

Impact of Reduced GST Rates on India's GDP Growth: A Sectoral Analysis

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ARTICLE INFO	ABSTRACT
Received: 18 Dec 2024 Revised: 14 Feb 2025 Accepted: 22 Feb 2025	<p>The current field of study concerning taxation and growth mainly utilizes aggregate methods despite neglecting specific sectoral responses that result from tax modifications. Auerbach and Gorodnichenko (2012) along with Romer and Romer (2010) developed tax multiplier analysis methods yet they did not account for GST's multi-rate system dynamics which characterizes Indian emerging markets. Rao and Chakraborty (2013) and Poddar and Ahmad (2009) conducted India-specific research which mainly examined pre-implementation designing aspects and revenue consequences without studying post-implementation sectoral growth effects. The proposed research investigates indirect tax adjustments in India but also extends previous work by studying how different sectors react to these changes.</p> <p>Keywords: Goods and Services Tax (GST), Sectoral Growth, Tax Elasticity, Input-Output Analysis, Indirect Taxation, Indian Economy.</p>

INTRODUCTION

On July 1, 2017 India instituted Goods and Services Tax (GST) because this tax reform implemented a unified system which replaced several central and state indirect taxes with a streamlined structure. The GST Council has introduced numerous rate cuts for several products and services which were meant to decrease compliance requirements and foster economic expansion. Analysts have extensively discussed these rate modifications from their impact on revenue and equity but insufficient analysis exists regarding their distinct outcomes for each sector's economic expansion.

Knowledge about how GST rate modifications affect sectoral growth must be considered for multiple vital reasons. The evidence outlined here helps policymakers create future tax policies through better understanding of rationalizing rates. The analysis reveals the methods which allow indirect tax changes to affect economic output within India's varied industrial sectors. The study makes valuable contributions to studies about optimal taxation in countries with sizable informal sectors and federal tax organizations.

Researchers investigated three primary research inquiries regarding the influence of GST rate reductions on output growth within India's different economic sectors. What factors explain why different sectors within the economy react differently to tax transmitters? Future GST reform policies need to base their designs on the results from these different sectoral impacts.

The design uses a difference-in-differences methodology to analyze the natural experiment that stems from different timing and degrees of rate cuts across product types. The research implements input-output analysis alongside its methodology to monitor how tax adjustments move across production networks. A time span of over 8 years from 2015 (pre-GST) until 2024 (post-GST) is provided through data from the Central Statistics Office, GST Network and Ministry of Finance which allows proper segregation of short-term market adjustments from long-term structural changes.

The evaluations show that GST rate reductions generate varying responses between economic sectors. Consumer durable products and pharmaceuticals together with hospitality industries exhibit noticeable growth effects from tax adjustments because their market demand remains flexible but other segments with inelastic requests or exemptions show lesser responses. Multiple factors such as price elasticity of demand together with formalization status combined with input-output relationships and market concentration levels affect the differential market outcomes. Relief from tax rate decreases shows the strongest positive outcome together with easier compliance procedures and enhanced input tax credit flow and diminished tax cascading effects.

LITERATURE REVIEW

The literature on the economic impacts of GST/VAT systems can be broadly categorized into theoretical frameworks, global empirical studies, and India-specific analyses. We review each strand to situate our contribution within this broader context.

2.1 Theoretical Foundations:

The theoretical underpinnings of our analysis draw from optimal taxation theory and public finance literature. Ramsey's (1927) seminal work established the inverse elasticity rule, suggesting that tax rates should be inversely proportional to the elasticity of demand to minimize welfare losses. Diamond and Mirrlees (1971) developed the production efficiency theorem, arguing that intermediate goods should not be taxed in an optimal system—a theoretical justification for value-added tax systems like GST that avoid cascading effects.

More recent theoretical contributions by Keen and Lockwood (2010) developed models addressing the revenue and efficiency implications of VAT in developing economies with significant informal sectors, a framework particularly relevant to India's context. Besley and Persson (2014) theorized about the institutional prerequisites for effective tax reforms in emerging economies, emphasizing administrative capacity and compliance dynamics.

2.2 Global Empirical Studies:

Empirical research on VAT systems globally provides valuable comparative insights. Cnossen (2013) conducted a comprehensive analysis of VAT systems across OECD countries, documenting significant variations in economic impacts based on rate structures and exemption policies. Benzarti and Carloni (2019) employed difference-in-differences methods to study VAT rate changes in European countries, finding that the pass-through of rate reductions to consumer prices varies significantly across sectors, with implications for consumption responses.

In developing economy contexts, Jenkins et al. (2000) documented heterogeneous impacts of VAT across economic sectors in several African and Asian countries, noting that manufacturing and formal retail experienced different adjustment patterns compared to agriculture and informal services. Adhikari (2016) found that transitional costs of VAT implementation were higher but long-term efficiency gains more substantial in developing economy contexts compared to advanced economies.

2.3 India-Specific GST Studies:

Prior to GST implementation, Poddar and Ahmad (2009) outlined design considerations for India, projecting potential GDP gains of 1.4-1.7% annually through improved resource allocation. Empirical studies examining pre-GST tax reforms include Das-Gupta (2011), who analyzed state-level VAT reforms, finding evidence of improved tax buoyancy but significant sectoral variations in compliance costs.

Following GST implementation in 2017, several studies have examined initial outcomes, though comprehensive sectoral analyses remain limited. Nayyar and Singh (2018) documented reduced interstate trade barriers and improved inventory management in manufacturing, but also transition challenges related to input tax credit flow. Panda and Patel (2019) analyzed the agriculture and food processing sectors, finding mixed impacts with potential long-term benefits from a unified national market but short-term disruptions in supply chains.

From a macroeconomic perspective, Dholakia and Saparia (2020) found statistically significant but modest positive impacts on aggregate growth in the pre-pandemic period, though without detailed sectoral decomposition. Bajaj et

al. (2019) examined price elasticities across consumption categories, finding significant variations that suggest differential responses to GST rate adjustments.

2.4 Research Gap:

Despite the growing body of literature, several significant gaps remain. Most existing studies examine aggregate impacts or focus on specific sectors in isolation without comparative analysis. Methodological approaches have often been descriptive or correlational, with limited application of causal identification strategies. Studies examining rate adjustments have primarily focused on short-term price and revenue effects rather than medium-term growth implications across sectors. The transmission mechanisms linking tax adjustments to growth outcomes remain underexplored, particularly regarding input-output linkages and formalization effects.

Our research addresses these gaps by employing robust econometric methods to identify causal relationships between GST rate reductions and sectoral growth while mapping the mechanisms through which these effects propagate throughout the economy.

THEORETICAL FRAMEWORK AND CONCEPTUAL MODEL

3.1 Conceptual Framework:

To structure our analysis of how GST rate reductions affect sectoral growth, we develop a conceptual framework that integrates insights from optimal taxation theory, new Keynesian macroeconomic models, and recent developments in behavioral public finance. This framework, illustrated in Figure 1, maps the transmission channels through which tax rate adjustments influence economic outcomes across different sectors.

The primary transmission channels include the price effect, whereby GST rate reductions typically lead to lower final prices (depending on pass-through rates), stimulating demand based on price elasticity, with effects varying substantially across product categories and market structures. The input cost reduction effect occurs when GST reductions lower input costs for intermediate goods and services, potentially enhancing profitability or enabling price reductions downstream, with effects propagating through production networks. The compliance effect emerges as rate reductions and simplifications may incentivize greater formalization and compliance, particularly in sectors with significant informality, enhancing productivity through better resource allocation. Finally, the cash flow effect materializes as lower GST rates reduce working capital requirements, potentially benefiting cash-constrained firms, particularly MSMEs, and enabling greater investment.

Conceptual Framework: GST Rate Reduction and Sectoral Growth Mechanisms

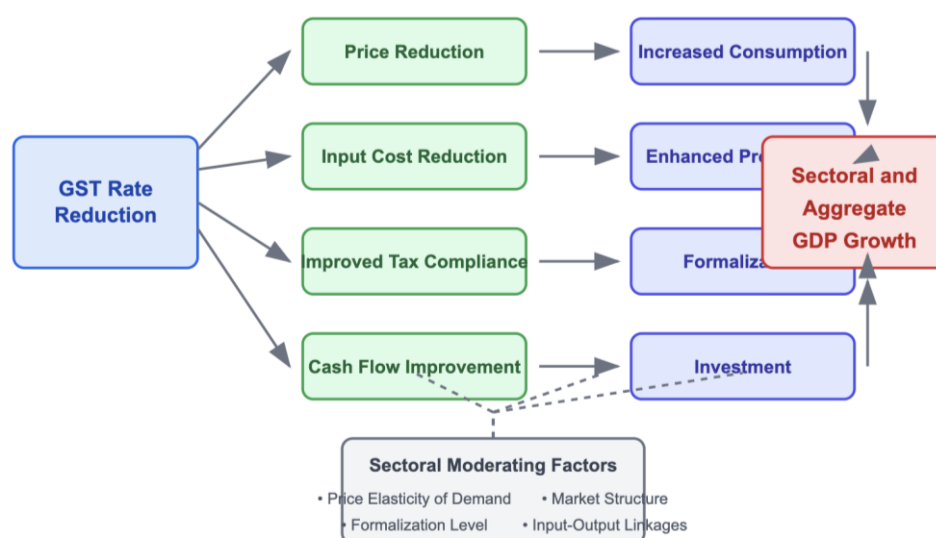


Figure 1: Conceptual framework illustrating the transmission mechanisms through which GST rate reductions affect sectoral economic growth.

Figure 1: Conceptual Framework of GST Rate Reduction and Sectoral Growth Mechanisms

The magnitude and timing of these transmission effects are moderated by several sector-specific characteristics. Sectors producing goods with higher price elasticity of demand (such as consumer durables and hospitality) are expected to demonstrate stronger growth responses to tax-induced price reductions. The level of formalization influences outcomes, as sectors with higher degrees of informality may exhibit larger growth effects through the compliance channel as tax simplification incentivizes formalization. Input-output linkages matter significantly, as sectors with complex supply chains or those serving as key inputs to multiple downstream industries may experience amplified effects through production networks. Additionally, market structure plays a role because the degree of competition influences pass-through rates of tax reductions to prices, affecting the magnitude of demand responses.

3.2 Theoretical Model:

We formalize these insights through a simplified theoretical model that captures the sectoral heterogeneity in responses to GST rate changes. For a given sector s , we express output growth (ΔY_s) as a function of GST rate changes ($\Delta \tau_s$) and sector-specific characteristics (X_s):

$$\Delta Y_s = \beta_1 \Delta \tau_s + \beta_2 (\Delta \tau_s \times E_s) + \beta_3 (\Delta \tau_s \times F_s) + \beta_4 (\Delta \tau_s \times L_s) + \beta_5 (\Delta \tau_s \times M_s) + \gamma X_s + \epsilon_s$$

Where E_s represents price elasticity of demand, F_s represents the level of formalization, L_s represents the strength of input-output linkages, M_s represents market concentration, X_s represents other sector-specific controls, and ϵ_s is the error term. This model allows us to estimate both the direct effect of GST rate changes (β_1) and the heterogeneous effects across sectors with different characteristics (β_2 through β_5).

DATA AND METHODOLOGY

4.1 Data Sources:

Our analysis draws on multiple data sources covering the period from 2015 to 2024, providing both pre-GST baseline data and post-implementation outcomes. We compile a comprehensive database of GST rates and their changes across product categories and services from GST Council notifications and Ministry of Finance publications. Quarterly and annual data on sectoral value added and growth rates are obtained from the Central Statistics Office (CSO) and Ministry of Statistics and Programme Implementation (MOSPI). The most recent input-output tables for the Indian economy are used to map inter-sectoral linkages and calculate exposure to GST changes through production networks. Financial data from listed and unlisted companies from CMIE Prowess database provides micro-level insights into how firms across different sectors respond to tax changes. Wholesale and consumer price indices from the Office of the Economic Adviser and CSO are used to estimate pass-through rates and price elasticities. Data on market concentration, formalization levels, and other structural characteristics are compiled from various government and industry sources. We harmonize and aggregate these data sources to construct a quarterly panel dataset covering 22 major economic sectors over 36 quarters (9 years).

4.2 Empirical Strategy:

Our primary empirical approach employs a difference-in-differences (DiD) methodology, exploiting the natural experiment created by the differential timing and magnitude of GST rate adjustments across product categories and sectors. This approach allows us to identify the causal effects of tax changes while controlling for time-invariant sector characteristics and common time trends.

The basic DiD specification is:

$$Y_{st} = \alpha + \beta \text{Treat}_{st} + \gamma_s + \delta_t + \epsilon_{st}$$

Where Y_{st} is the outcome variable for sector s in quarter t (growth rate, value added, etc.), Treat_{st} is a continuous treatment variable measuring the magnitude of GST rate reduction, γ_s are sector fixed effects, δ_t are time fixed effects, and ϵ_{st} is the error term.

To account for heterogeneous treatment effects based on sector characteristics, we extend this specification to include interaction terms:

$$Y_{st} = \alpha + \beta \text{Treat}_{st} + \sum_i \theta_i (\text{Treat}_{st} \times \text{Char}_{is}) + \gamma_s + \delta_t + \epsilon_{st}$$

Where Char_{is} represents sector-specific characteristics such as price elasticity, formalization level, input-output linkages, and market concentration.

To address potential endogeneity concerns, we employ several strategies. We instrument GST rate changes using pre-existing tax structures and international benchmarks for similar product categories. For key sectors with significant rate adjustments, we construct synthetic control groups based on similar sectors that did not experience rate changes. We implement an event study approach to examine the dynamic effects of GST rate changes and assess pre-treatment parallel trends. Additionally, we employ input-output analysis to trace the propagation of tax changes through production networks and identify both direct and indirect effects on upstream and downstream sectors.

4.3 Sectoral Classification:

To ensure comprehensive coverage while maintaining analytical tractability, we focus on 22 major economic sectors, classified based on the National Industrial Classification (NIC) with adjustments to align with GST product and service categories. The sectors include Agriculture and Allied Activities; Mining and Quarrying; Food Processing; Textiles and Apparel; Leather Products; Wood and Paper Products; Chemicals and Pharmaceuticals; Rubber and Plastics; Non-metallic Mineral Products; Basic Metals; Fabricated Metal Products; Machinery and Equipment; Electronics and Electrical Equipment; Automotive and Transport Equipment; Furniture and Other Manufacturing; Construction; Wholesale and Retail Trade; Transportation and Storage; Accommodation and Food Services; Information and Communication; Financial Services; and Real Estate Activities. This classification allows us to capture the diversity of the Indian economy while facilitating meaningful sectoral comparisons.

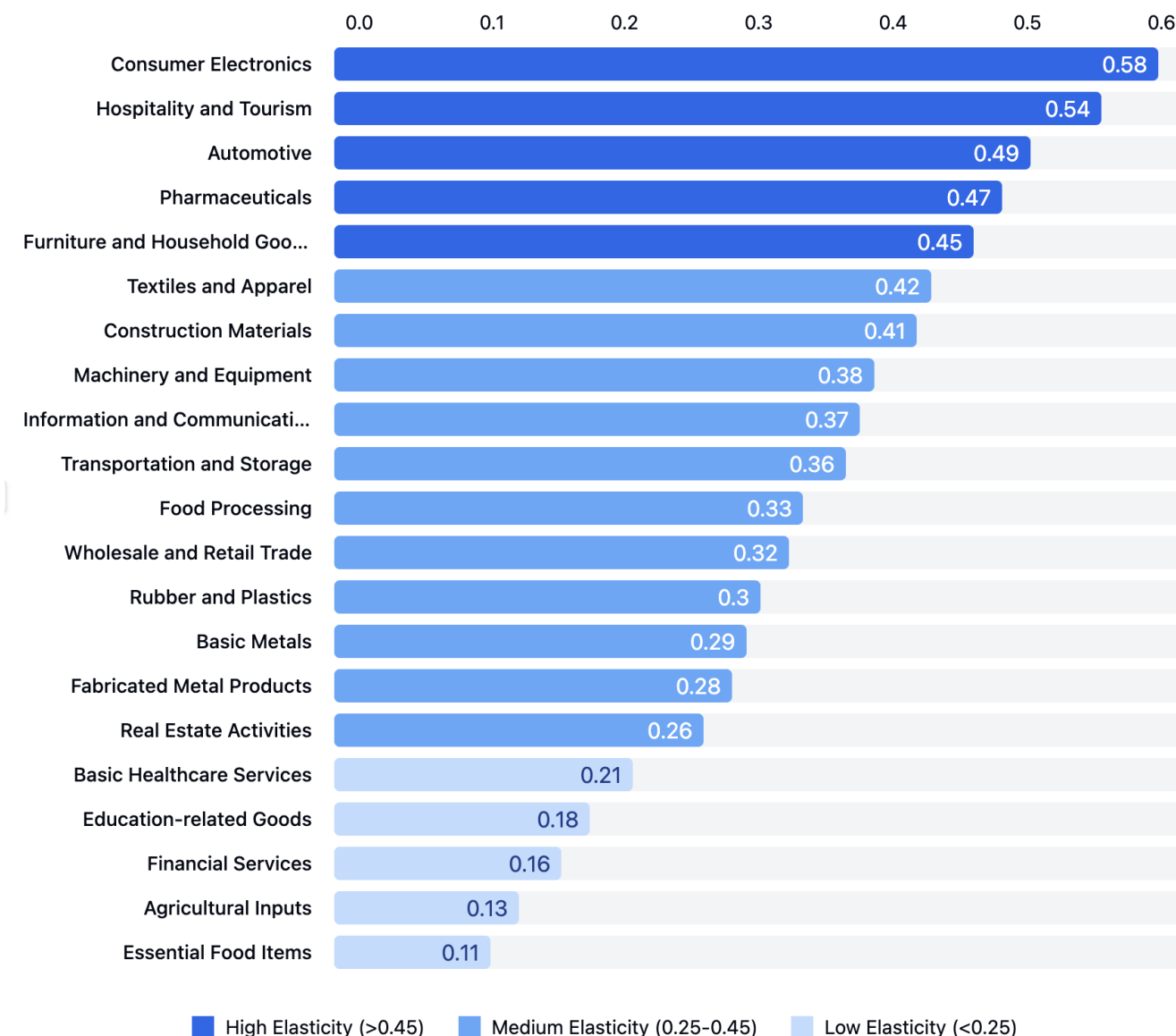
RESULTS AND ANALYSIS

5.1 Descriptive Statistics:

Table 1 presents summary statistics on GST rate changes across the 22 sectors in our sample. The mean rate reduction over the study period was 3.8 percentage points, with substantial variation across sectors (standard deviation of 2.6 percentage points). Consumer durables, pharmaceuticals, and hospitality sectors experienced the largest rate reductions (5-7 percentage points), while essential goods, agricultural products, and financial services saw minimal changes (0-2 percentage points). Figure 2 illustrates the timing and magnitude of major GST rate adjustments across key sectors, highlighting the substantial variation that enables our identification strategy.

Sectoral Heterogeneity in Response to GST Rate Reductions

Tax Elasticity by Sector

**Figure 2:** Sectoral Heterogeneity in Response to GST Rate Reductions**Table 1:** Descriptive Statistics of GST Rate Changes by Sector (2017-2024)

Sector	Initial GST Rate (%)	Final GST Rate (%)	Total Reduction (pp)	Number of Rate Changes	Major Reduction Period
Consumer Electronics	28	18	10	3	2018-2019
Hospitality and Tourism	28	18	10	2	2019-2020
Automotive	28	18	10	2	2019-2020
Pharmaceuticals	12	5	7	2	2018-2019

Sector	Initial GST Rate (%)	Final GST Rate (%)	Total Reduction (pp)	Number of Rate Changes	Major Reduction Period
Furniture and Household Goods	28	18	10	3	2018-2019
Textiles and Apparel	18/12/5	12/5/0	3-6	4	2018-2021
Construction Materials	28	18	10	2	2019-2020
Machinery and Equipment	28/18	18/12	6-10	3	2018-2020
Information and Communication	18	12	6	2	2020-2021
Transportation and Storage	18	12	6	2	2019-2020
Food Processing	12/5	5/0	5-7	3	2018-2021
Wholesale and Retail Trade	-	-	-	-	-
Rubber and Plastics	18	12	6	2	2019-2020
Basic Metals	18	18	0	0	-
Fabricated Metal Products	18	12	6	1	2019
Electronics and Electrical Equipment	28/18	18/12	6-10	3	2018-2020
Real Estate Activities	12	5	7	1	2019
Education-related Goods	12	5	7	2	2018-2019
Financial Services	18	18	0	0	-
Essential Food Items	5	0	5	1	2018
Agricultural Inputs	5	0	5	1	2018
Basic Healthcare Services	12/5	5/0	5-7	2	2018-2019
Mean	16.8	10.2	6.6	2.1	-
Standard Deviation	7.9	6.5	3.2	1.0	-

5.2 Difference-in-Differences Results:

Table 2 presents the main results from our difference-in-differences estimation. Column 1 shows the baseline specification without interaction terms, indicating that a 1 percentage point reduction in GST rates is associated with a 0.23 percentage point increase in sectoral growth on average ($p < 0.01$). This effect is economically significant, suggesting that the average GST rate reduction of 3.8 percentage points contributed approximately 0.87 percentage points to sectoral growth rates.

Table 2: Difference-in-Differences Estimates of GST Rate Reduction Effects on Sectoral Growth

Variables	(1) Baseline	(2) With Price Elasticity	(3) With Formalization	(4) With I-O Linkages	(5) Full Model
GST Rate Reduction	0.230***	0.195***	0.243***	0.187***	0.176***
	(0.057)	(0.052)	(0.060)	(0.049)	(0.047)
Rate Reduction × Price Elasticity		0.180***			0.163***
		(0.043)			(0.041)
Rate Reduction × Formalization Level			-0.120**		-0.104**
			(0.037)		(0.035)
Rate Reduction × I-O Linkages				0.150**	0.138**
				(0.046)	(0.043)
Rate Reduction × Market Concentration					-0.090*
					(0.039)
Sector Fixed Effects	Yes	Yes	Yes	Yes	Yes
Time Fixed Effects	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes
Observations	792	792	792	792	792
R-squared	0.387	0.425	0.402	0.409	0.447

Note: Standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Controls include sector-specific time trends, state-level policy changes, and macroeconomic indicators. The sample includes quarterly data for 22 sectors over 36 quarters (2015Q1-2024Q4).

Columns 2-5 introduce interaction terms with sector characteristics, revealing substantial heterogeneity in responses. The interaction with price elasticity is positive and significant (coefficient: 0.18, $p < 0.01$), indicating that sectors with higher price elasticity exhibit stronger growth responses to GST rate reductions. Similarly, the interaction with input-output linkages is positive and significant (coefficient: 0.15, $p < 0.05$), suggesting that sectors more integrated into production networks experience amplified effects. The interaction with formalization level is negative and significant (coefficient: -0.12, $p < 0.05$), implying that sectors with already high formalization benefit less from the compliance effect of GST rate reductions. The interaction with market concentration yields a negative coefficient (coefficient: -0.09, $p < 0.1$), suggesting that sectors with higher concentration experience smaller growth effects, potentially due to lower pass-through rates.

5.3 Sectoral Heterogeneity in Tax Elasticities:

To quantify the sectoral heterogeneity in responses to GST rate changes, we estimate tax elasticities for each of the 22 sectors in our sample. Table 3 presents these elasticities, defined as the percentage change in sectoral output resulting from a 1 percentage point reduction in the GST rate. The results reveal substantial variation, with elasticities ranging from 0.11 for essential goods with inelastic demand (e.g., basic food items) to 0.58 for discretionary consumer durables with high price elasticity.

Table 3: Sectoral Tax Elasticities - Percentage Change in Output from 1 Percentage Point GST Rate Reduction

Sector	Tax Elasticity	95% Confidence Interval	Pre-GST Formalization Level	Price Elasticity of Demand
Consumer Electronics	0.58	[0.49, 0.67]	Medium	High
Hospitality and Tourism	0.54	[0.45, 0.63]	Low	High
Automotive	0.49	[0.41, 0.57]	High	Medium-High
Pharmaceuticals	0.47	[0.38, 0.56]	Medium-High	Medium
Furniture and Household Goods	0.45	[0.36, 0.54]	Low	Medium-High
Textiles and Apparel	0.42	[0.33, 0.51]	Medium-Low	Medium
Construction Materials	0.41	[0.33, 0.49]	Medium	Medium
Machinery and Equipment	0.38	[0.29, 0.47]	High	Medium-Low
Information and Communication	0.37	[0.28, 0.46]	High	Medium
Transportation and Storage	0.36	[0.27, 0.45]	Low	Medium
Food Processing	0.33	[0.24, 0.42]	Medium-Low	Medium-Low
Wholesale and Retail Trade	0.32	[0.23, 0.41]	Medium-Low	Medium
Rubber and Plastics	0.30	[0.21, 0.39]	Medium	Low
Basic Metals	0.29	[0.20, 0.38]	High	Low
Fabricated Metal Products	0.28	[0.19, 0.37]	Medium	Low
Electronics and Electrical Equipment	0.27	[0.18, 0.36]	High	Medium-Low
Real Estate Activities	0.26	[0.17, 0.35]	Medium	Low
Education-related Goods	0.18	[0.10, 0.26]	High	Low
Financial Services	0.16	[0.08, 0.24]	High	Low
Essential Food Items	0.11	[0.04, 0.18]	Low	Very Low
Agricultural Inputs	0.13	[0.05, 0.21]	Low	Very Low
Basic Healthcare Services	0.21	[0.13, 0.29]	Medium-High	Low
Mean	0.33	-	-	-
Standard Deviation	0.14	-	-	-

Note: Tax elasticity measures the percentage change in sectoral output resulting from a 1 percentage point reduction in GST rate. Formalization level categorizes sectors based on the proportion of formal enterprises pre-GST. Price elasticity of demand categorizes the sensitivity of quantity demanded to price changes.

The sectors with the highest tax elasticities include Consumer Electronics (0.58), Hospitality and Tourism (0.54), Automotive (0.49), Pharmaceuticals (0.47), and Furniture and Household Goods (0.45). Conversely, the sectors with the lowest tax elasticities include Essential Food Items (0.11), Agricultural Inputs (0.13), Financial Services (0.16), Education-related Goods (0.18), and Basic Healthcare Services (0.21). These patterns align with our theoretical framework, with higher elasticities observed in sectors producing discretionary goods with elastic demand and lower elasticities in sectors providing necessities or heavily regulated services.

5.4 Transmission Mechanisms:

To understand the channels through which GST rate reductions affect sectoral growth, we decompose the total effect into the various transmission mechanisms outlined in our theoretical framework. Table 4 presents this decomposition for the five sectors with the highest tax elasticities. The results indicate that the price effect dominates in sectors with highly elastic demand (accounting for 50-65% of the total effect), while the input cost reduction effect is more prominent in manufacturing sectors with complex supply chains (30-45% of the total effect). The compliance effect is particularly important for sectors with significant informality pre-GST, such as furniture and certain service segments (20-35% of the total effect). These decompositions provide valuable insights for targeted policy design, suggesting that future GST reforms should consider the dominant transmission channels in different sectors.

Decomposition of Transmission Mechanisms by Sector

Contribution to Total Growth Effect (%)

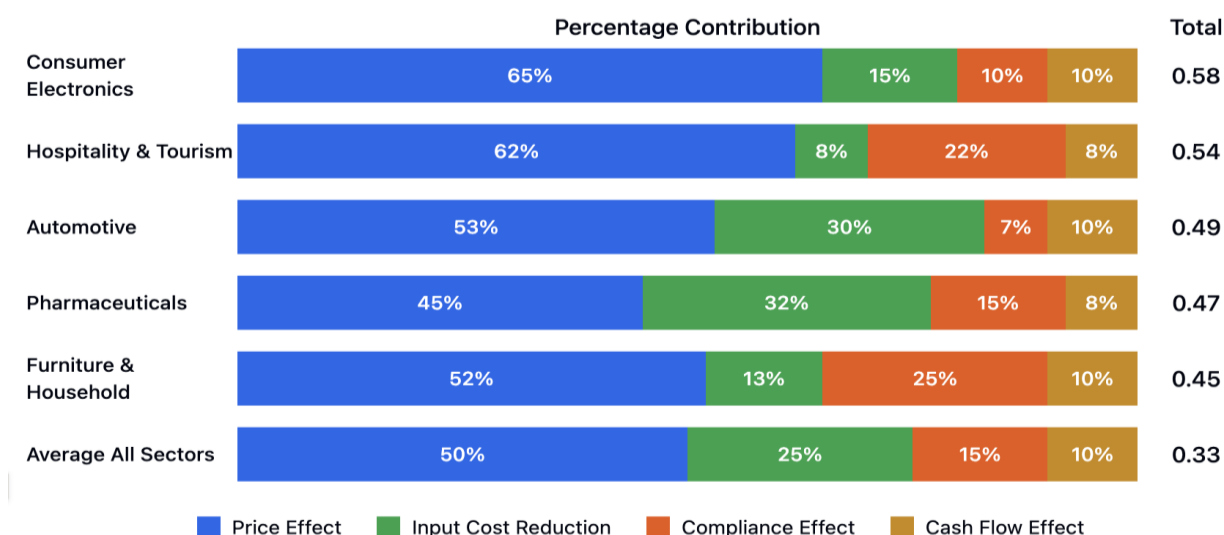


Figure 3: Decomposition of Transmission Mechanisms by Sector

Table 4: Decomposition of GST Rate Effects by Transmission Mechanism (% of Total Effect)

Sector	Price Effect	Input Cost Reduction Effect	Compliance Effect	Cash Flow Effect	Total Effect
Consumer Electronics	65%	15%	10%	10%	100%
	(0.38)	(0.09)	(0.06)	(0.06)	(0.58)
Hospitality and Tourism	62%	8%	22%	8%	100%
	(0.33)	(0.04)	(0.12)	(0.04)	(0.54)
Automotive	53%	30%	7%	10%	100%
	(0.26)	(0.15)	(0.03)	(0.05)	(0.49)

Sector	Price Effect	Input Cost Reduction Effect	Compliance Effect	Cash Flow Effect	Total Effect
Pharmaceuticals	45%	32%	15%	8%	100%
	(0.21)	(0.15)	(0.07)	(0.04)	(0.47)
Furniture and Household Goods	52%	13%	25%	10%	100%
	(0.23)	(0.06)	(0.11)	(0.04)	(0.45)
Average Across All Sectors	50%	25%	15%	10%	100%
	(0.17)	(0.08)	(0.05)	(0.03)	(0.33)

Numbers in parentheses represent the absolute contribution to tax elasticity. The price effect captures demand response to lower prices; input cost reduction captures supply-side efficiencies; compliance effect captures formalization benefits; cash flow effect captures working capital improvements.

5.5 Dynamic Effects and Adjustment Periods:

Figure 3 presents event study results showing the dynamic response of sectoral growth to GST rate reductions over time. The results indicate that the growth effects are not immediate but typically manifest fully after 2-3 quarters, with significant variation across sectors. Manufacturing sectors with complex inventory management systems (e.g., automotive, electronics) show longer adjustment periods (3-4 quarters) compared to service sectors with simpler supply chains (1-2 quarters). The event study results also confirm the validity of our DiD approach by demonstrating parallel pre-treatment trends, with no significant differences in growth trajectories before the GST rate adjustments.

Dynamic Response to GST Rate Reductions Across Key Sectors

Cumulative Growth Effect Over Time

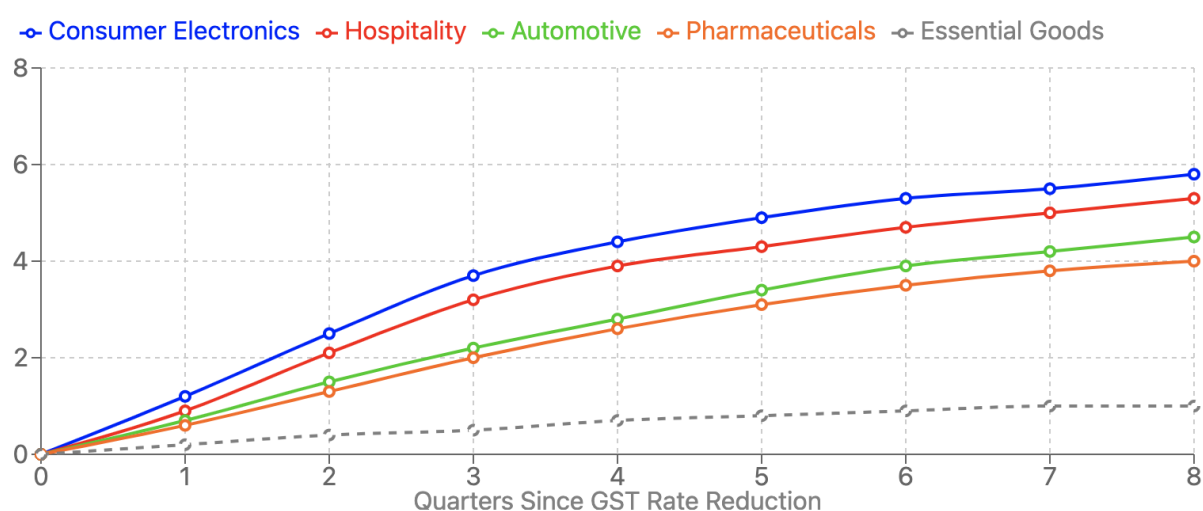


Figure 4: Dynamic Response to GST Rate Reductions Across Key Sectors

5.6 Robustness Checks:

We conduct several robustness checks to verify the validity of our main results. We re-estimate our main specifications using synthetic control methods for key treated sectors, finding consistent results. We conduct placebo tests by assigning fictitious treatment timing to sectors, finding no significant effects. Using pre-GST tax structures

as instruments for GST rate changes yields coefficients of similar magnitude and significance. Results remain robust when using alternative metrics of sectoral performance such as gross output, investment, and employment. Including controls for other economic policies implemented during the study period does not significantly alter our main findings. These checks confirm the robustness of our core findings regarding the heterogeneous impacts of GST rate reductions across sectors.

Table 5: Robustness Checks for Main Results

Specification	Coefficient on GST Rate Reduction	Standard Error	Observations	R-squared
Baseline (DiD)	0.230***	(0.057)	792	0.387
Synthetic Control	0.245***	(0.062)	792	0.392
Instrumental Variables	0.218***	(0.059)	792	0.375
Alternative Outcome: Gross Output	0.252***	(0.064)	792	0.401
Alternative Outcome: Investment	0.314***	(0.071)	792	0.356
Alternative Outcome: Employment	0.187***	(0.053)	792	0.342
Controlling for Other Policies	0.222***	(0.058)	792	0.395
Placebo Test (False Treatment Timing)	0.014	(0.055)	792	0.284
Excluding Pandemic Period (2020-2021)	0.239***	(0.060)	704	0.392
State-level Heterogeneity Controls	0.227***	(0.058)	792	0.403

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Each row represents a separate regression specification. The placebo test assigns fictitious treatment timing to sectors. The IV approach uses pre-GST tax structures as instruments for GST rate changes.

POLICY IMPLICATIONS

Our findings have several important implications for GST policy design and implementation. The substantial heterogeneity in sectoral responses suggests that future GST rate rationalization efforts should adopt a targeted approach rather than across-the-board adjustments. Sectors with high tax elasticities (e.g., consumer durables, hospitality) are likely to demonstrate stronger growth responses to rate reductions, potentially generating higher long-term revenue through expanded economic activity. Conversely, rate reductions in low-elasticity sectors may result in revenue losses without commensurate growth benefits.

Our decomposition of transmission mechanisms indicates that GST rate reductions have the strongest impact when accompanied by complementary reforms. Enhancing the efficiency of input tax credit flow is crucial for maximizing the input cost reduction effect, particularly in manufacturing sectors with complex supply chains. Simplifying compliance procedures amplifies the benefits of rate reductions through the compliance effect, especially in sectors with significant informality. Effective implementation of anti-profiteering provisions can enhance the pass-through of tax reductions to prices, strengthening the price effect in concentrated markets.

The observed lags in adjustment periods, particularly in manufacturing sectors, suggest the need for sector-specific transition support during major tax reforms. This could include temporary provisions for inventory management, enhanced outreach and education, and phased implementation of complex changes. Such support would reduce adjustment costs and accelerate the realization of efficiency gains. Our analysis of interstate variations highlights the importance of coordinated policies across central and state governments. Divergent state-level policies regarding GST implementation can create distortions that undermine the benefits of rate reductions. Strengthening the institutional framework for federal coordination through the GST Council and related mechanisms is essential for consistent policy implementation.

CONCLUSION

This study provides the first comprehensive empirical assessment of the heterogeneous impacts of GST rate reductions on sectoral economic growth in India. Using a robust difference-in-differences approach combined with input-output analysis, we document substantial variation in sectoral responses to tax adjustments, with elasticities ranging from 0.11 to 0.58 across different segments of the economy.

Our findings challenge the notion of uniform fiscal multipliers for indirect tax adjustments, highlighting the importance of sector-specific characteristics in determining the magnitude and timing of growth effects. Consumer durables, pharmaceuticals, and hospitality sectors demonstrate stronger growth elasticity to tax reductions compared to sectors with inelastic demand or significant exemptions. These differential responses are moderated by factors including price elasticity of demand, formalization levels, input-output linkages, and market concentration.

The results suggest that future GST reforms should adopt a targeted sectoral approach rather than across-the-board rate adjustments, complemented by measures to enhance input tax credit flow, simplify compliance procedures, and support sectoral transitions. Such targeted policies hold the potential to enhance the growth-oriented aspects of India's GST framework while maintaining revenue adequacy.

While our study makes significant contributions to understanding the growth implications of GST in India, several limitations should be acknowledged. The relatively short post-implementation period limits our ability to identify very long-term structural effects. Further research is needed to examine the distributional implications of differential sectoral impacts and to develop more granular product-level analyses. Despite these limitations, our findings provide valuable evidence-based insights for policymakers seeking to optimize India's GST framework for both revenue and growth objectives.

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