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An Analysis Of Tax Buoyancy And Its Determinants In India During Post Liberalization Period

Dr. Santosh Singh

Assistant Professor of Economics

Siddharth University, Kapilvastu, Siddharth Nagar, Uttar Pradesh (India)- 272202

Abstract: Tax Buoyancy is an indicator of the efficiency of a country's tax system. The primary determinant of tax buoyancy is Gross Domestic Product (GDP) but it is also impacted by Inflationary trends, tax compliance rate and tax reforms. This paper is an attempt to analyze the importance and relative impacts of GDP, inflation (CPI), tax compliance rate and tax reforms on total tax revenue and tax buoyancy in India during the post liberalization period from 1991 to 2024 with an objective to provide some policy implications that can help to ensure better sustainability and improved health of India's fiscal economy.

Key Words: Tax Buoyancy, Sustainability, Fiscal Economy, GDP, CPI, Tax Compliance Rate, Tax Reforms.

Introduction:

Tax Buoyancy represents the relationship between tax revenue and changes in the national income. It measures the elasticity of tax revenue with respect to the national income.

Mathematically, $Tax\ Buyancy = \frac{\%\ change\ in\ tax\ revenue}{\%\ \text{change in the GDP}}$

As the Tax Buoyancy is an indicator of the efficiency of a country's tax system, in Indian context, having a complex tax structure, it is important to understand the tax buoyancy and the relative impact of its determinants so as to ensure better fiscal policy outcomes.

India's tax system has witnessed significant transitions over the years including extensive tax reforms like implementation of Goods and Services Tax (GST) in 2017, faceless tax assessment in 2020, etc. with an objective to strengthen the efficiency of tax system.

The primary determinant of tax buoyancy is Gross Domestic Product (GDP) as an increase in income evidently increases the tax collections. Moreover, Inflation in the economy also plays a vital role in determining tax buoyancy as it changes the consumption patterns. Further, Tax Compliance Rate is equally significant in determining tax buoyancy. Because higher tax compliance rate ensures higher tax collections. Additionally, tax reforms, have also contributed in shaping the India's tax system over the time.

This study represents the basic tax buoyancy trends in India since 199

1 and aims to analyze the major determinants of tax buoyancy by examining the relative impacts of GDP, inflation, tax compliance, and tax reforms using econometric techniques.

The findings are expected to enable us to understand the responsiveness of tax revenue with respect to the National Income, Inflation, Tax Compliance and Tax Reforms in India.

Review of Literature:

Arya, N.K. (2022) examined the relationship between Gross Tax Revenue (GTR) and Gross Domestic Product (GDP) in India for the time period from 1950-51 to 2021-22 and elaborated the outcomes for pre and post-liberalization. He identified that the India's tax system performed relatively at a low pace as compared to the international standards and have been noticed performing poorly in revenue mobilizing. **Krushna, A.V. (2015)** analyzed the tax buoyancy from 1950 to 2010 using log-linear regression analysis. He divided the study period in five decades and the highest tax buoyancy is identified in 1960s and 1970s but overall trend represented a continuous decline in the tax buoyancy. **Vedicar P.I. and Rami D.R.** studied the tax buoyancy in India and across states and traced out that the tax productivity across states has been higher than central level during 1990-91 to 2015-16. He identified the compliance gap as a hurdle for central government. **Ashish (2024)** inquired in to the tax buoyancy for different Indian states from 2011-12 - 2022-23. He studied the impact of VAT, GST and other policies and analyzed that how the buoyancy impacts the discretionary policy formations by states. **Chakraborty, L and Thomas, E (2024)** studied the tax buoyancy in mining and natural resources across Indian states from 1991-92 to 2022-23. He found extractive taxes as a buoyant source of revenue and traced out the variations in this buoyancy at state-level. **Kohli, R (2023)** studied the pandemic-related effects, inflation effects, discretionary tax policy effects on tax buoyancy and suggested the requirement of clearer measure of tax buoyancy in India. **Audi, M, Amjad, A and Roussel, Y (2021)** examined the tax buoyancy in South Asian Association for Regional Cooperation (SAARC) countries from 1990 to 2019. Using pooled regression analysis the paper represented the buoyancy coefficient for sales tax, customs duty excise duty income tax and total tax revenue. **IMF (2020)** analyzed tax buoyancy across 185 countries and traced out that developed economies possess stable tax buoyancy, while developing economies face volatility.

Research Gap:

First, despite extensive research on tax buoyancy in India an evident research gap is that very none of these studies have analyzed the combined impact of GDP, Inflation, Compliance and Tax Reforms on tax buoyancy in India. Second, the present study will provide a long term combined impact assessment of the aforementioned determinants of the tax buoyancy which has not been done yet. This study aims to bridge these gaps by conducting a comprehensive econometric analysis of the determinants of tax buoyancy in India.

Objectives:

Following are the objectives of this paper-

1. Impact evaluation of GDP on tax buoyancy in India.
2. To enquire into the effects of Inflation on the tax buoyancy in India.
3. To access the role of tax reforms on tax buoyancy in India.
4. To examine the role of tax compliance in determining the tax buoyancy in India.

Hypotheses:

To analyze the above objectives of this study following relationships have been hypothesized:

- There is a positive association between GDP growth and tax revenue.
- There is a positive association between Inflation and tax buoyancy in India.
- Tax reforms over the period of time have significantly impacted the tax buoyancy in India.
- Higher Tax Complaisance Rate and tax buoyancy are positively associated.

Methodology:

For the purpose of analysis of the objectives of the study and to test our hypothesis the secondary data on the Tax Revenue, GDP, Inflation (CPI), Tax Reforms and Tax Compliance Rate have been used in this paper for the period of 1991 to 2024.

To estimate the tax buoyancy and analyze its trends and patterns during the period of study, formula used is-

$$Tax\ Buyancy = \frac{\%\ change\ in\ tax\ revenue}{\%\ \text{change in the GDP}}$$

The econometric approach involves regression analysis, with tax revenue as the dependent variable and GDP, inflation, tax reforms, and compliance rates as independent variables.

A log-log model is used to estimate the elasticity of tax revenue with respect to GDP. And a dummy variable model is used to assess the impact of tax reforms over the years of study. The regression equation is as follows:

$$Log\ (Tax\ Revenue) = \beta_0 + \beta_1 Log\ (GDP) + \beta_2\ Inflation\ (CPI) + \beta_3\ Tax\ Compliance\ Rate + \beta_4\ Tax\ Reforms\ (Dummy\ Variable\ Model) + \in$$

Analysis: Trends and Patterns of Tax Buoyancy in India

Tax Buoyancy in India for the years from 1991-92 to 2023-24 is estimated in the Table- 1 and diagrammatically represented in the Figure- 1 below.

A tax buoyancy greater than one represents the strong responsiveness of tax revenue with respect to the national income and denotes fair tax policy and compliance structure of the country whereas, the tax buoyancy less than one represents the weak responsiveness of the tax revenue with respect to the national income and suggests to improve compliance ratio along with policy reforms.

TABLE- 1
ESTIMATION OF TAX BUOYANCY OVER THE YEARS

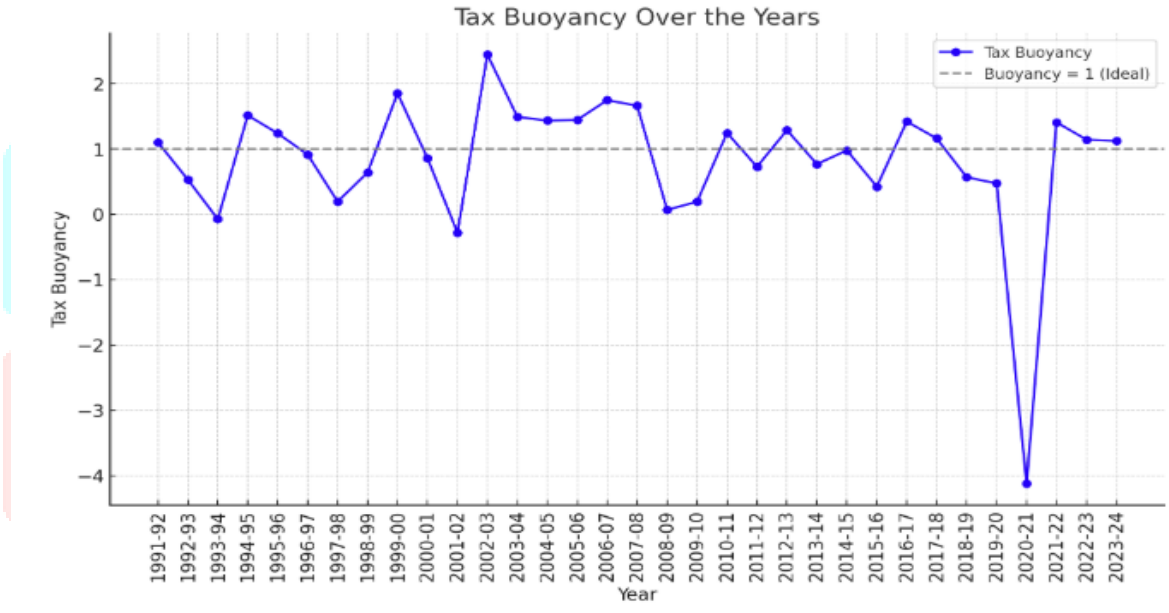
Year	Total Tax Revenue (Net)	GDP (₹ crore)	Tax Buoyancy
1990-91	42978	5,76,109	-
1991-92	50069	6,62,260	1.10333
1992-93	54044	7,61,196	0.53143
1993-94	53449	8,75,992	-0.073
1994-95	67454	10,27,570	1.51429
1995-96	81939	12,05,583	1.23957
1996-97	93701	13,94,816	0.91452
1997-98	95672	15,45,294	0.19498
1998-99	104652	17,72,297	0.63896
1999-00	128271	19,88,262	1.85211
2000-01	136658	21,39,886	0.8574
2001-02	133532	23,15,243	-0.2791
2002-03	158544	24,92,614	2.44499
2003-04	186982	27,92,530	1.49075
2004-05	224798	31,86,332	1.43415
2005-06	270264	36,32,125	1.44561
2006-07	351182	42,54,629	1.74693
2007-08	439547	48,98,662	1.66227
2008-09	443319	55,14,152	0.0683
2009-10	456536	63,66,407	0.1929
2010-11	569868	76,34,472	1.24632
2011-12	629764	87,36,329	0.72825
2012-13	741877	99,44,013	1.28782

2013-14	815854	1,12,33,522	0.76896
2014-15	903615	1,24,67,959	0.9789
2015-16	943765	1,37,71,874	0.42486
2016-17	1101372	1,53,91,669	1.41986
2017-18	1242488	1,70,90,042	1.16117
2018-19	1317211	1,88,99,668	0.56796
2019-20	1356902	2,01,03,593	0.47303
2020-21	1426287	1,98,54,096	-4.1203
2021-22	1804793	2,35,97,399	1.40754
2022-23	2097786	2,69,49,646	1.14277
2023-24	2323918	2,95,35,667	1.12337

Source:

- Economic Survey (different years), Govt. of India.
- Tax buoyancy is estimated on the basis of the formulae given in the methodology part.

Figure- 1
TAX BUOYANCY OVER THE YEARS



Based on the estimated values of the Tax Buoyancy in India over the years, the whole period of study is classified in to two categories-

1. **Years of High Tax Buoyancy (Above 1)**

   In the years of **1994-95 to 1996-97**, **2002-03 to 2007-08** and **2021-22 to 2023-24** the tax buoyancy is significantly higher than one which represents strongly implemented tax policies along with the high tax compliance rate.

2. **Years of Low or Negative Tax Buoyancy (Below 1):**

   In the years of **1993-94**, **2001-02**, **2008-09** to **2010-11** and in the year **2020-21** the tax buoyancy is significantly lower than one which represents the weak implementation of tax policies along with the low tax compliance rate.

It is noticeable here that in 2020-21 the tax buoyancy is estimated -4.12. It is due to the COVID- 19 pandemic.

The dataset provided in the Table- 2 represents the total tax revenue, GDP, inflationary trends (CPI), tax compliance rate and major tax reforms in India over the years from 1991-92 to 2023-24. An attempt to analyze the trends, relationships and implications of these parameters on tax buoyancy in India is done in the further analysis.

Table- 2
TOTAL TAX REVENUE, GDP, INFLATION (CPI), TAX COMPLIANCE RATE AND MAJOR TAX REFORMS IN INDIA

Year	Total Tax Revenue (Net) (₹ crore)	GDP (₹ crore)	CPI-AL (%)	Tax Compliance Rate (%)	Tax Reform
1990-91	36075	5,76,109	-	-	No Reforms
1991-92	39966	6,62,260	19.3	15-20	Introduction of Modified VAT
1992-93	41969	7,61,196	12.4	18-22%	Service Tax Introduced
1993-94	40927	8,75,992	3.5	18-22	Direct Tax Laws Amendments
1994-95	49045	10,27,570	11.9	18-22	No Reforms
1995-96	59652	12,05,583	10.7	20-23	No Reforms
1996-97	68326	13,94,816	9.1	22-25	Rationalization of Tax Rates
1997-98	68500	15,45,294	3.4	22-25	No Reforms
1998-99	72532	17,72,297	11	23-26	No Reforms
1999-00	86836	19,88,262	4.4	25-30	Introduction of Fringe Benefit Tax (FBT)
2000-01	87007	21,39,886	-0.3	25-30	No Reforms
2001-02	85828	23,15,243	1.1	30-33	No Reforms
2002-03	96932	24,92,614	3.2	30-35	Direct Taxes Code (DTC) Draft
2003-04	110392	27,92,530	3.9	33-37	No Reforms
2004-05	128854	31,86,332	2.6	35-40	Central Sales Tax (CST) Reduction
2005-06	149572	36,32,125	3.9	35-40	Introduction of Service Tax (Expansion)
2006-07	181444	42,54,629	7.8	38-42	No Reforms
2007-08	207972	48,98,662	7.5	40-45	Introduction of Central Excise Duty on Services
2008-09	195169	55,14,152	10.2	42-45	No Reforms
2009-10	184913	63,66,407	13.9	45-50	Introduction of Goods and Services Tax (GST) Concept
2010-11	256367	76,34,472	10	50-55	Launch of GST Council Framework
2011-12	286454	87,36,329	8.2	50-55	Introduction of Direct Tax Code (DTC) Bill
2012-13	345292	99,44,013	10	52-57	GAAR (General Anti Avoidance Rule) Introduced
2013-14	360025	1,12,33,522	11.6	55-60	Goods and Services Tax (GST) Bill Passed in Lok Sabha
2014-15	403085	1,24,67,959	6.6	55-60	Goods and Services Tax Network (GSTN) Formed
2015-16	494469	1,37,71,874	4.4	60-65	Introduction of 7th Pay Commission Recommendations

2016-17	580085	1,53,91,669	4.2	60-65	GST Implementation
2017-18	636272	1,70,90,042	2.2	65-70	Introduction of E-way Bill System
2018-19	593719	1,88,99,668	2.1	70-75	Corporate Tax Rate Cut
2019-20	718537	2,01,03,593	8	75-80	Introduction of Faceless Income Tax Assessments
2020-21	843077	1,98,54,096	5.5	80-85	TDS Provisions for E-commerce
2021-22	939407	2,35,97,399	4	85-90	Amendment to Income Tax Act (Tax Benefits)
2022-23	1045666	2,69,49,646	6.8	90	Taxation of Virtual Digital Assets (VDA)
2023-24	1091934	2,95,35,667	7.1	90-95	Reforms to Reduce Compliance Burden

Source:

- Economic Survey (different years), Govt. of India.
- The tax compliance rate is generally not published in the official reports in the form of a time series data. The data used here for the purpose of analysis is obtained from various official websites of Finance Ministry of India, Central Board of Direct Taxes (CBDT), Central Board of Indirect Taxes and Customs (CBIC), and reports from organizations like the World Bank and OECD, etc.

The scrutiny of the Table- 2 reveals the fact that GDP and tax revenue both are continuously growing almost on the same pace followed by the inflationary trends represented here as CPI- AL. It is noticiable here that moderat inflationary trends can increase the tax collections but excessive inflation negatively affects the tax collection be eroding purchasing power. Moreover the increasing tax compliance trends are also evident by the data which are more likely because of the tax digitization, GST implementation, and faceless tax assessment systems like tax reforms done over the years. As the growth of tax revenue is closely associated to the GDP expansion, inflation control, compliance measures and tax reforms all these parameters are crucial in maintaining sustainable tax buoyancy in India. To further authenticate this observation of the crucial role of these parameters in maintaining the sustainability of tax buoyancy in India and to analyze their relative impacts, the following multiple regression model is used-

$$Log\ (Tax\ Revenue) = \beta_0 + \beta_1 Log\ (GDP) + \beta_2\ Inflation\ (CPI) + \beta_3\ Tax\ Compliance\ Rate + \beta_4\ Tax\ Reforms\ (Dummy\ Variable\ Model) + \in$$

The findings of the regression analysis are given in the Table-3.

TABLE- 3
RESULTS OF REGRESSION ANALYSIS

OLS Regression Results

Dep. Variable:	Log_Tax_Revenue	R-squared:	0.996
Model:	OLS	Adj. R-squared:	0.996
Method:	Least Squares	F-statistic:	1826.
Date:	Wed, 19 Feb 2025	Prob (F-statistic):	2.10e-33
Time:	08:47:58	Log-Likelihood:	39.310
No. Observations:	33	AIC:	-68.62
Df Residuals:	28	BIC:	-61.14
Df Model:	4		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	-3.2273	0.242	-13.319	0.000	-3.724	-2.731
Log_GDP	1.0330	0.014	74.200	0.000	1.005	1.062
CPI-AL (%)	0.0106	0.004	2.707	0.011	0.003	0.019
Tax_Reform_Dummy	0.0370	0.036	1.034	0.310	-0.036	0.110
Tax_Compliance_Rate	-0.0155	0.054	-0.287	0.776	-0.126	0.095

Omnibus:	3.182	Durbin-Watson:	1.235
Prob(Omnibus):	0.204	Jarque-Bera (JB):	1.842
Skew:	0.430	Prob(JB):	0.398
Kurtosis:	3.775	Cond. No.	300.

Source: estimated on the basis of the data given in the Table- 2

The model explains 99.6% of the variation in tax revenue (R-squared = 0.996). Significant variables ($p < 0.05$) are GDP (has a positive effect with estimated coefficient of 1.033) and CPI-AL (has a small positive effect with estimated coefficient of 0.0106). Whereas Tax Reform Dummy ($p = 0.310$) and Tax Compliance Rate ($p = 0.776$) are Non-significant variables.

The intercept represents the total tax collections when all other independent variables are zero. The estimated value of the intercept here is -3.2273 which cannot directly be interpreted but it serves as a baseline for the model. With a coefficient of 1.033 and $p < 0.001$ the GDP has been reflected as the strongest driver of the tax revenue over the years. Which proves our hypothesis of strong positive relationship between tax revenue and national income to be true.

In context to the impact of inflationary trends on tax revenue the coefficient (0.0106) and p value (0.011) with respect to the CPI-AL proves our hypothesis of positive association between inflation and tax revenue to be true as it is showing small but positive affect.

In context to the Tax Compliance Rate the coefficient is -0.0155 with a p value of 0.776 which suggests that there is an inverse relationship between tax compliance rate and total tax revenue but this observation lacks in significance.

Moreover the impact of tax reforms on total tax revenue over the period of time have also not been statistically significant ($p = 0.310$). While the coefficient suggests that tax reforms might increase tax revenue by 3.7%, the lack of significance means we cannot confidently attribute this effect to tax reforms. It is most likely because of the fact that the results of reforms cannot be seen immediate after their implementation and there is some time lag between implementation of tax reforms and their impacts to be evident on the tax collections.

Conclusions and Implications:

Based on the above observations of the tax buoyancy and its determinants following are the major findings of the study:

- The data from 1991 to 2024 on different determinants of tax revenue provides a comprehensive overview of the tax buoyancy in India.
- The regression analysis makes it clear that GDP is the primary determinant of the tax revenue in India.
- GDP is the strongest determinant of the total tax revenue with nearly proportional association.
- Inflationary trends (measured with the parameter CPI) has a small but significant positive impact on total tax collections over the years.
- Tax compliance rates and tax reforms haven't shown a significant effect on the total tax revenue which indicates that either their impact is minimal or not traced out with the available data.

The policy implications derived from the analysis are as under:

- Since GDP has been proved to be the strongest determinant of the tax revenue the policies should be focused on sustaining high economic growth.
- Although inflation have a small positive impact on tax revenue, excessive inflation can result in to eradication of purchasing power of the economy. Hence it is essential to control inflation with suitable monetary and fiscal measures so as to ensure high economic fluctuations.
- However the regression analysis shows that the tax compliance rate doesn't have a significant impact on the total tax revenue, it is important to notice that the tax revenue has continuously increased in the same pace as that of tax compliance rate. Hence it is suggested to always maintain the high tax compliance rate through suitable policy measures.
- The insignificant impact of tax reforms on tax revenue represents the time lag in the implementation of the tax reform measures and its final impact to be evident on the total tax collections. It does not directly mean that there is no role of tax reforms in total tax revenue. Hence time to time refinement in the tax system is also suggested.

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