

An Analysis of Buoyancy and Elasticity Taxes of the Central Government

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Abstract – A buoyancy coefficient measures the income responsiveness of a tax yield due to the combined effects of the automatic and the discretionary changes made in the Tax system. The yield of a tax may also go up on account of an extension of its coverage or a revision in the tax rates. Such a characteristic features of a tax related system is referred to as its elasticity. In other words, the elasticity of a tax refers to its responsiveness to steps taken by the tax authorities in increasing the tax yield through an extension of its coverage or through a revision of its tax rates. An in depth analysis has been carried out to study the sensitivity of a Tax system by computing buoyancy and elasticity coefficients of taxes. A buoyancy coefficient measures the income responsiveness of a tax yield due to the combined effects of the automatic and the discretionary changes made in the tax system. The yield of a tax may also go up on account of an extension of its coverage or a revision in the tax rates. Such a characteristic features of a tax related system is referred to as its elasticity. In other words, the elasticity of a tax refers to its responsiveness to steps taken by the tax authorities in increasing the tax yield through an extension of its coverage or through a revision of its tax rates.

Key Words – Buoyancy, Elasticity Taxes, Coefficient, Tax Revenues, National Income

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INTRODUCTION

A good tax system requires a higher degree of responsiveness in respect of tax yield to changes in the national income. This is emphasized more particularly in the developing countries where the government sector is assigned a crucial and greater role in the growth process of the economy. The role can be performed more satisfactorily and efficiently only if the tax revenues are able to finance a major part of the Government expenditure on important development programmes. This necessitates an increasing proportion of the national income to flow continuously into the public treasuries by way of taxes. The tax revenue may change either through the automatic response of the tax yield to changes in National income or through the imposition of new taxes, or through a revision of the tax rates, or through the widening of the tax base of the existing taxes as also through other stringent administrative measures undertaken by the state backed up by a system of stern legal action. Buoyancy of a tax is computed by dividing the percentage change in the actual tax yield by the percentage change in the national income of the country. By removing discretionary effects from the buoyancy coefficient, the elasticity or the built-inflexibility of a tax could be calculated. It is the ratio of a percentage change in the revenues (adjusted for discretionary changes) to the percentage change in the national income of the country. In short, the buoyancy coefficient compares the actual growth of

the tax revenues to a growth in the national income of the country. It helps us in assessing the overall success of the measures undertaken by the government to increase its revenues. The elasticity coefficient on the other hand, indicates the inherent responsiveness of a tax system to changes in the national income of the country. It reflects on the extent to which the revenue potential of a given tax system had been actually realized. In view of this, the present article attempts to examine the elasticity and buoyancy of each one of the items of the taxes of the government of India by adopting the exponential functional form.

MODEL FOR TAX BUOYANCY AND ELASTICITY

The growth in tax revenues in India is conceptualized to have come about on account of both the changes in the National income and also on account of changes in the tax brought about the government of India. Given that the tax parameters are held constant, the response in the tax yield to changes in the national income could be considered as an automatic change. Similarly, the changes in the tax yield resulting out of changes in the tax parameters, namely, tax rates and the expansion of the base, without changes in the National income could be considered as due to discretionary changes. The former measures the elasticity or built-in flexibility of a Tax system. The latter reflects

the outcome of the increase in the revenue through the imposition of new taxes, through revision of the rates in the existing tax structure, or through the widening of the tax bases, through tax amenities, or through strict tax administration and other strict administrative measures. The change in the yield stemming from the combined effects of both the automatic changes and the discretionary changes could be defined as a measure of buoyancy of a tax system. In other words the measure of buoyancy takes into account both the automatic and the discretionary changes in respect of the total tax yield. In order to get the measure of tax elasticity, the effect of the discretionary changes on the tax yield should be separated. For this, the total growth of the tax yield is divided into the automatic effect and the effect due to the discretionary changes.

$$T = t Y \dots\dots\dots (1)$$

By total differentiation, the equation (1) becomes

$$DT = t. dY + Y. dt$$

By discrete approximation

$$1. \quad \Delta T = t. \Delta Y + Y. \Delta t + \Delta t. \Delta Y \dots\dots\dots (2)$$

$$Y. \Delta t + \Delta t. \Delta Y = \text{Discretionary changes,}$$

$$t. \Delta Y = \text{Automatic changes}$$

Where, T = Tax revenue, Y = Income, t = Average tax rate.

The effect of automatic changes on the tax yield alone is the measure of tax elasticity. M.M. Sury (1978) has further decomposed the automatic changes into the expected and the unexpected automatic changes. The reason behind this decomposition is that it is very important to know about the extent of the unexpected changes in the automatic response for effecting discretionary changes through fiscal policies, over and above the expected changes in the automatic response due to the increase in the tax base due to economic of development.

$$t. \Delta Y = t. \Delta Y_E + t. \Delta Y_{UE} \dots\dots\dots (3)$$

Where,

$$t. \Delta Y_E = \text{Expected automatic changes.}$$

$$t. \Delta Y_{UE} = \text{Unexpected automatic changes.}$$

The expected automatic changes will have their influence on the discretionary changes through appropriate fiscal policy while it is not so in the case of unexpected automatic changes.

The buoyancy and elasticity of a tax or a tax system are empirically estimated with the help of the following exponential functional form:

$$T = \alpha Y^\beta e^U \dots\dots\dots (4)$$

Taking logarithms on both sides, the equation (4) becomes in a stochaistic form.

$$\ln T = \ln \alpha + \beta \ln Y + U \dots\dots\dots (5)$$

Where, T refers to the tax yield, Y denotes the national income and U is the disturbance term. The slope coefficient of the model (5), 'b' is the measure of buoyancy of a tax or a tax system.

When the discretionary changes are separated and removed from that of the tax yield (T), the model (5) becomes

$$\ln T^1$$

$$= \ln \alpha + \beta b$$

$$1 \ln Y + U \dots\dots\dots (6)$$

Where, T^1

$= T - Y. \Delta t - \Delta t. \Delta Y$. The slope coefficient of the model (6) β_1 is the measure of the gross elasticity of a tax or the tax system. After removing the effects of both the discretionary changes and the expected automatic changes from the tax yield, the model (5) becomes

$$\ln T'' = \ln \alpha + \beta'' \ln Y + U \dots\dots\dots (7)$$

Where,

$$T'' = T - Y. \Delta t - \Delta t. \Delta Y - t. \Delta Y_E$$

The slope coefficient of the model (T), β'' is the measure of the net elasticity of a tax or a tax system. If the value of 'b' was more than one, the buoyancy or elasticity of a tax or a tax system could be considered as relatively high. If the value of 'b' was less than one, then that of a buoyancy or elasticity of a tax or that of a tax system could be considered as relatively low. The above tax yield models (5 to 7) assume explicitly that both buoyancy and elasticity remain constant over a period of time.

EMPIRICAL RESULTS

The buoyancy and elasticity coefficients have been estimated for five major taxes and for the total of all the taxes of the Central government. The five major taxes included in the study are the Personal income tax, the Corporation tax, the Wealth tax, the central Excise duties, and the Customs duties. The total tax revenue of the Central Government was also considered for purposes of this study. The coefficients were worked out for the three different time periods namely period I [1980-81 to 1990-91], period II [1991-92 to 2001-02] and for period III [1980-81 to 2001-02] namely Pre-reform, Post-

reform and for the whole study period. The results of the buoyancy coefficients obtained through regression models and also the elasticity coefficients have been presented in the Tables.

TABLE 4.1

BUOYANCY AND ELASTICITY COEFFICIENTS FOR DIFFERENT TAXES OF THE CENTRAL GOVERNMENT FOR THE PERIOD I (1980-81 TO 1990-91)

Tax	a(log a)	Buoyancy Coefficient	R ₂	Elasticity	Difference
Income Tax	-4.3393	0.8749	0.8179	0.7365	0.1384
Corporate Tax	-3.2969	0.9062	0.9748	0.8293	0.0769
Wealth Tax	-4.5644	0.7508	0.7451	0.4476	0.3032
Excise Duties	-3.1175	1.0101	0.9949	1.0016	0.0085
Customs Duties	-8.1333	1.3841	0.9790	1.1415	0.2426
Total Tax	-3.6756	1.1184	0.9945	1.1082	0.0102

Source: Compiled by the Researcher

Table 4.1 presents the buoyancy and the elasticity coefficients for the Period I (1980-81 to 1990-91). Table 4.2 gives the buoyancy and the elasticity coefficients for period II (1991-92 to 2001-02); and the buoyancy and the elasticity coefficients for the Period III (1980-81 to 2001-02) have been shown in Table 4.3. The observations relating to the various buoyancy and elasticity coefficients have been made for the different taxes and for the three different periods of time.

PERSONAL INCOME TAX

The buoyancy of the personal income tax during the period I was 0.8749 (Table 4.1) which had implied that a one percent increase in the National income with discretionary changes in the personal income tax levies had resulted in a 0.8749 increase in the revenues from the personal income tax. But elasticity of the personal income tax was observed to be 0.7365. During this period both the buoyancy and the elasticity coefficients have been found to be greater than unity. The difference between the buoyancy and the elasticity coefficients, which worked out to 0.1384, might be attributed to the substantial increases in the personal income tax revenue due to the discretionary measures undertaken by the government. The rate of standard deduction was raised from 30 per cent to 33-1/3 percent of the salary income and the ceiling limit was raised from Rs.10, 000 to Rs. 12,000. This measure was expected to benefit about a million taxpayers. To encourage exports, and to enhance the existing tax concessions, under section 80HHC of the Income Tax Act hundred percent for the export profit was exempted from the payment of income tax fully.

CORPORATE TAX

The buoyancy of the corporate tax was estimated at 0.9062 (Table 4.1) the elasticity coefficient of the corporate tax was found to be 0.8293. This had implied an increase of one per cent in the Gross Domestic Product had led to a 0.8293 percent

increase in the corporate tax after removing the effects of the discretionary changes in the corporate tax. The difference between the buoyancy and the elasticity coefficients was found to be 0.0769, which might be attributed to an increase in the tax rates of the corporate tax.

WEALTH TAX

The buoyancy and elasticity coefficients of the wealth tax during the period 1980-81 to 1990-91 were calculated to be 0.7508 and 0.4476 (Table 4.1) respectively. The difference between the two estimates was 0.3032, which had revealed that the decrease in the wealth tax revenue was due to the discretionary measures. It had also revealed the fact that the wealth tax was the most inelastic and the least buoyant among the various taxes. Buildings used by the company as factory, sites god owns, warehouses, hotel or office space for the purposes of its business or as residential accommodation for its low paid employees had been excluded from net wealth.

EXCISE DUTIES

The elasticity of the excise duties had recorded a buoyancy coefficient of 1.0101 (Table No. 4.1). The elasticity coefficient was found to be 1.0016. The difference between the two estimates was 0.0085, which had revealed that there was a positive impact of the discretionary changes in the rates of excise duties on its revenue yield. It had revealed that both the estimates were found to be less elastic and their effect of the tax system was found to be relatively low. The excise duties have to minimize the effects on inflation, lessen the scope for tax avoidance and evasion, should give a boost to certain selected industries suffering from demand recession, and ensure better utilization of the capacity and investments that have already been created.

CUSTOMS DUTIES

The buoyancy of customs duties was 1.3841 (Table 4.1). The elasticity coefficient for customs duties was 1.1415, which had revealed that a one per cent in the Centre's income had led to a 1.1415 percent increase in the tax revenue. The difference between the buoyancy and the elasticity coefficients was 0.2426, which had implied that the discretionary measures of the government have been effective.

TOTAL OF THE CENTRAL TAXES

The buoyancy of the total of all the taxes was found to be 1.1184 (Table 4.1) during the period 1980-81 to 1990-91. The elasticity coefficient was found to be 1.1082, which had measured the built-in-flexibility of the tax revenue to the Centre's income. The difference between the buoyancy and the elasticity coefficients of the total of the central taxes was 0.0102. It had shown the effective role of the

discretionary changes on the total tax revenue, which was responsible for lowering the buoyancy co-efficient. The customs and excise duties were observed to be fairly buoyant and elastic. The corporation tax was found to be more buoyant and elastic when compared with that of the other taxes. The above analysis reveals that more of tax effort is needed to improve the administration of taxes in the field of the customs duties and in respect of wealth tax.

PERIOD II (1990-91 to 2001-02)

The estimated values of the buoyancy and elasticity coefficient and their differences for the various taxes of the central government for the post reform period 1991-92 to 2001-02 are presented in Table 4.2.

TABLE 4.2

BUOYANCY AND ELASTICITY COEFFICIENTS OF DIFFERENT TAXES OF THE CENTRAL GOVERNMENT DURING THE PERIOD II (1991-92 TO 2001-02)

Tax	a(log a)	Buoyancy Coefficient	R ₂	Elasticity	Difference
Income Tax	-19.8776	2.0280	0.8369	1.9182	0.1098
Corporate Tax	-7.6947	1.2509	0.9886	1.2745	-0.0236
Wealth Tax	14.0661	-0.6505	0.2663	-0.3688	0.2817
Excise Duties	0.2434	0.7489	0.9759	0.7513	-0.0024
Customs Duties	1.3463	0.6505	0.8537	0.5623	0.0882
All Taxes	-6.3121	0.3689	0.0564	0.8433	0.4744

Source: Compiled by the Researcher

PERSONAL INCOME TAX

The buoyancy in respect of personal income tax was found to be 2.0280 (Table 4.2). The elasticity coefficient of the personal income tax was 1.9182, which had indicated that a one per cent increase in the centre's income had led to a 1.9182 per cent increase in the personal income tax. The difference between the two estimates of buoyancy and elasticity coefficients (0.1098) was due to discretionary changes in boosting the yield of the personal income tax. The maximum rate of income tax was brought down to the level of 40 per cent in the budget for 1992-93, and further to the level of 30 per cent in budget for 1997-98. The tax rates have also been reduced. Thus the degree of the progressivity of the Schedule of rates had been considerably reduced. The extraordinarily high tax rates in the past had been highly unrealistic. They had completely failed to reduce the economic disparities. On the contrary, they put a high premium on tax evasion and, in practice, had become a major factor in the growth of the black money in the country.

CORPORATE TAX

The buoyancy of the corporate tax was 1.2509 (Table 4.2). The elasticity coefficient of the corporate tax was 1.274. The difference between the buoyancy and the elasticity coefficient was -0.0236. The difference in the two coefficients reveals the fact that the discretionary tax measures had an insignificant effect in respect of

the corporate tax income in India during this period. The 1996-97 budgets had proposed a Minimum Alternate Tax (MAT) on companies which had escaped from the corporation tax net by using the Income Tax Act provisions of exemptions, deductions, incentives, and differential rates of depreciation in books of accounts and the like. The exemption from MAT was given to companies engaged in the power and the infrastructure sectors, and for the 100 per cent exports oriented units and the like.

WEALTH TAX

The buoyancy of wealth tax was found to be -0.6505, which had disclosed that a one per cent increase in the Gross Domestic Product had resulted in a 0.6505 per cent decline in the revenues from the wealth tax. The value of the elasticity coefficient for the wealth tax during this period was estimated at -0.3688, which had implied that the revenues from the wealth tax had been inelastic and had been the least buoyant tax in India. The difference between the buoyancy and the elasticity coefficients was found to be 0.2817. The budget proposals for 1992-93 had raised the exemption limit for this tax from Rs.2, 50,000 to Rs.15, 00,000 and various exemptions had also been allowed over a period of years. The corrupt direct tax administration might have also colluded with the rich people in helping them to evade the payment of the wealth tax.

EXCISE DUTIES

The buoyancy co-efficient for the excise duties during the period of 1991-92 to 2001-02 was 0.7489 (Table 4.2). The elasticity co-efficient was 0.7513, which had measured the built-in-flexibility of the tax revenue to the changes in income. It is clearly shows that the tax was on excise duties elastic and buoyant. The difference between the two estimates of buoyancy and elasticity coefficients was -0.0024, which had disclosed that the discretionary tax measures had a negative impact on the revenues from the excise duties in India. The reduction of excise duties on some selected items which included the diesel engines, the electronic calculators, the pagers, the cell phone the wood free particle boards and fiber boards and the bricks form fly ash and the like might have resulted in the negative impact on the excise duties.

CUSTOMS DUTIES

The buoyancy of the customs duties was found to be 0.6505 (Table 4.2). The elasticity co-efficient of the customs duties during the period of 1991-92 to 2001-02 was 0.5623. The difference between the two estimates of the coefficient was 0.0882, which had brought out the effective role played by the government by making discretionary changes in the rate of the customs duties. The tax revenues were found to be both elastic and buoyant in respect of the customs duties. The Long Terms Fiscal Policy

(LTFP) announced by the government in December 1985 had aimed at simplifying the tax structure and a move towards moderate rates of taxation. In recent years there had been continuous reduction in the peak rates of customs duties, a substantial reduction in the duties on key raw materials such as steel and chemicals, and a reduction in the customs duties on capital goods to help the domestic capital goods industry and the like.

TOTAL OF ALL CENTRAL TAXES

The buoyancy of the total of all the central taxes was found to be 0.3689 (Table 4.2). The elasticity coefficients were found to be 0.8433, which had measured the built-in flexibility of the tax revenue to the centre's income. The difference between the two estimates was found to be -0.4747, which had shown the ineffective role of the reform measures on the total tax revenues. The wealth tax was responsible for lowering the tax buoyancy co-efficient. The income tax, the corporation tax, and the customs duties were observed to have been fairly buoyant and elastic. The above analysis reveals that the personal income taxes have been largely buoyant and elastic. Further the reform measures taken by the government had resulted in negative influences in respect of collections of tax revenue. This analysis reveals that some more efforts were needed to improve the administration of the tax system in respect of the excise duties the corporate tax and the customs duties.

PERIOD III (1980-81 to 2001-02)

The estimated values of the buoyancy and elasticity coefficients and their differences for the various taxes of the Central Government for the whole period (1980-81 to 2001-02) are presented in Tables 4.3.

TABLE 4.3

BOUANCY AND ELASTICITY COEFFICIENTS OF THE DIFFERENT TAXES OF THE CENTRAL GOVERNMENT FOR THE PERIOD III (1980-81 TO 2001-02)

Tax	a(log a)	Buoyancy Coefficient	R ₂	Elasticity	Difference
Personal Income Tax	-9.5879	1.2941	0.8974	1.2217	0.0724
Corporate Tax	-6.3925	1.1564	0.9902	1.565	-0.0001
Wealth Tax	3.3744	0.1137	0.0465	0.1131	0.0006
Excise Duties	-9.4498	0.8347	0.9907	0.8144	0.0203
Customs Duties	-2.2971	0.9130	0.9463	0.8308	0.0822
All Taxes	0.4311	0.7891	0.6839	0.9190	-0.1299

Source: Compiled by the Researcher.

PERSONAL INCOME TAX

The buoyancy of income tax was 1.2941 Table 4.3. The elasticity coefficient of the income tax was 1.2217, and the difference between buoyancy and elasticity was 0.0724, which had shown that the personal income tax had been buoyant and elastic which could be attributed to the continuous reduction in the tax rate. The high rates of income tax had been responsible for tax evasion and certain deductions

from the gross annual income that were permitted had given more relief to the salaried persons and had improved tax compliance.

CORPORATE TAX

The buoyancy of the corporate tax was found to be 1.1564. The elasticity coefficient for corporate taxes was found to be 1.1565. This had disclosed that the tax was buoyant and elastic. The difference between the buoyancy and the elasticity coefficients was -0.0001. The negative value of the difference between the buoyancy and the elasticity coefficient reveals that there had been unfavorable impact on the corporate tax due to policy measures. The reduction in the corporate tax was aimed at better compliance and to stimulate the growth process, as also to generate multiplier beneficial effects around and also to attract foreign investments.

WEALTH TAX

Wealth tax had recorded a buoyancy of 0.1137, the elasticity coefficient, which measured the built-in flexibility of the tax revenue to a change in income, which was estimated at 0.1131. The difference between buoyancy and the elasticity coefficient was 0.0006 which may be attributed to the ineffective role played in the Government in bringing about changes in the exemption limits to bring about an increase in the total number of assesses and promoting a better tax compliance. The wealth tax rate is now ranging from 0.5 to 2 per cent.

EXCISE DUTIES

Excise duty had a buoyant coefficient of 0.8347. During this period the elasticity coefficient was 0.8144, which was found to be significantly lower than that of the buoyancy coefficient. The difference between the two estimates was 0.0203, which had disclosed the significant role of the government in bringing about tax reform changes in boosting the excise duty yield. Excise duties have been extended to a large number of goods and the duties already levied had been increased.

CUSTOMS DUTIES

Buoyancy and elasticity coefficients for the customs duties during the period 1980-81 to 2001-02 were found to be 0.9130 and 0.8308 respectively. The difference between the estimates was 0.0822. This had revealed the fact that the increase in the customs revenue was due to the long-term fiscal policy adopted in 1985. As import duties were relatively more productive there had been a considerable increase in the revenues from customs duties because of heavy imports of iron and steel, chemicals, drugs and medicines, fertilizers, petroleum products and the like.

ALL THE TOTAL TAXES OF THE CENTRAL GOVERNMENT

The buoyancy of the total tax revenues was found to be 0.7891; the elasticity coefficient was 0.919, which had measured the built in flexibility of the tax revenue to the income of the Centre. The difference between the buoyancy and the elasticity coefficients was - 0.1299. The measures taken by the government had exerted a negative influence on the corporate tax and on the total tax revenues. This had indicated that the reform measures did not have any significant impact on the total revenues. Wealth tax was responsible to a very great extent for lowering the overall level of buoyancy.

CONCLUSION

From the above analysis of buoyancy and elasticity, the income tax, the corporation tax and the excise and the Customs duties had been largely buoyant and elastic. The wealth tax was inelastic and less buoyant. Hence, it could be concluded that greater efforts were needed on the part of the Central Government to improve the administration of the tax system.

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