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The Impact of the COVID-19 Epidemic on China's Economy, Policy Implementation, and Future Prospects Impact on China's Economy

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Abstract: *The COVID-19 pandemic started in the first quarter of 2019 and has continued to impact the world through disruptions to global value chains and social and economic fallout because of policies taken to mitigate the spread of the virus and policies that were adopted subsequently to mitigate the economic impact of the pandemic. This paper aims to investigate the impact of COVID-19 on China's economy, domestic trade, foreign trade, and financial markets. This objective is achieved by using monthly data spanning from 2020 to 2022. I use autoregressive distributed lag (ARDL) models to analyze the impact of COVID-19 on the economy, trade, and financial markets. The results show that Covid-19 hurt the economy and financial markets and a positively impacted domestic trade.*

Keywords: *The COVID-19 Pandemic, Impact, Chinese Economy, Policies Implemented, Future Perspective*

1. Introduction

In the early quarter of 2020, the world was facing the dawn of a new decade with optimism and hope that the new beginnings would bring about a less divisive political atmosphere and an overall egalitarian economic environment. A cluster of pneumonia-like cases was detected in Wuhan, China, in late 2019, which was later discovered to be a new strain of the virus belonging to the same family that is responsible for a range oillnesseses from the common cold to Middle East respiratory syndrome (MERS- CoV) and severe acute respiratory syndrome (SARS-CoV)[1].

1.1 What differentiates Covid-19 from other pandemics?

Learning from the history of pandemics, it can be seen that influenza pandemics are a common occurrence, but Spanish the flu and Covid-19 seem to be the deadliest pandemics in the recent past. Some mortality estimates have been found to range from 24.7 to 39.3 million for the Spanish flu, 1- 4 million for Hong Kong flu and 1.5 - 4 million[2].

1.2 Research aim & objective

Studies have proved that Covid-19 indeed has a direct and indirect impact on both macroeconomic and socioeconomic factors. The novelty of the virus in terms of mortality and measures taken by governments have made this event an ideal natural experiment to establish a causal relationship between shocks and economic performance or general well-being.

2. Literature Review

2.1 Policy response to Covid-19

In response to the global pandemic, in order to reduce the spread of the virus, authorities around the world took measures ranging from policies for social isolation likes-lockdowns, closing education institutions, restricting mobility and social interactions, encouraging work- from-home and online education, and closing borders or preventing international travel[3]. The early stages of the Covid-19 pandemic set a puzzling policy problem for many countries[4]. Lack of consensus among experts about the severity of the virus, uncertainty, misinformation, lack of technical know-how, and other problems

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meant that it is spread could not be controlled in the early part of 2020[5]. However, subsequently, as the months went by some countries followed an on again off again lockdown policy as the pandemic intensity increased and decreased[6].

Preventive policies like social distancing were found to save several lives. This policy was not unique to Covid-19 but its roots trace back to the Spanish flu and most recently to the flu outbreak of 2009 in Mexico[7]. The main goal of social distancing was to "flatten the curve" i.e., to reduce the number of daily recorded cases[8].

2.2 Early predictions for macroeconomic repercussions of pandemics

As soon as the Covid-19 was declared a pandemic, several economists warned of significant economic effects drawing from experiences and studies based on earlier pandemics[9].

The impact of a pandemic on human lives cannot be quantified or interpreted by just looking at the macroeconomic scenario, because of how connected and diverse human lives are, such economic shocks or pandemics tend to impact different communities in different ways.

The majority of the brunt of hostility was borne by Asian communities. Tahmasbi's research shows that there was a significant increase in Sino-phobia especially as the number of cases rose[10]. Couch's research showed that unemployment due to Covid-19 was particularly high for mothers with school-aged children[11]. Studies by Almond and He in the context of China, found that air quality in terms of particulate matter, greenhouse gasses and other pollutants causing air pollution decreased by at least 25% in industrialized cities and ozone concentration increased by 40%[12].

2.3 Policies taken by China to mitigate the impact of Covid -19.

The response of the Chinese government to Covid -19 has come from all fronts of public governance-social, fiscal, monetary, and macroeconomic policies. These rules were adopted through a top-down leadership mechanism and were successful in containing the spread in a short period of time[13].

2.3.1 Medical containment policies

As the news circulated about the beginning of a pneumonia-like virus from Wuhan, the focus of the world shifted to China and a shadow of fear for a worldwide public health crisis began.

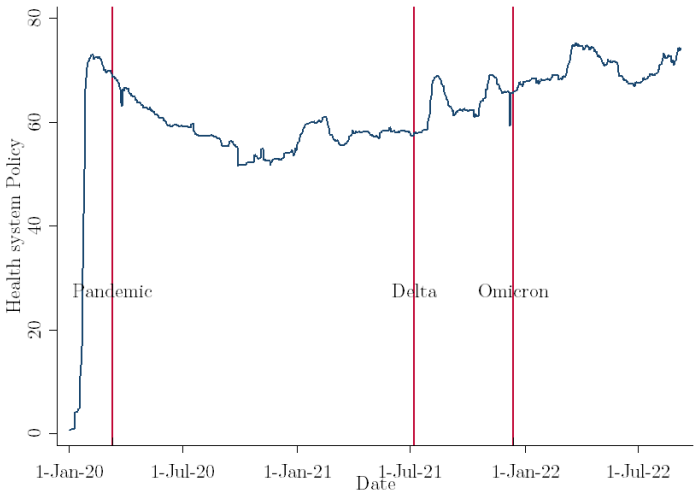

Figure 1: Medical Containment policies adopted by Chinese Government

The timeline of execution of these medical containment policies can be seen from the graph Figure 1, which tracks the policies adopted by the government daily from 2020 to the most recent update.

Source: Oxford Covid-19 Government Response Tracker

2.3.2 Social Policies

Anticipating such response, governments usually rollout a series of welfare programs ranging from

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an increase in social investments and public expenditure, extension or expansion of social protection programs and state intervention in welfare[14].

2.3.3 Economic Policies

About 4.7% of the Gross Domestic Product (GDP) was set aside as discretionary funds for pandemic control, production of medical-related equipment, tax relief, reduction in contribution to insurance by employers, etc.

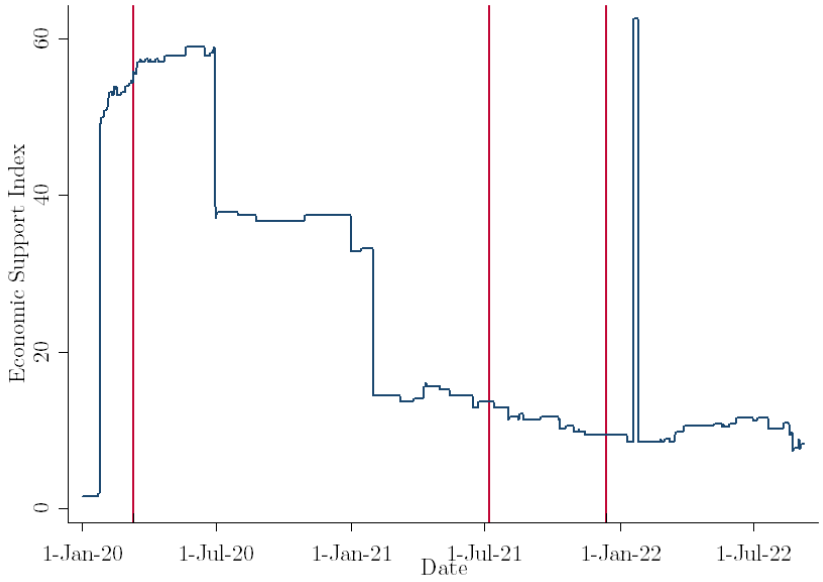

Figure 2: Economic policies adopted by Chinese Government

Similarly, to the time-series graph provided in earlier sections, the below graph in Figure 2 provides a visual representation of the economic policies taken by the Chinese government.

3. Methodology

3.1 Data

Table 1: Descriptive Statistics

	N	Mean	Std. Dev.	min	max
Gross Domestic Product (GDP)	30	4.606	.31	4.445	4.621
Total retail sales of consumer goods	29	10.474	.11	10.183	10.628
Total Value of Imports and Exports	33	19.947	.158	19.674	20.19
Composite index (SSE)	33	8.101	.077	7.919	8.2
Economic Support Index	30	2.999	.682	2.153	4.064
Containment and Health Index	30	4.089	.242	2.921	4.305
Government Response Index	30	4.014	.234	2.868	4.242
Stringency Index	30	3.965	.232	2.986	4.342
Confirmed Cases	30	8.73	.807	5.467	10.456
Confirmed Deaths	30	5.492	.743	1.715	5.789

Table 1 provides the summary statistics for the variables used. In order to normalize the data, I have the log transformed all the series. The total number of observations ranges from 29 to 30, so we have a small sample. On average, the mean ESI, CHI, GRI and SI are 3,4,4 and 4 respectively.

3.2 Research method

Deriving from the model of Habibi, the empirical models utilized in this study are:

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$$\log(GDP_t) = \beta_0 + \beta_1 \log(Cases_t) + \beta_2 \log(Deaths_t) + \beta_3 \log(GRI_t) + \beta_4 \log(SI_t) + \beta_5 \log(CHI_t) + \beta_6 \log(ESI_t) + \varepsilon_t \quad (1)$$

$$\log(TotalRetailSales_t) = \beta_0 + \beta_1 \log(Cases_t) + \beta_5 \log(CHI_t) + \beta_6 \log(ESI_t) + \varepsilon_t \quad (2)$$

$$\log(TotalIXvalue_t) = \beta_0 + \beta_1 \log(Cases_t) + \beta_5 \log(CHI_t) + \beta_6 \log(ESI_t) + \varepsilon_t \quad (3)$$

$$\log(SSE_t) = \beta_0 + \beta_1 \log(Cases_t) + \beta_5 \log(CHI_t) + \beta_6 \log(ESI_t) + \varepsilon_t \quad (4)$$

Where ε_t is the error term and the subscript "t" refers to the values in a particular month between the period January 2020 to January 2022.

Table 2: Unit Root Tests

Series	Level	
	Intercept	Trend & Intercept
Gross Domestic Product(GDP)	-4.498***	-4.552***
Total retail sales of consumer goods	-2.239	-2.051
Total Value of Imports and Exports	-2.281	-3.625***
SSE Composite index	-1.868	-1.629
Economic Support Index	-1.627	-6.102***
Containment and Health Index	-12.298***	-13.584***
Government Response Index	-13.810***	-13.201***
Stringency Index	-8.170***	-7.772***
Confirmed Cases	-5.214***	-6.295***
Confirmed Deaths	-82.595***	-85.218***

$*p<0.1$; $**p<0.05$; $***p<0.01$

The Tables2 show the results of the Dickey-Fuller test at level and first difference.

3.3 Pandemic and its impact on foreign trade

Since autoregressive distributed lag (ARDL) is chosen as the empirical mode, the corresponding autoregressive distributed lag (ARDL) equation for (vii) is formulated as

$$\begin{aligned} &\Delta \log(TotalIXvalue)_t \\ &= \alpha_0 \\ &+ \alpha_1 \sum_{i=1}^{n} \Delta \log(TotalIXvalue)_t + \alpha_2 \sum_{i=1}^{n} \Delta \log(Cases)_t + \alpha_3 \sum_{i=1}^{n} \Delta \log(CHI)_t \\ &+ \alpha_4 \sum_{i=1}^{n} \Delta \log(ESI)_t + \beta_1 \log(TotalIXvalue_{t-1}) + \beta_2 \log(Cases_{t-4}) \\ &+ \beta_3 \log(CHI_{t-1}) + \beta_4 \log(ESI_{t-1}) + \varepsilon_t \end{aligned}$$

This model provides both short-run and long-run in a single model. The error correction models (ECM) model is as follows:

$$\begin{aligned} &\Delta \log(TotalIXvalue)_t \\ &= \alpha_0 \\ &+ \alpha_1 \sum_{i=1}^{n} \Delta \log(TotalIXvalue)_t + \alpha_2 \sum_{i=1}^{n} \Delta \log(Cases)_t + \alpha_3 \sum_{i=1}^{n} \Delta \log(CHI)_t \\ &+ \alpha_4 \sum_{i=1}^{n} \Delta \log(ESI)_t + \lambda EC_{t-1} + u_t \end{aligned}$$

3.4 Pandemic and its impact on financial markets

Since autoregressive distributed lag (ARDL) is chosen as the empirical mode, the corresponding autoregressive distributed lag (ARDL) equation for (viii) is formulated as below:

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$$\Delta \log(SSE)_t = \alpha_0 + \alpha_1 \sum_{i=1}^{n} \Delta \log(SSE)_t + \alpha_2 \sum_{i=1}^{n} \Delta \log(Cases)_t + \alpha_3 \sum_{i=1}^{n} \Delta \log(CHI)_t + \alpha_4 \sum_{i=1}^{n} \Delta \log(ESI)_t + \beta_1 \log(SSE_{t-1}) + \beta_2 \log(Cases_{t-4}) + \beta_3 \log(CHI_{t-1}) + \beta_4 \log(ESI_{t-1}) + \varepsilon_t$$

4. Analysis & Findings

4.1 Impact on GDP

Table 3: Impact of Covid-19 on GDP

Dependent Variable = GDP	Coefficients
λ	-0.012**
	(0.005)
Long Run	
Cases	0.161
	(0.105)
ESI	0.002
	(0.004)
CHI	0.051
	(0.043)
Short Run	
ΔGDP	1.006***
	(0.024)
ΔCase	-0.002**
	(0.001)
LΔ Case	-0.002**
	(0.001)
L2Δ Case	-0.003**
	(0.001)
L3Δ. Case	0.000**
	(0.000)
Δ1.ESI	-0.000
	(0.000)
Δ1.CHI	-0.000
	(0.000)
Constant	0.036
	(0.027)
R2	0.99

Standard errors are in brackets (). ∗p<0.1; ∗∗p<0.05; ∗∗∗p<0.01

The estimates of the long-run relationship of autoregressive distributed lag (ARDL) GDP model (2,4,1,1) are provided in table 3.

Table 4: Diagnostic Tests

Diagnostic Test	Estimate [p-value]
DB-Watson	1.578
X^2_{Auto}	2.319 [0.128]
X^2_{White}	26.00 [0.407]
X^2_{Norm}	0.678 [0.712]

The diagnostic tests are provided in Table 4. The first diagnostic test performed is the Durbin-Watson test which tests the first-order auto-correlation among the variables and the null hypothesis of

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this test is that there is no auto-correlation.

4.2 Impact on Domestic trade

Table 5: Impact of Covid-19 on Domestic trade

Dependent Variable = $TotalRetailSales$	Coefficients
Total Retail Sales	
L1Total Retail Sales	2.984
	(1.029)
L2	-0.371
	(0.305)
L3	2.130*
	(0.661)
Cases	-0.167
	(4.363)
L1	-10.783
	(5.370)
L2	20.584*
	(6.046)
L3	-21.079
	(9.368)
L4	0.115
	(0.303)
ESI	-0.524
	(0.503)
L1	-0.308
	(0.194)
CHI	0.322
	(0.470)
L1	1.211
	(0.383)
Constant	55.133
	(38.519)
R2	0.98

Only the autoregressive distributed lag (ARDL) model is estimated, as the bounds test shows that there is no co-integration. The results of the autoregressive distributed lag (ARDL) model are provided in Table 5.

Table 6: Diagnostic Tests

Diagnostic Test	Estimate [p-value]
DB-Watson	1.455
X^2_{Auto}	0.734 [0.392]
X^2_{White}	15.00 [0.378]
X^2_{Norm}	0.53 [0.764]

The diagnostic tests are provided in Table 6. I perform the Breusch-Godfrey Lagrange multiplier (LM) test for auto-correlation.

4.3 Impact on foreign trade

The estimates of the long-run relationship of autoregressive distributed lag (ARDL) GDP model (1,4,1,1) are provided in Table 7.

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Table 7: Impact of Covid-19 on Foreign Trade

Dependent Variable = $TotalIXvalue$	Coefficients
λ	-0.775***
	(0.154)
Long Run	
Cases	-0.597
	(1.075)
ESI	-0.178*
	(0.085)
CHI	0.061
	(0.498)
Short Run	
Δ1 Cases	0.378
	(0.852)
LΔ Cases	-0.565
	(0.790)
L2Δ Cases	-0.706
	(1.108)
L3Δ. Cases	-0.512
	(0.170)
Δ1.ESI	0.303***
	(0.057)
Δ1.CHI	0.387
	(0.343)
Constant	19.741**
	(5.090)
R2	0.80

Standard errors are in brackets (). ∗p<0.1; ∗∗p<0.05; ∗∗∗p<0.01

4.3.1 Diagnostic Tests

Table 8: Diagnostic Tests

Diagnostic Test	Estimate [p-value]
DB-Watson	2.034
X^2_{Auto}	0.019 [0.891]
X^2_{White}	26.00 [0.408]
X^2_{Norm}	0.792 [0.673]

The diagnostic tests are provided in Table 8.

4.3.2 Diagnostic Tests

Table 9: Diagnostic Tests

Diagnostic Test	Estimate [p-value]
DB-Watson	1.989
X^2_{Auto}	0.002 [0.961]
X^2_{White}	26.00 [0.408]
X^2_{Norm}	0.686 [0.710]

The diagnostic tests are provided in Table 9.

5. Recommendations

As seen in the above analysis, Covid-19 has a significantly negative impact on the economy and financial markets. Also evidenced from other studies, Covid -19 had an overall negative impact on all aspects of human life. It is essential that the government and other stakeholders come together to mitigate the negative impact of Covid -19.

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6. Conclusion

The Covid-19 pandemic proved to be a shock, impacting all aspects of human behavior – social interaction, consumer behavior, and welfare, etc., Apart from a growing plethora of studies studying the impact on all the relevant, outcomes, one particular area has become particularly important at present.

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