Innovations

Does the GST Affect the Stock Market: An Empirical Study of India?

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Abstract
This study aims to determine how the GST's introduction has affected the instability of the stock market index in India. Daily data from the Nifty 50 index have been utilized for the study's purposes from the first of June 2011 to the fifth of November 2022. The entire sample has been separated into two periods: before and after the installation of the GST. The influence of GST adoption on the volatility of the stock market index of India has been studied empirically using the generalized autoregressive conditional heteroscedasticity (1,1) Model. According to the study's findings, there is less volatility has been found in the Indian stock market before the adoption of the GST than it was after.

Keywords : 1.*India, Stock market, 2.GARCH, 3.GST*

1. Introduction

After the GST concept was first introduced in 2000, a committee was established to create a GST strategy. A task force for budget management and fiscal responsibility was created in 2003 and is led by Dr. Vijay Kelkar. The working group recommended the implementation of GST in its 2004 report as a way to improve the present indirect tax structure. Later, in 2006–2007, the finance minister proposed that the GST be put into effect on April 1 of that year. (Roy, 2017) The task of creating a roadmap for India's GST with the assistance of the federal government was given to the Empowered Committee of State Finance Ministers (EC).

In December 2014, Finance Minister introduced the 122nd Constitutional amendment in the parliament and it was passed on May 2015 in LS (Lok Sabha). The bill became an act in September 2016 after ratification bythe state's legislatureand the president's assent and notified as Constitution (101st Amendment) Act 2016Kaur, B. (2016). and after enactment of various laws on GST, it was launched on July 01, 2017, at the central hall of Parliament of India in a mid-night ceremony.India's long-awaited tax reform, the GST. It was important to remove the negative impacts of previous tax systems (Roy, 2017)

Unlike the prior concept of taxing the "manufacture" of goods, the sale of goods, or the provision of services, GST is now levied on the "supply" of goods or services. In contrast to the prior principle of origin-based taxation, which results in the cascading impact of tax, the concept of GST is based on the principle of destination-based consumption taxation. GST is a dual tax system in which the federal government and each state simultaneously levy taxes on a single base and split the proceeds (Venkat, A. M.)

"Stock market" is a network of exchanges and other places where financial transactions such as purchases, sales, and issues of shares of various publicly traded firms take place. These transactions are done on recognized stock exchanges in physical or electronic form, supervised on over-the-counter (OTC) markets.Despite the fact that the terms "stock market" and "stock exchange" are frequently used interchangeably, the latter term only applies to a portion of the former. This process of buying and selling of stocks on stock exchanges is called trading in the stock market. A large no. of buyers and sellers of securities share information and conduct these transactions.Corporate shares can be priced through stock marketsand serve as an indicator of the economy.One can frequently anticipate fair pricing and a

high level of liquidity on the stock market due to the large number of participants competing for the best price.

Given that both microeconomics and macroeconomic events have an impact on the stock market. The author explained that unpredicteddeclarations have the greatest influence on European blue-chip volatility of the marketand a short-term rise in the spread before the European Central Bank's interest rate decision announcement. In order to better understand market behavior, it is essential to comprehend how macro-news affect the price of securities.The market's expectations have an impact on the macro news announcement (Rühl and Stein, 2015). Market participants and decision-makers must take into account how macro-news releases will affect the stock market to make better choices, and over time, researchers and decision-makers have shown an interest in how these announcements may affect stock market volatility (Adjasi,2009).

2. Literature review

According to Chaurasia et al. (2016), GST will create a single market by absorbing the majority of indirect tax rates. The entire indirect tax system will be simplified, which will aid economic growth. Various nations around the world have implemented GST and are reaping the benefits; for India to compete in the worldwide market, a consistent tax system is also essential. The fundamental issue is that it necessitated a constitutional revision and state consent. "GST is useful for the development of the Indian economy as well as it will be very helpful in enhancing the country's gross domestic product by more than two percent," they concluded.

Venkadasalam (2014) studied the impression of GST on the growth of ASEAN countries. The study used selected Philippines, Singapore, and Thailand countries from the panel analysis technique; secondary data collected from the World Bank and the relationship of National growth with macroeconomic variable was analyzed with the regression method. The study applied the least squares dummy variable model [LSDVM] and concluded that Singapore has a notable positive impact while other two countries i.e., the Philippines and Thailand have a notable negative impact.

Bouri (2015), studied with the help of the newly created VAR-GARCH model applied by taking the weekly data from 30th January 1998 to 30th May 2014 to investigate the return and volatility links between the prices of oil and the Lebanese stock market. In terms of volatility links, our empirical findings reveal that volatility transmission from oil prices to the Lebanese stock market was unidirectional throughout the time.

Haron and Ayojimi (2015), concluded that the commodity market of Malaysian CPO is volatile. The local CPO market is also impacted by shock in the connected markets. The author concluded that market assimilation, movement, and spillover effects can all be better understood using volatility. The volatility spillover found between the two CPO markets suggests that the volatility of the returns on one market has a large impact on the volatility of the returns on the other market.

Haron and Ayojimi (2018) investigated the association between GST and volatility of stock market index in Malaysia. The study used an experimental approach with the GARCH model (Generalized Autoregressive Conditional Heteroskedasticity) on closing prices of Malaysian stock indexes and futures markets for the time frame June 2009 to November 2016. The study concluded that the volatility of the Malaysian stock market index increased after the GST announcement rather than before, indicating that educational programs implemented by the government prior to the announcement of GST did not produce meaningful results.

Salami and Haron (2018), studied the impact of structure break on long-term pricing of crude palm oil (CPO) and futures of CPO in the Malaysian Market. Authors have applied Johansen cointegration, VECM (for symmetric model), TAR (for asymmetric long-run relationship) and M-TAR models, to the data from June 2009 to August 2016.The study came to the conclusion that the pricing efficiency of the market is unaffected by a structural break in the Malaysian CPO price series. Besides this, the study also established a positive correlation between CPO and CPO-F (future) prices, and price risk is eliminated by making deals in the future market.

Verma et al. (2018), studied the impact of GST in two categories i.e.long-term benefits to the country and operational efficiency. The study mentioned that entrepreneurs find challenges in the operation of technical software and government support is required in terms of subsidies and training. It was concluded that the majority of enterprises faced challenges while accepting the new tax regime. GST is supported due to the boon in the long-term development ofthe Nation.

Nedunchezhian, Babu and Bharathi (2018) conducted a study on the Analysis of the impact of GST fromthe Perspective of Small Business Stakeholders and mentioned that GST has a direct impact on two of its key components i.e., businesses and end customers. The descriptive study reflects that GST implementation is good but requires additional efforts for improvisation of GST.

Surendra and Shankar (2018), mentioned that the consequence of GST may be reviewed mainly on the multiple economic variables, inflation, growth of GDP, integration of national market, effective tax compliance in the country, improved revenue for governments, impact on producers and consumers, better tax administration in the country, transparency in the transactions.

Nguyen (2019) explained with the help of the least square method that, tax revenue has a positive influence on Vietnam's economy, however, the intensity of impact is high in the case of indirect tax, and for direct tax it is unseen. However, it was mentioned that from the analysis of data from 2003 to 2017, it cannot be concluded that indirect tax has a more favorable impact on the growth of Vietnam than direct tax. Tax revenues contribute around 80% of Vietnam's economy.

Beemabai and Krishnakumar (2020) examined the influence of GST on the Indian retail sector. Indian organized retail sector is having single-digit growth as compared to more than 20 % of growth a few years back. Indian retail sector facing problems including declining sales, high inventory costs and logistic issues. However, GST is providing an edge to the retail sector at various fronts i.e. policies, and taxation. It was concluded that improvement in the supply chain under GST will help to manage the logistic and storage cost, which will help to scale up their numbers and shortly it will help the ultimate consumer.

3. Data and methodology

3.1. Data set

In order to capture the influence of GST on the nifty indexvolatility, the sample for the study was chosen prior to the distribution of COVID-19 in India. Consequently, the daily data of the Nifty-50 index was gathered from investing.com during the time frame of June 2011 to November 2022 and divided according to the day GST was implemented in India, which was 1 July 2017. Pre-GST samples cover the period from June 1, 2011, to June 30, 2017, while post-GST samples cover the period from July 1, 2017, toNovember 30, 2022.

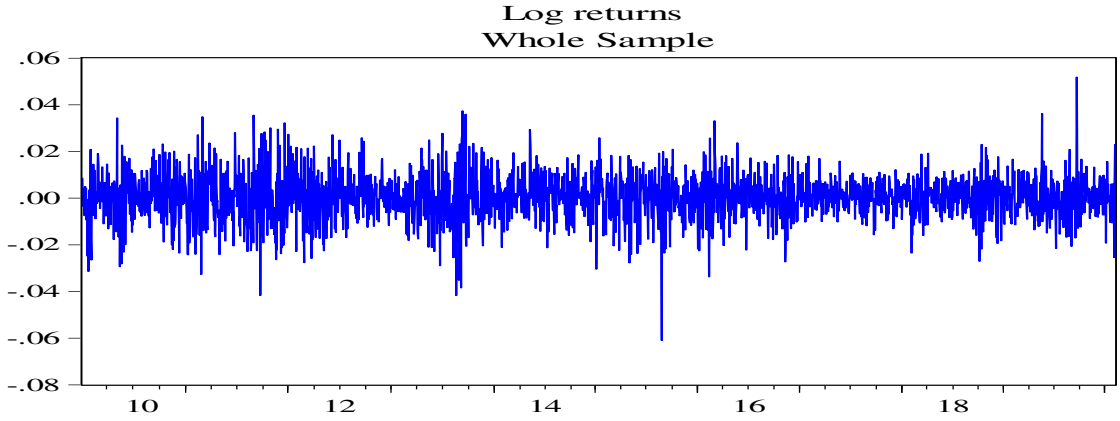

Figure 1. Graph of CNX Nifty 50

3.2. Methodology

The daily data are converted into compounded return by taking the following logarithmstransformation:

$$R_t = LN(P_t/P_{t-1})$$

Where the R_t is the Daily returns of the Nifty index, LN is used for the natural log, $P_t$represents the current day index price and P_{t-1} is the lagged value of the nifty index.

Before proceeding to the GARCH model, it is necessary to make the data suitable for the model therefore,the Augmented Dickey-Fuller (ADF) test is being used to check the stationary condition of the series. A series is said to be stationary when the series follows a mean reverting process.

In this study, the influence of GST implementation on the volatility of the Indian stock market is captured using the Generalized Autoregressive Conditional Heteroskedasticity (GARCH) model. Below is an expression for the GARCH model's conditional mean equation. The equation is also useful for determining whether the ARCH effect in the series is a necessary precondition for the ARCH models under consideration to be applicable.

$$y_t = \alpha + \beta y_{t-i} + \varepsilon_t \quad \text{.....(1)}$$

Where $\mathbf{y_t}$represents the nifty 50 returns, $\boldsymbol{\alpha}$ is the intercept term, β is the coefficient of the lag term of nifty 50 indexes and $\boldsymbol{\varepsilon_t}$ is the error term fulfilling the assumption of $\varepsilon_t|\Omega_t \sim N(0, h_t)$.$\Omega_t$ is the information set.

The second-moment equation i.e., the variance equation can be expressed as follows:-

$$\text{[illegible]}_t = \alpha + \sum_{i=1}^{p} \gamma_i \text{[illegible]}_{t-i} + \sum_{j=1}^{q} \lambda_j u_{j-i}^2 \quad \text{.....(2)}$$

Where, [illegible]_t represents conditionalvariance generated by own lags and previous day squared residuals of the mean equation.$\sum_{i=1}^{p} \gamma_i$ represents the ARCH term and $\sum_{j=1}^{q} \lambda_j$represents the GARCH term. The order for the best GARCH is selected by the lowest Akaike information criterion (AIC). Finally, the robustness of the model is carried out by checking the assumption of the normality, noautocorrelation and no heteroskedasticity in the residuals.

Empirical Results and Discussion

We initially present the data's summary statistics in this part. This will enable us to comprehend the nifty50 index's fundamental qualities. ADF test results are presented next. Finally, the GARCH model's maximum likelihood estimation is shown. This would make it easier for us to comprehend how the GST will affect the Nifty 50.

3.3. Summary statistics

Table 1. explains the descriptive statistics of the Nifty 50 index's returns for the whole sample period as well as the two subperiods before and after the adoption of the GST. The positive unconditional mean and median over the whole sample demonstrates the rise in the nifty50 during the course of the study. The distribution is negatively skewed in both the pre-GST sample and the entire sample, which suggests that the extreme values are on the distribution's negative side. The leptokurtic behavior of the distribution is represented by excess kurtosis. Since the Jarque-Bera test's probability value is below the 5% level of significance, the data are not normally distributed. Both the pre-GST sample and the post-GST sample have enough data to provide the model with superior resultsi.e., 1860 and 642 respectively.

Table 1. Summary statistics of return series of Nifty 50

	Whole Sample	Pre-GST	Post-GST
Mean	0.3850	0.654	0.208
Median	0.258	0.750	0.001
Max	0.052	0.037	0.052
Min	-0.061	-0.061	-0.027
Std. Dev.	0.010	0.010	0.008
Skewness	-0.113	-0.184	0.329
Kurtosis	4.945	4.583	6.303
Jarque-Bera	399.862	204.557	303.343
Probability	0***	0***	0***
Sum	0.837	0.599	0.229
Observations	2980	1970	1010

Notes: *** marks indicates the significant p-value at 1% level.

3.4. Unit root test

ADF test for unit root is applied to check the stationary condition of the series. According to results in Table 2,the P-value of the ADF test suggests both the sample series are found nonstationary at level 1 and become stationary after first differencing. The result of post-GST is a bit confusing because thepost-GST sample period is found stationary at the level as the P-value(.06) is significant at the 10% level. Therefore, for confirmatory results,the modified ADF is also carried out considering the structural break in the post-GSTperiod. And the result suggests that the series is integrated at the order I(1). Hence,we use the first differencing to get the series stationary.

Table 2. Results of ADF unit root test

	I(0)		I(1)	
	t-Statistic	Prob.*	t-Statistic	Prob.
Pre-GST	-2.586	0.634	-40.039***	0***
Post-GST	-3.299	0.068	-23.656***	0***
Post-GST With Break	-4.362	0.180	-24.601***	< 0.01**

Notes: For the First Difference, the Test Equation includes drift and trend factors at level. There is only Drift present. The ADF Test Equation's lag order is based on SIC. **and *** A 5% and 1% significance level, respectively

3.5. The GARCH model

The GARCH(1,1) model's findings for India's pre- and post-GST implementations are shown in Table 3. The ARCH LM test was used on the mean equation residuals to determine whether the volatility clustering in time series was a necessary precondition for the GARCH model. We also discovered a strong ARCH effect in both periods, which suggests that the GARCH model is the most effective one for modeling under these circumstances. Based on the lowest AIC value, the best model is chosen, and we discovered that the best model is GARCH(1,1).

Firstly,the result of conditional mean equationsis presented in the table. the abnormal return can be seen in the nifty 50 indexes on September 20, 2019, which has been considered as the outlier in the series. For that, a spike dummy is used in the conditional mean equation of the post-GST period, which is found to be

significant at a 10% significance level.The coefficient of the AR term was found insignificant in both the sample period.

Second, the result of the conditional variance equation is presented in the table. TheARCH term coefficient is found to be substantialat a 5% level in the post-GST period. Suggests that the previous day's news helps predict current-day volatility.However, the coefficient of ARCH is found to be insignificant in the Pre-GST period. The coefficient of the GARCH term is found to be significant at 5% and 1% levels in pre-GST and post-GST periodsrespectively.This implies that the previous day variance is also helpful in predicting the current day variance.

Finally, the goodness of the models is tested by checking the assumptionsforresiduals. Therefore, the diagnostics test is performed on residuals of both models. We found no autocorrelation problem in the residuals as the DurbinWatson(DW) values is near to 2. and there is no ARCH effect left up to 2 lags. This implies that the residual series ishomoscedastic.

Table 3. Empirical evidence of the GST announcement

Equations	**Coefficient**	**Pre-GST Implementation GARCH**	**Post-GST Implementation GARCH**
Mean Equation	C	-2.41E-06(0.9972)	0.004(0.034)
	AR(1)	0.06(0.153)	0.8(0.7857)
	Dum	-	0.9(0.0059)*
Variance equation	C	0.00(0.1652)	0.00(0.0851)
	ARCH(-1)	0.12(0.1768)	0.02(0.0056)**
	GARCH(-1)	0.255(0.0273)**	0.1(0.00)***
	AIC	-5.8201	-6.9854
	SIC	-5.9252	-6.8148
	DW	2.2063	2.0731
Diagnostic test	ARCH 1	0.3212	0.9529
	ARCH 2	0.0686	0.4985
Notes: p-values are given in the parenthesis and *, ** and *** represent the significant p-values at 10% , 5% and 1% level. Dum represents the Dummy variable, used for abnormal returns on “20 Sep 2019”.			

4. Conclusion

In this study, which serves as a proxy for the Indian stock market, we look at how the Goods and Services Tax (GST) implementation has affected the return volatility of the CNX Nifty 50. To further understand the effects of GST adoption, the GARCH (1,1) model has been utilised for the data period prior to Covid 19 dissemination. As a consequence, from June 2011 to November 2022, daily Nifty 50 data was gathered. The absence of autocorrelation and heteroskedasticity in the diagnostic test results shows that the model is stable. The study's findings indicate that the volatility of the Indian stock market was less severe prior to the implementation of the GST than it was thereafter.

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