemic in West Africa and Zika virus epidemic in Brazil, 2019-nCoV showed high infectivity and low mortality In addition to 2019-nCoV, other incubation periods are not infectious, which also shows the high complexity of 2019-nCoV;2019-ncov has the strongest infectivity and the highest R0. The current research results show that R0 is 3.8-6.7. Due to its high infectivity, it has the largest number and the widest range of infections In terms of the duration, most of the epidemics last for about two years, and the government's response measures have an important impact on the duration of the epidemic. Compared with global major PHEIC epidemic, it will take a long time for 2019-ncov to be fully controlled. The direct impact of novel corona virus epidemic as PHEIC is mainly concentrated in restaurants, tourism and transportation industries in the short term. But if the follow-up epidemic lasts for a long time or the speed of external spread does not decrease, the downward pressure on China's economy will further increase. In the short term, the impact of the epidemic on China's economy will mainly focus on catering, tourism and transportation. For the catering industry, in the past, the catering revenue during the Spring Festival accounted for about a quarter of the annual catering revenue. However, due to the impact of the epidemic, a large number of restaurants were forced to suspend business, and also faced with the pressure of employees' salaries and rents, the industry's prospects are not optimistic In terms of tourism, according to previous estimates of major tourism platforms, 450 million people will travel during the long Spring Festival holiday this year. However, with the epidemic continuing to spread, the tourism business will be shut down in an all-round way, and a large number of refunds from consumers will have a serious impact on the cash flow of tourism enterprises. In the foreseeable two or three months, the willingness of consumers to travel will also be significantly reduced, and the team tourism recovery time will be significantly reduced It is also hard to predict The period of "Spring Festival transportation" was originally the peak period of profit for the transportation industry, but due to the spread of the epidemic, the travel demand of passengers decreased significantly. In response to the epidemic, some cities took measures such as closing the city and closing the roads. The number of passengers sent by railways, roads, waterways and civil aviation decreased greatly, especially after the festival, the number of passengers decreased about 70%.In addition to these three industries, film and television entertainment, construction, real estate, finance and other industries are expected to be affected to varying degrees, while the medical industry is likely to be benefited. Because the main industry affected by the epidemic is service industry, which is the industry with the most employment in China, the epidemic may lead to the rise of unemployment rate in the short term. On the other hand, in a short period of time, the epidemic will lead to the insufficient production of consumer goods, and the blocking of transportation and logistics in some areas will aggravate the pressure on the supply of consumer goods. At the same time, the spread of the epidemic will also increase the human cost of transportation and logistics. In addition, some residents have panic buying demand, and the price is likely to rise in a short period of time. If the follow-up epidemic lasts for a long time or worsens rapidly, it may have a greater impact on the real economy, especially on consumption, investment and exports. In terms of consumption, the Spring Festival used to be the traditional peak season of consumption, but affected by the continuous spread of the epidemic and the sharp reduction of residents' going out, the consumption demand for catering, tourism, transportation and other related industries has been greatly reduced, and this situation may last for a period of time In terms of investment, affected by the postponement of holidays, production activities in manufacturing, infrastructure and other industries

basically stagnated in the short term, and the continuous spread of the epidemic will also have a certain negative impact on the investment willingness of enterprises In terms of export, as many countries have implemented travel bans on China, cross-border tourism based service trade is expected to be greatly affected, while goods trade will be affected by the cancellation of exhibitions and export restrictions.

Generally, the impact of the epidemic on China's real economy may gradually appear from February. If the epidemic can be effectively controlled at the beginning of the second quarter, economic data may rebound significantly, but the possibility of annual economic growth falling below 6% is still great. If the epidemic situation worsens or lasts for a long time, consumption, investment and export will be greatly affected. There may also be a vicious circle of "consumption and investment decline → consumer and enterprise confidence damaged → consumption and investment further decline", further increasing the economic downward pressure.

As the second largest economy in the world, China's GDP in 2019 has reached 100 trillion yuan. The impact of this epidemic on the macro-economy is short-term, and the impact on China's medium and long-term economic development is limited. The medium and long-term development of China's economy is mainly determined by its internal fundamentals. Although China's economy is currently facing problems such as the decline of population dividend and the difficulty of maintaining high-speed growth, the basis for China's long-term sound and high-quality development has not changed. Coupled with the expansion of counter cyclical macro-control efforts is expected to increase, it is unexpected that China's economy will decline significantly in the future. In the latest world economic outlook report, the IMF also raised China's economic growth forecast by 0.2% to 6% in 2020, expressing its confidence in China's economic development.

Acknowledgements: The study was supported by “Investigation and countermeasures of social resilience-based economic resilience under the impact of new crown pneumonia (Grant No.YNUXG-024)”.

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