Looking Back Deeper, Recovering up Better: Resilience-Oriented Contrarian Thinking about COVID-19 Economic Impact

Xiaochen Lin 1, Hai Long 2,∗ and Yu Chen 1

1 School of International Accounting, Anhui International Studies University, Hefei 231201, China
2 International College, Krirk University, Bangkok 10220, Thailand
∗ Correspondence: long.hai@krirk.ac.th

Abstract: In the early stage of the COVID-19 outbreak, a vast majority of research predicted its potential economic impacts based on various possible scenarios, believing that looking forward earlier and recovering better. In contrast, through contrarian thinking from an economic recovery perspective, this study empirically investigates the direct impact of COVID-19 on China’s economy. This reveals that China’s economy experiences a V-shaped recovery; it is in the recovery process and will achieve the pre-pandemic level in the coming years. Consumption, international trade, and investment indicators are synchronously recovering, which may be attributed to the fact that the pandemic has had little impact on China’s economy, although it remarkably hits national consumption, international trade, and investment that are less interrupted. Empirical evidence shows that the pandemic is unlikely to alter China’s industrial structure, as it has primarily affected the service and manufacturing sectors while leaving agriculture relatively unaffected. In light of these findings, China’s economy is facing challenges beyond the pandemic. By adopting a recovery-oriented contrarian approach, we can better identify the dynamic consequences and optimize economic strategies to mitigate potential long-term impacts on sustainable economic growth. These insights may also help guide economic recovery efforts in other developing countries.

Keywords: COVID-19; pandemic impact; contrarian thinking; economic recovery; recovery performance

1. Introduction

The COVID-19 impact on the global, national, and regional economies has been extensively discussed since it broke out [1,2]. At the very early stage, the vast majority of these studies were data reports or opinion discussions; later, they investigated the short-term impact and predicted the long-term influence, as it was believed that looking forward earlier meant recovering better. However, the simulation results and findings from these studies are uncertain and controversial because they are envisioned based on many types of possible static scenarios [2,3]; for instance, the real economic growth performance in 2021 is different from that predicted by Feng et al. [4]. In addition, some studies controversially regard short-term rebounds as a form of economic recovery. In contrast, this study follows Martin’s [5] definition of the extent of shock absorption and the resilience of returning to equilibrium in the long run.

Additionally, the long-term impact of the pandemic on the national economy is difficult to accurately predict early on. This is because the influence is dynamic and depends on factors such as countermeasures, gradual economic recovery, industrial diversity [6], and infrastructure improvement [7]. The government response plays a crucial role, and its effects were unknown during the initial outbreak. Moreover, predicting economic recovery is challenging due to the uncertainties created by the crisis [8]. As a result, the direct, indirect, short-term, and long-term effects of the pandemic on the national economy are still uncertain.
Measuring the profound consequences at different stages is a prerequisite for dealing with the impact of implementing a range of targeted economic policies for resilience during the pandemic. Many countries are recovering from the pandemic, but their indirect and long-term influences remain unclear. Although their economic recovery performs differently for various reasons, the major cause is the lack of successful and optimized economic strategies to accurately recognize the impact. For instance, Feng et al. [4] revealed that short-term economic recovery solutions generate side effects on environmental sustainability, particularly in resource-reliant regions, because of the growing amount of resource consumption. This suggests that the resource cost of economic recovery is unsustainable. Consequently, this drawback may lead to policy implementation and an accelerated economic recession.

Motivated by these issues, this study aims to bridge this gap by empirically investigating how the pandemic has impacted China’s economy in terms of leading and lagging indices. Based on the economic recovery performance, this study uses contrarian thinking to empirically examine the pandemic impact on China’s economy rather than investigating the pandemic impact to predict its recovery. Inspired by Woodside [9], this study uses contrarian thinking to empirically examine the impact of the pandemic on China’s economy from an economic recovery perspective. This mindset investigates the results to delve into their logic and principles for reassessing a matter, and then optimizes the existing solutions and strategies to deal with the potential long-term influence. From a contrarian perspective, a fading pandemic impact does not mean economic recovery; instead, economic resilience means that the impact has ceased. This study aims to investigate the recovery performance of China’s economy in order to identify long- or short-term impacts. It will then examine the relationship between the pandemic’s impact and economic performance to recognize direct or indirect impacts. Therefore, utilizing outcome-oriented contrarian thinking may facilitate a dynamic assessment of the consequences of a pandemic.

While this study investigates the economic consequences of the pandemic, it suggests connecting the consequences with ongoing economic resilience and calls for dynamic estimation of the impact and sparkling economic recovery solutions at different phases. Although the previous literature suggests potential solutions to the pandemic at an earlier moment, such as industrial diversity [6], financial liberalization [10], and infrastructure improvement [7], some of them may not work well in some circumstances. For instance, Singhal and Singhal [11] discovered that industrial development and increased diversity in the manufacturing sector have significant impacts on society and the environment. This includes the generation of large amounts of harmful solid waste as well as water and air pollution. Therefore, it is recommended that impact assessments be linked to recovery strategies based on economic resources. It is also suggested that policymakers consider unconventional approaches to optimize economic recovery policies in response to the pandemic shock.

Additionally, most studies concentrate on short-term resilience (from recession to recovery) through various indicators [12], which remains controversial. As Martin [5] suggests, economic resilience includes four processes: recession, recovery, restructuring (reorientation), and renewal. Consequently, recovery performance must be considered as a crucial factor in estimating pandemic shocks.

The contributions of this research are threefold. First, it develops a theoretical framework outlining the mechanism of the COVID-19 impact on the national economy in the short- and long-run in terms of the major economic drivers and three industrial sectors, which is expected to facilitate further studies on related topics. Second, this study expands the framework by taking a resilience-focused, contrarian approach to empirically analyze how the pandemic has affected the national economy’s recovery performance. This approach aims to provide a more accurate assessment of the consequences compared to a prediction-based perspective. This also facilitates the reassessment of the economic performance of government policies dealing with the pandemic. Third, the findings of this study provide practical value for other developing countries to regularly evaluate their
economic recovery performance in relation to the measures they have taken. This suggests that government officials should improve their existing strategies to mitigate any potential long-term impacts and expedite the recovery from the pandemic.

2. Literature Review and Theoretical Framework

This section reviews existing studies on economic resilience and the various consequences of the pandemic and builds a theoretical framework outlining the pandemic’s impact mechanism.

2.1. Economic Resilience

The purpose of studying pandemic consequences is to seek optimum solutions to economic recovery. Economic recovery performance should be included to estimate the pandemic impact because dynamic recovery results from changing consequences.

Post-shock resilience varies with economic growth across countries and regions. Cerra et al. [13] suggested that developed countries perform better than underdeveloped countries. Giannakis and Bruggeman [14] demonstrate that rural regions in Greece recovered sooner from the 2008 financial crisis than other regions. This spatial variation arises from implementing different responses to external shocks in various aspects, such as industrial diversity, policy frameworks, social capital, entrepreneurial environments, institutional structures, trade openness, and financial deregulation [6,10,15].

According to Martin [5], a post-shock economy has four phases: recession, recovery, restructuring, and renewal. We outline economic resilience performance after external shocks in four stages, as shown in Figure 1. Some national and regional economies go into recession in an uncertain period (line bc), followed by a recovery stage. The recovery of economies from recessions depends on the adoption and implementation of instant countermeasures such as trade openness, financial liberalization [10], input reduction or production flexibility [16], and pre-shock economic strengthening [10]. The majority of underdeveloped nations shown on line cd will continue to experience recession in the long run [13], while the others (above line ce) will subsequently begin recovering, which is classified as L-recovery [17]. They form angle A with line ci, the size of which is determined by how the countermeasures operate. Only completely recovered economies (V-recovery) have the opportunity to pursue further sustainable development (line hg) at angle M; the next stage is called S-recovery. This achievement relies on substantial and sustainable solutions to deal with shocks such as technological innovation [10], entrepreneurial ecosystems [15], and industrial restructuring.

Figure 1. Economic resilience performance after external shocks in four stages.
2.2. COVID-19 Impact

The economic impact of COVID-19 generally consists of two types: direct and indirect, and the empirical literature on the direct impact is dominant because of its data availability. We demonstrated this direct impact on the leading economic drivers. Gong et al. [18] suggested that the pandemic directly impacted the national economy in terms of consumption, investment, international trade, and government expenditure. Additionally, studies have demonstrated its impact on the economy in terms of railway transportation [10], energy consumption [19], financial markets [20,21], and firm performance [22].

We outline Figure 2, showing a comprehensive theoretical framework of the economic impact of the pandemic associated with different types of economic resilience in four stages. When the impact is considerable, the national economy lacks growth power and weakens even after a recession in consumption, investment, and international trade [23–25]. In terms of economic drivers (leading indices), the literature has shown that consumption-related sectors in catering, transportation, retail, and tourism were easily and significantly affected by the pandemic [26], which subsequently spread to individual daily lives.

The most significant effect on consumption is a change in consumption behavior. The pandemic has caused many consumers to rethink their usual shopping habits. Some have transitioned to online shopping [27], prompting changes in the business environment and marketing strategies. Retailers and marketers have had to adjust their established strategies to address and adapt to this new challenge [28]. The scarcity of household products has changed some business rules regarding price elasticity and stockpiling habits [29]. Additionally, increasing unemployment, decreasing household savings, and business confidence losses resulting from the unprecedented pandemic have inevitably disrupted individual consumption behavior [30]. Accordingly, consumption-associated factors, such as inflation, gradually interact to increase economic crises [31].

The shrinking consumption output impacted by the pandemic leads to a decrease in consumption-focused investments because manufacturers realize that reducing consumer demand will result in a decline in earnings expectations and high uncertainty in production, which constrains their desire to invest in fixed assets [32]. Subsequently, consumption-focused manufacturers face severe financing pressure in capital markets because of business deterioration. Their share prices are undervalued due to such pessimistic sensitivity. Meanwhile, a worse capital market and high economic risk across the world slowed global foreign direct investment (FDI) during the pandemic [23]. Under these circumstances, the broad money supply (M<sub>2</sub>) is adjusted by changing interest rates to stimulate the economy.

The remarkable shrinkage in global consumption and consumption-dominated industries simultaneously reduced international trade because of limited production and labor supply. Asgary et al. [33] suggest that a shortage in the labor force and industrial supply chain may greatly impact business operations and cause production suspensions in small businesses. The global trade shutdown during the crisis disrupted international trade connections and decreased trade demand in trade-dependent countries, where import demand increased for locals while export demand decreased [34]. Accordingly, currency exchange rates and FDI fluctuate [35]. As such, the pandemic has interrupted global trade with China, and this impact will be transmitted to all aspects of the domestic economic system, such as production and consumption, industrial sectors from agriculture to manufacturing, and the service sector.

Dealing with the unprecedented shock to the global economy, governments worldwide responded quickly and implemented a range of corresponding bailout packages to reduce the negative consequences. For instance, governments usually increase fiscal expenditure to stimulate the economy [25] because public spending significantly contributes to economic growth in many developing countries [36]. Global investment has been hit by the pandemic, and the negative effects were different across countries because of the various foreign direct investment determinants [37], particularly in developing and transition economies [38]. Thus, governments across countries deal with COVID-19 through fiscal policy and public expenditure in infrastructure, welfare, and business growth. For instance, governments
increase expenditure on the money supply and debt in middle-income countries [39]. The fiscal responses should be necessary and timely, but the practical effects and efficiency are remarkably heterogeneous around the world. In contrast, Makin and Layton [40] suggested that some fiscal policies for the pandemic were very expansive in a controversial form and underscored that these expansive public debts have resulted in macroeconomic risks. Therefore, it is still a big challenge for governments to well address the balance between fiscal policies and their potential side effects.

Figure 2. A theoretical framework of COVID-19 impact on the economy at different recovery processes.
In this context, governments face the challenge of efficiently investing in economic resilience and sustainability. This presents an opportunity to enhance the national economy and cultivate a circular economy by optimizing the industrial structure [1].

The Chinese central government is powerful in guiding the national economy through a range of stimulative policies [41] and releases a range of stimulus packages for economic recovery. Tian [42] discussed how Chinese monetary and fiscal policies accelerated the national economic recovery from the pandemic. Consequently, government bailouts may reduce the direct impact and turn it into an indirect consequence. However, the poorly designed and conducted bailouts yield some moral hazard to taxpayers and result in excessive risk-taking [43].

The pandemic has had different impacts on various types of economies, including service-led, manufacturing-driven, and agriculture-dominated economies. Unless the effects on key economic indicators are addressed, they will continue to affect the industrial structure, including the agricultural, manufacturing, and service sectors [44,45]. In developed countries with service-led economies, the initial and significant impact was on the consumption economy, leading to inevitable shocks in the consumption-related service sector, including food retail, entertainment, transport, tourism, and education. For instance, Fernandes [46] revealed that these economies have a particular impact and severe job losses in tourism-reliant countries, such as Greece, Spain, and others. This remarkable disruption in the service sector spreads further to the manufacturing sector and negatively impacts supply chain performance [47].

In countries where manufacturing is a major industry, the production of service-related products was disrupted due to problems in supply chains. This has had a significant impact on the manufacturing industry’s ability to produce goods sustainably and manage daily operations [48]. As a result, many manufacturers and policymakers are looking into sustainable manufacturing using advanced technologies. Restructuring the industry is a strategy to speed up resilient progress in industrialized areas. Additionally, economic resilience involves the dynamic process of adapting and being adaptable [49]. Therefore, manufacturing-driven economies, compared to others, have more chances and stronger resilience and are expected to step into sustainable economies through restructuring and renewal strategies.

In some underdeveloped countries, the economy is agriculture-dominated. For instance, the pandemic impacts agricultural production, labor [50], and food security [51] in Africa. Some countries were concerned about food supplies during the pandemic and restricted agricultural product exports, resulting in food shortages in agriculture-importing countries. However, Lin and Zhang [52] demonstrated that some agricultural products, especially grains, oil, and medicinal herbs, increased exports, showing a strong demand for staple food during the pandemic, although agricultural business exports declined in general. In contrast, exports of edible fungi and horticultural products sharply decreased.

These impacts are short-term, but some are long-term, depending on how governments respond. Pan et al. [3] found that the impact is short-term, and Zambrano-Monserrate et al. [53] documented some positive and negative indirect effects of COVID-19 on the environment. This study explores the pandemic’s consequences by following specific technical routes. We used contrarian thinking and a resilience-oriented perspective to identify these consequences and propose corresponding solutions. The empirical results and recovery process are discussed further in the Section 5.

3. Data and Methodology

3.1. Data

The data used in this study were collected manually from official websites. Macroeconomic data were obtained from the official website of the National Bureau of Statistics (https://www.stats.gov.cn/sj/ndsj/2018/indexeh.htm, accessed on 10 November 2023) and (https://tradingeconomics.com, accessed on 10 November 2023). Related financial data were collected from the People’s Bank of China (http://www.pbc.gov.cn/
The policy data were collected from the National Development and Reform Commission (https://www.ndrc.gov.cn/fgsj/?code=&state=123, accessed on 10 November 2023). The COVID-19 data covers two years, from 2018 to 2019, before the pandemic outbreak and three years, from 2020 to 2022, after the outbreak. Most economic data were updated to 2023.

### 3.2. Methodology

As contrarian thinking in this study refers to investigating the pandemic impact based on the economic recovery performance, following the theoretical framework in Figure 2, we draw Figure 3 to indicate the research methodology route. Based on economic indicators and industrial structure, the results on economic rebound, recovery, and recovery vulnerability can be obtained through Equations (1)–(3), and the relationship between the pandemic and economic performance can be investigated by Equations (4)–(6). Employing the impulse principle from physics, we assess the expected economic growth to achieve a complete V-recovery using Equations (7)–(10). Therefore, the extent of the pandemic’s consequences is confirmed.

![Figure 3. Research methodology route.](image)

#### 3.2.1. Economic Resilience Measurement

Economic rebound is different from recovery, as the rebound in economic activity is underway, but recovery may take a longer time to achieve. Accordingly, an economic rebound is regarded as a prerequisite for an approaching recovery. Economic rebounds can be measured using Equation (1) as follows:

\[
Reb = \frac{(GDP_{t,n} - GDP_{t,n-1})}{GDP_{t,n}} \quad (n \neq 0)
\]  

(1)

In addition, rebound activity was easily observed. There should be no significant difference between the economic growth rates (g) of two consecutive periods without a pandemic or other external shocks; accordingly, \(g_t \sim g_{t-1} \equiv 0\), while \(g_{t_{covid}} \leq g_{t_{covid}}\) is viewed as the turning point of COVID-19’s impact on the economy. On the contrary, in contrast, \(g_{t_{post}} \geq g_{t_{post}}\) is the point of economic rebound.

Thus, economic resilience is defined as an economy’s capability to withstand external shocks and recover quickly and can be measured by various economic indicators according...
to different kinds of economic recession, such as macroeconomic stability, micromarket efficiency, governmental performance, and social development factors [54]. According to Martin’s [5] economic resilience theory and employing the methodology of Jiang et al. [55], this study examines China’s economic resilience from a macroeconomic perspective. Thus, the multiple indexes come from two aspects: economic drivers and industrial structure, as described in Figure 2. We use Equation (2) to measure the deviation in national economic resilience.

\[
\Delta q_{n}g_{t} - \Delta q_{n}g_{2019} > 0 \mid \Delta q_{n}g_{2019} > 0
\]

The differential value of the four consecutive quarters was greater than zero, indicating economic resilience.

3.2.2. Measuring Recovery Vulnerability

A complete recovery is stable and long-term, rather than vulnerable and unsustainable; a fluctuating recovery indicates vulnerability and risk. Economic vulnerability in a particular region is associated with external economic shocks due to various inherent economic features, such as economic openness, exports, and export concentrations [54]. As economic resilience refers to an economy’s capability to deduce its inherent vulnerability, China is a developing country and its economy is export- and import-concentrated; this study takes recovery vulnerability into account and measures it using Equation (3) as follows:

\[
\left\{ \begin{array}{l}
\text{post} \sum_{k=1}^{4}q_{g_{t}} \approx \text{pre} \sum_{t=2019}^{n+1}q_{g_{t}} (n = 1, 2, 3, 4, 5) \\
\Delta q_{g} \rightarrow 0
\end{array} \right.
\]

When \( \text{post} \sum_{k=1}^{4}q_{g_{t}} \approx \text{pre} \sum_{t=2019}^{n+1}q_{g_{t}} (k \leq 3, n = 1, 2, 3, 4, 5) \) exists, it means a long-term influence with a short-term resilience; even though a V-recovery is achieved shortly, it will possibly fluctuate, while when \( \text{post} \sum_{k=1}^{4}q_{g_{t}} \geq \text{pre} \sum_{t=2019}^{n+1}q_{g_{t}} (n = 1, 2, 3, 4, 5) \) and \( t > 3 \) exist, it means a long-term recovery with a short-term impact. Therefore, the national economy has completely recovered from the external shock.

3.2.3. Regression Models

The regression approach was extensively used to assess the relationship between the pandemic impact and economic performance [56–58]. Given this wide application of the regression method, based on the concepts of Feng et al. [4], Verma et al. [58], this study used a regression model to investigate the relationship between the pandemic impact and economic performance:

\[
GDP_{t} = \alpha + \beta_{1}Covid_{t} + \beta_{n}Controls_{n} + \epsilon_{t}
\]

The national GDP performance is driven by four factors: consumption, investment, international trade, and government spending (Gov. spending), so they are included as control variables. According to studies [31,35,58,59], the macroeconomy is associated with consumer price index (CPI), capital market performance (C.market), and unemployment rate, so these control variables are considered as well.

When the impact is considerable, the national economy lacks growth power and weakens even after a recession in consumption, investment, and international trade [23–25]. Meanwhile, consumption-related sectors in catering, transportation, retail, and tourism were easily and significantly affected by the pandemic [26], which subsequently spread to individual daily lives. Subsequently, the shrinking consumption output impacted by the pandemic leads to a decrease in consumption-focused investments because manufacturers realize that reducing consumer demand will result in a decline in earnings expectations and high uncertainty in production [32]. The remarkable shrinkage in global consumption and consumption-dominated industries simultaneously reduced international trade because of limited production and labor supply [33].
As such, this study employs Equation (5) to further examine the pandemic’s impacts on each economic driver. Following Angeon and Bates (2015) [60] and Cutter et al. (2008) [61], we include control variables: purchasing manager index (PMI), business confidence, consumer confidence, exchange rate, foreign direct investment (FDI), interest rate (Interest), and broad money supply (M2).

\[
\text{Invest}_t, \text{Ex}_t, \text{Cons}_t = \alpha + \beta_1 \text{Covid}_t + \beta_n \text{Controls}_n + \epsilon_t
\] (5)

The pandemic has had different impacts on various types of economies, including service-led, manufacturing-driven, and agriculture-dominated economies. Unless the effects on key economic indicators are addressed, they will continue to affect the industrial structure, including the agricultural, manufacturing, and service sectors [44,45]. Therefore, this study uses Equation (6) to investigate the pandemic’s impact on the industrial sector.

\[
\text{Manu}_t, \text{Agri}_t, \text{Serv}_t = \alpha + \beta_1 \text{Covid}_t + \beta_n \text{Controls}_n + \epsilon_t
\] (6)

3.2.4. Assessing the Default Value for V-Recovery

The impact of the pandemic, viewed as an external force on the national economy, may be investigated using impulse principles from a physics perspective. Assuming that the pandemic generates a downward force on the national economy (denoted \( F_{\text{pre}} \)), which rebounds and fluctuates in the following year, the impulse on the economy can be measured as follows:

\[
I = \int F \Delta t
\] (7)

According to the law of energy conservation, the total energy in an isolated system remains constant without any inputs or outputs; therefore, the pandemic impulse remains unchanged after the COVID-19 outbreak if there is no economic bailout in an open economy. Under V-recovery conditions, this can be formulated as follows:

\[
\int_{t=2019}^{t=2019-n} \sum F_{\text{pre}} \Delta t + \int_{t=2020}^{t=2019} \Delta t = \int_{t=2020}^{t=2020+n} \sum F_{\text{Post}} \Delta t
\] (8)

where \( m_t \) can be measured by the GDP volume at time \( t \), \( a_t \) is computed by the GDP growth difference between time \( t - 1 \) and \( t \). Incorporating Equation (9) into (8), the impulse equation can be specifically denoted as follows:

\[
\int_{t=2019}^{t=2019-n} \sum (m_t, a_t, \Delta t)_{\text{pre}} + \int_{t=2020}^{t=2020+n} \sum (m_t, a_t, \Delta t, \lambda)_{\text{post}}
\] (10)

Upon this equation, the default value of V-recovery (\( \lambda \)) can be received; this value shows how much GDP growth is expected in the coming year of 2024 so that the complete V-recovery from the pandemic is expected; otherwise, the economic fluctuation will be ongoing.

4. Results and Analysis

4.1. Economic Rebound and Resilience

The figures in Appendix A show that a majority of countries suffered from the COVID-19 impact, even the zero-reported countries (North Korea and Turkmenistan in Group A), while their economies have rebounded since 2020. The developed countries (in Group B) almost approached their pre-pandemic growth track in 2019, except Japan, which performed...
better than the others and went beyond. In contrast, developing countries (in Group C) resumed on track, except China, which underwent a V-shaped rebound. Additionally, underdeveloped countries (in Group D) show a stronger rebound. However, Central Africa has been suffering an ongoing economic recession.

Figure 4 shows that China’s economy experienced a gradual decline from around 14 percent in 2007 to about 6 percent in 2019, mainly because the Chinese government is concerned with the national economy towards a potential Hard Landing as inflation-driven economic cracks have emerged [62]. In this context, the annual economic growth rate is assumed to be approximately 5.5 percent. The economy experienced a dramatic decline to approximately 2 percent in 2020, followed by a remarkable increase the following year, and then fluctuated. Therefore, China’s economy experienced a V-shaped rebound and almost approached the pre-COVID level in 2023. Accordingly, the pandemic directly affected China’s economy.

Figure 4. China’s GDP growth variations from 2002 to 2023.

The question we ask is as follows: how does an economy recover from a pandemic? Figure 5 shows the recovery performance. The red dotted line is defined as the benchmark, and the black curve tracks the post-pandemic GDP growth deviations from the benchmark at quarterly rates. Apparently, the deviations were very significant and fluctuated between a range of 2 and −2 at the beginning of the COVID-19 outbreak and then gradually approached the benchmark of the pre-pandemic level in the following years. This result shows that the direct impact is fading, and the national economy is getting back on track.

Taking further insight into recovery, Figure 6 outlines quarterly economic growth vulnerability before and after COVID-19. The quarter lines were consistently flat and parallel before the pandemic years from 2014 to 2019, indicating that the pre-pandemic rate was stable and more sustainable. In contrast, the fluctuation was more remarkable after the pandemic, especially in the early two years of 2020 and 2021, due to the significant pandemic impact; the most vulnerable growth fluctuated between less than 5 and over 15 percent in the two years, indicating more vulnerability and impact. In the following years, vulnerability decreased, the sharp fluctuations seemed flatter, and the blue line turned flat and close to the center. These results show that the direct impact gradually wears off and the economy recovers from the pandemic because of a range of corresponding economic solutions.
Figure 4. China's GDP growth variations from 2002 to 2023.

The question we ask is as follows: how does an economy recover from a pandemic? Figure 5 shows the recovery performance. The red dotted line is defined as the benchmark, and the black curve tracks the post-pandemic GDP growth deviations from the benchmark at quarterly rates. Apparently, the deviations were very significant and fluctuated between a range of 2 and $-2$ at the beginning of the COVID-19 outbreak and then gradually approached the benchmark of the pre-pandemic level in the following years. This result shows that the direct impact is fading, and the national economy is getting back on track.

Figure 5. Quarterly deviations of GDP growth rates from the rates in 2019.

Figure 6. Quarterly GDP growth fluctuation in the years before and after COVID-19.

Taking further insight into recovery, Figure 6 outlines quarterly economic growth vulnerability before and after COVID-19. The quarter lines were consistently flat and parallel before the pandemic years from 2014 to 2019, indicating that the pre-pandemic rate was stable and more sustainable. In contrast, the fluctuation was more remarkable after the pandemic, especially in the early two years of 2020 and 2021, due to the significant pandemic impact; the most vulnerable growth fluctuated between less than 5 and over 15 percent in the two years, indicating more vulnerability and impact. In the following years, vulnerability decreased, the sharp fluctuations seemed flatter, and the blue line turned flat and close to the center. These results show that the direct impact gradually wears off and the economy recovers from the pandemic because of a range of corresponding economic solutions.

Figure 6. Quarterly GDP growth fluctuation in the years before and after COVID-19.

In summary, Figure 4 shows the short-term economic rebound after the pandemic, Figure 5 indicates economic resilience performance, and Figure 6 shows resilience’s vulnerability.

Having investigated the general impact on the economy, this study further examines whether particular economic drivers (leading economic indices) change in terms of international trade, consumption, and investments. Figure 7A shows that both export and import growth were interrupted from 2020 to 2021; they were still underperforming by 2023, even though they had a short-term rebound by 2022. Figure 7B shows a similar story in which both consumption and government spending growth are in a recovery process. Figure 7C shows that both fixed assets and foreign direct investments declined dramatically by approximately 40 percent in 2020. Although fixed asset investment rebounds almost to pre-pandemic performance, foreign direct investment does not, and it is still in recession.

Figure 7. (A) Export and import growth from 2014 to 2023. (B) Consumption and government spending growth from 2014 to 2023. (C) Fixed assets and foreign direct investments growth from 2014 to 2023.

Figure 6. Quarterly GDP growth fluctuation in the years before and after COVID-19.
In summary, Figure 4 shows the short-term economic rebound after the pandemic, Figure 5 indicates economic resilience performance, and Figure 6 shows resilience’s vulnerability.

Having investigated the general impact on the economy, this study further examines whether particular economic drivers (leading economic indices) change in terms of international trade, consumption, and investments. Figure 7A shows that both export and import growth were interrupted from 2020 to 2021; they were still underperforming by 2023, even though they had a short-term rebound by 2022. Figure 7B shows a similar story in which both consumption and government spending growth are in a recovery process.

Figure 7C shows that both fixed assets and foreign direct investments declined dramatically by approximately 40 percent in 2020. Although fixed asset investment rebounds almost to pre-pandemic performance, foreign direct investment does not, and it is still in recession.

Furthermore, this study investigates whether the industrial structure (lagging indices) changed during the pandemic period. Figure 8 outlines China’s industrial structure and
its structural contributions to the national economy. Over the last decade, the tertiary industry has dominated China’s economy and shown strong growth potential, although it fluctuated during the pandemic period. The manufacturing industry has fluctuated slightly. In contrast, the agricultural industry experienced less change.

Figure 8. China’s industrial structure and structural contributions to the national economy.

Figure 9 outlines the dynamics of China’s industrial structure. This indicates that the tertiary industry has declined gradually since 2017 and decreased significantly in 2019. Meanwhile, the manufacturing industry decreased slightly in 2017 and showed no significant decline in 2019. In contrast, the agricultural industry gradually increased in 2017 and continued until 2020. This evidence suggests that there is no significant relationship between China’s industrial structural adjustment and the COVID-19 effect.

Figure 9. The dynamic situation of China’s industrial structure during the last decade.

Figure 10 provides detailed information on industrial changes. The rates of both the manufacturing and service sectors declined immediately and dramatically in the first quarter of 2020 and fluctuated in the next quarters. In contrast, the agricultural sector significantly increased until the first quarter of 2020, which indicated a lower pandemic impact on the sector. The findings of Lin and Zhang [52] may account for this, which uncovers the
essential demands for staple foods such as grain and oil, leading to a significant increase in agricultural exports. In contrast, by-products and some vegetables decreased sharply.

Figure 10. Quarterly growth rates in three industrial sectors.

In summary, the annual GDP scale after the pandemic continues and is significantly greater than the volume in 2019. Additionally, the post-pandemic industrial structure remains unchanged, but the national economy takes more than three years to approach the pre-pandemic level. Generally speaking, the pandemic has had a direct impact on China’s economy, and it has remarkably affected national consumption and international trade, although investment is interrupted less.

4.2. Economic Impact of COVID-19

Based on the aforementioned results on national economic performance during the pandemic period, we conducted a regression analysis to examine whether these economic consequences were attributable to the pandemic’s impact. In Table 1, the relationship between the pandemic’s impact and the national economy, as well as economic drivers, is explored. Column (1) indicates that COVID-19 has had little significant impact on the overall national economy. Therefore, the fluctuations in GDP seen in Figure 4 during the pandemic may not be solely attributed to the pandemic. This suggests that the Chinese economy experienced other significant shocks during this time. Furthermore, there is no statistically significant relationship between investment and GDP, whereas international trade and consumption are shown to have a significant impact. This indicates that these two factors were the main drivers of China’s national economy during the pandemic. Meanwhile, a negative relationship exists between government spending and GDP, demonstrating that the Chinese government plays an essential role in stimulating the national economy during public crises [41].

Column (2) shows that the pandemic had no statistical effect on investment; therefore, the investment fluctuation in Figure 7C may not have resulted from the pandemic. In addition, capital-related factors, such as the C-market, interest, savings, and M2, significantly influence investment performance. Although the capital market declined remarkably at the beginning of the pandemic outbreak [20,21], our findings suggest that it was not mainly attributed to the pandemic.

Column (3) shows that the pandemic did not affect international trade. Although Figure 7A shows that China’s imports and exports fluctuated remarkably during the pandemic, this cannot be attributed to the pandemic outbreak. Other factors, such as savings, FDI, and exchange rates, mainly determine China’s international trade. This also implies that the pandemic’s side effects in China were disconnected from the world’s economy because of restricted international trade.
### Table 1. Regression results of the pandemic impact and China’s economic performance.

<table>
<thead>
<tr>
<th></th>
<th>(1) National Economy (GDP)</th>
<th>(2) Investment</th>
<th>(3) International Trade</th>
<th>(4) Consumption</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Beta</td>
<td>t</td>
<td>Sig.</td>
<td>Beta</td>
</tr>
<tr>
<td>COVID-19 Investment</td>
<td>0.183</td>
<td>1.518</td>
<td>0.140</td>
<td>−0.326</td>
</tr>
<tr>
<td>International trade</td>
<td>0.021</td>
<td>0.273</td>
<td>0.787</td>
<td></td>
</tr>
<tr>
<td>Capital market</td>
<td>0.028</td>
<td>0.361</td>
<td>0.721</td>
<td>0.383</td>
</tr>
<tr>
<td>Unemployment</td>
<td>0.011</td>
<td>0.984</td>
<td>0.903</td>
<td></td>
</tr>
<tr>
<td>PMI</td>
<td>−0.036</td>
<td>−0.635</td>
<td>0.537</td>
<td></td>
</tr>
<tr>
<td>CPI</td>
<td>0.085</td>
<td>1.101</td>
<td>0.280</td>
<td></td>
</tr>
<tr>
<td>Capital market</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unemployment</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Imports</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Savings</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Confidence</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Government spending</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Business confidence</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Consumer confidence</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FDI</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Export price</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exchange rate α</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adjust R²</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>F</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ANOVA</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

However, Column (4) demonstrates COVID-19 has remarkably interrupted consumption, leading to a dramatic drop in consumption since the outbreak of the pandemic, as shown in Figure 7B. Furthermore, these factors, including unemployment, savings, and M2, determine consumption performance. Once the pandemic beats them directly, consumption is interrupted accordingly.

Having these results, we conclude, as shown in Figure 11, that the pandemic has a direct effect on China’s economy through consumption interruption rather than international trade and investment, and the Chinese government deals with this issue through government spending.

![Figure 11. COVID-19 impact on China’s GDP through economic drivers.](image-url)

If the pandemic negatively impacts China’s industrial structure and the situation persists, it will inevitably have a long-term influence. According to Figure 8, China’s industrial structure was not affected by the pandemic, even though the manufacturing industry dropped slightly and the tertiary industry declined dramatically, as shown in Figure 9. Regression models were used to investigate whether this decline was associated with the pandemic.
Column (1) in Table 2 shows a negative relationship between COVID-19 and manufacturing performance, indicating that this industry was significantly affected by the pandemic; however, its upward trend remained. The tertiary industry (service) is also hit according to the negative relationship in Column (2). In contrast, the agricultural industry suffers less from the pandemic because of the non-significant value in column (3).

Table 2. Regression results of the pandemic impact and China’s industrial structure.

<table>
<thead>
<tr>
<th></th>
<th>(1) Manufacturing</th>
<th></th>
<th>(2) Service</th>
<th></th>
<th>(3) Agriculture</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Beta</td>
<td>t</td>
<td>Sig.</td>
<td>Beta</td>
<td>t</td>
<td>Sig.</td>
</tr>
<tr>
<td>COVID-19</td>
<td>-0.391</td>
<td>-2.423</td>
<td>0.021</td>
<td>-0.238</td>
<td>-1.965</td>
<td>0.050</td>
</tr>
<tr>
<td>Savings</td>
<td>0.825</td>
<td>4.868</td>
<td>0.000</td>
<td>-2.400</td>
<td>-2.361</td>
<td>0.024</td>
</tr>
<tr>
<td>Industry production</td>
<td>0.045</td>
<td>0.550</td>
<td>0.586</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FDI</td>
<td>0.562</td>
<td>9.748</td>
<td>0.000</td>
<td>-0.112</td>
<td>-2.123</td>
<td>0.041</td>
</tr>
<tr>
<td>Gov spending</td>
<td>-0.211</td>
<td>-3.238</td>
<td>0.003</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exchange rate</td>
<td>-0.576</td>
<td>3.820</td>
<td>0.000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Import price</td>
<td>-0.057</td>
<td>0.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PMI</td>
<td>-0.031</td>
<td>-4.393</td>
<td>0.001</td>
<td>-0.213</td>
<td>-3.493</td>
<td>0.001</td>
</tr>
<tr>
<td>Unemployment</td>
<td></td>
<td></td>
<td></td>
<td>-0.426</td>
<td>0.031</td>
<td>0.713</td>
</tr>
<tr>
<td>Business confidence</td>
<td></td>
<td></td>
<td></td>
<td>3.496</td>
<td>3.959</td>
<td>0.001</td>
</tr>
<tr>
<td>M2</td>
<td></td>
<td></td>
<td></td>
<td>0.026</td>
<td>0.371</td>
<td>0.713</td>
</tr>
<tr>
<td>CPI</td>
<td></td>
<td></td>
<td></td>
<td>0.137</td>
<td>1.701</td>
<td>0.017</td>
</tr>
<tr>
<td>Revenue</td>
<td></td>
<td></td>
<td></td>
<td>2.042</td>
<td>0.049</td>
<td>0.772</td>
</tr>
<tr>
<td>α</td>
<td></td>
<td></td>
<td></td>
<td>0.897</td>
<td>0.000</td>
<td>0.556</td>
</tr>
<tr>
<td>F</td>
<td></td>
<td></td>
<td></td>
<td>4.79</td>
<td>174.075</td>
<td>11.920</td>
</tr>
<tr>
<td>Adjust R²</td>
<td>0.000</td>
<td>0.000</td>
<td></td>
<td>0.000</td>
<td>0.000</td>
<td></td>
</tr>
<tr>
<td>ANOVA</td>
<td>0.000</td>
<td>0.000</td>
<td></td>
<td>0.000</td>
<td>0.000</td>
<td></td>
</tr>
</tbody>
</table>

4.3. Assessment of the Default Value for V-Recovery

Based on the above findings, China’s economy suffered from a direct impact in the long run, and the national economy was in a V-shaped recovery process. This study assessed the default value of complete V-recovery to achieve pre-pandemic economic status. Appendix B outlines China’s gross domestic product (GDP) and growth rates from 2011 to 2023. With these figures, this study employs the impulse principle (shown in Equation (10)) to assess the default value \( \lambda \). To achieve a V-shaped recovery, the declining impulse in 2020 must be remedied in the subsequent years. Substituting the available figures into the equation, the expected annual GDP growth rate was calculated to be approximately 3.6 percent.

According to the research data, we outline Figure 12, showing that China’s economy was in a slight recession in 2023 but is expected to achieve a complete V-shaped recovery to the pre-pandemic level unless the GDP is able to increase by 3.6 percent in 2024; otherwise, it will take longer to recover. To meet this target, the Chinese government must implement proper policies to support this growth, because any remarkable growth deviation from this target will lead to potential fluctuations. Additionally, the trend line in the figure shows that the national economy faces declining potential. Therefore, the government should upgrade the national economy through a range of economic strategies, such as technological innovation and entrepreneurial ecosystems, to achieve restructuring and renewal processes for a sustainable economy; otherwise, recovery may fluctuate.
Contrarian thinking is a mindset that delves into the logic resulting from determined outcomes to re-understand and measure matters objectively, adjusting and optimizing existing solutions and strategies to eliminate potential long-term influence. This mindset offers new perspectives for the group to gain insight into the logic of a matter that is widely used in financial markets [63,64]. In line with Woodside [9], we are applying contrarian thinking to analyze the effect of the pandemic on China’s economy from the standpoint of economic recovery. This recovery-oriented approach may provide a more accurate assessment of the impact compared to the traditional perspective and facilitate the reassessment of dynamic economic performance. From a contrarian perspective, the diminishing impact of the pandemic does not necessarily signal economic recovery; instead, economic resilience signifies that the impact is waning. This study explores the subsequent effects of ongoing economic resilience and proposes a dynamic evaluation of the outcomes of effective economic recovery strategies at different stages. Therefore, this method, oriented towards economic recovery, allows for a dynamic and accurate assessment of economic consequences.

Based on the current theoretical framework of pandemic shock and economic resilience, this study makes a theoretical contribution to the circuit framework of the pandemic impact from a contrarian perspective (see Figure 13). There are several shapes of economic resilience, such as L-, V-, and W-shaped [65], along with S- and T-shaped resilience [5], as indicated in Figure 1. Based on resilience theory [5,65], an L-shaped recovery suggests a long-term economic influence. On the other hand, short-term impact can be represented by V-, S-, and T-shaped recoveries within a three-year period. Research has documented both long- and short-term impacts on industrial structure and economic indicators, therefore confirming a direct impact [18].

Figure 12. China’s GDP growth, along with a predicted rate in 2024.

5. Discussion

A vast majority of the literature, published at an early stage of the pandemic, investigates its potential shocks based on various scenarios, some of which are controversial because it is unlikely to accurately predict the profound consequences in a static situation, especially the long-term influence due to dynamic economic recovery and various factors. In contrast to existing studies, this study uses the principle of contrarian thinking from an economic recovery perspective to empirically examine the impact of the pandemic. From this viewpoint, the diminishing impact of the pandemic does not necessarily indicate economic recovery. Instead, economic resilience signifies that the impact is waning. This study explores the subsequent effects of ongoing economic resilience and proposes a dynamic evaluation of the outcomes of effective economic recovery strategies at different stages. Therefore, this method, oriented towards economic recovery, allows for a dynamic and accurate assessment of economic consequences.

Based on the current theoretical framework of pandemic shock and economic resilience, this study makes a theoretical contribution to the circuit framework of the pandemic impact from a contrarian perspective (see Figure 13). There are several shapes of economic resilience, such as L-, V-, and W-shaped [65], along with S- and T-shaped resilience [5], as indicated in Figure 1. Based on resilience theory [5,65], an L-shaped recovery suggests a long-term economic influence. On the other hand, short-term impact can be represented by V-, S-, and T-shaped recoveries within a three-year period. Research has documented both long- and short-term impacts on industrial structure and economic indicators, therefore confirming a direct impact [18].
The aforementioned studies show that different levels of impact result in heterogeneity in economic resilience and vice versa. Accordingly, efficient recovery policies may reduce the direct impact of the pandemic and eliminate its long-term effects. Furthermore, the relationship between these impacts was dynamic. An ongoing short-term shock that may not be completely addressed will potentially become a long-term shock, and vice versa. Similarly, it makes sense of the nexus between the direct and indirect impacts. Therefore, this study recommends contrarian thinking about dynamic consequences from a recovery perspective.

This framework is crucial for a comprehensive assessment of the pandemic’s impact on the Chinese economy. This study finds that China’s economy experienced a V-shaped recovery, was in the recovery process, and had almost achieved the pre-pandemic level. This finding suggests that the pandemic impact is long-term in China, which differs from the findings of Wu et al. [4] and Pan et al. [3], who simulated pandemic trends and their potential damage based on different scenarios. This kind of recovery is partially attributed to the Chinese government implementing a range of policies to stabilize traditional industries and foster new industrial drivers to promote national economic sustainability [66].

Although consumption, international trade, and investment indicators are recovering synchronously, empirical evidence shows a negative relationship between the pandemic and consumption rather than international trade and investment indicators. The large-scale and lasting lockdown and restrictions on public transportation [67], tourism [68], and catering sectors [45] may account for this result. We assume that the direct impact on the consumption sector is too short for the transition to the international trade and investment sectors. Additionally, the results reveal that the pandemic is unlikely to change China’s
industrial structure, which impacts the service and manufacturing industries but has no impact on agriculture. Generally speaking, the pandemic has directly impacted China’s economy because GDP growth has deviated from the pre-pandemic level. However, the impact is long-term because the national economy takes more than three years to recover and gradually approaches the pre-pandemic level, which remarkably affects national consumption and international trade, although the post-pandemic industrial structure remains unchanged and investment is less interrupted.

Based on these findings, we conclude that the direct impact on China’s economy is long-term and is expected to achieve a V-shaped recovery within the next year, provided that GDP increases by over 8.53 percent and is maintained around that rate. Meeting this economic target is challenging, so governors should accurately assess the dynamic pandemic impacts through different processes and implement corresponding solutions to deal with them as soon as possible, preventing long-term impacts on the economy.

This outcome-oriented principle from the framework effectively and efficiently addresses the impact of the pandemic on the global economy, particularly in developing economies. This is called looking back deeper, suggesting that governments should annually assess economic recovery performance and dynamically and accurately measure the pandemic impact, consequently optimizing the existing recovery strategies to achieve economic sustainability, as such crises may be viewed as a chance to realize a resilient and sustainable economy [69]. Building a sustainable and resilient economy requires a comprehensive and feasible system rather than fragmented policies. This principle is also applicable to other economic recessions caused by external shocks. This is the key contribution of the present study.

The dotted lines indicate prospective directions for further research, such as how the short-term impacts become long-term, how governmental countermeasures turn direct into indirect impacts, and how to address the direct impact of achieving S- or T-recovery for economic sustainability. From a contrarian perspective, the pandemic provokes some positive influences, such as air quality improvement [70], coastal cleanliness, environmental noise reduction [53], and carbon reduction [71]. Meanwhile, as the impact has remained for about four years, it is suggested that governments advance their economic resilience policies to cope with the long-term impact and build better restructuring or renewal processes. Consequently, developing a circular and sustainable economy will be a prevailing and profound topic in the future.

6. Conclusions

Through contrarian thinking from an economic recovery perspective, this study empirically investigated the direct impact of COVID-19 on China’s national economy in terms of economic factors such as consumption, investment, international trade, and industrial structure consisting of the agriculture, manufacturing, and service sectors. Considering the different types of economic recovery based on the processes of economic resilience, this study further assessed the direct impact that will potentially persist in the long run.

China’s economy took more than three years to approach V-shaped resilience, is still in the recovery process, and has almost reached the pre-pandemic level. The consumption, international trade, and investment indicators recovered synchronously. This kind of recovery may be attributed to the fact that the pandemic has had a direct and long-term impact on China’s economy, although it has remarkably affected national consumption, international trade, and investment, which are less interrupted. Empirical evidence showed that the pandemic is unlikely to change China’s industrial structure; it impacts the service and manufacturing industries but has no impact on agriculture. The post-pandemic GDP scale was still greater than the pre-pandemic scale, and the GDP growth rate was recovering and gradually approaching the pre-pandemic level. Based on these findings, we concluded that the direct impact on China’s economy is long-term and is expected to achieve a V-shaped recovery within the next year, provided that GDP increases by over 3.6 percent.
and achieves a restructuring process for a sustainable economy; otherwise, a fluctuating recovery may remain.

The principle of the updated theoretical framework suggested that the pandemic’s impact on the national economy depended on the pandemic itself and also on governmental countermeasures dealing with the impact. Governors should frequently assess their economic recovery performance, dynamically upgrade their solutions, and optimize existing strategies according to economic resilience. Consequently, the potential long-term influence will be eliminated from the direct impact, and a sustainable economy ultimately achieves this through technological innovation, entrepreneurial ecosystems, and industrial restructuring. Otherwise, the pandemic further accelerated the economic recession. Based on these findings, we concluded that looking back deeper and using contrarian thinking may facilitate an accurate assessment of the dynamic impact and optimize existing economic strategies to eliminate the potential long-term influence on a sustainable economy. These practical implications may facilitate the economic recovery of developing countries.

Author Contributions: X.L. was in charge of conceptualization, methodology, and writing the original draft; H.L. contributed to conceptualization, formal analysis, writing, review, and editing; Y.C. was in charge of data curation, resources, software, and visualization. All authors have read and agreed to the published version of the manuscript.

Funding: This study was supported by the Natural Science Research Fund of University Scheme by the Anhui Educational Bureau under grant number KJ2021A1199.

Institutional Review Board Statement: This study adheres to all ethical standards for conducting research without direct contact with human or animal subjects.

Informed Consent Statement: This study did not involve human participants.

Data Availability Statement: The data that support the findings of this study are available from the corresponding author upon reasonable request.

Conflicts of Interest: The authors declare no conflicts of interest.

Appendix A

Group A: Zero-reported countries

Source: https://tradingeconomics.com

Figure A1. Cont.
Group B: Developed countries

(US)

(CA)

(EU)

(UK)

(JP)

(AU)

Group C: Developing countries

(CN)

(BR)

Figure A1. Cont.
Group D: Underdeveloped Countries

![Graphs of Group D: Underdeveloped Countries](image-url)

---

**Figure A1.** Cont.
Figure A1. National Economic Rebound in Various Countries.

Appendix B

Table A1. China GDP Volume and Growth Rates.

<table>
<thead>
<tr>
<th>Years</th>
<th>GDP Volume (US$ Billion)</th>
<th>Growth Rates %</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>6087</td>
<td>10.6</td>
</tr>
<tr>
<td>2011</td>
<td>7551</td>
<td>9.6</td>
</tr>
<tr>
<td>2012</td>
<td>8532</td>
<td>7.9</td>
</tr>
<tr>
<td>2013</td>
<td>9570</td>
<td>7.8</td>
</tr>
<tr>
<td>2014</td>
<td>10,475</td>
<td>7.4</td>
</tr>
<tr>
<td>2015</td>
<td>11,061</td>
<td>7</td>
</tr>
<tr>
<td>2016</td>
<td>11,233</td>
<td>6.8</td>
</tr>
<tr>
<td>2017</td>
<td>12,310</td>
<td>6.9</td>
</tr>
<tr>
<td>2018</td>
<td>13,894</td>
<td>6.7</td>
</tr>
<tr>
<td>2019</td>
<td>14,279</td>
<td>6</td>
</tr>
<tr>
<td>2020</td>
<td>14,687</td>
<td>2.2</td>
</tr>
<tr>
<td>2021</td>
<td>17,820</td>
<td>8.1</td>
</tr>
<tr>
<td>2022</td>
<td>17,963</td>
<td>3</td>
</tr>
<tr>
<td>2023</td>
<td>18,490</td>
<td>5.2</td>
</tr>
<tr>
<td>2024</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

...... Default value λ

References


5. Martin, R. Regional economic resilience, hysteresis and recessionary shocks. J. Econ. Geogr. 2012, 12, 1–32. [CrossRef]


31. Hoarty, B.; Muri, S.M.; Pallotta, D.J.; Rogers, M.; Weinlagen, J.C.; Wilson, J.S. PPI and CPI seasonal adjustment during the COVID-19 pandemic. Mon. Labor Rev. 2022, 1–18. [CrossRef]
33. Asgary, A.; Anjum, M.I.; Azimi, N. Disaster recovery and business continuity after the 2010 flood in Pakistan: Case of small businesses. Int. J. Disaster Risk Reduct. 2012, 2, 46–56. [CrossRef]

44. Cambra-Fierro, J.; Gao, L.; Melero-Polo, I.; Patricio, L. Theories, constructs, and methodologies to study COVID-19 in the service industries. *Serv. Ind. J.* 2022, 42, 551–582. [CrossRef]


57. Lee, H.S. Exploring the initial impact of COVID-19 sentiment on US stock market using big data. *Sustainability* 2020, 12, 6648. [CrossRef]


