DIRECT TAXATION IN INDIA: AN EMPIRICAL ANALYSIS

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ABSTRACT

In the context of India's evolving fiscal landscape, this study offers a comprehensive examination of direct tax collection as a critical lever for economic stability and growth. This study explores the trends, patterns, and efficiency of direct tax collection, while also identifying the key macroeconomic and structural determinants that influence it. Based on these insights, the study forecasts future tax collections, offering evidence-based projections to inform fiscal policy and planning. Direct taxes, principally income tax and corporate tax, form the cornerstone of public finance, enabling the state to fund essential services, reduce inequality, and respond to macroeconomic challenges. This study adopts a multi-layered analytical approach to assess how responsive, efficient, and robust India's direct tax system is, both structurally and institutionally.

The research begins by tracing the historical evolution of taxation in India, from early references in *Arthashastra* and *Manusmriti*, through colonial-era legislation such as the Income Tax Act of 1922, to post-independence tax reforms. The liberalisation era, particularly the tax reforms of the 1990s and early 2000s, marks a shift toward rationalisation, broadening the tax base, and enhancing compliance.

The key strength of this study lies in its multi-layered framework to test tax collection in India. The determinants of direct collection in India are determined by conducting a systematic literature review, which synthesises global and national studies on the determinants of direct tax collection. Data from the Scopus database is extracted to analyse the best studies to figure out the variables of tax collection in India. Drawing from this review, the study identifies a set of macroeconomic and structural variables hypothesised to influence direct tax collection. These include Gross Domestic Product (GDP), Inflation, Cost of Tax Collection, Unemployment rate, Population, and Corruption.

To test the predictive and causal relationship between these variables and direct tax collection, the study employs Granger causality analysis. This statistical method enables the identification of time-lagged causal relationships, offering insights into which factors have the strongest and most consistent impact on tax revenues. Following this, the variables that demonstrate statistically significant causality with direct tax collection are further analysed for efficiency using the Data Envelopment Analysis

(DEA). This non-parametric method measures the relative efficiency of decision-making units (in this case, the years or periods of tax collection) in converting economic inputs into tax revenue. The DEA analysis uncovers patterns of inefficiency, benchmarks best-performing periods, and helps identify structural constraints limiting tax productivity.

Based on the above, the study was able to predict tax collection for the next five financial years using the well-established grey forecasting GM(1,1) model. The study forecasts direct and indirect tax collections to clock Rs. 30.67 Lakh Crores and Rs. 25.70 Lakh Crores, respectively, by the year 2029-30.

Building upon this analytical base, the study then delves into the concepts of tax buoyancy and tax elasticity. While buoyancy reflects the overall responsiveness of tax revenues to changes in GDP, including the effect of policy changes, elasticity isolates the autonomous responsiveness of taxes, excluding discretionary interventions. The findings show a clear upward trend in tax buoyancy, especially after liberalisation, thanks to growing digital systems, broader taxpayer coverage, and stronger compliance efforts. However, when it comes to tax elasticity, the picture is more tempered. The growth in tax revenue seems to be driven more by government policy changes than by the economy naturally expanding. Interestingly, corporate tax and personal income tax do not behave the same way; corporate tax tends to respond more to policy tweaks, while income tax shows a steadier, more predictable pattern. The study also employs an event study methodology to specifically analyse the impact of the 2008 global financial crisis and the 2016 demonetization on tax buoyancy and its relationship with economic growth, alongside ARDL and Johansen Cointegration techniques to examine long-term and short-term dynamics.

In conclusion, this study offers a holistic and data-driven evaluation of India's direct tax system, integrating historical context, econometric modelling, efficiency analysis, and event-based assessments. By identifying key determinants, measuring systemic efficiency, and forecasting future collections, it provides a robust framework for understanding and enhancing the collection of direct taxes. The detailed insights into tax buoyancy, elasticity, and the impact of major economic events underscore the complex interplay between policy, economic cycles, and revenue outcomes. These

findings hold significant implications for policymakers aiming to design a more equitable, efficient, and growth-aligned tax system in India's rapidly transforming fiscal landscape.

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LIST OF ABBREVIATIONS

S. NO.	DESCRIPTION	ABBREVIATION
1	Anno Domini	A.D.
2	Abstract Business Information	ABI
3	Augmented Dickey-Fuller	ADF
4	Augmented Dickey-Fuller	ADF
5	Accumulating Generation Operation	AGO
6	Artificial Intelligence	AI
7	Akaike Information Criterion	AIC
8	Association of Persons	AOP
9	Autoregressive Distributed Lag	ARDL
10	Autoregressive Integrated Moving Average	ARIMA
11	Before Christ	B.C.
12	Base Erosion and Profit Shifting	BEPS
13	Behavioural Elasticity of Tax Revenue	BETR
14	Body of Individuals	BOI
15	Brazil, Russia, India, China, and South Africa	BRICS
16	Central Board of Direct Taxes	CBDT
17	Central Value Added Tax	CENVAT
18	Constant Elasticity of Substitution	CES
19	Central Goods and Services Tax	CGST
20	Corporate Income Tax	CIT
21	Centralised Processing Centre	CPC
22	Dividend Distribution Tax	DDT
23	Data Envelopment Analysis	DEA
24	Degree of Freedom	DF
25	Decision-Making Units	DMU
26	Double Taxation Avoidance Agreements	DTAA
27	Direct Tax Code	DTC
28	Durbin-Watson Test	DW
29	Efficiency Change	Effch
30	Earned Income Tax Credit	EITC
31	Emerging Market Economies	EME
32	Elasticity of Taxable Income	ETI
33	Estimated Time Series	ETS

34	Electric Vehicles	EV
35	Finance Commission	FC
36	Foreign Direct Investment	FDI
37	Financial Year	FY
38	General Anti-Avoidance Rules	GAAR
39	Gross Domestic Product	GDP
40	Grey Model	GM
41	Gross State Domestic Product	GSDP
42	Goods and Services Tax	GST
43	Goods and Services Tax Network	GSTN
44	Hindu Undivided Family	HUF
45	Integrated Goods and Services Tax	IGST
46	International Monetary Fund	IMF
47	Information Technology	IT
48	Income Tax Returns	ITR
49	Long-Term Fiscal Policy	LTFP
50	Mean Absolute Percentage Error	MAPE
51	Minimum Alternate Tax	MAT
52	Modified Value Added Tax	MODVAT
53	Ministry of Statistics and Program Implementation	MoSPI
54	National Council of Applied Economic Research	NCAER
55	Nonlinear Grey Bernoulli model	NGBM
56	The Organisation for Economic Co-operation and Development	OECD
57	Personal Account Number	PAN
58	Pure Efficiency Change	Pech
59	Preferred Reporting Items for Systematic Review and Meta-Analysis	PRISMA
60	Relative Percentage Error	RPE
61	Residual Sum of Squares	RSS
62	Seasonal Auto-Regressive Integrated Moving Average	SARIMA
63	Sustainable Development Goals	SDG
64	Scale Efficiency Change	Sech
65	State Goods and Services Tax	SGST
66	Systematic Literature Review	SLR
67	Small and Medium Enterprise	SME
68	Supply Side Tax	SST
69	Shiga Toxin–Producing Escherichia Coli	STEC

70	Security Transaction Tax	STT
71	Tax Account Number	TAN
72	Trigonometric seasonality, Box-Cox transformation	TBATS
73	Tax Collected at Source	TCS
74	Tax Deduction at Source	TDS
75	Technical Efficiency	TE
76	Technical Efficiency Change	Techch
77	Total Factor Productivity Change	TFPC
78	Total Factor Productivity Change	TFPC
79	Tax Information Network	TIN
80	TDS Reconciliation, Accounting and Correction Enabling System	TRACES
81	Tax Reforms Committee	TRC
82	Tax Return Preparer Scheme	TRP
83	Vector Auto Regression	VAR
84	Value Added Tax	VAT
85	Virtual Digital Assets	VDA
86	Web of Science	WoS

CHAPTER I

INTRODUCTION

1.1 Background of Taxation

As quoted by Kalidas in Raghuvansh, “It was only for the good of his subjects that he collected taxes from them, just as the Sun draws moisture from the Earth to give it back a thousand-fold”. The purpose of imposing a tax on citizens is to make a shared pool of money that can be used for the common good of the entire community by a central authority. The effective and efficient utilisation of the tax collected is now directly related to the development of any nation (KPMG, 2017; Income Tax Department, 2021; Gangl & Tongler, 2020). The idea of taxation may be viewed as contemporary; nonetheless, it is as ancient as Kautilya and the Mauryan Empire. Kautilya's renowned work Arthashastra (300 B.C.) and the Indian legal text Manusmriti both address the taxation system and tax rates in ancient India (Kautilya trans. Shamasastry, 1915; Rangarajan, 1992; Income Tax Department, 2021). The tax rates were well delineated, with land revenue set at one-sixth (16.67 per cent) and duties on foreign commodities established at approximately 20 per cent of their whole worth throughout the Mauryan Empire (Kautilya trans. Shamasastry, 1915; Rangarajan, 1992; Income Tax Department, 2021). The Arthashastra was the inaugural text on taxation policy and public finance in India. Globally, Roman Emperor Caesar Augustus, during his reign from 27 BC to 14 A.D., issued an order to impose a tax on the entire world. The kingdoms of Greece and Germany commenced imposing turnover-based taxes early on, indicating that taxing systems had been enduring in the world for ages (Barnes, 2018; Income Tax Department, 2021; Britannica).

1.2 Historical Developments in the Tax Structure of India

The Income Tax Act of 1922 signifies the inception of the organisational history of direct taxation in India. Subsequently, reforms were enacted in 1939 to organise the income tax agency and enhance the system's efficacy across India (Acharya, 2005; Income Tax Act, 1961). The Income Tax Act of 1961 became effective on April 1, 1962, establishing the fundamental structure for income tax legislation in the nation. The period from 1970 onwards marks the foundation of tax changes in India. During this

period, the highest marginal rates escalated to exceedingly elevated levels of up to 97.75 per cent (Acharya, 2005; Income Tax Act, 1961). In 1973-74, the Wanchoo Committee was established to evaluate tax rates and ultimately recommended reducing the highest marginal tax rate to a maximum of 70 per cent. Comprehensive tax revisions commenced in the 1980s. Between 1985 and 1987, V.P. Singh implemented the Long-Term Fiscal Policy (LTFP), which encompassed significant reforms aimed at the merger of direct and indirect taxes (Acharya, 2005). The highest marginal rates were decreased to 50 per cent, and wealth tax rates were lowered from 5 per cent to 2 per cent. To streamline the tax structure, the number of slab rates was decreased from eight to four (Income Tax Department, 2024; Acharya, 2005). In 1986, the Modified Value Added Tax (MODVAT) was implemented to overhaul the Indirect Tax system, transferring the burden of excise duty from inputs to final goods through the introduction of chapters in the Central Excise Tariff (Acharya, 2005). In 1988, the Benami Transaction Prohibition Act was enacted to mitigate the rise of benami transactions in the country (Income Tax Department, 2024).

Dr. Manmohan Singh assumed the role of finance minister, and during 1991-92, a Tax Reforms Committee (TRC) led by Raja Chelliah was established to focus on expanding the tax base and simplifying the tax system (Chelliah, 1992; Acharya, 2005). A notable alteration during this period was the decrease in customs duty rates, which had reached as high as 200 per cent. The 1992-93 fiscal year streamlined personal taxation by reducing the tax slab rates to three categories: 20 per cent, 30 per cent, and 40 per cent, resembling the contemporary tax system. The wealth tax rates were decreased to 1 per cent, and financial assets were excluded from the scope of the wealth tax (Income Tax Department, 2024; Acharya, 2005). In the year 1994-95, a consolidated corporation tax rate of 40 per cent was implemented, aligning it with the personal income tax rate. In this phase, the Modified Value Added Tax (MODVAT) was expanded to include petroleum products and capital items, thereby reducing the number of excise rates for greater efficiency. The year 1997-98 was designated as a period of tax simplification and reduction, during which tax rates in the three-tier system were lowered to 10 per cent, 20 per cent, and 30 per cent. Simultaneously, the corporate tax was decreased to 35 per cent. The reforms of 1998-2000 may be referred to as Yashwant

Sinha's Reforms, as he consolidated excise rates into three primary categories: 8 percent, 16 percent, and 24 percent during his stint as finance minister (Sinha, 2002; Rao, 2005; Ramamurti, 2001; Income Tax Act, 1961).

The new millennium commenced with a goal of modernisation and technological integration, marked by the introduction of a singular Central Value Added Tax (CENVAT) rate of 16 per cent. The enhancement of technology for tax administration emerged as a main focus during this period, leading to the implementation of the Tax Information Network (TIN) and the Online Tax Accounting System (OLTAS) for improved tax management. As services increasingly contributed to GDP, the service tax was gradually extended to encompass over 70 services, enhancing government revenue (Rao, 2005; Ramamurti, 2001; Acharya, 2005). In 2003, the main website of the Income Tax Department received a silver medal at the National e-Governance Award in the category of government websites (Income Tax Department, 2024).

The emphasis from 2005 onwards transitioned to the integration of CENVAT with VAT due to diminished tax buoyancy (Income Tax Department, 2024). The concept for a unified Goods and Services Tax (GST) emerged to consolidate CENVAT, VAT, and Service Tax, culminating in its implementation in 2017. In 2006, a project was initiated to facilitate the e-filing of Income Tax Returns (ITRs). To assist taxpayers in electronically completing Income Tax Returns (ITRs), the Tax Return Preparer Scheme (TRP) was created in the same year. The Centralised Processing Centre (CPC) was established in 2009 to process e-filed and paper income tax returns (Income Tax Department, 2024).

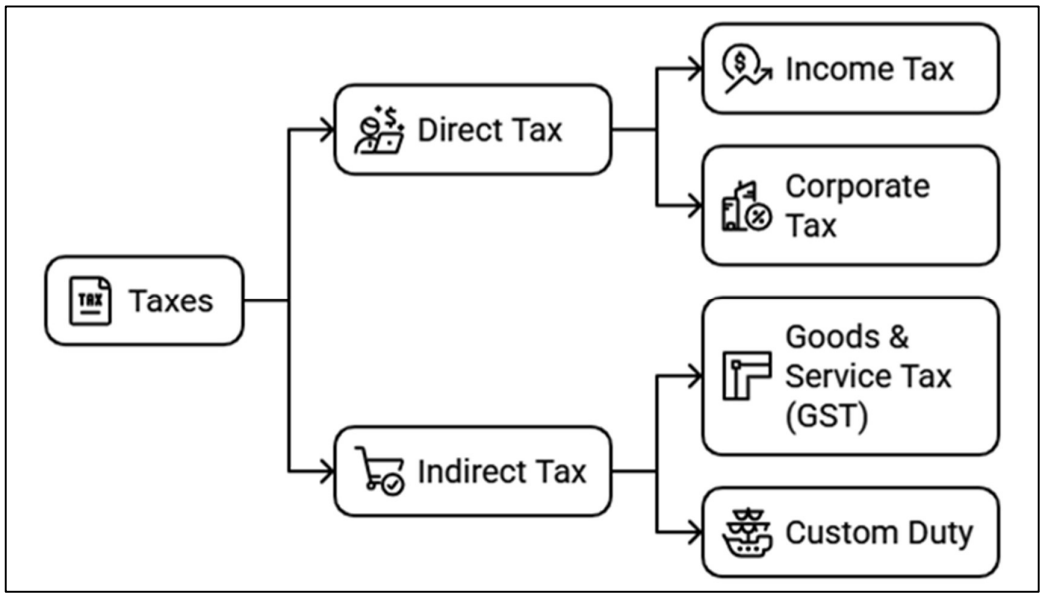
The subsequent decade witnessed several advancements in the nation's tax system, including the implementation of TRACES (TDS Reconciliation, Accounting and Correction Enabling System) in 2012, the establishment of a Special Investigation Team to probe black money in Swiss banks in 2014, and the repeal of wealth tax in 2015 (Income Tax Department, 2024). In 2017, the tax rate for the lowest income bracket of ₹2,50,000 to ₹5,00,000 was decreased from 10 per cent to 5 per cent, offering relief to taxpayers within this category. Recently, the Income Tax Department has implemented faceless proceedings to combat corruption, building upon the e-

proceedings established in 2018. A new e-filing platform was introduced in 2021 to facilitate tax filing and compliance for both taxpayers and the government. In response to the rise in transactions involving Virtual Digital Assets (VDAs), sometimes referred to as cryptocurrencies, a tax on VDAs was implemented in 2022 (Income Tax Department, 2024).

1.3 Types of Taxes in India

Broadly, taxes are bifurcated into two categories in India, i.e., Direct Tax and Indirect Tax, as shown in Figure 1.1. Where Direct Tax constitutes of taxes levied directly in the income of a person e.g., Income Tax and Corporate Tax, on the other hand Indirect Tax constitutes the taxes that are levied on price of good or service where burden of tax ultimately passes to another person e.g., Goods & Service Tax (GST) and Custom Duty (Income Tax Department, 2024; Income Tax Act, 1961, GST Act, 2017).

Figure 1.1: Type of Taxes in India



Source: Author's creation based on literature review

Personal Income Tax refers to the tax collected on the income of individuals. The tax net for Personal Income Tax majorly includes salaried persons and businessmen Income Tax Act, 1961). Department of Income Tax notifies a collection of ₹ 8,33,307 crores from Personal Income Tax in the financial year 2022-23. Corporate Tax refers to the

collection of direct tax on the profits of corporations. Currently, the rate of tax on corporates is 25 per cent, and total tax collection as per the Income Tax Department's accounts for ₹ 8,25,834 crores in the financial year 2022-23. Income Tax Department also categorises this collection of direct tax as “Other Direct Tax”. This category covers direct tax collected other than Personal and Corporate Tax, which accounts for ₹ 4,545 crores in the financial year 2022-23 (Government of India, CBDT 2024).

1.4 Importance of Direct Tax

Tax revenue is one of the most prominent sources of income for the government of any country. India is no exception to the statement, and more than three-fourths of the total receipts of the Government of India come from tax revenue, according to the Annual Financial Statement of the Central Government for the fiscal year 2019-20 (Mahapatra & Kaushik, 2022; Income Tax Department, 2024). More than fifty per cent of overall tax revenue is derived from Taxes on Income (Direct Taxes), underscoring its significance in the nation's revenue collection (Government of India, CBDT 2024).

The taxation system in India has significantly transformed since its foundation, with a yearly increase in the number of taxpayers and gross revenue per return (Rao, 2021; Kaushik et al., 2024). Even though the tax collection is increasing every year, there is a need to analyse the factors that affect the direct tax collection in India. It may help the government of the country in policy formulation to make tax collection even more effective and efficient. Trend analysis of direct tax collection will help in getting insights into the latest trends and patterns. It will also be helpful in identifying how significant events like the recession of 2008 and COVID-19 affected direct tax collection in the country (Mukundhan et al., 2019; Kaushik et al., 2024). Trend analysis of direct tax collection in India may also be helpful in unleashing the loopholes in the current tax policy, resulting in investments by Indian corporates in tax havens for tax avoidance. The analysis will be beneficial for the government in taking preventive steps to plug the loopholes in the tax policy, thereby making it more effective (Mukundhan et al., 2019). The economic system of a country is directly associated with its tax receipts (Rao, 2021). It is essential to assess the influence of tax collection on economic growth and the extent of that influence. Factors such as GDP, per capita income, and trade openness are significant predictors of a country's revenue collection (Gupta,

2007). The effects of tax collection can be evaluated on several economic indices of the country.

1.5 Process of Tax Collection in India

In India, Tax is mainly collected by the following:

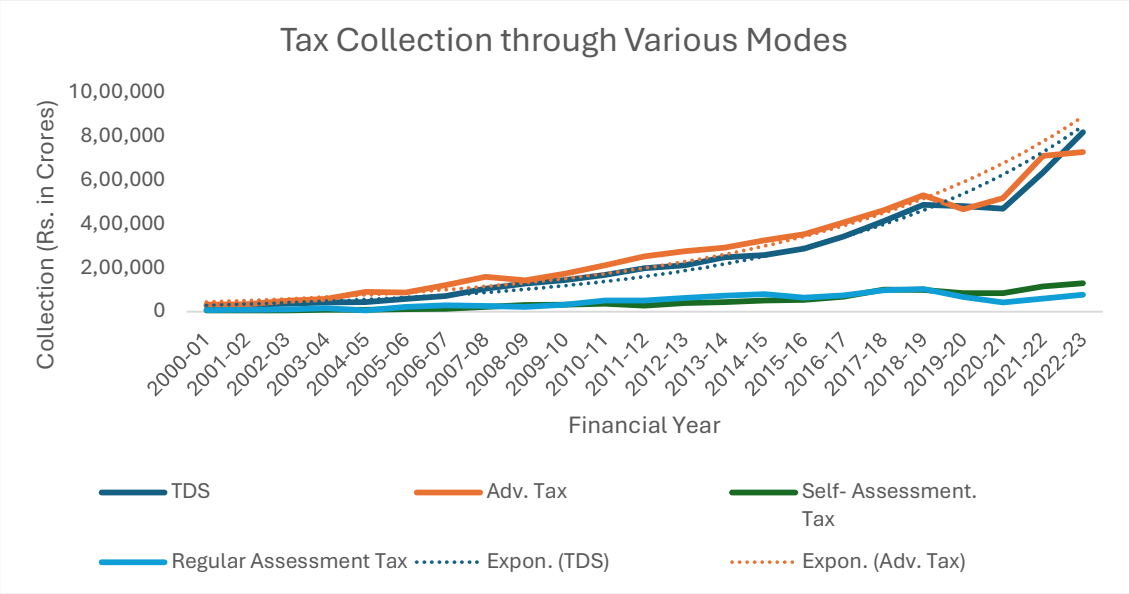
a) Tax Deduction at Source (TDS)
b) Advance Tax
c) Self-Assessment Tax
d) Regular Assessment Tax

The Income Tax Department of India implemented the TDS (Tax Deducted at Source) tax collection method, which deducts taxes at the time of a transaction as opposed to at the end of the fiscal year. In this method, the "deductor," or person or entity making the payment, takes a specific proportion of the tax out before sending the money to the "deductee," or recipient. Salary, interest, rent, professional fees, and other forms of income are all subject to TDS (Income Tax Act, 1961). For example, if someone receives interest from a bank, the bank may take TDS on the interest gained, or if someone receives a salary, the company will deduct TDS before paying the employee. Because the tax is withheld at the source, this technique helps the government maintain a consistent income flow by guaranteeing prompt tax collection throughout the year and lowering the likelihood of tax evasion. Depending on the type of income, various provisions of the Income Tax Act of 1961 specify the TDS rates (Income Tax Act, 1961).

Total Gross Direct Tax Receipts in India across financial years from 2000-01 to 2022-23, broken down by components such as TDS (Tax Deducted at Source), Advance Tax, Self-Assessment Tax, Regular Assessment Tax, and Other Receipts as shown in Figure 1.2 and Figure 1.3. Over these 23 years, the total tax revenue has exhibited a significant upward trend, growing from ₹80,209 crore in 2000–01 to ₹19,72,248 crore in 2022–23, as nearly a 25-fold increase, as shown in Figure 1.2 and Figure 1.3. This growth reflects expanding economic activity, broadening of the tax base, and improvements in tax compliance and administration. Notably, TDS and Advance Tax have remained the most significant contributors, with TDS increasing more than 29

times and Advance Tax about 21 times over the period. While Self-Assessment Tax and Regular Assessment Tax grew steadily, their proportion remained smaller compared to TDS and Advance Tax. Other Receipts became increasingly significant in later years, peaking at over ₹2.17 lakh crore in 2022–23, indicating the impact of enforcement measures and recovery actions.

Figure 1.2 Modes of Tax Collection in India



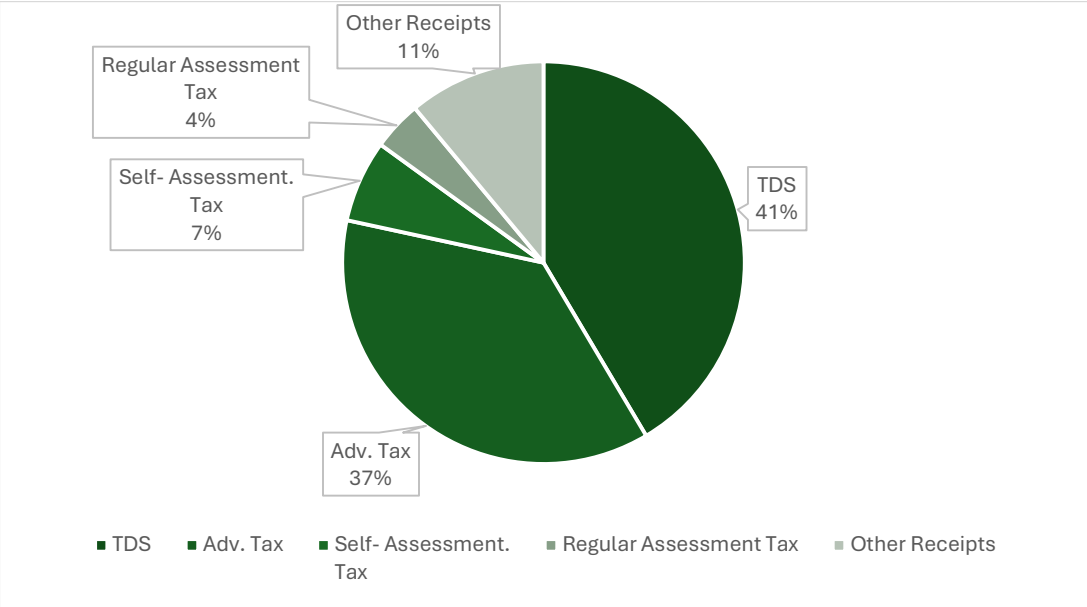
Source: Author compilation based on data collected from the Central Board of Direct Taxes (CBDT)

Figure 1.2 shows the growth of direct tax collection in India through various modes like TDS, advance tax, self-assessment tax, and regular assessment tax. Advance tax is the tax remitted in instalments throughout the year, determined by an individual's or a business's anticipated annual revenue. In a fiscal year, it is relevant if the tax obligation exceeds ₹10,000. Advance tax allows taxpayers to meet their tax obligations punctually, rather than deferring until year-end, as shown in Figure 1.2 (Income Tax Act, 1961). Typically disbursed in four instalments, the payments are scheduled for March, June, September, and December. Self-assessment tax refers to the tax an individual or company pays after calculating their total tax liability at the conclusion of the fiscal year (Income Tax Act, 1961). It encompasses any outstanding taxes that were not addressed by advance tax or TDS. Self-assessment tax must be sent by the deadline

for submitting an income tax return. Self-assessment taxes and advance taxes facilitate the incremental payment of taxes over the year and the resolution of any outstanding taxes upon filing the return (Income Tax Act, 1961).

Figure 1.3 explains the tax collection from different modes in the financial year 2022-23, where 41 per cent of the tax comes from TDS, making it the most prominent source of tax collection, followed by advance tax, accounting for 37 per cent of the collected tax.

Figure 1.3 Tax Collection from Different Modes in Financial Year 2022-23



Source: Author compilation based on data collected from the Central Board of Direct Tax (CBDT)

1.6 Growth of Income Tax Filings

According to the data released by CBDT, the number of income tax returns filed has increased significantly over time, indicating a rise in public understanding and involvement in India's tax system. The largest contributor is still the individual category, which increased its share from 3.5 crore returns in 2013–14 to over 7.33 crore returns in 2022–23 (Government of India, CBDT 2024). This expansion reflects both an increase in the number of taxpayers and improved compliance as a result of stricter laws, such as required PAN-Aadhaar linking, streamlined tax filing procedures, and

government programs to increase tax literacy. The introduction of significant changes like demonetisation and the adoption of the Goods and Services Tax (GST), which indirectly encouraged more people and entities to enter the formal sector, may also be responsible for the notable increase in returns filed during 2016–17 and 2017–18 (Government of India, CBDT 2024).

The firms and companies show a steady increase in the number of returns submitted among non-individual groups. While companies' returns expanded from 7.15 lakh to 10.88 lakh during the same period, firms' returns climbed from 9.6 lakh in 2013–14 to 15.73 lakh in 2022–23. These patterns demonstrate how corporate tax reforms, starting incentives, and more stringent tax law enforcement have led to the formalisation of enterprises and increased compliance. A modest but consistent rise is also seen in other groups, such as Hindu Undivided Families (HUFs), which increased from 9.55 lakh in 2013–14 to 12.74 lakh in 2022–23. This suggests that families who manage shared incomes or ancestral properties are gradually but steadily acknowledging their tax responsibilities.

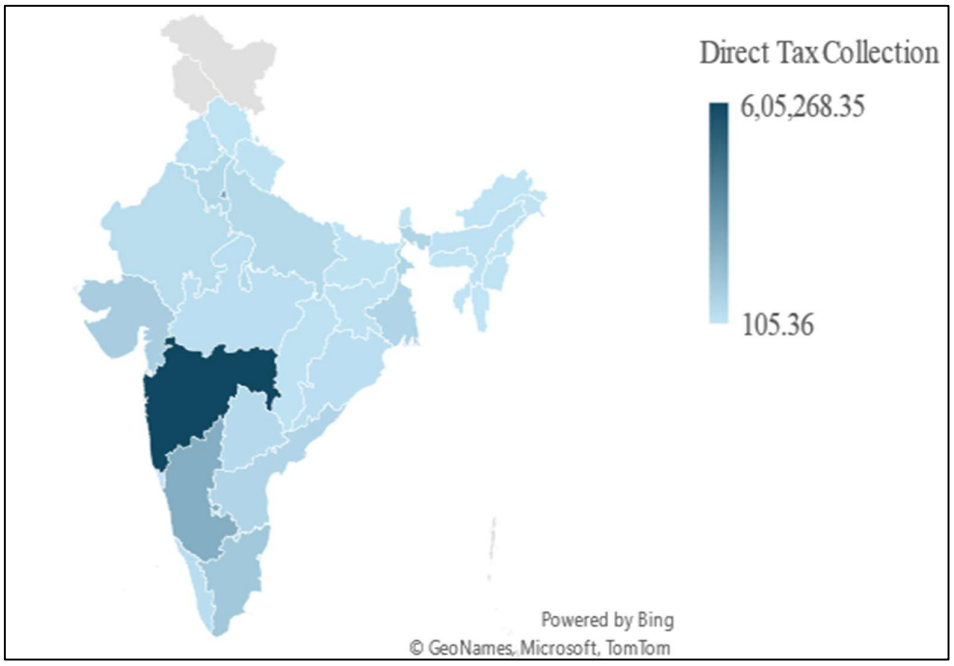
The categories of Association of Persons (AOP) (Trusts) and Other AOP/BOI (Body of Individuals) show modest annual variations, with notable increases in 2016–17 and 2017–18. The number of trust registrations increased from 1.83 lakh in 2013–14 to 2.86 lakh in 2022–23, indicating an increase in charitable organisations' and trusts' compliance. As a result of improvements in these organisations' reporting, the number of Other AOP/BOI submissions rose from 1.05 lakh to 2.66 lakh during the same period. With submissions staying below 5,000 each year, the category of Local Authorities exhibits little development, suggesting its narrow scope within the tax system. The success of India's tax reforms and the growing digitalisation of tax procedures is demonstrated by the nearly twofold increase in the total number of income-tax returns filed, from 3.79 crore in 2013–14 to 7.78 crore in 2022–23. The implementation of important government programs, such as online filing portals, taxpayer assistance systems, and faceless assessments, has dramatically increased compliance in all areas. Notwithstanding variations in specific areas, the general pattern indicates that India's tax system is strong and growing, with more people, companies, and other organisations

participating. In addition to increasing government revenue, this growth helps the economy become more financially transparent and accountable.

1.7 Major Factors Affecting Income Tax Collection

In the financial year 2022–23, Maharashtra emerged as the highest contributor to India's direct tax revenue, collecting an impressive ₹6,05,268.35 crore, followed by Delhi with ₹2,21,522.20 crore and Karnataka with ₹2,08,168.88 crore as shown in Figure 1.4. These states are home to significant economic, financial, and technological hubs, which drive significant tax revenues due to high corporate activity and individual incomes. In contrast, the states at the lower end of the spectrum were Mizoram, Nagaland, and Arunachal Pradesh, which contributed ₹105.36 crore, ₹295.44 crore and ₹293.90 crore respectively, as shown in Figure 1.4. These regions, characterised by smaller populations and less industrial development, naturally generate lower levels of taxable income and corporate presence, leading to their minimal contribution to the national tax pool.

Figure 1.4: State-wise Direct Tax Collection in FY 2022-23



Source: Author compilation based on data collected from the Central Board of Direct Tax (CBDT), Bing

1.8 Tax in Global Perspective

A complex framework of laws, rules, and tax rates that differ significantly between nations defines the global taxation system. These structures are intended to redistribute income, provide government revenue, and encourage particular economic practices. Globally, tax systems can be broadly divided into three categories: proportional, regressive, and progressive. Each of these types of systems has unique effects on economic growth and equity (OECD, 2020). Because of informal economies and low compliance rates, emerging economies may find it challenging to expand their tax bases. In contrast, industrialised economies frequently rely on a progressive tax framework to ensure that higher-income individuals contribute more. A dynamic environment for global trade and investment is created by the tax policies of various countries, which also reflect their priorities, such as market expansion, social welfare, or fiscal sustainability (Slemrod, 2019).

India's tax system has changed dramatically in relation to the global taxation framework, which is driven by both internal demands and global trends. With the goal of streamlining and improving the efficiency of the collection process, India implemented a dual taxation system that combines direct taxes, like income tax, and indirect taxes, like GST. However, compared to other industrialised countries, India's tax-to-GDP ratio is still very low, underscoring problems with tax compliance, ineffective administration, and the sizeable informal sector (World Bank, 2021). In contrast, nations like the US, Germany, and Japan have established strong tax-collecting systems that generate more income efficiently because of their more sophisticated technology tools and wider tax networks. Although there is still more to be done in terms of compliance and enforcement, India's recent tax reforms, most notably the adoption of the Goods and Services Tax (GST), have made headway in bringing the country's tax system into line with international norms, notwithstanding obstacles (Chakravarty & Ghosh, 2022).

1.9 Research Objectives

1. To study the trends and patterns of direct tax collection in India.
2. To identify the determinants of direct tax collection in India
3. To examine the relationship between direct tax collection and economic growth

4. To analyse the impact of buoyancy and elasticity on direct tax collection in India
5. To suggest policy measures for improving the efficiency of the direct tax system

1.10 Rationale of the Study

Tax revenues are the backbone of government revenue in any country. In fact, the public finances of various developing nations strongly depend on their tax revenue (Baunsgaard et al., 2010). In India, direct tax revenues comprise more than half of total tax revenue. These figures are evident enough to prove the importance of direct tax collection in a country's economy. Therefore, it becomes imperative to study the latest trends and patterns of the direct tax collection and the factors that determine the tax collection in India. This study will help policymakers and stakeholders understand the significant variables that affect tax collection in India. Also, the study will help policymakers understand the efficiency of tax collection in India, which will ultimately help the government formulate policies related to tax structure, deduction, exemptions, etc.

1.11 Structure of Study

The present study comprises six chapters. Chapter I provides a brief introduction to the Taxation system, including the types of taxes and collection trends. This will help in understanding the current structure of direct tax and indirect tax in India, along with the modes of collection and the contribution of states in tax collection. Chapter II presents a comprehensive review of the literature on tax collection, determinants of tax collection, and the impact of tax collection on economic growth. The systematic literature review helped to identify the determinants of tax collection in India. Chapter III highlights the research methodology, research instruments, statistical tools for data analysis and limitations. Where a systematic literature review has helped to identify the major determinants of tax collection, the Granger causality test has evaluated the Granger cause on tax collection. Subsequently, the shortlisted variables are assessed to check the efficiency of tax collection. Chapter IV discusses the trends and patterns of tax in India and its determinants. On the basis of historical collection, tax collection figures are forecasted for the next five years. Chapter V discusses the relationship

between tax and economic growth and tax buoyancy. Chapter VI summarises the key findings, presents policy recommendations, and suggests avenues for future research.

CHAPTER II
LITERATURE REVIEW

This chapter provides an overview of studies on tax systems, focusing on significant issues such as the impact of taxes on economic growth, trends in tax collection, and the effects of international taxation policy. It draws attention to the major disruptions in tax collection brought on by the COVID-19 epidemic, which resulted in lower revenue because of lockdowns and economic slowdown taxes (Kaushik et al., 2024; Kaushik et al., 2023). Furthermore, a great deal of research has been done on the connection between tax collection and economic growth. The results indicate that while excessive taxation may impede growth, higher tax revenues can promote economic development when they are used to fund infrastructure and public services. In India, approximately 50 per cent of government revenue is generated through tax collection, which includes both direct and indirect taxes (Kaushik et al., 2024; Kaushik et al., 2023; Priya & Sornaganesh, 2023; Government of India, CBDT, 2023). The reliance on tax revenue is crucial for the development of the country, as it funds various public services and infrastructure projects essential for economic growth (Priya & Sornaganesh, 2023).

2.1 Structural Overview of India's Tax System

The taxation system in India is a complex and evolving framework that has been shaped by historical, economic, and political influences (Hanlon, 2010; Amin et al., 2014). Historically, India's tax system has roots in ancient practices, as seen in texts like the Manu Smriti and Arthasastra, which emphasised fair taxation based on income and expenditure, and discouraged excessive taxation (Kautilya trans. Shamasastry, 1915; Rangarajan, 1992; Singh, 2018). Tax research draws from multiple fields, which often use different terminologies and perspectives, like economists, who focus on tax compliance, incidence, and optimal tax policy. At the same time, finance scholars view taxes as market imperfections that can affect firm value and financial decisions (Hanlon, 2010). Taxes play a crucial role in various business decisions, including investment policies, capital structure, and organisational form (Hanlon, 2010; Hundsdoerfer & Sichtmann, 2009). Over time, the tax system has undergone significant transformations, particularly during the colonial period and post-independence era, with major reforms occurring post-economic liberalisation in 1991 (Kapoor & Singh,

2023). The Indian tax structure is divided into three levels: Union, State, and Local Bodies, with the Constitution delineating taxing powers between the national and state governments. However, the system remains complex due to various tax types and compliance regulations (Central Board of Direct Taxes, 2021; Das, 2022). Despite reforms aimed at enhancing efficiency and equity, challenges such as tax evasion and the parallel economy persist, necessitating further systemic improvements (Das, 2020). The tax system's role in fostering economic growth is crucial, as it influences entrepreneurship and investment. Well-crafted tax incentives can stimulate innovation and job creation, while excessive taxation can stifle economic activity (Kumar & Chandel, 2024). As India continues to adapt its tax policies to meet global competition and domestic needs, ongoing reforms are essential to ensure a balanced and effective taxation system that supports sustainable development (Das, 2022; Das, 2020).

Tax Revenue is one of the most significant revenue sources for the government of any country. The government of India has divided the taxes into two major types, i.e., Direct Taxes and Indirect Taxes (Kaushik et al., 2023; Das, 2022; Central Board of Direct Taxes, 2021). Direct taxes in India include income tax, corporation tax, and wealth tax. In contrast, indirect taxes encompass customs duties, excise duties, and the Goods and Services Tax (GST), which was introduced to streamline the tax regime (Kaur et al., 2016; Das, 2022). Where Direct Taxes are levied directly on the income of the individual, Indirect Taxes are levied indirectly upon the consumers of goods or services. As per the latest data released by CBDT, more than 27 Lakh crores of rupees were collected by the Government of India as tax revenue, where the contribution of direct and indirect taxes was almost equal. Over the last two decades, efficiency in tax collection has improved, with a steady increase in the taxpayer base, particularly among small- and medium-sized firms and individual taxpayers (Shetty, 2024; Kaushik et al., 2024; Central Board of Direct Taxes, 2021).

On the contrary, some studies find that Indian direct tax collections have been sluggish (Deb, 2022; Singh, 2019). This has prompted the government to seek revenues from untapped sources to finance rising expenditures in health and defence (Deb, 2022). This situation has led to increased pressure on taxpayers, resulting in tax disputes and potential tax terrorism (Deb, 2022). In such a scenario, tax policy and tax reforms

become a topic of keen interest for all the stakeholders (Kaushik et al., 2023; Central Board of Direct Taxes, 2021). The government had introduced measures like the Vivad-se-Viswas tax amnesty scheme and the Faceless Assessment Scheme, aiming to rationalise the tax system, broaden the tax base, and enhance lower household incomes (Deb, 2022; Central Board of Direct Taxes, 2021). Past studies examine tax collection trends over the past 10 years, highlighting the importance of these revenues for the efficient functioning of national and sub-national governments (Priya & Sornaganesh, 2023). The reliance on tax revenue is crucial for the development of the country, as it funds various public services and infrastructure projects essential for economic growth (Kaushik et al., 2024; Kaushik et al., 2023; Priya & Sornaganesh, 2023). Taxation is a fundamental instrument used by governments all over the world to produce income for government spending, economic development, and social welfare programs. In the case of India, direct taxes are critical for funding government activities and promoting economic progress. Income taxes placed on individuals and enterprises contribute significantly to the country's overall tax collection (Kaushik et al., 2024; Central Board of Direct Taxes, 2021).

2.2 Historical Trends in Direct Tax Collection

The direct tax system in India has undergone significant reforms and plays a crucial role in the country's revenue mobilisation and economic development. Historically, direct taxes have shown a robust positive correlation with GDP, indicating their importance in the economic framework (Shetty, 2024; Wagle & Manerkar, 2022). The Indian Income Tax Act, 1961, governs direct taxes, with specific provisions like Section 43CB addressing the computation of income for construction contracts, reflecting the complexity and specificity of tax regulations (Mittal et al., 2023). Over the years, there has been a steady increase in the taxpayer base, particularly among small- and medium-sized enterprises and individual taxpayers, which has contributed to rising efficiency in tax collection processes (Shetty, 2024). Despite these improvements, challenges such as tax evasion, black money, and a parallel economy persist, necessitating further reforms to enhance the effectiveness of the direct tax structure (Das, 2020). The direct tax collection has shown an increasing trend from 2001-02 to 2018-19, positively impacting the GDP and highlighting the need for a cohesive tax system to balance

multiple objectives like reducing income inequality and maintaining price stability (Wagle & Manerkar, 2022; Das, 2020). Overall, while the direct tax system in India has made significant strides, continuous reforms and strategic policy implementations are essential to address existing challenges and support sustainable financial governance (Shetty, 2024; Das, 2020).

Following independence in 1947, India's economy grew gradually. Income and corporation taxes, for example, were instituted as early as 1922. Direct taxes' contribution to government revenue remained minimal during this period but increased gradually as industrialisation and urbanization expanded (Kaushik et al., 2023; Government of India, CBDT, 2023). In the 1990s, India embarked on massive economic reform and liberalisation measures. Direct tax collection increased considerably during this period because of efforts aimed at simplifying tax procedures, broadening the tax base, and combating tax evasion (Government of India, CBDT, 2023). During this decade, income tax and corporation tax contributions increased, giving greater revenue for government spending. The early 2000s experienced consistent economic growth, which led to higher incomes and larger corporate profits. Direct tax collections climbed even more, increasing government revenue. The Goods and Services Tax (GST) was introduced in 2004 with the intention of streamlining indirect taxes while also contributing to direct tax growth (Government of India, CBDT, 2023).

India's economic growth slackened in the fiscal year 2018-2019, with GDP growth hovering around 6.1 per cent. By 2019-2020, economic growth had slowed even more, with the GDP growth rate falling to around 4.2 per cent (Ramakumar & Kanitkar, 2021). It is vital to note that the early 2020 COVID-19 pandemic had a significant impact on India's economic growth trajectory, resulting in a sharp decline in economic activity during the lockdowns and restrictions. Because of the outbreak, India's economy had a severe downturn in 2020-2021, with GDP dropping by approximately 7.3 per cent. However, as the country gradually reopened and immunisation programs gained pace, chances for a comeback in 2021-2022 were raised (Ramakumar & Kanitkar, 2021). Traditional government duties, such as military and law enforcement, as well as modern-day functions, such as welfare and development initiatives, such as

water supply, sanitation, health, and education, rely primarily on tax revenue. According to various research, tax is a tool for attaining social and economic goals, making it vital for a country's economic development.

The research by Kaur and Rani looks at how corporate tax rates, surcharges, and the Minimum Alternate Tax (MAT) changed in India between 2005-06 and 2021-22. The study illustrates how corporate tax rates for domestic firms have fluctuated during this time, with a gradual decrease from 35 per cent in 2005-06 to 25 per cent in 2020-21 under certain conditions. Surcharge rates have also climbed over time, affecting businesses' total tax liability. MAT rates fluctuate, rising from 7.5 per cent in 2005-06 to 18.5 per cent in 2012-13 before reducing to 15 per cent in 2020-21(Kaur & Rani, 2022). Changes in corporation tax rates, surcharges, and MAT, as well as government policies to stimulate socio-economic growth, can all influence business tax collections. While specific policies may reduce tax revenue, they serve an important role in promoting economic development. The Earned Income Tax Credit (EITC) is a tax credit aimed at low-income working individuals and families to give financial help and encourage employment. The potential positive effects of the EITC on various aspects of community development in these areas (Wagner et al., 2006).

2.2.1 Historical Developments in the Legal Structure of Direct Tax

The Income Tax Act, 1961, imposes income tax on all artificial juridical persons, including individuals, Hindu undivided families, businesses, cooperative organisations, trusts, and similar institutions (Income Tax Act, 1961; Central Board of Direct Tax, 2021). A person's total income plus their residency status is used to determine their income tax in India. A person can have three possible statuses: resident and normally resident, resident but not ordinarily resident, and non-resident (Income Tax Act, 1961; Central Board of Direct Tax, 2021). There are various steps to take to find out someone's residence status. No matter where a citizen earns their money, it must be paid in taxes. A non-resident is only required to pay taxes on income that originates in India, whether earned or received. Taxes are levied on individuals who are not ordinarily residents of India on all income that is made in India, received in India, or generated by businesses or professions controlled from India (Income Tax Act, 1961; Central Board of Direct Tax, 2021).

The companies and business organisations in India are taxed on the income from their worldwide transactions under the provisions of the Income Tax Act, 1961 and the same is termed as Corporate Tax (Income Tax Act, 1961; Central Board of Direct Tax, 2021). A company is considered to have an Indian resident if it is either wholly controlled or formed in India In case of non-resident corporations, tax is levied on the income which is earned from their business transactions in India or any other Indian sources depending on bilateral agreement of that country (Income Tax Act, 1961; Central Board of Direct Tax, 2021).

When a person dies, there is a tax that comes into play called an inheritance tax, which is also called an estate tax or death duty. The whole value of a deceased person's money and property is subject to this tax. From 1953 to 1985, estate duty was applied in India. The Estate Duty Act of 1953 was adopted on October 15, 1953. With the adoption of the Estate Duty (Amendment) Act, 1984, the tax was abolished on farmland. The Estate Duty (Amendment) Act, 1985 also abolished the imposition of Estate Duty on property (other than agricultural land) that passes on death that occurs on or after March 16, 1985 (The Estate Duty (Amendment) Act, 1985; Central Board of Direct Tax, 2021). The Indian government established the Gift Tax Act on April 1, 1958, to regulate gift taxes. All states except Jammu and Kashmir were required to implement it. Gifts from non-blood relatives, whether in the form of cash, a draft, a check, or any other legal tender, are subject to taxation under the provisions of the Gift Act of 1958 if they exceed ₹25,000. However, the gift tax was abolished on October 1, 1998; therefore, any gifts given on or after that date were not subject to it. Meanwhile, in 2004, the Act was partially revived. The Income Tax Act of 1961 included a new paragraph (2) to Section 56. It specifies that any individual or Hindu Undivided Family (HUF) receiving gifts over ₹50,000 annually shall be subject to taxation (Income Tax Act, 1961; Central Board of Direct Tax, 2021).

2.3 Indirect Taxation Trends and Linkages to Direct Tax

The relationship between direct and indirect taxes is a fundamental aspect of taxation that has significant implications for both taxpayers and governments. Direct taxes are levied directly on individuals or entities based on income or wealth, and they cannot be transferred to another party; examples include income tax and corporate tax (Mitu,

2008). In contrast, indirect taxes are imposed on goods and services, allowing the tax burden to be passed on to the final consumer, making them less visible in pricing (Genschel & Jachtenfuchs, 2011). This distinction is crucial as it affects how tax policies are formulated and implemented. The treatment of these two types of taxes under international frameworks, such as the General Agreement on Tariffs and Trade (GATT), reveals complexities in their regulation. The fragmentation between tax and trade regimes has led to misunderstandings regarding their respective roles and implications in international trade (Althunayan, 2010). Moreover, the transferability of tax burdens is a key differentiator; while indirect taxes can be shifted, direct taxes remain the responsibility of the taxpayer (Income Tax Act, 1961; GST Act, 2017). Understanding these distinctions is essential for policymakers aiming to harmonise tax systems and ensure fair economic practices across borders, where indirect taxes significantly contribute to budget revenues (Genschel & Jachtenfuchs, 2011).

In India, Indirect taxes such as customs duties and excise duties also play a crucial role, with customs duties positively impacting economic growth (Venkataraman & Urmi, 2017). The Indian tax system is characterised by a division of tax authority among the Central, State, and local governments. The Central Government levies taxes on income, customs duties, and central excise, while State Governments impose taxes like VAT, stamp duty, and state excise (Kaur et al., 2016). Local bodies are responsible for property taxes and utilities (Kaur et al., 2016). The introduction of the Goods and Services Tax (GST) represents a significant reform, aiming to unify the tax structure across the country, thereby enhancing compliance and economic growth (Kaur et al., 2016).

The introduction of the Goods and Services Tax (GST) in India on July 1, 2017, marked a significant reform in the country's indirect tax system, replacing a multitude of pre-existing taxes such as VAT, service tax, and excise duty with a unified tax structure (Chakraborty & Shanmugam, 2024; Mittal et al., 2023). This reform aimed to simplify the tax system, curb black money, and establish a 'One Nation, One Tax' regime, thereby promoting economic efficiency and growth (Abhilasha, 2023). Apart from direct tax, another significant part of the government’s revenue comes from indirect taxes, making them an essential part of fiscal strategy. As the name suggests,

the burden of these taxes can be shifted from the original payer to the eventual consumer by levying them on products and services instead of income or profits (GST Act, 2017). Customs duties, value-added tax (VAT), and excise taxes are the three main components of indirect taxes. Each of these taxes has a unique function in the economy (GST Act, 2017).

The initial implementation of GST faced challenges, including revenue inadequacy, tax evasion, and a high compliance burden, which highlighted the need for further reforms (Chakraborty & Shanmugam, 2024). The GST system in India is characterised by a five-rate structure, which contrasts with the simpler two or three-rate systems preferred in other countries (Chakraborty & Shanmugam, 2024). The GST applies uniformly to goods and services across the nation, impacting various sectors, including public-private partnership projects, where it influences milestone payments and operational costs (Mittal et al., 2023). The GST's contribution to the Indian economy has been significant, with its collection and impact being a focal point of fiscal policy discussions (Abhilasha, 2023). Overall, while GST has streamlined the indirect tax landscape in India, ongoing reforms are necessary to fully realise its potential benefits (Chakraborty & Shanmugam, 2024; Abhilasha, 2023).

Most of India's indirect tax landscape has changed since July 1, 2017, when the Goods and Services Tax (GST) came into effect. The Goods and Services Tax (GST) unified a few different federal and state taxes into a single, more manageable system to simplify the system, increase compliance, and broaden the revenue base. There are two parts to the Goods and Services Tax (GST) system: the Central Goods and Services Tax (CGST) and the State Goods and Services Tax (SGST). For transactions between states, there is also the Integrated Goods and Services Tax (IGST). Levied by the central government on intra-state supplies of goods and services. It replaced central excise duty, service tax, and additional customs duties. Levied by state governments on intra-state supplies, replacing state VAT, luxury tax, and entertainment tax. Applied to inter-state transactions and imports, facilitating seamless trade across state borders by allowing input tax credit across states (GST Act, 2017). A tax on the manufacture of goods within India, which was subsumed under CGST. Levied on services provided, which was also replaced by CGST.A multi-stage tax on the sale of goods was replaced

by SGST. Although not subsumed under GST, it remains a significant component of indirect taxes, levied on imports and exports (GST Act, 2017). While GST has streamlined the indirect tax system in India, it is important to consider the broader context of indirect taxation. Prior to GST, the indirect tax structure was fragmented, with multiple taxes levied at different stages of production and distribution, leading to inefficiencies and opportunities for tax evasion (Sury, 2017).

As one of the world's fastest-growing economies, India's tax structure and regulations have significantly changed. The Goods and Services Tax (GST) and subsequent revisions attempted to streamline indirect taxation, but direct taxes continue to play an important role in resource mobilisation. It is critical to evaluate how direct taxation affects economic growth in India and if the current tax policy promotes long-term development (Ahmad & Poddar, 2009). The Economic Times article "India's unprecedented indirect tax reform that dared to revolutionise the economic landscape" (Das, 2023) provides an overview of India's Goods and Services Tax (GST) system and its impact on the country's economic climate. The introduction of the Goods and Services Tax (GST) six years ago was a huge and transformative step toward modernising India's indirect tax structure. It attempted to streamline and consolidate numerous taxes levied by the central and state governments into a single tax framework, encouraging ease of doing business, decreasing tax evasion, and establishing a national market (Rao & Rao, 2010). The Goods and Services Tax (GST) has aided India's economy by increasing tax collections, broadening the tax base, and boosting compliance. It has decreased logistical bottlenecks and made moving commodities across state lines easier, which benefits both firms and consumers (GST Act, 2017). GST implementation has been fraught with difficulties, including initial technology faults, compliance issues, and tax slab complications. However, the government has taken the initiative to address these issues by implementing reforms, simplifying procedures, and engaging with stakeholders to guarantee smoother implementation and compliance.

The Kelkar Task Force on Indirect Taxes advocated in 2000 that India implement a nationwide Goods and Services Tax (GST). The goal was to decrease tax cascading, simplify the existing complex and fragmented tax structure, and encourage

economic integration. The Empowered Committee of State Finance Ministers developed a plan and a road map, and the First Discussion Paper was published in 2009. However, the process encountered difficulties, particularly in terms of governmental compensation. After years of debate and discussions, the Constitution (122nd Amendment) Bill, 2014, was introduced in Parliament to modify the Constitution and allow the implementation of GST. In 2016, both chambers of Parliament modified and adopted the Bill. It received the required state ratification and presidential approval, and thus became the 101st Constitution Amendment Act of 2016. The GST Council, comprised of the Union Finance Minister and representatives from all states and union territories, was established to make decisions on various aspects of GST.

The GST Council was critical in defining India's GST architecture, including determining tax rates, exemptions, and administrative procedures. Goods and services were taxed at varied rates ranging from 5 per cent to 28 per cent, with exemptions for basic goods and lower taxation for select items such as gold and diamond jewellery. A compensatory cess was also levied on demerit products and luxury commodities. Extensive preparations for GST implementation were conducted, including the development of the GST Network (GSTN), a non-profit company that serves as the GST system's IT backbone. GSTN oversees taxpayer registration, return filing, and tax payments, among other things. In response to comments from businesses and the shifting economic landscape, the Indian GST has been revised and enhanced. While the first implementation caused businesses challenges in understanding new compliance requirements, the GST system has gradually become more familiar and incorporated into the Indian tax environment. Economic growth and tax collection have a bidirectional causal link in the short run (Takumah & Iyke, 2017). Indirect taxes, such as GST and customs and excise duties, provide a considerable contribution to revenue generation. Direct taxes, such as personal income tax and corporate tax, also contribute to tax revenue, but to a lesser extent. Promoting long-term economic growth is critical for increasing tax revenue and ensuring fiscal sustainability. Public spending can have a positive impact on economic development. The findings have substantial policy implications, underlining the importance of strategically allocating public expenditures to encourage growth and development (Ahuja & Pandit, 2020).

2.4 Government Interventions and Policy Reforms Influencing Direct Taxation

India's tax regime has evolved to be more complex and extensive since the country's independence in 1947. It channels substantial amounts of funding at both the federal and state levels towards developmental, welfare and administrative programs. The components of the tax system in India are multifaceted, encompassing both direct and indirect taxes, which have evolved significantly since independence. The tax system has been a critical tool for resource mobilisation, supporting developmental and welfare activities, although it has historically relied heavily on indirect taxes and faced challenges like tax evasion (Nainwal, 2015). Recent reforms have focused on simplifying and rationalising tax rates to align with international practices, aiming to broaden the tax base and improve administration (Nainwal, 2015). Additionally, the administration of tax and non-tax payments is integral to India's fiscal policy, ensuring financial stability and sustainable development (Shuvalova & Gordienko, 2024). Overall, the Indian tax system is a complex structure that continues to evolve, balancing revenue generation with economic growth objectives.

Tax exemptions, incentives and breaks all come under the policy framework, which promotes company ownership and investment. Several tax regimes have shaped these components, ranging from colonial tax systems to the earlier land revenue systems (Kumar & Chandel,2024). Sustainable development goals (SDGs) based tax strategies are the motivating force behind successful tax policy, which are income generation, promotion of economic growth, and innovation (Kumar & Chandel,2024). Tax policies are arteries when it comes to affecting investment and entrepreneurship. Excessive or complex taxes can thwart new ideas and the growth of small businesses (Streeter, 2022).

Tax evasion and avoidance are significant challenges in India. The tax-to-GDP ratio in India is one of the lowest in the world, indicating that tax compliance is a challenge. Several studies have examined the causes of tax evasion and avoidance in India. According to a study by the World Bank, the main factors contributing to tax evasion and avoidance in India are the complex tax system, weak tax administration, and corruption. It recommends reforms in tax administration and simplification of the tax system to improve compliance. The informal sector contributes to 50 per cent of the GDP. However, it pays only 10 per cent of the taxes, recommending incentivising tax

compliance in the informal sector by providing tax concessions and simplifying the tax system (National Institute of Public Finance and Policy). Indian companies investing in tax havens were more likely to do so in jurisdictions with low levels of transparency. They argued that this was due to the difficulty in identifying and tracing the flow of funds in such jurisdictions, making it easier for companies to avoid taxes (Mirinda & Dias, 2020).

The government has always been concerned about tax collections through both income tax and corporate tax, as both contribute significantly to government revenue. Companies' motivation to decrease tax liability and boost profits based on corporate investments is noteworthy for countries such as India. Throughout history, many tax reforms have been implemented in response to the needs of states and economies to achieve the transition, resulting in a diverse pattern of tax scales. Corporate investments in tax havens have grown in popularity in recent years, with India being no exception. According to a 2019 Economic Times survey, Indian corporations invested more than $1.5 billion in tax havens in the previous year alone (Economic Times, 2019).

The introduction of a value-added tax (VAT) in 2005 was a significant step in this direction, as tax reform was implemented to ameliorate the tax administration and reduce tax evasion. The government has been putting efforts into improving tax compliance through measures such as the beginning of electronic filing and the application of data mining techniques. The three models included the Optimal Tax, Harberger Tax, and Supply Side Tax (SST), describing the tax collection patterns (Rao, 2000). An intriguing study conducted in 2011 entertains the understanding of income by some groups, which in turn recalls how the income bearer is saving taxes (Sharma & Yadav, 2011). Special assessment units have been established to deal with circumstances in which taxpayers voluntarily disclose greater incomes; however, to avoid this, such income taxpayers typically understate their incomes (Sharma & Yadav, 2011). Taxpayers' voluntary disclosure is critical to tax collection. According to studies, there is a need for incentives for both staff officers and taxpayers. Taxpayers must be encouraged to reveal their income freely (Das-Gupta et al., 2004). The governments that focus on taxing income outperform those that focus on taxing products and services (Gupta, 2007).

The companies were tempted to invest in tax havens due to India's high corporate tax rates and convoluted tax system. They discovered that corporations that invest in tax havens had a lower effective tax rate than those that do not. As a result, it is suggested that the tax advantages connected with investing in tax havens are a substantial motivator for such investments (Armstrong et al., 2015). Another significant change in Indian tax policy is the decrease in the corporation tax rate. The company tax rate was cut from 30 per cent to 22 per cent in 2019, making it one of the lowest in the area. The tax cut was intended to encourage foreign investment and support economic growth. Several studies have been conducted to assess the impact of the corporation tax rate reduction on the Indian economy. According to research by the Reserve Bank of India, a tax decrease is likely to boost company profitability, investment, and job creation. However, there have been worries raised regarding the government's revenue loss because of the tax cut (Press Information Bureau, Government of India, Ministry of Finance, 2019).

The economic implications of India's decision to demonetise high-value currency notes in 2016 involved invalidating 86 per cent of the country's circulating currency. The study discusses the various factors that motivated demonetisation, including efforts to curb corruption and tax evasion, promote digital transactions, and stimulate economic growth. Drawing on a range of academic and policy literature, Lahiri outlines the potential benefits and drawbacks of these goals, as well as the unintended consequences of demonetisation (Lahiri, 2020). Tax policy and reforms in India have been pivotal in shaping the country's economic landscape, with a focus on fiscal consolidation, transparency, and efficiency. Recent reforms have emphasised the digitisation of tax administration to enhance transparency and taxpayer convenience, reducing the need for physical interactions and fostering voluntary compliance (Sury, 2024). Despite these efforts, India's tax system still struggles with a low tax-GDP ratio, partly due to exemptions like those on agricultural income, which narrow the tax base and facilitate evasion (Rao, 2022). The government's approach of 'Minimum Government and Maximum Governance' aims to create a stable regulatory environment, encouraging domestic manufacturing and economic growth. However, issues like the retrospective tax have negatively impacted the business environment

(Shettigar & Misra, 2022). Taxation policies in India are crucial for economic growth, influencing entrepreneurship and investment. High tax rates and complex systems can hinder innovation, while well-designed incentives can promote entrepreneurship and job creation (Kumar & Chandel, 2024). Overall, while India has made strides in tax reforms, challenges remain in broadening the tax base, simplifying the system, and enhancing administrative capacity to support sustainable economic development. Policymakers are seeking to streamline the tax system by introducing many regimes and investing in digitisation to make the tax structure simple and efficient (Sury, 2024).

Throughout history, many tax reforms have been implemented in response to the needs of states and economies to achieve the transition, resulting in a diverse pattern of tax scales. Although tax collection trends have continually been rising since 2010, a diminishing trend in Indian investments in tax havens has been seen, owing to agreements between India and the nations regarded as tax havens; therefore, policy reforms are also essential to keep the situation under control (Mukundhan et al., 2019).

The Indian government has been working to overhaul the tax system to increase revenue collection, promote efficiency, and decrease tax evasion. India's tax structure is complicated, with numerous layers of taxes, including central, state, and municipal taxes. In India, the tax system is highly regressive, with indirect taxes accounting for a major portion of revenue collection. Tax evasion is a serious issue in India, resulting in lower tax compliance and revenue collection (Rao & Rao, 2006). The introduction of GST in India in 2017 has been one of the most significant tax reforms in the country's history. GST is a value-added tax that replaces multiple indirect taxes such as excise duty, service tax, and value-added tax. The objective of GST was to simplify the tax system, reduce compliance costs, and improve tax collections. Several studies have examined the impact of GST on the Indian economy. According to a National Council of Applied Economic Research (NCAER) study, GST is expected to increase India's GDP by 0.9-1.7 per cent. However, there have been implementation challenges, including compliance, technology, and revenue collection issues.

The corporate investments in tax havens are driven by a range of factors, including tax rates, lack of transparency, firm size, internationalisation, and governance

quality. The evidence from India is consistent with these findings, highlighting the importance of understanding the underlying drivers of such investments. (Wang et al., 2020). The government argues that there is a need for greater transparency and accountability in the tax system and that there is a need to reduce the burden of indirect taxes on the poor. Studies have found that the countries that focus on taxing incomes perform better than those that focus on taxing goods and services (Gupta, 2007). Although the trends of tax collection were always seen rising before 2010, a declining trend has been observed in Indian investments in tax havens, particularly because of agreements between India and the countries considered as tax havens, so policy reforms are also required to be kept in check (Mukundhan et al., 2019).

2.5 Global Lessons for Direct Tax Efficiency

The Indian tax system, when compared to other countries, exhibits unique characteristics in terms of tax rates and compliance. India's tax system is designed to be broad-based with low and less differentiated rates to minimise collection, compliance, and distortion costs, thereby enhancing voluntary compliance through a strong technological platform (Rao & Rao, 2023). However, despite these efforts, India's tax-to-GDP ratio remains low, indicating a potential underperformance in revenue collection compared to its economic capacity (Rao, 2022). The complexity of the tax system, exacerbated by numerous tax preferences and exemptions, particularly in agricultural income, narrows the tax base and complicates compliance (Rao, 2022). Overall, while India strives for a simplified and efficient tax system, challenges remain in balancing tax rates, compliance, and economic growth, necessitating ongoing reforms and technological integration.

Over the past few decades, tax laws in developed nations have changed dramatically, with a greater focus on striking a balance between social welfare, economic growth, and budgetary sustainability. Tax laws are intended to guarantee equitable wealth distribution, encourage investment, and finance public services like infrastructure, healthcare, and education in many developed economies. Higher income earners pay a bigger percentage of their income in taxes under progressive tax systems, which are prevalent in these nations (Atkinson, 2015). Furthermore, a variety of direct and indirect taxes are used in many developed countries, with value-added taxes (VAT)

and corporation taxes being important sources of income. For instance, income taxes and social security contributions are significant sources of income for the US and many European countries. However, VAT has emerged as a significant source of income for nations like the UK and Germany (OECD, 2020).

The developed nations' tax policies have been shifting in recent years to address economic inequality and adjust to the challenges presented by the digital economy and globalisation. Through international accords like the OECD's Base Erosion and Profit Shifting (BEPS) effort, many nations have implemented policies to counteract aggressive tax avoidance and evasion by multinational firms (OECD, 2015). To guarantee that rising industries equitably contribute to the tax base, some countries have also enacted or are thinking about enacting wealth taxes, carbon taxes, or digital taxes. To ensure that multinational tech companies contribute to the local economy in the areas where they operate, countries like the U.S. and members of the European Union are taxing digital services in response to the growing significance of digital platforms and e-commerce (Zucman, 2019).

The growing trend in wealthy nations toward tax reforms that encourage green energy and sustainable development projects is one of the major themes. To lower carbon footprints and promote the use of renewable energy sources, governments are enacting tax credits, discounts, and exemptions (Stern, 2006). To lower greenhouse gas emissions, nations like Sweden, Denmark, and Finland have implemented carbon taxes and other environmental levies. These measures not only support international environmental objectives but also provide a new source of funding for the government (Hassett & Metcalf, 2009). These patterns show a broader understanding that to keep their fiscal policies sound and focused on the future, developed countries' tax policies must change to address global issues like income inequality, digitalisation and climate change in addition to more conventional economic ones.

The taxation policy around the globe is different for different nations, as nations need to manoeuvre their tax policies according to their economic interests. The study shows that justice and social norms highly impact the tax norms in a nation. In contrast, the expectations and tax regulation complexion did not have a significant influence on the taxation policy of a nation (Alhempi et. al, 2020). Further, another study dismissed

the widespread holding that the level of unemployment, consumer price index and the number of informally employed people impact the individual income tax receipt in a nation (Kalivoshko et. al, 2020).

Every economic activity and economic policy aims to increase the government's revenue inflow. One such way to attain this is to increase the wage and pension benefits that will counteract the negative per capita effect of aging and increase the government's income tax revenue (Prammer, 2018). However, to attain the same, the marginal cost must be kept greater than the marginal tax revenue (Sandmo, 1981). On the policy level, various studies find that multiple factors decide the taxation policies. In one of the studies, it was found that the dependence of VAT and personal income tax influences the individual rates to a larger extent (Tikhonova et al., 2019). Further, it was also found that the tax revenue usually falls when the government raises the marginal rates (Pellegrino et. al, 2018). Furthermore, when a single marginal tax rate in a multi-rate income tax structure is changed, those in the relevant tax bracket adjust their incomes in accordance with the elasticity of taxable income (Creedy & Gemmell, 2013).

According to the study conducted, several factors impact the optimal tax rate. The same study mentions that the optimal tax rate on capital income at the steady state becomes zero in the optimal taxation problem, conditioned on the two-sector dynamic general equilibrium model. Further, it was found that the optimal tax rate on labour income at the steady state depends on the initial labour, the parameter weighted on leisure in the utility function, the discount rate, and the degree of distortion of taxation. Furthermore, the initial relative price of a consumption good in terms of investment goods decreases the optimal tax rate on labour income (Muro, 2013).

Over the past decade, the tax on chemicals or substances that pose a threat to the environment has been levied so as to discourage the use of such harmful chemicals. However, the relative tax is being levied upon such chemicals in proportion to the risk they possess; the impact of these taxes on environmental regulation is yet to be assessed (Barthold, 1994). One of the significant sources of environmental damage in the established centres is the factory smog, which has a negative impact on large masses, and most economists are in favour of levying economic penalties on such factory owners who would resist the establishment of factories in residential areas (Coase,

1960). Apart from the environmental taxes, the GDP plays a crucial role in determining the discretionary taxes, and the same can be analysed using the Divisia Index Method, which simply uses the GDP and total tax revenue on a historical basis. However, there are a few drawbacks to the same method, as it underestimates the positive revenue effects and overestimates the revenue impact, which results in distorted conclusions for the comparative time series analysis (Choudhry, 1979). For tax compliance, which results in the collection of tax revenues, one of the crucial factors that is often overlooked is the compliance behaviour of the taxpayers, which is being impacted by the moral and social influences. Hence, we need to investigate the non-economic factors to make the tax compliance policies more effective (Andreoni et al., 1998). The compliance being one of the crucial factors, the tax revenues and sales tax are also quite sensitive to the changes in personal income, even the elasticity for the income tax is more than double that of the sales tax in the long run (Bruce et. al., 2006). Furthermore, the collected tax revenue is highly sensitive to the GDP and this metric is known as tax buoyancy. In one of the studies, it was found that the estimate of constant gross tax buoyancy is positively significant and more than unity during the pre-tax reform period, illuminating that gross tax is moderately elastic (Upender, 2008).

2.6 Direct Tax and Economic Growth Linkages

Understanding the link between direct taxes and economic growth in India is critical for policymakers, economists, and researchers. Governments rely on taxation to generate money, support public expenditures, and affect economic behaviour. The precise tax components within a tax structure, on the other hand, can have diverse effects on economic growth (McNabb, 2018). The link between direct taxes and economic growth has gotten much attention around the world. Many studies have been conducted in various countries to investigate this link, providing insight into the effects of taxation on economic performance (Adegbite et al., 2019; Arnold, 2008; PwC, 2020). Despite their importance in the Indian context, empirical research on the influence of direct taxes on economic growth is scarce. As a result, additional research is required to bridge this knowledge gap and provide crucial insights to Indian policymakers and scholars (Sukhtankar & Vaishnav, 2015).

Myles (2000) highlighted that while theoretical models suggest substantial channels through which taxation can affect growth, empirical evidence often indicates that the impact of taxes on growth is weak. Engen and Skinner's analysis of U.S. tax reforms suggests modest growth effects, with changes in tax rates potentially altering growth rates by 0.2 to 0.3 percentage points, which can still significantly impact living standards over time (Engen et al., 1996). Alqadi and Ismail's review reveals that both theoretical and empirical literature provide inconclusive evidence, with some studies indicating a negative impact of taxes on growth. In contrast, others suggest non-linear effects, influenced by factors such as country development levels and methodologies used (Alqadi & Ismail, 2019). Tanzi et al. provide a historical perspective, noting that the role of taxes in economic growth has evolved, with new growth theories emphasising the importance of government and tax policy in economic development (Tanzi et al., 2023). Overall, while there is no consensus, the literature suggests that the design and implementation of tax policies can significantly influence economic growth, albeit with varying degrees of impact depending on the context and specific tax structures involved.

The influence of direct taxation is essential to India's intricate link between taxation and economic growth. Taxation is essential for generating government money, as well as laying the groundwork for paying for public services and facilitating development projects. Individual and corporate income taxes, as well as direct taxes, account for a considerable portion of total tax revenue in India (Kirchler, 2007). The massive increase in direct tax collection by the Indian government in recent years can be attributed to the transformative effect of digitalisation in enhancing tax collection efficiency. By examining the relationship between taxation and economic growth, important insights contribute to a better understanding of India's tax policy and its impact on the country's economic environment (Moore, 2007). The analysis of the linkage between tax collection and economic growth could be helpful for policymakers as well as economists, as it will help them draft and amend the existing laws in the country. This study will also be helpful in highlighting the requirement for any changes in the existing cyber laws in the country for smooth digital tax management, as most of the tax collection and management systems are now operating digitally.

The individual and corporate income taxes are critical sources of government revenue in the country. Because taxation is the backbone of government finances, it is critical in funding public services, infrastructure development, and social welfare initiatives. India has a three-tier federal tax structure with a constitutional delegation of tax authorities. The evolution of the Indian tax system over time includes ancient taxation methods, British influence, and post-independence revisions (Etim et al., 2020). Direct tax receipts in India have increased significantly in recent years, according to the Central Board of Direct Taxes (2021). This achievement is due, in part, to the use of digitisation and technical developments in tax administration. The implementation of programs such as the e-filing of tax returns, online payment systems, and strong data analytics has considerably improved the efficiency of tax collection in India (Mallick, 2021).

Despite the evident impact of direct taxes on government revenue, there is still a gap in comprehending their relationship with economic growth in the Indian context. Globally, extensive studies have been undertaken on the effects of taxation on economic performance (Arnold, 2008; PwC, 2020). More research into India's particular relationship between direct taxes and economic growth, however, is needed to enhance policy planning and decision-making. The value of an appropriate tax structure in fostering investment, entrepreneurship, and overall economic activity cannot be overstated. Given the diversity of tax policies and structures between Indian states, the consequences of economic growth must be researched efficiently throughout the states (Ahrens, 1997). The primary tax components, including income tax, sales tax, and excise tax, are examined in relation to economic growth metrics such as gross state domestic product (GSDP) and per capita income (Neog & Gaur, 2020). Excessive reliance on excise taxes may be detrimental to growth. Specific tax components, such as income and sales taxes, have a favourable impact on economic growth.

Tax advantages for specific enterprises can encourage growth in these areas, highlighting the importance of implementing tax policies that align with state development goals. The importance of implementing a balanced tax structure and designing tailored tax policies to enhance regional economic growth and development. Government spending, foreign direct investment, and inflation all have an impact on

economic growth. Indirect taxes can be an effective way for the government to generate cash that can be used for public investment and development projects (Bissoon, 2012). To boost economic growth while limiting negative consequences on investment and consumption, policymakers should prioritise managing the structure and rates of indirect taxes.

Income and property taxes have been found to increase economic growth. These tax provisions may have a greater positive influence on investment, entrepreneurship, and productivity, resulting in higher rates of economic growth (McNabb, 2018). Policymakers should consider how various tax components influence investment, consumption, and overall economic activity. Balancing the tax burden among tax categories can aid in promoting long-term and inclusive economic growth (Johansson et al., 2008). Financial inclusion is viewed as a tool for promoting economic development, reducing income inequality, and improving overall well-being. Financial inclusion and tax income have a good relationship. The findings show that greater financial inclusion can help governments collect more tax revenue (Yalaman, 2019). Financial inclusion can help with economic formalisation by bringing formerly informal economic activity into the formal sector. Increased formalisation can promote tax compliance while extending the tax base.

Individuals' financial literacy and awareness can develop, leading to a greater understanding and compliance with tax requirements. People become more aware of their financial responsibilities, including tax payments, when they acquire access to financial services. Financial inclusion can improve financial transaction transparency and accountability, making it easier for tax authorities to monitor and enforce tax legislation (Omar & Inaba, 2020). Financial inclusion policies can have the twin effect of boosting economic development and raising tax income for governments. Financial inclusion and tax income have a beneficial link, shedding light on the potential. Direct taxes are expected to account for a larger part of Indian GDP than indirect taxes in the fiscal year 2022-23 (FY23), marking a two-year return to progressive taxation. Direct and indirect taxes converged in FY22, with each contributing roughly 5.4 per cent to India's GDP. Higher indirect taxes, such as excise duty, customs tariffs, and the goods

and services tax (GST), are considered regressive since they disproportionately affect the poor.

The direct taxes, on the other hand, are estimated to account for around 5.5 per cent of GDP in FY23, a four-year high. In comparison, indirect tax revenues are expected to fall to 5.2 per cent in FY23, mainly owing to reduced excise receipts. To alleviate consumer hardship, excise duty on gasoline and diesel was decreased in November, resulting in a decrease in the excise duty's share of gross tax collection. Direct tax collections are predicted to rise 13.6 per cent in FY23, but indirect tax collections would grow at a slower pace. This propensity toward progressive taxation is responsible for excise duty decreases and, as a result, overestimation of direct tax figures. However, to structurally adjust progressivity, personal income tax slabs may need to be altered.

The revenue receipts for fiscal year 2021-22 surged dramatically as the Indian economy recovered spectacularly following the successive waves of COVID-19. Revenue receipts totalled ₹27.07 lakh crore, above the ₹22.17 lakh crore predicted in the Union Budget 2021-22. This increase in revenue collection was a 34 per cent increase over the previous year, with direct taxes increasing by 49 per cent and indirect taxes increasing by 20 per cent. The increase in tax receipts contributed to India's tax-to-GDP ratio rising to 11.7 per cent in 2021-22. This ratio consists of a direct tax-to-GDP ratio of 6.1 per cent and an indirect tax-to-GDP ratio of 5.6 per cent. The substantial income gain was the result of the country's excellent economic recovery following the impact of the global pandemic, which was aided by the government's large-scale immunisation program. Furthermore, tax administration measures to promote tax compliance, such as the use of technology and artificial intelligence, have contributed to increasing tax revenues. However, keeping a larger share of direct taxes in the economy is expected to benefit the government's capital investment and fiscal deficit management. While indirect taxes might be unfair to the poor, progressive taxation by boosting revenue through income taxation can promote economic justice and growth.

2.7 Determinants of Direct Tax Collection

Both macroeconomic indicators and institutional characteristics influence the effectiveness of a nation's direct tax system. In India, net direct tax receipts witnessed a 45% year-on-year increase as of mid-June 2022, reflecting both buoyant economic activity and enhanced compliance efforts (Income Tax Department, 2022). Direct taxes, which include income tax, corporate tax, wealth tax, and capital gains tax, are considered economically and administratively efficient when compared to indirect taxes (Bird & Gendron, 2006). One of the defining attributes of direct taxation is its elasticity, revenues automatically rise with increases in GDP and personal income, enabling a responsive fiscal framework (Karras, 2019). The direct taxes are also viewed as more equitable instruments due to their progressive structure, as taxpayers contribute based on their ability to pay. Jackson (2020) emphasises the role of income and wealth taxes in promoting vertical equity and mitigating income disparities. This equity function is vital in emerging economies like India, where tax policy can serve as a redistributive mechanism to balance rapid growth with social justice (Gupta & Tareq, 2008). Furthermore, direct taxes foster a greater sense of civic responsibility among taxpayers, as they are directly aware of their contribution to public revenues (Bird, 2010). The certainty and transparency associated with direct taxes further enhance voluntary compliance and improve fiscal planning (Tanzi & Zee, 2000).

India's economic growth averaged 7.3% in 2018, and is a critical driver of direct tax performance. According to the IMF (2019), this growth has been supported by favourable demographic factors, declining fertility rates, improved education levels, better rule of law enforcement, and moderate inflation. These variables expand the formal economy and the tax base, indirectly contributing to more substantial direct tax collection (Dahal, 2020; Samarah & Talalweh, 2024). India's large population also presents immense fiscal potential, though capturing this through tax systems requires effective administration and compliance infrastructure (Mallick et al., 2023).

To improve revenue mobilisation, the Indian government has introduced several tax reforms. Initiatives such as reductions in corporate and personal income tax rates, the expansion of TDS and TCS systems, and dispute resolution schemes like Vivad se Vishwas aim to increase compliance while reducing litigation (Ministry of Finance,

2020). The Transparent Taxation – Honouring the Honest platform, launched in 2020, emphasises taxpayer empowerment and faceless assessments to curb discretionary power and increase trust (CBDT, 2023). Recent advancements in digital tax administration—particularly the new e-filing portal and automated refund mechanisms—have significantly reduced processing times, thereby enhancing both compliance and taxpayer satisfaction (PwC India, 2022). The increase in income tax returns and the refund issuance of ₹2.24 lakh crore in a single fiscal year demonstrate how digital reforms are improving fiscal efficiency. These administrative improvements, when paired with strong economic fundamentals, have positioned India as a growing tax power in the global economic landscape. The literature widely agrees that aligning tax administration reforms with structural economic changes is essential for achieving long-term revenue sustainability (Bird & Zolt, 2008; Hanlon & Heitzman, 2010).

2.7.1 Inflationary Pressures and Their Influence on Tax Collection

However, numerous studies have explored the relationship between taxation and inflation, highlighting significant interactions across different economies. Overall, tax policy adjustments are found to influence inflationary trends substantially (Bekbossinova et al., 2024; Okeke, 2024). Several empirical investigations suggest that both direct and indirect taxes contribute to inflation dynamics, though their effects vary depending on the tax type and economic context. For instance, indirect taxes have been observed to exert a more pronounced impact on inflation compared to direct taxes (Munir et al., 2023). In many cases, higher taxation has helped moderate inflation, while government expenditures and broader fiscal policies have been associated with inflationary pressures (Araby et al., 2024; Basconcillo, 2023). Some research also highlights that while taxes can contribute to inflation volatility, they play a more complex role in shaping inflation expectations over time (Akpan et al., 2024; Muriungi et al., 2024). Historical analyses further reveal that inflation itself can affect the real burden of corporate taxation, particularly for capital-intensive firms (Dhaliwal et al., 2015). Additionally, indirect tax shocks have shown varying influences on both GDP growth and inflation, emphasising the critical importance of balancing fiscal measures with price stability objectives (Makiyan & Farashah, 2023). These findings underline

the necessity of considering inflation as a key determinant when analysing direct tax collection trends and policy effectiveness.

2.7.2 Demographic Influence: The Role of Population in Tax Collection Dynamics

The relationship between taxation and population dynamics is complex and multifaceted, reflecting demographic, economic, and regional influences. Demographic factors such as age distribution, income levels, and urban-rural ratios significantly impact tax revenues and the design of tax policies (Bilgin, 2024; Malicka et al., 2022). Empirical evidence indicates that a productive and younger population positively correlates with property tax revenues, while aging populations and school-age groups may reduce the tax base (Malicka et al., 2022). In addition to revenue effects, tax systems have historically been employed as tools for managing population growth and distribution, as seen in Turkey and Russia, where fiscal policies were adapted to influence demographic outcomes (Bolat & Erdal, 2022). Moreover, studies from Oregon reveal that population growth directly leads to increases in property tax burdens, prompting discussions on tax limitations and growth management strategies (Weber & Buchanan, 1980; Buchanan & Weber, 1982). Recognising the evolutionary nature of tax systems, scholars have emphasised the need for adaptive taxation frameworks that account for demographic shifts across socio-cultural contexts (Vishnevsky & Gurnak, 2015). Overall, while population growth generally enhances tax revenue potential, the interaction between demographic changes and tax systems requires nuanced policy responses to ensure equity and economic sustainability.

2.7.3 Tax and Unemployment Rate

The relationship between taxation and unemployment has been widely studied, with most findings indicating a positive correlation between higher tax burdens and increased unemployment rates. Income tax revisions have been shown to influence unemployment both in the short and long term, with studies from Turkey demonstrating that higher income taxes are associated with elevated unemployment levels (Ay & Çelik, 2024). Corporate taxation also plays a critical role, with evidence suggesting that reductions in corporate tax rates can contribute to lower unemployment, as observed in South Africa and Vietnam (Son, 2023). Furthermore, the tax wedge, the gap between gross wages and net take-home pay, is a significant determinant of unemployment,

particularly among low-skilled workers. Research from Lithuania and OECD countries indicates that higher tax wedges correlate with higher unemployment rates (Neverauskienė et al., 2018; Todorović et al., 2019). Overall, while taxation is recognised as a factor affecting employment outcomes, the relationship is complex and influenced by broader economic conditions and labour market structures, emphasising the need for balanced tax policies to mitigate unemployment risks.

2.7.4 Corruption and Governance as Barriers to Efficient Tax Administration

The corruption significantly undermines the effectiveness of tax systems by facilitating tax evasion, weakening tax administration, and reducing overall tax revenues. Empirical evidence suggests a strong positive relationship between corruption and tax evasion, indicating that countries with higher corruption levels experience greater challenges in tax collection (Timofte et al., 2020). Corruption not only fosters evasion but also leads to irregular exemptions and manipulative practices within the tax system, further eroding revenue potential (Andıç, 2023; Maris, 2024). The structure and efficiency of a country's tax administration play a critical role in mitigating corruption; for instance, inefficient tax systems have been identified as significant contributors to corruption in various contexts (Voskresenskaya & Zernov, 2020). Moreover, corruption negatively affects the relationship between tax revenue and economic development, particularly in emerging economies, by diverting public resources away from productive use (Uche, 2024). While some studies note complex interactions where corruption and tax revenue may coexist with economic growth in highly developed countries, the overwhelming consensus underscores that corruption poses a significant barrier to efficient tax collection and economic stability (Hussain et al., 2023; Oanh et al., 2024). These findings highlight the importance of strong institutional frameworks and anti-corruption measures to enhance the performance of tax systems.

Trust in the existing government and the status of corruption in the country also determine the attitude of taxpayers towards tax payment. Trust in government results in improvement in the collection of tax (Batrancea et al., 2019), whereas corruption negatively affects tax collection in the economies (Ashraf & Sarwar, 2016). Corruption is also found to be a significant hurdle in the tax collection process (Amin et al., 2014). Trust of citizens in the government and authorities also has a positive impact on

voluntary tax compliance by the citizens (Batrancea et al., 2019). Apart from trust in the government, the stability of the government also affects the country's tax collection (Amin et al., 2014). The above-mentioned factors, such as trust in government, corruption, and stability of government, can be obtained through various prominent indices such as the Global Competitiveness Index. Tax is considered to be a strong tool of state policy, which is used by every nation to fulfil its national objective (Bagchi, 1974). It is a known fact that India was a closed economy till the 1990s. It was only after Dr. Manmohan Singh opened the doors of the Indian economy for global companies that India took its first steps towards globalisation. Such a significant change also affected the tax collection in several ways. The government uses different types of incentives to direct investments towards the sector into which it wants to channel funds.

"Income tax policies and reforms in India have covered a long distance since the country's independence in 1947. The maximum combined marginal rate of tax was once as high as 97.5 per cent of one's income in India, which resulted in widespread tax evasion and avoidance" (Acharya, 2005). "Income is the result and the main goal of entrepreneurial activity, which allows for the active use of the regulatory mechanism of tax" (Okanova et. al, 2021). "Tax compliance is directly related to the degree of IRPF (personal tax) decentralisation and inversely related to the use of the AC's regulatory powers to raise the tax" (Laborda et. al, 2020). Studies also reveal that tax compliance is influenced by two factors, namely justice and social norms, positively, while expectations and complexity of tax regulations do not affect tax compliance (Rudi Alhempi et al., 2020). Also, revenues collected and compliance were directly proportional to tax structure, while inflation and declining assessment intensity had an inverse relationship with the tax structure as well (Das-Gupta et al., 1995).

2.7.5 Gross Domestic Product (GDP) as a Macroeconomic Driver of Tax Revenue

The relationship between taxation and GDP has been extensively examined, revealing a complex and multifaceted interaction shaped by economic structures, tax policy design, and administrative efficiency. Generally, a positive relationship is observed where effective taxation strategies contribute to sustainable economic growth. Studies in developing economies have demonstrated that increased tax revenues, particularly through sector-specific policies, can positively influence GDP. For instance, in Nepal

and Palestine, tax revenues have shown a strong positive correlation with GDP growth, highlighting the role of efficient tax policies in stimulating economic performance (Dahal, 2020; Dangal et al., 2021; Samarah & Talalweh, 2024). Sectoral evidence from Nigeria further underscores the importance of targeted tax measures, where the petroleum profit tax and value-added tax were found to support GDP expansion. In contrast, company income tax and excise duties exhibited a negative relationship (Nwanakwere, 2019). Similarly, sectoral analyses in Indonesia revealed that industries like mining, finance, and accommodation positively correlate with tax revenue and, by extension, economic growth. In contrast, sectors like agriculture and transportation demonstrated weaker links (Indra, 2023). However, not all tax structures uniformly enhance GDP. Evidence from Kosovo and parts of Nepal indicates that inconsistent or poorly structured tax systems can negatively impact long-term economic growth (Çollaku et al., 2023; Neupane, 2023). Furthermore, broader perspectives suggest that exceeding optimal tax-to-GDP ratios, as seen in economies such as Vietnam, the USA, and South Africa, may stifle growth, necessitating balanced and context-specific taxation approaches (Dinh, 2022). Additionally, the efficiency of tax administration and taxpayer compliance are critical mediators; inefficiencies can lead to public dissatisfaction and counterproductive economic outcomes (Edeme et al., 2016; Usmansyah et al., 2022). Thus, while taxation is generally a vital tool for fostering economic development, its success largely depends on the design, sectoral targeting, and administrative efficiency of the tax system.

2.7.6 Economic Growth and Its Relationship with Direct Tax Mobilisation

Taxation generally provides the essential financial resources required for governments to fund infrastructure, healthcare, education, and other public services, which in turn stimulate economic growth. However, the magnitude and direction of this relationship vary across different economies and tax structures. In many cases, particularly in developed countries, direct taxes such as personal and corporate income taxes have demonstrated a positive impact on economic growth by facilitating public investment and promoting income redistribution (Đurović-Todorović et al., 2019; Obura, 2022; MacCarthy et al., 2022). Evidence from OECD countries and Kenya, for instance, highlights that well-structured direct tax systems significantly contribute to GDP growth, supporting the broader consensus that efficient tax administration is critical for

positive economic outcomes. Conversely, several studies point to the adverse effects of direct taxation on growth, especially in contexts where fiscal inefficiency prevails. In the European Union and Nigeria, high corporate and personal income taxes have been associated with reduced investment, lower disposable income, and slower economic expansion (Balasoiu et al., 2023; Adeolu, 2023). Moreover, comparative analyses suggest a divergence between developed and developing countries, with direct taxes positively influencing economic growth in developed economies while often hindering it in developing contexts due to weaker tax collection systems and heavier economic burdens (Hakim, 2020; Hakim et al., 2022). Broader literature supports the idea that the effectiveness of direct taxes in fostering economic development largely depends on the administrative efficiency, the elasticity of tax structures, and the responsiveness of fiscal policies to economic conditions. As emphasised in the existing scholarship, while direct taxes can be pivotal tools for sustainable growth, they require careful calibration to balance revenue needs with the minimisation of investment distortions and economic disincentives.

The study related to direct and indirect taxation has not been widely performed in India. However, the Allingham approach had been tested, and it was found that the approach stands true in today's scenario as well (Kogler et. al, 2022). Although the increase in the tax cut did not have a significant impact on economic growth (Gechert & Heimberger, 2022), the tax reforms increased the wages of middle and highly educated married people. They led to higher female participation in the workforce (Lyssiotou & Elena, 2022). In the Indian context, it was found that the taxpayers have shown more concern for the tax base broadening measures and the utilisation of tax revenue (Singh & Sharma, 2010). One of the studies in the Indian context highlighted that the Indian economy tends to adjust more strongly while lowering the rates (Lee, 2021).

However, recent research has also examined the difficulties and results of tax reforms intended to increase tax compliance and extend the tax base in the context of the Indian economy and taxation policy. For instance, India's introduction of the Goods and Services Tax (GST) was a dramatic change in policy, with the goal of streamlining tax collection and lessening the ripple impact of several indirect taxes. Even while the

reform has somewhat increased tax compliance, there are still issues, especially with enforcement in the unorganised sector, which still accounts for a sizable portion of the Indian economy (Chakravarty & Gupta, 2021). Furthermore, increased compliance rates have been a result of the growing digitisation of tax systems, including the widespread use of e-filing and digital payments. However, this change has brought attention to problems associated with the digital divide, especially in rural areas where internet access is still scarce (Sharma & Tiwari, 2021). These results imply that even though tax reforms have increased the effectiveness of tax collection and revenue generation, more work is required to close enforcement gaps and guarantee that everyone, especially those in the unorganised sector, can benefit from digitalisation.

2.7.7 Residual Drivers of Direct Tax Revenue

The relationship between direct taxation and economic growth in India is inextricably linked to the legislative and policy framework that regulates the country's direct taxation system. The Income Tax Act is the framework's cornerstone, giving standards for assessing, computing, and collecting income taxes from people, businesses, and other entities. The categorisation of different categories of income in the Act, as well as the assignment of appropriate tax rates, are critical in calculating the overall revenue generated by direct taxes (Dong, 2019). The annual Finance Act modifies the direct tax structure even further by revising current legislation and enacting new legislation and tax rates to increase tax compliance and collection. The Finance Act, as part of the Union Budget, outlines the government's economic goals and ambitions, impacting the taxation environment and its impact on economic growth.
India's participation in Double Taxation Avoidance Agreements (DTAAs) with other countries fosters cross-border trade and investment by preventing taxpayers from paying double taxes. This encourages economic cooperation and adds to overall economic growth (Dong, 2019).

The General Anti-Avoidance Rules (GAAR) were put in place to combat tax evasion and manipulation, ensuring that the tax system is fair and equitable. Meanwhile, transfer pricing laws play a critical role in avoiding transfer price manipulation and ensuring that related-party transactions are conducted at arm's length rates. Tax Deducted at Source (TDS) and Tax Collected at Source (TCS) policies speed revenue

collection and broaden the tax base, boosting government finances and public investment in infrastructure and development projects significantly (Prusty, 2021). The government provides tax cuts and exemptions to promote specific industries, attract investments, and foster economic growth in specific locations. The proposed Direct Tax Code (DTC) intends to streamline and modernise direct tax procedures while also providing a comprehensive direct tax framework. These improvements contribute to economic growth by enhancing tax administration and compliance (Samantara, 2021).

GDP growth is important in projecting direct tax collection since a healthy and developing economy generates more money, which leads to increasing tax receipts from individuals and corporations. Rising wages and employment levels result in larger tax payments from the working population, which benefits direct tax collection. Profitability influences tax liabilities as well, with profitable enterprises generating more corporation tax receipts (Yonah et al., 2008). Investment and capital formation are critical drivers of economic growth, as they lead to expansion and higher revenues, which boost direct tax receipts. Consumer spending habits, inflation rates, and the total cost of living can all have an impact on individual purchasing power and disposable income, altering spending, saving, and investing patterns and, as a result, direct tax collection.

The government policies and economic reforms, such as changes in tax rates, incentives, and tax administration improvements, can have an impact on taxpayer behaviour and compliance, and hence on direct tax collections. An increase or decrease in corporate tax rate does not affect economic growth (Kogler et al., 2022). The structure of the economy can be explored by analysing the contribution of various sectors in the economy (Karagoz, 2013). There is no uniformity in the rates of taxes in different countries, and reasons cited for the same can be GDP, per capita income (Pessino et al., 2010; Gupta, 2007), Foreign Direct Investment (Bird et al., 2008; Rehman et al., 2020), inflation and financial policies (Tanzi et al., 1989). Another study revealed that FDI improves healthy competition in the economy and leads to the formalisation of the economy (Gugler et al., 2007). The integration of India into the global economy exposes it to foreign economic trends that might influence the country's economic growth and, as a result, direct tax collection. Tax revenues can be influenced

by the performance of various sectors of the economy, with balanced and diverse economic growth across sectors leading to consistent tax receipts. Government spending and fiscal policies, such as infrastructure investments and targeted fiscal measures, can boost economic activity and income.

The digitisation has emerged as a critical component in improving tax collection efficiency in India, disrupting the traditional tax administration system. The use of technology and digitisation in tax processes has resulted in improved operations, increased transparency, and increased compliance, all of which benefit direct tax collection (Gupta et al., 2017). Real-time monitoring and reporting facilitated by digital technologies allow for the speedy discovery of tax evasion and noncompliance, ensuring accurate and timely tax collection. Digitisation has played an important part in modernising India's tax collection system, resulting in increased efficiency and efficacy. Through online filing and simplified payment systems, the integration of technology and digital solutions has reduced tax processes, making compliance more convenient for taxpayers. Direct tax collections have increased because of improved levels of voluntary compliance. The use of digitalisation has enabled tax authorities to manage massive volumes of data efficiently, utilising data analytics and artificial intelligence to discover possible tax evaders and irregularities in tax returns, resulting in improved tax audit outcomes and higher revenue collection (Strauss et al., 2021). The past decade has seen a boom in digitisation across all sectors, and the same has had an impact on the ways of collecting tax revenue as well. The official beginning of the digitisation of the taxation system in India started in 1981 with the setting up of the Directorate of Income Tax (Systems). Earlier, it was limited only to the processing of challans, but later on, its functioning was extended to the allotment of PAN (Permanent Account Number) and TAN (Tax Account Number). Thirty-three computer centres were set up for tax administration in 1996-97, along with a National Computer Centre in New Delhi. The “dot-com boom” and the digitisation of India were going hand in hand during the 90s. The task to develop application software for the Income Tax Department also took place during the same period from 1997 to 99.

According to the latest Sustainable Development Goals Report 2021 issued by Niti Aayog, 84 out of 100 people have a mobile connection, whereas 55 out of 100 have

a subscription to the internet in India. With rapid growth in the number of mobile and internet users in India, digitisation has now become inevitable in every field, and most areas have started transforming with the help of digitisation. Following suit, the Income Tax Department has also taken a step forward from merely processing challans and allotting PAN online. Now, the entire tax filing system has switched from a manual filing mechanism to an e-filing mechanism. To advance further in this area, even the verification of income tax returns is now done through an Aadhaar one-time password. The digitisation of the taxation system in India has definitely helped in making the tax management and collection system much more efficient and reliable.

India is the world's largest democracy, which makes it a complicated one as well. With such a large country governed by state and central governments, there is often a clash of ideologies. Frequent changes in governments and the instability of coalition partners may also impact the taxation policy at both the national and state levels. There is a healthy linkage between political factors and public expenditure (Dash et al., 2014). Factors such as government efficiency and political stability are also considered determinants of tax revenue (Bird et al., 2008; Martin-Mayoral and Uribe, 2010; Rehman et al., 2020). The fiscal output of the country is influenced by the characteristics of different governments (Dash et al., 2014). Studies have also found that coalition governments typically collect less tax compared to states with single party rule (Dash et al., 2014). Furthermore, research has shown that governments with leftist ideologies have experienced declining tax collections in India (Dash et al., 2014). "Left-wing governments do not seem to affect economic freedom; however, populist left-wing parties, when in office, are found to have a detrimental effect" (Castro et al., 2021).

Transparent and trust-building communication between taxpayers and tax authorities has been enhanced by providing information, updates, and clarifications online. The implementation of e-invoicing and e-way bills under the GST regime has improved tax monitoring and helped reduce tax evasion, facilitating a seamless flow of goods and services, thereby aiding economic growth. Transparency in financial transactions has diminished unreported income and tax evasion, leading to increased tax compliance and collection. Self-help apps and chatbots offer accurate information

and tax advice, bolstering compliance efforts. The adoption of digital tax systems has lowered costs and improved resource allocation for tax authorities, resulting in more efficient revenue collection. Taxpayers have been educated about their obligations and benefits through targeted outreach and awareness programs on digital platforms, fostering a culture of tax compliance. Faster tax return processing, enabled by digital technologies, has enhanced compliance while reducing the potential for tax evasion.

Tax rates also impact tax collection, with countries tending to adjust more substantially when lowering tax rates than when raising them (Lee, 2021). “A decrease of the tax revenue results in an increase of the redistributive power of the tax at the expense of both the average level of taxpayers’ marginal tax rates and the re-ranking effect exerted by the tax” (Pellegrino et al., 2019). “As far as Value Added Tax (VAT) is concerned, there is no clear dependence between VAT and corporate tax rates. However, there is a correlation between the rate of VAT and personal income tax” (Tikhonova at. al, 2019). However, studies also revealed that “top tax rates should be substantially lower than the recommendations ignoring scale of operations” (Ales et al., 2017). A higher corporate tax negatively impacts economic activities (Moore & Bruce, 2014). The corporate share of economic activity typically decreases by 0.2 to 0.3 percent for every ten percentage points that the corporate tax rate is raised, whereas the corporate share of economic activities increases by 0.5 to 0.6 percent for every ten percentage points that the personal income tax rates applied to non-corporate income are raised (Liu, 2014). Studies also find that countries characterised by significant landholding disparity implement income tax sooner, whereas those with more comprehensive electoral regulations are slower to embrace these taxation methods (Mares & Queralt, 2015).

2.8 Trends of Tax Collection During COVID-19

It was predicted at the beginning of the pandemic that “Direct taxes cannot be raised since profits and incomes were badly hit. Non-tax revenue, too, were not expected to contribute more since the public sector was also under stress” (Kumar, 2020). Measuring macroeconomic uncertainty during a pandemic is challenging, and effective coordination of fiscal and monetary policies is essential in mitigating these

uncertainties (Chakraborty & Harikrishnan, 2022). Various events such as natural calamities, economic recession, etc., severely affect the economy and tax collection of a country. It was found that efficiency levels of tax collection have fallen during the start of the economic recession in Spain (Cordero et al., 2021). Although the fall in crude prices rice helped the government increase the excise duty without giving the benefit of falling crude oil to the public to make up for its revenue loss due to the pandemic. Various states in India reprioritised their expenses to cope with the falling revenues during the pandemic, but the same was not enough for them to make up the losses (Mukherjee et al., 2021). Pre-covid studies observed that there was a continuous increase in tax collection without any exception, a study quoted "Irrespective of economic and market conditions, the collection of direct taxes had always increased. The observed increase can be seen as a result of continuous reforms in taxation policy of India" (Mahapatra & Kaushik, 2022). However, in the financial year 2019-20, the number of income tax returns filed, as well as the amount of income declared by taxpayers, has decreased. A fall of sixteen per cent in corporate tax collection was also observed during the financial year (Rao, 2021).

The COVID-19 pandemic has caused significant disruptions worldwide (Rayash & Dincer, 2020). The fact is evident when we analyse that direct tax collection in India fell for the first time from ₹10,50,681 in 2019-20 to ₹ 9,47,176 in 2020-21. The recovery was expected to be slow and uncertain, and it took several years to return to pre-pandemic levels (Rayash & Dincer, 2020). Foreign Direct Investment (FDI) is a key economic growth and development driver, particularly in emerging market economies (EMEs). In recent years, the BRICS countries - Brazil, Russia, India, China, and South Africa - have emerged as major recipients of FDI and have also become important sources of outbound investment. However, the COVID-19 pandemic has significantly impacted FDI flows worldwide, including in the BRICS countries. This literature review examines the trends and determinants of FDI in the BRICS, with a particular focus on the implications of the COVID-19 pandemic (Chattopadhyay et al., 2022). A combination of market size, economic growth, natural resources, and political factors drives FDI inflows to the BRICS countries. However, the COVID-19 pandemic has significantly impacted FDI flows, with adverse effects observed in some countries

and opportunities emerging in others. Policymakers in the BRICS countries should therefore focus on addressing the pandemic and improving the business environment to attract FDI inflows in the post-pandemic period (Chattopadhyay et al., 2022).

The present chapter has explored the changing tax system environment, with a focus on India. It has looked at the relationship between taxes and economic growth, the distinction between direct and indirect taxes, and the disruption brought on by the COVID-19 outbreak. Taxes are essential to both economic growth and the creation of government revenue. The review emphasises the need for a careful balance in tax policy, since high taxes can hinder economic progress while effectively distributed tax dollars can fund public services and infrastructure, promoting long-term economic growth. Notably, the COVID-19 pandemic highlights how susceptible tax systems are to international crises, which impacts revenue collection and emphasises the necessity of sound fiscal policies. Even if there have been significant advancements in our knowledge of the broader effects of tax laws, research also shows that there are still obstacles to reaching the ideal tax structure. A number of external factors, including legislative changes, worldwide economic trends, and crises like the pandemic, have an impact on the intricate link between tax collection and economic growth. More focused research that examines the subtleties of tax reforms in developing nations like India is imperative going forward. Gaps in the literature should be filled by more research, especially in the areas of understanding the effects of digitalisation, international taxation policy, and emerging technologies on national tax systems and how they contribute to sustainable growth.

2.9 Tax Buoyancy and Elasticity

Two key ideas in the study of fiscal policy are tax buoyancy and tax elasticity, which provide light on how tax collections react to shifts in the economy or tax laws (Aashish, 2024). Although they both gauge how responsive tax revenue is to fluctuations, their emphasis on the reason for the change is different (Tanchev & Todorov, 2019; Ahmed, 1994). One important metric for evaluating how well a tax system responds to economic expansion is tax buoyancy. Policymakers can make decisions that guarantee tax revenues sufficiently support government expenditure without unduly burdening the

economy by using this interpretation, which offers crucial insights (Aashish, 2024; Ahmed, 1994).

Tax buoyancy measures the sensitivity of tax revenue to changes in national income and policy adjustments. A buoyancy coefficient greater than one indicates that tax revenue grows faster than the economy, suggesting a robust tax system (Aashish, 2024). In India, tax buoyancy is essential for financing public spending. The buoyancy coefficient helps assess the success of fiscal policies in boosting tax revenues, with a focus on aligning tax systems with economic realities (Aashish, 2024). In the long run, the buoyancy of total tax receipts approaches equilibrium (Tanchev & Todorov, 2019). The tax measures' buoyancy and the entire tax revenue's reaction to changes in income (Ahmed, 1994). The estimate of constant gross tax buoyancy during the pre-tax reform period is higher than unity and positively significant, suggesting that India's gross tax was relatively elastic until 2004–05. Understandably, a one per cent rise in income causes a greater than one per cent increase in gross tax collections (Upender, 2008). Tax buoyancy is positively impacted by imports, the manufacturing and services sectors, monetisation, and budget deficits; tax buoyancy is negatively impacted by grant growth. In the case of poor countries, when taxes are either non-existent or insufficient, the expansion of the agricultural sector does not affect tax buoyancy (Ahmed & Muhammad, 2010).

Tax buoyancy, or the overall tax revenue response to changes in national income and discretionary tax policy over time, and tax elasticity, or the automatic tax revenue response to GDP changes less the discretionary tax changes, are two key metrics in public finance that have been used to evaluate the effectiveness of any tax system in terms of its mobilisation capacity (Ghai, 1966). If, with the tax structure remaining unchanged, the incremental tax revenue/national income ratio exceeds the average/national income ratio, the tax system is deemed elastic. The correlations between the marginal rate of taxation, average rate of taxation, marginal proportion of tax base in national income, and average share of tax base in national income determine the income elasticity of a specific tax (Ghai, 1966).

The tax buoyancy and elasticity of a country's tax system are crucial to guaranteeing long-term economic growth and fiscal stability. Tax buoyancy assesses

the responsiveness of tax revenue to changes in economic activity but does not account for discretionary changes in tax policy, whereas tax elasticity does. The empirical analysis of tax buoyancy across areas sheds light on the efficiency and effectiveness of various tax systems. Several studies have emphasised the relevance of tax buoyancy in ensuring economic stability. Ahmed (1994), for example, investigated the factors of tax buoyancy in 35 developing nations and discovered that industrial growth and increased money supply had a favourable influence on tax collections. In contrast, the agriculture and services sectors had the opposite effect. Similarly, Ghura (1998) investigated tax revenues in Sub-Saharan Africa, concluding that economic policies and corruption have a significant impact on tax revenue-to-GDP ratios, with trade openness and income positively impacting tax revenues and agricultural shares and external grants having negative effects.

The elasticity and buoyancy of direct taxes were more than one, indicating that tax collections increased more than proportionally to income. This pattern was also seen for sales taxes but not for customs and excise duties, demonstrating the varying influence of different forms of taxes on revenue generation (Mukarram, 2001). Most taxes were inelastic, with income and turnover taxes having mild elasticity. This inelasticity implies that the tax system does not adapt appropriately to changes in income levels, indicating potential inefficiencies in the tax structure (Indraratna, 2003). Sales tax accounts for a sizable percentage of indirect taxes, while income tax payments remain relatively low despite policy changes (Bilquees,2004). Gross taxes were more elastic prior to the reforms, but were inelastic afterwards. This trend suggests that tax reforms may have lessened the sensitivity of tax collections to economic growth (Upender,2008). The long-term elasticity of the personal income tax was larger than that of the VAT, both in the short and long terms (Wolswijk,2009).

The agriculture and services sectors had a negative impact on tax-to-GDP ratios. In contrast, openness, foreign aid, and political stability had favourable effects (Chaudhry & Munir, 2010) in the analysis of the factors influencing tax income in Pakistan. According to Twerefou et al. (2010), Ghana's tax system was elastic and buoyant over the long term but less so in the short term, indicating that shifts in policy and the state of the economy have a significant impact on tax responsiveness. The analysis of tax revenues in sub-Saharan Africa, trade openness and peacetime had a

beneficial impact on tax-GDP ratios, but agricultural share had a negative impact on tax performance (Addison & Levin's, 2011). After investigating the tax structure in Jamaica, Milwood (2011) discovered important discretionary modifications that had an impact on buoyancy and elasticity.

Kenya's entire tax structure was less elastic, with the main tax components exhibiting inelasticity (Okech & Mburu ,2011).The buoyancy estimations exceeded elasticity which suggests that discretionary measures play a substantial influence in the creation of tax income (Kargbo & Egwaikhide ,2012).Kenya's tax system was determined to be neither elastic or buoyant indicating the need for tax reforms(Samwel and Isaac ,2012). The long-run buoyancy of the tax buoyancy in OECD countries was found to be about unity, indicating stable tax regimes. Dudine and Jalles (2018) looked at tax buoyancy in 107 countries and found that while output volatility and inflation had a negative influence on buoyancy, trade openness and human capital had a beneficial effect.

The research on tax elasticity and buoyancy emphasizes the intricate relationship that exists between tax laws, economic expansion, and revenue collection. Numerous studies show that certain taxes, such as sales and income taxes, are more elastic and buoyant than others, such as excise taxes and customs charges. The results point to the necessity of ongoing assessment and modification of tax systems in order to improve their effectiveness and adaptability to fluctuations in the economy. The effectiveness and adaptability of India's tax system to changes in the economy are vitally revealed by the study of tax buoyancy and elasticity in that nation. An empirical investigation of the level of tax buoyancy in India before and after the 1992 tax reforms was carried out by Upender (2008). According to Upender (2008), the analysis found that gross taxes were more elastic prior to the reforms but became less elastic afterward. This suggests that the tax reforms may have lessened the tax revenues' elasticity in response to economic growth. This change emphasizes how important it is to continuously evaluate and modify tax laws in order to keep a functional and responsive tax system.

The historical background of India's tax reforms reveals a dramatic shift intended to increase tax compliance and efficiency. Mukarram (2001) investigated the effects of several tax measures that were put into place in India between 1980 and 2001.

According to the results, direct tax elasticity and buoyancy were both more than one, indicating that tax revenues rose beyond the income level proportionally (Mukarram, 2001). The varying effect of various tax types on revenue generation was highlighted by the observation of this trend for sales taxes but not for customs and excise duties. The main goals of the reforms have been to lower tax rates, increase tax administration, and increase the size of the tax base. Understanding the relationship between India's economic policies and tax receipts is essential to determining how effective the country's tax system is. According to Chaudhry and Munir's (2010) analysis, openness, foreign aid, and political stability had favourable effects on tax-GDP ratios, whereas the agriculture and services sectors had a negative influence (Chaudhry & Munir, 2010). While Pakistan was the study's primary focus, the same dynamics can be seen in India, where the sectoral mix and economic policy greatly influences the performance of tax income.

Over time, India's sectoral contributions to tax collections have changed. According to Bilquees (2004), sales tax made up a sizable amount of indirect taxes in Pakistan. This is similar to the situation in India, where sales tax—and now the Goods and Services Tax, or GST—play a significant role in generating income (Bilquees, 2004). In order to decrease the cascading effect of several taxes and create a single tax structure, India's indirect tax system underwent a major revamp with the implementation of the Goods and Services Tax (GST) in 2017. The GST is intended to be flexible and able to rise in revenue collection in line with economic expansion.

Even now, new research emphasises how important it is to maintain a flexible and buoyant tax framework. Upender (2008) found that gross taxes were more elastic before the reforms but less elastic afterwards in India, based on a comparison of tax buoyancies before and after the reforms. This study shows that, despite the fact that reforms have expedited tax collection, it is still critical to ensure that the tax system can adjust to changes in the state of the economy. Additionally, the introduction of GST has been a crucial step in developing a more adaptable and dynamic tax system by broadening the revenue base and simplifying the tax structure.

Continuous policy monitoring and reform are required to improve tax buoyancy and flexibility. Revenue collection can be greatly increased by taking steps like expanding the tax base, eliminating needless exemptions, enhancing tax administration, and

utilizing technology to improve compliance. Mukarram (2001) stressed the significance of adjustments that improve the tax system's effectiveness and adaptability to changes in the economy. By putting these suggestions into practice, we can make sure that the Indian tax system is strong and able to maintain long-term economic growth.

"A central tax policy parameter that has recently received much attention, but about which there is substantial uncertainty, is the overall elasticity of taxable income" (Gruber & Saez, 2002). Tax elasticity, particularly the elasticity of taxable income (ETI), is a crucial concept in public finance that measures the responsiveness of taxable income to changes in tax rates. This measure encapsulates various behavioral responses to taxation without delving into specific adjustment processes or tax regulations (Creedy, 2022). The ETI is central to understanding the efficiency and welfare implications of tax policies, as it reflects how individuals might alter their income reporting or economic activities in response to tax changes (Creedy, 2022). Empirical studies, such as those analyzing the Tax Cuts and Jobs Act of 2017 and the American Taxpayer Relief Act of 2012, have estimated the ETI using data from the Current Population Survey, finding an elasticity of 0.81, which aligns with previous research (Sherpa, 2023). Additionally, the concept of tax revenue elasticity is vital for fiscal sustainability, as it indicates how tax revenues respond to economic growth, ensuring that government budgets remain balanced (Pattichis, 2022). The behavioral elasticity of tax revenue (BETR) further refines this understanding by assessing the efficiency consequences of tax policies, helping policymakers optimize tax enforcement and achieve distributional objectives efficiently (Hemel & Weisbach, 2021). Overall, the study of tax elasticity provides valuable insights into the design and impact of tax systems, guiding both theoretical and practical approaches to fiscal policy.

2.10 Tax-to-GDP Ratio

The tax-to-GDP ratio remains a concern, with the need to balance tax reforms with other fiscal measures, such as managing subsidies and public debt. Additionally, the introduction of the Goods and Services Tax (GST) represents a significant shift in the overall tax structure, potentially impacting direct tax buoyancy by altering the balance between direct and indirect taxes (Paliwal et al., 2019). A steady and dependable source of income, buoyancy characteristics show that direct taxes are highly correlated with

GDP growth and have strong governmental backing. They are a solid foundation for revenue collection since they are less affected by changes in consumption. However, despite reforms like GST, indirect taxes are still quite vulnerable to economic cycles and outside shocks, necessitating concerted stabilising measures. There is hope for the future in the post-GST age, since buoyancy is slowly making a comeback.

The digitalisation and compliance enforcement should continue to broaden the tax base. Maintain buoyancy amid economic downturns by implementing progressive reforms—Maximise revenue efficiency by strengthening GST implementation and expanding its coverage. When the economy is in a slump, policymakers should prioritise spending cuts to stimulate spending. India could benefit from broadening its tax base by removing certain exemptions and expanding the number of taxpayers. Using technology to improve tax administration can also help increase revenue and reduce distortions caused by taxes. To improve tax revenue systems, policymakers should focus on both direct and indirect taxes. As a first step in expanding the tax base, digitisation and compliance enforcement should be prioritised for direct taxes. These measures will increase revenue collection and provide more consistent contributions during economic expansion. Progressive reforms, meanwhile, will help the system weather economic downturns. Many countries offer social welfare incentives that help reduce the tax burden on individuals, making it easier for them to comply with tax laws. These incentives can lead to better tax compliance and less tax evasion, which is beneficial for the economy.

A more effective and predictable revenue stream can be achieved by stabilising indirect taxes through better GST implementation and expanding tax coverage. In times of economic crisis, such as recessions or pandemics, targeted fiscal policies that increase consumption can help mitigate revenue losses and encourage economic recovery by increasing indirect tax buoyancy.

To make more informed policy decisions, it might be instructive to examine the correlation between GDP growth rate and buoyancy in direct and indirect taxes. Based on the findings, below are some practical recommendations for the Indian government. The buoyancy of direct taxes is inversely proportional to the growth rate of GDP; however, this relationship is weak and statistically insignificant. To encourage more

individuals and businesses to submit their income taxes, simplify the process. To reduce tax evasion, set up compliance monitoring systems that AI powers. Reduce reliance on a limited taxpaying population by increasing the number of individuals and companies liable to taxation. Make sure everyone knows how important it is to pay their taxes by launching campaigns that educate people about money management. Industries that significantly boost GDP growth, such as manufacturing, technology, and infrastructure, should be granted specific tax advantages.

The fact that indirect tax vacancy is positively correlated with GDP growth rate suggests that it is susceptible to changes in the economy. Government authorities must persist in their efforts to simplify GST procedures and reduce compliance costs for businesses. Make sure that SMEs receive their GST refunds on time to help them improve their cash flow. Authorities can improve the detection of tax leakage and the collection of indirect taxes by utilising AI and advanced analytics. Our system's principal objective should be to ensure that GST-related technologies, such as e-way bills, are effective. Assisting in the formalisation of the economy ought to be given paramount importance. A possible solution would be to associate the Goods and Services Tax (GST) benefits with jobs and tax registrations in the formal sector, and to provide financial incentives to businesses that make the transition from the informal to the official sector.

2.11 Research Gap

Although substantial research has been conducted on taxation systems and revenue mobilisation, notable gaps remain in the specific context of direct tax collection in India. First, while several studies have analysed individual macroeconomic factors such as GDP, inflation, and population, there is limited empirical literature and examination that integrates these variables to evaluate their combined effect on direct tax performance in India. Most studies are fragmented, and few have used recent post-reform data to build a comprehensive framework. This reveals a gap aligned with the study’s second objective: identifying the key determinants of direct tax collection in India.

Secondly, although buoyancy and elasticity are well-established concepts in fiscal literature, recent Indian studies evaluating these in the context of structural reforms like Tax Deduction at Source (TDS), faceless assessment, and digital filing remain scarce. This constrains the understanding of how responsive the Indian direct tax system is in the evolving economic environment, indicating a gap with respect to tax buoyancy and elasticity.

Third, much of the existing literature on the relationship between taxation and economic growth is based on cross-country or OECD datasets. The Indian context, characterised by rising income inequality, a growing digital economy, and sector-specific tax bases remains underexplored. There is a need for focused research that links direct tax performance with India's economic growth trajectory.

Furthermore, there is a lack of policy-focused research that evaluates the effectiveness of recent government initiatives aimed at improving tax compliance and collection efficiency, such as the Vivad se Vishwas Scheme and the Transparent Taxation platform. Most available literature describes these reforms rather than measuring their outcomes. This limits actionable insights and leaves a gap that seeks to recommend policy measures.

CHAPTER III

RESEARCH METHODOLOGY

A thorough understanding of research methods and data analysis is essential for designing and conducting effective secondary research. In secondary research, the focus is on collecting, analysing, and interpreting data from existing sources to address the research objectives. This chapter details the methodology employed in the study, including the research framework, data sources, and the analytical techniques used. Chapter III provides a comprehensive description of statistical tools employed for data analysis.

3.1 Research Design

The study is descriptive research, which uses secondary data from authentic and official sources to test the hypotheses for research questions.

3.1.1 Data Collection

Data collection from an authentic source is one of the most important parts of research as the entire research is dependent on the accuracy of the base data. Therefore, it becomes imperative to collect the data from an authentic source.

- Data related to direct tax is collected from the official website of *the "Central Board of Direct Tax (CBDT) which is a statutory body constituted under the Central Board of Revenue Act, 1963 and is a part of the Income Tax department of India.*
- Data related to Indirect Tax is collected through the official website of *the "Ministry of Statistics and Program Implementation (MoSPI) which is an independent ministry under the Government of India.*

Data related to parameters such as GDP, Inflation, Population, Unemployment Rate and Corruption is fetched through the official website of the World Bank Group.

3.1.2 Research Hypothesis

Based on literature review, following hypothesis has been framed:

H_{01} = "There is no significant relationship between Tax Collection and Gross Domestic Product (GDP)".

H_{02} = "There is no significant relationship between Tax Collection and Inflation".

H_{03} = "There is no significant relationship between Tax Collection and Population".

H_{04} = "There is no significant relationship between Tax Collection and Unemployment Rate".

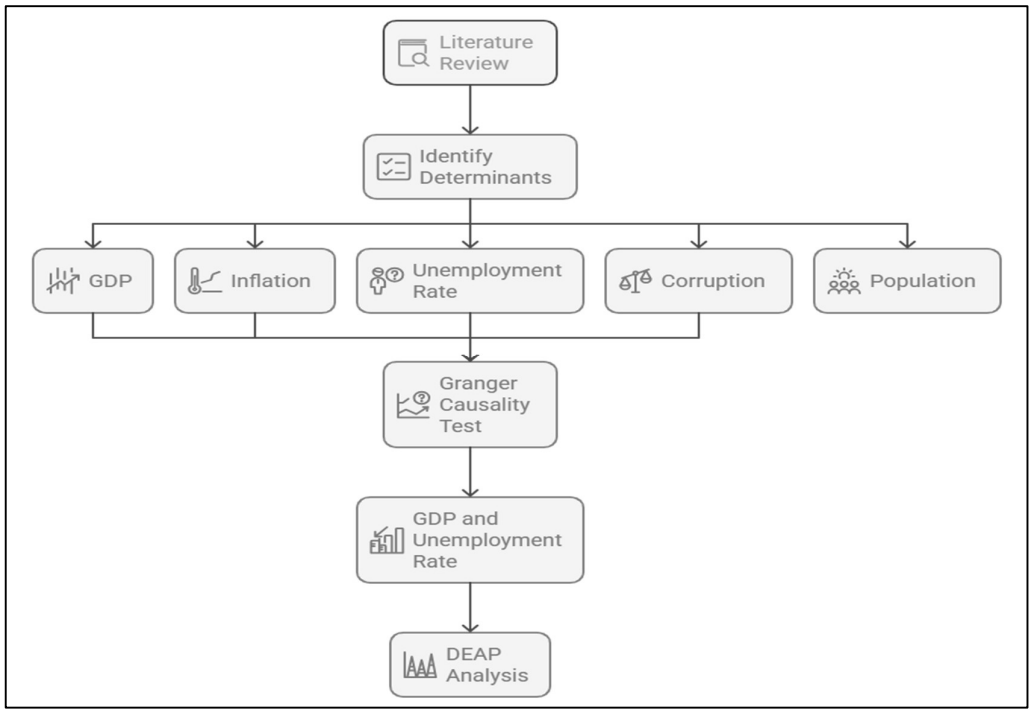
H_{05} = "There is no significant relationship between Tax Collection and Corruption".

H_{06} = "There is no significant relationship between Tax Collection and Cost of Tax Collection".

3.1.3 Conceptual Framework

Figure 3.1 explains the conceptual framework of identifying determinants of tax collection by literature review and further checking them for causality and efficiency through granger causality and Data Envelopment Analysis.

Figure 3.1 Conceptual Framework of Trend Analysis of Tax Collection



Source: Author's compiled model

3.2 Systematic Literature Review (SLR)

A systematic literature review was conducted using the Scopus database to identify determinants of direct tax collection in India. The Scopus database is considered a reliable and consistent platform for extracting data from published research papers (Silva & Moreira, 2022). Data is extracted from the Scopus database using the keywords "DIRECT TAX" or "INCOME TAX" and "DETERMINANTS" or "FACTORS". The study follows Preferred Reporting Items for Systematic Review and Meta-Analysis (PRISMA) to address the research questions. PRISMA approach is a widely accepted approach for Systematic Literature Reviews (SLR) (Martinez & Ahmad, 2022; Macusi et al., 2022; Maffezzoli et al., 2022). Also, to find relevant studies, the exact keywords were used on Google Scholar to find out studies that were not part of the data extraction on the Scopus database.

3.3 Grey Forecasting

Tax forecasting is essential for governments to formulate budgets, distribute resources, and maintain fiscal stability. It facilitates the forecasting of revenue streams, enabling policymakers to make educated choices on public expenditure and economic reforms. Precise tax projections enhance investor confidence and promote sustainable economic growth by reducing budgetary risks. This study encompasses the financial years 2000-2001 to 2022-23 regarding direct and indirect tax collection in India, sourced from the "Central Board of Direct Taxes (CBDT), Government of India" and the "Ministry of Statistics and Programme Implementation (MoSPI)". Utilising the aforementioned 22-year analysis, we projected tax revenue by grey forecasting (GM, 1,1) for the period 2023-24 to 2029-30. "Projections indicate that direct tax collections are anticipated to attain ₹ 30.67 trillion in 2029–30, representing around 54.41 per cent of total tax revenues, while indirect tax collections are likely to hit ₹ 25.70 trillion." (Kaushik et al., 2024).

The grey models and theory have developed, leading to an extensive body of literature on theory and applications. The Scopus search engine identified around 126,000 publications containing "grey model," "grey forecasting," or "GM" from 1854 to October 2024. It indicates a heightened interest in grey vehicles during the past decade. Prior studies demonstrate that "no prior research has employed GM (1,1) for taxation forecasting"; Khan & Osińska (2021) observed no substantial difference in predicting efficacy among the fractional grey model (FGM), GM (1,1), and ARIMA (1,1,1). Sharma and Kumar (2024) showed that "grey modelling yields more precise findings with limited data points than alternative approaches and is better suited for forecasting in chaotic and complex environments with discrete data points". Historically, in 1982, Deng Ju-long established grey system theory, which is intended to function efficiently with a limited set of observations (Kazancoglu et al., 2021). The idea is particularly beneficial for systems characterised by inadequate or ambiguous knowledge. "Grey system theory aims to connect the scientific and social sciences, enabling its application across many domains to address numerous difficulties" (Javanmardi et al., 2023). The term "grey system" derives from the hue symbolising the subject of investigation. In control theory, the intensity of the hue signifies the clarity of the information (Jiang et al., 2021). A prominent concept in this theory is the "black

box," utilised when the internal characteristics or mathematical equations governing system dynamics are entirely unknown (Pires et al., 2023). The Grey Forecasting Model, known as GM (1,1), is a technique employed for forecasting constrained and short-term datasets, generating an appropriate predictive model without necessitating the examination of the statistical distribution of the data (Zhou et al., 2021). Within this framework, "black" denotes information that is entirely unknown, "white" signifies obvious and identified information, and "grey" indicates a combination of known and unknown elements. Consequently, systems lacking any known information are designated as black systems, those with complete knowledge are termed white systems, and those with incomplete information are classified as grey systems. The word grey system originated from the colour of the subject under examination. In control theory, colour depth signifies the extent of information clarity; a notable variant is termed a black box (Hassija et al., 2024).

The term black means unknown information, white indicates information that is completely clear or identified, and grey shows information that is partially clear and partially unclear. Thus, systems with completely unknown information are labelled black systems, those with explicit knowledge are called white systems, while systems with incomplete information are classified as grey systems (Javanmardi et al., 2023). The GM type (1,1) is a version of grey system theory widely employed across various fields owing to its computing efficiency relative to other grey system theories (Delcea et al., 2023). The GM type (1,1) is often known as the First Order Grey Model. A solitary variable is employed for generating forecasts using time series data (Khan & Osińska, 2023). The GM (1,1) model, an essential component of this theory, is frequently utilised for forecasting objectives Guo et al. (2015) postulated the use of an actual data set (x_1^0, x_2^0) to compute predicted data (x_3^0).

Six primary phases are necessary to execute GM (1,1) modelling for prediction, as outlined below: The initial stage entails utilising the primary data points. Whereas x^0 Represents the original data points:

$$x^0 = (\{x^0(1), x^0(2), \ldots x^0(n)\}, n \geq 4 \quad (1)$$

Equation 2 is computed based on Equation 1.

$$x^0(i:k) = (\{x^0(i), x^0(i+1), \dots x^0(k)\} \quad (2)$$

Equation (3) is indicated below.

$$x^0(i:k) = \{x^0(1), x^0(2), \dots x^0(k)\}, i = 1 \quad (3)$$

Additionally, an "Accumulating Generation Operation (AGO)" is performed on this sequence (Equation 3), yielding the subsequent sequence (x_1).

In the second step, using AGO, x_0 series changes monotonically to increase the x_1 series. To calculate x_1. The Sigma function is used in the Equation, which is shown below.

$$x_k^1 = \sum_{i=1}^{k} (x^0 i)\,, i \qquad = 1,2, \dots, n \quad (4)$$

$$x_k^1 = x_1^1, x_2^1, \dots, x_n^1 \quad (5)$$

In this step Z_k^1 is calculated after finding the x_k^1. Then, the generated mean sequence Z_k^1 of x_k^1 is computed using the below-defined formula.

$$Z_k^1 = 0.5[(x_k^1) + (x_{(k-1)}^1)], k = 1,2,3, \dots, n \quad (6)$$

By using the given formula, Z_k^1 is found as follows:

$$Z_k^1 = 0.5x_k^1 + 0.5x_{(k-1)}^1 \quad (7)$$

The parameter values of both a and b are calculated using the least squares approach, resulting in the following equation as defined below. Furthermore, subsequent to the formulation of the necessary grey model, the output of the grey equation will be calculated utilising both the *a* and *b* parameters.

Equation (8) is used as a substitute for Equation (9).

$$b = x_{(k)}^0 + aZ_k^1\ , x_{(2)}^0 = aZ_2^1 + b\,, x_{(3)}^0 = aZ_3^1 + b \quad (8)$$

The output of equation 6 was put into equation 9 for further analysis

$$x_{(n)}^{0} = aZ_{n}^{1} + b \quad (9)$$

Additionally, to ascertain the values of parameters a and b, the subsequent matrices must be constructed using the specified formula:

$$x_{2}^{0}, -Z_{2}^{1}\ 1\ , \quad (10)$$

$$x_{3}^{0}, -Z_{3}^{1}\ 1,$$

$$\mathrm{Y} = x_{n}^{0}\ \ , \mathrm{B} = -Z_{n}^{1}\ \ 1$$

Subsequently, the matrix methodology is employed to ascertain the values of both parameters (i.e., a and b).

$$a = (a, b)^{T} = (B^{T}B)^{-1}(B^{T}Y) \quad (11)$$

To determine the predicted value of the initial data point at (*K+ 1*), there is a need to calculate the grey differential Equation.

$$x_{(K+1)}^{1} = \left[x_{1}^{0} - \frac{b}{a}\right] e^{-ak} + \frac{b}{a} \quad (12)$$

The inverse AGO method is employed to regulate the computed data, as demonstrated in Equation 10. This stage involves calculating the anticipated value utilising parameter values and initial data points, as seen in the subsequent equations of the GM (1,1) model.

$$x^{0}{}_{(K+1)} = \left[x_{(K+1)}^{1} - x_{(1)}^{1}\right], \mathrm{K} = 1,2,3.., \mathrm{n} \quad (13)$$

$$x_{(K+1)}^{0} = \left[\{(1 - e^{a})(x^{0}(1)\}] - \frac{b}{a}e^{-ak}\right], K = 1,2,3 \ldots, N$$

To assess the error in the GM (1,1) Model and ascertain the deviation between the actual and predicted values, we ultimately conduct an error analysis. We evaluate the accuracy the of the GM (1,1) prediction model by error analysis. The following Equation is applied to measure the average percentage error, where $\hat{x}_{k}^{0}$ shows the predicted value of the model and x_{k}^{0} shows the initial value of data.

$$e(K+1) = \left|\frac{x_{k}^{0} - \dot{\hat{x}}_{k}^{0}}{x_{k}^{0}}\right| \times 100\% \quad (14)$$

Table 3.5 Literature summary of different taxation forecasting models in India.

Author(s)	Method	Focused Area
Yadav et al. (2024).	Non-linear cointegration techniques.	Demand for fuel, tax on carbon and electric vehicle (EV) adoption for transportation in India
Thayyib et al., (2023)	TBATS, ETS, Neural Networks, and hybrid time series models	Forecasting Indian Goods and Services Tax revenue.
Mukherjee and Bhattacharya (2023)	Univariate "Seasonal Auto-Regressive Integrated Moving Average (SARIMA)" model and "Vector Auto Regression (VAR) model".	Revenue forecasting of corporate income tax (CIT) in India
Khurana et al. (2023).	Multiple linear regressions were carried out using SPSS	Tested the relationship between interest rate and price of vehicle, and a reduction in "Goods and Services Tax (GST)" for small cars could increase sales.
Nithin & Roy (2016).	"Theil's inequality coefficient and maximum entropy bootstrap."	Normative fiscal evaluations of the Finance Commission (FC) of India and the implementation of fiscal policy concerning Central Finances.

Dossani (2003).	Dynamic foundations of machine-loaded structures.	The necessity for venture capital in India to facilitate the expansion of its Information Technology sector is projected in the venture capital industry projection.

Source: Author's Compilation

3.3.1 Accuracy of the Forecasting Model

It is essential to evaluate the precision of the forecasting model, and to do so, the original values of the positive and negative errors are utilised to compute the estimated error value through RPE (Relative Percentage Error) (Kayacan et al., 2010; McEwan, 2024; Kaushik et al., 2024). Prior studies indicate that "grey forecasting yields more accurate predictions than the autoregressive integrated moving average (ARIMA)", as evidenced by a lower mean absolute percentage error (MAPE) (Yuan et al., 2016). Khan and Osińska (2023) advocated for the utilisation of the ONGBM (1,1) and NGBM (1,1) PSO models for short-term energy consumption prediction, integrating these predictions with those generated by the GM (1,1) and ARIMA (1,1,1) models. Furthermore, Sharma and Kumar (2024) demonstrated that "grey modeling produces more precise results with limited data points than alternative approaches and is better suitable for predicting in chaotic and complex environments with discrete data points".

Firstly, we have applied grey modelling to the values of indirect taxes. The process of calculating indirect tax generation using GM (1,1) has been elaborated systematically below. "X_0" represents a non-negative data series for indirect tax in previous consecutive years, and are given as:

X_0 = (119814, 237132, 369740…)

Then new X_1 series is calculated, which effectively is a cumulative addition of X_0 series, which is AGO

X^1 = (238380, 422002, 628914…)

From the following sequences,Z_k^1 of X_k^1 is found as

Z_k^1 = (1249118.3, 2807055.8, 3306198.3, 5034118.3)

Using the least squares method, the values of *a* and *b* have been obtained

Y= |117318 132608 148608 ... | B=|−238380 − 422002 − 628914 ... 1 1 1 1 |

Then we calculated $(B^T.B)^{-1}$ for using equation 8

$(B^T.B)$ = |1.25042E + 15 − 124242656 − 124242656 22 |

$(B^T.B)^{-1}$ = |1.82225E − 15 1.0291E − 08 1.0291E − 08 0.103572 |

a = -0.098, b = 123997.4, e = 2.7183

$$x_{(K+1)}^1 = \left(1455398 - \frac{123997.4}{-0.098}\right) e^{-(-0.098)(k)} - 123997.4$$

Upon calculating the constants a and b, the projected values for each year have been determined using the aforementioned forecasting equation. Likewise, we computed the forecasting equation for the direct taxes presented below:

$$x_{(K+1)}^1 = \left(1604571 - \frac{153627}{-0.1}\right) e^{-(-0.1)(k)} - 153627$$

"The expected rise in tax revenue, attributed to the augmented proportion of direct taxes, signifies a shift towards a more progressive taxation system" (Cloyne et al., 2024). As direct taxes constitute an increasing proportion of total revenue, it indicates a system where taxation is increasingly closely associated with income and profits, perhaps resulting in reduced income inequality. "This may result in a more equitable distribution of income, since higher earners contribute a greater share of government resources; such an action has significant consequences. An increased focus

on direct taxation can enhance fiscal stability, as these taxes are more predictable than consumption-based indirect taxes. This predictability enables governments to enhance resource planning and distribution" (Wildasin, 2021).

Moreover, the expanding revenue base enhances the ability for investment in the anticipated growth of both direct and indirect tax collections, indicative of the economy's formalisation and improved tax compliance (Okunogbe & Santoro, 2023). As the tax base expands, the government can reduce its dependency on borrowing and external financing, leading to enhanced financial autonomy. The rise in revenue may facilitate more focused fiscal policies, enabling the government to tackle specific economic challenges such as unemployment, inflation, and social welfare needs, hence fostering long-term economic resilience (Larch et al., 2024).

Furthermore, the data indicated sustained revenue growth, as the forecast suggested a significant rise in both direct and indirect tax receipts. It indicates that the government can anticipate augmented revenues to support public expenditure and long-term investments.

Augmented tax revenue is associated with anticipated economic expansion. This indicates that India's economic policies are expected to sustain growth, thereby enhancing the nation's fiscal standing. Revenue growth is anticipated to be propelled by both economic factors and enhancements in tax compliance. Ongoing initiatives to enhance tax enforcement and administration, particularly through digitalisation, will be essential to fulfilling this commitment. Notwithstanding the challenges posed by the COVID-19 pandemic, the grey forecasting model exhibited consistency. This illustrates its durability in unforeseen circumstances, rendering it a crucial instrument for future economic forecasting. This study highlights that, due to the model's resilience, policymakers may increasingly depend on it for strategic budgetary planning and resource allocation

3.4 Granger Causality

Granger causality is widely employed in public finance research to explore directional relationships among financial variables and their influence on economic indicators. Its application facilitates an empirical investigation into whether one time series can

predict another, making it a valuable tool for understanding the dynamic interplay between fiscal inputs and outcomes. For example, Ampedu et al. (2023) utilised Granger causality to evaluate how financial development influences economic growth in Tanzania, offering insights into the effectiveness of public policies on fiscal performance. Similarly, Rauf et al. (2024) applied Bootstrap Granger causality in the context of OECD nations to examine the impact of public expenditure on fiscal health, showcasing the robustness of the method in detecting policy effects on financial systems. On a more localised scale, Afshan and Vien (2024) analysed the causal link between government spending and regional economic performance in North Carolina, affirming the test's utility in assessing local fiscal dynamics. In Nigeria, Mishra (2024) used Granger causality to evaluate the relationship between tax revenue—specifically VAT—and governance indicators, emphasising its applicability in governance studies. Additionally, Wudil and Tsauni (2024) examined the interdependencies among economic growth, trade openness, and financial development using this approach, reinforcing its relevance for macroeconomic analysis. These studies collectively support the inclusion of Granger causality in the present research to uncover the predictive relationships between direct tax collection and selected economic variables in the Indian context.

"Granger causality has conventionally depended on the assumption of a linear vector autoregressive (VAR) model" (Lütkepohl, 2005) and "evaluating tests on the VAR coefficients within a bivariate framework. Nevertheless, in practical systems with several time series, analysing the link between only two series may result in misleading conclusions" (e.g., Lütkepohl 1982). "Network Granger causality seeks to account for potential confounders or simultaneously analyse multiple series" (Eichler, 2007; Basu et al., 2015). "In his foundational paper, Granger (1969) introduced a concept of causality predicated on the predictive capacity of past values of a time series Y_t for future values of another series X_t." (Shojaie and Fox, 2022).

3.4.1 Variables of Economic Growth relevant for Tax Collection

Various studies show the determinants of economic growth that have an impact on tax collection. Corruption is found to be a significant hurdle in the tax collection process (Amin et al., 2014). Also, there is no uniformity in the rates of taxes in different

countries, and reasons cited for the same can be GDP, population (Pessino et al., 2010; Gupta, 2007), and inflation (Tanzi et al., 1989). "Level of unemployment, and number of informally employed people impacts the individual income tax receipt in a nation" (Kalivoshko et. al, 2020). On the basis of past studies, it is found that the following economic variables have an impact on tax collection, i.e., Gross Domestic Product (GDP), Population, Inflation, Unemployment Rate and Corruption. The data for independent variables like GDP, population, inflation, and unemployment rate are extracted from the World Bank database. The data related to corruption is obtained through Transparency International (www.transparency.org).

3.4.2 Granger Causality Framework

H_0: The independent variable (GDP, Inflation, Population, Unemployment Rate, Corruption) does not Granger-cause the dependent variable (Tax Collection).

H_1: The independent variable Granger-causes the dependent variable.

F-statistic Formula:

$$F = \frac{(RSS_{restricted} - RSS_{unrestricted})/q}{RSS_{unrestricted}/(n-k)}$$

Where**:**

RSS $_{restricted}$: Residual sum of squares for Model 2.

RSS $_{unrestricted}$: Residual sum of squares for Model 1.

q: Number of restrictions (e.g., lags of the independent variable).

n: Number of observations.

k: Total number of parameters estimated in Model 1.

The null hypothesis (H_0) will be rejected if the p-value is less than or equal to the significance level (α), which is typically set at 0.05.

3.4.3 Granger Causality on GDP and Tax Collection

Model 1 (Extended):

$$Tax.Collection_t = \alpha + \sum_{i=1}^{p} \beta_i \, Tax.Collection_{t-i} + \sum_{i=1}^{q} \gamma_i \; GDP_{t-i} + \varepsilon_t$$

Model 2 (Restricted):

$$Tax.Collection_t = \alpha + \sum_{i=1}^{p} \beta_i \, Tax.Collection_{t-i} + \varepsilon_t$$

The coefficients and parameters in the Granger causality models are critical to understanding the relationship between tax collection and other variables. The intercept term (α) represents the average level of tax collection (Tax Collection) when all lagged terms are zero. The coefficients for the lagged terms of Tax Collection (βi) capture the effect of past tax collections on the current tax collection, highlighting the persistence or dependency within the variable. Similarly, the coefficients for the lagged terms of the independent variable (γ_i), such as GDP, Inflation, or other factors, quantify the impact of these variables on Tax Collection.

The models also incorporate lags for both dependent and independent variables, denoted as (*p)* and (*q*), respectively. Here, *p* indicates the number of lagged terms included for Tax Collection, while *q* specifies the number of lagged terms for the independent variable. Lastly, the error term (ε_t) accounts for unobserved factors at time (*t)* that might influence Tax Collection, ensuring that the models remain robust and unbiased. These elements collectively provide a comprehensive framework for analysing causality in the context of tax collection.

Table 3.4.3.1 Granger Causality on GDP and Tax Collection

Model Specification	Residual Degrees of Freedom	F-Statistic	P-Value	Significance
Tax Collection ~ Lags (Tax Collection, 1:1)	18	21.151	0.0002556	***

Source: Author's Calculations

3.4.4 Granger Causality on Inflation and Tax Collection

Model 1 (Extended):

$$Tax.Collection_t = \alpha + \sum_{i=1}^{p} \beta_i \, Tax.Collection_{t-i} + \sum_{i=1}^{q} \gamma_i \, Inflation_{t-i} + \varepsilon_t$$

Model 2 (Restricted):

$$Tax.Collection_t = \alpha + \sum_{i=1}^{p} \beta_i \, Tax.Collection_{t-i} + \varepsilon_t$$

Table 3.4.4.1 Granger Causality on Inflation and Tax Collection

Model Specification	Residual Degrees of Freedom	F-Statistic	P-Value	Significance
Tax Collection ~ Lags (Tax Collection, 1:1)	18	0.3082	0.586	Not Significant

Source: Author's Calculations

3.4.5 Granger Causality on Population and Tax Collection

Model 1 (Extended):

$$Tax.Collection_t = \alpha + \sum_{i=1}^{p} \beta_i \, Tax.Collection_{t-i} + \sum_{i=1}^{q} \gamma_i \, Population_{t-i} + \varepsilon_t$$

Model 2 (Restricted):

$$Tax.Collection_t = \alpha + \sum_{i=1}^{p} \beta_i \, Tax.Collection_{t-i} + \varepsilon_t$$

Table 3.4.5.1 Granger Causality on Population and Tax Collection

Model Specification	Residual Degrees of Freedom	F-Statistic	P-Value	Significance
Tax Collection ~ Lags (Tax Collection, 1:1)	18	3.0262	0.1	.

Source: Author's Calculations

3.4.6 Granger Causality on Unemployment Rate and Tax Collection

Model 1 (Extended):

$$Tax.Collection_t = \alpha + \sum_{i=1}^{p} \beta_i \, Tax.Collection_{t-i} + \sum_{i=1}^{q} \gamma_i \; Unemp.Rate_{t-i} + \varepsilon_t$$

Model 2 (Restricted):

$$Tax.Collection_t = \alpha + \sum_{i=1}^{p} \beta_i \, Tax.Collection_{t-i} + \varepsilon_t$$

Table 3.4.6.1 Granger Causality on Unemployment and Tax Collection

Model Specification	Residual Degrees of Freedom	F-Statistic	P-Value	Significance
Tax Collection ~ Lags (Tax Collection, 1:1)	18	4.545	0.0479	*

Source: Author's Calculations

3.4.7 Granger Causality on Corruption and Tax Collection

Model 1 (Extended):

$$Tax.Collection_t = \alpha + \sum_{i=1}^{p} \beta_i \, Tax.Collection_{t-i} + \sum_{i=1}^{q} \gamma_i \; Corruption_{t-i} + \varepsilon_t$$

Model 2 (Restricted):

$$Tax.Collection_t = \alpha + \sum_{i=1}^{p} \beta_i \, Tax.Collection_{t-i} + \varepsilon_t$$

Table 3.4.7.1 Granger Causality on Corruption and Tax Collection

Model Specification	Residual Degrees of Freedom	F-Statistic	P-Value	Significance
Tax Collection ~ Lags (Tax Collection, 1:1)	18	0.0015	0.9695	Not Significant

Source: Author's Calculations

Significance Codes:

- *** : $p \leq 0.001$ (Highly significant)
- ** : $p \leq 0.01$ (Significant)
- * : $p \leq 0.05$ (Moderately significant)
- . : $p \leq 0.1$ (Marginally significant)
- Not Significant : $p > 0.1$

3.5 Data Envelopment Analysis for Tax Efficiency

DEA is a tool for assessing the efficiency of DMUs through linear programming methods that closely encapsulate observable input-output vectors (Boussofiane, Dyson, and Thanassoulis 1991). DEA permits the simultaneous consideration of numerous inputs and outputs without any assumptions on data distribution (Ji & Lee, 2010). DEA is also capable of offering novel insights that have been assessed by alternative models (Cooper et al., 2011). DEA is a widely used technique for measuring efficiency and productivity in various industries. By using DEA, insights can be gained into the relative efficiency of different decision-making units (DMUs) or entities under evaluation. A score greater than 1 indicates improvement in efficiency, whereas a score of less than 1 indicates a decrease in efficiency.

The efficiency (θ) for a decision-making unit (DMU) in the CRS model is formulated as:

$$\theta = \frac{\sum_{r-1}^{s} u_r y_{rj}}{\sum_{i=1}^{m} v_i x_{ij}}$$

Where:

- x_i : Inputs (e.g., GDP, employment rates).
- y_r : Outputs (e.g., tax collection).
- u_r : Weights for the outputs.
- v_i : Weights for the inputs.
- m: Number of inputs.

- s: Number of outputs.

This equation aims to maximise the ratio of weighted outputs to weighted inputs, ensuring that $\theta \leq 1$.

3.6 MALMQUIST Index

To assess changes in tax collection performance over time, the study applies the Malmquist Productivity Index (MPI), a widely used DEA-based method that captures both efficiency shifts and technological progress (Caves et al., 1982; Fare et al., 1994). By decomposing productivity change into efficiency and technological components, MPI enables year-to-year performance comparisons without strong assumptions on production structure, making it suitable across sectors (Sufian, 2009; Chen et al., 2020).

The Malmquist Index for productivity change between period t and t+1 is defined as:

$$M_0^{t,t+1} = \sqrt{\left(\frac{D_t^t(x^{t+1}, y^{t+1})}{D_t^t(x^t, y^t)}\right) \cdot \left(\frac{D_{t+1}^{t+1}(x^{t+1}, y^{t+1})}{D_{t+1}^{t+1}(x^t, y^t)}\right)}$$

The overall productivity change can be decomposed as:

$$M_0^{t,t+1} = \underbrace{\left(\frac{D_{t+1}^{t+1}(x^{t+1}, y^{t+1})}{D_t^t(x^t, y^t)}\right)}_{\text{TFPCH}} = \underbrace{\left(\frac{D_{t+1}^{t+1}(x^{t+1}, y^{t+1})}{D_{t+1}^{t+1}(x^t, y^t)} \cdot \frac{D_t^t(x^t, y^t)}{D_t^t(x^{t+1}, y^{t+1})}\right)}_{\text{TECHCH}} \cdot \underbrace{\left(\frac{D_t^t(x^{t+1}, y^{t+1})}{D_t^t(x^t, y^t)}\right)}_{\text{EFFCH}}$$

In this study, the input is the cost of tax collection, and the output is the total direct tax revenue. MPI is applied to evaluate year-over-year improvements or regressions in the efficiency and technological progression of tax collection from FY 2000–01 to FY 2022–23. Using DEA-based MPI models, scores are calculated to assess whether improvements are due to better use of inputs (EFFCH) or due to system-level shifts such as digitisation and tax policy reforms (TECHCH). This dynamic productivity tracking complements the static DEA scores and provides richer policy insights.

3.7 Tax Elasticity and Tax Buoyancy

The choice of methods is driven by the specific objectives of the study:

- **ARDL (Autoregressive Distributed Lag) Model**: Ideal for estimating short-

and long-run dynamics with variables of mixed integration order (I(0) and I(1)). It accommodates small sample sizes and captures lag effects crucial for fiscal modelling.

- **Johansen Cointegration Test**: Suitable for assessing long-run equilibrium between two or more non-stationary variables in a multivariate framework.
- **Event Study Methodology**: Used to isolate and analyse the impact of specific economic shocks (e.g., 2008 financial crisis and 2016 demonetization) on tax buoyancy.

3.7.1 Autoregressive Distributed Lag (ARDL)

This study employs the Autoregressive Distributed Lag (ARDL) model to analyse the relationship between GDP growth, tax buoyancy, and tax elasticity in India. The ARDL approach is well-suited for time series data, especially when variables are integrated at different levels, as it can capture both short- and long-term dynamics. This is crucial for fiscal analysis, where tax responses often lag behind economic changes. Prior research, including works by Subhani et al. (2018), Swaray (2023), and others, has effectively used ARDL to study tax responsiveness across different countries. These studies validate ARDL's strength in modelling complex relationships in diverse economic settings.

The ARDL model used in this study takes the following form:

$$\boldsymbol{\Delta Yt = \alpha 0 + i = 1 \sum p \beta i \Delta Yt - i + j} \\ \boldsymbol{= 0 \sum q \gamma j \Delta Xt - j + \phi 1 Yt - 1 + \phi 2 Xt - 1 + \epsilon t}$$

Where:

- Yt = Direct Tax Growth Rate
- Xt = GDP Growth Rate
- Δ = First difference operator
- ϕ1, ϕ2 = Long-run coefficients
- βi, γj = Short-run dynamics
- ϵt = White noise error term

This structure allows analysis of how current and lagged GDP growth influences current and future tax performance.

3.7.2 Diagnostics and Limitations of ARDL

- R-squared: 0.6924
- ADF Test for Residuals: p = 0.354 → Residuals not stationary
- Durbin-Watson: 1.56 → Mild autocorrelation

These diagnostics suggest moderate model fit but call for refinement, potentially by including additional macroeconomic variables or improving lag selection.

3.7.3 Johansen Co-integration

The Johansen cointegration methodology is a robust statistical approach widely employed to examine long-run equilibrium relationships between non-stationary time series. Proposed by Johansen (1988), this technique extends the Engle-Granger two-step approach by providing a system-based estimation that allows for multiple cointegrating vectors, making it ideal for multivariate frameworks. As Johansen and Juselius (1990) demonstrated, the methodology ensures consistency and efficiency in parameter estimation, leveraging maximum likelihood procedures to identify cointegrating relationships.

The Johansen method is particularly valuable in economic research where interdependencies among variables are hypothesised, such as in analysing financial markets, macroeconomic policies, and trade dynamics. For instance, Pesaran and Shin (1999) emphasised its advantage in simultaneously testing for cointegration rank and long-term coefficients, which is critical for interpreting economic theories in a dynamic context.

Moreover, the technique's ability to account for endogeneity among variables and handle higher dimensions is highlighted in its application to policy impact analyses and structural adjustment scenarios (Harris, 1995). This robust framework justifies its widespread adoption in empirical research to unveil hidden equilibrium relationships among time series data.

Table 3.7.3.1 Stationarity Check for ADF

Variable	ADF Statistic	p-Value	Stationarity
GDP Growth Rate	-2.7949	0.2695	Non-stationary
Direct Tax Revenue	-2.3374	0.4438	Non-stationary

Source: Author's Calculations

Both variables were differenced to achieve stationarity before applying the Johansen test.

Table 3.7.3.2 Cointegration Results

Test Type	Hypothesis	Test Statistic	Critical Value (5%)	Conclusion
Trace	r = 0	22.20	17.95	1 cointegrating relation
Eigenvalue	r = 0	18.77	14.90	1 cointegrating relation

Source: Author's Calculations

Cointegration Equation

$$\boldsymbol{Direct\ Tax\ Revenue + 105510.8 \times GDP\ Growth\ Rate = 0}$$

This equation confirms that GDP growth has a significant and sustained influence on tax revenue over time.

Table 3.7.3.3 Adjustment Speed of Loading Coefficient

Variable	Loading Coefficient	Interpretation
Direct Tax Revenue	-0.1289	Adjusts quickly to equilibrium
GDP Growth Rate	-0.0000123	Adjusts slowly

Source: Author's Calculations

This indicates that tax revenue is more reactive to deviations in long-run equilibrium, a critical insight for revenue planning.

3.7.4 Event Study

The event study methodology is widely utilised in finance and economics research to evaluate the impact of specific events on asset prices, emphasising its robust theoretical foundation and empirical relevance. As MacKinlay (1997) highlighted in his seminal work, the event study method is critical for assessing market efficiency and identifying abnormal returns linked to corporate announcements or regulatory changes. Moreover, Kothari and Warner (2007) reinforced this perspective by illustrating the methodology's adaptability in examining a variety of market events, from mergers to earnings announcements, while addressing potential biases in return measurement.

Furthermore, Fama et al. (1969) underscored the methodology's alignment with efficient market hypotheses, emphasising its ability to capture immediate price adjustments to new information. Recent studies, such as Brown and Warner (1985), have validated the robustness of event studies in small samples, demonstrating their statistical power and reliability in detecting significant market reactions. A two-sample t-test is conducted to assess whether the difference in average buoyancy between the pre- and post-event periods is statistically significant.

$$\boldsymbol{H0: \mu Pre = \mu Post \; vs. H1: \mu Pre \neq \mu Post}$$

The test yields a *t-statistic* and *p-value* to evaluate significance at the 5 per cent level.

The rigorous estimation of expected returns, the use of control periods, and the precise quantification of event-induced anomalies justify the widespread adoption of this methodology across disciplines. Its application provides a clear framework for isolating the causal impacts of discrete events, thus supporting its enduring relevance in empirical research.

3.8 Limitations of the Study

While the study provides valuable insights into direct taxation in India, certain limitations need to be acknowledged:

1) The study excludes indirect taxes such as GST and customs duties, which are integral to India's taxation system. This omission limits a comprehensive understanding of the country's overall fiscal structure and tax burden.

2) By focusing only on India, the study lacks comparative analysis with global taxation systems, limiting the ability to benchmark performance, efficiency, and fairness against international best practices in direct tax policy and collection.

3) Although state-wise data is presented, the absence of detailed regional or district-level analysis restricts the understanding of localised tax performance variations driven by economic structures, governance models, and administrative capacities.

4) The study relies exclusively on secondary data from official sources, which may constrain the analysis due to potential issues like reporting lags, missing variables, or discrepancies in data consistency across different periods.

5) Taxpayer behaviour, perceptions, and compliance motivations are not explored, reducing the study's ability to provide nuanced insights into how psychological and social factors influence tax collection effectiveness and voluntary compliance.

6) While robust analytical techniques are used, some advanced econometric models such as ARDL and Johansen Cointegration are introduced later, potentially limiting early-stage causal analysis and long-run relationship estimation between key variables.

CHAPTER IV

TRENDS AND DETERMINANTS OF DIRECT TAX COLLECTION IN INDIA

The direct taxes form the backbone of India's fiscal framework, contributing significantly to government revenue and influencing economic policy decisions. The collection of direct taxes in India, including corporate tax and personal income tax, has evolved markedly over the decades, reflecting changes in economic growth, policy reforms, administrative efficiency, and compliance behaviour. This chapter aims to provide a comprehensive analysis of the trends and determinants of direct tax collection in India from 2000-01 to 2022-23. It explores the historical progression, year-on-year fluctuations, the impact of the cost of tax collection and the impact of major economic events such as the COVID-19 pandemic. Additionally, the chapter investigates the key determinants influencing direct tax performance, including GDP growth, inflation, population dynamics, unemployment rates, and governance quality, using the Granger causality test. Besides that, the factors that Granger causes tax collection are further tested to check the efficiency of the tax. Further, using the GM (1,1) model, the tax collections are forecasted until the year 2029-30. The chapter is divided into three sections, where section I discuss the trends of tax collection, section II highlights determinants of tax collection, and section III forecasts the tax collection using the GM (1,1) model of grey forecasting. The insights from this analysis will serve as a valuable foundation for policy recommendations aimed at enhancing the effectiveness and equity of India's direct tax system.

Section I: Trends of Tax Collection

4.1 Trends in Direct Tax Collection

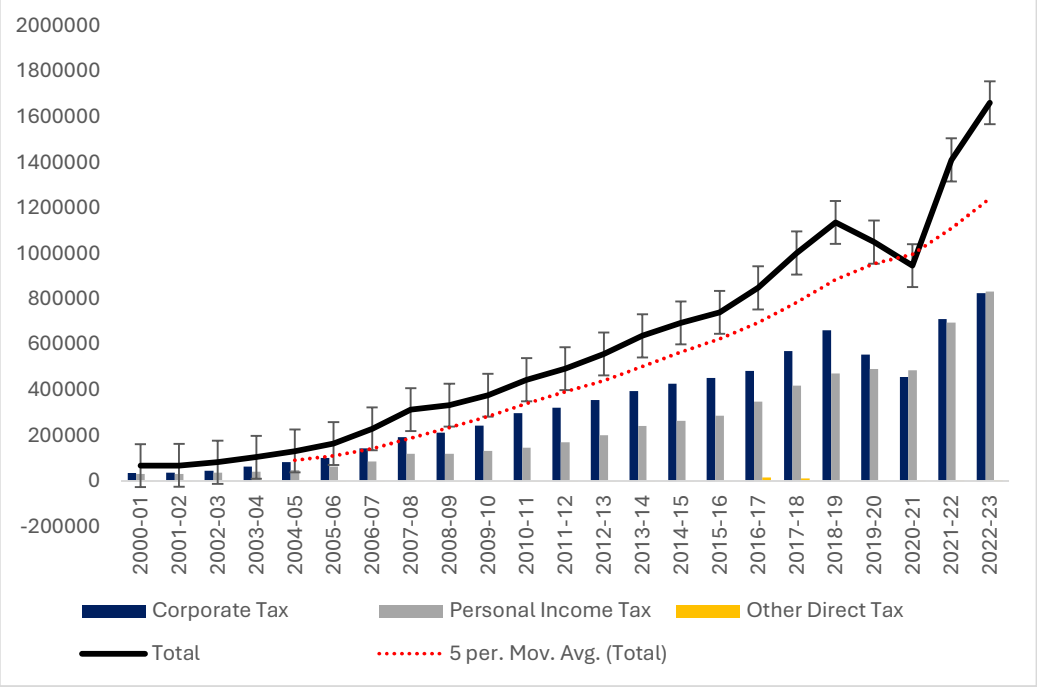
Taxation has always been a rich source of revenue for the government. Governments are vigilant and active enough to upgrade the regulations and collection mechanisms related to taxes. As per the Annual Financial Statement of the Central Government for the financial year 2019-20 (Government of India, 2021), more than three-fourths of the total receipts of the Government of India are through tax revenue. Talking about the contribution of taxes on income (direct taxes), it is more than 50 per cent of the total tax revenue and plays a crucial role in the revenue collection of the country. India's

direct tax collection has improved due to tax compliance enhancements resulting from tax policy reforms, lower tax rates, and improved tax administration (Acharya, 2005). The data presented in Figure 4.1 reflect direct tax income in India from the fiscal year 2000-01 to the fiscal year 2022-23. Several trends and patterns can be seen while analysing this data.

The direct tax collection has increased steadily over the years, with very minor changes. Total tax revenue rose from ₹68,305 crore in 2000-01 to ₹16,63,686 crore in 2022-23, suggesting a significant growth in tax receipts over time. Throughout the period, corporate tax income has increased steadily. The total amount increased from ₹35,696 crore in 2000-01 to ₹8,25,834 crore in 2022-23. This demonstrates firms' growing contribution to the country's overall tax income. Personal income tax revenue has also been steadily rising, reflecting the rise in individual income levels. Personal income tax receipts increased from ₹31,764 crore in 2000-01 to ₹8,33,307 crore in 2022-23, demonstrating significant growth. Other direct taxes, albeit relatively small in comparison to corporate and personal income taxes, have undergone notable variations. However, its contribution to total tax revenue has remained relatively low throughout time. There have been situations where tax revenue has fluctuated significantly. For example, tax collections increased significantly during the fiscal years 2006-07 and 2007-08, reflecting the period's substantial economic expansion. In contrast, the rate of growth has slowed in some years (Government of India, CBDT, 2023).

The data in Fig. 4.1 indicates a rising trend in direct tax revenue in India over the years, owing to increases in corporate and personal income tax collections. This reflects the country's enhanced tax compliance and broadening of the tax base. The government requires a sustained increase in direct tax collection to fund public services and development efforts.

Figure 4.1 Trends of Tax Collection and its Constituents in India (2000-01 to 2022-23)



Source: Author Calculation using data through Central Board of Direct Tax (CBDT), 2024)

Table 4.1.1: Tax Collection from Direct Tax and its Constituents (2000-01 to 2022-23) (₹ in Crores)

Financial Year	Corporate Tax	Y-o-Y Growth (%)	Personal Income Tax	Y-o-Y Growth (%)	Other Direct Tax	Y-o-Y Growth (%)	Total Collection	Y-o-Y Growth (%)
2000-01	35696	-	31764	-	845	-	68305	-
2001-02	36609	2.56%	32004	0.76%	585	-30.77%	69198	1.31%
2002-03	46172	26.12%	36866	15.19%	50	-91.45%	83088	20.07%
2003-04	63562	37.66%	41386	12.26%	140	180.00%	1,05,088	26.48%
2004-05	82680	30.08%	49268	19.05%	823	487.86%	1,32,771	26.34%
2005-06	1,01,277	22.49%	63689	29.27%	250	-69.62%	1,65,216	24.44%
2006-07	1,44,318	42.50%	85623	34.44%	240	-4.00%	2,30,181	39.32%
2007-08	1,93,561	34.12%	1,20,429	40.65%	340	41.67%	3,14,330	36.56%
2008-09	2,13,395	10.25%	1,20,034	-0.33%	389	14.41%	3,33,818	6.20%
2009-10	2,44,725	14.68%	1,32,833	10.66%	505	29.82%	3,78,063	13.25%
2010-11	2,98,688	22.05%	1,46,258	10.11%	1049	107.72%	4,45,995	17.97%
2011-12	3,22,816	8.08%	1,70,181	16.36%	990	-5.62%	4,93,987	10.76%
2012-13	3,56,326	10.38%	2,01,840	18.60%	823	-16.87%	5,58,989	13.16%
2013-14	3,94,678	10.76%	2,42,888	20.34%	1030	25.15%	6,38,596	14.24%
2014-15	4,28,925	8.68%	2,65,772	9.42%	1095	6.31%	6,95,792	8.96%
2015-16	4,53,228	5.67%	2,87,637	8.23%	1079	-1.46%	7,41,945	6.63%
2016-17	4,84,924	6.99%	3,49,503	21.51%	15286	1316.68%	8,49,713	14.53%
2017-18	5,71,202	17.79%	4,20,084	20.19%	11452	-25.08%	10,02,738	18.01%
2018-19	6,63,572	16.17%	4,73,179	12.64%	967	-91.56%	11,37,718	13.46%
2019-20	5,56,876	-16.08%	4,92,717	4.13%	1088	12.51%	10,50,681	-7.65%
2020-21	4,57,719	-17.81%	4,87,560	-1.05%	1897	74.36%	9,47,176	-9.85%
2021-22	7,12,037	55.56%	6,96,604	42.88%	3781	99.31%	14,12,422	49.12%
2022-23	8,25,834	15.98%	8,33,307	19.62%	4545	20.21%	16,63,686	17.79%

Source: Central Board of Direct Tax (CBDT), 2024

Table 4.1.1 shows that Direct tax collection has increased steadily over the years, with very minor changes. Table 4.1.1 also shows the year-on-year (y-o-y) growth of all the components of tax collections, and it is observed that the year 2021-22 witnessed the highest increase in y-o-y growth, which is due to the return of normalcy after Covid-19. Total tax revenue rose from ₹68,305 crore in 2000-01 to ₹16,63,868 crore in 2022-23, suggesting a significant growth in tax receipts over time. Throughout the period, corporate tax income has increased steadily. The total amount increased from ₹35,696 crore in 2000-01 to ₹8,25,834 crore in 2022-23. This demonstrates firms' growing contribution to the country's overall tax income. Personal income tax revenue has also been steadily rising, reflecting the rise in individual income levels. Personal income tax receipts increased from ₹31,764 crore in 2000-01 to ₹8,33,307 crore in 2022-23, demonstrating significant growth. Other direct taxes, albeit relatively small in comparison to corporate and personal income taxes, have undergone notable variations. However, its contribution to total tax revenue has remained relatively low throughout time. There have been situations where tax revenue has fluctuated significantly. For example, tax collections increased significantly during the fiscal years 2006-07 and 2007-08, reflecting the period's substantial economic expansion. In contrast, the rate of growth has slowed in some years (Government of India, CBDT, 2023).

Table 4.1.2: Descriptive Statistics of Direct Tax and Its Constituents

Descriptive Stats	Corporate Tax	Personal Income Tax	Other Direct Tax	Total Tax
Mean	334296.52	251366.35	2141.26	587804.17
Standard Error	48600.53	46590.06	780.96	94463.71
Median	322816.00	170181.00	967.00	493987.00
Standard Deviation	233079.94	223438.06	3745.33	453032.06
Sample Variance	54326259039.35	49924568711.78	14027513.29	205238048879.15
Skewness	0.41	1.17	2.87	0.76
Range	790138.00	801543.00	15236.00	1595381.00
Minimum	35696.00	31764.00	50.00	68305.00

Maximum	825834.00	833307.00	15286.00	1663686.00
Sum	7688820.00	5781426.00	49249.00	13519496.00
Count (N)	23	23	23	23

Source: Author's calculations using data from CBDT

The data indicates a rising trend in direct tax revenue in India over the years, owing to increases in corporate and personal income tax collections. This reflects the country's enhanced tax compliance and broadening of the tax base. The government requires a sustained increase in direct tax collection to fund public services and development efforts.

Table 4.1.2 provides an analysis of various tax components, including corporate tax, personal income tax, other direct tax, and the total tax through descriptive statistics. Starting with the average values, the total tax mean of 587,804.17 is heavily influenced by corporate tax (334,296.52) and personal income tax (251,366.35). In contrast, other direct taxes contribute only a small amount, with a mean of 2,141.26. The median values paint a similar picture, with total tax having a median of 493,987, shaped mainly by the corporate tax median of 322,816 and the personal income tax median of 170,181. The other direct tax median is a minimal 967.

Table 4.1.2 depicts the variability where total tax exhibits the highest standard deviation of 453,032.06, indicating substantial variation in the data. This variability is primarily driven by corporate tax (233,079.94) and personal income tax (223,438.06), while other direct tax shows much less variability, with a standard deviation of only 3,745.33. Similarly, the total tax range is the widest at 1,595,381, mainly due to the extensive ranges of corporate tax (790,138) and personal income tax (801,543). Other direct taxes, again, remain small, with a range of just 15,236. The data distribution is also insightful. Skewness values reveal that corporate tax (0.41) and total tax (0.76) are moderately skewed to the right, personal income tax (1.17) is more strongly skewed, and other direct tax (2.87) shows extreme right-skewness, suggesting a concentration of smaller values with a few outliers on the higher end.

In terms of contribution, corporate tax and personal income tax dominate the total tax with sums of 7,688,820 and 5,781,426, respectively, out of the total tax sum of 13,519,496. The other direct tax has a negligible impact, with a sum of just 49,249. Overall, corporate and personal income taxes are the major contributors to revenue, and both exhibit high variability. The skewness for other direct taxes suggests an uneven distribution with significant outliers. This analysis highlights the need for a deeper understanding of the factors contributing to the variability in corporate and personal income taxes and the potential impact of outliers in other direct taxes.

4.2 Cost of Tax Collection

The amount spent on tax collection by the government indicates the seriousness of the government's efforts towards tax collection. However, the amount should be spent judiciously so that the efficiency of tax collection increases. The Government of India spent ₹ 8452 Crores in 2022-23 for tax collection and is moving towards effective and efficient digitisation of tax collection to improve the same. The government launched a new portal for income tax return filing and spent crores of rupees on it. The government gave Infosys a contract for the new income tax portal. Since January 2019 till June 2021, the total amount paid to Infosys for the new income tax portal is ₹164.5 crore, as stated by Minister of State for Finance Pankaj Chaudhary (Lok Sabha Secretariat, 2024). Union Cabinet on January 16, 2019, gave its approval for an outlay of ₹ 4,241.97 crore for 8.5 years, including payout to the Managed Service Provider (MSP), GST, rent, postage and project management cost (Lok Sabha Secretariat, 2024).

Table 4.2.1: Cost of Tax Collection and Growth with Respect to Tax Collection

Financial Year	Total Collections (₹Crore)	Increase in Tax Collection (y-o-y) Growth	Total Expenditure (₹Crore)	Increase in Tax Expenditure (y-o-y) Growth	Cost of Collection
2000-01	68305	-	929	-	1.36%
2001-02	69198	1.31%	933	0.43%	1.35%
2002-03	83088	20.07%	984	5.47%	1.18%
2003-04	1,05,088	26.48%	1050	6.71%	1.00%
2004-05	1,32,771	26.34%	1138	8.38%	0.86%
2005-06	1,65,216	24.44%	1194	4.92%	0.72%
2006-07	2,30,181	39.32%	1349	12.98%	0.59%
2007-08	3,14,330	36.56%	1687	25.06%	0.54%

2008-09	3,33,818	6.20%	2248	33.25%	0.67%
2009-10	3,78,063	13.25%	2726	21.26%	0.72%
2010-11	4,45,995	17.97%	2698	-1.03%	0.60%
2011-12	4,93,987	10.76%	2976	10.30%	0.60%
2012-13	5,58,989	13.16%	3283	10.32%	0.59%
2013-14	6,38,596	14.24%	3641	10.90%	0.57%
2014-15	6,95,792	8.96%	4101	12.63%	0.59%
2015-16	7,41,945	6.63%	4593	12.00%	0.61%
2016-17	8,49,713	14.53%	5578	21.45%	0.66%
2017-18	10,02,738	18.01%	6087	9.13%	0.61%
2018-19	11,37,718	13.46%	7074	16.21%	0.62%
2019-20	10,50,681	-7.65%	6952	-1.72%	0.66%
2020-21	9,47,176	-9.85%	7223	3.90%	0.76%
2021-22	14,12,422	49.12%	7479	3.54%	0.53%
2022-23	16,63,686	17.79%	8452	13.01%	0.51%

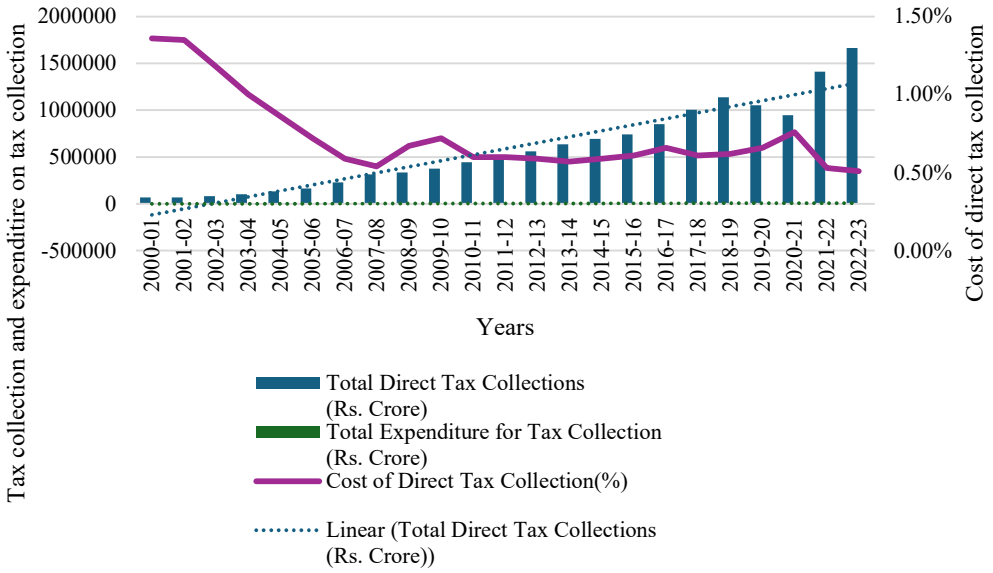
Source: Central Board of Direct Tax (CBDT),2024

Previous studies have observed that the cost of collecting direct taxes is significantly higher than that of indirect taxes (Ahmed, 1968). The data in Table 4.5 demonstrates that the cost of collection has fluctuated throughout time. The cost of collection has been declining gradually over the period between 2000-01 and 2022-23, reflecting the growing efficient functioning of the tax administration, leading to effective cost management. It was also observed from Table 4.2.1 and Figure 4.2 that during 2003-04 to 2010-11, there was an increase in the cost of collection, which was modest, followed by a period from 2011-12 to 2016- 17, which was relatively constant. The cost of collection has increased significantly during the previous years, but it reached its peak during the year 2020-21, then decreased in 2021- 22. The cost of collection is a measure of how efficiently the tax administration is spending tax revenue for administrative purposes. A lower cost of collecting indicates relatively more efficient tax-collecting systems and lower administrative costs, which allow a larger fraction of tax revenues available for government spending and development projects (Singh, 2019).

Conversely, a high cost of collection can be an indication of poor tax administration, expensive administrative procedures, or the need for reform. Shifts in tax policies, take-up of technology, levels of compliance and the wider economic environment can all affect the cost of collection. Tax administration needs to

continually focus on ways to enhance efficiency and control costs in tax collection activities. This covers many processes and tools, where administrative load and costs are reduced through efficient processes and technology, as well as through training and capacity building. IMF (2001) highlights efficient tax collection systems that reduce collection costs and increase user satisfaction, rendering tax compliance. Cost of Collection analysis highlights the need for continued analysis and improvement of tax administration operations. The emphasis is on the use of technology to automate tax processes, the simplification of tax compliance for taxpayers, and the implementation of cost-effective strategies to improve revenue collection efficiency. Regular cost-of-collection monitoring and benchmarking can help identify areas for improvement and inform policy decisions. Different taxes have different financial consequences. Reduced tax collecting costs should be a fundamental priority of fiscal policy. If only the cost of collecting taxes is considered, then customs duties are preferable to both excise duties and income tax, but excise duties are preferable to income tax. In contrast, direct taxes are more expensive to collect than indirect taxes (Ahmed, 1968). The author discovered that when the cost of collecting direct taxes is compared to the cost of collecting indirect taxes, the cost of collecting direct taxes is the highest.

Figure 4.2 Comparison of Tax Collections with Cost of Collections



Source: Central Board of Direct Tax (CBDT),2024

4.3 Relation Between Tax Collection and Cost of Tax Collection by Granger Causality

Granger causality is commonly used in the field of public finance to study the relations between financial variables and their effects on economic outcomes. For instance, Ampedu et al. (2023) employed Granger causality to analyse the relation between financial development and economic growth in Tanzania. Their research highlights how public policies affect fiscal outcomes and evaluates fiscal efficiency through Granger causality. Similarly, Rauf et al. (2024) in OECD countries employed Bootstrap Granger causality tests to analyse the relationship between public expenditure and fiscal health. This study showed the robustness of the approach to detect the effects of government measures on financial systems. On a regional basis, Afshan and Vien (2024) applied Granger causality to investigate the relationship between government spending and economic growth in North Carolina counties, thereby demonstrating its relevance for exploring local fiscal dynamics. Using Granger causality, Mishra (2024) also investigated public revenue, specifically VAT, and indices of governance in Nigeria. The research confirmed its use to examine taxation's impact on governance. Finally, Wudil and Tsauni (2024) employed the Granger technique to study the interactions between economic growth, financial development and trade openness. Their findings showed the contemporary relevance of the method to investigate fiscal indicators within the context of more general macroeconomic-related variables.

Granger causality was used by Okonkwo and Kenneth (2024) to assess interaction across fiscal and monetary policy and its impact on economic growth. The study showed how the approach can be used to analyse time-lagged relations, such as tax revenue and public expenditure. We are therefore able to conclude that Granger causality is indeed a valuable method for analysing and establishing the directional relationships in public finance. The concepts of budgetary slack and its different components have been used in a variety of settings, including government spending, tax collection, and other economic indicators, indicating their applicability for the current study in assessing the efficiency of the tax expenditure as compared to its collection.

H_{06}: "There is no significant relationship between Tax Collection and Cost of Tax Collection."

Table 4.3.1 Augmented Dickey-Fuller (ADF) Test Results

Variable	Test Statistic	Lag Order	p-value	Conclusion
Tax Collection	-2.3374	2	0.4438	Non-stationary (Differencing required)

Source: Author's calculation

Table 4.3.1 shows the application of the Granger Causality test on time series data of tax collections from 2000-01 to 2022-23 to test the hypothesis H06 in the study, providing fascinating insight into the relationship between tax expenditure and tax collection based on viewing the Granger causality result. Firstly, the Augmented Dickey-Fuller (ADF) test confirmed that the data for tax collection and tax expenditure were non-stationary (the statistical properties of the series, such as mean and variance, change over time). To tackle this, both series are differenced to become stationary prior to analysis. Thereafter, the appropriate lag length for analysis was ascertained, via Akaike Information Criterion (AIC), to be 5 years. Based on this lag, Granger causality tests were performed to determine if expenditure influences collection or vice versa.

Table 4.3.2 Granger Causality Test: Does Expenditure Granger-Cause Collection?

Hypothesis	Test Statistic	Degrees of Freedom	p-value
Expenditure does not Granger-cause Collection	F = 3.0779	df1 = 5, df2 = 12	0.05132

Source: Author's calculation

Table 4.3.2 indicates weak evidence that tax expenditure Granger-causes tax collection (P-value bordering on 0.051). It suggests that past levels of expenditure are capable of predicting tax collection to some extent. However, the strength of the relationship is not significant enough to be deemed by a threshold value of 5 per cent.

Table 4.3.3 Instantaneous Causality Test Results

Hypothesis	Test Statistic	Degrees of Freedom	p-value
No instantaneous causality between expenditure and collection	$x^2 = 5.589$	df = 1	0.01807

Source: Author's calculation

However, the instantaneous causality test revealed a significant relationship between the two variables, with a *P*-value of 0.018. This suggests that there is a simultaneous relationship between tax expenditure and tax collection, meaning common factors likely influence them at the same time.

4.4 Efficiency of Tax Collection with respect to Cost of Tax Collection

The costs of tax collection and tax collection are weakly correlated with each other using Granger Causality. It was observed from Table 4.3.2 that, where p =0.051, the relationship is not strong enough to be statistically significant at the conventional 5 per cent, but past expenditure levels seem to be able to predict tax collection somewhat. Hence, this study attempts to evaluate the efficiency of tax collection by using tax collection cost as input. DEA is a method for evaluating the performance of DMUs using linear programming methods that summarise closely the observable input-output vectors (Boussofiane, Dyson and Thanassoulis 1991). DEA allows for the nonparametric evaluation of multiple inputs and outputs simultaneously without any presumptions regarding data distribution (Ji & Lee, 2010). DEA can also provide new, unqualified insights that would be evaluated by other models (Cooper et al., 2011). DEA is a widely applied technique in measuring efficiency and productivity for different industries. In this context, it is possible to achieve a valuable understanding of the relative efficiency of DMUs or entities under investigation using DEA. A score greater than 1 means improvement in efficiency, while anything less than 1 means a decrease in efficiency. Thus, in DEA, input is considered the cost of tax collection, while output is tax collection.

Table 4.4.1 Efficiency of Tax Collection

Year	Technical Efficiency (te)
2001-02	0.045
2002-03	0.070
2003-04	0.189
2004-05	0.040
2005-06	0.006
2006-07	0.003
2007-08	0.013
2008-09	0.043
2009-10	0.018
2010-11	0.008
2011-12	0.018
2012-13	0.009
2013-14	0.017
2014-15	0.032
2015-16	0.013
2016-17	0.034
2017-18	0.033
2018-19	1.000
2019-20	0.059
2020-21	0.040
2021-22	0.038
2022-23	0.233

Source: Author's calculation

Table 4.4.1 highlights some important trends that are evident from the results of the analysis using Data Envelopment Analysis (DEA) to compute the efficiency of tax collection in relation to the cost of collection. Efficiency scores over the years have

been patently low, with most of the values closer to 0, which pretty much indicates considerable inefficiency. The notable exception was achieved in the year 2018-19 with a perfect efficiency score of 1.000. This means that at least this year, the revenue collection process was done under inefficient conditions, which may be the result of reforms, technology, or simply better compliance mechanisms. In the early years (2001-02 to 2007-08), efficiency varied but trended low, peaking at 0.189 in 2003-04 and dropping sharply. From 2005-06 to 2016-17, the scores were abysmally low: a better understanding of balancing collection costs against revenue was needed. The period 2006-07 witnessed the worst efficiency of 0.003. The situation did improve after 2014-15, but the scores during this period reveal that systemic inefficiencies remained.

The exception is the year 2018-19, which produced a perfect score of 1.000, an indication that significant progress is being made in that year. This may indicate successful policy changes or interventions that increased the cost-efficiency of tax collection. However, inefficiencies dropped in successive years but showed an increasing trend, improving to a score of 0.233 in 2022-23, marking a significant improvement over the previous years. The overarching trend in the results suggests that tax collection processes have historically been inefficient, at least until the outlier performance of 2018-19. Therefore, it is important to break down what went right that year and leverage that in upcoming years. The recent improvements suggest a process of ongoing reform or optimisation, but there is still much work to be done. In the long term, independence and technology, processes and best practices need to be used for systemic reforms and lessons learnt from the ultra-solution year of 2018-19 and around the world to make the system more effective. Keeping track of efficiency metrics on a regular basis can point out the gaps in performance and help rectify them.

4.5 Comparison of Direct Tax with Total Tax Revenue

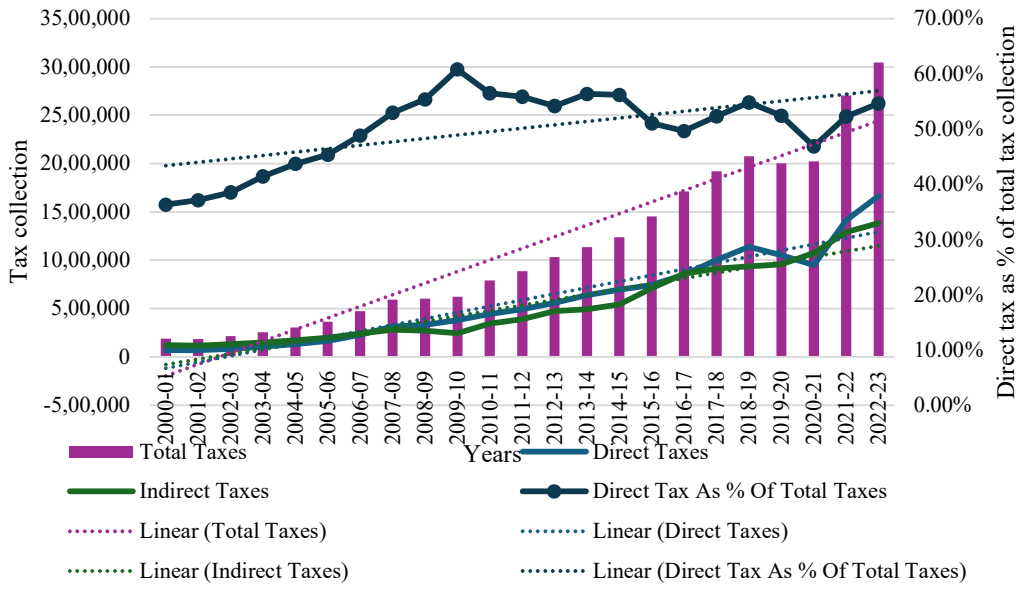
In India, total tax revenue has steadily increased throughout the years, suggesting economic progress and increasing tax compliance. Direct taxes have generally increased, with minor changes, and account for a sizable share of total tax revenue. Income tax, corporate tax, and wealth tax are examples of direct taxes that are levied directly on individuals or entities. In contrast, indirect taxes include the goods and services tax (GST), excise duty, customs duty, and other consumption-based taxes. The

share of total tax revenue contributed by direct taxes has slowly been increasing, indicating the increasing importance of personal and corporate income taxes. However, instead of raising tax collection, closing the tax gap is a more widely accepted solution (Singh, 2019). Closing the tax gap means lowering the space between potential tax collection and actual tax collection.

Direct taxes contributed approximately 36 per cent to total tax revenue from 2000 to 01, and this gradually rose to 52.27 per cent in 2021 22. Direct tax contributions have ranged between 36 per cent and 60 per cent over the years. In the year 2009-10, the highest share of 60.78 per cent of total taxable income was from direct taxes. Changes can also influence direct tax contributions in tax rates, tax changes, economic conditions, and compliance procedures. In years when there were alterations in tax schemes, such as the introduction of GST in 2017-18, it could skew the proportion of direct and indirect taxes in some years.

Direct taxes are said to be progressive, as they are levied as per the income or wealth of a person or entity, thereby maintaining justice in the tax load. The rising share of direct taxes also underscores a greater dependence on income and corporate tax collections to fund government spending. Higher economic activity, improved compliance, and a larger tax base have contributed to rising direct tax collections. This signifies growing income, business shares, and a good investment atmosphere in the country. “The key focus of this data is a tax administration — initiatives to improve tax compliance and curb tax evasion. This data can help policymakers evaluate tax policy effectiveness, make necessary adjustments, and sustain a harmonious tax structure. Direct tax receipts, in fact, fell slightly in fiscal years 2020-21 and 2021-22, something that may be attributed to economic disruptions due to the COVID-19 pandemic. The decline in economic activity and reduced corporate profitability may have created a transitory pressure on direct tax collections. A comprehensive review of tax revenues also necessitates a thorough look at other factors, including tax exemptions and deductions, and tax-to-GDP ratios. Still, the data provided helps get an idea of the share of direct taxes in India’s total tax collection over time.

Figure 4.3 Comparison of Direct Tax and Indirect Tax Collection (in ₹ Crore)



Source: Author's calculation using data from "Central Board of Direct Tax (CBDT), 2024"

Table 4.5.1 Descriptive Statistics of Direct Tax and Indirect Tax

Descriptive Stats	*Direct Taxes (₹ Crores)*	*Indirect Taxes (₹ Crores)*
Mean	587804.1739	534551.913
Standard Error	94463.71488	82821.09072
Median	493987	390953
Standard Deviation	453032.0616	397195.9977
Sample Variance	2.05238	1.57765
Skewness	0.76379151	0.781834716
Range	1595381	1264695
Minimum	68305	117318
Maximum	1663686	1382013
Sum	13519496	12294694

Count	23	23

Source: Author's calculations using data from "Central Board of Direct Tax (CBDT)"

Table 4.5.1 compares the performance of Direct and Indirect Taxes in terms of various descriptive statistics. On average, Direct Taxes contribute slightly more, with a mean of ₹587,804.17 crore compared to ₹534,551.91 crore for Indirect Taxes. The median values show a similar pattern, with Direct Taxes having a median of ₹493,987 crore, which is significantly higher than the ₹390,953 crore for Indirect Taxes. This indicates that Direct Taxes tend to have higher central values than Indirect Taxes. In the context of variability, Direct Taxes exhibit a higher standard deviation (₹453,032.06 crore) compared to Indirect Taxes (₹397,195.99 crore). This means there is more fluctuation in the collection of Direct Taxes. The range of Direct Taxes is also wider at ₹1,595,381 crore, compared to ₹1,264,695 crore for Indirect Taxes, suggesting more extreme values in the case of Direct Taxes. The lower minimum value (₹68,305 crore) and higher maximum value (₹1,663,686 crore) of Direct Taxes, compared to Indirect Taxes, further reinforce this observation.

Both types of taxes display a moderate positive skewness, with values of 0.76 for Direct Taxes and 0.78 for Indirect Taxes. This suggests that both have a concentration of smaller values with a long tail of larger ones. The kurtosis values for both are negative, meaning their distributions are flatter and have lighter tails compared to a normal distribution. In total revenue, Direct Taxes marginally outperform Indirect Taxes, with a sum of ₹13,519,496 crore compared to ₹12,294,694 crore. Overall, Direct Taxes show greater variability and extreme values, while Indirect Taxes are relatively more stable but still significant contributors. This analysis highlights that while both types of taxes play critical roles in revenue generation, Direct Taxes are slightly more dominant and variable.

4.6 Trends of Tax Collection During COVID-19

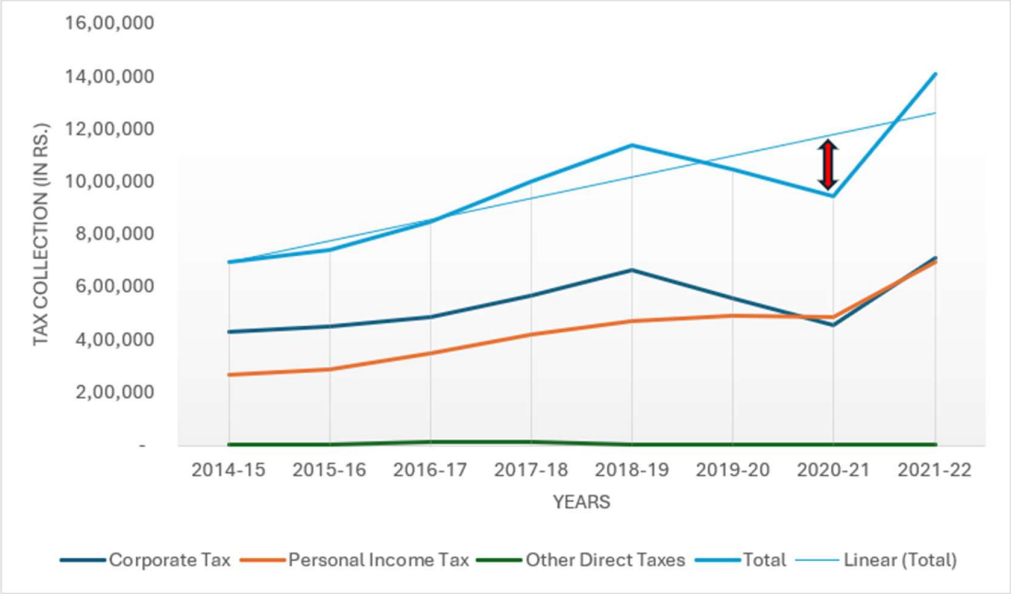
It was predicted at the beginning of the pandemic that "Direct taxes cannot be raised since profits and incomes were badly hit. Non-tax revenue, too, were not expected to contribute more since the public sector was also under stress" (Kumar, 2020). Measuring macroeconomic uncertainty during a pandemic is challenging, and effective

coordination of fiscal and monetary policies is essential in mitigating these uncertainties (Chakraborty & Harikrishnan, 2022). Various events such as natural calamities, economic recession, etc., severely affect the economy and tax collection of a country. It was found that efficiency levels of tax collection have fallen during the start of the economic recession in Spain (Cordero et al., 2021). Although the fall in crude prices rice helped the government increase the excise duty without giving the benefit of falling crude oil to the public to make up for its revenue loss due to the pandemic.

Various states in India reprioritised their expenses to cope with the falling revenues during the pandemic, but the same was not enough for them to make up the losses (Mukherjee et al., 2021). Pre-covid studies observed that there was a continuous increase in tax collection without any exception, a study quoted "Irrespective of economic and market conditions, the collection of direct taxes had always increased. The observed increase can be seen as a result of continuous reforms in taxation policy of India" (Mahapatra & Kaushik, 2022). However, in the financial year 2019-20, the number of income tax returns filed, as well as the amount of income declared by taxpayers, has decreased. A fall of sixteen per cent in corporate tax collection was also observed during the financial year (Rao, 2021).

The COVID-19 pandemic has caused significant disruptions worldwide (Rayash & Dincer, 2020). The fact is evident when we analyse that direct tax collection in India fell for the first time from ₹10,50,681 in 2019-20 to ₹9,47,176 in 2020-21. The recovery was expected to be slow and uncertain, and it took several years to return to pre-pandemic levels (Rayash & Dincer, 2020). Foreign Direct Investment (FDI) is a key economic growth and development driver, particularly in emerging market economies (EMEs). In recent years, the BRICS countries - Brazil, Russia, India, China, and South Africa - have emerged as major recipients of FDI and have also become important sources of outbound investment. However, the COVID-19 pandemic has significantly impacted FDI flows worldwide, including in the BRICS countries. This literature review examines the trends and determinants of FDI in India, with a particular focus on the implications of the COVID-19 pandemic (Chattopadhyay et al., 2022).

Figure 4.4 Trend of Tax Collection During COVID-19



Source: Author's calculation using data from "Central Board of Direct Tax (CBDT)"

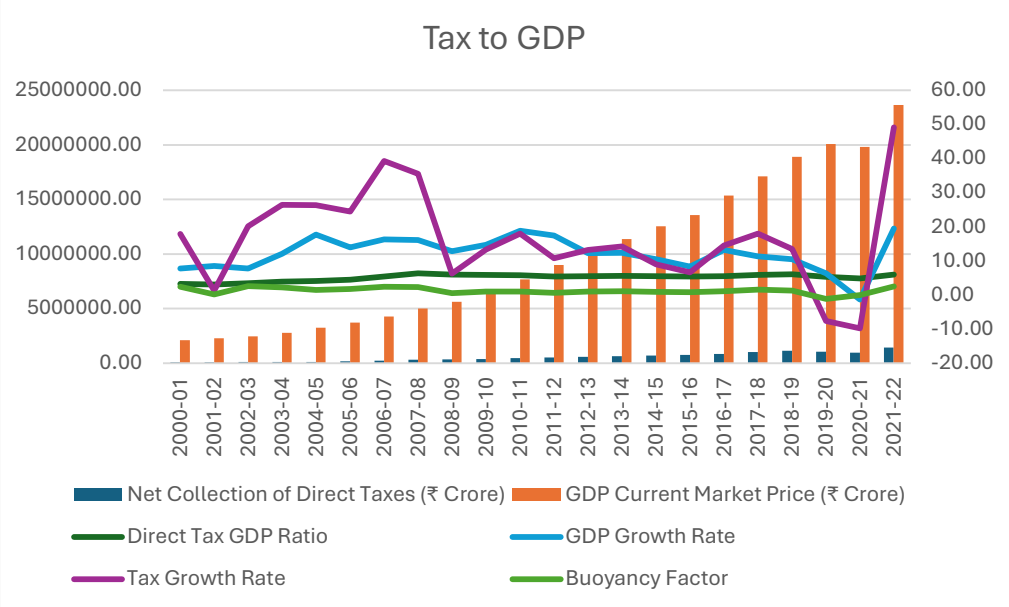
Figure 4.4 illustrates the trends in direct tax collections in India from 2014–15 to 2021–22, broken down into Corporate Tax, Personal Income Tax, and Other Direct Taxes, along with the overall total. There is a steady rise in all categories up to 2018–19, followed by a noticeable dip in 2020–21, likely due to the economic impact of the COVID-19 pandemic. Corporate Tax experienced a sharper decline than Personal Income Tax during that period. However, in 2021–22, there is a strong rebound across all categories, especially in the total tax collection, which surpasses the linear growth trend. This suggests a recovery in economic activity and improved compliance or policy measures boosting collections post-pandemic. FDI inflows to the BRICS countries are driven by a combination of market size, economic growth, natural resources, and political factors. However, the COVID-19 pandemic has significantly impacted FDI flows, with adverse effects observed in some countries and opportunities emerging in others. Policymakers in the BRICS countries should therefore focus on addressing the pandemic and improving the business environment to attract FDI inflows in the post-pandemic period. (Chattopadhyay et al., 2022). From 2000-01, tax collections had seen consistent growth on a year-on-year basis. Year 2019-20 became the first year since then that recorded a decline in tax collections from 11.37 Lakh crores in 2018-19 to ₹ 10.50 Lakh crores in 2019-20, followed by a further decline to ₹9.47 Lakh crores in

2020-21. Year 2020-21 became the first year when Personal Income Tax also recorded a decline.

4.7 Direct-Tax GDP Ratio

The tax-to-GDP ratio in India is the lowest among major nations (Singh, 2019). When compared globally, the cost of tax collection is relatively low (Singh, 2019). Because some of the compliances are pretty complex, India requires next-generation tax administration improvements (Singh, 2019). The Direct Tax GDP Ratio has fluctuated throughout time, reflecting changes in tax collection efficiency and the growth of the formal economy. The percentage fluctuated between 3.03 per cent in 2001-02 and 6.3 per cent in 2007-08, reflecting changes in tax policies, economic conditions, and tax administration. The Direct Tax GDP Ratio rose steadily until 2007-08, hitting a peak of 6.3 per cent during that fiscal year. This growing trend shows that the tax base is expanding, compliance is increasing, and tax collection techniques are improving. The ratio fluctuated in future years, driven by factors such as economic development, tax rate adjustments, and policy revisions.

Figure 4.5 GDP Growth Rate, Tax Growth Rate and Tax to GDP Ratio



Source: "Central Board of Direct Tax (CBDT)"

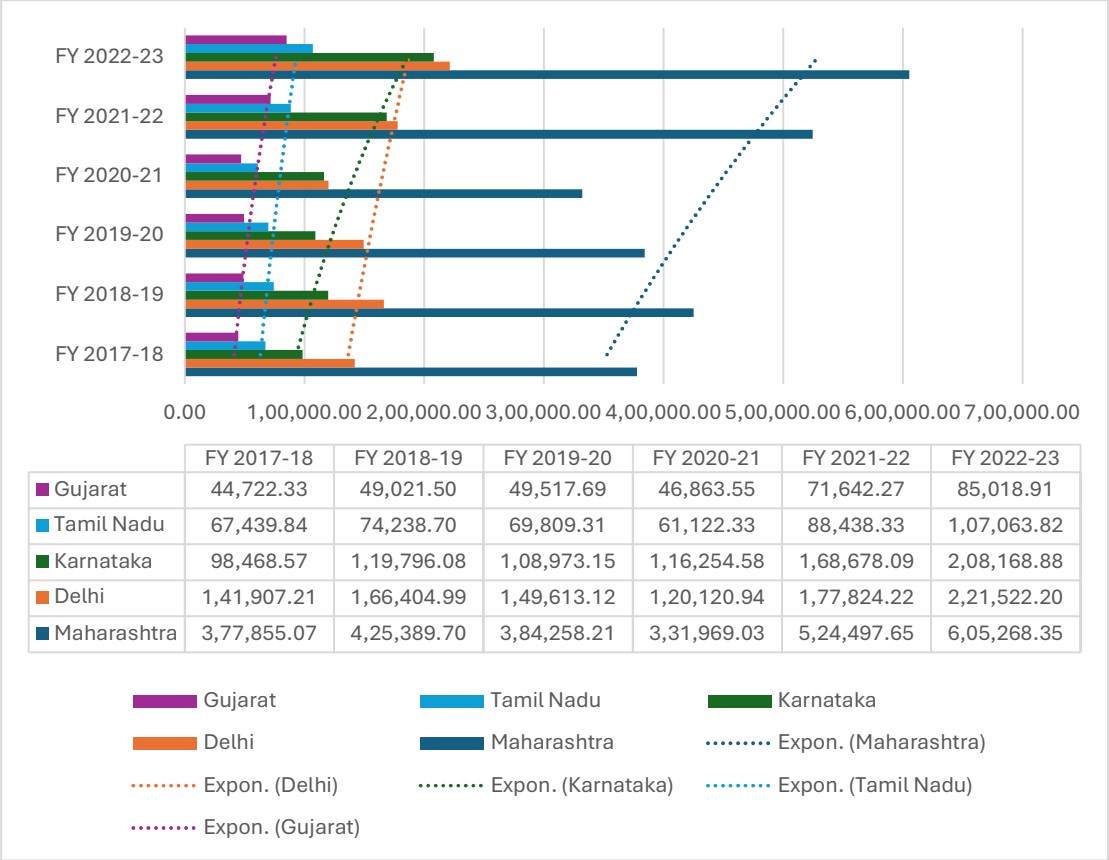
As shown in Figure 4.5, the ratio has fallen to 4.78 per cent in 2020-21 and marginally recovered to 5.97 per cent in 2021-22. The drop in ratio can be linked to causes such as the economic impact of the COVID-19 epidemic, reduced economic activity, and the government's response to the crisis. The Direct Tax GDP Ratio measures the progressivity of the tax system as well as the distribution of the tax burden. A higher ratio shows that a greater proportion of the country's economic production is paid in direct taxes, implying a more equitable allocation of tax burdens. It also implies that the government can extract a much larger share of tax money from both individual and corporate income. Its Direct Tax GDP Ratio can be influential in driving revenue generation and economic growth. A higher share indicates tax revenues are rising faster than GDP, reflecting positive buoyancy and the potential to finance public spending. Conversely, a low ratio may suggest less problematic income generation, possible budget surpluses, or constraints on public services and investment.

The buoyancy factor measures the sensitivity of direct tax receipts to variations in GDP. A ratio above one indicates tax revenues growing faster than GDP, suggesting an expanding tax base and rising tax compliance. If the factor is smaller than one, it denotes that the growth in tax revenues lags behind the growth in GDP, which implies the need for tax reforms or better tax administration. Policymakers can use this ratio to assess the efficiency of tax programs and identify areas for improvement, as well as to ensure a stable revenue base through reforms. A balanced approach to tax reform that enhances the tax base, makes for better compliance and encourages growth could help over time and lift the ratio higher.

4.8 Trends in State-wise Tax Collection

Total tax collection in India has been steadily increasing, rising from ₹6,38,588.90 crore in FY 2013-14 to ₹16,63,868 crore in FY 2022-23. Over the years, tax income has increased significantly, reflecting economic development and increased tax compliance. Maharashtra consistently tops the list of tax collectors, followed by Delhi, Karnataka, Tamil Nadu, and Gujarat. These states have strong economies, a significant industrial presence, and large populations, all of which contribute to larger tax collections. While most states' tax receipts have increased overall, there have been considerable swings in different years (Ministry of Finance, 2023).

Figure 4.6 Trends of Tax Collection in Top 5 States (By Collection)



	FY 2017-18	FY 2018-19	FY 2019-20	FY 2020-21	FY 2021-22	FY 2022-23
Gujarat	44,722.33	49,021.50	49,517.69	46,863.55	71,642.27	85,018.91
Tamil Nadu	67,439.84	74,238.70	69,809.31	61,122.33	88,438.33	1,07,063.82
Karnataka	98,468.57	1,19,796.08	1,08,973.15	1,16,254.58	1,68,678.09	2,08,168.88
Delhi	1,41,907.21	1,66,404.99	1,49,613.12	1,20,120.94	1,77,824.22	2,21,522.20
Maharashtra	3,77,855.07	4,25,389.70	3,84,258.21	3,31,969.03	5,24,497.65	6,05,268.35

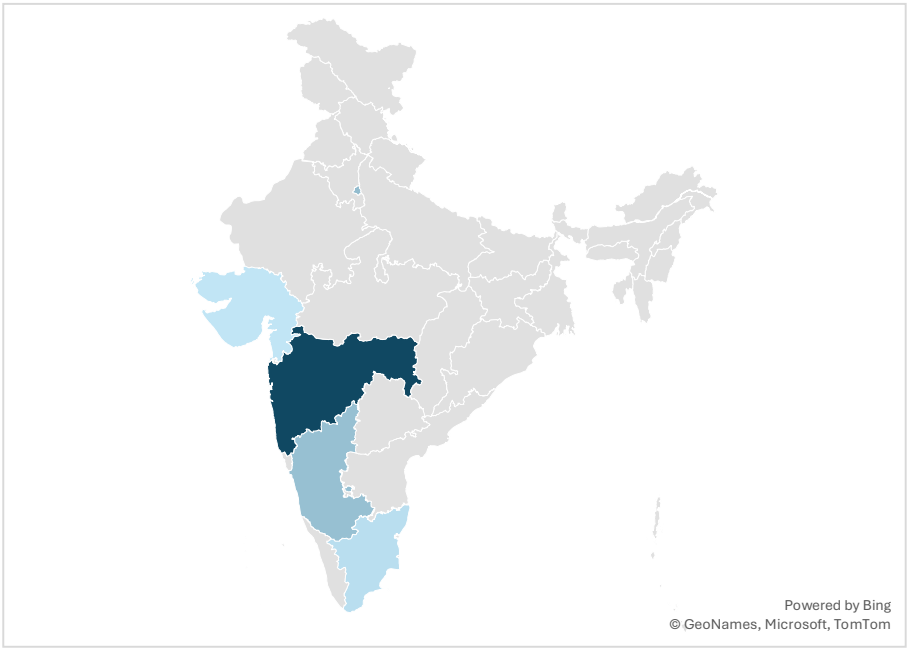
Source: Author's calculations using data from "Central Board of Direct Tax (CBDT)"

There are significant differences in tax collection between states. Increasing tax revenues are associated with increasing per capita income, urbanisation, and industrialisation. States with poor tax collections may need to make concentrated efforts to enhance tax compliance, stimulate economic growth, and attract investment. The COVID-19 pandemic and associated economic disruptions may have altered the data for fiscal years 2020-21 and 2021-22. Due to lockdowns and decreased economic activity, some governments saw a temporary decrease in tax collections. The recovery in tax collections in FY 2021-22 shows that economic activity will restart gradually.

4.8.1 Top-Performing States

Maharashtra consistently emerged as the top contributor in tax collections over the years, reflecting its strong industrial and economic activities, as shown in Figure 4.6. Its collections surged from ₹3,77,855 crore in FY 2017-18 to ₹6,05,268 crore in FY 2022-23, a spectacular hike that established its pre-eminence in the tax revenue landscape. With collections rising from ₹1,41,907 crore to ₹2,21,522 crore over this time, Delhi is another key contributor, with the exception of a temporary dip during the pandemic. Karnataka and Tamil Nadu are also prominent in the list, with Karnataka's collections jumping to ₹ 2,08,168 crore from ₹ 98,468 crore, more than doubling, while Tamil Nadu saw a steady rise to ₹ 1,07,063 crore from ₹ 67,439 crore over six years. These are the states that fuel India's fiscal revenues.

Figure 4.7 Map of the Top 5 States with the Highest Tax Collection



Source: Author's calculation using data from the Central Board of Direct Tax (CBDT)

4.8.2 Emerging States in Tax Collection

Emerging states such as Telangana, Gujarat, and Haryana have shown impressive performance, indicating high economic potential. Telangana's tax collections also grew exponentially, from ₹ 6,676 crore (FY 2017-18) to ₹ 35,433 crore in FY 2022-23, thanks

to the fast-paced industrial development and efficient tax administration. Gujarat recorded steady growth with collections moving up from ₹ 44,722 crore to ₹ 85,018 crore within the same period. Haryana too showed good growth from ₹ 25,380 crore in FY 2017-18 to ₹ 45,649 crore in FY 2022-23. These states exemplify how regionalised economies are growing and driving significant contributions to national tax revenue.

4.8.3 The Effect of the Pandemic and Rebound

FY 2020-21: The impact of the COVID-19 pandemic: There was a significant decline in tax collections in most states due to the COVID-19 pandemic. The collections of Maharashtra dropped to ₹3,31,969 crore as against that year's ₹3,84,258 crore, while those of Delhi declined to ₹1,20,120 crore. This trend was replicated in other states like Tamil Nadu and Gujarat. However, FY 2021-22 and especially FY 2022-23 saw a strong recovery, with a number of states not just bouncing back but also getting to pre-pandemic levels. For example, collections from Maharashtra climbed to ₹6,05,268 crore during FY 2022-23, while Karnataka, Tamil Nadu and Gujarat also saw impressive growth during this time. The rebound is a testament to the resilience of India's economic structure and the success of state-level fiscal policy.

4.8.4 Expansion in Smaller States

While states like Sikkim, Mizoram, and Nagaland are less contributors in the overall tax share, the growth trend over the years has remained consistent. From ₹224 crore in FY 2017-18, Sikkim's tax collections grew to ₹ 365 crore in FY 2022-23, whereas Mizoram's revenues increased from ₹72 crore to ₹105 crore during the same period. Nagaland, too, saw steady growth, rising from ₹135 crore in FY 2017-18 to ₹295 crore in FY 2022-23. This is a significant trend and a positive sign of economic movements reaching smaller and less industrialised regions, along with improved revenue collection mechanisms.

4.8.5 Regional Disparities

The stark regional differences in tax receipts are predominantly due to Maharashtra, Karnataka, Tamil Nadu, and Delhi, which are the central industrialised states with significant industrial bases and diversified economies that contribute to their tax

revenues. In comparison, smaller, industrialised states including Meghalaya, Tripura and Manipur contribute relatively small amounts. On the contrary, states like Telangana, Gujarat, and Haryana are bridging this gap with their growth trending upward, suggesting that regional imbalances are gradually diminishing.

The analysis pinpoints several important trends. First, economic powerhouses such as Maharashtra, Karnataka and Tamil Nadu still lead the pack when it comes to tax collections, serving as a reminder of their important role in India's economy. Second, fast-growing states like Telangana, Gujarat, and Haryana are on the rise in their contributions, showing regional possibilities. Third, though there were temporary declines due to the pandemic, the robust recovery in FY 2021-22 and FY 2022-23 highlights the strength of India's fiscal framework. Moreover, smaller states chip in less total, but a steady rise suggests the possibility for more inclusivity to come. The data on tax collections overall highlights both the diversity and the dynamism of India's fiscal landscape and offers opportunities for sustained growth across the various regions.

4.9 State-wise Efficiency of Tax Collection using MALMQUIST Index

One of the most popular tools for efficiency and productivity analysis is the Malmquist index, which is mainly applied to measure the performance over time of a set of decision-making units (DMUs). It is a product of data envelopment analysis (DEA) based on distance functions to measure productivity changes, which refers to both efficiency change and technological change (Caves et al., 1982). This index decomposes changes of productivity into two terms: a term that illustrates the movement of the production frontier (technological progress) and a term that measures the distance of DMUs from the frontier (efficiency change) (Fare et al., 1994). One such non-parametric measure, the Malmquist Index, measures productivity and its derived components by not making strong assumptions on the functional form of the production process, allowing the Malmquist Index to be employed in applications across sectors, including healthcare, education and finance.

Several studies indicate the importance of the Malmquist Index in examining efficiency and informing policy decisions. As an example, in a study of the banking sector, Sufian (2009) showed that the Malmquist Index could be used to identify causes of change in efficiency, including technological changes or changes in practice. Similarly, Chen et al. (2020), using this index to assess the effect of environmental regulations on industrial efficiency, demonstrated the versatility of the index even in different contexts. The ability of the Malmquist Index to separate efficiency changes attributable to managerial performance from those resulting from external technological progress makes the Malmquist Index an invaluable tool for benchmarking and performance improvement initiatives in both public and private sector organisations.

The data provides decision-makers with information on what aspects of tax programs are functioning and which need improvement. Instead, states with lower tax collections should look at improving tax administration, fighting tax evasion, and attracting investments to raise revenue. As the Indian economy revives and reforms are introduced, tax collections are expected to grow even more. At the same time, new tax changes, technological developments, and improved compliance methods may bode well for tax revenues in the coming years. It is crucial to highlight that a thorough examination of tax revenues necessitates considering other elements such as the size of the economy, population, and economic activities in each state. Nonetheless, the presented data provide valuable insights into India's state-by-state tax collection trends.

Table 4.9.1 State-wise Efficiency of Tax Collection by using the MALMQUIST Index

State	Efficiency Change (eefch)	Technical Change (techch)	Pure Technical Change (pech)	Scale Efficiency Change (sech)	TFP Change (tfph)
Andaman Nicobar	1.549***	***	1	1.549***	***
Andhra Pradesh	1	0.704	1	1	0.703

Arunachal Pradesh	0.997	0.828	0.995	1.003	0.826
Assam	1	0.703	1	1	0.703
Bihar	1	0.703	1	1	0.702
Chandigarh	1.007	0.735	1.007	1	0.741
Chhattisgarh	1	0.703	1	1	0.703
Delhi	1	0.703	1	1	0.704
Goa	1.001	0.706	1.001	1	0.706
Gujarat	1	0.699	1	1	0.699
Haryana	1	0.703	1	1	0.703
Himachal Pradesh	1	0.709	1	1	0.709
Jammu Kashmir	0.999	0.709	0.999	1	0.709
Jharkhand	1	0.703	1	1	0.703
Karnataka	1	0.699	1	1	0.699
Kerala	1	0.703	1	1	0.704
Madhya Pradesh	0.999	0.704	0.999	1	0.703
Maharashtra	1	0.699	1	1	0.699
Manipur	1.012	0.812	1.012	1	0.822
Meghalaya	1.007	0.772	1.007	1	0.778
Mizoram	1.013	0.884	1	1.013	0.896
Nagaland	1.008	0.818	1.008	1	0.824
Odisha	1	0.702	1	1	0.702
Puducherry	1.01	0.756	1.01	1	0.763
Punjab	1	0.703	1	1	0.703

Rajasthan	1	0.703	1	1	0.703
Sikkim	1	0.803	1	1	0.803
Tamil Nadu	1	0.699	1	1	0.699
Telangana	0.999	0.704	0.999	1	0.703
Tripura	1	0.719	1	1	0.719
Uttar Pradesh	1	0.699	1	1	0.699
Uttarakhand	1	0.707	1	1	0.707
West Bengal	1	0.702	1	1	0.702
mean	**1.015**	**54.16**	**1.001**	**1.014**	**54.246**

Source: Author's Calculation

The Malmquist Index analysis highlights changes in productivity and efficiency across Indian states and union territories. Most states show stable efficiency levels, with the Efficiency Change (Effch) values close to 1, indicating that their ability to utilise resources effectively has remained essentially unchanged. However, Andaman & Nicobar stands out with a remarkable Effch of 1.549, indicating a significant improvement in efficiency. On the other hand, the states with the highest tax collection, i.e., Gujarat, Karnataka, Maharashtra, Tamil Nadu and Uttar Pradesh, were technically the least efficient, with a joint lowest efficiency score of 0.699. This reflects a strong ability to utilise resources more effectively compared to other regions.

When it comes to Technological Change (Techch), most states show values below 1, indicating technological regression. This means that the production frontier—the benchmark for technology—has shifted backward for many states. For example, states like Bihar, Jharkhand, and Odisha show Techch values around 0.703, suggesting that a lack of technological progress is holding back productivity. On the other hand, a few states like Mizoram (Techch: 0.884) and Nagaland (Techch: 0.818) show relatively better technological performance, which has contributed positively to their overall productivity. The Pure Efficiency Change (Pech) values, which measure managerial

efficiency, remain consistently at 1 for almost all states, indicating no significant improvement or deterioration in operational management. Similarly, the Scale Efficiency Change (Sech) values are also close to 1, showing that changes in the scale of operations have not had a notable impact on productivity.

Techch primarily drives the Total Factor Productivity Change (Tfpch) values. Since most states show technological regression, their Tfpch values also remain below 1. For instance, Bihar and Jharkhand have Tfpch values matching their Techch values of around 0.703, suggesting that technological setbacks are the main reason for their productivity decline. On the other hand, Mizoram (Tfpch: 0.896) and Nagaland (Tfpch: 0.824) perform better due to their relatively stronger technological performance. While efficiency levels have remained stable across most states, technological regression is a significant challenge. States like Mizoram and Nagaland show some resilience with moderate technological progress, while Andaman & Nicobar demonstrate exceptional efficiency improvements. To boost productivity across the board, a stronger focus on technological innovation and advancements is essential. States performing well in this regard can serve as examples for others.

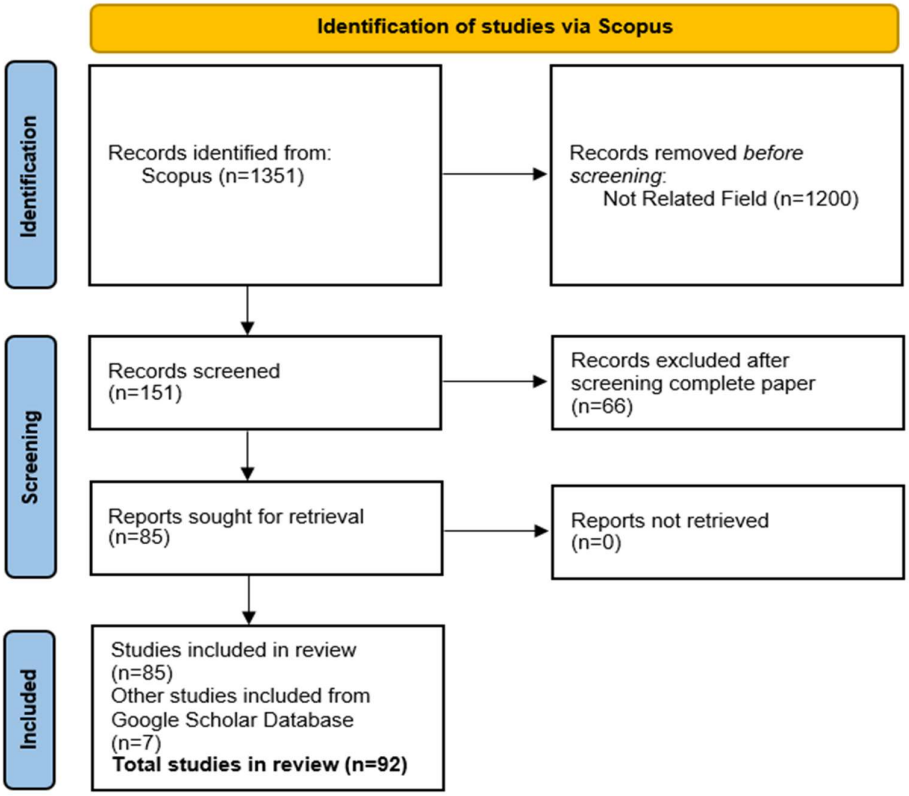
Section II: Determinants of Tax Collection

4.10 Relationship between Economic Growth and Tax Collection

Understanding the determinants of direct tax collection is essential for designing effective fiscal policy and enhancing the efficiency of tax administration. While the previous section outlined the historical trends in tax revenue, this section focuses on the underlying factors that influence direct tax receipts in India. The country's tax performance is shaped not only by macroeconomic variables such as GDP, inflation, and unemployment but also by institutional factors like governance, compliance mechanisms, and digitalisation initiatives. Through a blend of empirical analysis and theoretical insight, this section evaluates how these diverse variables affect the capacity of the government to mobilise revenue. This examination helps identify the key levers for improving tax policy and administration and provides valuable direction for policymakers aiming to strengthen the nation's fiscal foundations.

A systematic literature review was conducted using the Scopus database to identify determinants of direct tax collection in India. The Scopus database is considered a reliable and consistent platform for extracting data from published research papers (Silva & Moreira, 2022). Data is extracted from the Scopus database using the keywords "DIRECT TAX" or "INCOME TAX" and "DETERMINANTS" or "FACTORS". The study follows Preferred Reporting Items for Systematic Review and Meta-Analysis (PRISMA) to address the research questions. PRISMA approach is a widely accepted approach for Systematic Literature Reviews (SLR) (Martinez & Ahmad, 2022; Macusi et al., 2022; Maffezzoli et al., 2022).

Figure 4.8 PRISMA Flow Diagram



Source: Calculation of the author using articles from the Scopus database

A total of 1351 publications were extracted from the database with the above-mentioned keywords. After screening their title, abstracts and relevance, only 151 papers were found relevant to the underlying subject. After extensively reviewing all 151 papers, 85

papers were found relevant, and seven additional papers were added using Google search, as mentioned in Figure 4.8 above. The systematic literature review (SLR) conducted on studies highlights various economic determinants that impact tax collection. Various studies show the determinants of economic growth that have an impact on tax collection. Corruption is found to be a significant hurdle in the tax collection process (Amin et al., 2014). Also, there is no uniformity in the rates of taxes in different countries, and reasons cited for the same can be GDP, population (Pessino et al., 2010; Gupta, 2007), and inflation (Tanzi et al., 1989). "Level of unemployment, and number of informally employed people impacts the individual income tax receipt in a nation" (Kalivoshko et. al, 2020). On the basis of past studies, it is found that the following economic variables have an impact on tax collection, i.e., Gross Domestic Product (GDP), Population, Inflation, Unemployment Rate and Corruption.

4.11 Brief Details and Major Findings from Prominent Studies

After an extensive review of the shortlisted papers by following the underlying process, all papers were reviewed, and their primary outcomes were studied. A table of the top 10 most cited papers is constructed to highlight their research focus. Seven out of the top 10 cited studies belong to the USA.

Table 4.11.1: Review of Literature of Top Cited Studies

S No.	Representative Studies	Research Focus	Contributions/Outcomes	Country of Study
1	Alm and Whittington, 1997	The study aims to assess the influence of the federal individual income tax on the timing of marital choices.	"The analysis concludes that there is a significant positive relationship between the marriage penalty in a year and the probability of delaying marriage until the following year"	USA
2	Alm and Whittington, 1998	The study examines the influence of the federal individual income tax and various	"The paper concludes that the probability of marriage is significantly affected by a range of	USA

		economic and demographic factors on individuals' marriage choices.	economic and demographic variables. Furthermore, an increase in total income taxes paid by married versus single women has a negative effect on the likelihood of marriage. In contrast, the tax effect plays a rarely significant role in determining marriage probabilities among men."	
3	Auten and Carroll, 1999	The research examines the extent to which behavioural reactions to tax modifications in the 1980s may elucidate the increasing inequality.	"The paper concludes that both tax rates and nontax factors appear to have had significant effects on relative income growth during the late 1980s"	USA
4	Hamad and Rehkopf, 2016	The research aims to evaluate the correlations between the Earned Income Tax Credit (EITC) and child development, employing an instrumental variable technique to quantify the possible effects of income.	"The results suggest that EITC benefits and higher income are associated with modest but meaningful improvements in child development."	USA
5	Holcombe and Lacombe, 2004	The study analyses the effect of alterations in marginal state income tax rates on per capita income by contrasting income growth in counties along state	"The results depict that over the 30 years from 1960 to 1990, states that raised their income tax rates more than their neighbours had slower income growth and, on	USA

		borders with that in neighbouring counties across the border.	average, a 3.4 per cent reduction in per capita income"	
6	Mares and Queralt, 2015	The study examines the primary obstacles to the implementation of income taxes in Western economies since the 19th century.	"The authors conclude that while countries with low levels of electoral enfranchisement and high levels of landholding inequality adopt the income tax first, countries with more extensive electoral rules lag in adopting these new forms of taxation."	Cross-National Coverage
7	Mino, 1996	The research examines a two-sector model of endogenous growth, wherein one sector generates final goods while the other cultivates fresh human capital.	"The analysis concludes that the dynamic behaviour of the economy and some policy effects depend heavily upon the magnitude of factor intensity used in each production sector."	Japan
8	Rehkopf et. al, 2014	The article seeks to examine the influence of the Earned Income Tax Credit (EITC) on universal health programs.	"The short-term impacts of EITC income receipt are not universally health-promoting, but on balance, there are more health benefits than detriments."	USA
9	Sandmo, 1981	This research endeavours to integrate tax evasion into the	"The paper concludes that marginal cost should be greater than marginal tax revenue."	General

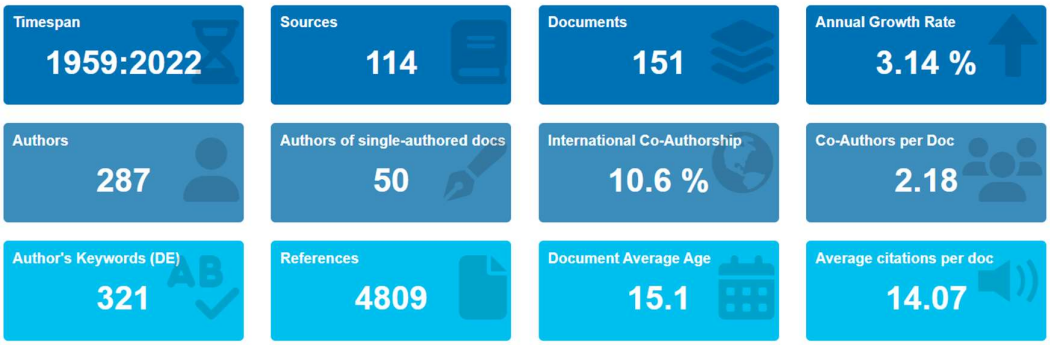
		examination of optimal income taxation.		
10	Ventry and J, 2000	The article examines policy alternatives concerning costs and labour supply incentives, along with those related to participation ease and compliance rates.	"The paper concludes that although economic analysis influenced the creation and development of the EITC (Earned Income Tax Credit), political factors, not economics, animated the history of the program."	USA

Source: Author's Compilation

4.12 Synthesis of Systematic Literature Review

This systematic review considers the papers from 1959-2022 from 114 sources written by 287 authors as depicted in Fig. 4.9. Other summary stats of the study are also mentioned in Fig. 3.2 below.

Figure 4.9: Overview of the Papers Extracted and Screened from the Scopus Database



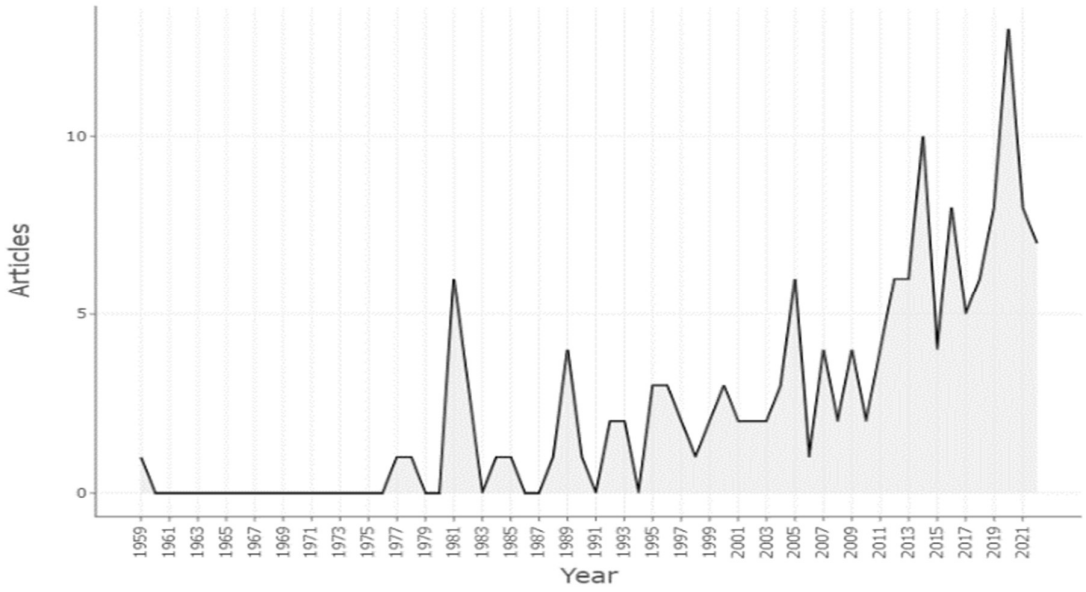
Source: Author's Calculations

4.12.1 Annual Scientific Production

Annual Scientific Production is increasing at a growth rate of 3.14 per cent. The number of studies significantly increased in 1981 and continued to increase thereafter. The

subsequent significant increase in annual scientific production was seen in 2005, 2015 and 2019, respectively.

Figure 4.10 Annual Scientific Production



Source: Author's Calculations

4.12.2 Most Relevant Sources and Impact

Analysis shows the most relevant sources. National Tax Journal, with eleven publications on the underlying subjects, becomes the most relevant source, followed by Journal of Public Economics and Public Finance Review, with nine and six publications, respectively. As far as the impact of the publication is concerned, National Tax Journal, Journal of Public Economics and Public Finance Review repeat the story, and the same is evident in Table 4.15.2.1

Table 4.12.2.1 Source Local Impact

Element	h_index	g_index	m_index	TC	NP	PY_start
National Tax Journal	10	11	0.345	250	11	1995
Journal Of Public Economics	7	9	0.149	434	9	1977
Public Finance Review	6	6	0.140	103	6	1981
American Journal of Epidemiology	2	2	0.250	56	2	2016
International Tax and Public Finance	2	3	0.105	44	3	2005

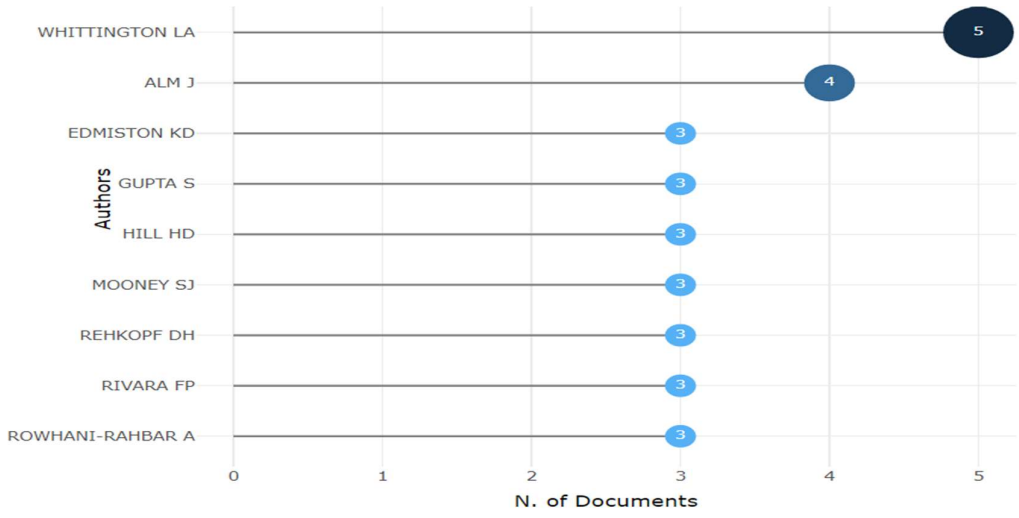
Journal Of Economic Behavior and Organization	2	2	0.333	4	2	2018
Scandinavian Journal of Economics	2	2	0.100	24	2	2004
2020 IEEE International Conference on Problems of Information Communications Science and Technology, Pic S and T 2020 - Proceedings	1	1	0.333	2	1	2021
Accounting Historians Journal	1	1	0.026	7	1	1985
Ahuri Final Report	1	1	0.167	4	1	2018

Source: Author's Calculations

4.12.3 Most Relevant Authors, Author Production Over Time and Reference Spectroscopy

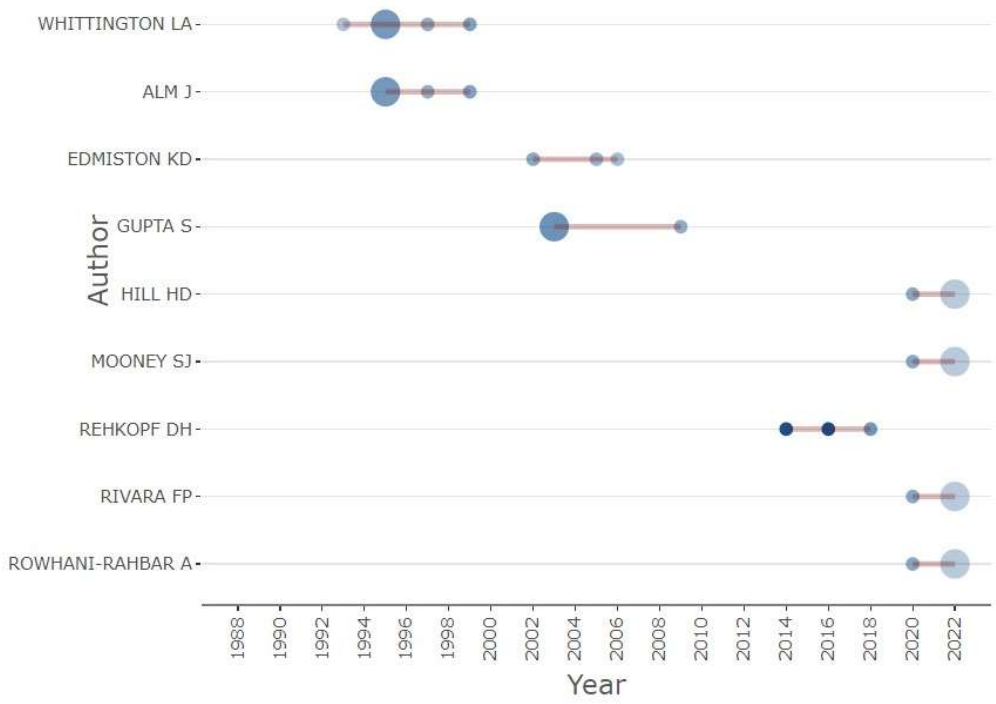
Whittington and Alm J are the most relevant authors on the subject, with five and four publications respectively, and are followed by Edmiston, Gupta and others as mentioned in Figure 4.11. While Whittington and Alm were more active from 1994-2000, Edmiston and Gupta were more active during 2002-2008 (Figure 4.12). References on the underlying topic increased from 1968 onwards and reached their peak around 1998.

Figure 4.11: Most Relevant Authors and Impact



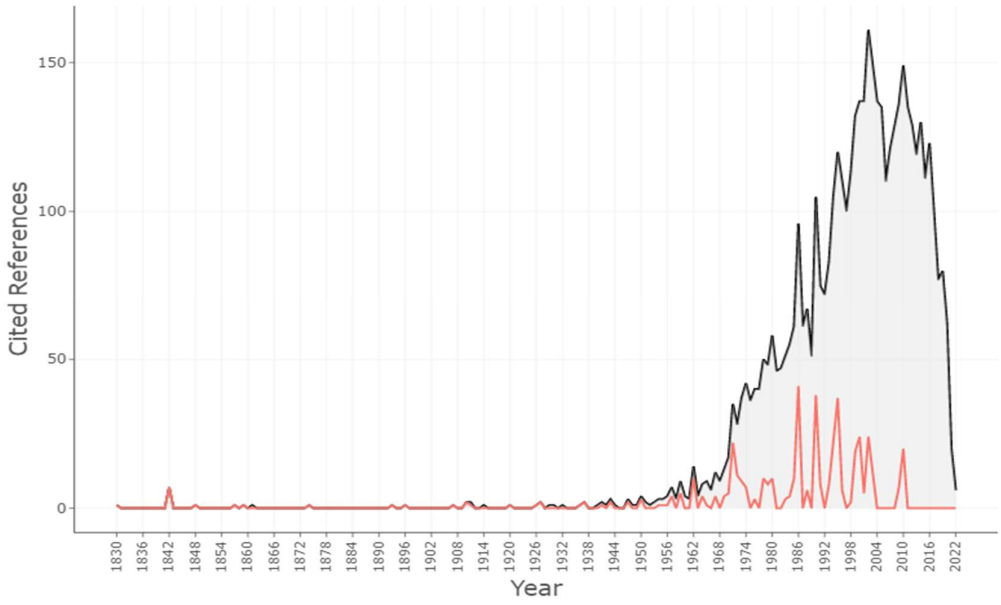
Source: Author's Calculations

Figure 4.12 Most Relevant Authors



Source: Author's Calculations

Figure 4.13 Author's Production Overtime

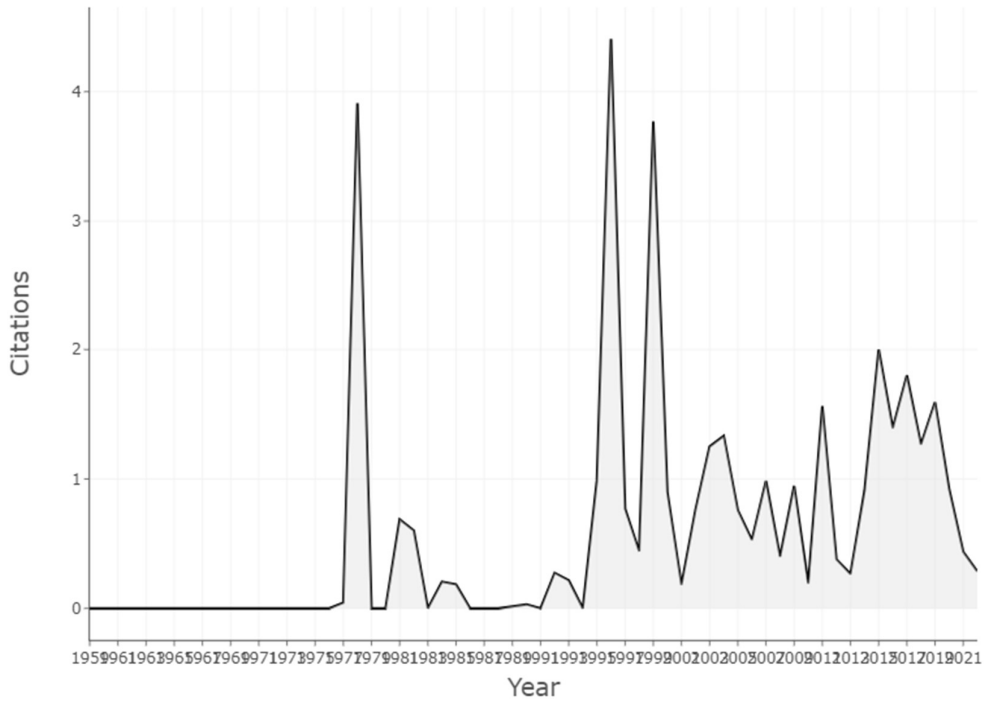


Source: Author's Calculations

4.12.4 Average Citations per year

The citation rate was minimal in the early decades, signifying little research effort or acknowledgment during that time. A notable rise in citations occurred in the late 1990s and early 2000s, indicating an increase in research production or the growing significance of the area. This peak signifies a phase of intense academic focus, sometimes associated with notable events, advancements, or publications. Subsequently, a more stable citation rate is upheld, indicating consistent involvement with the research, despite some remaining swings. The progressive decrease of citations at the timeline's conclusion may indicate a saturation of interest or a transition in focus to emerging subjects.

Figure 4.14 Average Citations Per Year



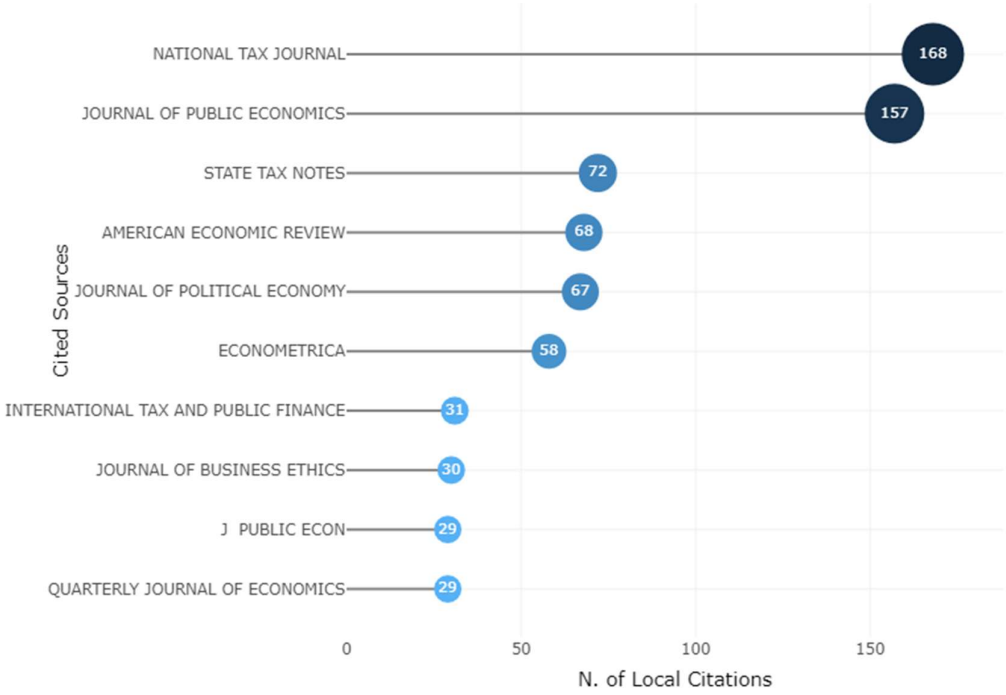
Source: Author's Calculations

4.12.5 Most Local Cited Sources

The National Tax Journal and the Journal of Public Economics are the top two sources, with 168 and 157 citations, respectively, showcasing their dominance and foundational contributions to the field. Following these, sources such as State Tax Notes (72 citations), American Economic Review (68 citations), and the Journal of Political

Economy (67 citations) indicate substantial academic engagement, further underscoring their significance in shaping discussions. Other notable journals, including Econometrica (58 citations), International Tax and Public Finance (31 citations), and the Journal of Business Ethics (30 citations), demonstrate their relevance in providing diverse perspectives on the subject matter. This distribution of citations highlights the critical role played by these journals in advancing knowledge, with the top two journals acting as primary hubs of scholarly dialogue.

Figure 4.15: Most Local Cited Sources



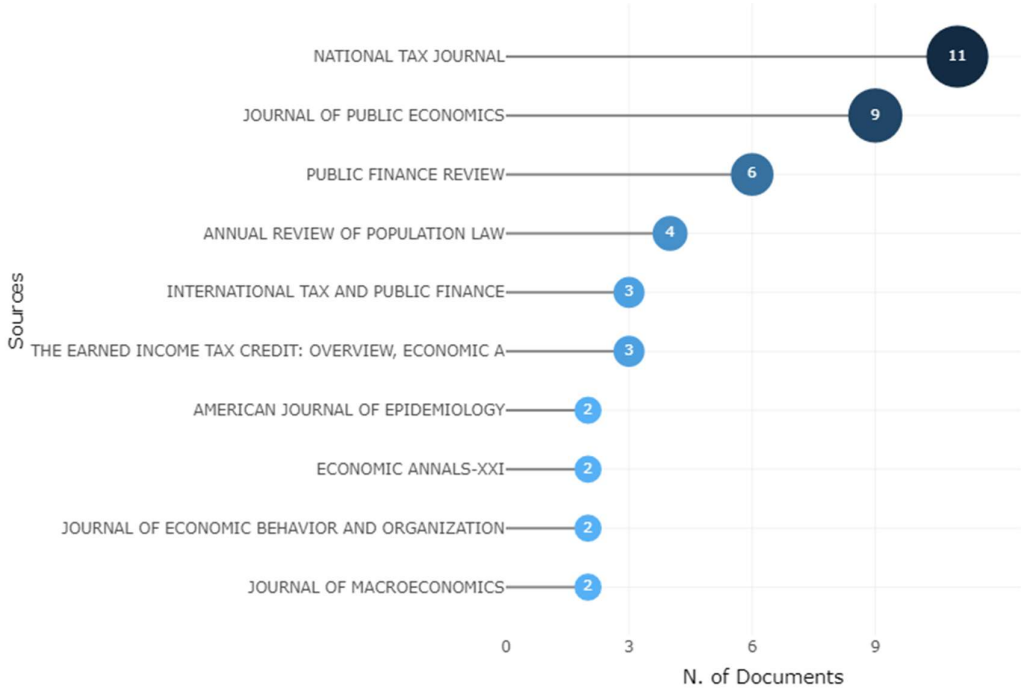
Source: Author's Calculations

4.12.6 Most Relevant Sources

Figure 4.16 delineates the most relevant sources within the research domain, sorted according to their document contributions. The National Tax Journal features 11 documents, highlighting its substantial contribution to the area. The Journal of Public Economics follows, with nine documents, so reinforcing its significance in determining academic discourse. Additional significant sources comprise the Public Finance Review (6 documents) and the Annual Review of Population Law (4 documents). Sources such as International Tax and Public Finance and the Earned Income Tax

Credit: Overview, Economic A, each comprising three documents, further illustrate their significance. These sources combined constitute the fundamental platforms for research and discourse in this field.

Figure 4.16 Most Relevant Sources



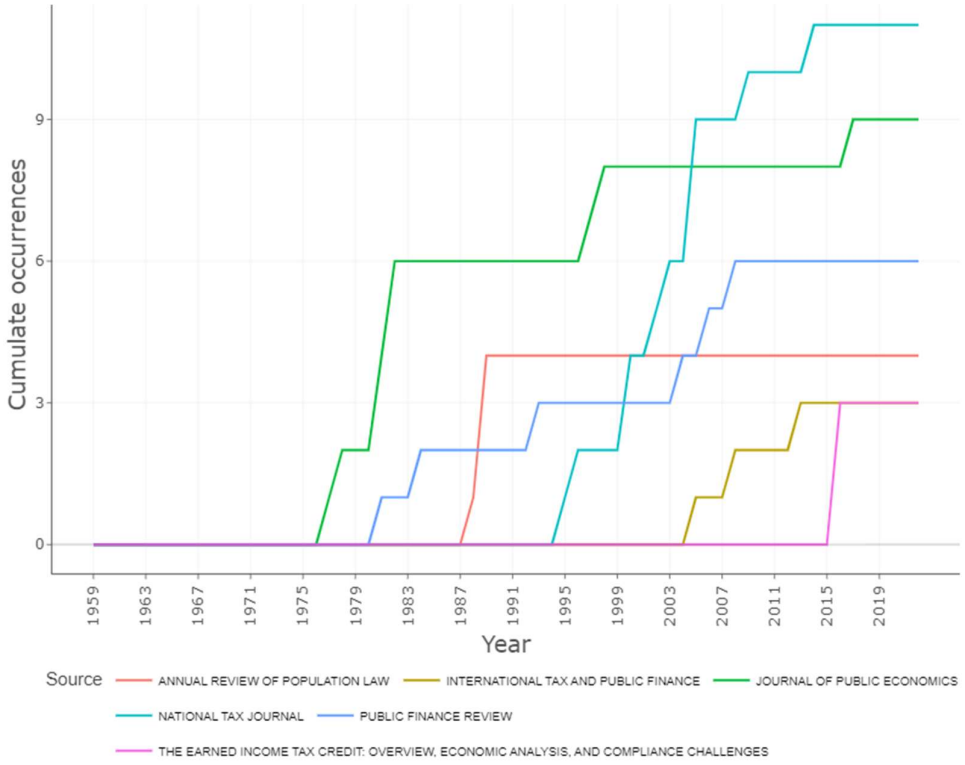
Source: Author's Calculations

4.12.7 Cumulative Occurrences

Figure 3.10 depicts the total number of publications from primary sources over time, demonstrating the development and contributions of these sources to the study field. The Journal of Public Economics and the National Tax Journal exhibit a sustained and notable rise in cumulative occurrences, reflecting their enduring impact and persistent contributions to the discipline. The Public Finance Review exhibits a progressive increase, underscoring its significance in subsequent years. Alternative sources, such as the Annual Review of Population Law and International Tax and Public Finance, demonstrate a gradual but consistent growth, indicating more specialised or niche contributions. The recent advent of the Earned Income Tax Credit underscores its contemporary significance. This cumulative tendency highlights the increasing depth

and scope of academic interaction over time, with specific sources facilitating foundational conversations and others arising to tackle current challenges.

Figure 4.17 Cumulative Occurrences



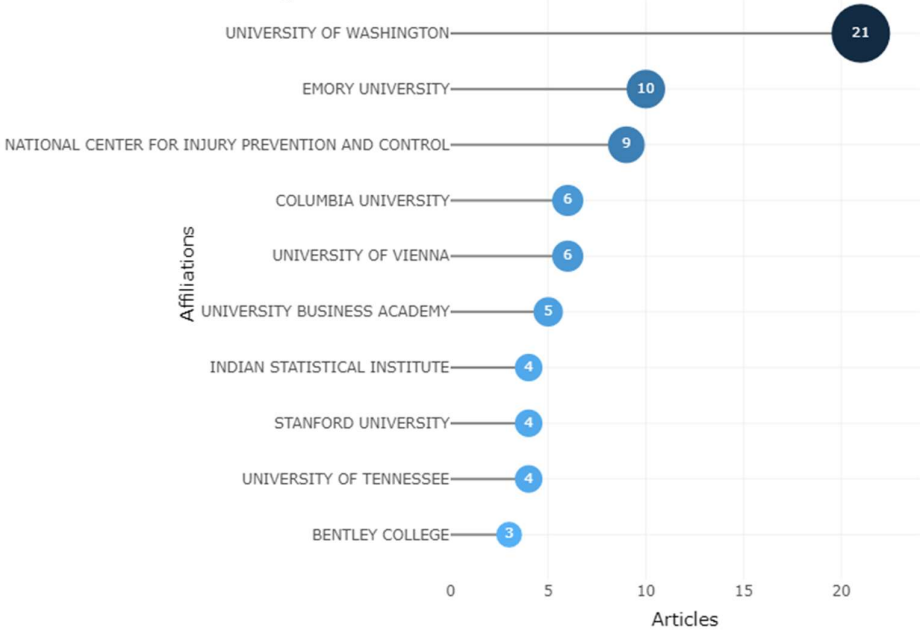
Source: Author's Calculations

4.12.8 Most Relevant Affiliations

The chart showcases the affiliations contributing the most articles in the research domain, highlighting institutions' influence and participation. The University of Washington leads significantly with 21 articles, indicating its dominant role and active research efforts in this field. Emory University follows with 10 articles, while the National Centre for Injury Prevention and Control ranks third with nine articles, reflecting their substantial contributions to the literature. Other notable contributors include Columbia University and the University of Vienna, with six articles each, alongside institutions like the Indian Statistical Institute, Stanford University, and the University of Tennessee, each contributing four articles. This distribution highlights the involvement of a diverse set of global academic and research institutions, with the top

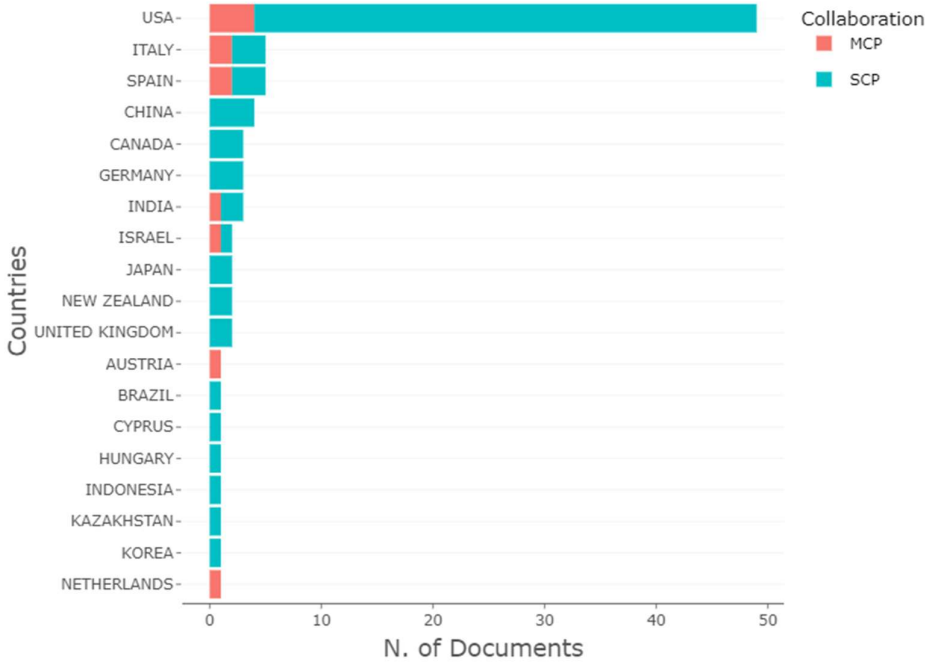
contributors likely acting as hubs for innovation and knowledge dissemination in the domain.

Figure 4.18 Most Relevant Affiliations



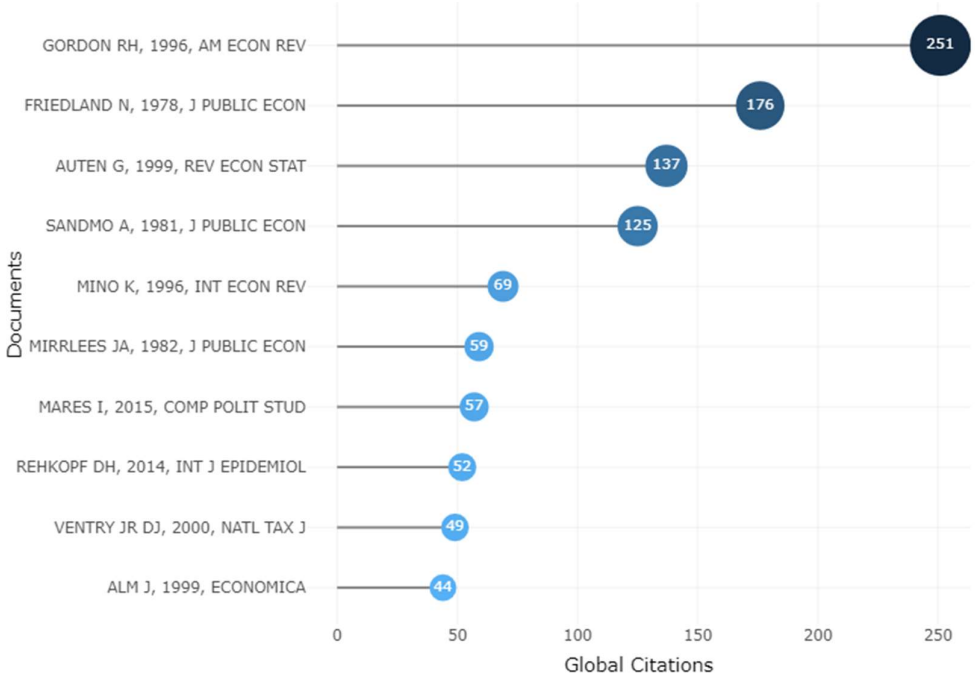
Source: Author's Calculations

Figure 4.19 Corresponding Author's Country



Source: Author's Calculations

Figure 4.20: Most Cited Documents



Source: Author's Calculations

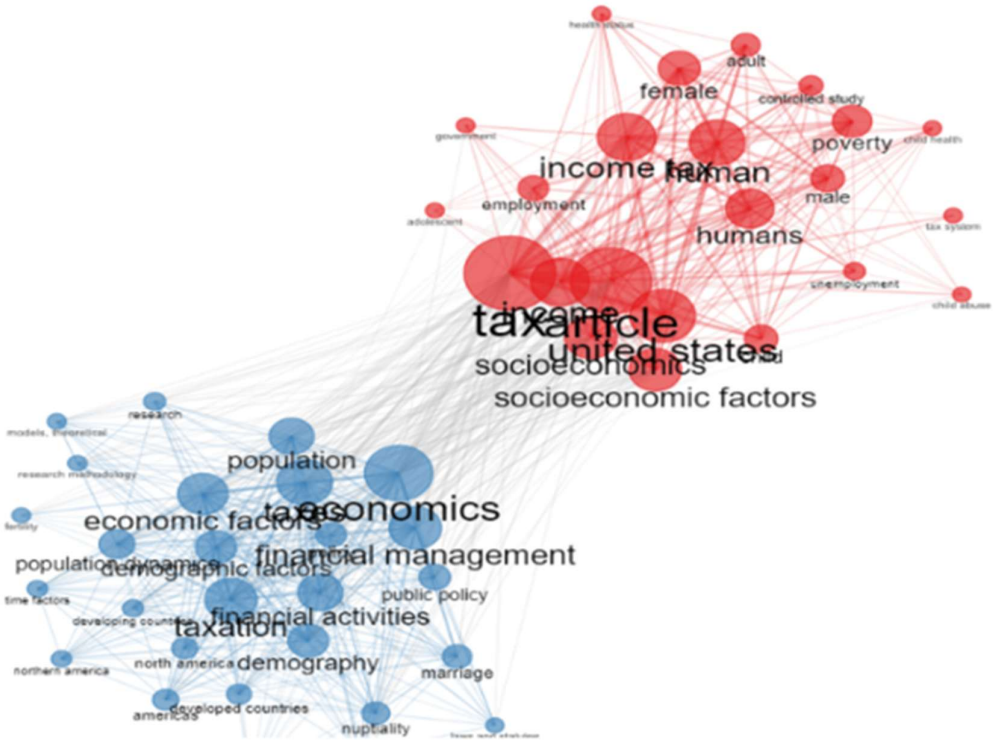
4.12.9 Most Cited Documents

The chart highlights the most globally cited documents in the research domain, reflecting their significant influence and contribution to academic discourse. The most cited document is Gordon RH, 1996, with 251 citations, demonstrating its foundational role and wide acceptance in the field. It is followed by Friedland N, 1978, with 176 citations, and Auten G, 1999, with 137 citations, indicating their pivotal contributions. Sandmo A, 1981, with 125 citations, also plays a significant role in shaping discussions. Other influential works include Mino K, 1996, (69 citations) and Mirrlees JA, 1982, (59 citations), showcasing their continued relevance. More recent documents, such as Mares I, 2015, and Rehkopf DH, 2014, highlight the evolving nature of the field and its responsiveness to emerging issues.

4.12.10 Clusters

The co-occurrence network visualises the relationships between key concepts and themes in the research domain. The nodes represent frequently occurring terms, while the edges indicate the strength of their connections.

Figure 4.21 Co-Currence Network



Source: Author's Calculations

From the above, two clusters emerge, which are as follows:-

Red Cluster (Socioeconomic Factors and Human Impact):

1) This cluster is centred around terms like "income," "human," "socioeconomic factors," and "United States." It highlights research themes focused on the societal and individual impacts of taxation, income distribution, poverty, employment, and gender disparities.

2) Keywords such as "poverty," "unemployment," "female," and "child health" emphasise the socio-demographic implications of economic policies and their effects on specific groups.

Blue Cluster (Economics and Financial Management):

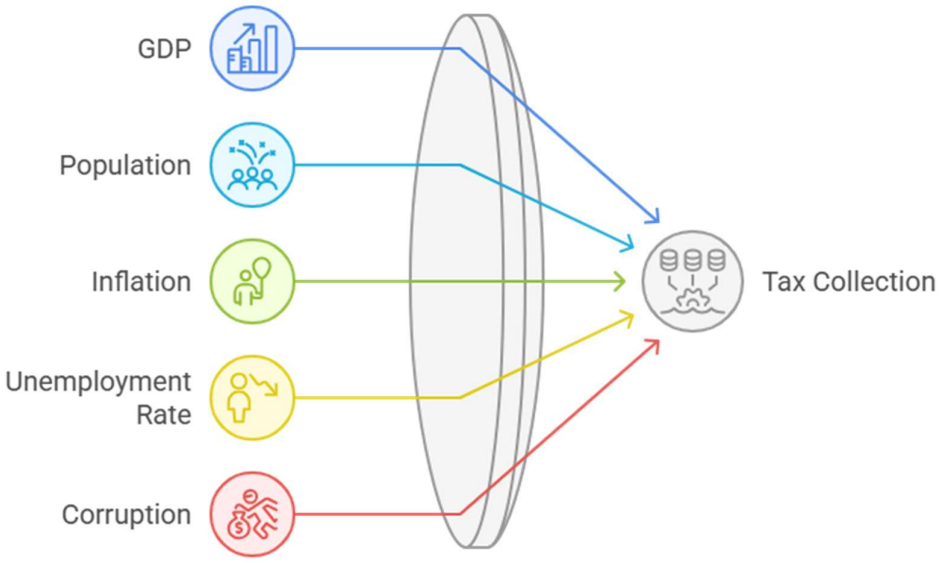
1) This cluster is dominated by terms like "economics," "taxation," "financial management," and "population." It reflects themes related to economic

systems, demographic analysis, financial activities, and public policy.

2) Terms like "demography," "economic factors," and "marriage" indicate a focus on broader economic behaviours and trends, including demographic and regional studies.

The strong connections between clusters suggest an interdisciplinary approach, where socioeconomic factors are closely tied to economic policies and frameworks. This network provides a comprehensive overview of the research landscape, highlighting both micro (individual-level) and macro (policy-level) aspects of taxation and economics. The visualisation demonstrates how diverse themes interlink to shape discussions in this domain. Various factors affects direct tax and its collection. These factors may vary from country to country. However, the major determinants of direct taxation on the basis of this extensive review are change in tax rates, tax avoidance, tax compliance, political orientation etc. Apart from these factors, online tax filing has also gained major traction, and it was found that people who perform online tax filing also perceive that e-filing is safer than conventional options. However, it is surprising to find that the increase in the tax cut did not have a significant impact on the economic growth. The finding of all these variables that affect direct tax and its collection can pave a roadmap for the research scholars to dig deeper into each of the determinants and find the impact on various sectors of the economy. The limitation of this study is the use of Scopus as the only database for extracting papers. Although it is known to be the largest database available for research papers, other databases such as ProQuest, ABI-inform, WoS, etc. may be explored for analysis of data from these sources as well.

Figure 4.22 Economic Factors Affecting Tax Collection



Source: Literature Review (SLR) by Author

Further, to check the causality of all these variables on tax collection in India, the Granger causality test is applied. The Granger causality analysis clarifies the relationships between various factors and tax collection. The results indicate that GDP at present prices Granger-causes tax collection, with a p-value under 0.05.

Table 4.12.10.1 Results of Granger Causality on Economic Factors on Tax Collection

Variable	Residual Degrees of Freedom	F-Statistic	P-Value	Significance
Gross Domestic Product (GDP)	18	21.151	0.0002556	***
Inflation	18	0.3082	0.586	Not Significant
Population	18	3.0262	0.1	.
Unemployment Rate	18	4.545	0.0479	*

Corruption	18	0.0015	0.9695	Not Significant

Source: Author's calculation

As shown in Table 4.12.10.1, the Granger causality test for the relationship between Tax Collection and GDP Current Prices (in Billion ₹) yielded an F-statistic of 21.151 and a p-value of 0.0002556. Since the p-value is less than 0.05, it is statistically significant, leading us to reject the null hypothesis that GDP Current Prices do not Granger-cause Tax Collection. This result indicates that changes in GDP Current Prices Granger-cause changes in Tax Collection, meaning that past values of GDP Current Prices provide valuable information for predicting future Tax Collection.

The Granger causality test for the relationship between Tax Collection and Inflation at Average Consumer Prices resulted in an F-statistic of 0.3082 and a p-value of 0.586. Since the p-value is greater than 0.05, it is not statistically significant, and we fail to reject the null hypothesis that Inflation does not Granger-cause Tax Collection. This indicates that past values of Inflation at Average Consumer Prices do not provide helpful information for predicting changes in Tax Collection. The Granger causality test for the relationship between Tax Collection and Population (in millions) resulted in an F-statistic of 3.0262 and a p-value of 0.1. Since the p-value is greater than 0.05 but less than 0.1, it is considered marginally significant. This indicates a weak relationship between Population and Tax Collection, suggesting that while Population might Granger-cause Tax Collection, the evidence is not strong enough to confirm this at the conventional 5 per cent significance level. Further investigation with additional data or alternative modelling approaches could help clarify the relationship.

The Granger causality test for the relationship between Tax Collection and Unemployment Rate yielded an F-statistic of 4.545 and a p-value of 0.0479. Since the p-value is less than 0.05, it is statistically significant, allowing us to reject the null hypothesis that the Unemployment Rate does not Granger-cause Tax Collection. This indicates that past values of the Unemployment Rate provide valuable information for predicting future changes in Tax Collection. The Granger causality test for the relationship between Tax Collection and Corruption yielded an F-statistic of 0.0015 and a p-value of 0.9695. Since the p-value is greater than 0.05, it is not statistically

significant, and we fail to reject the null hypothesis that Corruption does not Granger-cause Tax Collection. This indicates that past values of Corruption do not provide helpful information for predicting changes in Tax Collection.

This signifies a strong and statistically significant association, suggesting that historical GDP Current Prices are strongly predictive of fluctuations in Tax Collection. The Unemployment Rate Granger-causes Tax Collection, as indicated by a p-value below 0.05, demonstrating its significant impact on predicting future tax revenue. Conversely, inflation in average consumer prices does not Granger-cause tax revenue, as its p-value exceeds 0.05. This insignificance suggests that historical inflation rates do not contribute to predicting changes in Tax Collection. The population exhibits a marginally significant link with tax collection, as evidenced by a p-value of 0.1. This indicates a weak connection, which is inadequate to establish a reliable predictive relationship at the conventional 5 percent significance level. Ultimately, Corruption does not Granger-cause Tax Collection, as its p-value substantially surpasses 0.05, signifying an absence of predictive significance. Therefore, as mentioned in 3.12.1, H01 and H04 can be rejected whereas H02, H03 and H05 could be accepted. Thus, GDP at Current Prices and the Unemployment Rate significantly impact Tax Collection in this dataset, while factors like Inflation, Population, and Corruption exhibit limited predictive power. These findings highlight the importance of economic activity and labour market conditions in influencing tax income.

4.13 Efficiency of Tax Collection in India Using DEA

For Technical Efficiency, a change of less than 1 signifies a decrease in efficiency, whereas a change of more than 1 denotes an enhancement in efficiency over a specified period. The application of Granger Causality in the preceding section indicated that GDP and the Unemployment Rate influence tax collection. Consequently, to evaluate the efficacy of tax collection, both GDP and the Employment Rate (1 - Unemployment Rate) are regarded as inputs. Technical efficiency (TE) quantifies a firm's effectiveness in utilising inputs to generate outputs, with a score of 1.000 signifying complete efficiency. In 2001, the technological efficiency (TE) was 0.512, signifying the lowest efficiency of all the years examined. By 2022, the efficiency attained 1.000, indicating the pinnacle of efficiency. In 2019, the TE was likewise 1.000, establishing it as one of

the most efficient years and a benchmark for subsequent years. Throughout the entire duration, the average efficiency was determined to be 0.809, indicating a decent performance overall.

Technical Efficiency Change of less than 1 shows a decline in efficiency, whereas a change of more than 1 indicates an improvement in efficiency over a period. In Malmquist's analysis, the Total Factor Productivity Change (TFPC) is a measure that captures the overall change in productivity considering the efficient use of multiple inputs and outputs. By applying Granger Causality in the previous section, findings suggested that GDP and Unemployment Rate impact tax collection. Therefore, to check the efficiency of tax collection, both GDP and Employment Rate (*1- Unemployment Rate*) are considered as input.

Table 4.13.1 Efficiency Summary

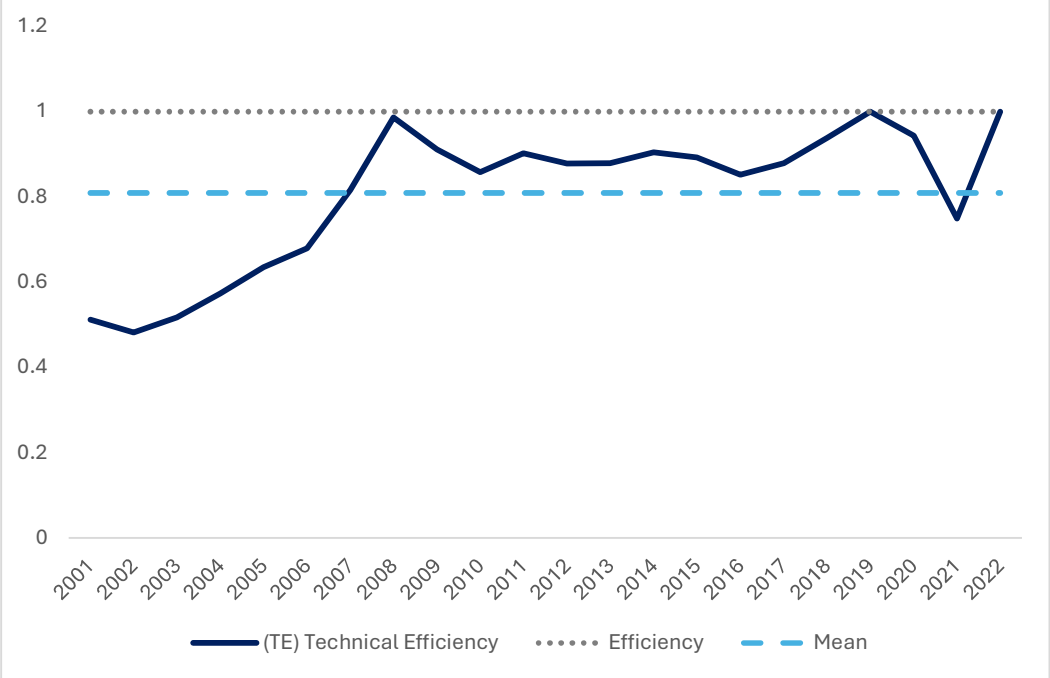
Year	**(*TE)* Technical Efficiency**
2001	0.512
2002	0.482
2003	0.517
2004	0.573
2005	0.635
2006	0.680
2007	0.816
2008	0.987
2009	0.911
2010	0.858
2011	0.902
2012	0.878
2013	0.879
2014	0.905
2015	0.893

2016	0.852
2017	0.879
2018	0.938
2019	**1.000**
2020	0.944
2021	0.749
2022	**1.000**
Mean	**0.809**

Source: Author's Calculations

Technical efficiency *(TE)* measures how well a firm uses inputs to produce outputs, with a score of 1.000 indicating full efficiency. In 2001, the technical efficiency (TE) was 0.512, indicating the lowest efficiency among all years analysed. By 2022, the efficiency had reached 1.000, demonstrating the highest level of efficiency. Similarly, in 2019, the TE was also 1.000, making it one of the most efficient years and serving as a benchmark for other years. Across the entire period, the mean efficiency was calculated to be 0.809, reflecting an overall moderate performance. Efficiency gradually improves over time, indicating better efficiency of tax collection as compared to GDP and Unemployment Rate. Years closer to 2022, such as 2018, 2019, and 2022, demonstrate higher efficiency compared to earlier years. The exceptional efficiency in 2022 and 2019 highlights significant optimisation in the contribution of GDP and employment rates to tax collection during these periods.

Figure 4.23 Summary of Technical Efficiency of Tax Collection over Years



Source: Author's calculation

As shown in Figure 4.23, efficiency progressively enhances over time, signifying superior tax collecting efficiency relative to GDP and the Unemployment Rate. Years nearer to 2022, including 2018, 2019, and 2022, exhibit more efficiency than preceding years. The remarkable efficiency in 2022 and 2019 underscores substantial optimisation in the contributions of GDP and employment rates to tax revenue throughout these years.

Table 4.13.2 Slack of Inputs for Efficiency Calculation

Year	GDP	Employment Rate
2001	0.000	41.543
2002	0.000	38.617
2003	0.000	40.522
2004	0.000	43.752
2005	0.000	47.085

2006	0.000	48.537
2007	0.000	55.681
2008	0.000	64.582
2009	0.000	55.993
2010	0.000	47.615
2011	0.000	46.190
2012	0.000	40.081
2013	0.000	34.927
2014	0.000	30.806
2015	0.000	25.033
2016	0.000	17.530
2017	0.000	11.238
2018	0.000	4.180
2019	0.000	0.000
2020	0.000	0.000
2021	0.000	0.000
2022	0.000	0.000
Mean	0.000	31.541

Source: Author's calculation

Table 4.13.2 shows the slack of inputs for efficiency calculations. Slack denotes the surplus use of inputs or unachieved output within a system. Regarding production slack, all years demonstrate 0.000 slack for tax collection, signifying no deficiency in attaining the recorded levels of tax collection. GDP (Input 1) exhibits negligible slack over all years, indicating optimal utilisation of this resource. Nonetheless, the employment rate (Input 2) exhibits considerable inefficiency in prior years. In 2001, the slack was 41.543 per cent, indicating significant underutilisation of the employment rate. By 2022, the slack diminished to 0.000 per cent, indicating an optimal employment rate usage in enhancing tax collection efficiency.

The year 2001 marked the lowest point in tax collection efficiency, with a technical efficiency (TE) score of just 0.512. Despite having relatively decent employment rate figures, the system remained highly inefficient, establishing a baseline for understanding the extent of inefficiency in earlier years. In contrast, the years 2019 and 2022 achieved full efficiency, each recording a perfect TE score of 1.000. These years reflect the culmination of long-term improvements, demonstrating how optimising the contribution of the employment rate can align inputs effectively to maximise tax collection. The intermediate period, particularly between 2016 and 2018, shows a gradual improvement in efficiency, underscoring the positive impact of incremental policy reforms and systemic enhancements implemented over time. The analysis highlights significant efficiency improvements from 2001 to 2022, with 2022 achieving full efficiency. Earlier years exhibit inefficiencies, primarily in employment rate utilisation. The year 2019 serves as a key benchmark, representing optimal practices for the majority of inefficient years.

4.14 Year-wise Efficiency of Tax Collection using MALMQUIST Index

The Malmquist index was named after Swedish economist Staffan Malmquist. It is a specific metric used in the DEA to evaluate changes in efficiency and productivity over time. It is based on the concept of DEA for evaluating the relative efficiency of DMUs, taking into account technical change. In Malmquist's analysis, Total Factor Productivity Change (TFPC) quantifies the comprehensive alteration in productivity, accounting for the effective use of various inputs and outputs.

Table 4.14.1 Summary of Tax Efficiency using MALMQUIST Index

Year	Efficiency Change (Effch)	Technical Change (Techch)	Pure Technical Change	Scale Efficiency Change	TFP Change (Tfpch)
2	1	0.703	1	1	0.703
3	1	0.745	1	1	0.745
4	1	0.77	1	1	0.77
5	1	0.796	1	1	0.796
6	1	0.818	1	1	0.818
7	1	0.784	1	1	0.784
8	1	0.8	1	1	0.8
9	1	0.915	1	1	0.915
10	1	0.891	1	1	0.891
11	1	0.878	1	1	0.878
12	1	0.91	1	1	0.91
13	1	0.903	1	1	0.903
14	1	0.902	1	1	0.902
15	1	0.926	1	1	0.926
16	1	0.938	1	1	0.938
17	1	0.907	1	1	0.907
18	1	0.895	1	1	0.895
19	1	0.914	1	1	0.914
20	1	1.014	1	1	1.014
21	1	1.028	1	1	1.028
22	1	0.8	1	1	0.8
Mean	1	0.864	1	1	0.864

Source: Author's Calculation

Table 4.14.1 shows the Malmquist Index analysis from 2002 to 2022, revealing critical trends in efficiency and productivity changes related to tax collection, where

GDP and employment rate are inputs, and tax collection is the output. Over these 20 years, the Efficiency Change (Effch) consistently remained at 1, indicating no significant changes in resource utilisation efficiency. Similarly, both Pure Efficiency Change (Pech) and Scale Efficiency Change (Sech) maintained values of 1, reflecting stable managerial and scale efficiencies. Consequently, all variations in productivity are attributed to shifts in the technological frontier, as reflected in the values of Technological Change (Techch) and Total Factor Productivity Change (Tfpch).

4.14.1 Early Years (2002–2006): Declining Productivity

From 2002 to 2006, there is a clear trend of declining productivity, with Tfpch values increasing slightly from 0.703 in 2002 to 0.818 in 2006. This improvement, while progressive, occurred at a slow pace. The Techch values during this period reflect a technological lag, consistently remaining below one and acting as a primary constraint on productivity growth. Despite stability in efficiency levels (Effch = 1), the lack of significant innovation or technological advancement hindered the overall productivity of tax collection.

4.14.2 Middle Period (2007–2016): Mixed Trends and Plateauing

Between 2007 and 2016, the data showcase a mix of performance levels:

1) Technological performance showed some recovery, with Techch values improving in certain years (e.g., 2009, 2013, and 2016), where productivity saw modest gains.

2) However, the overall trend during this period remained suboptimal, as Tfpch values averaged around 0.864 due to fluctuating technological advancements. While managerial and scale efficiency remained consistent, the inability to sustain technological improvements limited significant gains in tax collection productivity. The period also highlights the consequences of inconsistent investments in technology and innovation. Improvements were sporadic and insufficient to overcome the long-term decline in technological contributions to productivity.

4.14.3 Later Years (2017–2022): Marked Progress and Regression

The later years of the analysis show both promising advancements and setbacks:

1) 2020 stands out as a pivotal year with Tfpch surpassing 1.0 at 1.014, marking

significant productivity growth driven by technological progress (Techch = 1.014). This surge was likely due to external factors, such as global challenges necessitating rapid innovation and investment.

2) Following this brief improvement, the data shows a return to regression, with Tfpch declining to 0.8 in 2022, reflecting a loss of the technological momentum gained in 2020.

These patterns underscore the volatility of technological advancements in the tax collection process, with temporary gains unable to offset the long-term decline in productivity. The analysis reveals several critical insights into the productivity trends of tax collection over the studied period. To begin with, efficiency levels, represented by Effch, Pech, and Sech, stood firm with a constant value of 1.000 across all years. This suggests that the inefficiencies that had been a drag on productivity improvement were no longer there, nor were asset allocation and operational management limiting the system.

Secondly, productivity changes were solely determined by technology shifts across Techch values. This highlights the importance of innovations and technology adoption for optimising tax collection systems. But, overall, the trend in technological contributions to productivity was negative, despite a few sporadic positive developments. With mean Techch and Tfpch both observed as 0.864, this persistent technological regression has been an important barrier for long-term productivity growth. However, Year 2020 was a year of considerable progress marked by an unprecedented productivity boom driven by specific technology developments. This shows how large-scale growth can be achieved with targeted approaches to innovation investment. The latter half has however revealed the need for adherence to persistent courtesies which is vital to enabling both technology innovation and adoption in the tax collection process.

While efficiency levels remain constant over time, demand has declined towards the long-run equilibrium point, and the Malmquist Index analysis identifies technological regression as the major contributing factor to the decline in productivity affecting the tax collection process. So, the little progress we made in 2020 shows we

can grow if we innovate and invest in technology. However, to turn around this downward spiral—the combination of technology investment and innovation must have a better effect on GDP —employment —and tax collection.

Section III: Tax Forecasting

4.15 Forecasting of Tax Collection

As India continues to evolve economically, accurate forecasting of direct tax collection becomes increasingly vital for sound fiscal planning and policy formulation. This section employs the Grey Forecasting Model (GM 1,1) to project future trends in direct tax revenue based on historical data. Given the inherent uncertainties and complexities in economic systems, especially in a dynamic environment like India's, grey forecasting offers a reliable approach to estimate tax revenues when data is limited or partially known. By analyzing past patterns and projecting future outcomes, this section aims to provide policymakers with forward-looking insights to enhance budgetary efficiency, ensure fiscal sustainability, and support long-term economic development.

The grey forecasting model was a useful tool for predicting India's direct tax revenue. Because it can perform well in the context of limiting and uncertain data, it is a good choice for this type of forecasting. The model predicts federal tax collections will keep rising over the next 10 years, much of it from a growing economy, combined with better tax enforcement and compliance. The COVID-19 pandemic made prediction accurate with reasonable accuracy difficult, but the model held up all the same. Newer grey forecasting methods outperform traditional time-series forecast like ARIMA and are more suited for a multi-faceted environment like the tax regime in India.

According to Sharma and Kumar (2024) "grey modeling produces more accurate results with a limited number of data points when compared to other models and is better suited for prediction in chaotic and complex situations having discrete data points". Traditionally, grey system theory was proposed by Deng Ju-long in 1982, and it aims to operate effectively with a small number of observations (Kazancoglu et al., 2021). The idea is particularly beneficial for systems characterized by inadequate or ambiguous knowledge. "Grey system theory aims to connect the scientific and social sciences, enabling its application across many domains to address numerous

difficulties" (Javanmardi et al., 2023). The term "grey system" derives from the hue symbolizing the subject of investigation. In control theory, the intensity of the hue signifies the clarity of the information (Jiang et al., 2021). Furthermore, the application of GM (1,1) indicates a steady and ongoing rise in the share of direct tax within the overall tax revenue. Total revenue from direct tax, about ₹16.63 lakh crores in 2022-23, is projected to reach ₹30.67 lakh crores by 2029-30. Conversely, indirect tax collection, currently approximately ₹ 13.82 lakh crores, is projected to reach ₹ 25.70 lakh crores. The total tax revenue from direct and indirect taxes is projected to rise from ₹ 30.45 lakh crores in 2022-23 to ₹56.37 lakh crores by 2029-30.

"The expected rise in tax revenue, attributed to the augmented proportion of direct taxes, signifies a shift towards a more progressive taxation system" (Cloyne et al., 2024). As direct taxes constitute an increasing proportion of total revenue, it indicates a system where taxation is increasingly closely associated with income and profits, perhaps resulting in reduced income inequality. "This may result in a more equitable distribution of income, since higher earners contribute a greater share of government resources; such an action has significant consequences. An increased focus on direct taxation can enhance fiscal stability, as these taxes are more predictable than consumption-based indirect taxes. This predictability enables governments to enhance resource planning and distribution" (Wildasin, 2021). Moreover, the expanding revenue base enhances the ability for investment in the anticipated growth of both direct and indirect tax collections, indicative of the economy's formalization and improved tax compliance (Okunogbe and Santoro, 2023). As the tax base expands, the government can reduce its dependency on borrowing and external financing, leading to enhanced financial autonomy. The rise in revenue may facilitate more focused fiscal policies, enabling the government to tackle certain economic challenges like as unemployment, inflation, and social welfare needs, hence fostering long-term economic resilience (Larch et al., 2024).

Table 4.15.1 Predicted Values of Tax Collection in India (₹in Crores)

Year	2023-24	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30
Direct Tax	16,83,223	18,60,250	20,55,896	22,72,118	25,11,080	27,75,175	30,67,044
Indirect Tax	14,27,485	15,74,463	17,36,576	19,15,380	21,12,594	23,30,114	25,70,031
Proportion of Direct Tax	54.11%	54.16%	54.21%	54.26%	54.31%	54.36%	54.41%

Source: Author's Calculations

Table 4.15.1 illustrates that as the actual and projected tax collection values have evolved over time, the actual and predicted values, accompanied by the error term, demonstrate that direct and indirect tax collections are forecasted using the GM (1,1) model, originating from the base period of 2000-01 with zero error, and continue to be projected annually.

- From 2000-01 to 2005-06, both direct and indirect taxes had significant negative discrepancies, signifying tax receipts fell short of projections. Beginning in 2006-07, the disparity between actual and projected figures for both direct and indirect taxes began to diminish, resulting in less inaccuracies over time.
- By 2010-11, the error in direct tax revenues began to fall substantially, eventually approaching zero in 2012-13, when real and forecast numbers were nearly identical. Although the mistake in indirect taxes decreases over time, greater differences still occur.
- From 2017-18 to 2022-23, direct tax receipts have shown positive mistakes, suggesting that they exceeded forecasts. This indicates a possible improvement in economic conditions or changes in tax policies.

Nonetheless, indirect tax revenues persistently display substantial discrepancies, especially in 2020-21, when there was a notable deviation, likely attributable to economic disruptions such as the pandemic.

The error diminished, suggesting either improved forecasting methods or more stable economic circumstances. “Significant discrepancies arise during economic recessions, exemplified by COVID-19 in the fiscal year 2020-21, when the deviation for direct taxes is especially pronounced. This likely indicates the impact of COVID-19 on tax income resulting from the lockdown, which halted manufacturing and other economic operations” (Chetty et al., 2024). The anticipated tax revenue has a consistently rising trajectory for both direct and indirect taxes, suggesting forecasts of economic expansion or modifications in tax legislation. Thus, it is observed that there is a progressive enhancement in the precision of tax forecasts over time, especially with direct taxes. ‘Substantial mistakes in prior years, particularly during economic crises, underscore the challenges of forecasting under volatile circumstances. Future forecasts suggest a rise in tax revenues that will foster long-term economic growth” (Kaushik et al., 2024).

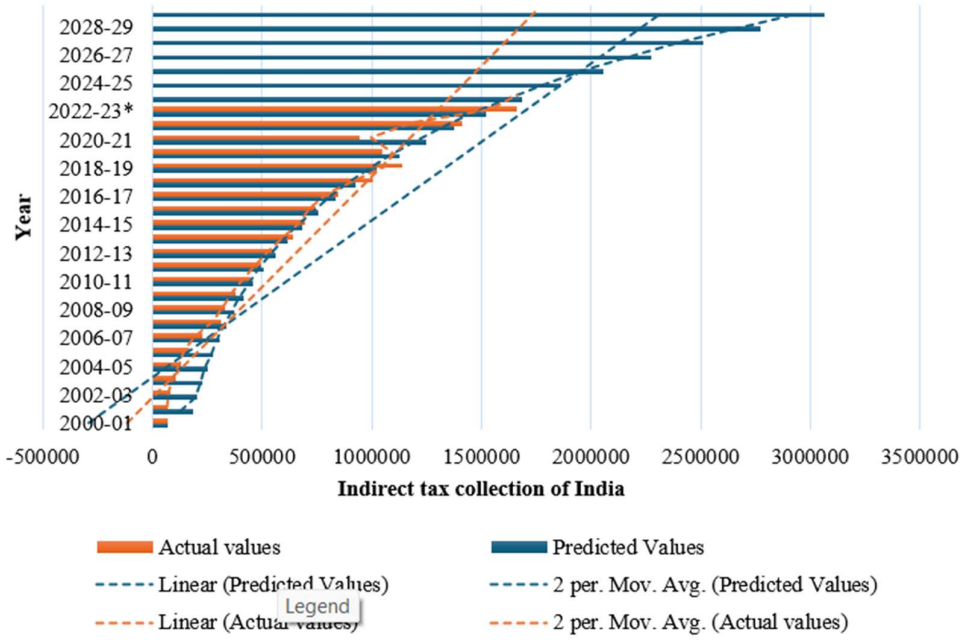
Table 4.15.2 Actual and predicted values of direct and indirect tax collection in India

Years	Actual Values X^0_k		Predicted Values X^1_k		Error E (k)	
	“Direct Tax”	“Indirect Tax”	“Direct Tax”	“Indirect Tax”	“Direct Tax”	“Indirect Tax”
2000-01	68305	119814	68305	119814	0	0
2001-02	69198	117318	186504	165282	-117306	-47964
2002-03	83088	132608	206119	182300	-123031	-49692
2003-04	105088	148608	227796	201071	-122708	-52463
2004-05	132771	170936	251754	221774	-118983	-50838
2005-06	165216	199348	278232	244608	-113016	-45260
2006-07	230181	241538	307494	269794	-77313	-28256
2007-08	314330	279031	339833	297573	-25503	-18542
2008-09	333818	269433	375574	328212	-41756	-58779
2009-10	378063	243939	415074	362006	-37011	-118067
2010-11	445995	343716	458728	399279	-12733	-55563
2011-12	493987	390953	506973	440390	-12986	-49437
2012-13	558989	472915	560292	485734	-1303	-12819
2013-14	638596	495347	619219	535747	19377	-40400
2014-15	695792	543215	684343	590910	11449	-47695
2015-16	741945	711885	756317	651752	-14372	60133
2016-17	849713	861515	835860	718859	13853	142657
2017-18	1002738	915256	923769	792875	78969	122381
2018-19	1137718	937322	1020923	874512	116795	62810

2019-20	1050681	953513	1128295	964555	-77614	-11042
2020-21	947176	1074809	1246960	1063869	-299784	10940
2021-22	1412422	1289662	1378105	1173408	34317	116254
2022-23	1663686	1382013	1523042	1294226	140644	87787
2023-24	-	-	1683223	1427485	-1683223	-1427485
2024-25	-	-	1860250	1574463	-1860250	-1574463
2025-26	-	-	2055896	1736576	-2055896	-1736576
2026-27	-	-	2272118	1915380	-2272118	-1915380
2027-28	-	-	2511080	2112594	-2511080	-2112594
2028-29	-	-	2775175	2330114	-2775175	-2330114
2029-30	-	-	3067044	2570031	-3067044	-2570030

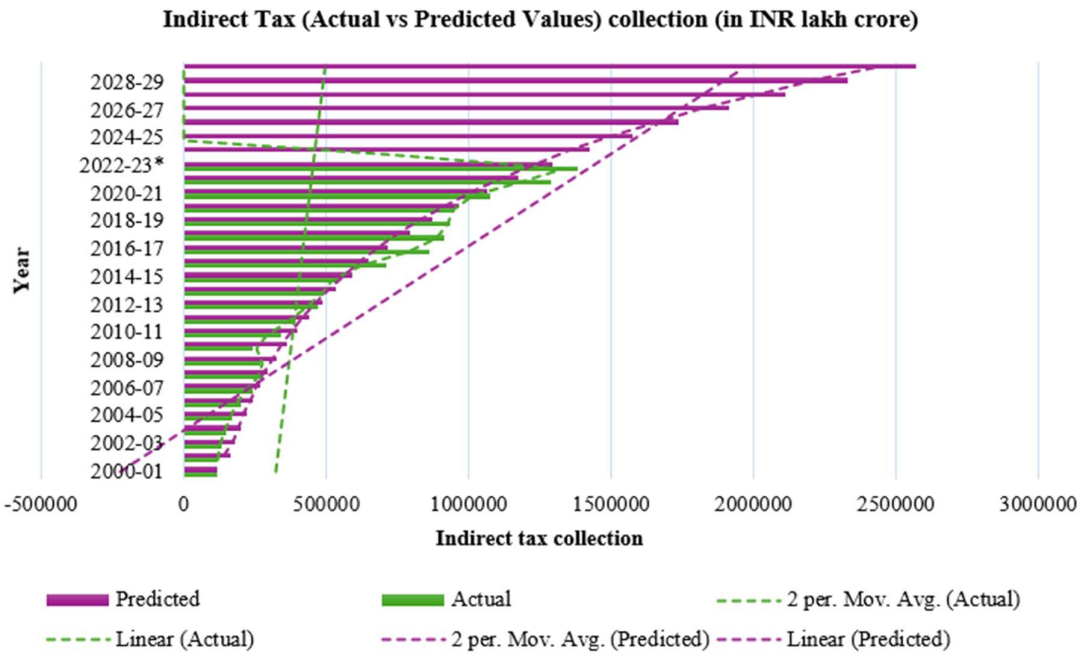
Source: Author's Calculation

Figure 4.24 Direct Tax (Actual vs Predicted Values) (in ₹ Lakh Crores)



Source: Author's Calculations

Figure 4.25 Comparison Between Actual and Predicted Observations of Indirect Tax Collection in India using the GM (1,1) Model



Source: Author's Calculations

Furthermore, we determined a relative percentage of the error term, ranging from 0 per cent to 8.50 per cent for direct taxes and from 0 per cent to 6.35 per cent for indirect taxes (Table 5). Additionally, we computed the average RPE, which is 12.62 per cent for indirect (direct tax) taxation, indicating a forecast accuracy of 87.38 per cent.

Table 4.15.3 Relative Percentage Error (RPE) Generated by GM (1,1) Model

Year	RPE	
	"Direct Tax"	**"Indirect Tax"**
2000-01	0.00%	0.00%
2001-02	169.50%	-40.88%
2002-03	148.10%	-37.47%
2003-04	116.80%	-35.30%
2004-05	89.60%	-29.74%
2005-06	68.40%	-22.70%
2006-07	33.60%	-11.70%
2007-08	-8.10%	-6.65%
2008-09	-12.50%	-21.82%
2009-10	-9.80%	-48.40%

2010-11	-2.90%	-16.17%
2011-12	-2.60%	-12.65%
2012-13	-0.20%	-2.71%
2013-14	3.00%	-8.16%
2014-15	1.60%	-8.78%
2015-16	1.90%	8.45%
2016-17	1.60%	16.56%
2017-18	7.90%	13.37%
2018-19	10.30%	6.70%
2019-20	-7.40%	-1.16%
2020-21	-31.70%	1.02%
2021-22	2.40%	9.01%
2022-23	8.50%	6.35%

Source: Author's Calculations

Table 4.15.2 shows that total revenue from direct tax, about ₹ 16.63 lakh crores in 2022-23, is projected to reach ₹30.67 lakh crores by 2029-30. Conversely, indirect tax collection, at approximately ₹ 13.82 lakh crores, is projected to reach ₹ 25.70 lakh crores. The total tax revenue from direct and indirect taxes is projected to rise from ₹ 30.45 lakh crores in 2022-23 to ₹ 56.37 lakh crores by 2029-30. Furthermore, the data indicated sustained revenue growth, as the forecast suggested a significant rise in both direct and indirect tax receipts. It indicates that the government can anticipate augmented revenues to support public expenditure and long-term investments. Increased tax revenue is correlated with expected economic growth. India's economic policies are also likely to support growth, which will boost the country's fiscal profile. The dip in the FY 2023 tax take is expected to broadly reflect economic factors rather than changes in tax compliance and government administrative capacity. To honour this commitment, efforts to strengthen tax enforcement and administration, especially through digitalisation, must continue.

Despite the influence of the COVID-19 pandemic, the grey forecasting model demonstrated stability. This demonstrates its resilience in unexpected conditions, making it an essential tool for the evolution of economic predictions going forward. This model may gain further reliance from policymakers as it exhibits resilience, and any further developments may potentially position it as the most well-read model for strategic budgetary planning and resource allocation. The total tax collection is estimated to increase from ₹ 30.45 lakh crores in 2022-23 to ₹ 56.37 lakh crores by

2029-30, giving the government more room to invest in social programs, infrastructure, and other public goods.

4.16 Salient Observations

This study revealed that forecasting taxes is critical for financial planning and controlling public spending. It can also help guide decisions on consumer tax adjustments to fulfil fiscal aims. The study analyses the relationship between Indirect and direct taxes by analysing the proportion of direct tax as a percentage of the total tax. This study helps to understand how the balance of direct and indirect taxes changes over time. It can disclose whether the government relies more on consumption taxes or income taxes, which may have ramifications for tax justice and economic growth policies. It may also lead policy changes aimed at improving tax structure balance. Moreover, are as follows-

1) To capitalize on the expected income growth, the government should continue to enhance tax changes. This involves digitizing tax administration systems and increasing anti-evasion measures to improve compliance and revenue collection.
2) Given the anticipated increase in tax revenue, the government should prepare for long-term investments in vital areas. Prioritizing sustainable projects such as infrastructure, education, and health is one way to improve economic resilience and societal well-being.
3) The government and financial institutions should consider using more advanced forecasting models, such as the grey forecasting model, particularly in areas with ambiguous or complex data. This can help to produce more accurate economic and budgetary forecasts.
4) Despite the good outlook, the government should remain prepared for economic shocks such as global recessions or pandemics. Creating contingency savings and diversifying income streams outside taxes may improve fiscal resilience.
5) Given the economy's changing nature, authorities should routinely evaluate tax revenue trends and adjust policies as needed. Continuous monitoring of tax revisions and compliance activities will be critical to staying on track with the expected increase.

6) The government should guarantee that any increased income is invested in areas that encourage inclusive growth by targeting all 17 sustainable development goals (SDG). Focussing on rural development, job creation, and poverty reduction will ensure that the advantages of economic expansion reach everyone, which can also be enhanced by charging cess integrated as an increase in total tax collection.

The chapter highlighted the major trends, patterns, and determinants of direct tax collection in India. In the last 20 years, the revenues from direct taxes have been on a rising trend aided by compliance and administrative moves as well as economic growth. Thus, Corporate and personal income taxes have become the largest component of total tax revenues of the government, emphasizing their importance in the Indian taxation scenario. Nonetheless, the research does show variability in tax collection rates, especially during times of economic upheaval, like the 2008 worldwide financial crisis and the COVID-19 pandemic, emphasizing the susceptibility of tax revenues to macroeconomic conditions.

The results have additionally highlighted collection efficiency of tax collection and how this changes from a cost perspective, which has shown significant variation across time and across regions. However, this analyses and other others with the Granger Causality Test and Data Envelopment Analysis (DEA) prove us that the GDP, employment rate or other variables are significant factors where tax efficiency depend and which they drive tax efficiency. The results underscore an enduring battle over STEC inefficiencies in collection systems with notable fluctuations in performance year on year, such as in 2018-19. Moreover, the Malmquist Index analysis confirms that the technological slippages that face the developing countries get re-visited and hence there is the need to continuously innovate and make investments in tax collection mechanisms.

A state-wise analysis of tax collection indicates the concentration of revenue in developed states like Maharashtra, Karnataka and Tamil Nadu, while states like Telangana and Gujarat show fast growth, indicating strong growth potential in the future. But there are regional differences, and smaller, less-industrialized states make relatively small contributions. The insights derived from these trends indicate that informed policy actions in the form of administrative reforms along with technological

integration are required to narrow down the existing gaps and to improve the overall tax collection efficiency. Thus, chapter highlights the factors affecting India's direct tax collection scenario. The analysis emphasizes the importance of sustained policy reforms, technological advancements, and regional equity in reinforcing a robust and efficient tax system. As such, India could address identified inefficiencies and capitalize on emerging opportunities to enhance its direct tax revenues as a means towards increasing fiscal stability and economic growth.

CHAPTER V

TAXATION AND ECONOMIC GROWTH: ANALYZING BUOYANCY AND ELASTICITY IN INDIA

This chapter investigates the dynamic relationship between direct tax collection and economic growth in India, with a particular focus on tax buoyancy and elasticity. The objective is to assess how responsive the tax system is to changes in economic activity and to evaluate its efficiency and adaptability over time. To achieve this, the chapter employs a combination of robust econometric models, including the Autoregressive Distributed Lag (ARDL) model, the Johansen Cointegration technique, and the Event Study methodology. These models enable both short- and long-run analyses of tax performance and offer insights into how major economic events—such as the 2008 global financial crisis and the 2016 demonetisation—have influenced tax buoyancy. By examining the extent to which direct taxes adjust with economic indicators like GDP, the chapter identifies structural strengths and weaknesses within the current tax framework. Additionally, it provides evidence-based policy implications for improving tax responsiveness and sustaining revenue generation. Through this multifaceted analysis, the chapter contributes to a deeper understanding of the efficiency and resilience of India's direct tax system in the face of evolving economic challenges.

Tax buoyancy, a concept central to fiscal policy analysis, reflects the responsiveness of tax revenues to changes in national income, accounting for both automatic adjustments due to economic growth and discretionary policy changes (Kohli, 2023; Khatik & Nag, 2012). It serves as a critical indicator of the efficiency and adaptability of a tax system, illustrating its capacity to generate sufficient revenue in response to economic fluctuations. A buoyant tax system is characterised by tax revenues increasing by more than one per cent for every one per cent rise in national income, highlighting its robustness and responsiveness (Mandela & Olukuru, 2015). Factors such as economic shocks, inflation, and legislative shifts play a significant role in shaping tax buoyancy, often obscuring trends and complicating assessments of fiscal health (Kohli, 2023). This measure is particularly relevant in the context of India's direct tax system, where enhancing buoyancy is a key consideration in improving efficiency and ensuring sustainable revenue growth (Khatik & Nag, 2012). Policymakers must

navigate the intricate interplay of economic conditions and tax policies to maintain a balance between funding government services and avoiding undue economic strain, with tax buoyancy offering valuable insights into this dynamic (Mandela & Olukuru, 2015). The distinction between tax buoyancy and tax elasticity further underscores the importance of understanding how structural and discretionary factors influence revenue responsiveness, making it a cornerstone of effective fiscal management.

5.1 Tax Buoyancy as a Measure of Fiscal Responsiveness

The tax buoyancy estimate derives the responsiveness of tax revenue to changes in national income or GDP for a defined period. It deals with changes in tax revenue separately, that is, the changes that automatically follow economic growth and the changes that follow intentional changes in taxation policies (such as base broadening or rate alterations). The typical method for calculating tax buoyancy involves running a regression analysis between the logarithm of tax revenues and the logarithm of GDP (Belinga et al., 2014). Computation: Tax buoyancy is determined by the following formula:

$$Tax\ Buoyancy = \frac{\%\ Change\ in\ Tax\ Revenue}{\%\ Change\ in\ GDP}$$

An indicator of how well the tax system converts rising income into usable spending is the relative stability of direct taxes. Tax buoyancy gauges the amount of tax revenue that changes when there are changes in the economy or policy. The greater the buoyancy, the better the tax systems can adapt to economic growth, such as in Bangladesh, where buoyancy estimates for direct taxes were much more than their elasticities, meaning reliance on discretionary changes (Yousuf & Huq, 2013). In Botswana, buoyancy was related to the changes in structure and the development of the economy, which increased the revenue from mineral taxes (Botlhole & Agiobenebo, 2006).

Tax collections grow faster than the economy when tax buoyancy exceeds 1, showing that the tax system effectively responds to economic growth. On the other hand, when tax revenues increase at a slower pace than the economy, it is reflected by

a tax buoyancy of less than 1 (Haughton, 1998). The moderation of Direct Tax rates leads to increased tax compliance, which, as a result, enhances tax buoyancy by increasing revenue collections as more individuals and entities comply with tax laws. An expanded tax base can contribute to improved tax buoyancy, as it allows for a broader collection of taxes from a larger segment of the economy (Dudine & Jalles,2018). A stable tax regime can positively influence tax buoyancy by creating a predictable environment for taxpayers, encouraging compliance and consistent revenue growth.

There were many reasons why pandemic-related effects have obscured the true trend in tax revenues. These effects include disruptions caused by the pandemic that have impacted the economy and, consequently, tax revenues. The fiscal policy responses during the pandemic have contributed to the distortion of the historical relationship between tax revenues and income. These responses are part of the broader analysis of how exceptional shocks have affected tax buoyancy. The overarching goal remains to expand the tax base, rationalise tax structures, and enhance tax administration to elevate tax buoyancy. This chapter explores the implications of the Indian Direct Tax System on tax buoyancy. Tax reforms are crucial for improving compliance, simplifying tax laws, and enhancing enforcement, which collectively contribute to the country's development. The difficulty of discerning patterns in tax collections, which inflation, discretionary policy shifts, and the consequences of the current epidemic have masked. Recognising the actual condition of the economy is made more difficult by these considerations. The problem with the long-term use of new revenue methods is that they have obscured the inherent connection between tax collections and GDP. This connection is fundamental to comprehending the state of the economy.

5.2 Tax Elasticity

Contrarily, tax elasticity holds constant tax rates and other policy variables and quantifies how responsive tax revenue is to changes in the tax base. It sheds light on how much tax income fluctuates in reaction to expansion or contraction in the economy in the absence of new tax legislation or rate adjustments. Tax elasticity is like tax buoyancy, except it adjusts revenue figures to account for modifications to tax laws. It

makes sense to concentrate solely on tax buoyancy due to the lack of systematic access to such information (Belinga et al., 2014).

Calculation: Tax elasticity is calculated using the formula:

$$Tax\ Elasticity = \frac{\%\ Change\ in\ Tax\ Revenue\ (Adjusted\ for\ Policy\ Changes)}{\%\ Change\ in\ Tax\ Base}$$

This calculation often involves adjusting the change in tax revenue to isolate the effect of the tax base change from any changes due to tax policy. In India, a balanced approach to elasticity is essential for fiscal sustainability, as it reveals the potential for revenue growth alongside economic expansion (Dia et al., 2024).

The diverse dynamics emerge from the effects of buoyancy on India's direct and indirect tax collections, as these two forms of revenue react differently to shifts in the economy and changes in government policy. Tax buoyancy is a measure of the efficacy of fiscal policies since it shows how tax revenue reacts to changes in national income and policy changes (Lagravinese et al.,2020). To maximise tax income and guarantee fiscal sustainability, India must have a firm grasp of these dynamics. Because they are based on actual financial transactions, direct taxes are more affected by fluctuations in the economy Customs charges and goods and services tax (GST) are examples of indirect taxes that are associated with buying and selling Revenue responsiveness to economic activity is measured by indirect tax buoyancy, which, owing to widespread spending patterns, frequently exhibits a stronger instant reaction (Kinyua, 2013).

The measures have successfully raised government revenue through direct taxes. The reforms have improved the country's fiscal health through better financial management and distribution of resources. Although it has made great strides, the direct tax system still has room to grow in terms of efficiency and effectiveness. Several countries provide social welfare benefits as an incentive for citizens to pay their fair share of income taxes (Goode, 2010). By expanding the tax base through the elimination of exclusions, enlarging the taxpayer net, and leveraging information technology to boost tax administration, India may further improve revenue productivity and minimise tax-induced distortions. As a result of changes made over the last several

years, the tax system is now far more effective and efficient. The number of persons and organisations subject to tax assessments has grown in tandem with the efficiency of tax collection, leading to suggestions of tax base broadening (Pradip, 2020). The development of a consistent tax structure that achieves several goals—for example, increasing domestic savings, decreasing income and wealth disparities, and preserving price stability—is one of the many challenges that India's direct tax system faces (Mitra, 2017). Though the tax base has grown, most Indians still try to avoid paying taxes. The fact that some states and union territories receive a larger share of direct taxes (61.33 per cent vs. the rest) is evidence of this (Assessment of Direct Tax Collection in India, 2022). These states and territories are Gujarat, Maharashtra, Andhra Pradesh, Karnataka, and Delhi. Revenue from direct taxes is highest in Maharashtra at 38 per cent. Although most direct taxes are collected from corporations, most tax returns are filed by individuals. Many people in rural India make their living from agriculture, which does not incur taxes. The increase can be traced back to a threefold increase in taxpayers from 2000-01 to 2022-23, which can be attributed to more efficient tax administration and thorough profiling of taxpayers, their incomes, and investments (Waters, 2022).

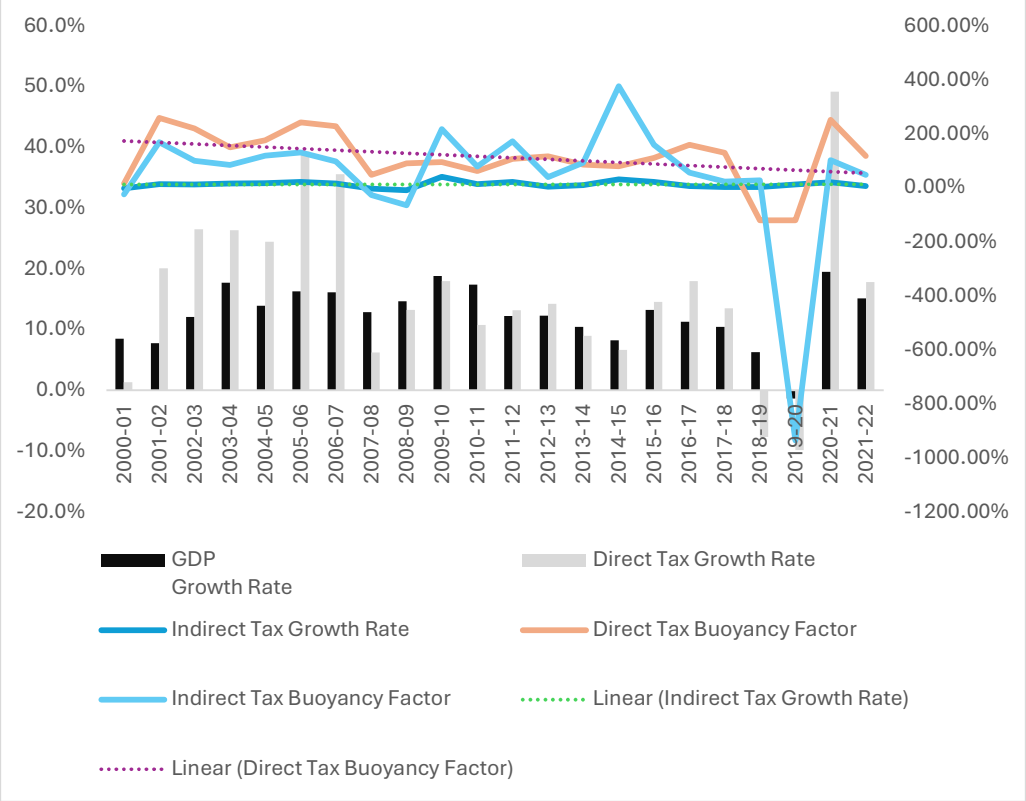
Although direct sales in India are not new, the study found that the regulatory climate has only just started to improve. Despite this, the industry faces considerable difficulties due to the complicated regulatory landscape that has resulted from competing regulations and various legislative efforts. There must be more coordination between the federal and state governments of India (Ashfaq, 2024). There may be problems with the tax system that are causing the low tax buoyancy, which means that lawmakers should reconsider and enhance their tax policies. To align financial performance with national economic goals, policymakers can obtain a complete understanding of fiscal sustainability and economic stability by studying tax buoyancy and elasticity (Aashish, 2024). Tax-heavy nations attract less FDI. Lower corporate taxes may encourage foreign direct investment (FDI) in India. There is a small but non-significant positive correlation between the Direct Tax Collection Rate and foreign direct investment (FDI) inflows. This demonstrates that FDI in India is unaffected by

direct tax collection and that this metric understates the true extent to which taxes influence FDI.

5.3 Comparative Analysis of Direct Tax Buoyancy and Indirect Tax Buoyancy

During most years, the Direct Tax Buoyancy is more than 1.0, which means that revenue from direct taxes grows at the same rate as or faster than GDP. Economic reforms, increased compliance, and policy improvements were the driving forces behind notable buoyancy jumps in years like 2003 (2.59), 2007 (2.42), and 2022 (2.52). As a measure of responsiveness to larger macroeconomic issues, direct tax buoyancy fell sharply during recessions like 2009 (0.48) and 2020 (-1.21). Optimal buoyancy levels during the 2007–2008 timeframe are associated with substantial profits for corporations and an expansion of the tax base. As a result of decreased economic activity and income, buoyancy drops precipitously in 2020 (-1.21).

Figure 5.1 Comparison of Direct Tax and Indirect Tax Buoyancy Factors



Source: Author's Calculation by using data from the Central Board of Direct Tax (CBDT)"

The indirect tax buoyancy exhibits more pronounced annual fluctuations, displaying substantial swings. Years with high buoyancy, such as 2011 (2.17), 2016 (3.76), and 2022 1.02), are caused by consumption-driven growth and adjustments like GST. Crisis years such as 2009 (-0.27) and 2021 (-9.35) demonstrate how changes in expenditure habits can affect tax buoyancy indirectly. After implementing GST (2017), buoyancy factors improved in 2017 (1.59 points) and 2018 (0.55 points), indicating increased efficiency and compliance.

Table 5.3.1 Descriptive Statistics of GDP Growth Rate, Direct Tax Growth Rate, Indirect Tax Growth Rate and Buoyancy Factors of Direct and Indirect Tax

Descriptive Statistics	GDP Growth Rate	Direct Tax Growth Rate	Indirect Tax Growth Rate	Direct Tax Buoyancy Factor	Indirect Tax Buoyancy Factor
Mean	0.1224	0.1643	0.1230	1.1865	0.4712
Standard Error	0.0099	0.0283	0.0244	0.2137	0.5083
Median	0.1228	0.1453	0.1287	1.1600	0.8867
Standard Deviation	0.0477	0.1360	0.1147	1.0252	2.3845
Sample Variance	0.0022	0.0184	0.0131	1.0512	5.6859
Skewness	-0.8725	0.3596	0.4300	-0.8440	-3.4899
Range	0.2087	0.5897	0.5036	3.8000	13.1173
Minimum	-0.0136	-0.0985	-0.0946	-1.2100	-9.3536
Maximum	0.1951	0.4912	0.4090	2.5900	3.7636
Sum	2.8163	3.7794	2.7078	27.2900	10.3674

Source: Author's calculation using data from the Central Board of Direct Tax (CBDT)

The descriptive statistics provide a detailed overview of the relationships and variability between GDP growth rate, direct and indirect tax growth rates, and their respective buoyancy factors. The average GDP growth rate is 12.24 per cent, with direct taxes growing faster at an average rate of 16.43 per cent, and indirect taxes slightly slower at 12.31 per cent. This suggests that direct tax revenues are more responsive to economic growth than indirect taxes. The buoyancy factor for direct taxes has a mean of 1.19, indicating that direct tax revenue growth generally outpaces GDP growth. Conversely, the indirect tax buoyancy factor, with a mean of 0.47, suggests a weaker correlation between GDP growth and indirect tax revenue growth.

In terms of variability, the GDP growth rate shows lower dispersion with a standard deviation of 4.77 per cent, compared to the higher variability observed in direct (13.60 per cent) and indirect (11.47 per cent) tax growth rates. The direct tax buoyancy factor has moderate variability, with a standard deviation of 1.03. In contrast, the indirect tax buoyancy factor is highly volatile, reflected in its standard deviation of 2.38 and extensive range of 13.12. Furthermore, skewness values indicate asymmetry in the data. Both GDP growth and direct tax buoyancy factors are negatively skewed, implying longer tails on the lower end of the data. However, the indirect tax buoyancy factor is highly negatively skewed (-3.49), showing significant concentration of values in the higher range with extreme negative outliers.

The range and extremes reveal that while GDP growth rate and tax growth rates have moderate ranges, the buoyancy factors exhibit substantial fluctuations. For instance, the indirect tax buoyancy factor spans from -9.35 to 3.76, indicating potential anomalies or policy influences on tax responsiveness. Overall, the data suggest that direct taxes exhibit stronger and more consistent growth relative to GDP compared to indirect taxes, which show significant variability and instability in their responsiveness to economic growth. This warrants further investigation into the factors influencing indirect tax buoyancy and its pronounced distributional anomalies.

Table 5.3.2 Descriptive Statistics: Tax as Percentage of GDP of Top World Economies

	Brazil	***Canada***	***China***	***Germany***	***France***	***UK***	***India***	***Italy***	***United States***
Mean	13.89	12.84	9.39	11.23	22.87	25.38	10.31	23.94	10.45
Standard Error	0.16	0.18	0.19	0.08	0.21	0.12	0.26	0.20	0.24
Median	13.84	12.90	9.42	11.37	22.82	25.36	10.39	23.79	10.41
Standard Deviation	0.54	0.85	0.78	0.37	0.97	0.56	1.11	0.94	1.14
Sample Variance	0.29	0.72	0.60	0.14	0.94	0.32	1.24	0.87	1.30
Kurtosis	1.23	0.01	-0.89	-0.46	-0.10	-0.20	-0.47	-0.56	0.50
Skewness	-0.43	0.39	-0.49	-0.79	0.00	-0.03	-0.32	-0.54	-0.12
Range	2.13	3.23	2.35	1.28	3.94	2.29	4.03	3.18	5.07

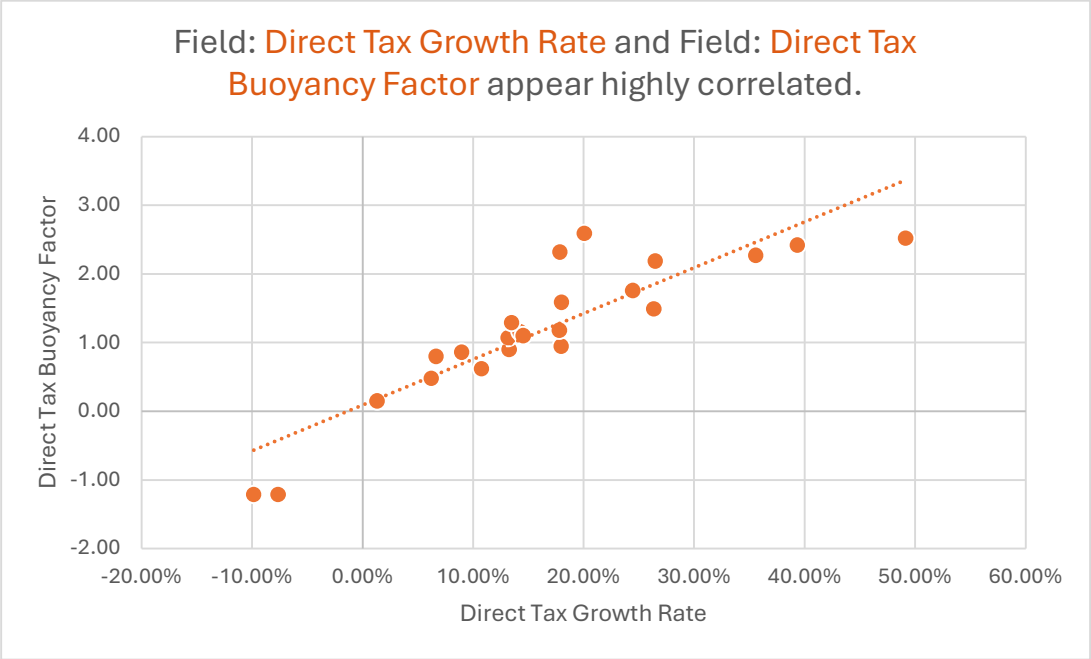
Minimum	12.72	11.62	7.97	10.43	20.70	24.17	8.08	21.96	7.90
Maximum	14.85	14.86	10.31	11.71	24.64	26.46	12.11	25.14	12.97

Source: Author's Calculation using data from the World Bank

As shown in Table 5.3.2, India has a mean of 10.308 per cent, which is lower than the majority of the countries listed, especially compared to high-tax economies like France (22.871 per cent), the United Kingdom (25.376 per cent), and Italy (23.937 per cent). This suggests that, on average, India has a lower tax burden relative to GDP compared to these economies. India's mean tax rate is closer to China (9.394 per cent), Brazil (13.892 per cent), and the United States (10.447 per cent), indicating that its tax-to-GDP ratio is within the range of other large economies but on the lower end.

India's standard deviation is 1.112, which is among the higher values listed, indicating a higher volatility in the tax-to-GDP ratio over the period analysed. This suggests greater fluctuations in India's tax revenue or GDP growth compared to countries with lower standard deviations, like Germany (0.371). Compared to high-tax economies (France, the United Kingdom, Italy), India has a much lower tax burden relative to its GDP. This could be due to various factors, including differences in tax policies, the structure of the economy, and the effectiveness of tax collection. Compared to similar or lower-tax economies (China, the United States), India's tax-to-GDP ratio is somewhat comparable. However, it exhibits more volatility as indicated by its higher standard deviation and range. India's tax-to-GDP ratio is on the lower end compared to many of the world's largest economies, especially those in Europe. The data suggests variability and a degree of volatility in India's tax collection relative to its GDP, which could be a focus area for policy stability and economic planning. The comparative analysis reveals potential areas for India to explore, such as enhancing tax efficiency and adapting policies to stabilise its tax revenue in relation to GDP growth.

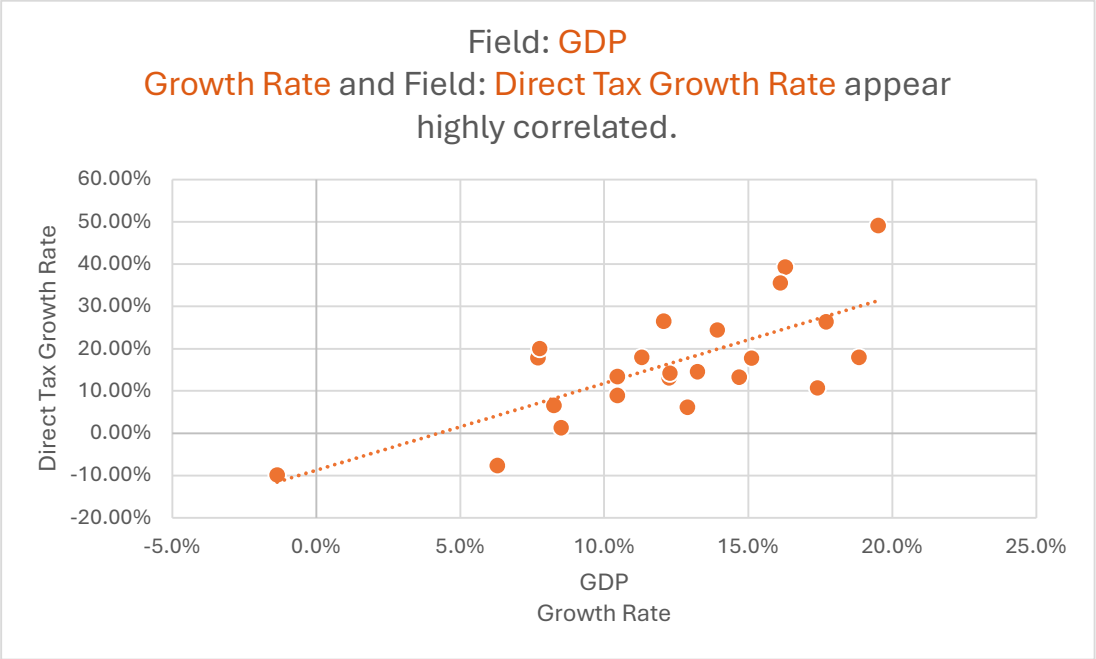
Figure 5.2 Relation between Tax Growth Rate and Buoyancy Factor



Source: Author's Calculation using data from the Central Board of Direct Tax (CBDT)

Figure 5.2 demonstrates a scatter plot of a strong positive relation between the Direct Tax Growth Rate and the Direct Tax Buoyancy Factor, as evidenced by the upward-sloping trend line. This indicates that higher growth rates of direct taxes are generally associated with a corresponding increase in buoyancy, reflecting a more efficient and responsive tax system relative to GDP changes. The data points are mostly clustered around the trend line, reinforcing the consistency of this relationship. However, there is significant variability, with direct tax growth rates ranging from negative values (around -10 per cent) to over 50 per cent, and buoyancy factors spanning from approximately- -1.5 to 3.5. This wide range suggests differing levels of efficiency in how tax revenues respond to economic growth. Additionally, a few outliers, particularly at the higher end of the direct tax growth rate (above 40 per cent), highlight instances where substantial growth in tax revenues did not proportionally enhance buoyancy. These outliers may warrant further investigation to understand the underlying factors. Overall, the correlation underscores the importance of policies and economic conditions that drive direct tax growth as a means of improving buoyancy and ensuring a more responsive tax system.

Figure 5.3 Relationship between GDP Growth Rate and Direct Tax Growth Rate



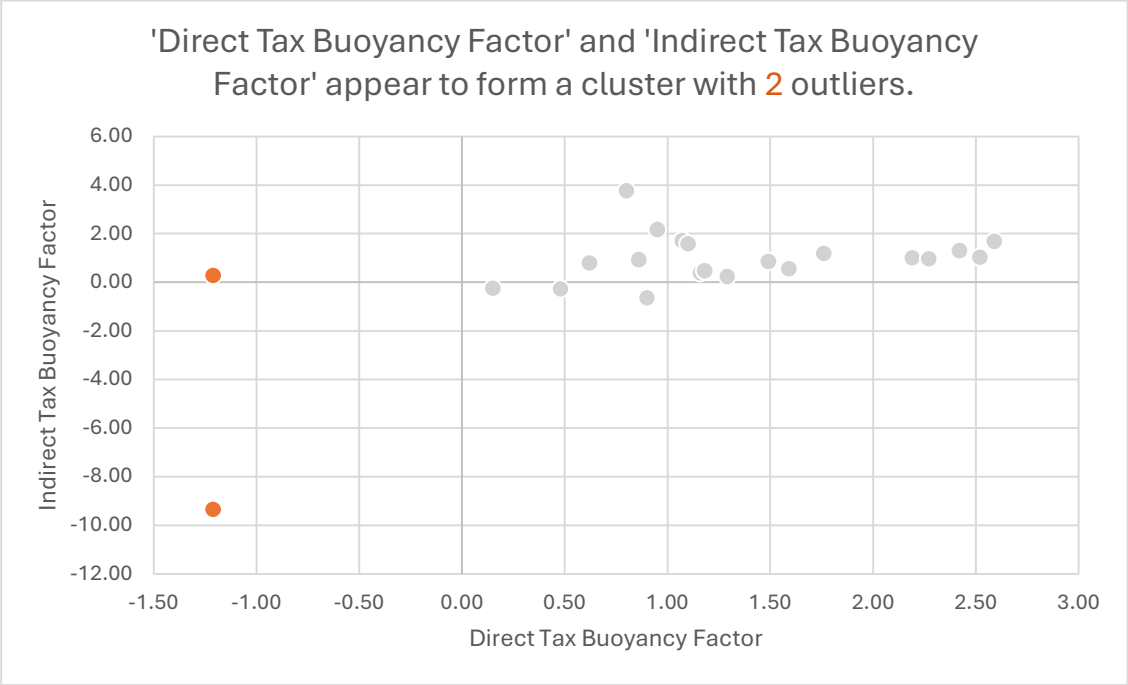
Source: Author's calculation using data from the Central Board of Direct Tax (CBDT)

Direct Tax Growth Rate, as shown by Figure 5.3, indicates an upward-sloping trend line. This suggests that as GDP grows, the growth rate of direct taxes also tends to increase proportionally. The clustering of points along the trend line reflects a consistent relationship, indicating that economic growth significantly influences the performance of direct tax revenues. Key observations include the variability in both GDP growth and direct tax growth rates. The GDP growth rate ranges from slightly negative to approximately 20 per cent, while the direct tax growth rate spans from about -10 per cent to 60 per cent. This wide range demonstrates that, although the relationship is generally positive, there are instances of divergence, possibly due to policy changes or economic shocks affecting tax collections independently of GDP growth.

Notably, the presence of outliers—where direct tax growth significantly exceeds what might be expected for a given GDP growth rate—suggests periods of heightened tax revenue efficiency or one-off factors such as compliance drives or tax reforms. These anomalies highlight the importance of contextual factors beyond GDP growth that can influence direct tax performance. Overall, the plot reaffirms that direct taxes

are closely tied to economic performance, underscoring their responsiveness to changes in GDP.

Figure 5.4 Relationship between Direct Tax and Indirect Tax Buoyancy Factors



Source: Author's calculation using data from the Central Board of Direct Tax (CBDT)

The scatter plot in Figure 5.4 highlights the relationship between the Direct Tax Buoyancy Factor and the Indirect Tax Buoyancy Factor, showing a distinct clustering pattern with two notable outliers. Most data points are concentrated within a narrow range, with direct tax buoyancy values between 0 and 2 and indirect tax buoyancy values near 0. This clustering suggests that, under normal conditions, both tax types exhibit relatively stable responsiveness to GDP growth, with direct taxes generally being more responsive than indirect taxes. However, two outliers deviate sharply from this pattern. One outlier reflects an extremely low indirect tax buoyancy factor of approximately -10, paired with a direct tax buoyancy factor near -1, indicating a period of severe inefficiency or a significant negative impact on indirect tax revenues relative to GDP growth. The second outlier shows an indirect tax buoyancy factor of about 2 with a near-zero direct tax buoyancy factor, suggesting an unusual situation where indirect taxes outperformed direct taxes in their responsiveness to GDP growth. These

outliers underscore the need to investigate potential external shocks, policy changes, or structural economic factors that caused these anomalies. Overall, while the relationship between direct and indirect tax buoyancy factors is generally stable, the extreme outliers highlight instances of divergence that require further analysis.

Except for catastrophic years like 2020, direct taxes are more stable, with buoyancy factors always greater than 1.0. Because they rely on consumption and external causes, indirect taxes display greater volatility, often exhibiting buoyancy levels below 1.0. Improvements to compliance methods and structural reforms have a more gradual impact on direct taxes, whereas changes to indirect taxes, such as GST, have an instant impact. The buoyancy of direct taxes rebounded more quickly after the epidemic, reaching 1.18 in 2023, as opposed to indirect taxes' 0.47, demonstrating the resiliency of the former.

Figure 5.5 Correlation Table: Direct Tax Buoyancy Factor, Indirect Tax Buoyancy Factor and GDP Growth

		Direct Tax Buoyancy Factor	Indirect Tax Buoyancy Factor	GDP Growth Rate
Direct Tax Buoyancy Factor	Pearson's r	—		
	df	—		
	p-value	—		
	95% CI Upper	—		
	95% CI Lower	—		
Indirect Tax Buoyancy Factor	Pearson's r	−0.704 ***	—	
	df	21	—	
	p-value	< .001	—	
	95% CI Upper	−0.411	—	
	95% CI Lower	−0.865	—	
GDP Growth Rate	Pearson's r	−0.366	0.588 **	—
	df	21	21	—
	p-value	0.085	0.003	—
	95% CI Upper	0.054	0.805	—
	95% CI Lower	−0.676	0.232	—

Note. * p < .05, ** p < .01, *** p < .001

Source: Author's calculation using data from Central Board of Direct Tax (CBDT)

Performing the growth rate analysis helped us identify the patterns and trends in tax revenues and GDP growth, enabling us to understand economic performance over time. The study also performed the buoyancy analysis to check the efficiency and responsiveness of the tax system to economic growth, which indicates the proportionate relationship of the buoyancy with the tax system elasticity. The years with high

buoyancy showed the more elastic nature of the tax system over these years, bringing in the idea of tax reforms, economic policy enhancement, and a greater amount of tax collection. In contrast, the low buoyancy showed the inefficiency and lack of responsiveness in the tax system.

The correlation table provides insight into the relationships between the Direct Tax Buoyancy Factor, the Indirect Tax Buoyancy Factor, and the GDP Growth Rate. The correlation coefficient of the direct tax buoyancy factor and GDP growth rate, Pearson's r (-0.366), indicates a weak negative relationship with a p-value (0.085), which is greater than 0.05, indicating no statistically significant relationship at a 5 per cent significance level. The indicators at a 95 per cent confidence interval show the lack of significance with lower bound (-0.676) and upper bound (0.0.54). Based on the data, it appears that the Direct Tax Buoyancy does not significantly affect the GDP Growth Rate. There may be other factors at play here, such as direct tax collection being inefficient compared to GDP growth, which would explain the weak negative link. The mean elasticity coefficient between the direct tax elasticity and GDP growth rate grows at a 1.55 times faster rate, indicating a highly elastic relationship. The median elasticity coefficient (1.18) suggests a year-on-year positive and moderately elastic relationship between direct tax revenue and GDP growth. The variability (standard deviation) (1.52) shows a moderate fluctuation in the responsiveness of direct tax revenue collections to changes in GDP. There was a notice in the negative elasticity coefficient (-1.22) in years, which suggests a direct tax revenue decrease compared to GDP in specific periods, due to economic downturns and policy inefficiencies. Since direct tax revenue is very sensitive to GDP growth, a mean elasticity larger than one suggests that the system is generally effective in leveraging economic growth to increase tax collection.

The research showed us a moderate positive relationship between the Indirect tax buoyancy factor and GDP growth rate, with a correlation coefficient (0.588), Pearson's r value, and p-value less than 0.01 (0.003), which indicates the relationship as statistically significant at the 1 per cent level. At a 95 per cent confidence interval with lower bound (0.232) and upper bound (0.805), the statistical significance of the relationship between the indirect tax buoyancy factor and GDP growth rate is confirmed. A rise in the indirect tax buoyancy factor is linked to stronger GDP growth,

since it has a statistically significant positive impact on the GDP growth rate. This outcome demonstrates the fact that indirect tax collections are sensitive to GDP growth.

The mean elasticity coefficient of indirect tax on GDP growth rate (0.451) grows more slowly than GDP, which indicates an inelastic relationship. At the same time, the median elasticity coefficient (0.849) indicates near proportional responsiveness of indirect taxes on GDP over the running number of years. The median being closer to 1 indicates that in some years, indirect taxes exhibit a near-proportional response to GDP growth. This reflects periods of improved compliance or effective policy implementation. Enhancing compliance and stabilising tax policies could ensure that indirect tax revenue becomes more proportional to GDP growth. The median is slightly lower than the mean, indicating that while the whole system responds to growth, direct tax elasticity is less intense in some years, maybe due to external shocks or policy inconsistencies. Stabilising response in poorer years is important for ensuring constant revenue growth. The link between GDP growth and indirect tax collection shows a high degree of unpredictability (standard deviation) (2.33), suggesting considerable swings. It appears that responsiveness varies, although not to an extreme degree, based on the moderate fluctuation in elasticity. Automation of tax filing, compliance monitoring powered by AI, and reduction of evasion are stabilising variables that could assist in sustaining higher elasticity over time. Reducing variability through consistent tax rates, strengthening GST compliance mechanisms, and improving administration can stabilise indirect tax elasticity.

Economic cycles, tax compliance rates, and shifts in tax policy are all potential outside influences that can cause this variation. Negative elasticity implies that in some years, direct tax revenue declined despite GDP growth. The reasons may be due to various tax reforms with excessive exemption, economic policy that reduced direct tax applicability or may be due to tax collection efficiencies. Stricter compliance procedures, fewer exclusions, and a steady regulatory framework can solve these problems and stop them from happening. There were years when direct tax collection increased at a far higher rate than GDP, suggesting that changes like demonetisation or digitisation had a positive impact on compliance and the size of the tax base.

Policy moves or economic shocks could cause these swings. There were years where indirect tax collection dropped dramatically despite GDP expansion, according to the Minimum Elasticity Coefficient's severely negative value of 9.35. Low compliance rates or issues with the GST's implementation might be to blame. Indirect tax income is susceptible to changes in GDP growth in specific years, as shown by the greatest Elasticity Coefficient of 3.76. Inefficiency in the indirect tax system is indicated by a mean elasticity below 1, which indicates that indirect tax income is not responsive to GDP growth. Comparing the elasticity of direct tax (mean >1) with that of indirect tax, it is highly elastic, indicating a well-structured system that capitalises on economic growth to increase tax revenue. A mean elasticity greater than 1 indicates that for every 1 per cent increase in GDP, direct tax revenue grows by 1.55 per cent. This suggests a highly elastic and growth-responsive direct tax system, which is beneficial for revenue generation during periods of economic growth. Because of efficient tax collection methods and policy alignment with economic conditions, the government has achieved its goal of a progressive tax system in which revenue grows at a higher rate than economic growth.

However, negative elasticity of the compass on the need for stabilisation of the policy. The indirect taxes on the other side are highly inelastic with the GDP growth rate (mean <1), suggesting inefficiencies in capturing the full potential of economic growth to generate revenue. Also, the higher variability reflects inconsistency in the system, possibly due to frequent policy changes or compliance challenges. A mean elasticity below 1 indicates that indirect tax revenue is inelastic, growing at a slower rate than GDP. This suggests inefficiencies in the indirect tax system and its inability to capture economic growth fully. The inelastic nature could stem from a narrow tax base, evasion, inefficiencies in compliance, or policy inconsistencies such as frequent GST rate changes.

Table 5.3.3 Tax Elasticity

Metric	Direct Tax Elasticity	Indirect Tax Elasticity
Mean Elasticity	Highly elastic (>1)	Inelastic (<1)
Responsiveness	Strong	Weak

Stability (SD)	Moderate (1.52)	High variability (2.33)
Policy Efficiency	Effective	Inefficient

Source: Author's calculation using data from the Central Board of Direct Tax (CBDT)

5.4 Relationship between GDP, Tax Buoyancy, and Tax Elasticity using ARDL Model

The analysis of the relationship between GDP growth, tax buoyancy, and elasticity provides critical insights into the responsiveness of India's direct tax system to economic changes. The Autoregressive Distributed Lag (ARDL) model was selected for this study due to its ability to capture both short-run and long-run relationships between variables in time series data, even when the series exhibit different levels of integration (Pesaran et al., 2001). This methodology is particularly suitable for fiscal analysis, as it enables the modelling of lagged effects and dynamic adjustments, which are vital for understanding the delayed impact of economic growth on tax collections.

The Autoregressive Distributed Lag (ARDL) model has been extensively employed to examine the dynamic relationships between GDP, tax buoyancy, and elasticity in economic studies. The ARDL approach is particularly suited for analysing both short- and long-term interactions among variables, accommodating different levels of integration $I(0)$ and $I(1)$. Studies like Subhani et al. (2018) have demonstrated its utility in exploring tax buoyancy's dependence on GDP as a proxy for economic performance. Similarly, Swaray (2023) utilised ARDL to estimate the responsiveness of tax revenues to GDP changes, affirming its capability to model elasticity and buoyancy. Research by Neupane (2019) highlighted ARDL's application in evaluating Nepal's tax system, revealing insights at both aggregate and disaggregate levels. Moreover, studies such as Sinaga et al. (2023) and Jalles et al. (2022) applied ARDL to uncover the intricate dynamics of tax policies and their responsiveness to economic growth, underscoring the methodology's adaptability to diverse fiscal environments. These works collectively establish ARDL as a robust framework for exploring the complex interdependencies between economic growth, tax buoyancy, and elasticity.

The ARDL model highlights a significant relationship between GDP Growth Rate and Direct Tax Growth Rate, capturing the short-term and lagged dynamics of economic growth and tax revenue. The current GDP Growth Rate has a strong positive

impact on Direct Tax Growth Rate, with a coefficient estimate of 2.206 (p = 0.00026). This indicates that a 1-unit increase in GDP growth leads to an approximate 2.21-unit rise in direct tax growth, reflecting the immediate responsiveness of tax revenue to economic activity. Conversely, the lagged GDP Growth Rate (Lag 1) shows a significant negative impact, with a coefficient of -1.683 (p = 0.03230), suggesting that higher economic growth in the previous year may moderate tax revenue growth in the current year due to delayed adjustments or fiscal policy responses. However, the lagged GDP Growth Rate (Lag 2) does not significantly influence direct tax growth (p = 0.92745), indicating that the effect of GDP growth dissipates quickly after the first lag.

The lagged terms of Direct Tax Growth Rate (Lag 1 and Lag 2) are not significant, with p-values of 0.25250 and 0.94087, respectively. This implies that past tax revenue growth rates do not have a meaningful impact on current tax revenue growth, suggesting a lack of persistence in tax growth trends. The model explains 69.24 per cent of the variation in Direct Tax Growth Rate (R-squared = 0.6924), with an adjusted R-squared of 58.99 per cent, indicating moderate explanatory power. However, diagnostic tests reveal potential residual issues: non-stationarity and possible autocorrelation (Durbin-Watson statistic = 1.5612). These concerns suggest the need for further refinements, such as differencing or model re-specification, to enhance reliability.

Table 5.4.1: Relationship between GDP and Tax Buoyancy using ARDL Model

Variable	Estimate	Std. Error	t-Value	p-Value	Significance
Intercept	0.0394	0.0814	0.484	0.63545	Not significant
GDP Growth Rate	2.2060	0.4648	4.746	0.00026 ***	Highly significant
GDP Growth Rate Lag 1	-1.6826	0.7132	-2.359	0.03230 *	Significant
GDP Growth Rate Lag 2	0.0636	0.6865	0.093	0.92745	Not significant

Direct Tax Growth Rate Lag 1	0.3055	0.2567	1.190	0.25250	Not significant
Direct Tax Growth Rate Lag 2	0.0186	0.2462	0.075	0.94087	Not significant

Source: Author's Calculation

Table 5.4.2: Model Summary

Model Fit	**Value**
Residual Standard Error	0.0886
R-squared	0.692
Adjusted R-squared	0.589
F-statistic	6.754
F-statistic p-value	0.001

Source: Author's Calculation

The results reveal that the current GDP Growth Rate significantly drives the Direct Tax Growth Rate, while the effect of past GDP growth diminishes beyond the first lag. The model provides moderate explanatory power, but diagnostic issues, including residual non-stationarity and potential autocorrelation, suggest the need for refinement. Policymakers can leverage these insights to design responsive tax policies aligned with economic growth trends. Simplifying the model by removing insignificant terms may further improve efficiency without compromising accuracy. The ARDL model analysed the impact of GDP growth (current and lagged) and past values of direct tax growth on the current year's direct tax growth rate. The results are summarised in the table below, along with diagnostic tests for model reliability.

Table 5.4.3 Economic Interpretation of Results

Parameter	Coefficient	Economic Interpretation
Intercept	0.039	Baseline growth in the direct tax rate when other variables are zero.
GDP Growth Rate (Current)	2.206	A 1 per cent increase in GDP growth leads to a 2.206 per cent increase in direct tax growth in the short run.
GDP Growth Rate (Lag 1)	-1.683	A 1 per cent increase in the previous year's GDP growth reduces direct tax growth by 1.683 per cent, indicating an adjustment effect.
GDP Growth Rate (Lag 2)	0.064	Minimal long-run effect of GDP growth from two years prior.
Direct Tax Growth Rate (Lag 1)	0.305	30.5 per cent of the previous year's direct tax growth persists into the current year.
Direct Tax Growth Rate (Lag 2)	0.019	Negligible influence of the two-year lagged direct tax growth rate.
Long-Run Coefficient (GDP Growth)	0.587	A 1 per cent increase in GDP growth leads to a 0.587 per cent increase in direct tax growth in the long run.

Source: Author's Calculation using data from the Central Board of Direct Tax (CBDT)

The regression results in Table 5.4.3 reveal several important economic interpretations regarding the relationship between GDP growth and direct tax growth. The intercept of 0.039 suggests that, in the absence of any influence from other variables, the baseline growth in the direct tax rate is 3.9 per cent. The current GDP growth rate has a strong and positive impact, with a coefficient of 2.206, indicating that a 1 per cent increase in current GDP growth results in a 2.206 per cent increase in direct tax growth in the short run. Interestingly, the lagged GDP growth rate (Lag 1) has a negative coefficient of -1.683, suggesting that a 1 per cent increase in the previous year's GDP growth reduces direct tax growth by 1.683 per cent, possibly due to adjustment or correction effects. The second lag of GDP growth (Lag 2) has a minimal impact with a coefficient of 0.064, implying little long-term influence from GDP growth two years prior. The persistence

of tax growth over time is also evident. The coefficient for the lagged direct tax growth rate (Lag 1) is 0.305, showing that 30.5 per cent of the previous year's tax growth carries over into the current year. In contrast, the second lag (Lag 2) of direct tax growth shows a negligible effect, with a coefficient of just 0.019. Finally, the long-run coefficient for GDP growth is 0.587, which means that, over time, a 1 per cent increase in GDP growth results in a 0.587 per cent increase in direct tax growth, capturing the overall sustained relationship between economic performance and fiscal revenue.

5.4.1 Residual and Diagnostic Tests

The standard tests, such as the Durbin-Watson (DW) test, the Augmented Dickey-Fuller (ADF) test for residuals, and residual statistics evaluation, are frequently employed in time-series econometric models. The use of such tests aligns with established studies such as Gujarati (2009) and Brooks (2014), which emphasise their importance in validating assumptions of residual independence, stationarity, and unbiasedness in regression models. Studies like Pesaran and Shin (1999) and Narayan (2005) validate the use of the DW test in ARDL models, particularly for its ability to diagnose autocorrelation in dynamic regressions.

Table 5.4.1.1 Summary of Residual and Diagnostic Test

Test	Statistic/Result	Interpretation
Durbin-Watson Test	DW = 1.5612, p = 0.079	It suggests mild positive autocorrelation but is not statistically significant.
ADF Test for Residuals	DF = -2.572, p = 0.354	Residuals are not stationary, indicating potential model limitations.
Residual Statistics	Min = -0.130, Max = 0.138	Residuals are centred around zero but exhibit some variability.

Source: Author's Calculation using data from the Central Board of Direct Tax (CBDT)

As shown in Table 5.4.1.1, the ADF test for residuals (DF=−2.572, p=0.354DF = -2.572, p = 0.354DF=−2.572, p=0.354) reveals that the residuals are not stationary. Non-stationarity implies potential limitations in the model's long-run dynamics, as stationarity of residuals is critical for ensuring valid long-term relationships. This result is consistent with critiques raised by Engle and Granger (1987), who highlight the

significance of residual stationarity in validating cointegrating relationships. Addressing this issue might require model refinements, such as incorporating additional explanatory variables or higher-order lags, as suggested by Perron (1989) for improving stationarity in time-series analyses. The residual statistics (Min = -0.130, Max = 0.138) indicate that residuals are centred around zero, reflecting an absence of systematic bias in the model. However, the observed variability implies potential inefficiencies in capturing all the dynamics of direct tax growth. Studies such as Asteriou and Hall (2021) recommend analysing residual variability alongside heteroscedasticity tests to validate model efficiency further. Figure 5.6 shows the fitted vs. actual plot, which reveals that the ARDL model aligns well with observed direct tax growth rates in most years. However, deviations in years like 2008-09 (global financial crisis) and 2020-21 (COVID-19 pandemic) highlight the influence of external shocks on tax buoyancy.

Figure 5.6 Actual and Fitted Direct Tax Growth Rate

Source: Author's Calculation

The short-run coefficients indicate the immediate impact of GDP growth and past tax growth rates on direct tax collections. The positive and significant effect of the current GDP growth rate (2.206) confirms that direct tax growth is highly responsive to

concurrent economic activity. However, the negative coefficient for the one-year lag (-1.683) suggests an adjustment or overreaction effect, where a high GDP growth rate in one year is followed by a decline in direct tax growth the next year. This may reflect challenges in sustaining tax collection efficiency or policy delays in translating economic growth into tax revenues. The coefficients for lagged direct tax growth rates (0.305 and 0.019) highlight moderate persistence, indicating that prior growth rates partially influence current outcomes. The long-run coefficient (0.587) suggests that while direct tax growth is positively associated with GDP growth over time, the relationship is less than proportional. This indicates inefficiencies in India's tax system, potentially due to exemptions, tax evasion, or structural issues in tax administration. These findings emphasise the need for policy measures aimed at improving tax buoyancy and elasticity by broadening the tax base and enhancing compliance mechanisms.

This analysis provides a comprehensive understanding of the dynamic interplay between GDP growth and direct tax collections in India. The ARDL model reveals significant short-run and long-run relationships, underscoring the importance of economic growth in driving tax revenues. However, the findings also highlight areas for improvement in tax administration and policy, primarily to address inefficiencies and enhance the responsiveness of the tax system to economic changes. Future research could build on these results by refining the model and exploring the impact of policy interventions in greater depth. The results align with studies like Bahmani-Oskooee and Ng (2002), which emphasise that non-stationarity and autocorrelation may affect the robustness of long-term elasticity estimates. The results have several implications for tax policy and administration. The moderate long-run elasticity of 0.587 underscores the need for reforms to make direct tax revenues more responsive to economic growth. Administrative measures to improve compliance and reduce tax evasion are critical, particularly during years of economic slowdown. Additionally, the presence of external shocks, such as the 2008 global financial crisis and the 2020 pandemic, highlights the need for counter-cyclical tax policies that stabilise revenue during downturns. The ARDL model's ability to capture dynamic relationships and lagged effects makes it a suitable tool for such fiscal analyses. However, the non-stationarity of residuals and

potential autocorrelation suggest areas for model refinement. Incorporating additional macroeconomic variables (e.g., inflation, government spending) or structural breaks due to major reforms could further improve the model's robustness and explanatory power.

5.5 Impact of Major Events on Tax Buoyancy using Event Study

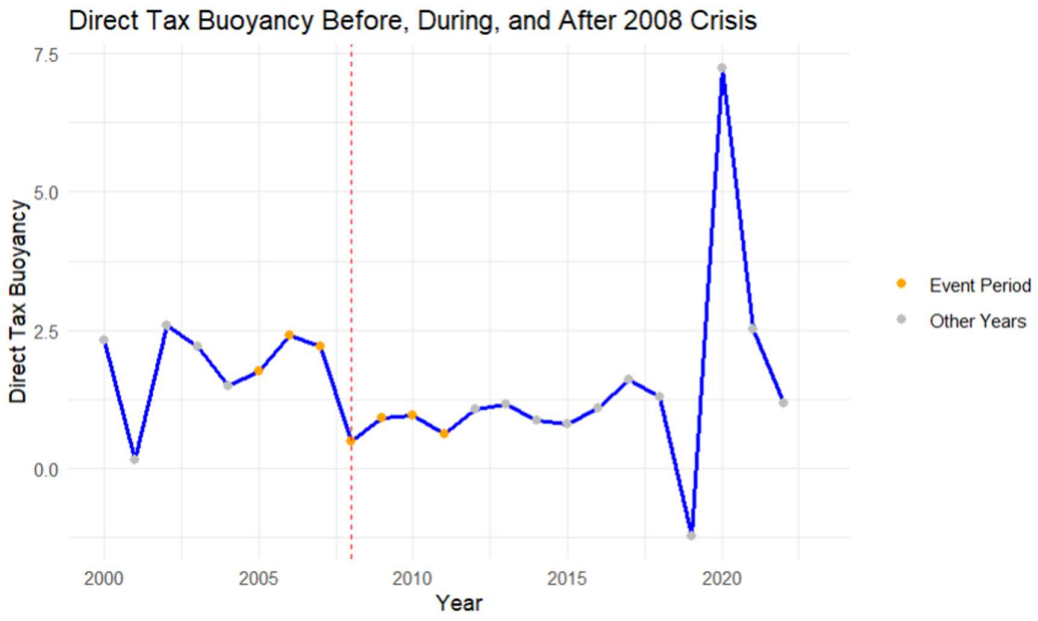
Event study methodology is a statistical approach used to assess the impact of specific events on the value of an entity, such as a company or an economy. This methodology is widely applied in various fields, including finance, health, and social research, to evaluate the causal effects of interventions or occurrences. In financial research, event studies are commonly used to analyse the impact of events like mergers, stock splits, and economic shocks on stock prices and market conditions (Sasikumar & Sundaram, 2024). The methodology typically involves comparing the actual performance of a stock or market to a predicted performance in the absence of the event, often using a control period to establish a baseline. Recent advancements in event study methodology have addressed limitations such as data volatility and non-normal distribution, which traditional methods struggle with. For instance, an enhanced framework incorporating quantile regression and nonparametric tests has been proposed to provide more robust estimates, as demonstrated in the analysis of the HNA Group's market contraction (Wang et al., 2024). Additionally, event studies have been used to quantify the effects of significant political events, such as Brexit, on stock markets, revealing sector-specific impacts (Tomic et al., 2023). Similarly, the death of Queen Elizabeth II was analysed using event study methodology to understand its differential impact on various UK industries, highlighting the importance of firm-specific characteristics in driving market responses (Li, 2023). These studies illustrate the versatility and adaptability of event study methodology in capturing the nuanced effects of diverse events across different contexts.

5.5.1 Event Study: Impact of the 2008 Global Crisis on Tax Buoyancy

The 2008 global financial crisis, precipitated by the collapse of major financial institutions and subsequent economic instability, disrupted economies globally, leading to a significant contraction in GDP and fiscal revenues (Reinhart & Rogoff, 2009). Governments worldwide faced a dual challenge of declining revenues and rising

expenditure needs, necessitating a closer examination of tax systems' resilience. Tax buoyancy, a measure of the responsiveness of tax revenues to changes in economic growth, serves as a crucial indicator of fiscal stability, particularly during periods of economic upheaval (Auerbach, 2009). This study employs an event study methodology, widely recognised for its ability to isolate the effects of significant events by comparing pre-, during-, and post-event periods (MacKinlay, 1997). By analysing tax buoyancy during the pre-crisis (2005–2007), crisis year (2008), and post-crisis (2009–2011) periods, this study uncovers substantial disruptions, including a sharp decline in buoyancy during the crisis year. The statistical robustness of the findings, supported by a t-test ($t = 5.894$, $df = 3.061$, $p = 0.009$), highlights the utility of the event study framework in understanding the fiscal impacts of the crisis. These results offer critical insights into the vulnerability and recovery trajectory of tax systems during economic shocks.

Figure 5.7 Tax Buoyancy Before, During, and After 2008 Crisis



Source: Author's Calculation using data from the Central Board of Direct Tax (CBDT)

Table 5.5.1.1 Average Tax Buoyancy before, during, and after 2008 Crisis

Period	Average Buoyancy
Pre-Event (2005-2007)	2.1256
Event (2008)	0.4800
Post-Event (2009-2011)	0.8247

Source: Author's Calculation using data from the Central Board of Direct Tax (CBDT)

Pre-Event Period (2005–2007): 2.126

- Before the financial crisis, the buoyancy factor was significantly above 1, indicating that direct tax revenues were growing at more than twice the rate of GDP growth. This reflects strong tax collection efficiency during the pre-crisis years.

Event Year (2008): 0.481

- During the crisis year, buoyancy dropped sharply to below 1, indicating a substantial decline in the responsiveness of tax revenues to GDP growth. This suggests that the economic shock disrupted tax collection, potentially due to reduced compliance, economic contraction, or policy challenges.

Post-Event Period (2009–2011): 0.825

- In the years following the crisis, buoyancy improved but remained below 1. This indicates partial recovery in tax responsiveness, but the tax system did not regain its pre-crisis efficiency.

Table 5.5.1.2 Test of Statistical Significance: Event Study on Tax Buoyancy (2008 Crisis)

Test Static (t)	Degree of Freedom (df)	p-value
5.894	3.061	0.009

Source: Author's Calculation using data from the Central Board of Direct Tax (CBDT)

The p-value (0.009) is highly significant, indicating that the difference in buoyancy between the pre-event and post-event periods is statistically significant. The positive confidence interval [0.606, 1.996] confirms that buoyancy in the pre-event period was

consistently higher than in the post-event period. These results suggest that the 2008 financial crisis had a profound and lasting impact on direct tax buoyancy, reducing the efficiency of tax collection relative to GDP growth.

Table 5.5.1.3 Summary of Metrics: Event Study on Tax Buoyancy (2008 Crisis)

Metric	Value
95% Confidence Interval (Lower)	0.606
95% Confidence Interval (Upper)	1.996
Mean (Pre-Event Period)	2.126
Mean (Post-Event Period)	0.825

Source: Author's Calculation using data from the Central Board of Direct Tax (CBDT)

Impact of the Crisis:

- The sharp decline in buoyancy during the year of the crisis reflects the immediate impact of the economic shock on tax collection.
- Reduced tax revenues may have been caused by a contraction in taxable income, lower corporate profits, or a decline in economic activity.

Post-Crisis Recovery:

- While buoyancy improved in the post-event period, it did not return to pre-crisis levels, indicating that the tax system did not fully recover its responsiveness to GDP growth.
- Structural challenges or lagging policy responses could have contributed to this incomplete recovery.

Pre-Crisis Strength:

- The high buoyancy factor before the crisis demonstrates strong tax collection efficiency during periods of economic stability and growth.

The significant decline in direct tax buoyancy during the 2008 financial crisis highlights the urgent need for policies that stabilise tax revenues during economic shocks. Counter-cyclical fiscal measures, such as broadening the tax base, strengthening tax compliance mechanisms, and diversifying revenue sources, could help mitigate revenue

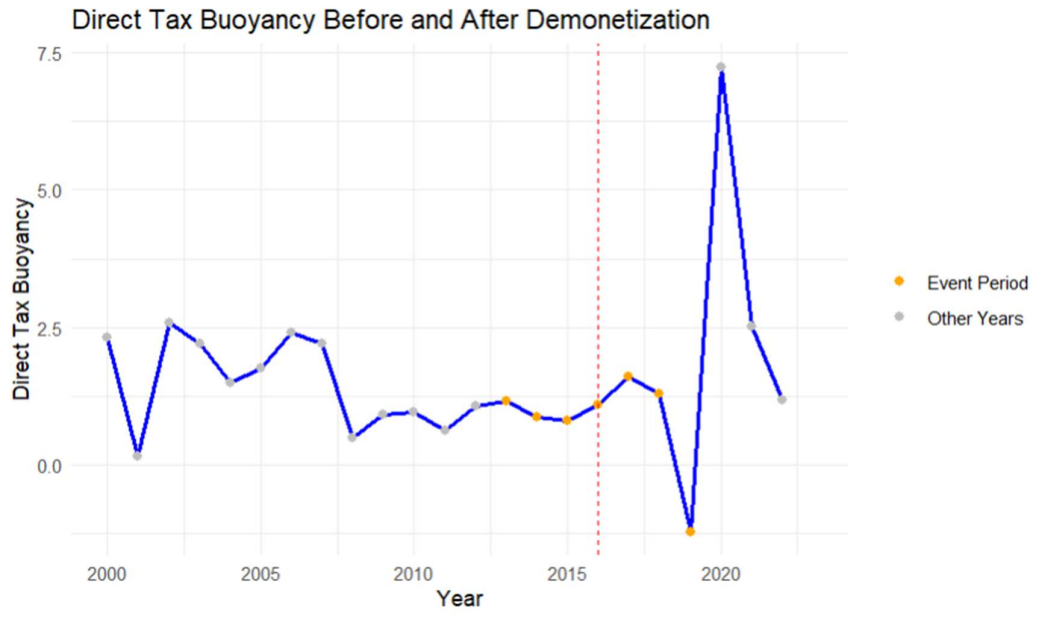
losses during periods of economic contraction. The incomplete recovery in buoyancy in the post-crisis years underscores the importance of implementing structural reforms, including simplifying tax laws, enhancing administrative capacity, and leveraging technology to improve efficiency and reduce evasion. Furthermore, the consistently high buoyancy before the crisis indicates that periods of economic stability and growth offer opportunities to strengthen the tax system, enabling it to withstand future crises better. By prioritising resilience and efficiency, policymakers can ensure a more responsive and robust tax system that supports fiscal sustainability.

The 2008 financial crisis had a profound and lasting impact on direct tax buoyancy in India. While the pre-crisis period demonstrated strong tax collection efficiency, the sharp decline during the crisis and the partial recovery in subsequent years indicate structural vulnerabilities in the tax system. The statistically significant difference in buoyancy between the pre- and post-crisis periods reflects the need for long-term reforms to restore and sustain the responsiveness of tax revenues to economic growth. Policymakers should focus on stabilising revenues during downturns, addressing inefficiencies, and aligning tax policies with economic realities to build a resilient fiscal framework. These findings emphasise the critical importance of strengthening tax systems to safeguard revenue stability amidst economic fluctuations.

5.5.2 Event Study: Impact of Demonetization on Tax Buoyancy

Demonetisation, characterized by the sudden withdrawal of high-denomination currency notes from circulation, represents a disruptive event with immediate and long-term economic consequences. India's demonetisation policy of 2016, which rendered 86 per cent of the country's cash invalid overnight, is a prime example of such an event. This policy aimed to curb black money, counter tax evasion, and promote a cashless economy, but triggered short-term economic shocks, particularly in sectors reliant on cash transactions (Chodorow-Reich et al., 2020).

Figure 5.8 Tax Buoyancy before, during and after Demonetization



Source: Author's Calculation on using data from the Central Board of Direct Tax (CBDT)

Figure 5.8 depicts the impact of demonetisation on direct tax buoyancy, highlighting significant trends before and after the 2016 event (marked by a red vertical line). Prior to demonetisation, buoyancy fluctuated moderately, generally below 3, reflecting steady but uneven tax responsiveness to GDP growth. During the event year, there is a clear decline, indicating the immediate disruption caused by cash shortages and reduced liquidity. Post-demonetization, buoyancy spikes dramatically, exceeding 7, likely due to improved compliance, formalisation of the economy, or one-time effects such as tax amnesty schemes. However, this surge is short-lived, as buoyancy trends downward in subsequent years, stabilising closer to pre-demonetization levels. This suggests that while demonetisation initially disrupted tax collection, it briefly enhanced compliance before structural challenges moderated the gains.

Table 5.5.2.1 Average Tax Buoyancy Before, During, and After Demonetization

Period	Average Buoyancy
Pre-Event (2013-15)	0.9402206
Event (2016)	1.0982615
Post-Event (2017-19)	0.5545037

Source: Author's Calculation using data from the Central Board of Direct Tax (CBDT)

The average buoyancy factors for the three periods were as follows:

- Pre-Event (2013–2015): The buoyancy factor during this period was 0.9402, indicating that direct tax revenues grew slightly slower than GDP. This reflects moderate efficiency in translating GDP growth into tax revenue before demonetisation.
- Event Year (2016): The buoyancy factor increased to 1.0983, surpassing 1. This suggests a temporary improvement in the proportional response of direct tax revenues to GDP growth, likely driven by compliance efforts and scrutiny of cash-based transactions during demonetisation.
- Post-Event (2017–2019): The buoyancy factor dropped significantly to 0.5545, indicating that direct tax revenues grew at a much slower rate than GDP in the years following demonetisation. This decline highlights inefficiencies or disruptions in tax collection mechanisms during the post-event period.

The event study methodology applied to assess the impact of demonetisation (2016) on direct tax buoyancy in India provides important insights into the responsiveness of tax revenues to GDP growth. The analysis revealed that the average buoyancy factor during the pre-event period (2013–2015) was 0.9402**,** indicating that direct tax revenues grew slightly slower than GDP, reflecting moderate efficiency in tax collection. During the event year (2016), the buoyancy factor increased to 1.0983, exceeding 1, which suggests a temporary boost in the proportional response of tax revenues to GDP growth. This improvement is likely attributable to heightened compliance efforts and the government's scrutiny of cash transactions during demonetisation. However, in the post-event period (2017–2019)**,** the buoyancy factor dropped significantly to 0.5545**,**

indicating that tax revenues grew much slower than GDP. This decline points to inefficiencies or disruptions in tax collection mechanisms following demonetisation.

Table 5.5.2.2 Test of Statistical Significance: Event Study on Tax Buoyancy (Demonetization)

Test Static (t)	Degree of Freedom (df)	p-value
0.4302	2.062	0.7097

Source: Author's Calculation

Table 5.5.2.3 Summary of Metrics: Event Study on Tax Buoyancy (Demonetization)

Metric	Value
95% Confidence Interval (Lower)	-3.363
95% Confidence Interval (Upper)	4.134
Mean (Pre-Event Period)	0.940
Mean (Post-Event Period)	0.554

Source: Author's Calculation

A Welch two-sample t-test was conducted to compare the mean buoyancy factors of the pre-event and post-event periods. The results showed a test statistic of 0.4302, degrees of freedom of 2.062, and a p-value of 0.7079. The high p-value suggests that the observed difference in buoyancy factors between the pre-event and post-event periods is not statistically significant. The wide confidence interval, ranging from -3.3631 to 4.1345, reflects the variability in buoyancy values and the limited sample size. While the decline in buoyancy post-demonetization is notable, the statistical test indicates that it cannot be conclusively attributed to the event based on the available data. The results have significant policy implications. The temporary rise in buoyancy during the demonetisation year demonstrates the potential of targeted policy interventions to improve tax compliance and boost revenues. However, the sharp decline in buoyancy after the event highlights the need for sustained reforms to address structural inefficiencies in the tax system. Long-term strategies, such as digitising tax systems, improving compliance mechanisms, and simplifying tax structures, are

essential for maintaining high tax responsiveness to GDP growth. The post-event decline also underscores the potential economic disruptions caused by demonetisation and the challenges in sustaining compliance efforts beyond a one-time intervention. This study has limitations, including the small sample size and the potential confounding effects of other policy changes, such as the implementation of GST in 2017. Moreover, the post-event period includes only three years, which may not fully capture the longer-term impacts of demonetisation. Future research should include a longer time frame and account for other policy reforms to provide a more comprehensive understanding of the structural factors influencing tax buoyancy. Thus, the event study suggests that demonetisation had a temporary positive impact on direct tax buoyancy in 2016, likely driven by compliance efforts during the event. However, this effect was not sustained, with buoyancy declining significantly in the post-event years. While the statistical analysis indicates that this decline is not conclusively significant, the observed trends highlight the importance of long-term structural reforms to ensure sustained improvements in tax responsiveness to GDP growth. These findings underscore the need for policymakers to adopt holistic and enduring approaches to enhance tax collection efficiency.

5.6 Testing the Cointegration between GDP Growth and Tax Growth using the Johansen Cointegration Test

The Johansen cointegration methodology is a robust statistical approach widely employed to examine long-run equilibrium relationships between non-stationary time series. Proposed by Johansen (1988), this technique extends the Engle-Granger two-step approach by providing a system-based estimation that allows for multiple cointegrating vectors, making it ideal for multivariate frameworks. As Johansen and Juselius (1990) demonstrated, the methodology ensures consistency and efficiency in parameter estimation, leveraging maximum likelihood procedures to identify cointegrating relationships. The Johansen cointegration methodology is particularly suitable for analysing tax buoyancy data, as it often involves examining long-term relationships between tax revenue growth and GDP growth—both of which are typically non-stationary time series. Tax buoyancy reflects structural economic relationships that evolve over time, making the Johansen approach ideal for capturing

these dynamics in a multivariate context. The relationship between Direct Tax Revenue and GDP Growth Rate was analysed using the Augmented Dickey-Fuller (ADF) test to assess stationarity, and the Johansen Cointegration Test to evaluate the presence of a long-term equilibrium relationship between the variables.

Table 5.6.1 Stationarity Analysis for Johansen Cointegration Test

Variable	Test Statistic	p-Value	Stationarity
Direct Tax Revenue	-2.3374	0.4438	Non-Stationary
GDP Growth Rate	-2.7949	0.2695	Non-Stationary

Source: Author's Calculation

Table 5.6.1 shows that the ADF test results reveal that both Direct Tax Revenue and GDP Growth Rate are non-stationary, as the p-values exceed the standard significance threshold of 0.05. This indicates that the variables exhibit time-varying trends or persistence. Hence, differencing was applied to transform the variables into stationary series for further analysis.

The Johansen Cointegration Test was applied using both the Trace Statistic and Maximum Eigenvalue Statistic methods. The results indicate the presence of one cointegrating relationship between Direct Tax Revenue and GDP Growth Rate, signifying a long-term equilibrium between these variables. This implies that GDP Growth Rate plays a crucial role in influencing Direct Tax Revenue over the long term.

Table 5.6.2 Johansen Cointegration Test on GDP Growth and Tax Growth

Test Type	Hypothesis (H0)	Test Statistic	Critical Value (5%)	Conclusion
Trace Test	$r \leq 1$	3.43	8.18	Do not reject H0
	$r = 0$	22.20	17.95	Reject H0 (1 cointegrating relationship)

Eigenvalue	$r \leq 1$	3.43	8.18	Do not reject H0	
	$r = 0$	18.77	14.90	Reject H0 cointegrating relationship)	(1

Source: Author's Calculation

Table 5.6.2 shows the Cointegration Equation and Adjustment Speed. The normalised cointegrating vector shows that changes in GDP Growth Rate have a significant long-term impact on Direct Tax Revenue. The loading matrix highlights that Direct Tax Revenue adjusts faster than the GDP Growth Rate toward equilibrium when deviations occur. The normalised cointegration equation-

Direct Tax Revenue + 105510.8 x GDP Growth Rate = 0

This indicates a significant long-term influence of GDP Growth Rate on Direct Tax Revenue.

Table 5.6.3 Loading Matrix

Variable	Loading Coefficient	Adjustment Speed
Direct Tax Revenue	-0.1288870	Faster
GDP Growth Rate	-0.0000123	Slower

Source: Author's Calculation

The results indicate a robust long-term relationship between GDP Growth Rate and Direct Tax Revenue. Policymakers should focus on GDP growth strategies, as they have a significant and sustained impact on tax revenue generation. Direct Tax Revenue also exhibits a quicker adjustment mechanism toward equilibrium when deviations occur, making it a responsive indicator of economic performance.

The analysis employs the Johansen cointegration methodology to investigate the long-term equilibrium relationship between GDP growth and direct tax revenue growth. The Augmented Dickey-Fuller (ADF) test confirms that both variables are non-stationary, necessitating differencing to achieve stationarity for further analysis. The

Johansen Cointegration Test, applied through Trace and Maximum Eigenvalue statistics, identifies a single cointegrating relationship, highlighting the significant long-term influence of GDP growth on direct tax revenue. The normalised cointegration equation underscores that changes in GDP growth drive long-term adjustments in direct tax revenues, while the loading matrix reveals that tax revenue adjusts more rapidly than GDP growth to restore equilibrium after deviations. These findings confirm a robust and meaningful linkage, emphasising the critical role of GDP growth in sustaining tax revenue generation. Policymakers are encouraged to focus on fostering GDP growth, as it significantly impacts tax buoyancy, while the quick adjustment of tax revenues further underscores its responsiveness to economic changes.

5.7 Implications

This chapter provides an in-depth exploration of tax buoyancy, tax elasticity, and tax efficiency as critical indicators of the responsiveness and adaptability of a tax system to economic changes. Tax buoyancy measures the proportional relationship between tax revenues and GDP growth, reflecting both automatic economic responses and the effects of discretionary policy interventions. The findings highlight the dynamic nature of tax buoyancy across various periods, shaped by economic shocks such as the 2008 financial crisis and India's demonetisation policy of 2016. By employing robust methodologies, including event study analysis and Johansen cointegration, this chapter demonstrates how extraordinary events disrupt historical revenue trends and reveals the need for policy measures that stabilise revenue streams during economic uncertainties. The findings also underscore the importance of structural reforms to enhance tax buoyancy by broadening the tax base, simplifying tax laws, and improving compliance mechanisms.

The analysis of tax elasticity complements the discussion on tax buoyancy by focusing on the inherent responsiveness of tax revenues to GDP changes while holding tax policy constant. Elasticity estimates reveal that India's direct tax system is moderately elastic, reflecting a reasonably robust linkage between economic growth and tax revenue. However, the indirect tax system exhibits significant variability and inelasticity, highlighting inefficiencies in capturing economic growth through indirect taxes. These findings call for policy interventions to reduce variability and improve the

proportionality of indirect tax revenue to economic growth. Measures such as stabilising GST rates, enhancing compliance mechanisms, and leveraging technology to minimise evasion are essential for ensuring the resilience and sustainability of indirect tax collections.

Using the Johansen cointegration test, the chapter identifies a significant long-term equilibrium relationship between GDP growth and direct tax revenue growth. This robust linkage confirms that GDP growth is a critical determinant of tax revenue performance over the long term. The results suggest that direct tax revenue adjusts more rapidly than GDP growth toward equilibrium, reflecting its responsiveness to economic changes. However, the less-than-proportional long-term coefficient indicates structural inefficiencies, such as exemptions and compliance challenges, that hinder the tax system's full potential. Policymakers are encouraged to focus on fostering economic growth, enhancing tax collection efficiency, and implementing structural reforms to ensure that tax buoyancy and elasticity align with fiscal sustainability goals. These findings provide valuable insights for designing policies that strengthen India's tax system and promote a more stable and resilient fiscal framework.

This chapter outlines the methodological framework employed to examine the responsiveness of India's direct tax system to economic growth, specifically through the lenses of tax buoyancy and tax elasticity. Given the time-series nature of the data and the dynamic relationship between GDP growth and tax revenue, a combination of econometric models—ARDL, Johansen Cointegration, and Event Study Analysis—was used. This multifaceted approach ensures a comprehensive understanding of both short-term adjustments and long-run equilibrium in tax responsiveness.

Table 5.7.1 Summary of Models used and Results

Methodology	Purpose	Key Output
ARDL Model	Short- and long-run tax-GDP dynamics	GDP has a strong short-term impact; long-run elasticity < 1
Johansen Cointegration	Test the long-run equilibrium	1 cointegrating relationship; tax reacts faster than GDP

Event Study	Analyze shocks (2008, 2016)	Crises lower buoyancy: short-lived reform effects observed

Source: Author's Calculation

The ARDL model confirms that while GDP growth boosts tax revenues, this impact weakens over time implying the need for structural reform. Cointegration results stress the long-run reliance of tax performance on economic expansion, reinforcing the importance of growth-oriented policies. Event studies highlight the vulnerability of tax buoyancy to external shocks, advocating for counter-cyclical fiscal planning and automation-driven compliance.

CHAPTER VI

SUMMARY, CONCLUSION AND POLICY IMPLICATIONS

This study aims to comprehensively evaluate the performance, determinants, efficiency, and future trends of direct tax collection in India. The study initially set out to analyze historical trends in tax collection, identifying macroeconomic and institutional factors influencing revenue generation. Through rigorous empirical methods, including Granger Causality, Grey Forecasting (GM 1,1), Data Envelopment Analysis (DEA), ARDL, and Johansen Cointegration, the study systematically addressed its key objectives. The primary objectives of the study included assessing the historical performance of direct tax collections, identifying key determinants impacting revenue collection, evaluating efficiency levels of tax administration, and forecasting future trends in tax revenue. The study revealed significant causal relationships between macroeconomic indicators like GDP and unemployment rate with tax revenues, highlighting their critical role in shaping tax performance.

Efficiency analysis through DEA indicated progressive improvements, particularly noting the peak efficiency in recent years attributed to significant administrative and technological reforms. Forecasting via the Grey model demonstrated a steady upward trajectory in tax revenues, reflecting stable economic growth patterns. Further, econometric analyses like ARDL and Johansen Cointegration confirmed robust long-run relationships between GDP and tax revenue, emphasizing the importance of proactive fiscal policies. Additionally, the study explored the concept of tax buoyancy, assessing the responsiveness of tax revenues to changes in GDP. Event study analyses provided an in-depth examination of how major economic events influenced tax buoyancy. The study specifically focused on disruptions such as the 2008 global financial crisis and the 2016 demonetization, revealing temporary declines in tax buoyancy. The analyses indicated that while these shocks initially impacted tax revenues negatively, subsequent strategic policy interventions and administrative adjustments facilitated recovery and eventually restored tax revenue growth. These findings underline the significance of preparedness, swift policy response, and resilient administrative practices to ensure stability and sustainability in tax revenue during periods of economic uncertainty.

The research also evaluated the resilience of the Indian tax system through event studies, revealing temporary disruptions caused by major economic shocks, followed by recovery facilitated by strategic policy responses. Additionally, the study thoroughly examined the impact of digital transformation and policy shifts, notably the move from the old to the new tax regime and increased use of digital compliance tools such as Form 26AS, AIS, and TIS.

6.1 Summary

This section presents an overview of the trends and patterns in India's direct tax collection over the past two decades. It highlights the growth in corporate and personal income tax revenues, declining cost of collection, and rising efficiency through administrative reforms. Using tools like Granger causality and Data Envelopment Analysis (DEA), the study evaluates the relationship between tax expenditure and revenue, revealing areas of both strength and inefficiency. The section also includes future projections using Grey Forecasting (GM 1,1), indicating continued growth and a shift toward a more progressive tax system. These insights provide a foundation for the analysis of determinants, economic linkages, and policy implications that follow.

6.1.1 Trends and patterns of direct tax collection in India

Direct tax revenue in India has shown a consistent upward trajectory from ₹68,305 crore in 2000–01 to ₹14,12,422 crore in 2021–22. Corporate and personal income taxes have been the main contributors, while "Other Direct Taxes" remain minor. Corporate tax increased from ₹35,696 crore to ₹7,12,037 crore, and personal income tax from ₹31,764 crore to ₹6,96,604 crore over the same period. Growth spikes were observed during economic expansions (e.g., 2006–08), while minor contractions occurred during slowdowns. The increase reflects improved compliance, tax base broadening, and administrative reforms.

The government's cost of collecting direct taxes decreased from 1.36% in 2000–01 to 0.51% in 2022–23, indicating rising efficiency. The Granger causality test showed a weak but borderline significant relationship ($p = 0.05132$) between tax expenditure and tax collection. Instantaneous causality was statistically significant ($p = 0.018$), implying real-time mutual influence due to common underlying economic factors.

Using Data Envelopment Analysis (DEA), technical efficiency scores were calculated for each year. Efficiency was mostly low, with 2018–19 achieving a perfect score of 1.000. This indicates wide inefficiencies across years, except where administrative reforms or favorable conditions improved collection outcomes. The findings emphasized the need to follow successful practices from high-efficiency years.

Direct taxes' share in total tax revenue rose from ~36% in 2000–01 to over 52% in 2021–22, reflecting stronger reliance on progressive taxation. COVID-19 caused a rare decline in direct tax collection from ₹10.50 lakh crore in 2019–20 to ₹9.47 lakh crore in 2020–21. Both corporate and personal income tax suffered. The dip reversed sharply in 2021–22, driven by economic recovery and administrative efforts. The direct tax-to-GDP ratio peaked at 6.3% in 2007–08 and declined to 4.78% in 2020–21, rebounding to 5.97% in 2021–22. This ratio reflects the progressivity and efficiency of the tax system. Higher ratios indicate improved compliance and capacity, while drops suggest economic contractions or inefficiencies.

Corporate and personal income taxes are the largest contributors to total direct tax revenue. Other direct taxes contribute minimally and display extreme skewness, suggesting inconsistency in their collection. Granger Causality test was applied to determine whether tax expenditure (cost of collection) Granger-causes tax revenue collection. The relationship was weakly significant ($p = 0.05132$), indicating a marginal predictive power of past expenditure on future collection. Instantaneous causality was found to be significant ($p = 0.018$), implying that in the same time frame, changes in tax collection and tax expenditure are jointly influenced by common factors. DEA was used to assess efficiency of tax collection relative to cost. Tax collection was treated as the output and cost of collection as the input. Most years had low technical efficiency scores (well below 1), indicating inefficient use of resources. The year 2018–19 was a notable exception that recorded a perfect efficiency score (1.000), suggesting optimal use of resources. A gradual improvement was seen post-2020, indicating the effectiveness of reforms and digitization.

Grey Forecasting (GM 1,1) was applied to forecast the tax collection data. This model is particularly suited for forecasting when data points are limited and environments are complex or uncertain making it ideal for economic and fiscal

forecasting. Grey Forecasting (GM 1,1) is a first-order, one-variable grey model used for predicting data series with limited historical information. The model was applied to India's direct and indirect tax collection data from FY 2000–01 to FY 2022–23. Using the generated coefficients from the historical data, forecasts were made for FY 2023–24 to FY 2029–30. The projection indicates that direct tax collections are expected to reach ₹30.67 trillion by FY 2029–30, accounting for approximately 54.41% of total tax revenues. Indirect tax collections are projected to grow to ₹25.70 trillion in the same period. The forecast suggests a growing reliance on direct taxes, implying a move towards a more progressive tax structure. Greater revenue predictability from direct taxes enables better fiscal planning, reduced dependency on borrowing, and improved capital investment. The expansion of the tax base and enhanced compliance especially due to digitization are expected to support these projections.

6.1.2 Determinants of direct tax collection in India

The study employs a multi-layered analytical approach to examine the determinants of direct tax collection in India. It begins with a Systematic Literature Review (SLR), drawing from reputable databases such as Scopus and Google Scholar to identify recurring macroeconomic variables associated with tax performance. Through this review, five key determinants were identified: Gross Domestic Product (GDP), Inflation, Population, Unemployment Rate, and Corruption. These variables were frequently cited in global and Indian studies as having a significant influence on the capacity of governments to generate direct tax revenues.

Each of these determinants is examined in detail through existing literature. GDP is the most consistently linked variable to tax collection, with empirical evidence suggesting that economic growth directly drives increased revenue through higher incomes and business profits. Inflation, on the other hand, shows a mixed impact. While it affects indirect taxes more visibly, inflation can also erode real income and corporate profits, indirectly affecting tax receipts. Population dynamics are also crucial especially the age structure. A younger, economically active population expands the tax base, whereas an aging or dependent population can contract it. Unemployment, as expected, reduces tax collection by limiting both personal income tax and corporate profitability.

Corruption is recognized as a major impediment to efficient tax systems, fostering evasion, undermining compliance, and reducing revenue potential.

To empirically test the causal impact of these five variables on direct tax collection, the study applies the Granger Causality Test. The results indicate that GDP significantly Granger-causes direct tax collection, with a highly significant F-statistic (21.15) and p-value (<0.001). This underscores GDP's predictive strength for revenue forecasting. The unemployment rate also shows moderate significance (p = 0.048), indicating that rising joblessness adversely affects tax intake. Population exhibits marginal causality with a p-value of 0.1, suggesting weak predictive relevance. However, inflation and corruption were found to have no statistically significant causal relationship with tax collection, showing p-values of 0.586 and 0.9695 respectively. Following these findings, the study evaluates the efficiency of direct tax collection using Data Envelopment Analysis (DEA), incorporating GDP and employment rate (inverse of unemployment) as input variables and direct tax revenue as the output. The DEA assessed technical efficiency scores from 2001 to 2022. The results show significant variations over time. The year 2019 achieved perfect efficiency (score = 1.000), serving as a benchmark for optimal resource utilization. Conversely, years like 2006–07 revealed deep inefficiencies with a score as low as 0.003. Over the years, especially post-2010, tax collection efficiency has gradually improved largely due to tax reforms, digitization, and administrative strengthening. The study finds that while GDP and employment are reliable indicators of tax collection potential, actual efficiency varies due to policy execution, compliance behavior, and administrative robustness. The analysis highlights the need for continuous reform to align macroeconomic growth with fiscal performance and to eliminate inefficiencies in the tax system.

6.1.3 Relationship between direct tax collection and economic growth

The relationship between direct tax collection and economic growth is one of the key focus of the study, explored through both theoretical grounding and empirical analysis. To examine this relationship, the study uses multiple methodological approaches including Autoregressive Distributed Lag (ARDL) model, Johansen Cointegration test, and Event Study methodology. The ARDL model is applied to analyze both short-run

and long-run dynamics between GDP growth and direct tax revenue. This model is chosen for its suitability in handling time series data with variables that are integrated at different levels (I(0) and I(1)). The ARDL results reveal a significant and positive long-term relationship between GDP and tax revenue, indicating that as economic activity increases, direct tax collection tends to rise in tandem. However, short-run dynamics show that tax collection is more volatile and may not immediately respond to GDP changes, highlighting a time-lagged response in fiscal performance.

To confirm long-run equilibrium between tax collection and economic growth, the Johansen Cointegration test is employed. This technique validates the presence of a stable, long-term association between GDP and direct tax revenue, with the tax system adjusting more quickly to deviations from the equilibrium compared to GDP. The cointegration equation shows that economic growth has a sustained and meaningful influence on tax collection over time, reinforcing the argument for synchronising tax policy with broader economic strategies. Additionally, the study uses Event Study methodology to examine how specific economic shocks like the 2008 global financial crisis and the 2016 demonetisation in India affected tax buoyancy, a measure of how tax revenue responds to changes in GDP. The findings from this method show that while tax buoyancy was adversely affected during these events, recovery followed with strong policy responses and structural reforms. The Event Study analysis highlights the sensitivity of tax buoyancy to major economic events, such as the 2008 financial crisis and 2016 demonetisation, which temporarily disrupted tax responsiveness but were followed by strong recoveries.

6.1.4 Impact of buoyancy and elasticity on direct tax collection in India

To explore these relationships, the study employs multiple methodological approaches, starting with the Autoregressive Distributed Lag (ARDL) model. This model is particularly well-suited for handling time series data with variables that are integrated at different levels. The ARDL results indicate a significant and positive long-run relationship between GDP growth and direct tax revenue growth, suggesting that economic expansion does lead to higher tax revenues over time. However, the short-run dynamics were found to be less stable, highlighting a lagged adjustment of tax collections to economic fluctuations. The model's R-squared value was 0.6924,

suggesting a moderate level of explanatory power, while the ADF test for residuals revealed non-stationarity ($p = 0.354$), implying the need for cautious interpretation of short-term estimates.

To validate the long-term relationship, the Johansen Cointegration test was conducted. This test confirmed the presence of one cointegrating relationship between GDP and direct tax revenue using both the trace statistic ($22.20 > 17.95$) and the eigenvalue statistic ($18.77 > 14.90$). The cointegration equation further reinforced the strong and stable influence of GDP on tax revenue. Notably, the adjustment speed revealed that direct tax revenue responds more quickly to economic shocks compared to GDP, with a loading coefficient of -0.1289, indicating quicker realignment with equilibrium in the tax system. An Event Study methodology was also applied to assess how external shocks—specifically the 2008 global financial crisis and the 2016 demonetization impacted tax buoyancy. This approach used a two-sample t-test to compare average buoyancy before and after each event. The findings show that tax buoyancy declined temporarily during these disruptions but recovered in the post-event periods due to strategic policy responses and tax reforms. This indicates the resilience and adaptive capacity of the Indian tax system in the face of macroeconomic shocks. Overall, the analysis reveals that India's tax system is reasonably buoyant, with tax revenues typically growing faster than GDP in the long run, thereby reflecting a responsive structure. Elasticity, while present, is moderate, suggesting that some degree of responsiveness still depends on active policy measures rather than automatic mechanisms. The findings highlight both the strengths and limitations of the current tax framework, emphasizing the need for continuous reform and alignment of tax policy with economic cycles to ensure robust and sustainable revenue generation.

6.2 Policy Implications and Suggestions

Building on the empirical findings and analytical insights of this study, this section presents a forward-looking set of policy implications aimed at strengthening India’s direct tax system. These recommendations emphasize the integration of advanced technologies such as artificial intelligence and predictive analytics, the alignment of tax policy with economic growth drivers, and the need for structural reforms to enhance efficiency, equity, and responsiveness. By focusing on digital innovation, data-driven

governance, and administrative simplification, the proposed measures seek to create a more transparent, adaptive, and inclusive tax framework that supports sustainable fiscal development. The following suggestions outline specific, actionable strategies for enhancing tax administration, broadening the base, and improving long-term revenue performance which are as follows:

1. There is a need for the integrate AI into tax filing portals to provide real-time, personalized assistance by auto-suggesting applicable forms, deductions, and schedules based on taxpayer profiles enhancing user experience and extending the utility of existing systems like Form 26-AS and AIS.
2. There is a dire need to create a centralized digital dashboard to monitor year-wise tax efficiency using Data Envelopment Analysis and buoyancy metrics, allowing policymakers to identify underperforming regions and allocate reform efforts more strategically for improved direct tax mobilization.
3. It is suggested to strengthen the link between GDP growth and direct tax revenue by designing tax brackets responsive to sectoral growth patterns and aligning fiscal incentives with high-growth sectors to enhance long-run tax elasticity and revenue buoyancy.
4. Encouraging the formalization of the economy by offering targeted incentives for digital transactions and business registrations, thereby expanding the tax base and improving the responsiveness of tax collections to overall economic growth trends.
5. The findings of the study directs to institutionalize the use of predictive models such as Grey Forecasting, ARIMA, and others to improve the accuracy of tax revenue forecasting and enable proactive, data-informed fiscal planning that adapts to economic fluctuations and growth projections.
6. A forecasting and analytics cell within the CBDT can be started to regularly update revenue projections using machine learning and statistical models, ensuring timely policy adjustments based on real-time data and evolving economic indicators.
7. There is a need to broaden the direct tax base by simplifying the filing process, eliminating redundant exemptions, and linking tax incentives to formal business

activity, making compliance easier and more attractive for a wider section of taxpayers.

8. There is a need to improve transparency and reduce corruption by incorporating governance indices into tax administration, enhancing institutional accountability, and ensuring political and bureaucratic stability to foster long-term trust in the taxation system.
9. There are many structural inefficiencies in the tax system and it can be taken care by simplifying the regime, rationalizing tax rates, and improving coordination between central and state tax authorities to reduce administrative overlap and enhance revenue collection efficiency.
10. Launch a targeted taxpayer segmentation program using behavioral data analytics. Segment taxpayers (e.g., salaried individuals, SMEs, gig workers, high-net-worth individuals) based on income sources, compliance history, and digital behavior. Tailor communication, compliance nudges, and policy incentives accordingly to boost voluntary compliance and reduce enforcement costs.
11. States with low tax collections should adopt targeted policies to boost economic activity, promote urbanization and industrialisation, and enhance compliance through digital monitoring, while learning from high-performing states and post-pandemic recovery patterns to ensure sustainable revenue growth
12. Introduce a "Pre-Filled Return Guarantee Scheme" for salaried and low-complexity taxpayers. Provide fully pre-filled tax returns based on TDS, AIS, and banking data, with a turnaround guarantee (e.g., within 48 hours). This would encourage timely filing, reduce errors, and promote transparency, especially for first-time or low-literacy filers.
13. Develop a nationwide tax literacy and inclusion drive focused on tier-2 and tier-3 cities. Partner with local educational institutions, fintech platforms, and Panchayati Raj institutions to run awareness programs on filing, benefits of formalization, and use of digital tax platforms. This would widen the taxpayer base and improve long-term civic engagement with the tax system.

6.3 Scope of Future Research

While this study offers a multifaceted view of direct taxation in India, there remain several avenues for further inquiry. Future research could:

1) To conduct comprehensive analyses of indirect taxes in order to complement and enrich the findings related to direct taxation.
2) To undertake detailed, state-wise investigations aimed at capturing regional disparities, tax structures, and the differential impacts of fiscal policies.
3) To evaluate the economic and behavioural impacts of the new tax regime, with the objective of assessing its overall effectiveness and identifying areas for policy enhancement.
4) To extend the study by examining the influence of sector-specific policies on tax revenue generation and fiscal sustainability.
5) To explore taxpayer behaviour and compliance psychology through the use of micro-level survey data, offering insights into motivations, deterrents, and compliance dynamics.

These directions would deepen the understanding of tax dynamics and support the development of more nuanced policy frameworks.

6.4 Conclusion of the Study

The study provides a comprehensive assessment of India's direct tax system, highlighting key trends, determinants, and their relationship with economic growth. Direct tax collection has experienced significant growth from ₹ 68,305 crore in 2000–01 to ₹ 16,63,686 crore in 2022–23, largely driven by corporate and personal income taxes. This growth trajectory reflects improved compliance, tax base expansion, and administrative reforms. The cost of tax collection has declined markedly, indicating rising efficiency. However, technical efficiency scores derived from Data Envelopment Analysis (DEA) reveal persistent inefficiencies across years, with only 2018–19 achieving optimal efficiency. Granger causality analysis suggests only a borderline significant link between tax expenditure and revenue collection, but strong instantaneous causality reflects a real-time interplay of economic factors. Grey Forecasting (GM 1,1) projects direct tax revenues reaching ₹30.67 trillion by 2029–30,

highlighting a shift toward a more progressive and predictable tax structure. The study identifies five key macroeconomic determinants i.e., GDP, inflation, population, unemployment, and corruption through literature review. Empirical testing using Granger causality shows GDP and unemployment rate significantly impact tax collection, while inflation and corruption are statistically insignificant. DEA, using GDP and employment as inputs, indicates variable efficiency, with better performance in post-reform years. The relationship between direct tax revenue and economic growth is further validated using ARDL and Johansen Cointegration models, revealing a strong long-term association and quicker tax system adjustment to shocks. Event studies of the 2008 global financial crisis and 2016 demonetization show tax buoyancy is temporarily disrupted but resilient. The analysis of tax buoyancy and elasticity confirms a responsive tax system in the long term, although elasticity remains moderate. These insights culminate in comprehensive policy implications aimed at broadening the tax base, enhancing compliance through digital systems, promoting revenue stability, and aligning tax policy with economic growth. Targeted reforms and incentives are recommended to stimulate innovation and investment, while continuous monitoring and forecasting are essential for policy adaptability. The study also emphasizes reducing corruption, enhancing public trust, and addressing structural inefficiencies to create a fair, efficient, and sustainable tax system that supports India's economic and developmental goals.

References

Aashish (2024). Tax buoyancy in major states in India. *EPRA International Journal of Economics, Business and Management*, 60–67.

Abata, M. A. (2023). The effect of direct and indirect taxes on economic growth: evidence from nigeria. EPRA International Journal of Economics, Business and Management, 87–97.

Abhilasha, A. C. (2023). GST: An Analysis Of The Collection And Contribution Of GST In FY 2022-23. *International Journal For Multidisciplinary Research*, *5*(5), 1-12.

Abu-Rayash, A., & Dincer, I. (2020). Analysis of mobility trends during the COVID-19 coronavirus pandemic: Exploring the impacts on global aviation and travel in selected cities. *Energy Research & Social Science, 68*, 101693.

Acharya, S. (2005). Thirty years of tax reform in India. Economic and Political Weekly, 2061-2070.

Addison, T., & Levin, J. (2011). The determinants of tax revenue in sub-Saharan Africa. *Journal of International Development*.

Adegbite, T. A., Bojuwon, M., & Adegbite, A. F. (2019). The impact of ICT on taxation: Evidence from Oyo State. *Copernican Journal of Finance & Accounting, 8*(4), 9–24.

Afshan, S., & Vien, H. (2024). *Decoding the Relationship Between Economic Growth and Fiscal Health: Insights from Local Governments in North Carolina*. Public Finance Journal.

Ahmed, Q. M. (1994). The determinants of tax buoyancy: An experience from the developing countries. *The Pakistan Development Review, 33*, 1089-1098.

Ahmed, Qazi Masood & Muhammad, Suleiman (2010). “Determinants of Tax Buoyancy: Empirical Evidence from Developing Countries”. European Journal of Social Sciences, Vol 13 (3), pp. 408-414.

Ahrens, J. (1997). Prospects of institutional and policy reform in India: toward a model of the developmental state? *Asian Development Review*, *15*(01), 111-146.

Ahuja, D., & Pandit, D. (2020). Public expenditure and economic growth: Evidence from the developing countries. FIIB Business Review, 9(3), 228–236.

Akpan, U. F., Odu, A. T., Ado, N., Nsonwu, N. F., Okereke, A., Bulus, B. Y., Yunana, N. Z., Akanni, E., Rimamtanung, B., & Musa, A. A. (2024). Tax and Price Stability in Selected African Countries: A GARCH-MIDAS Approach. Scientific African, 23.

Alhempi, R. R., Ardiansyah, I., Kusumastuti, S. Y., & Endri, E. (2020). Tax compliance in income tax payments. *International Journal of Innovation, Creativity and Change*, *13*(1), 356-374.

Alqadi, M., & Ismail, S. (2019). Taxation and Economic Growth: Theoretical and Empirical Literature, 7(4).

Alqadi, Mohammed & Ismail, S. (2019). Government Spending and Economic Growth: Contemporary Literature Review. *Journal of Global Economics,* Vol 7(4): 343

Althunayan, T., & Althunayan, T. (2010). Differentiation Between Direct and Indirect Taxes. Dealing with the Fragmented International Legal Environment: WTO, International Tax and Internal Tax Regulations, 3-23.

Amin, A., Nadeem, A. M., Parveen, S., Kamran, M. A., & Anwar, S. (2014). Factors affecting tax collection in Pakistan: An empirical investigation. *Journal of Finance and Economics*, *2*(5), 149–155.

Amit, M., Mukund, Sharma. (2024). Exploring Tax Policy Changes and Foreign Direct Investment Inflows in the Indian Economy. Indian Scientific Journal of Research In Engineering And Management, 08(01):1–10.

MANG'ATI, F. P., AGYEI, B. A., & AMPEDU, R. (2024). Financial Development and Economic Growth in Tanzania. *International Journal of Research and Innovation in Social Science, VIII*, 2113-2125.

Andıç, N. Ö. (2023). The Impact of Corruption on Tax Revenue (pp. 283–300). IGI Global.

Andreoni, James, Erard, Brian and Feinstein, Jonathan (1998). Tax Compliance, *Journal of Economic Literature*, 36, issue 2, p. 818–860.

Armstrong, C. S., Blouin, J. L., Jagolinzer, A. D., & Larcker, D. F. (2015). Corporate governance, incentives, and tax avoidance. Journal of Accounting and Economics, 60(1), 1-17

Arnold, J. M. (2008). Do tax structures affect aggregate economic growth? Empirical evidence from a panel of OECD countries, ECO/WKP(2008)/51, 5-26.

Ashfaq, Pathan, Ketan, D. (2024). Direct selling laws and regulations in India: A comprehensive study. The Scientific Temper, 15(03):2771-2777.

Assessment of Direct Tax Collection in India. doi: 10.21203/rs.3.rs-2148335/v1

Asteriou, D., & Hall, S. G. (2021). *Applied econometrics* (4th ed.). Palgrave Macmillan.

Atkinson, A. (2015). *Inequality: What Can Be Done?*. Cambridge, MA and London, England: Harvard University Press. https://doi.org/10.4159/9780674287013

Avi-Yonah, R. S. (2008). Corporate social responsibility and strategic tax behavior. In *Tax and corporate governance* (pp. 183-198). Berlin, Heidelberg: Springer Berlin Heidelberg.

Ay, Ş., & ÇELİK, S. (2024). A cyclical analysis of the relationship between income tax and unemployment: empirical evidence for turkey. Ordu Üniversitesi Sosyal Bilimler Enstitüsü Sosyal Bilimler Araştırmaları Dergisi, *14*(4), 1479-1489.

Bahmani-Oskooee, M., & Ng, R. C. W. (2002). Long-run demand for money in Hong Kong: An application of the ARDL model. *International Journal of Business and Economics, 1*(2), 147–155.

Balasoiu, N., Chifu, I., & Oancea, M.-L. D. (2023). Impact of Direct Taxation on Economic Growth: Empirical Evidence Based on Panel Data Regression Analysis at the Level of Eu Countries. Sustainability, 15(9), 7146.

Barthold, Thomas A. 1994. "Issues in the Design of Environmental Excise Taxes." *Journal of Economic Perspectives* 8 (1): 133–151.

Basconcillo, J.-A. (2023). A nexus between fiscal policy and inflation: a case study of Indonesia using SVAR model. Public Sector Economics, *47*(4), 477-503.

Basu, S., Shojaie, A., & Michailidis, G. (2015). Network granger causality with inherent grouping structure. The Journal of Machine Learning Research, 16(1), 417-453.

Baunsgaard, T., & Keen, M. (2010). Tax revenue and (or?) trade liberalization. Journal of Public Economics, 94(9-10), 563-577.

Bekbossinova, A. S., Yelikbayeva, D., Dinmukhamedkyzy, I., & Zhumabay, A. (2024). Correlation between taxes and inflation in the Republic of Kazakhstan.

Belinga, V., Benedek, M. D., De Mooij, R. A., & Norregaard, M. J. (2014). Tax buoyancy in OECD countries. International Monetary Fund.

BİLGİN, M. (2024). A Research on the Relationship between Tax Revenues and Social Demography: A Comparison of Bosnia and Turkey. 1(2), 01–05.

Bilquees, F. (2004). Elasticity and Buoyancy of the Tax System in Pakistan. The Pakistan Development Review, 73–93.

Bird, R. M. (2010). Smart tax administration. World Bank.

Bird, R. M., & Gendron, P. (2006). Is VAT the Best Way to Impose a General Consumption Tax in Developing Countries (pp. 6-17). International Studies Program Working Paper.

Bird, R. M., & Zolt, E. M. (2008). Tax policy in emerging countries. Environment and Planning C: Government and Policy, 26(1), 73–86.

Bissoon, O. (2012). Can Better Institutions Attract More Foreign Direct Investment (FDI)? Evidence from Developing Countries. International Research Journal of Finance and Economics, 82, 142–158.

BOLAT, E. Y., & Erdal, M. (2022). Income tax application as a population policy tool. Uluslararası Sosyal Bilgilerde Yeni Yaklaşımlar Dergisi, *6*(1), 126-138.

Boussofiane, A., Dyson, R. G., & Thanassoulis, E. (1991). Applied data envelopment analysis. European Journal of Operational Research, 52(1), 1–15.

Brooks, C. (2014). Introductory econometrics for finance (3rd ed.). Cambridge University Press.

Brown, S. J., & Warner, J. B. (1985). Using Daily Stock Returns: The Case of Event Studies. Journal of Financial Economics, 14(1), 3–31.

Brys, B., Perret, S., Thomas, A., & O'Reilly, P. (2016). Tax design for inclusive economic growth.

Buchanan, S. C., & Weber, B. A. (1982). Growth and Residential Property Taxes: A Model for Estimating Direct and Indirect Population Impacts. Land Economics, 58(3), 324–337.

Caves, D. W., Christensen, L. R., & Diewert, W. E. (1982). The Economic Theory of Index Numbers and the Measurement of Input, Output, and Productivity. Econometrica, 50(6), 1393-1414.

Income Tax Department. (2023). Final approved consolidated time series: 2022–23. Government of India. Retrieved from https://incometaxindia.gov.in/Documents/Direct%20Tax%20Data/Final-approved-Consolidated-Time-series-2022-23.pdf

Central Board of Indirect Taxes and Customs. (2020). Central Goods and Services Tax Act, 2017 (as amended up to 30.09.2020).

Chakraborty, L. S., Thomas, E., & Gandhi, P. (2019). Natural resources revenue buoyancy in India: Empirical evidence from state-specific mining regimes.

Chakraborty, L., & Harikrishnan, S. (2022). COVID-19 and fiscal-monetary policy coordination: Empirical evidence from India. Levy Economics Institute, Working Papers Series, 1002.

Chakravarty, A., & Ghosh, P. (2022). Goods and Services Tax (GST): India's Tax Reform in the Global Context. Economic Affairs Journal.

Chakravarty, S., & Gupta, R. (2021). GST implementation in India: Challenges and implications for tax compliance. Journal of Indian Taxation, 18(3), 210–229.

Chattopadhyay, A. K., Rakshit, D., Chatterjee, P., & Paul, A. (2022). Trends and determinants of FDI with implications of COVID-19 in BRICS. Global Journal of Emerging Market Economies, 14(1), 43–59.

Chattopadhyay, A., Lin, Y., Shen, Z., & Zubizarreta, J. R. (2024). An Anatomy of Event Studies: Hypothetical Experiments, Exact Decomposition, and Weighting Diagnostics.

Chaudhry, I. S., & Munir, F. (2010). Determinants of low tax revenue in Pakistan. Pakistan Journal of Social Sciences, 30(2), 439–452.

Chen, Y., Hu, H., & Wang, Y. (2020). Evaluating the Effects of Environmental Regulations on Industrial Efficiency Using the Malmquist Index. Journal of Cleaner Production, 249, 119364.

Chodorow-Reich, G., Gopinath, G., Mishra, P., & Narayan, A. (2020). Cash and the Economy: Evidence from India's Demonetization. The Quarterly Journal of Economics, 135(1), 57–103.

Chowdhury, B. (1979). Vegetables. 6th Revised Edition, The Director National Book Trust, New Delhi, 45 p.

Coase, R.H. (1960). The Problem of Social Cost. Journal of Law and Economics, 3, 1–44.

Çollaku, L., Balaj, D., & Hajdini, A. (2023). Correlation between tax revenues and gross domestic product: Evidence from the developing economy. Corporate and Business Strategy Review, 4(1), 31–38.

Cooper, W. W., Seiford, L. M., & Zhu, J. (Eds.). (2011). Handbook on data envelopment analysis.

Cordero, J. M., Díaz-Caro, C., Pedraja-Chaparro, F., & Tzeremes, N. G. (2021). A conditional directional distance function approach for measuring tax collection efficiency: Evidence from Spanish regional offices. International Transactions in Operational Research, 28(2), 1046–1073.

Creedy, J. (2022). Measuring the welfare gain from a new good: An introduction. Australian Economic Review, 55(1), 117–126.

Creedy, John and Gemmell, Norman, (2013). Measuring revenue responses to tax rate changes in multi-rate income tax systems: behavioural and structural factors, International Tax and Public Finance, 20, issue 6, p. 974–991.

Dahal, A. K. (2020). Tax-to-GDP Ratio and the Relation of Tax Revenue with GDP: Nepalese Perspective. 4(1), 80–96.

Dahal, S. (2020). The role of tax revenue in economic growth: Evidence from Nepal. Nepalese Journal of Economic Studies, 7(1), 71–88.

Dai, B., Amarteifio, E. N. A., Kyere, F., & Sampene, A. K. (2024). Examining the dynamics between economic development, tourism, renewable energy and life expectancy in the Nordic economies. Environmental Research, 252, 118900.

Dangal, D. N., Chapagai, S. D., Gajurel, R. P., & Pokhrel, A. (2021). A Basic Analysis of Tax Revenue and GDP in Nepal: Exploring the Correlation Dynamics. Deleted Journal, 29(1–2), 11–18. https://doi.org/10.3126/jodas.v29i1-2.68211

Daniel J Hemel, David A Weisbach (2021). The Behavioural Elasticity of Tax Revenue, Journal of Legal Analysis, Volume 13, Issue 1, 2021, Pages 381–438.

Daniel J Hemel, David A Weisbach, The Behavioural Elasticity of Tax Revenue, Journal of Legal Analysis, Volume 13, Issue 1, 2021, Pages 381–438

Das-Gupta, A. (2004). The economic theory of tax compliance with special reference to tax compliance costs (NIPFP Working Paper No. 13). National Institute of Public Finance and Policy.

De Clercq, B. (2023). Tax literacy: What does it mean? Meditari Accountancy Research, 31(3), 501–523.

Deb, R. (2022). Lining India's Direct Tax Collection Contractions. The Indian Economic Journal, 70(2), 365–369.

Dhaliwal, D. S., Gaertner, F. B., Lee, H. S., & Trezevant, R. (2015). Historical Cost, Inflation, and the US Corporate Tax Burden. Social Science Research Network.

Dickey, D. A., & Fuller, W. A. (1979). Distribution of the estimators for autoregressive time series with a unit root. Journal of the American Statistical Association, 74(366a), 427–431.

Dinh, D. V. (2022). Fiscal Policy and Economic Growth: Threshold Regression Model Approach. Industrial Engineering and Management Systems, 21(4), 632–645.

Donald Bruce & William F. Fox & M. H. Tuttle, (2006). "Tax Base Elasticities: A Multi-State Analysis of Long-Run and Short-Run Dynamics," Southern Economic Journal, John Wiley & Sons, vol. 73(2), pages 315–341.

Dudine, P., & Jalles, J. T. (2018). How buoyant is the tax system? New evidence from a large heterogeneous panel. Journal of International Development, 30, 961–991.

Đurović Todorović, J., Đorđević, M., & Ristić, M. (2019). The tax wedge as the determinant of unemployment: a comparative overview of OECD countries and Serbia. 49(1), 61–75.

Đurović-Todorović, J., Milenković, I., & Kalaš, B. (2019). The Relationship Between Direct Taxes and Economic Growth in OECD Countries. Economic Themes, 57(3), 273–286.

Edeme, R. K., Edeme, R. K., Nkalu, C. N., Azu, B., & Nwachukwu, S. C. (2016). Alternative Specification and Estimation of Tax Revenue-Gross Domestic Product Relationship. 4(3), 134–141.

El Araby, L., ElSehaimy, Y., Ali, Z., Karim, F., Mohamed, F., & Mahmoud, M. (2024). The Impact of Fiscal and Monetary Policies on Inflation: Empirical Evidence from Egypt from 1990 to 2020, *Journal of Advances in Economics and Business Studies*, *1*(1), 94-108.

Elina, K. (2019). An Empirical Study on the Journey of Tax Reforms in India. 13(01).

Engen, E. and Skinner, J. (1996). Taxation and Economic Growth. National Tax Journal, 49, 617–642.

Engle, R. F., & Granger, C. W. J. (1987). Co-integration and error correction: Representation, estimation, and testing. Econometrica, 55(2), 251–276.

Eric, M., Engen., Jonathan, Skinner., Jonathan, Skinner. (1996). Taxation and Economic Growth. Social Science Research Network,

Etim, E. O., Nweze, A. U., Umoffon, N., & Elias, A. (2020). Empirical analysis of the relationship between tax revenue components and economic growth in Nigeria: 1980-2018. International Institute of Academic Research and Development, 6(3), 61-82.

Fama, E. F., Fisher, L., Jensen, M. C., & Roll, R. (1969). The Adjustment of Stock Prices to New Information. International Economic Review, 10(1), 1–21.

Fare, R., Grosskopf, S., Norris, M., & Zhang, Z. (1994). Productivity Growth, Technical Progress, and Efficiency Change in Industrialised Countries. The American Economic Review, 84(1), 66–83.

Gechert, Sebastian and Heimberger, Philipp, (2022). Do corporate tax cuts boost economic growth?, European Economic Review, *147*, 104157.

Genschel, P., & Jachtenfuchs, M. (2011). How the European Union constrains the state: Multilevel governance of taxation. European Journal of Political Research, 50(3), 293–314.

Ghai, D. P. (1966). Taxation for development: a case study of Uganda. The Institute of Development Studies and Partner Organisations. Report.

Ghura, D. (1998). Tax revenue in Sub-Saharan Africa: Effects of economic policies and corruption. IMF Working Papers, 98/135, 1–25.

Goode, R. (2010). Government finance in developing countries. Brookings Institution Press.

Government of India. (1985). The Estate Duty (Amendment) Act, 1985. Ministry of Law and Justice. Retrieved from https://www.indiacode.nic.in

Granger, C. W. J. (1969). Investigating causal relations by econometric models and cross-spectral methods. Econometrica, 37(3), 424–438.

Gruber, J., & Saez, E. (2002). The elasticity of taxable income: Evidence and implications. Journal of Public Economics, 84(1), 1–32.

Gujarati, D. N. (2009). Basic econometrics (5th ed.). McGraw-Hill Education.

Gupta, A. S. (2007). Determinants of tax revenue efforts in developing countries. IMF Working Papers, 2007(184).

Gupta, S., & Tareq, S. (2008). Mobilizing revenue: Strengthening revenue performance in sub-Saharan Africa. IMF Working Paper WP/08/35.

Hakim, T. A. (2020). Direct Versus Indirect Taxes: Impact on Economic Growth and Total Tax Revenue. International Journal of Financial Research, 11(2), 146–153.

Hakim, T., Karia, A. A., David, J., Ginsad, R. b., Lokman, N. I. S., & Zolkafli, S. (2022). Impact of direct and indirect taxes on economic development: A comparison between developed and developing countries. Cogent Economics & Finance, 10(1).

Hanlon, M., & Heitzman, S. (2010). A review of tax research. Journal of Accounting and Economics, 50(2–3), 127–178.

Harris, R. (1995). Using Cointegration Analysis in Econometric Modelling. Prentice Hall/Harvester Wheatsheaf.

Hassett, K. A., & Metcalf, G. E. (2009). The Incidence of a U.S. Carbon Tax: The Economic and Environmental Impacts of a Carbon Tax. Brookings Institution Press.

Haughton, G. (Ed.). (1999). Community economic development (Vol. 22). Psychology Press.

Hundsdoerfer, J., & Sichtmann, C. (2008). The importance of taxes in entrepreneurial decisions: An analysis of practising physicians' behaviour. Review of Managerial Science, 3(1), 19–40.

Hussain, B., Abbas, M., & Munir, S. (2023). Taxation, Corruption and Economic Growth: A Causality Analysis of Developed and Developing Countries. Forman Journal of Economic Studies, 19(01).

IMF. (2019). India: Staff Report for the 2019 Article IV Consultation. International Monetary Fund.

Income Tax Department. (1961). Income-tax Act, 1961. Government of India. Retrieved from https://incometaxindia.gov.in/pages/acts/income-tax-act.aspx

Income Tax Department, Government of India. (2024). History of direct taxation in India. Retrieved from https://incometaxindia.gov.in/Pages/about-us/history-of-direct-taxation.aspx

Indra, I. (2023). Sectoral GDP and Tax Revenue: a Panel Data Analysis. Qeios.

Indraratna, Y. (2003). The Measurement of Tax Elasticity in Sri Lanka: A Time Series Approach. Staff Studies, 33, 73-109.

Jackson, P. (2020). Progressivity in tax policy: Concepts and applications. Tax Studies Quarterly, 58(3), 195–213.

Jalles, J. T., Gupta, S., & Liu, J. (2022). Tax buoyancy in sub-Saharan Africa and its determinants. International Tax and Public Finance, 29(5), 1031–1058.

Ji, Y. B., & Lee, C. (2010). Data envelopment analysis. The Stata Journal, 10(2), 267-280.

Johansen, S. (1988). Statistical Analysis of Cointegration Vectors. Journal of Economic Dynamics and Control, 12(2-3), 231-254.

Johansen, S., & Juselius, K. (1990). Maximum Likelihood Estimation and Inference on Cointegration—With Applications to the Demand for Money. Oxford Bulletin of Economics and Statistics, 52(2), 169-210.

Johansson, Åsa, Heady, Chistopher, Arnold, Jens, Brys, Bert and Vartia, Laura, (2008), Taxation and Economic Growth, No 620, OECD Economics Department Working Papers, OECD Publishing.

Paliwal, U. L., Saxena, N. K., & Pandey, A. (2019). Analysing the impact of GST on tax revenue in India: the tax buoyancy Approach (pp. 514-523).

Kalivoshko, O., Kraevsky, V., & Payanok, T. (2020, October). Assessment of Factors Influencing the Volume of Personal Income Tax Revenues. In 2020 IEEE International Conference on Problems of Infocommunications. Science and Technology (PIC S&T) (pp. 279-282). IEEE.

Kantha Priya.M; Dr.V.Sornaganesh (2023). A Study on Tax Collection in India and United States. Journal of Reattach Therapy and Developmental Diversities, 6, 141-1744.

Kapoor, S., & Singh, A. (2023). Development of Indian tax system: Pre- and post-colonial influences. FIIB Business Review, *14*(3), 261-271.

Kargbo, B. I. B., & Egwaikhide, F. O. (2010). Tax Elasticity in Sierra Leone: A Time Series Approach. International Journal of Economics and Financial Issues, 2, 432.

Karras, G. (2019). Tax structures and economic performance in OECD countries: A panel data analysis. Public Finance Review, 47(6), 1141–1166.

Kaur, Gurpreet & Rani, Vaneeta (2022). Indian Income Tax System with Regard to Corporate Tax: An Analysis. An International Journal of Humanities and Management. 8(1), 38-42

Kaur, Gurpreet (2016). Self-Assessment System of Taxation as a Challenge for India. International Journal of Advanced Education and Research. 1(3), 9-11.

Kaushik, P., Kansra, P. & Mahapatra, SK. (2023). Determinants of Direct Tax in India: A Systematic Review. Journal of Propulsion Technology, 44(6), 605-620.

Kaushik, P., Brahmi, M., Kakran, S., & Kansra, P. (2024). The predictive grey forecasting approach for measuring tax collection. Journal of Risk and Financial Management, 17(12), 558.

Kinyua, J. D. (2013). The relationship between tax revenue and economic growth in Kenya (Doctoral dissertation, University of Nairobi,).

Kirchler, E (2007) The Economic Psychology of Tax Behaviour. Cambridge University Press, Cambridge.

Kogler, C., Olsen, J., Müller, M., & Kirchler, E. (2022). Information processing in tax decisions: a MouselabWEB study on the deterrence model of income tax evasion. Journal of Behavioral Decision Making, 35(4), e2272.

Kohli, R. (2023). Tax Buoyancy: Too Noisy for Signals. Indian Public Policy Review, 4(6 (Nov-Dec)), 32-44.

Kothari, S. P., & Warner, J. B. (2007). Econometrics of Event Studies. Handbook of Corporate Finance: Empirical Corporate Finance, 1, 3-36.

Kumar, V., & Chandel, K. (2024). Effectiveness of tax incentives in promoting foreign direct investment in India. Vision: Journal of Indian Taxation, 11(2), 1-26.

Kumar, A. (2020). Impact of COVID-19 and what needs to be done. Economic and Political Weekly, 55(14), 10-12.

Lagravinese, R., Liberati, P., & Sacchi, A. (2020). Tax buoyancy in OECD countries: New empirical evidence. Journal of Macroeconomics, 63, 103189.

Lahiri, A. (2020). The great Indian demonetization. Journal of Economic Perspectives, 34(1), 55-74.

Lee, Y. J. (2021). The effects of analysts' tax expense forecast accuracy on corporate tax avoidance: An international analysis. Journal of Contemporary Accounting & Economics, 17(2), 100243.

Li,X. (2023).Event Study: The Effect of the Passing Away of Queen Elizabeth II on the UK Stock Market. Advances in Economics, Management and Political Sciences, 17, 378-392.

Lütkepohl, H. (1982). Non-causality due to omitted variables. Journal of Econometrics, 19(2–3), 367–378.

Lütkepohl, H. (2005). New Introduction to Multiple Time Series Analysis. Springer-Verlag Berlin Heidelberg.

Lyssiotou, P., & Savva, E. (2022). Labor supply responses to income tax free and bracket expansions. Journal of Economic Studies, 49(7), 1225-1239.

M., M., Sury. (2017). Indirect Tax Structure Prior to the Introduction of GST: Challenges and the Need for a Unified Tax Structure. 3(2):1-30.

MacCarthy, J., Muda, P., & Sunu, P. (2022). Tax Revenue and Economic Growth Nexus in Ghana: Co-integration and Granger causality Test. Bulletin of Applied Economics, 15–35.

MacKinlay, A. C. (1997). Event Studies in Economics and Finance. Journal of Economic Literature, 35(1), 13-39.

Mahapatra, S. K., & Kaushik, P. (2022). Effect of Sensex on direct tax collection: An empirical study from India. International Journal of Economics and Accounting, 11(1), 99-114.

Makiyan, S. N., & NAJAFİ FARASHAH, S. M. S. (2023). The Effects of Tax Shocks on GNP and Inflation in Iran, A DSGE Approach. Sosyoekonomi Journal, 31(55), 253–24.

Malicka, L., Lukáčová, J., & Hadačová, D. (2022). Demographic and Economic Characteristics of Population as Determinants of the Revenue from The Real Property Tax in the Slovak Republic. Financial Law Review, 28 (4), 1–13.

Mallick, H. (2021). Do governance quality and ICT infrastructure influence the tax revenue mobilisation? An empirical analysis for India. Economic Change and Restructuring, 54(2), 371-415.

Mallick, S., Singh, R., & Chakraborty, T. (2023). Population dynamics and tax revenue in emerging economies: Evidence from India. Journal of Asian Public Policy, 16(2), 215–234.

Mandela, B., & Olukuru, J. (2015). Tax buoyancy: a comparative study between Kenya and South Africa. Strathmore University, Nairobi, Kenya.

Maris, A. W. (2024). Analisis Yuridis Tindak Pidana Perpajakan sebagai Salah Satu Modus Operandi Tindak Pidana Korupsi di Indonesia. Deleted Journal, 1(3), 197–206.

McNabb, K. (2018). Tax structures and economic growth: New evidence from the government revenue dataset. *Journal of International development*, *30*(2), 173-205.

Mei, Y. (2021). Research and practice on tax planning of modern service industry based on multi attribute decision making model. 2021 International Conference on Education, Information Management and Service Science (EIMSS), 394–397. IEEE.

Michael Eichler, (2007), Granger causality and path diagrams for multivariate time series, Journal of Econometrics, 137, (2), 334-353

Milwood, T. A. T. (2011). Elasticity and Buoyancy of the Jamaica Tax System.

Ministry of Finance, Government of India. (1961). Income Tax Act, 1961. https://incometaxindia.gov.in/pages/acts/income-tax-act.aspx

Ministry of Finance, Government of India. (2024). Annual Financial Statement 2024–25. https://www.indiabudget.gov.in/doc/AFS/allafs.pdf

Ministry of Finance. (2020). Vivad se Vishwas Scheme: Policy Note. Government of India.

Ministry of Statistics and Programme Implementation, Government of India. (2023). Statistical year book India. Retrieved from https://www.mospi.gov.in/sites/default/files/Statistical_year_book_india_chapters

Miranda, A., & Dias, P. (2020, June). A Literature Review: Empirical Research on Tax Havens, years 2008 to 2018. In 2020 15th Iberian Conference on Information Systems and Technologies (CISTI) (pp. 1-7). IEEE

Mishra, R. (2024). Value Added Tax, Governance, and Economic Growth in a Democratic Era: A Study of Nigeria. SSRN. Retrieved from https://papers.ssrn.com/sol3/Delivery.cfm?abstractid=4845499

Mitra, S. (2017). Politics in India: structure, process and policy. Routledge.

Mittal, A., Agrawal, P., & Agrawal, S. (2023). *Hybrid Annuity Model (HAM) of Hybrid Public-Private Partnership Projects*. Springer Singapore.

Mitu, N. E. (2008). Direct Taxation–Direction of Harmonization. Annals of University of Craiova–Economic Science Series, 3, 1407-1411.

Moore, Mick (2007). How does taxation affect the quality of governance? The Institute of Development Studies and Partner Organisations. Report. Retrieved from https://hdl.handle.net/20.500.12413/4044

Morini, M., & Pellegrino, S. (2018). Personal income tax reforms: A genetic algorithm approach. European Journal of Operational Research, 264(3), 994-1004.

Mr, Paarth, Kumar., Mr, Pratulya, Garg. (2024). Taxation Policies in India: A Critical Examination of Tax Rates, Structures, and Their Impact on Entrepreneurship, Investment, and Economic Growth. International Journal for Multidisciplinary Research.

Mukarram, F. (2001). Elasticity and Buoyancy of Major Taxes in Pakistan. Pakistan Economic and Social Review, 75-86.

Mukarram, Fauzia (2001), "Elasticity and Buoyancy of Major Taxes In Pakistan". Pakistan Economic and Social Review, Vol 39, Issue 1, pp. 75-86.

Mukherjee, S., & Badola, S. (2021). Public Finance Management in India in the time of COVID-19 Pandemic (No. 21/337)

Mukundhan, K. V., Sahasranamam, S., & Cordeiro, J. J. (2019). Corporate investments in tax havens: evidence from India. Asian Business & Management, 18(5), 360-388.

Munir, N., Ali, M. S., & Nasir, A. (2023). Examining the Influence of Direct and Indirect Taxation on Economic Growth: A Case Study of Pakistan. iRASD Journal of Economics, 5(4), 1130–1146.

Muriungi, A., Ndagara, M., & Mugambi, P. (2024). The Nexus Between Fiscal Policy Measures, Inflation and Growth of Manufacturing Sector in Kenya. International Journal of Research and Innovation in Social Science, VIII(V), 1441–1451.

Muro, K. (2013). Optimal labor income taxation in a two-sector dynamic general equilibrium model. International Review of Economics 60 (1), 21– 48.

Myles, G. D. (2000). Taxation and economic growth. Fiscal studies, 21(1), 141-168.

Nainwal, N. (2015). Tax system in India – Evolution and present structure. PRAGATI: Journal of Indian Economy, 2(1), 119–120.

Namrata Wagle, Manjiri Manerkar (2022). Assessment of Direct Tax Collection in India - Research Square, December 2022.

Narayan, P. K. (2005). The saving and investment nexus for China: Evidence from cointegration tests. Applied Economics, 37(17), 1979–1990.

Neha, Nainwal. (2015). Tax System in India-Evolution and Present Structure. 2(1).

Neog, Y., & Gaur, A. K. (2020). Tax structure and economic growth in India: insights from the ARDL model. Indian Growth and Development Review, 13(3), 589–605.

Neupane, D. (2023). Analysis of the Relationship between Tax Revenue and Economic Growth in Nepal. Siddhajyoti Interdisciplinary Journal, 4(1), 25–36.

Neupane, S. (2019). Estimation of elasticity and buoyancy coefficients of the Nepalese tax system.

Neverauskienė, L., Zabarauskaitė, R., & Gataūlinas, A. (2018). Evaluation of the Relationship between Labour Taxation and Unemployment: Case Study of Lithuania in the EU Context. Filosofija-Sociologija, 28(4).

Nwanakwere, J. T. (2019). Tax and economic growth in Nigeria: an ARDL approach. 20(2), 124–134.

O., Uche. (2024). Moderating Influence of Corruption on the Relationship between Aggregate Tax Revenue and Economic Development in Nigeria and Ghana. African Journal of Accounting and Financial Research, 7(2), 34-45.

Oanh, T. T. K., Quoc, H. V., Nha, L. T., Chau, N. T. B., & Phat, N. H. (2024). The Relationship Between the Shadow Economy, Corruption, and Taxes: Empirical

Evidence from Countries with High and Low Financial Development. Studia Universitatis Vasile Goldis Arad, Seria Stiinte Economice, 34(4), 78–104.

Obura, J. (2022). Analysis of direct taxes and gross domestic product of the Kenyan economy. European Journal of Economic and Financial Research, 6(1).

OECD. (2015). Base Erosion and Profit Shifting (BEPS). OECD Publishing.

OECD. (2020). Tax Policy Reforms 2020: Special Edition on Tax Policy During the COVID-19 Pandemic. OECD Publishing.

OECD. (2020). Tax Revenue Trends in OECD Countries. OECD Publishing.

Okech, T. C., & Mburu, P. G. (2011). Analysis of responsiveness of tax revenue to changes in national income in Kenya between 1986-2009. International Journal of Business and Social Science, 2.

Okeke, C. (2024). Effectiveness of Fiscal and Economic Policy in Monitoring Inflation in Nigeria.

Okonkwo, J. J., & Kenneth, A. C. (2024). Fiscal Policy and the Effectiveness of Monetary Policy on Economic Growth. African Journal of Banking and Finance Research.

Omar, M. A., & Inaba, K. (2020). Does Financial Inclusion Reduce Poverty and Income Inequality in Developing Countries? A Panel Data Analysis. Journal of Economic Structures, 9, Article No. 37.

Oz-Yalaman, Gamze, (2019). Financial inclusion and tax revenue, Central Bank Review, 19, issue 3, p. 107–113.

Paarth, Kumar, Pratulya, G. (2024). Taxation Policies in India: A Critical Examination of Tax Rates, Structures, and Their Impact on Entrepreneurship, Investment, and Economic Growth. International Journal for Multidisciplinary Research

Pattichis, C. (2022). Are tax revenue elasticities consistent with a balanced government budget? An analysis and implications for six CEE countries. Economics and Business Letters, 11(1), 33–40.

Perron, P. (1989). The great crash, the oil price shock, and the unit root hypothesis. Econometrica, 57(6), 1361–1401.

Pesaran, M. H., & Shin, Y. (1999). An Autoregressive Distributed Lag Modelling Approach to Cointegration Analysis. Econometrics and Economic Theory in the 20th Century, 371–413.

Pesaran, M. H., & Shin, Y. (1999). An autoregressive distributed lag modelling approach to cointegration analysis. In S. Strom (Ed.), Econometrics and economic theory in the 20th century: The Ragnar Frisch Centennial Symposium (pp. 371–413). Cambridge University Press.

Pesaran, M. H., Shin, Y., & Smith, R. J. (2001). Bounds testing approaches to the analysis of level relationships. Journal of Applied Econometrics, 16(3), 289–326.

Pessino, C., & Fenochietto, R. (2010). Determining countries' tax effort. Hacienda Pública Española/Revista de Economía Pública, 65-87.

Pinaki Chakraborty and K R Shanmugam (2024). Goods and Services Tax in India: Transition, Experience, and Future Reforms, Fiscal Policy and Public Financial Management, 83-112.

Das, P. (2022). India's evolving tax system: its successes and challenges. *RESEARCH REVIEW International Journal of Multidisciplinary*, *7*(7), 118-124.

Ahmad, Ehtisham & Poddar, Satya, 2009. "GST reforms and intergovernmental considerations in India," LSE Research Online Documents on Economics 38346, London School of Economics and Political Science, LSE Library.

Pradip, Kumar, Das. (2020). Indian Direct Tax Structure – An Analytical Study.

Prammer, Doris and Reiss, Lukas, (2018), How to increase fiscal stabilization at the euro area level? Monetary Policy & the Economy, issue Q2/18, p. 111-131.

Press Information Bureau Government of India Ministry of Finance (PIB). (2019). Press release. Retrieved from https://pib.gov.in/Pressreleaseshare.aspx?PRID=1585641

PwC India. (2022). India Budget Report: Reforms in Direct Tax Administration. PricewaterhouseCoopers.

PricewaterhouseCoopers. (n.d.). India: Overview. PwC Worldwide Tax Summaries. Retrieved March 28, 2025, from https://taxsummaries.pwc.com/india

Ramakumar, R., & Kanitkar, T. (2021). Impact of COVID-19 pandemic on the Indian economy: A critical analysis. Investigación económica, 80(315), 3-32.

Rao, M. G. (2005). Tax system reform in India: Achievements and challenges ahead. Journal of Asian Economics, 16(6), 993-1011

Rao, M. G. (2022). Evolving issues and future directions in GST reform in India. Madras School of Economics.

Rao, M. G., & Rao, R. K. (2006, September). Trends and issues in tax policy and reform in India. In India Policy Forum (Vol. 2, No. 1, pp. 55-122). National Council of Applied Economic Research

Rao, M. G., & Rao, R. K. (2010). Tax system reform in India. In R. Gordon (Ed.), Taxation in developing countries: Six case studies and policy implications (pp. 109–152). Columbia University Press.

Rao, R. K. (2021). The Economy as Reflected in Income Tax Data (No. 21/330).

Rauf, A., Saleem, S. F., & Breaz, T. O. (2024). Public Expenditure and Fiscal Health in OECD Countries. Romanian Journal of Economic Forecasting.

Renu, Kohli. (2023). Tax Buoyancy: Too Noisy for Signals. Indian Public Policy Review.

S., K., Khatik., Amit, Kr, Nag. (2012). Direct Tax Reform in India- An Analysis of Direct Tax Code 2011. International journal of innovative research and development, 1(4):53-65.

Salam, M. M., Uddin, M. S., Khan, M. F. A., Mazumdar, P. K., Huq, M. E., Yousuf, R., & Salam, A. (2013). Maternal awareness on under-5 child immunization in a rural community of Bangladesh. Int Med J, 20(6), 681-684.

Samantara, D. (2021). Tax reforms in India: A critical analysis. International Journal of Management and Social Science, 9(1), 8-21.

Samarah, S., & Talalweh, M. (2024). Tax revenues and economic growth: Empirical evidence from Palestine. Middle East Economic Review, 39(2), 112–130.

Samarah, W. A., & Talalweh, M. (2024). The Impact of Tax Revenue on Macroeconomic Variables: A Case Study from Palestine.

Samwel, K. C., & Isaac, M. K. (2012). Elasticity and Buoyancy of Tax Components and Tax Systems in Kenya. Research Journal of Finance and Accounting, 3, 2221697(Paper) ISSN 22222847.

Sandmo, Agnar, (1981), Income tax evasion, labour supply, and the equity--efficiency tradeoff, Journal of Public Economics, 16, issue 3, p. 265-288.

Sasikumar, S., & Sundaram, N. (2024). Event study methodology trends in the stock market: A systematic review based on bibliometric analysis. Multidisciplinary Reviews, 7(10), 2024234.

Sharma, Dr Sujeet Kumar, and Dr Rajan Yadav (2011) "An empirical study on taxpayer's attitude towards e-return filing in India." International Journal of Research in Computer Application and Management, Vol. 1(6), 20-24.

Sharma, S., & Tiwari, P. (2021). Digitalization and tax compliance in India: A study of e-filing and digital payments in rural areas. Indian Economic Review, 56(2), 145-161.

Shashank, Shetty. (2024). Direct Tax Reforms of India: History and Evolution. Indian Scientific Journal of Research in Engineering and Management.

Shashi, Kapoor., Amanpreet, Singh. (2023). Development of Indian Tax System: Pre and Post-Colonial Influences. FIIB business review

Sherpa, L. (2023). Tax reforms and elasticity of taxable income: estimation using the current population survey. Applied Economics Letters, 31(16), 1554–1559.

Shettigar, Jagadish, and Pooja Misra (2022), Taxation Reforms, Resurgent India: The Economics of Atmanirbhar Bharat (Oxford, 2022; online edn, Oxford Academic, 185-187.

Shetty, N. H. K. (2024). Impact of Foreign Direct Investment on the Indian Telecom Sector: An Analysis.

Shojaie, A., & Fox, E. B. (2022). Granger causality: A review and recent advances. Annual Review of Statistics and Its Application, 9(1), 289-319.

Shuvalova, EB & Gordienko, Mikhail, (2024). "Practice of Collecting Tax and Non-Tax Payments in India" Vestnik of the Plekhanov Russian University of Economics

Sinaga, S. T., Ekananda, M., Gitaharie, B. Y., & Setyowati, M. (2023). Tax buoyancy in Indonesia: An evaluation of tax structure and policy reforms. Economies, 11(12), 294.

Singh, A. (2018). ITC Mechanism under GST Era: A Backbone Concept. Envision Journal of Commerce Department of ACFA, 12.

Singh, J., & Sharma, P. (2010). Income tax policy design and implementation in India—individual assessees attitude. Global Business Review, 11(2), 135-152.

Singh, P. (2019). Tax revenue in India: Trends and issues.

Slemrod, J. (2019). Tax Systems. Cambridge University Press.

Son, N. N. (2023). Corporation income taxation impact on unemployment rate: VAR model approach. Problems and Perspectives in Management, 21(2), 744–757.

Stern, N. (2006). The Stern Review: The Economics of Climate Change. Cambridge University Press.

Streeter, J. L. (2022). How do tax policies affect individuals and businesses. Stanford Institute for Economic Policy Research (SIEPR). Available online: https://siepr. stanford. edu/publications/policy-brief/how-do-tax-policies-affectindividuals-and-businesses

Subhani, F., Chaudhry, I. S., Akhtar, M. H., & Sheikh, M. R. (2018). The institutional determinants of tax buoyancy: A case study of Pakistan. Pakistan Journal of Social Issues, 11, 119-135.

Sufian, F. (2009). Sources of Productivity Changes in the Malaysian Banking Sector: Does Ownership Matter? Journal of Asian Economics, 20(6), 639-649.

Sukhtankar, Sandip & Vaishnav, Milan, 2015. "Corruption in India: Bridging Research Evidence and Policy Options," India Policy Forum, National Council of Applied Economic Research, vol. 11(1), pages 193-276.

Press Trust of India. (2019). USD 1.5 tn parked in tax havens by Indians: Opposition. The Economic Times.

Sury, M.M. (2024). Fiscal Policy, Budgetary Reforms and Digitization of Tax Administration in India. VISION: Journal of Indian Taxation, 11(2), 95-104.

Sury, MM, (2017). International Tax Avoidance and Evasion with Special Reference to India. VISION: Journal of Indian Taxation. 4(1), 19-39.

Swaray, S. (2023). An investigation of tax buoyancy and economic growth nexus in Sierra Leone. Studies in Economics and International Finance, 3(2), 111-130.

Tanchev, S., & Todorov, I. (2019). Tax buoyancy and economic growth: Empirical evidence of Bulgaria. Journal of Tax Reform, 5, 236-48.

Tanzi, V. (1989). The impact of macroeconomic policies on the level of taxation and the fiscal balance in developing countries. Staff Papers, 36(3), 633-656.

Tanzi, V., & Zee, H. H. (2000). Tax policy for emerging markets: Developing countries. IMF Working Paper WP/00/35.

Tanzi, V., Şen, H., & Kaya, A. (2023). Taxation and economic growth: A historical and agnostic review. Acta Oeconomica, 73(1), 19-34.

Tikhonova, A., Telegina, Z., Babanskaya, A., & Grudneva, A. (2019). Evaluation of the optimal ratio for consumption and income taxes with the use of econometric methods. Economic Annals-XXI, 177.

Timofte, C., Mates, D., Coca, D. A., & Tanasa, S. M. (2020). The Relationship between Tax Evasion and Corruption. A Cross-country Examination. 11, 173–181.

Tomić, N., Todorović, V., & Vasić, A. S. (2023). Quantifying The Effects of Brexit Via The Application Of Event Study Methodology. Teme, 267-279.

Twerefou, D. K., Fumey, A., Assibey, E. O., and Asmah, E. O. (2010). Buoyancy and elasticity of tax: evidence from Ghana, Monetary Econ, Integration, 10, 36-70.

Upender, M. (2008). Degree of Tax Buoyancy in India: An Empirical Study. International Journal of Applied Econometrics and Quantitative Studies, 5, 59-70.

Usmansyah, U., Santiago, F., & Sungkowati, S. (2022). Analysis Of Determinants Affecting Gross Domestic Product (GDP) And State Revenue and Its Implications on Tax Ratio. Proceedings of the 2nd International Conference on Law, Social Science, Economics, and Education, ICLSSEE 2022, 16 April 2022, Semarang, Indonesia.

Venkataraman, S., & Urmi, A. (2017). Development Expenditure, Fiscal Consolidation and Public Revenue in India. International Journal of Accounting and Economic Studies, 5(1), 16-18.

Vikramjit, Singh. (2018). The Advent and Elevation of Taxation Regime in India with Progressive Dimensions. Journal of emerging technologies and innovative research, 5(11), 456-463.

Vishnevsky, V. P., & Gurnak, A. (2015). Taxation, evolutionary economics and tax populations. Journal of Tax Reform, 1(1), 113–132.

Voskresenskaya, E., & Zernov, A. O. (2020). The Relationship between the Tax System and the Level of Corruption in Russia. Economics and Management, 26(3), 291–296.

Wagner, R. E. (2006). Choice, catallaxy, and just taxation: contrasting architectonics for fiscal theorizing. Social Philosophy and Policy, 23(2), 235-254.

Wang, F., Xu, S., Sun, J., & Cullinan, C. P. (2020). Corporate tax avoidance: A literature review and research agenda. Journal of Economic Surveys, 34(4), 793-811.

Wang, X., Wei, Y., Wang, L., & Wang, S. (2024). An extended event study methodology and its application in the HNA group's overseas market contraction. Journal of Asian Economics, 94, 101783.

Waters, T., & Wernham, T. (2022). Reforms, roll-outs and freezes in the tax and benefit system (No. R218). IFS Report.

Weber, B. A., & Buchanan, S. C. (1980). The impact of population growth on residential property taxes. Western Journal of Agricultural Economics, 5(2), 177–184.

Wiersma Strauss, A. (2021). Untangling public values: Incorporating regime values to advance research and practice. Perspectives on Public Management and Governance, 4(4), 379–393.

Wisdom Takumah & Bernard Njindan Iyke, 2017. "The links between economic growth and tax revenue in Ghana: an empirical investigation," International Journal of Sustainable Economy, Inderscience Enterprises Ltd, vol. 9(1), pages 34-55.

Wolswijk, G. (2009). The Short-run and Long-run tax revenue responses to changes in tax bases. Economics Bulletin, 29, 1960-1970.

World Bank. (2021). India’s Tax System: Challenges and Opportunities. World Bank Group.

Wudil, A. A., & Tsauni, A. M. (2024). The Long-Run and Causal Analysis of Economic Growth, Financial Development, and Trade Openness on CO2 Emissions in Nigeria. ResearchGate.

Yousuf, M., & Huq, S. M. (2013). Elasticity and Buoyancy of Major Tax Categories: Evidence from Bangladesh and Its Policy Implications. Research Study Series No. FDRS, 3, 2013.

Zucman, G. (2019). The Hidden Wealth of Nations: The Scourge of Tax Havens. University of Chicago Press.

APPENDIX

State-wise collection of Direct Taxes

States/UT	FY 2017-18	FY 2018-19	FY 2019-20	FY 2020-21	FY 2021-22	FY 2022-23
Andhra Pradesh	42,946.61	46,222.64	42,730.45	40,314.07	56,663.27	57,324.09
Arunachal Pradesh	189.38	250.57	241.48	182.06	233.34	293.90
Assam	5,390.84	6,262.81	4,723.02	4,550.89	5,688.45	8,111.38
Bihar	6,893.48	6,239.41	5,723.48	5,381.96	7,396.60	6,845.32
Jharkhand	5,643.46	6,933.63	6,637.17	5,581.39	7,031.06	9,213.47
Goa	2,465.80	2,459.22	2,170.29	2,655.27	2,879.41	3,379.19
Gujarat	44,722.33	49,021.50	49,517.69	46,863.55	71,642.27	85,018.91
Haryana	25,380.18	29,881.15	27,824.12	24,492.81	37,729.33	45,649.85
Himachal Pradesh	2,512.00	2,419.92	2,482.26	2,322.74	3,072.86	3,537.79
Jammu Kashmir	1,528.65	1,563.42	-	-	-	-
Karnataka	98,468.57	1,19,796.08	1,08,973.15	1,16,254.58	1,68,678.09	2,08,168.88
Kerala	16,427.32	17,021.10	15,164.10	14,515.59	19,562.02	23,983.26
Madhya Pradesh	17,585.97	19,696.93	18,698.24	13,283.23	18,137.83	19,484.78
Chhattisgarh	4,998.11	5,272.04	5,008.88	4,451.08	7,782.70	8,747.52
Maharashtra	3,77,855.07	4,25,389.70	3,84,258.21	3,31,969.03	5,24,497.65	6,05,268.35
Manipur	149.28	171.95	139.11	417.65	310.50	383.13
Meghalaya	807.67	1,125.20	1,101.54	999.73	1,063.86	1,608.82
Mizoram	72.56	59.57	42.28	44.07	90.14	105.36
Nagaland	135.40	121.21	134.77	176.91	292.70	295.44
Delhi	1,41,907.21	1,66,404.99	1,49,613.12	1,20,120.94	1,77,824.22	2,21,522.20
Odisha	10,585.92	13,420.44	13,581.03	10,257.99	15,587.24	19,590.40
Punjab	11,542.30	11,820.10	11,703.85	10,491.10	15,981.11	17,271.44
Rajasthan	19,519.47	21,059.38	16,507.93	17,539.35	25,215.64	30,609.56
Sikkim	224.25	479.67	400.26	291.82	384.10	365.17
Tamil Nadu	67,439.84	74,238.70	69,809.31	61,122.33	88,438.33	1,07,063.82
Tripura	314.70	312.49	292.02	488.73	424.19	481.39
Uttar Pradesh	26,114.78	27,687.93	26,990.00	26,735.17	34,719.83	37,983.05

Uttarakhand	3,041.81	3,265.19	3,406.16	3,088.27	4,208.44	4,632.19
West Bengal	40,073.96	44,638.58	40,628.71	40,310.24	53,774.61	55,560.62
Telangana	6,676.66	10,860.20	14,045.81	15,853.93	27,184.95	35,433.56
State Sub-total	**9,81,613.58**	**11,14,095.72**	**10,22,548.46**	**9,20,756.48**	**13,76,494.77**	**16,17,932.86**
Andaman Nicobar	102.92	115.50	116.17	67.88	88.86	96.18
Chandigarh	2,621.46	2,730.66	2,668.12	1,868.01	3,574.08	3,939.81
Daman and Diu	214.92	270.93	264.40	548.34	985.00	344.18
Dadar N. Haveli	212.06	256.65	269.65			669.78
Puducherry	731.31	800.02	805.41	611.86	991.78	1,268.68
Ladakh	-	-	-	0.02	-0.06	0.01
Lakshadweep	19.75	19.44	20.36	20.77	28.79	33.52
Jammu Kashmir	-	-	1,318.29	1,036.83	1,778.40	2,036.10
UT Sub-total	3,902.42	4,193.20	5,462.40	4,153.71	7,446.85	8,388.26
C.T.D.S.	17,222.41	19,429.56	22,669.70	22,266.20	28,480.83	37,365.35
Grand Total	**10,02,738.40**	**11,37,718.48**	**10,50,680.56**	**9,47,176.37**	**14,12,422.45**	**16,63,686.47**

Source: Central Board of Direct Tax

Year-wise Efficiency Results using Data Envelopment Analysis (DEA)

Year 2001

Technical Efficiency: 0.512

Variable	Original Value	Radial Movement	Slack	Projected Value
Output (Tax Collection)	68305	0	0	68305
Input (GDP)	23558.5	-11489	0	12069.6
Input (Employment Rate)	92.043	-44.887	-41.543	5.613

Peer	Lambda Weight
2019	0.060

Source: Author's Calculations

Year 2002

Technical Efficiency: 0.482

Variable	Original Value	Radial Movement	Slack	Projected Value
Output (Tax Collection)	69198	0	0	69198
Input (GDP)	25363.3	-13136	0	12227.4
Input (Employment Rate)	91.898	-47.595	-38.617	5.686

Peer	Lambda Weight
2019	0.061

Source: Author's Calculations

Year 2003

Technical Efficiency: 0.517

Variable	Original Value	Radial Movement	Slack	Projected Value
Output (Tax Collection)	83088	0	0	83088

Input (GDP)	28415	-13733	0	14681.7
Input (Employment Rate)	91.64	-44.291	-40.522	6.828

Peer	Lambda Weight
2019	0.073

Source: Author's Calculations

Year 2004

Technical Efficiency: 0.573

Variable	Original Value	Radial Movement	Slack	Projected Value
Output (Tax Collection)	105088	0	0	105088
Input (GDP)	32422.1	-13853	0	18569.2
Input (Employment Rate)	91.469	-39.082	-43.752	8.635

Peer	Lambda Weight
2019	0.092

Source: Author's Calculations

Year 2005

Technical Efficiency: 0.635

Variable	Original Value	Radial Movement	Slack	Projected Value
Output (Tax Collection)	132771	0	0	132771
Input (GDP)	36933.7	-13473	0	23460.8
Input (Employment Rate)	91.3	-33.305	-47.085	10.91

Peer	Lambda Weight
2019	0.117

Source: Author's Calculations

Year 2006

Technical Efficiency: 0.68

Variable	Original Value	Radial Movement	Slack	Projected Value
Output (Tax Collection)	165216	0	0	165216
Input (GDP)	42947.1	-13753	0	29193.8
Input (Employment Rate)	91.375	-29.262	-48.537	13.576

Peer	Lambda Weight
2019	0.145

Source: Author's Calculations

Year 2007

Technical Efficiency: 0.816

Variable	Original Value	Radial Movement	Slack	Projected Value
Output (Tax Collection)	230181	0	0	230181
Input (GDP)	49870.9	-9197.7	0	40673.2
Input (Employment Rate)	91.464	-16.869	-55.681	18.915

Peer	Lambda Weight
2019	0.202

Source: Author's Calculations

Year 2008

Technical Efficiency: 0.987

Variable	Original Value	Radial Movement	Slack	Projected Value
Output (Tax Collection)	314330	0	0	314330
Input (GDP)	56300.6	-758.18	0	55542.4

Input (Employment Rate)	91.646	-1.234	-64.582	25.83

Peer	Lambda Weight
2019	0.276

Source: Author's Calculations

Year 2009

Technical Efficiency: 0.911

Variable	Original Value	Radial Movement	Slack	Projected Value
Output (Tax Collection)	333818	0	0	333818
Input (GDP)	64778.3	-5792.3	0	58986
Input (Employment Rate)	91.616	-8.192	-55.993	27.431

Peer	Lambda Weight
2019	0.293

Source: Author's Calculations

Year 2010

Technical Efficiency: 0.858

Variable	Original Value	Radial Movement	Slack	Projected Value
Output (Tax Collection)	378063	0	0	378063
Input (GDP)	77841.2	-11037	0	66804.1
Input (Employment Rate)	91.681	-12.999	-47.615	31.067

Peer	Lambda Weight
2019	0.332

Source: Author's Calculations

Year 2011

Technical Efficiency: 0.902

Variable	Original Value	Radial Movement	Slack	Projected Value
Output (Tax Collection)	445995	0	0	445995
Input (GDP)	87363.3	-8555.5	0	78807.8
Input (Employment Rate)	91.832	-8.993	-46.19	36.649

Peer	Lambda Weight
2019	0.392

Source: Author's Calculations

Year 2012

Technical Efficiency: 0.878

Variable	Original Value	Radial Movement	Slack	Projected Value
Output (Tax Collection)	493987	0	0	493987
Input (GDP)	99440.1	-12152	0	87288
Input (Employment Rate)	91.905	-11.231	-40.081	40.593

Peer	Lambda Weight
2019	0.434

Source: Author's Calculations

Year 2013

Technical Efficiency: 0.879

Variable	Original Value	Radial Movement	Slack	Projected Value
Output (Tax Collection)	558989	0	0	558989
Input (GDP)	112335	-13561	0	98773.9
Input (Employment Rate)	91.963	-11.102	-34.927	45.934

Peer	Lambda Weight
2019	0.491

Source: Author's Calculations

Year 2014

Technical Efficiency: 0.905

Variable	Original Value	Radial Movement	Slack	Projected Value
Output (Tax Collection)	638596	0	0	638596
Input (GDP)	124680	-11839	0	112841
Input (Employment Rate)	92.019	-8.738	-30.806	52.476

Peer	Lambda Weight
2019	0.561

Source: Author's Calculations

Year 2015

Technical Efficiency: 0.893

Variable	Original Value	Radial Movement	Slack	Projected Value
Output (Tax Collection)	695792	0	0	695792
Input (GDP)	137719	-14772	0	122947
Input (Employment Rate)	92.085	-9.877	-25.033	57.175

Peer	Lambda Weight
2019	0.612

Source: Author's Calculations

Year 2016

Technical Efficiency: 0.852

Variable	Original Value	Radial Movement	Slack	Projected Value
Output (Tax Collection)	741945	0	0	741945
Input (GDP)	153917	-22814	0	131102
Input (Employment Rate)	92.158	-13.66	-17.53	60.968

Peer	Lambda Weight
2019	0.652

Source: Author's Calculations

Year 2017

Technical Efficiency: 0.879

Variable	Original Value	Radial Movement	Slack	Projected Value
Output (Tax Collection)	849713	0	0	849713
Input (GDP)	170900	-20755	0	150145
Input (Employment Rate)	92.267	-11.206	-11.238	69.824

Peer	Lambda Weight
2019	0.747

Source: Author's Calculations

Year 2018

Technical Efficiency: 0.938

Variable	Original Value	Radial Movement	Slack	Projected Value
Output (Tax Collection)	1002738	0	0	1002738
Input (GDP)	188997	-11812	0	177185
Input (Employment Rate)	92.35	-5.772	-4.18	82.398

Peer	Lambda Weight
2019	0.881

Source: Author's Calculations

Year 2019

Technical Efficiency: 1.000

Variable	Original Value	Radial Movement	Slack	Projected Value
Output (Tax Collection)	1137718	0	0	1137718
Input (GDP)	201036	0	0	201036
Input (Employment Rate)	93.49	0	0	93.49

Peer	Lambda Weight
2019	1

Source: Author's Calculations

Year 2020

Technical Efficiency: 0.944

Variable	Original Value	Radial Movement	Slack	Projected Value
Output (Tax Collection)	1050681	0	0	1050681
Input (GDP)	198299	-11121	0	187178
Input (Employment Rate)	89.805	-5.036	0	84.769

Peer	Lambda Weight
2019	0.84
2022	0.067

Source: Author's Calculations

Year 2021

Technical Efficiency: 0.749

Variable	Original Value	Radial Movement	Slack	Projected Value
Output (Tax Collection)	947176	0	0	947176
Input (GDP)	234710	-58900	0	175810
Input (Employment Rate)	92.287	-23.159	0	69.128

Peer	Lambda Weight
2019	0.371
2022	0.372

Source: Author's Calculations

Year 2022

Technical Efficiency: 1.000

Variable	Original Value	Radial Movement	Slack	Projected Value
Output (Tax Collection)	1412422	0	0	1412422
Input (GDP)	272267	0	0	272267
Input (Employment Rate)	92.67	0	0	92.67

Peer	Lambda Weight
2022	1

Source: Author's Calculations