Impact of the FRBM Act on Tax Elasticity and Buoyancy in India: An Econometric Analysis

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Abstract

The analysis of tax elasticity and buoyancy in India's tax system during different periods reveals important dynamics and responsiveness. The post-FRBM Act and post-NEP periods experienced a decline in tax buoyancy, emphasizing the need for policies that stimulate economic growth, broaden the tax base, and address issues of tax evasion and compliance. Tax elasticity increased in the post-FRBM Act period, highlighting the significance of aligning tax rates and structures with economic conditions and regularly evaluating tax policies for their effectiveness. The analysis also showed that direct taxes had higher buoyancy and elasticity compared to indirect taxes, suggesting the importance of a balanced approach to maximize revenue generation and ensure fairness. Personal income tax exhibited reduced dynamism and increased elasticity, emphasizing the need for simplified compliance, decreased tax evasion, and progressive reforms for equitable distribution. Corporate tax demonstrated increased dynamism but inelasticity, calling for a review of tax rates and incentives to attract investment and support economic growth while maintaining competitiveness. The decline in buoyancy and elasticity of custom duty and excise duty in the post-FRBM Act period highlights the need for reforms in these areas, including streamlined tariff structures and reduced trade barriers, in line with economic goals and international trade agreements. To maintain a dynamic and elastic tax system, policymakers should implement regular review and monitoring mechanisms.

Key Words: FRBM Act, Tax, Elasticity, Buoyancy.

JEL: H2, H3, H6, C1

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Introduction

Tax elasticity measures the responsiveness of tax revenue to changes in the tax base or tax rates. It shows how sensitive tax revenue is to changes in economic conditions. There are two types of tax elasticity namely Price Elasticity of Tax Revenue and Income Elasticity of Tax Revenue. Price Elasticity of Tax Revenue measures the responsiveness of tax revenue to changes in tax rates. If tax revenue increases proportionally more than the tax rate, it indicates a high price elasticity, implying that the tax is elastic and responsive to changes in rates. Income Elasticity of Tax Revenue measures the responsiveness of tax revenue to changes in income levels. If tax revenue increases proportionally more than income, it indicates a high income elasticity, implying that the tax is elastic and responsive to changes in income. Tax buoyancy measures the ability of a tax system to generate additional revenue in response to changes in economic conditions, such as economic growth or inflation. A tax system is considered buoyant if it automatically generates increased revenue when the tax base expands due to economic growth or inflation. A buoyant tax system ensures that tax revenue keeps pace with economic expansion, maintaining the stability of the tax-to-GDP ratio. Tax buoyancy can exhibit variation in both the short-term and long-term perspectives. In the short run, buoyancy is closely tied to the stabilization function of fiscal policy. If tax revenue grows at a higher rate than GDP, it indicates that the tax system effectively acts as an automatic stabilizer. Conversely, if the short-term buoyancy is less than one, tax revenue is more stable than GDP and its effectiveness as an automatic stabilizer is reduced. On the other hand, long-term buoyancy is significant for evaluating the impact of economic growth on fiscal sustainability over an extended period. A buoyancy greater than one suggests that higher economic growth will contribute to an improved fiscal balance through increased revenue. Conversely, a long-term buoyancy below one implies that economic growth negatively affects fiscal sustainability. A buoyancy of one signifies that a 1% increase in GDP would correspond to a 1% increase in tax revenue, thereby maintaining the tax-to-GDP ratio constant. A buoyancy surpassing one would result in tax revenue growing at a rate greater than that of GDP, potentially leading to a decrease in the deficit ratio (Suppannavar et al 2023; Belinga et al., 2014).

Analyzing the elasticity, buoyancy of a tax system helps policymakers understand its performance and make informed decisions. An elastic tax system can provide flexibility to adjust tax rates or tax base to generate additional revenue or respond to changing economic conditions. A buoyant tax system ensures that tax revenue grows with the economy, supporting fiscal stability. Economists focus on the degree of responsiveness of taxes to fluctuations in economic activity or policy decisions as it directly impacts the effectiveness of a well-functioning tax system. To assess this responsiveness, economists employ models to analyze how taxes react to various changes. Elasticity and buoyancy are key concepts utilized to quantify this responsiveness. Elasticity gauges the automatic reaction of tax revenue to alterations in income, excluding discretionary tax policy modifications. On the other hand, buoyancy measures the overall response of tax revenue to changes in both income and discretionary tax policy adjustments. A higher revenue productivity is associated with a robust tax system that exhibits greater responsiveness to these changes (Suppannavar, et al, 2023; Ashraf & Sarwar, 2016). The study has used the Tax Elasticity and Tax Buoyancy approach to measure the efficiency of the tax system according to pre and post FRBM act period in India.

Methodology for Elasticity and Buoyancy

The elasticity of taxes quantifies the extent to which tax revenue changes in response to variations in GDP. This measure captures the "automatic" changes in tax revenue without the need for frequent adjustments in tax rates. When the elasticity of taxes exceeds one, it suggests that tax rates do not need to be frequently manipulated as this could introduce uncertainty and distort consumption and investment decisions. By decomposing elasticity into tax-to-base elasticity and base-to-GDP elasticity, we can gain a

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deeper understanding of how the tax yield responds to changes in the tax base and how the tax base, in turn, reacts to fluctuations in GDP (Seydou, 2020; Suppannavar, et al, 2023).

$$E_{Tt}{}^{Y} = \frac{\Delta Tt}{\Delta Y} \text{ x } \frac{Y}{Tt} \qquad (1)$$

Where, T_t is Total Tax Revenue; Y is GDP; E Elasticity.

Buoyancy of taxes measures the change in tax revenue due to changes in tax rates, bases, regulations, or administration efficiency, also known as "discretionary" changes. Buoyancy measures the total change in tax revenue, not just due to changes in GDP but also due to discretionary tax changes (Seydou, 2020; Suppannavar, et al, 2023). The Buoyancy is expressed as follows:

$$B_{Tt}{}^{Y} = \frac{\Delta Tt}{\Delta Y} \text{ x } \frac{Y}{Tt} \qquad (2)$$

Where, T_t is the Total Tax Revenue; Y is the GDP; B Buoyancy.

The objective of this study is to utilize regression analysis to estimate the tax elasticity and buoyancy in India for the period from 1970 to 2022BE. Taxation plays a crucial role in achieving a balanced distribution of resources, income, and economic stability. Bonga (2009) emphasizes that an efficient tax system can contribute to the equitable distribution of economic development benefits and generate revenue for government expenditures. Evaluating tax buoyancy and elasticity is vital in assessing the effectiveness of a tax system in generating revenue, both with and without policy changes, as highlighted by Cotton (2012). Given recent changes in India's tax policies, it becomes essential to reexamine these concepts. Understanding the elasticity of different taxes allows policymakers to estimate the additional revenue that can be generated as national income increases, as noted by Mitchell and Andrews (1991).

The study relied on secondary data sourced from the Reserve Bank of India's Various Handbook of Statistics on Indian Economy. The data encompassed key variables such as GDP, total tax revenues, and various tax categories. To facilitate econometric analysis, the collected data was transformed into logarithmic form. Log transformation is a technique commonly used in econometric analysis to address the issue of heteroscedasticity. By applying a logarithmic transformation to the variables, the scale in which they are measured is compressed. As a result, a tenfold difference between two values is reduced to a twofold difference (Gujarati, 1995). This transformation helps to mitigate the problem of heteroscedasticity, which refers to the unequal variability of the error terms across different levels of the independent variables. By reducing the scale of the variables, log transformation can contribute to creating more homoscedasticity, where the error terms exhibit more equal variance across the range of independent variables. The study period covered from 1970 to 2022BE. The data has been categorized into pre (1970-71 to 2001-02) and post (2002-03 to 2021-22BE) FRBM Act periods: The Pre-FRBM Act period, which is divided into the pre NEP (1970-71 to 1990-91) period and the post NEP (1991-92 to 2001-02) Period; and the Post-FRBM Act period, which is divided into the FRBM Act implementation (2002-03 to 2007-08) period and the FRBM Act Deterioration (2008-09 to 2021-22 BE) Period. This classification allows for a comprehensive analysis of the data across different timeframes, accounting for the impact of the FRBM Act and other reforms on the tax elasticity and buoyancy in India. Therefore, the study used ordinary least square method for estimating the tax elasticity and buoyancy in India according to the pre and post FRBM Act.

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Econometrics Model for Elasticity and Buoyancy

The study employed a log regression model to assess the elasticity and buoyancy of different taxes using regression analysis.

$$Ln\ (TR) = \alpha + \beta 1.\ Ln(TB) + \epsilon \qquad (3)$$

Where, TR = Tax Revenue/Individual Taxes; TB = Tax Base; B1 = Tax Elasticity/Buoyancy; α = Constant.

Table 1.

Tax Base for Elasticity and Buoyancy of Major Taxes in India

Taxes	**Tax Base**
Tax Revenue	Current GDP at Market Price
Direct Tax	Current GDP at factor Cost
Corporate Tax	Current GDP at Market Price
Personal Income Tax	Current GDP at Market Price
Indirect Tax	Current Final Private Consumption at Market Price
Custom Duties	Current Value of Imports
Excise Duties	Current GDP at Market Price

Source: (Suppannavar et al 2023; Seydou 2020; Tanchev & Todorov 2019; Bonga et al 2015).

Skeete, Coppin, and Boamah (2003) noted that the interpretation of the coefficient (β) in the tax revenue series depends on whether discretionary tax changes are included or excluded. When discretionary tax changes are excluded, the coefficient represents the elasticity of taxes. In this case, it reflects the responsiveness of tax revenue to changes in the tax base. However, when discretionary tax changes are included, the coefficient represents the buoyancy of taxes. It indicates the total response of tax revenue to changes in both the tax base and discretionary tax policy adjustments. By considering the presence or absence of discretionary tax changes, the interpretation of the coefficient can provide insights into the underlying dynamics of the tax system and its revenue generation capacity.

Results and Discussions

FRBM Act: Tax Elasticity and Buoyancy

Table 2 Analysed the Tax Buoyancy and Elasticity of the Central Government. During the pre-FRBM Act period, the tax buoyancy was 2.49, indicating that tax revenues grew by 2.49 times for every 1% increase in GDP. The tax elasticity was 2.71, suggesting a relatively higher responsiveness of tax revenues to changes in GDP. These evidences shows that the Central Government tax system is more dynamic and elastic in this period. The negative gap between buoyancy and elasticity (-0.22) suggests a there is no impact of the discretionary change effects on tax system in India. In the post-FRBM Act period, the tax buoyancy decreased to 0.91, indicating a lower growth rate of tax revenues relative to GDP compared to the pre-FRBM Act period. The tax elasticity was 1.31, suggesting a more responsiveness of tax revenues

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to changes in GDP. These evidences show that Central Government tax system less dynamic with more elastic in post FRBM Act period. The negative gap between buoyancy and elasticity (-0.4) indicates an absence of discretionary effects i.e. FRBM Act on tax system.

During the pre-NEP (New Economic Policy) period, the tax buoyancy coefficient was 3.44, indicating that tax revenues grew by 3.44 times for every 1% increase in GDP. The tax elasticity coefficient was 3.20, suggesting a high responsiveness of tax revenues to changes in GDP. The positive gap between buoyancy and elasticity (0.24) indicates there is impact of discretionary changes on tax system of central government. In the post-NEP period, the tax buoyancy coefficient decreased to 2.12, indicating a lower growth rate of tax revenues relative to GDP compared to the pre-NEP period. The tax elasticity coefficient was 1.87, suggesting a reduced responsiveness of tax revenues to changes in GDP. The positive gap between buoyancy and elasticity coefficients (0.25) indicates a discretionary change i.e. NEP (1991) has greater impact on central government tax system. From these evidences, the central government tax system is more dynamic with more elastic in both pre and post NEP Period (Table 2).

During the FRBM Act implementation period, the tax buoyancy coefficient was -2.56, indicating a decline in tax revenues despite an increase in GDP. The tax elasticity coefficient was 2.42, suggesting that tax revenues were still responsive to changes in GDP, albeit in an inverse manner. The negative gap between buoyancy and elasticity coefficients (-4.98) indicates a there is no significant impacts of discretionary change i.e. FRBM Act on central government tax system in India. In the FRBM Act deterioration period, the tax buoyancy coefficient increased to 0.86, indicating a modest growth rate of tax revenues relative to GDP. The tax elasticity coefficient was decreased 0.98, suggesting a moderate responsiveness of tax revenues to changes in GDP. The negative gap between buoyancy and elasticity coefficients (-0.12) indicates a there is no impact of discretionary (Deterioration period and financial crises, 2008) changes on central government tax System. The central government tax system is less dynamic in both implementation and deterioration period as well as elasticity has more elastic in implementation period compare to that of deterioration period (Table 2).

Table 2.

Tax Revenue Elasticity and Buoyancy of Central Government in India

Year		Buoyancy		Elasticity		Gap
		Coef.(t-stat)	R^2	Coef.(t-stat)	R^2	
Central Government						
Pre FRMB ACT Period	1970-71 to 1990-91	3.44 (2.50)**	0.24	3.20 (28.91)***	0.97	0.24
	1991-92 to 2001-02	2.12 (1.19)	0.13	1.87 (20.78)***	0.97	0.25
	1970-71 to 2001-02	2.49 (4.30)***	0.38	2.71 (37.27)***	0.97	-0.22
Post FRBM Act Period	2002-03 to 2007-08	-2.56 (-0.75)	0.12	2.42 (41.42)***	0.99	-4.98
	2008-09 to 2021-22	0.86 (1.08)	0.08	0.98 (11.98)***	0.92	-0.12
	2002-03 to 2021-22	0.91 (1.79)*	0.15	1.31 (15.28)***	0.92	-0.4
Overall	1970-71 to 2021-22	2.00 (9.57)***	0.64	2.06 (35.84)***	0.96	-0.06

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Note: (*) Significant at 10%; (**) Significant at 5%; (***) Significant at 1%

FRBM Act: Direct and Indirect Tax Elasticity and Buoyancy

Data provided in Table 3 that explains the Direct Tax Buoyancy and Elasticity of the Central Government. During the pre-FRBM Act period, the buoyancy coefficient for direct taxes was 1.13, indicating that direct tax revenues grew by 1.13 times for every 1% increase in GDP. The elasticity coefficient was 1.09, suggesting a direct tax revenues grew by 1.09 times for every 1% increase in GDP. The positive gap between buoyancy and elasticity coefficients (0.04) indicates a there is an impact of discretionary change in economy on direct tax system of central government. In the post-FRBM Act period, the buoyancy coefficient decreased to 0.87, indicating a lower growth rate of direct tax revenues relative to GDP compared to the pre-FRBM Act period. The elasticity coefficient was 0.97, suggesting a reduced responsiveness of direct tax revenues to changes in GDP. The negative gap between buoyancy and elasticity coefficients (-0.1) indicates a there is no impact of discretionary change i.e. FRBM Act on central government direct tax system. The buoyancy and elasticity value indicate that central government direct tax system was more dynamic as well as more elastic in pre FRBM Act period as compare to post NEP period. Central government direct tax system was less dynamic and inelastic in post FRBM Act period.

During the pre-NEP period, the buoyancy coefficient for direct taxes was 0.56, indicating that direct tax revenues grew by 0.56 times for every 1% increase in GDP. The elasticity coefficient was 0.96, suggesting direct tax revenues grew by 0.96 times for every 1% increase in GDP. The negative gap between buoyancy and elasticity coefficients (-0.4) indicates a there is no impact of discretionary changes in economy on central government direct tax system. In the post-NEP period, the buoyancy coefficient increased to 1.31, indicating a higher growth rate of direct tax revenues relative to GDP compared to the pre-NEP period. The elasticity coefficient was 1.27, suggesting a moderate responsiveness of direct tax revenues to changes in GDP. The positive gap between buoyancy and elasticity coefficients (0.04) indicates a there is an impact of discretionary changes in economy i.e. NEP (1991) on Central government direct tax system. The buoyancy and elasticity value indicate that central government direct tax system was less dynamic as well as inelastic in pre NEP Period as compare to post NEP period. Central government direct tax system was more dynamic and more elastic in post FRBM Act period (Table 3)

During the FRBM Act implementation period, the buoyancy coefficient for direct taxes was 0.91, indicating that direct tax revenues grew by 0.91 times for every 1% increase in GDP. The elasticity coefficient was 1.96, suggesting a high responsiveness of direct tax revenues to changes in GDP. The negative gap between buoyancy and elasticity coefficients (-1.05) indicates a there is no impact of discretionary changes i.e. FRBM Act in economy on central government direct tax system. In the FRBM Act deterioration period, the buoyancy coefficient increased to 1.31, indicating a higher growth rate of direct tax revenues relative to GDP compared to the FRBM Act implementation period. The elasticity coefficient, however, decreased to 0.71, suggesting a reduced responsiveness of direct tax revenues to changes in GDP. The positive gap between buoyancy and elasticity coefficients (0.6) indicates a there is an impact of discretionary changes i.e. FRBM Act in economy on central government direct tax system. The buoyancy and elasticity value indicate that central government direct tax system was less dynamic and more elastic in FRBM Act Implementation period, more dynamic and inelastic in FRBM Act deterioration period (Table 3).

Analyzing the data in Table 3 on the Indirect Tax Buoyancy and Elasticity of Central Government. During the pre-FRBM Act period, the buoyancy coefficient for indirect taxes was 0.58, indicating that indirect tax revenues grew by 0.58 times for every 1% increase in GDP. The elasticity coefficient was 1.04, suggesting indirect tax revenues grew by 1.04 times for every 1% increase in GDP. The negative gap between

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buoyancy and elasticity coefficients (-0.46) indicates there is no impact of discretionary changes in economy on Central government indirect tax system. In the post-FRBM Act period, the buoyancy coefficient increased to 0.96, indicating a higher growth rate of indirect tax revenues relative to GDP compared to the pre-FRBM Act period. The elasticity coefficient was 0.93, suggesting indirect tax revenues grew by 0.93 times for every 1% increase in GDP. The gap between buoyancy and elasticity coefficients (0.0) indicates that there is an impact of discretionary changes in economy i.e. FRBM Act on Central government indirect tax system. The buoyancy and elasticity value indicate that central government indirect tax system was less dynamic and more elastic in Pre FRBM Act period, less dynamic and inelastic in post FRBM Act period.

During the pre-NEP period, the buoyancy coefficient for indirect taxes was 1.24, indicating that indirect tax revenues grew by 1.24 times for every 1% increase in GDP. The elasticity coefficient was 1.22, suggesting a high responsiveness of indirect tax revenues to changes in GDP. The positive gap between buoyancy and elasticity coefficients (0.02) indicates there is an impact of discretionary changes in economy on Central government indirect tax system. In the post-NEP period, the buoyancy coefficient decreased to -0.30, indicating a negative growth rate of indirect tax revenues relative to GDP. The elasticity coefficient, however, was 0.72, suggesting indirect tax revenues grew by 0.72 times for every 1% increase in GDP. The negative gap between buoyancy and elasticity coefficients (-1.02) indicates a there is no impact of discretionary changes in economy i.e. NEP (1991) on Central government indirect tax system. The buoyancy and elasticity value indicate that central government indirect tax system was more dynamic and more elastic in NEP period as compare to that of post NEP period (Table 3).

During the FRBM Act implementation period, the buoyancy coefficient for indirect taxes was 0.17, indicating a very low growth rate of indirect tax revenues relative to GDP. The elasticity coefficient was 1.39, suggesting indirect tax revenues grew by 1.39 times for every 1% increase in GDP. The negative gap between buoyancy and elasticity coefficients (-1.22) indicates there is no impact of discretionary changes in economy i.e. FRBM Act on Central government indirect tax system. In the FRBM Act deterioration period, the buoyancy coefficient increased to 1.28, indicating a higher growth rate of indirect tax revenues relative to GDP compared to the FRBM Act implementation period. The elasticity coefficient was 1.03 suggesting a relatively lower responsiveness of indirect tax revenues to changes in GDP as compare to the FRBM Act implementation period. The positive gap between buoyancy and elasticity coefficients (0.25) indicates there is an impact of discretionary changes in economy (FRBM Act deterioration period or Global Financial crisis) on Central government indirect tax system. The buoyancy and elasticity value indicate that central government indirect tax system was less dynamic and more elastic in FRBM Act implementation period but in FRBM Deterioration, buoyancy and elasticity coefficients are indicating that more dynamic and more elastic (Table 3).

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Table 3

Direct and Indirect Tax Elasticity and Buoyancy of Central Government in India

Year		Buoyancy		Elasticity		Gap
		Coef.(t-stat)	R^2	Coef.(t-stat)	R^2	
Direct Tax						
Pre FRMB ACT Period	1970-71 to 1990-91	0.56 (1.51)	0.99	0.96 (23.04)***	0.96	-0.4
	1991-92 to 2001-02	1.31 (2.20)*	0.35	1.27 (22.83)***	0.98	0.04
	1970-71 to 2001-02	1.13 (6.53)***	0.58	1.09 (48.06)***	0.98	0.04
Post FRBM Act Period	2002-03 to 2007-08	0.91 (0.84)	0.15	1.96 (46.15)***	0.99	-1.05
	2008-09 to 2021-22	1.31 (4.05)***	0.57	0.71 (17.91)***	0.96	0.6
	2002-03 to 2021-22	0.87 (5.03)***	0.58	0.97 (17.91)***	0.94	-0.1
Overall	1970-71 to 2021-22	1.28 (17.47)***	0.85	1.19 (72.13)***	0.99	0.09
Indirect Tax						
Pre FRMB ACT Period	1970-71 to 1990-91	1.24 (7.20)***	0.73	1.22 (57.81)***	0.99	0.02
	1991-92 to 2001-02	-0.30 (-0.23)	0.00	0.72 (15.61)***	0.96	-1.02
	1970-71 to 2001-02	0.58 (3.27)***	0.26	1.04 (43.39)***	0.98	-0.46
Post FRBM Act Period	2002-03 to 2007-08	0.17 (0.19)	0.00	1.39 (23.05)***	0.99	-1.22
	2008-09 to 2021-22	1.28 (2.58)**	0.35	1.03 (24.43)***	0.98	0.25
	2002-03 to 2021-22	0.96 (4.09)***	0.48	0.93 (30.61)***	0.98	0.0
Overall	1970-71 to 2021-22	0.94 (11.50)***	0.72	0.97 (82.76)***	0.99	-0.03

Note: (*) Significant at 10%; (**) Significant at 5%; (***) Significant at 1%

FRBM Act: Personal Income Tax and Corporate Tax Elasticity and Buoyancy

Analyzing the data in Table 4 on the Personal Income Tax Buoyancy and Elasticity of the Central Government. During the pre FRBM Act period, the buoyancy coefficient for personal income tax was 3.27, indicating that personal income tax revenues grew by 3.27 times for every 1% increase in GDP. The elasticity coefficient was 2.96, suggesting a high responsiveness of personal income tax revenues to changes in GDP. The positive gap between buoyancy and elasticity coefficients (0.31) indicates there is an impact of discretionary changes in economy on Central government indirect tax system. In the post-FRBM Act period, the buoyancy coefficient decreased significantly to 0.46, indicating a low growth rate of personal income tax revenues relative to GDP. The elasticity coefficient was 1.49, suggesting personal

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income tax revenues grew by 1.49 times for every 1% increase in GDP. The negative gap between buoyancy and elasticity coefficients (-1.0) indicates there is no impact of discretionary changes in economy i.e. FRBM Act on Central government personal income tax system. The buoyancy and elasticity value indicate that central government personal income tax system was more dynamic and more elastic in pre FRBM Act period but in post FRBM Act, central government personal income tax system was less dynamic and more elastic.

During the pre-NEP period, the buoyancy coefficient for personal income tax was 1.76, indicating that personal income tax revenues grew by 1.76 times for every 1% increase in GDP. The elasticity coefficient was 2.41, suggesting a high responsiveness of personal income tax revenues to changes in GDP. The negative gap between buoyancy and elasticity coefficients (-0.65) indicates there is no impact of discretionary changes in economy on Central government corporate tax system. In the post-NEP period, the buoyancy coefficient increased significantly to 4.82, indicating a high growth rate of personal income tax revenues relative to GDP. The elasticity coefficient was 4.51, suggesting a high responsiveness of personal income tax revenues to changes in GDP. The positive gap between buoyancy and elasticity coefficients (0.31) indicates there is an impact of discretionary (NEP 1991) changes in economy on Central government personal income tax system. The buoyancy and elasticity value indicate that central government personal income tax system was more dynamic and more elastic in both pre and post NEP period (Table 4).

During the FRBM Act implementation period, the personal income tax buoyancy coefficient was -1.75, indicating a decline in personal income tax revenues relative to GDP. The elasticity coefficient was 2.74, suggesting personal income tax revenues grew by 2.74 times for every 1% increase in GDP. The negative gap between buoyancy and elasticity coefficients (-4.49) indicates there is no impact of discretionary (FRBM Act) changes in economy on Central government personal income tax system. In the FRBM Act deterioration period, the personal income tax buoyancy coefficient further decreased to -0.39, indicating a continued decline in personal income tax revenues relative to GDP. The elasticity coefficient was 1.13, suggesting a personal income tax revenues grew by 1.13 times for every 1% increase in GDP. The negative gap between buoyancy and elasticity coefficients (-1.52) indicates a there is no impact of discretionary (FRBM Act) changes in economy on Central government personal income tax system. The buoyancy and elasticity value indicate that central government personal income tax system was less dynamic and more elastic in both FRBM Act implementation and FRBM Act deterioration period (Table 4).

Data provided in Table 4 show that Corporate Tax Buoyancy and Elasticity of the Central Government. During the pre-FRBM Act period, the corporate tax buoyancy coefficient was 2.76, indicating that corporate tax revenues grew by 2.76 times for every 1% increase in GDP. The elasticity coefficient was 2.93, suggesting a high responsiveness of corporate tax revenues to changes in GDP. The negative gap between buoyancy and elasticity coefficients (-0.17) indicates there is no impact of discretionary (FRBM Act) changes in economy on Central government corporate tax system. In the post-FRBM Act period, the corporate tax buoyancy coefficient decreased to 1.24, indicating a lower growth rate of corporate tax revenues relative to GDP compared to the pre-FRBM Act period. The elasticity coefficient decreased at 1.24 as compare to pre FRBM Act period. The gap between buoyancy and elasticity coefficients is zero, indicating that there is no impact of discretionary (FRBM Act) changes in economy on Central government corporate tax system. The buoyancy and elasticity value indicate that central government corporate tax system was more dynamic and more elastic in pre FRBM Act as compare to that of post FRBM Act. In post FRBM, the central government corporate tax system was more dynamic but inelastic.

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During the pre-NEP period, the corporate tax buoyancy coefficient was 2.97, indicating that corporate tax revenues grew by 2.97 times for every 1% increase in GDP. The elasticity coefficient was 2.93, suggesting a high responsiveness of corporate tax revenues to changes in GDP. The positive gap between buoyancy and elasticity coefficients (0.04) indicates there is an impact of discretionary change in economy on central government corporate tax system. In the post-NEP period, the corporate tax buoyancy coefficient significantly decreased to 0.11, indicating a much lower growth rate of corporate tax revenues relative to GDP compared to the pre-NEP period. The elasticity coefficient, however, remained relatively high at 2.23, suggesting a high responsiveness of corporate tax revenues to changes in GDP. The large negative gap between buoyancy and elasticity coefficients (-2.12) indicates a there is no impact of discretionary (NEP 1991) change in economy on central government corporate tax system. The buoyancy and elasticity value indicate that central government corporate tax system was more dynamic and more elastic in pre NEP period as compare to that of post NEP period. In post NEP, the central government corporate tax system was less dynamic but more elastic (Table 4).

During the FRBM Act Implementation Period, the corporate tax buoyancy coefficient was 1.69, indicating that corporate tax revenues grew by 1.69 times for every 1% increase in GDP. The elasticity coefficient was 3.37, suggesting a high responsiveness of corporate tax revenues to changes in GDP. The negative gap between buoyancy and elasticity coefficients (-1.68) indicates there is no impact of discretionary (FRBM Act) change in economy on central government corporate tax system. In the FRBM Act Deterioration Period, the corporate tax buoyancy coefficient was 1.61, indicating that corporate tax revenues grew by 1.61 times for every 1% increase in GDP. The elasticity coefficient, however, was significantly lower at 0.57, suggesting a lower responsiveness of corporate tax revenues to changes in GDP compared to the implementation period. The positive gap between buoyancy and elasticity coefficients (1.04) indicates there is an impact of discretionary (FRBM Act) change in economy on central government corporate tax system. The buoyancy and elasticity value indicate that central government corporate tax system was more dynamic and more elastic in FRBM Act Implementation period as compare to that of FRBM Act Deterioration period. In FRBM Act Deterioration period, the central government corporate tax system was less dynamic but more elastic (Table 4).

Table 4.

Personal Income tax and Corporate Tax Elasticity and Buoyancy of Central Government in India

Year		Buoyancy		Elasticity		Gap
		Coef.(t-stat)	R^2	Coef.(t-stat)	R^2	
Personal Income Tax						
Pre FRMB ACT Period	1970-71 to 1990-91	1.76 (1.86)*	0.15	2.41 (7.40)***	0.74	-0.65
	1991-92 to 2001-02	4.82 (3.68)**	0.60	4.51 (8.01)***	0.87	0.31
	1970-71 to 2001-02	3.27 (7.65)***	0.66	2.96 (17.61)***	0.91	0.31
Post FRBM Act Period	2002-03 to 2007-08	-1.75 (-0.38)	0.03	2.74 (11.95)***	0.97	-4.49
	2008-09 to 2021-22	-0.39 (-0.24)	0.00	1.13 (14.49)***	0.94	-1.52

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	2002-03 to 2021-22	0.46 (0.49)	0.01	1.49 (16.15)***	0.93	-1.0
Overall	1970-71 to 2021-22	2.28 (9.01)***	0.61	2.77 (32.85)***	0.95	-0.49
Corporate Tax						
Pre FRMB ACT Period	1970-71 to 1990-91	2.97 (4.63)***	0.53	2.93 (21.52)***	0.96	0.04
	1991-92 to 2001-02	0.11 (0.04)	0.00	2.23 (10.48)***	0.92	-2.12
	1970-71 to 2001-02	2.76 (6.44)***	0.58	2.93 (43.34)***	0.98	-0.17
Post FRBM Act Period	2002-03 to 2007-08	1.69 (1.38)	0.32	3.37 (37.00)***	0.99	-1.68
	2008-09 to 2021-22	1.61 (5.06)***	0.68	0.57 (5.80)***	0.73	1.04
	2002-03 to 2021-22	1.24 (6.03)***	0.66	1.24 (7.90)***	0.77	0.0
Overall	1970-71 to 2021-22	2.51 (16.92)***	0.85	2.36 (32.24)***	0.95	0.15

Note: (*) Significant at 10%; (**) Significant at 5%; (***) Significant at 1%

FRBM Act: Custom Duty Elasticity and Buoyancy

Data provided in Table 5, shows the Revenue collection from Custom Duty of the Central Government. During the Pre FRBM Act Period, the custom duty revenue collection exhibited a buoyancy coefficient of 0.74. This suggests that for every 1% increase in GDP, custom duty revenue increased by 0.74%. The elasticity coefficient was 0.87, indicating a relatively low responsiveness of custom duty revenue to changes in GDP. The positive gap between the buoyancy and elasticity coefficients (0.02) suggests a there is an impact of discretionary change in an economy on central government custom duties system. In the Post FRBM Act Period, the custom duty buoyancy coefficient significantly decreased to 0.19. This indicates a lower growth rate of custom duty revenue relative to GDP, with only a 0.19% increase in custom duty revenue for every 1% increase in GDP. The elasticity coefficient was also lower at 0.44, suggesting a reduced responsiveness of custom duty revenue to changes in GDP. The negative gap between the buoyancy and elasticity coefficients (-0.3) indicates there is no impact of discretionary (FRBM Act) change in an economy on central government custom duties system. The buoyancy and elasticity value indicate that central government custom duty system was less dynamic and inelastic in both pre and post FRBM Act period but pre FRBM Act better than post FRBM Act Period.

During the Pre NEP Period, the custom duty revenue collection exhibited a buoyancy coefficient of 0.96. This suggests that for every 1% increase in GDP, custom duty revenue increased by 0.96%. The elasticity coefficient was 1.12, indicating a relatively high responsiveness of custom duty revenue to changes in GDP. The negative gap between the buoyancy and elasticity coefficients (-0.16) suggests there is no impact of discretionary change in an economy on central government custom duties system. In the Post NEP Period, the custom duty buoyancy coefficient decreased to 0.55. This indicates a lower growth rate of custom duty revenue relative to GDP, with only a 0.55% increase in custom duty revenue for every 1% increase in GDP. The elasticity coefficient was even lower at 0.34, suggesting a reduced responsiveness of custom duty revenue to changes in GDP. The positive gap between the buoyancy and elasticity coefficients (0.21) indicates a there is an impact of discretionary (NEP 1991) change in an economy on central government custom duties system. The buoyancy and elasticity value indicate that central government

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custom duty system was less dynamic in both pre and post NEP period but more elastic in pre NEP as compare to post NEP period (Table 5).

During the FRBM Act Implementation Period, the custom duty revenue collection exhibited a buoyancy coefficient of 0.82. This suggests that for every 1% increase in GDP, custom duty revenue increased by 0.82%. The elasticity coefficient was 0.70, indicating a relatively low responsiveness of custom duty revenue to changes in GDP. The positive gap between the buoyancy and elasticity coefficients (0.12) suggests there is an impact of discretionary (FRBM Act) change in an economy on central government custom duties system. In the FRBM Act Deterioration Period, the custom duty buoyancy coefficient declined to -0.12. This indicates a negative growth rate of custom duty revenue relative to GDP, with custom duty revenue decreasing by 0.12% for every 1% increase in GDP. The elasticity coefficient was also low at 0.14, suggesting a relatively low responsiveness of custom duty revenue to changes in GDP. The negative gap between the buoyancy and elasticity coefficients (-0.26) indicates a there is no impact of discretionary change in an economy on central government custom duties system. The buoyancy and elasticity value indicate that central government custom duty system was less dynamic and inelastic in both FRBM Act Implementation and FRBM Act Deterioration Period (Table 5).

Table 5.

Custom Duty Elasticity and Buoyancy of Central Government in India

Year		**Buoyancy**		**Elasticity**		**Gap**
		Coef.(t-stat)	**R^2**	**Coef.(t-stat)**	**R^2**	
Pre FRMB ACT Period	1970-71 to 1990-91	0.96 (8.41)***	0.78	1.12 (23.82)***	0.96	-0.16
	1991-92 to 2001-02	0.55 (1.06)	0.11	0.34 (3.14)**	0.52	0.21
	1970-71 to 2001-02	0.74 (8.98)***	0.72	0.87 (22.10)***	0.94	0.02
Post FRBM Act Period	2002-03 to 2007-08	0.82 (1.46)	0.34	0.70 (9.58)***	0.95	0.12
	2008-09 to 2021-22	-0.12 (-0.12)	0.00	0.14 (0.68)	0.03	-0.26
	2002-03 to 2021-22	0.19 (0.61)	0.02	0.44 (6.13)***	0.67	-0.3
Overall	1970-71 to 2021-22	0.51 (9.84)***	0.65	0.61 (22.40)***	0.90	-0.1

Note: (*) Significant at 10%; (**) Significant at 5%; (***) Significant at 1%

FRBM Act: Excise Duty Elasticity and Buoyancy

Analyzing Table 6 on the Revenue Collection from Excise Duties of the Central Government, focusing on the Pre FRBM Act Period and the Post FRBM Act Period. During the Pre FRBM Act Period, the excise duties revenue collection exhibited a buoyancy coefficient of 2.24. This indicates that for every 1% increase in GDP, excise duties revenue increased by 2.24%. The elasticity coefficient was 2.29, suggesting a relatively high responsiveness of excise duties revenue to changes in GDP. The negative gap between the buoyancy and elasticity coefficients (-0.05) indicates there is no impact of discretionary change in an economy on the central government Excise duty system. In the Post FRBM Act Period, the excise duties buoyancy coefficient decreased to 1.52. This suggests that for every 1% increase in GDP, excise duties revenue increased by 1.52%. The elasticity coefficient was 0.94, indicating a reduced responsiveness of excise duties revenue to changes in GDP compared to the Pre FRBM Act Period. The positive gap between the buoyancy and elasticity coefficients (0.6) indicates a there is an impact of discretionary (FRBM Act) change in an economy on the central government Excise duty system. Overall, the analysis of these two specific periods suggests that the growth rate of excise duties revenue collection of the central government declined in the Post FRBM Act Period compared to the Pre FRBM Act Period. The buoyancy and elasticity

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value indicate that central government excise duty system was more dynamic in both pre FRBM act period and it was more elastic in pre FRBM and inelastic in post FRBM Act.

During the Pre NEP Period, the excise duties revenue collection exhibited a buoyancy coefficient of 2.53. This indicates that for every 1% increase in GDP, excise duties revenue increased by 2.53%. The elasticity coefficient was 2.55, suggesting a relatively high responsiveness of excise duties revenue to changes in GDP. The negative gap between the buoyancy and elasticity coefficients (-0.02) indicates there is no impact of discretionary change in an economy on the central government Excise duty system. In the Post NEP Period, the excise duties buoyancy coefficient significantly increased to 4.65. This suggests that for every 1% increase in GDP, excise duties revenue increased by 4.65%, reflecting a higher growth rate compared to the Pre NEP Period. However, the elasticity coefficient decreased to 2.02, indicating a reduced responsiveness of excise duties revenue to changes in GDP compared to the Pre NEP Period. The positive gap between the buoyancy and elasticity coefficients (2.63) highlights a there is an impact of discretionary change in an economy on central government excise duty system. The buoyancy and elasticity value indicate that central government excise duty system was more dynamic and more elastic in both pre and post FRBM act period. Buoyancy was more in post NEP as compare to pre NEP and elasticity is was more in pre NEP as compare post NEP (Table 6).

During the FRBM Act Implementation Period, the excise duties revenue collection exhibited a low buoyancy coefficient of 0.20. This suggests that for every 1% increase in GDP, the excise duties revenue increased by only 0.20%. The elasticity coefficient was 1.04, indicating a moderate responsiveness of excise duties revenue to changes in GDP. The negative gap between the buoyancy and elasticity coefficients (-0.84) implies a there is no impact of discretionary change (FRBM Act) in an economy on central government excise duty. In the FRBM Act Deterioration Period, the excise duties buoyancy coefficient increased to 1.78. This suggests that for every 1% increase in GDP, the excise duties revenue increased by 1.78%, indicating a higher growth rate compared to the FRBM Act Implementation Period. The elasticity coefficient remained relatively stable at 0.99, indicating a moderate responsiveness of excise duties revenue to changes in GDP. The positive gap between the buoyancy and elasticity coefficients (0.79) suggests a there is an impact of discretionary change (FRBM Act) in an economy on excise duty. The buoyancy and elasticity value indicate that central government excise duty system was less dynamic in FRBM Act Implementation period as compare to FRBM Act Deterioration Period. Elasticity was more in FRBM Act Implementation period as compare to FRBM Act Deterioration period (Table 6).

Table 6.

Excise Duty Elasticity and Buoyancy of Central Government in India

Year		**Buoyancy**		**Elasticity**		**Gap**
		Coef.(t-stat)	**R^2**	**Coef.(t-stat)**	**R^2**	
Central Government						
Pre FRMB ACT Period	1970-71 to 1990-91	2.53 (6.07)***	0.66	2.55 (27.40)***	0.97	-0.02
	1991-92 to 2001-02	4.65 (4.68)***	0.70	2.02 (10.26)***	0.92	2.63
	1970-71 to 2001-02	2.24 (9.31)***	0.74	2.29 (44.36)***	0.98	-0.05
Post FRBM Act Period	2002-03 to 2007-08	0.20 (0.14)	0.00	1.04 (9.87)***	0.96	-0.84
	2008-09 to 2021-22	1.78 (2.06)*	0.26	0.99 (6.22)***	0.76	0.79

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	2002-03 to 2021-22	1.52 (3.20)***	0.36	0.94 (11.14)***	0.87	0.6
Overall	1970-71 to 2021-22	1.79 (14.51)***	0.80	0.83 (68.29)***	0.98	0.96

Note: (*) Significant at 10%; (**) Significant at 5%; (***) Significant at 1%

Conclusion and Policy Suggestions

The analysis of tax elasticity and buoyancy during different periods, such as the pre-FRBM Act, post-FRBM Act, pre-NEP, post-NEP, FRBM Act implementation, and FRBM Act deterioration periods, provides insights into the dynamics and responsiveness of the central government's tax system in India. In the pre-FRBM Act period, both tax buoyancy and elasticity were higher, indicating a dynamic and elastic tax system. Hence, in this period, the tax revenue is less stable than the GDP. However, in the post-FRBM Act period, tax buoyancy decreased, suggesting a lower growth rate of tax revenues relative to GDP. The tax system also became less dynamic and more elastic during this period. It shows that tax revenue is more stable than the GDP in this period. Similarly, during the pre-NEP period, tax buoyancy and elasticity were higher, indicating a dynamic and elastic tax system. In the post-NEP period, tax buoyancy decreased, indicating a lower growth rate of tax revenues relative to GDP. The tax system also became less dynamic and less elastic during this period.

Tax revenue is more stable than the GDP in post-NEP period as compare to the pre-NEP period. During the FRBM Act implementation period, tax buoyancy decreased significantly, indicating a decline in tax revenues despite an increase in GDP. However, tax elasticity remained relatively high, suggesting tax revenues were still responsive to changes in GDP, albeit in an inverse manner. In the FRBM Act deterioration period, tax buoyancy increased slightly, indicating a modest growth rate of tax revenues relative to GDP. Tax elasticity decreased, suggesting a reduced responsiveness of tax revenues to changes in GDP. Tax revenue is more stable than the GDP in both FRBM Act implementation and deterioration period. In the pre-FRBM Act period, direct taxes had higher buoyancy and elasticity coefficients, indicating a dynamic and elastic system. It indicates direct tax revenue has less stable than the GDP in this period. In the post-FRBM Act period, direct taxes became less dynamic and more elastic. It indicates direct tax revenue more stable than the GDP. Indirect taxes, on the other hand, showed lower buoyancy and elasticity coefficients in the pre-FRBM Act period, indicating a less dynamic and less elastic system. In the post-FRBM Act period, the buoyancy coefficient increased, but the elasticity coefficient remained low, suggesting a less dynamic and inelastic system.

Indirect tax revenue has more stable as compare to that of GDP in both pre and post FRBM Act. The analysis of personal income tax and corporate tax reveals that in the pre-FRBM Act period, both taxes had higher buoyancy and elasticity coefficients, indicating a dynamic and elastic system. In the post-FRBM Act period, personal income tax became less dynamic and more elastic, while corporate tax became more dynamic but inelastic. As concern custom duty, excise duty, and their respective buoyancy and elasticity coefficients, it can be observed that in general, these taxes exhibited a decline in buoyancy and elasticity in the post-FRBM Act period compared to the pre-FRBM Act period. The excise duty system was more dynamic and elastic in both pre and post FRBM Act periods, while the custom duty system was less dynamic and inelastic. These indicates that revenue from excise duty has less stable than the GDP in both pre and post FRBM Act, while the revenue from custom duty has more stable than the GDP. Overall, the tax system became less dynamic and more elastic in the post-FRBM Act period. Direct taxes were more dynamic and elastic compared to indirect taxes. Personal income tax and corporate tax showed a decrease in dynamism and an increase in elasticity in the post-FRBM Act period. Custom duty and excise duty exhibited a decline in both buoyancy and elasticity in the post-FRBM Act period.

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The analysis of tax elasticity and buoyancy in India's tax system during different periods provides valuable insights into its dynamics and responsiveness. The post-FRBM Act and post-NEP periods witnessed a decline in tax buoyancy, highlighting the need for policies that promote economic growth, expand the tax base, and address tax evasion and compliance issues. Tax elasticity increased in the post-FRBM Act period, emphasizing the importance of aligning tax rates and structures with economic conditions and periodically reviewing tax policies to ensure their effectiveness. The analysis also revealed the higher buoyancy and elasticity of direct taxes compared to indirect taxes, suggesting the need for a balanced approach in optimizing revenue generation and ensuring fairness. Personal income tax exhibited a decrease in dynamism and an increase in elasticity, indicating the importance of simplifying compliance, reducing tax evasion, and exploring progressive reforms for equitable distribution. Corporate tax showed increased dynamism but inelasticity, calling for an evaluation of tax rates and incentives to attract investment and support economic growth while maintaining competitiveness. The decline in buoyancy and elasticity of custom duty and excise duty in the post-FRBM Act period indicates the necessity of reforms in these areas, such as streamlining tariff structures and reducing trade barriers, to align with economic objectives and international trade agreements. To maintain a dynamic and elastic tax system, policymakers should implement periodic review and monitoring mechanisms.

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