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Analysis of Inter-State Tax Effort in India

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Abstract – The study is an attempt to measure and analyze the interstate tax effort and inefficiency in raising the tax revenues of Indian states over the period, 2005 to 2016. In order to measure the tax effort, Between Effect Panel Data model has been used. Further the tax inefficiency of a particular state has been measured as the distance between tax effort index of this state and the index of benchmark state. Through the course of this study it has been emerged that per capita state domestic product, shares of primary and tertiary sectors are the strong determinants of the tax efforts of state governments. Further the results also demonstrate that the states with low per capita income are more efficient in bridging the gap between their actual and potential tax collections than the states with high per capita income.

Key words: Tax Effort, Between Effect Panel Data Model, Indian States.

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1. INTRODUCTION

The question often arises whether there is a scope for an increase in the level of taxation in a country or state as a part of stabilization programs for the mobilization of resources to finance a development program or for other purposes. A relevant consideration in ensuring this question is how the tax of the country or state compares with that of other countries or states in similar circumstances. The task can be accomplished by measuring the tax effort of each state or country. Tax effort is measured by relating actual tax collections to some indicator of taxable capacity. In the empirical literature, considerable attention has been focused on the ratio of tax revenue to national income with some suggesting there is an upper limit to this ratio. This formulation implies that total income is a proper indicator of taxable capacity and that tax effort is measured by the ratio of tax revenue to income. The tax effort can be measured by dividing the actual tax-income ratio by the potential or fitted tax-income ratio. One advantage of this method is that it allows the estimation of tax efficiency or inefficiency of a particular state in raising the tax revenues. The tax inefficiency of a particular state can be defined as the distance of its own tax effort to that of the benchmark state.

The Constitution of India makes a clear division of fiscal power between the Union and State Governments. The principle adopted for this classification is that taxes which have an inter-state base are levied by the Union while those with local base are levied by the States. The residuary powers belong to the Union. The Union taxes are laid down in the list I of Seventh Schedule of the Constitution of India whereas taxes within the jurisdiction of the states are given in list II of the Seventh Schedule of the Constitution. The state own tax revenues (SOTR) can be divided in three broad categories: Taxes on agriculture income (TOI), taxes on property & capital transaction (TPCT), and taxes on commodities and services (TCS). The present paper is an attempt to measure and analyze tax efforts of Indian states over the period from 2005 to 2016.

The rest of the paper is organized as follows. Section 2 reviews the relevant empirical literature on tax effort and taxable capacity. Section 3 discusses the data and methodological aspect of the study. Section 4 analyzes and compares ranks of the various states based on tax effort and tax inefficiency. Finally, section 5 concludes the empirical findings of this chapter.

2. REVIEW OF LITERATURE

There is an extensive volume of empirical literature is available on the tax effort analysis of the Indian states. It is neither necessary nor feasible to review all of these studies, though an attempt has been made to review some important studies on tax effort.

Nambiar and Rao (1972) employed incremental tax rate, elasticity and regression method for assessing the tax performance of the Indian states. They found that the backward states as a group contributed more compared to industrial state to the total tax effort of all the state. 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 its 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. Further, 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.

Jha et al. (1999) identified that for the period 1980-81 to 1992-93, State Domestic Product (SDP) or Gross State Domestic Product (GSDP), proportion of agricultural income to total SDP (AGY), and time-series trend (captured through year or time variable) are the major factors determining own tax capacity of 17 major Indian States. They found a positive relationship between SDP and own tax revenue and a negative relationship between share of agriculture in GSDP and own tax revenue. Further, Garg et al. (2014) found that for the period 1992-93 to 2010-11, per capita real GSDP, share of agriculture in GSDP, literacy rate, labour force, road density and urban Gini (a measure of consumption inequality) influence own tax revenue (as percentage of GSDP) capacity for 14 major Indian states. Except for square of per capita real GSDP and share of agriculture in GSDP, all other independent variables have positive and significant relationship with own tax revenue collection of the states. Karnik and Raju (2015) found that for the period 2000-01 to 2010-11, sectoral share of manufacturing in GSDP and annual per capita consumption expenditure are the major determinants for sales tax (as percentage of GSDP) capacity for 17 major Indian states. Both the variables have positive and significant relationship with state's sales tax collection.

3. METHODOLOGY

3.1 Data:

The study is based on the data pertaining to years 2005 to 2016. The data for the reference period for state own tax revenues 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). Excluding the Union Territories from the sample, the study mainly constrained to 27 states of India on which data is readily available.

3.2 Between Effect Panel Data Model:

Generally, tax ratio analysis aims to explain the main determinants of differences in the tax ratio across countries. It uses a stochastic model where T_i is the total tax revenues of state i, Y_i is a proxy for income (GSDP), T_i/Y_i is the tax ratio, X_i (i = 1,…, n) represent various independent variables expected to influence the tax ratio and u_i is the error term:

$$T_i/Y_i = f(X_i, \ldots, X_i, u_i) \qquad (1)$$

Per capita gross state domestic product (PCGSDP), share of agriculture sector and share of tertiary sector are taken as independent variables. Per capita GSDP is supposed to be positively related to tax ratio (T/Y). The share of primary sector is supposed to be negatively related to tax ratio in developing countries like India and reflect a possible degree of tax evasion in this sector. Further, the share of tertiary sector is expected to be positively related to the dependent variable. It is worthy to mention that we have not included the share of secondary sector in the above model in order to avoid the problem of multicollinearity. The decision of taking the share of tertiary sector as an independent variable in place of the share of the secondary sector is also dominated by the fact that the tertiary sector accounts for the approximately 60 percent of the gross national product as compared to the secondary sector which contributes only 25 percent on an average in the national income.

In order to estimate the potential tax revenues of the various states of India, we have taken 27 major states which are sampled over the period of 12 years from 2005 to 2016. Therefore, in aggregate we have a panel of 324 observations. Since we are interested in the interstate variations in the tax effort, therefore the appropriate panel data model which can be applied for estimating the potential tax revenues of the various states is: between effect panel data model. For this purpose, the data is averaged over the period 12 years. The basic model which is estimated for various states, takes the following form:

$$\overline{T_i/Y_i} = B_0 + B_1\overline{X_{1i}} + B_1\overline{X_{2i}} + B_1\overline{X_{3i}} + u_i \qquad (2)$$

Where $\overline{T_i/Y_i}$ average tax ratio of state i, $\overline{X_{1i}}$ = time average of per capita GSDP of state i after taking the logarithms, $\overline{X_{2i}}$ and $\overline{X_{3i}}$ are time averages of the shares of state i.

The tax effort is measured by taking the ratio of actual tax revenues and potential (or estimated) tax revenues.

$$\text{Tax effort} = \frac{\text{Actual}\left(\frac{T}{Y}\right)}{\text{Estimated}\left(\frac{T}{Y}\right)} \qquad (3)$$

The states whose actual tax ratio exceeds the estimated one by the largest percentage was given

the highest tax effort ranking, was given the highest tax effort ranking, and the state whose tax ratio falls short of our estimate by the largest percentage is given the lowest ranking.

Further, tax inefficiencies in raising the tax revenues are also measured the various states. The tax inefficiency of a particular state may be defined as the extent to which the tax effort of this state falls short of the tax effort of the benchmark state. The benchmark state is defined as the state with highest tax effort in the sample.

$$TIE_i = \frac{Tax\ effort_b}{Tax\ effort_i} \qquad (4)$$

Where TIE_i = tax inefficiency of state i, Tax $effort_b$ = tax effort of the benchmark state and Tax $effort_i$ = tax effort of the state i.

4. RESULTS AND DISCUSSION

4.1 Determinants of Tax efforts

Table 1 shows the estimated coefficients of the various determinants of potential tax ratio. The equation (2) is estimated ten times in order to measure the potential ratio for states own tax revenues (SOTR) and various components. Table 1 shows that per capita GSDP is positively related (as it was expected) to the potential tax ratio measured in terms of all taxes levied by the state governments except taxes on income (TOI) and also found statically significant as far as TOI is concerned, per capita GSDP is negatively associated with potential tax ratio. It means that states with high per capita income have relatively low revenues from the taxes on income. This result is consistent to the fact that in India, tax on agriculture income is in the jurisdiction of the state governments and in most of the states with high per capita income like Haryana, Punjab etc., the agriculture income is tax exempted. Further, the share of primary sector in GSDP is negatively related to the all of tax – GSDP ratio (except TOI – GSDP ratio) and found highly significant. It implies that states with relatively high share of primary sector in its total income have low tax ratio which suggest a possible degree of tax evasion in this sector which is consistent with the finding of previous empirical literature. As far as TOI – GSDP ratio is concerned, it is found that share of the primary sector has significant and positive impact on TOI – GSDP ratio. It establishes that fact that states with relatively high share of primary sector in their total income have greater revenues raising potential from the taxes on agriculture income. Another important determinant of the tax ratio is share of the tertiary sector in total income. Table 1 shows that the share of tertiary sector has significant and positive impact on the potential tax income ratio as far as SOTR, TOI, TOPCT, and TOCS. It implies that as the share of tertiary sector increases in the overall economic activity of a particular state, it raises its tax income ratio. Since, a relatively high share of tertiary or service sector in the overall economic activity is the indicator of high level of economic growth and a high level of taxable capacity as well.

Table 1: Determinants of tax effort: Between effects panel data model, 2005 to 2016

Dependent Variable	Independent variables				
	LOG (PCGSDP)	Primary	Tertiary	R^2	Adjusted R^2
SOTR	0.128**	-0.504**	0.420**	0.98	0.96
TOI	-0.506**	0.877**	1.211**	0.735	0.708
TOPCT	0.085**	-0.138*	0.204**	0.951	0.904
TOCS	0.153**	-0.532**	0.325**	0.945	0.940

Source: Author's calculation based on RBI data

Note: ** and * statistically significant at 1% and 5% respectively.

4.2 Analysis of Tax Effort and Tax Inefficiency

Most of the studies analyzed the performance of the various Indian states on the basis of tax ratio (more specifically tax income ratio). One major drawback of the criteria based on tax-income ratio or per capita tax revenues is that they do not take into account the differences in the way each state exploits its taxable capacity. Considering this fact, an attempt has been made to measure the fiscal performance of the states under consideration by making the use of tax effort indices in this paper. Given the set of independent variables as defined in section 3, inter-state tax effort is measured by taking the ratio of the actual and the predicted values of tax ratio. The index constructed in this way is known as tax effort index. A state having the value of tax effort index greater than one, collects considerably more tax revenues that would be expected for a state with its per capita GSDP and other factors affecting the tax revenues. In contrast, if the value of the index is less than one for a state it implies that this particular state's tax revenues are much lower than the amount they would predicted by the equation (2).

Table 2: Tax Effort and Tax Inefficiency Based on SOTR to GSDP Ratio, 2005 to 2016

State	Rank	Tax effort	Tax inefficiency
MADHYA PRADESH	1	1.124	0
MANIPUR	2	1.116	0.711
MEGHALAYA	3	1.114	0.885
GOA	4	1.031	8.307
SIKKIM	5	1.03	8.365
KARNATAKA	6	1.023	8.998
ANDHRA PRADESH	7	1.014	9.783
TRIPURA	8	1.006	10.51
PUNJAB	9	1.002	10.84
UTTARAKHAND	10	1	11.04
HARYANA	11	0.995	11.45
GUJARAT	12	0.992	11.76
TAMIL NADU	13	0.99	11.94
MAHARASHTRA	14	0.989	12.02
JHARKHAND	15	0.987	12.17
WEST BENGAL	16	0.986	12.32
RAJASTHAN	17	0.985	12.41
HIMACHAL PRADESH	18	0.984	12.45
ASSAM	19	0.984	12.49
CHHATTISGARH	20	0.984	12.51
ORISSA	21	0.979	12.93
UTTAR PRADESH	22	0.978	13.03
BIHAR	23	0.977	13.1
JAMMU AND KASHMIR	24	0.961	14.54
ARUNACHAL PRADESH	25	0.952	15.33
KERALA	26	0.892	20.66
NAGALAND	27	0.7	37.75

Source: Author's calculation based on RBI data

Table 2 ranks the various states of India as per their tax efforts. Uttarakhand breaks the states in the two categories: states with high tax effort and states with low tax effort. The value of tax effort index for Uttarakhand is 1 which implies that the actual tax collection of this state is exactly equals its potential tax revenues. Therefore, the tax efforts of Uttarakhand in raising the revenues from its own taxes are at optimum level. There are nine states which are ranked high viz. Madhya Pradesh, Manipur, Meghalaya, Goa, Sikkim, Karnataka, Andhra Pradesh, Tripura, and Punjab. All of these states have the value of tax effort index greater than one, which indicates that these states are collecting considerably high level of tax revenues from the state's own taxes as compared to their potentials. On the other hand, there are 17 states having the value of tax effort index less than one which shows that these states are underperforming in the sense that their tax collections are below their taxable capacity. It means that they can increase their tax revenues to the optimal level by boosting their tax effort.

Apart from the tax effort the Table 2 also demonstrates the tax inefficiencies of the various states for the period 2005 to 2016. The tax inefficiency is the extent to which the tax effort of a state falls short of the tax efforts of the benchmark state. The benchmark state is the state which reported with the highest value of tax effort index in the sample. It is clear from Table 2 that Madhya Pradesh is the benchmark state which secured the highest value of tax effort index (1.124), that is, in case of Madhya Pradesh, the inefficiency is Zero. It means that Madhya Pradesh is 100 percent efficient in collecting the tax revenues as per its taxable capacity. Therefore, the efficiency or inefficiency of other states is measured relative to the Madhya Pradesh. There two states namely Manipur and Meghalaya which are observed with very low level of tax – inefficiency (approximately 1 percent) as compared to the benchmark. In other words, these two states can be considered as efficient as the benchmark. On the other hand, there are two states viz. Kerala and Nagaland which exhibit the very high level of tax inefficiency among the sample. Kerala is approximately 21 percent inefficient is raising the tax revenues as compared to the best practice state. In case of Nagaland, the level of tax – inefficiency is approximately 38 percent which indicates the extremely poor performance of Nagaland in exploiting its taxable capacity. Therefore, it is evident that for these two states, there is a strong need to augment their tax efforts. Further, Table 2 also demonstrates that the inefficiency score of the rest of the state's varies from 8.31 to 15.33 percent.

One important fact which has been emerged from table 2 is that it is not necessary that states having high ranking in terms of tax ratio (SOTR to GSDP ratio) will also have the high ranking in terms of tax efforts. For example, Andhra Pradesh, Kerala, Haryana, Chhattisgarh, and Uttar Pradesh were ranked high in terms of SOTR to GSDP ratio. But in terms of tax effort they are ranked low. Similarly states with low tax ratio like Manipur, Meghalaya and Sikkim are ranked high in terms of tax effort. It means that states with low tax ratio have low taxable capacity. Despite this they are fully exploiting their taxable capacity since their funds fall short of their expenditure needs and therefore, they have to depend more on the transfer from the Centre. The shortage of the finance leads them to boost their tax effort in order to fully exploit their taxable capacity. Contrary to it, the states with high tax ratio have the high taxable capacity. These states can collect a considerable amount of tax revenues to support their expenditure plans even in the situation underutilization of their taxable capacity. Therefore, the states with high tax income ratio lack the incentive to enhance their tax efforts for raising the tax revenues. There are several other factors which affect the taxable capacity of a state but they were not taken into account while measuring the tax performance of the states based on tax – income ratio. Due to this, we cannot establish a unique relationship, between the ranks of a state based on tax ratio and tax effort index.

Table 3: Tax Effort and Tax Inefficiency Based on TOI to GSDP Ratio, 2005 to 2016

State	Rank	Tax effort	Tax inefficiency
CHHATTISGARH	1	2.515	0
KERALA	2	2.116	15.84
MADHYA PRADESH	3	1.388	44.79
ORISSA	4	1.234	50.92
MANIPUR	5	1.219	51.53
ANDHRA PRADESH	6	1.095	56.46
ASSAM	7	1.062	57.76
NAGALAND	8	1.046	58.42
TRIPURA	9	1.01	59.84
WEST BENGAL	10	1.008	59.92
KARNATAKA	11	1.004	60.07
MAHARASHTRA	12	1.004	60.08
SIKKIM	13	0.667	73.48
JHARKHAND	14	0.272	89.18
GUJARAT	15	0.27	89.25
MEGHALAYA	16	0.182	92.76
RAJASTHAN	17	0.002	99.9
TAMIL NADU	18	5E-04	99.98
ARUNACHAL PRADESH	19	0	100
BIHAR	20	0	100
GOA	21	0	100
HARYANA	22	0	100
HIMACHAL PRADESH	23	0	100
JAMMU AND KASHMIR	24	0	100
PUNJAB	25	0	100
UTTAR PRADESH	26	0	100
UTTARAKHAND	27	0	100

Source: Author's calculation based on RBI data

Table 3 shows the inter-state tax effort and tax efficiency based on TOI and GSDP ratio. TOI (Tax on Income) is one of the important sources of revenues of the state governments. It includes the revenues from taxes on agriculture income, profession, trade, callings and employment. Table 3 shows that out of 27 states 12 states are observed with the value of tax effort index greater than one. Among these 12 states, Chhattisgarh is ranked first, which reported with 2.515 value of tax effort index and zero inefficiency in the collection of revenues from the income tax. The inefficiency score of the rest of states which are in the list of top 12 states in terms of tax effort varies between 15.84 and 60.08percent. The remaining 15 states are reported with extremely very low tax effort index. Out of these 15 states, Rajasthan, Tamil Nadu, Arunachal Pradesh, Bihar, Goa, Haryana, Himachal Pradesh, Jammu and Kashmir, Punjab, Uttar Pradesh and Uttarakhand have the value of their tax effort indices equal to zero. It is due to the fact that in these states agriculture income is tax exempted. Some states like Haryana and Punjab have high potential of raising revenues from the tax on agriculture income. But they are reported with zero tax effort due to their tax exemption laws on agriculture income.

Table 4: Tax Effort and Tax Inefficiency Based on TPCT to GSDP Ratio, 2005 to 2016

State	Rank	Tax effort	Tax inefficiency
ARUNACHAL PRADESH	1	5.83	0
SIKKIM	2	1.226	78.97
TRIPURA	3	1.096	81.2
MADHYA PRADESH	4	1.083	81.42
HIMACHAL PRADESH	5	1.034	82.26
PUNJAB	6	1.015	82.59
KARNATAKA	7	1.015	82.59
UTTARAKHAND	8	1.015	82.6
ASSAM	9	1.013	82.62
ANDHRA PRADESH	10	1.011	82.67
WEST BENGAL	11	1.008	82.7
HARYANA	12	1.001	82.84
RAJASTHAN	13	0.994	82.95
MAHARASHTRA	14	0.991	83.01
UTTAR PRADESH	15	0.99	83.03
TAMIL NADU	16	0.989	83.03
CHHATTISGARH	17	0.986	83.09
GUJARAT	18	0.985	83.1
BIHAR	19	0.977	83.24
ORISSA	20	0.974	83.29
JHARKHAND	21	0.973	83.32
GOA	22	0.938	83.92
JAMMU AND KASHMIR	23	0.935	83.95
KERALA	24	0.899	84.58
MEGHALAYA	25	0.514	91.18
NAGALAND	26	0.006	99.89
MANIPUR	27	0.004	99.94

Source: Author's calculation based on RBI data

Table 4 shows the tax effort and tax efficiency based on TPCT and GSDP ratio of the various states of India for the period of 12 years. Arunachal Pradesh is reported with highest tax effort 5.83 among the 27 states as far as TPCT are concerned. Further 11 states viz Sikkim, Tripura, Madhya Pradesh, Himachal Pradesh, Punjab, Karnataka, Uttarakhand, Assam, Andhra Pradesh, West Bengal and Haryana are reported with the tax effort index greater than one. It means that these states are collecting the high revenues from TPCT as compared to their potential. Rests of the states are reported with low tax effort having value less than one. Meghalaya, Manipur and Nagaland are observed with very low values of tax effort index which demonstrates their relative inefficiency in collecting the revenues from TPCT. The inefficiency scores of these three states vary between 91.18 to 99.94 percent.

Table 5: Tax Effort and Tax Inefficiency Based on TCS to GSDP Ratio, 2005 to 2016

State	Rank	Tax effort	Tax inefficiency
MADHYA PRADESH	1	1.117	0
WEST BENGAL	2	1.103	1.212
MEGHALAYA	3	1.095	2.006
MANIPUR	4	1.041	6.83
GOA	5	1.038	7.051
SIKKIM	6	1.03	7.81
KARNATAKA	7	1.022	8.514
ANDHRA PRADESH	8	1.012	9.36
UTTAR PRADESH	9	1.011	9.455
TRIPURA	10	1	10.48
UTTARAKHAND	11	0.996	10.84
GUJARAT	12	0.994	11
PUNJAB	13	0.994	11.03
HARYANA	14	0.992	11.17
JHARKHAND	15	0.99	11.38
MAHARASHTRA	16	0.99	11.4
TAMIL NADU	17	0.99	11.33
CHHATTISGARH	18	0.984	11.9
HIMACHAL PRADESH	19	0.984	11.86
RAJASTHAN	20	0.984	11.92
ASSAM	21	0.982	12.08
ORISSA	22	0.979	12.32
BIHAR	23	0.978	12.44
JAMMU AND KASHMIR	24	0.962	13.84
ARUNACHAL PRADESH	25	0.949	15.05
KERALA	26	0.895	19.85
NAGALAND	27	0.794	28.95

Source: Author's calculation based on RBI data

Table 5 measures and compares the inter-state tax effort in terms of taxes on commodity & services (TCS). TCS constitutes the largest share of states own tax revenues. In 2016, revenues from TCS accounts for 90 percent of SOTR on an average. Therefore, measuring the tax effort in terms of TCS becomes the subject of immense importance. Table 5 shows that Madhya Pradesh is reported with highest tax effort (1.12) followed by West Bengal, Meghalaya, Manipur, Goa, Sikkim, Karnataka, Andhra Pradesh, Uttar Pradesh and Tripura. The tax inefficiency of these states varies with in the range of 10 percent. Kerala and Nagaland are observed as the states with lowest tax effort in collecting the revenues from TCS. In case of Kerala and Nagaland approximately 19.85 and 28.95 percent tax inefficiencies are present respectively. The inefficiency score of the remaining states varies from 10.84 and 15.05 percent as far as TCS is concerned. It is evident from table 4.5 that the amount of variations in the tax inefficiency is not so large.

5. CONCLUSION

In this paper we have attempted to analyze the inter-state tax effort and tax inefficiency in India for the period, 2005 to 2016. The tax effort is measured by taking the ratio of potential tax revenues to actual tax revenues from the various taxes levied by the state governments. In order to measure the potential tax revenues from each of the taxes, we have taken three independent variables: log of per capita gross state domestic product, share of primary and tertiary sector in GSDP. It is found that states with high per capita income have relatively low revenues from the taxes on income. This result is consistent to the fact that in India, tax on agriculture income is in the jurisdiction of the state governments and in most of the states with high per capita income the agriculture income is tax exempted. Further, it is also observed that the states with relatively high share of primary sector in its total income have low tax ratio which suggest a possible degree of tax evasion in this sector which is consistent with the finding of previous empirical literature. The results establish that fact that states with relatively high share of primary sector in their total income have greater revenues raising potential from the taxes on agriculture income. Another important determinant of the tax ratio is share of the tertiary sector in total income, which implies that as the share of tertiary sector increases in the overall economic activity of a particular state, it raises its tax income ratio. Since, a relatively high share of tertiary or service sector in the overall economic activity is the indicator of high level of economic growth and a high level of taxable capacity as well.

One important fact which has been emerged from the above analysis is that the states with high tax income ratio lack the incentive to enhance their tax efforts for raising the tax revenues. There are several other factors which affect the taxable capacity of a state but they were not taken into account while measuring the tax performance of the states based on tax – income ratio. Due to this, we cannot establish a unique relationship, between the ranks of a state based on tax ratio and tax effort index. The tax efforts rankings of various states vary in terms of different taxes collected by the state governments. It implies that a state which is efficient in collecting the revenues from one tax is simultaneously inefficient in collecting the revenues from several other taxes.

REFERENCES

1. Dwivedi, D. N. (1985). On measurement of tax effort of Indian state governments. *The Indian Economic Journal*, 4 (33).

2. Chelliah, R. J., Baas, H. J., & Kelly, M. R. (1975). Tax ratios and tax effort in developing countries, 1969-71. *Staff papers*, *22*(1), pp. 187-205.

3. Greene, W. (2005). Fixed and random effects in stochastic frontier models. *Journal of productivity analysis*, *23*(1), pp. 7-32.

4. Jha, R., Mohanty, M. S., Chatterjee, S., & Chitkara, P. (1999). *Tax efficiency in selected Indian states*.Empirical Economics, 24(4): pp. 641-654.

5. Karnik, A., & Raju, S. (2015). State Fiscal Capacity and Tax Effort: Evidence for Indian States. *South Asian Journal of*

Macroeconomics and Public Finance, *4*(2), pp. 141-177.

6. Nambiar, K.V and Govinda Rao (1972). Tax performance of Major States in India. *Economic and Political Weekly*, 20 (7): pp. 1036-1038.

7. Pal, R., Garg, S., & Goyal, A. (2014). *Why tax effort falls short of capacity in Indian States: A Stochastic frontier approach.* IGIDR Working Paper No: WP-2014-032.

8. Purohit, M. C. (2006). Tax efforts and taxable capacity of central and state governments. *Economic and Political Weekly*, pp. 747-755.

9. Reddy, K. N. (1975). Inter-state tax effort. *Economic and political Weekly*, 50(10): pp. 1916-1924.

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