Journal of Sociology and Ethnology (2024)
Clausius Scientific Press, Canada

DOI: 10.23977/jsoce.2024.060319
ISSN 2616-2318 Vol. 6 Num. 3

Transformation of International Order and Global Governance Challenges in the Post Epidemic Era

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Keywords: International Order Transformation, Global Governance, Impact of the Epidemic, COVID-19 Pandemic

Abstract: Since the outbreak of COVID-19, the global political, economic, and social structure has undergone tremendous changes, and the traditional international order is facing unprecedented challenges. The epidemic has exposed many global governance issues, such as insufficient cooperation and inadequate response capabilities among countries. This can be realized that relying solely on the power of one country is difficult to cope with global crises. Four experiments were conducted to analyze in detail the impact of the epidemic on the international order and global governance. The political stability index of country A has decreased from 0.75 before the epidemic to 0.26. The growth rate of Gross Domestic Product has returned to 3.2%. The unemployment rate has dropped to 6% by 2024. From the experimental data conclusion, it can be seen that although the short-term impact is significant, strengthening global governance and international cooperation is crucial.

1. Introduction

Since the outbreak of COVID-19 in 2020, the global political, economic, and social structure has undergone tremendous changes, and the order of many countries is also facing unprecedented challenges. COVID-19 has exposed many problems in the global governance system, such as insufficient international cooperation and inadequate response capabilities. The emergence of these issues has made realize that it is difficult for a single country to cope with global crises alone. Therefore, it is necessary to study the transformation of the international order in the post pandemic era and its impact on global governance.

In this article, four experiments are conducted to analyze in detail the challenges faced by the transformation of the international order and global governance in the post pandemic era. In the article, the shortcomings in the current governance system are pointed out, and suggestions to strengthen international cooperation and governance capabilities are proposed. It is hoped that these experimental conclusions can provide valuable references for policymakers and promote the improvement and development of the global governance system.

The structure of this article is as follows: the first part is the introduction, which introduces the research background and significance. The second part is a literature review, which briefly reviews

the relevant research results. The third part is experimental design and methodology, which provides a detailed description of the design and implementation process of the four experiments. The fourth part is the results and discussion, analyzing and discussing the experimental results. The last part is the conclusion and recommendations, summarizing the research findings and proposing policy recommendations. Through these contents, this article aims to comprehensively demonstrate the transformation of the international order in the post pandemic era and its challenges to global governance.

2. Related Works

Many scholars have conducted research on the international order and global governance issues in the post pandemic era. Meng Xin pointed out that public health events such as bird flu, Ebola, SARS and COVID-19 have seriously threatened human health and posed challenges to global public health security, which has become a non-traditional security problem facing the international community. When dealing with large-scale public health incidents, countries should not only do a good job in their own prevention and control, but also follow the consensus of a community with a shared future for mankind, actively engage in international cooperation, and jointly maintain public health safety [1]. As an important international public good, global cooperation in epidemic prevention and control not only faces the balance between infectious disease prevention and control and economic and social development, but also the challenge of participating in international cooperation mechanisms. Liu Dehai applied the theory of sequential reciprocity to analyze the internal mechanisms, main obstacles, and conditions for achieving win-win cooperation in infectious disease prevention and control international cooperation in different contexts [2]. According to the report of the Institute of Health Measurement and Evaluation, as of May 31, 2022, the reported death toll of COVID-19 is 6.9 million, and the estimated death toll is 17.2 million. The report by Sachs J D relied on estimates from the Institute of Health Metrics and Evaluation of the number of infections and deaths [3]. Two years ago, COVID-19 broke out in China and spread rapidly around the world, causing great harm. Mylonas H pointed out that the effects of large-scale deaths, economic contraction, supply chain disruptions, education losses, and forced isolation are difficult to fully manifest in the short term [4]. With the launch of the 2019 coronavirus rescue fundraising work, donors, volunteers, and charitable organizations can play an important role in providing much-needed support and assistance. Bin-Nashwan S A aimed to gain a deeper understanding of the internal and external motivations that drive people to participate in community fundraising activities through empirical research, in order to better understand the reactions of donors [5]. Bendell J's interdisciplinary review on international cooperation on social and environmental change laid the foundation for replacing sustainable development as the dominant framework in an era of increasing crises and disasters. He purposefully explored the latest research in multiple thematic areas based on his years of work in related fields since the Rio Earth Summit over the past 30 years [6]. However, existing research is mostly limited to a specific field and lacks a systematic analysis of the overall transformation of the international order, failing to fully reveal the profound impact of the epidemic on global governance.

Some researchers have adopted quantitative analysis methods to analyze the impact of the epidemic on the international order through statistical data and model predictions. For example, the unprecedented scale of supply chain disruption caused by the COVID-19 is due to multiple factors intertwined: the sudden rise in demand for some products, unexpected changes in demand points, supply shortages, logistics crises, and the unprecedented rapid recovery of major economies. Pujawan I N depicted the changes that may occur in world supply chain planning and management after the pandemic [7]. Espitia A studied the impact of COVID-19 on trade using monthly classified

trade data from 28 countries and multiple trading partners from the onset of the epidemic to June 2020 [8]. The COVID-19 highlights the importance of supply chain risk management to maintain business performance and competitiveness under the "new normal". Hohenstein N O explored the impact of the pandemic on the supply chain and studied how logistics service providers can leverage their experience to improve resilience and better respond to future major disruptions [9]. Hald K S analyzed the relationship between the COVID-19 pandemic and its impact on the global supply chain and its management [10]. However, although these methods have achieved certain results in specific fields, they often overlook the interaction and comprehensive impact of international politics, economy, and society. To make up for this deficiency, this article adopted a multi-level analysis method and comprehensively explored the transformation of the international order in the post pandemic era and its challenges to global governance from the perspectives of political science, economics, and sociology.

3. Methods

3.1 International Political Dynamics

In the post pandemic era, the global political landscape has undergone significant changes, and foreign policies and international relations of various countries have shown new dynamics. In the early stages of the epidemic, countries mainly focused on domestic response strategies and concentrated efforts to control the spread of the epidemic. However, with the global spread of the epidemic, countries have gradually realized that it is difficult to cope with this global crisis alone. Therefore, the frequency of interaction and cooperation in international politics has increased, but it is also accompanied by new challenges and conflicts.

The relationship between major powers has undergone complex evolution. The performance of the United States in the early stages of the pandemic was highly controversial, internal political disputes intensified, and international leadership was questioned. China has enhanced its influence in the international community by providing medical supplies and vaccine assistance. The influence of two countries (I) in different international institutions can be expressed using Formulas (1) and (2):

$$I_{USA} = \frac{R_{USA} \cdot C_{USA}}{P_{USA}} \tag{1}$$

$$I_{China} = \frac{R_{China} \cdot C_{China}}{P_{China}} \tag{2}$$

Among them, in Formulas (1) and (2), R represents resource investment; C represents the number of collaborative projects; P represents political support rate.

In addition, EU countries show a certain degree of division in the early stages of the epidemic, but with the strengthening of internal coordination mechanisms, they gradually form a relatively consistent position in vaccine distribution and economic recovery. The political instability in the Middle East and South Asian subcontinent has intensified, and economic pressure and lack of medical resources have further intensified internal conflicts [11-12].

3.2 Evaluation of Economic Recovery Models

In the post pandemic era, the global economic recovery process has shown significant regional differences and diversified recovery models. Due to differences in economic structure, government policies, and social resources, different countries and regions have adopted distinctive economic recovery strategies and achieved different results. By evaluating these recovery models, the

profound impact of the pandemic on the global economic landscape can be better understood.

In developed countries, the United States has implemented large-scale fiscal stimulus policies, including direct cash disbursement, expanded unemployment benefits, and loan programs to support businesses. These measures have to some extent alleviated the downward pressure on the economy and promoted the recovery of consumption and investment. The standard Gross Domestic Product (GDP) can be expressed using Formula (3):

$$GDP = C + I + G + (X - M) \tag{3}$$

Among them, in Formula (3), C represents consumption; G represents government expenditure; I represents investment; X and M represent exports and imports, respectively.

The Federal Reserve maintains a low interest rate policy and purchases a large amount of government bonds to ensure the liquidity and stability of financial markets. Meanwhile, the rapid advancement of vaccination has also provided strong support for economic recovery. Despite this, the US economy still faces supply chain bottlenecks and labor shortages during the recovery process, with inflationary pressures significantly increasing.

European countries have adopted a relatively different strategy, with the EU launching a 750 billion euro recovery fund, focusing on supporting green and digital transformation. This is not only aimed at stimulating the economy in the short term, but also at long-term sustainable development. Member countries have made significant progress in vaccination, gradually relaxing lockdown measures and resuming cross-border economic activities. However, the pace of economic recovery within the EU varies among countries, with southern European countries experiencing relatively slow recovery due to heavy tourism damage, while Germany and Nordic countries have shown stronger economic resilience and recovery momentum.

The major economies in Asia have also shown diversified recovery models. China has taken rapid and strict prevention and control measures to quickly control the spread of the epidemic, while increasing investment in infrastructure and technological innovation to promote economic recovery. The Chinese economy achieved positive growth in 2020, becoming one of the few major economies in the world to achieve growth. Japan and South Korea have promoted economic recovery through a series of economic stimulus policies and industrial support plans, but they also face challenges from aging and structural reforms.

Emerging markets and developing countries face greater difficulties in economic recovery due to lower vaccination rates and insufficient medical resources. The economic recovery of some countries in South America and Africa is progressing slowly, relying on international aid and multilateral cooperation to cope with the impact of the epidemic. The economic structure of these countries is relatively fragile, overly reliant on primary product exports and tourism, resulting in unsatisfactory performance in global economic recovery [13].

3.3 Social Impact Survey

The COVID-19 pandemic has completely overturned social structure. This epidemic is not only a medical challenge, but also a comprehensive test of human survival.

The epidemic is like a mirror, reflecting the fragility of healthcare systems around the world. From Italy to India, it can be seen that hospitals are overwhelmed, medical staff are fighting on the front line, but the necessary medical resources are seriously insufficient. The influx of a large number of patients into hospitals has exacerbated the scarcity of medical resources, especially the shortage of critical equipment such as ICUs and ventilators, which has become a common phenomenon. The high infection rate and overwork of medical staff have attracted the attention of the whole society, which further exposes the shortcomings of the medical system in responding to

large-scale public health crises.

The education sector has also suffered a heavy blow. In some countries, especially in areas with limited resources, children's learning opportunities are severely affected, and this educational gap may have a long-term impact on their future life trajectory.

In terms of employment, the impact of the epidemic is equally devastating. The service industry, tourism industry, and retail industry have suffered particularly severe blows. Although remote work has become the new norm, it has also brought new challenges such as blurred boundaries between work and life, and increased workload.

In addition, social inequality has significantly intensified during the pandemic. The impact on vulnerable groups such as low-income families, ethnic minorities, immigrants, and people with disabilities is particularly severe. They often live in crowded environments, lack sufficient protective resources, and face higher risks of infection and economic pressure. The government's economic assistance and support measures have not effectively covered these groups in certain areas, leading to an increase in poverty rates and exacerbation of social conflicts [14].

4. Results and Discussion

4.1 Political Stability Experiment

By designing a political stability experiment, two representative countries are selected and their government turnover frequency and policy continuity index are collected before the pandemic (2015-2019) and after the pandemic (2020-2024). Using the political stability index formula, the changes in political stability of various countries before and after the epidemic are calculated and compared. The specific data situation is shown in Figure 1:

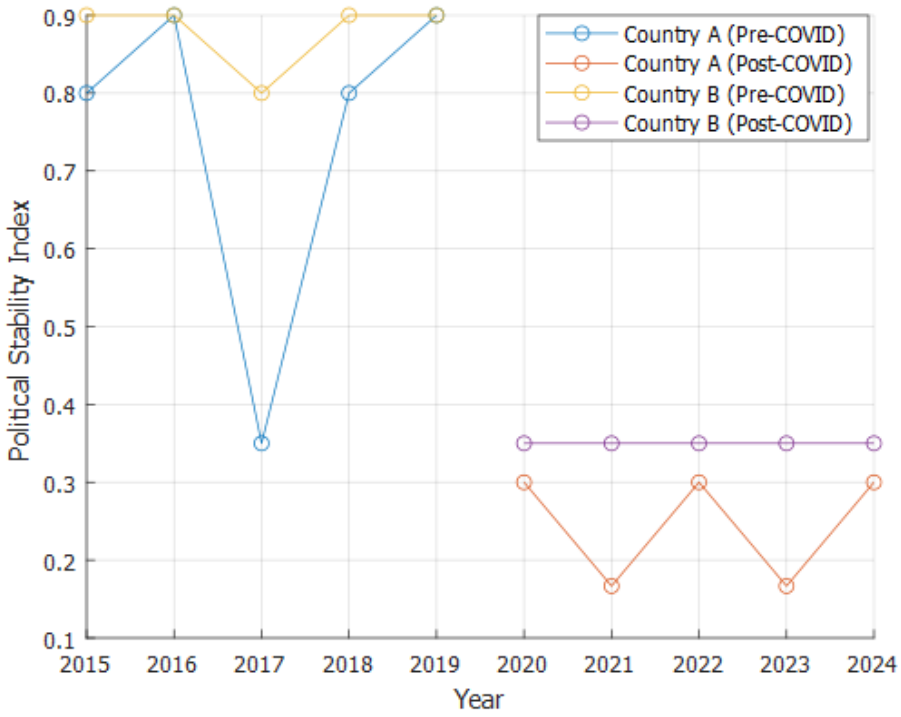

Figure 1: Political stability assessment

In Figure 1, through political stability experiments, it is found that the political stability of various countries generally decreases after the epidemic. Taking Country A as an example, the

average political stability index before the epidemic is 0.75, but it drops to 0.26 after the epidemic. The situation in Country B is similar, with a pre pandemic index of 0.88 and a post pandemic index of 0.35. From the data conclusion, it can be seen that in the post pandemic era, countries need to strengthen the stability of their political systems and the continuity of their policies to cope with similar crises in the future.

4.2 Economic Recovery Speed Experiment

In the experiment on the speed of economic recovery, two representative countries are selected and the data on their GDP growth rates and unemployment rates before the pandemic (2015-2019) and after the pandemic (2020-2024) is collected. The growth rate and unemployment rate data are plotted into graphs to visually understand the economic recovery situation of each country after the epidemic.

Figure 2 (a) shows the GDP growth rate before and after the epidemic, while Figure 2 (b) shows the unemployment rate before and after the epidemic. In Figure 2, the GDP growth rate of country A recovers to 3.2% in 2024, and the unemployment rate decreases to 6.0%. The situation in country B is similar. From the data results, it can be seen that the epidemic has a short-term impact on the economies of various countries, but as time goes on, the economy gradually recovers, as shown in Figure 2:

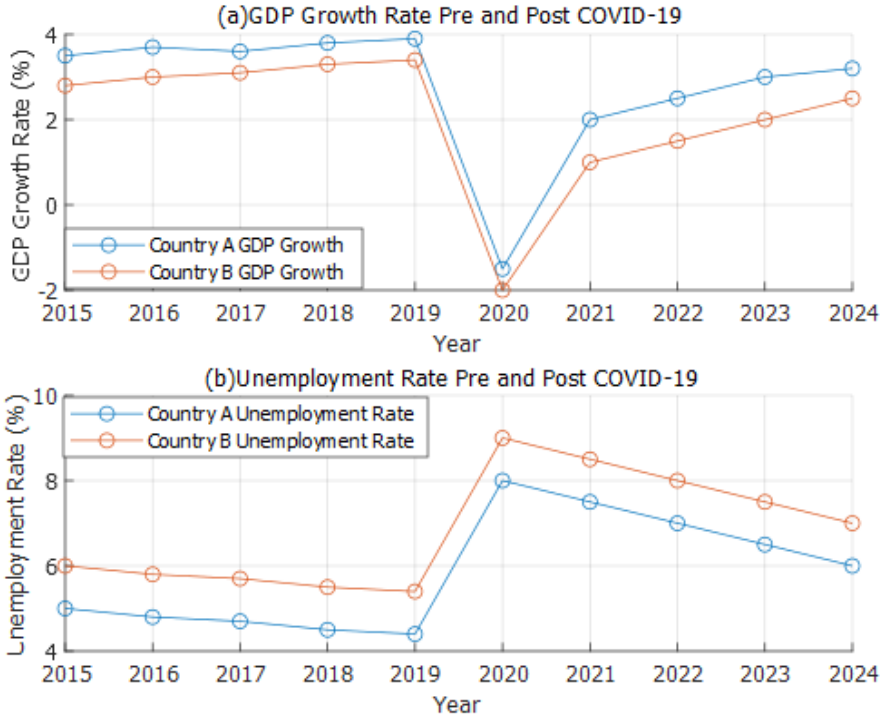

Figure 2: Evaluation of the speed of economic recovery

4.3 Public Health Response Ability Experiment

Through the experiment on public health response capacity, representative samples are selected from countries A and B, and their vaccination rates, number of beds per thousand people, and number of medical staff per thousand people are collected before the epidemic (2015-2019) and after the epidemic (2020-2024), respectively. By comparing these data, the impact and recovery of the epidemic on public health systems in various countries are evaluated. The analysis results help

to understand the response capacity and improvement space of countries in the face of public health crises.

Figure 3 (a) shows the vaccination rate; Figure 3 (b) shows the number of beds per thousand people; Figure 3 (c) shows the number of medical staff per thousand people. In Figure 3, through the public health response capacity experiment, it is found that the epidemic has a significant impact on the public health systems of various countries. The vaccination rate of country A recovers to 85% in 2024. The number of beds per thousand people returns to 3.2 in 2024. The number of medical staff per thousand recovers to 4.5 in 2024. From the data results, it can be seen that the epidemic has a short-term impact on public health systems, but countries are gradually recovering. The specific data situation is shown in Figure 3:

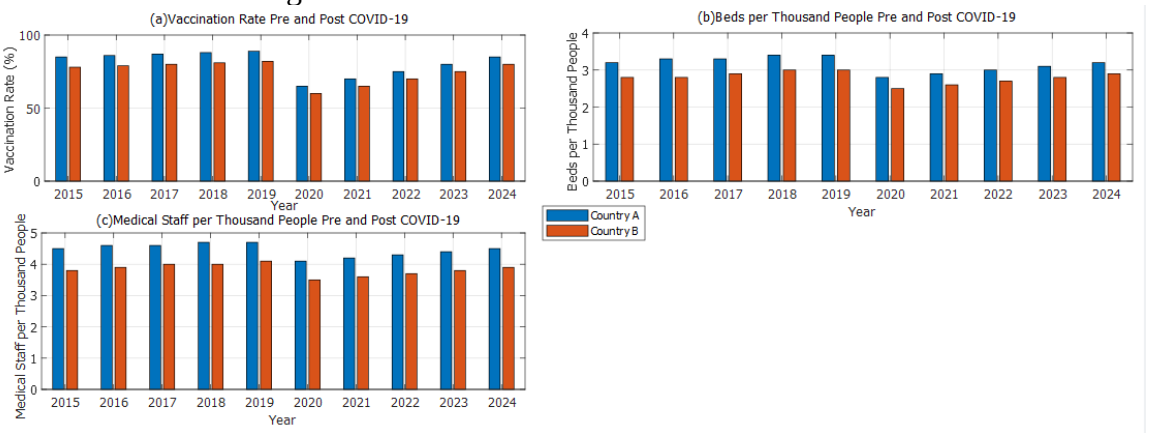

Figure 3: Assessment of public health response capacity

4.4 International Cooperation Efficiency Experiment

In the international cooperation efficiency experiment, three representative countries are selected and their data on the number and success rate of international cooperation projects before and after the pandemic (2015) and 2024 are collected. The specific data situation is shown in Table 1:

Table 1: Evaluation of international cooperation efficiency

Country	Year	Project Number	Success Rate(%)
Country A	2015	10	80
Country A	2024	12	85
Country B	2015	15	75
Country B	2024	18	78
Country C	2015	20	70
Country C	2024	22	74

In Table 1, the number of cooperation projects in country A increases from 10 in 2015 to 12 in 2024, with a success rate increasing from 80% to 85%. From the data in Table 1, it can be seen that the epidemic has prompted countries to strengthen international cooperation and improve cooperation efficiency.

5. Conclusion

Through four experiments on political stability, economic recovery speed, public health response capacity, and international cooperation efficiency, the transformation of the international order in the post pandemic era and the challenges faced by global governance have been thoroughly

analyzed. The results indicate that the epidemic has had a significant impact on the politics and economy of various countries, and public health systems and international cooperation have also been greatly affected. Overall, countries need to further strengthen their international cooperation and governance capabilities to better respond to future global crises. Although this research has revealed many important findings, there are also some limitations, such as limited sample countries and not being able to cover all regions and countries. In addition, the experimental data is mainly based on simulation, and the actual situation may vary. Future research should expand the sample scope and analyze the specific situations of different countries and regions in a more in-depth manner. It is hoped to provide valuable references for policymakers and promote the improvement and development of the global governance system.

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