International Journal of Scientific Research and Management (IJSRM)
||Volume||5||Issue||06||Pages||5560-5568||2017||
Website: www.ijsrm.in ISSN (e): 2321-3418
Index Copernicus value (2015): 57.47 DOI: 10.18535/ijsrm/v5i6.30

Measurement of tax effort in India: An inter-state analysis

Dr. Ummed Singh
Assistant Professor
Department of Economics
University of Rajasthan, Jaipur**.**
Mail Id: drummedsinghuniraj@gmail.com

Abstract
In the wake of fiscal crisis in recent years, most of the state governments have increasingly began to restructure their tax system to seek higher revenue or to improve the taxable capacity or tax efforts to counter balance the ever increasing public expenditures. A proper evaluation of the tax efforts of the states is required for the formulation of suitable and rational criteria for resource transfers from the centre to the states and to encourage the states to mobilize the resources for development plans from their own sources. Therefore, the examination of tax efforts of the states is important because it indicates the extent to which a state has been able to extract the resources out of its capacity. This study aims at estimating tax efforts and taxable capacity of the states in India. This exercise covers 14 major Indian states. Taxable capacity is the predicted tax-to-GDP ratio calculated using the estimated coefficients of a regression specification. In this study, tax ratio is regressed on the two capacity factors, per capita income and percentage of non-agricultural sector income in the state income Tax effort is the index of the ratio between the share of the actual collection to NSDP and the predicted taxable capacity. On the basis of tax effort index, states have been classified into three groups- high tax effort, good tax effort and low tax effort. The states have also been ranked on this basis. The findings of the study indicated that less-developed state like Bihar, Madhya Pradesh, and Rajasthan were raising more than their capacity, while West Bengal, Gujarat, Punjab and Haryana were making lower tax effort, i.e. their tax effort has not been able to sufficiently exploit its estimated tax potential.

Keywords: Taxable capacity, Tax efforts, fiscal performance, Representative Tax System (RTS)

Introduction

Tax assignment in most of the federal form of governments including India is such that the Central government has the assignment of broad based taxes and states have allocation of taxes that are generally confined to their territory. The Constitution gave to the central government the power to levy the most important and productive sources. This seems to have been done for three reasons: the need for a financially strong central government, efficiency in collection and the minimization of undesirable economic effects, and the desirability of enabling the central government to generate a surplus of revenues over its own current needs so that it can make equalizing transfers to the states in need of assistance. State governments on the other hand, have been assigned functions that require larger resources than the tax sources assigned to them, therefore it has created vertical imbalance between the centre and the states. Besides, there is also horizontal imbalance among the states due to differences in the level of development and resource endowments. States do not have equal fiscal capacities. Therefore, to reduce fiscal imbalances, the central government shares some of the taxes with states on the basis of the recommendations of the Finance Commission. However, it has been recognized that the efforts put in by the state in tax revenue collection should also be taken as one of the factors influencing its share in central transfers. This enables the central government to distribute its resources in a fair manner. It encourages the states to put in more effort to utilize their taxable capacity in order to get a bigger share from central transfers and finance it development plan at their own level without giving rise to inflationary trends. The tax performance of a state should be used as a criterion for transfer of

resources from centre to states otherwise laxity in tax efforts may be rewarded. State governments may become reluctant to undertake politically unpleasant task of taxing the public and increasing rely in the transfers from the centre.

In the wake of fiscal crisis in recent years, most of the state Governments have increasingly began to restructure their tax system to seek higher revenue or to improve the taxable capacity or tax efforts to counterbalance the ever increasing public expenditures. some states are excessively dependent on federal transfers, while others resort extensively to overdrafts, which can be attributed either to the failure on the part of the state governments in tapping all the productive sources of revenue or to the fact that a `critical limit' as regards to tax effort as well as taxable capacity has already been reached in the cases of most of the states. Therefore, the examination of tax efforts of the states is important because it indicates the extent to which a state has been able to extract the resources out of its capacity.

Theoretical Framework

The term 'tax effort' is a relative term which shows relationship between actual amount of tax collection and some measure of taxable capacity. Taxable capacity is normally used in two senses, namely, a) the absolute taxable capacity and b) the relative taxable capacity.

Absolute taxable capacity

Absolute taxable capacity is defined as the maximum amount of the tax revenue a country or state can collect by using its own tax bases without producing unpleasant effects. It indicates the proportion of income that can be taken away by the government from people in the form of taxes without producing unfavorable effects, i.e. beyond which productive efforts and efficiency as a whole begins to suffer. The limitation of the concept of taxable capacity is that it does not take into account the effects of government spending during the period of taxation which may increase or decrease the taxable capacity in the subsequent year, because taxable capacity keeps on changing from one time period to another time period.

Relative taxable capacity

Relative taxable capacity on the other hand can be defined as the maximum amount of tax revenue a state can collect relative to other states, i.e. the proportion in which two or more states can contribute, in the form of taxes, in order to meet some common expenditure. It refers to the comparative study of taxable capacity of states. The relative approach of taxable capacity is more appropriate in allocating the burden of taxation on different communities in accordance with their ability to pay. The principle suggests the imposition of tax in such a way that its incidence should be more on persons who have greater taxable capacity and less on persons having lower taxable capacity. If the government knows the relative taxable capacity of different sections of the community then it can collect more taxes in emergencies from those whose taxable capacity is higher. It also acquires significance in a country with federal set up where different states have to contribute to common expenditure according to their relative capacity. In federal countries with large economic disparities among the states, the capacity to raise resources for financing public services would vary across the states, creating what may be called horizontal fiscal imbalance.
It depends upon the size of State Domestic Product (SDP), size and rate of growth of population, distribution of income and wealth, administrative efficiency and other factors.

Methods of measuring tax effort

Tax effort refers to the extent to which the taxable capacity is utilized by the government to raise revenue. Tax ratio depends upon taxable capacity factor as well as tax effort. Further, tax effort has to be distinguished from fiscal effort. Fiscal effort of state refers to the total of tax effort and non-tax effort, thus covering both tax and nontax revenues excluding revenues received from the union government. On the

other hand, tax effort includes only the independent tax revenues of the states. Following methods are in use for measuring the relative tax efforts of countries/states:

(1) Per capita tax revenue approach
(2) Tax - income Ratio approach
(3) Incremental tax approach
(4) Income elasticity approach
(5) Representative Tax System (RTS) approach
(6) Regression approach

Per capita tax revenue is simplest measure of tax effort but it is not satisfactory because it solely dependent upon population of a particular state. Population is not in itself a determinant of tax effort of a particular state; the revenue mopped up by the state government from taxation depends upon the pattern of taxation, and the efficiency and ability of the taxing authorities. This method is considered highly dissatisfactory because it does not relate tax efforts to fiscal capacity. While the general and conventional technique of appraising the tax performance of governments has been on the basis of the variants of ratios of taxes to income. This measure aims at finding out whether states are collecting taxes in proportion to their respective total income or not. This method indirectly assumes that state income determines the tax revenue collected i.e. the state income is the index of the fiscal potential of a state. But this method ignores the factors which are believed to affect taxable capacity, such as size distribution of income, sectoral composition of national output, patterns of govern-mental outlays, extent of urbanization, degree of monetization, etc.

Under incremental tax approach, the ratio between absolute change in tax revenue to the absolute change in state's income ($\Delta T/\Delta Y$) is taken is taken. It lends itself to time series study and has the advantage of giving the information on how much of a given increase in income resulting from planned development is scooped by the additional taxation. From the view point of dynamic fiscal policy for growth, this is very relevant and useful since the objective is to ensure that as large proportion as possible of incremental income is siphoned out to government for capital formation instead of allowing such increases to be spent in consumption.

The tax performance of states measured by regression analysis may not be a sufficient indicator of the ability and willingness of the different states to raise additional resources as it is likely to miss certain important factors. Moreover, the regression analysis does not enable one to evaluate performance of individual state through a period of time. To get an idea about such factors it may be useful to analyze the income elasticity of the state tax structure. The term 'income elasticity' as used here is not in the sense- of elasticity of a static function, but as the ratio of the percentage change in revenue to the percentage change in state income during the period. It thus takes into account the effects of both the changes in rate structure and also base structure on the productivity of taxes. Elasticity is measured using the following equation:

$$E = \frac{\Delta T}{T} \div \frac{\Delta Y}{Y}$$

It is the ratio of percentage change in the tax revenue to percentage change in the income. Where, E stands for income elasticity, ΔT for change in tax revenues, T for tax revenues in the base year, ΔY for change in state income and Y for state income in the base period.

In the RTS approach, the relative taxable capacity is estimated first and then compared with the actual tax revenue for measuring tax effort. The relative taxable capacity is defined as total tax revenue that would be collected if each country applied an identical set of tax rates to selected tax bases. In other words, RTS consists of national average tax rates applied to all commonly used tax or revenue bases. Although, in reality state governments' tax rates and tax bases vary from one jurisdiction to another, in estimating RTS measures, these differences are ignored in order to avoid possible efforts of state governments to manipulate their own policies to influence the policy outcome of fiscal capacity measure. Under this method by estimating the tax revenue that would result from applying a representative set of tax rates to a

representative set of tax base, policy-makers may estimate and compare the relative amounts of revenue that each state could collect from its own sources. To make the comparison among states more meaningful, a common denominator of population is used where the estimated revenues of the RTS is expressed on per capita basis.

All the above methods are based upon an assumption that the state tax revenue is a function of state income only. But in reality there are a large number of factors which may exert significant influence on the taxable capacities of a state. Different empirical studies show that factors like per capita income, sectoral composition of income, degree of urbanization, level of literacy and level of development expenditure etc., have important impact on the taxable capacity. The first two represent the level of income and structure of economy whereas the latter two represent he level of tax base and the level of tax compliance. Regression approach takes into account all these, as it present a more comprehensive picture. Other methods have narrow scope as consider the income to be single determinant of tax effort and they do not consider various other important factors like distribution of income and wealth over states and the sectroral contribution in the economy. If major share of income comes from the agriculture sector in a state then the tax revenue collected may be less and the state is placed at a position of disadvantage. On the other hand, if large proportion of income comes from industry and service sector then that state will be better in terms of taxable capacity.

Literature review

Nambiar and Govinda Rao (1972) employed incremental tax rate, elasticity and regression method for assessing the tax performance of the Indian states. They found differences in the ranks of the state on the basis of these three methods. They found that the backward states as a group contributed more compared to industrial state to the total tax effort of all the state.

Dwivedi (1985) used regression analysis for the purpose of measuring tax effort for the period 1973-76. He classified the states on the basis of overall performances in per capita income and tax ratio covering the entire period under study. K.N. Reddy (1975) examined the relative tax efforts of the states for the period 1962-64 to 1970-72 by using income elasticity, incremental tax rate method and regression method. He found that backward state Bihar was exploiting more tax revenue than it capacity, while industrial state like Gujarat, West Bengal, Andhra Pradesh were making lower tax effort. But many of the explanatory variables included in this study were having the problem of multi-co-linearity between them affecting the reliability of the results.

Objective of the study

A proper evaluation of the tax efforts of the states is required for the formulation of suitable and rational criteria for resource transfers from the centre to the states and to encourage the states to mobilize the resources for development plans from their own sources. Therefore, the examination of tax efforts of the states is important because it indicates the extent to which a state has been able to extract the resources out of its capacity. The present study aims at estimating tax efforts and taxable capacity of the states in India to appraise their relative fiscal capacity in tapping their resources.

Data and Methodology

The study is based on the data pertaining to years 2002 to 2015. The data for the reference period for own tax revenue are sourced from State Finances: A study of Budgets and Handbook of Statistics on State Government Finances published by the Reserve Bank of India and Net State Domestic Product (NSDP) are taken from Central Statistical Organization (CSO).

The tax ratio is regressed on the two taxable capacity factors, per capita NSDP and proportion non-agricultural sector income in the state income (NSDP). For the purpose of measuring the taxable capacity a multiple regression equation of the following form is estimated

$$T/Y = \beta_1 + \beta_2 X_1 + \beta_3 X_2 + e$$

Where T/Y is ratio of own tax revenue to net state domestic product (NSDP), and β_1 is the intercept. X_1 and X_2 are independent variables, where X_1 is state per capita income and X_2 is the percentage share of non-agricultural sector income in the state income. β_2 and β_3 are parameters to be estimated and e is random error term. The taxable capacity ratio for a state is then obtained by plugging the observed values of taxable factors from the individual state into the estimated equation.

The tax effort index (TEI) has been computed by dividing the actual tax ratio by the estimated tax ratio.

$$TEI = T/Y \div E(T/Y)$$

The ratio between actual tax ratio and estimated tax ratio is considered as an indicator of tax effort. A "high tax effort" is the case when a tax effort index is greater than 1 (TEI > 1), implying that the state well utilizes its tax base to increase tax revenues. A "low tax effort" is the case when a tax effort index is below 1 (TEI < 1), showing that the states have relatively substantial scope or potential to raise tax revenues. The tax effort has been computed for 14 major states of India for the two periods. The first period covers 2002-08 and the second 2009-15. For estimating the regression equation, six year averages of the dependent as well as the independent variables have been used to avoid the effect of fortuitous factors on these variables.

Data analysis and Findings

The regression results to estimate the potential tax ratio relating to these two periods are presented in the table 1.

Table 1 Regression results

Period	Per capita income	Share of non-agriculture sector income in state income	R-squared
2002-2008	0.00075*	0.321*	0.621
2009-2015	0.00082**	0.249**	0.509

*show that coefficients are significant at 5 % level and ** significant at 10% level.

The F-test is statistically significant, which means that the model is statistically significant. The coefficients of both independent variables are significant in the first period at 5% level of significance, but they are significant at 10% level during second period. Per capita income and percentage of non-agricultural sector income in the state income explain 62 per cent of the variation in tax ratio in the first period and 51 percent of variation in the second period.

An increase in per capita income by one rupee resulted in 0.075 percentage point increase in tax ratio and an increase of one percentage point in the share of non-agricultural sector income in state's income is associated with an increase of 0.32 percentage point in tax ratio during the first period. Similarly, a one rupee increase in per capita income during the second period led to an increase in tax ratio by 0.08 percentage point and an increase of one percentage point in the share of non-agricultural sector income in state's income resulted in an increase in tax ratio by 0.25 percentage point. From the perusal of table, it is obvious that effect of per capita income is higher during the period 2009-2015. While, the effect of proportion of non-agricultural sector income in state's income is higher in 2002-2008.

Table 2 indicates the actual tax ratio, estimated tax ratio and tax effort index of the states for the reference period. It also shows the ranks of the states on the basis of tax effort index for 2001-2008 and 2009-2015.

It will be seen that the ranking of states on the basis of tax effort index show an interesting picture. The rankings differ vastly in each case. The ranking on the basis of regression analysis is indicative of the gap between tax effort and the estimated tax potential. A high ranking in the regression analysis implies that the particular state has been taxing very near to its potential. Basically, for those who have a lower rank, actual revenue is lesser than total taxable capacity. So, if they want to improve their actual revenue more efforts should be made as compared to other states that have a higher rank.

Maharashtra (8.3) had the highest tax potential while Bihar (5.3) recorded the lowest tax potential during the first period. During the second period Kerala (8.01) had the highest tax potential whereas Uttar Pradesh 6.71) registered the lowest tax potential.

Table 2 Tax Ratio and Tax Effort Index

	2002-2008				2009-2015			
States	**Tax Ratio**	**Estimated Tax Ratio**	**Tax Effort Index**	**Rank**	**Tax Ratio**	**Estimated Tax Ratio**	**Tax Effort Index**	**Rank**
Andhra Pradesh	7.8	7.5	1.04	7	7.9	7.08	1.11	4
Bihar	5	5.3	0.94	10	5.4	6.75	0.80	13
Gujarat	7	7.8	0.89	13	7	7.9	0.89	10
Haryana	8.2	7.9	1.03	8	6.8	7.7	0.88	11
Karnataka	9.6	7.3	1.31	1	9.8	7.4	1.32	1
Kerala	8.1	7.7	1.05	6	8.5	8.01	1.06	6
Madhya Pradesh	7.5	6.0	1.25	2	8.1	6.76	1.20	2
Maharashtra	7.7	8.3	0.92	11	7.2	7.8	0.92	9
Odisha	5.7	6.3	0.90	12	5.8	6.9	0.84	12
Punjab	7	6.8	1.02	9	7.5	7.2	1.04	7
Rajasthan	6.9	5.9	1.16	4	6.5	7.0	0.93	8
Tamil Nadu	9.2	7.8	1.18	3	9.1	7.7	1.18	3
Uttar Pradesh	6.4	5.7	1.12	5	7.4	6.71	1.10	5
West Bengal	4.4	6.7	0.66	14	4.9	7.0	0.70	14

Source: author's calculations**.**

The states are categorized as high tax effort, good tax effort and low tax effort. If TEI > 1, then state is termed as the state having high tax effort. If TEI lies in the range of 0.85 – 0.99 then, state is termed as the state having good tax effort. If TEI < 0.85, then state is termed as the state with low tax effort. Table 3 presents the tax efforts of the states.

On the basis of tax effort index the Karnataka ranked at first place, followed by Madhya Pradesh, Tamil Nadu in both periods. Andhra Pradesh showed remarkable improvement according to this tax performance index. This show that the states placed at higher rank have imposed taxes according to the potential, whereas the states ranked at low level have not been able to mobilize tax revenue according to the potential. The states like Karnataka, Madhya Pradesh, Tamil Nadu and Uttar Pradesh have made commendable efforts to mobilize tax revenue according to their potential. States like Gujarat, Haryana and Odisha are placed at medium level in respect of tax effort. There is need of more serious efforts in these states to tap the tax potential.

During first period nine states have high tax efforts to mobilize their tax potential and four states good tax effort. While in second period, Rajasthan and Haryana slipped from high tax effort category to good tax

efforts. The states with good tax effort in second period are Rajasthan, Maharashtra, Gujarat and Haryana. The state Odisha and Bihar which were in good tax effort category during 2001-2008 slipped to low tax effort during 2009-15. The remaining states used their capacity less intensively because their actual tax ratio is less than their potential tax ratio i.e. tax effort index is lower than one.

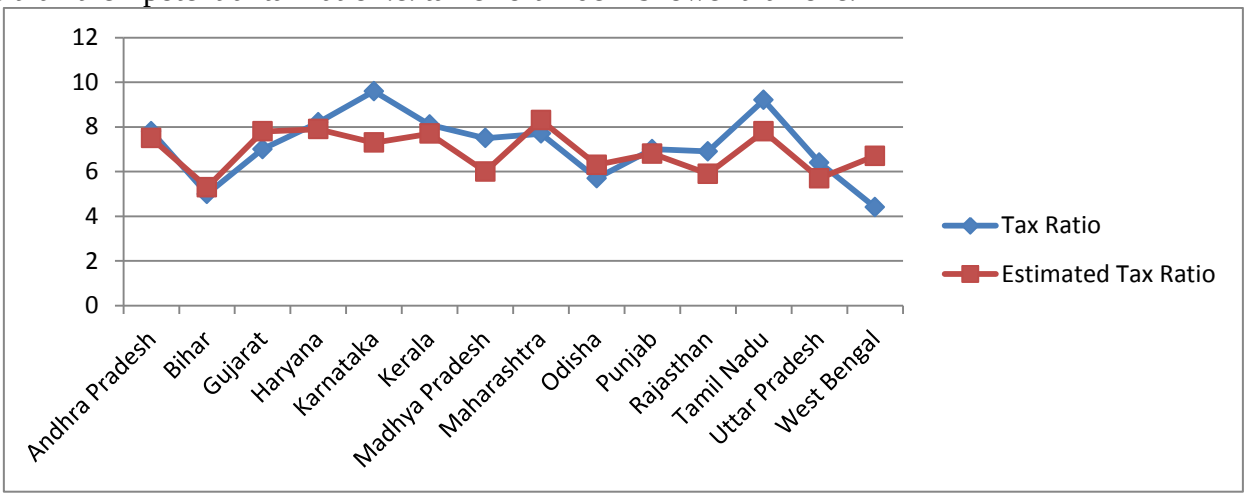

Fig.1 Tax ratio and estimated tax ratio for 2002-2008

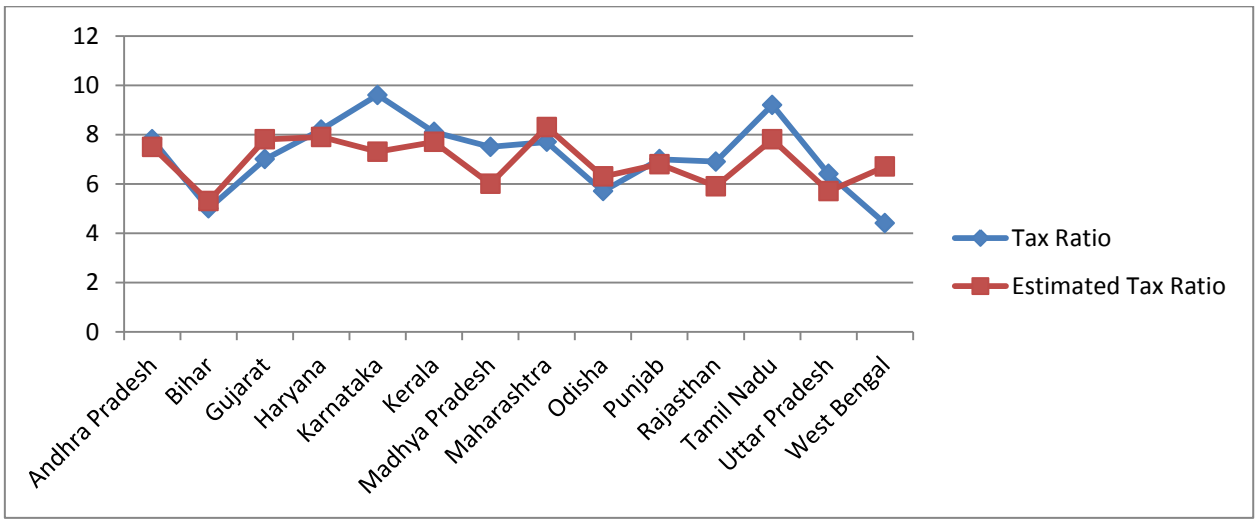

Fig.2 Tax ratio and estimated tax ratio for 2009-2015

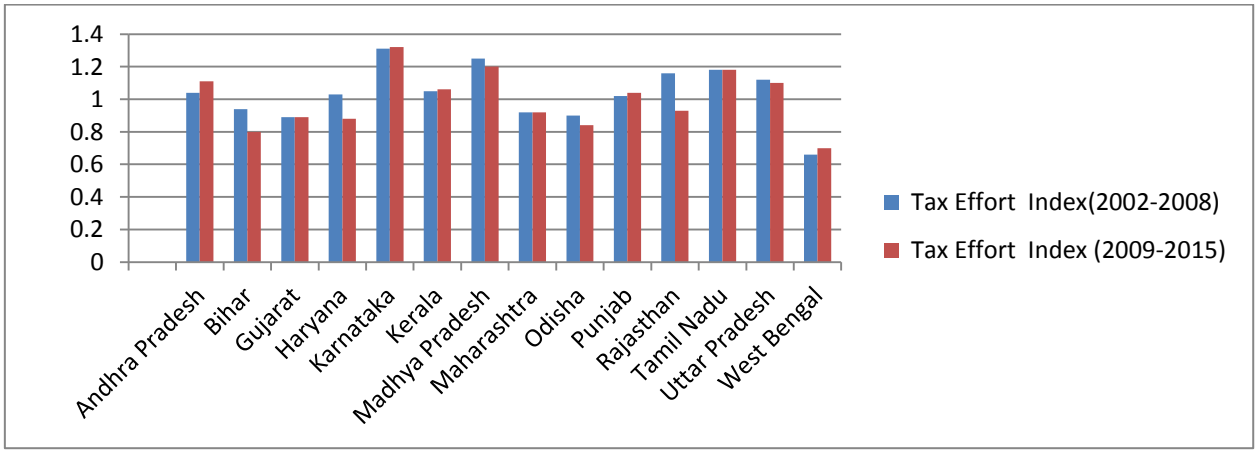

Fig.3 Tax Effort Index

DOI: 10.18535/ijsrm/v5i6.30

Table 3 Inter-state Comparisons of Tax Effort

2001-2008				2009-2015			
A. High Tax Effort (TEI > 1)				**A. High Tax Effort (TEI > 1)**			
S.No.	State	Tax Effort Index	Rank	S.No	State	Tax Effort Index	Rank
1.	Karnataka	1.31	1	1.	Karnataka	1.32	1
2	Madhya Pradesh	1.25	2	2	Madhya Pradesh	1.20	2
3	Tamil Nadu	1.18	3	3	Tamil Nadu	1.18	3
4	Rajasthan	1.16	4	4	Andhra Pradesh	1.11	4
5	Uttar Pradesh	1.12	5	5	Uttar Pradesh	1.10	5
6	Kerala	1.05	6	6	Kerala	1.06	6
7	Andhra Pradesh	1.04	7	7	Punjab	1.04	7
8	Haryana	1.03	8				
9	Punjab	1.02	9				
B. Good Tax Effort (TEI 0.85 to 0.99)				**B. Good Tax Effort (TEI 0.85 to 0.99)**			
1	Bihar	0.94	10	1	Rajasthan	0.93	8
2	Maharashtra	0.92	11	2	Maharashtra	0.92	9
3	Odisha	0.90	12	3	Gujarat	0.89	10
4	Gujarat	0.89	13	4	Haryana	0.88	11
C. Low Tax Effort (TEI < 0.85)				**C. Low Tax Effort (TEI < 0.85)**			
1	West Bengal	0.66	14	1	Odisha	0.84	12
				2	Bihar	0.80	13
				3	West Bengal	0.70	14

Source: Computed from the data collected.

The states with low tax effort are, West Bengal, Odisha and Bihar. While, states Karnataka, Madhya Pradesh and Tamil Nadu maintained the same rank during both the periods. In high tax effort category, Andhra Pradesh and Punjab have improved their tax effort from first to second period.

During the second period (2009-15) Karnataka, Madhya Pradesh, Tamil Nadu, Kerala, Andhra Pradesh, Uttar Pradesh and Punjab made a high tax effort. Rajasthan, Maharashtra, Gujarat and Haryana were in good tax effort category. While for the remaining states the actual tax ratio is less than their potential tax ratio which an indication of a comparatively larger segment of untaxed potential. It is clear from above table that Karnataka has been maintaining high tax efforts during the period of study, while West Bengal made the lowest tax effort.

Conclusion

In the case of Gujarat, Haryana and West Bengal the performance in NSDP has been of a high order but their tax effort has not been able to sufficiently exploit its estimated tax potential. This may be concluded that their inadequate tax performance has been more due to their unwillingness rather than their inability to tax. It implies that richer states are not exerting much in raising their own tax revenues. West Bengal provides the unique case of an industrially advanced state where the segment of untaxed potential seems to be very high as indicated by its low regression ranking. Perhaps in this case, one could say, in a relative sense that the state government has not been putting in adequate efforts. The states like Karnataka, Madhya Pradesh, Tamil Nadu, and Uttar Pradesh have made commendable efforts to mobilize tax revenue according to their potential.

DOI: 10.18535/ijsrm/v5i6.30

References

1. Advisory Commission on Inter-Governmental Relations (1971) "*Measuring the Fiscal Capacity and Effort of State and Local Areas",* Washington DC.
2. Amaresh Bagchi, (1994) "India's Tax Reforms: A Progress Report", Economic and Political Weekly, Vol.XXIX, No.43, October 22, 1994,
3. Atul Sarma, Govinda Rao, M. and Radha Krishna, R., (1973), "*Gujarat's State Tax Revenue: Growth,*Responsiveness, Determinants and Projections*",* Anvesak**,** Vol. 3, no. 1, June.
4. Autar Dhesi, S. and Ghuman, B.S., (1984) "*The Responsiveness of State Taxes: A Comparative Study of Punjab and Haryana",* Indian Economic Review**,** Vol. 19, no. 2.
5. Bahl, R.W., (1971), "A Regression Approach to Tax Effort and Tax Ratio Analysis", IMF Staff Papers, Vol.18, November.
6. Chelliah R.J., Baas H.J., and Kelly M.R. (1975) "Tax Ratios and Tax Effort in Developing Countries, 1969-71" IMF staff Papers, Vol. 22, No. 1, March. 1975.
7. Dwivedi, D.N. (1985) "*On Measurement of Tax Effort of Indian State Governments",* The Indian Economic Journa**l**, Vol.33, No.4.
8. Gupta, Abhijit Sen (2007) "Determinants of Tax Revenue Efforts in Developing Countries," IMF Working Paper, No: WP/07/184 (July).
9. Jain, M.M. (1969), "Income Elasticity of Indian Tax Structure 1955-56 to 1965-66", *Economic and Political Weekly*, Vol. IV, No. 18, pp.769-71.
10. Manjit Kalra, (2001), "*Federal Transfers and Fiscal Capacity of States*", Fiscal Deficit of States in India, (Ed.) Janak Raj Gupta, Atlantic Publishers and Distributors, New Delhi.
11. Naganathan M & Sivagnanam Jothi (1999), Federal transfer and tax efforts of the states in India-The Indian Economic Journal, Vo 47, No. 4.
12. Nambiar, K.V and Govinda Rao (1972) "Tax performance of Major States in India" Economic and Political Weekly, May 20, 1972, Vol. VII, pp.1036-1038.
13. Prest, A. R. (1979) "The Taxable Capacity of a Country." Taxation and Economic Development. London School of Economics and Political Science: London, UK.
14. Purohit, M.C., (1976), *"*Growth and Composition of States' Tax Revenue in India", Artha Vajnana, Vol. 18,No. 2, June.
15. Raja J. Chelliah and Sinha, N.S. (1982), Measurement of Tax Effort of State Governments, Somaiya Publications, New Delhi.
16. Rao, V.G., (1979), The Responsiveness of Indian Tax System, Allied Publishers, New Delhi.
17. Reddy, K.N. (1975), "Inter-State Tax Effort", Economic and Political Weekly, Vol. X, No. 50, pp.1961-67.
18. Sen Tapas K (1998) "Tax administration in India: Motor vehicle tax, NIPFP-December
19. Stephen Howes, Ashok K. Lahiri and Nicholas Stern, (2003) "State Level Reforms in India: Towards More Effective Government", MacMillan India Limited, New Delhi.