



EMERALD POINTS

**ECONOMIC POLICY  
UNCERTAINTY  
AND THE INDIAN  
ECONOMY**

**RAKTIM GHOSH  
AND  
BHASKAR BAGCHI**



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BY

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INVESTOR IN PEOPLE

*To the Holy Feet of  
Lord Venkateshwara Swamy*



*In Loving Memory of*

***Late Smt. Nihar Bagchi***

(26.04.1941 - 30.07.2020)



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# LIST OF ABBREVIATIONS

- ADF – Augmented Dickey–Fuller  
AIDS – Acquired Immune Deficiency Syndrome  
ARIMA – Autoregressive Integrated Moving Average  
AR – Autoregressive  
ARCH-IM – Autoregressive Conditional Heteroscedasticity–Lagrange Multiplier  
ARDL – Autoregressive Distributed Lag  
BOLT – BSE Online Trading  
BRICS – Brazil, Russia, India, China, and South Africa  
BSE SENSEX – Bombay Stock Exchange Sensitive Index  
BTC – Bitcoin  
CAD – Current Account Deficit  
CEE – Central and Eastern European  
COVID – Coronavirus  
DCC-MGARCH – Dynamic Conditional Correlation–Multivariate generalized Autoregressive Conditional Heteroskedasticity  
DF – Dickey–Fuller  
DIPP – Department of Industrial Policy and Promotion  
DJIM – Dow Jones Islamic Market  
EoDB – Ease of Doing Business  
EPU – Economic Policy Uncertainty  
EPZ – Export Processing Zone  
EU – European Union  
FC – Factor Cost  
FCI – Food Corporation of India  
FDI – Foreign Direct Investment  
FIGARCH – Fractionally Integrated Generalized Autoregressive Conditional Heteroscedasticity  
FOB – Free on Board  
FPI – Foreign Portfolio Investment  
FRED – Federal Reserve Economic Data  
G7 – Group of Seven  
GARCH – generalized Autoregressive Conditional Heteroscedasticity  
GDP – Gross Domestic Product  
GEPU – Global Economic Policy Uncertainty  
GGM – Gaussian Graphical Model

GMO – Genetically Modified Organism  
GVAR – Global Vector Autoregression  
H1N1 – Haemagglutinin Type 1 and Neuraminidase Type 1  
HIV – Human Immunodeficiency Virus  
ICSS – Iterated Cumulative Sum of Squares  
IMF – International Monetary Fund  
IOC – Indian Oil Corporation  
KPSS – Kwiatkowski–Phillips–Schmidt–Shin  
MLE – Maximum Likelihood Estimation  
MPU – Monetary Policy Uncertainty  
MRS – Markov Regime Switching  
NATO – North Atlantic Treaty Organization  
NIFTY 50 – National Stock Exchange 50  
NSDL – National Securities Depository Limited  
NSE – National Stock Exchange  
OLS – Ordinary Least Squares  
PP – Phillips–Perron  
PPE – Personal Protective Equipment  
QQR – Quantile-on-Quantile Regression  
RBI – Reserve Bank of India  
REER – Real Effective Exchange Rate  
SBI – State Bank of India  
S&P – Standard and Poor  
SEBI – Securities and Exchange Board of India  
SEZ – Special Economic Zone  
SSSS – Stochastic Search Specification Selection  
SVAR – Structural Vector Autoregressive Model  
T-bill – Treasury Bill  
TGARCH – Threshold Generalized Autoregressive Conditional Heteroskedasticity  
TVP-VAR – Time-Varying Parameter Vector Autoregression  
UK – United Kingdom  
UNCTAD – United Nations Conference on Trade and Development  
USA – United States of America  
USD – United States Dollar  
USSR – Union of Soviet Socialist Republics  
VAR – Vector Autoregression  
VC – Venture Capital  
VECM – Vector Error Correction Model  
VIX – Volatility Index  
WHO – World Health Organization

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# PREFACE

This study empirically investigates the effects of economic policy uncertainty (EPU) on the Indian economy and stock markets in times of different crises like global recession, COVID-19 pandemic, and Russia–Ukraine conflict. Simultaneously, it measures the impact of the conflict between Russia and Ukraine on the Indian economy by analysing the effect of surging crude oil price on the Indian stock market indices and the real effective exchange rate (REER) using daily data from 24 February 2022 to 29 July 2022. Moreover, it also measures and analyses the long-run and short-run relationship between the EPU index and select Indian macroeconomic variables like export of goods and services of India, import of goods and services of India, foreign direct investment (FDI) in India (net), foreign portfolio investment (net), treasury bill (T-bill) yields (364 days), and gross domestic product (GDP) along with stock market indices from India like Bombay Stock Exchange Sensitive Index (BSE Sensex) and National Stock Exchange 50 (NIFTY 50). The study furthermore examines the changeover in a relationship (if any) among the select variables during the global financial recession period (from December 2007 to June 2009), pre-recession period (from April 2003 to November 2007), post-recession along with pre-COVID-19 period (from July 2009 to February 2020) and COVID-19 period (from March 2020 to January 2022). Moreover, the causal relationship between the EPU index, select macroeconomic variables, and Indian stock market indices along with the regime-switching behaviour of the select variables during the global recession period, pre-recession period, post-recession along with pre-COVID-19 period and COVID-19 period, that is, from low-volatility regime to high-volatility regime and vice versa is also measured. The volatility spillovers among the EPU index, select macroeconomic variables, and Indian stock market indices for the study period are also studied.

Theoretically, an attempt has been made to exhibit an idea regarding EPU and the EPU index from an Indian perspective. Further, a broad-spectrum summary on macroeconomic indicators and the functioning of Indian stock markets is also summarized. Apart from using daily data to examine the effect of the Russia–Ukraine conflict on Indian stock markets and REER, in order to accomplish the other objectives of the study, monthly data of select variables like macroeconomic indicators (export of goods and services of India, import

of goods and services of India, FDI in India (net), FPI (net), T-bill yields (364 days), GDP, and EPU index) have been used along with stock market indices like BSE Sensex and NIFTY 50. Various econometric tools like breakpoint unit root test (innovative outlier model), Johansen co-integration analysis, Wald test, Granger causality test, vector error correction model (VECM), Markov regime-switching (MRS) model, fractionally integrated generalized autoregressive conditional heteroscedasticity (FIGARCH) model, and dynamic conditional correlation–multivariate generalized autoregressive conditional heteroskedasticity (DCC-MGARCH) model are used.

The data of the different variables like T-bill rate (364 days) and FDI are collected from the Reserve Bank of India (RBI) database. Import and export data are collected from the database of the Ministry of Commerce and Industry, Government of India; BSE Sensex data are collected from BSE database; NIFTY 50 data are collected from NSE database. Data on FPI are collected from the database of National Securities Depository Limited (NSDL); data on the GDP are collected from the database of Federal Reserve Economic Data (FRED); and the data of EPU index are collected from India news-based policy-uncertainty database by Baker, Bloom, and Davis ([www.policyuncertainty.com](http://www.policyuncertainty.com)). The total period of the study spans from April 2003 to January 2022 covering a period of 19 years approximately. Furthermore, to study the effects of the Russia–Ukraine conflict, daily data of Brent crude oil prices, BSE Sensex, NIFTY 50, and REER are collected from 1 September 2021 to 29 July 2022. The data of Brent crude oil price are collected from the database of [investing.com](http://investing.com), and the data of REER are collected from the database of BIS Statistics Warehouse.

In conducting this study, one of the motivations is to cover different financial shocks as much as possible that have occurred over the years. So, with this objective in mind, the authors decided to choose the study period from April 2003, because the dataset on the EPU index for India is not available beyond this period. The period of the study is extended up to January 2022, so that the authors can study the effect of COVID-19 shocks as well. The study period is mainly fragmented into four divisions – pre-recession period (from April 2003 to November 2007), global recession period (from December 2007 to June 2009), post-recession along with pre-COVID-19 period (from July 2009 to February 2020), and COVID-19 period (from March 2020 to January 2022). The period of global recession has been determined as per the reports of the Business Cycle Dating Committee, National Bureau of Economic Research, USA.

BSE Sensex, NIFTY 50, import, export, FDI, FPI, T-bill, and GDP that have been selected for the study are normal in nature. It is observed that BSE

Sensex, NIFTY 50, import, export, T-bill, and GDP are non-stationary at the level but stationary at first difference. However, FDI, FPI, and EPU are stationary at both level and first difference. Hence, the non-existence of a unit root is confirmed for all the stock market indices along with the macroeconomic indicators with EPU, and therefore, the variables are free from a random walk. It can be noted that there remains a long-run association among the select variables or the select variables are co-integrated. It is found that there remains a short-run association between EPU and BSE Sensex and EPU and NIFTY 50. Also, there remains a short-run association between EPU and import and EPU and T-bill. Though there is no short-run association between EPU and exports, FDI, FPI, and GDP. The VECM model provide the findings that export, FDI, FPI, T-bill, and GDP bear a negative coefficient, and BSE Sensex, NIFTY 50, and import bear a positive coefficient, which allows the researcher to conclude that the negative coefficients indicate the percentage of correction in terms of speed made within the variables following a deviation in the previous month. The positive coefficients indicate that the variables instead of returning to equilibrium continue to move away from equilibrium. Also, there is a significant long-run causality running from EPU to BSE Sensex, NIFTY 50, export, FDI, FPI, and T-bill. Granger causality suggests that there is bidirectional causality between EPU and BSE Sensex, NIFTY 50, import, export, FDI, FPI, and T-bill, although there is no significant causality between EPU and GDP. MRS model represents the possibility of the select variables to move from high-volatility regime to a low-volatility regime and vice versa along with the possibility to remain in one particular state.

The FIGARCH (1,1) model indicates the presence of the ARCH effect or volatility within all the dependent variables running from EPU. The variance in volatility is noted for all the variables except import. However, a long-memory effect is observed for BSE Sensex, NIFTY 50, FPI, and GDP, indicating the remembrance of the shock from EPU over a long time period. The DCC-MGARCH (1,1) model indicates the presence of both short-run and long-run volatility within the select variables running from EPU. Even, a long-memory effect was found for BSE Sensex and NIFTY 50 due to a steep surge in Brent crude oil price during the conflict between Russia and Ukraine. Both short-run and long-run volatility spillover are noted from crude oil prices during the period from 1 September 2021 to 29 July 2022.

It is suggested that policies should be framed by the government to curb the effects of EPU at the macrolevel. It is recommended that necessary policies should be taken up to check the underlying effects of the global financial recession and the outbreak of the COVID-19 pandemic. Impetus needs to be provided to the prospective investors for making investments in the stock

market. Congenial investment conditions should be made to attract FDI and FPI which can lead to an infusion of foreign exchange within the economy. Dependency on imports should be reduced, and production in the home country, that is, India, should be escalated along with an increase in exports to maintain the foreign exchange reserve which can be the resilience to shocks. Relaxations should be provided in terms of the legal framework, providing a greater amount of relief in tax burden, setting up new business parks, and many more can be done by the government to invite new foreign investment in the form of FDI and FPI. More investments in T-bills need to be ensured. All these can lead to a greater GDP.

After China, India is the world's second-largest importer of crude oil, over 80% of which is imported. Because of the Russia-Ukraine conflict, there is no doubt that the steep surge in oil prices increases the likelihood of inflation accelerating in India. In order to shield the economy from the negative impact of escalating crude oil prices, Indian oil companies like Indian Oil, Numaligarh Refinery, and others have bought millions of barrels of crude oil from Russia at discounted rates ignoring global backlash including Western countries. According to the report published by 'Nomura', the steep hike in crude oil prices, coupled with high domestic demand, is going to drastically escalate India's import bill. Although India does not import much of its crude oil from Russia, still a neighbourhood effect of Russia-Ukraine war can be noted in case of India. Moreover, India should also adopt policies to make necessary corrections in their domestic currency to check the volatility in the REER.

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