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Economic Impact of GST Reforms on Indian Economy: An Empirical Analysis

Shubham Garg[1*], Karam Pal Narwal[2] and Sanjeev Kumar[3]
[1]Research Scholar, Haryana School of Business, Guru Jambheshwar University of Science and Technology, Hisar, Haryana.
E-mail: shubhamgarg1230@gmail.com
[2]Professor, Haryana School of Business, Guru Jambheshwar University of Science and Technology, Hisar, Haryana.
E-mail: karampalhsb@gmail.com
[3]Professor, Haryana School of Business, Guru Jambheshwar University of Science and Technology, Hisar, Haryana.
E-mail: sanjeev.aseem@gmail.com
**Corresponding Author*

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Abstract: This study endeavors to examine the impact of Goods and Service Tax (GST) adoption on the Indian economy. The study has employed the Economic Policy Uncertainty index (EPU) as a proxy for measuring the uncertainty caused in the Indian economy due to the policy change in the indirect taxation system in India. Moreover, the study has used the NSE sectoral Indices as the proxy to the Indian economy. The study has performed the Impulse Response Function after constructing a vector autoregressive model by modeling the EPU, and NSE sectoral indices as endogenous variables and other macroeconomic variables (i.e. call rate, CPI, and exchange rate) as exogenous variables. The result indicates that the GST implementation has an initial lagged negative response to the Indian economy which is wiped off after a time period of around 2 and half months. This study may act as a guide for the government and policymakers in the future policy formation and announcement of future macroeconomic policies.

1. Introduction

GST is a major tax reform in the tax structure of the country by unifying all indirect taxes under an umbrella to create 'One Nation, One Market, and One Taxation' by removing the cascading effect of taxation in India (Sherawat and Dhanda, 2015). Worldwide, already 160 countries have adopted the GST in their respective territories. The implementation of the GST is anticipated to endow with the much-needed stimulant for the economic growth of the Indian economy by changing the existing taxation system for the free flow of goods and services (Khoja and Khan, 2020). However, the proposed GST regime for India's economy was well criticized before its implementation due to its inflationary

and negative impact on a few sectors in other countries. Valadkhani and Layton (2004) revealed that the adoption of GST increases the prices of goods and services by 2.8% during its implementation stage in Australia. However, the impact of inflation is found to be transitory which prevails only in the short run during its implementation phase. Palil and Ibrahim (2011) posit that customers are concerned for increase of at least 4% with the GST adoption in Malaysia. The introduction of GST in Malaysia has sparked debate among academicians, professionals, policymakers, and the general public on how GST will affect the cost of products and services. Malaysians also whispered that the GST adoption would have an injurious effect on society and will cause price increases, as their country was already depends a lot on household spending (Islam *et al.,* 2017). Similarly, Sankar (2017) has found that the GST adoption in India has a favorable impact on the Indian economy as a whole. But upon performing sectoral categorization, the GST has both positive and negative effects on every industry, creating a speculative environment of uncertainty and anxiety among investors and shareholders. Nayak *et al.,* 2022 found a positive impact of indirect tax revenue on the Indian GDP. Renjith (2021) observed the sustainable debt policies of Indian states during the GST regime. They found that the debt policy is sustainable in only 8 states out of 23 states under the study. Further, only 5 states are sustainable as well as solvent. Similarly, Haron and Ayojimi (2018) investigated the effect of GST announcement on the stock market index of Malaysia namely KLCI and KLCI-F. They established that the stock market index volatility raises with the announcement of GST in Malaysia in comparison to the pre-GST period which demonstrates that the awareness programs organized by the government before the announcement of the GST does not yield any meaningful results. The announcements of macroeconomic news by the government usually come as a shock and create an environment of uncertainty in an economy as some sections of the society gets benefit from it while other sections bear it up. Similarly, the announcement of the GST in the Indian economy has changed the tax structure for the whole Indian economy as some industries have gained a benefit from it, while others have borne up an increase in their tax rates. The adoption of the GST is a new experience for the Indian economy and households as it creates an environment of anxiety, worries, and uncertainty in the economy for taxation to various industries which can cause worries, shocks, and uncertainties indirectly to numerous sectors of the Indian economy. The existing literature has confirmed the notion that changes in government micro and macroeconomic policies affect the daily fluctuations in stock prices of various sectoral indices. Therefore, it becomes imperative to study the impact of GST on the Indian economy before and after the GST era by covering different sectors of the Indian economy. The study has undertaken four major sectors of the Indian economy i.e. FMCG, automobiles, Indian financial services, and realty sectors of NSE as a proxy to the Indian economy which are significantly impacted by the GST adoption in India. The study has taken the FMCG sector which is bearing a tax rate of around 22-24% in the pre-GST era and after the adoption of GST, the FMCG sector GST rate is reduced to 18%. Similarly, the previous rate of VAT and Excise in the automobile sector was on an average of 26.50% to 44% which is higher than the GST current rates of 18% and 28% in the auto sector. The service sector, on the other hand, has withstood a minor increase in tax rate which increases the tax incidence for the service sector. The financial services i.e. banking, and stock trading firms which are bearing a tax rate of around 14.5% under the VAT system are transferred into the GST slab

of 18%. Similarly, the realty sector has also gained a benefit with a decrease in tax rate under the GST regime. The study has employed the Economic Policy Uncertainty (EPU) index to measure the uncertainty originated in the economy due to its major indirect tax reforms in India.

The rest of the study proceeds as follows: Section 2 proffers a summary of previous empirical studies conducted in this domain. Section 3 narrates the objective and hypothesis formulation. Section 4 explicates the research methodology and the successive sections summarize the results, conclusive remarks with policy implications of the study.

2. Literature Review

The existing literature on policy uncertainty is brimming with a lot of studies illustrating that how policy uncertainty in an economy negatively impacts its GDP and investment. The economic risk associated with vacillating regulatory frameworks and future government policies is known as policy uncertainty. Bloom (2014) found in their study that continuous fluctuations in policy uncertainty result in slowing down the investment and hiring of employees as corporate sectors are often more hesitant in making crucial or costly decisions in vacillating regulatory frameworks. Levine (1991) demonstrates that the state growth rate is affected by the tax policy directly and indirectly by modifying the investment incentives and underlying financial contracts. Similarly, Barrero *et al.,* (2017) found that a boost in policy uncertainty will have implications in long run on economic growth as well as on capital investment. Bachmann *et al.,* (2010) found that uncertainty is accompanied by adverse economic times and both run concurrently. Bhagat *et al.,* (2013) found that there persists an inverse relationship between uncertainty in economic policy and fixed investment in India. All these studies suggest that it is necessary to have stable economic policies for the continued economic growth of a country. Similarly, Cakan *et al.*, (2015) found that the volatility shocks are persistent and any bad news about the US inflation increases the asymmetric volatility in 5 out of 12 countries under the study and that volatility asymmetric jump up with bad news on US unemployment in 4 out of 12 countries. Haron and Ayojimi (2018) discovered that the stock market index volatility increased with the announcement of GST in Malaysia which demonstrates that the awareness programs organized by their respective government before the announcement of the GST do not yield meaningful results. Similarly, Hoseini (2019) investigated the impact of tax policy change from Sales tax to Value Added Tax (VAT) adoption in India on informal sectors for different activities. They found that the theoretical findings are supported by empirical data from the Indian services sector, which also demonstrates a notable rise in forward-linked activity tax compliance after the implementation of the VAT in India. Bhattarai *et al.,* (2019) examined the impact of taxation reforms in Vietnam's economy through the application of the CGE model. They found that the government should increase the VAT rate from 10 to 12% and should decrease the corporate income tax rate from 20 to 17%. Similarly, Panga *et al.*, (2018) explored the effect of GST policy change on indices of S&P BSE. They observed that the GST adoption has no significant impact on selected sectors of BSE. Joy *et al.,* (2020) also investigated the impact of GST on shareholder investment and stock market operations. They found that the GST adoption will mark the share market operations costly in India. Similarly, Saran C (2018) studied the impact of the indirect tax policy change in India on sectoral indices of the NSE and Nifty-50 index using the OLS, T-GARCH, and GARCH modeling.

They observed that out of 10 sectors and the Nifty index selected for the study, only two sectoral indices have depicted a positive impact of the GST announcement in India. John and Dhannur (2019) also explicate that GST has adverse effect for service sector in India, but it does not have any statistical significant effect for the manufacturing sector in India. Nayaka and Panduranga (2021) also found that the tax collections and filing of GST returns are increasing in India at a rapid rate but the compensation to states is continuously delayed by the government which is affecting state government spending on numerous welfare activities. Similarly, Sankar (2017) has found that the GST announcement has a favorable impact on the Indian economy as a whole. But upon performing a sectoral classification of the Indian economy, the GST has both positive and negative effects on every industry. Therefore, it becomes imperative to explore the effect of GST on the Indian economy by bifurcating it into different sectors as there is a vast paucity of empirical studies on this phenomenon.

3. Relevance of the Current Study

The above extensive literature shows that a lot of studies have been conducted in the past on stock market volatility due to global crises, taxation, and monetary policy changes at national and international levels. However, this study is novel from past studies in many ways conducted in this area for India. Firstly, past studies have been mainly centered on the impact of the global crisis and there is hardly any empirical study on exploring the effect of GST in India. This study is different as it primarily focused on analyzing the impact of the implementation of GST on the Indian economy through the application of the VAR and IRF analysis. Moreover, this study also takes some exogenous macroeconomic variables which equally triggered the Indian market volatility to avoid spurious results while investigating the impact of GST on various sectoral indices of NSE as a proxy to the Indian economy. This study adds to the existing literature by examining the association between macroeconomic news uncertainty and its impact on various sectors in an emerging and developing stock market. Although the adoption of GST has passed the time period of 5 years, but there is no empirical study on the impact of GST in India. Finally, this study contributes in developing a better understanding of how macroeconomic news announcement uncertainties affect small emerging markets i.e. India, whose institutions, organizations, and structures are dissimilar to other developed markets.

4. Objective and Hypothesis of the Study

The current study aims at examining the impact of GST implementation on the Indian economy. For this purpose, the study has taken the four major sectors namely, FMCG, Auto, Indian Financial Services, and Realty sectors. This study has also included the EPU index to measure the uncertainty caused in the Indian economy due to the implementation of GST in India. In this regard, the following hypothesis has been constructed to achieve the aforementioned objective of the study:

H_{01}: There is no significant impact of GST implementation on the selected sectors considered for the study.

5. Data and Research Methodology

The present study has examined the impact of the adoption of GST on the Indian economy as the announcement of GST in India has changed the tax structure for the whole economy by creating an

environment of anxiety and uncertainty among different stakeholders. Therefore, this study endeavors to inspect the economic impact of GST on the Indian economy by taking NSE sectoral indices as a proxy for the Indian economy. The study has undertaken four major sectors of the Indian economy i.e. FMCG, auto, Indian financial services, and realty sectors that are vastly impacted by the GST adoption in India. For fulfilling this objective, the study has taken the NSE sectoral indices as a proxy for the Indian economy. The study has used the monthly closing prices of NSE sectoral indices from January 2013 to December 2021 as the monthly data avoids the spurious correlation which is often detected in annual or quarterly data (Patra and Poshakwale, 2006). The total time period of the study has been classified into pre and post-GST implementation equivalent time period of 4 years. The monthly closing prices of NSE sectoral indices are collected from the CMIE ProwessIQ database. Similarly, in order to measure the uncertainty triggered by the announcement of GST in the Indian economy, the EPU index (Economy Uncertainty Index) formulated by Baker *et al.,* 2016 has been utilized in this study. The news-based Indian EPU index has been constructed using the same approach as they use for the US-based EPU Index by including the 7 Indian newspapers. The EPU index is an uncertainty index of a country that illustrates the relative frequency of the newspaper articles of a particular country that include three terms relating to the economy (E), policy (P), and uncertainty (U) of their respective country. Moreover, to control the impact of other macroeconomic variables on NSE sectoral indices volatility, it becomes imperative to include some exogenous macroeconomic variables that directly affect the volatility of sectoral indices in India. A lot of past studies have already affirmed that macroeconomic factors have an impact on stock market returns (Fama and Schwert, 1977; Lee 1992). Similarly, Booth and Booth (1997), Ibrahim and Aziz (2003), and Chen (2007) found that the uncertainty in the inflation and exchange rate, money growth, and interest rates may affect the financial market and return volatility. Moreover, Tripathy (2011) found that any modification in the interest rate, currency rate, and global market considerably affects the stock market in India and vice-versa (Mohanty *et al.,* 2023; Singh *et al.*, 2020). Therefore, this present study has taken macroeconomic variables (Exchange rate, call rate, and CPI,) as exogenous variables to prevent the biasness in the results of the study. The growth of the call rate has been utilized as a representative of the interest rate in the Indian economy. The data on the exchange rate, call rate, and CPI have been compiled from the RBI website. The price series of the Nifty-50 sectoral indices, CPI, and the exchange rate have been transformed by the use of logarithm compounding returns.

5.1. Unit Root Test and Model Specification

Before applying any statistical modeling to financial time series, there is a universal precondition to check the stationarity of the financial time series as modeling with non-stationary data may yield spurious and misleading results (Haron and Salami, 2015). To apply any econometric modeling, the series should be stationery (Priyanka *et al.,* 2022). For this purpose, the study has applied ADF and PP unit root test statistics with the following statistical equation:

$$\Delta y_t = \propto + \beta t + \delta y_{t-1} + \Sigma_{i=1}^{k} \phi_i \Delta y_{t-i} + \varepsilon_t \quad (1)$$

$$\Delta y_{t-1} = \propto_0 + \rho \gamma_{t-1} + \varepsilon_t \quad (2)$$

Where y_t = price series, $\propto$ = constant, β = coefficient on a time trend, k = maximum length of the lagged dependent variable, ϕ_i = parameter of lagged first, Δy_t = first difference of series y_t, ε_t = pure white noise error term.

The return series of the sectoral indices, CPI, and exchange rate are stationary at level after converting them into natural logarithms. Similarly, interest growth rates are stationary at level ($I\sim(0)$).

In order to examine the response of sectoral indices (endogenous variable) due to shock caused by the adoption of GST in India from the EPU index, the study has employed the vector autoregressive model (VAR). VAR models are vastly utilized for multivariate time series in finance in which every variable is a linear function of itself and other variables lag value. Moreover, the VAR analyses allow the researchers to use Impulse Response Functions and Variance decomposition to examine the impact of a shock or policy change in an economy. The equation and matrix representation of a multivariate VAR model with three different time series variables denoted by X_t, Y_t, and Z_t with lag 1 is as below:

$$X_t = \propto_1 + \varnothing_{11} X_{t-1} + \varnothing_{12} Y_{t-1} + \varnothing_{13} Z_{t-1} + U_t$$

$$Y_t = \propto_2 + \varnothing_{21} X_{t-1} + \varnothing_{22} Y_{t-1} + \varnothing_{23} Z_{t-1} + V_t$$

$$Z_t = \propto_3 + \varnothing_{31} X_{t-1} + \varnothing_{22} Y_{t-1} + \varnothing_{33} Z_{t-1} + W_t$$

Matrix representation

$$[X_t\ Y_t\ Z_t] = [\propto 1\ \propto_2\ \propto_3] + [\varnothing_{11}\ \varnothing_{12}\ \varnothing_{13}\ \varnothing_{21}\ \varnothing_{22}\ \varnothing_{23}\ \varnothing_{31}\ \varnothing_{32}\ \varnothing_{33}]\ [X_{t-1}\ Y_{t-1}\ Z_{t-1}] + [U_t\ V_t\ W_t]$$

Where X_t, Y_t, and Z_t are stationary variables. U_t, V_t and W_t are white noise disturbances or shock terms. The coefficients in the main matrix are computed through OLS.

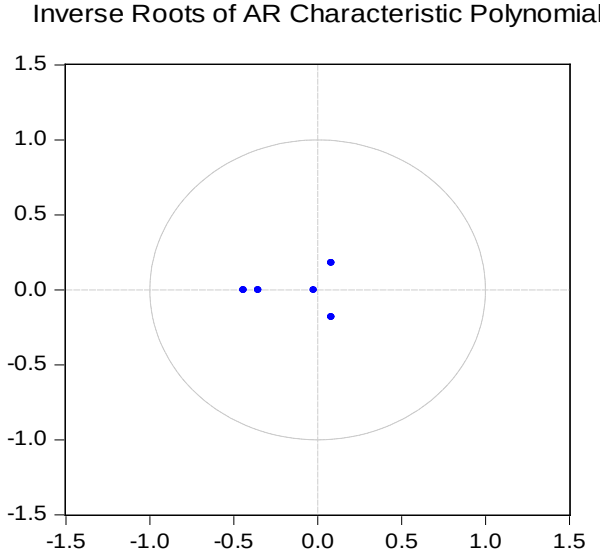

Figure I: Inverse Roots of constructed VAR model

The study has also employed the inverse roots function to examine the stability of the VAR model. Figure 1 demonstrates that there is no unit root outside the circle which validates the stability of the estimated VAR model.

The selection of the optimum number of lags of the VAR model has been performed based on FPE, SIC, and AIC criteria which suggest the optimum number of lags to be 1. The equation of the VAR model is given below where each lag represents a month:

LNEPU = LNEPU.l1 + LNFMCG.l1 + LNAuto.l1 + LNIFS.l1 + LNRealty.l1 + const + Int+ LNExR + LNCPI

LNFMCG = LNEPU.l1 + LNFMCG.l1 + LNAuto.l1 + LNIFS.l1 + LNRealty.l1 + const + Int + LNExR + LNCPI

LNRealty = LNEPU.l1 + LNFMCG.l1 + LNAuto.l1 + LNIFS.l1 + LNRealty.l1 + const + Int + LNExR + LNCPI

LNIFS = LNEPU.l1 + LNFMCG.l1 + LNAuto.l1 + LNIFS.l1 + LNRealty.l1 + const + Int + LNExR + LNCPI

LNAuto = LNEPU.l1 + LNFMCG.l1 + LNAuto.l1 + LNIFS.l1 + LNRealty.l1 + const + Int + LNExR + LNCPI

As depicted in the above equation, the endogenous variables are regressed onto each other and the exogenous variables appear as independent variables. In a VAR model, the individual coefficient estimation provides only a limited amount of information about the system's response to a shock because all the variables in a multivariate VAR model are dependent on one another. Therefore, to cope with this problem and to provide a holistic view of the model dynamic's behavior, the study has employed the Impulse Response Function (IRF). The IRF analysis is an advanced form of the Forecast Error Impulse Response (FEIR) analysis. An important limitation of the FEIR is that it cannot be used to examine the contemporaneous reactions of variables.

6. Results and Discussion

Table 1 display the result of the unit root test which is carried out at level with ADF and PP test with the trend and trend & intercept. The major differentiation between the PP and ADF unit root tests is how both of these tests deal with the serial correlation. The ADF test exercises parametric auto regression to simulate the structure of errors, whereas the PP test does not consider any serial correlation (Jain *et al.*, 2013). A financial time series is assumed to be stationary when the data series is not displaying any trend over time or the statistical properties i.e. mean, variance, and covariance of the distribution remain constant throughout time. If a financial series is found to be non-stationary, then it needs to be corrected by employing differencing (Idrees *et al.*, 2019).

The result of the ADF and PP test illustrates that all variables considered in the study are statistically significant and stationary at the level as computed t-statistics are greater than the test critical values as shown in table I. The study has computed both test statistics for both intercept, and trend & intercept, both of which confirm that the series under consideration is stationary at the level. Hence, in further

Table 1: Results of Unit Root Test

Variable	*Test Statistic*	*P-value*	*Critical Value*	
			1%	*5%*
LNEPU	-10.221*	0.0000	-4.046	-3.452
LNAuto	-9.634*	0.0000	-4.046	-3.452
LNIFS	-10.323*	0.0000	-4.046	-3.452
LNRealty	-9.736*	0.0000	-4.046	-3.452
LNFMCG	-9.147*	0.0000	-4.046	-3.452
LNCPI	-18.584*	0.0000	-4.046	-3.452
LNExR	-9.727*	0.0000	-4.046	-3.452
Int	-14.745*	0.0000	-4.046	-3.452
LNEPU	-53.233*	0.0001	-4.046	-3.452
LNAuto	-9.634*	0.0000	-4.046	-3.452
LNIFS	-10.396*	0.0000	-4.046	-3.452
LNRealty	-9.722*	0.0000	-4.046	-3.452
LNFMCG	-12.192*	0.0000	-4.046	-3.452
LNCPI	-21.199*	0.0000	-4.046	-3.452
LNExR	-17.282*	0.0000	-4.046	-3.452
Int	-22.597*	0.0000	-4.046	-3.452

Source: Authors' Own Compilation

* Sig at 1%

analysis, all the variables have been considered as integrated of I(0) after converting them into natural logarithms.

Table 2: Results of VAR Estimation

	LNEPU	*LNFMCG*	*LNAUTO*	*LNIFS*	*LNREALTY*
LNEPU(-1)	-0.374146	0.012354	0.002755	-0.001342	-0.008468
	(0.09421)	(0.01094)	(0.01901)	(0.01859)	(0.02930)
	[-3.97140]	[1.12897]	[0.14491]	[-0.07220]	[-0.28903]
	0.0001*	0.2595	0.8848	0.9425	0.7727
LNFMCG(-1)	1.302401	-0.033976	0.248545	0.127726	-0.125778
	(1.03995)	(0.12080)	(0.20987)	(0.20523)	(0.32342)
	[1.25237]	[-0.28127]	[1.18429]	[0.62237]	[-0.38890]
	.2110	0.7786	0.2369	0.5340	0.6975

Contd. table 2

	LNEPU	*LNFMCG*	*LNAUTO*	*LNIFS*	*LNREALTY*
LNAUTO(-1)	-1.927228	0.002188	0.168437	0.193478	0.344119
	(0.76117)	(0.08841)	(0.15361)	(0.15021)	(0.23672)
	[-2.53193]	[0.02474]	[1.09652]	[1.28804]	[1.45368]
	0.0117**	0.9803	0.2734	0.1983	0.1467
LNIFS(-1)	1.071086	0.154911	-0.273938	-0.344674	-0.020126
	(0.92431)	(0.10736)	(0.18653)	(0.18241)	(0.28746)
	[1.15880]	[1.44286]	[-1.46858]	[-1.88960]	[-0.07001]
	0.2471	0.1497	0.1426	0.0594	0.9442
LNREALTY(-1)	-0.756715	-0.090331	-0.015027	0.072032	-0.075651
	(0.49819)	(0.05787)	(0.10054)	(0.09831)	(0.15494)
	[-1.51893]	[-1.56100]	[-0.14946]	[0.73267]	[-0.48827]
	0.1294	0.1192	0.8813	0.4641	0.6256
C	-0.011145	0.006854	0.007516	0.011961	0.003288
	(0.03531)	(0.00410)	(0.00713)	(0.00697)	(0.01098)
	[-0.31558]	[1.67086]	[1.05458]	[1.71623]	[0.29940]
	0.7525	0.0954	0.2921	0.0868	0.7648
Int	-0.002670	9.09E-05	-9.14E-05	0.000276	0.000191
	(0.00217)	(0.00025)	(0.00044)	(0.00043)	(0.00067)
	[-1.23318]	[0.36154]	[-0.20924]	[0.64648]	[0.28387]
	0.2181	0.7178	0.8343	0.5183	0.7766
LNExR	0.041704	-0.097373	-0.275682	-0.324236	-0.299995
	(0.47970)	(0.05572)	(0.09681)	(0.09466)	(0.14919)
	[0.08694]	[-1.74755]	[-2.84776]	[-3.42509]	[-2.01089]
	0.9308	0.0812	0.0046*	0.0007*	0.0449**
LNCPI	0.000300	0.000826	0.000371	0.000301	0.000172
	(0.00306)	(0.00036)	(0.00062)	(0.00060)	(0.00095)
	[0.09788]	[2.32192]	[0.59995]	[0.49819]	[0.18027]
	0.9221	0.0206**	0.5488	0.6186	0.8570

Source: Authors' Own Compilation

Standard errors are provided in () & t-statistics in [ ]

*, ** denotes Significant at 1 and 5% respectively.

The results of the VAR analysis as presented in table 2 illustrate that the EPU is negatively affected by its own lagged value and lagged value of auto sector indices. Similarly, lagged value of EPU is negatively affected by its own current value. The auto sector, nifty financial services sector, and realty sector are negatively impacted by the exchange rate as indicated by the negative coefficient and significant

p-value. Similarly, the FMCG sector is affected by the consumer price index value as illustrated by the significant p-value. As it is observed that some of the estimates have not entered significantly in the constructed vector autoregressive model, therefore, the study has computed a restrictive VAR model to generate the impulse response function of our computed VAR model.

Table 3: Results of VAR Residual Serial Correlation LM Test

H_{02}: There is no serial correlation at lags 1 to h of the computed VAR model						
Lags	*LRE* stats*	*DF*	*Probability Value*	*Rao F-statistic*	*Df*	*Probability Value*
1	27.37696	25	0.3373	1.101735	(25, 332.1)	0.3379
2	48.83298	50	0.5202	0.976489	(50, 386.5)	0.5226

Source: Author's Computations

Table 4: Results of VAR Residual Heteroskedasticity Joint Tests (Levels and Squares)

H_{03}: There is no existing ARCH effect up to order q in the residuals (e_t)		
Chi-sq	*Df*	*Prob.*
229.4812	240	0.6761

Source: Authors' Own Compilation

Table 5: Results of VAR Residual Heteroskedasticity Tests Individual Component

Dependent	*F(16,90)*	*Prob.*	*Chi-sq. (16)*	*Prob.*
resi1*res1	0.334133	0.9920	5.999566	0.9881
resi2*res2	0.528433	0.9254	9.188745	0.9054
resi3*res3	2.078630	0.1602	28.87125	0.1248
resi4*res4	1.621582	0.0790	23.94360	0.0907
resi5*res5	1.036273	0.4277	16.64565	0.4089
resi2*res1	0.592974	0.8816	10.20400	0.8558
resi3*res1	0.915611	0.5542	14.97878	0.5262
resi3*res2	1.730858	0.0547	25.17746	0.0668
resi4*res1	0.565571	0.9015	9.775524	0.8781
resi4*res2	1.488087	0.1217	22.38484	0.1312
resi4*res3	1.796256	0.4372	25.89850	0.0555
resi5*res1	0.459503	0.9598	8.080662	0.9464
resi5*res2	1.236652	0.2568	19.28424	0.2542
resi5*res3	1.772319	0.2475	25.63606	0.0594
resi5*res4	1.525586	0.1080	22.82857	0.1184

Source: Authors' Own Compilation

Table 6: Results of VAR Residual Normality Tests Cholesky Orthogonalization

H_{04}: Residuals are normally distributed			
Components	*JB Statistic*	*Df*	*Prob. Value*
1	1.354247	2	0.5081
2	0.375826	2	0.8287
3	6.88356	2	0.7326
4	1.645494	2	0.4392
5	17.92197	2	0.1021
Joint	28.181097	10	0.738

Source: Authors' Own Compilation

The diagnostic testing which is performed after computing the restricted VAR model is presented in Tables 3 to 6. The results of the serial autocorrelation LM test as presented in table 3 confirm that there is no autocorrelation at lags 1 to h in the error terms of the computed Vector autoregressive model as indicated by the insignificant p-value. Similarly, the p-value of the VAR Residual Heteroskedasticity Joint and individual component tests confirms the rejection of the null hypothesis which shows that the VAR model has no ARCH effect and the variance of the residuals is constant as shown by insignificant p-values in table 4 and 5 respectively. Similarly, the result of VAR residual normality tests (Cholesky Orthogonalization) confirms that the residuals are multivariate normally distributed in the restricted VAR model which confirms the presence of the normality in the computed restricted VAR model as indicated by insignificant joint Jarque-Bera statistics. Upon passing all the diagnostic testing, the IRF analysis was performed to examine the responses of various sectors of the Indian economy due to shocks caused by the error or innovation term of the EPU. This will show the impact of one unit change in the error term of EPU on various sectors of the Indian economy under the study.

The results of the IRF analysis confirm that the response of the FMCG, Auto, realty sector, and Indian Financial Service (IFS) to the shocks caused by the innovation or error term of the EPU is contemporaneous negative as indicated in figures 2 to 5 respectively. This negative response of the FMCG sector pushes up in an upward positive direction up to 2 months time period and afterward, it declines abruptly until the 3rd period when it hits its steady-state value. After this, the FMCG sector rises gradually towards the positive region and just as the pendulum of the clock goes on oscillating around the point of rest and ultimately comes to a standstill, similarly, the FMCG sector tends to move around the base or zero line.

Similarly, the negative response of the Realty sector pushes up in an upward positive direction up to the 3rd month where it takes its peak point, and afterward, the 4th month tends to merge in the zero line. Similarly, the negative response of the Auto sector pushes up in an upward positive direction up to the 2nd month's time period where it takes its peak point and afterward it tapers off gradually towards the zero point and after the 3.5th month, it tends to merge in the zero line. Similarly, the

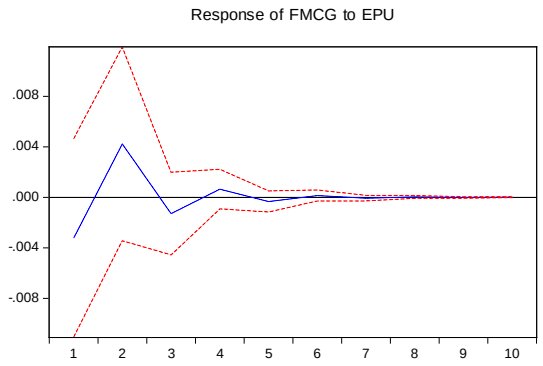

Figure 2: Impulse Response of FMCG Sector to EPU

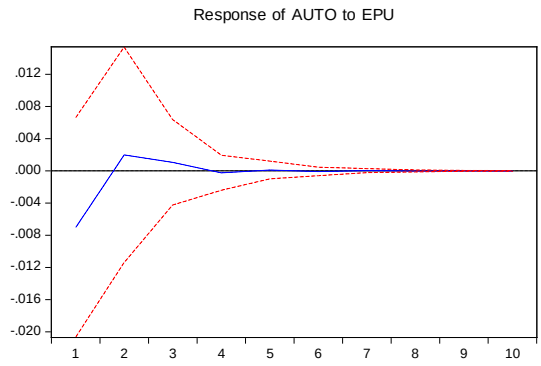

Figure 3: Impulse Response of Auto Sector to EPU

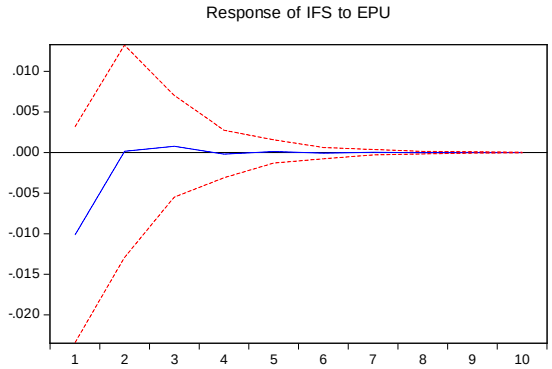

Figure 4: Impulse Response of IFS Sector to EPU

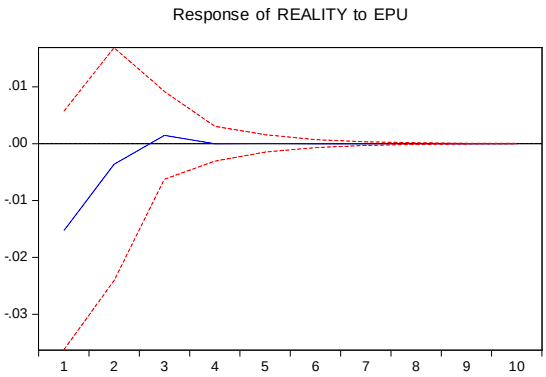

Figure 5: Impulse Response of Realty Sector to EPU

negative response of the IFS sector pushes up in an upward positive direction abruptly up to the 2nd month time period and afterward it going to increase towards the positive region gradually until the 4th month and after this point, it tends to merge in the zero line. The realty and service sector has bear up the negative instantaneous response for the longest time period due to GST adoption in India. Thus the impulse response function depicts an overall negative response of all four sectors to the one unit shocks in the EPU due to the uncertainty in the Indian market because of the announcement of the indirect tax reform (GST announcement) in the Indian economy by the Indian government. The findings show that, despite the reduction in tax rates for various sectors, the overall impact of GST on the Indian economy is negative. Therefore, the study rejects the formulated null hypothesis and concludes that the GST implementation negatively impact the major sectors of the Indian economy.

It is depicted from the results of the granger causality test that EPU does not Granger cause FMCG, realty, and Indian financial service sectors of the Indian economy since the p-value is greater than 0.05. However, the Auto sector of the Indian economy is granger cause by economic policy

Table 7: Results of the VAR Granger Causality and Block Exogeneity Wald Test

Sectors	*Chi-Sq*	*df*	*Prob.*	H_0
FMCG	1.568440	1	0.2104	EPU does not granger cause FMCG.
Auto	6.410680	1	0.0113**	EPU does not granger cause Auto.
Realty	2.307163	1	0.1288	EPU does not granger cause Realty.
IFS	1.342814	1	0.2465	EPU does not granger cause IFS.
Joint	13.60724	4	0.0087*	EPU does not Granger Cause FMCG, Auto, Realty, and IFS sector jointly.

Source: Author's Computations * Sig at 1% and 5%

uncertainty (EPU) which indicates that there subsists a unidirectional relationship between FMCG and EPU. However, the joint results show that there is no relationship between EPU and FMCG, auto, realty, and IFS sector of the Indian economy. Thus, the study concludes that there is no contemporaneous causality between EPU, FMCG, realty, auto, and IFS.

7. Conclusion

This study aims to observe the impact of the implementation of GST reform on the Indian economy. The finding of the study illustrates that in spite of the reduction of taxation rate for the realty, FMCG, and auto sector, the instantaneous impact of GST comes as a shock for these sectors resulting in an adverse or negative initial impact on the Indian economy which is covered up with a time range of near 2-3 months. On the contrary, the service sector has faced a slight increase in its tax rate under the GST regime. The service sector has also faced a negative instantaneous effect with the announcement and implementation of GST in India. Thus, the results indicate that the shocks caused by one unit change in EPU negatively affect the Indian economy as indicated by all the four sectors under the study in the initial stage. The realty and service sector has bear up the negative instantaneous response for the longest time period due to the adoption of GST in India. Thus, the results show that the uncertainty in the Indian economy created due to their major tax reform (GST implementation) has negatively affected the Indian economy in its initial stage after which it covers up rapidly with a time period on an average of two and half months. The findings of the study are in contrast to the anticipation of the market that the adoption of the GST will benefit the various sectors of the Indian economy by reducing the tax burden on consumers and producers by simplifying the taxation system and abolishing the cascading effect of taxation as prevalent under the value-added taxation system. However, the elimination of tax on already paid taxes reduced the prices of goods and services in India and improved the standard of living by increasing the purchasing power of the consumers, but the contemporaneous response of GST came as shock for various sectors of the Indian economy which takes some time to nullify the impact of GST. The impact of policy reform on a particular sector also depends on the extent to which the government takes a particular sector of an economy in confidence before its policy announcement through advertisement and awareness programs. But the result shows that the awareness

programs sponsored by the government and other groups do not yield a meaningful result which shows the non-readiness of various sectors of the Indian economy for the adoption of GST in India.

8. Managerial and Policy Implications

The current study has focused on examining the impact of the implementation of GST on the Indian economy by categorizing it into different sectors. India is being a developing economy whose economic conditions are not stable and it reacts very quickly and sensitively to any small or big market news. This study may act as a guide for the government and policymakers in the announcement and development of macroeconomic policies in near future. The results suggest that the awareness programs arranged by the government for the GST reforms in India do not yield any meaningful results and are unable to take different sectors of the Indian economy under confidence. Moreover, this study attempts to extend the previous literature by examining whether the announcement of macroeconomic news of tax law changes impacts the Indian economy. A future study can be conducted by including more sectors of the Indian economy. Similarly, there is a vast scope for analyzing the effect of GST at the international level by taking this study as a base. Moreover, this study may be used as a foundation for future studies in investigating the effect of other macroeconomic news announcements and market shocks generated by recession or by natural causes i.e. covid-19 and market crashes like 2007 on the stock market volatility.

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