From traditional tax to GST: analysing the tax revenue and economic growth of Haryana

IIM Ranchi Journal of Management Studies

131

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Received 4 December 2024
Revised 14 March 2025
17 July 2025
Accepted 1 September 2025

Abstract

Purpose – This study evaluates the impact of the Goods and Services Tax (GST) on the finances of the state of Haryana, particularly focusing on its effect on tax revenue receipts and economic output. The research is driven by the need to assess the GST regime's performance seven years after its implementation, with special attention to its implications for state finances.

Design/methodology/approach – The study employs secondary data covering the period from 2012–2013 to 2022–2023. Analytical techniques, including paired sample *t*-tests and regression analysis, are used to assess the changes in tax revenue and the economic output of the Haryana government post-GST implementation.

Findings – The results indicate a significant increase in tax revenue receipts following the adoption of GST. Additionally, the study finds a significant positive relationship between GST revenue and economic output in Haryana, suggesting that the GST regime has had a favourable impact on the state's economic performance.

Originality/value – This research fills a gap in the existing literature by providing a comprehensive impact assessment of GST on a state's fiscal health and economic performance, which has not been explored in previous studies. The findings can help policymakers in formulating strategies that capitalise on positive trends to ensure fiscal sustainability and economic stability within the evolving GST framework.

Keywords GST, Haryana, Tax revenue, Economic output, Paired sample *t*-test, Regression analysis

Paper type Research article

1. Introduction

Indirect taxes were imposed on imported goods, and Indian manufactured products were charged at a higher rate of excise duty by British India. But after independence, a lot of taxes were imposed on goods by the Indian indirect tax structure. Customers were bound to pay taxes ranging from service tax, excise, Value-Added Tax (VAT), Central Sales Tax (CST) and other local levies to Goods and Services Tax (GST) for the consumption of goods (Chakraborty & De, 2020). Tax management is a key factor in the generation of revenues of the countries, particularly in emerging economies such as India. Both direct tax and indirect tax are difficult to understand and are actually often difficult to measure in India's taxation system. The government of India is seeking to simplify both kinds of taxes to overcome various problems. So, the suggestions were made by the government to introduce DTC (Direct Tax Code) in place of direct taxes and GST (Goods and Services Tax) in place of all indirect taxes. However, luckily, GST secured a leading position in the purview of implementation (Ajay Kumar, 2017). On 1st July 2017, GST was implemented after long political discussions. The Indian Constitution was amended through the 101st Amendment

IIM Ranchi Journal of Management Studies
Vol. 5 No. 2, 2026
pp. 131-141
Emerald Publishing Limited
e-ISSN: 2754-0146
p-ISSN: 2754-0138
DOI 10.1108/IRJMS-12-2024-0167

Act, 2016, and Article 246A was included, which dealt with GST (Chakraborty & De, 2020). GST's incorporation would provide an outstanding tax structure to India, and tax collection would likely boost. Unequal treatment of the manufacturing and services sectors would come to an end. Several taxes, such as entry tax, turnover tax, stamp duty, state-level sales tax, octroi, CST and many others, are abolished (Gupta, 2014). As per the government, GST is a well-organised and user-friendly tax system in which the authoritative division of the central government and the state government has been carried out. It is based on a dual model application, i.e. "Central Goods and Services Tax (CGST)" and "State Goods and Services Tax (SGST)" (Digal, 2020). There is a provision of IGST also, the proceeds of which are distributed among the centre and states. According to Nayaka and Panduranga (2019), *"GST is considered as the mother of all indirect tax reforms."* A business-friendly environment is supposed to be generated by GST due to the application of standardised tax rates resulting in declining price levels, and thus the inflation price would come down over time. More comprehensibility in the tax collection system would make tax evasion difficult, which will boost the fiscal stability of the country (Gupta, 2014).

1.1 Progress of GST revenue of Haryana after implementation of GST

Haryana, a state known for its production-based economy, has experienced a significant shift in tax structure with the implementation of GST, which transitioned from an origin-based to a consumption-based tax system. This shift makes it crucial to analyse Haryana's tax revenue collections, as the change is likely to have a considerable impact on the state's revenue. Figures 1 and 2 show the progress of revenue collection in Haryana after the implementation of GST.

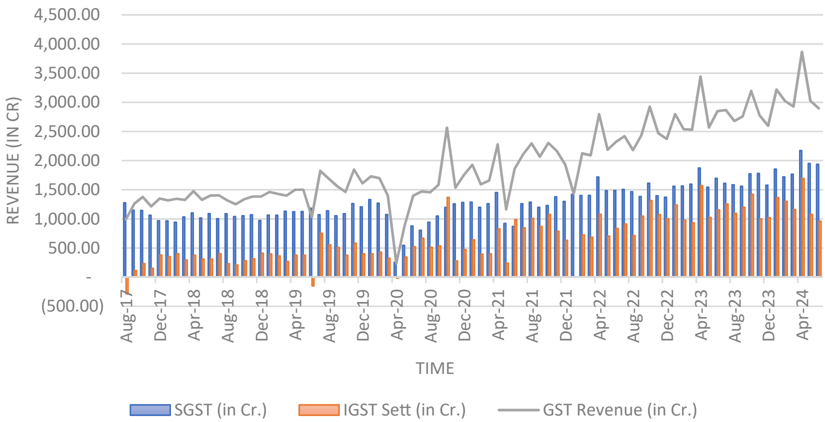

Figure 1. Trends of SGST, IGST and GST revenue. Source: Authors' compilation

Figure 1 captures the progress of GST revenue of Haryana on a monthly basis. GST revenue comprises SGST as well as IGST settlement. Generally, it is showing an upward trend of GST revenue but faces a downtrend during April 2020 due to the arrival of COVID-19 pandemic, which led to a slowdown in the economy. Similarly, Figure 2 captures the progress of GST revenue on a yearly basis. It is also showing an upward trend in the revenue collections of Haryana, but during 2021, revenue collections reduced due to the COVID-19 pandemic. But after that, it is making growth in GST revenue.

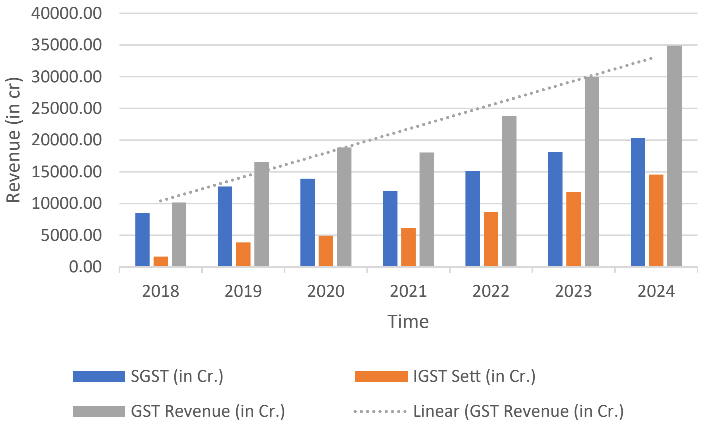

Figure 2. Yearly trend of SGST, IGST and GST revenue. Source: Authors' compilation

"It is a paradoxical truth that tax rates are too high today and tax revenues are too low, and the soundest way to raise the revenues in the long run is to cut the tax rates."– John F. Kennedy. According to this statement, the tax rates need to be reduced to increase the revenue of the government, but the Indian government introduced GST with the expectation that it would result in increased government revenues. The present study seeks to address how, since its introduction in July 2017, GST has impacted the revenue collection and Gross State Domestic Product (GSDP) of Haryana. The reason for choosing Haryana is that the impact of GST varies across states due to differences in economic structure, revenue generation and compliance structures. As Haryana has a diverse economic structure comprising agriculture, manufacturing and services that makes it a representative case for other industrially developed states. Besides that, a state-level analysis ensures a more controlled and detailed examination without excessive heterogeneity that may arise from a multi-state study.

1.2 Objectives

(1) To make a comparison of Haryana's tax revenue before the implementation of GST and after GST.

(2) To examine the impact of GST and GST revenue on the GSDP of Haryana.

In addition to this, we have examined the comparative analysis of other states to Haryana which are of a similar nature to Haryana to generalise the findings of the study.

2. Review of literature

In India, Ahamad and Poddar (2009) found that the implementation of GST would provide India's economy with an increase in production and productivity via an easier and translucent tax mechanism. However, the advantages of GST were found to be highly reliant on the GST's rational design. The shift towards seamless GST was reaffirmed by Vasanthagopal (2011), which represents a big move forward in the framework of indirect taxation and would also like a new boost to Indian economic reform. It was further stated that, boosted by GST's popularity, upwards of 140 countries somehow implemented GST for others and were increasingly becoming the Asia Pacific region's preferred form of indirect tax. As indicated by Gupta (2014), GST implementation would give rise to economic advantages that are not subject to the

Value-Added Tax system and would ultimately contribute to India's economic growth. Therefore, for agriculture, trade, industrial sector and common consumers and also for the state government and the central government, the GST can enhance the prospect of betterment. In the same way, Khan and Shadab (2012) explored the importance of GST in India by focusing on prospects for states to generate more revenue and ensuring transparency in the tax structure. Through a comprehensive study, Tripathi (2018) assessed GST's impact on India's GDP, exploring its conceptual foundation, strengths, limitations and international applications, positioning it as a pivotal indirect tax system for economic growth. According to Khurana and Sharma (2016), GST would lead to benefits of resources and revenue, mainly by expanding the tax base and enhancing tax enforcement, for both central and state governments. Wholesalers, retailers and manufacturers could easily claim input taxes in the form of a tax credit after the introduction of GST. Regarding firms, service providers and businessmen, GST would be advantageous in the long run, says Agrawal (2017). It will make the indirect tax collection evident and help the government as well as the citizens of India. Without human intervention, electronic processing of refunds, tax payments and tax returns using "GST NET" would minimise tax evasion and corruption. Via flawless credit and return processing, incorporated checks on business dealings will reduce the potential for generating black money, leading to the efficient use of resources, opined by Lourdunathan and Xavier (2017). The GST system was proposed in a certain way to generate more revenues for both central and state governments, as it would lead to transparent indirect tax collection, as mentioned by Bindal and Gupta (2018). Gautam, Mohanty, Lodha, and Vadera (2020) carried out a study of India's sales and returns since the implementation of GST. They noted that if any country's tax system was straightforward and comprehensible to its citizens, then the nation would develop. Nayaka and Panduranga (2019) analysed the effect of GST on indirect taxes in the state of Karnataka and reported that the advanced aspects of GST against previous tax structures brought about more approvals, tax receipts and returns to the state. In a similar vein, Dey (2021) examined the GST influence on the indirect tax revenue performance in the state of Odisha, where the author reported that the expected tax revenue is not yet realised instead of an increasing trend of indirect tax. The GST, cascading and revenue development of the Indian commodity taxation market were researched by Khoja and Khan (2020). Their study showed that GST resulted in cascading reductions and thus increased the sales efficacy of the product. The report's findings, majorly substantiated by the tax efficiency of post-GST state and central governments, concluded that, on average, most Indian states saw their tax receipts increase considerably, yet in the presence of some of the current framework's technical difficulties. Furthermore, Shukla, Dwivedi, Gupta, and Mishra (2022) conducted an analysis of GST's effects on tax revenue in India by comparing indirect tax revenue before and after the implementation of GST. Their findings demonstrated that GST significantly boosted the nation's indirect tax revenue. Similarly, Garg, Anand, and Singh (2020) conducted the study on the impact of the implementation of GST on indirect tax revenue across the states. Their study revealed that the tax collections among the states have increased after the imposition of GST, showing more fluctuations in the tax collections. The findings of Dandona, Tomar, Gupta, and Verma (2024) reinforce this argument, revealing that revenue growth following GST implementation is consistently higher than during the pre-GST era across all states, suggesting a favourable impact of GST. Haldankar and Patkar (2024) assessed the GST revenue performance across different regions of the Indian economy; they found that Haryana leads the pack in the northern region, Assam in the northeastern region and Uttar Pradesh in the central region. West Bengal, Maharashtra and Karnataka became the best performers in the eastern, western and southern region, respectively. Furthermore, the study of Garg, Priyanka, Narwal, and Kumar (2023) illustrated the GST influence on revenue efficiency of Indian states. They concluded that the GST implementation had a negative influence on the revenue efficiency of states.

2.1 Research problem

Introduced in 2017, the GST has transformed India's taxation system, but how has it performed in terms of revenue collection? Has GST resulted in increased tax and indirect tax revenue? Furthermore, as a landmark reform in indirect taxes, what impact has it had on the economic growth of individual states like Haryana? This study seeks to analyse these aspects, focusing on the experience of Haryana post-GST implementation.

2.2 Hypothesis

A review of literature indicates that the implementation of GST has a positive and statistically significant impact on tax revenues. Notably, Dandona *et al.* (2024) provide empirical evidence of a significant and positive relationship between GST implementation and government tax revenue. In the context of indirect tax revenues, similar findings are reported by Garg *et al.* (2020) and Shukla *et al.* (2022) in the Indian framework, while Dey (2021) and Nayaka and Panduranga (2019) highlight comparable outcomes in Odisha and Karnataka, respectively. Haldankar and Patkar (2024) further emphasise the positive contribution of GST to GST revenue. Importantly, Dandona *et al.* (2024) also identify a direct link between GST revenue and the GDP of India. These findings collectively form the basis for the development of the following alternative hypothesis:

H01. The GST implementation has a positive effect on tax revenue compared to the pre-GST period.

H02. The GST implementation has a positive effect on the indirect tax revenue compared to the pre-GST period.

H03. The GST implementation has a positive effect on GST revenue compared to the pre-GST period.

H04. GST revenue has a positive effect on the GSDP of Haryana.

H05. GST dummy has a positive effect on the GSDP of Haryana.

3. Research methodology

The analysis is of an empirical sort. The core of this research is to examine the revenue effects of GST on the state of Haryana's tax revenue and economic output. Variables are used in the study as tax revenue, indirect tax revenue, GST revenue, GST Dummy and GSDP. Tax revenue comprises direct tax revenue as well as indirect tax revenue. Direct tax revenue comes from the income tax, corporation tax, and property and capital transactions tax, whereas indirect tax revenue comes from sales tax, state excise, taxes on vehicles, GST and so on. GST revenue taken in the analysis presents collections from GST in the post-GST period and for pre-GST period, it represents revenue from taxes subsumed in GST. GST dummy takes the value 1 when it is present; otherwise, 0. The data for GST revenue is taken from the GST statistics website; GSDP data is taken from "Handbook of Statistics of Indian States"; tax revenue and indirect tax revenue data is taken from "State Finances: A Study of Budgets" from the RBI website. The time taken for analysis is from 2012–2013 to 2022–2023 due to the availability of the data of all variables. This time is bifurcated into pre-GST and post-GST periods, in which the pre-GST duration is from 2012–2013 to 2016–2017, whereas the post-GST duration follows from 2018–2019 to 2022–2023. The year 2017–2018 is omitted due to the implementation year.

The techniques used for the analysis are paired *t*-tests and regression analysis. The paired sample *t*-test, or dependent sample *t*-test, is designed to evaluate if there is a significant mean difference between two sets of paired observations. This procedure involves taking two measurements for each subject or entity, producing pairs of data. The utility of the paired sample *t*-test lies in its ability to assess GST's impact by comparing revenue figures from distinct time periods. By evaluating pre-GST and post-GST data, it determines if there's a significant difference in average revenue levels. This study aids in determining how effectively GST influences revenue growth and highlights any major shifts brought about by the reform. As a result, the paired sample *t*-test is indispensable for verifying the statistical significance of these differences and guiding evidence-based decisions. Further, utilising regression analysis allows for the identification of key variables that impact a specific issue or topic. It improves the analysis by uncovering the relationships between GST revenue and the economic output of Haryana, which will determine how changes in GST revenue affect the overall economic output of the state. Regression analysis serves as a valuable tool for recognising key predictors, enabling policymakers to discern which variables have a statistically significant influence on fluctuations in economic output. Whether GST revenue plays a significant role in the economic growth of the state or not. Using identified trends, this predictive modelling approach offers reliable insights into future revenue expectations.

4. Empirical results

4.1 Objective (1) comparative analysis of tax revenue of the Haryana government before and after implementation of GST

This study begins with a comparative analysis of government tax revenue before and after the introduction of GST. To gauge the effect of GST on revenue performance, a paired *t*-test is conducted.

The descriptive statistics in Table 1 reveal the impacts of GST on tax revenues. It presents the mean and standard deviation of three different tax revenue indicators: tax revenue, indirect tax revenue and GST revenue. Additionally, it reported the paired differences in means along with their standard deviations. Paired difference mean indicates how much more revenue is generated during the post-GST period in comparison to the pre-GST period across all observations. However, the negative sign in the paired difference mean indicates the running of the paired *t*-test in the pre-GST-post-GST form. If we run this in the form post-GST-pre-GST, then this sign will become positive without interrupting the paired difference values. Thus, it is clearly shown in the table that tax revenue is increased by Rs. 24,835 crores in the post-GST period, whereas indirect tax revenue shows a Rs. 17,101 crore increment, and GST revenue is increased by approximately Rs. 7,622 crores.

Table 1. Descriptive statistics of variables and paired sample *t*-test results

	Pre-GST		Post-GST		Paired difference		
Variables	Mean	Std. dev.	Mean	Std. dev.	Mean	Std. dev.	*t*-stat (*p*-val)
Tax revenue	32752.42	5706.59	57587.48	11708.85	−24835.07	6749.64	−8.228 (0.001)***
Indirect tax revenue	25106.39	4191.04	42207.71	7955.08	−17101.32	4428.19	−8.636 (0.001)***
GST revenue	13833.18	2406.92	21454.96	5481.88	−7621.78	3356.31	−5.078 (0.007)***

Note(s): *** indicates 1% significance level
Source(s): Authors' compilation

Further, it shows that the standard deviation of all the variables is higher in the post-GST period, implying greater variability in these variables after the implementation of GST. Overall, the findings reveal that government tax revenue has grown more significantly post-GST implementation compared to the pre-GST period in the state. This is further confirmed by the statistical significance indicated by the *t*-statistics and *p*-values presented in Table 1. The *p*-value is low, i.e. less than 0.05 for all variables, supporting the consistency of this positive impact. The similar kind of impact is demonstrated by Dandona *et al.* (2024). In a similar vein, Garg *et al.* (2020) came to the conclusion that tax collections among states have increased post-GST. Furthermore, the considerable impact of GST in boosting indirect tax revenue is reported by Shukla *et al.* (2022). In light of these findings, policymakers are encouraged to consider this result as evidence of a favourable trend, with Haryana showing an average increase in government revenue post-GST implementation.

4.2 Objective (2) analysing the impact of GST and GST revenue on GSDP of Haryana

The second portion of the paper deals with analysing the impact of GST and GST revenue on Haryana's GDP, i.e. GSDP of Haryana. The relationship between GST revenue and GSDP in the light of the GST dummy reflects the overall economic health of Haryana. Evaluating this impact provides valuable insights for policymakers, economists and businesses into the overall resilience and efficiency of Haryana's economy. The works of Dandona *et al.* (2024), Mukherjee (2023), Khan and Shadab (2012), and Shrivastava, Sharma, and Bhatnagar (2010) largely center on the GST-GDP relationship, providing important perspectives on economic behaviour and the consequences of tax policy shifts.

Table 2 reflects the regression analysis portraying the impact of GST and GST revenue on the GSDP of Haryana. It demonstrates that there is a substantial impact of GST and GST revenue on GSDP of Haryana, as the *p*-value is significant at the 5% significance level. Additionally, the model's adjusted *R*-squared value stands at 0.829, signifying that it explains approximately 83% of the variation in economic growth. The overall model shows statistical significance, with an F-statistic of 25.17 and a *p*-value of 0.000, further confirming the model's robustness and appropriateness for analysis.

Table 2. Results of regression analysis

Variables	Coefficient	*t*-stat	*p*-val
GST revenue	7.795	2.406	0.043**
GST dummy	96801.24	2.747	0.025**
C	273988.6	5.689	0.000***
R-sq.	0.863	Adj. *R*-Sq.	0.829
F-stat (*p*-val)	25.170 (0.000)	D-W stat	2.424

Note(s): *** and ** indicates 1% and 5% significance level respectively

Source(s): Authors' compilation

In this case, the coefficient for GST revenue is 7.795, and the *p*-value is 0.043, which is less than the 0.05 level of significance. The presence of a low *p*-value points to a statistically significant relationship between GST revenue and GSDP. The analysis suggests that shifts in GST revenue significantly influence Haryana's economic output, with this impact being clearly reflected in the state's GSDP. Furthermore, the positive and significant impact of GST dummy on GSDP shows that there is considerable change in the economic output of Haryana after the implementation of GST. In other words, the economic output of Haryana receives a boost from GST adoption in the nation. Therefore, we can accept the alternate hypothesis formulated earlier and provide evidence that there is a significant impact of GST and GST revenue on the GSDP of Haryana. Dandona *et al.* (2024) support the findings of the study, highlighting the significant impact of GST on the GDP of the Indian economy. Similarly, the improvement in the tax buoyancy after implementation of GST for states, union and general governments is observed by Mukherjee (2023). Additionally, Shrivastava *et al.* (2010) revealed that even with several revisions and improvements in direct and indirect taxes, the overall effect on India's GDP and tax revenue has been positive. Furthermore, more studies, such as Khan and Shadab (2012) and Tripathi (2018), reported the positive influence of GST on GDP conceptually.

Table 3 displays the results of diagnostic tests conducted on the model, aimed at identifying potential issues related to normality, serial correlation, heteroskedasticity and the correct functional form. It is showing that the residuals are normally distributed, as confirmed by the Jarque–Bera test, which did not reject the null hypothesis. Similarly, the problem of serial correlation was examined using the Breusch–Godfrey test, and the obtained *p*-value was incidental at the 5% significance criterion. This suggests that the model's residuals do not exhibit serial correlation.

Table 3. Diagnostic testing

Diagnostic test		Null hyp.	F-test (prob)	Result
Normality test	Jarque-Bera	H0: Residuals are normally distributed	0.8871 (0.642)	Normal distribution
Serial correlation LM test	Breusch-Godfrey	H0: No Serial Correlation	0.7985 (0.493)	No serial correlation
Heteroskedasticity test	ARCH	H0: No Heteroskedasticity	1.0021 (0.346)	Homoscedasticity
	Breusch-Pagan-Godfrey		0.0689 (0.934)	
Functional form	Ramsey RESET Test	H0: Functional Form is Correct	3.2828 (0.113)	Correct functional form

Source(s): Authors' compilation

Heteroskedasticity was assessed using the Breusch–Pagan–Godfrey test and ARCH test, and the probability value was found to be greater than 0.05. These outcomes indicate the absence of heteroskedasticity in the residuals. Likewise, the Ramsey RESET test further supports the correct specification of the model, demonstrated by a *p*-value of 32%, which is above the 5% significance threshold. Consequently, we arrived at the decision of correctly specifying the model. For policymakers and analysts, this result serves as empirical confirmation that shifts in GST policies, rates, or collections translate into observable changes across the broader economic landscape. The notable impact of these changes reinforces the importance of integrating GST dynamics into economic policy decisions, recognising their influence on the state's economy.

4.2.1 Comparative analysis of Haryana with other states. Table 4 shows the results of paired *t*-tests of various states in addition to Haryana. Other states which are taken in the analysis are decided upon the basis of economic diversification, revenue generation and tax compliance, which are in line with Haryana. The result shows that there is a significant increase in tax revenue incomes post-GST. In a similar way, indirect tax revenue and GST revenue show the significant increase in respective incomes post-GST.

Table 5 shows the results of regression analysis conducted across various states, illustrating the impact of GST revenue and GST on their economic output. The analysis reveals a strong and favourable impact of GST-related variables on state-level economic performance, aligning with the patterns observed in Haryana.

Table 4. *t*-test results

Variables	Paired diff. mean	*t*-stat	*p*-val
Tax revenue			
Haryana	−24835.07	−8.228	0.001***
Gujarat	−43569.94	−4.678	0.009***
Karnataka	−55635.38	−9.345	0.001***
Maharashtra	−113308.24	−7.038	0.002***
Punjab	−15831.52	−7.476	0.002***
Indirect tax revenue			
Haryana	−17101.32	−8.636	0.001***
Gujarat	−25531.73	−3.629	0.022**
Karnataka	−36877.44	−8.499	0.001***
Maharashtra	−75578.67	−6.464	0.003***
Punjab	−8352.25	−5.945	0.004***
GST revenue			
Haryana	−7621.78	−5.078	0.007***
Gujarat	−11705.98	−2.673	0.056*
Karnataka	−13806.31	−4.591	0.010**
Maharashtra	−14257.34	−2.552	0.063*
Punjab	−645.52	−0.254	0.812

Note(s): ***, ** and * indicates 1%, 5% and 10% significance level respectively
Source(s): Authors' compilation

Table 5. Regression analysis results

Variables	Coefficient	*t*-stat	*p*-val
Haryana			
GST revenue	7.795	2.406	0.043**
GST dummy	96801.24	2.747	0.025**
C	273988.6	5.689	0.000***
Gujarat			
GST revenue	11.673	2.560	0.034**
GST dummy	312526.02	3.882	0.005***
C	491904.0	3.612	0.007***
Karnataka			
GST revenue	11.664	7.139	0.000***
GST dummy	248318.49	7.511	0.000***
C	393882.6	6.931	0.000***
Maharashtra			
GST revenue	13.080	3.412	0.009***
GST dummy	267825.72	3.257	0.012**
C	779112.8	3.322	0.011**
Punjab			
GST revenue	5.214	3.697	0.006***
GST dummy	101871.46	8.739	0.000***
C	229844.4	9.343	0.000***

Note(s): *** and ** indicates 1% and 5% significance level respectively
Source(s): Authors' compilation

5. Conclusion

GST reform has been one of India's most significant post-independence indirect tax reforms. Undoubtedly, the GST serves as an open and effective tax mechanism that will gradually widen the tax base and enhance income generation. The implementation of GST has reduced the cascading effect on the final consumers by reducing the cost of goods & services. So, it is essential to evaluate the performance of the GST regime in terms of the finances of the states. The present study shows that the tax collections in the state have increased after the imposition of GST. The enhanced tax collections may be due to more simplicity and integration of the system to reduce tax evasion. Therefore, we recommend policymakers to further make GST model simpler and single layer tax system to boost tax revenue. The evident positive impact of GST on government revenue post-implementation affirms the effectiveness of the reform. Policymakers must use these results to craft targeted approaches that align with ongoing positive trends, ensuring both fiscal sustainability and economic stability in an evolving GST framework. Moreover, the positive impact of GST and GST revenue on the economic output of Haryana attracts policymakers to recognise those sectors which are getting more benefit from GST as these are providing an encouraging impact on Haryana's GSDP. Further, providing targeted support to these sectors, such as tax incentives and subsidies, will help in strengthening economic output. The further scope of the study involves the analysis of the impact of GST in different states individually and collectively. Additionally, more independent variables can be added in the regression analysis. Moreover, panel regression analysis can be done by incorporating all states of the country.

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