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ورای دام مالیاتی: آثار واقعی مالیات بر کالاها و خدمات در چشم‌انداز مالی هند

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مقالهٔ مروری موضـــوع: اقتصـــاد، مالیات و رشد مالی حوزهٔ موضوعی: هند تاریخ دریافت: ۱۴۰۵/۰۱/۲۳ تاریخ بازنگری: ۱۴۰۵/۰۲/۱۵ تاریخ پذیرش: ۱۴۰۵/۰۲/۲۲ تاریخ انتشار: ۱۴۰۵/۰۴/۰۹ **واژگان کلیدی:** اصلاح مالیاتی، آثار کلان اقتصادی، درآمدهای مالیاتی، کارایی درآمدی، مالیات بر کالاها و خدمات (GST).	مالیات بر کالاها و خدمات (GST: Goods and Services Tax) در هند، یکی از مهم‌ترین اصلاحات اقتصادی هند محسوب می‌شود که در سال ۲۰۱۷م به اجرا درآمد و نظام چندلایهٔ مالیات‌های غیرمســـتقیم جای خود را به نظام مالیاتی ملی یکپارچه داد. در این پژوهش با مطالعهٔ تجربی اکتشـــافی، تأثیر GST بر ساختار مالی هند بررسی شده است. بدین منظور، داده‌های ۲۸ ایالت و ۴ قلمرو اتحادیه‌ای در دورهٔ پیش از اجرای GST (۲۰۱۲ تا ۲۰۱۷م) و پس از اجرای آن (۲۰۱۷ تا ۲۰۲۴م) تحلیل شـــد. ارزیابی GST از طریق تحلیل مقایســه‌ای در ســطح ایالت‌ها و مقایســهٔ مقطعی انجام شــد. به‌منظور ســنجش تغییرات درآمدهای مالیاتی، دگرگونی‌های ساختاری و آثار کلان اقتصادی، از آزمون t زوجی، تحلیل واریانس (ANOVA)، آزمون چاو (Chow Test) و مدل‌های برازش چندگانه استفاده شد. یافته‌ها نشان می‌دهد میانگین درآمدهای مالیاتی ایالت‌ها پس از اجرای GST به‌طور معناداری افزایش یافت که بیانگر تأثیر مثبت این اصــلاح مالی بر وضــعیت درآمدی دولت اســت. بااین‌حال، برخلاف انتظار، نوســان درآمدی میان ایالت‌ها افزایش یافت که حاکی از کاهش ثبات مالی کشــور اســت. همچنین، درآمدهای حاصــل از GST با شـکل‌گیری سـرمایهٔ ثابت خالص (GCF: Gross Capital Formation) و درآمد ناخالص ملی (GNI: Gross National Income) هم‌بسـتگی دارد که نشـان‌دهندهٔ نقش این مالیات در رشـد مبتنی‌بر سـرمایه‌گذاری اسـت. با وجود این، مصـرف خانوار همچنان بیشـــترین ســـهم را در درآمد ملی دارد. بر این اساس، در این پژوهش بر ضـرورت تداوم اصـلاحات به‌منظور تقویت عدالت، ثبات و رشد فراگیر تأکید می‌شود.

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Beyond the tax net: The real effects of GST on India's fiscal landscape

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Abstract

The Goods and Services Tax (GST) in India, the major reform that happened in the country in 2017, replaced the multi-tiered indirect tax system with a unified national tax. This study evaluates GST's impact on India's fiscal structure by conducting exploratory empirical study analyzing data from 28 states and 4 union territories across pre-GST (2012–2017) and post-GST (2017–2024) periods. It's a comparative GST assessment done by State-level comparative analysis by Cross sectional comparison Using paired t-tests, ANOVA, Chow tests, and multiple regression models, the study assesses changes in tax revenue, structural shifts, and macroeconomic effects. Results indicate significant increase in average collection of state tax revenues post-GST, affirming a positive fiscal impact. However, contrary to expectations, inter-state revenue volatility rose, indicating reduction in the fiscal stability of the country. Goods and Service Tax (GST) collections correlate with Gross Capital Formation (GCF) and Gross National Income (GNI), suggesting its role in investment-led growth. Nonetheless, the household consumption remains the largest contributor to national income. The study calls for ongoing reforms to promote equity, stability, and inclusive growth.

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1. Introduction

1.1. Origin of system of taxation

Taxation was initially instituted under the initial ruling family of the old Kingdom of Egypt also called the Ancient Egypt, which governed the kingdom between 3000 B.C. and 2800 B.C. In the ancient Egyptian times, the taxes were addressed as "Labour". "The corvée" and "the tithe" were the first and most common methods of taxation. The corvée was a sort of involuntary labour provided to the state by impoverished farmers (Burg, 2004). Various ancient records, granary receipts on limestone flakes and papyrus have documented records that taxes then called as "Tithe", were collected by the Pharoh during their tour across the kingdom (Olmert, 1996). *The first book of the Hebrew Bible and the Christian Old Testament* also mentions the concept of taxation where the residents gave one-fifth of the crops brought to the Pharaohs as taxes (*The Holy Bible, New International Version*, 2011, Gen. 47:24 (Price & House, 2017)).

In 500 BC, Darius I of the Persian Empire introduced the taxation system, which the provincial governors modified later. In those times there were nearly 20 to 30 provincial governors also called the "Satrapies" in the empire and each of the provincial governors was assessed based on their productivity. Provincial governors had the responsibility of collecting the owed sum which was deposited with the treasury after keeping the expenses incurred by the provincial governors. During reign of Persian empire, taxes were charged by different provinces based upon their economic potential, like:

- Babylon paid one thousand silver talents and made a supply of food for army personnel for four months;
- India paid in terms of gold dust, valuation of which accounted nearly to silver talent coins valuing 4680 in numbers;
- Egypt was wealthy in crops and agriculture. It paid huge volumes of crop in the form of grains valuing 120000 measures of grain and along with these also paid 700 talents of silver coins.

According to UNRV Roman history, taxes paid by citizens of the Roman Republic ranged from 1% to 3% of their entire property valuation. The government auctioned off the tax collection each year given how difficult it was to collect. The successful tax farmers (known as publicani) would prepay the government with the tax revenue they gathered from citizens, and then keep the money for themselves. The successful tax farmers (Publicani's) saved the government's time and effort by collecting the taxes through various mediums and also got the tax revenue converted to coins. The government treated the revenue contribution like a loan and paid interest on it. Although the government and publicani benefited from this system, Emperor Augustus eventually instituted a direct tax system in which all provinces were required to pay a uniform rate of one percent of their wealth and one dollar per adult. This resulted in more frequent censuses and a tilt towards income taxation rather than wealth taxation.

1.2. Taxation in India: A brief history

India's formal taxation system dates to the time of the Maurya dynasty. Those in upper class of society paid taxes equal to one sixth of their income. One of India's earliest scriptures, Manu Smruti, is claimed to have mentioned taxation long before the reign of the Mauryas. After that, the Mughals came and they had their own method of taxes where the non-Muslim population of the country was subject to the dreaded Jezia tax which was later abolished by in India.

In 1850, Sir James Willson legally established India's taxation system. He was India’s finance minister before the country’s independence. He recommended the levies during the country's first union budget session under British authority. The passage of the Indian Income Tax Act in 1860 marked a watershed moment in the development of the Indian tax system. This law marked the beginning of a unified taxation system in India. This act was enacted to help the government make up for the money it lost during the military revolt of 1857. This new law-imposed taxes on earnings from all sources, including real estate, employment, investments, and retirement plans. India's tax code was mostly based on the Indian Income Tax Act. But after decades, it was updated and rebuilt.

In 1886, legislators changed the law to better define which types of income were subject to taxation. The new classifications incorporated things like take-home pay and company profits. In 1918 and 1922, the taxation system witnessed subsequent updates. The Act of 1918 replaced the Act of 1886 and included a number of significant new improvements. Since 1922, when this statute was enacted, India has had a fully functional income tax department. This legislation delineated the roles of several income tax authorities. As several administrations made changes to the act throughout the decades, it gradually got more onerous to comply with. In India, the 1922 law stayed in effect until 1961. The law was originally enacted by the British, but in 1956 a law committee was appointed by the Government of India to streamline the law.

The Indian Income Tax Act of 1961 was passed after 40 years of debate inside the Ministry of Law and 15 years after India obtained independence from the British. In April of 1962, it became law. This Act was binding upon all residents of India. Since 1962, the Union Budget annually amended the statute with a number of new provisions. There is a total of 23 chapters, 298 total parts, and 14 appendices in the entire Income Tax Act of 1961. Each new administration seeks to change the Act in order to fund government operations and make income distribution more equitable. The Indian government specifically exempts agricultural revenue from taxation, which is a notable aspect of India's revenue tax act.

Each country, including India, calculates its income tax based on the previous fiscal year. As the Nation evolves and develops, it requires a shift and changes in the system. The same holds true for India too. On July 1, 2017, the Goods and Services Tax (GST) replaced other indirect taxes levied by the central government and various states in India. This was done to keep pace with the country's rapid pace of development and prosperity.

Figure 1. Types of taxes in India

Table 1. Types of direct and indirect taxes in India

Direct taxes	Indirect taxes	
I. Income tax	Central taxes: Excise duty, additional excise duty, service tax, surcharges and cess	Central and state taxes subsumed in GST since July 2017
II. Capital gains	State taxes: Central sales tax, luxury tax, purchase tax, state VAT, entry tax, entertainment tax, taxes on adds, lotteries betting and gambling, surcharges and state cesses	
III. Securities transaction tax	III. Other taxes: Property tax, entertainment tax, registration fees, stamp duty, transfer tax, entry tax, road tax, toll tax.	
IV. Prerequisite tax		
V. Corporate tax		

1.3. Goods and services tax: An overview

India's indirect taxation system was exceedingly complex before the Goods and Services Tax (GST) was implemented in July 2017. As a nationwide indirect tax, GST has helped unify India's previously fragmented tax landscape into a unified, competitive market. The Goods and Services Tax Act was approved by Parliament on March 29, 2017. As of July 1, 2017, after this approval, GST was in effect throughout India. GST in India is a multi-rate system that is levied on all domestic value addition and is now the only tax levied along the supply chain, from manufacturer to end user. GST is effectively a tax on value addition alone due to the fact that input tax credits can be used to lower the amount of GST owed at subsequent stages of value addition.

1.4. Challenges which existed in the taxation system before GST era

Indian taxation policies and systems were complicated and onerous since different states imposed varying taxes on the same goods, contributing to widespread price increases. The system was extremely intricate, and the results were far-reaching. The following are the key and most pressing problems which existed with the Indian indirect tax structure:

- Cascading of taxes was the plague of the economy when tax collected once by goods and services were charged multiple times in the supply chain till the product reached the final consumer.
- The Indian economy suffered greatly from tax evasion and the black money market, which is said to have become difficultt now after GST implementation.
- Items made in India were subject to CENVAT (excise duty). Yet, problems emerged when attempting to assign prices to goods. A major roadblock to the free and smooth transfer of tax credits was the controversy surrounding CENVAT's first and exclusive application to the industrial sector. Because of this, GST has replaced VAT in several nations.
- The Indian constitution splits the tax collection responsibility among the federal (central) and the individual states government. Government of individual states could levy any kind of tax on anything within the state. While the federal government had veto power over service contracts, state governments hold sway over labour agreements. The government's ability to collect and distribute taxes was skewed by such a structure.
- The government did not include many goods in its taxation system, including copyrights, patents, and software. This added another layer of difficulty to the process of determining how to tax these products.
- The growth of the service economy gives the federal government a monopoly on taxation. State governments, on the other hand, are hurting financially since they don't tax the service industry.
- Major revolutions in technology were required for improved monitoring and administration of taxes. Several discrepancies occurred because there wasn't enough cross-checking between the central and state taxes systems. More than 15 distinct taxes have to be reported in accordance with various regulations under the indirect taxation system which led to high inflation; therefore, there needed to be fast and uniform regulation of tax forms and calculations.

Countries Studies, Vol ?, No ?, ????

1.5. Issues that paved the way to GST

- Various bottlenecks in the prevalent taxation system in India particularly in terms of taxes like Service Taxes, Central Excise Taxes, and VAT etc. added to the complexity and had cascading effects. Under VAT the tax was charged more than one time on the same source and same destination. This issue was removed after implementation of GST in India.
- Several discrepancies emerged as a result of insufficient validations of returns submitted to both the state and central taxation systems.
- More than 15 different taxes were there, which required different treatments under Indirect Taxation system.
- There was no clear delineation of power between the government at the Centre and State, and the taxing system was divided between them.
- Centre had the single right to get taxes on services while the State Governments did not have such a right and were losing the revenue.
- Several items like software, patents and copyrights were not considered for taxation purpose by the government. So, it required for a better classification.
- The CENVAT was imposed on products made in India, although there were complications with product values. Its use had been only at the level of manufacturing, which has always been a blockade to a tax flow that is balanced, resulting in the replacement of VAT with GST.

Hence to summarise GST was introduced in India for the following reasons:

- To make the taxation system in India Transparent & Simple;
- To do away with the cascading system of tax in India;
- To bring on role the non tax payers and specially an attempt to bring on roll the underground economy.

1.6. Taxation system under GST era

Under GST regime all the taxes (Figure 2) were subsumed and are now collected only under one single head which is GST and further this is bifurcated between the state and the centre in the ratio of 50:50 (Table 2).

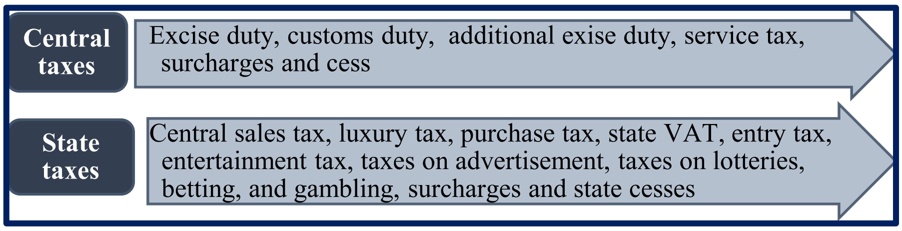


Figure 2. Indirect taxes which are subsumed under GST umbrella

Table 2. GST bifurcation

Nature of supply	Type of GST	Sharing ratio
Within state- intra state	CGST & SGST	50:50 between state and central government
Within union territory	CGST & UTGST	50:50 between state and central government
Outside state- inter states	IGST	100% to Central Govt.

(Source: Gst.gov)

1.7. Indian GST structure/ GST types

GST is a layered tax in India where it includes three components which are CGST, SGST or UTGST & IGST.

CGST. In case of intra state sale when tax is collected by the central government (e.g. transaction happening within Uttar Pradesh);

SGST. In case of intra state sale when tax is collected the state government (e.g. transaction taking place within Maharashtra);

UTGST. When in place of a state it’s a union territory then instead of SGST, the tax charged is called UTGST. Like states in SGST this is charged by union territories;

IGST. IGST refers to integrated GST which is charged when goods and services are crossing two different states in the country (inter state sale). IGST is to be charged by central government. (e.g. sale between Uttar Pradesh and Tamil Nadu).

1.8. Taxes not covered under GST

There still are some taxes which have been kept out of GST domain (Figure 3).

Prior to July 1, 2017, India's indirect taxation system was characterized by a complex and fragmented structure, posing significant challenges to economic efficiency and growth. This system comprised a multitude of taxes levied concurrently by both the central and state governments, creating a web of overlapping jurisdictions and compliance requirements (CAG, 2019). Key central levies included central excise duty (on manufacturing), service tax, and additional duties of excise, while states imposed Value Added Tax (VAT) or sales tax, Central Sales Tax (CST) on interstate sales, entry tax, octroi, luxury tax, and entertainment tax, among others (CAG, 2019; Garg et al., 2023). This multiplicity meant businesses had to navigate numerous tax laws, maintain multiple registrations, and file various returns, significantly increasing administrative complexity and compliance costs (CAG, 2019).

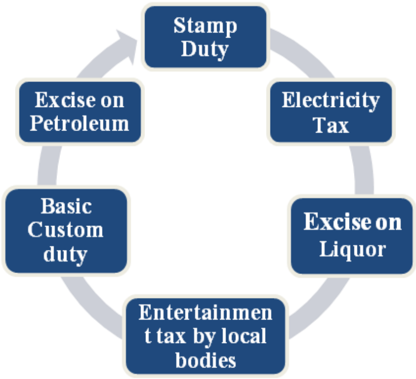


Figure 3. Taxes which are not subsumed under GST

A defining and detrimental feature of this regime was the pervasive "cascading effect", often described as "tax on tax" (CAG, 2019; PIB, 2017; Comptroller and Auditor General of India, 2019; GST Council, 2024). Taxes were levied sequentially at different stages of the supply chain on a value that already included taxes paid at previous stages. For instance, VAT was often calculated on the price of a good that included the central excise duty paid during manufacturing (CAG, 2019; PIB, 2017). This occurred because the system lacked a seamless mechanism for claiming credit for taxes paid on inputs across different tax types (like Excise and VAT) and across state borders (GST Council, 2024; Garg et al., 2023). The consequence was an artificial inflation of the final price of goods and services, burdening consumers and rendering Indian products less competitive both domestically and internationally (PIB, 2017).

Further, the pre-GST period of limited uniformity was not much. VAT rates, procedure, and regulation were widely different state by state, creating distortions and interstate trade complexities (CAG, 2019). CST and entry tax were used as brakes on the free flow of goods across states, presenting logistical challenges and expenses to multi-state organizations (CAG, 2019). This fragmentation raised costs and paid for bad supply chain choices, such as having warehouses in several states simply to be tax-deductible rather than for reasons of logistics.

The path to a single Goods and Services Tax (GST) in India was a lengthened, thoughtful one, and it took more than a decade and half. The idea of a unified, value-added-based GST was first officially proposed by the Kelkar Task Force on Fiscal Responsibility and Budget Management back in 2002-2003 (Garg et al., 2023; NIPFP, 2022). The concept of implementing a national level GST was proposed in the

2006-07 Union Budget speech, paving the way for intensive debates and design efforts (Garg et al., 2023; NIPFP, 2022).

The core objectives driving the GST reform were ambitious and transformative. Primarily, it aimed to create a unified national market by subsuming the complex web of existing indirect taxes under a single, harmonized structure– embodying the principle of "One Nation, One Tax" (CAG, 2019; Garg et al., 2023;). A critical goal was the elimination of the detrimental cascading effect of taxes through a seamless flow of input tax credits across the entire supply chain (CAG, 2019; Garg et al., 2023; PIB, 2017; GST Council, 2024; NIPFP, 2022; IMF, 2018; Manjunatha & Nagaraja, 2022). Other key objectives included simplifying tax compliance for businesses, enhancing administrative efficiency, improving transparency, boosting revenue for governments, and ultimately fostering economic growth (CAG, 2019; Garg et al., 2023; GST Council, 2024; NIPFP, 2022; IMF, 2018).

The legislative foundation for GST was laid by the Constitution (101st Amendment) Act, 2016, which received Presidential assent in September 2016 (Garg et al., 2023; NIPFP, 2022). This enabled the passage of the key GST Acts– the Central GST Act, 2017; the Integrated GST Act, 2017; the Union Territory GST Act, 2017; the GST (Compensation to States) Act, 2017; and the respective State GST Acts by each state legislature– leading to the nationwide rollout on July 1, 2017 (Garg et al., 2023).

The introduction of the Goods and Services Tax stands as arguably the most significant fiscal reform in India since its independence (Dash & Kakarlapudi, 2022), fundamentally altering the landscape of indirect taxation. While the objectives of simplification, unification, and efficiency were clear, the actual, realized impact of this monumental reform on India's fiscal architecture, particularly at the sub-national level, remains a complex and evolving subject of analysis.

The GST experience has been mixed. The positive side is that tangible success has been recorded, such as an unprecedented boost in the effectiveness of logistics, and an unprecedented expansion in the number of registered taxpayers, which is a reflection of broadening of the tax base and formalization (Subramanian, 2018). But the implementation process was marred with issues. Firms, especially small and medium enterprises (SMEs), were not able to meet the new specifications, like time-consuming return filing and technical issues in relation to the GSTN portal (Garg et al., 2023; IMF, 2018). Performance concerns were also expressed with reports that in certain states revenue growth was still lagging behind expectations or pre-GST levels, bringing the Centre's compensation scheme (Dash & Kakarlapudi, 2022; Rao & Chakraborty, 2020; NIPFP WP 376, 2022). Apart from that, the timing of the rollout of GST, immediately after the demonetization scheme, may have had a significant contribution towards creating macroeconomic shocks and transition effects on consumption and business operations (IMF, 2017; Subramanian, 2018).

Therefore, there is a strong need to move beyond the simplistic evaluation of the transition to GST. This research attempts to evaluate the real impact of GST by looking at its underlying implications on the fiscal condition. This does not just imply analyzing the state tax revenue level at the aggregate level, but also its variability and certainty in the long term. This entails testing whether the introduction of GST placed a structural break on underlying revenue trends, which would be suggestive of a fundamental change rather than the mere cyclical trends. It also requires detecting any potential spillover effects on other broader macroeconomic measures of the general well-being and direction of the economy.

The intention of the current study is to explore the actual effects of GST on India's financial situation with the following extended research questions:

- **RQ1:** Did GST increase total tax revenue for states?
- **RQ2:** Did GST improve tax revenue consistency among states?
- **RQ3:** Was there a structural break in revenue trends due to GST?
- **RQ4:** Did GST impact economic indicators like Gross National Income (GNI), Gross Capital Formation (GCF), and Per Capita Gross Domestic Product (GDP)?

By testing the impact of GST at all levels of state revenues (RQ1), revenue stability (RQ2), potential structural breaks (RQ3), and significant macroeconomic variables (RQ4) all at once, it aims to offer a more holistic perspective than studies that examine individual aspects.

2. Literature review

The research in context to tax reforms assumes more or less automatically that a transition to broad-based consumption taxes at lower, more proportional rates can improve economic efficiency (Garg et al., 2022). The kind of reform represented by GST can help in improving resource utilization, promoting investment, and enhancing economic growth even further (IMF, 2018; Van Leemput, 2017; Pathak & Kumar, 2019).

India's dual GST model, where the Centre and States have concurrent taxing power and the GST Council as the coordinating agency, seeks to reconcile the advantages of a unitary tax system with the maintenance of state fiscal independence (NIPFP, 2022). The compensation mechanism proposed originally was a direct measure to compensate states for possible loss of revenues due to this realignment of tax powers (NIPFP, 2022; Garg et al., 2023).

The onset of GST has encouraged significant empirical studies to look at its effects on the fiscal health of Indian states. The results, however, reflect a mixed and in many cases complex pattern across various dimensions of revenue performance.

2.1. Impact on revenue levels and growth (RQ1)

Comparison of post-GST revenue collection figures from studies reveal the strong growth of absolute values with monthly collections well over the INR 1 lakh crore mark regularly in recent times (Manjunatha & Nagaraja, 2022). A few analyses via paired t-tests have revealed statistically significant growth in the average of monthly indirect tax revenue collected after GST compared to before GST (ibid).

However, a more critical assessment focusing on the *rate* of revenue growth reveals concerns. Several studies, including those from the National Institute of Public Finance and Policy (NIPFP) and the Reserve Bank of India (RBI), suggest that the average growth rate of states' own tax revenues (OTR), particularly from taxes on commodities and services, has often been lower in the post-GST era compared to the pre-GST period (Rao & Chakraborty, 2020; NIPFP WP 376, 2022).

Contrary to the expectation that a unified tax might provide a more stable revenue stream, empirical evidence points towards increased revenue *volatility* for many state governments following GST implementation (Garg et al., 2023). Analysis using the coefficient of variation of GST revenue relative to Gross State Domestic Product (GSDP) indicated higher fluctuations compared to the pre-GST VAT regime for a majority of states studied (ibid). This increased uncertainty poses challenges for state budgeting and fiscal planning.

The shift to a destination-based tax system under GST appears to have improved revenue efficiency for smaller, primarily consumption-oriented states (e.g., North-Eastern states) as they now receive tax revenue on goods consumed within their borders, irrespective of where they were produced (Garg et al., 2023). Conversely, major producing or industrialized states (e.g., Maharashtra, Gujarat, Tamil Nadu) experienced a decline in revenue efficiency post-GST, as the tax on interstate sales shifted from origin to destination (Garg et al., 2023). This suggests that while GST might contribute to reducing horizontal fiscal imbalances by redirecting revenue towards consuming states, it has created revenue uncertainty for many.

A limited number of studies have employed econometric techniques to explicitly test for structural breaks in tax revenue time series coinciding with the GST implementation. One study analyzing the relationship between digital payments and GST revenue identified a structural break around July 2020 (Joseph & Ramalingam, 2023). However, attributing such breaks solely to GST is methodologically challenging. The period following GST implementation witnessed other significant events, most notably the COVID-19 pandemic and associated lockdowns, as well as various policy adjustments made by the GST Council itself (ibid). Separating the effect of GST from such

Countries Studies, Vol ?, No ?, ????

simultaneous shocks necessitates a sophisticated econometric test capable of controlling for such shocks. Establishing evidence for a break indicates a possible change in the process that produces data somewhere near the time of GST implementation, but attributing GST the pivotal role for such breaks necessitates cautious investigation and interpretation due to the polydimensional interdependence of reasons that influence trend revenue in such a time.

In addition to its immediate budgetary effect, GST was likely to create a positive spillover impact on the Indian economy as a whole. Its economic growth, investment, consumption, and other macroeconomic factors have been the subject of its studies, with various conclusions.

There is a considerable body of research, including estimates by global institutions like the IMF and World Bank, and academic papers employing different methodologies, which indicates a positive effect of GST on the medium to long-term economic growth of India (Subramanian, 2018; IMF, 2017; Garg et al., 2022; Van Leemput, 2017; Pathak & Kumar, 2019). Time series ARDL tests also identified GST revenue to significantly and positively correlate with economic growth both in short run as well as long run (Garg et al., 2022).

Theoretically, GST is expected to encourage investment (measured by Gross Capital Formation, GCF) by creating a more predictable and transparent tax environment, reducing the cost of capital goods through better availability of ITC, eliminating interstate barriers, and generally improving the ease of doing business (IMF, 2018; Subramanian, 2018; Van Leemput, 2017).

- **RQ1:** Did GST increase total tax revenue for states?
- **RQ2:** Did GST improve tax revenue consistency among states?
- **RQ3:** Was there a structural break in revenue trends due to GST?
- **RQ4:** Did GST impact economic indicators like Gross National Income (GNI), Gross Capital Formation (GCF), and Per Capita Gross Domestic Product (GDP)?

3. Methodology

This study uses a quantitative approach to examine the effect of the Goods and Services Tax (GST) on state-level tax collections and macroeconomic indicators in India. The study compares in specific the time frames 2012-2017 (pre-GST) and 2017-2024 (post-GST) to witness the stunning changes. The study is based on secondary information collected from credible and publicly available sources such as government finance records, Reserve Bank of India, GST Council, and government national statistics websites. Taxation revenues for 28 states and 4 union territories were collected and organized for the pre-GST and post-GST periods.

Table 3. Summary of key empirical studies on GST impacts in India

Study (Author, Year)	Focus area	Methodology	Data period	Key findings summary	RQ
Rao & Chakraborty (2020)	State revenue performance	Descriptive and comparative analysis	Post-GST period	Revenue neutrality varied across states; SGST collections experienced shortfalls.	RQ1
Mukherjee (2021)	State revenue and compensation dependence	Descriptive and comparative analysis	Post-GST period	Expiry of compensation mechanisms intensified fiscal pressure, particularly for manufacturing states.	RQ1
National Institute of Public Finance and Policy Working Paper 376 (2022)	State revenue growth, volatility, and compensation	Comparative analysis and projections	Pre- and post-GST up to 2022	Post-GST revenue growth remained below the pre-GST benchmark for several states. Significant compensation dependence and revenue volatility were observed.	RQ1, RQ2
Garg et al. (2023)	State revenue efficiency and volatility	Panel regression (Random effects model)	Pre- and post-GST	GST improved efficiency in consumptive states but reduced efficiency in productive states. Revenue volatility increased for most states.	RQ1, RQ2
Dash & Kakarlapudi (2022)	State debt sustainability, GST revenue, and compensation	Panel regression (fiscal response function) and indicator approach	2012–13 to 2019–20	Debt sustainability of many states was dependent on GST compensation. Only 6 out of 22 states remained sustainable without compensation support.	RQ1
Joseph & Ramalingam (2023)	GST revenue, digital payments, and structural break analysis	Time series analysis (ARDL and break tests)	August 2017 – December 2023	Digital payments showed a positive long-run relationship with GST revenue. A structural break was identified around July 2020.	RQ1, RQ3

Study (Author, Year)	Focus area	Methodology	Data period	Key findings summary	RQ
Garg et al. (2022)	GST revenue, economic growth (GDP), FDI, and government expenditure	Time series analysis (ARDL)	August 2017 – March 2024	GST revenue demonstrated positive short-run and long-run impacts on GDP. FDI and government expenditure also positively influenced economic growth.	RQ1, RQ4 (GDP)
Subramanian (2018)	GST impact overview	Qualitative/ Interview-based analysis	Early Post-GST Period	GST increased taxpayer registration by approximately 50% and was expected to enhance trade and economic growth despite implementation complexities.	RQ1, RQ4 (GDP)
Van Leemput (2017)	GST impact on growth and welfare	Dynamic CGE model	Projected analysis	GST was found to be welfare-enhancing, with estimated GDP gains ranging from 3.1% to 4.2%, depending on the tax structure.	RQ4 (GDP)
Pathak & Kumar (2019)	GST impact on efficiency, growth, and distribution	Dynamic CGE model	Projected analysis	GST improved specialization, transparency, and economic growth while supporting human capital and financial sector expansion.	RQ4 (GDP, GCF)
Chitra (2020)	Consumer spending behaviour	Survey analysis	Post-GST period	Consumer spending patterns varied significantly across essential and non-essential product categories.	RQ4 (Consumption)
Garg et al. (2022)	Consumer spending behaviour (Bangalore South)	Survey analysis (Chi-Square Test)	Post-GST period	GST significantly altered consumer spending behaviour, with variation across income and awareness groups.	RQ4
Schayowitz (2017)	Consumer behaviour in tax reform context	Literature review	Pre- and post-tax reform context	Global evidence showed mixed consumer responses to tax reforms, suggesting possible behavioural changes under GST.	RQ4 (Consumption)

Study (Author, Year)	Focus area	Methodology	Data period	Key findings summary	RQ
National Institute of Public Finance and Policy Working Paper 403 (2023)	GST incidence and distributional effects	NSSO consumption data analysis	Post-GST period	Approximately 58% of the consumption basket remained exempt or taxed at lower slabs, while distributional effects varied across expenditure groups.	RQ4 (Consumption)
Ghosh (2019)	VAT impact on consumption (Pre-GST context)	Panel regression using NSSO Data	VAT Era (Pre-GST)	VAT reduced consumption quantity for selected goods while expenditure remained stable or increased across some income groups.	RQ4 (Consumption)
Mukherjee (2023)	GST impact on consumer surplus	Conceptual and regression-based analysis	Post-GST period	GST was argued to increase prices for several goods and services, thereby reducing consumer surplus.	RQ4 (Consumption)
Manjunatha & Nagaraja (2022)	GST revenue performance	Paired t-test and Wilcoxon test	April 2015 – March 2021	Mean revenue collections increased significantly during the post-GST period.	RQ1
Garg et al. (2023)	GST impact on state revenue productivity	Panel regression (Random effects and dummy variable model)	Pre- and post-GST	GST improved overall state revenue productivity; however, economically stronger states benefited relatively more, potentially widening regional disparities.	RQ1

Besides, macroeconomic variables such as GNI, GCF, and PFCE have also been utilized to measure the aggregate economic effect of GST. Data has been collected systematically and analyzed with the help of SPSS statistical software.

For measuring the research questions, several statistical tests have been employed. A paired sample t-test was initially applied for comparing the aggregate tax collection pre-GST and post GST in states. The test is useful in evaluating whether the increase in tax collection due to GST was statistically significant or not. Second, an Analysis of Variance (ANOVA) was used to test if GST increased the stability of the states in collecting revenue by taxation by approximating differences in revenue before and after GST. Third, a Chow Test, i.e., a structural break test in the regression line, was performed to examine if GST created a structural break in the patterns of revenue of the states. Lastly, series of regression runs were conducted in order to determine the correlation between GST revenue and macroeconomic performance like GNI, with the intervening variables investment (GCF) and consumption (PFCE).

Variables utilized in this analysis are GST revenue, state total revenue, GNI, GCF, and consumption. The GST revenue serves as the specific independent variable since the introduction of GST, whereas state revenue behavior and macro indicators are the variables to be dependant. Control variables economic period and year were employed to manage temporal effects. Statistical significance of regression models was tested, and the confidence intervals were estimated for validity and reliability purposes. The significance level was established at 5% ($P < 0.05$) for every test.

The sample in the research consists of 64 observations (28 states and 4 union territories for 2 periods), to ensure that it has cross-sectional and longitudinal comparisons. Through the analysis of a large and heterogeneous dataset, the study tries to generalize its findings to the entire Indian economy. The approach ensures that the results are not merely statistically important but also practically relevant in determining GST's role in economic policy.

Type of Study: Exploratory Empirical Study

For comparative analysis, annual observations were aggregated into mean pre-GST and post-GST values for each State/UT and cross-sectional comparison has been conducted.

3.1. Data analysis

RQ1: Did GST increase total tax revenue for states?

To analyze whether the introduction of the Goods and Services Tax (GST) resulted in a rise in state-level aggregate tax revenues for India, a paired samples t-test was done with comparison of mean state-wise revenues during the pre-GST era (2012–2017) and the post-GST era (2017–2024) as highlighted in Table 4.

Table 4. Paired samples statistics

	Mean	N	Std. deviation	Std. error mean
Pair 12012-2017	22891.03	32	59910.860	10590.844
2017-24	63767.50	32	180202.626	31855.625

The results show a substantial increase in the mean tax revenue, rising from ₹22,891.03 crores in the pre-GST period to ₹63,767.50 crores after the implementation of GST. This indicates a notable upward trend in tax collection following the policy change. The correlation between the two periods was extremely high (r= 0.997, *P*< 0.001), suggesting that states with higher revenues before GST tended to maintain that pattern post-GST. The paired samples t-test revealed that the difference in means (M= -₹40,876.47 crores) was statistically significant, with a t-value of -1.918 and a p-value of 0.034, which is below the conventional threshold of 0.05. This indicates that the observed increase in tax revenue is unlikely due to chance. However, the large standard deviation of the differences (₹120,527.74 crores) indicates considerable variation among states, implying that while GST had a generally positive impact on revenue, the extent of benefit varied significantly across states. In conclusion, the data supports the assertion that GST implementation has, on average, led to a statistically significant increase in total tax revenues for states, albeit with uneven effects across the country.

Table 5. Paired samples correlations

	N	Correlation	Sig.
Pair 1 2012-2017 & 2017-24	32	0.997	0.000

Table 6. Paired samples test

	Paired Differences				t	df	Sig. (2-tailed)
	Mean	Std. deviation	95% Confidence interval of the difference				
			Lower	Upper			
2012- Pair 2017 - 1 2017- 24	- 40876.469	120527.738 21306.495	- 84331.352	2578.415	- 1.918	31	0.034

RQ2: Did GST improve tax revenue consistency among states?

To assess whether the implementation of GST led to greater consistency in tax revenue across Indian states, a comparison of variability in tax revenues before and after GST was conducted using descriptive statistics, Levene's Test for equality of variances, and a one-way ANOVA (Table 7). Before GST (2012–2017), the standard deviation in tax revenues was ₹59,910.86 crores, while after GST (2017–2024), it increased substantially to ₹180,202.63 crores. This rise in standard deviation suggests increased dispersion in state-level tax revenues post-GST, indicating less consistency, not more. Levene's Test, used to assess whether the variances in the two groups are significantly different, yielded a statistic of 2.641 with a p-value of 0.109. Since this p-value is greater than the conventional 0.05 threshold, we fail to reject the null hypothesis of equal variances, suggesting that the difference in variability is not statistically significant. Similarly, the one-way ANOVA comparing the mean revenues between the two periods showed no statistically significant difference either (F= 1.483, *P*= 0.228). Taken together, while the descriptive statistics indicate that the post-GST period is marked by higher variance in tax revenues among states, the lack of statistical significance in both the Levene's Test and ANOVA means we cannot conclusively state that GST either improved or worsened revenue consistency across states from a statistical standpoint. Therefore, the evidence does not support the claim that GST led to more uniform tax revenues across Indian states.

Table 7. Descriptives

N	Mean	Std. deviation	Std. Error	95% confidence interval for mean		Minimum	Maximum
				Lower bound	Upper bound		
PRE GST POST GST Total	32 22891.03	32 63767.50 180202.626 31855.625 64 43329.27 134793.516 16849.190	59910.860 10590.844	1290.86 - 1202.48 9658.85	44491.20 128737.48 76999.68	159 295 159	343202 1024692 1024692

Table 8. Test of homogeneity of variances

Levene statistic	df1	df2	Sig.
2.641	1	62	0.109

Table 9. ANOVA

	Sum of squares	df	Mean square	F	Sig.
Between Groups	26734171159.5 16	1	26734171159.5 16	1.483	0.228
Within Groups	1117931229248 .969	62	18031148858.8 54		
Total	1144665400408 .484	63			

RQ3: Was there a structural break in revenue trends due to GST?

To evaluate whether the implementation of GST introduced a structural break in tax revenue trends among Indian states, a regression analysis incorporating a dummy variable for the GST period was conducted. The variable V3 represents the GST_Period (coded as 0 for pre-GST years and 1 for post-GST years), and the dependent variable is tax revenue. The regression model shows a low R-square value of 0.023, indicating that only 2.3% of the variation in revenue is explained by the model. Despite the low explanatory power, the model is statistically significant (F= 7.971, *P*= 0.005), suggesting that the GST_Period variable has a meaningful impact. Most importantly, the coefficient for GST_Period is significant (B= 6995.24, *P*= 0.005), indicating a statistically significant difference in revenue levels before and after the implementation of GST. This confirms the presence of a structural break in the revenue trend associated with the GST transition. Although the change is relatively modest in magnitude and the overall model fit is weak, the statistically significant coefficient provides clear evidence that GST had a disruptive effect on the pattern of tax revenue collection, marking a distinct shift between the pre- and post-GST eras.

Table 10. Model summary model

R	R square	Adjusted R square	Std. error of the estimate
0.153[a]	0.023	0.020	156780.176

a. Predictors: (Constant), V3

Table 11. ANOVA[a] model 1; Regression residual total

Sum of squares	df	Mean square	F	Sig.
195929400428. 330	1	195929400428. 330	7.971	0.005[b]
820972786805 9.076	334	24580023557.0 63		
840565726848 7.406	335			

a. Dependent Variable: V2

b. Predictors: (Constant), V3

Table 12. Coefficients[a] Model 1.Constant V3

Unstandardized coefficients		Standardized coefficients	t	Sig.
B	**Std. error**	**Beta**		
2744.806	18235.185		0.151	0.880
6995.242	2477.674	0.153	2.823	0.005

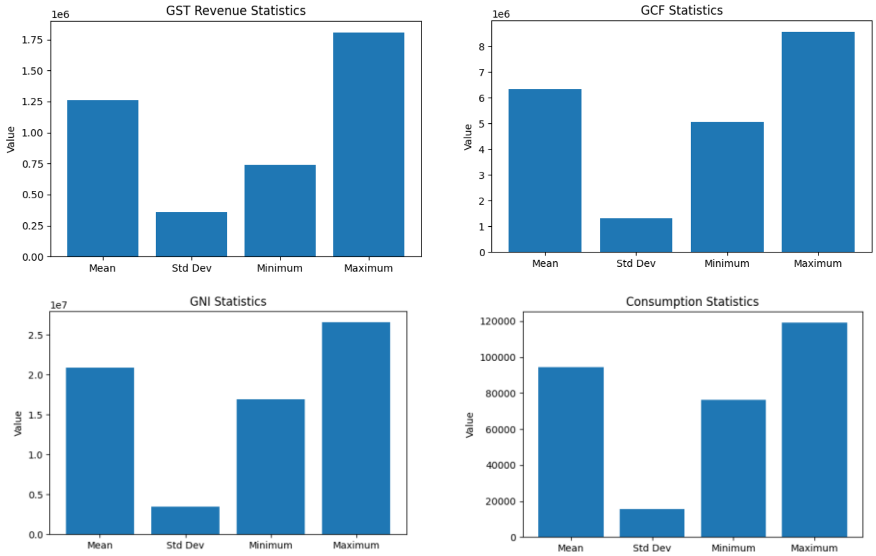
a. Dependent Variable: V2

RQ4: Did GST impact economic indicators like GNI, GCF, and Per Capita GDP?

To assess the broader macroeconomic effects of GST implementation, a series of regression analyses were conducted to explore its impact on key economic indicators—Gross Capital Formation (GCF), Gross National Income (GNI), and Per Capita GDP (proxied through consumption) as represented though Tables 10-14**.** The first regression model revealed a statistically significant and positive relationship between GST Revenue and GCF (B= 3.48, *P*= 0.0028), suggesting that increases in GST revenue are associated with increases in capital formation. This implies that GST may have indirectly supported investment activity by strengthening the government's fiscal capacity. The second regression, analyzing the impact of GCF on GNI, also showed a strong and significant effect (B= 2.63, *P*= 0.0006), highlighting GCF as a key intermediary variable influencing national income. Additionally, the direct effect of GST Revenue on GNI was significant and positive (B= 9.50, *P*= 0.0013), reinforcing the view that GST contributed to economic growth by boosting national multiple regression income levels.

However, the multiple regression model incorporating GST Revenue, GCF, and Consumption to predict GNI paints a more nuanced picture. In this comprehensive model, GST Revenue was no longer a statistically significant predictor of GNI (B= -0.61, *P*= 0.377), while consumption emerged as the dominant variable (B= 202.78, *P*= 0.0058), suggesting that household demand plays a more direct and robust role in driving national income. GCF showed a positive but marginally significant effect (B= 0.46, *P*= 0.085), indicating its role remains relevant but less dominant when other variables are considered simultaneously.

In summary, the findings indicate that GST has a significant positive impact on investment (GCF) and national income (GNI)**,** both directly and indirectly. However, when multiple economic drivers are analyzed together, household consumption appears to have a stronger influence on income levels than GST revenue alone. Thus, while GST has contributed to macroeconomic performance, its influence is mediated through other channels and is not the sole driver of economic growth.



Source: Compiled by the authors using data from GST Council Database and Ministry of Statistics and Programme Implementation (MoSPI), Government of India.

Figure 4. Macroeconomic variables; Descriptive statistical charts

Table 13. Descriptive statistics

Variable	Mean	Std. deviation	Minimum	Maximum
Year	2019.5	1.87	2017	2022
GST revenue	1261308	358612.5	740607	1807680
GCF	6336082	1306854	5053181	8564099
GNI	20833230	3509829	16905230	26579339
Consumption	94333.33	15431.54	76379	119277

Table 14. Regression: Effect of GST revenue on GCF

Predictor	B	Std. error	T	Sig.	Lower CI	Upper CI
Constant	1940495	694238.12	2.8	0.049	12980.57	3868008.6
GST revenue	3.48	0.53	6.54	0.0028	2.01	4.96

Table 15. Regression: Effect of GCF on GNI

Predictor	B	Std. error	t	Sig.	Lower CI	Upper CI
Constant	4165311	1744347	2.39	0.075	-677772.01	9008394.6
GCF	2.63	0.27	9.72	0.0006	1.88	3.38

Table 16. Regression: Direct effect of GST revenue on GNI

Predictor	B	Std. error	t	Sig.	Lower CI	Upper CI
Constant	8853314	1538817	5.75	0.0045	4580874.3	13125754
GST revenue	9.5	1.18	8.04	0.0013	6.22	12.78

Table 17. Multiple regression: GST, GCF, Consumption → GNI

Predictor	B	Std. error	t	Sig.	Lower CI	Upper CI
Constant	-470663.24	546470.51	-0.86	0.4798	- 2821936.1	1880609.6
GST revenue	-0.61	0.54	-1.13	0.377	-2.94	1.72
GCF	0.46	0.14	3.21	0.085	-0.16	1.09
Consumption	202.78	15.48	13.1	0.0058	136.17	269.4

4. Limitations

Since the analysis is based on aggregated pre- and post-GST state-wise observations, the findings should be interpreted as comparative empirical associations rather than definitive causal estimates.

5. Conclusion

The Goods and Services Tax (GST) was launched as a path-breaking tax reform intended to consolidate India's indirect tax system, ease compliance, and improve revenue efficiency. This paper conducted an examination of its real impact on the fiscal and macroeconomic environment of Indian states to discern underlying structural and economic consequences.

The evidence suggests that GST has, indeed, led to an increase in overall tax receipts accruing to the states. The sharp hike in post-GST mean revenue suggests that, overall, the reform was able to broaden the tax base and put the economy on to the board. But the gains were not evenly distributed. Large gaps persist with some of the states registering disproportionate gains while others registered marginal increments. On the aspect of stability and consistency of tax revenues between states, the findings are not as comforting. Though overall revenues increased, cross state volatility also increased following GST. The increased standard deviation further indicate that GST did not stimulate higher stability. Notably, the analysis also found that there was a structural break in the revenue trend during the phase of the GST launch.

That is, the reform was not simply an extension of previous fiscal trends but a turning point that reversed the general trajectory of state revenues. The break is a fresh start in India's fiscal policy, it identifies change in tax institutions as well as structure. Except for revenue, GST has exhibited significant positive correlation with major macroeconomic indicators. GST is related to greater capital formation and greater national income, or the reform contributed to the investment-driven growth and created greater fiscal room. When they are controlled with other variables, household consumption actually made the most contribution to national income. This result accentuates the point that although GST has contributed to growth, it is not the sole or the primary cause for the same; stronger demand-side impulses still remain very relevant.

GST has transformed the fiscal scene in India—raising revenues, inducing investment, and inducing a structural change in tax collection. However, the reform is short of its full potential of stability and consistency among states. Its fiscal impact, as real as it is, is tied to other strong drivers such as consumption. Policymakers now need to concentrate on further streamlining the GST model to correct imbalances, increase certainty, and bring it closer to India's idea of inclusive growth

Conflict of interest

The authors declared no conflicts of interest.

Authors' contributions

All authors contributed to the original idea, study design.

Ethical considerations

The authors have completely considered ethical issues, including informed consent, plagiarism, data fabrication, misconduct, and/or falsification, double publication and/or redundancy, submission, etc. This article was not authored by artificial intelligence.

Data availability

The dataset generated and analyzed during the current study is available from the corresponding author on reasonable request.

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