FORECASTING RECESSION IN INDIA AFTER COVID-19

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ABSTRACT

The project discusss about recession and its impact on economies. It also discusses about the possibilities of forecasting recession in India. The code provided alongwith this project are of great help and seek some scope of improvements as well. I would like to extend my gratitude to our course instructor Parthiban Srinivasan. The project helped me gain deeper insights in the field of machine learning and economics. I also urge for a guided support to help me take this further and deliver possible solutions.

INTRODUCTION

In economics, a **recession** is a business cycle contraction when there is a general decline in economic activity. Recessions generally occur when there is a widespread drop in spending (an adverse demand shock). This may be triggered by various events, such as a financial crisis, an external trade shock, an adverse supply shock, the bursting of an economic bubble, or a large-scale anthropogenic or natural disaster (e.g. a pandemic).

A recession is a significant, widespread, and prolonged downturn in economic activity. A common rule of thumb is that two consecutive quarters of negative gross domestic product (GDP) growth mean recession, although more complex formulas are also used.

Economists at the National Bureau of Economic Research (NBER) measure recessions by looking at nonfarm payrolls, industrial production, and retail sales, among other indicators, going far beyond the simpler (although not as accurate) two-quarters of negative GDP measure. However, the NBER also says there is “no fixed rule about what measures contribute information to the process or how they are weighted in our decisions.”

COVID-19 AND RECESSION

The **COVID-19 recession**, also referred to as the **Great Lockdown**, is a global economic recession caused by the COVID-19 pandemic. The recession began in most countries in February 2020.

After a year of a global economic slowdown that saw a stagnation of economic growth and consumer activity, the COVID-19 lockdowns and other precautions taken in early 2020 drove the global economy into crisis. Within seven months, every advanced economy had fallen into recession

The first major sign of recession was the 2020 stock market crash, which saw major indices drop 20 to 30% in late February and March. Recovery began in early April 2020; by April 2022, the GDP for most major economies had either returned to or exceeded pre-pandemic levels, and many market indices recovered or even set new records by late 2020.

The recession saw unusually high and rapid increases in unemployment in many countries. By October 2020, more than 10 million unemployment cases had been filed in the United States, swamping state-funded unemployment insurance computer systems and processes. The United Nations (UN) predicted in April 2020 that global unemployment would wipe out 6.7% of working hours globally in the second quarter of 2020—equivalent to 195

million full-time workers. In some countries, unemployment was expected to be around 10%, with more severely affected nations by the pandemic having higher unemployment rates. Developing countries were also affected by a drop in remittance and exacerbating COVID-19 pandemic–related famines.

The recession and the 2020 Russia–Saudi Arabia oil price war led to a drop in oil prices; the collapse of tourism, the hospitality industry, and the energy industry; and a downturn in consumer activity compared to the previous decade. The 2021–2022 global energy crisis was driven by a global surge in demand as the world exited the early recession caused by the pandemic, particularly due to strong energy demand in Asia.[This was then further exacerbated by the reaction to escalations of the Russo-Ukrainian War, culminating in the 2022 Russian invasion of Ukraine and the 2022 Russian debt default.

IMPACT OF COVID-19 ON INDIAN ECONOMY

The outbreak of Covid-19 has had a significant impact on the Indian economy. The lockdown imposed by the government in an attempt to contain the spread of the virus has resulted in a sharp decline in economic activity. This has had a knock-on effect on jobs, with many people being laid off or facing reduced hours and pay. The tourism

and hospitality sector has been particularly hard hit, with many hotels and restaurants closing down. The manufacturing sector has also been affected, with supply chains being disrupted and demand for many products falling. The stock market has also taken a hit, with the Sensex falling by around 30% since the start of the year.

The impact of Covid-19 is likely to be felt for some time to come. The International Monetary Fund has forecast that the Indian economy will contract by around 4.5% this year. This is a significant decline from the 7% growth that was forecast just a few months ago. The IMF has also warned that the global economy is facing its worst recession since the Great Depression of the 1930s.

The government has announced a number of measures to try and mitigate the impact of the virus on the economy. These include a Rs 1.7 trillion relief package for businesses and workers, as well as a three-month moratorium on loan repayments. The Reserve Bank of India has also cut interest rates and injected liquidity into the banking system.

It is still too early to say how effective these measures will be in tackling the economic fallout from Covid-19. However, it is clear that the pandemic has dealt a severe blow to the Indian economy and its recovery is likely to be slow and difficult.

RECESSION IN INDIA AND IT'S FORECASTING

There has been a lot of talk about a possible recession in India. While it is difficult to predict the future, some signs suggest a recession may be on the horizon. One of the most obvious signs that a recession may be coming is the slowing of the economy. India's GDP growth has been slowing for a few quarters now and is expected to continue to do so. This is a classic sign of an impending recession. Another sign that a recession may be coming is the stock market. The stock market has been volatile recently and has seen some significant swings. This is often a sign that investors are worried about the economy's future and are starting to pull their money out. Finally, another sign that a recession may be coming is the increase in unemployment. Unemployment has been rising in India for the past few months and is expected to continue to do so. This is a significant concern as it means that more and more people are struggling to make ends meet. While these are just some of the signs that a recession may be coming, it is essential to remember that it is impossible to predict the future. However, if you are concerned about the possibility of a recession, it is important to take steps to protect yourself and your finances.

While there have been many attempts to forecast the recession and its future in India, machine learning and econometric models pave the way to be on. In the past, time series forecasting has seen an enormous surge in its application in various finance and economics domains. Complementing it, machine learning has also been a great tool for making predictions, decisions, and policy-driven decisions. Models like ARIMA and ARMA have given us an upper hand in time series forecasting. But forecasting recession requires a more probabilistic oriented approach than making it a complete time series problem. The probability of whether a recession will come or not can help us plan and make appropriate decisions during policy formulation.

Now, a great question arises which model will suit the best in this approach as many methods are being devised each day to formulate new algorithms and machine learning models. To overcome this, we can compare all the classifiers present and then choose the best one. This was done using the Lazy Predict library of python that helped compare various models and then perform parameter tuning of the best classifier to make it more robust. Studies have been done in the past involving LSTM Neural Networks and Machine Learning models like Random Forest, Adaboost Classifier, and Logistic Regression to predict the probability of occurrence of recession in the US. No such efforts have been made in the Indian domain, and

my approach is the first among all approaches made in predicting a recession in India. The problem that was faced in the course of the study and application was the lack of availability of the data. FRED is one of the trusted data sources for economists to carry out studies in economics. The source doesn't have enough data for the Indian Market and Economy when discussing recession-specific data. The lack of data availability put me on backfoot while going for the Neural Network, especially the LSTM and Bi-LSTM, because the network will overfit the data or will not give accurate results due to a lack of data for training. I have discussed each plot in the code and have shown some here. The indicators used are related to those used in earlier studies for the US recession.

SCOPE OF IMPROVEMENT

The project possesses a great scope for improvement. There is a possibility of the application of Neural Networks to the Data. We can apply Neural Networks like LSTM if were are able to gather enough data and produce much effective predictions. We can also use the LSTM for time series prediction which machine learning classifiers like Adaboost can follow to get effective probabilistic measures. The project will greatly support Indian economics if I am provided with well-guided supervision. It can benefit the

Indain Economy with millions of dollars if we come out with an effective solution.

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