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Indicators of Tax Policy: Tax Elasticity, Tax Buoyancy and Tax Stability

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ABSTRACT: The paper evaluates the Indian tax system based on productivity and stability from 1990-91 to 2015-16, using time series analysis. It was found that the tax elasticity and tax buoyancy are either one or greater than one for all major taxes except custom duty; this indicates that the government mainly relies on domestic taxes. The policy examines the effects of discretionary changes on tax productivity. The paper largely raises questions about over-dependency and the challenges faced by the government in raising taxes through indirect taxes (GST), given the limitations of the tax base in direct taxes.

Keywords: tax buoyancy, policy examines, tax stability.

I. INTRODUCTION

Globalisation has resulted in lower tax rates over the last three decades, especially in India, after economic reforms, which have affected the tax productivity and revenue stability from taxes. The study examines the tax elasticity and tax buoyancy of central governments as a measure of the productivity of tax and the coefficient of variation for measuring tax stability during 1990-91 to 2015-16. The time regime of study covers the post-economic reform period and pre-GST period, which has great importance as both phenomena brought major breakthroughs in tax reforms.

The tax buoyancy coefficient is ratio of change in tax revenue and change in tax base, the coefficient reflects the effect of change in GDP and discretionary changes on the tax revenue. The tax elasticity simply reflects change in tax revenue in response to change in GDP without any discretionary changes [4]. The tax stability is the ratio of the mean and the standard deviation of tax revenue, where both values are presented as a fraction of GDP.

A DTM can be broadly defined as any legislative or administrative change in policy that has an impact on tax revenues, whether it is already finally adopted or only likely to be implemented [7].

II. REVIEW OF LITERATURE

Tax buoyancy [5] measures the total response of tax revenue to a change in national income, the total response includes both an increase in income and discretionary changes like a change in tax base, a change in tax rate, etc. The responsiveness of tax revenue to the discretionary change in the tax rate and tax base in relation to GDP is termed the buoyancy of tax. The tax elasticity purely measures the response of tax revenue to the change in national income.

A study that has used the Singer method of dummy variables to trace the effect of discretionary tax measures [6] to examine the base elasticity of the tax system in Sierra Leone during 1977 and 2009. The study found that the discretionary tax measures proved effective in generating more revenue, and at the same time, the tax system was relatively inelastic. It is observed that, except in the case of personal income tax, in the case of other taxes like total tax system, import duty, domestic transaction tax, and corporate tax, the tax buoyancy value is higher than the tax elasticity value.

A time series analysis has assessed the elasticity of tax [1]. In India, from 1991 to 2010, it was found that the tax elasticity for Direct tax is 1.63, for Indirect tax 0.90 and gross tax revenue 1.2. During the same period, the tax buoyancy coefficient remained one for Direct tax, Indirect tax and Gross tax revenue. That proves the responsiveness of tax revenue is better to changes in national income.

A study that has examined the tax buoyancy and tax stability [2]. For Zimbabwe during 2000 to 2013, the tax buoyancy of tax revenue has remained 1.013, and tax stability has remained 23.79%.

An IMF working paper that has examined and compared the tax buoyancy [3] for one hundred and seven countries, including advanced, emerging and low-income countries, from 1980 to 2014, found that long-run buoyancy of total revenue is not different from 1 in all country groups. In contrast, short run buoyancy in advanced nation is less than one and in emerging and less developed nation it is more than one. Specifically for India, the long run tax buoyancy is 1.104 and the short run tax buoyancy is 1.668.

A study (Vadikar & Rami, 2018) which has estimated tax elasticity and tax buoyancy for India`s State government during 1990-91 to 2015-16 revealed that the tax elasticity and tax buoyancy value for tax revenue has gradually increased with the progress of time, and tax buoyancy value is less than tax elasticity that indicated the discriminatory changes have created negative effects on revenue [8]. Compare to first decade of study, the value of tax elasticity and tax buoyancy for direct tax has increased during second decade of study. But in last five year of study the both values have been reduced.

A study (Vadikar & Rami, 2018) which has compare tax elasticity and tax buoyancy for Indian State government during 1990-91 to 2015-16 revealed that for All form of government the value of tax buoyancy remained less than tax elasticity that indicated discriminatory measures have created negative effect to tax productivity [9]. For combine government, tax elasticity and tax buoyancy value has improved compare to 1990-91 to 1999- 2000 and during 2000-2001 to 2015-16 the both vale has not changed. For all forms of government, the long run value of tax elasticity and tax buoyancy has remained near to 1.

Research Gap: It was found in review of literature there is time gap in various studies which have estimated tax elasticity and tax buoyancy in India. Few selected study has used regression model with dummy variable for discretionary changes but it is highly complicated to find breakthrough in tax policy. Even some of the studies have used qualitative discretionary changes like trade openness, civil liberty and political rights, but it is a highly complex task to quantify such variables.

III. RESEARCH METHODOLOGY

The major sources of data are a series of Indian Public Finance Statistics from 1990-91 to 2015-16, which is published by the Indian Finance Ministry. The study has also uses Handbook of Statistics on Indian Economy for 2015-16 which is published by Reserve Bank of India.

Objectives of Study:

(1) To estimate tax elasticity and tax buoyancy for various tax revenue

(2) To estimate the tax stability of various taxes

Variables of study:

Model for Measuring Tax Elasticity and Tax Buoyancy: The Study has used log regression Model to measure elasticity and Buoyancy of various taxes through regression analysis.

Equation 1: $\text{Log (TR)} = \alpha + \beta_1 . \text{Log (TB)} + \epsilon$

Where, TR = Tax Revenue, TB = Tax Base and β_1 = tax elasticity/buoyancy

Table 1: Base for measuring Tax Buoyancy and Tax Elasticity.

For particular tax	Base for Regression for (Tax Elasticity)	Base for Regression for (Tax buoyancy)
Total tax revenue	GDP	NAGDP
Direct tax revenue	GDP	NAGDP
Indirect tax revenue	GDP	PCE
Corporate tax	GDP	NAGDP
Personal Income tax	GDP	NAGDP
Custom Duty	GDP	GDPIMEX
Excise duty	GDP	PCE
Service tax	GDP	GDPSERV

Method for Measuring Tax Stability: A simple measure of the stability of tax revenue [4] is the coefficient of variation (CV), which is defined as the standard deviation (SD) of tax revenue (as a fraction of total tax revenue) divided by its mean (μ).

Equation 2: $CV = \frac{SD}{\mu} \times 100$

In further process, the revenue stabilizing coefficient (RSC) for a particular tax can be derived by dividing the CV of the total tax without the particular tax from the CV of the total tax revenue. That is;

Equation 3: RSC = (CV for TTR) – (CV for TTR without particular tax)

If total tax revenue is R, total tax revenue without the particular tax is R_0, and tax revenue from the particular tax is R_T, then,

Equation 4: $R = R_0 + R_T$

To measure the effect of an increase in the particular tax rate on revenue stability, a further equation can be developed as follows,

Equation 5: $CV(R)^2 = \alpha^2 . CV(R_0)^2 + (1- \alpha)^2 . CV(R_T)^2 + 2 \alpha . (1- \alpha) . CV(R_O) . CV(R_T) . Corr(R_O, R_T)$

Where $\alpha = R_0/R$ and $Corr(R_0, R_T)$ reflects correlation between R_0 and R_T

IV. FINDINGS

Estimation of Tax Elasticity:

(1) Ln CTTR = 1.606352 + 1.039982 Ln GDP
(7.47) (49.55)
Duration = 1990-91 to 2015-16, $R^2 = 0.99$, P-Value = 0.000 and DW = 0.6002

(2) Ln CDT = -4.602152 + 1.569784 Ln GDP
(10.79) (37.71)
Duration = 1990-91 to 2015-16, $R^2 = 0.98$, P-Value = 0.000 and DW = 0.4813

(3) Ln CPIT = -9.238551 + 1.897850 Ln GDP
(-10.60) (22.31)
Duration = 1990-91 to 2015-16, $R^2 = 0.95$, P-Value = 0.000 and DW = 0.5567

(4) Ln CCORP = -4.267811 + 1.496587 Ln GDP
(-9.14) (32.82)
Duration = 1990-91 to 2015-16, $R^2 = 0.97$, P-Value = 0.000 and DW = 0.4710

(5) Ln CIDT = 2.03566 + 0.962649 Ln GDP
(7.01) (33.94)
Duration = 1990-91 to 2015-16, $R^2 = 0.97$, P-Value = 0.000 and DW = 0.7438

(6) Ln CCUST = 3.340916 + 0.749345 Ln GDP
(8.42) (19.34)
Duration = 1990-91 to 2015-16, $R^2 = 0.93$, P-Value = 0.000 and DW = 0.9482

(7) Ln CECX = 1.577534 + 0.923915 Ln GDP
(3.04) (18.24)
Duration = 1990-91 to 2015-16, $R^2 = 0.93$, P-Value = 0.000 and DW = 0.3090

(8) Ln CSERV = -16.49353 + 2.484488 Ln GDP
(-14.56) (22.99)
Duration = 1994-95 to 2015-16, $R^2 = 0.96$, P-Value = 0.000 and DW = 0.3307

Estimation of Tax Buoyancy:

(9) Ln CTTR = 2.429734 + 0.983691 Ln NAGDP
(12.63) (51.09)
Duration = 1990-91 to 2015-16, $R^2 = 0.99$, P-Value = 0.000 and DW = 0.6095

(10) Ln CDT = -3.379119 + 1.486808 Ln NAGDP
(-9.56) (42.06)
Duration = 1990-91 to 2015-16, $R^2 = 0.98$, P-Value = 0.000 and DW = 0.5485

(11) Ln CPIT = -7.791531 + 1.800711 Ln NAGDP
(-10.46) (24.16)
Duration = 1990-91 to 2015-16, $R^2 = 0.96$, P-Value = 0.000 and DW = 0.6211

(12) Ln CCORP = -3.093814 + 1.416677 Ln NAGDP
(-7.55) (34.55)
Duration = 1990-91 to 2015-16, $R^2 = 0.98$, P-Value = 0.000 and DW = 0.5012

(13) Ln CIDT = 1.749830 + 1.031311 Ln PCE
(5.34) (30.94)
Duration = 1990-91 to 2015-16, $R^2 = 0.97$, P-Value = 0.000 and DW = 0.6264

(14) Ln CCUST = 6.159088 + 0.530593 Ln GDPIMEX
(19.62) (15.53)
Duration = 1990-91 to 2015-16, $R^2 = 0.90$, P-Value = 0.000 and DW = 0.7916

(15) Ln CECX = 1.310001 + 0.989032 Ln PCE
(2.36) (17.51)
Duration = 1990-91 to 2015-16, $R^2 = 0.92$, P-Value = 0.000 and DW = 0.2836

(16) Ln CSERV = -13.53721 + 2.322665 Ln GDPSERV

(-15.03) (25.65)
Duration = 1994-95 to 2015-16, $R^2 = 0.97$, P-Value = 0.000 and DW = 0.4115
The estimated values of tax elasticity and tax buoyancy are presented in Table 2, which reflects that during the twenty-six years of study, in the case of TTR, the tax elasticity has remained quite unitary (1.04) and the tax buoyancy has remained near 1 (0.98). In the case of direct taxes, the tax elasticity and tax buoyancy both values are greater than 1, which reflects a very positive frame for taxes. In the case of overall indirect taxes and particular indirect taxes except service tax, the tax elasticity and tax buoyancy values are both less than 1, which reflects that these indirect taxes have been quite unproductive. The service tax has emerged as the most promising source of revenue, as in its case, the tax elasticity and tax buoyancy both values are greater than 2.
Only in the case of overall indirect tax and excise duty, the tax buoyancy value is greater than tax elasticity, which reveals that in the case of indirect tax and excise duty, discretionary changes have proved revenue productive. In the case of overall direct tax, personal income tax, corporate tax, customs duty and service tax, the discretionary changes have generated a negative impact on revenue productivity.

Table 2: Estimation of Tax Elasticity and Tax Buoyancy.

Particular Tax	CTTR	CDT	CPIT	CCORP	CIDT	CCUST	CECX	CSERV
Tax Elasticity	1.04	1.57	1.90	1.50	0.96	0.75	0.92	2.48
Tax Buoyancy	0.98	1.49	1.80	1.42	1.03	0.53	0.98	2.32

Revenue stability is desirable from the government's perspective, as it assures the spending and borrowing plans. It can be observed in Table 3 that from the point of view of the coefficient of variance, direct taxes have less stability compared to indirect taxes, as CV for direct tax (0.116) is greater than CV for indirect taxes (0.103). In direct taxes, the CV for corporate tax (0.662) is greater than the CV for personal income tax (0.477), which reflects that the revenue of individual income tax has remained more stable. Whereas in direct taxes, CV for service tax, Custom duty and Excise duty have remained respectively 0.873, 0.307 and 0.241, which reflects that the revenue of service tax is comparatively more unstable and the revenue of excise duty is more stable.
In the case of RSC value, the negative value indicates that the revenue stream with the tax is more stable than the revenue stream without tax and vice versa. It reflects that, except for service tax, in the case of other taxes, the total tax revenue is more stable with the particular tax, whereas in the case of service tax, its inclusion in the total tax leads to instability. It may be possible that service tax was introduced in 19994-95 with very few services, and gradually its horizon was expanded, which has resulted in instability.
The $CV(R)^2$ value measures whether an increase in tax rate or inclusion of tax leads to stability in the tax system or not. The result reflects that direct taxes have brought more stability to the tax system compared to indirect taxes, as the CV(R)2 value for direct taxes (-0.007) is less than the value of indirect taxes (-0.002), and the result is consistent with the RSC value. In direct taxes, the CV(R)2 value for personal income tax (-0.007) is much less than the CV(R)2 value for corporate tax (-0.001), which reflects that personal tax brings more stability to the tax system compared to corporate tax. Whereas in the case of indirect taxes, the CV(R)2 value for service tax, excise duty and customs duty is respectively 0.007, -0.007 and -0.009, the result indicates that the service tax has brought instability to the tax system, even though the result is consistent with the RSC value.

Table 3: Estimation of Tax Stability.

Particular Tax	CTTR	CDT	CPIT	CCORP	CIDT	CCUST	CECX	CSERV
CV	0.068	0.116	0.477	0.662	0.103	0.307	0.241	0.873
RSC	NA	-0.223	-0.109	-0.043	-0.220	-0.114	-0.098	0.017
$CV(R)^2$	NA	-0.007	-0.007	-0.001	-0.002	-0.009	-0.007	0.007

V. CONCLUSIONS

The Indian tax system has maintained a tolerable level of tax productivity, as the tax elasticity and tax buoyancy both values are close to 1 during the study period. The central government has performed comparatively better in the case of direct taxes, which have proved more productive than indirect taxes, except for service tax. All taxes except excise duty, the discretionary changes have generated a negative impact on revenue productivity. Even after the implementation of GST, the government should remain more concerned about the productivity of indirect taxes.

Overall, the Indian tax system is quite stable on the basis of CV, but the revenue from direct taxes and service tax is comparatively unstable. The RSC value reflects the inclusion of all taxes in TTR, which has generated stability in the tax system except for the service tax. The interpretation of $CV(R)^2$ value is consistent with reflection of the RSC value as well as the value of CV that inclusion of service tax has brought instability in tax system, the reason for instability of service tax may be as it was introduced in 1994-95 with few selected services and gradually other services were included under it. The study concludes that the overall Indian tax system has remained revenue productive and stable during 1990-91 to 2015-16.

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