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Impact of GST Reforms on Healthcare, Banking, and Pharmaceutical-Sectors: An Empirical study via VAR Model Perspective

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Abstract
The current study aims to examine the impact of the GST reforms on the banking, pharmaceutical and healthcare sector of the Indian economy. The study has employed the monthly closing prices of NSE sectoral indices from January 2013 to December, 2021 as a representative to the selected sectors of the Indian economy. The finding of the study illustrates that the policy uncertainty due to the GST reforms negatively affect the banking sector by increasing the tax rates on financial services and interbank transactions from 15% to 18% under GST regime.The increase in tax rate has resulted in increasing the cost of financial services provided by the banking sector to its customers which directly affect their banking business in India as depicted by contemporaneous negative response in Impulse Response Function analysis. On the contrary, the adoption of GST has created an opportunity for the pharmaceutical and healthcare sector which has resulted in instantaneous positive response to both of these sectors. However, this positive response is wiped off in the short run within a time period of two months on an average for both of these sectors.
Keywords:[Economic Impact; GST Reforms;Sectoral Indices; Impulse Response Function; Vector autoregressive model]

Introduction

Tax revenue is a major source of funding for government spending on public goods and services around the world. The revenue from taxation builds the government's capability to meet basic needs, ensure vertical equity and foster economic growth, but the ability of the government to generate revenue from taxation is limited.After Independence, the India innate a taxation structure which is regressive in naturewith anti-trade bias for international and domestic trade (Purohit, 1992). Afterward, the Indian government has introduced a number of taxation and fiscal reforms in India with the purpose to intensify the efficiency and transparency in the tax collection system, as well as to formulate a more competitive and transparent taxation system for the country. In 2005, the introduction of the Value-added tax (VAT) was the initial step by the government at the state level to improve the tax base and buoyancy of the state governments (Mukherjee, 2015). The value added tax is called as self policing taxation system as the implementation of the VAT encourage the taxpayers to demand their invoices in order to ensure to get the tax credit to lower down their tax burden by claiming tax credits on already paid taxes. However, the implementation of the VAT is still have some cascading effect as this system does not offer for set offs for CENVAT which is already paid at the distribution and consumption stages (Neporam, 2011). Cascading effects means tax on already paid some taxes resulting in extra burden on a taxpayer. Since, the cascading effect results in an extra burden on taxpayer in the form of extra price, it results in increase in general price level in an economy (Khoja and Khan, 2021).Therefore, in order to remove this prevailing cascading effect of taxation, the Government of India has introduced harmonized system of Goods and Services Tax (GST) on July, 2017 in India. GST is a destination-based taxation system in which tax is levied on value addition at each stage of the manufacturing and distribution process.The introduction of GST has resulted in the elimination of 13 cesses and subsumption of 17 central and state taxes, i.e., Octroi duty, Service Tax, Turnover tax, Stamp duty, and State level Sales Tax, etc. in India. Vasanthagopal (2011) found that the adoption of GST in India would eliminate all the complexities in the current taxation system and would be a great leap in the Indian taxation system. However, the implementation of the GST in India is well criticized by various academicians, researchers and the opposition political parties in India due to its initial inflationary effects in some countries in its inception year. However, the international experience with the implementation of GST is not uniform around the world. For example,Gelradi, 2004 found that the introduction of VAT has no significant impact on UK, however, the introduction of GST in Canada faces an increase in general price level. Valadkhani and Layton (2004) revealed in their study 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 during the implementation phase. Palil and Ibrahim (2011) also found that the consumers are worried about price hikes of at least 4% with the implementation of GST in Malaysia.Similarly, Sahooet al., (2017) found in their study that China faced an inflation increase of 9.81% in the introductory year and an increase of 15.215% in the immediately subsequent year. However, according to their study New Zealand and Portugal experienced a price drop after GST implementation. Similarly, the adoption of the GST has changed the tax structure for all the industries working in Indian environment.With the adoption of the GST, SBEs (Small Business Enterprises) are required to update their business processes and accounting systems, as well as be prepared to set up the improved accounting and record-keeping systems, train their employees and have the appropriate software to facilitate successful documentation and recording keeping for GST compliance (Chen and Taib, 2017, and Ramli et al., 2015). SBEs were required to train their personnel to deal with the complexity of this newly adopted taxation system at the initial stage, which increased the compliance cost of their taxes.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 GST adoption is a new experience for the Indian economy which creates an environment of anxiety and worries among Indian households and industrialist. Sankar (2017) has found that the adoption of GSThas a favorable impact on the Indian economy as a whole. But when we do the 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. Therefore, the present study tries to focus on exploring and determining the impact of adoption of GST on the selected sectors of Indian economy and to provide future guidance and research gaps for further study.

The Current study has been structured into 5 different sections. Section 2 of the study deals with the theoretical framework and previous empirical studies conducted in this domain. Similarly, it covers up the research gap formulated from the available literature for conducting this study. Section 3 presents the objective and hypothesis formulation for the current study. Section 4 explains the research methodology used for conducting the present study. Section 5 and 6 summarizes the results, policy implications and scope for conducting future study.

Literature Review

The field of public finance, especially, taxation in general has received major attention of the policy makers, academicians and the professionals over time. The change of taxation policy in a country by their respective government creates an environment of uncertainty and anxiety among various taxpayersand households. The announcements of macro-economic news usually came as a shock and create an environment of uncertainty in an economy as some sections of the society get benefit from it while other sections bear it up.A lot of studies have already been conducted on policy uncertainty and its impact on GDP and investment of a country. **Niemann (2004)** found thatincrease in tax rate uncertainty has an equivocal effect on investment behavior under risk neutrality without time flexibility. Handley and **Limao(2012)** found in their study that the state policy uncertainty has a significant impact on firm entry and investment decision in context to international trade. Similarly, **Barrero et al.,(2017)** found that rise in policy uncertainty will have a long-term implication on economic growth as well as on capital investment. **Bhagat et al., (2013)** also studied the relationship between economic policy uncertainty and fixed investment. They found that there persists a inverse relationship between uncertainty in economic policy and fixed investment in India. Similarly, **Zare et al. (2013)** found that monetary policy announcement has a higher impact on the volatility of the stock market in bear periods in comparison to bull market periods, as predicted by finance constraint models. **Adra and Menassa (2022)** demonstrate that the shock cause by monetary policy decision of Federal Reserve plays an important role in determining both risk adjusted and absolute returns from value investing. Similarly, the change of the taxation structure in India from Value added tax to Goods and Service tax has resulted in creation of uncertainty, anxiety and worries among various sectors of Indian economy. The implementation of the GST has changed the tax slabs for all the industries working in Indian economy by creating an opportunity and threat for them. **Haron and Ayojimi (2018)** found in their study that the Malaysian stock market index volatility increased with the GST announcement which illustrates that the awareness programs organized by their respective government before the announcement of the GST do not yield meaningful results. Similarly, **Nutman et al., (2021)** found in their study that the complexities in GST computation and filling of returns, exaggerated rules, and frequent amendments in GST rules are

the major cause for the abolishment of the Goods and Service tax in Malaysia. **John and Dhannur (2019)** found that the uncertainty caused in the Indian market due to the announcement of the GST adversely affected the service sector, but does not have any significant or major impact on the manufacturing sector. **Nayaka and Panduranga (2021)** also found that the GST return filing and tax collections 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)** found upon performing sectoral classification of the Indian economy, the GST has both positive and negative effects on every industry.The adoption of the GST in India has increased the tax rate on financial services from 15% to 18% which directly impact the banking and other non-banking financial service providers directly **(Baliyan and Rathi, 2018).**Similarly, the pharmacy sector companies are taxed at the 18% slab rate under the GST regime which is previously 15-20% under the VAT system. Therefore, it becomes imperative to analyze the impact of GST on numerous sectors of the Indian economy as there is a vast scarcity of empirical studies on this phenomenon.

The present study is different from past studies in many ways conducted in this area for India. Firstly, the previous studies have mainly focused on change in monetary and other economic policies and there is hardly any study on the sectoral impact of GST in India. This study is different from past studies as it primarily focused on the impact of the implementation of GST on various sectors of the Indian economy through the application of the VAR and IRF analysis. However, the majority of the existing studies in this domain are conceptual and theoretical which only focus on change in taxation rate for different sector of the Indian economy. 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 novel study, this study contributes significantly to the available literature and provides a pathway of future directions for further study in this domain. Finally, this study contributes to developing a better understanding of how macroeconomic news announcement uncertainties affect the small emerging markets i.e. India, whose institutions, organizations, and structures are dissimilar toother developed markets.

Objective of the Study

The current study aims to examine the impact of implementation of Goods and service taxation reforms on the banking, pharmaceutical and healthcare sector. For fulfilling this objective, the study has taken NSE sectoral indices as a proxy to these sectors of the Indian economy.

Hypothesis formulation of the Study

In order to examine the impact of the GST on selected sectors of the Indian economy, the following hypotheses are formulated:

- H01: The return series has a unit root.
- H02: There is no autocorrelations in the residual of constructed VAR model up to lag h
- H03: There is no serial correlation at lags 1 to h in the residuals of the constructed VAR model.
- H04: The residuals of the constructed VAR models are normally distributed.
- H05: There exists no ARCH effect up to order q in the residuals of the constructed VAR model.

Data and Research Methodology

The present study has examined the impact of the implementation of the GST on selected sectors of the Indian economy as the announcements of GST in India have changed the tax structure for the whole economy. The study has undertaken three major sectors of the Indian economy i.e. Pharmacy, Healthcare and banking sector (both private and public banking sector) that are vastly affected by the implementation of GST in India. The study has employed the monthly closing prices of NSE sectoral indices as a representative to the selected sectors of the Indian economy. The study has employed the monthly closing process of the NSE sectoral indices from the CMIE Prowess IQ database as the monthly data avoids the spurious correlation which is often detected in annual or quarterly data (Patra and Poshakwale, 2006). Similarly, the study has employed the EPU index (Economic Uncertainty index) to measure the uncertainty caused in the Indian economy due to the announcement of GST tax reforms. The EPU index is an uncertainty index of a country which illustrates the relative frequency of the newspaper articles of a particular country that include three terms pertaining to economy (E), policy (P) and uncertainty(U) of their respective country. The EPU index of India is developed by Baker et al., (2016) which have been constructed using the same approach as they use for the US-based EPU Index by including the 7 Indian newspapers. In order to provide realistic and unbiased results, the study has used

the exchange rate, CPI and call rate as exogenous variables.The growth of the call rate has been utilized as a proxy for the interest rate in the Indian economy. The data onthe exchange rate, call rate, and CPI has been extracted from RBIwebsite. The price series of the Nifty-50 sectoral indices, CPI, and the exchange rate has been transformed by the use of logarithm compounding returns with the following formula:

$$NSI_t = \log\left(P_t^{close}/P_{t-1}^{close}\right) \times 100$$

Where NSI_t represent sectoral indices of NSE India, P_t represents current closing prices, and p_(t-1)represents lagged closing prices of the NSE India.

Unit Root Test for stationarity

The study has focused on examining the impact of GST announcement and implementation of GST on selected sectors of Indian economy. The study has employed both the parametric and non-parametric test for checking the stationarity of the return series. As a parametric test, the study has employed the familiar ADF test and as a non-parametric test, Phillips Perron (PP)stationarity test has been employed. The major difference between the ADF and PP unit root test is that ADF uses the parametric structure in order to detainthe serial correlation and Phillips Perron test uses the non-parametric correction on the basis of the log run variance of the ΔX_t. ADF and PP unit root test statistics have been used as below:

$$\Delta X_t = \propto + \beta t + \delta X_{t-1} + \sum_{i=1}^{k} \emptyset_i \Delta X_{t-i} + \varepsilon_t$$

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

Where X_t = price series, β = coefficient on a time trend, k= maximum length of the lagged dependent variable, □_(i)= parameter of lagged first, ΔX_(t)= first difference of series□ X□_t, ε_t = pure white noise error term.

Table I show that all the variables including the return series of sectoral indices, CPI, and exchange rate are stationary at level after converting them into natural logarithm. Similarly, interest growth rates are stationary at level (I~ (0)).

In order to examine the response of the endogenous variable (sectoral indices of NSE) due to shock caused by the implementation and announcement of GST in the Indian economy from the EPU index, the study has employed the Vector Autoregressive model (VAR). VAR models are vastly applicable for multivariate time series in which each variable is a linear function of its own and other variables past lag. The equation and matrix representation of a multivariate VAR model with three different time series variables denoted by X_t,Y_t,andZ_t with lag 1 is as below:

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

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

$$Z_t = \propto_3 + \delta_{31}X_{t-1} + \delta_{32}Y_{t-1} + \delta_{33}Z_{t-1} + W_t$$

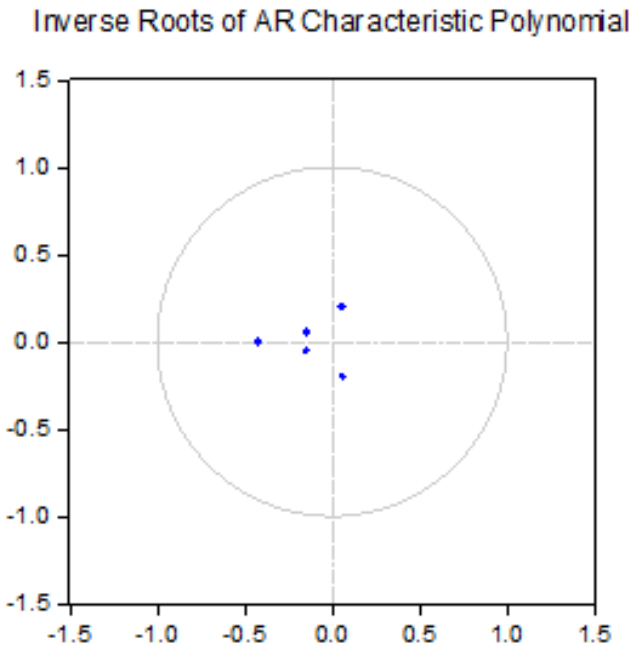
Matrix representation

$$\begin{bmatrix} X_t \\ Y_t \\ Z_t \end{bmatrix} = \begin{bmatrix} \propto_1 \\ \propto_2 \\ \propto_3 \end{bmatrix} + \begin{bmatrix} \delta_{11} & \delta_{12} & \delta_{13} \\ \delta_{21} & \delta_{22} & \delta_{23} \\ \delta_{31} & \delta_{32} & \delta_{33} \end{bmatrix} \begin{bmatrix} X_{t-1} \\ Y_{t-1} \\ Z_{t-1} \end{bmatrix} + \begin{bmatrix} U_t \\ V_t \\ W_t \end{bmatrix}$$

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.

The study has also appliedthe inverse roots of the AR characteristic polynomial to examine the

Fig1 Inverse Roots of computed VAR model



stability of the VAR model. If the estimated ARMA process is stationary, then all the unit roots should lie inside the circle. Figure 1 demonstrates that there is no unit root outside the circle which authenticates the stability of the estimated VAR model. The number of lags to be regressed under the VAR model has been selected

on the basis of AIC, BIC and FPE Criterion. The equation of the computed VAR model is as below where each lag represents a month:

LNEPU = LNEPU.l1 + LNNiftypharmal1 + LNNiftyHC.l1 + LNNiftyPVTbank.l1 +LNNiftyPSUbank.l1+ const + Int +LNExR + LNCPI

LNNiftypharma = LNEPU.l1 + LNNiftypharmal1 + LNNiftyHC.l1 + LNNiftyPVTbank.l1 +LNNiftyPSUbank.l1+ const + Int +LNExR + LNCPI

LNNiftyHC = LNEPU.l1 + LNNiftypharmal1 + LNNiftyHC.l1 + LNNiftyPVTbank.l1 +LNNiftyPSUbank.l1 + const + Int +LNExR + LNCPI

LNNiftyPVTbank= LNEPU.l1 + LNNiftypharmal1 + LNNiftyHC.l1 + LNNiftyPVTbank.l1 +LNNiftyPSUbank.l1 + const + Int +LNExR + LNCPI

LNNiftyPSUbank.l1 = LNEPU.l1 + LNNiftypharmal1 + LNNiftyHC.l1 + LNNiftyPVTbank.l1 +LNNiftyPSUbank.l1 + const + Int +LNExR + LNCPI

Where HC represent healthcare sector, PVTbank represent private sector and psubank represent public sector bank of NSE India.

The above equation illustrates that the endogenous variables are regressed onto each other and the exogenous variables (exchange rate, CPI, and interest growth rate) – 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 undercover this problem and to provide a holistic view of the model dynamic's behavior, the study has applied the Impulse Response Function (IRF).The Impulse Response Function analysis is an advanced versionof 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 the variables. The major aim of IRF analysis is to describe how the variables of the model react in response to a change of one unit in the current value of the error term of the VAR model.This property of IRF analysis allows us to trace the diffusion of a single shock in a noisy system of equations, which build them particularly as a helpful tool for evaluating economic policies.

Results and Discussion

The basic condition for the return series for random walk is that it must have a unit root. The study has applied the two familiar tests i.e. ADF and PP Test for checking the unit roots of the return series. The major difference between the ADF and PP unit root test is that ADF uses the parametric structure in order to detainthe serial correlation and Phillips Perron (PP) test uses the non-parametric correction on the basis of the log run variance of the ΔX_t. A financial time series is assumed to be stationary when the statistical properties of a distribution i.e. mean, variance, and covariance of the distribution remain constant throughout the time or the series is not displaying any trend over time. If a financial series has a unit root, then it needs to be corrected by employing differencing (Idrees et al., 2019). The null hypothesis (h01) of the study for both of the test statistic used in the current study is that the return series of NSE sectoral indices and other variables has a unit root in comparison to the H1 of no unit roots i.e. the series is stationary.

Table I: Results of Unit Root Test (with trend and intercept)

Variable Name	Test Statistic	P-value	Critical Value		H0	Dec.
			1%	5%		(H0)
Augmented Dickey-Fuller Test (Trend and Intercept)						
LNEPU	-10.221*	0.0000	-4.046	-3.452	The LNEPU series has a unit root	Reject
LNPharma	-11.387*	0.0000	-4.046	-3.452	The LNPharma series has a unit root	Reject
LNHealth	-11.955*	0.0000	-4.046	-3.452	The LNHealth sector has a unit root	Reject
LNPSU	-9.379*	0.0000	-4.046	-3.452	LN of PSU bank series has a unit root	Reject
LNPVT	-10.634*	0.0000	-4.046	-3.452	LN of Pvt bank series has a unit root	Reject
LNCPI	-18.584*	0.0000	-4.046	-3.452	The natural log of CPI series has a unit root	Reject
LNExR	-9.727*	0.0000	-4.046	-3.452	The natural log of ExR has a unit root	Reject
Intr	-14.745*	0.0000	-4.046	-3.452	The Interest series has a unit root	Reject

Phillips-Peron Test (Trend and Intercept)						
LNEPU	-53.233*	0.0001	-4.046	-3.452	The LNEPU series has a unit root	Reject
LNPharma	-11.350*	0.0000	-4.046	-3.452	The LNPharma series has a unit root	Reject
LNHealth	-11.840*	0.0000	-4.046	-3.452	The LNHealth sector has a unit root	Reject
LNPSU	-9.336*	0.0000	-4.046	-3.452	LN of PSU bank series has a unit root	Reject
LNPVT	-10.669*	0.0000	-4.046	-3.452	LN of Pvt bank series has a unit root	Reject
LNCPI	-21.199*	0.0000	-4.046	-3.452	The natural log of CPI series has a unit root	Reject
LNExR	-17.282*	0.0000	-4.046	-3.452	The natural log of ExR has a unit root	Reject
Intr	-22.597*	0.0000	-4.046	-3.452	The Interest series has a unit root	Reject

Table 1 illustrates the results of the unit root test for both test statistics used in the current study. These tests statistic has been performed for the whole sample of the study on the level with constant and constant & trend. If the p-value of ADF statistics is less than 5%, the null hypothesis is rejected. The null hypothesis (h0) of a unit root in the level series can be rejected for all the variables as the computed t-statistics are greater than the test critical values as shown in table I.This indicates that all the variable under the study are stationery at level after converting them into returns with natural logarithm compounding (Natural log is not for Interest rate as it is a variable in percentage). Hence, in further analysis, all the variables have been consideredas integrated of I(0).

Table II Results of VAR Model

	LNEPU	LNPSUbank	LNPVTbank	LNPharma	LNhealthcare
LNEPU(-1)	-0.379958	0.022256	-0.009966	-0.004023	-0.001986
	(0.09902)	(0.02895)	(0.02108)	(0.01598)	(0.01472)
	[-3.83704]	[0.76878]	[-0.47284]	[-0.25176]	[-0.13496]
	0.0001*	0.4424	0.6365	0.8013	0.8927
LNPSUbank(-1)	-0.272999	0.193705	0.143709	0.087851	0.122138
	(0.53091)	(0.15521)	(0.11300)	(0.08566)	(0.07891)
	[-0.51421]	[1.24800]	[1.27172]	[1.02551]	[1.54775]
	0.6073	0.2126	0.2041	0.3056	0.1223
LNPVTbank(-1)	-0.661563	-0.085799	-0.230420	-0.129655	-0.149049
	(0.74604)	(0.21810)	(0.15879)	(0.12038)	(0.11089)
	[-0.88677]	[-0.39338]	[-1.45107]	[-1.07708]	[-1.34413]
	0.3756	0.6942	0.1474	0.2820	0.1795
LNPharma(-1)	-0.987809	2.173273	1.255052	0.641485	0.643964
	(3.12389)	(0.91327)	(0.66492)	(0.50405)	(0.46433)
	[-0.31621]	[2.37966]	[1.88754]	[1.27266]	[1.38688]
	0.7520	0.0177**	0.0597***	0.2037	0.1661
LNHealthcare(-1)	1.054827	-2.253687	-1.255968	-0.796863	-0.812108
	(3.37404)	(0.98640)	(0.71816)	(0.54442)	(0.50151)
	[0.31263]	[-2.28475]	[-1.74887]	[-1.46370]	[-1.61933]
	0.7547	0.0228**	0.0809***	0.1439	0.1060

C	-0.000488	0.000919	0.014001	0.011767	0.013605
	(0.03745)	(0.01095)	(0.00797)	(0.00604)	(0.00557)
	[-0.01302]	[0.08395]	[1.75636]	[1.94716]	[2.44390]
	0.9896	0.9331	0.0797***	0.0521***	0.0149**
LNExR	-0.087310	-0.366675	-0.369367	-0.046067	-0.041304
	(0.50185)	(0.14672)	(0.10682)	(0.08098)	(0.07459)
	[-0.17398]	[-2.49920]	[-3.45789]	[-0.56889]	[-0.55371]
	0.8620	0.0128**	0.0006*	0.5697	0.5800
LNCPI	-0.001437	0.001105	0.000597	0.000616	0.000573
	(0.00315)	(0.00092)	(0.00067)	(0.00051)	(0.00047)
	[-0.45572]	[1.19905]	[0.88980]	[1.20973]	[1.22169]
	0.6488	0.2311	0.3740	0.2270	0.2224
Intr	-0.004016	0.001232	0.000463	-0.000101	4.44E-06
	(0.00223)	(0.00065)	(0.00047)	(0.00036)	(0.00033)
	[-1.80290]	[1.89156]	[0.97733]	[-0.27993]	[0.01341]
	0.0720***	0.0591**	0.3289	0.7796	0.9893

Source: Author's Compilations
Standard errors in are provided ( ) & t-statistics are provided in [ ]
*, **,*** denotes Significant at 1, 5 and 10 percent respectively.
The results of the VAR model analysis as presented in table II illustrates that the EPU is negatively affected by its own lagged value and the interest rate factor. The public sector banking index is positively affected by the lagged value of the pharmaceutical sector and interest rate factor as denoted by positive coefficient value in the third column of table II. The PSU banking sector is negatively affected by the lagged value of the healthcare sector and the exchange rate factor as represented by significant p-value. Similarly, the private sector index is positively affected by lagged value of the pharmaceutical sector index and the intercept term.As observable in table II that some of the estimates have not entered significantly in the estimated VAR model, therefore, we have computed a restrictive VAR model to generate the impulse response function of our computed VAR model.

Diagnostic Testing

Table III Results of the Vector Autoregressive Residual Portmanteau Tests for Autocorrelations

H02:There is no autocorrelations in the residual of the constructed VAR model up to lag h					
Lags	Q-Statistic	Prob.	Adj Q-Statistic	Prob.	Df
1	2.349246	-	2.371409	-	-
2	26.99907	0.3559	27.49076	0.3318	25
3	41.89378	0.7857	42.81511	0.7544	50
4	62.92200	0.8388	64.65996	0.7971	75

Source: Author's Compilations

Table IV Results of VAR Residual Serial Correlation LM Tests

H03: No serial correlation at lags h						
Lags	LRE* stats	DF	Probability-Value	Rao F-statistic	Df	Probability
Value						
1	19.72441	25	0.7611	0.784883	(25, 332.1)	0.7615
2	26.48371	25	0.3822	1.064386	(25, 332.1)	0.3828
3	15.35789	25	0.9326	0.607225	(25, 332.1)	0.9327
4	22.87342	25	0.5850	0.914413	(25, 332.1)	0.5855
H03: No serial correlation at lags 1 to h						
1	19.72441	25	0.7611	0.784883	(25, 332.1)	0.7615
2	39.28868	50	0.8623	0.776394	(50, 386.5)	0.8634
3	69.93083	75	0.6439	0.926343	(75, 382.6)	0.6495
4	100.9826	100	0.4537	1.008293	(100, 365.7)	0.4673
*Edgeworth expansion corrected likelihood ratio statistic.						

Source: Author's Compilations

Table V Results of VAR Residual Normality Tests

H04: Residuals are normally distributed			
Components	Jarque-Bera	Df	Prob. Value
1	0.167514	2	0.9197
2	0.043769	2	0.9784
3	95.45883	2	0.0000
4	0.465577	2	0.7923
5	8.913054	2	0.0116**
Joint	105.0487	10	0.7243

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

Table IV Results of VAR Residual Heteroskedasticity Joint Tests

H05: There is no ARCH effect in residuals (et) up to order q		
Chi-sq	Df	Prob.
244.3566	240	0.4098
VAR Residual Heteroskedasticity Tests (Includes Cross Terms)		
632.2684	660	0.7751

Source: Author's Computations

The diagnostic testing which is performed after computing the restricted VAR model is presented in table III to VI. Table III and IV represents the results of the autocorrelation and serial correlation test respectively. The probability value for both of these tests are insignificant as illustrated in table III and IV which represent that the computed restricted VAR model is free from serial correlation and auto-correlation. Similarly, Table V represents

the results of the EPU, Public sector banks, private sector bank, pharmacy and healthcare sector normality results under the component section under 1 to 5. The p-value denotes that EPU, Public sector banks, private sector banks and pharmacy sectors are normally distributed. However, the healthcare care sector is not normally distributed as denoted by significant p-value at 5% level of significance. The joint probability test shows the result of the overall normality results of all the 5 variables which shows that jointly all the five variables are normally distributed. The VAR residual heteroskedasticity test (without cross term and including cross term) shows that the variance of the residuals is constant over time and the constructed VAR model does not have ARCH effect. Afterward, passing all the diagnostic testing, the impulse response function has computed to analysis the impact of GST announcement on the sectoral indices of NSE. The result of the Impulse Response Function (IRF) in figure 2 and 3 show the responses of the banking sector to the shocks caused by 1 unit changed in error or innovation term of the EPU index which is due to the implementation of GST reforms in India. The result shows that the contemporaneous response of the EPU index is negative to both of the banking sectors in India. Afterward, both of these sectors move in upward direction towards the base line. The public banking sector recovers up instantaneously with a time range of around one and half month and become positive afterward.

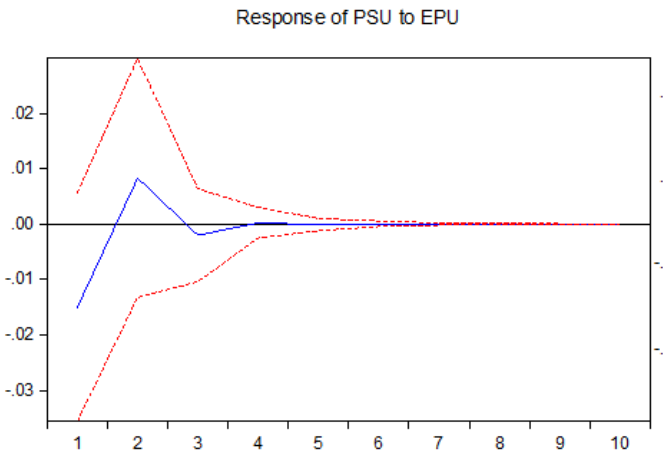


Fig 2 impulse response of PSU Banking Sector

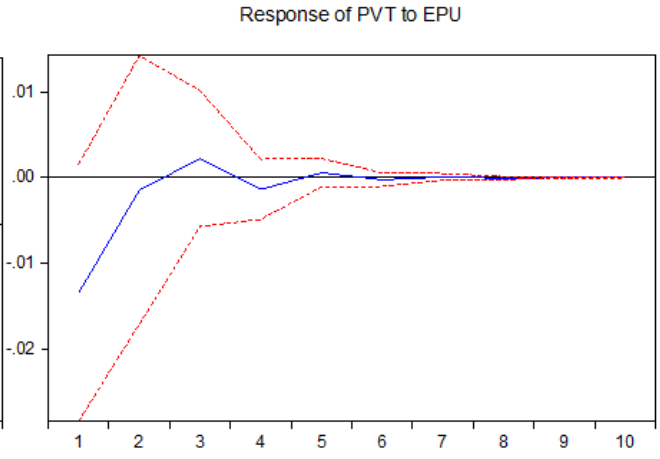


Fig 3 impulse response of Private Banking Sector

On the other hand, the private banking sector recovers up gradually from the shocks of EPU index to the announcement of the GST in India. The private banking sector take a time period of around 2 and half month to taper off the negative effect of the EPU index. Afterward, the impact of the EPU index to both of these banking sector forces them reversely back towards the negative region which depicts an overall negative impact of the shocks from EPU to the Indian banking sectorfrom the announcement and implementation of GST in India. The implementation of the GST in India has increased the tax rate from 15% to 18% on banking services i.e. locker facilities, tax payment and interbank transactions which has resulted in negative instantaneous impact of GST on banking sector in India.

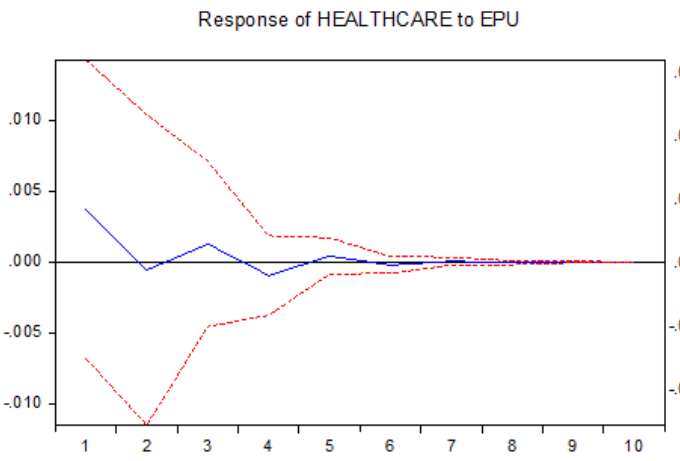


Fig 4 impulse response to healthcare sector

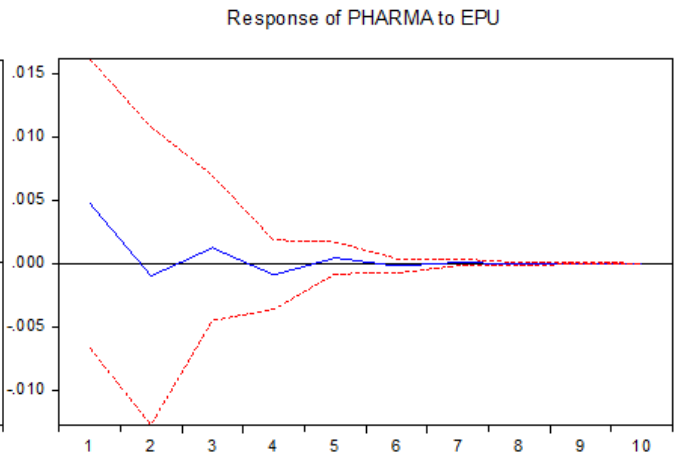


Fig 5 impulse response to Pharmacy sector

Figure 4 and 5 represents the impact on healthcare and pharmaceutical sectors respectively to the shock caused by one unit change in EPU index due to the GST tax reforms in India. The results depict a contemporaneous positive impact of GST reforms on both sectors of Indian economy. The figure of orthogonal response of the healthcare sector represents that immediate positive impact of GST on healthcare sector start declining immediately after its announcement and which is wiped off to the base line within a time period of 2 months. Similarly, the positive impact on pharmaceutical sector is also wiped off within the simultaneous time period. Afterward, both of these sectors tend to move around the base line in short run and afterward merge into the base line into the long run.

Thus the results depict a contemporaneous negative response to the banking sectors from the shocks of EPU due to taxation policy reforms in India by the government. On the contrary, the policy uncertainty due to GST reforms create an opportunity for the pharmaceutical and healthcare sector resulting in contemporaneous positive response to these sectors as indicted in plot 4 and 5. Thus, the results illustrate a negative response to banking sector and positive impact on pharmaceutical and healthcare sectors of the GST reforms in India.

6 Conclusion

The study aims to analyze the impact of the GST reforms on the banking, pharmaceutical and healthcare sector of the Indian economy. As GST reform in India is one the major tax reforms recently performed by the Indian government. The finding of the study illustrates that the policy uncertainty due to the GST reforms negatively impact the banking sector by increasing the tax rates on the financial services and interbank transactions. The implementation of GST has increased the tax rate from 15% VAT rates to 18% under the GST regime which negatively affected the both public and private banking sector in India. As a result of increase in tax rates, the financial services provided by the banking sector to its customers become costly which directly affected their banking business in India as depicted by contemporaneous negative impact in IRF analysis. On the contrary, the adoption of GST in India has created an opportunity for the pharmaceutical and healthcare sector which has resulted in instantaneous response due to uncertainty in the EPU index. However, this positive response to both of these sectors is wiped off in the short run within a time period of two months on an average. This can be due to the reason that the adoption of GST has reduced the tax rate instantly in India by providing the input tax credits to the firm but ultimately increase their compliance cost latterly wiping off the positive impact on these sectors. However, the overall results show that in the long run GST has resulted in increasing the tax base and its impact is wiped off in the long run with the passage of time.

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