DO COMPANIES FINANCIALLY WITHSTAND SWEEPING TAX REFORM?

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Abstract

Tax reform aims to transform how a nation collects or manages taxes. It is frequently conducted to enhance tax administration or to bring economic advantages. Goods and Service Tax (GST) is an indirect tax that replaced many indirect taxes in several nations in the world. Likewise, GST implementation in India was considered positive for the government and the economy. However, its impact on the corporate sector needs to be investigated more. In this study, we investigated the impact of GST on the financials of Indian companies, especially profitability, liquidity, and their relationship. Financial data from 123 companies for ten years (2013 to 2017 — pre-GST; 2018 to 2022 — post-GST) were analyzed using panel regression methods. The parameters examined are operating profit, return on assets, and working capital. The analysis shows that the companies' operating profit increased after GST implementation, whereas the return on assets decreased. Further, working capital requirements increased after the GST implementation. The impact of GST on operating profits did not significantly differ across sectors. Nevertheless, sectors like metals and mining, information technology (IT), oil and gas, and reality significantly improved return on assets and decreased working capital after GST implementation. The results are helpful to researchers and policymakers considering the differential impact of GST across sectors and thereby ascertain the ability of corporations to financially withstand tax reforms.

Keywords: Tax Reform, Goods and Services Tax, GST, Impact of GST on Companies, Sectoral Impact of GST

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1. INTRODUCTION

As an imperative tax reform, the Goods and Services Tax (GST) swapped India's central and state taxes by replacing the seven central and nine state taxes, including VAT (value-added tax). In India, GST was first considered for implementation during the year 1991 and later implemented in the year 2017. GST caused a structural economic shift and a significant change post-liberalization (Jha, 2019; Siddiqui, 2018). However, GST was first implemented at the global level in 1950 itself and successfully executed in over 116 nations. Likewise, with five tax brackets (0%, 5%, 12%, 18%, 28%), the implementation of GST was expected to have a positive effect on the Indian economy by increasing tax collection and control over inflation (Vanita, 2018; Deshmukh et al., 2022). Even the Reserve Bank of India (RBI) expressed that the economy would have significant macroeconomic implications on growth, inflation, and fiscal balances post-GST implementation (Business Insider, 2017).

Further, GST implementation is expected to increase the country's tax-to-GDP ratio, improve states' fiscal health, and ease business. However, the impact of GST widely differed across sectors (GST Helpline, 2019). Garg (2014), Shaik et al. (2015), and Munde and Chavan (2016) are the notable works that discussed the fiscal benefits of GST implementation across the Indian economy.

Nevertheless, more literature is needed to address the impact of GST on a sectoral level. Notably, Bhattarai (2017), Negi et al. (2022), and Ramya and Sivasakthi (2017) investigated the sector-level differences in industrial output and economic growth after GST implementation.

At a business level, Indian companies experience better compliance due to simplified tax structures after GST implementation (Nutman et al., 2022; Fernando & Chukai, 2018). Further, the cost of production was likely to reduce due to the avoidance of double taxation and improved supply chain, which would improve companies' operating profits. Likewise, liquidity requirements tend to increase after GST implementation, which will be evident from companies' working capital. In general, profitability and liquidity are the two critical parameters that reflect the financial position of companies.

However, less empirical evidence is available on the significance of GST on the profitability and liquidity of Indian companies. For example, Shukla and Singh (2018) found no significant impact of GST on the profits of Indian companies. However, Riyazahmed (2022) found a positive impact of GST on operating profits. Further, liquidity is an essential determinant of profitability. However, the nature of the relationship between financial variables significantly differs due to the macroeconomic and industry conditions in which the companies operate (Margerakis, 2018). Since GST is a systemic economy-level change, it is necessary to investigate its significance on corporate profitability, liquidity, and their relationship. Nevertheless, there needs to be evidence of whether the impact of the GST differs between sectors. The paper intends to examine these aspects.

The remaining sections of the paper are structured as follows. Section 2 presents the literature review. Section 3 focuses on the research framework. Section 4 presents the results of the analysis. Section 5 presents the discussion. Section 6 concludes.

2. LITERATURE REVIEW

2.1. Importance of tax reforms and Goods and Services Tax

Examining the impact of the corporate tax rate changes, Bolboros (2019) analyzed the financials of real estate companies in Europe. The author found that an increase in tax rate reduces corporate financial performance. Princen (2012) investigated the impact of taxation on corporate financial decision-making and found that different tax codes between countries and states in the European Union offer a sizeable profit-shifting opportunity to multinational enterprises. Notably, Kariuki (2017) investigated the impact of corporate tax on the financial performance of Kenyan-listed companies. The study found liquidity positively impacts corporate tax, and leverage negatively impacts corporate tax, whereas there was no significant impact of the size of firms on the corporate tax.

Very little understanding exists of the impact of GST on an economy (Kir, 2021). However, GST causes an increase in inflation (GeeksforGeeks, 2022) and will positively impact the GDP in the long run (Manakiwala, 2022). Bhattarai (2017) investigated the impact of GST on the economic output of the country and various sectors using a dynamic Computable General Equilibrium (CGE) model analysis. The study showed that GST would positively impact economic growth, capital formation, investment, consumption, and employment.

There is a significant difference in the output level of various sectors due to GST. For example, the food, textiles, health, real estate, and transport sectors experienced a 21 percent expansion, whereas construction, non-metallic minerals, and wood products declined post-GST (Bhattarai, 2017). Likewise, Negi et al. (2022) found negative impacts of GST on motor and pump exports, like reimbursement of duty drawbacks and biases in the indirect tax system. Ramya and Sivasakthi (2017), Deepaware and Dwivedi (2022), and Arya (2022) also emphasize the differences in the broader sector-level impact of GST.

We need more evidence to understand the impact of GST on the financials of the corporate sector. GST will reduce warehouse requirements in multiple places, improve logistics efficiency, and benefit manufacturing and trading companies (IAS Score, 2019). Likewise, efficient supply chain management will bring cost efficiency in producing and distributing goods (Mukherjee, 2017, 2022). Further, GST implementation removes the cascading effect of taxes and is expected to bring the cost of production to companies (ClearTax, 2022), thereby improving operating profits. Contrastingly, GST implementation will increase the liquidity requirements of companies (Fibre2Fashion, 2022).

2.2. Profitability and liquidity relationship

Profitability and liquidity are the two important indicators of the financial performance of companies (Ehiedu, 2014). Profitability is generally measured by operating profit and return on assets (Choiriya et al., 2020). Liquidity is measured mainly through working capital, current ratio, and cash conversion cycle (Emery & Cogger, 1982). It is a widely investigated phenomenon about the relationship between profitability and liquidity. Liquidity, in general, is found to reduce profitability. The lower the liquidity, the higher the profitability (Enow & Brijlal, 2014; Aldubhani et al., 2022; Arora, 2013; Syeda, 2021; Rehn, 2012).

Padachi (2006) found a positive relationship between liquidity and profitability (measured by return on assets), yet the nature and level of impact significantly vary across the industries considered for the study. Likewise, Björkman and Hillergren (2014), Chakraborty (2020), and Deeposhree (2013) found a positive impact of liquidity on profitability. Ali and Ul Hassan (2010) and Thuvarakan (2013) found no significant relationship between liquidity and profitability. Anton and Nugu (2021) found an inverted U-shaped curve in the working capital relationship on profitability, meaning that up to a breakeven point or optimum level, liquidity positively impacts profitability, and later the impact is negative. Margerakis (2018) found that the level of relationship between finance variables differs due to the economic and industry conditions in which companies operate.

It is evident from the literature that GST has a significant macroeconomic impact and a positive effect on the profitability of companies by reducing double taxation and improving logistics and supply

chains. For example, Pandey and Sinha (2022) found a considerable increase in operating and net profit in 2018–2019 (post-GST implementation). Likewise, their study reported a decrease in the average working capital cycle of Indian companies during the financial year 2018–2019. Except for finished goods conversion days, the raw materials, work in progress, and debtors' conversion period reduced in the year after GST implementation, which is evident in large, privately owned, listed companies. Consumer goods, construction materials, and metals saw a relatively better decrease in the working capital cycle. However, except for Shukla and Singh (2018), Riyazahmed (2022), and Pandey and Sinha (2022), the literature still needs to examine the impact of GST on corporate financial performance.

Since we expect the GST to impact both the profitability and liquidity of companies, it is crucial to examine the nature and level of impact on them and their relationship after the GST implementation. Further, we add to the existing literature by examining the sectoral level difference in the impact of GST by taking companies from nine core sectors of the economy. The following are the research questions.

RQ1: Does GST implementation positively impact the profitability and liquidity of Indian companies?

RQ2: Is the impact of GST on profitability and liquidity identical across the companies in all sectors of the economy?

Hence, we frame the following hypotheses for the analysis.

$H1_0$: GST has no significant positive impact on profitability.

$H2_0$: GST has no significant positive impact on liquidity.

$H3_0$: GST has no significant positive impact on the profitability and liquidity relationship.

$H4_0$: There is no significant difference between sectors on the impact of GST on profitability.

$H5_0$: There is no significant difference between sectors on the impact of GST on liquidity.

$H6_0$: There is no significant difference between sectors on the impact of GST on the profitability and liquidity relationship.

3. RESEARCH METHODOLOGY

Data for the variables considered for the study is collected from companies listed in the sectoral indices of the National Stock Exchange (NSE), India, between 2013 and 2022. These are non-financial companies belonging to nine sectors of the economy. Out of the ten sectoral indices of NSE, the financial services index is excluded. In the Appendix, Table A.1 details the data sets sectoral indices, companies, and sub-sectors. After excluding companies with incomplete information, we used 1230 observations for further analysis.

We source data from Capitaline, a subscription-based database. Since the data set is longitudinal, we used balanced panel data regression models for analysis. Further, we examined the following models for hypothesis testing.

Base model:

Main effect

$$OPM_{it} \sim \beta_0 + \beta_1 GST_t + \beta_2 WC_{it} + \beta_3 Size_{it} + \beta_4 Sector_t + \varepsilon_{it} \quad (1)$$

Interaction effect

$$OPM_{it} \sim \beta_0 + \beta_1 GST_t + \beta_2 WC_{it} + \beta_3 Size_{it} + \beta_4 Sector_t + \beta_5 (GST * Sector)_{it} + \beta_6 (GST * WC * Sector)_{it} + \varepsilon_{it} \quad (2)$$

Refer to Table 1 for the description of the variables. Eq. (1) and Eq. (2) are also examined with the *return on assets* (*ROA*) as the dependent variable. To estimate the level of impact between variables, we used pooled ordinary least squares (OLS), fixed effect (FE), and random effect (RE) methods. We used the poolability (pF), and Hausman (pH) tests to choose the best model for representing the relationships. pF is an F-test of a null hypothesis that all fixed effects are jointly 0 when comparing fixed effects estimates to those from pooled regression (SAS Institute, 2020). Likewise, the pH test estimates the null hypothesis that fixed effects are better than the random effects model. We used the plm() package in the R software, version 3.2.2, for the analysis.

Table 1. Variable description

Variables	*Estimation*
Dependent variables	
Profitability	
Operating profit margin (OPM)	[Operating profit or EBITDA]/Net sales
Return on assets (ROA)	Net profit after tax/Total assets
Liquidity	
Working capital (WC)	[Current assets – Current liabilities]/Total assets
Independent variables	
Goods and Services Tax (GST)	Pre-GST = the Year 2013 to 2017 Post-GST = the Year 2018 to 2022
Working capital (WC)	[Current assets – Current liabilities]/Total assets
Size	Log of net sales
Sector	Classification of sectors

Source: Author's elaboration.

4. RESULTS

Table 2 presents a descriptive summary of the absolute value of the variables. Further, a descriptive summary of the ratios shows that the mean OPM and the ROA are estimated to be 22.11 percent and 13.41 percent, respectively. Further, Indian companies typically maintain 26.42 percent of total assets in working capital. However, no considerable change was found in the OPM and ROA throughout the sample period (Figures 1a and 1b).

Table 2. Descriptive information of variables (absolute figures, in crores)

Variables	*Mean*	*SD*
Operating profit	4800.6	11133.15
Net profit	2272.7	5527.3
Working capital	3286.2	9341.05
Sales	31341.4	76992.51
OPM (%)	22.11	11.36
ROA (%)	13.415	9.4
Size (log)	3.876	0.63
WC (ratio)	26.42	22.63

Source: Author's calculation based on the data collected from the Capitaline, a subscription-based database.

Figure 1a. Trends of operating profit (2013–2022)

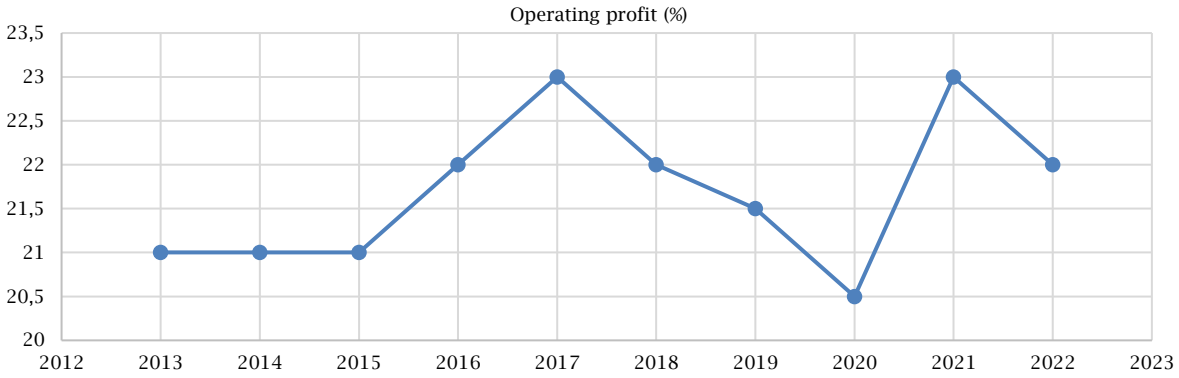
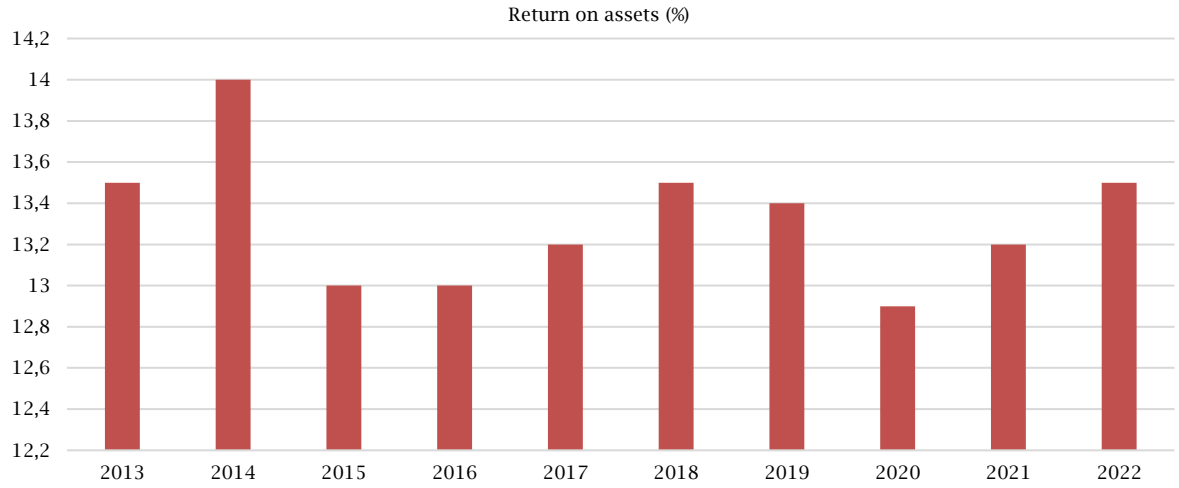


Figure 1b. Trends of return on assets (2013–2022)



Source: Author's elaboration based on the data collected from the Capitaline, a subscription-based database.

Further, we aggregate the data into pre- and post-GST implementation on the overall sample and the broadly classified sectors as manufacturing and service companies (Table 3). The OPM increased by 0.59 percent, whereas the ROA decreased by 1.17 percent. Likewise, sales increased by 0.21 times, and the working capital level decreased by 1.26 ratio points compared to the overall samples' pre-GST levels.

Table 3. Mean values (pre- and post-GST)

Variables	*Pre-GST*	*Post-GST*	*Change*
Overall sample			
OPM	21.81	22.4	0.59
ROA	14	12.83	-1.17
Size	3.77	3.98	0.21
WC	27.05	25.79	-1.26
Manufacturing			
OPM	20.56	21.31	0.75
ROA	13.56	12.92	-0.64
Size	3.89	4.07	0.18
WC	25.74	23.96	-1.78
Services			
OPM	24.4	24.66	0.26
ROA	14.92	12.64	-2.28
Size	3.54	3.8	0.26
WC	29.77	29.59	-0.18

Note: OPM and ROA — %; Size — log; WC — ratio.
Source: Author's calculation based on the data collected from the Capitaline, a subscription-based database.

Likewise, the data aggregation at the sector level shows a difference in values among the nine sectors during the pre- and post-GST period (Figures 2a, 2b, and 2c). Sectors like consumer durables, FMCG, and media increased in OPM, and sectors like metals, mining, oil, and gas decreased from their pre-GST levels.

When sectors like auto, consumer durables, health, and media show a massive decrease in their ROA during the post-GST period, the metal and mining, and oil and gas sectors exhibit markable improvement. Likewise, WC fell hugely for metals, mining, and oil and gas during the post-GST period (Appendix, Table A.2). The sectoral difference in the impact of GST on OPM and ROA is evident, as shown in Appendix, Figures A.1 and A.2. Hence, we test the statistical significance of the impact of GST and the sectoral differences using the panel data regression method.

Figure 2a. Sector-wise aggregation of mean values of variables (pre – and post-GST period): Operating profit margin (OPM)

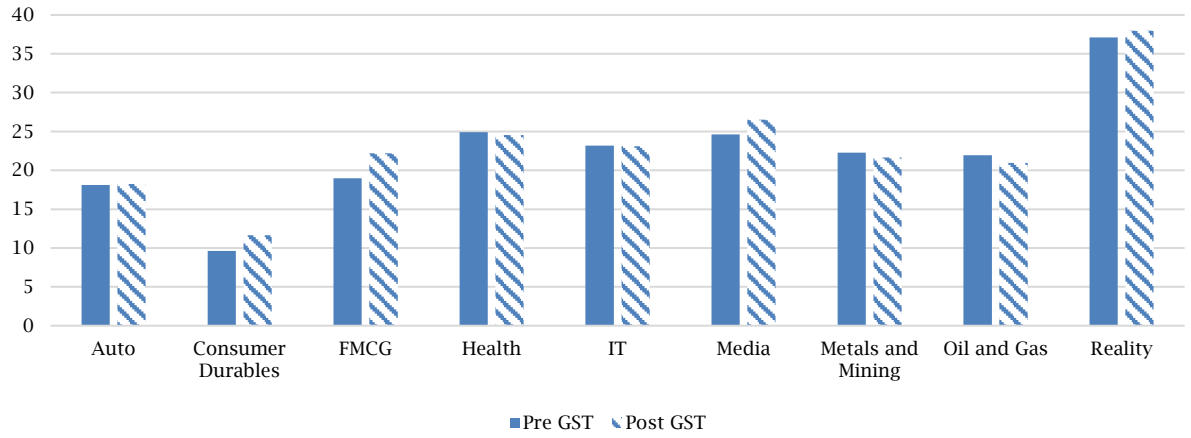


Figure 2b. Sector-wise aggregation of mean values of variables (pre – and post-GST period): Return on assets (ROA)

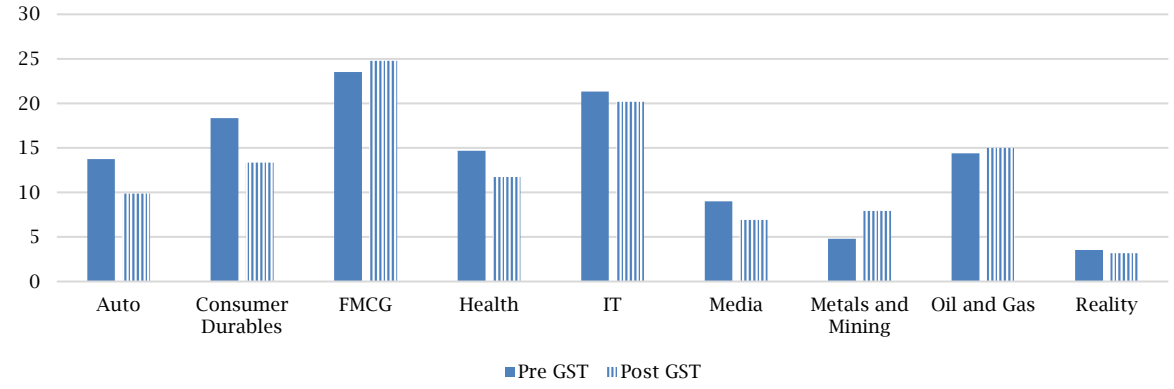
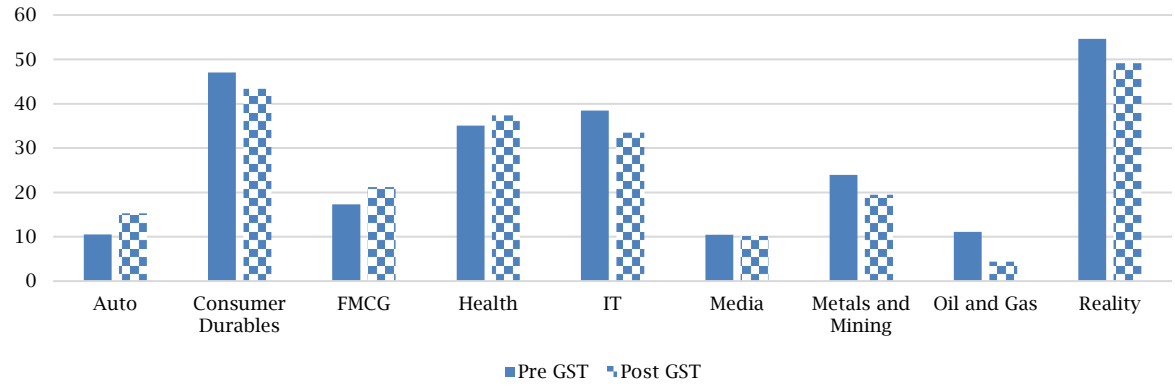


Figure 2c. Sector-wise aggregation of mean values of variables (pre – and post-GST period): Working capital (WC)



4.1. Panel data analysis

Before the panel regression analysis, the data were winzorised at the 5th and 95th percentile to deal with abnormal values or outliers. Post-winzorization, the mean values of OPM were 21.51 percent, ROA was 12.58 percent, size was 3.883, and WC was 26.87 percent. There is little difference found in mean values post-winzorization. At first, to estimate the causal impact of GST on IVs, we analyzed the data using pooled OLS, FE, and RE methods on the two dependent variables, i.e., OPM and ROA. Tables 4 and 5 present the results of the panel data analysis of OPM and ROA. We conducted all the tests with robust HAC standard errors.

4.1.1. Impact of GST on operating profits

To begin with, we analyzed the impact of GST on the OPM using the FE method (Table 4). Results show that GST had positively impacted the OPM (b = 0.763, p < 0.001). Though sectors like FMCG, media, metals, and mining show significance, the effect is inconsistent across models. WC significantly improved OPM (b = 0.063, p < 0.001), meaning that holding more liquid assets adds value to the operating margin of companies. On the other hand, size does not show any significance, which means that the operating profit margin does not differ due to the size of the companies.

Further to the main effects, we examined the interaction effect of GST with WC and its sectoral difference. In contrast to the main effect, WC reduced OPM post-GST implementation (b = -0.055, p < 0.001), which is significant in sectors like media and metals and mining.

The whole model (FE6) is estimated through pooled OLS and tested using the pF test. We found that FE6 is better than pooled OLS (p < 0.00). Hence, we analyze FE models through RE. FE6 model is compared with RE6 using the pH (Hausman) test. Results showed that RE6 is better than FE6 (p < 0.00). However, the sign of effects and significance did not change in RE.

The findings show that GST improved OPM, which is similar across sectors. However, any increase in WC post the GST implementation reduced the OPM mainly in sectors like media and metals and mining which is evidence of the level of change GST has brought down to the determinants of profitability and liquidity in the media metals and mining sectors.

4.1.2. Impact of GST on return on assets

Further to examining the impact of GST on the OPM, we analyzed its impact on the ROA using the FE method (Table 5). First, we analyzed the overall sample and found that GST reduces the ROA (b = -0.64, p < 0.001). However, sectors like FMCG, IT, metals and mining, oil and gas, and reality improved RoA after GST implementation. Further, WC (b = 0.043, p < 0.01) and size (b = 6.87, p < 0.001) exhibit a positive impact on ROA separately.

Further examining the main effects, we analyzed the impact of GST and WC across sectors. The impact of WC, which was positive individually, was found to reduce ROA after the GST implementation (b = -0.178, p < 0.01), which is significant in sectors like consumer durables, media, metals and mining, oil and gas, and reality.

The whole model (FE6) is estimated through pooled OLS and tested using the pF test. We found that FE6 is better than pooled OLS (p < 0.00). Hence, we analyzed FE models through RE. FE6 model is compared with RE6 using the pH (Hausman) test. Results showed that RE6 is better than FE6 (p < 0.00). However, the sign of effects and significance did not change in RE.

The findings show that after the GST implementation, companies declined in ROA, yet sectors like FMCG, IT, metals and mining, oil and gas, and reality show significant improvement. Further, WC and size increased the ROA. However, the effect of WC changed to negative after the GST implementation and is evident in sectors like consumer durables, media, metals and mining, and reality.

4.1.3. Impact of GST on liquidity

Further to examining the impact of GST on profitability measured by operating profits (OPM) and financial performance (ROA), we found that WC significantly impacted both profitability variables. Hence, to understand the scenario further, we analyzed the impact of GST on the WC of the companies using Eq. (3).

$$WC_{it} \sim \beta_0 + \beta_1 GST_t + \beta_2 (GST * Sector)_{it} \qquad (3)$$

At first, we tested the model using FE (Table 6) and found GST overall increased the WC (b = 3.789, p < 0.05). However, the WC exhibits a significant reduction in sectors like IT, metals and mining, oil and gas, and reality. Therefore, we examined the FE and RE models and used the pH (Hausman) test to choose the best model. The result showed that RE best explains the impact of GST on working capital on a sector level (p = 1).

4.1.4. Additional analysis: Two-way fixed effects

We used ten-year data for the analysis, which included the implementation of demonetization, a significant systemic economic change that happened in the year 2016 in India. Likewise, the COVID-19 pandemic impacted the economy during the years 2021 and 2022 by the COVID-19 pandemic. Hence, to control for the impact of both the macro factors, the whole model of operating profits, return on assets, and working capital was analyzed using a two-way fixed effects model to address both the group-wise impact and year-wise impact (Hanck et al., 2024; Cross-validated, 2019).

Table 7 presents the results of two-way fixed effects models on the three dependent variables, *OPM*, *ROA*, and *WC*. Again, we found that the results of the analysis remained the same. Notably, the metals and mining sector only exhibits a significant improvement in all the financial variables after the GST implementation.

Table 5. Results of panel data regression (operating profits)

Variables	*Pooled OLS*	*FE1*	*FE2*	*FE3*	*FE4*	*FE5*	*FE6*	*RE1*	*RE2*	*RE3*	*RE4*	*RE5*	*RE6*
Reference category: Pre_GST													
Post_GST	-0.42 (2.27)	0.763* (0.317)	0.205 (0.93)	0.803* (0.315)	2.25*** (0.496)	2.00*** (0.544)	0.119 (1.311)	0.763* (0.317)	0.205 (0.937)	0.801* (0.315)	2.27*** (0.495)	2.48*** (0.525)	0.13 (1.30)
Sectoral impact: Reference category — Post_GST: Auto													
Consumer durables	-4.78 (3.038)		1.59 (1.32)				3.203 (2.75)		1.597 (1.325)				3.197 (2.73)
FMCG	2.806 (2.139)		2.43# (1.30)				4.082* (1.961)		2.43 (1.30)				4.30* (1.95)
Health	9.24*** (2.74)		-0.54 (1.22)				-2.95 (2.31)		-0.549 (1.22)				-3.04 (2.30)
IT	-1.53 (4.256)		-0.31 (1.45)				1.99 (4.408)		-0.317 (1.452)				2.098 (4.39)
Media	-1.23 (2.234)		1.29 (1.45)				4.520* (1.921)		1.296 (1.45)				4.83* (1.91)
Metals and mining	-1.45 (2.20)		0.60 (1.30)				4.39* (1.826)		0.606 (1.303)				4.43* (1.82)
Oil and gas	-0.22 (1.979)		1.25 (1.30)				2.212 (1.649)		1.25 (1.30)				2.27 (1.64)
Reality	26.65*** (3.73)		-1.69 (1.45)				0.215 (2.90)		-1.69 (1.452)				0.064 (2.88)
Working capital	0.011 (0.076)			0.063*** (0.017)	0.085*** (0.017)	0.085*** (0.017)	0.018 (0.063)			0.060*** (0.015)	0.083*** (0.016)	0.081*** (0.016)	0.018 (0.061)
Size						1.52 (1.33)						-1.196 (0.973)	
Interaction effects: Two way — Pre_GST * Working capital													
*Post_GST * Working capital*	0.038 (0.113)				-0.054*** (0.014)	-0.055*** (0.014)	0.0166 (0.067)				-0.05*** (0.014)	-0.05*** (0.014)	0.017 (0.067)
Interaction effects: Three way – GST * Working capital * Sectors													
Reference category: Post_GST * Working capital * Auto													
Consumer durables	-0.050 (0.144)						-0.0461 (0.0853)						-0.046 (0.085)
FMCG	-0.195 (0.148)						-0.079 (0.087)						-0.089 (0.086)
Health	0.127 (0.141)						0.053 (0.083)						0.055 (0.083)
IT	-0.135 (0.227)						-0.069 (0.13)						-0.072 (0.135)
Media	-0.415** (0.137)						-0.265** (0.080)						-0.268*** (0.080)
Metals and mining	-0.214 (0.137)						-0.159* (0.080)						-0.161*** (0.08)
Oil and gas	-0.134 (0.140)						-0.038 (0.081)						-0.042 (0.081)
Reality	-0.019 (0.140)						-0.064 (0.082)						-0.062 (0.081)
Intercept	17.96*** (1.457)							21.12*** (0.924)	18.09*** (2.39)	19.47*** (1.02)	18.87*** (1.02)	23.45*** (3.85)	17.88*** (2.46)
Adj. R^2	0.268	-0.105	-0.099	-0.092	-0.079	-0.079	-0.003	0.003	0.038	0.014	0.025	0.026	0.114
N	1230	1230	1230	1230	1230	1230	1230	1230	1230	1230	1230	1230	1230

*Note: *** significant at 0.1% level, ** significant at 1% level, * significant at 5% level, # significant at 10% level.*
Source: Author's calculation of panel regression models based on the data collected from the Capitaline, a subscription-based database.

Table 6. Results of panel data regression (financial performance, i.e., return on assets)

Variables	*Pooled OLS*	*FE1*	*FE2*	*FE3*	*FE4*	*FE5*	*FE6*	*RE1*	*RE2*	*RE3*	*RE4*	*RE5*	*RE6*
Reference category: Pre_GST													
Post_GST	-0.64*** (1.69)	-0.57* (0.271)	-3.86*** (0.780)	-0.553* (0.271)	0.323 (0.428)	-0.836# (0.463)	-0.89*** (1.089)	-0.571* (0.271)	-0.86*** (0.78)	-0.553* (0.27)	0.303 (0.42)	-0.303 (0.44)	-0.80*** (1.09)
Sectoral impact: Reference category — Post_GST: Auto													
Consumer durables	10.75** (3.53)		1.860 (1.103)				7.07** (2.284)		1.86# (1.10)				7.35** (2.29)
FMCG	5.11* (2.53)		5.40*** (1.085)				3.944* (1.629)		5.40*** (1.08)				4.3** (1.63)
Health	-3.91 (3.004)		1.027 (1.01)				-0.225 (1.919)		1.02 (1.01)				-0.55 (1.93)
IT	5.94 (5.57)		2.937* (1.20)				6.067# (3.662)		2.93* (1.20)				5.97 (3.68)
Media	8.44*** (2.52)		1.637 (1.209)				6.755*** (1.596)		1.63 (1.20)				6.79*** (1.60)
Metals and mining	10.157*** (2.41)		6.576*** (1.085)				10.12*** (1.51)		6.57*** (1.08)				10.07*** (1.52)
Oil and gas	8.36*** (2.15)		6.410*** (1.085)				8.09*** (1.37)		6.41*** (1.08)				8.210*** (1.376)
Reality	5.99 (3.77)		3.66** (1.209)				6.16 * (2.41)		3.66** (1.20)				6.257** (2.41)
Working capital	0.35*** (0.05)			0.029* (0.014)	0.042** (0.015)	0.043** (0.015)	0.189*** (0.052)			0.029* (0.013)	0.04** (0.012)	0.046** (0.014)	0.214*** (0.05)
Size						6.87*** (1.13)						3.518** (0.83)	
Interaction effects: Two way — Pre_GST * Working capital													
*Post_GST * Working capital*	0.201* (0.084)				-0.032** (0.012)	-0.036** (0.012)	-0.178** (0.055)				-0.031** (0.012)	-0.033** (0.012)	-0.179** (0.056)
Interaction effects: Three way — GST * Working capital * Sectors													
Reference category: Post_GST * Working capital * Auto													
Consumer durables	-0.368*** (0.107)						-0.253*** (0.07)						-0.262*** (0.07)
FMCG	-0.075 (0.11)						-0.011 (0.07)						-0.028 (0.072)
Health	-0.022 (0.105)						-0.090 (0.069)						-0.085 (0.069)
IT	-0.191 (0.169)						-0.178 (0.112)						-0.177 (0.113)
Media	-0.498*** (0.102)						-0.383*** (0.067)						-0.389*** (0.067)
Metals and mining	-0.267** (0.102)						-0.238*** (0.066)						-0.239*** (0.066)
Oil and gas	-0.091 (0.104)						-0.177** (0.068)						-0.170* (0.068)
Reality	-0.211** (0.105)						0.192** (0.068)						-0.194** (0.06)
Intercept	17.94*** (1.086)							12.87*** (0.758)	13.87*** (1.87)	12.081*** (0.84)	11.728*** (0.85)	-1.73 (3.31)	16.36*** (1.74)
Adj. R^2	0.405	-0.106	-0.038	-0.103	-0.097	-0.063	0.056	0.0027	0.097	0.005	0.012	0.023	0.186
N	1230	1230	1230	1230	1230	1230	1230	1230	1230	1230	1230	1230	1230

*Note: *** significant at 0.1% level, ** significant at 1% level, * significant at 5% level, # significant at 10% level.*
Source: Author's calculation of panel regression models based on the data collected from the Capitaline, a subscription-based database.

Table 7. Impact of GST on working capital

	Fixed effects	*Random effects*
Main effect: Reference category — Pre_GST		
Post_GST	3.789* (1.619)	3.789* (1.619)
Interaction Effect: Reference category — Post_GST * Auto		
Consumer durables	-3.506 (2.289)	-3.506 (2.289)
FMCG	-1.528 (2.251)	-1.528 (2.251)
IT	-8.830*** (2.508)	-8.830*** (2.508)
Media	1.488 (2.508)	1.488 (2.508)
Metals and mining	-7.801*** (2.251)	-7.801*** (2.251)
Oil and gas	-10.588*** (2.251)	-10.588*** (2.251)
Reality	-8.485*** (2.508)	-8.485*** (2.508)
Intercept		11.622** (6.381)
Adj. R^2	0.065	0.081
No. of observations	1230	1230

*Note: *** significant at 0.1% level, ** significant at 1% level, * significant at 5% level, # significant at 10% level.*
Source: Author's elaboration based on the panel data analysis on liquidity.

Table 8. Two-way fixed effects analysis

	Operating margin	*Return on assets*	*Working capital*
Main effect			
Sectoral impact: Reference category — Post_GST: Auto			
Consumer durables	3.859 (4.20)	4.39 (3.14)	-8.36 (3.46)*
FMCG	3.822 (3.04)	2.09 (2.27)	-0.79 (3.40)
Health	-2.26 (3.43)	-0.36 (2.56)	-2.39 (3.19)
IT	2.022 (6.96)	5.79 (5.21)	-9.741 (3.79)*
Media	3.067 (2.65)	4.734 (1.98)*	-4.978 (3.79)
Metals and mining	5.64 (2.80)*	10.33 (2.09)***	-9.11 (3.40)**
Oil and gas	0.727 (2.52)	6.20 (1.89)***	-11.42 (3.40)***
Reality	7.741 (4.30)	6.152 (3.22)#	-10.12 (3.79)**
Working capital	0.0024 (0.088)	-0.1943 (0.065)**	
Interaction effect: Two way — Pre_GST * Working capital			
*Post_GST * Working capital*	0.033 (0.100)	0.171 (0.075)*	
Interaction effects: Three way — GST * Working capital * Sectors			
Reference category: Post_GST * Working capital * Auto			
Consumer durables	-0.072 (0.127)	-0.218 (0.095)*	
FMCG	-0.048 (0.131)	0.123 (0.098)	
Health	0.022 (0.122)	-0.092 (0.091)	
IT	-0.076 (0.211)	-0.177 (0.15)	
Media	-0.101 (0.019)	-0.291 (0.081)***	
Metals and mining	-0.268 (0.12)*	-0.239 (0.09)**	
Oil and gas	-0.061 (0.122)	-0.415 (0.091)***	
Reality	-0.17 (0.11)	-0.19 (0.032)*	
Adj. R^2	-0.03	0.24	-0.101
T	10	10	10
N	1230	1230	1230

*Note: *** significant at 0.1% level, ** significant at 1% level, * significant at 5% level, # significant at 10% level.*
Source: Author's calculation based on the two-way fixed effects model.

5. DISCUSSION

The results of the primary analysis show that there is a decline in the post-GST implementation period in variables like the return on assets (ROA) and working capital (WC). ROA declined more heavily for the service sector than manufacturing. Likewise, WC declined heavily in manufacturing when compared to services due to the nature of the sector. However, there is a marginal increase in the operating margin of all the companies during the post-GST period. This can be attributed to the reduction in the cost of production due to GST through double taxation avoidance between states (Arya, 2022).

Further, there is a radical difference in how the variables reacted to GST implementation across different sub-sectors of manufacturing and services. Panel data analysis performed to examine the significance of the differences reveals that operating margin improved after GST across all sectors. However, any increase in working capital post the GST implementation reduced the operating margin of the companies in sectors like media and metals and mining.

Even though GST reduced ROA overall, sectors like FMCG, IT, metals and mining, oil and gas, and reality significantly improved. Likewise, panel results show that working capital is reduced in sectors like IT, metals and mining, oil and gas, and reality. The effects largely were the same after taking into consideration demonetization and pandemic effects using a two-way fixed effects model. Interestingly, the metals and mining sector has improved in all the variables like the operating margin, return on assets, and working capital after the implementation of GST. The findings of the research can further be extended to a sector-specific analysis considering the sector-specific aspects which would be more valuable for policymakers to devise policies.

6. CONCLUSION

We expect the GST implementation to benefit the revenues of the government. Since its impact on the corporate sector is less investigated, we examined the financials of Indian companies to find the impact of GST on profitability and liquidity. Further, we examined the sector-level differences across the nine core sectors of the Indian economy. Implementing the GST is expected to reduce the cost of production by lowering the raw material cost and avoiding double taxation. Further, the supply chain and warehousing efficiency would also reduce the production cost, improving the operating profits.

As expected, the analysis results show a significant positive impact of GST on companies' operating profits. Sectoral differences are not evident in this regard. The impact of liquidity was found significant and positive in determining the operating profits, i.e., an increase in working capital increases the operating profits. As an interesting observation, the impact of working capital turns negative after the GST implementation. This scenario is because companies tend to maintain less liquidity. After all, holding liquid assets will not fetch any return, as evident from the reduced liquidity in most sectors after the GST implementation. For instance, companies in sectors like consumer durables, FMCG, metals and mining reduced their working capital after the GST implementation to increase operating profits.

In contrast to operating profits, companies' return on assets declined after the GST implementation. Interestingly, sectoral effects are significantly positive in FMCG, IT, metals and mining, oil and gas, and reality. However, like the effect on operating profits, working capital decreases the return on assets after the GST implementation, which is significant in consumer durables, media, metals and mining, and reality.

Overall, in all the nine sectors considered for the analysis, the metals and mining sector exhibited improvement in profitability and a reduction in liquidity after GST implementation.

The findings of the study have the following limitations. The differential impact of the GST on different levels of profits, i.e., operating profits and return on assets, is due to financial factors like sales and administrative expenses impacting the latter, and the business-specific characteristics are not included in the study. Further, the level of impact of product level changes in a particular sector, and the net cost and benefits vitally change the outcome of GST implementation. This study is only an aggregate analysis of the overall impact of GST on the selected financials of the companies. As a scope of further research, the more sector-specific and product-specific analysis would give more profound insights into the sector-level changes needed for implementing a tax reform like GST.

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APPENDIX

Table A.1. Details of sectors in the data set

S. No.	*NIFTY*	*Sector*	*Companies*	*Observations*
1	Auto	Automobiles — manufacturers of cars & motorcycles, heavy vehicles, auto ancillaries, and tires.	14	140
2	FMCG	Fast-moving consumer goods — goods and products, that are nondurable, mass consumption products, and available off the shelf	15	150
3	Metal	Metals and mining companies	15	150
4	Reality	Companies engaged in the construction of residential and commercial real estate properties.	10	100
5	Consumer durables	Consumer durables industry	14	140
6	O&G	Oil and gas — companies included in oil, gas, and petroleum products.	15	150
7	Health	Healthcare and pharmaceutical companies	20	200
8	IT	Information technology companies are involved in software development, hardware, and IT infrastructure.	10	100
9	Media	Companies involved in the business include advertising, media and entertainment, printing, and publishing.	10	100
			Total	1230

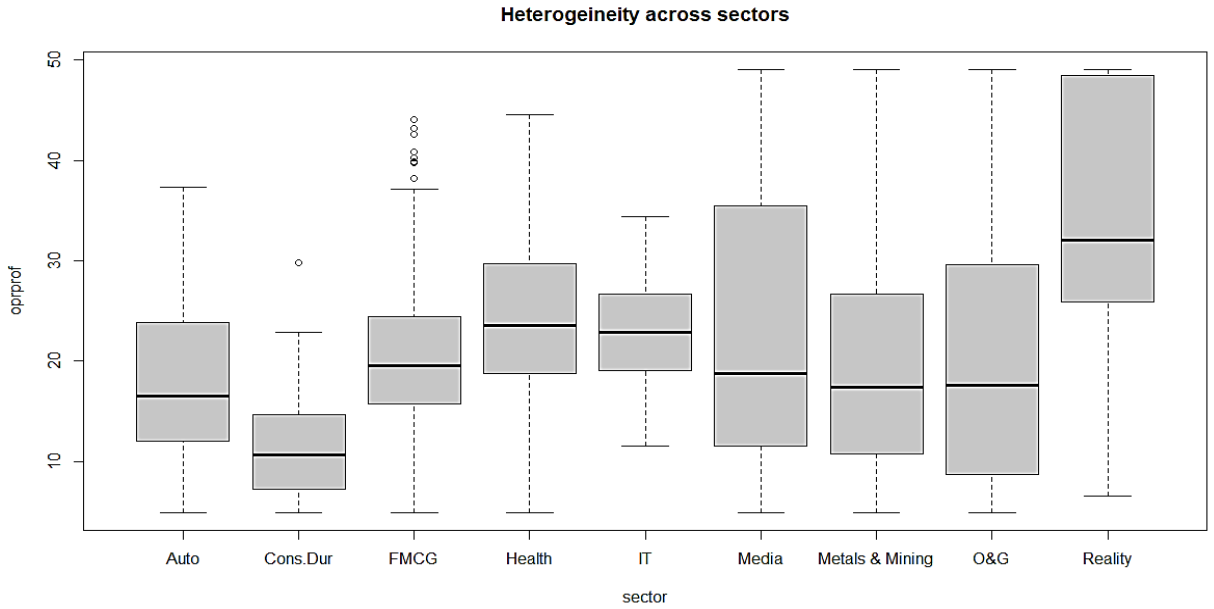
Source: Author's elaboration based on the information given in the National Stock Exchange (NSE), India sectoral indices website as of November 20, 2022, https://www.niftyindices.com/Methodology/Method_NIFTY_Equity_Indices.pdf

Table A.2. Sector-wise aggregation (pre- and post-GST levels)

Variables	*Pre-GST*	*Post-GST*	*Change*
Auto			
OPM (%)	18.1	18.22	0.12
ROA (%)	13.74	9.86	-3.88
Size (log sales)	4.17	4.33	0.16
WC (ratio)	10.55	15.25	4.7
Consumer durables			
OPM (%)	9.61	11.64	2.03
ROA (%)	18.35	13.36	-4.99
Size (log sales)	3.53	3.77	0.24
WC (ratio)	47.06	43.39	-3.67
FMCG			
OPM (%)	18.96	22.18	3.22
ROA (%)	23.54	24.78	1.24
Size (log sales)	3.78	3.93	0.15
WC (ratio)	17.31	21.22	3.91
Health			
OPM (%)	24.9	24.53	-0.37
ROA (%)	14.68	11.73	-2.95
Size (log sales)	3.54	3.8	0.26
WC (ratio)	35.06	37.37	2.31
IT			
OPM (%)	23.2	23.09	-0.11
ROA (%)	21.32	20.18	-1.14
Size (log sales)	4.01	4.32	0.31
WC (ratio)	38.48	33.44	-5.04
Media			
OPM (%)	24.61	26.5	1.89
ROA (%)	8.99	6.93	-2.06
Size (log sales)	3.06	3.27	0.21
WC (ratio)	10.46	10.19	-0.27
Metals and mining			
OPM (%)	22.28	21.64	-0.64
ROA (%)	4.79	7.91	3.12
Size (log sales)	4.05	4.24	0.19
WC (ratio)	23.91	19.5	-4.41
Oil and gas			
OPM (%)	21.95	20.94	-1.01
ROA (%)	14.38	15.01	0.63
Size (log sales)	4.3	4.48	0.18
WC (ratio)	11.08	4.37	-6.71
Reality			
OPM (%)	37.09	37.95	0.86
ROA (%)	3.54	3.19	-0.35
Size (log sales)	3.28	3.45	0.17
WC (ratio)	54.58	49.15	-5.43

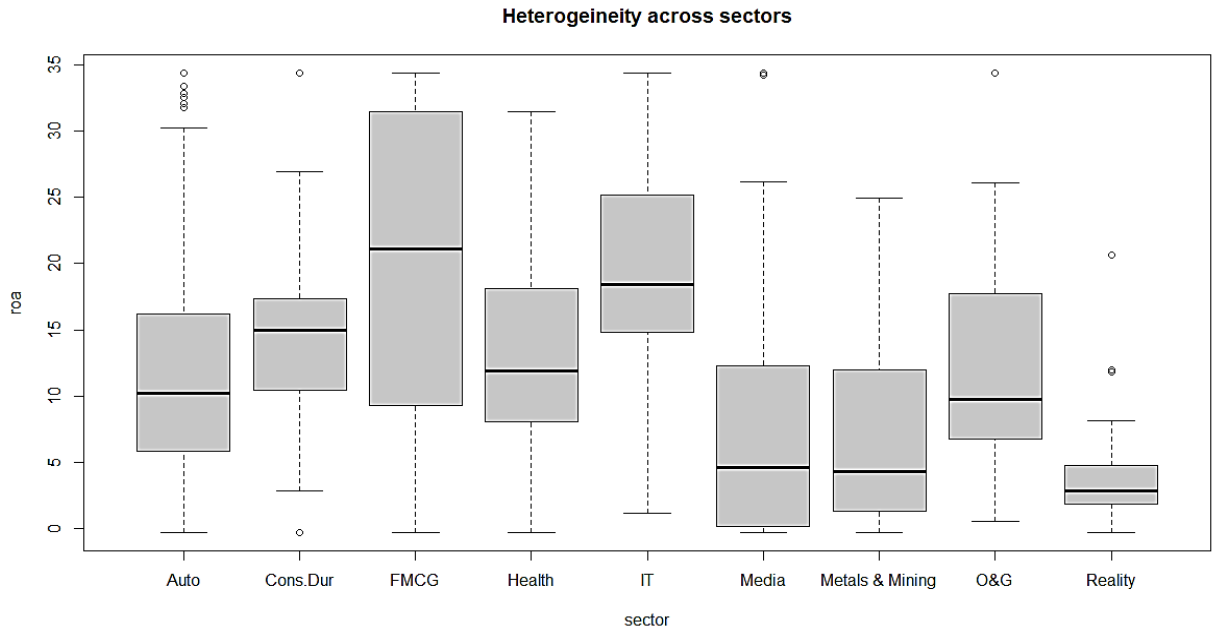
Source: Author's calculation based on the data collected from the Capitaline, a subscription-based database.

Figure A.1. Sector-wise impact of GST on operating profits



Source: Author's elaboration based on the results of the analysis of operating profit.

Figure A.2. Sector-wise impact of GST on return on assets



Source: Author's elaboration based on the results of analysis on return on assets.