Manufacturing State Advantage Under GST: Evidence from Gujarat's Fiscal Trajectory (2008–2025)

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Abstract

This paper examines the examines the fiscal impact of Goods and Services Tax (GST) in Gujarat which is a strong base of manufacturing activities. The paper covers the time period from 2008–09 to 2024–25 and uses an Interrupted Time Series model with Newey-West HAC standard errors. The paper finds evidence of persistent but moderate fiscal deceleration post-GST. During the study period, revenue growth decelerated by 4.0 percentage points annually and expenditure by 3.2 points. Chow test confirms structural breaks for both revenue and expenditure. Though the revenue CAGR had declined from 13.94% pre-GST to 9.29% post-GST, SGST achieved remarkable 18.05% CAGR compared to pre-GST Sales Tax at 13.51%. A decline in fiscal Autonomy Index was also registered during the study period from 66.1% to 60.3%, which can be attributed to increased transfer dependence from the centre. Developmental expenditure

share had remained stable, while the interest burden declined from 17.9% to 15.5%. Revenue buoyancy improved from 1.01 to 1.22, the highest among major states. Findings reveal a manufacturing state paradox: destination-based GST created initial revenue losses requiring large compensation, yet improved buoyancy. It suggests long-term SGST potential exceeds pre-GST Sales Tax/ VAT performance.

Keywords: *GST, Fiscal federalism, Manufacturing states, Time series, Gujarat, Revenue buoyancy*

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Introduction

India implemented Goods and Services Tax (GST) on July 1, 2017. It was a milestone in restructuring of fiscal federalism. It subsumed over 17 central and state level sales tax/VAT into a destination-based consumption tax (GOI, 2017). The efficiency gains through eliminating cascading taxation and broadening the tax base were some of the selling points of GST, but it has led to asymmetric impacts across states based on their economic structure. As the GST shifts the tax system from origin-based Sales Tax/VAT to destination-based SGST, states with strong manufacturing base faced a critical transition. The new system has threatened revenue loss from production states to consuming states (Rao, 2018).

This paper examines Gujarat, to assess three interrelated questions. First, has GST altered Gujarat's revenue growth trajectory and if so, is the change a one-time level shift or persistent? Second, how has the destination principle affected revenue composition and fiscal autonomy for production-oriented economy? Third, has GST improved buoyancy of revenue, compensated for the initial transition losses, and what is the implication for post-compensation fiscal sustainability?

Gujarat is an ideal state to study the GST impact dynamics. It is the fifth-largest economy of India on GSDP basis in 2024-25 and contributes approximately 9% of national output. It is also the home of major industrial clusters like petrochemicals, pharmaceuticals, automobiles, and textiles. Contribution

of Sales Tax/VAT was 62% of own-tax revenue in 2016–17, thus making the transition to destination-based SGST particularly impactful. Pre-GST analyses put Gujarat in the category of states that would experience the revenue loss among major states (Purohit, 2017). This concern is also validated by compensation receipts during 2017–22.

This paper contributes to the existing literature both methodologically and empirically. Methodologically, the paper focuses on balanced analytical window, which includes 9 pre-GST observations (2008–09 to 2016–17) and compares it with 8 post-GST observations (2017–18 to 2024–25). It minimises structural bias from asymmetric sub-samples. The paper works entirely with nominal current-price data (Mankiw, 2010), to avoid macroeconomics measurement error from state-level price deflators. This methodology design with Newey-West HAC robust standard errors addresses serial correlation inherent in fiscal time series.

Empirically, the paper challenges conventional wisdom about manufacturing states under destination-based taxation. Despite destination-based taxation diverting consumption tax base to consuming states, Gujarat experienced significant revenue deceleration and increased transfer dependence, though SGST buoyancy (1.22) substantially exceeds pre-GST Sales Tax buoyancy (1.01). It suggests long-term revenue potential. This performance reflects Gujarat's robust manufacturing growth, and effective tax administration.

1. Institutional Background

The Seventh Schedule of Constitution of India assigns Sales Tax/VAT to the state list. While under the union list income tax, customs, and central excise are reserved to the central government. This fiscal arrangement under the constitution of India between union and its constituent units have created vertical fiscal imbalances. All States together collected 38% of combined tax revenue but had incurred 58% of expenditure responsibilities in 2024 -25 (PRS, 2024).

The 101st Constitution Amendment act, enabled GST by creating concurrent taxation powers. The dual structure comprises State GST (SGST) on intra-state transactions, Central GST (CGST) on intra-state transactions, and Integrated GST (IGST) on inter-state transactions (Purohit, 2017). Under the GST

framework, the Integrated Goods and Services Tax (IGST) follows the principle of destination-based taxation. IGST is collected by the Central Government and is transferred to the consuming state. This means that tax revenue ultimately accrues to the consuming state rather than the producing state. This system represents a significant shift from the pre-GST tax regime, where producing states retained a substantial share of tax revenue from interstate trade. Thus, Implementation of GST has restructured the horizontal imbalances among the states. Manufacturing states like Gujarat which generated large Sales Tax/VAT collections from production are now discriminated against the consumption states.

To address revenue uncertainties of the manufacturing states, the Parliament guaranteed states a compensation for revenue losses for a period of five years (2017–2022) at a 14 percent compound annual growth rate in tax revenue relative to the 2015–16 base year. Any shortfall in revenue was to be compensated through a GST Compensation Cess imposed on selected luxury and demerit goods (Chakraborty & Dash, 2020). Gujarat, received Rs.42,438 crore in total compensation. The compensation mechanism expired in June 2022, creating a fiscal testing whether SGST growth could sustain expenditure needs of the states.

Gujarat is characterized by a strong manufacturing base supported by industries such as petrochemicals, automobiles, and pharmaceuticals. The state also has a very vibrant and expanding service sector. All these factors support strong domestic consumption. The state's Gross State Domestic Product had increased substantially over the past decade, from approximately ₹5.98 lakh crore in 2008–09 to around ₹27.9 lakh crore in 2024–25.

2. Theoretical Framework

Classical fiscal federalism theory (Musgrave,1959 ; Oates,1972) assigns taxation and expenditure powers in such a way that promotes efficiency, equity, and fiscal autonomy at all levels of governance. Contributions by Richard Musgrave and Wallace E. Oates emphasized that subnational governments should have access to adequate revenue sources to finance their expenditure requirements. Within this framework, as the GST shift from origin-based taxation to destination-based taxation in India, fiscal capacity of states depending on their

economic structure is bound to be affected. The empirical analysis focuses on evaluating the impact of GST on revenue performance, fiscal dependence, and compensation flows for a manufacturing-oriented state such as Gujarat.

In a theoretical and Empirical study of VAT system in India, Keen & Lockwood (2010) concluded that the destination principle is expected to create asymmetric impact on the states. So consuming states such as Bihar, UP, and Rajasthan stands to gain and producing states like Gujarat, Tamil Nadu, Maharashtra stands to lose. The magnitude depends on production-versus-consumption balance. Highly industrialized states with lower per-capita consumption like Gujarat which exports 60–70% of production face largest losses.

2.1 Revenue Buoyancy as Compensatory Mechanism

Revenue buoyancy (η) which measures tax responsiveness to economic base is an important tool to gauge the impact of any policy initiative on the tax collection (Mansfield,1972). Buoyancy increases if broader base captures previously untaxed services or improved compliance through GSTN reduces evasion or harmonized rates eliminates cascading effect stimulating growth. If post-GST buoyancy exceeds pre-GST levels; buoyancy revenue growth could offset destination-based losses over time.

2.2 ITS Identification Strategy

When policy intervention occurs at known time points across all units, Interrupted Time Series (Shadish et.al, 2002), is appropriate to capture the impact of policy change. GST is a perfect case for ITS assumptions. July 1, 2017 implementation was nationwide and exogenous to Gujarat's fiscal trajectory. ITS estimates immediate level shifts coefficients and slope changes coefficient gives distinct values for one-time shocks and persistent trajectory changes.

3. Literature Review

There are studies examining the fiscal implications of the Goods and Services Tax (GST), for manufacturing-oriented states. Empirical analyses indicate significant implications for state-level revenue distribution because of the structure of GST in India. M. Govinda Rao illustrates that several manufacturing states experienced revenue shortfalls after the initial implementation of GST in India. His analysis attributes the structural shift toward destination-based

taxation for the revenue effects. Mahesh C. Purohit (2017) projected that industrial states could face substantial fiscal pressures following the GST transition. Rao and Chakraborty (2020) also find that manufacturing-intensive states received relatively higher compensation payments under the GST compensation framework linking it to the destination principle in the GST.

Mansfield (1972) and Tanzi (1987) links the responsiveness of tax revenue to changes in income without discretionary policy adjustments. Empirical studies on India suggests buoyancy of Sales Tax/Value Added Tax (VAT) in the range of 1.1 to 1.4. However, empirical evidence on tax buoyancy under the Goods and Services Tax regime is not well documented due to the relatively recent introduction of the system. Existing studies suggest that State GST exhibit higher buoyancy compared to the earlier Sales Tax regime

In econometrics Chow test (1960) is used widely for the structural break test. Newey and West method (1987) which gives HAC covariance is deployed to address the issue of autocorrelation in time series regression (Stock & Watson, 2020). Linden and Adams (2011) used Interrupted Time Series (ITS) approach in fiscal policy analysis. This is a quasi-experimental method to examine the impact of reforms by comparing trends in outcomes before and after policy implementation

3.1 Research Gap

Existing GST literature is limited to short post-implementation windows, and it is insufficient to distinguish transitory shocks from persistent changes. The 8-year post-GST window here presents a robust analysis. Most studies are based on deflated real data which leads to measurement error. Our focus on nominal-methods allows us to avoid measurement errors.

4. Data and Variable Construction

Reserve Bank of India's Handbook of Statistics on Indian States (2024) is our data source; we have extracted 17 fiscal years data from 2008-09 to 2024-25 at current prices by consolidating state budget documents following standardized classification method.

Table 1

Data Description

Item	Detail
Source	RBI State Finances: A Study of Budgets
State analyzed	Gujarat
Analysis window	2008–09 to 2024–25 (17 years)
Pre-GST observations	9 years (2008–09 to 2016–17)
Post-GST observations	8 years (2017–18 to 2024–25)
Price basis	Current (nominal) prices
Value unit	Rs. Crore (nominal)

Source: Authors' summation of data

Key variables include Total Revenue Receipts, Own Tax Revenue, SGST, Sales Tax/VAT, GST Compensation, Revenue Expenditure, Developmental Expenditure, and Interest Payments. Four ratio indicators: Fiscal Autonomy Index (Own Tax/Total Revenue), Interest Burden (Interest/Revenue Expenditure), Developmental Share (Developmental/Revenue Expenditure), and Capital Productivity (Capital Outlay/Total Capital Disbursements) have been constructed.

Deflation of the fiscal series has been deliberately avoided. No valid state-specific price deflator exists for Gujarat; applying all-India GDP deflator introduces measurement error exceeding any gain from real-value interpretation. Our research questions concern fiscal sustainability—inherently nominal concepts. States must service nominal debt and meet nominal obligations. Our ratio indicators are dimensionless, invariant to deflation choice (Bird, 2011).

5. Methodology

For this paper descriptive analysis, interrupted time series model, Chow Structural Break test and revenue buoyancy index have been used. Fiscal autonomy index has also been constructed to gauge the impact of GST on the Fiscal autonomy of the state. GST and VAT performance comparison is also

made in the paper to evaluate the impact on GST on tax collection. Following three regression models have been fitted for our analysis.

Model 1 — Interrupted Time Series:

$$\ln(Yt) = \alpha + \beta 1t + \beta 2DGST + \beta 3tstar + ut$$

where ln(Yt): Natural logarithm of tax revenue and t is time trend variable and captures the underlying pre GST growth trend in tax revenue. DGST is a GST intervention dummy variable , Equals 0 for all pre-GST years and 1 for all post-GST years. tstar = max (0 ,t−9) , it measures Post-GST trend variable , equals 0 before GST and increases by one each year after GST. Captures the change in the growth rate after GST . β1 annual growth rate change in annual revenue before GST implementation , β2 Immediate level change in tax revenue following GST implementation and β3 represents change in the slope after GST implementation relative to the pre-GST period

Model 2 — Chow Structural Break Test:

$$F = \frac{(RSS_{pool} - RSS_{pre} - RSS_{post})/k}{(RSS_{pre} + RSS_{post})/ (n-2k)}$$

Rejection of null hypothesis confirms GST represents genuine parameter break.

Model 3 — Revenue Buoyancy:

$$\ln(Revenuet) = \gamma 0 + \eta \ln(GSDPt) + vt$$

where η > 1 tax buoyancy is elastic.

6. Empirical Results

6.1. Descriptive Statistics

Table 2

Descriptive Statistics by Period — Gujarat (Rs. Crore)

Series	Period	N	Mean	Min	Max
Revenue Receipts	Pre-GST	9	72,242	38,676	109,842
	GST Era	8	167,747	123,291	229,653

Revenue Expenditure	Pre-GST	9	70,645	38,741	103,895
	GST Era	8	162,428	118,060	219,832
Own Tax Revenue	Pre-GST	9	47,732	29,850	75,715
	GST Era	8	101,125	82,932	150,126

Source: Authors' calculation

The descriptive statistics indicate a profound hike in fiscal parameters during the GST era compared with the pre-GST period. Evidence suggests that the GST period is associated with higher revenue mobilization along with increased public expenditure. However, to determine the statistical significance of these changes and relation with the GST reform , Interrupted Time Series (ITS) framework is conducted.

6.2.Regression Results

Table 3

Model 1 — Interrupted Time Series Results

Dep. Variable	Term	Estimate	Std. Error	p-value
ln(Revenue)	Intercept	10.45	0.05	0.00***
	t	0.13	0.01	0.00***
	DGST	−0.09	0.07	0.25
	tstar	−0.04	0.01	0.00***
ln (Expenditure)	Intercept	10.53	0.04	0.00***
	t	0.12	0.01	0.00***
	DGST	0.01	0.02	0.74
	tstar	−0.03	0.01	0.00***

Source: Authors' calculation ;Note: Newey-West HAC SEs (lag=2). *** $p < 0.01$.

The Interrupted Time Series (ITS) regression results table 3 measures the impact of the GST reform on the state's fiscal indicators. The log revenue estimate for the baseline revenue level and the pre-GST time trend coefficient is positive and significant. It indicates that revenue receipts were growing prior to the introduction of GST. The implementation of GST did not have a significant

immediate impact on revenue levels as the coefficient of the GST intervention dummy (DGST) is negative but statistically insignificant. This suggests that revenues increase during the GST era is in sync with the pre-GST trend.

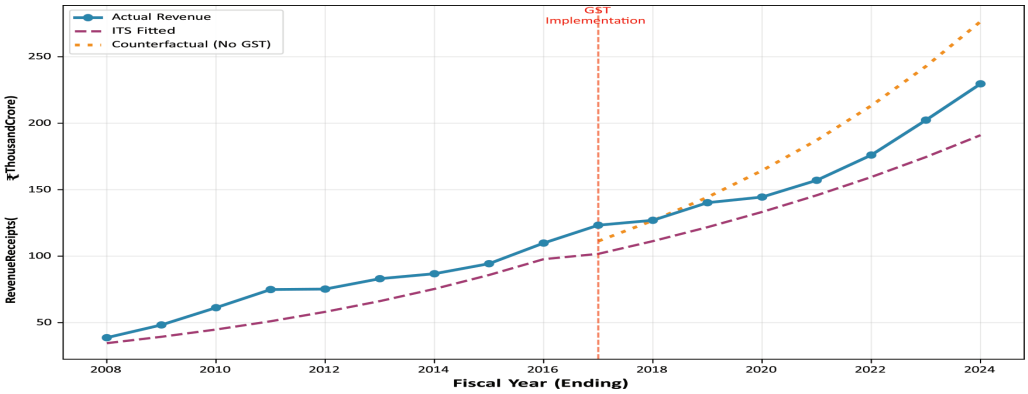
For expenditure model also, similar trend is observed. The baseline expenditure level and the pre-GST trend coefficient suggest a consistent increase in revenue expenditure over time. This with statistically insignificant GST dummy variable indicates that GST did not generate an immediate fiscal shock but the increase in indicators were on the trend line.

Figure 1

Revenue Trajectory with ITS Decomposition

Gujarat, 2008-09 to 2024-25

Source: Authors' construct



6.3 Chow Structural Break Test

Table 4

Model 2 -Chow Structural Break Test

Series	F-statistic	df1, df2	p-value	Conclusion
ln(Revenue)	4.85	2, 13	0.03**	Structural break
ln(Expenditure)	9.05	2, 13	0.00***	Structural break

Source: Authors' calculation Note: *** p < 0.01, ** p < 0.05.

Both series exhibit statistically significant breaks at 2017–18, validating ITS assumptions.

6.4 Revenue Buoyancy

Table 5

Model 3 — Revenue Buoyancy

Period	Buoyancy (η)	Std. Error	p-value	R^2
Pre-GST (2008–09 to 2016–17)	1.01	0.04	0.00	0.99
GST Era (2017–18 to 2024–25)	1.22	0.06	0.00	0.99

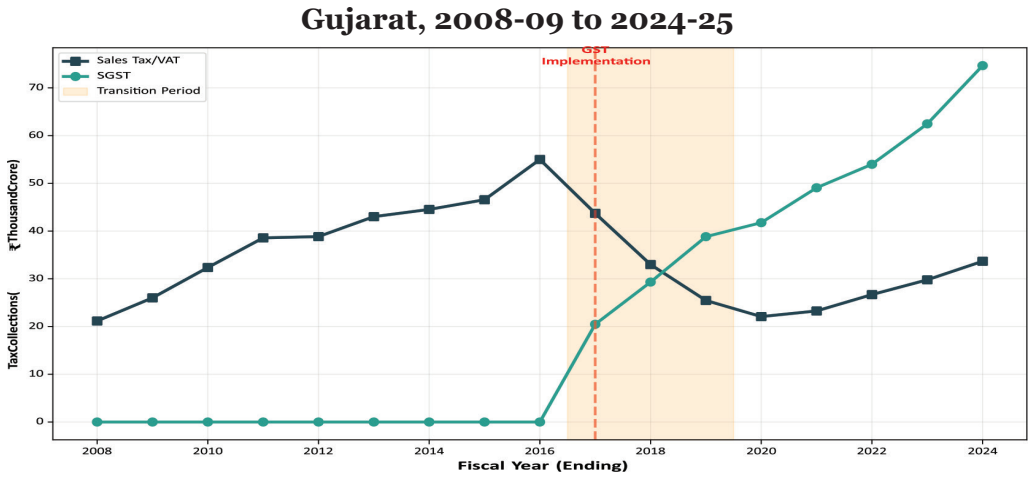
Source: Authors' calculation

Buoyancy increased significantly from 1.01 to 1.22—the highest among major states. This 21-percentage-point increase indicates SGST captures economic growth more effectively than pre-GST Sales Tax/VAT, despite destination-based taxation.

6.5 SGST vs Sales Tax (VAT) Performance

Figure 2

Transition from Sales Tax/VAT to SGST



Source: Authors' construct

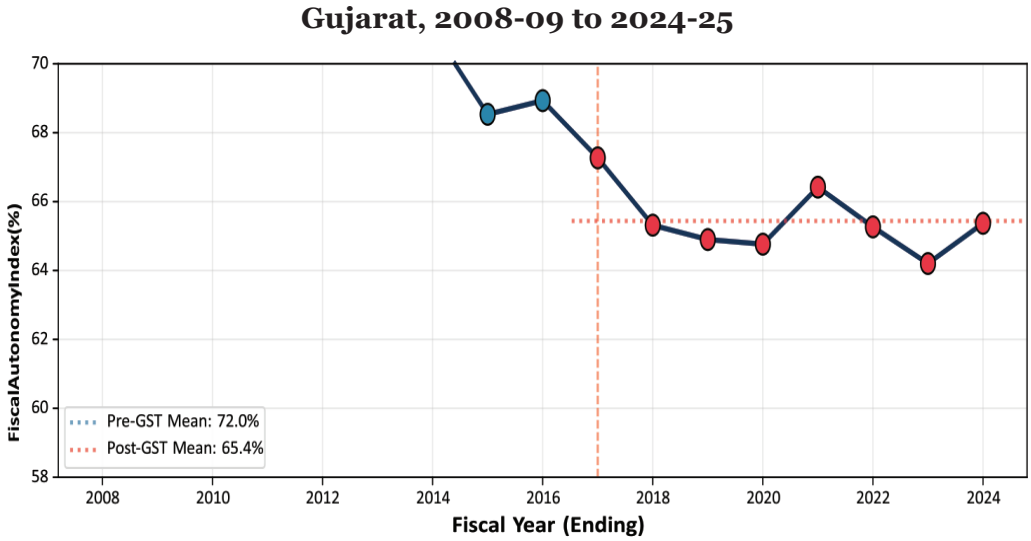
Sales Tax collections peaked at Rs.54,997 crore (2016–17), dropped to Rs.43,712 crore (2017–18), declined further through 2020–21 (Rs.22,084 crore), then partially recovered to Rs.33,675 crore (2024–25). Residual reflects assessments, penalties, and petroleum products outside GST.

SGST commenced at Rs.20,473 crore (2017–18, 9 months), grew to Rs.74,662 crore (2024–25), achieving 18.05% CAGR—exceeding pre-GST Sales Tax CAGR (13.51%) by 4.5 points. This remarkable performance contradicts expectations that destination-based taxation would devastate manufacturing state revenues.

6.6 Fiscal Autonomy Index(FAI)

Figure 3

Fiscal Autonomy Index Over Time



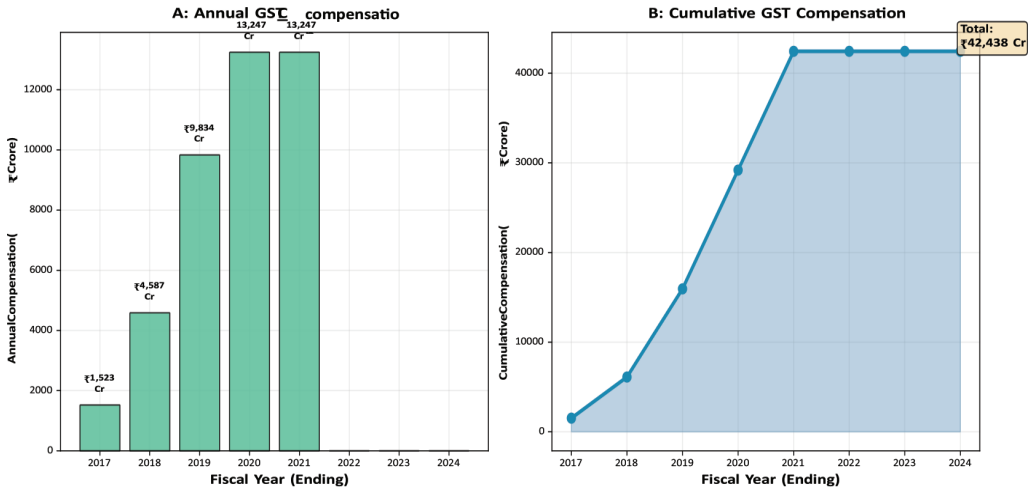
Source: Authors' calculation

FAI declined from 66.1% pre-GST to 60.3% post-GST. Gujarat is successful in maintaining relatively high autonomy but has experienced significant decline. The decline can be attributed to two factors: (a) destination-based taxation reduced own-tax share, (b) compensation transfers (categorized as grants) inflated total revenue denominator though that was not own .

6.7 GST Compensation

Figure 4

GST Compensation Transfers to Gujarat, 2017-18 to 2021-22



Source: Authors' construct

Gujarat received Rs.42,438 crore total: Rs.1,523 crore (2017–18), Rs.4,587 crore (2018– 19), Rs.9,834 crore (2019–20), Rs.13,247 crore (2020–21), Rs.13,247 crore (2021–22). The compensation trajectory has nearly tripled from 2017–18 to 2019–20,validating pre GST predictions of substantial destination-based losses.

6.8 Expenditure Quality

Table 6

Expenditure Quality Indicators, Gujarat

Indicator	Pre-GST Mean (%)	Post-GST Mean (%)
Developmental Share	64.8	64.5
Interest Burden	17.9	15.5
Capital Productivity	95.4	83.6

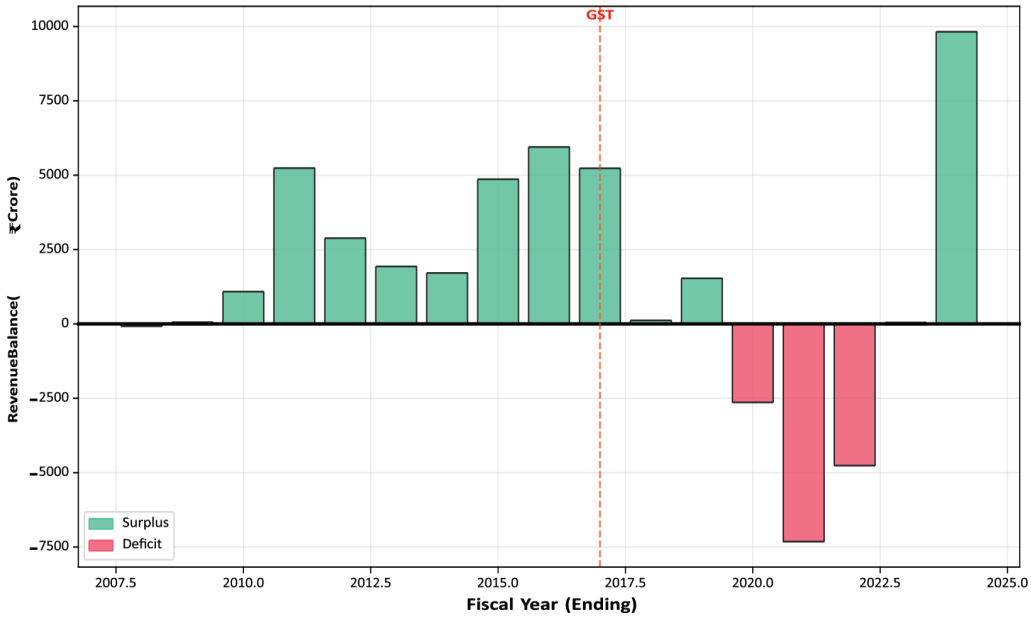
Source: Authors' calculation

The expenditure quality indicators in Table 6 compares Gujarat in the pre- and post-GST periods. The developmental share of Gujarat has remained stable. This stability indicates that Gujarat was able to maintain productive and development-oriented spending despite a deceleration in revenue growth. But the interest burden has declined significantly from 17.9% to 15.5%. This is due to better debt management. During the same time period, capital productivity declined from 95.4% to 83.6%, a potential shift away from growth-enhancing expenditure

Figure 5

Revenue-Expenditure Balance

Gujarat, 2008-09 to 2024-25



Source: Authors' calculation

Gujarat succeeded in maintaining near-balanced revenue accounts throughout the study period with small surpluses in several pre-GST years and moderate deficits post-GST.

7. Discussion and Policy Implications

This paper provides evidence that GST has impacted fiscals of Gujarat negatively. Six key findings have emerged from our analysis. First, using Chow tests it is confirmed that structural break had happened at 2017–18. Second, ITS slope coefficients prove persistent deceleration for revenue as well as for expenditure. Third, revenue CAGR has also declined from 13.94% to 9.29%, despite SGST achieving remarkable CAGR of 18.05% which exceeds pre-GST Sales Tax. The paradox of overall revenue deceleration coexisting with superior SGST performance suggests that though destination-based taxation diverts base to consuming states. Gujarat has SGST benefits from robust manufacturing growth and rising domestic consumption. Fourth, revenue buoyancy has also improved significantly from 1.01 to 1.22. This is highest among major states and an improvement of 21 percentage points above pre-GST levels. Fifth, Transfer dependency has increased as fiscal Autonomy Index declined from 66.1% to 60.3%, This reflects both destination-based losses and compensation's distorting effects on autonomy metrics. Sixth, Gujarat received Rs.42,438 crore in compensation this is highest amount nationwide and proves pre-implementation apprehensions of substantial destination-based losses correct. Sixth, Gujarat received Rs.42,438 crore in compensation, this is the highest amount nationwide and proves pre-implementation apprehensions of substantial destination-based losses for manufacturing State.

The following policy interventions are recommended on the basis of our findings. First, extend compensation cutoff line for manufacturing states till 2030. This will ease the transition and incentivise for SGST optimization. Second, limited SGST rate flexibility should be provided to states (±2 percentage points) to restore partial autonomy while preserving the current structure of GST. Third, GST Council should simplify the compliance and rationalise the rate for industrial inputs.

8. Limitations

Our study has two major limitations. First, due to focus on single-state design, external validity results of the study cannot be generalised. Cross-state panel analysis can be taken by interested scholars to provide broader inference. Second, as our study focuses on nominal-data approach, and it prevents real growth decomposition.

9. Conclusion

This paper employed Interrupted Time Series (ITS) design to assess the fiscal impact of GST on Gujarat between 2008–09 to 2024–25. Findings reveal that for a manufacturing state, destination-based GST created significant initial losses. Though improved buoyancy suggests long-term SGST potential benefits over pre-GST performance. The primary policy intervention calls for transitional support through extended compensation and enhanced vertical devolution through the Finance Commission.

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Ethical Considerations

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