EMERALD POINTS

ECONOMIC POLICY UNCERTAINTY AND THE INDIAN ECONOMY

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AND
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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-LM – 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). 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, 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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