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Covid-19 Impact on the Indian Economy

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Keywords

Covid-19; Economy; GDP; Impulse response function; Unemployment; VAR.

Abstract

This study has focused on the Indian economy during the pandemic to forecast how the COVID-19 viral epidemic has affected India's economic productivity. A forecast on how the economic shutdown has impacted India's Gross Domestic Product was carried out using the unemployment rate as a labor component and againstthe measure of economic activity (GDP). Tests like the Augmented Dickey-Fuller Unit Root Test, Vector Autoregressive Model (VAR), and Impulse Response were employed to study whether there is a short-run relation between the chosen variables. It is found that the GDP and unemployment have an antagonistic relationship. Through VAR, it indicated that there is an inverse relationship between employment and GDP. The impulse response function also confirmed the VAR findings by depicting an inverse relationship between GDP and unemployment. Recent policies have reduced financing for public R&D and restricted the influx of immigrants with specialized talents. To encourage more robust product development in the future, these policies must bechanged because they were a grave error.

Introduction

The epidemic of the Coronavirus Disease of 2019 (COVID-19), which ushered in the year 2020, was brought on by the SARS-CoV-2 virus (also known as SARS-CoV-2). In Wuhan, China, in December 2019, it was first recognized as an atypical pneumonia case. Nevertheless, it has spread across the nation.

Since the epidemic started in December 2019, the number of confirmed COVID-19 cases around the world has increased by fourfold every few days. Such a rise has taken place in spite of numerous measures, including social distance (also known as physical distance), and telework, resulting in the closure of schools and universities, opening facilities for quarantines, cancellation of sporting events, cruises, festivals, and other such events. There have been more than 10.23 million

confirmed COVID-19 infections worldwide, with more than 500,000 fatalities (World Health Organization, 2020).

The spread of COVID-19 in India did not initially cause significant concern. There were more confirmed COVID-19 cases and fatalities than in any other country, but things suddenly became worse. In India, there were no verified COVID-19 cases in January 2020, but this number sharply rose in the following months. The New York Times claimed that India's COVID-19 death toll is significantly underreported. According to official government figures, there are more than 40 million confirmed cases but only 5,28,312 verified deaths in India. Based on the number of cases and the infection mortality rate, several media sources and scientists estimate that the actual death toll is between 8,00,000 to 1.6 million, which is around 2-3 times more than reported cases. Such a dire situation occurred due to lack of hospital beds, nurses, doctors, and other medical professionals, as well as inadequate supplies of essential medical equipment like oxygen and ventilators.

Orkideh Gharehgozli et al. (2020) employed a VAR model to examine the effect of COVID- 19 on the Gross Domestic Product (GDP) of New York. The study uses the total weekly MTA card swipes and the total weekly claims for U.S. unemployment insurance. This study observes if there is a short-run relationship between the studies' weekly GDP and the unemployment rate in addition to fitting a shock when introduced in the future date is affecting the past data. With a population of 1.41 billion, it is felt that the unemployment rate is still one of the most important figures to consider to accurately capture and visualize economic activity, early on in the outbreak. The unemployment rate has significantly increased during the pandemic which is bad for India which already has an excess workforce.

The structure of this article's body is as follows. Section 2: Review of the Literature, Section3: Information Gathering and methods used, Section 4: Analysis and Interpretation, Section 5: Conclusion.

Review of literature

This section outlines the important data that was acquired for this research through reading numerous articles. Michael Konig, et.al (2020) analyze the effects of lockdown regulations forced social isolation and COVID-19 fatality rates induced voluntary social isolation on GDP growth for a sample of 42 nations in the first three quarters of 2020. They used Instrumental variable regressions and OLS regressions and concluded that from an economicst and point, every effort should be made to avoid harsh lockdowns because any increase in lockout intensity will lead to detrimental consequences on economic activity. However, they also found that tight lockdowns may still be a useful economic policy tool if it is successful in reducing health risks. David Havrlant, et.al (2020) observed that individual economic sectors have been exposed to the economic lockdown. The estimation was carried out in the Saudi economy using IO models which assist in determining how different government policies and initiatives affect a certain sector, a collection of sectors, or the entire economy. They found that the COVID-19 economic lockout has a negative effect on real GDP and caused a 7.2% divergence from the baseline level. The simulation also addresses the Saudi government's fiscal actions to safeguard the economy and lessen the effects of COVID-19. Direct fiscal support, which mostly benefits the private sector, has a positive impact on real GDP of 2.5%. In the hypothetical scenario where the COVID-19 crisis did not arise, the economy grew by 2% between 2019 and 2020 and projected that real GDP would decrease by 3.0% a year in 2020.

While Sanjita Jaipuria et al. (2020) study on the tourism business was found significantly impacted by the spread of COVID-19. They stated that to stop the virus from spreading, all economic activity, including production, consumption, and commerce, must cease. Whereas Monika Chaudhary et al. (2020), pointed out the high likelihood of COVID-19 causing a global recession in the year 2020 or in 2021. It may be due to its uniqueness in bringing a supply shock, a demand shock, and a market shock.

The spread of COVID-19 in India has tested the country's capacity to fight a pandemic in terms of its technological capability, governmental actions, and health infrastructure, as per Isha Goel et al (2020).

In 2021, Pradyot Ranjan Jena and others researched how Covid-19 affected the GDP of major economies (USA, Mexico, Italy, Germany, Spain, France, Japan, and India). The countries during the pandemic were found lowering interest rates, by majority of central banks to pump cash into the economy.

R. Ramakumar, et.al (2020) analyzed the impact of Covid 19 using the Leontief matrix and the I-O models and discovered that an extraordinary economic catastrophe had coincided with the health crisis, in which supply and demand both declined simultaneously and independently while also depressing one another in feedback loops. The fact that the Indian economy had been going down for more than a decade before the pandemic led to an increase in the severity of the issue.

From the numerous articles referred, it was found that Orkideh Gharehgozli et al. (2020) is closely related to this study. They have examined the effect of COVID-19 on the U.S economy while this paper has used their model and replicated the same on the Indian economy during Covid-19.

Information gathering and method used

To conduct this research using secondary data; GDP and Unemployment from The Reserve Bank of India's Data Warehouse was referred which manages the entire database on the Indian Economy. The selected data ranges from December 2019 (Beginning of pandemic in India) to March 2022.

3-Step Research Model

The steps taken to carry the study were: Step 1 is checking the stationarity of data and ensuring that data does not possess a unit root. Furthermore, in Step 2 VAR model is included and finally Impulse Response function is portrayed which is followed by discussion of the findings.

Step 1:

Augmented Dickey Fuller Test

It provides assurance on the stationarity and reliability of the data being studied. By conducting this test as a primary step, we can conclude whether or not data being used for the study possess unit root or not.

Step 2:

Vector Autoregressive Model

A common method for examining the relationships between variables and drawing conclusions about how a system has historically changed is called vector auto regression (VAR) (e.g., an economy). However, because of the complex dynamics of VARs, it is typically neither a simple nor useful task to interpret the estimated coefficients of the model when doing so. However, VAR is utilized to determine whether or not there is a short run link among the chosen variables. Impulse response function was employed in addition to the short run relationship since it is a more illuminating statistic (Stock and Watson, 2001).

Step 3:

Impulse Response

The original impulse responses with conditional error bands are represented as solid (blue) lines with squares and corresponding dashed (blue) lines. The solid (red) line with circles represents the conditional answer given this counterfactual in the top panel whereas it represents the counterfactual response in the bottom graph.

The p-value at the bottom of the graph is a test result that quantifies the gap between the sample estimates and the conditioning event.

The system's response to an interesting shock is measured by the Impulse Response Function (IRF). IRFs obtained from the model will, unfortunately, be biased and deceptive if the

underlying data generation process (DGP) cannot be well modelled by a VAR (p) process. Using local projections instead of the genuine multivariate dynamic system's unknown specification and estimation, Jordà (2005) proposed a different approach for computing IRFs.

The blue line represents the impulse response function, while the red line represents the 95% confidence interval. The blue line should be beneath both the red lines.

Analysis and Interpretation

Tables 1 and 2 indicate the results of the unit root test (Augmented Dickey-Fuller Test) at the first difference. Both sets of data are found stationary and do not have a unit root.

Table 1: ADF (Augmented Dickey-Fuller Test) Unit Root Test for GDP

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.865574	0.0007
Test critical values:	1% level	-3.724070	
	5% level	-2.986225	
	10% level	**-2.632604**	

Source: Secondary Data

Table 2: ADF (Augmented Dickey-Fuller Test) Unit Root Test for Unemployment

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.591124	0.0013
Test critical values:	1% level	-3.724070	
	5% level	-2.986225	
	10% level	-2.632604	

Source: Secondary data

Two lags is chosen as the optimal latency based on various informational criteria. There is no cointegrating equation (based on the Johansen Cointegration and stationarity Test). Both the lag time of the series have a detrimental impact on the present (VAR, Table 3). Based on the Wald test (Test output will be disclosed on individual request), it is discovered that both thelags exhibit a short-run association. GDP and employment are inversely correlated, which means that as GDP rises, employment rate falls.

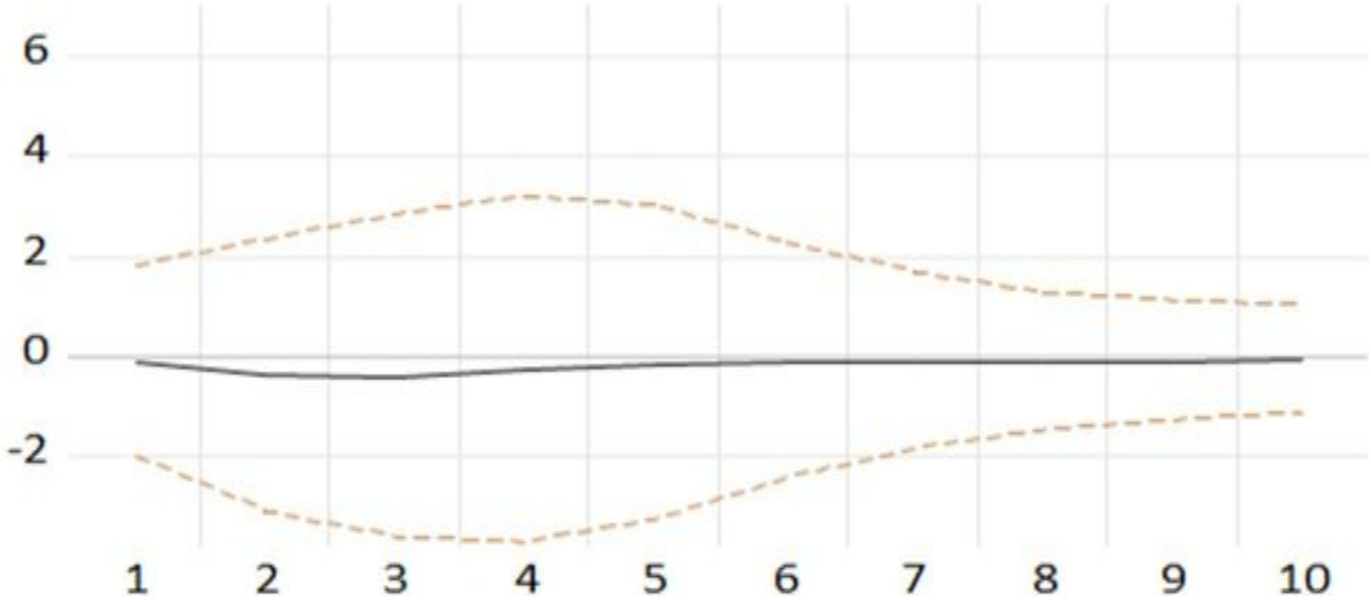
Table 3: Vector Autoregressive Model

Unemployment = C (1) *Unemployment (-1) + C (2) * Unemployment (-2) + C (3) *GDP (-1) +C (4) *GDP (-2) + C (5)

	Coefficient	Std. Error	t - Statistic	Prob.
Unemployment (-1)	0.718304	0.207479	3.462052	0.0025
Unemployment (-2)	-0.370299	0.208414	-1.776749	0.0908
GDP (-1)	-0.024037	0.172901	-0.139021	0.8908
GDP (-2)	0.042439	0.189160	0.224355	0.8284
Constant (5)	5.827444	2.049396	2.843493	0.0100
R-squared	0.376810		Mean dependent va	9.010800
Adjusted R-squared	0.252172		S.D. dependent var	4.297455
S.E. of regression	3.716312		Akaike info criterion	5.640197
Sum squared residual	276.2194		Schwarz criterion	5.883972
Log-likelihood	-65.50246		Hannan-Quinn criteria	5.707810
F-statistic	3.023237		Durbin-Watson stat	1.928869
Prob(F-statistic)	0.042126			

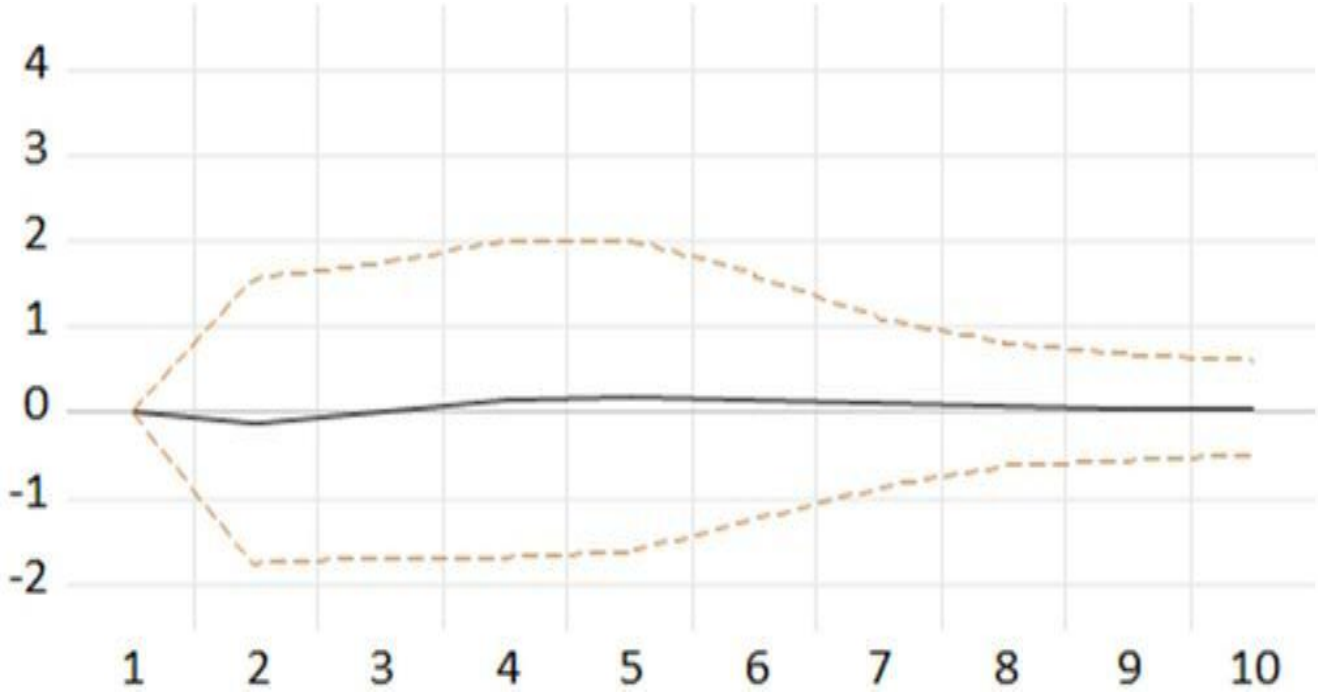
Source: Secondary Data

Fig: 1: Impulse Response of Unemployment to GDP Innovation



Source: Secondary Data

Fig: 2 Impulse Response of GDP to Unemployment



Source: Secondary Data

Conclusion

This paper examined the impact of the COVID-19 outbreak on India's economic production and the labor scenario prevailing during the time. To predict and evaluate the impact of the outbreak on India's GDP after thepandemic, a three-step VAR model is used. In the first step, the impact of unemployment on GDP was assessed and determined that there is an inverse relationship between employment and GDP. In the first latency, GDP has a negative influence on employment.

The impulse response function confirmed the VAR findings by depicting an inverse relationship between GDP and unemployment. If GDP increases, unemployment decreases, and if GDP declines, unemployment rises. Theauthors suggest a job training boot camp or a plan to aid in restoring employment in the short term. Such measures may also help in the Long-term as it can potentially quicken the rate of growth. Robots, artificial intelligence, and the internet of things, for instance, are just a few of the intriguing technologies that are currently being developed or that are soon to be adapted widely in the near future. To profit from these technological advancements and its productivity gains, a skilled workforce is also necessary.

Recent policies have reduced financing for public R&D and restricted the influx of immigrants with specialized talents. To encourage more robust product development in the future, these policies must be changed because they were a grave error.

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